FREEFIELD LTD.
Ottawa, Ontario

ACOUSTIC ASSESSMENT REPORT FOR THE ZONING OF A HOT MIX ASPHALT PLANT

TOWN OF GREATER NAPANEE
COUNTY OF LENNOX AND ADDINGTON, ONTARIO

Prepared for

R. W. Tomlinson Limited

Prepared by

Freefield Ltd.

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Postal Address: PO Box 74056, RPO Beechwood, Ottawa, Ontario, K1M 2H9, Canada
T/F: 613 747 0983 | E: info@freefieldacoustics.com | W: www.freefieldacoustics.com

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Executive Summary

R. W. Tomlinson Limited (Tomlinson) are planning to install a permanent Hot Mix Asphalt Plant (HMA Plant) on their property located at 8205 County Road 2, Town of Greater Napanee, County of Lennox and Addington, Ontario (subject site).

The Town of Greater Napanee and the MECP require the submission of an Acoustic Assessment Report of the proposed operation to support the zoning amendment and subsequent ECA application. Freefield Ltd. has been retained by Tomlinson to complete this acoustic assessment.

The acoustic assessment has been carried out according to the applicable MECP noise assessment guidelines, including NPC-300, published August 2013 and in accordance with the Town's Official Plan.

The assessment considers the impacts on nearby noise sensitive land uses of noise generated by all significant noise generating equipment associated with the proposed HMA Plant. As the site is immediately adjacent to Tomlinson's existing Napanee Quarry, and materials will be shared directly between the two sites, noise from the adjacent quarry operations, including operation of rock drills, rock extraction with loaders, aggregate processing with a portable crushing plant, loading and vehicle movements has been included in this analysis.

The proposed HMA Plant operations are not a significant source of vibrations; hence, an assessment of vibration impacts from these operations is not required.

Noise impacts have been predicted and compared to the MECP sound level limits as set out in NPC-300. Where applicable, noise mitigation measures such as restrictions on operations, berms and barriers etc. have been designed to ensure all operations are in compliance with the applicable sound level limits.
Assessment methodology is provided in Section 1. A detailed description of the facility and its operations is provided in Section 2. Noise sources associated with operations at the HMA Plant are summarized in Section 3. Critical receptors are described in Section 1 and Section 4, with Section 5 and 6 and 7, detailing applicable assessment criteria, an assessment of predicted noise impacts, and recommended noise mitigation measures.

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ACOUSTIC ASSESSMENT REPORT FOR THE ZONING OF A HOT MIX ASPHALT PLANT IN THE TOWN OF GREATER NAPANEE COUNTY OF LENNOX AND ADDINGTON, ONTARIO

1.0 Introduction

R. W. Tomlinson Limited (Tomlinson) are planning to install a permanent Hot Mix Asphalt Plant (HMA Plant) on their property located at 8205 County Road 2, Town of Greater Napanee, County of Lennox and Addington, Ontario (subject site).

As part of the approvals process an application to the Town of Greater Napanee for a zoning amendment to permit asphalt production on the subject site is required.

Following approval by municipal authorities it is understood Tomlinson will apply to the Ministry of Environment, Conservation and Parks (MECP) for an Environmental Compliance Approval (ECA) for the proposed operation.

This report describes an assessment, carried out by Freefield Ltd., of the potential impact of noise from operations at the proposed HMA Plant on nearby noise sensitive receptors in accordance with MECP guidelines for stationary noise sources. [1, 2] As the site is immediately adjacent to Tomlinson's existing licensed Napanee Quarry, ARA License Number: P646823, and materials will be shared directly between the two sites, noise from the adjacent quarry operations have been included in this analysis as is appropriate under MECP guidelines.

This report addresses the land use compatibility and adverse impact policies of the Town of Greater Napanee Official Plan (OP), as applicable to the zoning amendment application to be filed by Tomlinson. Specifically, OP Policy 5.2.3 which states that noise studies shall be prepared in accordance with Provincial guidelines.

This report has been prepared in accordance with the MECP Document NPC-233, *Information to be Submitted for Approval of Stationary Sources of Sound*, October 1995. Noise from the facility is assessed according to MECP Documents: NPC-300, *Stationary and Transportation Sources – Approval and Planning,* August 2013.[1] This report follows the recommended format contained in, *Sample Application Package, Basic Comprehensive Certificate of Approval (Air and Noise)*, July 2009.[2]

The noise assessment methodology is summarised below.

- Identification of noise sensitive receptors in the vicinity of the proposed HMA Plant. Potential noise sensitive receptors include residences, motels, places of worship, schools, hospitals and vacant land zoned for potential noise sensitive use.
- Determination of the MECP sound level limits[1] which apply at each of the noise sensitive receptors.

- Identification of the sources of noise that will arise from the HMA Plant operations. In the current study, the strengths of the various noise sources were obtained from manufacturers data and from noise measurements of similar operations at other facilities in Ontario by Freefield Ltd.

- Based on the strengths of the individual noise sources, noise levels due to the proposed HMA Plant operations are predicted at nearby noise sensitive receptors using a prediction procedure[6] which is favoured by the MECP. The MECP methodology requires that compliance be assessed under predictable "worst case" conditions for normal operations.

- Assessment of compliance of the noise due to the proposed HMA Plant operations with MECP sound level limits. Where appropriate mitigation measures are recommended, such that, compliance with MECP sound level limits is achieved at all receptors.

Surrounding Lands, Acoustic Environment and Critical Receptors

The proposed HMA Plant is to be located in a predominantly rural and industrial area, on the north side of County Road 2, in the Town of Greater Napanee, County of Lennox and Addington, Ontario.

The existing Quarry lies immediately north of the proposed HMA Plant site with shared access to the quarry.

Note that directions in this report are referenced to north as shown in Figure 1.

The legal description of the land to be occupied by the proposed Hot Mix Asphalt Plant is as follows:

8205 County Road 2,
Town of Greater Napanee,
County of Lennox and Addington,
Ontario

The legal description of the land to be occupied by the existing Quarry is as follows:

Part of Lot 21
Concession VII,
Town of Greater Napanee,
County of Lennox and Addington,
Ontario

A location plan showing the site with respect to the surrounding area is provided in Figure 1. A site plan and detailed layout plan, showing the sites detailed arrangement and elevation contours, are provided in Figure 2 and 3. A land use zoning map is provided in Appendix 1.
The proposed HMA Plant is located on land zoned Extractive Industrial (M4), as shown on the Zoning Map, Appendix 1.

Immediately north of the site, the land is zoned Extractive Industrial (M4) and occupied by the existing Napanee Quarry which is owned and operated by the applicant (Tomlinson).

Further north the land is zoned Rural (RU) and Environmental Protection (EP) with pockets of Residential Type 1 (R1), and Residential Type 4 (R4) fronting Palace Road. A number of residences exist in this direction fronting Palace Road. The closest existing residences in this direction have been selected as critical receptors in the following assessment.

Immediately east of the site the land is zoned Rural (RU). This land owned by the applicant (Tomlinson). Further east the land is zoned Rural (RU) and consists of large partially wooded lots that extend to County Road 2 to the south east and Switzerville Road further east. The residences associated with these lots are located in close proximity to County Road 2 and Switzerville Road. The closest existing residences in this direction have been selected as critical receptors in the following assessment.

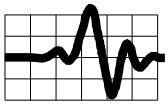
Immediately south of the site the land is zoned Rural (RU) and Rural Commercial (C4). This land owned by the applicant (Tomlinson). Further south, on the south side of County Road 2, the land is zoned General Industrial (M2), Rural (RU), Rural Commercial (C4) and Rural Residential (RU). A number of residences exist in this direction fronting County Road 2. The closest existing residences in this direction have been selected as critical receptors.

West of the site the land is zoned Future Development (D) and occupied by existing industrial uses including the Lafarge Quarry and the Town public works yard. Further west lies Palace Road with a strip of land fronting Palace Road zoned Residential Type 1, 4 and 6 (R1, R4 and R6). A number of residences exist in this direction fronting Palace Road. The closest existing residences in this direction have been selected as critical receptors.

The lands surrounding the proposed HMA Plant are relatively flat with minor changes in elevation. There is a significant grade change to the north and west of the site in local vicinity of Palace Road and the adjacent river. This grade change provides significant shielding to the residences fronting Palace Road.

The HMA site consists of relatively flat topography at an approximate elevation of 129 mASL.

The existing quarry is partially excavated with the unexcavated portion ranging from 129 mASL at the southern boundary bordering the HMA Plant site to 109 mASL at quarries north west boundary. The final quarry floor will be sloped from an approximate elevation of 105 mASL to 107 mASL at the site's northern extraction limit of Area 1 to Area 3 respectively to approximately 110 mASL along the southern extraction limit of Area 1, 2 and 3.



Refer Figure 2 showing detailed elevation contours.

The critical noise sensitive receptors, which have been selected for detailed analysis, are shown in Figure 1. These were selected as being the receptors most likely impacted by noise from the proposed Napanee HMA Plant operations. Other noise sensitive receptors are at greater distances and will be less affected by noise.

Table 1 lists the noise sensitive receptors selected for analysis.

2.0 Facility Description

Hot Mix Asphalt Plant (HMA Plant):

Asphalt is produced from an aggregate mixture (crushed stone, sand, etc.) that is fed by loader into hoppers which transfers the material via conveyors to a screener then to the drum mixer (drum). Liquid bitumen, stored in oil tanks, is combined with the aggregate in the drum under heat provided by the burner. The resulting product is transferred to the asphalt silos prior to being delivered to trucks located under the silo's, via gravity feed, for delivery off site.

The baghouse fan draws water vapour, the products of combustion and entrained dust particles, from the drum into the baghouse. A dust auger is used to draw the entrained dust particles from the baghouse to the mineral silo before the exhaust passes up the stack to the baghouse exhaust to be discharged into the atmosphere.

Electricity supplied by the grid is used to operate the plant during production periods and during shutdowns. During shut-downs electricity is used to maintain the plant in an operational condition, primarily to supply heat to the bitumen storage tanks to keep the bitumen in a liquid state, and, to provide security lighting. All other processes are generally shut down.

The proposed HMA Plant is manufactured by Gencor Industries Inc. Noise data was obtained from Gencor for the 400tph Gencor Ultraplant, which is similar to the model proposed HMA Plant for the subject site and shares many of the same components with respect to noise generation.

The major components of the proposed HMA Plant are as follows:

HMA Plant Components

- Rotating drum mixer (drum) with oil fired burner,
- Baghouse with associated exhaust fan,
- Mineral fines silo with associated dust auger,
- Batch tower (asphalt silo's) with associated air compressor,
- Aggregate Screen,
- Recycled Asphalt Product (RAP) screen,
- Bitumen tanks and associated oil heater,
- Fuel oil tanks,
- Control trailer.
- Hoppers,
- Aggregate and product conveyors.

Ancillary Equipment associated with the HMA Plant:

- Loader (to load aggregate into hoppers),
- Highway Trucks used for delivery and shipping of product.

To assess the cumulative impacts of noise, the adjacent quarry operations have been included in this analysis and consist of the following:

Aggregate at the existing quarry is extracted using a process of drilling and blasting. Blasting produces large pieces of rock which are loaded into haul trucks which deliver the raw material to a portable crushing and screening plant. After crushing and screening, the various grades of aggregate produced are placed into stockpiles using conveyors and stackers. Loaders then load the stockpiled aggregate into highway trucks which are used to deliver the product to market. Processed aggregate from the quarry will be delivered by haul truck to stockpiles located at the proposed HMA Plant prior to being used in the asphalt production process.

The existing quarry is partially excavated with the final quarry floor sloped from an approximate elevation of 105 mASL to 107 mASL at the northern extraction limit to approximately 110 mASL along the southern limit of extraction. Extraction will proceed from the current lift face to the setback limits with the majority of extraction and aggregate processing equipment operating below grade on the quarry floor.

The following assumptions have been incorporated into the acoustic modelling of the quarry:

- The rock drill has been modelled in operation on the original surface in worst case locations in the north and south of the extraction area. Refer Scenario 1 and Scenario 2 respectively. The rock drill operates only during the daytime period (07:00 to 19:00).
- The portable crushing plant and associated diesel generator have been modelled in operation on the quarry floor in the approximate center of the extraction area, with the lift face or stockpile, assumed to be 14 m high, located at a maximum distance of 25 m to the south. The portable crushing plant potentially operates on a 24-hour basis.
- Extraction operations occur only during the daytime period (07:00 to 19:00).
- Loading and hauling operations potentially operate on a 24-hour basis.

Site Entry

The site entry for the HMA Plant will be via the existing site entry serving the quarry off County Road 2, as shown in Figure 2.

Hours of Operation

Daytime Operations (07:00 to 19:00) - During the daytime period, all significant noise sources associated with the HMA Plant and adjacent quarry are assumed to be in operation concurrently.

Evening and Night Operations (19:00 – 07:00) **-** During the evening and nighttime period all significant noise sources associated with the HMA Plant are assumed to be in operation with aggregate processing, loading, and hauling operations only at the quarry. It is assumed extraction and drilling operations do not occur during the evening and nighttime period.

Refer to Section 7.0 for restrictions and recommended mitigation measures that apply for the various MECP defined periods of operation.

3.0 Noise Source Summary

The following noise sources have been used to model noise generated by operations at proposed HMA Plant. In brackets are the shortened names of the noise sources as used in the acoustic model. The characteristics of these sources, as used in acoustic modelling, are summarized in Table 1.

Hot Mix Asphalt Plant Noise Sources:

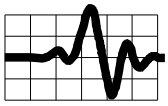
- Drum Mixer (source: AP_Drum);
- Burner (source: AP_Burner);
- Baghouse Fan (source: AP_Baghouse_Fan);
- Dust Auger (source: AP_Dust_Auger);
- Oil Heater (source: AP_Oil_Heater);
- Air Compressor (source: AP_Air_Compressor);
- Aggregate Screen (source: AP_Aggregate_Screen);
- Recycled Asphalt Product Screen (source: AP_RAP_Screen);
- Loader used to feed aggregate and recycled asphalt product into the asphalt plants hoppers (source: AP_Loader);
- Highway trucks used for delivery of aggregate and recycled asphalt product (source: AP_IHR_Aggregate),
- Highway trucks used for shipping of asphalt product (source: AP_IHR_Asphalt).

To assess the cumulative impacts of noise from the adjacent quarry operations the following additional noise sources have been included in this analysis:

- Rock Drill (source: Q_Rockdrill and Q_Low_Noise_Rockdrill),
- Portable Crushing and Screening Plant and associated equipment (source: Q_Crushing_Plant),
- Diesel Generator with existing exhaust silencer (source: Q_Genset),
- Loaders, four in total, used for quarry operations (Source: Q_Loaders_Extraction, Q_Loaders_Stockpiling),
- Haul Trucks (source: Rock_Truck_JD400D),
- Highway Trucks (source: HWYTruck_Slow58).

The strengths of the noise sources, i.e. the sound powers shown in Table 2, and used in this analysis, are taken from manufacturers data and data from a database of noise measurements made by Freefield Ltd. of similar operations at other facilities in Ontario. Refer to Table 2 for calculated sound powers, and Appendix 2 for raw measurement data and Appendix 3 for manufacturers data.

The strengths of the noise sources for the asphalt plant, i.e. the sound powers shown in Table 2 and Table A2.6, where calculated for each of the individual noise sources using a combination of



both near and far field measurement data provided by the manufacturer. Following calibration, noise from the overall asphalt plant was compared to the far field measurement data at location 38 and location 39 at 100ft and 50 ft respectively, refer to manufacturers sound data in Appendix 3, Figure A3.1. The results indicted that the predicted results after calibration exceed the manufacturers measurement data at these far field measurement locations, hence, the calculated sound levels are considered conservative.

Noise from the loader associated with the HMA Plant have been modelled as a moving point source within a typical area of operation.

Noise from the haul routes is modelled as a line source using the moving point source method.

The truck movements associated with the HMA Plant are based on a full operational day production of 1,800 tonnes occurring over a ten hour period and typical 20 tonne truck capacities. As such, it is assumed nine (9) loads of asphalt will be shipped and four (4) loads of sand, course aggregate or recycled asphalt product will be delivered per hour during periods of maximum capacity during the daytime period.[7] During the evening and nighttime period, during periods of reduced demand, it is assumed four (4) loads of asphalt will be shipped and one (1) load of sand, course aggregate or recycled asphalt product will be delivered per hour.

The truck movements associated with the adjacent quarry are based on a maximum capacity of 400 tonnes per hour and typical 20 tonne highway truck capacities and 30 tonne haul truck capacities. As such, it is assumed twelve (12) loads of processed aggregate will be shipped off-site, eight (8) loads of processed aggregate will be delivered to the HMA Plant, and fifteen (15) loads of blast rock will be delivered to the portable crushing plant per hour during periods of maximum capacity during the daytime period. During the evening and nighttime period, during periods of reduced demand, it is assumed two (2) loads of processed aggregate will be shipped off-site and two (2) loads of processed aggregate will be delivered to the HMA Plant per hour. Haul trucks delivering blast rock from the lift face to the crushing plant are assumed to not operate during the evening and nighttime period.

Conveyors and stackers used to transfer material are considered insignificant noise sources.

Refer Figure 1 to 7 for location of sources for worst case modes of operation analysed.

4.0 Point of Reception Summary

A total of nineteen nearby noise sensitive receptors have been selected for detailed noise evaluation. These existing residences are those closest to the proposed HMA Plant in all directions and represent the worst-case noise impacts in comparison to other nearby or more distant noise sensitive receptors.

The nineteen points of reception selected for analysis, POR 1 to POR 19, are shown in Figure 1 and listed in Table 1.

As per MECP Guideline NPC-300, two points of reception (POR) have been selected at each residence for which worst case sound levels have been calculated.

> POW – Plane of window (POW) points of reception are located on the dwelling or noise sensitive building, typically 2 m above ground for single storey dwellings and 4.5 m above ground for two storey dwellings.
>
> OPR – Outdoor Point of Reception, an area on the property of the residence. For large properties, the OPR point of reception can be up to 30 m from the dwelling at a height of 1.5 m above ground.

Noise prediction results are summarized in Table 6 by point of reception. Figures 4, 5 and 6 show predicted results as noise contours for Scenario 1 to Scenario 6.

Detailed prediction results are contained in Appendix 2, with Tables A2.8.1 to A2.8.3 providing a summary of predicted noise impacts at each point of reception (POR) for the individual sources.

5.0 Assessment Criteria, Performance Limits

Sound level limits, as specified in the MECP guideline NPC-300[1], depend on the acoustical classification of the area as Class 1, 2, 3 or 4.

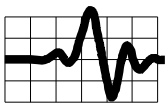
> **Class 1 area** 'an area with an acoustical environment typical of a major population centre, where the background sound level is dominated by the activities of people, usually road traffic, often referred to as urban hum.'
>
> **Class 2 area** 'an area with an acoustical environment that has qualities representative of both Class 1 and Class 3 areas: sound levels characteristic of Class 1 during daytime (07:00 to 19:00 or to 23:00 hours); and low evening and night background sound level defined by natural environment and infrequent human activity starting as early as 19:00 hours (19:00 or 23:00 to 07:00 hours).'
>
> **Class 3 area** 'a rural area with an acoustical environment that is dominated by natural sounds having little or no road traffic, such as: a small community; agricultural area; a rural resort area such as a cottage or resort area; or, a wilderness area. '
>
> **Class 4 area** 'an area or specific site that would otherwise be defined as Class 1 or 2 and which: is an area intended for development with new noise sensitive land use(s) that are not yet built; is in proximity to existing, lawfully established stationary source(s); and, has formal confirmation from the land use planning authority with the Class 4 area classification which is determined during the land use planning process. Additionally, areas with existing noise sensitive land use(s) cannot be classified as Class 4 areas.'

Due to the relatively high levels of road traffic along Palace Road, County Road 2 and Highway 401, particularly during the daytime period, with relatively low levels of background noise associated with road traffic during the evening and/ or nighttime period, the acoustical classification of the area in which receptors POR 3 to 16 and POR 18 and 19 are located is classified as a Class 2 area.

Due to the larger distance County Road 2 and Highway 401 and the dominant rural character of the acoustic environment at Switzerville Road the area in which POR 1, 2 and 17 are located is subject to occasional daytime traffic noise but dominated by natural sounds for the majority of the time, hence, these receptors are classified as Class 3 Area (Rural).

The applicable outdoor sound level limit at a point of reception is the higher of the applicable exclusion limit value, presented in Tables 3 and Table 4, or the background sound level for that point of reception. Background sound level means the sound level that is present in the environment produced by noise sources other than the source under assessment.

A background noise assessment was carried out based on MECP methodology[3-5] at points of reception on County Road 2 and Palace Road, POR 3 to POR 16 and POR 18 to POR 19. Appendix 4 contains an analysis of background traffic noise at points of reception based on road traffic data obtained from the Ontario Ministry of Transportation for Highway 401 and the County of Lennox and Addington.



This assessment indicated elevated sound levels, above the Class 2 area exclusion limits, at POR 7 and POR 8, located on the south side of County Road 2, during the daytime and evening period. As this meets the MECP definition for a Class 2 Area as noted above, we have applied the Class 2 area exclusion limits for POR 7 and POR 8 during the nighttime period and the levels determined in the background noise assessment as the limits for the daytime and evening period.

This assessment indicated elevated sound levels, above the Class 2 area exclusion limits, at POR 19, located on the west side of Palace Road, during the daytime and evening period. As this meets the MECP definition for a Class 2 Area as noted above, we have applied the Class 2 area exclusion limits for POR 19 during the nighttime period and the levels determined in the background noise assessment as the limits for the daytime and evening period.

For POR 4 to POR 6 and POR 9 to POR 16 and POR 18, located with the rear of the house facing away from nearby roads, the assessment indicated elevated sound levels above the Class 2 area exclusion limits during the daytime period with lower levels realized during the evening and nighttime period. As this meets the MECP definition for a Class 2 Area and taking into consideration the shielding provided by the residence to the plane of window (POW) locations, facing away from the nearby roads, we have applied the Class 2 area exclusion limits for these receptors during the daytime, evening, and nighttime period.

For POR 3 the assessment indicated elevated sound levels above the Class 2 area exclusion limits during the daytime and evening period with lower levels realized during the nighttime period. While this meets the MECP definition for a Class 2 Area because POR 3 also represents receptors to the east fronting Switzerville Road at a greater distance to County Road 2 we have applied the Class 3 area exclusion limits for this receptor during the daytime, evening, and nighttime period.

For all other receptors, the levels given in the Tables 3 and 4 are taken as the sound level limits at all points of reception for the purpose of this assessment according to their location in a Class 3 Area.

The applicable sound level limits for each point of reception are set out in Table 5.

Sound levels are assessed in terms of the 1-hour equivalent sound level, L_{eq}, effectively the average sound level over each hour. All sound levels are A-weighted, A-weighting being a frequency weighting with represents sensitivity of human hearing to sounds of differing frequencies.

6.0 Impact Assessment

Noise levels have been predicted at the critical receptors using "predictable worst case" assumptions under normal operations and using the ISO sound propagation methodology[6] as implemented in the sound prediction software Cadna-A, Version 2021. The "predictable worst case" is interpreted as meaning the greatest noise impact anticipated under normal operating conditions. The ISO methodology provides a conservative (i.e. high) estimate of the noise level at a receptor taking into account adverse wind and meteorological conditions.

The estimation method includes the following:

- Distance attenuation is based on spherical spreading.
- Atmospheric attenuation.
- Ground attenuations, as appropriate.
- Barrier attenuation, as appropriate.

In order to consider cases of worst noise impacts, three worst case operational scenarios have been modeled. In general, the worst impacts are those which occur when all equipment is operating concurrently. The following three worst case scenarios are presented in this report and form the basis for the recommended mitigation measures and assessment of compliance to MECP criteria:

Scenario 1: Worst Case, Daytime Period of Operation (07:00 – 19:00) - All equipment in operation at the proposed HMA Plant and adjacent quarry concurrently with extraction occurring in the north (Day only) – Figure 4.

Scenario 2: Worst Case, Daytime Period of Operation (07:00 – 19:00) - All equipment in operation at the proposed HMA Plant and adjacent quarry concurrently with extraction occurring in the south (Day only) – Figure 5.

Scenario 3: Worst Case, Evening and Nighttime Period of Operation (19:00 – 07:00) – All equipment in operation at the proposed HMA Plant concurrently with aggregate processing, loading and hauling operations at the quarry (Day, Evening or Night) – Figure 6.

In Table 6, estimated noise levels at the nearest receptors for the worst case, among all scenarios, are compared with the applicable sound level limits. More detailed estimates, for all sources and scenarios, are contained in Appendix 2, Tables A2.8.1 to A2.8.3.

It can be seen that with the recommended mitigation measures as detailed in Section 7.0 the sound level limits are met at all noise sensitive points of reception, POR 1 to POR 19, for worst case operating conditions during the proposed daytime period of operation (07:00 to 19:00) and the proposed evening and nighttime period of operation (19:00 to 07:00).

Details of acoustic modeling are provided in Appendix 2. Figures 4, 5 and 6 show predicted noise contours for each mode of operation analyzed.

Statement of Compliance

It is concluded that, with the recommended noise mitigation measures detailed in section 7.0, noise impacts from operations at the proposed HMA Plant will be in compliance with MECP Environmental Noise Guidelines[1] for the proposed daytime period of operation 7 am to 7 pm (07:00 to 19:00) and evening and nighttime period of operation (19:00 to 07:00).

7.0 Mitigation Measures (Site Plan Recommendations)

Noise mitigation measures for the proposed HMA Plant are detailed below.

The predicted noise impacts shown in Tables A2.8.1 to A2.8.3 are based on the implementation of the following mitigation measures:

7.1 Noise Barriers and Berms:

7.1.1 Noise barriers and berms are to be provided as per Table 7 and Figure 7.

7.1.2 Noise barriers and berms are to be solid, having no gaps, and are to have a surface density of no less than 20 kg/m2. Examples of suitable barriers or berms are as follow:

7.1.2.1 Lift face or existing terrain;

7.1.2.2 Earth, gravel or aggregate berms or stockpiles;

7.1.2.3 Concrete or brick walls;

7.1.2.4 Commercial noise barriers;

7.1.2.5 Shipping containers or buildings,

A portable barrier such as a truck trailer equipped with movable flaps to block the space between the ground and the bottom of the trailer and increase height if required.

7.2 Hot Mix Asphalt Plant

7.2.1 The operation of the Hot Mix Asphalt Plant (HMA Plant) and associated equipment, may take place on a twenty-four-hour basis (24-hour) and shall comply with the following:

7.2.1.1 The HMA Plant is to be located in location shown on Figure 2 and Figure 3.

7.2.1.2 Noise barriers and berms are to be provided as per Table 7 and Figure 7.

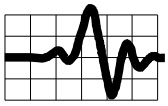
7.3 Trucks

7.3.1 The loading and shipping of product using trucks may take place on a twenty-four-hour basis (24-hour) and shall comply with the following:

7.3.1.1 When operating on-site, trucks shall not exceed 30 km/h and shall not use compression braking (Jake Brakes).

7.4 New Process

7.4.1 If a new process is introduced to the site, or the layout of the HMA Plant is altered, then this additional or modified process shall be assessed by a qualified acoustical consultant prior to commissioning. Noise mitigation measures shall be reviewed, and altered if necessary, to ensure that MECP sound level limits are met at all points of reception.



8.0 Conclusions

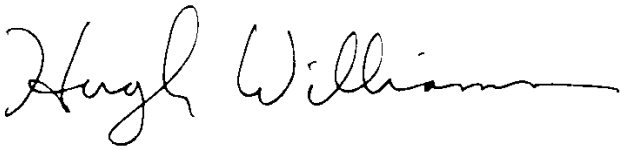
An acoustic assessment of noise from the proposed HMA Plant in operation concurrently with the existing quarry has been conducted according to MECP noise assessment procedures.

It has been found that the cumulative noise levels from the combined operations at nearby receptors are in compliance with MECP sound level limits as set out in publication NPC-300[1], provided that the noise mitigation measures described in Section 7.0 of this report are implemented.

Further in accordance with Section 5.2.3 of the Town's Official Plan, potential noise impacts have been assessed and appropriate mitigation to acceptable levels have been recommended.

This study has been prepared in accordance with Provincial guidelines as noted above.

Michael Wells, B. Architecture (Hons), B.Sc. Arch. Registered Architect of NSW, ARN: 8111
Member, Canadian Acoustical Society, Member, Australian Acoustical Society, Associate Member, INCE-USA



Hugh Williamson, Ph.D., P.Eng.
Member, Canadian Acoustical Society

References

1. Ministry of Environment, Conservation and Parks Publication NPC-300, *Environmental Noise Guideline, Stationary and Transportation Sources – Approval and Planning*, August 2013, adopted by the MECP on 22 October 2013.

2. Ministry of Environment, Conservation and Parks, *Sample Application Package, Basic Comprehensive Certificate of Approval (Air and Noise)*, July 2009.

3. Ministry of Environment, Conservation and Parks Publication NPC-206, *Sound Levels due to Road Traffic,* October 1995.

4. Ministry of Environment, Conservation and Parks, Ontario Road Noise Analysis Method for Environment and Transportation (ORNAMENT), 1989.

5. Ministry of Environment, Conservation and Parks, STAMSON Software, Version 5.04, 1996. (Software implementation of reference 4).

6. International Standards Organization, *Acoustics - Attenuation of Sound during Propagation Outdoors, Part 2: General Method of Calculation*, ISO 9613-2: 1996(E).

7. Castleglenn Consultants, "Traffic Impact Assessment for the proposed Asphalt Plant 8205 County road 2, Napanee", July 17, 2020.

TABLES

Table 1: Point of Reception Summary Table

Point of Reception	Location*
POR 1	Residence 2936 Switzerville Road (2 storey) Note: Also represents residences located east along Switzerville Road
POR 2	Residence 3038 Switzerville Road (2 storey) Note: Also represents residences located east along Switzerville Road
POR 3	Residence 8061 County Road 2 (2 storey) Note: Also represents residences located east along Switzerville Road
POR 4	Residence 8129 County Road 2 (1 storey)
POR 5	Residence 8155 County Road 2 (2 storey)
POR 6	Residence 8173 County Road 2 (1 storey)
POR 7	Residence 8266 County Road 2 (2 storey)
POR 8	Residence 8282 County Road 2 (2 storey) Note: Also represents 8286 County Road 2
POR 9	Residence 8297 County Road 2 (1 storey)
POR 10	Residence 8039 County Road 2 (1 storey)
POR 11	Residence 168 Hillside Avenue (1 storey)
POR 12	Residence 434 Palace Road (2 storey)
POR 13	Residence 528 Palace Road (1 storey)
POR 14	Residence 568 Palace Road (2 storey)

Point of Reception	Location*
POR 15	Residence 684 Palace Road (1.5 storey)
POR 16	Residence 746 Palace Road (2 storey)
POR 17	Residence 54 Oke Road (1 storey)
POR 18	Residence 474 Palace Road (1 storey)
POR 19	Residence 643 Palace Road (2 storey)

* For assessment purposes, points of reception, (POR), have been taken as upper floor plane of window (POW) locations, 2 m above grade for single storey and 4.5 m above grade to represent two storey residences, and, outdoor point of receptions (OPR), 30 m from residence, 1.5 m above grade, in acoustic calculations.

Table 2: Noise Source Summary Table

Name	Source ID	Sound Power (dBA)	Source Location Ht. above ground (m)	Sound Characteristics	Noise Control Measures
Drum Mixer (Asphalt Plant)	AP_Drum	108	4.2	Steady, non-tonal, non-directional	As noted in section 7.0
Burner (Asphalt Plant)	AP_Burner	105.7	4.2	Steady, non-tonal, non-directional	As noted in section 7.0
Baghouse Fan (Asphalt Plant)	AP_Baghouse_Fan	112.8	1.5	Steady, non-tonal, non-directional	As noted in section 7.0
Dust Auger (Asphalt Plant)	AP_Dust_Auger	79.1	1.9	Steady, non-tonal, non-directional	As noted in section 7.0
Oil Heater (Asphalt Plant)	AP_Oil_Heater	89.1	1	Steady, non-tonal, non-directional	As noted in section 7.0
Rotary Air Compressor (Asphalt Plant)	AP_Air_Compressor	96.3	1.5	Steady, non-tonal, non-directional	As noted in section 7.0
Aggregate Screen (Asphalt Plant)	AP_Aggregate_Screen	102.9	5.2	Steady, non-tonal, non-directional	As noted in section 7.0
Recycled Asphalt Product Screen (Asphalt Plant)	AP_RAP_Screen	97.7	5.2	Steady, non-tonal, non-directional	As noted in section 7.0
Loader (Asphalt Plant)	AP Loader	98	2.5	Steady, moving, non-tonal, non-directional	As noted in section 7.0
Portable Crushing and Screening Plant (Quarry)	Q_Crushing_Plant	121.5	4	Steady, non-tonal, non-directional	As noted in section 7.0
Generator (Quarry)	Q_Genset	108.1	4.0	Steady, non-tonal, non-directional	As noted in section 7.0
Standard Hydraulic Rock Drill (Quarry)	Q_Rockdrill (Q_Rockdrill_TH_70)	118.6	0.5	Steady, non-tonal, non-directional	As noted in section 7.0
Low Noise Rock Drill (Quarry)	Q_Low_Noise_Rockdrill (Rockdrill_SmartRIG)	108.3	0.5	Steady, non-tonal, non-directional	As noted in section 7.0
Loaders (Quarry)	Q_Loader_1 Q_Loader_2 Q_Loader_3 Q_Loader_4 (Q_Loader)	108.9	2.5	Steady, moving, non-tonal, non-directional	As noted in section 7.0

Name	Source ID	Sound Power (dBA)	Source Location Ht. above ground (m)	Sound Characteristics	Noise Control Measures
Haul Trucks delivering blast rock to the crusher and processed aggregate from the crusher to the HMA Plant	Q_IHR_Aggregate QAP_IHR_Aggregate (Rock_Truck_JD400D)	104.3	2.5	Steady, moving non-tonal, non-directional	As noted in section 7.0
Highway Trucks delivering aggregate and recycled asphalt product to the HMA Plant	AP_IHR_Aggregate (HWYTruck_Slow58)	110.1	2.5	Steady, moving non-tonal, non-directional	As noted in section 7.0
Highway Trucks shipping asphalt product from the HMA Plant and processed aggregate from the existing quarry	AP_IHR_Asphalt Q_IHR_Shipping (HWYTruck_Slow58)	110.1	2.5	Steady, moving non-tonal, non-directional	As noted in section 7.0

Table 3: MECP Exclusion Limit Values for One-Hour Equivalent Sound Level (Leq, dBA) at Outdoor Points of Reception

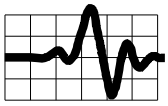
Time of Day	Class 1 Area	Class 2 Area	Class 3 Area	Class 4 Area
07:00 – 19:00	50	50	45	55
19:00 – 23:00	50	45	40	55

Table 4: MECP Exclusion Limit Values for One-Hour Equivalent Sound Level (Leq, dBA) at Plane of Window of Noise Sensitive Spaces

Time of Day	Class 1 Area	Class 2 Area	Class 3 Area	Class 4 Area
07:00 – 19:00	50	50	45	60
19:00 – 23:00	50	50	40	60
23:00 – 07:00	45	45	40	55

Table 5: Applicable One Hour Sound Level Limits for the Proposed Daytime (07:00 – 19:00) and Early Morning Period (06:00 – 07:00) period of operation.

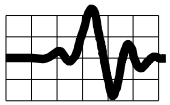
Receptor & Point of Reception POW = Plane of Widow OPR = Outdoor Point of Reception	Sound Level Limit 1-hour LAEQ dBA (Daytime Period, 07:00 – 19:00)	Sound Level Limit 1-hour LAEQ dBA (Evening Period, 19:00 – 23:00)	Sound Level Limit 1-hour LAEQ dBA (Nighttime Period, 23:00 – 07:00)
POR 1 - POW	45	40	40
POR 1 - OPR	45	40	-
POR 2 - POW	45	40	40
POR 2 - OPR	45	40	-
POR 3 - POW	45	40	40
POR 3 - OPR	45	40	-
POR 4 - POW	50	50	45
POR 4 - OPR	50	45	-
POR 5 - POW	50	50	45
POR 5 - OPR	50	45	-
POR 6 - POW	50	50	45
POR 6 - OPR	50	45	-
POR 7 - POW	52.8	50	45
POR 7 - OPR	52.8	49.7	-
POR 8 - POW	52.8	50	45
POR 8 - OPR	52.8	49.7	-
POR 9 - POW	50	50	45
POR 9 - OPR	50	45	-
POR 10 - POW	50	50	45
POR 10 - OPR	50	45	-
POR 11 - POW	50	50	45
POR 11 - OPR	50	45	-
POR 12 - POW	50	50	45
POR 12 - OPR	50	45	-
POR 13 - POW	50	50	45
POR 13 - OPR	50	45	-
POR 14 - POW	50	50	45
POR 14 - OPR	50	45	-
POR 15 - POW	50	50	45
POR 15 - OPR	50	45	-
POR 16 - POW	50	50	45
POR 16 - OPR	50	45	-
POR 17 - POW	45	40	40



Receptor & Point of Reception POW = Plane of Widow OPR = Outdoor Point of Reception	Sound Level Limit 1-hour LAEQ dBA (Daytime Period, 07:00 – 19:00)	Sound Level Limit 1-hour LAEQ dBA (Evening Period, 19:00 – 23:00)	Sound Level Limit 1-hour LAEQ dBA (Nighttime Period, 23:00 – 07:00)
POR 17 - OPR	45	40	-
POR 18 - POW	50	50	45
POR 18 - OPR	50	45	-
POR 19 - POW	58.8	55.5	45
POR 19 - OPR	58.8	55.5	-

Table 6.1: Acoustic Assessment Summary Table, Scenario 1: Worst Case, Daytime Period of Operation, 7 am to 7 pm (07:00 - 19:00)

Point of Reception ID	POR Description	Location	Estimated Sound Level associated with the proposed HMA Plant, Daytime Period (Worst Case) (dBA)	Estimated Sound Level associated with the adjacent quarry, Daytime Period (Worst Case) (dBA)	Estimated Sound Level associated with the combined operation, Daytime Period (Worst Case) (dBA)	Performance Limit* Daytime Period (dBA)	Compliance with Performance Limit (Yes/No)
POR 1	Residence	POW	34	33	37	45	Yes
		OPR	32	31	35	45	Yes
POR 2	Residence	POW	34	33	37	45	Yes
		OPR	32	32	35	45	Yes
POR 3	Residence	POW	38	35	40	45	Yes
		OPR	36	34	38	45	Yes
POR 4	Residence	POW	41	37	43	50	Yes
		OPR	39	36	41	50	Yes
POR 5	Residence	POW	43	38	44	50	Yes
		OPR	40	38	42	50	Yes
POR 6	Residence	POW	43	39	44	50	Yes
		OPR	42	38	43	50	Yes
POR 7	Residence	POW	46	46	49	53	Yes
		OPR	44	45	48	53	Yes
POR 8	Residence	POW	44	44	47	53	Yes
		OPR	42	43	46	53	Yes
POR 9	Residence	POW	37	38	40	50	Yes
		OPR	37	37	40	50	Yes
POR 10	Residence	POW	40	40	43	50	Yes
		OPR	38	40	42	50	Yes
POR 11	Residence	POW	38	41	43	50	Yes
		OPR	39	43	45	50	Yes
POR 12	Residence	POW	29	39	40	50	Yes
		OPR	30	40	40	50	Yes



Point of Reception ID	POR Description	Location	Estimated Sound Level associated with the proposed HMA Plant, Daytime Period (Worst Case) (dBA)	Estimated Sound Level associated with the adjacent quarry, Daytime Period (Worst Case) (dBA)	Estimated Sound Level associated with the combined operation, Daytime Period (Worst Case) (dBA)	Performance Limit* Daytime Period (dBA)	Compliance with Performance Limit (Yes/No)
POR 13	Residence	POW	31	44	45	50	Yes
		OPR	30	46	46	50	Yes
POR 14	Residence	POW	32	44	44	50	Yes
		OPR	33	44	44	50	Yes
POR 15	Residence	POW	36	45	45	50	Yes
		OPR	35	44	45	50	Yes
POR 16	Residence	POW	34	42	43	50	Yes
		OPR	33	40	41	50	Yes
POR 17	Residence	POW	41	41	44	45	Yes
		OPR	41	41	44	45	Yes
POR 18	Residence	POW	27	42	43	50	Yes
		OPR	26	42	42	50	Yes
POR 19	Residence	POW	36	44	44	58.8	Yes
		OPR	32	41	42	58.8	Yes

Notes:

1. Performance limits are based on 1-hour equivalent sound levels, Leq.
2. The highest predicted sound level at plane of window or outdoor point of reception are provided above as these are the most critical at each point of reception. Refer to Tables A2.8.1 to A2.8.3 in Appendix 2 for more detailed sound level estimates by source.
3. Outdoor Points of Reception (OPR) are not considered noise sensitive during the nighttime period (23:00 to 07:00) as per MECP criteria.

Table 6.2: Acoustic Assessment Summary Table, Scenario 2: Worst Case, Daytime Period of Operation, 7 am to 7 pm (07:00 - 19:00)

Point of Reception ID	POR Description	Location	Estimated Sound Level associated with the proposed HMA Plant, Daytime Period (Worst Case) (dBA)	Estimated Sound Level associated with the adjacent quarry, Daytime Period (Worst Case) (dBA)	Estimated Sound Level associated with the combined operation, Daytime Period (Worst Case) (dBA)	Performance Limit* Daytime Period (dBA)	Compliance with Performance Limit (Yes/No)
POR 1	Residence	POW	34	32	36	45	Yes
		OPR	32	31	34	45	Yes
POR 2	Residence	POW	34	33	37	45	Yes
		OPR	32	32	35	45	Yes
POR 3	Residence	POW	38	34	39	45	Yes
		OPR	36	34	38	45	Yes
POR 4	Residence	POW	41	38	43	50	Yes
		OPR	39	37	41	50	Yes
POR 5	Residence	POW	43	39	44	50	Yes
		OPR	40	38	42	50	Yes
POR 6	Residence	POW	43	38	44	50	Yes
		OPR	42	38	43	50	Yes
POR 7	Residence	POW	46	46	49	52.8	Yes
		OPR	44	44	47	52.8	Yes
POR 8	Residence	POW	44	44	47	52.8	Yes
		OPR	42	42	45	52.8	Yes
POR 9	Residence	POW	37	39	41	50	Yes
		OPR	37	39	41	50	Yes
POR 10	Residence	POW	40	44	45	50	Yes
		OPR	38	42	43	50	Yes
POR 11	Residence	POW	38	41	43	50	Yes
		OPR	39	44	45	50	Yes
POR 12	Residence	POW	29	37	37	50	Yes
		OPR	30	38	38	50	Yes

Point of Reception ID	POR Description	Location	Estimated Sound Level associated with the proposed HMA Plant, Daytime Period (Worst Case) (dBA)	Estimated Sound Level associated with the adjacent quarry, Daytime Period (Worst Case) (dBA)	Estimated Sound Level associated with the combined operation, Daytime Period (Worst Case) (dBA)	Performance Limit* Daytime Period (dBA)	Compliance with Performance Limit (Yes/No)
POR 13	Residence	POW	31	42	42	50	Yes
		OPR	30	41	42	50	Yes
POR 14	Residence	POW	32	43	43	50	Yes
		OPR	33	43	43	50	Yes
POR 15	Residence	POW	36	44	44	50	Yes
		OPR	35	43	44	50	Yes
POR 16	Residence	POW	34	42	43	50	Yes
		OPR	33	40	41	50	Yes
POR 17	Residence	POW	41	42	45	45	Yes
		OPR	41	40	43	45	Yes
POR 18	Residence	POW	27	41	41	50	Yes
		OPR	26	40	40	50	Yes
POR 19	Residence	POW	36	44	45	58.8	Yes
		OPR	32	42	42	58.8	Yes

Notes:

1. Performance limits are based on 1-hour equivalent sound levels, Leq.
2. The highest predicted sound level at plane of window or outdoor point of reception are provided above as these are the most critical at each point of reception. Refer to Tables A2.8.1 to A2.8.3 in Appendix 2 for more detailed sound level estimates by source.
3. Outdoor Points of Reception (OPR) are not considered noise sensitive during the nighttime period (23:00 to 07:00) as per MECP criteria.

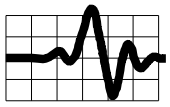


Table 6.3: Acoustic Assessment Summary Table, Scenario 3: Worst Case, Evening and Nighttime Period of Operation, 7 pm to 7 am (19:00 – 07:00)

Point of Reception ID	POR Description	Location	Estimated Sound Level associated with the proposed HMA Plant, Evening and Nighttime Period (Worst Case) (dBA)	Estimated Sound Level associated with the adjacent quarry, Evening and Nighttime Period (Worst Case) (dBA)	Estimated Sound Level associated with the combined operation, Evening and Nighttime Period (Worst Case) (dBA)	Performance Limit* Evening / Nighttime Period (dBA)	Compliance with Performance Limit (Yes/No)
POR 1	Residence	POW	34	31	36	40 / 40	Yes
		OPR	32	29	34	40 / -[3]	Yes
POR 2	Residence	POW	34	30	36	40 / 40	Yes
		OPR	32	30	34	40 / -[3]	Yes
POR 3	Residence	POW	37	30	38	40 / 40	Yes
		OPR	35	29	36	40 / -[3]	Yes
POR 4	Residence	POW	40	31	41	50 / 45	Yes
		OPR	38	30	39	45 / -[3]	Yes
POR 5	Residence	POW	42	32	43	50 / 45	Yes
		OPR	39	32	40	45 / -[3]	Yes
POR 6	Residence	POW	42	32	42	50 / 45	Yes
		OPR	41	32	42	45 / -[3]	Yes
POR 7	Residence	POW	42	38	44	49.7 / 45	Yes
		OPR	41	36	42	49.7 / -[3]	Yes
POR 8	Residence	POW	40	36	42	49.7 / 45	Yes
		OPR	39	34	40	49.7 / -[3]	Yes
POR 9	Residence	POW	34	31	36	50 / 45	Yes
		OPR	34	31	36	45 / -[3]	Yes
POR 10	Residence	POW	39	36	40	50 / 45	Yes
		OPR	36	35	38	45 / -[3]	Yes
POR 11	Residence	POW	38	35	40	50 / 45	Yes
		OPR	39	42	43	45 / -[3]	Yes
POR 12	Residence	POW	29	36	37	50 / 45	Yes

Point of Reception ID	POR Description	Location	Estimated Sound Level associated with the proposed HMA Plant, Evening and Nighttime Period (Worst Case) (dBA)	Estimated Sound Level associated with the adjacent quarry, Evening and Nighttime Period (Worst Case) (dBA)	Estimated Sound Level associated with the combined operation, Evening and Nighttime Period (Worst Case) (dBA)	Performance Limit* Evening / Nighttime Period (dBA)	Compliance with Performance Limit (Yes/No)
		OPR	30	37	37	45 / -[3]	Yes
POR 13	Residence	POW	31	41	41	50 / 45	Yes
		OPR	30	41	41	45 / -[3]	Yes
POR 14	Residence	POW	32	42	42	50 / 45	Yes
		OPR	32	42	43	45 / -[3]	Yes
POR 15	Residence	POW	36	43	44	50 / 45	Yes
		OPR	35	42	43	45 / -[3]	Yes
POR 16	Residence	POW	34	41	42	50 / 45	Yes
		OPR	33	39	40	45 / -[3]	Yes
POR 17	Residence	POW	39	35	40	40 / 40	Yes
		OPR	38	33	39	40 / -[3]	Yes
POR 18	Residence	POW	27	40	41	50 / 45	Yes
		OPR	26	39	40	45 / -[3]	Yes
POR 19	Residence	POW	36	43	44	55.5 / 45	Yes
		OPR	31	41	41	55.5 / -[3]	Yes

Notes:

1. Performance limits are based on 1-hour equivalent sound levels, Leq.
2. The highest predicted sound level at plane of window or outdoor point of reception are provided above as these are the most critical at each point of reception. Refer to Tables A2.8.1 to A2.8.3 in Appendix 2 for more detailed sound level estimates by source.
3. Outdoor Points of Reception (OPR) are not considered noise sensitive during the nighttime period (23:00 to 07:00) as per MECP criteria.

Table 7: Recommended Noise Barriers

Barrier	Minimum Height (m)	Minimum Length (m)	Maximum Distance from Source (m)	Location	Required to shield Line of Sight from Identified Source ID	Required to shield Line of Sight to Identified Receptor/s	Description
Barrier_AP1[1] (Asphalt Plant)	4 m	Not applicable	3 m	As per Figure 7	AP_Baghouse_Fan	POR 3 POR 4 POR 5 POR 6 POR 7 POR 17	New Barrier: Required prior to operating the baghouse fan concurrently with quarry operations or during the evening and nighttime period.
Barrier_AP2 (Asphalt Plant)	5 m	62 m	Not applicable	As per: Figure 7	HMA Plant	POR 7 POR 8 POR 17	New Barrier: Required prior to operating the HMA Plant concurrently with quarry operations or during the evening and nighttime period

Notes:

1. Alternative mitigation acceptable following approval by qualified acoustical consultant to ensure MECP sound level limits are met at all locations. This may include installation of a silencer and or relocation of the baghouse fan so that the plant building provides the required shielding and / or other measure.

FIGURES

Figure 1: Scaled Area Location Plan showing Receptor Locations

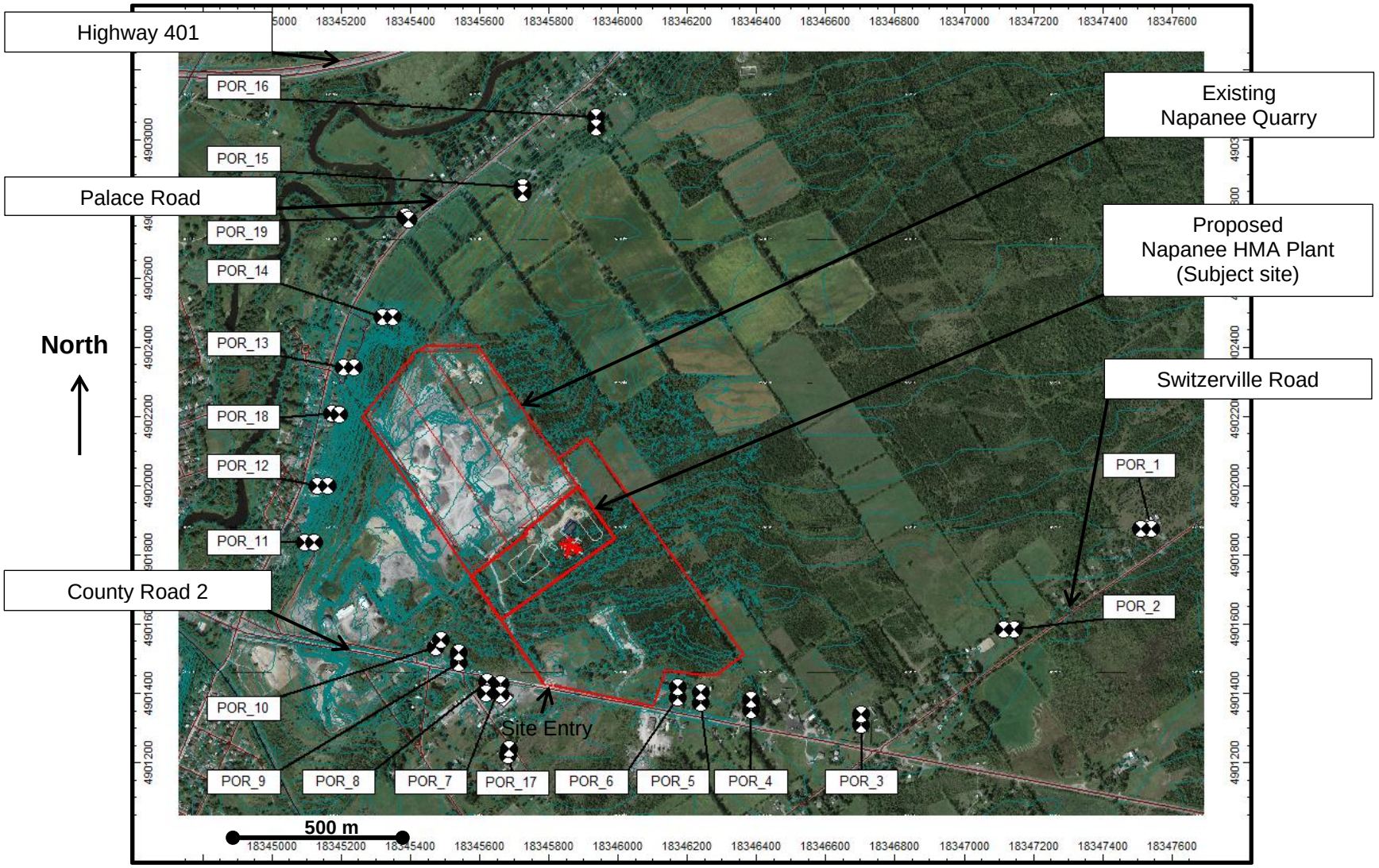


Figure 2: Site Layout & Surface Elevation Contours (elevation contours at 0.5-meter intervals)

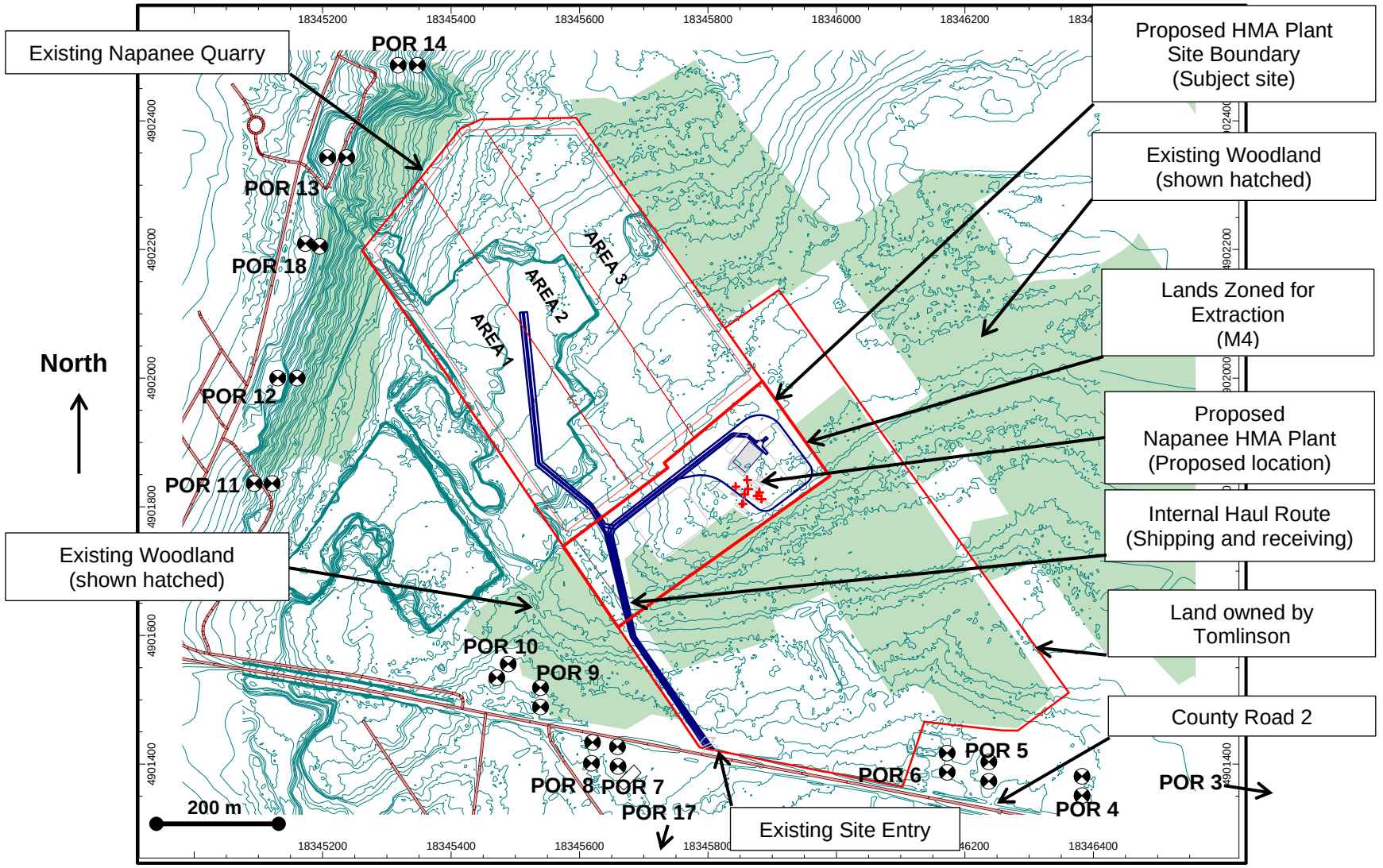


Figure 3: Detail Plan at HMA Plant showing Source Locations

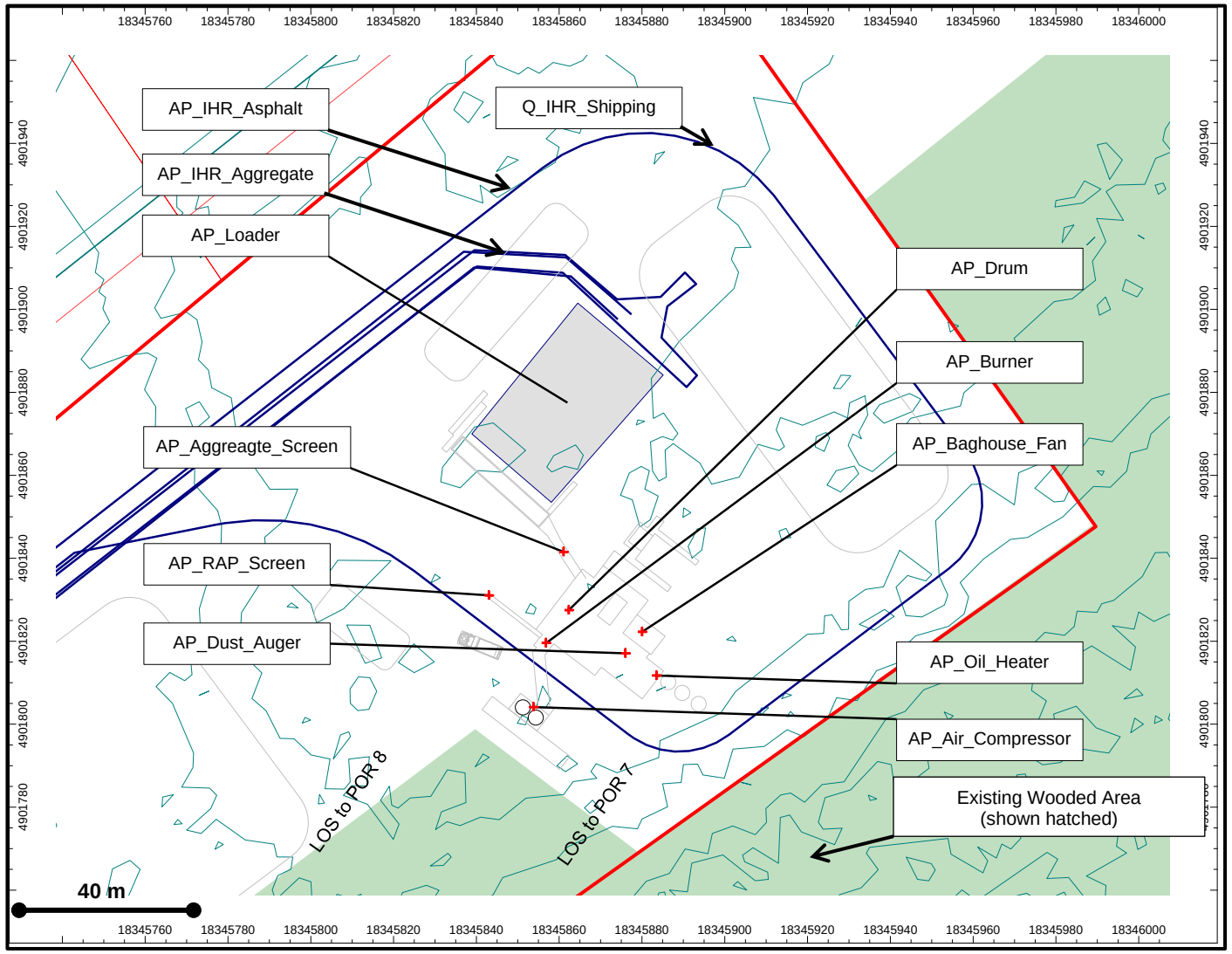


Figure 4: Prediction Results, Scenario 1: Worst Case, All equipment in operation at the proposed HMA Plant and adjacent quarry concurrently with extraction occurring in the North - Daytime Period – Noise Contours, (Noise levels at 4.5 m)

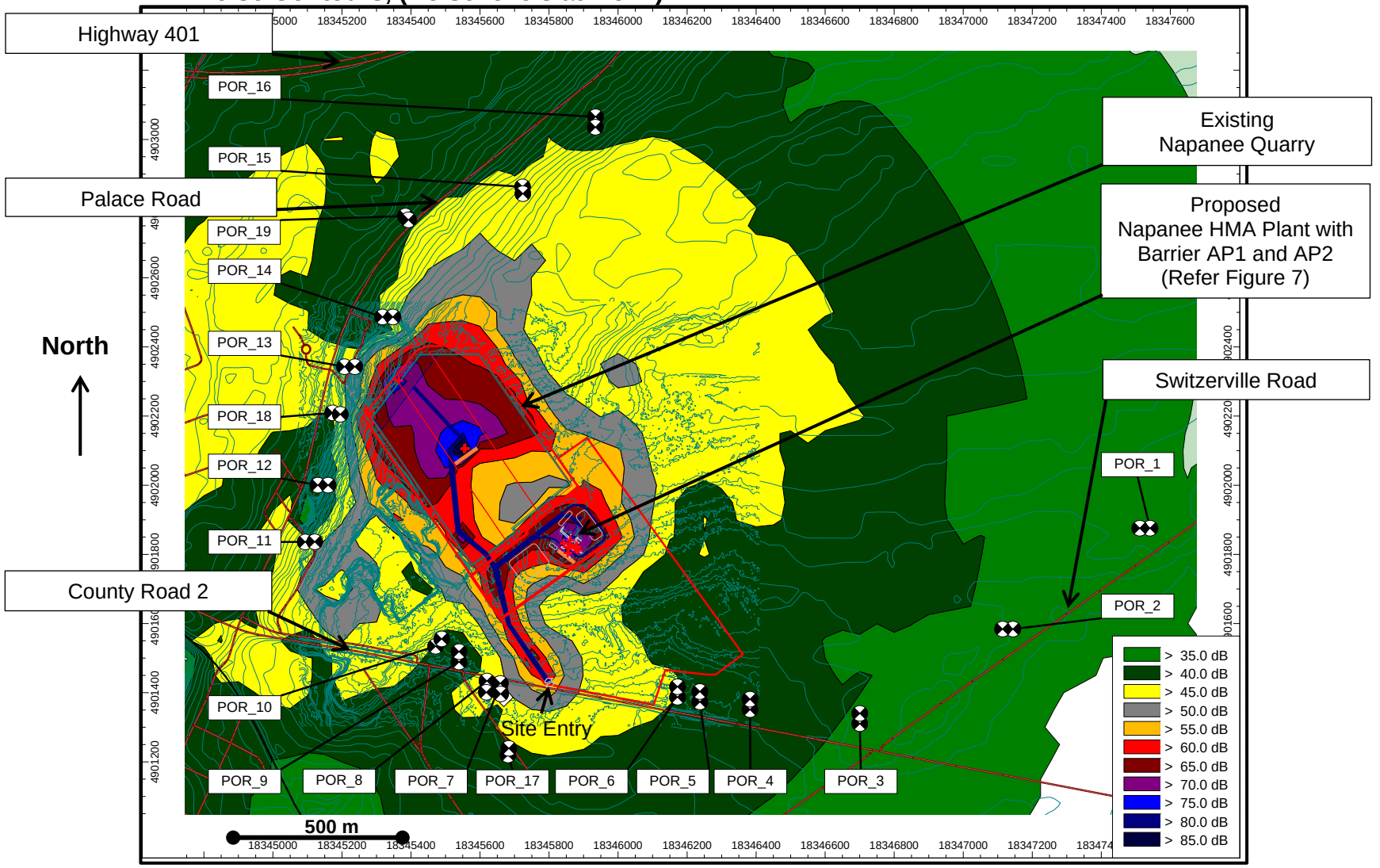


Figure 5: Prediction Results, Scenario 2: Worst Case, All equipment in operation at the proposed HMA Plant and adjacent quarry concurrently with extraction occurring in the South - Daytime Period – Noise Contours, (Noise levels at 4.5 m)

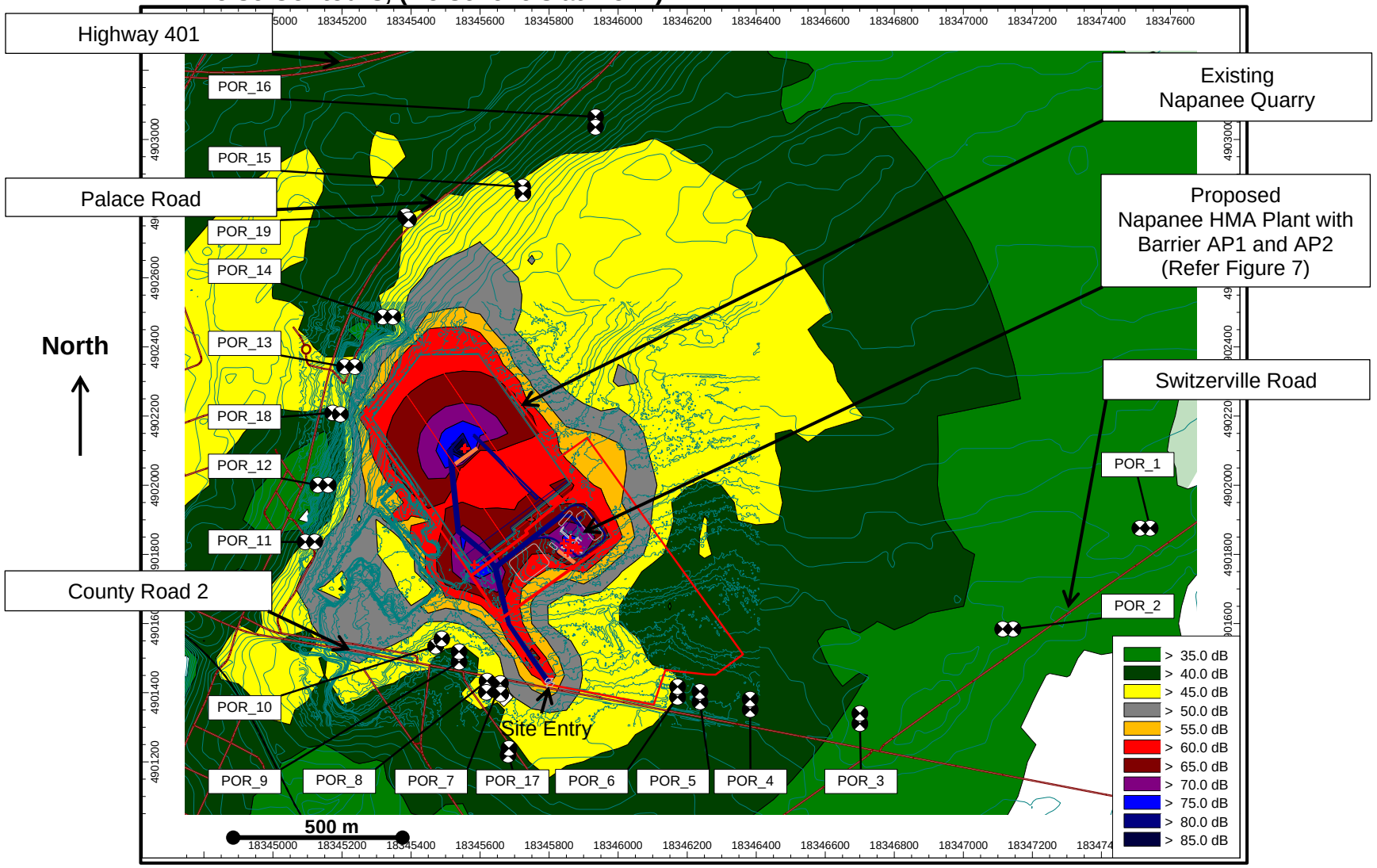


Figure 6: Prediction Results, Scenario 3: Worst Case, All equipment in operation at the proposed HMA Plant concurrently with aggregate processing, loading and hauling operations at the quarry – Evening and Nighttime Period – Noise Contours, (Noise levels at 4.5 m)

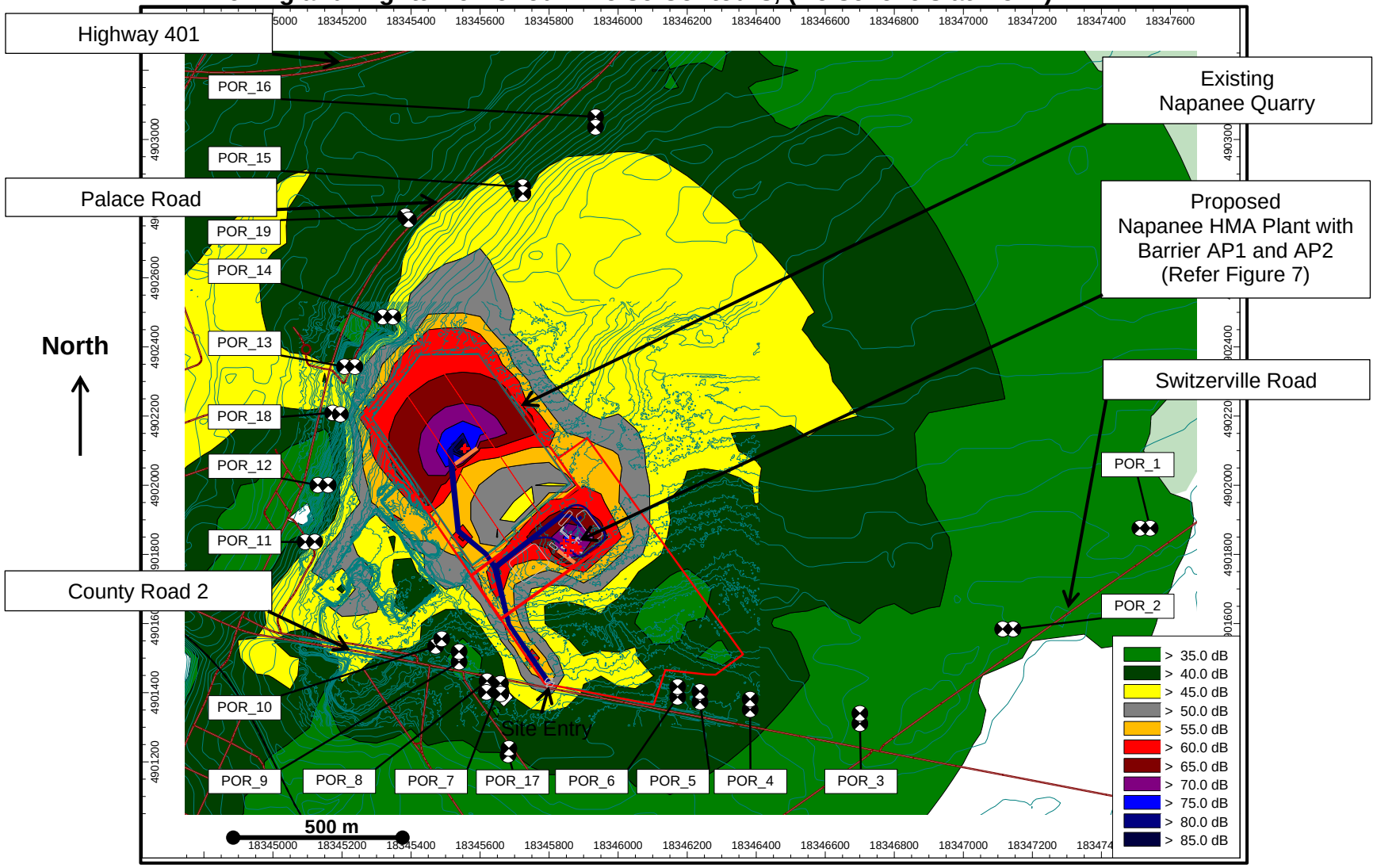
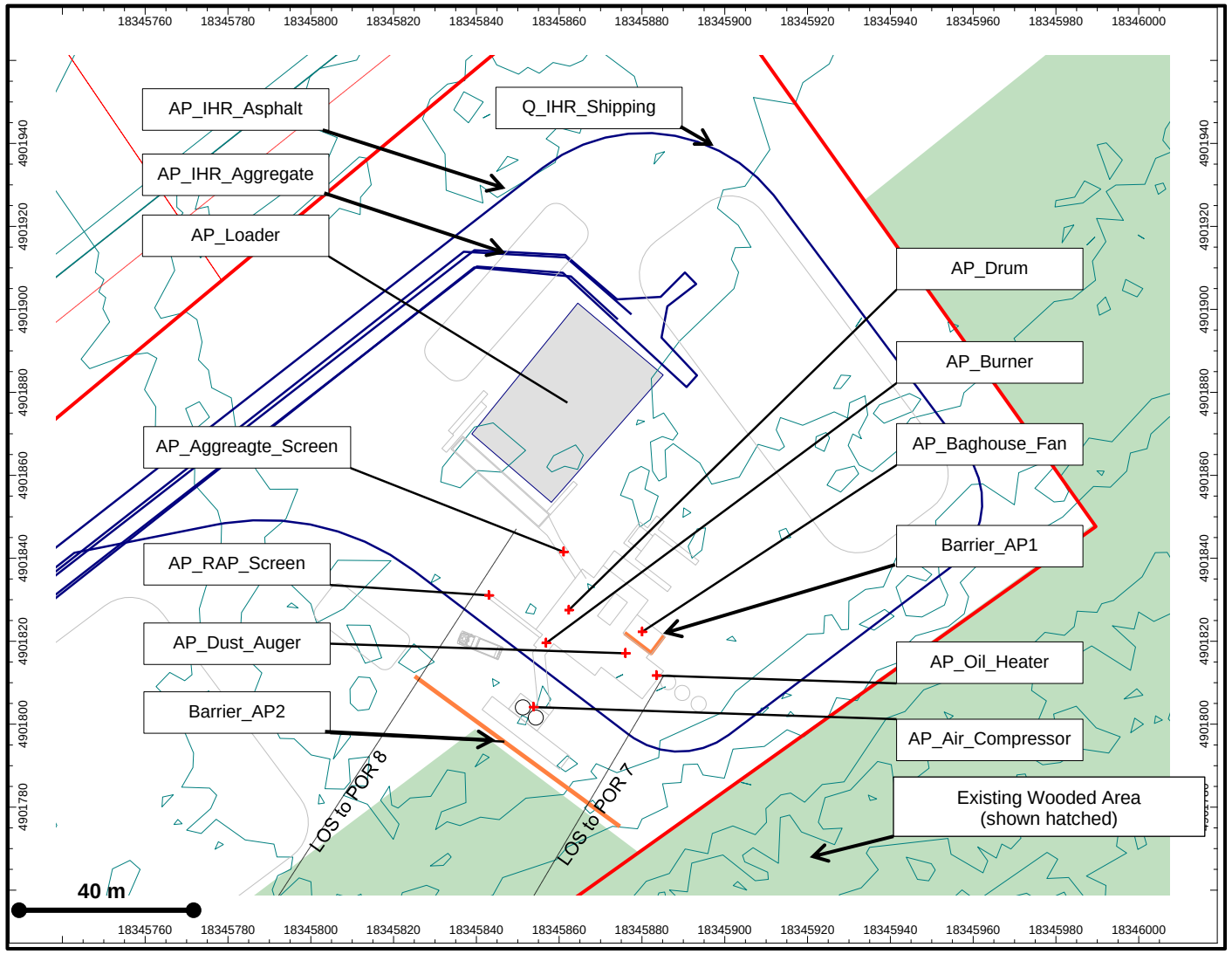


Figure 7: Detailed Plan at Recommended Barriers AP1 and AP2 at HMA Plant



Appendix 1

Zoning Plan and Land Use Designations

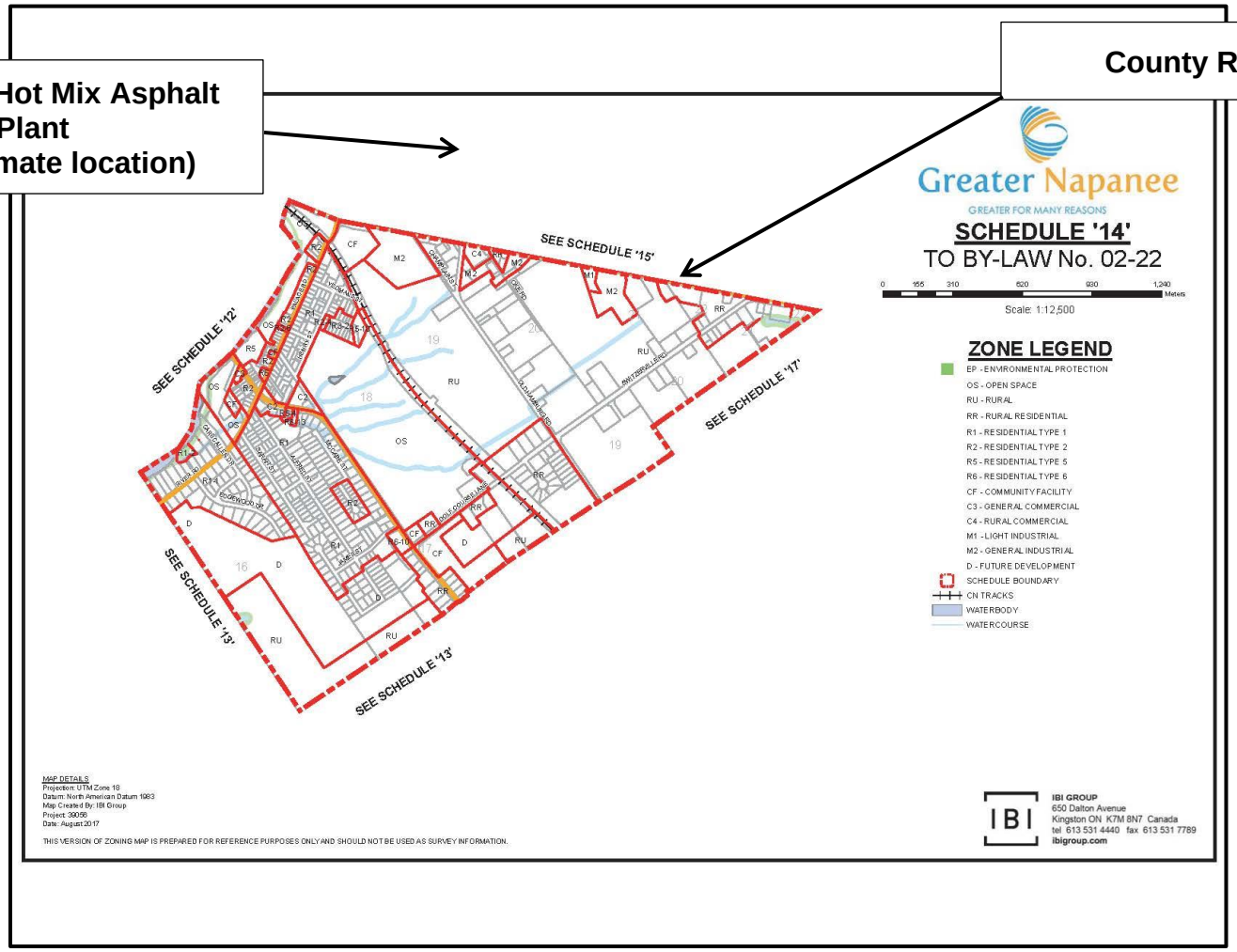
Contents:

Zoning Plan, source: Town of Greater Napanee By-Law No. 02-22 –Schedule 14

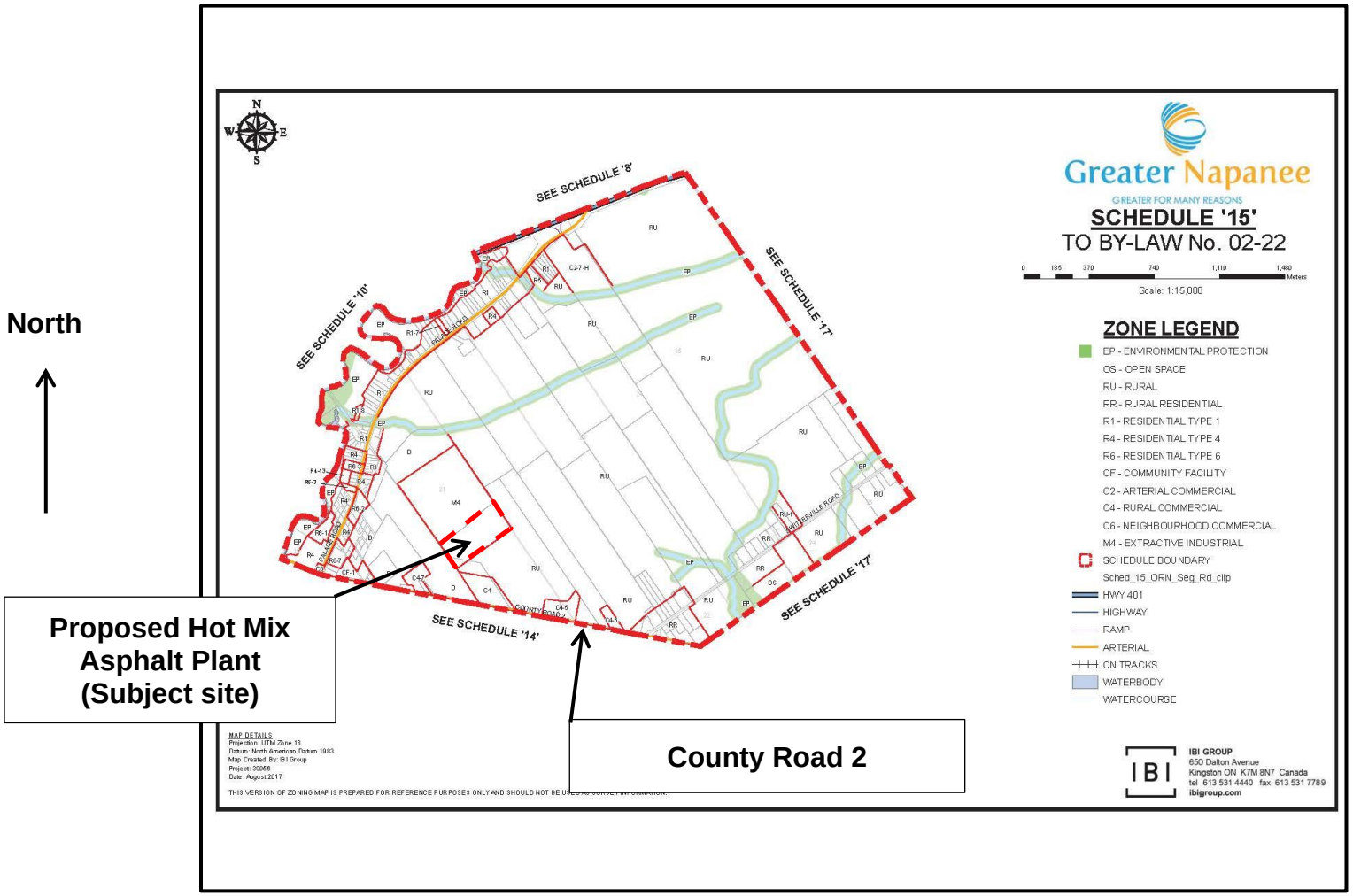
Proposed Hot Mix Asphalt Plant (Approximate location)

County Road 2

North



Zoning Plan, source: Town of Greater Napanee By-Law No. 02-22 –Schedule 15



Appendix 2

Acoustic Modelling Details

Modeling Notes:

1. Acoustic model developed uses Cadna-A software, Version 2021.
2. Sound propagation is modeled according to ISO 9613-2: 1996(E).
3. The whole of the disturbed area of the site is modeled as reflective with an absorption coefficient of 0.3, a conservative assumption.
4. MECP favoured conservative modelling assumptions are used, that is, 'no subtraction of negative ground attenuation' and 'no negative path differences'.

Contents:

Table A2.1 Point of Reception Location Table

Name	ID	Height	Coordinates, ground		
		Above Ground	X	Y	Z
		(m)	(m)	(m)	(m)
POR_1	POR_1_POW	4.5	18347541.5	4901875.57	130.93
POR_1	POR_1_OPR	1.5	18347511.5	4901875.57	127.99
POR_2	POR_2_POW	4.5	18347144.1	4901583.9	128.33
POR_2	POR_2_OPR	1.5	18347114.1	4901583.9	125.5
POR_3	POR_3_POW	4.5	18346700.3	4901310.13	128.95
POR_3	POR_3_OPR	1.5	18346700.3	4901340.13	125.82
POR_4	POR_4_POW	4.5	18346382.4	4901350.96	125
POR_4	POR_4_OPR	1.5	18346382.4	4901380.96	121.9
POR_5	POR_5_POW	4.5	18346237.3	4901373.3	124
POR_5	POR_5_OPR	1.5	18346237.3	4901403.3	121
POR_6	POR_6_POW	2	18346172.4	4901387.15	121
POR_6	POR_6_OPR	1.5	18346172.4	4901417.15	120.88
POR_7	POR_7_POW	4.5	18345659.1	4901426.73	124.68
POR_7	POR_7_OPR	1.5	18345660	4901396.25	121.24
POR_8	POR_8_POW	4.5	18345620.3	4901433.72	124.12
POR_8	POR_8_OPR	1.5	18345618.6	4901401.15	120.9
POR_9	POR_9_POW	2	18345539.3	4901488.68	121.44
POR_9	POR_9_OPR	1.5	18345539.3	4901518.68	121.12
POR_10	POR_10_POW	2	18345471.3	4901534.16	123
POR_10	POR_10_OPR	1.5	18345489	4901555.52	122
POR_11	POR_11_POW	2	18345093.6	4901835.99	108.72
POR_11	POR_11_OPR	1.5	18345121.4	4901836.34	111.67
POR_12	POR_12_POW	4.5	18345130.2	4902000.05	101.47
POR_12	POR_12_OPR	1.5	18345160.2	4902000.05	106.26
POR_13	POR_13_POW	2	18345207.5	4902342.78	101.23
POR_13	POR_13_OPR	1.5	18345220.2	4902336.9	101.06
POR_14	POR_14_POW	4.5	18345317.6	4902486.43	107.2
POR_14	POR_14_OPR	1.5	18345337.8	4902466.74	105.49
POR_15	POR_15_POW	3	18345723.3	4902862.74	116.46
POR_15	POR_15_OPR	1.5	18345724.3	4902843.03	116.72
POR_16	POR_16_POW	4.5	18345934.8	4903065.48	116.65
POR_16	POR_16_OPR	1.5	18345934.3	4903035.41	115.05
POR_17	POR_17_POW	4.5	18345681.2	4901219.98	122.4
POR_17	POR_17_OPR	1.5	18345683.7	4901238.91	119.6
POR_18	POR_18_POW	2	18345173.2	4902209.19	96.15
POR_18	POR_18_OPR	1.5	18345195.3	4902204.81	98.01
POR_19	POR_19_POW	4.5	18345384	4902778.34	95.86
POR_19	POR_19_OPR	1.5	18345392.8	4902767.5	94.21

Table A2.2 Point Sources

Source ID	Result. PWL			Lw / Li	Noise Source	Operating Time			Direct.	Source	Attenuation
	Day	Evening	Night	Type	Library File	Day	Evening	Night (Early Morning Period)		Height	
	(dBA)	(dBA)	(dBA)			(min/Hr)	(min/Hr)	(min/Hr)		(m)	
AP_Drum	AP_Drum	108	108	108	Lw	60	60	60	(none)	4.2	(none)
AP_Burner	AP_Burner	106	106	106	Lw	60	60	60	(none)	4.2	(none)
AP_Baghouse_Fan	AP_Baghouse_Fan	113	113	113	Lw	60	60	60	(none)	1.5	(none)
AP_Dust_Auger	AP_Dust_Auger	79	79	79	Lw	60	60	60	(none)	1.9	(none)
AP_Oil_Heater	AP_Oil_Heater	89	89	89	Lw	60	60	60	(none)	1	(none)
AP_Air_Compressor	AP_Air_Compressor	96	96	96	Lw	60	60	60	(none)	1.5	(none)
AP_Aggregate_Screen	AP_Aggregate_Screen	103	103	103	Lw	60	60	60	(none)	5.2	(none)
AP_RAP_Screen	AP_RAP_Screen	98	98	98	Lw	60	60	60	(none)	5.2	(none)
Q_Crushing_Plant	Q_Crushing_Plant_S1-3	122	122	122	Lw	60	60	60	(none)	4	(none)
Q_Genset	Q_Genset_S1-3	108	108	108	Lw	60	60	60	Chimney (VDI 3733)	4	Silex_Silencer_Model_JB_6
Q_Rockdrill	Q_Rockdrill_S1	119	119	119	Lw	60	0	0	(none)	0.5	(none)
Q_Rockdrill	Q_Rockdrill_S2	119	119	119	Lw	60	0	0	(none)	0.5	(none)

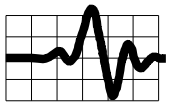


Table A2.3 Line Sources

Source ID	Result. PWL			Numbers of vehicles per hour			Lw / Li	Modelling Type/ Noise Source Lib. File	Speed (km/h)
	Day (dBA)	Evening (dBA)	Type	Day	Evening	Night			
AP_IHR_Asphalt_S1-2	107	103	103.3	9	4	4	PWL-Pt	Moving Point Source / HWYTruck_Slow58	30
AP_IHR_Asphalt_S3	103	103	103.3	4	4	4	PWL-Pt	Moving Point Source / HWYTruck_Slow58	30
AP_IHR_Aggregate_S1-2	103	97	96.8	4	1	1	PWL-Pt	Moving Point Source / HWYTruck_Slow58	30
AP_IHR_Aggregate_S3	97	97	96.8	1	1	1	PWL-Pt	Moving Point Source / HWYTruck_Slow58	30
Q_IHR_Shipping_S1-2	108	100	100.2	12	2	2	PWL-Pt	Moving Point Source / HWYTruck_Slow58	30
Q_IHR_Shipping_S3	100	100	100.2	2	2	2	PWL-Pt	Moving Point Source / HWYTruck_Slow58	30
Q_IHR_Aggregate_S1	97	-	-	14	0	0	PWL-Pt	Moving Point Source / Rock_Truck_JD400D	30
Q_IHR_Aggregate_S2	98	-	-	14	0	0	PWL-Pt	Moving Point Source / Rock_Truck_JD400D	30
QAP_IHR_Aggregate_S1-2	100	94	93.8	8	2	2	PWL-Pt	Moving Point Source / Rock_Truck_JD400D	30
QAP_IHR_Aggregate_S3	94	94	93.8	2	2	2	PWL-Pt	Moving Point Source / Rock_Truck_JD400D	30

Table A2.4 Area Sources

Source ID	Result PWL			Numbers of vehicles per hour			Lw / Li	Modelling Type/ Noise Source Lib. File	Direct.
	Day	Evening	Night	Day	Evening	Night	Type		
	(dBA)	(dBA)	(dBA)	(dBA)	(dBA)	(dBA)			
AP_Loader_S1-3	98	98.0	98	1	1	1	PWL-Pt	Moving Point Source / AP_Loader	(none)
Q_Loaders_Ext_S1	112	-	-	2	0	0	PWL-Pt	Moving Point Source / Q_Loader	(none)
Q_Loaders_Ext_S2	112	-	-	2	0	0	PWL-Pt	Moving Point Source / Q_Loader	(none)
Q_Loaders_Stockpiling_S1-3	112	112	112	2	2	2	PWL-Pt	Moving Point Source / Q_Loader	(none)

Table A2.5 Noise Source Library

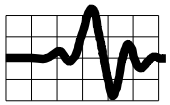
ID	Type	Spectra (dB)											Source
		31.5	63	125	250	500	1000	2000	4000	8000	A	lin	
AP_Drum	Lw	102.5	95.5	99.9	99.9	103.9	100.5	99	102.1	100.2	108	110.5	Manufacturers Data - 78 dBA at 11 m
AP_Burner	Lw	92.9	98.6	107.5	108.7	105.2	97.2	94.2	87.2	81.1	105.7	112.6	Manufacturers Data - 88 dBA at 2.75 m
AP_Baghouse_Fan	Lw	103.2	104.5	106.9	107.7	108.2	110.5	100.9	102	83	112.8	115.6	Manufacturers Data - 83 dBA at 11 m
AP_Dust_Auger	Lw	70.9	68.3	66.4	71.2	69.6	70.2	66.7	76.5	63.3	79.1	80.3	Meas. St. Albert HMA Plant 21/8/2017 - 72dBAat0.9m
AP_Oil_Heater	Lw	81.8	83.7	85.2	83.2	86.4	82.9	81.3	81.1	76.2	89.1	92.7	Meas. St. Albert HMA Plant 21/8/201-67.7 at 0.7m
AP_Air_Compressor	Lw	75.5	77.9	84.6	91.5	95.9	89.7	87.9	84.6	80.1	96.3	98.8	Meas. St. Albert HMA Plant 21/8/2017-84.7at 1.5m
AP_Aggregate_Screen	Lw	103.6	96.5	99.4	96.1	96	95.3	97	96.8	90.8	102.9	107.7	Manufacturers Data - 73 dBA at 11 m
AP_RAP_Screen	Lw	98.4	91.3	94.2	90.9	90.8	90.1	91.8	91.6	85.6	97.7	102.5	Manufacturers Data - 80 dBA at 2.75 m
AP_Loader	Lw	101.4	110.6	106.3	97.4	95.6	90.3	88.6	84.9	82.6	98	112.6	Measurements on-site 21 August 2017 - 68.75at11.3m
Q_Crushing_Plant	Lw	117.1	119.8	121.3	121.3	120	115.2	113.1	108.9	103.2	121.5	127.6	adj. 90m source Mielke Quarry 3rd February 2015
Q_600kW_Genset_Exhaust	Lw	64.9	97.4	112.5	120.2	121.8	122.9	124.9	121.1	109.3	129.3	129.6	Manufacturers Data - Cummin Model 600DQPAA
Rockdrill_TH_70	Lw	111	110.6	112.4	108.9	108.7	109.3	113.6	112.2	109.9	118.6	120.6	Furukawa Model HCR12-ES Rock Drill Measured 2007
Rockdrill_SmartRIG	Lw	103	109.4	112.6	106.8	102.2	101.7	102.5	98.6	91.3	108.3	116	Measured 30/08/11
Q_Loader	Lw	102	109.4	113.1	112.6	106.1	103.1	96.2	90.2	82.6	108.9	117.5	adj. 90m source Historical Data
Rock_Truck_JD400D	Lw	107	108.7	108.2	102.3	98.5	100.5	96.7	91.3	85.1	104.3	113.7	Meas. OTR 23rd August 2017 at 12.5m
HWYTruck_Slow58	Lw	116	112.7	110.2	101.6	101.4	105	104.2	97.6	103.5	110.1	119	Brockville McDowell Study, 2003

Table A2.6 Noise Measurement Data

ID	Type	Spectra (dB)											Source
		31.5	63	125	250	500	1000	2000	4000	8000	A	lin	
Meas_AP_Drum	Li	72.5	65.5	69.9	69.9	73.9	70.5	69	72.1	70.2	78	80.5	Manufacturers Data - 78 dBA at 8.25 m
Meas_AP_Burner	Li	75.2	80.9	89.8	91	87.5	79.5	76.5	69.5	63.4	88	94.9	Manufacturers Data - 88 dBA at 2.75 m
Meas_AP_Baghouse_Fan	Li	76.4	77.7	80.1	80.9	81.5	83.7	74.1	75.2	56.2	86	88.8	Manufacturers Data - 83 dBA at 8.25 m
Meas_AP_Dust_Auger	Li	63.8	61.2	59.3	64.1	62.5	63.1	59.6	69.4	56.2	72	73.2	Meas. St. Albert HMA Plant 21/8/2017 - 72dBAat0.9m
Meas_AP_Oil_Heater	Li	60.4	62.3	63.8	61.8	65	61.5	59.9	59.7	54.8	67.7	71.3	Meas. St. Albert HMA Plant 21/8/201-67.7 at 0.7m
Meas_AP_Air_Compressor	Li	63.9	66.3	73	79.9	84.3	78.1	76.3	73	68.5	84.7	87.2	Meas. St. Albert HMA Plant 21/8/2017-84.7at 1.5m
Meas_Aggregate_Screen	Li	73.7	66.6	69.5	66.2	66.1	65.4	67.1	66.9	60.9	73	77.8	Manufacturers Data - 73 dBA at 11 m
Meas_AP_RAP_Screen	Li	80.7	73.6	76.5	73.2	73.1	72.4	74.1	73.9	67.9	80	84.8	Manufacturers Data - 80 dBA at 2.75 m
Meas_AP_Loader	Li	72.2	81.4	77.1	68.2	66.4	61.1	59.4	55.7	53.4	68.8	83.4	Meas. St. Albert HMA August 2017 - 68.8 at 11.3m
Meas_Q_Crushing_Plant	Li	69.5	72.2	73.7	73.7	72.4	67.6	65.5	61.3	55.6	73.9	80	adj. 90m source Mielke Quarry 3rd February 2015
Meas_Rockdrill_TH_70	Li	68.5	74.3	79.9	81.8	79	80.2	80.3	79.1	76.6	86.5	88.5	Measured by Hugh Williamson Ass. 13th April 2012
Meas_Q_Loader	Li	55	62	65.7	65.2	58.7	55.7	48.8	42.8	35.2	61.5	70.1	adj. 90m source Historical Data
Meas_Rock_Truck_JD400D	Li	76.9	78.2	77.7	71.8	68	70	66.2	60.8	54.6	73.8	83.2	Meas. OTR 23rd August 2017 at 12.5m
Meas_HWYTruck_Slow58	Li	67.5	64.3	61.8	53.2	53	56.6	55.8	49.2	55.1	61.7	70.6	adj. 90m source Brockville McDowell Study, 2003

Table A2.7 Distance Source to Point of Reception

ID	Coordinates		AP_Drum	AP_Burner	AP_Baghouse_Fan	AP_Dust_Auger	AP_Oil_Heater	AP_Air_Compressor	AP_Aggregate_Screen	AP_RAP_Screen	Q_Crushing_Plant_S1-3	Q_Genset_S1-3	Q_Rockdrill_S1	Q_Rockdrill_S2
	X (m)		18345862.34	18345856.84	18345880.04	18345876.01	18345883.5	18345853.78	18345861.08	18345843.01	18345554.43	18345557.09	18345418.9	18345584.26
		Y (m)	4901827.49	4901819.54	4901822.25	4901817.08	4901811.72	4901804.12	4901841.52	4901831.05	4902104.59	4902106.34	4902375.6	4901769.12
POR_1_POW	18347541.45	4901875.57	1680	1686	1662	1666	1659	1689	1681	1699	2000	1998	2181	1960
POR_1_OPR	18347511.45	4901875.57	1650	1656	1632	1636	1629	1659	1651	1669	1970	1968	2151	1930
POR_2_POW	18347144.05	4901583.9	1305	1309	1286	1289	1281	1309	1309	1324	1673	1671	1898	1571
POR_2_OPR	18347114.05	4901583.9	1275	1279	1257	1260	1251	1279	1279	1295	1644	1642	1871	1541
POR_3_POW	18346700.32	4901310.13	985	985	967	968	959	980	993	1003	1394	1393	1667	1207
POR_3_OPR	18346700.32	4901340.13	969	970	951	952	943	965	978	988	1377	1376	1647	1196
POR_4_POW	18346382.4	4901350.96	705	704	689	688	679	696	716	722	1120	1119	1406	901
POR_4_OPR	18346382.4	4901380.96	685	685	669	668	659	677	696	703	1100	1099	1385	888
POR_5_POW	18346237.26	4901373.3	589	586	574	572	563	577	601	604	1001	1000	1294	764
POR_5_OPR	18346237.26	4901403.3	566	564	551	549	540	555	578	582	979	978	1271	748
POR_6_POW	18346172.36	4901387.15	539	535	524	522	514	525	551	553	947	946	1243	701
POR_6_OPR	18346172.36	4901417.15	514	511	500	498	489	501	526	529	924	924	1219	685
POR_7_POW	18345659.13	4901426.73	449	440	453	447	446	425	461	444	686	687	979	350
POR_7_OPR	18345659.96	4901396.25	476	467	479	473	472	452	489	472	716	718	1009	380
POR_8_POW	18345620.25	4901433.72	462	453	467	461	461	438	474	456	674	676	963	337
POR_8_OPR	18345618.64	4901401.15	491	481	496	489	489	467	503	485	706	708	995	370
POR_9_POW	18345539.25	4901488.68	468	459	477	470	472	445	478	458	616	618	895	284
POR_9_OPR	18345539.25	4901518.68	447	437	456	450	452	425	456	436	586	588	865	254
POR_10_POW	18345471.26	4901534.16	489	480	500	494	497	468	496	476	576	579	843	261
POR_10_OPR	18345488.95	4901555.52	462	453	473	467	470	441	469	449	553	555	823	234
POR_11_POW	18345093.61	4901835.99	769	763	787	783	790	761	767	749	533	537	630	495
POR_11_OPR	18345121.42	4901836.34	741	736	759	755	762	733	740	722	509	513	616	468
POR_12_POW	18345130.21	4902000.05	752	749	771	768	776	750	748	733	437	440	474	509
POR_12_OPR	18345160.21	4902000.05	723	720	741	739	747	721	719	703	408	411	456	483
POR_13_POW	18345207.51	4902342.78	833	834	850	850	860	841	824	816	421	422	214	686



ID	Coordinates		AP_Drum	AP_Burner	AP_Baghouse_Fan	AP_Dust_Auger	AP_Oil_Heater	AP_Air_Compressor	AP_Aggregate_Screen	AP_RAP_Screen	Q_Crushing_Plant_S1-3	Q_Genset_S1-3	Q_Rockdrill_S1	Q_Rockdrill_S2
	X (m)		18345862.34	18345856.84	18345880.04	18345876.01	18345883.5	18345853.78	18345861.08	18345843.01	18345554.43	18345557.09	18345418.9	18345584.26
		Y (m)	4901827.49	4901819.54	4901822.25	4901817.08	4901811.72	4901804.12	4901841.52	4901831.05	4902104.59	4902106.34	4902375.6	4901769.12
POR_13_OPR	18345220.22	4902336.9	820	820	837	837	846	828	810	802	407	408	202	674
POR_14_POW	18345317.62	4902486.43	855	858	870	872	881	868	843	840	449	449	150	765
POR_14_OPR	18345337.78	4902466.74	827	830	842	844	853	840	815	812	422	422	122	740
POR_15_POW	18345723.28	4902862.74	1045	1052	1052	1057	1063	1067	1030	1039	777	774	574	1102
POR_15_OPR	18345724.25	4902843.03	1025	1032	1033	1037	1044	1047	1011	1019	758	755	558	1083
POR_16_POW	18345934.77	4903065.48	1240	1248	1244	1250	1255	1264	1226	1238	1033	1031	861	1343
POR_16_OPR	18345934.31	4903035.41	1210	1218	1214	1220	1225	1234	1196	1208	1005	1003	837	1314
POR_17_POW	18345681.16	4901219.98	634	625	634	628	625	609	647	632	894	895	1185	558
POR_17_OPR	18345683.67	4901238.91	615	606	616	609	607	590	628	613	875	877	1167	539
POR_18_POW	18345173.22	4902209.19	788	787	806	805	814	792	780	769	395	397	297	602
POR_18_OPR	18345195.3	4902204.81	766	766	784	783	793	771	758	748	373	375	281	584
POR_19_POW	18345384	4902778.34	1064	1069	1077	1080	1088	1082	1051	1053	695	694	404	1029
POR_19_OPR	18345392.79	4902767.5	1051	1055	1063	1066	1074	1068	1038	1039	682	681	393	1017

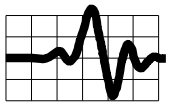


Table A2.8.1 Point of Reception Impacts by Source for Scenario 1*

ID	Partial Level Day time Period (07:00 – 19:00)																		
	AP_Baghouse_Fan	Q_Crushing_Plant_S1-3	AP_Burner	Q_Loaders_Stockpiling_S1-3	Q_Loaders_Ext_S1	AP_Drum	Q_Rockdrill_S1	AP_IHR_Asphalt_S1-2	Q_IHR_Shipping_S1-2	AP_Loader_S1-3	AP_Aggregate_Screen	AP_IHR_Aggregate_S1-2	QAP_IHR_Aggregate_S1-2	AP_Air_Compressor	AP_RAP_Screen	Q_IHR_Aggregate_S1	AP_Oil_Heater	Q_Genset_S1-3	Total
POR_1_POW	32	29	27	26	26	25	23	22	21	19	19	18	15	15	13	9	6	6	37
POR_1_OPR	30	27	21	25	24	22	21	20	20	18	17	16	14	12	11	8	4	3	35
POR_2_POW	26	28	29	26	27	28	25	25	24	22	22	21	17	18	17	11	9	5	37
POR_2_OPR	26	27	25	25	26	26	24	24	23	20	20	20	16	15	15	11	7	4	35
POR_3_POW	30	28	32	24	29	31	27	29	28	25	25	25	21	21	20	13	12	5	40
POR_3_OPR	29	27	28	24	28	29	26	28	27	23	24	24	19	19	19	13	10	5	38
POR_4_POW	31	28	36	24	31	35	30	33	32	28	29	29	24	24	24	15	14	7	43
POR_4_OPR	30	27	32	24	30	33	29	32	31	26	28	28	22	21	23	14	12	7	41
POR_5_POW	31	29	37	25	33	37	31	35	34	29	31	31	24	25	26	16	15	8	44
POR_5_OPR	28	29	33	24	31	34	30	33	33	27	30	30	22	21	25	16	10	9	42
POR_6_POW	30	29	36	25	32	37	31	35	35	29	32	31	23	23	27	16	13	9	44
POR_6_OPR	28	29	35	25	32	37	31	34	35	28	32	31	23	20	27	15	9	9	43
POR_7_POW	21	30	31	25	35	30	35	44	45	26	26	40	24	12	21	18	8	8	49
POR_7_OPR	19	24	29	20	32	27	33	43	44	23	24	39	20	10	19	15	5	0	48
POR_8_POW	20	26	31	23	35	29	34	42	42	27	26	38	25	11	21	18	7	2	47
POR_8_OPR	18	24	28	21	32	26	33	40	42	24	23	37	20	9	18	15	4	1	46
POR_9_POW	17	26	26	25	29	24	32	34	35	24	23	31	23	10	20	13	5	4	41
POR_9_OPR	18	26	26	25	29	24	28	35	35	24	20	31	23	10	17	13	5	4	40
POR_10_POW	17	32	33	32	33	32	32	34	33	29	32	30	26	10	27	18	5	11	43
POR_10_OPR	17	31	28	31	33	27	31	34	34	25	27	30	24	10	22	18	5	11	41
POR_11_POW	36	34	30	27	30	29	39	27	23	23	24	23	21	12	19	11	11	13	43
POR_11_OPR	36	41	31	31	30	30	38	28	24	23	25	24	22	12	20	12	11	22	45
POR_12_POW	26	35	22	27	34	20	32	18	17	17	14	13	13	9	9	14	-4	14	39
POR_12_OPR	26	36	23	28	33	20	31	19	19	17	15	15	15	11	10	14	-2	15	40
POR_13_POW	26	40	26	32	32	23	41	22	24	19	17	18	20	12	13	15	1	20	44

ID	Partial Level Day time Period (07:00 – 19:00)																		
	AP_Baghouse_Fan	Q_Crushing_Plant_S1-3	AP_Burner	Q_Loaders_Stockpiling_S1-3	Q_Loaders_Ext_S1	AP_Drum	Q_Rockdrill_S1	AP_IHR_Asphalt_S1-2	Q_IHR_Shipping_S1-2	AP_Loader_S1-3	AP_Aggregate_Screen	AP_IHR_Aggregate_S1-2	QAP_IHR_Aggregate_S1-2	AP_Air_Compressor	AP_RAP_Screen	Q_IHR_Aggregate_S1	AP_Oil_Heater	Q_Genset_S1-3	Total
POR_13_OPR	23	38	24	31	32	21	38	19	23	18	15	16	17	7	10	15	-1	18	42
POR_14_POW	28	41	26	33	29	24	49	23	24	19	18	19	18	12	13	16	3	22	50
POR_14_OPR	23	38	24	30	29	21	46	19	20	18	16	15	16	7	11	15	-1	18	47
POR_15_POW	33	42	28	34	35	26	41	25	26	21	21	20	20	16	15	19	-5	24	46
POR_15_OPR	33	41	27	33	34	26	41	24	25	20	20	20	19	16	15	19	-5	23	45
POR_16_POW	31	41	26	32	31	24	35	22	22	19	19	18	18	14	13	16	-7	22	43
POR_16_OPR	30	38	25	30	29	24	35	21	20	18	18	17	16	14	13	13	-8	19	42
POR_17_POW	24	30	32	28	34	31	32	38	38	25	26	35	27	15	20	18	12	10	44
POR_17_OPR	23	29	30	24	33	30	32	38	38	24	26	34	25	14	20	17	10	9	44
POR_18_POW	21	40	22	32	35	19	32	17	17	17	13	13	14	5	8	19	-4	20	42
POR_18_OPR	20	39	21	32	35	17	30	16	17	17	13	12	14	4	7	18	-5	19	41
POR_19_POW	33	43	28	34	24	27	40	24	25	21	21	20	21	17	16	15	-6	24	45
POR_19_OPR	28	40	25	32	24	22	40	21	23	18	17	16	18	12	12	14	-7	22	44

* Values at first floor window height (W) at 4.5 m or 2 m and Outdoor Point of Reception (OPR) at 1.5 m are given above as these where the most critical points at each receptor.

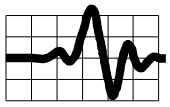


Table A2.8.2 Point of Reception Impacts by Source for Scenario 2*

ID	Partial Level Day time Period (07:00 – 19:00)																		
	AP_Baghouse_Fan	Q_Crushing_Plant_S1-3	AP_Burner	Q_Loaders_Stockpiling_S1-3	AP_Drum	Q_Rockdrill_S2	AP_IHR_Asphalt_S1-2	Q_IHR_Shipping_S1-2	AP_Loader_S1-3	AP_Aggregate_Screen	Q_Loaders_Ext_S2	AP_IHR_Aggregate_S1-2	QAP_IHR_Aggregate_S1-2	AP_Air_Compressor	AP_RAP_Screen	Q_IHR_Aggregate_S2	AP_Oil_Heater	Q_Genset_S1-3	Total
POR_1_POW	32	29	27	26	25	23	22	21	19	19	18	18	15	15	13	12	6	6	36
POR_1_OPR	30	27	21	25	22	22	20	20	18	17	18	16	14	12	11	11	4	3	34
POR_2_POW	26	28	29	26	28	26	25	24	22	22	17	21	17	18	17	14	9	5	37
POR_2_OPR	26	27	25	25	26	26	24	23	20	20	17	20	16	15	15	14	7	4	35
POR_3_POW	30	28	32	24	31	31	29	28	25	25	17	25	21	21	20	16	12	5	39
POR_3_OPR	29	27	28	24	29	30	28	27	23	24	17	24	19	19	19	16	10	5	38
POR_4_POW	31	28	36	24	35	35	33	32	28	29	16	29	24	24	24	18	14	7	43
POR_4_OPR	30	27	32	24	33	34	32	31	26	28	15	28	22	21	23	17	12	7	41
POR_5_POW	31	29	37	25	37	35	35	34	29	31	14	31	24	25	26	18	15	8	44
POR_5_OPR	28	29	33	24	34	34	33	33	27	30	13	30	22	21	25	15	10	9	42
POR_6_POW	30	29	36	25	37	34	35	35	29	32	14	31	23	23	27	15	13	9	44
POR_6_OPR	28	29	35	25	37	33	34	35	28	32	14	31	23	20	27	13	9	9	43
POR_7_POW	21	30	31	25	30	36	44	45	26	26	23	40	24	12	21	17	8	8	49
POR_7_OPR	19	24	29	20	27	32	43	44	23	24	18	39	20	10	19	15	5	0	47
POR_8_POW	20	26	31	23	29	37	42	42	27	26	24	38	25	11	21	16	7	2	47
POR_8_OPR	18	24	28	21	26	33	40	42	24	23	18	37	20	9	18	13	4	1	45
POR_9_POW	17	26	26	25	24	35	34	35	24	23	21	31	23	10	20	15	5	4	41
POR_9_OPR	18	26	26	25	24	37	35	35	24	20	22	31	23	10	17	14	5	4	41
POR_10_POW	17	32	33	32	32	42	34	33	29	32	30	30	26	10	27	19	5	11	45
POR_10_OPR	17	31	28	31	27	40	34	34	25	27	25	30	24	10	22	18	5	11	43
POR_11_POW	36	34	30	27	29	38	27	23	23	24	32	23	21	12	19	16	11	13	43
POR_11_OPR	36	41	31	31	30	40	28	24	23	25	33	24	22	12	20	18	11	22	45
POR_12_POW	26	35	22	27	20	27	18	17	17	14	25	13	13	9	9	11	-4	14	37
POR_12_OPR	26	36	23	28	20	29	19	19	17	15	26	15	15	11	10	12	-2	15	38
POR_13_POW	26	40	26	32	23	34	22	24	19	17	32	18	20	12	13	14	1	20	42

ID	Partial Level Day time Period (07:00 – 19:00)																		
	AP_Baghouse_Fan	Q_Crushing_Plant_S1-3	AP_Burner	Q_Loaders_Stockpiling_S1-3	AP_Drum	Q_Rockdrill_S2	AP_IHR_Asphalt_S1-2	Q_IHR_Shipping_S1-2	AP_Loader_S1-3	AP_Aggregate_Screen	Q_Loaders_Ext_S2	AP_IHR_Aggregate_S1-2	QAP_IHR_Aggregate_S1-2	AP_Air_Compressor	AP_RAP_Screen	Q_IHR_Aggregate_S2	AP_Oil_Heater	Q_Genset_S1-3	Total
POR_13_OPR	23	38	24	31	21	32	19	23	18	15	30	16	17	7	10	13	-1	18	41
POR_14_POW	28	41	26	33	24	31	23	24	19	18	31	19	18	12	13	17	3	22	43
POR_14_OPR	23	38	24	30	21	28	19	20	18	16	28	15	16	7	11	15	-1	18	40
POR_15_POW	33	42	28	34	26	33	25	26	21	21	33	20	20	16	15	10	-5	24	44
POR_15_OPR	33	41	27	33	26	33	24	25	20	20	32	20	19	16	15	10	-5	23	44
POR_16_POW	31	41	26	32	24	31	22	22	19	19	30	18	18	14	13	9	-7	22	43
POR_16_OPR	30	38	25	30	24	29	21	20	18	18	28	17	16	14	13	7	-8	19	41
POR_17_POW	24	30	32	28	31	38	38	38	25	26	18	35	27	15	20	18	12	10	45
POR_17_OPR	23	29	30	24	30	32	38	38	24	26	15	34	25	14	20	14	10	9	43
POR_18_POW	21	40	22	32	19	25	17	17	17	13	25	13	14	5	8	14	-4	20	41
POR_18_OPR	20	39	21	32	17	23	16	17	17	13	25	12	14	4	7	13	-5	19	40
POR_19_POW	33	43	28	34	27	34	24	25	21	21	33	20	21	17	16	18	-6	24	45
POR_19_OPR	28	40	25	32	22	33	21	23	18	17	29	16	18	12	12	13	-7	22	42

* Values at first floor window height (W) at 4.5 m or 2 m and Outdoor Point of Reception (OPR) at 1.5 m are given above as these where the most critical points at each receptor.

Table A2.8.3 Point of Reception Impacts by Source for Scenario 3*

ID	Partial Level Evening and Nighttime Period (19:00 – 07:00)															
	AP_Baghouse_Fan	Q_Crushing_Plant_S1-3	AP_Burner	Q_Loaders_Stockpiling_S1-3	AP_Drum	AP_Loader_S1-3	AP_Aggregate_Screen	AP_IHR_Asphalt_S3	AP_Air_Compressor	AP_RAP_Screen	Q_IHR_Shipping_S3	AP_IHR_Aggregate_S3	QAP_IHR_Aggregate_S3	AP_Oil_Heater	Q_Genset_S1-3	Total
POR_1_POW	32	29	27	26	25	19	19	18	15	13	13	11	9	6	6	36
POR_1_OPR	30	27	21	25	22	18	17	16	12	11	12	10	8	4	3	34
POR_2_POW	26	28	29	26	28	22	22	21	18	17	16	15	11	9	5	36
POR_2_OPR	26	27	25	25	26	20	20	20	15	15	15	14	10	7	4	34
POR_3_POW	30	28	32	24	31	25	25	26	21	20	20	19	15	12	5	38
POR_3_OPR	29	27	28	24	29	23	24	25	19	19	19	18	13	10	5	36
POR_4_POW	31	28	36	24	35	28	29	29	24	24	24	23	18	14	7	41
POR_4_OPR	30	27	32	24	33	26	28	28	21	23	23	22	16	12	7	39
POR_5_POW	31	29	37	25	37	29	31	31	25	26	26	25	18	15	8	43
POR_5_OPR	28	29	33	24	34	27	30	29	21	25	25	23	16	10	9	40
POR_6_POW	30	29	36	25	37	29	32	31	23	27	27	25	17	13	9	42
POR_6_OPR	28	29	35	25	37	28	32	31	20	27	27	25	17	9	9	42
POR_7_POW	21	30	31	25	30	26	26	40	12	21	37	34	18	8	8	44
POR_7_OPR	19	24	29	20	27	23	24	39	10	19	36	33	14	5	0	42
POR_8_POW	20	26	31	23	29	27	26	38	11	21	35	32	18	7	2	42
POR_8_OPR	18	24	28	21	26	24	23	37	9	18	34	31	14	4	1	40
POR_9_POW	17	26	26	25	24	24	23	31	10	20	27	25	17	5	4	36
POR_9_OPR	18	26	26	25	24	24	20	31	10	17	27	25	17	5	4	36
POR_10_POW	17	32	33	32	32	29	32	30	10	27	25	24	20	5	11	40
POR_10_OPR	17	31	28	31	27	25	27	30	10	22	26	24	18	5	11	38
POR_11_POW	36	34	30	27	29	23	24	23	12	19	15	17	15	11	13	40
POR_11_OPR	36	41	31	31	30	23	25	24	12	20	17	18	16	11	22	43
POR_12_POW	26	35	22	27	20	17	14	14	9	9	9	7	7	-4	14	37
POR_12_OPR	26	36	23	28	20	17	15	16	11	10	11	9	9	-2	15	37
POR_13_POW	26	40	26	32	23	19	17	19	12	13	17	12	14	1	20	41

ID	Partial Level Evening and Nighttime Period (19:00 – 07:00)															
	AP_Baghouse_Fan	Q_Crushing_Plant_S1-3	AP_Burner	Q_Loaders_Stockpiling_S1-3	AP_Drum	AP_Loader_S1-3	AP_Aggregate_Screen	AP_IHR_Asphalt_S3	AP_Air_Compressor	AP_RAP_Screen	Q_IHR_Shipping_S3	AP_IHR_Aggregate_S3	QAP_IHR_Aggregate_S3	AP_Oil_Heater	Q_Genset_S1-3	Total
POR_13_OPR	23	38	24	31	21	18	15	16	7	10	15	9	11	-1	18	39
POR_14_POW	28	41	26	33	24	19	18	19	12	13	16	13	12	3	22	42
POR_14_OPR	23	38	24	30	21	18	16	15	7	11	12	9	10	-1	18	39
POR_15_POW	33	42	28	34	26	21	21	21	16	15	18	14	14	-5	24	44
POR_15_OPR	33	41	27	33	26	20	20	21	16	15	17	14	13	-5	23	43
POR_16_POW	31	41	26	32	24	19	19	18	14	13	14	12	12	-7	22	42
POR_16_OPR	30	38	25	30	24	18	18	17	14	13	12	11	10	-8	19	40
POR_17_POW	24	30	32	28	31	25	26	34	15	20	30	29	21	12	10	40
POR_17_OPR	23	29	30	24	30	24	26	34	14	20	30	28	19	10	9	39
POR_18_POW	21	40	22	32	19	17	13	13	5	8	10	7	8	-4	20	41
POR_18_OPR	20	39	21	32	17	17	13	12	4	7	9	6	8	-5	19	40
POR_19_POW	33	43	28	34	27	21	21	21	17	16	17	14	14	-6	24	44
POR_19_OPR	28	40	25	32	22	18	17	17	12	12	15	10	12	-7	22	41

* Values at first floor window height (W) at 4.5 m or 2 m and Outdoor Point of Reception (OPR) at 1.5 m are given above as these where the most critical points at each receptor.

Table A2.9 Sample Calculations – Scenario 1

Receiver
Name: POR_1
ID: POR_1_POW
X: 18347541.45 m
Y: 4901875.57 m
Z: 130.93 m

Point Source, ISO 9613, Name: "Q_Crushing_Plant", ID: "Q_Crushing_Plant_S1-3"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
1	18345554.43	4902104.59	111.79	0	DEN	32	77.7	0.0	0.0	0.0	0.0	77.0	0.1	-5.6	0.0	0.0	5.7	0.0	0.0	0.5
1	18345554.43	4902104.59	111.79	0	DEN	63	93.6	0.0	0.0	0.0	0.0	77.0	0.2	-5.6	0.0	0.0	6.5	0.0	0.0	15.5
1	18345554.43	4902104.59	111.79	0	DEN	125	105.2	0.0	0.0	0.0	0.0	77.0	0.8	4.1	0.0	0.0	3.6	0.0	0.0	19.6
1	18345554.43	4902104.59	111.79	0	DEN	250	112.7	0.0	0.0	0.0	0.0	77.0	2.1	1.0	0.0	0.0	8.5	0.0	0.0	24.1
1	18345554.43	4902104.59	111.79	0	DEN	500	116.8	0.0	0.0	0.0	0.0	77.0	3.9	-1.1	0.0	0.0	11.7	0.0	0.0	25.4
1	18345554.43	4902104.59	111.79	0	DEN	1000	115.2	0.0	0.0	0.0	0.0	77.0	7.3	-1.1	0.0	0.0	14.2	0.0	0.0	17.8
1	18345554.43	4902104.59	111.79	0	DEN	2000	114.3	0.0	0.0	0.0	0.0	77.0	19.3	-1.1	0.0	0.0	17.0	0.0	0.0	2.1
1	18345554.43	4902104.59	111.79	0	DEN	4000	109.9	0.0	0.0	0.0	0.0	77.0	65.5	-1.1	0.0	0.0	19.9	0.0	0.0	-51.4
1	18345554.43	4902104.59	111.79	0	DEN	8000	102.1	0.0	0.0	0.0	0.0	77.0	233.8	-1.1	0.0	0.0	22.8	0.0	0.0	-230.4

Point Source, ISO 9613, Name: "Q_Rockdrill", ID: "Q_Rockdrill_S1"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
4	18345418.90	4902375.60	120.00	0	DEN	32	71.8	0.0	0.0	0.0	0.0	77.8	0.1	-5.8	0.0	0.0	4.8	0.0	0.0	-5.0
4	18345418.90	4902375.60	120.00	0	DEN	63	84.4	0.0	0.0	0.0	0.0	77.8	0.3	-5.8	0.0	0.0	4.8	0.0	0.0	7.4
4	18345418.90	4902375.60	120.00	0	DEN	125	96.3	0.0	0.0	0.0	0.0	77.8	0.9	6.5	0.0	0.0	0.0	0.0	0.0	11.1
4	18345418.90	4902375.60	120.00	0	DEN	250	100.3	0.0	0.0	0.0	0.0	77.8	2.3	5.6	0.0	0.0	0.0	0.0	0.0	14.7
4	18345418.90	4902375.60	120.00	0	DEN	500	105.5	0.0	0.0	0.0	0.0	77.8	4.2	6.6	0.0	0.0	0.0	0.0	0.0	16.9
4	18345418.90	4902375.60	120.00	0	DEN	1000	109.3	0.0	0.0	0.0	0.0	77.8	8.0	1.6	0.0	0.0	3.2	0.0	0.0	18.8
4	18345418.90	4902375.60	120.00	0	DEN	2000	114.8	0.0	0.0	0.0	0.0	77.8	21.1	-0.8	0.0	0.0	4.8	0.0	0.0	12.0
4	18345418.90	4902375.60	120.00	0	DEN	4000	113.2	0.0	0.0	0.0	0.0	77.8	71.5	-0.8	0.0	0.0	4.8	0.0	0.0	-40.0
4	18345418.90	4902375.60	120.00	0	DEN	8000	108.8	0.0	0.0	0.0	0.0	77.8	254.9	-0.8	0.0	0.0	4.8	0.0	0.0	-227.8

Point Source, ISO 9613, Name: "AP_Baghouse_Fan", ID: "AP_Baghouse_Fan"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
8	18345880.04	4901822.25	130.65	0	DEN	32	63.8	0.0	0.0	0.0	0.0	75.4	0.1	-5.7	0.0	0.0	0.0	0.0	0.0	-6.0
8	18345880.04	4901822.25	130.65	0	DEN	63	78.3	0.0	0.0	0.0	0.0	75.4	0.2	-5.7	0.0	0.0	0.0	0.0	0.0	8.4
8	18345880.04	4901822.25	130.65	0	DEN	125	90.8	0.0	0.0	0.0	0.0	75.4	0.7	4.7	0.0	0.0	0.0	0.0	0.0	10.0
8	18345880.04	4901822.25	130.65	0	DEN	250	99.1	0.0	0.0	0.0	0.0	75.4	1.7	2.8	0.0	0.0	0.0	0.0	0.0	19.1
8	18345880.04	4901822.25	130.65	0	DEN	500	105.0	0.0	0.0	0.0	0.0	75.4	3.2	0.7	0.0	0.0	0.0	0.0	0.0	25.7
8	18345880.04	4901822.25	130.65	0	DEN	1000	110.5	0.0	0.0	0.0	0.0	75.4	6.1	-0.8	0.0	0.0	0.0	0.0	0.0	29.8
8	18345880.04	4901822.25	130.65	0	DEN	2000	102.1	0.0	0.0	0.0	0.0	75.4	16.1	-1.0	0.0	0.0	0.0	0.0	0.0	11.6
8	18345880.04	4901822.25	130.65	0	DEN	4000	103.0	0.0	0.0	0.0	0.0	75.4	54.5	-1.0	0.0	0.0	0.0	0.0	0.0	-25.9
8	18345880.04	4901822.25	130.65	0	DEN	8000	81.9	0.0	0.0	0.0	0.0	75.4	194.3	-1.0	0.0	0.0	0.0	0.0	0.0	-186.8

Point Source, ISO 9613, Name: "AP_Drum", ID: "AP_Drum"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
13	18345862.34	4901827.49	133.20	0	DEN	32	63.1	0.0	0.0	0.0	0.0	75.5	0.1	-5.5	0.0	0.0	0.0	0.0	0.0	-6.9
13	18345862.34	4901827.49	133.20	0	DEN	63	69.3	0.0	0.0	0.0	0.0	75.5	0.2	-5.5	0.0	0.0	0.0	0.0	0.0	-0.9
13	18345862.34	4901827.49	133.20	0	DEN	125	83.8	0.0	0.0	0.0	0.0	75.5	0.7	4.8	0.0	0.0	0.0	0.0	0.0	2.8
13	18345862.34	4901827.49	133.20	0	DEN	250	91.3	0.0	0.0	0.0	0.0	75.5	1.8	1.4	0.0	0.0	0.0	0.0	0.0	12.7
13	18345862.34	4901827.49	133.20	0	DEN	500	100.7	0.0	0.0	0.0	0.0	75.5	3.2	-0.8	0.0	0.0	0.0	0.0	0.0	22.8
13	18345862.34	4901827.49	133.20	0	DEN	1000	100.5	0.0	0.0	0.0	0.0	75.5	6.1	-0.8	0.0	0.0	0.0	0.0	0.0	19.7
13	18345862.34	4901827.49	133.20	0	DEN	2000	100.2	0.0	0.0	0.0	0.0	75.5	16.2	-0.8	0.0	0.0	0.0	0.0	0.0	9.3
13	18345862.34	4901827.49	133.20	0	DEN	4000	103.1	0.0	0.0	0.0	0.0	75.5	55.0	-0.8	0.0	0.0	0.0	0.0	0.0	-26.6
13	18345862.34	4901827.49	133.20	0	DEN	8000	99.1	0.0	0.0	0.0	0.0	75.5	196.3	-0.8	0.0	0.0	0.0	0.0	0.0	-171.9

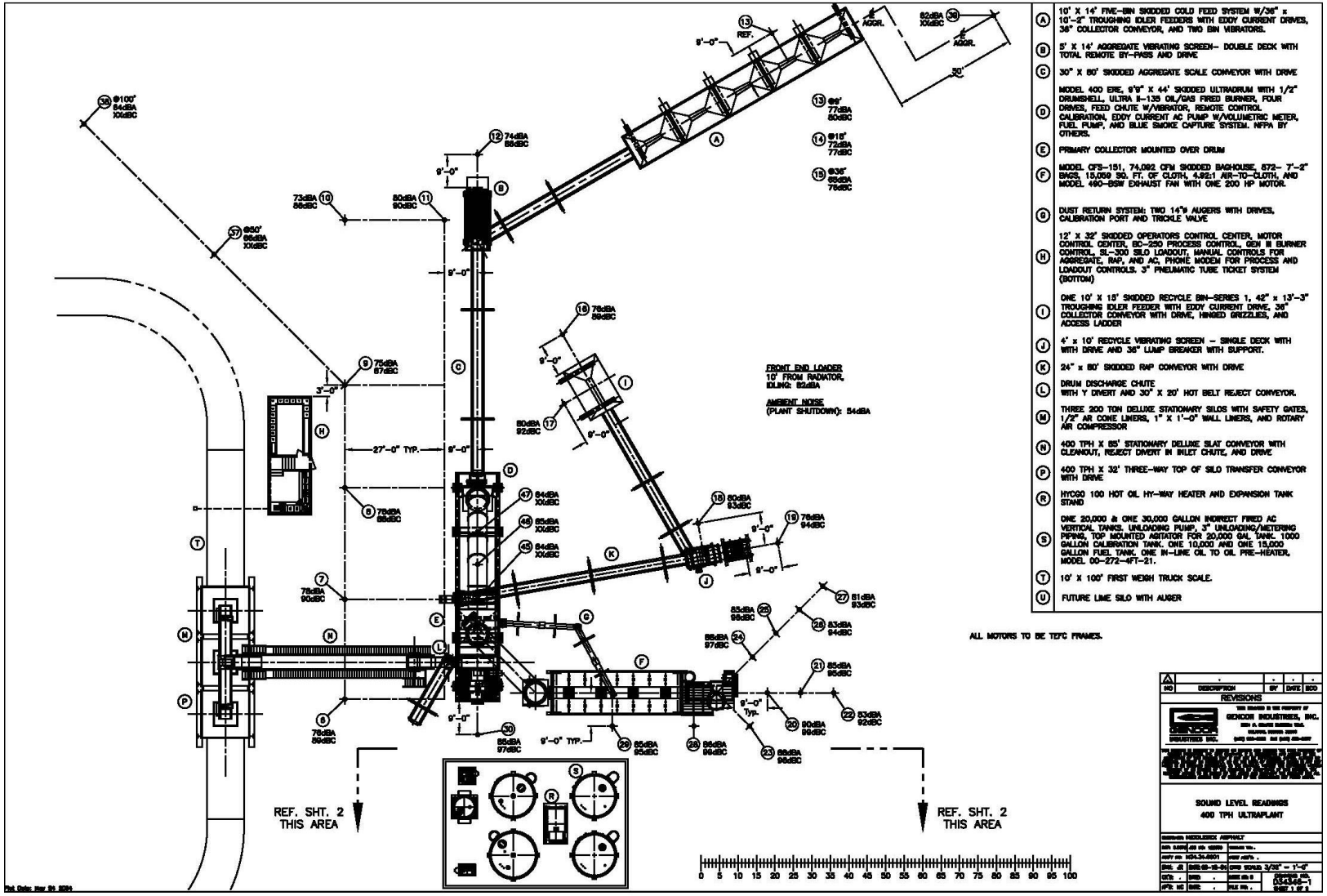
Area Source, ISO 9613, Name: "Q_Loaders_Stockpiling", ID: "Q_Loaders_Stockpiling_S1-3"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
19	18345547.69	4902126.45	110.14	0	DEN	32	36.3	23.0	0.0	0.0	0.0	77.1	0.1	-5.7	0.0	0.0	4.8	0.0	0.0	-16.9
19	18345547.69	4902126.45	110.14	0	DEN	63	56.5	23.0	0.0	0.0	0.0	77.1	0.2	-5.7	0.0	0.0	4.8	0.0	0.0	3.1
19	18345547.69	4902126.45	110.14	0	DEN	125	70.3	23.0	0.0	0.0	0.0	77.1	0.8	4.3	0.0	0.0	0.4	0.0	0.0	10.6
19	18345547.69	4902126.45	110.14	0	DEN	250	77.3	23.0	0.0	0.0	0.0	77.1	2.1	2.0	0.0	0.0	2.8	0.0	0.0	16.4

Appendix 3

Manufacturers Data

Contents:

Figure A3.1: Manufacturers Noise Data for Gencor HMA Plant 400 Ton per hour - D34346-1
(Refer measurement location 30 relating to the burner)



Appendix 4

Background Traffic Noise Analysis

This appendix presents the results of an analysis of background noise from road traffic on County Road 2, Palace Road and Highway 401 at receptors in the vicinity of the proposed Napanee HMA Plant.

Noise generated by road traffic is predicted using STAMSON, a traffic noise model developed by the MECP. STAMSON considers such factors as distance from the road, height, nature of the intervening buildings and terrain, ground absorption, and noise barriers, if present.

The results of the background noise level calculations are presented in Table A4.1 below. Samples of the outputs of the STAMSON software are also provided.

Traffic data used in this analysis was based on a traffic count data provided by the County of Lennox and Addington and the Ontario Ministry of Transportation which contains annual average daily traffic (AADT) volume information for Country Road 2 and Palace Road collected on the 4th and 5th July 2019 and Highway 401 collected from 7th August 2016 to the 14th August 2016. An excerpt of this data is presented below containing the relevant traffic data used in this analysis.

In order to consider the lowest background noise occurring in each hour during the daytime period (07:00 to 19:00) and evening period (19:00 to 23:00) to justify the Class 2 Area classification or higher sound level limits as applicable, hourly traffic volumes were calculated based methodology contained RWDI AIR Inc. Publication, "Typical Hourly Traffic Distribution for Noise Modelling", Vol. 36 No. 3 (2008) which outline applicable distribution factors to apply to Ontario AADT traffic volumes in order to calculate hourly traffic volumes for use in noise modelling. The estimated split was based on City of Ottawa Environmental Noise Control Guidelines which includes a split used for Medium Trucks to Heavy Trucks of 7% and 5% respectively. The results of this analysis are presented in Table A4.1 below at the selected points of reception.

Contents:

Table A4.1: Background Sound Level at Receptors Impacted by Noise from Road Traffic on County Road 2, Palace Road and Highway 401 during the daytime and evening period.[1]

Point of Reception Reception	Lowest Sound Level Limit 1-hour L_{AEQ} dBA (Daytime Period, 07:00 – 19:00)	Lowest Sound Level Limit 1-hour L_{AEQ} dBA (Evening Period, 19:00 – 23:00)
POR 3 to POR 6	56.81	53.75
POR 7 to POR 10	52.81	49.77
POR 11 to POR 12	50.90	47.54
POR 13, POR 14 and POR 18	50.04	46.68
POR 15	53.83	50.57
POR 16	55.79	52.54
POR 19	58.82	55.51

Notes:

1. Nighttime traffic during the lowest volume hour were generally low on all road segments analysed, hence, the exclusion sound level limits have been applied during the nighttime period at all receptors for the purpose of assessing compliance.

Table A4.2: Traffic Volumes – Palace Road

Unity Road - AADT Traffic Volumes from County of Lennox and Addington, 4th and 5th July 2019
Posted Speed Limit: 50 km/h and 60 km/h

Hour Beginning	Distribution Factor[3]	Total Vehicles Count no.	Estimated split[2]		
			Cars no.	Medium Trucks no.	Heavy Trucks no.
0:00	0.87	37			
1:00	0.49	21			
2:00	0.36	15			
3:00	**0.3**	13			
4:00	0.36	15			
5:00	0.95	41			
6:00	2.75	118			
7:00[1]	**5.05**	**217**	**191**	**15**	**11**
8:00	6.55	281			
9:00	5.62	241			
10:00	5.5	236			
11:00	6.04	259			
12:00	6.48	278			
13:00	6.26	269			
14:00	6.6	283			
15:00	7.41	318			
16:00	7.82	336			
17:00	7.65	329			
18:00	6.27	269			
19:00	5.12	220			
20:00	4.09	176			
21:00	3.41	146			
22:00[1]	**2.41**	**104**	**92**	**7**	**5**
23:00	1.67	72			
Total	100	4296			

Notes:

1. Minimum Hourly Traffic Volume during the daytime period occurs 07:00 to 08:00 and evening period at 22:00 to 23:00.

2. Estimated split for vehicle type based on provincially accepted methodology. Split used for Medium Trucks to Heavy Trucks is 7% and 5% respectively. Traffic volumes presented above rounded up, where applicable, for use in traffic noise modelling software (STAMSON). Heavy Truck traffic was excluded from calculations to account for the potential of site related truck traffic included in count.

3. Distribution factor based on RWDI AIR Inc. Publication, "Typical Hourly Traffic Distribution for Noise Modelling", Vol. 36 No. 3 (2008).

Table A4.3: Traffic Volumes – County Road 2

Unity Road - AADT Traffic Volumes from County of Lennox and Addington, 4th and 5th July 2019
Posted Speed Limit: Varies 50 km/h and 80 km/h

Hour Beginning	Distribution Factor[3]	Total Vehicles Count no.	Estimated split[2]		
			Cars no.	Medium Trucks no.	Heavy Trucks no.
0:00	0.87	54			
1:00	0.49	31			
2:00	0.36	22			
3:00	**0.3**	19			
4:00	0.36	22			
5:00	0.95	59			
6:00	2.75	171			
7:00[1]	**5.05**	**315**	**277**	**22**	**16**
8:00	6.55	408			
9:00	5.62	350			
10:00	5.5	343			
11:00	6.04	377			
12:00	6.48	404			
13:00	6.26	390			
14:00	6.6	412			
15:00	7.41	462			
16:00	7.82	488			
17:00	7.65	477			
18:00	6.27	391			
19:00	5.12	319			
20:00	4.09	255			
21:00	3.41	213			
22:00[1]	**2.41**	**150**	**132**	**11**	**8**
23:00	1.67	104			
Total	100	6237			

Notes:

1. Minimum Hourly Traffic Volume during the daytime period and evening period at 22:00 to 23:00.

2. Estimated split for vehicle type based on provincially accepted methodology. Split used for Medium Trucks to Heavy Trucks is 7% and 5% respectively. Traffic volumes presented above rounded up, where applicable, for use in traffic noise modelling software (STAMSON). Heavy Truck traffic was excluded from calculations to account for the potential of site related truck traffic included in count.

3. Distribution factor based on RWDI AIR Inc. Publication, "Typical Hourly Traffic Distribution for Noise Modelling", Vol. 36 No. 3 (2008).

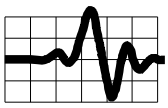


Table A4.4: Traffic Volumes – Highway 401

Unity Road - AADT Traffic Volumes from MTO, 7th August 2016 to the 14th August 2016.
Posted Speed Limit: 100 km/h

Hour Beginning	Distribution Factor[1]	Total Vehicles Count no.	Estimated split[2]		
			Cars no.	Medium Trucks no.	Heavy Trucks no.
0:00	0.87	392			
1:00	0.49	221			
2:00	0.36	162			
3:00	**0.3**	135			
4:00	0.36	162			
5:00	0.95	428			
6:00	2.75	1240			
7:00	**5.05**	**2277**	**2004**	**159**	**114**
8:00	6.55	2953			
9:00	5.62	2534			
10:00	5.5	2480			
11:00	6.04	2723			
12:00	6.48	2921			
13:00	6.26	2822			
14:00	6.6	2975			
15:00	7.41	3341			
16:00	7.82	3525			
17:00	7.65	3449			
18:00	6.27	2827			
19:00	5.12	2308			
20:00	4.09	1844			
21:00	3.41	1537			
22:00	**2.41**	**1087**	**957**	**76**	**54**
23:00	1.67	753			
Total	100	45097			

Notes:

1. Minimum Hourly Traffic Volume during the daytime period and evening period at 22:00 to 23:00.

2. Estimated split for vehicle type based on provincially accepted methodology. Split used for Medium Trucks to Heavy Trucks is 7% and 5% respectively. Traffic volumes presented above rounded up, where applicable, for use in traffic noise modelling software (STAMSON). Heavy Truck traffic was excluded from calculations to account for the potential of site related truck traffic included in count.

3. Distribution factor based on RWDI AIR Inc. Publication, "Typical Hourly Traffic Distribution for Noise Modelling", Vol. 36 No. 3 (2008).

Traffic Data:

Sheet1

COUNTY OF LENNOX & ADDINGTON

PHYSICAL SERVICES DEPT.

Speed Summary Report

91-2 0 2019-07-05 1025.EC2

Location: CR91 at Civic 53 <60 km/h>
Station #: 91-1 Location:
Start: 8:00 July 4, 2019
End: 8:00 July 5, 2019
Duration: (1 days, 0.142857 weeks)
Limit: 60 km/h
Profile: Cls(1-4) Dir(NESW) Sp(0,200) Headway(>0) Span(0 - 100) Lane(0-16), **Scheme:** SchemeF4-LA Aggregate (0 1 1 1 2 2 2 2 2 3 3 3 3 3 4)

		ALL	East	West	Adj Factor	Adj Total(AADT)					
Volume	All	7085	3447	3638	0.88	6235					
		Mean	85%ile	50%ile	15%ile	>PSL (60)	%>PSL (60)	> 70	%> 70	> 80	%>80
Statistics	All	64.3	79.0	61.2	51.3	3831	54.1	2237	31.6	984	13.9
		0 - 40	40 - 50	50 - 60	60 - 70	70 - 80	80 - 90	90 - 100	100 - 110	110 - 120	120 - 200
Speed Bins	Total	46	699	2509	1594	1253	668	258	45	10	3
	Percentage	0.6	9.9	35.4	22.5	17.7	9.4	3.6	0.6	0.1	0.0
		1 - (F1-F3)	2 - (F4-F8)	3 - (F9-F13)	4 - (F14)		Trucks				
Class	Grand Totals	6176	877	15	17		892				
	Percentage	87.2	12.4	0.2	0.2		12.6				
		Peak Volume	Peak Hour	Peak Percent							
Peaks	AM	479	11:00	6.8							
	PM	623	16:00	8.8							

MTE version 4.0.8.0

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Sheet1

COUNTY OF LENNOX & ADDINGTON

PHYSICAL SERVICES DEPT.

county of Lennox & Addington

Speed Summary Report

36-1 0 2019-07-05 1025.EC2

Location: CR 5 @ civic 358 < 50km/h>
Station #: 36-1 Location:
Start: 8:00 Thursday, July 04, 2019
End: 8:00 Friday, July 05, 2019
Duration: (1 days, 0.142857 weeks)
Limit: 50 km/h
Profile: Cls(1-4) Dir(NESW) Sp(0,200) Headway(>0) Span(0 - 100) Lane(0-16), **Scheme:** SchemeF4-LA Aggregate (0 1 1 1 2 2 2 2 2 3 3 3 3 3 4)

		ALL	North	South	Adj Factor	Adj Total(AADT)					
Volume	All	4383	2109	2274	0.98	4295.34					
		Mean	85%ile	50%ile	15%ile	>PSL (50)	%>PSL (50)	> 60	%> 60	> 70	%>70
Statistics	All	55.9	63.9	55.8	48.1	3392	77.39	1293	29.50	183	4.175
		0 - 40	40 - 50	50 - 60	60 - 70	70 - 80	80 - 90	90 - 100	100 - 110	110 - 120	120 - 200
Speed Bins	Total	93	898	2099	1110	171	11	1	0	0	0
	Percentage	2.122	20.49	47.89	25.33	3.901	0.251	0.023	0.000	0.000	0.000
		1 - (F1-F3)	2 - (F4-F8)	3 - (F9-F13)	4 - (F14)		Trucks				
Class	Grand Totals	4060	311	5	7		316				
	Percentage	92.63	7.096	0.114	0.160		7.21				
		Peak Volume	Peak Hour	Peak Percent							
Peaks	AM	343	08:00	7.8							
	PM	384	16:00	8.8							

MTE version 5.0.6.0

Page 1

Ontario

Ministry of Transportation

TVIS II - Traffic Volume information System

ICS Weekly Volume Summary

Hwy: 401 Between: IC-593-CAMDEN E RD

TS: 215 and: PALACE RD IC-582

Regn: EASTERN Pattern: CTR PDCS: 09 Factor: 0.82

LHRS: 47430 Offset: 1.000 Locn: 1.000 KM W OF IC-593-CAMDEN E RD

Dir: COMBINED Lanes: 4 Speed: 100 km/h Dates: 07-Aug-2016 to 14-Aug-2016

	Sun		Mon	Pk	Tue	Pk	Wed	Pk	Thu	Pk	Fri	Pk	Sat	Pk	Sun	Pk
H. Interval	08/07		08/08		08/09		08/10		08/11		08/12		08/13		08/14	
00:00-01:00			614		747		676		789		750		670		416	
01:00-02:00			425		571		594		619		606		511		301	
02:00-03:00			399		493		531		523		485		434		186	
03:00-04:00			393		458		408		471		463		341		185	
04:00-05:00			398		383		392		365		460		331		174	
05:00-06:00			614		588		604		635		607		397		220	
06:00-07:00			1422		1299		1371		1393		1374		747		457	
07:00-08:00			2044		1957		1959		1999		1955		1303		863	
08:00-09:00			2412	◄	2238	◄	2150	◄	2336	◄	2379	◄	2138	◄	1446	◄
09:00-10:00			2673		2446		2338		2473		2834		2928		2287	
10:00-11:00			3014		2603		2557		2811		3332		3545		3235	
11:00-12:00			3492		2846		3043		3110		4001	◄	4190		4107	◄
AM Total			**17900**		**16629**		**16623**		**17524**		**19246**		**17535**		**13877**	
12:00-13:00	4533		3647		3123	◄	3192		3404		2627		3554			
13:00-14:00	4725	◄	3766	◄	3101		3385	◄	3545	◄	3940		4199	◄		
14:00-15:00	4942		3681		3259		3254		3562		4690		3654			
15:00-16:00	4995	◄	3241		3235		3330		3667		4466		3130	◄		
16:00-17:00	4468		3911	◄	3416	◄	3430	◄	3839	◄	4470	◄	2521			
17:00-18:00	4679		3415		3111		3262		3388		4136		2693			
18:00-19:00	3949		2796		2302		2308		2712		3518		2336			
19:00-20:00	3369		1930		1744		1991		2014		3237		1981			
20:00-21:00	2838		1796		1662		1781		2049		2846		1535			
21:00-22:00	2108		1408		1447		1509		1781		2110		1203			
22:00-23:00	1335		1137		1168		1128		1478		1453		860			
23:00-00:00	901		876		886		804		1136		942		694			
PM Total	**42842**		**31604**		**28454**		**29374**		**32575**		**38435**		**28360**			
24h. Total	**42842**		**49504**		**45083**		**45997**		**50099**		**57681**		**45895**		**13877**	

Noon - Noon	60742	48233	45077	46898	51821	55970	42237

ADT	AWD	AADT	SADT	SAWDT	WADT	DHV
50140	48007	41100	61200	61700	42600	4900

Sensitivity: Medium © Queen's Printer, 2019 Printed on: 3-Oct-2019 Page: 3 of 4

STAMSON 5.0 SUMMARY REPORT Date: 02-06-2020 08:21:13
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: por3d.te Time Period: 1 hours
Description: POR 3 to POR 6 - Kingston Road - Daytime

Road data, segment # 1: Kingston Rd

Car traffic volume : 277 veh/TimePeriod
Medium truck volume : 22 veh/TimePeriod
Heavy truck volume : 16 veh/TimePeriod
Posted speed limit : 80 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

Data for Segment # 1: Kingston Rd

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 60.00 m
Receiver height : 2.00 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Result summary
---

source height (m)	Road Leq (dBA)	Total Leq (dBA)
1.Kingston Rd	1.50	56.81	56.81
Total			56.81 dBA

TOTAL Leq FROM ALL SOURCES: 56.81

STAMSON 5.0 SUMMARY REPORT Date: 02-06-2020 08:21:52
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: por3e.te Time Period: 1 hours
Description: POR 3 to POR 6 - Kingston Road - Evening

Road data, segment # 1: Kingston Rd

Car traffic volume : 132 veh/TimePeriod
Medium truck volume : 11 veh/TimePeriod
Heavy truck volume : 8 veh/TimePeriod
Posted speed limit : 80 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

Data for Segment # 1: Kingston Rd

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 60.00 m
Receiver height : 2.00 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Result summary
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source height (m)	Road Leq (dBA)	Total Leq (dBA)
1.Kingston Rd	1.52	53.75	53.75
Total			53.75 dBA

TOTAL Leq FROM ALL SOURCES: 53.75

STAMSON 5.0 NORMAL REPORT Date: 07-01-2021 10:09:13
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: por7d.te Time Period: 1 hours
Description: POR 7 to 10 (Day)

Road data, segment # 1: Kingston Rd

Car traffic volume : 277 veh/TimePeriod
Medium truck volume : 22 veh/TimePeriod
Heavy truck volume : 16 veh/TimePeriod
Posted speed limit : 50 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

Data for Segment # 1: Kingston Rd

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 60.00 m
Receiver height : 2.00 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Kingston Rd

Source height = 1.50 m

ROAD (0.00 + 52.81 + 0.00) = 52.81 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.64	64.15	0.00	-9.90	-1.43	0.00	0.00	0.00	52.81

Segment Leq : 52.81 dBA

Total Leq All Segments: 52.81 dBA

TOTAL Leq FROM ALL SOURCES: 52.81

STAMSON 5.0 NORMAL REPORT Date: 07-01-2021 10:09:40
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: por7e.te Time Period: 1 hours
Description: POR 7 to 10 (Evening)

Road data, segment # 1: Kingston Rd

Car traffic volume : 132 veh/TimePeriod
Medium truck volume : 11 veh/TimePeriod
Heavy truck volume : 8 veh/TimePeriod
Posted speed limit : 50 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

Data for Segment # 1: Kingston Rd

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 60.00 m
Receiver height : 2.00 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Kingston Rd

Source height = 1.52 m

ROAD (0.00 + 49.77 + 0.00) = 49.77 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.64	61.10	0.00	-9.90	-1.43	0.00	0.00	0.00	49.77

Segment Leq : 49.77 dBA

Total Leq All Segments: 49.77 dBA

STAMSON 5.0 NORMAL REPORT Date: 07-01-2021 10:06:49
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: por11d.te Time Period: 1 hours
Description: POR 11 and 12 (Day)

Road data, segment # 1: Palace Road

Car traffic volume : 191 veh/TimePeriod
Medium truck volume : 15 veh/TimePeriod
Heavy truck volume : 11 veh/TimePeriod
Posted speed limit : 50 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

Data for Segment # 1: Palace Road

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 72.00 m
Receiver height : 2.00 m
Topography : 3 (Elevated; no barrier)
Elevation : 4.00 m
Reference angle : 0.00

Results segment # 1: Palace Road

Source height = 1.50 m

ROAD (0.00 + 50.90 + 0.00) = 50.90 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.52	62.51	0.00	-10.39	-1.22	0.00	0.00	0.00	50.90

Segment Leq : 50.90 dBA

Total Leq All Segments: 50.90 dBA

STAMSON 5.0 NORMAL REPORT Date: 07-01-2021 10:08:04
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: por11e.te Time Period: 1 hours
Description: POR 11 and 12 (Evening)

Road data, segment # 1: Palace Road

Car traffic volume : 92 veh/TimePeriod
Medium truck volume : 7 veh/TimePeriod
Heavy truck volume : 5 veh/TimePeriod
Posted speed limit : 50 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

Data for Segment # 1: Palace Road

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 72.00 m
Receiver height : 2.00 m
Topography : 3 (Elevated; no barrier)
Elevation : 4.00 m
Reference angle : 0.00

Results segment # 1: Palace Road

Source height = 1.48 m

ROAD (0.00 + 47.54 + 0.00) = 47.54 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.53	59.16	0.00	-10.39	-1.22	0.00	0.00	0.00	47.54

Segment Leq : 47.54 dBA

Total Leq All Segments: 47.54 dBA

STAMSON 5.0 NORMAL REPORT Date: 07-01-2021 10:00:45
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: por11d.te Time Period: 1 hours
Description: POR 13 and 14 (Day)

Road data, segment # 1: Palace Road

Car traffic volume : 191 veh/TimePeriod
Medium truck volume : 15 veh/TimePeriod
Heavy truck volume : 11 veh/TimePeriod
Posted speed limit : 50 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

Data for Segment # 1: Palace Road

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 82.00 m
Receiver height : 2.00 m
Topography : 3 (Elevated; no barrier)
Elevation : 4.00 m
Reference angle : 0.00

Results segment # 1: Palace Road

Source height = 1.50 m

ROAD (0.00 + 50.04 + 0.00) = 50.04 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.52	62.51	0.00	-11.25	-1.22	0.00	0.00	0.00	50.04

Segment Leq : 50.04 dBA

Total Leq All Segments: 50.04 dBA

STAMSON 5.0 NORMAL REPORT Date: 07-01-2021 10:02:16
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: por13e.te Time Period: 1 hours
Description: POR 13 and 14 (Evening)

Road data, segment # 1: Palace Road

Car traffic volume : 92 veh/TimePeriod
Medium truck volume : 7 veh/TimePeriod
Heavy truck volume : 5 veh/TimePeriod
Posted speed limit : 50 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

Data for Segment # 1: Palace Road

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 82.00 m
Receiver height : 2.00 m
Topography : 3 (Elevated; no barrier)
Elevation : 4.00 m
Reference angle : 0.00

Results segment # 1: Palace Road

Source height = 1.48 m

ROAD (0.00 + 46.68 + 0.00) = 46.68 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.53	59.16	0.00	-11.25	-1.22	0.00	0.00	0.00	46.68

Segment Leq : 46.68 dBA

Total Leq All Segments: 46.68 dBA

STAMSON 5.0 NORMAL REPORT Date: 26-05-2020 11:45:09
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: por15d.te Time Period: 1 hours
Description: POR 15 - Palace Road and Hwy 401 - Day

Road data, segment # 1: Palace Road

Car traffic volume : 191 veh/TimePeriod
Medium truck volume : 15 veh/TimePeriod
Heavy truck volume : 11 veh/TimePeriod
Posted speed limit : 60 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

Data for Segment # 1: Palace Road

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 110.00 m
Receiver height : 2.00 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Road data, segment # 2: Hwy 401

Car traffic volume : 2004 veh/TimePeriod
Medium truck volume : 159 veh/TimePeriod
Heavy truck volume : 114 veh/TimePeriod
Posted speed limit : 100 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

Data for Segment # 2: Hwy 401

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 490.00 m
Receiver height : 2.00 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Palace Road

Source height = 1.50 m

ROAD (0.00 + 48.36 + 0.00) = 48.36 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.64	64.03	0.00	-14.23	-1.43	0.00	0.00	0.00	48.36

Segment Leq : 48.36 dBA

Results segment # 2: Hwy 401

Source height = 1.50 m

ROAD (0.00 + 52.38 + 0.00) = 52.38 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.65	78.72	0.00	-24.91	-1.43	0.00	0.00	0.00	52.38

Segment Leq : 52.38 dBA

Total Leq All Segments: 53.83 dBA

TOTAL Leq FROM ALL SOURCES: 53.83

STAMSON 5.0 NORMAL REPORT Date: 26-05-2020 11:45:55
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: por15e.te Time Period: 1 hours
Description: POR 15 - Palace Road and Hwy 401 - Evening

Road data, segment # 1: Palace Road

Car traffic volume : 92 veh/TimePeriod
Medium truck volume : 7 veh/TimePeriod
Heavy truck volume : 5 veh/TimePeriod
Posted speed limit : 60 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

Data for Segment # 1: Palace Road

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 110.00 m
Receiver height : 2.00 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Road data, segment # 2: Hwy 401

Car traffic volume : 957 veh/TimePeriod
Medium truck volume : 76 veh/TimePeriod
Heavy truck volume : 54 veh/TimePeriod
Posted speed limit : 100 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

Data for Segment # 2: Hwy 401

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 490.00 m
Receiver height : 2.00 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Palace Road

Source height = 1.48 m

ROAD (0.00 + 45.01 + 0.00) = 45.01 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.65	60.68	0.00	-14.24	-1.43	0.00	0.00	0.00	45.01

Segment Leq : 45.01 dBA

Results segment # 2: Hwy 401

Source height = 1.49 m

ROAD (0.00 + 49.15 + 0.00) = 49.15 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.65	75.50	0.00	-24.91	-1.43	0.00	0.00	0.00	49.15

Segment Leq : 49.15 dBA

Total Leq All Segments: 50.57 dBA

TOTAL Leq FROM ALL SOURCES: 50.57

STAMSON 5.0 NORMAL REPORT Date: 26-05-2020 11:44:32
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: por16d.te Time Period: 1 hours
Description: POR 16 - Palace Road and Hwy 401 - Day

Road data, segment # 1: Palace Road

Car traffic volume : 191 veh/TimePeriod
Medium truck volume : 15 veh/TimePeriod
Heavy truck volume : 11 veh/TimePeriod
Posted speed limit : 60 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

Data for Segment # 1: Palace Road

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 82.00 m
Receiver height : 2.00 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Road data, segment # 2: Hwy 401

Car traffic volume : 2004 veh/TimePeriod
Medium truck volume : 159 veh/TimePeriod
Heavy truck volume : 114 veh/TimePeriod
Posted speed limit : 100 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

Data for Segment # 2: Hwy 401

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 375.00 m
Receiver height : 2.00 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Palace Road

Source height = 1.50 m

ROAD (0.00 + 50.46 + 0.00) = 50.46 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.64	64.03	0.00	-12.14	-1.43	0.00	0.00	0.00	50.46

Segment Leq : 50.46 dBA

Results segment # 2: Hwy 401

Source height = 1.50 m

ROAD (0.00 + 54.29 + 0.00) = 54.29 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.65	78.72	0.00	-23.00	-1.43	0.00	0.00	0.00	54.29

Segment Leq : 54.29 dBA

Total Leq All Segments: 55.79 dBA

TOTAL Leq FROM ALL SOURCES: 55.79

STAMSON 5.0 NORMAL REPORT Date: 26-05-2020 11:43:32
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: por16e.te Time Period: 1 hours
Description: POR 16 - Palace Road and Hwy 401 - Evening

Road data, segment # 1: Palace Road

Car traffic volume : 92 veh/TimePeriod
Medium truck volume : 7 veh/TimePeriod
Heavy truck volume : 5 veh/TimePeriod
Posted speed limit : 60 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

Data for Segment # 1: Palace Road

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 82.00 m
Receiver height : 2.00 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Road data, segment # 2: Hwy 401

Car traffic volume : 957 veh/TimePeriod
Medium truck volume : 76 veh/TimePeriod
Heavy truck volume : 54 veh/TimePeriod
Posted speed limit : 100 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

Data for Segment # 2: Hwy 401

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 375.00 m
Receiver height : 2.00 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Palace Road

Source height = 1.48 m

ROAD (0.00 + 47.11 + 0.00) = 47.11 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.65	60.68	0.00	-12.14	-1.43	0.00	0.00	0.00	47.11

Segment Leq : 47.11 dBA

Results segment # 2: Hwy 401

Source height = 1.49 m

ROAD (0.00 + 51.07 + 0.00) = 51.07 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.65	75.50	0.00	-23.00	-1.43	0.00	0.00	0.00	51.07

Segment Leq : 51.07 dBA

Total Leq All Segments: 52.54 dBA

TOTAL Leq FROM ALL SOURCES: 52.54

STAMSON 5.0 NORMAL REPORT Date: 26-05-2020 11:45:09
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: por19d.te Time Period: 1 hours
Description: POR 19 - Palace Road and Hwy 401 - Day

Road data, segment # 1: Palace Road

Car traffic volume : 191 veh/TimePeriod
Medium truck volume : 15 veh/TimePeriod
Heavy truck volume : 11 veh/TimePeriod
Posted speed limit : 60 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

Data for Segment # 1: Palace Road

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 30.00 m
Receiver height : 2.00 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Road data, segment # 2: Hwy 401

Car traffic volume : 2004 veh/TimePeriod
Medium truck volume : 159 veh/TimePeriod
Heavy truck volume : 114 veh/TimePeriod
Posted speed limit : 100 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

Data for Segment # 2: Hwy 401

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 475.00 m
Receiver height : 2.00 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Result summary
---

	source height (m)	Road Leq (dBA)	Total Leq (dBA)
1.Palace Road	1.50	57.64	57.64
2.Hwy 401	1.50	52.60	52.60
Total			58.82 dBA

TOTAL Leq FROM ALL SOURCES: 58.82

STAMSON 5.0 NORMAL REPORT Date: 26-05-2020 11:45:55
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: por19e.te Time Period: 1 hours
Description: POR 19 - Palace Road and Hwy 401 - Evening

Road data, segment # 1: Palace Road

Car traffic volume : 92 veh/TimePeriod
Medium truck volume : 7 veh/TimePeriod
Heavy truck volume : 5 veh/TimePeriod
Posted speed limit : 60 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

Data for Segment # 1: Palace Road

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 30.00 m
Receiver height : 2.00 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Road data, segment # 2: Hwy 401

Car traffic volume : 957 veh/TimePeriod
Medium truck volume : 76 veh/TimePeriod
Heavy truck volume : 54 veh/TimePeriod
Posted speed limit : 100 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

Data for Segment # 2: Hwy 401

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 475.00 m
Receiver height : 2.00 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Result summary
---

	source height (m)	Road Leq (dBA)	Total Leq (dBA)
1.Palace Road	1.48	54.29	54.29
2.Hwy 401	1.49	49.38	49.38
Total			55.51 dBA

TOTAL Leq FROM ALL SOURCES: 55.51

RESUMÉ: Dr. HUGH WILLIAMSON, P.Eng.

QUALIFICATIONS:

Ph.D. Mechanical Engineering, University of New South Wales, 1972

B.Sc. Mechanical Engineering, (with Distinction), University of Alberta, 1967

Member, Professional Engineers, Ontario

Member, Canadian Acoustical Association

Member, American Society of Heating, Refrigeration and Air-conditioning Engineers

KEY COMPETENCIES:

- Environmental noise and vibration assessments, Environmental Compliance Approval (ECA). Noise assessment for land use planning
- Architectural and building acoustics, acoustics of office spaces, meeting rooms, auditoriums and studios, noise and vibration control of building mechanical services.
- Industrial noise and vibration assessment and control.
- Transportation noise and vibration.

PROFESSIONAL EXPERIENCE:

Hugh Williamson is a professional engineer with many years of experience in the measurement, analysis and control of noise and vibration. Freefield Ltd. was incorporated in 2017 and provides consulting services in architectural, building, industrial, transportation and environmental acoustics and vibration. Clients include architects, engineering firms, industrial firms and government departments. Prior to joining Freefield Ltd. Hugh Williamson founded and directed Hugh Williamson Associates Inc. which specialized in consulting services in architectural, building, industrial, transportation and environmental acoustics and vibration. His career included extensive periods in industry as well as university level research and teaching. He is a former Director of the Acoustics and Vibration Unit at the Australian Defence Force Academy. He has published over 50 engineering and scientific papers and has been an invited speaker on noise and vibration at national and international conferences. He has more than 25 years of experience as a consultant.

CLIENT LIST:

Hugh Williamson has provided consulting services to large and small clients including: National Research Council, R. W. Tomlinson, G. Tackaberry & Sons Construction, Miller Paving, J. L. Richards & Associates, Barry Padolsky Associates, Atkinson Schroeter Design Group and Industry Canada.

RESUMÉ: MICHAEL WELLS

QUALIFICATIONS:

Registered Architect of NSW, Registration Number: 8111

B. Architecture (Hons), University of Sydney, 2002

B.Sc. Architecture, University of Sydney, 1999

Member, Canadian Acoustical Association

Member, Australian Acoustical Society

Associate Member, INCE-USA

KEY COMPETENCIES:

- Environmental noise and vibration assessments, Environmental Compliance Approval (ECA). Noise assessment for land use planning.
- Architectural and building acoustics, acoustics of office spaces, meeting rooms, auditoriums and studios, noise and vibration control of building mechanical services.
- Industrial noise and vibration assessment and control.
- Transportation noise and vibration.
- Design services including sketch design, design development (development / permit applications), contract documents, tendering and contract administration.

PROFESSIONAL EXPERIENCE:

Michael Wells is a professional Architect registered in NSW, Australia, with many years of experience in the measurement, analysis and control of noise and vibration. Michael Wells is a founding Director of Freefield Ltd. which was incorporated in 2017, and provides consulting services in architectural, building, industrial, transportation and environmental acoustics and vibration. Clients include architects, engineering firms, industrial firms and government departments. Prior to establishing Freefield Ltd., his career included working for Hugh Williamson Associates Inc. specializing in acoustics, noise and vibration consulting services, and, the founding of Michael Wells Architect in Sydney, Australia, specializing in the design of institutional, commercial and residential projects. He is the former Director of Architectural Workshops Australia and Vision Blue Pty Ltd. He has more than 15 years of experience as a consultant.

CLIENT LIST:

Michael Wells has provided consulting services to large and small clients including: National Research Council, R. W. Tomlinson, G. Tackaberry & Sons Construction, Miller Paving, J. L. Richards & Associates, Barry Padolsky Associates, Atkinson Schroeter Design Group and Industry Canada.