

# **Noise Feasibility Study**

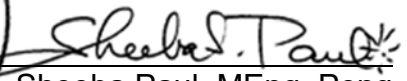
## **Development of Twenty Road West Lands, Upper West Side, Hamilton, Ontario**

Prepared for:

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July 9, 2020

HGC Project Number: 01900453

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## 1 Introduction and Summary

HGC Engineering was retained by Corbett Land Strategies to conduct a noise feasibility study for the Urban Boundary Expansion (UBE) Plans for the Central and Eastern Community Plans in the City of Hamilton. These lands are within the Twenty Road West Lands. The development is located south of Twenty Road, west of Upper James Street, north of Dickenson Road West and east of Glancaster Road. There are some existing residential homes in the area along with some agricultural areas. The John C. Munro Hamilton International Airport is also located to the south of the proposed development on the south side of Dickenson Road. The study is required by the City of Hamilton as part of the approvals process.

This study has been updated to reflect the latest Urban Boundary Expansion plan for the Upper West Side Community. The latest plan prepared by Corbett Land Strategies Inc. is dated 2020-06-04.

Road traffic information for Twenty Road, Upper James Street, Dickenson Road West, Glancaster Road were obtained from the City of Hamilton. Forecasted road traffic volumes to the year 2031 were provided by R.J. Burnside. The latest noise contours for the John C. Munro Hamilton International Airport were obtained. This data was used to predict future traffic sound levels at the locations of the proposed dwelling facades and in outdoor living areas. The predicted sound levels were compared to the guidelines of the Ministry of Environment, Conservation and Parks (MECP) and the City of Hamilton.

Nighttime and daytime sound levels will exceed MECP guideline limits at the bedroom windows and living/dining room windows of dwelling units with exposure to Twenty Road, Glancaster Road and Street B. Forced air ventilation with ducts sized to accommodate the future installation of central air conditioning will be required for many of the lots/blocks adjacent to Twenty Road, Glancaster Road and Street B. Since the residential portion of the site is located between the 25 and 30 NEF/NEP contours of the nearby airport, forced air ventilation systems with ductwork sized for the future installation of central air conditioning system by the occupant will be required for all the residential portions of the site. Noise warning clauses should be used to inform future residents of the road and air traffic sound level excesses.

The predicted daytime sound levels in the rear yards of the lots with backing exposure to Twenty

Road and the hydro right of way will exceed the MECP limits by up to 4 dBA. Since the City of Hamilton requires sound levels to be mitigation to 55 dBA, physical mitigation in the form of noise barriers will be required to address the sound level excesses. The MECP guidelines recommend that warning clauses be used to inform future residents of the traffic noise impacts. When detailed grading, lotting and lot orientation information is available, the acoustic barrier heights should be refined.

## 2 Site Description and Noise Sources

Figure 1 is a key plan indicating the general area of the subject site. The site is situated on the south side of Twenty Road, west of Upper James Street, north of Dickenson Road West, and east of Glancaster Road, in the City of Hamilton. Figure 2 shows the Urban Boundary Expansion (UBE) Plan including the Western UBE, Central UBE and Eastern UBE prepared by Corbett Land Strategies Inc. dated 2020-06-04. The NEF 30 contour line is indicated on this plan. The proposed development will consist of residential lands, natural open space, airport light industrial uses, airport prestige business, and future applications.

There is an existing hydro corridor to the south of Twenty Road. Twenty Road, Dickenson Road and Glancaster Road are two lane roadways (one lane in each direction). Upper James Street is a four lane roadway (2 lanes in each direction with a centre turning lane at the intersections). The grade on the roadways is fairly flat. There are existing residential uses fronting along Glancaster Road, Twenty Road West and Dickenson Road. Along Upper James Street, there are a mix of commercial and residential uses. To the further south of Dickenson Road is the John C. Munro Hamilton International Airport. The residential portion of the site is located between the 25 and 30 Noise Exposure Forecast/Noise Exposure Projection (NEF/NEP) contours (see Figure 3). Air traffic is expected to have an impact on the development site and is considered in the following analysis. There are no stationary industrial sources of sound within 500 m of the site.

### 3 Noise Level Criteria

#### 3.1 Road Traffic

Guidelines for acceptable levels of road and aircraft noise impacting residential developments are given in the MECP publication NPC-300, “Environmental Noise Guidelines – Stationary and Transportation Sources – Approval and Planning”, Part C release date October 21, 2013 and are listed in Table I below. The values in Table I are energy equivalent (average) sound levels [ $L_{EQ}$ ] in units of A weighted decibels [dBA].

**Table I: Road Traffic Noise Criteria**

Area	Daytime $L_{EQ}$ (16 hour) Road	Night-time $L_{EQ}$ (8 hour) Road
Outdoor Living Area	55 dBA	--
Inside Living/Dining Room	45 dBA	45 dBA
Inside Bedroom	45 dBA	40 dBA

The MECP defines daytime hours as the period between 07:00 and 23:00, and nighttime hours between 23:00 and 07:00. The term "Outdoor Living Area" (OLA) is used in reference to an outdoor patio, backyard, terrace, children's playground or other area where passive recreation is expected to occur.

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/living/dining room windows exceed 60 dBA, or where the daytime sound levels outside bedroom/living/dining room windows exceeds 65 dBA. Forced-air ventilation with ducts sized to accommodate the future installation of central air

conditioning is required when nighttime noise levels at bedroom/living/dining room windows are in the range of 51 to 60 dBA, or where the daytime sound levels outside bedroom/living/dining room windows are in the range of 56 to 65 dBA. Building envelope constructions must be specified to achieve the desired interior noise levels when nighttime levels exceed 60 dBA, or the daytime sound levels exceed 65 dBA. The use of warning clauses is also recommended to notify the future residents of possible excesses when outdoor or plane of window criteria or exceeded during either daytime or nighttime periods.

### 3.2 Air Traffic

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 II: Air Traffic Noise Criterion**

Area	Daytime NEF	Nighttime NEF
Living/Dining Room (indoor)	5	--
Bedroom (indoor)	--	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 residential dwellings 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 residential dwellings 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.

According to MECP guidelines, redevelopment of existing residential uses and other sensitive land uses or infilling of residential and other sensitive land uses may be considered above 30 NEF/NEF if it has been demonstrated that there will be no negative impacts on the long term function of the airport. This is subject to implementation of appropriate control measures including a Warning Clause.

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

### **3.2.1 Existing Policies Regarding Air Traffic and Residential Uses**

In the City of Hamilton’s Official Plan, the lands are shown to be within the urban boundary except for a couple of small blocks near Twenty Road. In respect of Schedule F of the Rural Hamilton Official Plan, the lands are within the Airport Influence Area. Schedule F is provided in Appendix C.

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.

Greater detail regarding the assessment of environmental noise for the development of lands near airports is provided in “Environmental Noise Guideline, Stationary and Transportation Sources – Approval and Planning, Publication NPC-300” prepared by the Ontario Ministry of the Environment, Conservation and Parks in 2013. The MECP has no authority under the Planning Act and does not have a direct role in land use planning. Nonetheless, their guidance is consistent with the PPS and is often applied in planning decisions by municipalities and the Land Use Appeal Tribunal (LPAT).

NPC-300 reiterates the policy of requiring an outdoor aircraft noise limit of NEF-30, but goes on to provide indoor limits of NEF-5 and NEF-0 indoors, for living rooms and bedrooms respectively. For dwellings located within the outdoor band from NEF-25 to NEF-30, the MECP requires that these indoor limits are achieved through the proper selection of acoustical insulation. Further, within this band the provision for air-conditioning is required to allow the window and doors to remain closed, and a warning clause is recommended.

The City of Hamilton's Rural Hamilton Official Plan provides the Airport Influence Area, as mentioned above, 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 Twenty Road West Lands, 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.

An Airport Master Plan was prepared for the Hamilton International Airport by Pryde Schropp McComb in May 2011. In Section 6.2.4 of the Master Plan addressing land use planning, the report recommends a 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, despite the fact that the Master Plan indicates in the same section that "City of Hamilton Official Plans should have due regard for recent changes in provincial policy regarding the development of residential and other noise sensitive land uses in the vicinity of airports".

In formulating the Eastern and Central Urban Boundary Expansion Plans, proposed residential uses south of Twenty Road are consistent with the Urban Hamilton Official Plan, Airport Employment Growth District Secondary Plan, Land Use Plan, Map B.8-1 provided in Appendix C of the lands not currently influenced by the airport. The residential portions of the Eastern and Central Urban Boundary Expansions plans are approximately at NEF-28 or less.

As selected areas of the Twenty Road West Lands are developed for residential uses, a careful assessment of the noise impact from aircraft on the interior spaces within the dwellings must be undertaken and noise mitigation, and warning clauses, prescribed. There is little that can be done to



address outdoor noise from the aircraft, but it is certainly feasible to ensure an acceptable indoor noise environment through the proper design of the dwellings.

### Recent Development Applications in the Airport Influence Area

HGC Engineering has assisted with two recent applications within the Airport Influence Area. These are Branthaven Homes development at 80 Marion Street and 9255 Airport Road West to the south of Airport Road and north of Highway 6. Both developments have residential portions of the development up to NEF 30. These are consistent with the MECP NPC-300 guidelines and with the PPE. Both of these residential developments include a detailed review of architectural drawings to ensure appropriate exterior wall, glazing and ceiling constructions to achieve indoor sound level targets in accordance with NPC-300.

Further discussion is provided in Section 5.2 and Section 5.3.

## 4 Traffic Noise Predictions

### 4.1 Road Traffic

Road traffic data for the roadways were obtained from the City of Hamilton in the form of current turning movement counts and from R.J. Burnside in the form of forecasted 2031 data. The higher forecasted 2031 data was used in the analysis. The data is provided in Appendix A.

The following table provides the commercial vehicle percentages and speed used in the analysis.

**Table III: Projected Road Traffic Data to Year 2031**

Road Name	Medium Trucks %	Heavy Trucks %	Speed kph
Glancaster Road	1.3	2.1	60
Twenty Road	0.6	0.9	60
Garth Road	1.2	1.8	50
Street B/Street E	1.2	1.8	50

Table IV summarizes the traffic volume data used in this study.

**Table IV: Projected Road Traffic Data to Year 2031**

Road Name		Cars	Medium Trucks	Heavy Trucks	Total
Twenty Road West	Daytime	23 049	140	211	23 400
	Nighttime	2 561	16	23	2 600
	<b>Total</b>	<b>25 610</b>	<b>156</b>	<b>234</b>	<b>26 000</b>
Glancaster Road	Daytime	9 129	123	198	9 450
	Nighttime	1 014	14	22	1 050
	<b>Total</b>	<b>10 143</b>	<b>137</b>	<b>220</b>	<b>10 500</b>
Garth Road	Daytime	12 659	157	235	13 050
	Nighttime	1 407	17	26	1 450
	<b>Total</b>	<b>14 065</b>	<b>174</b>	<b>261</b>	<b>14 500</b>
Street B (E/W)	Daytime	8 206	102	152	8 460
	Nighttime	912	11	17	940
	<b>Total</b>	<b>9 118</b>	<b>113</b>	<b>169</b>	<b>9 400</b>
Street E (N/S)	Daytime	4 278	53	79	4 410
	Nighttime	475	6	9	490
	<b>Total</b>	<b>4 753</b>	<b>59</b>	<b>88</b>	<b>4 900</b>

The data provided by RJ Burnside is the form of ultimate traffic volumes for a forecasted condition, year 2031. The volumes provided inherently includes the full build out of the area including the internal traffic within the site boundaries from both residential and employment traffic.

Future traffic sound levels were predicted using STAMSON version 5.04, a computer algorithm developed by the MECP. Sample STAMSON output is included in Appendix B. Predictions of the traffic sound levels were made at various locations around the residential portion of the community plans. The results of these predictions are summarized in Table V and Table VI.

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 floor bedroom windows during 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 of the blocks is changed.

**Table V: Predicted Sound Levels Due to Road Traffic [dBA]  
 Central Urban Boundary Expansion Plan**

Prediction Location	Description	Daytime – in OLA, LEQ (16)	Daytime – at Façade, LEQ (16)	Nighttime – at Façade, LEQ (8)
[A]	Lots with backing exposure to Twenty Road	59	59	52
[B]	Lots with backing exposure to Twenty Road	59	59	52
[C]	Lot with backing exposure to Twenty Road	59	59	52
[D]	Lot fronting onto Street B+	--	61	55

Note: + Blocks front onto roadway

**Table VI: Predicted Sound Levels Due to Road Traffic [dBA]  
 Eastern Urban Boundary Expansion Plan**

Prediction Locations	Description	Daytime – in OLA, LEQ (16)	Daytime – at Façade, LEQ (16)	Nighttime – at Façade, LEQ (8)
[E]	Lots with backing exposure to Twenty Road	59	59	52
[F]	Lot with backing exposure to Twenty Road	59	59	52
[G]	Lot with backing exposure to Twenty Road	59	59	52
[H]	Lot with backing exposure to Twenty Road	<55	52	50
[I]	Lot with fronting exposure to Street B+	--	61	55
[J]	Lot with fronting exposure to Street B+	--	61	55

Note: + Blocks front onto roadway

**Table VII: Predicted Sound Levels Due to Road Traffic [dBA]  
 Western Urban Boundary Expansion Plan**

Prediction Locations	Description	Daytime – in OLA, LEQ (16)	Daytime – at Façade, LEQ (16)	Nighttime – at Façade, LEQ (8)
[K]	Lots with fronting exposure to Glancaster Road+	<55	62	56
[L]	Lots with fronting exposure to Glancaster Road and some exposure to Twenty Road+	<55	62	56
[M]	Lots with backing exposure to Twenty Road	59	59	52

Note: + Blocks front onto roadway

## 4.2 Air Traffic

The 2011 Composite Noise Contour Map for the John C. Munro Hamilton International Airport was obtained. This Map indicated that some residential portions of the proposed site are located between the 25 and 30 NEF/NEP contour. Some lots/blocks are outside of the NEF 25 noise contour at the northwest corner of the lands.

The NEF contour map was used to determine the Acoustical Insulation Factors (AIF) required for the building components for the proposed dwellings and mixed use. The Ministry of the Environment, Conservation and Parks (MECP) indoor noise criteria for aircraft traffic noise was used as a guideline.

## 5 Discussion and Recommendations

The predictions indicate that the future traffic sound levels from the adjacent roadways (Twenty Road and Street B) exceed the MECP guidelines. Air traffic does impact the residential portions of the site. Recommendations to address the excesses are discussed below.

### 5.1 Noise Barrier Requirements

#### Lots with Backing Exposure to Twenty Road

The predictions indicate that without any noise control measures in place, the daytime traffic sound levels at the future blocks backing onto the hydro corridor with exposure to Twenty Road will be above the MECP's limit of 55 dBA in outdoor living areas (OLA's) by up to 4 dBA, and will require physical noise mitigation.

Since the City of Hamilton requires minor excesses above 55 dBA to be mitigated, physical mitigation in the form of acoustic barriers will be required. To achieve 55 dBA, acoustic barriers on the order of 2 m in height will be required.

As required by the City of Hamilton, the results are summarized in the following table which summarises the barrier heights that would be required to meet sound levels of 55 to 60 dBA in the OLA's.



**Table VIII: Summary of Barrier Heights Required to Meet 55 to 60 dBA**

Prediction Location	Description	Barrier Height (m)					
		55 dBA	56 dBA	57 dBA	58 dBA	59 dBA	60 dBA
[A]	Lots with backing exposure to Twenty Road	2	--	--	--	--	--
[B]	Lots with backing exposure to Twenty Road	2	--	--	--	--	--
[C]	Lot with backing exposure to Twenty Road and some exposure to Street A	2	--	--	--	--	--
[D]	Lot fronting onto Street B+	--	--	--	--	--	--
[E]	Lots with backing exposure to Twenty Road	2	--	--	--	--	--
[F]	Lot with backing exposure to Twenty Road	2	--	--	--	--	--
[G]	Lot with backing exposure to Twenty Road	2	--	--	--	--	--
[H]	Lot with backing exposure to Twenty Road	--	--	--	--	--	--
[I]	Lot with fronting exposure to Street B+	--	--	--	--	--	--
[J]	Lot with fronting exposure to Street B+	--	--	--	--	--	--
[K]	Lots with fronting exposure to Glancaster Road+	--	--	--	--	--	--
[L]	Lots with fronting exposure to Glancaster Road and some exposure to Twenty Road+	--	--	--	--	--	--
[M]	Lots with backing exposure to Twenty Road	2	--	--	--	--	--

Note: All barrier heights are stated relative to the grade 3 m from the rear façade of the dwelling.  
 -- no specific requirement

The approximate barrier locations are shown in Figure 4. The acoustic barrier requirements should be refined further when detailed grading information and lotting information is available.

The noise barriers can be a combination of an earth berm with an acoustic fence on top. All noise barriers must return back to the dwelling units so that the rear yards are entirely shielded from the major roadways, as shown in Figure 4. The wall component of the barrier may be constructed from a variety of materials such as wood, brick, pre-cast concrete or other concrete/wood composite systems

provided that it is free of gaps or cracks and has a surface density of at least 20 kg/m<sup>2</sup>. All barrier heights are stated relative to the grade 3 m from the rear façade of the dwellings.

### **Commercial/Light Industrial/Prestige Business Blocks**

If large commercial/light industrial/prestige business establishments such as grocery stores or large hardware stores, car washes or auto maintenance garages or industrial uses such as warehousing facilities are proposed, particularly those involving significant trucking activity or rooftop mechanical equipment such as refrigeration condensing units or rooftop cooling towers, or a significant number of loading/unloading bays, individual noise studies should be required by the individual parcel owners, when siting information is available, to ensure that the noise emissions from these facilities complies with MECP guideline limits contained in NPC-300 at the closest sensitive receptors and appropriate mitigation is provided.

## **5.2 Ventilation Requirements**

### **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 Twenty Road, Glancaster Road and Street B 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.

In addition, the remaining lots are located between 25 to 30 NEF contour for John C. Munro Hamilton International Airport and will be impacted by aircraft noise. The 30 NEF noise contour runs east/west of the intersection of Street A and Street C. The future residential lots/blocks between NEF 25 to 30 will 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 in the proposed eastern and central urban boundary expansion plan include forced air

ventilation systems with ductwork sized for the future installation of central air conditioning by the occupant.

## **5.3 Building Facade Constructions**

### **5.3.1 Air Traffic**

Since a portion of the site is located between the 25 to 30 NEF/NEP 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. 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 Twenty Road. 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) Lots/Blocks between NEF 25-30**

##### ***Glazing Requirements***

The minimum specification for the walls, windows, roofs and doors is Acoustical Insulation Factor, AIF-36 for bedrooms and AIF-32 for living/dining/family rooms. Sample glazing constructions for bedrooms are 3/13/3 or 4/6/4 based on a window to floor area ratio of 6% for bedrooms and 20% for living/dining rooms.

##### ***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 100% for living/dining rooms and does not exceed 32% for bedrooms.



**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.

**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.

**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 Engineering should be contacted to provide recommendations.

**Table IX: Summary of Minimum Glazing Requirements**

Area	Location	Maximum Window to Floor Area Ratio	AIF Requirement*	Minimum Glazing Constructions
Lots within NEF25 to 30 (adjacent to major roadways/ collector roads)	Bedrooms	6%	36	3(13)3, 4(6)4
	Living/dining/ family rooms and dens	20%	32	OBC

Note: If these ratios are exceeded, HGC Engineering should be contacted for a revised recommendation.

\* An acoustical consultant should review the plans for the different types of dwellings to be located in the residential portion of the development.

## 5.4 Warning Clauses

The MECP guidelines recommend that warning clauses be included in the property and tenancy agreements for all lots and blocks with anticipated traffic sound level excesses. Examples are provided below.

Suggested wording for future dwellings which have sound level excess in the OLA's but do not require mitigation measures is given below.

Type A:

Purchasers/tenants are advised that sound levels due to increasing road and air traffic may occasionally interfere with some activities of the dwelling unit occupants as the sound levels exceed the sound level limits of the Municipality and the Ministry of the Environment, Conservation and Parks.

Suggested wording for future dwellings with daytime OLA sound levels exceeding the MECP criteria by 6 dB or more, for which physical mitigation has been provided is given below.

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 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, Conservation and Parks.

Suitable wording for future dwellings requiring forced air ventilation systems is given below.

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, Conservation and Parks.

Suitable wording for future dwelling near commercial uses is given below.

Type D:

Purchasers are advised that sound levels due to the proximity of the adjacent commercial facility, sound levels from the commercial facilities may at times be audible.

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

## 6 Summary Of Recommendations

The following list summarizes the recommendations made in this report. Please refer to Figure 4 for more information regarding the locations to which these recommendations apply.

The following recommendations are provided in regard to noise mitigation.

1. Noise barriers are required for the rear yards of lots/blocks with backing exposure to Twenty Road. When detailed lotting information, lotting information and grading information is available, the acoustic barrier heights should be refined.
2. Forced air ventilation with ducts sized to accommodate the future installation of central air conditioning is recommended for all the dwelling units in the development.
3. Upgraded building constructions are required for those residential lots between NEF 25 to NEF 30. When architectural drawings are available for the future dwellings in the residential portion of the site, 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/light industrial/business prestige blocks, a detailed noise study should be performed by each parcel owner to determine any acoustic requirements in accordance with NPC-300 to meet guidelines and the proposed sensitive uses in



the area.

The noise control recommendations are summarized in Table IX. The reader is referred to the previous sections of the report where these recommendations are discussed in more detail.

**Table X: Summary of Noise Control Requirements and Noise Warning Clauses**

Prediction Location	UBE Plan	Acoustic Barrier <sup>◇</sup>	Ventilation Requirements*	Type of Warning Clause	Acoustic Insulation Factor
A	Central	✓	Forced Air	B, C	**BR: AIF-36 LR/DR: AIF-32
B		✓	Forced Air	A, C	**BR: AIF-36 LR/DR: AIF-32
C		✓	Forced Air	A, C	**BR: AIF-36 LR/DR: AIF-32
D		--	Forced Air	B, C	**BR: AIF-36 LR/DR: AIF-32
E	Eastern	✓	Forced Air	A, C	**BR: AIF-36 LR/DR: AIF-32
F		✓	Forced Air	A, C	**BR: AIF-36 LR/DR: AIF-32
G		✓	Forced Air	A, C	**BR: AIF-36 LR/DR: AIF-32
H		--	Forced Air	A, C	**BR: AIF-36 LR/DR: AIF-32
I		--	Forced Air	A, C	**BR: AIF-36 LR/DR: AIF-32
J		--	Forced Air	A, C	**BR: AIF-36 LR/DR: AIF-32
K	Western	--	Forced Air	A, C	**BR: AIF-36 LR/DR: AIF-32
L		--	Forced Air	A, C	**BR: AIF-36 LR/DR: AIF-32
M		✓	Forced Air	B, C	**BR: AIF-36 LR/DR: AIF-32
--	--	Residential near commercial/ industrial uses	--	D	--
--	--	Airport Light Industrial/Airport Prestige Business	+	+	+

Notes:

-- no specific requirement

◇ Barrier heights should reduce the sound level to less than 60 dBA, as close to 55 dBA as possible depending on the

Notes continued:

requirements of the municipality. When detailed grading information is available, the acoustic barrier heights should be refined.

\* Note: Locate the air cooled condenser unit in a noise insensitive area and ensure that the unit has a maximum ARI not exceeding 7.6 bels for 3.5 tons or less.

OBC – must meet minimum Ontario Building Code Requirements

\*\* Architectural drawings are to be reviewed by an acoustical consultant when available.

+ Impact of Industrial/Commercial Buildings/Uses on nearby residential uses is required to be assessed in the form of noise studies by individual parcel owners, in accordance with NPC-300 guidelines.

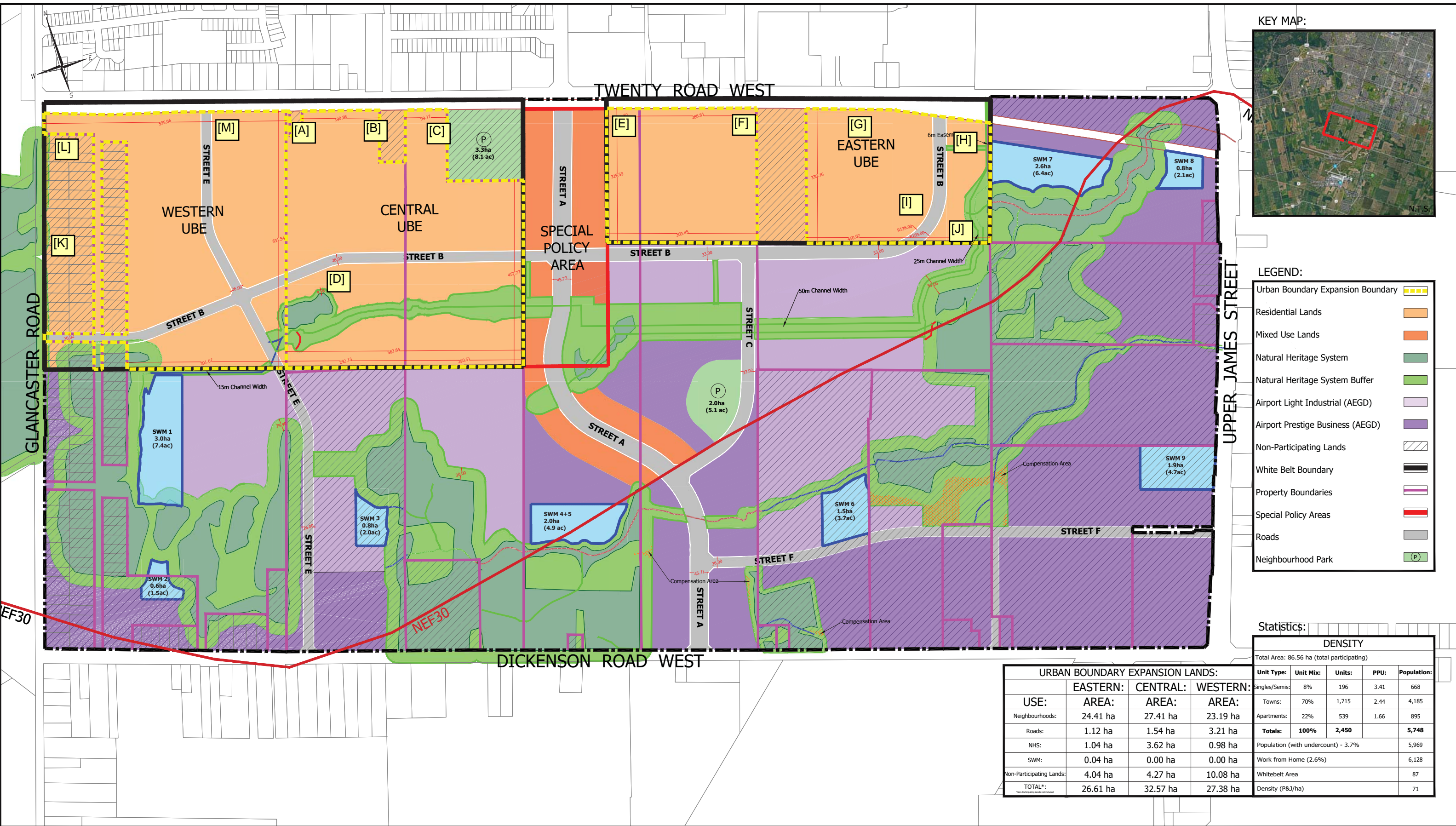
## 6.1 Implementation

To ensure that the noise control recommendations outlined above are fully implemented, it is recommended that:

- 1) When detailed lotting and grading information is available, a detailed noise study should be performed to refine the acoustic barrier heights and specific acoustic requirements.
- 2) When architectural drawings are available for the residential lots/blocks, an acoustic consultant should provide revised glazing recommendations based on actual window to floor area ratios.
- 3) Prior to final approval, when house 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 certify that the noise control barriers as approved have been incorporated for lots/blocks adjacent to Twenty Road.
- 4) Prior to assumption of the subdivision, the Municipal building inspector or a Professional Engineer qualified to perform acoustical services in the Province of Ontario shall certify that the noise control measures for lots/blocks adjacent to Twenty Road have been properly installed and constructed.



Figure 1 - Key Plan



**LEGEND:**

- Urban Boundary Expansion Boundary [Yellow dashed line]
- Residential Lands [Orange]
- Mixed Use Lands [Light Orange]
- Natural Heritage System [Green]
- Natural Heritage System Buffer [Light Green]
- Airport Light Industrial (AEGD) [Purple]
- Airport Prestige Business (AEGD) [Dark Purple]
- Non-Participating Lands [Hatched]
- White Belt Boundary [Black line]
- Property Boundaries [Thin grey line]
- Special Policy Areas [Red outline]
- Roads [Grey line]
- Neighbourhood Park (P) [Green circle with P]

**Statistics:**

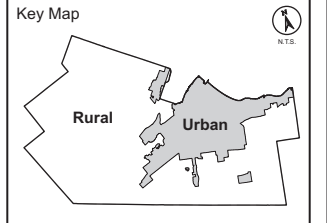
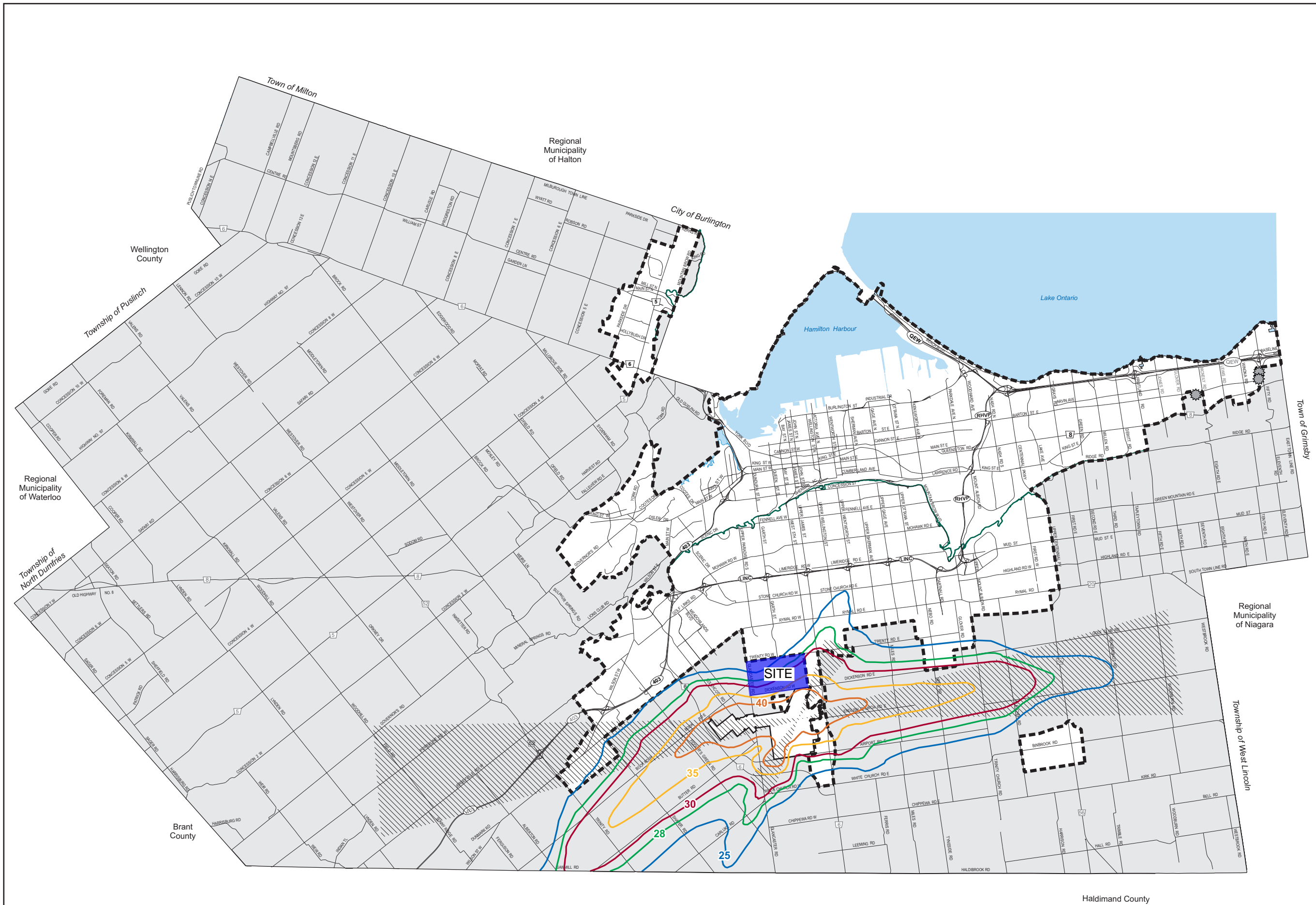
DENSITY				
Total Area: 86.56 ha (total participating)				
Unit Type:	Unit Mix:	Units:	PPU:	Population:
Singles/Semis:	8%	196	3.41	668
Towns:	70%	1,715	2.44	4,185
Apartments:	22%	539	1.66	895
<b>Totals:</b>	<b>100%</b>	<b>2,450</b>		<b>5,748</b>
Population (with undercount) - 3.7%				5,969
Work from Home (2.6%)				6,128
Whitebelt Area				87
Density (P&J/ha)				71

**URBAN BOUNDARY EXPANSION LANDS:**

USE:	EASTERN: AREA:	CENTRAL: AREA:	WESTERN: AREA:
Neighbourhoods:	24.41 ha	27.41 ha	23.19 ha
Roads:	1.12 ha	1.54 ha	3.21 ha
NHS:	1.04 ha	3.62 ha	0.98 ha
SWM:	0.04 ha	0.00 ha	0.00 ha
Non-Participating Lands:	4.04 ha	4.27 ha	10.08 ha
<b>TOTAL*:</b>	<b>26.61 ha</b>	<b>32.57 ha</b>	<b>27.38 ha</b>

Scale: 1:4,000

Figure 2 - Urban Boundary Expansion  
Upper West Side Community Plan



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

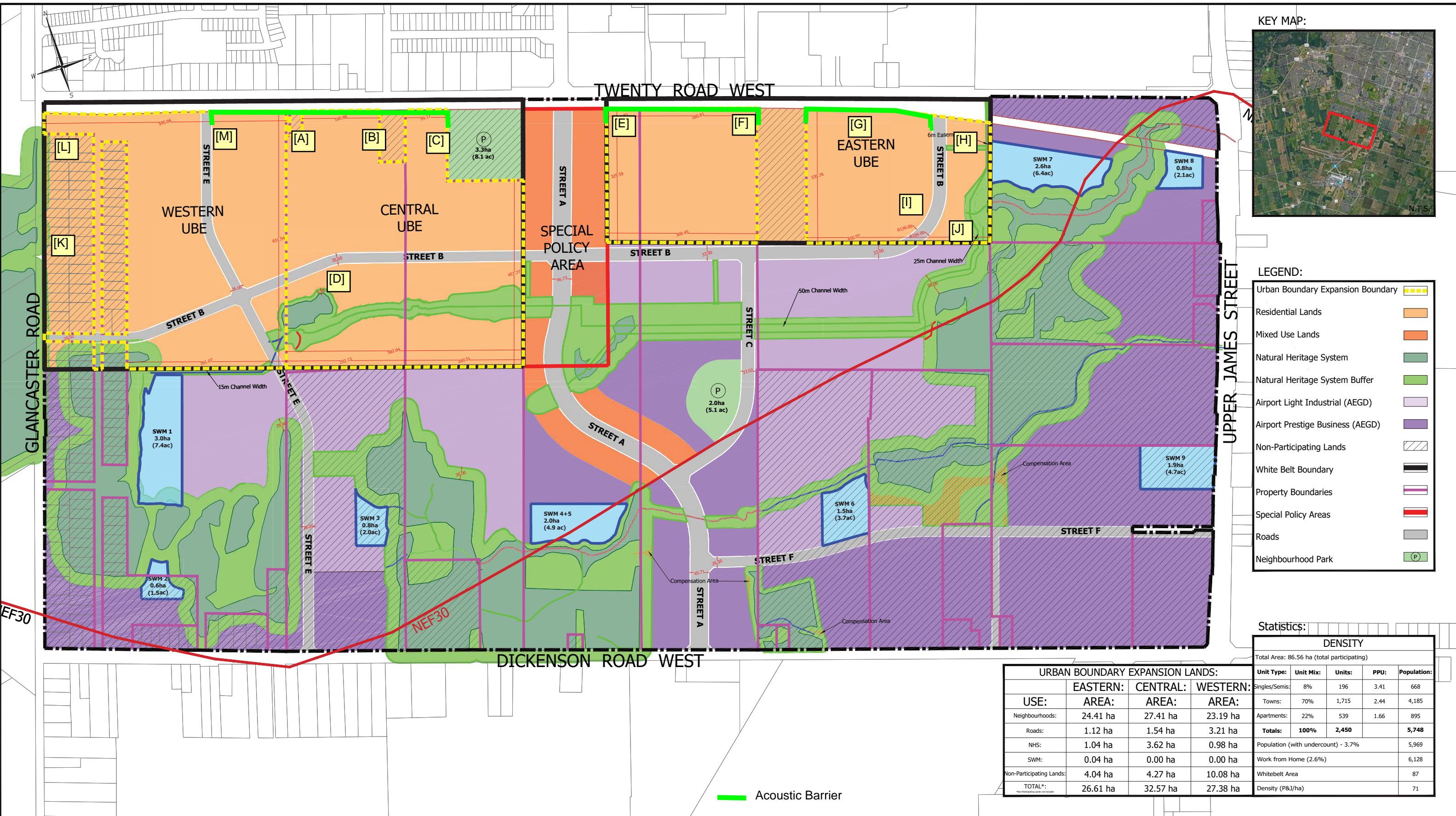
- Legend**
- 25— 2010 NEF Contour
  - 28— 2010 NEF Contour
  - 30— 2010 NEF Contour
  - 35— 2010 NEF Contour
  - 40— 2010 NEF Contour
  - Primary Airport Zoning Regulation Area
  - Other Features**
  - Rural Area
  - John C. Munro Hamilton International Airport
  - Niagara Escarpment
  - Urban Boundary
  - 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  
PLANNING & ECONOMIC DEVELOPMENT DEPARTMENT  
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**Figure 3 - Map Showing the Noise Contours for the John C. Munro Hamilton International Airport**





- LEGEND:**
- Urban Boundary Expansion Boundary [Yellow dashed line]
  - Residential Lands [Orange]
  - Mixed Use Lands [Light Orange]
  - Natural Heritage System [Green]
  - Natural Heritage System Buffer [Light Green]
  - Airport Light Industrial (AEGD) [Purple]
  - Airport Prestige Business (AEGD) [Dark Purple]
  - Non-Participating Lands [Hatched]
  - White Belt Boundary [Black line]
  - Property Boundaries [Thin black line]
  - Special Policy Areas [Red line]
  - Roads [Grey line]
  - Neighbourhood Park (P) [Green circle with P]

**Statistics:**

DENSITY				
Total Area: 86.56 ha (total participating)				
Unit Type:	Unit Mix:	Units:	PPU:	Population:
Singles/Semis:	8%	196	3.41	668
Towns:	70%	1,715	2.44	4,185
Apartments:	22%	539	1.66	895
<b>Totals:</b>	<b>100%</b>	<b>2,450</b>		<b>5,748</b>
Population (with undercount) - 3.7%				5,969
Work from Home (2.6%)				6,128
Whitebelt Area				87
Density (P&J/ha)				71

**URBAN BOUNDARY EXPANSION LANDS:**

USE:	EASTERN: AREA:	CENTRAL: AREA:	WESTERN: AREA:
Neighbourhoods:	24.41 ha	27.41 ha	23.19 ha
Roads:	1.12 ha	1.54 ha	3.21 ha
NHS:	1.04 ha	3.62 ha	0.98 ha
SWM:	0.04 ha	0.00 ha	0.00 ha
Non-Participating Lands:	4.04 ha	4.27 ha	10.08 ha
<b>TOTAL*:</b>	<b>26.61 ha</b>	<b>32.57 ha</b>	<b>27.38 ha</b>

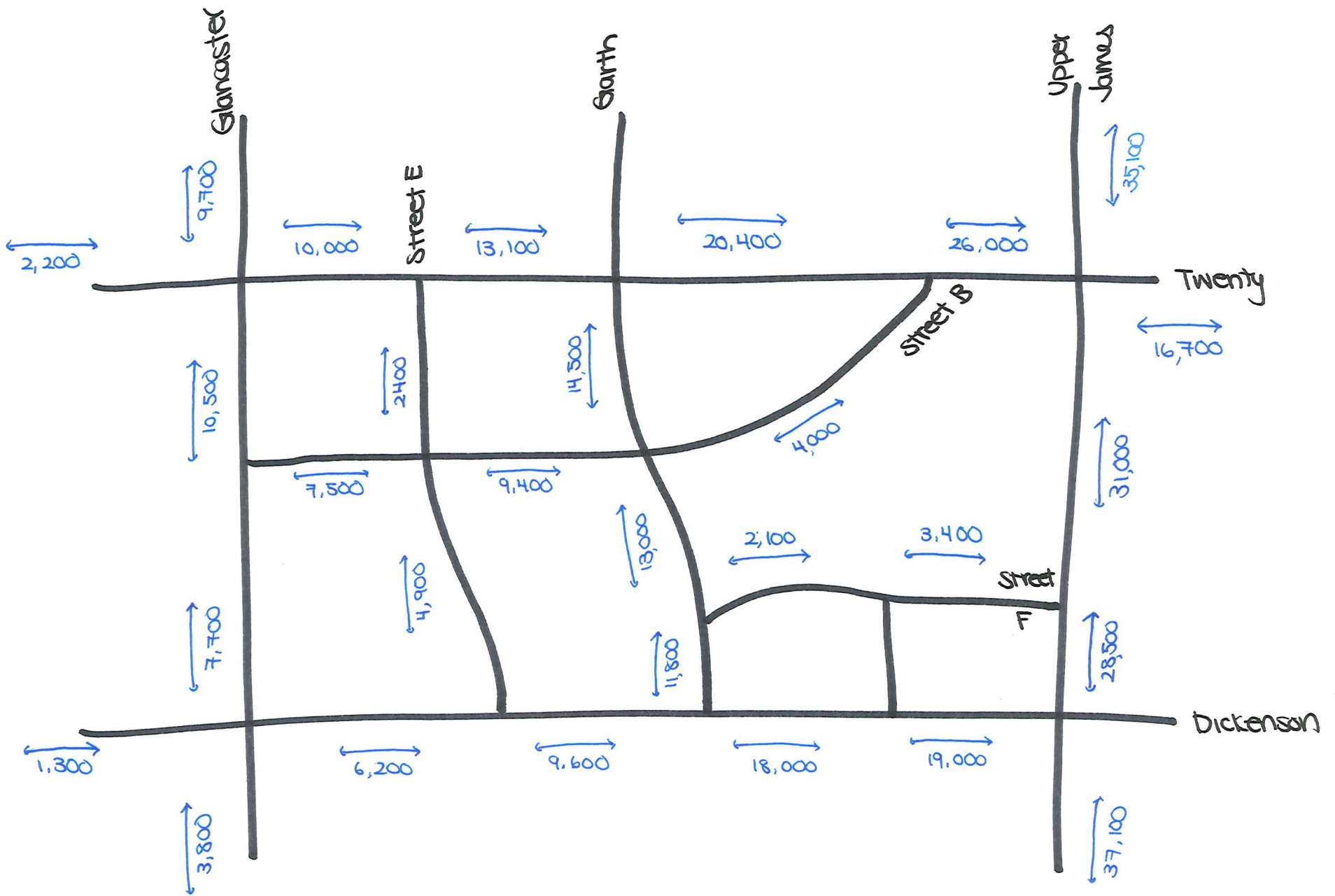
Acoustic Barrier

Scale: 1:4,000

**Figure 4 - Urban Boundary Expansion**  
Upper West Side Community Plan

# **APPENDIX A**

Traffic Information



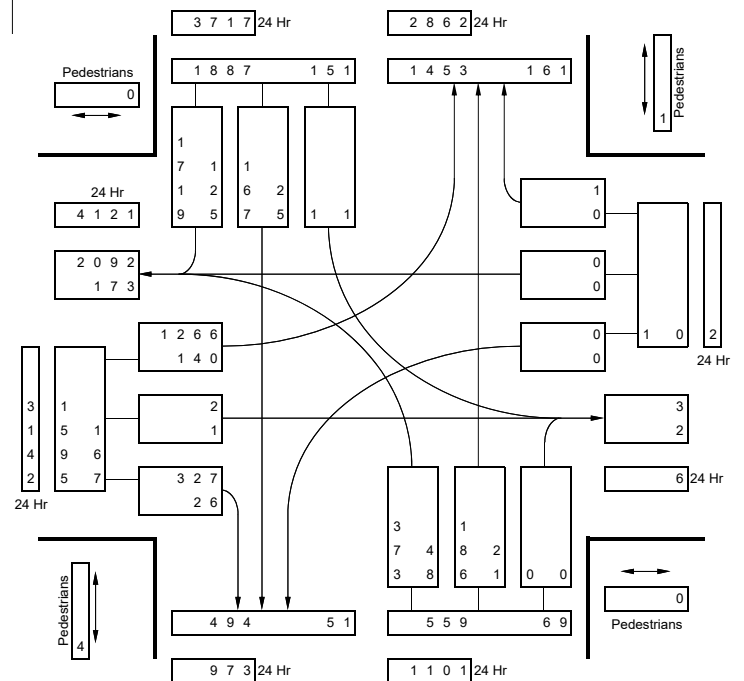
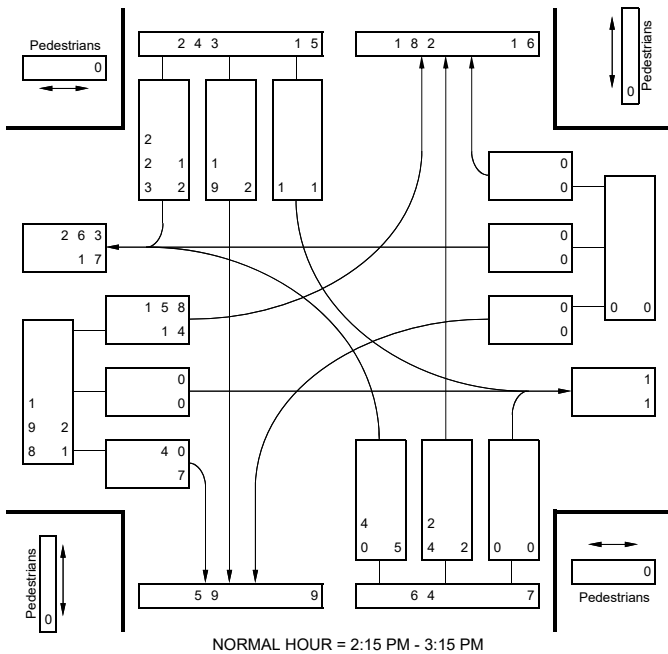
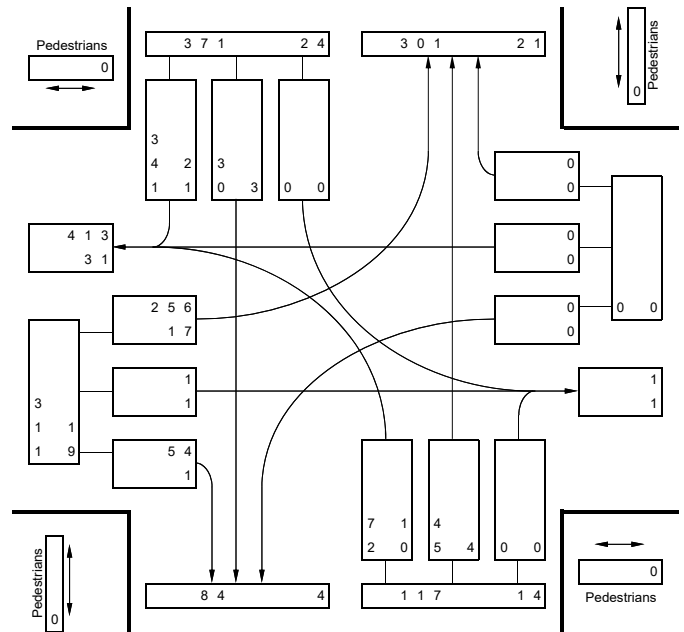
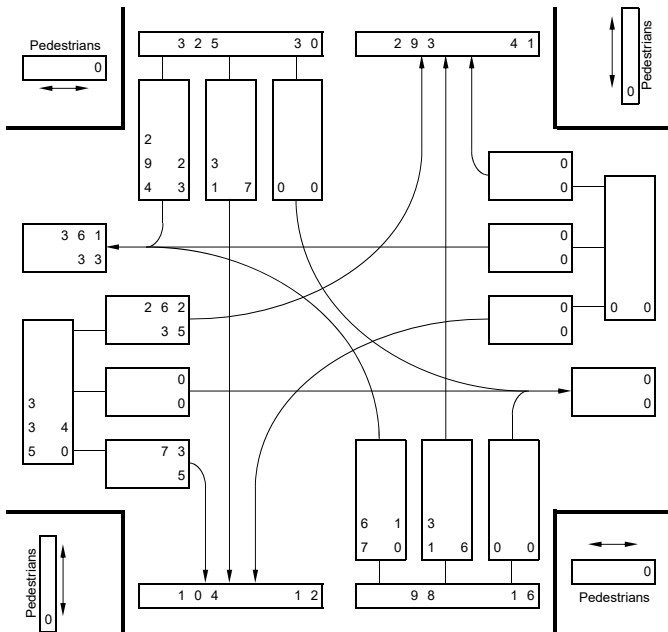
Total 2031  
AADT.

Intersection: **Glancaster Rd**  
Direction: (North/South)  
Road Condition: Dry  
Comments:

at **Book Rd**  
(East/West)  
Weather: Clear

Total Vehicles: 4,042  
M.V.E./Year: 2,707  
AWDT Factor: 1.97

Date: Thursday  
May 17, 2018  
Period: 7 hours

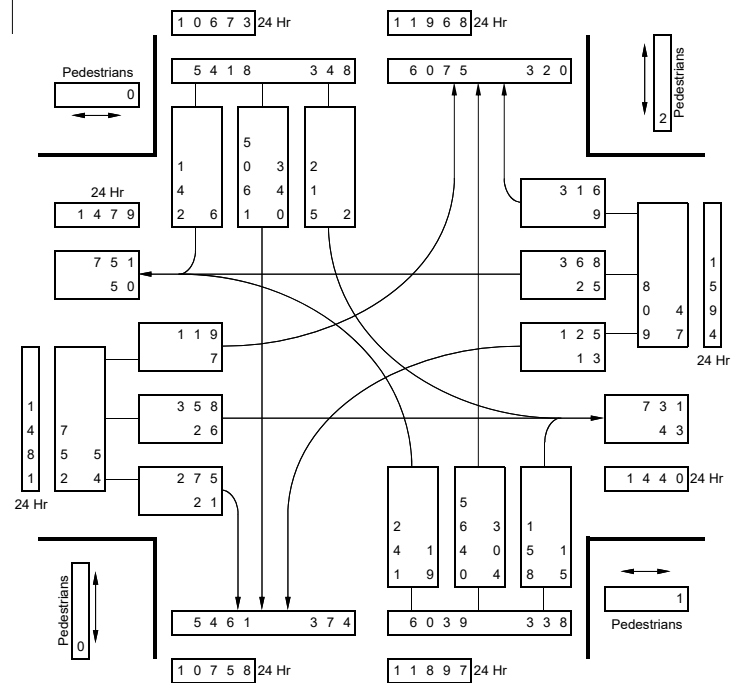
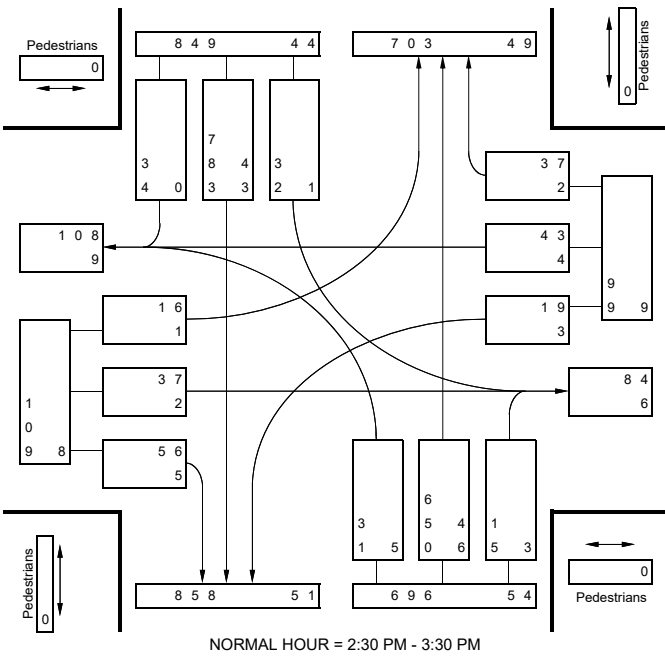
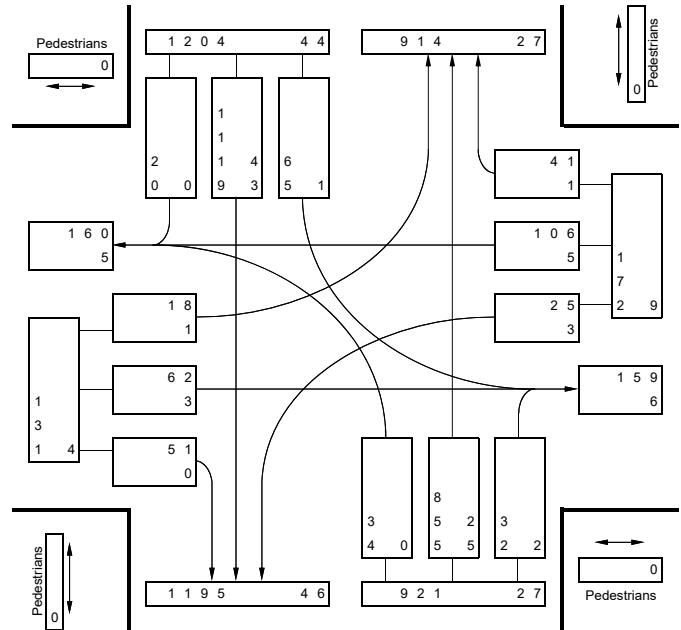
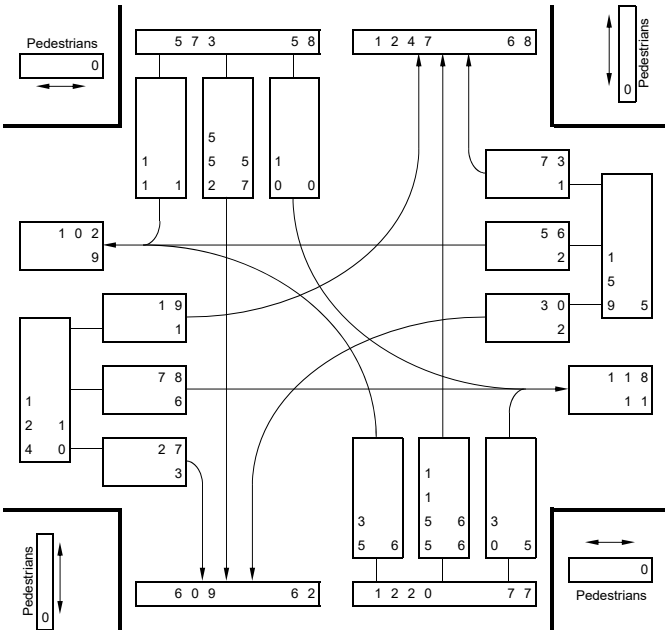


Intersection: Dickenson Rd at Upper James St  
Direction: (East/West)  
Road Condition: Dry  
Comments:

Weather: Clear

Total Vehicles: 13,018  
M.V.E./Year: 8,719  
AWDT Factor: 1.97

Date: Thursday  
May 23, 2019  
Period: 7 hours



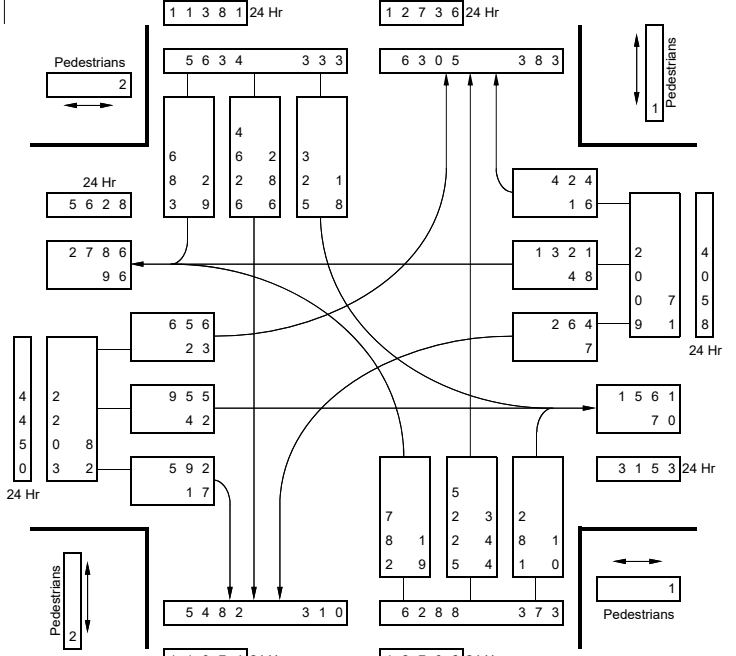
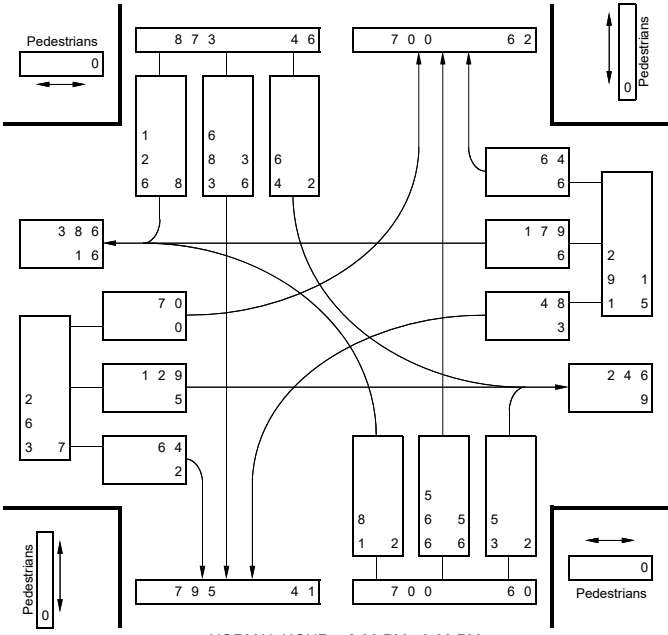
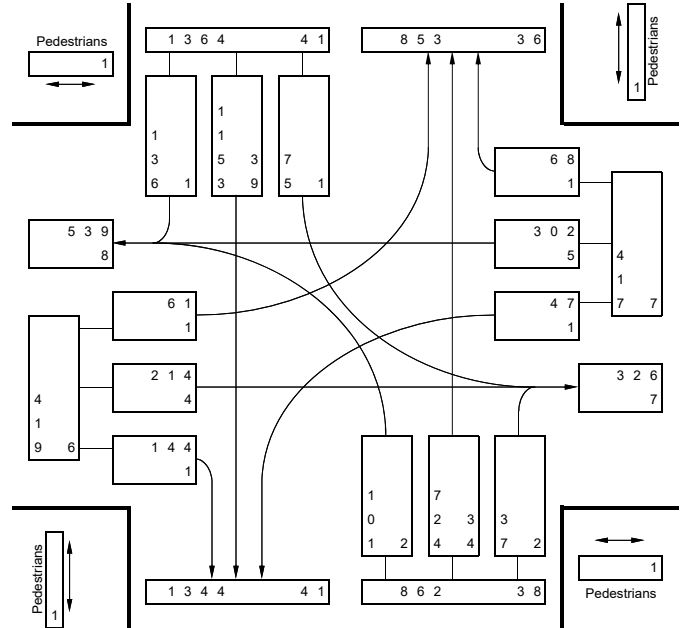
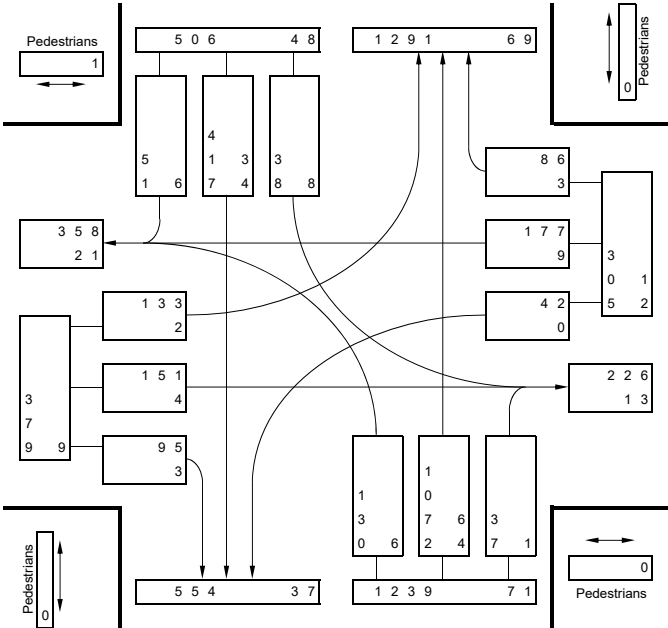
7 Hr & 24 Hr TOTAL VOLUMES

Intersection: **Twenty Rd**  
Direction: (East/West)  
Road Condition: Dry  
Comments:

at **Upper James St**  
(North/South)  
Weather: Clear

Total Vehicles: 16,134  
M.V.E./Year: 11,081  
AWDT Factor: 2.02

Date: Monday  
Jun 3, 2019  
Period: 7 hours



## **APPENDIX B**

Sample Stanson 5.04 Output

STAMSON 5.0                    NORMAL REPORT                    Date: 02-12-2019 15:01:07  
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: af\_cent.te                    Time Period: Day/Night 16/8 hours  
Description: **Daytime and nighttime sound levels at the future dwelling facades with backing exposure to Twenty Road**

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

-----  
Car traffic volume : 23049/2561    veh/TimePeriod    \*  
Medium truck volume : 140/16    veh/TimePeriod    \*  
Heavy truck volume : 211/23    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): 26000  
Percentage of Annual Growth : 0.00  
Number of Years of Growth : 0.00  
Medium Truck % of Total Volume : 0.60  
Heavy Truck % of Total Volume : 0.90  
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 1: Twenty (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 : 47.00 / 47.00 m  
Receiver height : 4.50 / 4.50 m  
Topography : 1    (Flat/gentle slope; no barrier)  
Reference angle : 0.00

Results segment # 1: Twenty (day)

-----  
Source height = 0.97 m

ROAD (0.00 + 58.56 + 0.00) = 58.56 dBA  
Angle1 Angle2    Alpha RefLeq    P.Adj    D.Adj    F.Adj    W.Adj    H.Adj    B.Adj  
SubLeq

-----  
---  
-90        90        0.59    67.76    0.00    -7.87    -1.33    0.00    0.00    0.00  
58.56  
-----  
---

Segment Leq : 58.56 dBA

Total Leq All Segments: 58.56 dBA



Results segment # 1: Twenty (night)

-----  
Source height = 0.97 m

ROAD (0.00 + 52.01 + 0.00) = 52.01 dBA

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

SubLeq	Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj
52.01	-90	90	0.59	61.21	0.00	-7.87	-1.33	0.00	0.00	0.00

-----  
-----  
-----

Segment Leq : 52.01 dBA

Total Leq All Segments: 52.01 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 58.56  
(NIGHT): 52.01

STAMSON 5.0                    NORMAL REPORT                    Date: 02-12-2019 15:01:37  
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: a\_cent.te                    Time Period: 16 hours  
Description: **Daytime sound levels in the OLA of the future dwellings with backing exposure to Twenty Road, with mitigation**

Road data, segment # 1: Twenty

-----  
Car traffic volume : 23049 veh/TimePeriod \*  
Medium truck volume : 140 veh/TimePeriod \*  
Heavy truck volume : 211 veh/TimePeriod \*  
Posted speed limit : 60 km/h  
Road gradient : 0 %  
Road pavement : 1 (Typical asphalt or concrete)

Data for Segment # 1: Twenty

-----  
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 : 44.00 m  
Receiver height : 1.50 m  
Topography : 2 (Flat/gentle slope; with barrier)  
Barrier angle1 : -90.00 deg Angle2 : 90.00 deg  
Barrier height : 2.00 m  
Barrier receiver distance : 4.50 m  
Source elevation : 0.00 m  
Receiver elevation : 0.00 m  
Barrier elevation : 0.00 m  
Reference angle : 0.00

Results segment # 1: Twenty

-----  
Source height = 0.97 m

Barrier height for grazing incidence

-----

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
0.97	1.50	1.45	1.45

-----

ROAD (0.00 + 53.11 + 0.00) = 53.11 dBA  
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj  
SubLeq

-----  
-90 90 0.56 67.76 0.00 -7.27 -1.28 0.00 0.00 -6.11  
53.11

-----

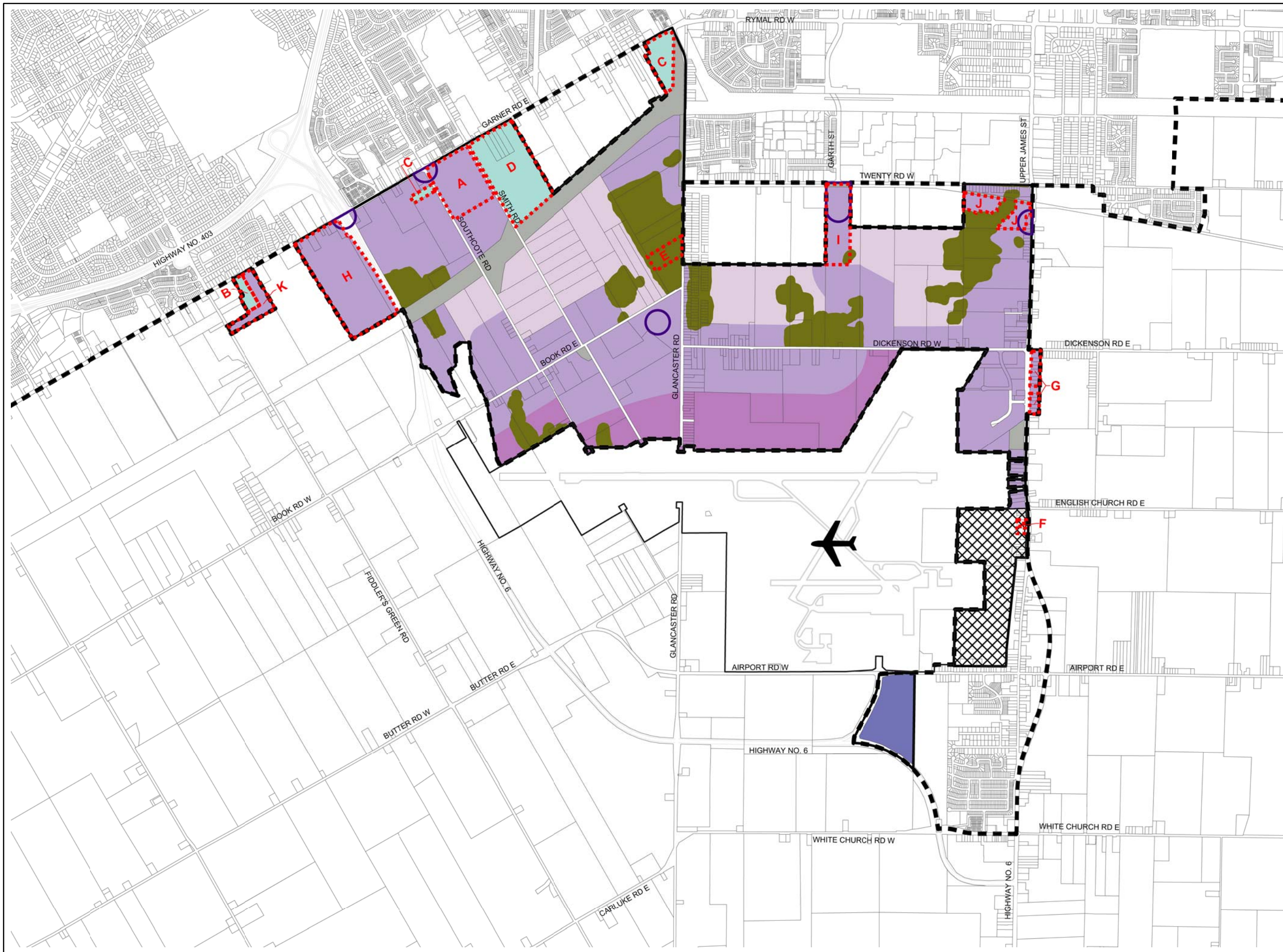
Segment Leq : 53.11 dBA

Total Leq All Segments: 53.11 dBA

TOTAL Leq FROM ALL SOURCES: 53.11

# **APPENDIX C**

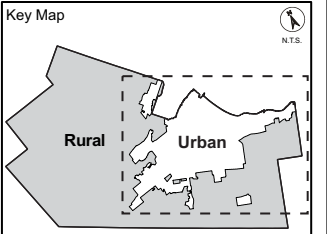
Supporting Information



**Legend**

- Land Use Designations**
- Airport Light Industrial
  - Airport Prestige Business
  - Airport Related Business
  - Airside Industrial
  - Institutional
  - Natural Open Space
  - Airport Reserve
  - Utilities
- Other Features**
- Area or Site Specific Policy
  - Employment Supportive Centres
  - John C. Munro Hamilton International Airport
  - Urban Boundary
  - Secondary Plan Boundary

**Urban Hamilton Official Plan**  
**Airport Employment**  
**Growth District Secondary Plan**  
 Land Use Plan  
 Map B.8-1



Note: For Rural Airport Influence Area, refer to Schedule F of the Rural Hamilton Official Plan.

- Legend**
- Airport Influence Area
  - Other Features**
  - Rural Area
  - John C. Munro Hamilton International Airport
  - Niagara Escarpment
  - Urban Boundary
  - Municipal Boundary

**Urban Hamilton Official Plan  
Schedule F  
Airport Influence Area**

Not To Scale

Date: September 2019

**PLANNING & ECONOMIC DEVELOPMENT DEPARTMENT**

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