

## **DETAILED COMMENTS**

### **The Proposed Transit Project**

In order to meet Toronto's projected transit ridership growth, the Toronto Transit Commission (TTC) proposed a new bus garage at the McNicoll Avenue site, located in the northeast part of Toronto. The current capacity of the existing TTC bus garages is approximately 1,630 buses. The forecasted growth in transit ridership will require the acquisition of approximately 120 additional buses by 2018. As such, TTC determined the current bus garage capacity must be increased by over 200 buses within the next five years and it will require a new bus garage in order to accommodate the growth.

The proposed facility will be located on McNicoll Avenue, just east of Kennedy Road. When built, the facility will be able to accommodate 250 conventional buses, a maintenance shop and office, a transportation office and a bus service area. The maintenance shop will include maintenance bays, brake shop, degrease shop, body shop, touch-up paint shop and an inspection shop.

The potential environmental impacts of the project are being assessed under the Ontario's Transit Project Assessment Process (TPAP). In this streamlined environmental assessment process the assessment of potential impacts and decision-making can be completed within a shorter timeframe. As part of the TPAP process, TTC commissioned a number of environmental and health studies that comprise the Environmental Project Report (EPR) that is to be submitted to the Ministry of Environment and Climate Change (MOECC) for review and approval.

### **Community Concerns**

Several interest and community groups, including the Mon Sheong Foundation, Bamburgh Gate Condominium Complex, the Scarborough Chinese Baptist Church, have expressed concerns over the proposed facility. In particular, the community is concerned about impacts of bus emissions on air quality, noise impacts, increased traffic impacts on the McNicoll Avenue, Kennedy Road and the proposed Redlea Avenue, and safety impacts related to seniors residing in the Mon Sheong Foundation Long Term Care Facility and Seniors Residence.

## **COMMENTS**

### **Scope of the Review**

On August 28, 2014, City Council approved the McNicoll Bus Garage Draft Environmental Report and authorized the submission of the report to the Ministry of Environment and Climate Change as part of the TPAP process. Furthermore, City Council requested the Chief Executive Officer of the TTC to report to the Transit

Commission on consultation with Toronto Public Health (TPH) regarding potential community health impacts of the project.

In response to the request, Toronto Public Health undertook an independent review of the health-related studies commissioned by the TTC for the purpose of the TPAP process. The scope of the review was limited to the air quality assessment, the noise assessment, traffic impact assessment, and the screening level human health risk assessment. In addition, TPH requested the TTC to undertake air quality roadway assessment and further noise impact analysis to further characterize the potential risks. Both were completed by TTC and reviewed by TPH.

## **Air Quality Assessment**

Novus Environmental was retained by the TTC to assess the potential air quality impacts from the proposed facility. The Air Quality Assessment involved the evaluation of combined air quality impacts resulting from background concentrations, facility emissions, and on-site and off-site emissions from future buses and employee vehicles. On a request from TPH, TTC specifically assessed the potential future impacts of the additional buses on Redlea Avenue as well as associated vehicle traffic.

### Assessment Approach

The McNicoll Bus Garage air quality assessment focused on contaminants related to the proposed facility that are most often associated with adverse human and environmental impacts. They include both criteria air contaminants (CACs) and volatile organic compounds (VOCs) emitted during fuel combustion, brake and tire wear and the breakdown and resuspension of road dust. For the purpose of the assessment, background conditions were characterized using existing air quality data from the Ministry of the Environment and Climate Change (MOECC) and the National Air Pollution Surveillance (NAPS) stations. As some stations were located at a distance from the proposed facility, the station with the highest maximum value over the last available 5-year period for each contaminant and averaging period was chosen for analysis. This is considered very conservative as it represents the absolute worst-case background concentration.

In order to assess emissions from the proposed facility, emission rates were estimated for vehicles, heating equipment, paint booth and shop area, and liquid storage tanks using established United States Environmental Protection Agency (US EPA) and MOECC emission factors. The emission factors were used in the air dispersion modelling to predict hourly, 8-hour and 24-hour concentrations at identified sensitive receptors in the area, mainly the Mon Sheong Long-Term Care Facility and Mon Sheong Court. The modelled concentrations were compared to the MOECC Ambient Air Quality Criteria (AAQC) and the Canadian Council of Ministers of the Environment (CCME) Canada Wide Standards (CWSs).

## Results

The air quality assessment predicted potential exceedence of the AAQCs for PM2.5, PM10, and benzene to occur less than 1% of the time over a five year time period. For all three substances, the contribution from the facility and the associated roadway traffic constitutes a small percentage of the predicted impact, with majority of the impact being attributable to the existing background sources. All other contaminants considered in the assessment met the provincial AAQC guidelines. It should be noted the predicted air quality concentrations are considered to be very conservative. They are based on combining the worst-case background ambient air quality concentration with the worst-case scenario facility concentration and roadway modelling, assuming they will occur at the same time. The Novus Environmental air quality report concluded the addition of the bus garage and the associated roadway traffic will account for small incremental change in overall air quality. It is unlikely the emissions from the proposed facility alone will result in adverse impacts to health.

## **Screening Level Human Health Risk Assessment**

Intrinsic was retained by TTC to conduct a Screening Level Human Health Risk Assessment (SLHHRA) to assess potential human health impacts associated with the expected emissions from the facility and the corresponding traffic. A SSHHRA is a quantitative evaluation of risk typically related to worst-case exposure scenarios. It relies on the use of existing data to provide conservative estimates and characterization of human health risk. As there are many conservative assumptions built into the process, a SLHHRA cannot predict whether potential health risks will occur, but rather determine whether significant human health risks are unlikely to occur.

## Assessment Approach

The SLHHRA undertaken by Intrinsic was based on widely accepted risk assessment methodologies and guidance developed and utilized by regulatory agencies across North America and Europe. The framework consists of four main steps: problem formulation, exposure assessment, hazard assessment and risk characterization. The predicted air quality concentrations modelled at 21 discrete sensitive receptors were combined with toxicity reference values (TRVs) to characterize both short-term "acute" and long-term "chronic" risk for each contaminant of concern, both carcinogens and non-carcinogens.

## Toxicity Reference Values

The TRVs used to characterize risk in the SLHHRA were chosen based on an extensive consultation with TPH. In this case the most current and conservative TRVs from variety of credible regulatory agencies were selected for each contaminant and each averaging period. The TRVs used in the assessment reflect the current evidence of the toxicity of each substance and are meant to be protective of the sensitive receptors, such as the elderly.

## Assumptions and Conservatism

There were a number of assumptions made during the risk assessment process that introduce a high level of conservatism into the SLHHRA likely resulting in the overestimation of human health risk. Such approach is common in screening level risk assessments as it allows for the evaluation of the worst-case scenarios and the quantification of the corresponding risk. Conservative assumptions were introduced at nearly every step of the risk assessment process, including exposure assessment and toxicity.

## Results

The results from the SLHHRA indicate the projected emissions from the proposed facility alone are unlikely to result in unacceptable human health risk. However, under worst-case conditions, facility emissions combined with the existing background conditions have been predicted to exceed acute, non-carcinogenic health-based benchmarks for PM<sub>2.5</sub>, PM<sub>10</sub> and NO<sub>2</sub>. For PM<sub>2.5</sub> and PM<sub>10</sub> the majority of the health risk is attributable to the existing background conditions with negligible contribution from the facility. For NO<sub>2</sub>, approximately half of the cumulative risk is attributable to the facility and the related roadway.

In order to characterize carcinogenic risk, incremental lifetime cancer risk was calculated for each carcinogenic substance and compared to widely accepted benchmarks of one-in-one-million (or  $1 \times 10^{-6}$ ), or one additional cancer case in a population of one million. This is risk related to the emissions from the facility alone, and not the background conditions. Results of the carcinogenic assessment indicate that none of the substances exceed the one-in-one-million benchmark.

As there were many conservative assumptions incorporated into the SLHHRA, the quantified risk are likely an overestimation of the actual human health risk. As such, potential impacts from the proposed facility are likely to be negligible, especially when compared with existing background conditions

## **Noise Assessment**

Novus Environmental was retained by the TTC to assess the overall noise emissions from the proposed facility and compare the results to the relevant noise guidelines. For the purpose of the TPAP process, the results of the noise assessment were compared to MOECC Publication NPC-300. The Publication NPC-300 was developed by the MOECC in order to evaluate and minimize noise impacts that may result in an "adverse effect" as defined under the Environmental Protection Act.

The Novus Environmental assessment entailed consideration of both, the ambient sound levels from the surrounding roadways and the projected worst-case noise levels from the facility. The noise levels were modelled at sensitive receptors identified in the

area. The Novus report concluded that with the inclusion of appropriate noise mitigation measures, all NPC-300 noise guidelines will be met. TPH consulted with the MOECC staff and was informed the future facility will need to obtain an Environmental Compliance Approval (ECA) and demonstrate to the Ministry that NPC-300 guidelines are in fact met.

### Health-Based Noise Benchmarks

As a result of consultation with TPH, Novus Environmental compared the projected noise levels against a number of additional health-based noise guidelines. There is a growing body of evidence that noise at certain levels is associated with several health outcomes such as sleep disturbance, cardiovascular disease, and annoyance (Van Kamp & Davies, 2013). The additional analyses indicate that:

- impacts from the project in relation to health endpoint such as ischemic heart disease and hypertension are unlikely
- the WHO criteria for annoyance in outdoor areas are exceeded under the existing conditions and with the proposed facility; the increase in noise levels due to facility is negligible
- maximum predicted noise increase from the project is less than 1%, much lower than the Health Canada benchmark of 6.5%
- at some locations, the existing and predicted noise levels exceed the WHO guideline for nighttime noise; the exceedances are largely due to ambient noise levels

Based on the results of the additional analysis, it is unlikely that noise related to the proposed facility will result in adverse effects on health. The addition of the McNicoll bus garage will account for small incremental change in noise levels, especially as it relates to the existing and future ambient noise levels in the area.

### **Traffic Assessment**

Concerns about traffic and potential impacts on pedestrian safety were raised throughout the consultation process. Stakeholders identified concerns for the intersection of Kennedy Road and McNicoll Avenue, as well as the proposed Redlea Avenue. Concerns were raised particularly about seniors and those with mobility issues that reside in the area and utilize these roads. A Traffic Impact Study was carried out by the URS Canada Inc. to assess the existing traffic conditions, forecast future traffic associated with the proposed development, and to assess future traffic conditions. The Traffic Impact Study concluded the following:

- The movements at Kennedy Road and McNicoll Avenue intersection at the p.m. peak hour were near capacity
- Under the future scenario (the sum of future background traffic and site specific traffic) the intersections in the vicinity of the site are expected to operate poorly during peak hours

- The peak operating periods of the proposed facility do not coincide with the a.m. and p.m. periods of traffic
- The addition of the bus garage traffic will account for small incremental change in total future traffic volume

While the Traffic Impact Study provided projections of the traffic volumes associated with the future growth in the area as well as the proposal, it did not assess the potential increase in traffic injuries that may be associated with that. Links between traffic volume higher rates of injury are well established in the literature. In a 2007 evidence review, Williams & Wright state that "traffic volume, defined as the number of vehicles on the roadway, is the most important causal factor in traffic collisions, injuries and fatalities" (p. 40).

A quantitative assessment of traffic volume-related injuries was not possible at the time of the review, however, it is expected that general growth in the area may result in higher injury rates. Redlea Avenue, which currently terminates south of Steeles Avenue, will be extended south to Milliken Boulevard. Toronto Public Health staff consulted with City Planning, the Redlea Avenue is being extended independently of the proposed McNicoll bus garage. The future extension is proposed to have a three-lane urban cross-section and a speed limit of 60 kilometers per hours. It is anticipated this will add considerable traffic volume to the area, in addition to the projected traffic growth on McNicoll Avenue and Kennedy Road. The URS Canada Inc. Traffic Impact Study concluded that the addition of the bus garage traffic will account for only a small incremental change in total future traffic volume.

## **CONCLUSION**

In order to meet Toronto's projected transit ridership growth, TTC must increase its capacity to house and service additional buses. The proposed McNicoll Bus Garage will provide TTC with an opportunity to allow for future growth. As part of the Transit Project Assessment Process, TTC commissioned a number of studies to assess the potential impact from the proposed facility. The environmental and health assessments completed by TTC to date, mainly the air quality, noise, and traffic assessment, and the Screening Level Human Health Risk Assessment, indicate the impacts from the facility alone are negligible and unlikely to result in adverse health effects.

## **References**

Van Kamp, I. & Davies, H. (2013). Noise and health in vulnerable groups: A review. *Noise & Health*, May-June 2013, 15:64, 153-9.

Williams, M. & Wright, M. (2007). The impact of the built environment on the health of the population: A review of the literature. ISBN 978-896603-13-1. Last accessed May 1, 2015.  
<http://www.simcoemuskokahealth.org/healthunit/Library/Research/BHCintro.aspx>