REIMAGINING YONGE STREET (SHEPPARD AVENUE TO FINCH AVENUE)

MUNICIPAL CLASS ENVIRONMENTAL ASSESSMENT STUDY

NOISE ASSESSMENT REPORT

CITY OF TORONTO

Project No. 161-03171-00

November 2, 2017

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Project No. 161-03171-00

Nov 2, 2017

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Subject: REimagining Yonge Street (Sheppard Avenue to Finch Avenue) Municipal Class Environmental Assessment Study Environmental Noise Assessment Report

Dear Marilia Cimini:

Enclosed, please, find the Noise Assessment Report for REimagining Yonge Street from Sheppard Avenue to Finch Avenue for your review and comment.

If you need any clarifications or require any additional information, please, do not hesitate to contact the undersigned.

Yours Truly,
WSP Canada Inc.

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EXECUTIVE SUMMARY

WSP Canada Inc. (WSP) has been retained to complete the Noise Assessment Report (the Report) in support of the REimagining Yonge Street from Sheppard Avenue to Finch Avenue Municipal Class Environmental Assessment Study. This Report will present the Project's Preferred Plan, and the respective potential noise impacts due to road traffic noise on the neighbouring sensitive areas.

The study is being carried out under Schedule 'C' of the Municipal Class Environmental Assessment (EA), which is an approved planning process under the *Ontario Environmental Assessment Act*. As part of the noise scope of work, WSP undertook an analysis of closest noise sensitive area or receptors and level of expected noise mitigation that may be required during the construction process.

The modelling of future noise level conditions was performed for two scenarios; "With" and "Without" the implementation of the project using the Ontario MOECC approved acoustical modelling software, STAMSON. Modeling results for both scenarios indicate that projected noise levels after 10 years are comparatively less with the implementation of the project. This is because the existing six-lane roadway is being reduced to four-lanes from Sheppard Avenue to Finch Avenue, which results in the reallocation of space for cycle tracks and pedestrian clearway. Yonge Street is not being widened, and a major reconstruction will occur from curb to curb.

Daytime and night time OLA sound level at one representative NSA is estimated to be approximately 61.5 dBA and 55.3 dBA respectively 10 years with the implementation of the project. The noise impacts at other NSAs are not considered significant. Therefore, under the MTO/MOECC Joint Noise Protocol, noise mitigation measures are not warranted for any location for within the Study Area. It should also be noted that these noise impacts are highly conservative, in reality; their impacts will be likely less than what has been evaluated in this Study.

Including cycling lanes in the service roads; Doris Avenue and Beecroft Road does not impact noise levels after 10 years. This is because of the fact that cycling activity does not generate ambient noise levels. In addition, there is no proposal to reduce or increase the existing travel lanes on both of these service roads and accordingly there will not be trends of decrease or increase in vehicular traffic contributing to a change in ambient noise levels.

Unlike the noise emitted by the operation of vehicles on the roads, noise due to construction is temporary in nature, and largely unavoidable. The noise impact levels during construction depends upon size and number of pieces of equipment being used, their types, time of operation and their proximity with the NSAs. Recommendations relating to the management of construction noise are listed in the report.

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1. INTRODUCTION

WSP Canada Inc. was retained to prepare the Noise Assessment Report (the "Report") in support of the REimagining Yonge Street from Sheppard Avenue to Finch Avenue Municipal Environmental Assessment Study (the "Study").

Yonge Street, located within Ward 23 of the City of Toronto, is the central transportation corridor and pedestrian promenade within North York Centre, one of four centres that have an important role in achieving the provincial growth objectives of the Official Plan where jobs, housing, and services will be concentrated.

While North York Centre is transforming into a transit-oriented and dynamic mixed-use area, the implementation of the street vision has not been kept pace with this evolution. Inconsistent urban features, including sidewalks, crossings, and medians, and the lack of dedicated cycling facilities reduce the prominence of the street and present transportation challenges.

The City of Toronto is carrying out the Study that will evaluate opportunities to improve the streetscape and public realm for all users, such as, pedestrians, cyclists, transit and vehicles, along Yonge Street from Sheppard Avenue to the Finch Hydro Corridor (the "Project"). A number of opportunities have been considered, including: adding street trees, lighting, paving, and street furniture; enhancing sidewalks and boulevard widths, integrating adjacent parks and public open spaces; enhancing the landscaped median; improving safety for all users; including cycle tracks on Yonge Street; improving pedestrian crossing facilities; and re-configuring right-of-way and traffic lanes. The City is also considering the potential to include cycling facilities in the service roads, Doris Avenue and Beecroft Road. These cycling facilities extend from Avondale Avenue to Bishop Avenue for Doris Avenue and from Florence Avenue to Hendon Avenue for Beecroft Street.

The Study is being carried out under Schedule 'C' of the Municipal Class Environmental Assessment (MCEA), which is an approved planning process under the *Ontario Environmental Assessment Act.*

The extent of this MCEA study area with roads and areas around are shown on Figure 1 and a bird's eye view on Figure 2.

This Report presents the proposed modification to the existing transportation network and the potential noise impacts due to road traffic noise on the neighbouring sensitive areas. This noise assessment was conducted within the limits of this MCEA steady focus area, as shown in Figure 1.

This Report also outlines the applicable City of Toronto noise by-law, noise complaint process for construction activities and a general discussion with regard to noise arising from construction activities. The Ontario Ministry of the Environment and Climate Change's (MOECC's) Environmental Noise Guidelines - Stationary and Transportation – Publication NPC – 300, Ontario Ministry of Transportation (MTO) Noise Protocol described in the MTO's Environmental Guide for Noise, October 2006 (MTO Noise Guideline) and the City of Toronto's Noise Abatement Policy would form the basis of the assessment criteria and methodology of this Report, details of which have been provided in subsequent sections.

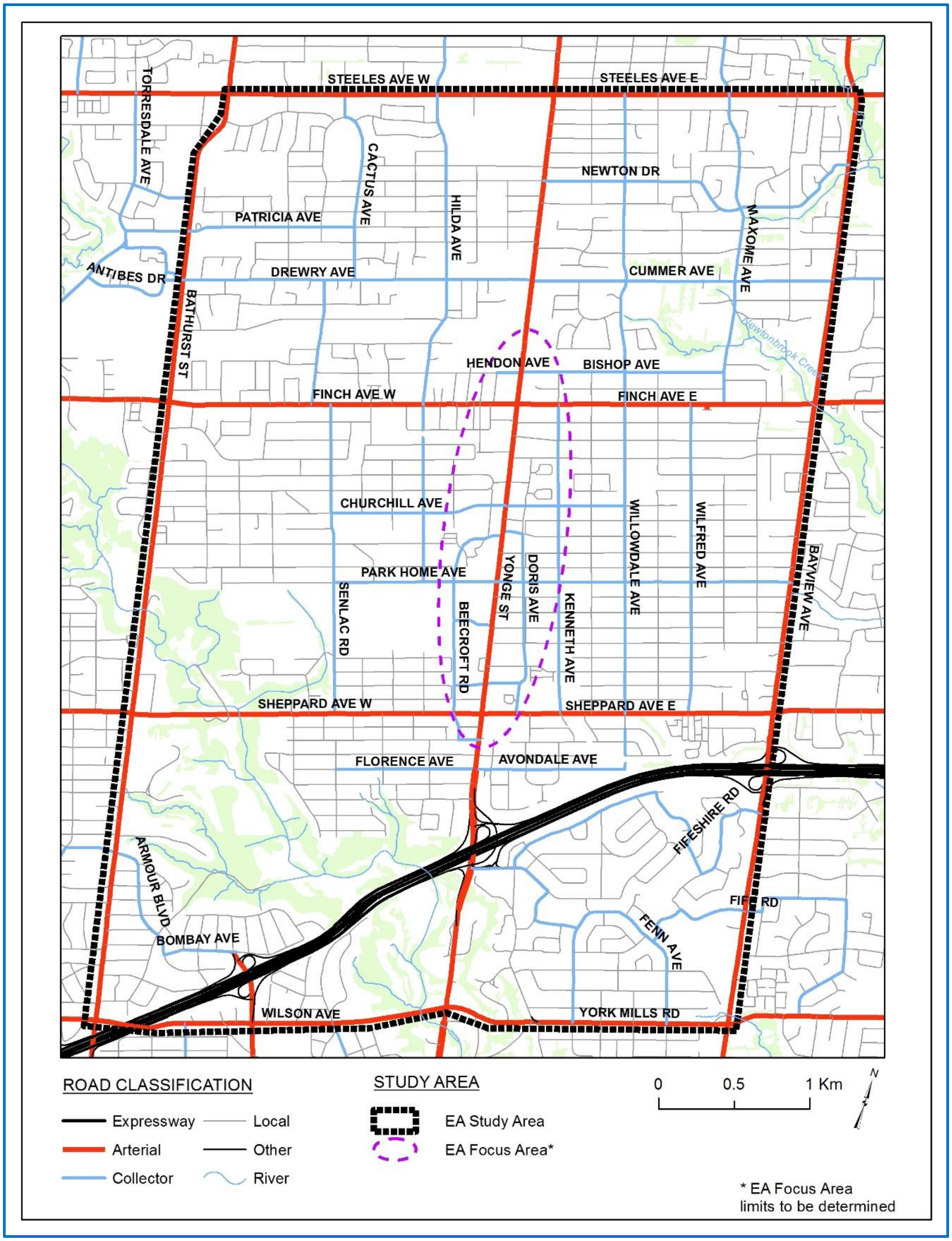

Figure 1 Detailed expanses around Study Area

Figure 2 Bird's Eye View of Study Focus Area

During the Preliminary Design Phase, two (2) Design Options: 4A and 4B are being considered along Yonge Street from Sheppard Avenue to Finch Avenue. Amongst the two, Design Option 4A has been selected for implementation south of Sheppard Avenue. This Design Option (as shown in Figure 3) includes a six (6) lane cross section, cycle tracks and the inclusion of the landscaped median.

Design Option 4B (shown in Figure 4) was proposed to be implemented from north of Sheppard Avenue to Finch Avenue. This includes four (4) travel lanes, wider sidewalks, cycle tracks, street trees and the inclusion of the landscaped median. However, based on direction from City Council, the Project Team is / has reviewed alternatives that include implementing cycling facilities on the service roads (Doris Avenue and Beecroft Road) instead of Yonge Street.

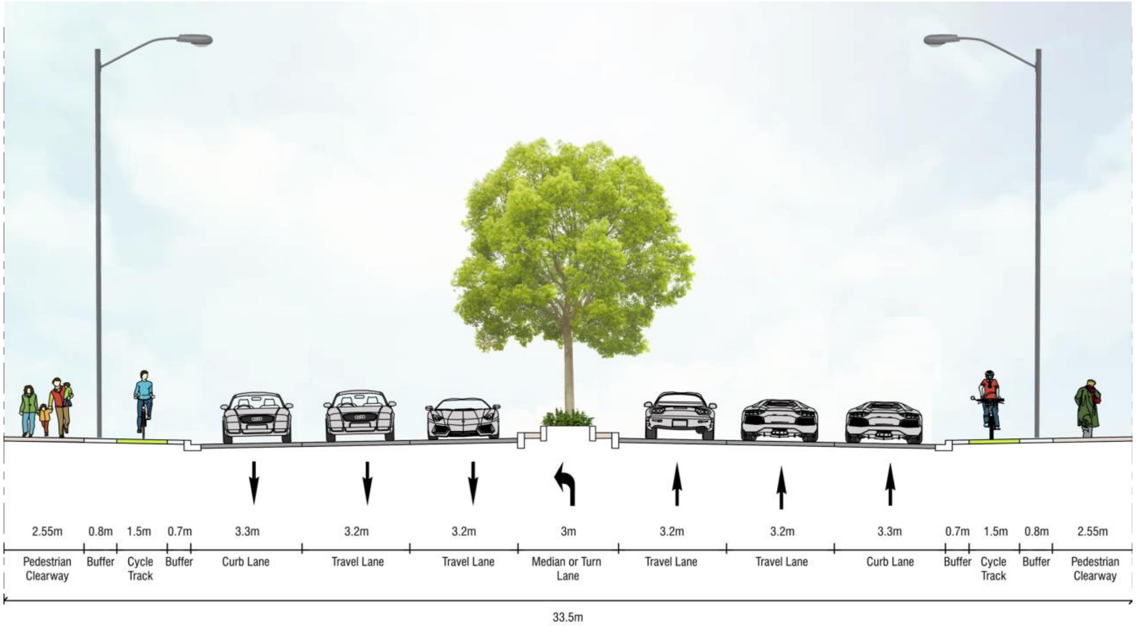

Figure 3 Typical Cross Section for Design Option 4A

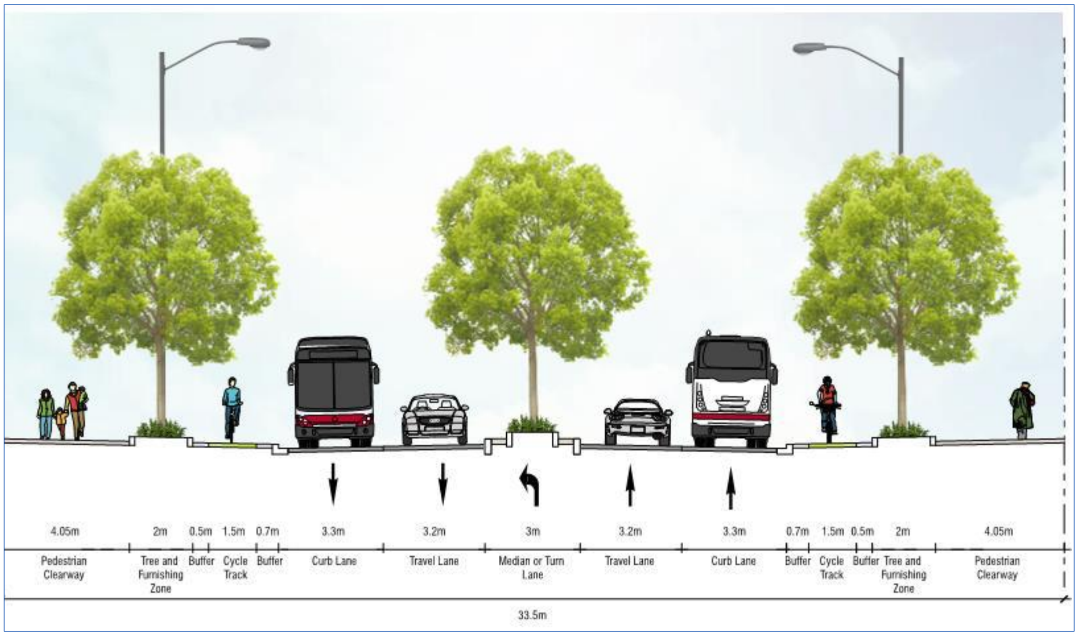

Figure 4 Typical Cross Section for Design Option 4B

2. APPLICABLE NOISE GUIDELINES

The potential noise impacts resulting from this Study are assessed based on the Ontario Provincial Noise Guidelines.

2.1 ONTARIO PROVINCIAL GUIDELINES

The Ontario Ministry of Transportation (MTO)'s Environmental Guide for Noise, October 2006 (MTO Noise Guideline) provides requirements for noise assessment related to the expansion of existing or construction of new roads. The REimagining Yonge Street MCEA Study does not entail expansion as such; however, the proposed works are a major reconstruction and reallocation of the existing roadway and therefore, to assess the noise impacts due to change in traffic volumes on the nearest receptors when the Project is constructed, the MTO Environmental Guide of Noise is considered suitable for this Study.

These requirements have been summarized into two (2) Environmental Protection Requirements (EPRs) for noise in accordance to the MTO Environmental Protection Requirements Section 6 and the MTO Noise Guideline are summarized below:

2.1.1 EPR NOISE-1 – PLANNING & DESIGN

Environmental Protection Requirement (EPR) Noise-1 – Planning & Design requires that potential noise impacts be investigated where a road construction project is proposed through or adjacent to a Noise Sensitive Area (NSA). In order to determine noise impacts, a comparison shall be made for future sound levels with and without the proposed improvements for the Noise Sensitive Areas.

Where increases in noise levels are predicted, the mitigation requirements are to be applied for the noise level above the ambient as summarized in Table 1.

Table 1 Summary of Mitigation Efforts

Change in Noise Level Above Ambient	Mitigation Effort Requirement
0 to 5 dBA Change & <65 dBA	• None
≥ 5 dBA Change or ≥ 65 dBA	• Investigate noise mitigation measures on the right-of-way • Introduce noise control measures within the right-of-way if technically, administratively and economically feasible • When applied, noise mitigation measures should achieve a minimum of 5 dBA reduction, over the first row receivers • Try to mitigate close to ambient sound levels where administratively, economically, and technically feasible

As per the MTO Noise Guidelines, the noise analysis needs to be carried out during the planning stage in the following steps:

- Identification of the area of investigation
- Identification of noise sensitive areas (NSAs)
- Determination of future ambient noise levels without the Project
- Determination of future noise levels with the Project
- Determination of potential impacts, determination of significance
- Assessment of mitigation
- Summary of the noise analysis

2.1.2 EPR NOISE-2 – CONSTRUCTION

Unlike the noise emitted by the operation of vehicles on highways, noise due to construction of roads is temporary in nature, and largely unavoidable. The noise impact levels during construction depends upon size and number of pieces of equipment being used, their types, time of operation and their proximity with the NSAs. However, with adequate controls, noise impacts can be minimized even though for some periods of time and types of work, construction sound levels will be perceptible.

2.2 CITY OF TORONTO GUIDE FOR NOISE

The City of Toronto Noise By-law 111-2003, as amended, includes provisions for addressing construction noise (Toronto 2003). Section 591-3 (C) addresses the construction noise issues which are similar to as stated in Section 2.1 of this report. According to Section 591-4 (B) of the By-law, the description of activity that entails the operation of any equipment in connection with construction is prohibited from 7:00 p.m. one day to 7:00 a.m. the next day, 9:00 a.m. on Saturdays, Sundays, and statutory holidays.

The City of Toronto provides noise by-law exemptions to permit night work outside the permitted hours for projects similar to REimagining Yonge Street. However, a requirement for public notification will be included in the contract documentation for affected residents within a 500-metre radius prior to the overnight construction activities. In addition, the current Ward Councillors of the area, John Filion and David Shiner, will be notified in advance of any night work construction activities.

3. LOCATION OF NOISE SENSITIVE AREAS

3.1 CHARACTERIZATION OF NOISE SENSITIVE AREAS

Noise Sensitive Areas (NSAs) include specific land uses, provided they have an “Outdoor Living Area” (OLA) associated with them. An Outdoor Living Area is the part of an outdoor area easily accessible from the residential building and intended for the quiet enjoyment of the outdoor environment. The term OLA is generally used in reference to an outdoor patio, a backyard, a terrace, or other area where passive recreation is expected to occur. Patios associated business/commercial establishments on Yonge Street cannot be considered as NSAs.

Small balconies for high-rise residential buildings are not considered OLAs for the purposes of noise assessment. Terraces greater than 4 meters in depth, measured perpendicular to the building façade, are considered to be OLAs. In general, the following OLAs are considered NSAs:

- Private Dwellings: single family units and townhouses
- Multiple unit buildings such as apartments, provided they have a communal OLA associated with them
- Schools, educational facilities and daycare centers where there are OLAs for students
- Hospitals and nursing homes for the aged, provided they have an OLA for use by patients
- Campgrounds that provide overnight accommodation
- Hotels and motels with outdoor communal OLAs for visitors
- Churches and places of worship

The following land uses are generally not considered to qualify as NSAs:

- Apartment balconies;
- Cemeteries;
- Parks and picnic areas that are not part of a defined OLA;
- All commercial facilities; and
- All industrial facilities

3.2 REPRESENTATIVE NSAS WITHIN STUDY FOCUS AREA

3.2.1 YONGE STREET

The portion of the street that is considered for this Study is approximately 3.3 kilometres in length and extends from the municipal addresses of 4672 to 5915 on Yonge Street. The corridor is shown on the Figure 5a below. The locations along Yonge street are mostly commercial; however, five (5) NSAs are shown below that illustrate noise sensitive areas. Description of the NSA on Yonge Street are presented in Table 2a.

Table 2a Description of NSAs on Yonge Street

NSA ID	LOCATION	DESCRIPTION
NSA1	Young and Poyntz avenue (north east)	Residential/Commercial
NSA2	Yonge street and Spring Garden Avenue(north east)	Residential/Condominium
NSA3	Young street and Church avenue(north east)	Cemetery/Place of Worship
NSA4	Young street and Church avenue(north east)	Place of Worship
NSA5	Young Street and Byng avenue(north east)	Residential

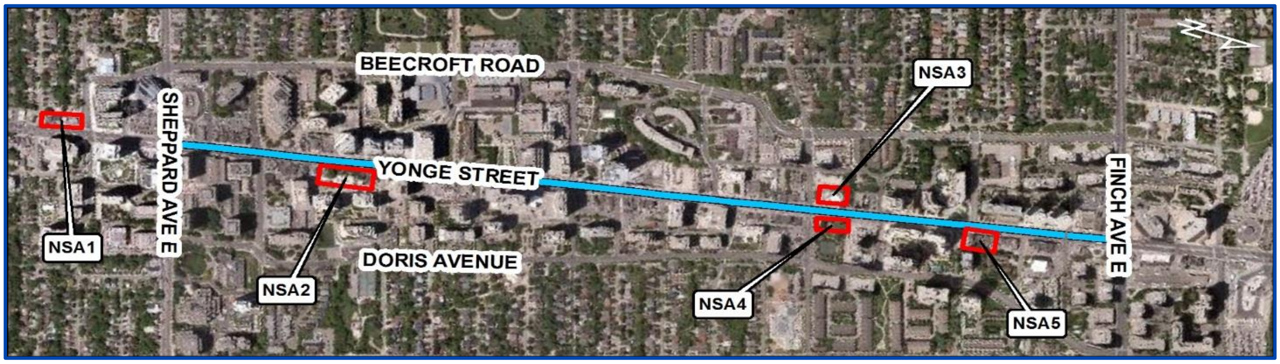

Figure 5a Representative Receptors around the Yonge Street

3.2.2 BEECROFT ROAD

The Site is approximately 2 kilometres in length and extends from the municipal addresses of 37 to 509 on Beecroft Road. The corridor is shown on the Figure 5b below. The locations along the Beecroft are mostly residential and seven representative NSAs are shown below that illustrate noise sensitive land use land use.

Table 2b Description of NSAs on Beecroft Road

NSA ID	LOCATION	DESCRIPTION
NSA6	Beecroft road and Sheppard avenue west (north west)	Healthcare Facility
NSA7	Beecroft road and Park Home avenue (north west)	Residential
NSA8	Beecroft road and Churchill avenue (north west)	Residential
NSA9	Beecroft road and Elleslie Avenue (north east)	Place of Worship
NSA10	Beecroft road and Churchhill avenue (north west)	Residential
NSA11	Beecroft road and Housnslow avenue (north west)	Residential
NSA12	Beecroft road and Finch Avenue west (north west)	Residential

Figure 5b Representative Receptors around Beecroft Rd.

3.2.3 DORIS AVENUE

The Site is approximately 2.1 kilometres in length and extends from the municipal addresses of 9 to 212 on Doris Avenue. The corridor is shown on the Figure 5c below. The locations along the Beecroft are mostly residential and five representative NSAs are shown below that illustrate residential land use.

Table 2c Description of NSAs on Doris Avenue

NSA ID	LOCATION	DESCRIPTION
NSA13	Doris Avenue and Spring garden avenue (north west)	Residential
NSA14	Doris Avenue parallel to Glady's Allison place (north west)	Residential
NSA15	Doris Avenue and princess avenue (north west)	Residential
NSA16	Doris Avenue and Kingsdale (north west)	Residential
NSA17	Doris Avenue and Kenneth avenue (north east)	Residential

Figure 5c Representative Receptors around Dories Ave.

4. ROAD PROPERTIES

When assessing the noise impact of modifications of roadways, the overall sound level from the future traffic volume and other traffic parameters as stated is important, but of equal importance is the change resulting from physical modifications of the roads. To understand and evaluate this change, the following road properties should be taken into account.

4.1 ROAD SURFACE CONDITION

Road surface conditions have significant impact on the noise radiated by the road traffic. For example, a concrete surface tends to create louder noise than an asphalt surface. Also, poor road surfaces create impulsive noise as vehicles typically encounter rough discontinuities.

For this project, special pavement treatments are being explored at three (3) locations – Olive Square, Mel Lastman Square and near the Joseph Shepard building. The special pavement treatments have the potential to contain noise levels in general.

4.2 ROAD GRADIENT

Road gradient significantly affects traffic noise as vehicle engine noise increases, while travelling up a slope, with heavy vehicles producing more noise. However, for a significant noise impact, the grade should not be trivial and must be for a reasonable length. The Ontario Road Noise Analysis Method (ORNAMENT) calculates the effect of grade only for the trucks, ignoring the effects of small vehicles and only if the total gain in elevation exceeds six (6) meters and grade exceeds 2%.

Yonge Street from Sheppard Avenue to the Finch Hydro Corridor is relatively flat, therefore road gradient is not anticipated to cause increase in significant noise along Yonge Street.

4.3 HORIZONTAL ALIGNMENT

A receptor located close to a road experiences a greater noise impact compared to a distant receptor. This is important for widening of roads, whereby traffic lanes are closer to the adjacent homes.

For this Project, all of the work will be occurring within the City's existing property limits, and the major reconstruction will occur from curb to curb. Therefore, the travel lanes will not be moving closer to the existing receptor locations.

4.4 GEOMETRY

Receptors can benefit from natural shielding from road traffic. For example, if a receptor is located behind a berm, row of trees or a hillock, the noise impact would naturally be lower when such shielding is in place. In general, when a roadway is depressed below the surrounding receptor grade, the lip of the cut again provides noise shielding. When road is at a higher elevation compared to the nearby receptors, the noise impact is increased. Shielding is not considered in the noise assessment modeling for the Project.

5. NOISE IMPACT ASSESSMENT

Under the applicable MOECC and MTO guidelines, the assessment should be conducted by comparing noise levels “with” and “without” from 10 years after implementation of the project. So, essentially, “Future 2031” sound levels (i.e., 2031 Horizon Year with the project in place) versus “Future 2031” sound levels (i.e., 2031 Horizon Year without the project) should be compared.

5.1 ROAD TRAFFIC DATA

Future 2031 sound levels are dependent upon the projected traffic data. Parameters such as Annual Average Daily Traffic (AADT) data, existing and proposed speed limits, day/night split traffic volume, vehicle classification in terms of automobiles, medium trucks and heavy trucks, and signalized Intersections are analysed for noise impact assessment.

5.1.1 ANNUAL AVERAGE DAILY TRAFFIC

The City of Toronto Traffic Safety Unit provided a 24-Hour Traffic Count Summary Report that was completed for a day in 2014 (Appendix A). This is the currently available traffic data with the City of Toronto for Yonge Street. The Report provides both northbound and southbound data for different sections of Yonge Street within the Study Area in terms of AM Peak, PM Peak and 24 hours total. While the traffic data varies from section to section, the average 24-hours traffic volume for northbound is 27,618 and for southbound is 27,266 with total traffic volume of 54,884. However, as a conservative estimate for this analysis a 24-hour AADT data has been taken as 60,000.

5.1.2 SPEED LIMIT

Existing speed limit for Yonge Street within the Study Area is 50 km/hour, and is summarized in Table 2.

5.1.3 DAY/NIGHT SPLIT

A split of 90% –10% day-night traffic volume was used for all the section of the roads in the project and is summarized in Table 2.

5.1.4 VEHICLE CLASSIFICATION

For noise impact assessment, vehicular traffic is classified into three different types: automobiles, medium trucks and heavy trucks.

Automobiles are classified as motorized vehicles, comprised of two (2) axles and four (4) wheels, meant for the transportation of a maximum of nine (9) passengers, light trucks for transportation of cargo, and motorcycles. Medium trucks, two (2) axles and six (6) wheels, are designed for transportation of cargo and have a gross vehicle weight (GVW) between 4500 and 12,000 kg. Heavy trucks, three (3) or more axles, are designed for transportation of cargo with a gross vehicle weight of more than 12,000 kg. The vehicle volume percentage splits for various sections of the roads are summarized in Table 2 as per past experiences for such roads. Although five NSAs are shown on Figure 5A, this assessment has used only one representative NSA, NSA4, as it is the receptor located closest to Yonge Street. .

Table 2 Traffic Parameters for Future Noise Level Predictions for the Year 2031

RECEPTOR	% ANNUAL GROWTH	DISTANCE, METER	PROJECTED YR	AADT, VEH/DAY	POSTED SPEED, KM/H	% MEDIUM TRUCKS	%HEAVY TRUCKS	% DAY NIGHT
NS4	1%	50	15	60,000	50	3	2	90/10

Note: Medium Trucks volume has been taken as mere 90% and that of Heavy Trucks as 10% which is a conservative estimate for Yonge Street.

5.2 NOISE MODEL

ORNAMENT developed by the MOECC, was used to assess the potential noise impacts.

ORNAMENT was applied using the computer software program STAMSON to predict sound levels generated from road sources in the outdoor living area of NSAs. The program considers variables such as traffic volumes, percentage of trucks and distance from roadway, roadway grade, posted speed limit, topography, barriers and vegetation. Sound levels were predicted for both the future 2031 “With” and future 2031 “Without” the implementation of the project scenarios.

Sound levels are predicted in decibels on the A-weighted (dBA) scale, which best approximates the human perception of sound over a specified time period. In accordance with the MOECC Guidelines, the 16-hour equivalent daytime and 8-hour equivalent nighttime sound levels were calculated using the STAMSON noise software program.

In addition to traffic volume, vehicle split and truck percentage, the following STAMSON input variables were considered for the calculation of future sound levels:

- Topography (hills, flat lands)

- The intermediate ground surface (hard surface reflects sound, soft surface absorbs sound)
- Distance, in metres, from source to receptor, using the centreline of the road (or road segment) as the source
- The angle at which the receptor intercepts the source (roadway), measured relative to the perpendicular line between the source and the receptor
- Receptor height of 1.5 metres for the OLA
- Roadway grade or slope
- Any existing noise barriers, etc.

5.3 NOISE MODEL RESULTS

Both the two "with" and "without" scenarios were estimated using STAMSON noise software program for day and night time sound levels for the OLA located at NSA4 (between Church Avenue and Northtown Way). The noise impacts at other NSAs are anticipated to be the same. The results are shown in Table 4 below. STAMSON model outputs are attached in Appendix B.

Table 3 Noise levels: "With" and "Without" Project Scenarios

Scenario	Noise Levels (dBA)	
	Day Time	Night Time
With The Project Implementation	61.46	55.26
Without The Project Implementation	70.15	63.75
Change due to Undertaking	***- 8.69***	***- 8.49***

Modelling results for both scenarios indicate that projected noise levels after 10 years are comparatively less for implemented project conditions than the scenario without the project. This is because the existing 6-lane roadway is being reduced to 4-lanes from Sheppard Avenue to Finch Avenue, which results in the reallocation of space for cycle tracks and pedestrian clearway. Yonge Street is not being widened, and a major reconstruction will occur from curb to curb.

Including cycling lanes in the service roads, Doris Avenue and Beecroft Road, does not impact noise levels after 10 years. This is because of the fact that cycling activity does not generate ambient noise levels. In addition, there is no proposal to reduce or increase the existing travel lanes on either of these service roads and accordingly there will not be trends of decrease or increase in vehicular traffic contributing to change in ambient noise levels.

Based on the proposed works (streetscape, public realm and infrastructure improvements) and the results from assessment, the noise impact is anticipated to be less than 65 dBA at all receiver locations. Therefore, noise mitigation measures are not warranted for any locations within the Study Area. These noise impacts are highly conservative.

It should be noted that the sound level changes of 0 to less than 3 dBA are considered acoustically insignificant, while the changes from 3 to less than 5 dBA are considered acoustically noticeable. However, as noted earlier, from this Study, with the construction of the Project it is anticipated that the noise impact will be reduced from existing conditions.

6. CONSTRUCTION NOISE

Unlike the noise emitted by the operation of vehicles on the roads, noise due to construction is temporary in nature, and largely unavoidable. The noise impact levels during construction depends upon size and number of pieces of equipment being used, their types, time of operation and their proximity with the NSAs. However, with adequate controls, noise impacts can be minimized even though for some periods of time and types of work, construction sound levels will be perceptible.

The following construction activities are anticipated for this project:

- Modification of existing surface pavements;
- Construction and rehabilitation of the base course;
- Addition of new cycle tracks along Yonge Street;
- Construction of parking bays;
- Paving and repaving of the roadway surface; and,
- Construction of a median and planters for street trees.

Recommendations relating to the management of construction noise are summarized below.

- In conjunction with the City's Public Consultation Unit (PCU), the contractor should notify adjacent property owners (i.e., residents, businesses, etc.) in advance of construction.
- The contractor should obtain copies of the current noise control by-laws from the City of Toronto. Where adherence of the laws is not possible and mitigation is not feasible, an exemption from the City of Toronto should be obtained before the start of construction work. The Preliminary Design Phase anticipates that a noise bylaw exemption for night work is required, and it will be further reviewed and obtained during the Detail Design Phase.
- The MOECC stipulates limits on sound emissions from various equipment used in the construction. Sound emission standards for the various types of construction equipment used on the project must be checked to ensure that they meet the specified limits contained in MOECC Publication NPC-115 – "Construction Equipment".
- Unnecessary noise emission by faulty or non-operating components of equipment should be minimized by regular maintenance of the equipment. Idling of construction equipment should be restricted to the least minimum time necessary to complete any specific task.
- The construction equipment should be operated with effective muffling devices that are in good working condition.
- Regular maintenance of construction equipment must be undertaken for minimizing the noise level.
- Should the authorities receive any complaint from the public; the staff will verify that the "general noise control measures" agreed to, are in effect. The authorities will investigate any noise concerns, warn the contractor of any problems and enforce its contract.

If the "general noise control measures" are complied with, but if public noise complaints arise during construction, the authorities will require the contractor to comply with the MOECC sound level criteria for construction equipment contained in the MOECC's Model Municipal Noise Control By-Law. Subject to the results of a field investigation, alternative noise control measures may be required, where these are reasonably available.

In selecting the appropriate construction noise control and mitigation measures, the contractor will give consideration to the technical, administrative, and economic feasibility of the various alternatives.

Table 4 NPC-115 Maximum Noise Emission Levels for Typical Construction Equipment

Equipment Type	*Maximum Sound Level in dBA	Distance (m)	Power Rating (kW)
Excavation Equipment (includes includes bulldozers, backhoes, front end loaders, graders, excavators, steam rollers	83	15	< 75
	85	15	>75
Pneumatic Equipment (includes pavement breakers)	85	7	--
Portable Compressors	86	7	--

*(equipment manufactured after Jan. 1, 1981)

Subject to the results of a field investigation, alternative noise control measures may be required, where these are reasonably available. In selecting the appropriate construction noise control and mitigation measures, the municipality will give consideration to the technical, administrative, and economic feasibility of the various alternatives.

7. CONCLUSIONS

Predicted noise levels at OLA during daytime and night time for the representative NSA is estimated to be approximately 61.5 dBA and 55.3 dBA respectively 10 years with the implementation of the project. The noise impacts at other NSAs are not considered significant. Based on this noise impact assessment, should the number of travel lanes be reduced from six (6) to four (4)on the Yonge street, there will be reduction in noise levels with the implementation of the project.

Therefore noise mitigation measures are not warranted for any location within the Study Focus Area. It should also be noted that these noise impacts are highly conservative.

Including cycling lanes in the service roads; Doris Avenue and Beecroft Road does not impact noise levels after 10 years. This is because of the fact that cycling activity does not generate ambient noise levels. In addition, there is no proposal to reduce or increase the existing travel lanes on both of these service roads and accordingly there will not be trends of decrease or increase in vehicular traffic contributing to a change in ambient noise levels.

8. REFERENCES

- MTO, Noise: Technical Requirements for Environmental Impact Study and Environmental Protection / Mitigation, October 2006.
- MOECC NPC-300, “Environmental Noise Guideline Stationary and Transportation Sources – Approval and Planning”, August 2013.
- City of Toronto By-law No. 111-2003.
- Ontario Ministry of the Environment. STAMSON v5.04. “Noise Assessment and Systems Support Unit.” c. 1996.

Appendix A

ROAD TRAFFIC DATA

City of Toronto - Traffic Safety Unit

24-Hour Count Summary Report

YONGE ST	STAT CODE	ARTERY CODE	COUNT DATE	AM PEAK	AM PEAK HOUR	PM PEAK	PM PEAK HOUR	OFF HOUR PEAK	OFF HOUR PEAK HOUR	24 HOUR Total
Northbound Category: 24 HOUR										
YONGE ST N/B N OF BYNG AVE	7226	7226	7/11/99 Sun	447	08:45 - 09:45	1,236	17:15 - 18:15	1,286	12:15 - 13:15	18,976
YONGE ST N/B N OF POYNTZ AVE	7227	7227	4/12/00 Wed	2,081	08:00 - 09:00	2,463	17:30 - 18:30	1,960	11:45 - 12:45	31,933
YONGE ST N/B S OF ELMWOOD AVE	1903	1903	12/11/03 Thu	1,825	08:15 - 09:15	2,299	17:30 - 18:30	1,947	14:30 - 15:30	31,246
YONGE ST N/B N OF CHURCHILL AVE	13836	13836	2/21/06 Tue	1,283	08:00 - 09:00	1,773	16:45 - 17:45	1,342	14:30 - 15:30	23,326
YONGE ST N/B N OF SHEPPARD AVE	3885	3885	11/11/10 Thu	1,539	08:15 - 09:15	1,491	17:30 - 18:30	1,542	12:45 - 13:45	25,160
YONGE ST N/B S OF BYNG AVE	1830	1830	10/11/12 Thu	1,412	08:00 - 09:00	1,999	16:45 - 17:45	1,669	14:30 - 15:30	26,873
YONGE ST N/B S OF CHURCH AVE	3686	3686	10/11/12 Thu	1,318	07:45 - 08:45	1,781	16:45 - 17:45	1,513	14:30 - 15:30	25,096
YONGE ST N/B S OF CUMMER AVE	1846	1846	10/11/12 Thu	1,708	08:00 - 09:00	2,286	17:00 - 18:00	1,834	14:30 - 15:30	29,590
YONGE ST N/B S OF EMPRESS AVE	1857	1857	10/11/12 Thu	1,316	08:00 - 09:00	1,731	17:00 - 18:00	1,508	14:30 - 15:30	24,218
YONGE ST N/B S OF FINCH AVE	1861	1861	10/11/12 Thu	1,533	08:00 - 09:00	1,784	16:00 - 17:00	1,595	14:30 - 15:30	26,121
YONGE ST N/B S OF GREENFIELD AVE	1872	1872	10/11/12 Thu	1,787	08:00 - 09:00	1,899	17:30 - 18:30	1,769	13:00 - 14:00	29,459
YONGE ST N/B S OF NORTH YORK BLVD	1902	1902	10/11/12 Thu	1,695	08:00 - 09:00	1,722	17:30 - 18:30	1,654	13:30 - 14:30	27,108
YONGE ST N/B S OF POYNTZ AVE	1907	1907	10/11/12 Thu	2,085	08:15 - 09:15	1,901	17:30 - 18:30	1,966	13:30 - 14:30	32,311
YONGE ST N/B N OF GREENFIELD AVE	3884	3884	6/27/13 Thu	1,790	08:15 - 09:15	1,931	17:30 - 18:30	1,733	12:45 - 13:45	29,330
YONGE ST N/B S OF GO TERMINAL N OF BISHOP	30702	30702	6/27/13 Thu	1,524	08:00 - 09:00	1,802	17:00 - 18:00	1,571	12:00 - 13:00	26,275
YONGE ST N/B S OF BISHOP AVE	1824	1824	10/3/14 Fri	1,395	08:30 - 09:30	1,700	16:45 - 17:45	1,507	13:45 - 14:45	23,821
YONGE ST N/B S OF SHEPPARD AVE	1920	1920	10/3/14 Fri	2,405	08:15 - 09:15	2,544	17:30 - 18:30	2,296	13:00 - 14:00	38,671
			Northbound Total:	27,143		32,342		28,692		469,514
			Northbound Average:	1,597		1,902		1,688		27,618
Southbound Category: 24 HOUR										
YONGE ST S/B N OF GLENDORA AVE	3882	3882	12/11/01 Tue	2,615	07:45 - 08:45	2,576	16:45 - 17:45	2,141	10:00 - 11:00	35,595
YONGE ST S/B N OF GO TERMINAL N OF BISHOP	29593	29593	4/5/07 Thu	2,264	07:45 - 08:45	1,781	17:30 - 18:30	1,655	14:30 - 15:30	28,811
YONGE ST S/B S OF CUMMER AVE	13878	13878	11/4/10 Thu	2,186	07:45 - 08:45	1,527	17:00 - 18:00	1,391	14:30 - 15:30	25,259
YONGE ST S/B S OF SHEPPARD AVE	23071	23071	11/17/10 Wed	1,798	07:15 - 08:15	1,806	15:30 - 16:30	1,725	13:30 - 14:30	28,646
YONGE ST S/B S OF FINCH AVE	23073	23073	11/18/10 Thu	1,422	08:15 - 09:15	1,334	14:45 - 15:45	1,291	14:30 - 15:30	22,047
YONGE ST S/B S OF PARK HOME AVE	23072	23072	11/18/10 Thu	1,356	08:45 - 09:45	1,288	14:45 - 15:45	1,279	14:15 - 15:15	21,266
YONGE ST S/B N OF CHURCHILL AVE	1842	1842	10/11/12 Thu	1,859	08:00 - 09:00	1,584	15:00 - 16:00	1,526	14:30 - 15:30	25,983
YONGE ST S/B N OF DREWRY AVE	1850	1850	10/11/12 Thu	2,204	08:00 - 09:00	1,903	17:30 - 18:30	1,698	14:15 - 15:15	29,175
YONGE ST S/B N OF FINCH AVE	1862	1862	10/11/12 Thu	1,765	07:45 - 08:45	1,666	17:30 - 18:30	1,618	14:15 - 15:15	26,651
YONGE ST S/B N OF KEMPFORD BLVD	1881	1881	10/11/12 Thu	1,857	08:15 - 09:15	1,613	14:45 - 15:45	1,630	14:00 - 15:00	27,362
YONGE ST S/B N OF NORTH YORK BLVD	1904	1904	10/11/12 Thu	1,408	07:15 - 08:15	1,477	15:00 - 16:00	1,476	14:30 - 15:30	24,199

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City of Toronto - Traffic Safety Unit

24-Hour Count Summary Report

YONGE ST	STAT CODE	ARTERY CODE	COUNT DATE	AM PEAK	AM PEAK HOUR	PM PEAK	PM PEAK HOUR	OFF HOUR PEAK	OFF HOUR PEAK HOUR	24 HOUR Total
YONGE ST S/B N OF PARK HOME AVE	1858	1858	10/11/12 Thu	1,565	08:15 - 09:15	1,591	14:45 - 15:45	1,600	14:30 - 15:30	25,553
YONGE ST S/B N OF POYNTZ AVE	1908	1908	10/11/12 Thu	2,333	07:15 - 08:15	2,352	15:00 - 16:00	2,152	14:30 - 15:30	35,026
YONGE ST S/B N OF ELMHURST AVE	1856	1856	6/27/13 Thu	1,447	07:30 - 08:30	1,474	17:30 - 18:30	1,503	10:45 - 11:45	24,495
YONGE ST S/B N OF HENDON AVE	20190	20190	10/3/14 Fri	1,766	08:00 - 09:00	1,695	17:30 - 18:30	1,543	14:30 - 15:30	25,966
YONGE ST S/B N OF SHEPPARD AVE	1921	1921	10/3/14 Fri	1,720	07:15 - 08:15	2,040	16:00 - 17:00	1,760	13:45 - 14:45	30,223
			Southbound Total:	29,565		27,707		25,988		436,257
			Southbound Average:	1,848		1,732		1,624		27,266
YONGE ST				56,708		60,049		54,680		905,771

Comment:

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Appendix B

STAMSON OUTPUT

YONGE

STAMSON 5.0 NORMAL REPORT Date: 19-09-2016 12:02:42
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: yonge.te Time Period: Day/Night 16/8 hours
Description:

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

Car traffic volume	: 57234/6359	veh/TimePeriod	*
Medium truck volume	: 1807/201	veh/TimePeriod	*
Heavy truck volume	: 1205/134	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)	: 60000
Percentage of Annual Growth	: 1.00
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: Yonge (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	: 60.00 / 60.00 m	
Receiver height	: 1.50 / 4.50 m	
Topography	: 1	(Flat/gentle slope; no barrier)
Reference angle	: 0.00	

Results segment # 1: Yonge (day)

Source height = 1.19 m

ROAD (0.00 + 60.63 + 0.00) = 60.63 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.66	72.08	0.00	-9.99	-1.46	0.00	0.00	0.00	60.63

Segment Leq : 61.46 dBA

Total Leq All Segments: 61.46 dBA

Results segment # 1: Yonge (night)

Source height = 1.19 m

ROAD (0.00 + 54.72 + 0.00) = 54.72 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.58	65.55	0.00	-9.51	-1.32	0.00	0.00	0.00	54.72

Segment Leq : 54.72 dBA, Total Leq All Segments: 55.26 dBA,

TOTAL Leq FROM ALL SOURCES (DAY): 61.46
(NIGHT): 55.26