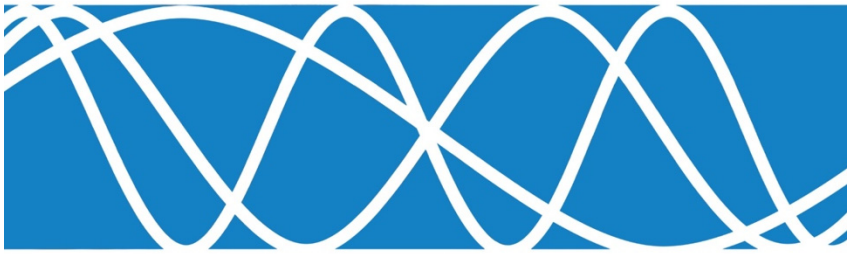
Noise Feasibility Study

Proposed White Church Urban Boundary Expansion Hamilton, ON

December 9, 2024
HGC Project #: 02300361



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Version Control
Project Name/Address

Ver.	Date	Version Description	Prepared By
1.0	December 7, 2023	Noise Feasibility Study	M. Chan
2.0	December 9, 2024	Revised per Urban Boundary Area Expansion Plan	M. Chan

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1 INTRODUCTION & SUMMARY

HGC Noise Vibration Acoustics (HGC) was retained by Whitechurch Landowners Group Inc. to conduct a noise feasibility study for the proposed White Church Urban Boundary Area Expansion. The proposed uses include residential, commercial, institutional and parklands. The lands are located east of Upper James Street, south of Airport Road West, west of Miles Road and north of White Church Road East in Hamilton, Ontario. The surrounding area consists of mainly residential uses. A noise study is required by the municipality as part of the planning and approvals process.

The primary noise sources which require analysis are: road traffic on Airport Road West, Upper James Street and White Church Road East and air traffic from the John C. Munro Hamilton International Airport.

Road traffic information was obtained from the City of Hamilton. The latest air traffic noise contours for the John C. Munro Hamilton International Airport were obtained and reviewed. The data was used to predict future traffic sound levels at the development and were compared to the guidelines of the Ministry of the Environment, Conservation and Parks (MECP).

Design considerations have been provided in the study with respect to traffic noise impact for the various blocks. The sound level predictions indicate that the future road traffic sound levels will exceed the MECP guidelines at blocks closest to Upper James Street, Airport Road and White Church Road. Central air conditioning and upgraded glazing constructions are required for the lots closest to Upper James Street. Forced air ventilation systems with ductwork sized for the future installation of central air conditioning by the occupant and upgraded building façade construction will be required for remaining blocks due to air traffic noise and proximity to the roadways. Noise barriers may be required depending on the location of the amenity spaces relative to the roadways. Warning clauses are required to inform future residents of the potential for road traffic sound level excesses.

When the detailed lotting plans and building locations are available, a Professional Engineer qualified to provide acoustical engineering services in Ontario shall conduct a detailed noise study to review the plans to refine or determine if noise control measures are required (acoustic barriers, ventilation requirements and building façade constructions) for each specific residential block.

For the commercial and school blocks, detailed noise studies shall be completed when building details and rooftop equipment specifications are available to confirm that sound levels associated with these uses will meet the MECP guidelines at neighbouring off-site noise sensitive uses.

2 SITE DESCRIPTION & NOISE SOURCES

Figure 1 is a key plan of the site. Figure 2 is the proposed White Church Urban Boundary Expansion Plan dated October 2024 which shows the traffic noise prediction locations [A] to [E].

The acoustical environment surrounding the site is semi-urban (Class 2) in nature. An aerial imagery is attached as Figure 3. The surrounding lands consist mainly of low rise residential dwellings. Some of those dwellings are also used for commercial purposes. There is a self-storage facility located at the southeast corner of Upper James Street and Airport Road. To the south of the storage facility is the Southern Pines Golf & Country Club.

To the northwest of the site is the John C. Munro Hamilton International Airport. The Noise Exposure Forecast (NEF) contours plan from the Urban Hamilton Official Plan from year 2010 and from the latest NEF contours plan from the 2023-2043 Airport Master Plan were reviewed and attached in Appendix B. These NEF contours are also shown on Figure 2. The northwestern portion of the subject lands are located within NEF contours 25 and 30. Traffic on Upper James Street, Airport Road and White Church Road and air traffic are the dominant noise sources and considered this assessment. Due to low traffic volume, traffic on Miles Road is not considered a significant noise source.

3 CRITERIA

3.1 Road Traffic Noise Criteria

Guidelines for acceptable levels of road and air traffic noise impacting new residential type developments are given in the MECP publication NPC-300, "Environmental Noise Guideline Stationary and Transportation Sources – Approval and Planning" [1], release date October 21, 2013, and are listed in Table 1 below. The values in Table 1 are energy equivalent (average) sound levels (LEQ) in units of A weighted decibels (dBA).

Table 1: MECP Road Traffic Noise Criteria (dBA)

Space	Daytime LEQ (16 hour) Road	Nighttime LEQ(8 hour) Road
Outdoor Living Area	55 dBA	--
Inside Living/Dining Rooms	45 dBA	45 dBA
Inside Bedrooms	45 dBA	40 dBA
General offices, reception areas, retail stores, etc.	50 dBA	--

Daytime references the period between 07:00 and 23:00, while nighttime is defined as the time between 07:00 and 23:00. The term "Outdoor Living Area" (OLA) is used in reference to an outdoor patio, backyard, terrace, or other area where passive recreation is expected to occur. Balconies that measure less than 4 m in depth are not classified as outdoor living areas under MECP guidelines.

The MECP guidelines allow the daytime sound levels in an Outdoor Living Area to be exceeded by up to 5 dBA, without mitigation, if warning clauses are placed in the purchase and rental agreements to the property. Where OLA sound levels exceed 60 dBA, physical mitigation is recommended to reduce the OLA sound level to below 60 dBA and as close to 55 dBA as technically, economically, and administratively feasible.

A central air conditioning system as an alternative means of ventilation to open windows is required for dwellings where nighttime sound levels outside bedroom or living/dining room windows exceed 60 dBA or daytime sound levels outside living/dining room/bedroom windows exceed 65 dBA. Forced-air ventilation with ducts sized to accommodate the future installation of air conditioning is required when nighttime sound levels at bedroom/living/dining room windows are in the range of 51 to 60 dBA or when daytime sound levels at living/dining room/bedroom windows are in the range of 56 to 65 dBA.

Building components such as walls, windows, and doors must be designed to achieve indoor sound level criteria when the plane of window nighttime sound level is greater than 60 dBA or the daytime sound level is greater than 65 dBA due to road traffic noise.

Warning clauses to notify future residents of possible excesses are also required when nighttime sound levels exceed 50 dBA at the plane of the bedroom/living/dining room window and daytime sound levels exceed 55 dBA in the outdoor living area and at the plane of the living/dining room/bedroom window due to road traffic.

The guidelines also provide acceptable indoor sound levels that are extended to land uses and developments which are not normally considered noise sensitive such as offices and schools, etc. The specified values are maximum sound levels and apply to the indicated indoor spaces with the windows and doors closed. The sound level limits for offices and institutional uses are presented as information, for good-practice design objectives.

3.2 Air Traffic Noise Criteria

3.2.1 MECP

Indoor sound limits due to air traffic are also defined in the MECP in publication NPC -300. The maximum allowable Noise Exposure Forecast (NEF) limits are summarized in Table II.

Table 2: Air Traffic Noise Criterion

Area	Daytime NEF	Nighttime NEF
Living/dining/den areas of residences, hospitals, schools, nursing/retirement homes, daycare centres, etc.	5	--
Sleep Quarters (bedrooms)	--	0

The living/dining/family rooms, dens and bedrooms of the proposed dwelling units are the sensitive receptor locations. Typically, washrooms and kitchens are considered noise insensitive areas. There are no outdoor noise criteria for aircraft noise because there is no effective means of mitigation.

For noise sensitive uses located between the NEF 25 and 30, the MECP requires that the dwelling be designed with the provision for central air conditioning. This requirement usually implies forced air ventilation systems with the ducts sized for future installation of central air conditioning. In addition, building components including windows, doors, walls and ceiling/roof must be designed to achieve the indoor sound level criteria. A warning clause is also required in property and tenancy agreements.

For noise sensitive uses located between the NEF 30 and 35, the MECP requires that central air conditioning is mandatory with warning clauses in the property and tenancy agreements. In addition, building components including windows, doors, walls and ceiling/roof must be designed to achieve the indoor sound level criteria in Table II.

There are no specific requirements if the dwellings are located in the area where the NEF/NEP contours are less than 25.

3.2.2 Existing Policies Regarding Air Traffic and Residential Uses

From a land use planning perspective in Ontario, of the greatest importance concerning the development of lands near airports is the "Provincial Policy Statement" (PPS) prepared under the Planning Act by the Ontario Ministry of Municipal Affairs and Housing in 2020. Section 1.6.9.2 of the PPS prescribes that airports shall be protected from incompatible land uses and development by prohibiting new residential development and other sensitive land uses in areas near airports above NEF-30. Section 1.6.9.2 allows infilling of residential and other sensitive land uses in areas above 30 NEF only if it has been demonstrated that there will be no negative impacts on the long-term functioning of the airport.

3.2.3 City of Hamilton

The City of Hamilton's Urban Hamilton Official Plan (UHOP) provides the Airport Influence Area, and in Table C.4.8.1 sets out requirements for development in the vicinity of the airport with regards to the NEF contours. Of relevance to the White Church Urban Boundary Expansion area, all new development of residential and other sensitive land uses, including infill development and redevelopment, shall be prohibited in areas of 28 NEF and greater.

A recent Airport Master Plan was prepared for the Hamilton International Airport by Avia NG Inc. dated November 27, 2023. It is understood that the NEF contours from the Master Plan has yet to be adopted into the UHOP. In the Master Plan addressing "Noise Management", the report recommends maintaining the policy of not permitting new residential development and other sensitive land uses to be developed within areas exposed to noise disturbance levels greater than 28 NEF. This is more stringent than the provincial policies noted above.

The Airport Master Plan further recommends the new NEF contours be adopted into the UHOP but it does not suggest that "the existing NEF contours, as reflected in current policy and planning documentation at the City of Hamilton, be abandoned or replaced immediately with the new NEF contour. The new NEF contours reflect an evolution of the Airport over the long-term and offers compatible land use planning guidance for the City of Hamilton and regional land use planning authorities related to aircraft noise."

4 TRAFFIC NOISE PREDICTIONS

4.1 Traffic Data

4.1.1 Air Traffic

The Composite Noise Exposure Forecast (NEF) Contour Maps for the Hamilton International Airport were reviewed and provided in Appendix B. The 2010 and the Recommended NEF contours from the 2023 Airport Master Plan of NEF 28 and 30 are also shown on the plan in Figure 2. The northwestern portion of the site is located within NEF 25 and 30 contour lines.

The NEF contour map was used to determine the building constructions required for the building components for residential blocks. The MECP indoor noise criteria for aircraft traffic noise was used as a guideline.

4.1.2 Road Traffic

Road traffic data for Airport Road West and Upper James Street was obtained from the City of Hamilton and is provided in Appendix A. Commercial vehicle percentages for Airport Road and Upper James Street were calculated from 8-hour intersection turning counts. The prediction considered traffic that will exist in year 2035, assuming annual traffic growth of 2.5% on all roadways, as required by the MECP. The higher of the AADT from the turning counts or from the Hamilton online database were used. Table 3 summarizes the parameters and traffic volumes used in the traffic noise for assessment.

Table 3: Projected Road Traffic Data for Year 2035

Roadway	AADT	Day / Night Split [%]	Trucks Percentage (%)		Speed Limit [km/h]
			Medium	Heavy	
Airport Road	8 415	90 / 10	3.0	2.0	50
Upper James Street	32 658	90 / 10	2.8	1.7	80
White Church Road East	5 789	90 / 10	2.0	2.0	60

4.2 Road Traffic Noise Predictions

To assess the levels of the road traffic noise, which will impact the study area in the future, sound level predictions were made using STAMSON version 5.04, a computer algorithm developed by the MECP. STAMSON outputs are included in Appendix C.

Sound levels were predicted at ground level in the rear yards (OLA's) during daytime hours to investigate the need for noise barriers. Sound levels were also predicted in the plane of the second or third storey windows during daytime and nighttime hours to investigate ventilation requirements. Since building envelope locations are not yet known, typical building setbacks were used in the analysis. A typical rear yard setback of 7 m, front yard setback of 7 m, exterior side yard setback of 4.5 m and interior side yard setback of 1.2 m were used in the analysis.

The acoustic requirements may change when siting information is known and if orientation/use of the blocks are changed. summarizes the predicted sound levels at each of the sound level prediction locations.

Table 4: Predicted Road Traffic Sound Levels [dBA] Without Mitigation

Location	Description	Daytime – OLA LEQ(16)	Daytime – Façade LEQ(16)	Nighttime – Façade LEQ(8)
A	Residential Block adjacent to Upper James Street	67	70	64
B	Residential Block closest to Upper James Street and Airport Road	67	70	64
C	Residential Block adjacent to Airport Road	60	59	53
D	Residential Block adjacent to White Church Road East	59	59	52
E	Institutional School Block with some exposure to Upper James Street	<55*	59	--

Note: * OLA with some shielding by building

5 DISCUSSION & RECOMMENDATIONS

The sound level predictions indicate that road traffic sound levels exceed MECP criteria during the daytime and nighttime at facades of dwellings with exposure to Airport Road, Upper James Street and White Church Road East. Recommendations for traffic noise are provided below.

5.1 Noise Barrier Requirements

Residential Lots adjacent to Upper James Street

The predicted sound level in the rear yard adjacent to Upper James Street, assuming full exposure, will be up to 67 dBA. As required by the City of Hamilton, to reduce the sound level in the rear yards with full exposure to Upper James Street to 55 dBA, a 5.0 m high noise barrier will be required. Warning clauses are also required to inform future residents of the traffic noise impact. It is recommended that amenity spaces be located on the east of buildings, on the shielded side away from Upper James Street to reduce noise barrier requirements.

Residential Lots adjacent to Airport Road

The predicted sound level in the rear yard adjacent to Airport Road, assuming reverse frontage, will be 60 dBA. MECP Guidelines do not require physical mitigation if sound levels are equal to or less than 60 dBA with the inclusion of a warning clause. As required by the City of Hamilton, to reduce the sound level in the rear yards with full exposure to Airport Road to 55 dBA, a 2.0 m high noise barrier will be required. Warning clauses are also required to inform future residents of the traffic noise impact.

Residential Lots adjacent to White Church Road

The predicted sound level in the rear yard adjacent to White Church Road, assuming reverse frontage, will be 59 dBA. MECP Guidelines do not require physical mitigation if sound levels are less than 60 dBA with the inclusion of a warning clause. As required by the City of Hamilton, to reduce the sound level in the rear yards with full exposure to White Church Road to 55 dBA, a 2.0 m high noise barrier will be required. Warning clauses are also required to inform future residents of the traffic noise impact.

Institutional & School Blocks near White Church Road and Airport Road

If the buildings are to have dedicated outdoor amenity areas, they should be located on the shielded side of the building, away from the roadways to avoid noise barrier requirements.

When siting and grading plan is available, the noise barrier location and height shall be confirmed. The wall component of the barrier should be of a solid construction with a surface density of no less than 20 kg/m2. The walls may be constructed from a variety of materials such as glass, wood, brick, pre-cast concrete or other concrete/wood composite systems provided that it is free of gaps or cracks.

5.2 Ventilation Requirements

Central Air Conditioning

For the noise sensitive uses in residential and commercial blocks adjacent to Upper James Street, the predicted nighttime sound levels outside the windows will be greater than 65 dBA during the daytime hours and greater than 60 dB during the nighttime hours. Central air conditioning will be required for dwellings with direct exposure to Upper James Street.

Provision for the Future Installation of Air Conditioning

The predicted nighttime sound levels outside the second storey bedroom windows of the lots/blocks with exposure to Upper James Street, Airport Road and White Church Road have nighttime sound levels at the plane of the bedroom/living/dining room windows are between 51 and 60 dBA and the daytime sound levels at the plane of the bedroom/living/dining room window are between 56 and 65 dBA. These lots/blocks will require the provision for the future installation of central air conditioning systems. This requirement is typically satisfied through the installation of forced air ventilation systems with the ductwork sized for the future installation of central air conditioning by the occupant.

The future residential lots/blocks between NEF 25 to 30 will also require the provision for the future installation of central air conditionings by the occupant. Since the location of the NEF contours are approximate, it is recommended that all residential lots include forced air ventilation systems with ductwork sized for the future installation of central air conditioning by the occupant.

5.3 Building Façade Constructions

Future road traffic sound levels for the residential blocks adjacent to Upper James Street will exceed 65 dBA during the daytime hours and 60 dBA during the nighttime hours, upgraded exterior building façade constructions will be required. The acoustic insulation factors (AIF) required for road traffic and air traffic must be combined to obtain an overall AIF for some of the lots that also

have exposure to the roadways. The required building components are selected based on the overall AIF value.

To do so, calculations were performed to determine the acoustical insulation factors to maintain indoor sound levels within MECP guidelines. The calculation methods were developed by the National Research Council (NRC). They are based on the predicted future sound levels at the building facades, and the anticipated area ratios of the facade components (walls, windows, roofs and doors) and the floor area of the adjacent room.

a) Residential Blocks adjacent to Upper James Street

Glazing Requirements

The minimum specification for the walls, windows, roofs and doors is Acoustical Insulation Factor, AIF-34 for bedrooms and AIF-33 for living/dining/family rooms. Based on a window to floor area ratio of 25% for bedrooms and 40% for living/dining rooms, minimum STC-34 glazing constructions are required.

Exterior Wall Construction

Any exterior wall construction meeting the Ontario Building Code (OBC) will be acceptable for the dwellings as long as the exterior wall area to room floor area ratio does not exceed 80% for living/dining rooms.

Exterior Doors

Any insulated metal exterior door meeting OBC requirements will be sufficient to provide noise insulation. If patio doors are to be used in the dwellings, they must be included in the window area.

Ceiling/Roof System

A typical ceiling/roof construction consisting of a concrete slab, rigid insulation and built up roofing would provide adequate sound insulation for the buildings.

b) Lots/Blocks between NEF 25-30

Since a portion of the site is located between the 25 to 30 NEF contours for the John C. Munro Hamilton International Airport, air traffic noise must be considered in the building designs over the remainder of the site.

Glazing Requirements

The minimum specification for the walls, windows, roofs and doors is Acoustical Insulation Factor, AIF-30 for bedrooms and living/dining/family rooms. As a minimum, STC-32 window glazing constructions are recommended.

Exterior Wall Construction

Any exterior wall construction meeting the Ontario Building Code (OBC) will be acceptable for the dwellings on lots in the remainder of the development, as long as the exterior wall area to room floor area ratio does not exceed 120%.

Exterior Doors

Any insulated metal exterior door meeting OBC requirements will be sufficient to provide noise insulation. If patio doors are to be used in the dwellings, they must be included in the window area.

Ceiling/Roof System

Sloped roofs with ventilated attics are recommended above all noise sensitive rooms in the dwelling units. Cathedral ceilings or vaulted ceilings are not recommended. If such constructions are desirable, HGC should be contacted to provide recommendations.

Further Analysis

An acoustical consultant should review the plans for the different types of dwellings to be located in the residential portion of the development to ensure that these components will provide adequate sound insulation for the dwelling units. As a general note, if brick exterior facades are used and sloped roofs with

ventilated attics are located above all rooms in the dwelling units, the window requirements will be less stringent

5.4 Warning Clauses

The MECP guidelines recommend that the following warning clauses be included in the property agreements and/or purchase and sale agreements for the dwellings with anticipated traffic sound level excesses. The warning clause Type labels follow the same lettering system outlined MECP NPC-300.

Type A:

Purchasers/tenants are advised that sound levels due to increasing road traffic and air traffic may occasionally 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.

Type B:

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 and air 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."

Type C:

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

Type D:

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

Type E:

Purchasers/tenants are advised that due to the proximity of the adjacent commercial uses, noise from the facilities may at times be audible.

These sample clauses are provided by the MECP as an example and can be modified by the Municipality as required.

6 SUMMARY OF RECOMMENDATIONS

The following recommendations are provided in regard to noise mitigation for traffic noise.

1. Noise barriers may be required for the rear yards of lots/blocks with exposure to Upper James Street, Airport Road and White Church Road. When detailed lotting information and grading information is available, the acoustic barrier heights and locations should be refined. To reduce noise barrier requirements, amenity spaces should be located on the shielded side of the dwelling, away from the roadway.

2. Central air conditioning is required for the residential uses adjacent to Upper James Street. Forced air ventilation with ducts sized to accommodate the future installation of central air conditioning is recommended for all remaining dwelling units in the development.

3. Upgraded building constructions are required for blocks between NEF-25 to NEF-30. When architectural drawings are available, an acoustical consultant should review the drawings and provide revised glazing recommendations based on actual window to floor area ratios.

4. Warning clauses should be used to inform future residents of the traffic noise issues.

5. When siting information is available for the commercial and institutional school blocks, a detailed noise study should be performed to determine any acoustic requirements in accordance with NPC-300.

The reader is referred to the previous sections of this report where these recommendations are discussed in more detail. The following table summarizes the recommendations made in this report.

Table 5: Predicted Road Traffic Sound Levels [dBA] Without Mitigation

Prediction Location or Area	Location	Acoustic Barrier◇	Ventilation	Type of Warning Clause	Minimum Glazing Constructions[1]
A	Residential Block adjacent to Upper James Street	--	Central A/C	A, D, E	STC-33
B	Residential Block with Exposure to Upper James Street and Airport Road	--	Central A/C	A, D, E	STC-34
C	Residential Block adjacent to Airport Road	✓	Forced Air Ventilation	A, B, C	STC-33
D	Residential Block adjacent to White Church Road East	✓	Forced Air Ventilation	A, B, C, E	STC-32
Institutional Blocks	All School Blocks	--	Alternative to Open Windows	A, C (D)	STC-32
All other lands within NEF-25 and NEF-30		--	Forced Air Ventilation	A, C	STC-32
All remaining lands outside of Recommended NEF-25, away from White Church Road		--	Forced Air Ventilation*	A, C*	STC-32*

Notes:
-- no specific requirement
OBC – Ontario Building Code Requirements
◇ Barrier heights should reduce the sound level to less than 60 dBA, as close to 55 dBA as possible depending on the requirements of the municipality. When lot details, building location and grading information are available, the acoustic barrier heights should be refined.
* – Recommended due to proximity of the airport and roadways
1 – Preliminary STC requirements, subject to refinement

6.1 Implementation

To ensure that the noise control recommendations outlined above are properly implemented prior to registration, it is recommended that:

1. When the detailed lot plans are available, a Professional Engineer qualified to provide acoustical engineering services in Ontario shall review them to refine or determine if noise control measures are required (acoustic barriers, ventilation requirements, building façade constructions and warning clauses).

2. When the site plans and architectural plans (elevations and floor plans) are available for the residential blocks adjacent to Upper James Street, a Professional Engineer qualified to provide acoustical engineering services in Ontario shall review them to determine if noise control measures are required (acoustic barriers, ventilation requirements and building façade constructions).

3. When the site plans and architectural plans (elevations and floor/roof plans) are available for the commercial and institutional school blocks, a Professional Engineer qualified to provide acoustical engineering services in Ontario shall conduct a detailed noise study to confirm that that stationary noise sources associated with these uses can meet MECP limits at off-site noise sensitive receptors.

4. Prior to final approval, when dwelling locations and final grades are available, a Professional Engineer qualified to perform acoustical services in the province of Ontario to review the lot plan and grading plans to confirm that the noise barriers as approved have been incorporated for the lots/blocks.

5. Prior to the issuance of occupancy permits for lots/blocks with noise control requirements, or a Professional Engineer qualified to perform acoustical engineer services in the province of Ontario should certify that the noise control measures have been properly incorporated, installed, and constructed, as required.

7 CONCLUSIONS

In summary, HGC has reviewed the White Church Urban Boundary Expansion Plan and performed calculations to determine the traffic noise impact in accordance with MECP guidelines.

The development is feasible from a noise perspective. The results of the road and air traffic noise assessment indicate that noise sensitive land uses will require central air conditioning systems or forced air ventilation systems, noise warning clauses, and upgraded building constructions (exterior walls and windows) as specified in this report. Noise barriers may also be required depending on the location of the amenity spaces with respect to the roadways.

When the detailed lotting plans and building locations are available, a Professional Engineer qualified to provide acoustical engineering services in Ontario shall conduct a detailed noise study to review the plans to refine or determine if noise control measures are required (acoustic barriers, ventilation requirements, building façade constructions and warning clauses) for each specific block.

8 REFERENCES

1. *Ontario Ministry of the Environment, Conservation and Parks, Publication NPC-300, Environmental Noise Guideline – Stationary and Transportation Sources – Approval and Planning, August 2013.*

2. *International Organization for Standardization, Acoustics – Attenuation of Sound during Propagation Outdoors – Part 2: General Method of Calculation, ISO-9613-2, Switzerland, 1996.*

3. *Google Maps Aerial Imagery, Internet application: maps.google.com.*

Figure 1: Key Plan

WHITE CHURCH BOUNDARY EXPANSION AREA

SCALE 1:9000

0 100 200 300 400 500

NOTES:

- Base information prepared by A.T. McLaren Limited
- Aerial Imagery: Google Earth 2023

URBAN SOLUTIONS est.2014 PLANNING & LAND DEVELOPMENT

LEGEND

- SUBJECT LANDS
- RESIDENTIAL
- INSTITUTIONAL
- PARK / OPEN SPACE
- COMMERCIAL
- STORM WATER MANAGEMENT POND
- PIPELINE / TRAIL NETWORK
- NATURAL HERITAGE SYSTEM
- 26m COLLECTOR RIGHT OF WAY
- ARTERIAL RIGHT OF WAY
- CHIPPEWA RAIL TRAIL

LAND USE SCHEDULE

ITEM	AREA (ha)
RESIDENTIAL	249.44
INSTITUTIONAL	7.32
PARK / OPEN SPACE	18.88
COMMERCIAL	16.78
STORM WATER MANAGEMENT POND	18.52
PIPELINE / TRAIL NETWORK	6.59
NATURAL HERITAGE SYSTEM	17.57
RIGHT OF WAY	29.27
TOTAL	364.37

POPULATION

POLICY DOCUMENT	NET DENSITY (UPH)	PEOPLE PER HECTARE	ESTIMATED NUMBER OF UNITS (@ 3.5 PERSON PER UNIT)	ESTIMATED POPULATION
WHITE CHURCH SECONDARY PLAN	22	77	5,488	19,207
PROVINCIAL PLANNING STATEMENT	14	50	3,563	12,472
URBAN HAMILTON OFFICIAL PLAN TARGET	20	70	4,989	17,461

AIRPORT ROAD EAST

COMMERCIAL 16.78 ha

2010 NEF CONTOUR- 30dB

RECOMMENDED NEF CONTOUR - 30dB

2010 NEF CONTOUR- 28dB

RECOMMENDED NEF CONTOUR- 28dB

COMMUNITY PARK 6.37 ha

SWM POND 4.87 ha

PUBLIC ELEMENTARY SCHOOL 2.44 ha

N. PARK 2.50 ha

SIGNIFICANT WOODLAND 5.10 ha

SWM POND 1.72 ha

N. PARK 2.50 ha

NEIGHBOURHOOD PARK 2.50 ha

SIGNIFICANT WOODLAND 12.48 ha

MILES ROAD

UPPER JAMES STREET

SWM POND 1.13 ha

N. PARK 2.50 ha

PUBLIC ELEMENTARY SCHOOL 2.44 ha

N. PARK 2.50 ha

CATHOLIC ELEMENTARY SCHOOL 2.44 ha

SWM POND 4.61 ha

SWM POND 1.88 ha

SWM POND 4.31 ha

EXISTING CHIPPEWA RAIL TRAIL

WHITE CHURCH ROAD EAST

RRIS ROAD

A B C D E

N

Figure 2: Urban Boundary Expansion Plan Showing Traffic Noise Prediction Locations

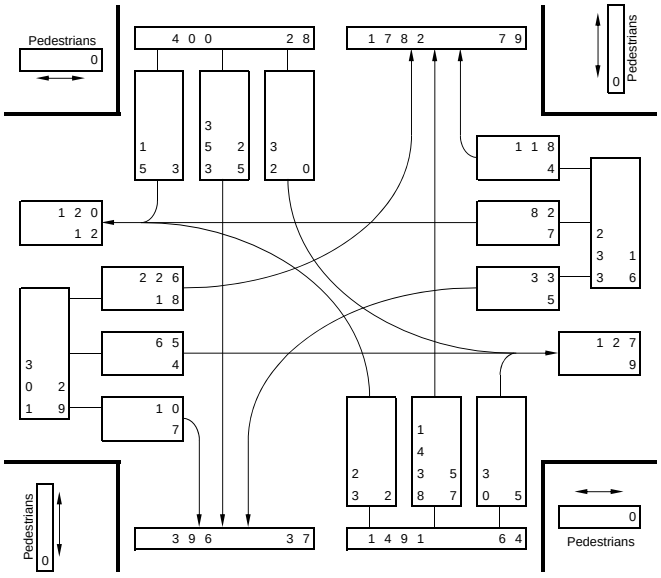
C:\Users\StephenEricksonBACPT\Urban Solutions\Active Projects - Documents\464-22 - Whitechurch Secondary Plan\2 - Drawings\1 - Urbansolutions\Secondary Plan\2024\10. October\464-22 - Boundary Expansion Concept - 2024-10-16.dwg

Figure 3: Aerial Plan

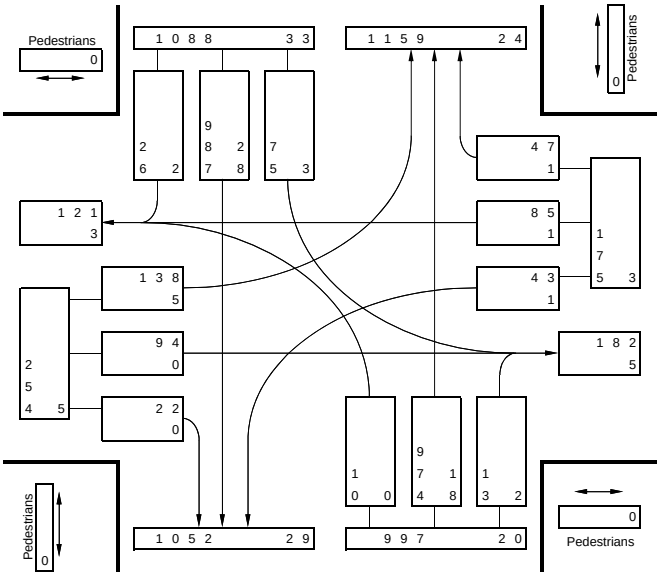
Appendix A
Traffic Data

City of Hamilton **TURNING MOVEMENT FLOW CHART** Loc. Code: 89

Intersection: **Airport Rd** **at** **Upper James St** Total Vehicles: 13,454 Date: Monday
Direction: (East/West) (North/South) M.V.E./Year: 9.560 May 16, 2016
Road Condition: Dry Weather: Clear AWDT Factor: 2.09 Period: 7 hours
Comments:

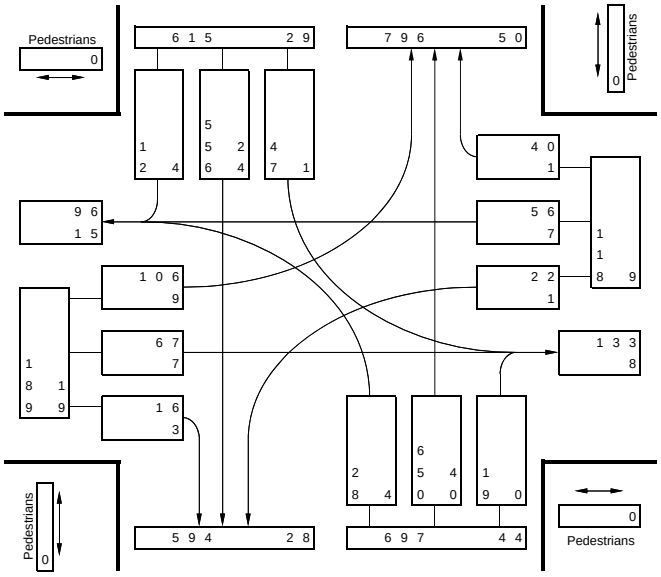


A.M. PEAK HOUR = 7:30 AM - 8:30 AM

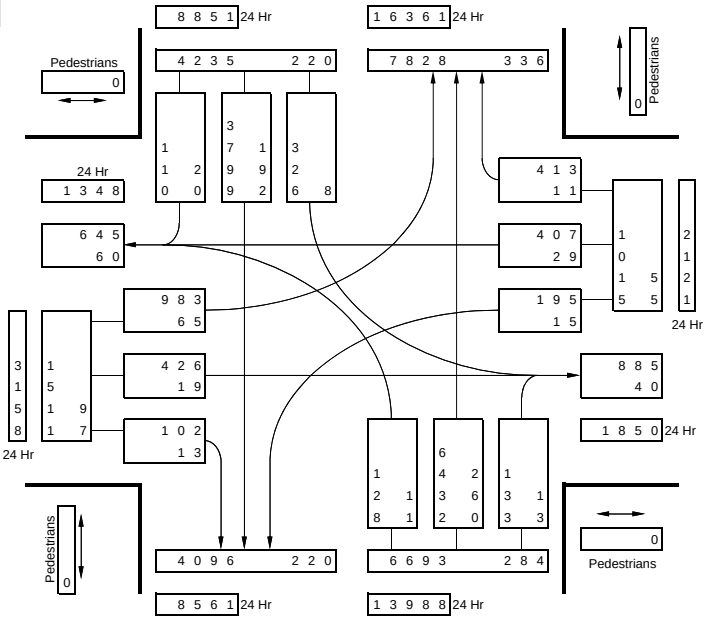


P.M. PEAK HOUR = 5:00 PM - 6:00 PM

N



NORMAL HOUR = 2:30 PM - 3:30 PM



7 Hr & 24 Hr TOTAL VOLUMES

7-Hr Traffic

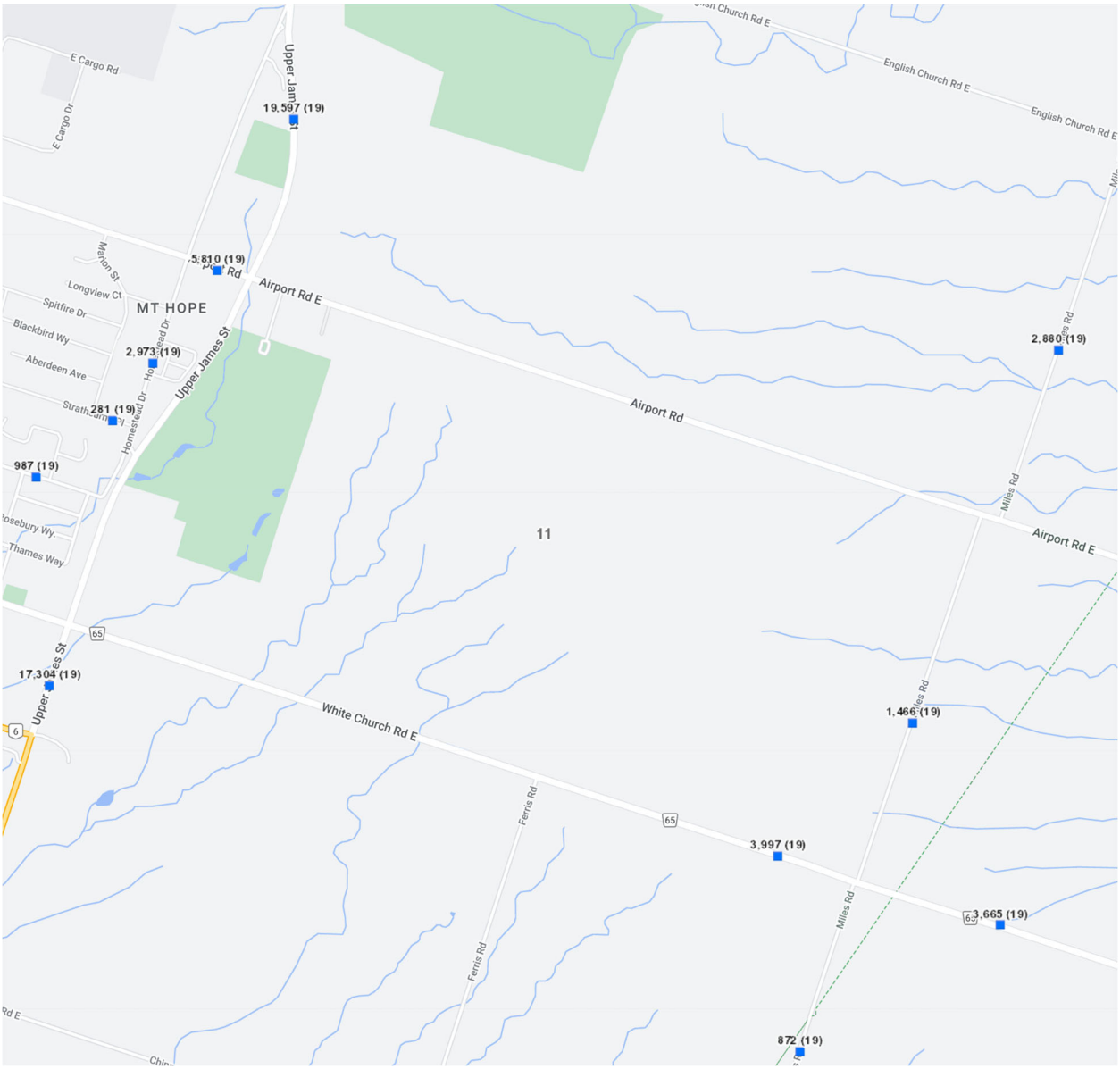
Upper James(South of Airport)
Cars: 4096+6693=10789
Trucks: 220+284=504 4.5%

Airport Rd
Cars: 1015+885=1900
Trucks: 55+40=94 4.9%

24-Hr Traffic

Upper James (South of Airport)
Total: 8561+13988= 22,549

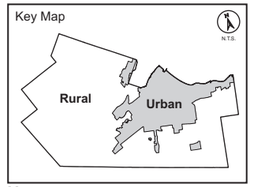
Airport Rd (East of Upper James)
Total: 2121+1850 = 3,971



https://open.hamilton.ca/pages/mapping

Appendix B
Hamilton Airport Noise Exposure Forecast Contours and Information

Key Map



Note: For Rural Noise Exposure Forecast Contours and Primary Zoning Regulation Area Designations, refer to Appendix D of the Rural Hamilton Official Plan.

Legend

- 25 — 2010 NEF Contour
- 28 — 2010 NEF Contour
- 30 — 2010 NEF Contour
- 35 — 2010 NEF Contour
- 40 — 2010 NEF Contour
- Primary Airport Zoning Regulation Area

Other Features

- Rural Area
- John C. Munro Hamilton International Airport
- Niagara Escarpment
- Urban Boundary
- Municipal Boundary
- **Subject to Future OMB Hearing**

Urban Hamilton Official Plan Appendix D

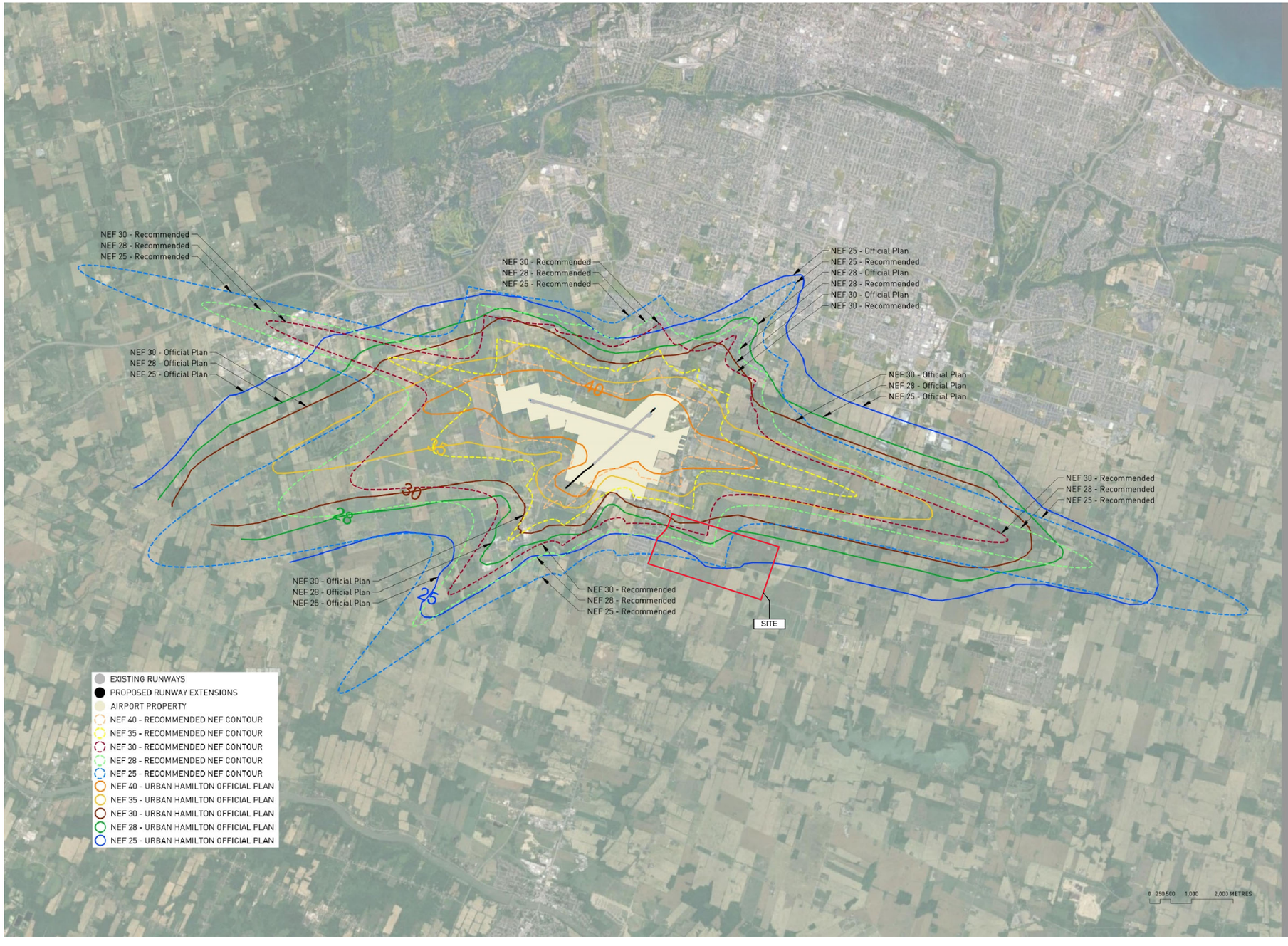
Noise Exposure Forecast Contours and Primary Zoning Regulation Area

Not To Scale

Date: July 9, 2009

Hamilton

PLANNING & ECONOMIC DEVELOPMENT DEPARTMENT


NEF 30 - Recommended
NEF 28 - Recommended
NEF 25 - Recommended
NEF 30 - Official Plan
NEF 28 - Official Plan
NEF 25 - Official Plan
NEF 30 - Recommended
NEF 28 - Recommended
NEF 25 - Recommended
NEF 25 - Official Plan
NEF 25 - Recommended
NEF 28 - Official Plan
NEF 28 - Recommended
NEF 30 - Official Plan
NEF 30 - Recommended
NEF 30 - Official Plan
NEF 28 - Official Plan
NEF 25 - Official Plan
NEF 30 - Recommended
NEF 28 - Recommended
NEF 25 - Recommended
NEF 30 - Official Plan
NEF 28 - Official Plan
NEF 25 - Official Plan
NEF 30 - Recommended
NEF 28 - Recommended
NEF 25 - Recommended
SITE
40
35
30
28
25
EXISTING RUNWAYS
PROPOSED RUNWAY EXTENSIONS
AIRPORT PROPERTY
NEF 40 - RECOMMENDED NEF CONTOUR
NEF 35 - RECOMMENDED NEF CONTOUR
NEF 30 - RECOMMENDED NEF CONTOUR
NEF 28 - RECOMMENDED NEF CONTOUR
NEF 25 - RECOMMENDED NEF CONTOUR
NEF 40 - URBAN HAMILTON OFFICIAL PLAN
NEF 35 - URBAN HAMILTON OFFICIAL PLAN
NEF 30 - URBAN HAMILTON OFFICIAL PLAN
NEF 28 - URBAN HAMILTON OFFICIAL PLAN
NEF 25 - URBAN HAMILTON OFFICIAL PLAN
0 250 500 1,000 2,000 METRES
CYHM
AIRPORT MASTER PLAN 2023-2043
N
W
E
S
AVIA · NG
AIRPORT CONSULTANTS
John C. Munro
HAMILTON
INTERNATIONAL AIRPORT
VANTAGE
AIRPORT GROUP
RECOMMENDED
NEF CONTOURS
EXHIBIT 8-5

Appendix C
Stamson Calculations

```
STAMSON 5.0        NORMAL REPORT        Date: 07-12-2023 17:04:39
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: a.te                  Time Period: Day/Night 16/8 hours
Description: Predicted daytime and nighttime sound levels at upper storey windows for
residential block, location [A]

Road data, segment # 1: UpperJames (day/night)
-----------------------------------------------
Car traffic volume  : 28069/3119  veh/TimePeriod  *
Medium truck volume :   823/91    veh/TimePeriod  *
Heavy truck volume  :   500/56    veh/TimePeriod  *
Posted speed limit  :    80 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

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

    24 hr Traffic Volume (AADT or SADT):  22549
    Percentage of Annual Growth        :   2.50
    Number of Years of Growth          :  15.00
    Medium Truck % of Total Volume     :   2.80
    Heavy Truck  % of Total Volume     :   1.70
    Day (16 hrs) % of Total Volume     :  90.00

Data for Segment # 1: UpperJames (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  :  20.00 / 20.00  m
Receiver height           :  10.50 / 10.50  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

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

Source height = 1.14 m

ROAD (0.00 + 70.43 + 0.00) = 70.43 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90     90   0.40  73.17   0.00  -1.75  -0.98   0.00   0.00   0.00  70.43
-------------------------------------------------------------------------------

Segment Leq : 70.43 dBA

Total Leq All Segments: 70.43 dBA
```

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

Source height = 1.14 m

ROAD (0.00 + 63.91 + 0.00) = 63.91 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90     90   0.40  66.64   0.00  -1.75  -0.98   0.00   0.00   0.00  63.91
-------------------------------------------------------------------------------

Segment Leq : 63.91 dBA

Total Leq All Segments: 63.91 dBA


TOTAL Leq FROM ALL SOURCES (DAY): 70.43
                           (NIGHT): 63.91
```

```
STAMSON 5.0        NORMAL REPORT        Date: 09-12-2024 16:36:19
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: a_ola.te             Time Period: 16 hours
Description: Predicted daytime sound level in the OLAs adjacent to Upper
James Street, typical of Prediction Locations [A} & [B]


Road data, segment # 1: UpperJames
----------------------------------
Car traffic volume  : 28069 veh/TimePeriod  *
Medium truck volume :   823 veh/TimePeriod  *
Heavy truck volume  :   500 veh/TimePeriod  *
Posted speed limit  :    80 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

Data for Segment # 1: UpperJames
--------------------------------
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                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Results segment # 1: UpperJames
--------------------------------

Source height = 1.14 m

ROAD (0.00 + 66.71 + 0.00) = 66.71 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90     90   0.66  73.17   0.00  -5.00  -1.46   0.00   0.00   0.00  66.71
-------------------------------------------------------------------------------

Segment Leq : 66.71 dBA

Total Leq All Segments: 66.71 dBA


TOTAL Leq FROM ALL SOURCES:       66.71
```

```
STAMSON 5.0        NORMAL REPORT        Date: 09-12-2024 16:43:35
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: b.te                  Time Period: Day/Night 16/8 hours
Description: Predicted daytime and nighttime sound levels at upper storey windows for
residential block, location [B]

Road data, segment # 1: Airport (day/night)
-------------------------------------------
Car traffic volume  :  7202/800   veh/TimePeriod  *
Medium truck volume :   227/25    veh/TimePeriod  *
Heavy truck volume  :   144/16    veh/TimePeriod  *
Posted speed limit  :    50 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

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

    24 hr Traffic Volume (AADT or SADT):   5810
    Percentage of Annual Growth        :   2.50
    Number of Years of Growth          :  15.00
    Medium Truck % of Total Volume     :   3.00
    Heavy Truck  % of Total Volume     :   1.90
    Day (16 hrs) % of Total Volume     :  90.00

Data for Segment # 1: Airport (day/night)
-----------------------------------------
Angle1   Angle2           :   0.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  : 255.00 / 255.00 m
Receiver height           :  10.50 / 10.50  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Road data, segment # 2: UpperJames (day/night)
----------------------------------------------
Car traffic volume  : 28069/3119  veh/TimePeriod  *
Medium truck volume :   823/91    veh/TimePeriod  *
Heavy truck volume  :   500/56    veh/TimePeriod  *
Posted speed limit  :    80 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

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

    24 hr Traffic Volume (AADT or SADT):  22549
    Percentage of Annual Growth        :   2.50
    Number of Years of Growth          :  15.00
    Medium Truck % of Total Volume     :   2.80
    Heavy Truck  % of Total Volume     :   1.70
    Day (16 hrs) % of Total Volume     :  90.00

Data for Segment # 2: UpperJames (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  :  20.00 / 20.00  m
Receiver height           :  10.50 / 10.50  m
Topography                :      1       (Flat/gentle slope; no barrier)
```

```
Reference angle           :   0.00

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

Source height = 1.17 m

ROAD (0.00 + 41.76 + 0.00) = 41.76 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
     0     90   0.40  62.97   0.00 -17.22  -3.99   0.00   0.00   0.00  41.76
-------------------------------------------------------------------------------

Segment Leq : 41.76 dBA

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

Source height = 1.14 m

ROAD (0.00 + 70.43 + 0.00) = 70.43 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90     90   0.40  73.17   0.00  -1.75  -0.98   0.00   0.00   0.00  70.43
-------------------------------------------------------------------------------

Segment Leq : 70.43 dBA

Total Leq All Segments: 70.44 dBA

Results segment # 1: Airport (night)
------------------------------------

Source height = 1.17 m

ROAD (0.00 + 35.22 + 0.00) = 35.22 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
     0     90   0.40  56.43   0.00 -17.22  -3.99   0.00   0.00   0.00  35.22
-------------------------------------------------------------------------------

Segment Leq : 35.22 dBA

Results segment # 2: UpperJames (night)
---------------------------------------

Source height = 1.14 m

ROAD (0.00 + 63.91 + 0.00) = 63.91 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90     90   0.40  66.64   0.00  -1.75  -0.98   0.00   0.00   0.00  63.91
-------------------------------------------------------------------------------

Segment Leq : 63.91 dBA

Total Leq All Segments: 63.92 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 70.44
                           (NIGHT): 63.92
```

```
STAMSON 5.0        NORMAL REPORT        Date: 07-12-2023 18:48:28
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: c.te                  Time Period: Day/Night 16/8 hours
Description: Predicted daytime and nighttime sound levels at upper storey windows,
location [C]

Road data, segment # 1: Airport (day/night)
-------------------------------------------
Car traffic volume  :  7194/799   veh/TimePeriod  *
Medium truck volume :   227/25    veh/TimePeriod  *
Heavy truck volume  :   151/17    veh/TimePeriod  *
Posted speed limit  :    50 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)
* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):   5810
    Percentage of Annual Growth        :   2.50
    Number of Years of Growth          :  15.00
    Medium Truck % of Total Volume     :   3.00
    Heavy Truck  % of Total Volume     :   2.00
    Day (16 hrs) % of Total Volume     :  90.00

Data for Segment # 1: Airport (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  :  23.00 / 23.00  m
Receiver height           :   7.50 / 7.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Results segment # 1: Airport (day)
----------------------------------
Source height = 1.19 m

ROAD (0.00 + 59.15 + 0.00) = 59.15 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90     90   0.49  63.07   0.00  -2.76  -1.15   0.00   0.00   0.00  59.15
-------------------------------------------------------------------------------
Segment Leq : 59.15 dBA

Total Leq All Segments: 59.15 dBA

Results segment # 1: Airport (night)
------------------------------------
Source height = 1.19 m

ROAD (0.00 + 52.63 + 0.00) = 52.63 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90     90   0.49  56.55   0.00  -2.76  -1.15   0.00   0.00   0.00  52.63
-------------------------------------------------------------------------------
Segment Leq : 52.63 dBA

Total Leq All Segments: 52.63 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 59.15
                           (NIGHT): 52.63
```

```
STAMSON 5.0        NORMAL REPORT        Date: 07-12-2023 18:48:00
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: c_ola.te             Time Period: 16 hours
Description: Predicted daytime sound level in the rear yard, reverse frontage to
Airport Road, Location [C]

Road data, segment # 1: Airport
-------------------------------
Car traffic volume  :  7194 veh/TimePeriod  *
Medium truck volume :   227 veh/TimePeriod  *
Heavy truck volume  :   151 veh/TimePeriod  *
Posted speed limit  :    50 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

Data for Segment # 1: Airport
-----------------------------
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  :  20.00 m
Receiver height           :   1.50 m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Results segment # 1: Airport
----------------------------

Source height = 1.19 m

ROAD (0.00 + 59.53 + 0.00) = 59.53 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90     90   0.66  63.07   0.00  -2.07  -1.46   0.00   0.00   0.00  59.53
-------------------------------------------------------------------------------

Segment Leq : 59.53 dBA

Total Leq All Segments: 59.53 dBA

TOTAL Leq FROM ALL SOURCES:       59.53
```

```
STAMSON 5.0        NORMAL REPORT        Date: 09-12-2024 16:37:15
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: d.te                  Time Period: Day/Night 16/8 hours
Description: Predicted daytime and nighttime sound levels at upper storey windows for
residential block adjacent to White Church Road East, location [D]

Road data, segment # 1: WhiteChurch (day/night)
-----------------------------------------------
Car traffic volume  :  5002/556   veh/TimePeriod  *
Medium truck volume :   104/12    veh/TimePeriod  *
Heavy truck volume  :   104/12    veh/TimePeriod  *
Posted speed limit  :    60 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)
* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):   3997
    Percentage of Annual Growth        :   2.50
    Number of Years of Growth          :  15.00
    Medium Truck % of Total Volume     :   2.00
    Heavy Truck  % of Total Volume     :   2.00
    Day (16 hrs) % of Total Volume     :  90.00

Data for Segment # 1: WhiteChurch (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  :  23.00 / 23.00  m
Receiver height           :   4.50 / 4.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Results segment # 1: WhiteChurch (day)
--------------------------------------
Source height = 1.19 m

ROAD (0.00 + 58.64 + 0.00) = 58.64 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90     90   0.58  62.89   0.00  -2.93  -1.32   0.00   0.00   0.00  58.64
-------------------------------------------------------------------------------
Segment Leq : 58.64 dBA

Total Leq All Segments: 58.64 dBA

Results segment # 1: WhiteChurch (night)
----------------------------------------
Source height = 1.20 m

ROAD (0.00 + 52.21 + 0.00) = 52.21 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90     90   0.58  56.46   0.00  -2.93  -1.32   0.00   0.00   0.00  52.21
-------------------------------------------------------------------------------
Segment Leq : 52.21 dBA

Total Leq All Segments: 52.21 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 58.64
                           (NIGHT): 52.21
```

```
STAMSON 5.0        NORMAL REPORT        Date: 07-12-2023 18:49:35
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: dola.te              Time Period: 16 hours
Description: Predicted daytime sound level in the rear yard, reverse frontage to
White Church Road, Location [D]

Road data, segment # 1: WhiteChurch
----------------------------------
Car traffic volume  :  5002 veh/TimePeriod  *
Medium truck volume :   104 veh/TimePeriod  *
Heavy truck volume  :   104 veh/TimePeriod  *
Posted speed limit  :    60 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

Data for Segment # 1: WhiteChurch
---------------------------------
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  :  20.00 m
Receiver height           :   1.50 m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Results segment # 1: WhiteChurch
---------------------------------

Source height = 1.19 m

ROAD (0.00 + 59.36 + 0.00) = 59.36 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90     90   0.66  62.89   0.00  -2.07  -1.46   0.00   0.00   0.00  59.36
-------------------------------------------------------------------------------

Segment Leq : 59.36 dBA

Total Leq All Segments: 59.36 dBA


TOTAL Leq FROM ALL SOURCES:       59.36
```

```
STAMSON 5.0        NORMAL REPORT        Date: 09-12-2024 16:39:01
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: e.te                  Time Period: 16 hours
Description: Predicted daytime sound levels at upper storey windows for school block
adjacent to White Church Road East, location [E]


Road data, segment # 1: WhiteChurch
----------------------------------
Car traffic volume  :  5002 veh/TimePeriod  *
Medium truck volume :   104 veh/TimePeriod  *
Heavy truck volume  :   104 veh/TimePeriod  *
Posted speed limit  :    60 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

Data for Segment # 1: WhiteChurch
----------------------------------
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  :  25.00 m
Receiver height           :   7.50 m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Road data, segment # 2: Upper James
----------------------------------
Car traffic volume  : 28069 veh/TimePeriod  *
Medium truck volume :   823 veh/TimePeriod  *
Heavy truck volume  :   500 veh/TimePeriod  *
Posted speed limit  :    80 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

Data for Segment # 2: Upper James
----------------------------------
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  : 200.00 m
Receiver height           :   7.50 m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Results segment # 1: WhiteChurch
----------------------------------

Source height = 1.19 m

ROAD (0.00 + 58.43 + 0.00) = 58.43 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90     90   0.49  62.89   0.00  -3.30  -1.15   0.00   0.00   0.00  58.43
-------------------------------------------------------------------------------

Segment Leq : 58.43 dBA
```

```
Results segment # 2: Upper James
--------------------------------

Source height = 1.14 m

ROAD (0.00 + 52.23 + 0.00) = 52.23 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
     0     90   0.49  73.17   0.00 -16.77  -4.17   0.00   0.00   0.00  52.23
-------------------------------------------------------------------------------

Segment Leq : 52.23 dBA

Total Leq All Segments: 59.36 dBA


TOTAL Leq FROM ALL SOURCES:       59.36
```

```
STAMSON 5.0        NORMAL REPORT        Date: 09-12-2024 16:52:08
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: eola.te              Time Period: 16 hours
Description: Predicted daytime sound level in the amenity of school block adjacent to
White Church Road East, on shielded side of building, Prediction Location [E]


Road data, segment # 1: WhiteChurch
----------------------------------
Car traffic volume  :  5002 veh/TimePeriod  *
Medium truck volume :   104 veh/TimePeriod  *
Heavy truck volume  :   104 veh/TimePeriod  *
Posted speed limit  :    60 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

Data for Segment # 1: WhiteChurch
----------------------------------
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  :  40.00 m
Receiver height           :   1.50 m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -90.00 deg   Angle2 : 90.00 deg
Barrier height            :   8.00 m
Barrier receiver distance :   5.00 m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00

Road data, segment # 2: Upper James
----------------------------------
Car traffic volume  : 28069 veh/TimePeriod  *
Medium truck volume :   823 veh/TimePeriod  *
Heavy truck volume  :   500 veh/TimePeriod  *
Posted speed limit  :    80 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

Data for Segment # 2: Upper James
----------------------------------
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  : 200.00 m
Receiver height           :   1.50 m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00
```

```
Results segment # 1: WhiteChurch
---------------------------------

Source height = 1.19 m

Barrier height for grazing incidence
-------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.19 !        1.50 !        1.46 !         1.46

ROAD (0.00 + 39.92 + 0.00) = 39.92 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90     90   0.19  62.89   0.00  -5.07  -0.51   0.00   0.00 -17.39  39.92
-------------------------------------------------------------------------------

Segment Leq : 39.92 dBA

Results segment # 2: Upper James
---------------------------------

Source height = 1.14 m

ROAD (0.00 + 50.02 + 0.00) = 50.02 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
     0     90   0.66  73.17   0.00 -18.67  -4.47   0.00   0.00   0.00  50.02
-------------------------------------------------------------------------------

Segment Leq : 50.02 dBA

Total Leq All Segments: 50.42 dBA

TOTAL Leq FROM ALL SOURCES:       50.42
```