Appendix J

Air Quality Impact Assessment Report

DILLON CONSULTING

REPORT

THE CITY OF WINDSOR

7310 TECUMSEH ROAD EAST, WINDSOR, ONTARIO

AIR QUALITY IMPACT ASSESSMENT

RWDI # 2407997

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SUBMITTED TO

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1 INTRODUCTION

RWDI was retained by The City of Windsor to conduct an air quality assessment for the proposed East End Transit Terminal at 7310 Tecumseh Road East in Windsor, Ontario.

The scope of the study is itemized below:

- Use vehicle emissions modelling techniques to estimate tailpipe, brake wear, tire wear and road dust emissions associated with the traffic for 2026.
- Calculate the expected percentage difference of emission factors over a 20-year period (from 2026 to horizon year 2046).
- Quantify the effect of the difference in emission factors from 2026 to 2046 on off-site concentrations.
- Use a computer simulation of atmospheric dispersion to predict maximum contaminant concentrations at representative sensitive receptors due to vehicle emissions from the future conditions with the project (Future Build scenario).
- Use representative historical monitoring data to establish background concentrations for each contaminant of interest, due to various other sources in the surrounding area other than those associated with the proposed project.
- Combine the dispersion model results with the background concentrations and compare to applicable air quality thresholds for all scenarios.
- Conduct a semi-quantitative assessment to determine the incremental impact of greenhouse gases within the context of provincial emissions.
- Conduct a qualitative assessment of construction activities.

2 PROJECT DESCRIPTION

The project is described as the proposed East End Transit Terminal at 7310 Tecumseh Road East in Windsor, Ontario. The undertaking covers the construction of the proposed transit terminal on an approximately 0.67-hectare site. This Transit Terminal will be a replacement for the existing terminal at Tecumseh Mall and will be utilized by up to 35 buses per hour from a total fleet of 119 diesel-fueled and diesel-hybrid buses.

Figure 1 shows the study area and its surrounding land use. The study area consists of residential, commercial, industrial, and agricultural land uses. There are no critical receptors (such as retirement homes, hospitals, childcare centres, and schools) in the study area, however, there are several sensitive (residential) receptors. Sensitive receptors were identified within the study area based on the latest publicly available satellite imagery.

3 ASSESSMENT METHODOLOGY

This assessment generally followed the methodology described in the MTO "Environmental Guide for Assessing and Mitigating the Air Quality Impacts and Greenhouse Gas Emissions of Provincial Transportation Projects" (May 2020) (the "MTO Air Quality Guide").

3.1 Modelled Scenarios

The new terminal is expected to be completed in 2026; therefore, the assessment was undertaken for the **Build** scenario of the proposed project for 2026. This scenario includes the construction of the proposed transit terminal at 7310 Tecumseh Road East in Windsor, Ontario as a replacement for the existing terminal at the nearby Tecumseh Mall. Hourly bus volumes provided by The City of Windsor for the 2026 horizon year were used in this assessment. An additional **Future Build** scenario of the proposed project was conducted for the horizon year 2046, using the same data provided by the City of Windsor for 2026, as traffic volumes were assumed to be the same in future years.

Modelled emission factors from MOVES decrease significantly over the twenty-year horizon beyond inauguration in 2026 due to expected improvements in vehicle engine technology and removal of older vehicles from the fleet. The 2026 assessment is expected to provide a worst-case scenario for emissions impacts, with decreased emission factors compensating for any potential increase in traffic volume that may occur at the terminal in future years. However, emission impacts for the 2046 horizon year were also modelled to quantify this expected decrease. **Table 1** compares the emission factors from the MOVES software for the 2026 and 2046 horizon years.

3.2 Modelled Roadways

There are three potential routes that buses could take within the transit terminal:

- From the north entrance to the east platform area (L1);
- From the east platform area to the south exit (L2); and
- From the east platform area to the north exit (L3).

The south exit is an emergency exit only and traffic along this route was not considered in the modelling. All bus traffic accessing the terminal at the north entrance was assumed to proceed along the roadway segments east and west of the platform (L1 and L3) and exit to the north.

Sources representing bus idling and warm starts in parking areas were also included in the model. Two idling scenarios were considered in the modelling:

- **Idling Scenario 1**: One (1) idling source positioned in the centre of the platform area; and
- **Idling Scenario 2**: Eight (8) smaller idling sources positioned along the perimeter of the platform area.

The modelled roadways, idling and warm start sources are shown in **Figure 1** and **2**.

Other potential sources of emissions from the proposed site were not considered. The proposed building will be fully electric, therefore not generating any emissions that are released to the atmosphere from fuel combustion. Staff vehicles were not included as they are expected to be on-site occasionally, not full time. No staff parking other than occasional supervisors are expected to be using support vehicles at the site. Any emissions generated from the occasional use of staff vehicles is insignificant in comparison to emissions from buses at the terminal.

3.3 Traffic Data

Future bus traffic data for the horizon year 2026 was provided for the proposed East End Transit Terminal by the City of Windsor. This data was also used for the 2046 horizon year.

In order to assign the vehicle distribution percentages to appropriate vehicle classes, the MOVES vehicle classification by source type was used. Since this assessment involves the proposed bus terminal and no surrounding roadways, the only source type used was Transit Buses (MOVES Source Type 42).

An hourly profile was used to determine diurnal variation of traffic volumes. This traffic profile was based on the number of buses scheduled to use the terminal during the day (7 a.m. to 7 p.m.), evening (7 p.m. to 11 p.m.) and night (11 p.m. to 7 a.m.). **Table 2** provides a summary of the modelled traffic volumes. **Appendix A** provides additional detail of hourly traffic vehicle counts and the ratios used to estimate hourly traffic on the modelled roadways.

3.4 Key Air Contaminants

Vehicular traffic produces a variety of air contaminants from fuel combustion inside the engine, evaporation of fuel from the tank, brake and tire wear, and re-suspension (also known as re-entrainment) of loose particles on the road surface (silt) as the vehicle travels over the road surface. The following key contaminants were assessed:

- nitrogen dioxide (NO_2)
- carbon monoxide (CO)
- inhalable particulate matter (PM_{10})
- respirable particulate matter ($PM_{2.5}$)
- benzene
- 1,3-butadiene
- formaldehyde
- acetaldehyde
- acrolein
- benzo(a)pyrene

3.5 Air Quality Thresholds

The Ontario Ministry of Environment, Conservation and Parks (MECP) has Ontario Ambient Air Quality Criteria (AAQC) for airborne concentrations of NO_2, CO, PM_{10}, benzene, 1,3-butadiene, formaldehyde, acetaldehyde, acrolein and benzo(a)pyrene. The MECP does not have a benchmark for $PM_{2.5}$. The Canadian Council of Ministers of the Environment (CCME) has established Canadian Ambient Air Quality Standards (CAAQS) for $PM_{2.5}$ (CCME, 2022). CCME also has established standards for 1-hour and annual concentrations of NO_2 that will come into effect in 2025. The AAQCs and CAAQS are collectively referred to as air quality thresholds in this report. The thresholds are summarized in **Table 3**.

The CAAQS were developed for use by provinces and territories to guide air zone management actions. They are not project-level regulatory standards; measures mandated to achieve the CAAQS should consider technical achievability, practicality, and implementation costs (CCME, 2019).

3.6 Background Air Quality Data

AERMOD was used to predict the contribution of the modelled roadways to concentrations of contaminants at nearby sensitive receptors. The predicted maximum concentrations were combined with estimated background concentrations that are due to other emission sources in the surrounding area, thus providing a prediction of maximum cumulative concentrations.

The ambient background data for each key contaminant were taken from representative air quality monitoring stations within the ECCC National Air Pollution Surveillance (NAPS) Program and MECP ambient air monitoring station network. A review of representative stations with relevant data for the key contaminants was completed.

The NAPS and MECP monitoring stations were selected for parameters available from the stations. Volatile organic compounds (VOCs) and polycyclic aromatic hydrocarbons (PAHs) are only monitored at select monitoring stations. The sources of background monitoring data used for this study are presented in **Table 4.**

In the case of NO_2, hourly monitoring data was available for the Windsor Downtown monitoring station that allowed estimation of background concentration by hour of day. As background concentrations vary widely from day to day, a 90^{th} percentile concentration was calculated for each hour of the day using 5 years of hourly monitoring data from 2018 to 2022, as this represents the most recent dataset available. The resulting background concentrations represented the highest background conditions likely to coincide with maximum predicted concentrations from the modelled roadways. These background concentrations were used when predicting maximum 1-hour and 24-hour cumulative concentrations of NO_2. For the annual averaging period, the annual mean values were used.

PM_{10} monitoring data were not available; therefore, PM_{10} background concentrations were estimated from the $PM_{2.5}$ values using a $PM_{2.5}/PM_{10}$ ratio of 0.54 (Lall et. al., 2004).

For benzene and benzo(a)pyrene, the monitoring data consisted of 24-hour average concentrations. It was not possible to calculate background values by hour of day, therefore, for these contaminants, the background concentrations for the 24-hour averaging period consisted of 90^{th} percentile values.

For 0.5-hour acetaldehyde and 1-hour acrolein, the background values were calculated from the corresponding 24-hour average background value following Section 4.4 of the MECP Air Dispersion Modelling Guideline for Ontario. The summary of all background values used for the assessment is presented in **Table 6.**

3.7 Emissions Model

The standard approach for estimating vehicular emissions is to use computer simulation techniques that are based on extensive previous testing of a wide range of vehicles. Motor Vehicle Emission Simulator (MOVES3) is such a model that has been developed for this purpose by the U.S. Environmental Protection Agency (EPA). MOVES3 was used to generate vehicle emission factors for the years 2026 and 2046.

Exhaust emissions vary widely by vehicle type and speed. Since the vehicle fleet using the bus terminal is comprised of diesel-fueled or diesel-hybrid transit buses, MOVES3 was configured to generate emission factors for transit buses using diesel fuel. MOVES3 does not consider hybrid vehicles separately from conventional fuel vehicles since hybrids must meet the same emissions standards as conventional vehicles, and emissions from hybrids are incorporated into MOVES emission factors (US EPA, 2023). For this assessment, a conservative assumption was made that the fleet was conventional diesel engines only and variable emission factors due to use of diesel-hybrid engines were not considered.

For particulate matter, it is necessary to account for the re-suspension of dust as vehicles travel over a roadway surface, in addition to tailpipe emissions. The road dust emissions were calculated based on the revised version of U.S. EPA's AP-42, Chapter 13.2.1 (US EPA, 2011). The tailpipe emission factor for particulate matter, from MOVES3, was added to the road dust emission factor to account for both emission sources.

3.8 Dispersion Model

Air contaminants emitted from vehicles on a roadway will drift downwind and disperse as they travel. The degree to which the contaminants disperse depends on the weather-related factors, such as wind speed and amount of turbulence. The typical approach to determine potential future downwind concentrations from a proposed project is to use a computer simulation that predicts the dispersal of air pollutants as they drift away from the roads. These simulations are referred to as dispersion models.

Dispersion modelling is a common approach for assessing local air quality near an emission source such as vehicular traffic. The dispersion model used in this study is the US EPA's AERMOD version 22112. This is a widely used dispersion model and is an approved model for regulatory purposes in Ontario. The model predicts how emissions from the vehicles travelling within each segment disperse and contribute to air pollutant concentrations within the study area. The dispersion model requires information on emission rates for the air pollutants of interest, the layout of the project corridor, terrain elevation data, and hourly meteorological data.

The facility is located in Windsor, Ontario and has been provided with site specific meteorological data from the MECP on October 17, 2024. The meteorological data set was pre-processed by the MECP using the 22112 version of AERMET.

Terrain information for the area surrounding the facility was obtained from the MECP Regional Meteorological and Terrain Data for Air Dispersion Modelling website. The terrain data is based on the Canadian Digital Elevation Model (CDEM) horizontal reference datum. These data were run through the AERMAP terrain pre-processor to estimate base elevations for sources and receptors to help the model account for changes in elevation in the surrounding terrain. The rural dispersion coefficient was used in the dispersion modelling analysis.

3.8.1 Selection of Receptors

Sensitive receptors were identified within the study area based on the latest publicly available satellite imagery. There are no critical receptors (such as retirement homes, hospitals, childcare centres, and schools) in the study area. **Figures 1** and **2** show the sensitive receptor locations within the study area. Due to its proximity to the proposed bus terminal, three receptors were selected for the residential property immediately to the west of the site, one for each of the existing buildings on the property; receptor R7 corresponds to the actual residence on the property and R8 and R9 represent a barn and garage, respectively.

3.8.2 Conversion of NO_x to NO_2, Ozone Limiting Method

Any chemical reactions among pollutants are not considered in the assessment of local air quality impacts, except for the conversion of nitric oxide (NO) to NO_2 through reaction with ambient ground-level ozone (O_3). Vehicle exhausts initially consist mainly of NO. However, NO can convert to NO_2 once in the outside air. The Ozone Limiting Method (OLM) was used to estimate this conversion for the credible worst-case NO concentration.

The OLM assumes that the conversion of NO to NO_2 is limited only by the amount of ozone (O_3) present in the outside air. If the concentration of available O_3 (parts per billion or ppb) is less than that of the NO contributed by the modelled roadway emissions, then the portion of NO that is converted to NO_2 equals the available O_3. On the other hand, if the concentration of available O_3 exceeds that of the NO contributed by the modelled roadway, then all of the NO is converted to NO_2.

For the credible worst-case analysis, a fixed hourly concentration of ozone was used in the OLM, shown in **Table 5**, corresponding to the 90^{th} percentile of measured values from historical monitoring data recorded at the Windsor monitoring stations operated by the MECP.

3.9 Climate Change Assessment

The potential for the project to impact climate change was assessed by calculating the total annual emissions for the Build scenarios in 2026 and 2046 using emission factors generated by MOVES3. This analysis focused on the emissions of greenhouse gases, carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O), in terms of CO_2e (CO_2 equivalent).

This analysis included the emissions from modelled roadways, idling, and warm starts within the study area.

In order to assess the effect of the project on regional air quality, annual project-related emissions were compared with the annual total Ontario-wide emissions of the same pollutants from transportation and other sources. It was assumed that this project would have no significant impact on GHG emissions as it is replacing an already existing transit terminal in the same area.

4 RESULTS

4.1 Assessment of Maximum Cumulative Concentrations

Tables 7a and 7b present a summary of the predicted maximum modelled project contribution at each of the sensitive receptors for the 2026 Build Scenario and Idling Scenario 1, without background and with background, respectively. **Tables 7c** and **7d** present the same summary as the previous two tables, with Idling Scenario 2 rather than 1. **Tables 7e and 7f** present a summary of the predicted maximum modelled project contribution at each of the sensitive receptors for the 2046 Build Scenario and Idling Scenario 1, without background and with background, respectively. **Tables 7g** and **7h** present the same summary as the previous two tables, with Idling Scenario 2 rather than 1.

The results with background are cumulative concentrations (maximum modelled project contribution plus the 90th percentile 1-hour, 24-hour, or annual background concentration). The resultant concentrations are compared to the applicable thresholds in each of these tables.

For all scenarios, the cumulative maximum predicted concentrations for all contaminants were below their respective thresholds, except for 1-hour and annual NO_2, and 24-hour and annual benzo(a)pyrene; 1-hour and annual NO_2 exceeded the CAAQS threshold for receptors R7, R8, and R9; elevated ambient background concentrations already exceeded both the 24-hour and annual benzo(a)pyrene thresholds at all receptors without consideration of emissions from dispersion modelling. Annual NO_2 only exceeded the CAAQS threshold for receptors R8 and R9 for the 2046 Build Scenario and Idling Scenario 1. For receptors R1 to R6, the cumulative maximum predicted concentrations for all contaminants and averaging periods except 1-hour and 24-hour NO_2 were dominated by the contribution from the ambient background contaminant concentrations. Although still making a significant contribution, the ambient background concentrations were not as dominant over the modelled concentrations for receptors R7, R8, and R9 due to their proximity to contaminant sources.

Three types of sources were modelled: vehicle movement within the terminal, vehicle stops and starts, and vehicle idling. Vehicle idling was predicted to be the most significant contributor to the maximum predicted concentrations of NO_2 and benzo(a)pyrene at receptors R7, R8, and R9. Idling accounted for over 80% of the modelled benzo(a)pyrene concentrations and over 70% of the modelled NO_2 concentrations at these receptors for the 2026 Build and Idling Scenario 1. For the 2026 Build and Idling Scenario 2, idling accounted for over 70% of the modelled benzo(a)pyrene concentrations and over 60% of the modelled NO_2 concentrations at these receptors. Idling accounted for 70% and 60% of the modelled NO_2 concentrations at these receptors for the 2046 Build Idling Scenario 1 and Idling Scenario 2, respectively. For both 2046 Build Scenarios, there are no benzo(a)pyrene emissions as MOVES considered improved engine emissions technologies in 2010 and later engines which facilitated further reductions in PAHs and significantly lower particulate-phase PAH emission rates in this future modelled year (US EPA, 2020).

Tables 8a - 8h show comparisons of the results between all scenarios with and without background data. In summary:

- Overall concentrations for NO_2 and benzo(a)pyrene decreased from the 2026 Idling 1 Scenario to Idling 2 Scenario. Concentrations at receptor R7, one of the main receptors of concern, increased due to the change in idling setup, however, a solid acoustical barrier 40 m long and 3.5 m high will be constructed along the shared property line between the adjacent residential property and the proposed terminal. The extent of this barrier could mitigate impacts at the residence (R7) on this property.
- Overall concentrations for NO_2 decreased from the 2046 Idling 1 Scenario to Idling 2 Scenario. Concentrations at receptor R7, one of the main receptors of concern, increased due to the change in idling setup, however, a solid acoustical barrier 40 m long and 3.5 m high will be constructed along the shared property line between the adjacent residential property and the proposed terminal. The extent of this barrier could mitigate impacts at the residence (R7) on this property. Benzo(a)pyrene concentrations remained the same as they were only influenced by background data (because benzo(a)pyrene emissions for the year 2046 are zero in MOVES).
- Overall concentrations for NO_2 and benzo(a)pyrene decreased from 2026 to 2046 for both the Idling 1 and Idling 2 Scenarios.

4.1.1 Frequency Analysis for Benzo(a)pyrene and Nitrogen Dioxide

Frequency analyses were performed for modelled concentrations of 24-hour benzo(a)pyrene without background and 1-hour NO_2 with background for all scenarios. Frequency analyses were not conducted for benzo(a)pyrene for the 2046 Build Scenarios because benzo(a)pyrene emissions for the year 2046 are considered zero in MOVES. The results of the frequency analysis are shown in **Tables 9a - 9f**.

The ambient background concentration of benzo(a)pyrene already exceeds the 24-hour AAQC for that contaminant. For the frequency analysis, the threshold for modelled concentrations of benzo(a)pyrene was set to the 24-hour AAQC of 5.0E-5 $\mu g/m^3$. As shown in **Table 9a**, for the 2026 Build Scenario and Idling Scenario 1, modelled benzo(a)pyrene concentrations at receptors R8, and R9 exceeded the AAQC less than 5% of the time over the five years modelled (R7 had no exceedances of the AAQC); the modelled concentrations exceeded 5.0E-5 $\mu g/m^3$ 18 times over five years, representing 1% of the time. As shown in **Table 9c**, for the 2026 Build Scenario and Idling Scenario 2, modelled benzo(a)pyrene concentrations did not exceed the AAQC at any receptors.

For nitrogen dioxide, the threshold for the frequency analysis was set to the 2025 CAAQS threshold of 79 $\mu g/m^3$ for the 1-hour concentration of NO_2 including ambient background. As shown in **Table 9b**, for the 2026 Build Scenario and Idling Scenario 1, frequency of exceedance of the 2025 CAAQS threshold was predicted as 2.7% at receptor R8, 2.0% at R9, and 0.3% at R7. The maximum predicted 1-hour concentration of NO_2 is 155 $\mu g/m^3$ at receptor R8; this concentration is below the 1-hour NO_2 AAQC of 400 $\mu g/m^3$ which is the standard used for regulatory purposes in Ontario.

As shown in **Table 9d**, for the 2026 Build Scenario and Idling Scenario 2, frequency of exceedance of the 2025 CAAQS threshold was predicted as 1.5% at receptor R9, 1.4% at R8, 0.5% at R7 and 0.02% at R6. The maximum predicted 1-hour concentration of NO_2 is 135 $\mu g/m^3$ at receptor R9.

As shown in **Table 9e**, for the 2046 Build Scenario and Idling Scenario 1, frequency of exceedance of the 2025 CAAQS threshold was predicted at 2.4% at receptor R8, 1.7% at R9, 0.2 at R7 and 0.02% at R6. The maximum predicted 1-hour concentration of NO_2 is 153 µg/m^3 at receptor R8.

As shown in **Table 9f**, for the 2046 Build Scenario and Idling Scenario 2, frequency of exceedance of the 2025 CAAQS threshold was predicted at 1.2% at receptor R9, 1.1% at R8, 0.3% at R7 and 0.02% at R6. The maximum predicted 1-hour concentration of NO_2 is 132 µg/m^3 at receptor R9.

Receptor R7 is the only residence on the residential property immediately to the west of the proposed terminal. Receptors R8 and R9 represent non-residential structures: a barn and garage, respectively. The residential property and surrounding properties are currently zoned "General Commercial Warehouse" (CD3.3). With this designation, it is assumed to be unlikely that either of the existing non-residential structures (R8, R9) would be converted to, or replaced by, a new permanent residence or any other sensitive land use.

4.1.2 Potential Mitigation

Traffic-related air pollution (TRAP) is recognized as a significant source of air pollution, especially in urban area, and assessment of health risks from TRAP show elevated risk for cardiovascular illness, respiratory illness, and cancer (City of Toronto, 2017; Canada, 2022). Mitigation of TRAP should always be considered to improve local and regional air quality and reduce potential exposure to air contaminants.

The Acoustical Assessment Report for the East End Transit Terminal project recommended installation of a solid acoustical barrier approximately 40 m long and 3.5 m high along the shared property line between the residential property and the terminal, extending north from the northern limit of the existing Brakes & Tire Center garage.

The City of Windsor will construct this acoustical barrier as specified, and the remainder of the property line will be delineated by a wood screening fence, likely 1.2 m to 1.5 m in height (City of Windsor, 2024). Studies have suggested that a solid noise barrier could significantly reduce the concentration of traffic related air contaminants downwind of the barrier (Ahangar, et al., 2017; EPA, 2017). Modelling in this air quality assessment assumed no barrier between the air contaminant sources and the residential property immediately to the west of the proposed transit terminal. A solid physical barrier such as the planned acoustical barrier would break the air flow between source and receptor during those times when wind conditions would put the receptors downwind of the source.

In addition to the installation of the acoustical barrier, the following measures could potentially reduce exposure to air pollution associated with operation of the proposed transit terminal.

- **Limit duration of bus idling.** The contribution of idling to the modelled concentration of air contaminants at nearby residential receptors was significant. The model assumed that each bus entering the terminal would idle for 5 minutes. During the peak hour when 35 buses enter the terminal, this is the equivalent of three buses idling continuously for that hour. Reduced idling of buses within the terminal should decrease emissions of air contaminants during operation of the facility and limit potential exposure to these contaminants.
- **Ensure regular maintenance of the transit vehicle fleet.** Regular vehicle maintenance should improve engine performance and fuel efficiency, and subsequently reduce air emissions.

- **Ensure regular update of the vehicle fleet.** Transit Windsor has recently purchased 24 new buses to replace older vehicles that are aging out of service (CBC, 2023) and the City of Windsor Transit Master Plan includes implementation of a 12-year lifecycle of its fleet as one of its goals (City of Windsor, 2019). Commitment to regular fleet renewal should foster reductions in air contaminant emissions through adoption of improved engine technology for conventional fuel vehicles and the potential for gradual electrification of the fleet.

4.2 Assessment of Regional Air Quality and Greenhouse Gas Emissions

The impact of the project on greenhouse gas emissions was assessed by calculating the total annual emissions associated with the modelled roadways within the study area as shown in **Table 10**. Overall, the net emissions from this transit terminal are insignificant in relation to provincial totals as the facility is replacing an already existing transit terminal in the same area.

Additional contaminants of provincial significance, including carbon monoxide (CO), volatile organic compounds (VOCs), nitrogen oxides (NOx), and fine particulate matter without re-entrained road dust ($PM_{2.5}$), were not quantified in this assessment. Similar to greenhouse gas emissions, net emissions from operations at this transit terminal are insignificant in relation to provincial totals as the facility is replacing an already existing transit terminal in the same area.

4.3 Emissions During the Construction Phase

Construction activities involve heavy equipment that generates air pollutants and dust; however, these impacts are temporary in nature. The emissions are highly variable, difficult to predict, and depend on the specific activities that are taking place and the effectiveness of the mitigation measures. The best manner to deal with these emissions is through diligent implementation of operating procedures such as application of dust suppressants, reduced travel speeds for heavy vehicles, efficient staging of activities and minimization of haul distances, covering up stockpiles, etc. It is recommended that in order to minimize potential air quality impacts during construction, the construction tendering process should include requirements for implementation of an Air Quality Management Plan. Such a Plan would set out established best management practices for dust and other emissions. Some of the best practices include the following:

- Use of reformulated fuels, emulsified fuels, exhaust catalyst and filtration technologies, cleaner engine repowers, and new alternative-fueled trucks to reduce emissions from construction equipment.
- Regular cleaning of construction sites and access roads to remove construction-caused debris and dust.
- Dust suppression on unpaved haul roads and other traffic areas susceptible to dust, subject to the area being free of sensitive plant, water or other ecosystems that may be affected by dust suppression chemicals.
- Covered loads when hauling fine-grained materials.
- Prompt cleaning of paved streets/roads where tracking of soil, mud or dust has occurred.

- Tire washes and other methods to prevent trucks and other vehicles from tracking soil, mud or dust onto paved streets or roads.
- Covered stockpiles of soil, sand, and aggregate, as necessary.
- Compliance with posted speed limits and, as appropriate, further reductions in speeds when travelling sites on unpaved surfaces.

5 CONCLUSIONS

The majority of modelled contaminants were below their applicable thresholds for all modelled scenarios, with the exception of nitrogen dioxide (CAAQS 1-hour and annual) and benzo(a)pyrene (AAQC) at the receptors on the residential property immediately to the west of the transit terminal. The remaining residential receptors within the study area are further than 100 m metres from the bus terminal and are expected to experience low impacts to local air contaminant levels, with the maximum predicted cumulative concentrations for all contaminants and averaging periods less than current respective thresholds except for 24-hour and annual benzo(a)pyrene. In the case of benzo(a)pyrene, the background concentrations already exceed both the 24-hour and annual criteria without consideration of emissions from dispersion modelling. Hence, this exceedance cannot be prevented via mitigation.

Three types of sources were modelled: vehicle movement within the terminal, vehicle stops and starts, and vehicle idling. Vehicle idling was predicted to be the most significant contributor to the maximum predicted concentrations of NO_2 and benzo(a)pyrene at receptors R7, R8, and R9. Idling accounted for over 80% of the modelled benzo(a)pyrene concentrations and over 70% of the modelled NO_2 concentrations at these receptors for the 2026 Build and Idling Scenario 1. For the 2026 Build and Idling Scenario 2, idling accounted for over 70% of the modelled benzo(a)pyrene concentrations and over 60% of the modelled NO_2 concentrations at these receptors. Idling accounted for 70% and 60% of the modelled NO_2 concentrations at these receptors for the 2046 Build Idling Scenario 1 and Idling Scenario 2, respectively. For both 2046 Build Scenarios, there are no benzo(a)pyrene emissions as MOVES considered improved engine emissions technologies in 2010 and later engines which facilitated further reductions in PAHs and significantly lower particulate-phase PAH emission rates in this future modelled year (US EPA, 2020).

A solid acoustical barrier 40 m long and 3.5 m high will be constructed along the shared property line between the adjacent residential property and the proposed terminal. The extent of this barrier could mitigate impacts from emissions at the residence (R7) on this property.

Receptors R8 (barn) and R9 (garage) are north of the limit of the acoustical barrier; therefore, there may be only limited mitigating effect at these receptors for emissions restricted to those originating in the southern third of the terminal.

To further mitigate potential impacts from emissions, the following measures are suggested:

- Limited duration of bus idling within the terminal;
- Regular maintenance of the transit vehicle fleet; and,
- Regular update of the vehicle fleet.

No additional mitigation measures are recommended, beyond those which are already in place through phased-in federal regulations for on-road vehicle and engine emissions, which are expected to reduce NO_2 and other tailpipe emissions beyond the 2026 horizon year used to model emission factors in this assessment. This reduction in emissions is shown in the results from the 2046 Build scenarios.

The net emissions from the project compared to the regional provincial emissions of greenhouse gas CO_2e are insignificant (assumed to be close to 0%) as the facility is replacing an already existing transit terminal in the same area. Therefore, the project is not expected to have a net impact on the regional air quality.

Construction phase impacts were addressed qualitatively. It is recommended that in order to minimize potential air quality impacts during construction, the construction tendering process should include requirements for implementation of an Air Quality Management Plan.

6 STATEMENT OF LIMITATIONS

This report entitled Air Quality Impact Assessment – 7310 Tecumseh Road East, was prepared by RWDI AIR Inc. ("RWDI") for The City of Windsor ("Client"). The findings and conclusions presented in this report have been prepared for the Client and are specific to the project described herein ("Project"). The conclusions and recommendations contained in this report are based on the information available to RWDI when this report was prepared. Because the contents of this report may not reflect the final design of the Project or subsequent changes made after the date of this report, RWDI recommends that it be retained by Client during the final stages of the project to verify that the results and recommendations provided in this report have been correctly interpreted in the final design of the Project.

The conclusions and recommendations contained in this report have also been made for the specific purpose(s) set out herein. Should the Client or any other third party utilize the report and/or implement the conclusions and recommendations contained therein for any other purpose or project without the involvement of RWDI, the Client or such third party assumes any and all risk of any and all consequences arising from such use and RWDI accepts no responsibility for any liability, loss, or damage of any kind suffered by Client or any other third party arising therefrom.

Finally, it is imperative that the Client and/or any party relying on the conclusions and recommendations in this report carefully review the stated assumptions contained herein and to understand the different factors which may impact the conclusions and recommendations provided.

7 REFERENCES

1. Ahangar, F. E., Heist, D., Perry, S., & Venkatram, A. (2017). Reduction of air pollution levels downwind of a road with an upwind noise barrier. Atmospheric environment (Oxford, England : 1994), 155, 137–10. https://doi.org/10.1016/j.atmosenv.2017.02.001
2. Canada, 2022. Health impacts of traffic-related air pollution in Canada. Accessed June 12, 2024 at https://www.canada.ca/en/health-canada/services/publications/healthy-living/health-impacts-traffic-related-air-pollution.html#a7.3
3. Canada Council of Ministers of the Environment (CCME), 2019. Guidance Document on Air Zone Management. Accessed at https://ccme.ca/en/res/guidancedocumentonairzonemanagement_secured.pdf, December 2022.
4. CCME, 2022. CAAQS. Accessed at https://ccme.ca/en/air-quality-report, November 2022.
5. CBC, 2023. Windsor is investing $63M in transit, including buying new buses and repairing old ones. Accessed May 24, 2024 at https://www.cbc.ca/news/canada/windsor/windsor-city-transit-invest-1.6810682.
6. City of Toronto, 2017. Avoiding the TRAP: Traffic-Related Air Pollution in Toronto and Options for Reducing Exposure. https://www.toronto.ca/legdocs/mmis/2017/hl/bgrd/backgroundfile-108070.pdf
7. City of Windsor, 2019. More Than Transit – 2019 Transit Master Plan. Accessed May 24, 2024 at https://www.citywindsor.ca/residents/transit-windsor/transit-master-plan.
8. City of Windsor, 2024. Email correspondence.
9. EPA, 2017. Living Close to Roadways: Health Concerns and Mitigation Strategies. Accessed May 28, 2024 at https://www.epa.gov/sciencematters/living-close-roadways-health-concerns-and-mitigation-strategies
10. Lall et al. 2004. Estimation of Historical Annual $PM_{2.5}$ Exposures for Health Effects Assessment. January 2004.
11. MECP, 2017. Air Dispersion Modelling Guideline for Ontario, version 3.0, PIBs # 5165e03, February 2017.
12. MECP, 2024. Air Pollutant Data. Accessed at http://www.airqualityontario.com/history/index.php, June 2024.
13. MTO, 2013. Environmental Reference for Highway Design. June 2013.
14. MTO, 2020. Environmental Guide for Assessing and Mitigating the Air Quality Impacts and Greenhouse Gas Emissions of Provincial Transportation Projects. May 2020.
15. United States Environmental Protection Agency (US EPA), 2011. AP-42: Section 13.2.1 Paved Roads. January 2011.
16. US EPA, 2015. Transportation Conformity Guidance for Quantitative Hot-spot Analyses in $PM_{2.5}$ and PM_{10} Nonattainment and Maintenance Areas. 160 pp.
17. US EPA, 2020. Air Toxic Emissions from Onroad Vehicles in MOVES3. Retrieved from https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=P1010TJM.pdf, November 2022.
18. US EPA, 2023. Can I model emissions from Electric, Fuel-Cell, and Hybrid Vehicles and Equipment in MOVES? Retrieved from https://www.epa.gov/moves/can-i-model-emissions-electric-fuel-cell-and-hybrid-vehicles-and-equipment-moves, June 2024.

TABLES

Table 1: Comparison of MOVES Emission Factors for Transit Buses – 2026 and 2046 Horizon Years

Link ID	Link Description	Contaminant	Emission Factor (g/hr) [1]	
			2026	2046
1	Idling	Nitrogen dioxide (NO_2)	5.07E+01	4.72E+01
		Carbon monoxide (CO)	1.84E+01	1.58E+01
		Inhalable particulate matter (PM_{10})	4.79E-01	2.34E-02
		Respirable particulate matter ($PM_{2.5}$)	4.41E-01	2.16E-02
		Benzene	1.34E-02	0
		1,3-butadiene	4.25E-03	0
		Formaldehyde	1.67E-01	1.83E-02
		Acetaldehyde	8.87E-02	2.86E-02
		Acrolein	1.34E-02	2.47E-03
		Benzo(a)pyrene	7.19E-05	0
2	Bus movement along route	Nitrogen dioxide (NO_2)	1.36E+01	1.20E+01
		Carbon monoxide (CO)	6.78E+00	6.25E+00
		Inhalable particulate matter (PM_{10})	1.13E-01	8.29E-01
		Respirable particulate matter ($PM_{2.5}$)	1.04E-01	1.15E-01
		Benzene	3.09E-03	0
		1,3-butadiene	9.58E-04	0
		Formaldehyde	3.90E-02	3.77E-03
		Acetaldehyde	2.06E-02	5.91E-03
		Acrolein	3.09E-03	5.10E-04
		Benzo(a)pyrene	1.08E-05	0
3	Starts and stops	Nitrogen dioxide (NO_2)	3.07E-01	3.30E-01
		Carbon monoxide (CO)	6.50E-01	3.01E-01
		Inhalable particulate matter (PM_{10})	1.33E-03	1.47E-03
		Respirable particulate matter ($PM_{2.5}$)	1.22E-03	1.35E-03
		Benzene	1.01E-03	0
		1,3-butadiene	2.35E-04	0
		Formaldehyde	2.49E-02	1.37E-02
		Acetaldehyde	2.33E-02	2.15E-02
		Acrolein	2.40E-03	1.85E-03
		Benzo(a)pyrene	3.63E-09	0

Note: [1] Emission factors for idling in units of grams per hour.

[2] Emission factors for bus movement along route in units of grams per mile.

[3] Emission factors for start/stop scenarios in units of grams per start.

Table 2: 2026 Traffic Volumes and Speeds for the Study Area

Road	Portion of Road	Description	Direction	Build		Average Speed (km/hour)
				AM Peak Volume	PM Peak Volume	
Tecumseh East Bus Terminal	Idling	Assumed each bus idles for 10 minutes per hour	n/a	35	35	0
Tecumseh East Bus Terminal	Idling	Assumed each bus idles for 10 minutes per hour	n/a	4	4	0
Tecumseh East Bus Terminal	Idling	Assumed each bus idles for 10 minutes per hour	n/a	4	4	0
Tecumseh East Bus Terminal	Idling	Assumed each bus idles for 10 minutes per hour	n/a	4	4	0
Tecumseh East Bus Terminal	Idling	Assumed each bus idles for 10 minutes per hour	n/a	4	4	0
Tecumseh East Bus Terminal	Idling	Assumed each bus idles for 10 minutes per hour	n/a	4	4	0
Tecumseh East Bus Terminal	Idling	Assumed each bus idles for 10 minutes per hour	n/a	4	4	0
Tecumseh East Bus Terminal	Idling	Assumed each bus idles for 10 minutes per hour	n/a	4	4	0
Tecumseh East Bus Terminal	Idling	Assumed each bus idles for 10 minutes per hour	n/a	4	4	0
Tecumseh East Bus Terminal	North entrance to east platform	Buses moving through terminal	SB	35	35	10
	East platform to south exit		SB	0	0	
	East platform to north exit		NB	35	35	
Tecumseh East Bus Terminal	Warm Starts – north parking area	Assume each bus accessing the terminal has one warm start per hour	n/a	32	32	0
	Warm Starts – south parking area		n/a	4	4	

Table 3: Summary of Relevant Air Quality Thresholds (μg/m^3)

Pollutant	Criterion (μg/m³)	Averaging Period	Source of Threshold Value [5]
$PM_{2.5}$	27	24-hour	CAAQS 2020[1]
	8.8	Annual	CAAQS 2020[2]
PM_{10}	50	24-hour	AAQC
Carbon monoxide (CO)	36,200	1-hour	AAQC
	15,700	8-hour	AAQC
Nitrogen dioxide (NO_2)	400	1-hour	AAQC
	113	1-hour	CAAQS 2020 [3]
	79	1-hour	CAAQS 2025 [3]
	200	24-hour	AAQC
	32	Annual	CAAQS 2020 [4]
	22.6	Annual	CAAQS 2025 [4]
Benzo(a)pyrene	5.0E-05	24-hour	AAQC
	1.0E-05	Annual	AAQC
Acetaldehyde	500	0.5-hour	AAQC
	500	24-hour	AAQC
Acrolein	4.5	1-hour	AAQC
	0.4	24-hour	AAQC
Formaldehyde	65	24-hour	AAQC
Benzene	2.3	24-hour	AAQC
	0.45	Annual	AAQC
1,3-Butadiene	10	24-hour	AAQC
	2	Annual	AAQC

Note: [1] The 3-year average of the annual 98th percentile of the daily 24-hour average concentrations.

[2] The 3-year average of the annual average concentrations.

[3] The 3-year average of the annual 98th percentile daily maximum 1-hour average concentrations.

[4] The average over a single calendar year of all the 1-hour average concentrations.

[5] Ontario Ambient Air Quality Criteria (AAQC) from https://www.ontario.ca/page/ontarios-ambient-air-quality-criteria, accessed January 4, 2024.

[6] Ontario AAQC for SO2 of 67 ppb (10-minute), 40 ppb (1-hour), 4 ppb (annual) converted to μg/m3 assuming 10ºC and 101.3 kPa as noted at https://www.ontario.ca/page/ontarios-ambient-air-quality-criteria#section-4

Table 4: Source of Background Monitoring Data Used

Contaminant	NAPS ID and Location	Years Included [1] [2]
$PM_{2.5}$	60204 – WINDSOR DOWNTOWN	2018, 2019, 2020, 2021, 2022
PM_{10} [3]	60204 – WINDSOR DOWNTOWN	2018, 2019, 2020, 2021, 2022
CO	60204 – WINDSOR DOWNTOWN	2018, 2019, 2020, 2021, 2022
NO2	60204 – WINDSOR DOWNTOWN	2018, 2019, 2020, 2021, 2022
Benzo(a)pyrene	60427 – GAGE INSTITUTE	2011, 2012, 2013, 2014, 2015
Acetaldehyde	60211 – WINDSOR WEST	2015, 2016, 2017, 2018, 2019
Acrolein	60211 – WINDSOR WEST	2014, 2015, 2016, 2017
Formaldehyde	60211 – WINDSOR WEST	2015, 2016, 2017, 2018, 2019
Benzene	60211 – WINDSOR WEST	2018, 2019, 2020, 2021, 2022
1,3-Butadiene	60211 – WINDSOR WEST	2018, 2019, 2020, 2021, 2022

Note: [1] For some contaminants, data availability from 2020 were insufficient for use in estimating a background value.
[2] The most recent years with valid data were used. No data for Acrolein after 2017.
[3] TSP and PM_{10} background data will be based on $PM_{2.5}$.

Table 5: 90th Percentile Background NO_2 and Ozone by Hour of Day

Hour of Day	NO_2 (ppb)	O_3 (ppb)
1	20.6	39.0
2	21.3	37.0
3	21.4	36.0
4	22.5	35.0
5	22.7	34.0
6	24.5	32.0
7	26.0	32.0
8	26.0	32.0
9	22.3	35.0
10	18.6	39.0
11	14.7	45.0
12	12.6	49.0
13	11.6	52.0
14	11.3	54.0
15	11.1	56.0
16	11.6	56.0
17	12.9	56.0
18	14.1	54.0
19	15.3	52.0
20	16.9	49.0
21	17.5	45.0
22	18.9	42.0
23	19.4	41.0
24	20.1	40.0

Table 6: Summary of Background Concentrations

Pollutant	Averaging Period	Adopted Background Value (µg/m³)	Description	Criterion (µg/m³)	% of Threshold
$PM_{2.5}$	24-hour	13.4	90th Percentile	27	50%
	Annual	7.8	Annual Average	8.8	89%
PM_{10}	24-hour	24.8	90th Percentile	50	50%
CO	1-hour	388	90th Percentile	36,200	1%
	8-hour	386	90th Percentile	15,700	2%
NO_2	1-hour	38.1	90th Percentile	400	10%
	1-hour	38.1	90th Percentile	113	34%
	1-hour	38.1	90th Percentile	79	48%
	24-hour	33.0	90th Percentile	200	17%
	Annual	19.8	Annual Average	32	62%
	Annual	19.8	Annual Average	22.6	87%
Benzo(a)pyrene	24-hour	1.2E-04	90th Percentile	5.0E-05	234%
	Annual	7.1E-05	Annual Average	1.0E-05	714%
Acetaldehyde	0.5-hour [1]	4.24	90th Percentile	500	1%
	24-hour	1.44	90th Percentile	500	0.3%
Acrolein	1-hour [2]	0.14	90th Percentile	4.5	3%
	24-hour	0.06	90th Percentile	0.4	14%
Formaldehyde	24-hour	2.38	90th Percentile	65	4%
Benzene	24-hour	0.61	90th Percentile	2.3	27%
	Annual	0.45	Annual Average	0.45	99%
1,3-Butadiene	24-hour	0.04	90th Percentile	10	0.4%
	Annual	0.03	Annual Average	2	1%

Notes: [1] 0.5-hour average converted from 24-hour average background following Section 4.4 of the Air Dispersion Modelling Guideline for Ontario.

[2] 1-hour average converted from 24-hour average background value following Section 4.4 of the Air Dispersion Modelling Guideline for Ontario.

Table 7a: Maximum Predicted Concentrations (µg/m³), 2026 Build Scenario, Idling Scenario 1, Without Background

	$PM_{2.5}$		PM_{10}	CO		NO_2 [1]				Benzo-a-pyrene		Acetaldehyde		Acrolein		Formaldehyde	Benzene		1,3-Butadiene	
Averaging Period	24-hour	Annual	24-hour	1-hour	8-hour	1-hour	1-hour	24-hour	Annual	24-hour	Annual	0.5-hour	24-hour	1-hour	24-hour	24-hour	24-hour	Annual	24-hour	Annual
Threshold	27	8.8	50.0	36200	15700	400	79.0	200	22.6	0.00005	0.00001	500.0	500.0	4.5	0.4	65	2.3	0.45	10	2
Source of Threshold Value	CAAQS 2020	CAAQS 2020	AAQC	AAQC	AAQC	AAQC	CAAQS 2025	AAQC	CAAQS 2025	AAQC	AAQC	AAQC	AAQC	AAQC	AAQC	AAQC	AAQC	AAQC	AAQC	AAQC
Ambient Background	13.4	7.80	24.8	388	386	38.1	38.1	33.0	19.8	1.17E-04	7.14E-05	4.24	1.44	0.138	0.057	2.38	0.61	0.45	0.041	0.025

Receptor	$PM_{2.5}$		PM_{10}	CO		NO_2 [1]				Benzo-a-pyrene		Acetaldehyde		Acrolein		Formaldehyde	Benzene		1,3-Butadiene	
R1	0.22	0.01	0.87	13	2.5	8.6	8.6	2.1	0.1	2.5E-06	1.8E-07	1.4E-01	9.4E-03	1.4E-02	1.2E-03	1.3E-02	8.0E-04	6.0E-05	2.3E-04	2.0E-05
R2	0.08	0.01	0.32	5	0.8	4.1	4.1	0.7	0.1	7.8E-07	8.9E-08	5.0E-02	3.4E-03	4.9E-03	4.0E-04	4.5E-03	2.7E-04	3.0E-05	8.0E-05	1.0E-05
R3	0.21	0.02	0.84	10	2.2	7.5	7.5	1.6	0.1	1.9E-06	1.6E-07	1.1E-01	8.8E-03	1.1E-02	1.0E-03	1.2E-02	6.8E-04	6.0E-05	1.9E-04	2.0E-05
R4	0.34	0.02	1.32	13	3.4	12.2	12.2	3.2	0.2	4.1E-06	2.4E-07	1.1E-01	1.4E-02	1.1E-02	1.7E-03	1.9E-02	1.2E-03	8.0E-05	3.5E-04	2.0E-05
R5	0.09	0.01	0.37	8	1.3	5.5	5.5	0.9	0.1	1.1E-06	1.0E-07	7.1E-02	3.5E-03	7.4E-03	4.3E-04	4.9E-03	3.2E-04	3.0E-05	9.0E-05	1.0E-05
R6	0.50	0.04	1.96	26	4.6	23.7	23.7	4.7	0.4	5.8E-06	4.7E-07	2.9E-01	2.1E-02	2.8E-02	2.6E-03	3.0E-02	1.8E-03	1.5E-04	5.2E-04	4.0E-05
R7	2.45	0.37	9.64	68	17.9	61.0	61.0	22.8	3.0	3.1E-05	3.7E-06	5.8E-01	7.2E-02	6.2E-02	9.3E-03	1.1E-01	7.3E-03	1.0E-03	2.2E-03	3.0E-04
R8	3.28	0.59	12.22	142	35.8	105.8	105.8	43.3	8.3	7.1E-05	1.2E-05	8.3E-01	1.5E-01	1.0E-01	1.9E-02	2.3E-01	1.6E-02	2.8E-03	4.8E-03	8.5E-04
R9	3.21	0.61	12.35	129	42.2	104.2	104.2	42.7	7.3	7.2E-05	1.0E-05	7.7E-01	1.4E-01	9.2E-02	1.9E-02	2.2E-01	1.6E-02	2.4E-03	4.9E-03	7.2E-04
Maximum Predicted % of Threshold	**12%**	**7%**	**25%**	**<1%**	**<1%**	**26%**	**134%**	**22%**	**37%**	**144%**	**118%**	**<1%**	**<1%**	**2%**	**5%**	**<1%**	**<1%**	**<1%**	**<1%**	**<1%**

[1] Conversion of NOx to NO2 using the Ozone Limiting Method.

Table 7b: Maximum Predicted Concentrations (µg/m³), 2026 Build Scenario, Idling Scenario 1, With Background

	$PM_{2.5}$		PM_{10}	CO		NO_2 [1]				Benzo-a-pyrene		Acetaldehyde		Acrolein		Formaldehyde	Benzene		1,3-Butadiene	
Averaging Period	24-hour	Annual	24-hour	1-hour	8-hour	1-hour	1-hour	24-hour	Annual	24-hour	Annual	0.5-hour	24-hour	1-hour	24-hour	24-hour	24-hour	Annual	24-hour	Annual
Threshold	27	8.8	50.0	36200	15700	400	79.0	200	22.6	0.00005	0.00001	500.0	500.0	4.5	0.4	65	2.3	0.45	10	2
Source of Threshold Value	CAAQS 2020	CAAQS 2020	AAQC	AAQC	AAQC	AAQC	CAAQS 2025	AAQC	CAAQS 2025	AAQC	AAQC	AAQC	AAQC	AAQC	AAQC	AAQC	AAQC	AAQC	AAQC	AAQC
Ambient Background	13.4	7.80	24.8	388	386	38.1	38.1	33.0	19.8	1.17E-04	7.14E-05	4.24	1.44	0.138	0.057	2.38	0.61	0.45	0.041	0.025

Receptor	$PM_{2.5}$		PM_{10}	CO		NO_2 [1]				Benzo-a-pyrene		Acetaldehyde		Acrolein		Formaldehyde	Benzene		1,3-Butadiene	
R1	13.6	7.8	25.7	401	388	53.8	53.8	39.1	19.9	1.2E-04	7.2E-05	4.39	1.44	1.5E-01	5.8E-02	2.4	6.1E-01	4.5E-01	4.1E-02	2.5E-02
R2	13.5	7.8	25.1	393	386	51.0	51.0	38.0	19.8	1.2E-04	7.2E-05	4.29	1.44	1.4E-01	5.7E-02	2.4	6.1E-01	4.5E-01	4.1E-02	2.5E-02
R3	13.6	7.8	25.7	398	388	54.5	54.5	38.9	19.9	1.2E-04	7.2E-05	4.36	1.44	1.5E-01	5.8E-02	2.4	6.1E-01	4.5E-01	4.1E-02	2.5E-02
R4	13.7	7.8	26.1	401	389	53.1	53.1	39.1	20.0	1.2E-04	7.2E-05	4.35	1.45	1.5E-01	5.8E-02	2.4	6.1E-01	4.5E-01	4.1E-02	2.5E-02
R5	13.5	7.8	25.2	396	387	52.2	52.2	38.0	19.8	1.2E-04	7.2E-05	4.31	1.44	1.5E-01	5.7E-02	2.4	6.1E-01	4.5E-01	4.1E-02	2.5E-02
R6	13.9	7.8	26.8	414	390	60.5	60.5	42.1	20.1	1.2E-04	7.2E-05	4.53	1.46	1.7E-01	5.9E-02	2.4	6.1E-01	4.5E-01	4.1E-02	2.5E-02
R7	15.8	8.2	34.5	456	404	103.2	103.2	56.7	22.8	1.5E-04	7.5E-05	4.83	1.51	2.0E-01	6.6E-02	2.5	6.2E-01	4.5E-01	4.3E-02	2.6E-02
R8	16.7	8.4	37.0	530	421	140.0	140.0	77.3	28.0	1.9E-04	8.3E-05	5.07	1.58	2.4E-01	7.6E-02	2.6	6.3E-01	4.5E-01	4.5E-02	2.6E-02
R9	16.6	8.4	37.2	517	428	134.3	134.3	76.7	27.1	1.9E-04	8.2E-05	5.02	1.57	2.3E-01	7.5E-02	2.6	6.3E-01	4.5E-01	4.6E-02	2.6E-02
Maximum Predicted % of Threshold	**62%**	**96%**	**74%**	**1%**	**3%**	**35%**	**177%**	**39%**	**124%**	**378%**	**833%**	**1%**	**<1%**	**5%**	**19%**	**4%**	**27%**	**99.7%**	**<1%**	**1%**

[1] Conversion of NO_x to NO_2 using the Ozone Limiting Method and hourly concentrations of NO_2 and ozone. The ambient background concentrations measured at local monitoring stations are not added directly to the modelled concentration without background.

Table 7c: Maximum Predicted Concentrations (µg/m³), 2026 Build Scenario, Idling Scenario 2, Without Background

	$PM_{2.5}$		PM_{10}	CO		NO_2 [1]				Benzo-a-pyrene		Acetaldehyde		Acrolein		Formaldehyde	Benzene		1,3-Butadiene	
Averaging Period	24-hour	Annual	24-hour	1-hour	8-hour	1-hour	1-hour	24-hour	Annual	24-hour	Annual	0.5-hour	24-hour	1-hour	24-hour	24-hour	24-hour	Annual	24-hour	Annual
Threshold	27	8.8	50.0	36200	15700	400	79.0	200	22.6	0.00005	0.00001	500.0	500.0	4.5	0.4	65	2.3	0.45	10	2
Source of Threshold Value	CAAQS 2020	CAAQS 2020	AAQC	AAQC	AAQC	AAQC	CAAQS 2025	AAQC	CAAQS 2025	AAQC	AAQC	AAQC	AAQC	AAQC	AAQC	AAQC	AAQC	AAQC	AAQC	AAQC
Ambient Background	13.4	7.80	24.8	388	386	38.1	38.1	33.0	19.8	1.17E-04	7.14E-05	4.24	1.44	0.138	0.057	2.38	0.61	0.45	0.041	0.025

Receptor	$PM_{2.5}$		PM_{10}	CO		NO_2 [1]				Benzo-a-pyrene		Acetaldehyde		Acrolein		Formaldehyde	Benzene		1,3-Butadiene	
R1	0.28	0.01	1.09	15	2.6	9.6	9.6	2.3	0.1	2.7E-06	1.8E-07	1.5E-01	9.8E-03	1.5E-02	1.2E-03	1.4E-02	8.5E-04	6.0E-05	2.5E-04	2.0E-05
R2	0.10	0.01	0.39	5	0.9	4.8	4.8	0.7	0.1	8.3E-07	9.0E-08	5.2E-02	3.5E-03	5.1E-03	4.2E-04	4.7E-03	2.9E-04	3.0E-05	8.0E-05	1.0E-05
R3	0.22	0.02	0.86	13	2.3	9.1	9.1	1.7	0.1	2.0E-06	1.6E-07	1.2E-01	9.0E-03	1.2E-02	1.1E-03	1.2E-02	7.1E-04	6.0E-05	2.0E-04	2.0E-05
R4	0.39	0.02	1.53	13	3.5	12.4	12.4	3.3	0.2	4.0E-06	2.4E-07	1.1E-01	1.4E-02	1.1E-02	1.7E-03	1.9E-02	1.2E-03	7.0E-05	3.5E-04	2.0E-05
R5	0.12	0.01	0.45	9	1.4	6.0	6.0	0.9	0.1	1.1E-06	1.0E-07	7.2E-02	3.5E-03	7.6E-03	4.3E-04	5.0E-03	3.3E-04	3.0E-05	1.0E-04	1.0E-05
R6	0.57	0.04	2.22	28	4.8	24.3	24.3	4.9	0.4	6.0E-06	4.8E-07	2.9E-01	2.2E-02	2.9E-02	2.7E-03	3.0E-02	1.9E-03	1.5E-04	5.4E-04	4.0E-05
R7	2.72	0.39	10.48	55	18.2	67.9	67.9	26.5	4.0	3.4E-05	5.1E-06	5.2E-01	7.1E-02	5.3E-02	9.0E-03	1.1E-01	7.8E-03	1.3E-03	2.4E-03	3.9E-04
R8	3.28	0.59	12.66	69	28.1	81.0	81.0	31.8	6.4	4.2E-05	8.5E-06	9.7E-01	1.4E-01	9.2E-02	1.7E-02	1.9E-01	1.1E-02	2.2E-03	3.4E-03	6.6E-04
R9	3.41	0.63	13.16	66	26.1	78.1	78.1	35.5	6.9	4.8E-05	9.2E-06	7.2E-01	1.0E-01	7.1E-02	1.3E-02	1.5E-01	1.1E-02	2.2E-03	3.4E-03	6.7E-04
Maximum Predicted % of Threshold	**13%**	**7%**	**26%**	**<1%**	**<1%**	**20%**	**103%**	**18%**	**31%**	**96%**	**92%**	**<1%**	**<1%**	**2%**	**4%**	**<1%**	**<1%**	**<1%**	**<1%**	**<1%**

[1] Conversion of NOx to NO2 using the Ozone Limiting Method.

Table 7d: Maximum Predicted Concentrations (µg/m³), 2026 Build Scenario, Idling Scenario 2, With Background

	$PM_{2.5}$		PM_{10}	CO		NO_2 [1]				Benzo-a-pyrene		Acetaldehyde		Acrolein		Formaldehyde	Benzene		1,3-Butadiene	
Averaging Period	24-hour	Annual	24-hour	1-hour	8-hour	1-hour	1-hour	24-hour	Annual	24-hour	Annual	0.5-hour	24-hour	1-hour	24-hour	24-hour	24-hour	Annual	24-hour	Annual
Threshold	27	8.8	50.0	36200	15700	400	79.0	200	22.6	0.00005	0.00001	500.0	500.0	4.5	0.4	65	2.3	0.45	10	2
Source of Threshold Value	CAAQS 2020	CAAQS 2020	AAQC	AAQC	AAQC	AAQC	CAAQS 2025	AAQC	CAAQS 2025	AAQC	AAQC	AAQC	AAQC	AAQC	AAQC	AAQC	AAQC	AAQC	AAQC	AAQC
Ambient Background	13.4	7.80	24.8	388	386	38.1	38.1	33.0	19.8	1.17E-04	7.14E-05	4.24	1.44	0.138	0.057	2.38	0.61	0.45	0.041	0.025

Receptor	$PM_{2.5}$		PM_{10}	CO		NO_2 [1]				Benzo-a-pyrene		Acetaldehyde		Acrolein		Formaldehyde	Benzene		1,3-Butadiene	
R1	13.7	7.8	25.9	403	388	53.7	53.7	38.8	19.9	1.2E-04	7.2E-05	4.39	1.45	1.5E-01	5.8E-02	2.4	6.1E-01	4.5E-01	4.1E-02	2.5E-02
R2	13.5	7.8	25.2	393	387	51.0	51.0	38.0	19.8	1.2E-04	7.2E-05	4.30	1.44	1.4E-01	5.7E-02	2.4	6.1E-01	4.5E-01	4.1E-02	2.5E-02
R3	13.6	7.8	25.7	401	388	53.7	53.7	39.0	19.9	1.2E-04	7.2E-05	4.37	1.44	1.5E-01	5.8E-02	2.4	6.1E-01	4.5E-01	4.1E-02	2.5E-02
R4	13.8	7.8	26.3	401	389	53.1	53.1	39.2	20.0	1.2E-04	7.2E-05	4.35	1.45	1.5E-01	5.8E-02	2.4	6.1E-01	4.5E-01	4.1E-02	2.5E-02
R5	13.5	7.8	25.3	397	387	52.4	52.4	38.0	19.8	1.2E-04	7.2E-05	4.32	1.44	1.5E-01	5.7E-02	2.4	6.1E-01	4.5E-01	4.1E-02	2.5E-02
R6	14.0	7.8	27.0	416	390	61.1	61.1	42.2	20.1	1.2E-04	7.2E-05	4.53	1.46	1.7E-01	5.9E-02	2.4	6.1E-01	4.5E-01	4.1E-02	2.5E-02
R7	16.1	8.2	35.3	443	404	108.3	108.3	60.5	23.7	1.5E-04	7.7E-05	4.77	1.51	1.9E-01	6.6E-02	2.5	6.2E-01	4.5E-01	4.3E-02	2.6E-02
R8	16.7	8.4	37.5	457	414	119.0	119.0	65.8	26.2	1.6E-04	8.0E-05	5.21	1.58	2.3E-01	7.3E-02	2.6	6.2E-01	4.5E-01	4.4E-02	2.6E-02
R9	16.8	8.4	38.0	454	412	119.9	119.9	69.5	26.7	1.7E-04	8.1E-05	4.96	1.54	2.1E-01	7.0E-02	2.5	6.2E-01	4.5E-01	4.4E-02	2.6E-02
Maximum Predicted % of Threshold	**62%**	**96%**	**76%**	**1%**	**3%**	**30%**	**152%**	**35%**	**118%**	**330%**	**807%**	**1%**	**<1%**	**5%**	**18%**	**4%**	**27%**	**99.5%**	**<1%**	**1%**

[1] Conversion of NO_x to NO_2 using the Ozone Limiting Method and hourly concentrations of NO_2 and ozone. The ambient background concentrations measured at local monitoring stations are not added directly to the modelled concentration without background.

Table 7e: Maximum Predicted Concentrations (µg/m³), 2046 Build Scenario, Idling Scenario 1, Without Background

	$PM_{2.5}$		PM_{10}	CO		NO_2 [1]				Benzo-a-pyrene		Acetaldehyde		Acrolein		Formaldehyde	Benzene		1,3-Butadiene	
Averaging Period	24-hour	Annual	24-hour	1-hour	8-hour	1-hour	1-hour	24-hour	Annual	24-hour	Annual	0.5-hour	24-hour	1-hour	24-hour	24-hour	24-hour	Annual	24-hour	Annual
Threshold	27	8.8	50.0	36200	15700	400	79.0	200	22.6	0.00005	0.00001	500.0	500.0	4.5	0.4	65	2.3	0.45	10	2
Source of Threshold Value	CAAQS 2020	CAAQS 2020	AAQC	AAQC	AAQC	AAQC	CAAQS 2025	AAQC	CAAQS 2025	AAQC	AAQC	AAQC	AAQC	AAQC	AAQC	AAQC	AAQC	AAQC	AAQC	AAQC
Ambient Background	13.4	7.80	24.8	388	386	38.1	38.1	33.0	19.8	1.17E-04	7.14E-05	4.24	1.44	0.138	0.057	2.38	0.61	0.45	0.041	0.025

Receptor	$PM_{2.5}$		PM_{10}	CO		NO_2 [1]				Benzo-a-pyrene		Acetaldehyde		Acrolein		Formaldehyde	Benzene		1,3-Butadiene	
R1	0.21	0.01	0.91	11	2.1	7.9	7.9	1.9	0.1	0.0E+00	0.0E+00	1.0E-01	6.6E-03	7.3E-03	5.7E-04	4.2E-03	0.0E+00	0.0E+00	0.0E+00	0.0E+00
R2	0.08	0.01	0.34	4	0.7	3.8	3.8	0.6	0.1	0.0E+00	0.0E+00	3.6E-02	2.4E-03	2.6E-03	2.1E-04	1.5E-03	0.0E+00	0.0E+00	0.0E+00	0.0E+00
R3	0.21	0.02	0.88	8	1.8	6.8	6.8	1.5	0.1	0.0E+00	0.0E+00	8.0E-02	6.4E-03	5.7E-03	5.5E-04	4.1E-03	0.0E+00	0.0E+00	0.0E+00	0.0E+00
R4	0.33	0.02	1.38	11	2.8	11.1	11.1	3.0	0.2	0.0E+00	0.0E+00	6.7E-02	9.0E-03	4.8E-03	7.8E-04	5.8E-03	0.0E+00	0.0E+00	0.0E+00	0.0E+00
R5	0.09	0.01	0.39	7	1.1	5.1	5.1	0.8	0.1	0.0E+00	0.0E+00	4.3E-02	2.4E-03	3.1E-03	2.1E-04	1.6E-03	0.0E+00	0.0E+00	0.0E+00	0.0E+00
R6	0.48	0.03	2.05	22	3.9	21.5	21.5	4.3	0.3	0.0E+00	0.0E+00	2.0E-01	1.5E-02	1.4E-02	1.3E-03	9.4E-03	0.0E+00	0.0E+00	0.0E+00	0.0E+00
R7	2.39	0.35	10.13	57	15.1	55.6	55.6	21.1	2.8	0.0E+00	0.0E+00	3.7E-01	4.4E-02	2.6E-02	3.8E-03	2.8E-02	0.0E+00	0.0E+00	0.0E+00	0.0E+00
R8	2.97	0.53	12.57	122	30.5	104.0	104.0	40.2	7.7	0.0E+00	0.0E+00	7.0E-01	1.0E-01	4.9E-02	8.6E-03	6.4E-02	0.0E+00	0.0E+00	0.0E+00	0.0E+00
R9	3.03	0.56	12.87	112	36.2	97.7	97.7	39.8	6.8	0.0E+00	0.0E+00	5.2E-01	6.8E-02	3.7E-02	5.9E-03	4.3E-02	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Maximum Predicted % of Threshold	**11%**	**6%**	**26%**	**<1%**	**<1%**	**26%**	**132%**	**20%**	**34%**	**<1%**	**<1%**	**<1%**	**<1%**	**1%**	**2%**	**<1%**	**<1%**	**<1%**	**<1%**	**<1%**

[1] Conversion of NOx to NO2 using the Ozone Limiting Method.

Table 7f: Maximum Predicted Concentrations (µg/m³), 2046 Build Scenario, Idling Scenario 1, With Background

	$PM_{2.5}$		PM_{10}	CO		NO_2 [1]				Benzo-a-pyrene		Acetaldehyde		Acrolein		Formaldehyde	Benzene		1,3-Butadiene	
Averaging Period	24-hour	Annual	24-hour	1-hour	8-hour	1-hour	1-hour	24-hour	Annual	24-hour	Annual	0.5-hour	24-hour	1-hour	24-hour	24-hour	24-hour	Annual	24-hour	Annual
Threshold	27	8.8	50.0	36200	15700	400	79.0	200	22.6	0.00005	0.00001	500.0	500.0	4.5	0.4	65	2.3	0.45	10	2
Source of Threshold Value	CAAQS 2020	CAAQS 2020	AAQC	AAQC	AAQC	AAQC	CAAQS 2025	AAQC	CAAQS 2025	AAQC	AAQC	AAQC	AAQC	AAQC	AAQC	AAQC	AAQC	AAQC	AAQC	AAQC
Ambient Background	13.4	7.80	24.8	388	386	38.1	38.1	33.0	19.8	1.17E-04	7.14E-05	4.24	1.44	0.138	0.057	2.38	0.61	0.45	0.041	0.025

Receptor	$PM_{2.5}$		PM_{10}	CO		NO_2 [1]				Benzo-a-pyrene		Acetaldehyde		Acrolein		Formaldehyde	Benzene		1,3-Butadiene	
R1	13.6	7.8	25.7	399	388	53.3	53.3	38.9	19.9	1.2E-04	7.1E-05	4.35	1.44	1.5E-01	5.7E-02	2.4	6.1E-01	4.5E-01	4.1E-02	2.5E-02
R2	13.5	7.8	25.2	392	386	50.8	50.8	37.9	19.8	1.2E-04	7.1E-05	4.28	1.44	1.4E-01	5.7E-02	2.4	6.1E-01	4.5E-01	4.1E-02	2.5E-02
R3	13.6	7.8	25.7	396	387	54.0	54.0	38.8	19.9	1.2E-04	7.1E-05	4.32	1.44	1.4E-01	5.7E-02	2.4	6.1E-01	4.5E-01	4.1E-02	2.5E-02
R4	13.7	7.8	26.2	399	388	52.7	52.7	38.9	19.9	1.2E-04	7.1E-05	4.31	1.44	1.4E-01	5.7E-02	2.4	6.1E-01	4.5E-01	4.1E-02	2.5E-02
R5	13.5	7.8	25.2	395	387	51.9	51.9	38.0	19.8	1.2E-04	7.1E-05	4.29	1.44	1.4E-01	5.7E-02	2.4	6.1E-01	4.5E-01	4.1E-02	2.5E-02
R6	13.9	7.8	26.9	410	390	58.8	58.8	41.7	20.1	1.2E-04	7.1E-05	4.44	1.45	1.5E-01	5.8E-02	2.4	6.1E-01	4.5E-01	4.1E-02	2.5E-02
R7	15.8	8.2	34.9	445	401	97.3	97.3	55.1	22.5	1.2E-04	7.1E-05	4.61	1.48	1.6E-01	6.0E-02	2.4	6.1E-01	4.5E-01	4.1E-02	2.5E-02
R8	16.4	8.3	37.4	510	416	138.4	138.4	74.2	27.4	1.2E-04	7.1E-05	4.94	1.54	1.9E-01	6.5E-02	2.4	6.1E-01	4.5E-01	4.1E-02	2.5E-02
R9	16.4	8.4	37.7	500	422	132.3	132.3	73.8	26.5	1.2E-04	7.1E-05	4.76	1.50	1.7E-01	6.3E-02	2.4	6.1E-01	4.5E-01	4.1E-02	2.5E-02
Maximum Predicted % of Threshold	**61%**	**95%**	**75%**	**1%**	**3%**	**35%**	**175%**	**37%**	**121%**	**234%**	**714%**	**<1%**	**<1%**	**4%**	**16%**	**4%**	**27%**	**99.0%**	**<1%**	**1%**

[1] Conversion of NO_x to NO_2 using the Ozone Limiting Method and hourly concentrations of NO_2 and ozone. The ambient background concentrations measured at local monitoring stations are not added directly to the modelled concentration without background.

Table 7g: Maximum Predicted Concentrations (μg/m³), 2046 Build Scenario, Idling Scenario 2, Without Background

	$PM_{2.5}$		PM_{10}	CO		NO_2 [1]				Benzo-a-pyrene		Acetaldehyde		Acrolein		Formaldehyde	Benzene		1,3-Butadiene	
Averaging Period	24-hour	Annual	24-hour	1-hour	8-hour	1-hour	1-hour	24-hour	Annual	24-hour	Annual	0.5-hour	24-hour	1-hour	24-hour	24-hour	24-hour	Annual	24-hour	Annual
Threshold	27	8.8	50.0	36200	15700	400	79.0	200	22.6	0.00005	0.00001	500.0	500.0	4.5	0.4	65	2.3	0.45	10	2
Source of Threshold Value	CAAQS 2020	CAAQS 2020	AAQC	AAQC	AAQC	AAQC	CAAQS 2025	AAQC	CAAQS 2025	AAQC	AAQC	AAQC	AAQC	AAQC	AAQC	AAQC	AAQC	AAQC	AAQC	AAQC
Ambient Background	13.4	7.80	24.8	388	386	38.1	38.1	33.0	19.8	1.17E-04	7.14E-05	4.24	1.44	0.138	0.057	2.38	0.61	0.45	0.041	0.025

Receptor	$PM_{2.5}$		PM_{10}	CO		NO_2 [1]				Benzo-a-pyrene		Acetaldehyde		Acrolein		Formaldehyde	Benzene		1,3-Butadiene	
R1	0.27	0.01	1.15	13	2.2	8.7	8.7	2.1	0.1	0.0E+00	0.0E+00	1.0E-01	6.7E-03	7.4E-03	5.7E-04	4.3E-03	0.0E+00	0.0E+00	0.0E+00	0.0E+00
R2	0.10	0.01	0.41	5	0.8	4.4	4.4	0.7	0.1	0.0E+00	0.0E+00	3.7E-02	2.4E-03	2.6E-03	2.1E-04	1.6E-03	0.0E+00	0.0E+00	0.0E+00	0.0E+00
R3	0.21	0.01	0.90	11	1.9	8.3	8.3	1.6	0.1	0.0E+00	0.0E+00	8.3E-02	6.5E-03	5.9E-03	5.6E-04	4.1E-03	0.0E+00	0.0E+00	0.0E+00	0.0E+00
R4	0.38	0.02	1.60	11	3.0	11.3	11.3	3.0	0.2	0.0E+00	0.0E+00	6.7E-02	9.0E-03	4.8E-03	7.8E-04	5.8E-03	0.0E+00	0.0E+00	0.0E+00	0.0E+00
R5	0.11	0.01	0.48	8	1.2	5.5	5.5	0.8	0.1	0.0E+00	0.0E+00	4.4E-02	2.4E-03	3.1E-03	2.1E-04	1.6E-03	0.0E+00	0.0E+00	0.0E+00	0.0E+00
R6	0.55	0.03	2.32	23	4.1	22.1	22.1	4.5	0.3	0.0E+00	0.0E+00	2.0E-01	1.5E-02	1.4E-02	1.3E-03	9.4E-03	0.0E+00	0.0E+00	0.0E+00	0.0E+00
R7	2.58	0.37	10.94	46	15.9	63.9	63.9	24.2	3.6	0.0E+00	0.0E+00	3.5E-01	4.3E-02	2.5E-02	3.7E-03	2.7E-02	0.0E+00	0.0E+00	0.0E+00	0.0E+00
R8	3.11	0.55	13.20	56	24.1	74.4	74.4	29.1	5.9	0.0E+00	0.0E+00	7.4E-01	1.1E-01	5.3E-02	9.1E-03	6.7E-02	0.0E+00	0.0E+00	0.0E+00	0.0E+00
R9	3.23	0.59	13.71	54	22.8	73.3	73.3	32.9	6.4	0.0E+00	0.0E+00	5.0E-01	6.2E-02	3.6E-02	5.3E-03	3.9E-02	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Maximum Predicted % of Threshold	**12%**	**7%**	**27%**	**<1%**	**<1%**	**19%**	**94%**	**16%**	**28%**	**<1%**	**<1%**	**<1%**	**<1%**	**1%**	**2%**	**<1%**	**<1%**	**<1%**	**<1%**	**<1%**

[1] Conversion of NOx to NO2 using the Ozone Limiting Method.

Table 7h: Maximum Predicted Concentrations (µg/m³), 2046 Build Scenario, Idling Scenario 2, With Background

	$PM_{2.5}$		PM_{10}	CO		NO_2 [1]				Benzo-a-pyrene		Acetaldehyde		Acrolein		Formaldehyde	Benzene		1,3-Butadiene	
Averaging Period	24-hour	Annual	24-hour	1-hour	8-hour	1-hour	1-hour	24-hour	Annual	24-hour	Annual	0.5-hour	24-hour	1-hour	24-hour	24-hour	24-hour	Annual	24-hour	Annual
Threshold	27	8.8	50.0	36200	15700	400	79.0	200	22.6	0.00005	0.00001	500.0	500.0	4.5	0.4	65	2.3	0.45	10	2
Source of Threshold Value	CAAQS 2020	CAAQS 2020	AAQC	AAQC	AAQC	AAQC	CAAQS 2025	AAQC	CAAQS 2025	AAQC	AAQC	AAQC	AAQC	AAQC	AAQC	AAQC	AAQC	AAQC	AAQC	AAQC
Ambient Background	13.4	7.80	24.8	388	386	38.1	38.1	33.0	19.8	1.17E-04	7.14E-05	4.24	1.44	0.138	0.057	2.38	0.61	0.45	0.041	0.025
Receptor	**$PM_{2.5}$**		**PM_{10}**	**CO**		**NO_2 [1]**				**Benzo-a-pyrene**		**Acetaldehyde**		**Acrolein**		**Formaldehyde**	**Benzene**		**1,3-Butadiene**	
R1	13.7	7.8	26.0	401	388	52.9	52.9	38.7	19.9	1.2E-04	7.1E-05	4.35	1.44	1.5E-01	5.7E-02	2.4	6.1E-01	4.5E-01	4.1E-02	2.5E-02
R2	13.5	7.8	25.2	393	386	50.8	50.8	38.0	19.8	1.2E-04	7.1E-05	4.28	1.44	1.4E-01	5.7E-02	2.4	6.1E-01	4.5E-01	4.1E-02	2.5E-02
R3	13.6	7.8	25.7	399	388	53.3	53.3	38.9	19.9	1.2E-04	7.1E-05	4.33	1.44	1.4E-01	5.7E-02	2.4	6.1E-01	4.5E-01	4.1E-02	2.5E-02
R4	13.8	7.8	26.4	399	389	52.6	52.6	39.0	19.9	1.2E-04	7.1E-05	4.31	1.44	1.4E-01	5.7E-02	2.4	6.1E-01	4.5E-01	4.1E-02	2.5E-02
R5	13.5	7.8	25.3	396	387	52.1	52.1	38.0	19.8	1.2E-04	7.1E-05	4.29	1.44	1.4E-01	5.7E-02	2.4	6.1E-01	4.5E-01	4.1E-02	2.5E-02
R6	13.9	7.8	27.1	411	390	59.8	59.8	41.8	20.1	1.2E-04	7.1E-05	4.44	1.45	1.5E-01	5.8E-02	2.4	6.1E-01	4.5E-01	4.1E-02	2.5E-02
R7	16.0	8.2	35.8	434	402	101.8	101.8	58.1	23.4	1.2E-04	7.1E-05	4.59	1.48	1.6E-01	6.0E-02	2.4	6.1E-01	4.5E-01	4.1E-02	2.5E-02
R8	16.5	8.4	38.0	444	410	117.8	117.8	63.1	25.7	1.2E-04	7.1E-05	4.98	1.54	1.9E-01	6.6E-02	2.5	6.1E-01	4.5E-01	4.1E-02	2.5E-02
R9	16.6	8.4	38.5	442	408	118.7	118.7	66.9	26.1	1.2E-04	7.1E-05	4.75	1.50	1.7E-01	6.2E-02	2.4	6.1E-01	4.5E-01	4.1E-02	2.5E-02
Maximum Predicted % of Threshold	**62%**	**95%**	**77%**	**1%**	**3%**	**30%**	**150%**	**33%**	**116%**	**234%**	**714%**	**<1%**	**<1%**	**4%**	**16%**	**4%**	**27%**	**99.0%**	**<1%**	**1%**

[1] Conversion of NO_x to NO_2 using the Ozone Limiting Method and hourly concentrations of NO_2 and ozone. The ambient background concentrations measured at local monitoring stations are not added directly to the modelled concentration without background.

Table 8a: Percent Change in Maximum Predicted Concentrations from 2026 to 2046 Build Scenario, Idling Scenario 1 - Without Background

	$PM_{2.5}$		PM_{10}	CO		NO_2 [1]				Benzo-a-pyrene		Acetaldehyde		Acrolein		Formaldehyde	Benzene		1,3-Butadiene	
Averaging Period	24-hour	Annual	24-hour	1-hour	8-hour	1-hour	1-hour	24-hour	Annual	24-hour	Annual	0.5-hour	24-hour	1-hour	24-hour	24-hour	24-hour	Annual	24-hour	Annual
Threshold	27	8.8	50.0	36200	15700	400	79.0	200	22.6	0.00005	0.00001	500.0	500.0	4.5	0.4	65	2.3	0.45	10	2
Source of Threshold Value	CAAQS 2020	CAAQS 2020	AAQC	AAQC	AAQC	AAQC	CAAQS 2025	AAQC	CAAQS 2025	AAQC	AAQC	AAQC	AAQC	AAQC	AAQC	AAQC	AAQC	AAQC	AAQC	AAQC
Ambient Background	13.4	7.8	24.8	388	386	38.1	38.1	33.0	19.8	1.17E-04	7.14E-05	4.2	1.4	0.14	0.06	2.4	0.61	0.45	0.04	0.03
Receptor	**$PM_{2.5}$**		**PM_{10}**	**CO**		**NO_2 [1]**				**Benzo-a-pyrene**		**Acetaldehyde**		**Acrolein**		**Formaldehyde**	**Benzene**		**1,3-Butadiene**	
R1	-4%	-5%	5%	-17%	-18%	-9%	-9%	-9%	-8%	-100%	-100%	-29%	-30%	-49%	-50%	-68%	-100%	-100%	-100%	-100%
R2	-3%	-4%	5%	-17%	-16%	-9%	-9%	-9%	-9%	-100%	-100%	-28%	-29%	-48%	-48%	-66%	-100%	-100%	-100%	-100%
R3	-3%	-4%	5%	-18%	-18%	-9%	-9%	-9%	-9%	-100%	-100%	-29%	-27%	-48%	-47%	-65%	-100%	-100%	-100%	-100%
R4	-5%	-5%	4%	-15%	-16%	-9%	-9%	-9%	-8%	-100%	-100%	-38%	-34%	-58%	-54%	-70%	-100%	-100%	-100%	-100%
R5	-3%	-5%	5%	-15%	-16%	-8%	-8%	-9%	-8%	-100%	-100%	-39%	-31%	-59%	-51%	-68%	-100%	-100%	-100%	-100%
R6	-4%	-5%	5%	-18%	-16%	-9%	-9%	-8%	-8%	-100%	-100%	-30%	-31%	-50%	-51%	-68%	-100%	-100%	-100%	-100%
R7	-3%	-4%	5%	-16%	-15%	-9%	-9%	-7%	-9%	-100%	-100%	-37%	-40%	-58%	-60%	-74%	-100%	-100%	-100%	-100%
R8	-10%	-10%	3%	-14%	-15%	-2%	-2%	-7%	-8%	-100%	-100%	-16%	-32%	-51%	-56%	-72%	-100%	-100%	-100%	-100%
R9	-5%	-7%	4%	-13%	-14%	-6%	-6%	-7%	-8%	-100%	-100%	-33%	-50%	-60%	-68%	-80%	-100%	-100%	-100%	-100%

[1] Conversion of NOx to NO2 using the Ozone Limiting Method.

[2] Red cells indicate an increase in concentration >1%.

Table 8b: Percent Change in Maximum Predicted Concentrations from 2026 to 2046 Build Scenario, Idling Scenario 1 - With Background

	$PM_{2.5}$		PM_{10}	CO		NO_2 [1]				Benzo-a-pyrene		Acetaldehyde		Acrolein		Formaldehyde	Benzene		1,3-Butadiene	
Averaging Period	24-hour	Annual	24-hour	1-hour	8-hour	1-hour	1-hour	24-hour	Annual	24-hour	Annual	0.5-hour	24-hour	1-hour	24-hour	24-hour	24-hour	Annual	24-hour	Annual
Threshold	27	8.8	50.0	36200	15700	400	79.0	200	22.6	0.00005	0.00001	500.0	500.0	4.5	0.4	65	2.3	0.45	10	2
Source of Threshold Value	CAAQS 2020	CAAQS 2020	AAQC	AAQC	AAQC	AAQC	CAAQS 2025	AAQC	CAAQS 2025	AAQC	AAQC	AAQC	AAQC	AAQC	AAQC	AAQC	AAQC	AAQC	AAQC	AAQC
Ambient Background	13.4	7.8	24.8	388	386	38.1	38.1	33.0	19.8	1.17E-04	7.14E-05	4.2	1.4	0.14	0.06	2.4	0.61	0.45	0.04	0.03
Receptor	**$PM_{2.5}$**		**PM_{10}**	**CO**		**NO_2 [1]**				**Benzo-a-pyrene**		**Acetaldehyde**		**Acrolein**		**Formaldehyde**	**Benzene**		**1,3-Butadiene**	
R1	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	-2%	<1%	<1%	<1%	-5%	-1%	<1%	<1%	<1%	<1%	<1%
R2	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	-2%	<1%	<1%	<1%	<1%	<1%	<1%
R3	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	-2%	<1%	<1%	<1%	-4%	<1%	<1%	<1%	<1%	<1%	<1%
R4	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	-3%	<1%	<1%	<1%	-4%	-2%	<1%	<1%	<1%	<1%	<1%
R5	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	-3%	<1%	<1%	<1%	<1%	<1%	<1%
R6	<1%	<1%	<1%	-1%	<1%	-3%	-3%	<1%	<1%	-5%	<1%	-2%	<1%	-9%	-2%	<1%	<1%	<1%	-1%	<1%
R7	<1%	<1%	1%	-2%	<1%	-6%	-6%	-3%	-1%	-21%	-5%	-4%	-2%	-18%	-8%	-3%	-1%	<1%	-5%	-1%
R8	-2%	<1%	<1%	-4%	-1%	-1%	-1%	-4%	-2%	-38%	-14%	-3%	-3%	-22%	-14%	-6%	-3%	<1%	-10%	-3%
R9	-1%	<1%	1%	-3%	-1%	-1%	-1%	-4%	-2%	-38%	-12%	-5%	-4%	-24%	-17%	-7%	-3%	<1%	-11%	-3%

[1] Conversion of NOx to NO2 using the Ozone Limiting Method.

[2] Red cells indicate an increase in concentration >1%.

Table 8c: Percent Change in Maximum Predicted Concentrations from 2026 to 2046 Build Scenario, Idling Scenario 2 - Without Background

	$PM_{2.5}$		PM_{10}	CO		NO_2 [1]				Benzo-a-pyrene		Acetaldehyde		Acrolein		Formaldehyde	Benzene		1,3-Butadiene	
Averaging Period	24-hour	Annual	24-hour	1-hour	8-hour	1-hour	1-hour	24-hour	Annual	24-hour	Annual	0.5-hour	24-hour	1-hour	24-hour	24-hour	24-hour	Annual	24-hour	Annual
Threshold	27	8.8	50.0	36200	15700	400	79.0	200	22.6	0.00005	0.00001	500.0	500.0	4.5	0.4	65	2.3	0.45	10	2
Source of Threshold Value	CAAQS 2020	CAAQS 2020	AAQC	AAQC	AAQC	AAQC	CAAQS 2025	AAQC	CAAQS 2025	AAQC	AAQC	AAQC	AAQC	AAQC	AAQC	AAQC	AAQC	AAQC	AAQC	AAQC
Ambient Background	13.4	7.8	24.8	388	386	38.1	38.1	33.0	19.8	1.17E-04	7.14E-05	4.2	1.4	0.14	0.06	2.4	0.61	0.45	0.04	0.03
Receptor	**$PM_{2.5}$**		**PM_{10}**	**CO**		**NO_2 [1]**				**Benzo-a-pyrene**		**Acetaldehyde**		**Acrolein**		**Formaldehyde**	**Benzene**		**1,3-Butadiene**	
R1	-3%	-5%	5%	-15%	-17%	-9%	-9%	-9%	-8%	-100%	-100%	-30%	-32%	-50%	-53%	-69%	-100%	-100%	-100%	-100%
R2	-3%	-4%	5%	-16%	-16%	-10%	-10%	-9%	-9%	-100%	-100%	-30%	-30%	-50%	-50%	-67%	-100%	-100%	-100%	-100%
R3	-3%	-4%	5%	-16%	-18%	-9%	-9%	-9%	-8%	-100%	-100%	-32%	-28%	-52%	-48%	-66%	-100%	-100%	-100%	-100%
R4	-4%	-5%	5%	-15%	-15%	-9%	-9%	-9%	-8%	-100%	-100%	-38%	-34%	-58%	-54%	-70%	-100%	-100%	-100%	-100%
R5	-3%	-5%	5%	-15%	-15%	-9%	-9%	-9%	-8%	-100%	-100%	-39%	-31%	-59%	-51%	-69%	-100%	-100%	-100%	-100%
R6	-4%	-5%	5%	-17%	-15%	-9%	-9%	-9%	-8%	-100%	-100%	-31%	-32%	-51%	-52%	-69%	-100%	-100%	-100%	-100%
R7	-5%	-5%	4%	-16%	-12%	-6%	-6%	-9%	-9%	-100%	-100%	-34%	-39%	-54%	-59%	-74%	-100%	-100%	-100%	-100%
R8	-5%	-6%	4%	-19%	-15%	-8%	-8%	-8%	-8%	-100%	-100%	-23%	-26%	-43%	-46%	-64%	-100%	-100%	-100%	-100%
R9	-5%	-6%	4%	-18%	-13%	-6%	-6%	-7%	-8%	-100%	-100%	-30%	-39%	-50%	-59%	-74%	-100%	-100%	-100%	-100%

[1] Conversion of NOx to NO2 using the Ozone Limiting Method.

[2] Red cells indicate an increase in concentration >1%.

Table 8d: Percent Change in Maximum Predicted Concentrations from 2026 to 2046 Build Scenario, Idling Scenario 2 - With Background

	$PM_{2.5}$		PM_{10}	CO		NO_2 [1]				Benzo-a-pyrene		Acetaldehyde		Acrolein		Formaldehyde	Benzene		1,3-Butadiene	
Averaging Period	24-hour	Annual	24-hour	1-hour	8-hour	1-hour	1-hour	24-hour	Annual	24-hour	Annual	0.5-hour	24-hour	1-hour	24-hour	24-hour	24-hour	Annual	24-hour	Annual
Threshold	27	8.8	50.0	36200	15700	400	79.0	200	22.6	0.00005	0.00001	500.0	500.0	4.5	0.4	65	2.3	0.45	10	2
Source of Threshold Value	CAAQS 2020	CAAQS 2020	AAQC	AAQC	AAQC	AAQC	CAAQS 2025	AAQC	CAAQS 2025	AAQC	AAQC	AAQC	AAQC	AAQC	AAQC	AAQC	AAQC	AAQC	AAQC	AAQC
Ambient Background	13.4	7.8	24.8	388	386	38.1	38.1	33.0	19.8	1.17E-04	7.14E-05	4.2	1.4	0.14	0.06	2.4	0.61	0.45	0.04	0.03
Receptor	**$PM_{2.5}$**		**PM_{10}**	**CO**		**NO_2 [1]**				**Benzo-a-pyrene**		**Acetaldehyde**		**Acrolein**		**Formaldehyde**	**Benzene**		**1,3-Butadiene**	
R1	<1%	<1%	<1%	<1%	<1%	-1%	-1%	<1%	<1%	-2%	<1%	-1%	<1%	-5%	-1%	<1%	<1%	<1%	<1%	<1%
R2	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	-2%	<1%	<1%	<1%	<1%	<1%	<1%
R3	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	-2%	<1%	<1%	<1%	-4%	<1%	<1%	<1%	<1%	<1%	<1%
R4	<1%	<1%	<1%	<1%	<1%	-1%	-1%	<1%	<1%	-3%	<1%	<1%	<1%	-4%	-2%	<1%	<1%	<1%	<1%	<1%
R5	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	-3%	<1%	<1%	<1%	<1%	<1%	<1%
R6	<1%	<1%	<1%	-1%	<1%	-2%	-2%	<1%	<1%	-5%	<1%	-2%	<1%	-9%	-2%	<1%	<1%	<1%	-1%	<1%
R7	<1%	<1%	1%	-2%	<1%	-6%	-6%	-4%	-1%	-23%	-7%	-4%	-2%	-15%	-8%	-3%	-1%	<1%	-6%	-2%
R8	-1%	<1%	1%	-3%	<1%	<1%	<1%	-4%	-2%	-26%	-11%	-4%	-2%	-17%	-10%	-5%	-2%	<1%	-8%	-3%
R9	-1%	<1%	1%	-3%	<1%	-1%	-1%	-4%	-2%	-29%	-11%	-4%	-3%	-17%	-11%	-4%	-2%	<1%	-8%	-3%

[1] Conversion of NOx to NO2 using the Ozone Limiting Method.

[2] Red cells indicate an increase in concentration >1%.

Table 8e: Percent Change in Maximum Predicted Concentrations from 2026 Build Scenario, Idling Scenario 1 to Idling Scenario 2 - Without Background

	$PM_{2.5}$		PM_{10}	CO		NO_2 [1]				Benzo-a-pyrene		Acetaldehyde		Acrolein		Formaldehyde	Benzene		1,3-Butadiene	
Averaging Period	24-hour	Annual	24-hour	1-hour	8-hour	1-hour	1-hour	24-hour	Annual	24-hour	Annual	0.5-hour	24-hour	1-hour	24-hour	24-hour	24-hour	Annual	24-hour	Annual
Threshold	27	8.8	50.0	36200	15700	400	79.0	200	22.6	0.00005	0.00001	500.0	500.0	4.5	0.4	65	2.3	0.45	10	2
Source of Threshold Value	CAAQS 2020	CAAQS 2020	AAQC	AAQC	AAQC	AAQC	CAAQS 2025	AAQC	CAAQS 2025	AAQC	AAQC	AAQC	AAQC	AAQC	AAQC	AAQC	AAQC	AAQC	AAQC	AAQC
Ambient Background	13.4	7.8	24.8	388	386	38.1	38.1	33.0	19.8	1.17E-04	7.14E-05	4.2	1.4	0.14	0.06	2.4	0.61	0.45	0.04	0.03
Receptor	**$PM_{2.5}$**		**PM_{10}**	**CO**		**NO_2 [1]**				**Benzo-a-pyrene**		**Acetaldehyde**		**Acrolein**		**Formaldehyde**	**Benzene**		**1,3-Butadiene**	
R1	25%	<1%	26%	14%	5%	11%	11%	10%	<1%	7%	<1%	2%	4%	3%	4%	5%	6%	<1%	9%	<1%
R2	20%	3%	21%	13%	13%	17%	17%	10%	1%	7%	<1%	4%	3%	5%	5%	4%	7%	<1%	<1%	<1%
R3	2%	-4%	2%	29%	7%	22%	22%	5%	-1%	5%	<1%	10%	2%	12%	3%	3%	4%	<1%	5%	<1%
R4	15%	-2%	15%	3%	4%	1%	1%	<1%	<1%	-2%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	-13%	<1%	<1%
R5	23%	<1%	23%	8%	8%	9%	9%	5%	<1%	<1%	<1%	2%	<1%	2%	<1%	2%	3%	<1%	11%	<1%
R6	13%	<1%	13%	5%	5%	3%	3%	5%	<1%	2%	<1%	1%	2%	1%	2%	2%	3%	<1%	4%	<1%
R7	11%	6%	9%	-19%	2%	11%	11%	16%	31%	12%	38%	-10%	-2%	-14%	-3%	-3%	7%	26%	9%	30%
R8	<1%	<1%	4%	-51%	-21%	-23%	-23%	-27%	-22%	-41%	-28%	17%	-4%	-9%	-14%	-18%	-28%	-22%	-29%	-22%
R9	6%	4%	7%	-49%	-38%	-25%	-25%	-17%	-5%	-33%	-8%	-7%	-25%	-23%	-30%	-31%	-32%	-6%	-32%	-7%

[1] Conversion of NOx to NO_2 using the Ozone Limiting Method.

[2] Red cells indicate an increase in concentration >1%.

Table 8f: Percent Change in Maximum Predicted Concentrations from 2026 Build Scenario, Idling Scenario 1 to Idling Scenario 2 - With Background

	$PM_{2.5}$		PM_{10}	CO		NO_2 [1]				Benzo-a-pyrene		Acetaldehyde		Acrolein		Formaldehyde	Benzene		1,3-Butadiene	
Averaging Period	24-hour	Annual	24-hour	1-hour	8-hour	1-hour	1-hour	24-hour	Annual	24-hour	Annual	0.5-hour	24-hour	1-hour	24-hour	24-hour	24-hour	Annual	24-hour	Annual
Threshold	27	8.8	50.0	36200	15700	400	79.0	200	22.6	0.00005	0.00001	500.0	500.0	4.5	0.4	65	2.3	0.45	10	2
Source of Threshold Value	CAAQS 2020	CAAQS 2020	AAQC	AAQC	AAQC	AAQC	CAAQS 2025	AAQC	CAAQS 2025	AAQC	AAQC	AAQC	AAQC	AAQC	AAQC	AAQC	AAQC	AAQC	AAQC	AAQC
Ambient Background	13.4	7.8	24.8	388	386	38.1	38.1	33.0	19.8	1.17E-04	7.14E-05	4.2	1.4	0.14	0.06	2.4	0.61	0.45	0.04	0.03
Receptor	**$PM_{2.5}$**		**PM_{10}**	**CO**		**NO_2 [1]**				**Benzo-a-pyrene**		**Acetaldehyde**		**Acrolein**		**Formaldehyde**	**Benzene**		**1,3-Butadiene**	
R1	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%
R2	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%
R3	<1%	<1%	<1%	<1%	<1%	-2%	-2%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%
R4	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%
R5	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%
R6	<1%	<1%	<1%	<1%	<1%	1%	1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%
R7	2%	<1%	2%	-3%	<1%	5%	5%	7%	4%	3%	2%	-1%	<1%	-4%	<1%	<1%	<1%	<1%	<1%	<1%
R8	<1%	<1%	1%	-14%	-2%	-15%	-15%	-15%	-7%	-15%	-4%	3%	<1%	-4%	-4%	-2%	<1%	<1%	-3%	<1%
R9	1%	<1%	2%	-12%	-4%	-11%	-11%	-9%	-1%	-13%	-1%	-1%	-2%	-9%	-7%	-3%	<1%	<1%	-3%	<1%

[1] Conversion of NOx to NO2 using the Ozone Limiting Method.

[2] Red cells indicate an increase in concentration >1%.

Table 8g: Percent Change in Maximum Predicted Concentrations from 2046 Build Scenario, Idling Scenario 1 to Idling Scenario 2 - Without Background

	$PM_{2.5}$		PM_{10}	CO		NO_2 [1]				Benzo-a-pyrene		Acetaldehyde		Acrolein		Formaldehyde	Benzene		1,3-Butadiene	
Averaging Period	24-hour	Annual	24-hour	1-hour	8-hour	1-hour	1-hour	24-hour	Annual	24-hour	Annual	0.5-hour	24-hour	1-hour	24-hour	24-hour	24-hour	Annual	24-hour	Annual
Threshold	27	8.8	50.0	36200	15700	400	79.0	200	22.6	0.00005	0.00001	500.0	500.0	4.5	0.4	65	2.3	0.45	10	2
Source of Threshold Value	CAAQS 2020	CAAQS 2020	AAQC	AAQC	AAQC	AAQC	CAAQS 2025	AAQC	CAAQS 2025	AAQC	AAQC	AAQC	AAQC	AAQC	AAQC	AAQC	AAQC	AAQC	AAQC	AAQC
Ambient Background	13.4	7.8	24.8	388	386	38.1	38.1	33.0	19.8	1.17E-04	7.14E-05	4.2	1.4	0.14	0.06	2.4	0.61	0.45	0.04	0.03

Receptor	$PM_{2.5}$		PM_{10}	CO		NO_2 [1]				Benzo-a-pyrene [2]		Acetaldehyde		Acrolein		Formaldehyde	Benzene [2]		1,3-Butadiene [2]	
R1	26%	-1%	26%	16%	6%	10%	10%	10%	<1%	-	-	<1%	<1%	<1%	<1%	<1%	-	-	-	-
R2	21%	3%	21%	14%	13%	16%	16%	9%	1%	-	-	2%	1%	2%	<1%	1%	-	-	-	-
R3	2%	-5%	2%	32%	7%	21%	21%	5%	-1%	-	-	4%	<1%	4%	2%	<1%	-	-	-	-
R4	16%	-2%	16%	4%	4%	1%	1%	<1%	<1%	-	-	<1%	<1%	<1%	<1%	<1%	-	-	-	-
R5	23%	-1%	23%	8%	9%	8%	8%	4%	<1%	-	-	<1%	<1%	<1%	<1%	<1%	-	-	-	-
R6	13%	<1%	13%	6%	5%	3%	3%	5%	<1%	-	-	<1%	<1%	<1%	<1%	<1%	-	-	-	-
R7	8%	4%	8%	-19%	5%	15%	15%	14%	31%	-	-	-5%	-1%	-5%	-1%	-1%	-	-	-	-
R8	5%	4%	5%	-54%	-21%	-28%	-28%	-28%	-23%	-	-	6%	5%	6%	5%	5%	-	-	-	-
R9	7%	5%	7%	-52%	-37%	-25%	-25%	-17%	-6%	-	-	-4%	-9%	-4%	-9%	-9%	-	-	-	-

[1] Conversion of NOx to NO2 using the Ozone Limiting Method.

[2] No emissions of benzo-a-pyrene, benzene and 1,3-butadiene from modelling in 2046.

[3] Red cells indicate an increase in concentration >1%.

Table 8h: Percent Change in Maximum Predicted Concentrations from 2046 Build Scenario, Idling Scenario 1 to Idling Scenario 2 - With Background

	$PM_{2.5}$		PM_{10}	CO		NO_2 [1]				Benzo-a-pyrene		Acetaldehyde		Acrolein		Formaldehyde	Benzene		1,3-Butadiene	
Averaging Period	24-hour	Annual	24-hour	1-hour	8-hour	1-hour	1-hour	24-hour	Annual	24-hour	Annual	0.5-hour	24-hour	1-hour	24-hour	24-hour	24-hour	Annual	24-hour	Annual
Threshold	27	8.8	50.0	36200	15700	400	79.0	200	22.6	0.00005	0.00001	500.0	500.0	4.5	0.4	65	2.3	0.45	10	2
Source of Threshold Value	CAAQS 2020	CAAQS 2020	AAQC	AAQC	AAQC	AAQC	CAAQS 2025	AAQC	CAAQS 2025	AAQC	AAQC	AAQC	AAQC	AAQC	AAQC	AAQC	AAQC	AAQC	AAQC	AAQC
Ambient Background	13.4	7.8	24.8	388	386	38.1	38.1	33.0	19.8	1.17E-04	7.14E-05	4.2	1.4	0.14	0.06	2.4	0.61	0.45	0.04	0.03
Receptor	**$PM_{2.5}$**		**PM_{10}**	**CO**		**NO_2 [1]**				**Benzo-a-pyrene [2]**		**Acetaldehyde**		**Acrolein**		**Formaldehyde**	**Benzene [2]**		**1,3-Butadiene [2]**	
R1	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	-	-	<1%	<1%	<1%	<1%	<1%	-	-	-	-
R2	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	-	-	<1%	<1%	<1%	<1%	<1%	-	-	-	-
R3	<1%	<1%	<1%	<1%	<1%	-1%	-1%	<1%	<1%	-	-	<1%	<1%	<1%	<1%	<1%	-	-	-	-
R4	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	-	-	<1%	<1%	<1%	<1%	<1%	-	-	-	-
R5	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	-	-	<1%	<1%	<1%	<1%	<1%	-	-	-	-
R6	<1%	<1%	1%	<1%	<1%	2%	2%	<1%	<1%	-	-	<1%	<1%	<1%	<1%	<1%	-	-	-	-
R7	1%	<1%	2%	-2%	<1%	5%	5%	5%	4%	-	-	<1%	<1%	<1%	<1%	<1%	-	-	-	-
R8	<1%	<1%	2%	-13%	-2%	-15%	-15%	-15%	-6%	-	-	<1%	<1%	2%	<1%	<1%	-	-	-	-
R9	1%	<1%	2%	-12%	-3%	-10%	-10%	-9%	-1%	-	-	<1%	<1%	<1%	<1%	<1%	-	-	-	-

[1] Conversion of NOx to NO2 using the Ozone Limiting Method.

[2] No emissions of benzo-a-pyrene, benzene and 1,3-butadiene from modelling in 2046.

[3] Red cells indicate an increase in concentration >1%.

Table 9a: Benzo(a)pyrene 24-Hour Frequency Analysis - 2026 Build Scenario, Idling Scenario 1

RWDI# 2407997

7310 Tecumseh Road East, Windsor, Ontario

Receptor Information					Maximum Predicted 24-Hour Concentration (µg/m³)	Predicted Excursions Above Specified 24-Hour Values [1]					
ID#	Description	X	Y	Z		Events > 0.00005 µg/m³		Events > 0.00007 µg/m³		Events > 0.00009 µg/m³	
						Count	Frequency	Count	Frequency	Count	Frequency
R1	Residence	340448	4686068	1.5	2.53E-06	0	0.0%	0	0.0%	0	0.0%
R2	Residence	340694	4686958	1.5	7.77E-07	0	0.0%	0	0.0%	0	0.0%
R3	Residence	340039	4686936	1.5	1.90E-06	0	0.0%	0	0.0%	0	0.0%
R4	Residence	340052	4686144	1.5	4.05E-06	0	0.0%	0	0.0%	0	0.0%
R5	Residence	340771	4686337	1.5	1.11E-06	0	0.0%	0	0.0%	0	0.0%
R6	Residence	340364	4686264	1.5	5.82E-06	0	0.0%	0	0.0%	0	0.0%
R7	Residence - Building #1	340169	4686381	1.5	3.05E-05	0	0.0%	0	0.0%	0	0.0%
R8	Residence - Building #2	340144	4686445	1.5	7.07E-05	13	0.7%	1	0.1%	0	0.0%
R9	Residence - Building #3	340162	4686417	1.5	7.21E-05	5	0.3%	1	0.1%	0	0.0%

43573 Hours of valid Meterological Data

1816 Days of valid Meteorological Data

Notes:

[1] Maximum predicted concentration with no background.

Table 9b: NO_2 1-Hour Frequency Analysis - 2026 Build Scenario, Idling Scenario 1

RWDI# 2407997

7310 Tecumseh Road East, Windsor, Ontario

Receptor Information					Maximum Predicted 1-Hour Concentration (µg/m³)	Predicted Excursions Above Specified 1-Hour Values [1]					
						Events > 79 µg/m3		Events > 99 µg/m3		Events > 119 µg/m3	
ID#	Description	X	Y	Z		Count	Frequency	Count	Frequency	Count	Frequency
R1	Residence	340448	4686068	1.5	63	0	0.0%	0	0.0%	0	0.0%
R2	Residence	340694	4686958	1.5	56	0	0.0%	0	0.0%	0	0.0%
R3	Residence	340039	4686936	1.5	61	0	0.0%	0	0.0%	0	0.0%
R4	Residence	340052	4686144	1.5	69	0	0.0%	0	0.0%	0	0.0%
R5	Residence	340771	4686337	1.5	58	0	0.0%	0	0.0%	0	0.0%
R6	Residence	340364	4686264	1.5	89	9	0.0%	0	0.0%	0	0.0%
R7	Residence - Building #1	340169	4686381	1.5	126	147	0.3%	37	0.1%	14	0.0%
R8	Residence - Building #2	340144	4686445	1.5	155	1198	2.7%	540	1.2%	205	0.5%
R9	Residence - Building #3	340162	4686417	1.5	147	859	2.0%	351	0.8%	131	0.3%

43573 Hours of valid Meterological Data

Notes:
[1] Maximum predicted concentration with background using the Ozone Limiting Method.
These concentrations differ from those presented in Table 6, which use the 98th percentile of the daily 1-hour maximum concentrations to conform to CAAQS standard.

Table 9c: Benzo(a)pyrene 24-Hour Frequency Analysis - 2026 Build Scenario, Idling Scenario 2

RWDI# 2407997

7310 Tecumseh Road East, Windsor, Ontario

Receptor Information					Maximum Predicted 24-Hour Concentration (µg/m³)	Predicted Excursions Above Specified 24-Hour Values [1]					
ID#	Description	X	Y	Z		Events > 0.00005 µg/m³		Events > 0.00007 µg/m³		Events > 0.00009 µg/m³	
						Count	Frequency	Count	Frequency	Count	Frequency
R1	Residence	340448	4686068	1.5	2.72E-06	0	0.0%	0	0.0%	0	0.0%
R2	Residence	340694	4686958	1.5	8.29E-07	0	0.0%	0	0.0%	0	0.0%
R3	Residence	340039	4686936	1.5	2.00E-06	0	0.0%	0	0.0%	0	0.0%
R4	Residence	340052	4686144	1.5	3.95E-06	0	0.0%	0	0.0%	0	0.0%
R5	Residence	340771	4686337	1.5	1.11E-06	0	0.0%	0	0.0%	0	0.0%
R6	Residence	340364	4686264	1.5	5.95E-06	0	0.0%	0	0.0%	0	0.0%
R7	Residence - Building #1	340169	4686381	1.5	3.43E-05	0	0.0%	0	0.0%	0	0.0%
R8	Residence - Building #2	340144	4686445	1.5	4.18E-05	0	0.0%	0	0.0%	0	0.0%
R9	Residence - Building #3	340162	4686417	1.5	4.82E-05	0	0.0%	0	0.0%	0	0.0%

43573 Hours of valid Meterological Data
1816 Days of valid Meteorological Data

Notes:
[1] Maximum predicted concentration with no background.

Table 9d: NO_2 1-Hour Frequency Analysis - 2026 Build Scenario, Idling Scenario 2

RWDI# 2407997

7310 Tecumseh Road East, Windsor, Ontario

Receptor Information					Maximum Predicted 1-Hour Concentration (µg/m³)	Predicted Excursions Above Specified 1-Hour Values [1]					
ID#	Description	X	Y	Z		Events > 79 µg/m3		Events > 99 µg/m3		Events > 119 µg/m3	
						Count	Frequency	Count	Frequency	Count	Frequency
R1	Residence	340448	4686068	1.5	64	0	0.0%	0	0.0%	0	0.0%
R2	Residence	340694	4686958	1.5	57	0	0.0%	0	0.0%	0	0.0%
R3	Residence	340039	4686936	1.5	64	0	0.0%	0	0.0%	0	0.0%
R4	Residence	340052	4686144	1.5	70	0	0.0%	0	0.0%	0	0.0%
R5	Residence	340771	4686337	1.5	59	0	0.0%	0	0.0%	0	0.0%
R6	Residence	340364	4686264	1.5	93	10	0.0%	1	0.0%	0	0.0%
R7	Residence - Building #1	340169	4686381	1.5	124	198	0.5%	61	0.1%	16	0.0%
R8	Residence - Building #2	340144	4686445	1.5	133	616	1.4%	187	0.4%	35	0.1%
R9	Residence - Building #3	340162	4686417	1.5	135	671	1.5%	202	0.5%	42	0.1%

43573 Hours of valid Meterological Data

Notes:

[1] Maximum predicted concentration with background using the Ozone Limiting Method.

These concentrations differ from those presented in Table 6, which use the 98th percentile of the daily 1-hour maximum concentrations to conform to CAAQS standard.

Table 9e: NO_2 1-Hour Frequency Analysis - 2046 Build Scenario, Idling Scenario 1

RWDI# 2407997

7310 Tecumseh Road East, Windsor, Ontario

Receptor Information					Maximum Predicted 1-Hour Concentration (µg/m³)	Predicted Excursions Above Specified 1-Hour Values [1]					
ID#	Description	X	Y	Z		Events > 79 µg/m3		Events > 99 µg/m3		Events > 119 µg/m3	
						Count	Frequency	Count	Frequency	Count	Frequency
R1	Residence	340448	4686068	1.5	62	0	0.0%	0	0.0%	0	0.0%
R2	Residence	340694	4686958	1.5	56	0	0.0%	0	0.0%	0	0.0%
R3	Residence	340039	4686936	1.5	60	0	0.0%	0	0.0%	0	0.0%
R4	Residence	340052	4686144	1.5	68	0	0.0%	0	0.0%	0	0.0%
R5	Residence	340771	4686337	1.5	58	0	0.0%	0	0.0%	0	0.0%
R6	Residence	340364	4686264	1.5	85	9	0.0%	0	0.0%	0	0.0%
R7	Residence - Building #1	340169	4686381	1.5	124	101	0.2%	33	0.1%	9	0.0%
R8	Residence - Building #2	340144	4686445	1.5	153	1049	2.4%	457	1.0%	172	0.4%
R9	Residence - Building #3	340162	4686417	1.5	146	732	1.7%	283	0.6%	99	0.2%

43573 Hours of valid Meterological Data

Notes:

[1] Maximum predicted concentration with background using the Ozone Limiting Method.

These concentrations differ from those presented in Table 6, which use the 98th percentile of the daily 1-hour maximum concentrations to conform to CAAQS standard.

Table 9f: NO_2 1-Hour Frequency Analysis - 2046 Build Scenario, Idling Scenario 2

RWDI# 2407997

7310 Tecumseh Road East, Windsor, Ontario

Receptor Information					Maximum Predicted 1-Hour Concentration (µg/m³)	Predicted Excursions Above Specified 1-Hour Values [1]					
						Events > 79 µg/m3		Events > 99 µg/m3		Events > 119 µg/m3	
ID#	Description	X	Y	Z		Count	Frequency	Count	Frequency	Count	Frequency
R1	Residence	340448	4686068	1.5	62	0	0.0%	0	0.0%	0	0.0%
R2	Residence	340694	4686958	1.5	56	0	0.0%	0	0.0%	0	0.0%
R3	Residence	340039	4686936	1.5	63	0	0.0%	0	0.0%	0	0.0%
R4	Residence	340052	4686144	1.5	68	0	0.0%	0	0.0%	0	0.0%
R5	Residence	340771	4686337	1.5	58	0	0.0%	0	0.0%	0	0.0%
R6	Residence	340364	4686264	1.5	89	9	0.0%	0	0.0%	0	0.0%
R7	Residence - Building #1	340169	4686381	1.5	120	151	0.3%	40	0.1%	7	0.0%
R8	Residence - Building #2	340144	4686445	1.5	126	483	1.1%	148	0.3%	18	0.0%
R9	Residence - Building #3	340162	4686417	1.5	132	510	1.2%	153	0.4%	29	0.1%

43573 Hours of valid Meterological Data

Notes:
[1] Maximum predicted concentration with background using the Ozone Limiting Method.
These concentrations differ from those presented in Table 6, which use the 98th percentile of the daily 1-hour maximum concentrations to conform to CAAQS standard.

Table 10: Total Annual Greenhouse Gas Emissions for Project Years 2026 and 2046 Compared to Ontario's Total Annual Greenhouse Gas Emissions

Pollutant	Ontario Emissions (tonnes/year)	Ontario Emissions: Transportation Sector (tonnes/year)	Ontario Emissions: Road Transportation Sector (tonnes/year)	Emissions: 2026 Build – Idling Scenario 1 (tonnes/year)	Emissions: 2026 Build – Idling Scenario 2 (tonnes/year)	Emissions: 2046 Build – Idling Scenario 1 (tonnes/year)	Emissions: 2046 Build – Idling Scenario 2 (tonnes/year)	Change in Emissions due to the Project [2] [3] (tonnes/year)
CO_2e [1]	151,000,000	52,400,000	38,800,000	7,336	10,745	6,311	9,229	0%

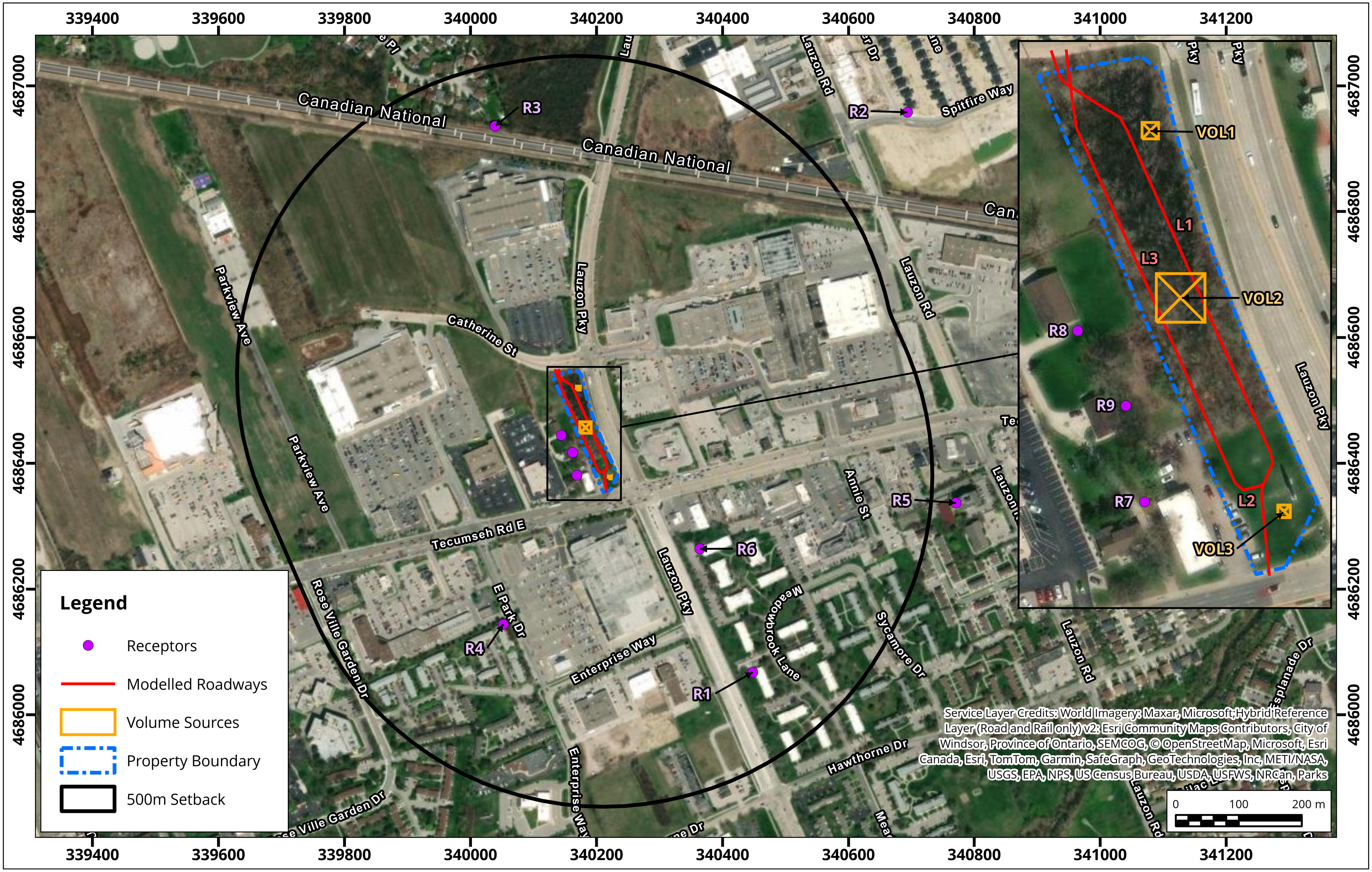
Notes:

[1] CO_2e emissions obtained from Environment and Climate Change Canada National Inventory Report – 2023 Edition, with data from 2021.

[2] Relative to total Ontario emissions.

[3] As this Transit Terminal is replacing an existing terminal, it is assumed that there is no change in GHG emissions due to the project.

FIGURES



Area Plan Showing Study Area, Modelled Roadways, Volume Sources, and Sensitive Receptors - Idling Scenario 1

Map Projection: NAD 1983 UTM Zone 17N

7310 Tecumseh Road East - Windsor, Ontario

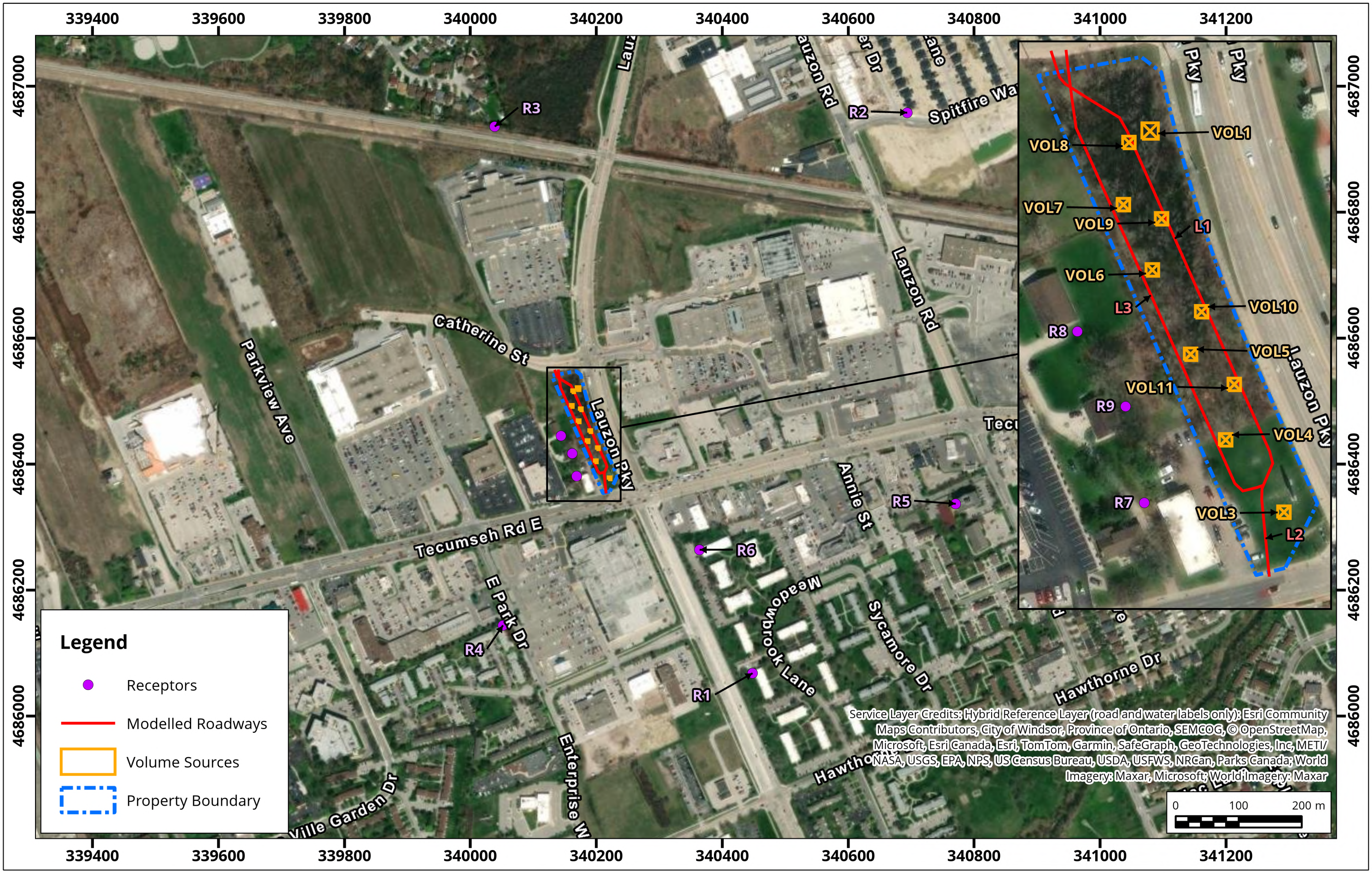
True North

Project #: 2407997

Drawn by: PIP	Figure: 1
Approx. Scale:	1:8,500
Date Revised:	Jul 29, 2024

RWDI

Map Document: C:\WorkingFolder\Jobs_America\P2407997\P2407997.aprx



Area Plan Showing Study Area, Modelled Roadways, Volume Sources, and Sensitive Receptors - Idling Scenario 2

Map Projection: NAD 1983 UTM Zone 17N

7310 Tecumseh Road East - Windsor, Ontario

True North

Project #: 2407997

Drawn by: PIP	Figure: 2
Approx. Scale:	1:8,500
Date Revised:	Oct 25, 2024

Map Document: C:\WorkingFolder\Jobs_America\P2407997\P2407997.aprx

APPENDIX A

Appendix A: Hourly Traffic Data - Generic Profile

Time (Hour Ending)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Hourly Bus Traffic Volume at Tecumseh Bus Terminal	12	12	12	12	12	12	35	35	35	35	35	35	35	35	35	35	35	35	35	22	22	22	22	12
Hourly ratio of traffic to peak hour (PM Hr-1700)	34.3%	34.3%	34.3%	34.3%	34.3%	34.3%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	62.9%	62.9%	62.9%	62.9%	34.3%
Average Hourly ratio of traffic	34.3%	34.3%	34.3%	34.3%	34.3%	34.3%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	62.9%	62.9%	62.9%	62.9%	34.3%
Average Hourly ratio of traffic normalized to peak	34.3%	34.3%	34.3%	34.3%	34.3%	34.3%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	62.9%	62.9%	62.9%	62.9%	34.3%