FREEFIELD LTD.
Ottawa, Ontario

ACOUSTIC ASSESSMENT OF THE WEST CARLETON QUARRY EXTENSION CITY OF OTTAWA

Prepared for

Thomas Cavanagh Construction Limited

Prepared by

Freefield Ltd.

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

ACOUSTIC ASSESSMENT OF THE WEST CARLETON QUARRY EXTENSION CITY OF OTTAWA

Executive Summary

Thomas Cavanagh Construction Limited (Cavanagh) is in the process of applying to the Ministry of Natural Resources and Forestry (MNRF) for an extension to their existing West Carleton Quarry, Aggregate Resources Act (ARA) License No. 4085. The Proposed Extension Area is located to the northwest of the Existing Licensed Area, see Figure 1. The West Carleton Quarry is located on rural lands within the City of Ottawa.

The acoustic assessment of the West Carleton Quarry Extension has been carried out according to the applicable Ministry of Environment, Conservation and Parks (MECP) Noise Assessment Guidelines, including NPC-300. Because the intention is that extraction of the Extension Area and the extraction of the Existing Licensed Area will be carried out as one operation by Cavanagh, this assessment includes noise impacts from operations over the extended West Carleton Quarry, Extension Area plus Existing Licensed Area. The assessment considers the impacts on nearby noise sensitive lands, including existing residences and land zoned for potential noise sensitive use, of noise generated by all on-site equipment operations, including preparing for blasting with a rock drill, extraction operations by loaders, aggregate processing operations by a portable crushing and screening plant and a wash plant. The impacts of blasting at the Extended West Carleton Quarry are assessed in other reports.

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 barriers and limits to operations, have been designed to ensure all operations comply 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 extended quarry are summarized in Section 3. Noise sensitive receptors are described in Section 1 and Section 4, with Section 5, 6, 7 and 8 detailing applicable assessment criteria, an assessment of noise impacts and recommended mitigation measures.

It has been found that noise levels from the operations are in compliance with MECP sound level limits at nearby noise sensitive receptors, provided that the noise mitigation measures described in Sections 7.0 and 8.0 of this report are followed.

ACOUSTIC ASSESSMENT OF THE WEST CARLETON QUARRY EXTENSION CITY OF OTTAWA

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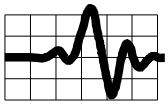

Appendix 1 Zoning Plan and Land Use Designations

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ACOUSTIC ASSESSMENT OF THE WEST CARLETON QUARRY EXTENSION CITY OF OTTAWA

1.0 Introduction

Thomas Cavanagh Construction Limited (Cavanagh) is in the process of applying to the Ministry of Natural Resources and Forests (MNRF) for an extension to their existing West Carleton Quarry, Aggregate Resources Act (ARA) License No. 4085. The Proposed Extension Area is located to the northwest of the Existing Licensed Area, see Figure 1. The West Carleton Quarry is located on rural lands within the City of Ottawa.

Freefield Ltd. has been retained by Cavanagh to complete this acoustic assessment.

The North American Industry Classification System (NAICS) code of the facility is 212323.

Because the intention is that the extraction of the Extension Area and the extraction of the Existing Licensed Area will be carried out as one operation by Cavanagh, this assessment includes noise impacts from operations over the whole extended West Carleton Quarry, Extension Area plus Existing Licensed Area. This report describes an assessment of the potential impact of noise from operations at the extended West Carleton Quarry(the facility) on nearby noise sensitive receptors in accordance with Ministry of Environment, Conservation and Parks (MECP) guidelines for stationary noise sources[1, 2].

This report has been prepared in accordance with MECP Document NPC-233, *Information to be Submitted for Approval of Stationary Sources of Sound*, October 1995[1]. Noise from the facility is assessed according to MECP Documents: NPC-300, *Stationary and Transportation Sources – Approval and Planning*, August 2013.[2] This report follows the recommended format contained in, *Sample Application Package, Basic Comprehensive Certificate of Approval (Air and Noise)*, July 2009.[3]

The noise assessment methodology is summarised below.

- Identification of noise sensitive receptors in the vicinity of the facility. 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 facility's operations. In the current study, the strengths of the various noise sources were obtained from noise measurements carried out in 2020 and from a database of noise measurements of similar operations at other aggregate operations in Ontario by Freefield Ltd.

- Based on the strengths of the individual noise sources, noise levels due to the facility's operations are predicted at nearby noise sensitive receptors using a prediction procedure[8] 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 facility's 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.

Note that this assessment considers all significant noise sources in operation on the expanded site except for noise and vibration produced from blasting. The impacts of blasting at the expanded site are being assessed by others.

Surrounding Lands and Noise Sensitive Receptors

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

The West Carleton Quarry is located in a rural area within the City of Ottawa at the intersection of March Road (Regional Road 49) and Upper Dwyer Hill Road (Regional Road 3), see Figure 1. The town of Almonte is located approximately 6 km west of the West Carleton Quarry along March Road. The town of Almonte, which is part of the town of Mississippi Mills, is located in Lanark County. Golden Line Road, shown in Figures 1 and 2, is the boundary between the City of Ottawa and Lanark County.

The existing West Carleton Quarry has been in operation for many years and the site is partially excavated. As shown in Figure 3, the surface elevations increase rapidly from east to west, from approximately 124 masl near Upper Dwyer Hill Road to approximately 150 masl on the western portion of the site (including the proposed extension area).

The legal description of the land occupied by the facility is as follows:

Part of Lots 14 & 15 Concession XI,
Township of West Carleton,
City of Ottawa, Ontario

A land use zoning map is provided in Appendix 1. As shown on the Zoning Map, the land surrounding the Extended West Carleton Quarry is in the City of Ottawa, however, land to the west, beyond Golden Line Road is in the Municipality of Mississippi Mills, Lanark County.

The existing West Carleton Quarry is on Land Zoned ME, Mineral Extraction Zone, and an application will be made to change the zoning of the extension area from EP3, Environmental Protection Zone, to a zoning which will allow mineral extraction.

As shown in the Zoning Map, much of the land surrounding the Extended West Carleton Quarry is zoned EP, Environmental Protection Zone, with some nearby areas also zoned RU, Rural Zone, and RG1, Rural General Industrial Zone. It is noted that the City of Ottawa EP zoning does permit single residential use.

Immediately to the west and northwest of the Extended West Carleton Quarry is Burnt Lands Provincial Park, where no residential use is permitted, see Zoning Map in Appendix 1.

Thirteen noise sensitive receptors, which have been selected for detailed analysis, are shown in Figures 1 and 2, and on the Zoning Map. These were selected as being the receptors most likely impacted by noise from the facility's operations. Other noise sensitive receptors are at greater distances and will be less affected by noise from the facility.

Accessible vacant lots, where a noise sensitive building is permitted, must be considered as points of reception[2], POR. The only accessible vacant lot in this category, which has a critical location, is a lot located immediately south of the Extended West Carleton Quarry on Upper Dwyer Hill Road on which we have located a potential future point of reception POR 7. The City of Ottawa Zoning By-law prohibits houses within 210 m of an ME zone, and the location of POR 7 on this lot takes this 210 m into account.

Receptor POR 7A was also included in the analysis as it is the closest existing residence in this direction.

Table 1 lists the noise sensitive receptors selected for analysis.

Acoustic Environment

March Road, Regional Road 49, is the major transportation corridor connecting the City of Ottawa and the town of Almonte, population approximately 5000. Traffic data from the City of Ottawa, see Appendix 2, indicates that March Road carries approximately 9,000 vehicles per day. Hence road traffic noise is the dominant background noise along the March Road corridor during the day, with less traffic noise occurring during the evening and night.

Upper Dwyer Hill Road, Regional Road 3, is also a major traffic corridor carrying approximately 2,000 vehicles per day. Hence road traffic noise is the dominant background noise along the Upper Dwyer Hill Road corridor during the day, with less traffic noise occurring during the evening and night.

2.0 Facility Description

The existing West Carleton Quarry produces various grades of aggregate and sand. The purpose of the proposed extension is to extend the life of the quarry. No increase in annual production rate is planned for the extended quarry.

Aggregate from the quarry operation is extracted using the process of drilling and blasting. Blasting produces large pieces of rock at the extraction face which are transferred by loader to a nearby 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 aggregates onto highway trucks which are used to ship the product off-site. The crushing and screening plant has a maximum throughput capacity of 600 tonnes per hour. Generally, the portable crushing and screening plant is located close to the active lift face.

Finer products from the portable crushing and screening operation are taken by quarry truck to stockpiles located near the wash plant. A loader then feeds the stockpiled fines into a wash plant which cleans and separates the product into various grades of sand. Processed material is stockpiled using conveyors and stackers. A loader then loads the processed sand from stockpiles onto highway trucks which are used to deliver the product off-site. The wash plant has a maximum capacity of 200 tonnes per hour. The wash plant, which is powered by hydro, is in a permanent location shown in Figure 3.

The quarry has two entries as shown in Figure 3. Aggregate product loaded from stockpiles near the portable crushing plant is generally shipped off site via the March Road entry. Sand from the wash plant is generally shipped off site via the Upper Dwyer Hill Road entry.

Additional material may be brought on site as needed, stored and processed, before being shipped off site.

Planned Extraction

Extraction of the West Carleton Quarry, including the Proposed Extension Area, is planned to take place in 5 lifts with approximate depths shown below. Actual lift depths may vary due to site conditions and rock quality. At times, two lifts may be extracted in benches or two lifts simultaneously with a double height lift face.

Lift 1: approximate base of Lift 1, 142 masl
Lift 2: approximate base of Lift 2, 134 masl
Lift 3: approximate base of Lift 3, 125 masl
Lift 4: approximate base of Lift 4, 116 masl
Lift 5: approximate base of Lift 3, 107 masl

The current state of extraction of the West Carleton Quarry is show in Figure 3 with the extraction area divided into three Zones. The following can be said about the current state of extraction.

Zone 1: Most of Zone 1, including the Proposed Extension Area, is largely unextracted. However, Lifts 1 and 2 have been extracted in the southeastern portion of Zone 1.

Zone 2: Lifts 1 ad 2 have been extracted in the southern portion of Zone 2. Lift 1 has been extracted from the northern portion of this zone.

Zone 3: Zone 3, which is sub-divided into Zones 3A, 3B and 3C, contains the two entry roads, the scale house and the permanent wash plant as shown in Figure 3. Little extraction has taken place in the northern part of Zone 3 as its original surface was at or near the base elevation of Lift 3. Some extraction has taken place in the southern portion of Zone 3 where the original surface elevation was higher. In the southwest corner of Zone 3 there is a relatively elevated portion (142 masl) which is unexcavated.

The extraction of Zones 1 and 2 to full depth, Lift 5, is expected to take many years at planned production rates. The extraction of Zone 3 is planned for after the full extraction of Zones 1 and 2.

The general sequence of extraction envisaged in this assessment is as follows.

- Lifts 1 ad 2 will be extracted in Zone 1 down to an elevation of approximately 134 masl. This extraction will generally be from south to north, toward March Road.
- Either later or simultaneously with the above, Lift 2 will be extracted from the northern portion of Zone 2. Extraction of Lift 2 will generally be from south to north, towards March Road. (The result of the above will be that Lifts 1 and 2 have been extracted from both Zones 1 and 2, resulting in a surface elevation in Zones 1 and 2 of approximately 134 masl.)
- Lifts 3, 4 and 5 will then be extracted from Zones 1 and 2, with extraction starting at the north end and proceeding to the south, away from March Road.
- Extraction of Zone 3. As shown in Figure 3, Zone 3 is sub-divided into Zones 3A, 3B and 3C with the wash plant currently located in Zone 3B. During the extraction of Zone 3B, probably the last part of the quarry to be extracted, the wash plant will be relocated to Zone 1. Most of Zone 3 has only Lifts 4 and 5 to be extracted. A part of Zone 3C also has Lift 3 to be extracted.

At times, two lifts may be extracted in benches or two lifts simultaneously with a double height lift face.

The actual sequence of extraction may be varied, provided that the noise mitigation measures detailed in Section 7 and 8 are followed.

The following equipment will be operated on-site and is included in this assessment as significant sources of noise:

- One standard hydraulic rock drill or one low noise rock drill,

- One portable crushing and screening plant, including two impact crushers, associated screeners, and, a 1,500 kW diesel generator providing power to the portable crushing and screening plant,
- One wash plant, powered by hydro,
- Up to four loaders,
- Quarry trucks used for transporting material from the crushing and screening plant to the wash plant for further processing,
- Highway haulage trucks used for shipping processed material off-site,
- Portable equipment for site preparation and rehabilitation, including excavators, hydraulic shovels, dozers and scrapers.

A description of each operation follows:

Portable Rock Drill

Rock drilling prepares a section of the rock for blasting. A rock drill is brought to the site, as needed. Blasting breaks the rock into a variety of sizes. Holes, into which blast material is inserted, are drilled into the rock in a predetermined pattern. Typically, rock drilling occurs some days or weeks prior to blasting.

The rock drill operates only during daytime hours (07:00 – 19:00).

Portable Crushing and Screening Plant

A portable crushing and screening plant is used to crush the blast rock and separate it into various grades of aggregate. The portable plant is located near the active excavation face. The major components of the plant generally include a hopper (feed bin), one primary impact crushing unit, a secondary impact crushing unit, primary and secondary screen decks, and, conveyors and stackers. Typically, associated operations include two loaders, one to load blast rock into the feed hopper of the plant and one to load processed aggregate onto trucks for delivery off-site or onto quarry trucks for delivery to the wash plant.

The crushing and screening plant operates only during daytime hours (07:00 – 19:00).

Wash Plant

A wash plant is used to process extracted aggregate fines and sand into various washed grades of sand. The major components of the wash plant include a hopper (feed bin), a main wash screen, a fine wash screen, a water pumping station plus conveyors and stackers. Typically, associated operations include two loaders, one used to load raw material into the wash plant and one to load trucks with processed sand from stockpiles for delivery off-site. The wash plant is in a permanent

location in Zone 3B and is powered by Hydro. During the final extraction of Zone 3C, the wash plant will be relocated to the floor of Zone 1.

The wash plant operates only during daytime hours (07:00 – 19:00).

Loaders

Typically, loaders are required on-site for the following:

- Loading and moving blast material to the feed hopper of the crushing and screening plant,
- Loading processed aggregate and sand on to trucks for shipping off-site,
- Loading fines from the crushing and screening plant onto a quarry truck for delivery to stockpiles at the wash plant,
- Loading fines from stockpiles into the feed hopper of the wash plant,
- Generally moving around rock and aggregate to maintain the site in a safe state.

Loaders are active during the daytime, (07:00 – 19:00), and, during the evening, (19:00 to 23:00) when used for the evening shipping of material from either the wash plant or the crushing and screening plant.

Highway Trucks

Highway trucks are used for shipping processed sand and aggregate off site. Based on the capacities of the plants it is assumed that 8 loads per hour are shipped from the crushing and screening plant and 4 loads per hour are shipped from the wash plant during periods of maximum capacity during the daytime period (07:00 to 19:00). During the evening (19:00 to 23:00), it is assumed 4 loads per hour are shipped from the crushing and screening plant area and 2 loads per hour are shipped from the wash plant area during periods of maximum capacity. Note that no increase in production or truck traffic is planned with the addition of the Extension. The assumed maximum truck traffic levels are the same as those in the current West Carleton Quarry.

Quarry Trucks (Rock Trucks)

Quarry trucks (rock trucks) are used to deliver fine material from crushing and screening plant stockpiles to stockpiles at the wash plant. Based on a maximum capacity of 200 tonnes per hour for the wash plant, it is assumed 6 loads per hour are delivered to the wash plant.

Quarry trucks operate only during the daytime (07:00 to 19:00).

The speed limit for trucks on site is 20 km/h. The use of jake brakes (compression assisted brakes) is forbidden on site.

Portable equipment for site preparations and rehabilitation

Portable construction equipment will be used occasionally for site preparation (e.g. land clearing and construction of berms) and rehabilitation. This equipment would typically include excavators, hydraulic shovels, dozers and scrapers. To minimize the impact of noise during site preparation and rehabilitation, the construction equipment used, excavators, bulldozers, etc., will comply with MECP Publication NPC-115[4], *Construction Equipment*, August 1978. This publication gives noise standards to be met by construction equipment in Ontario.

Site preparation and rehabilitation activities will take place only during daytime hours (07:00 – 19:00).

Hours of Operation

Daytime Operations (07:00 – 19:00) - During the daytime period, all significant noise sources are assumed to be in operation and include the following:

- One portable standard hydraulic rock drill and low noise rock drill,
- One portable crushing and screening plant and associated diesel generator,
- One wash plant,
- Up to four loaders,
- Highway trucks and quarry trucks, to deliver material to the processing plants and ship processed product off-site.

Evening Operations (19:00 – 23:00) – No processing of material takes place during the evening period, however, limited loading and shipping may take place. During the evening period the following significant noise sources may be in operation:

- Up to two loaders,
- Highway trucks, to ship processed product off-site.

3.0 Noise Source Summary

The following noise sources have been used to model noise generated by operations at the Extended West Carleton Quarry. 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 2.

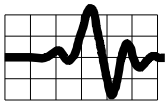
- One standard hydraulic rock drill (source: Drill_*);
- One portable crushing and screening plant, consisting of primary, secondary crushing and screening units operating without a generator (source: Crush_*);
- One diesel generator providing power to the crushing and screening plant (Source: Gen_*);
- One wash plant, (Source: Wash)
- Up to four loaders (source: Loader_*);
- On-site truck movements, highway trucks and quarry trucks (source: Trucks_*, QTrucks_*).

The strengths of the noise sources, i.e. the sound powers shown in Table 2 and used in this analysis, are taken from noise measurements of the portable crushing and screening plant and wash plant carried out during 2020 and from a database of noise measurements by Freefield Ltd. of similar operations made at other aggregate operations in Ontario.

Noise source measurements for the portable crushing and screening plant were taken at six far field measurement locations in critical directions from the plant with all equipment in operation concurrently, including the generator. The crushing and screening plant was processing aggregate at the time of noise measurements and one loader was in operation feeding the plant. Noise from the crushing and screening plant has been modelled as a single point source located at the centre of the equipment and 4 m above grade. Noise from the generator, determined as described below, was later subtracted from the combined measurements so that the sound power of the portable crushing plant operating without a generator (Crush) could be determined.

Noise measurements for the diesel generator supplying power to the portable crushing and screening plant were carried out at three far field measurement locations plus various near field locations to determine the relative magnitudes of noise from the trailer open end, side louvres and the engine exhaust. The open end and louvres are modelled as vertical area sources on the generator trailer. The engine exhaust is modelled as a directional point source. Overall sound power of the generator sources was matched to the far field measurements with the generator operating separately from the portable crushing plant.

Measurements for the wash plant where taken at six far field measurement locations in critical directions from the plant with all equipment in operation concurrently. One loader was in operation at the plant during noise measurements. The wash plant was processing fine aggregates at the time of noise measurements. Noise from the wash plant has been modelled as a single point source located at the main screen deck, 8 m above grade.



Noise from the loaders and excavators have been modelled as point sources in the assessment.

Noise from the haul routes is estimated using the moving point source method and modelled as a continuous line source. Three internal haul route operations have been assessed. Two haul routes representing highway trucks used for shipping of processed product from the crushing and screening plant and wash plant off-site, and, one haul route representing quarry trucks moving material from the portable crushing area to the wash plant area.

All conveyors and stackers used to transfer material were considered insignificant noise sources, as observed during field investigations. These were running while noise measurements of the plants were carried out.

Two Brüel & Kjær sound level meters were used for the noise measurements, one Type 2250 and one Type 2270. Field calibrations, using a Brüel & Kjær 4231 field calibrator, and battery checks were carried out before and after each measurement series. In no case did the field calibration vary by more than 0.1 dB over a series of measurements. In addition, the sound level meters and the field calibrator are laboratory calibrated on an annual basis. Copies of the relevant calibration certificates are included in Appendix 3.

The weather conditions during the measurements were well suited to outdoor noise measurements (variable winds of less than 20 km/h, skies generally clear with relatively low humidity). A windshield was used on the microphone during all noise measurements.

4.0 Point of Reception Summary

A total of thirteen nearby noise sensitive receptors have been selected for detailed noise evaluation. These existing and potential future residences are those closest to the extended West Carleton Quarry in all directions and represent the worst-case noise impacts in comparison to other nearby or more distant noise sensitive receptors.

The thirteen noise sensitive receptors selected for analysis, POR 1 to POR 12 (including POR 7A), 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 noise sensitive receptor for which worst case sound levels have been calculated.

> W – 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.
>
> O – Outdoor Point of Reception (OPR), an outdoor location 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.

Where receptors have been located on vacant land zoned for potential noise sensitive use, e.g. POR 7 a possible future residence located on land zoned EP3, the location selected for assessment is consistent with City of Ottawa requirement that no residence be built within 210 m of an ME Zone.

Noise prediction results are summarized in Tables 6A and 6B by point of reception. Figures 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, 27, 30, 32, 34 and 36 show predicted results as noise contours for Scenario 1 through Scenario 13.

Appendix 2 contains a detailed description of noise modelling parameters used to calculate noise impacts at points of reception. Point of reception noise impact tables are contained in Appendix 2, Tables A2.5.1 to A2.5.15, 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[2], depend on the acoustical classification of the area as Class 1, 2, 3 or 4.

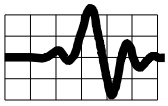
> **Class 1 area** 'an area with an acoustical environment typical of a major population centre, where the background sound level is dominated by the activities of people, usually road traffic, often referred to as urban hum.'
>
> **Class 2 area** 'an area with an acoustical environment that has qualities 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 high levels of road traffic on March Road (Regional Road 59) and upper Dwyer Hill Road (Regional Road 2), the points of reception which are adjacent to these roads are subject to significant road traffic noise, particularly during the daytime hours. See traffic count data in Appendix 3. Hence points of reception POR1 to POR3, and, POR 7 to POR 12 are classified as being in a Class 2 Area.

Golden Line Road does not carry major volumes of road traffic, hence the points of reception on Golden Line Road, POR 4, POR 5 and POR6 are classified as being in a Class 3 Area.

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, typically road traffic noise.

A background noise assessment from road traffic was carried using the MECP methodology[6,7,8] at points of reception at points of reception: POR 1, POR 2 and POR 11 which are adjacent to March Road, and POR 10 which is adjacent to Upper Dwyer Hill Road. Appendix 3 contains the details of the analysis of background road traffic noise at these points of reception based on the most recently available traffic count data from the City of Ottawa for the intersection of



March Road and Upper Dwyer Hill Road. This analysis shows daytime background sound levels above the exclusion limits at POR 1, POR 10 and POR 11. Hence higher than exclusion limits are applicable at these three points of reception.

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 noise sensitive receptors using "predictable worst case" assumptions under normal operations and using ISO 9613-2 sound propagation methodology[8] 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, eleven operational scenarios have been modeled. In general, the worst impacts are those which occur when equipment is operating concurrently and this is assumed in all scenarios.

The following eleven worst case scenarios are presented in this report and form the basis for the recommended mitigation measures and assessment of compliance to MECP criteria:

Model Scenario	Excavation Zone	Lift	Location of Excavation	Reference Figures
Scn 1	Zone 1	2	At a current lift face (extracting lifts 1 & 2 together)	Fig. 6 & 7
Scn 2A	Zone 1	1	Near POR 1	Fig. 8 & 9
Scn 2B	Zone 1	1	Near POR 2	Fig. 10 & 11
Scn 2C	Zone 1	1	Middle of Zone 1, impacting POR 9 & 10	Fig. 12 & 13
Scn 3	Zone 1	2	Middle of Zone 1, impacting POR 9 & 10	Fig. 14 & 15
Scn 4	Zone 1	2	Near POR 2	Fig. 16 & 18
Scn 5	Zone 2	2	At current face	Fig. 18 & 19
Scn 6	Zones 1 & 2	3	Near POR 2	Fig. 20 & 22
Scn 7	Zones 1 & 2	3	Impacting to POR 9 & 10	Fig. 22 & 23
Scn 8	Zones 1 & 2	3	Near POR 7	Fig. 24 & 25
Scn 9	Zones 1 & 2	4	Middle of Zone 1 and Zone 2	Fig. 26 & 27
Scn 10	Zone 3C	3	Extraction of elevated portion of Zone 3C	Fig. 29 & 30
Scn 11	Zone 3C	4	Extraction of Lift 4, Zone 3C	Fig. 31 & 32
Scn 12	Zone 3A	4	Extraction of Lift 4, Zone 3A	Fig. 33 & 34
Scn 13	Zone 3B	5	Extraction of Lift 5, Zone 3B	Fig. 35 & 36

In Tables 6A and 6B 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 the Point of Reception Noise Impact Tables in Appendix 2, Tables A2.5.1 to A2.5.15 (sound levels and distances).

It can be seen that the sound level limits are met at all noise sensitive points of reception, POR 1 to POR 12, for worst case operating conditions during the proposed daytime period of operation 7 am to 7 pm (07:00 to 19:00) and evening period of operation 7 pm to 7 am (19:00 to 23:00).

Details of acoustic modeling are provided in Appendix 2. Figures 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, 27, 30, 32, 34, and 36 show predicted noise contours for each mode of operation analyzed.

Statement of Compliance

It is concluded that, with the recommended mitigation measures detailed in Sections 7.0 and 8.0, noise impacts from operations at the Extended West Carleton Quarry will be in compliance with MECP Environmental Noise Guidelines[1,2] for the proposed daytime period of operation 7 am to 7 pm (07:00 to 19:00) and evening period of operation (19:00 to 23:00).

7.0 Mitigation Measures for Extended Quarry (Site Plan Recommendations)

Noise mitigation measures for the Extended West Carleton Quarry operations, including the Extension Area, are detailed below.

The predicted noise impacts in Tables 6A and 6B, and in Tables A2.5.1 to A2.5.15, are based on the implementation of the following mitigation measures.

Assumptions:

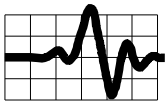
- Zones 1 and 2 will be fully extracted down to Lift 5 before the extraction of Zone 3.
- In Zone 1, Lifts 1 and 2, the direction of extraction shall be from south to north, towards March Road.
- In Zone 2, Lift 2, the direction of extraction shall be from south to north, towards March Road.
- For Lifts 3, 4 and 5 in Zones 1 and 2, the direction of extraction shall be from north to south, away from March Road.
- In Zone 3, the extraction will generally be from west to east in each of the sub-zones 3A, 3B and 3C.
- Zone 3B, the current location of the wash plant, will be extracted last. During the extraction of Zone 3B, the wash plant will be relocated to the floor of Zone 1.

7.1 Noise Barriers and Berms:

- Noise barriers and berms shall be provided as per Tables 7A, 7B and 8, and, Figure 28.
- Noise barriers and berms shall be solid, having no gaps, and shall have a surface density of no less than 20 kg/m^2. Examples of suitable barriers or berms are as follow:
  - Lift face or existing terrain;
  - Earth, gravel or aggregate berms or stockpiles;
  - Concrete or brick walls;
  - Commercial noise barriers;
  - 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;
  - Noise barriers shielding portable equipment may be progressively established to provide shielding from location of operation to the identified noise sensitive point of reception (POR).

7.2 Rock Drilling:

- The operation of a Standard Hydraulic Rock Drill shall take place only during the daytime period (07:00 – 19:00), and shall comply with the following:
  - In Zones 1 and 2, portable noise barriers are to be provided as per Tables 7A and Figure 28.



- In Zone 3, portable noise barriers are to be provided as per Tables 7B.

7.3 Portable Crushing and Screening Plant and Generator

- The operation of the portable crushing and screening plant and associated diesel generator (crushing plant) shall take place only during the daytime period (07:00 to 19:00) and shall comply with the following:
  - The crushing plant is to be located on the quarry floor at a maximum elevation of 142 masl.
- The crushing plant shall be located within 30 m of the advancing lift face such that the lift face provides acoustic shielding as follows:
  - Shielding for POR 1 and POR 2 when the lift face is advancing to the north, as in Lifts 1 and 2 in Zones 1 and 2.
  - Shielding for POR 7 when the lift face is advancing south as in Lifts 3, 4 and 5 in Zones 1 and 2.
  - Shielding POR 9 and POR 10 during the extraction of Zones 3A, 3B and 3C.
- In the extraction of Zones 1 and 2, POR 9 and POR 10 shall be shielded from portable crushing plant by a barrier, berm or stockpile when required as detailed in Table 8 and Figure 28.
- In the extraction of Zone 3, POR 9 and POR 10 shall be shielded from portable crushing plant by the advancing lift face as described in Table 8.
- The generator exhaust shall be fitted with an exhaust silencer with minimum insertion loss given in Table 9. (The generator is currently fitted with an exhaust silencer which meets this requirement.)
- The generator trailer rear opening and side vents shall be fitted with acoustic louvres that meet the minimum insertion loss requirements listed in Table 9. The louvres shall be constructed of weather resistant material and fully seal all openings in the generator trailer.

7.4 Wash Plant

- The wash plant shall operate only during the daytime period (07:00 to 19:00) and shall comply with the following:
  - The wash plant is to be located on the surface in the location shown in Figure 3 until the final extraction of Zone 3B.
  - During the extraction of Zone 3B, the wash plant shall be located on the floor of the quarry in Zone 1.

7.5 Loaders

- During the daytime period (07:00 to 19:00): A maximum of four loaders shall be in operation carrying out extraction, stockpiling and loading operations.
- During the evening period (19:00 to 23:00): A maximum of two loaders shall be in operation carrying out stockpiling and loading operations. Extraction operations shall not occur during the evening (19:00 to 23:00) and nighttime (23:00 to 07:00) periods.

7.6 Highway Trucks

- The loading and shipping of product using highway trucks shall take place only during the daytime (07:00 to 19:00) and evening (19:00 to 23:00) periods and shall comply with the following:
    - When operating on-site, highway trucks shall not exceed 20 km/h and shall not use compression braking (Jake Brakes).

7.7 Quarry Trucks (Rock Trucks)

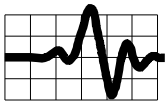
- The delivery of aggregate fines from the crushing and screening plant area to the wash plant using quarry trucks shall take place only during the daytime period (07:00 to 19:00) and shall comply with the following:
    - When operating on-site, highway trucks shall not exceed 20 km/h and shall not use compression braking (Jake Brakes).

7.8 Portable construction equipment

- Portable construction equipment used for site preparation (e.g. land clearing and construction of berms) and rehabilitation shall comply with MECP Publication NPC-115, Construction Equipment, August 1978. (This publication gives noise standards to be met by construction equipment in Ontario.) Site preparation and rehabilitation activities shall take place only during daytime hours (07:00 – 19:00).

7.9 New Process and Alternative Extraction Procedures

- If a new process, or alternative extraction procedure not described in this report, is introduced to the site, then this process or alternative procedure shall be assessed by a qualified acoustical consultant prior to implementation. 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 Mitigation Measures for the Extension Area Only (Site Plan Recommendations for the Extension Area)

Noise mitigation detailed in this section applies to operations in the Extension Area. The measures are a sub-set of mitigation measures stated in Section 7.0 which apply to the whole of the West Carleton Quarry, including the Extension area.

The predicted noise impacts in Tables 6A and 6B, and in Tables A2.5.1 to A2.5.12, are based on the implementation of the following mitigation measures.

Assumptions:

- These mitigation measures shall apply to the extraction of the Extension Area.
- For Lifts 1 and 2, the direction of extraction shall be from south to north, towards March Road.
- For Lifts 3, 4 and 5 the direction of extraction shall be from north to south, away from March Road.

8.1 Noise Barriers and Berms:

- Noise barriers and berms shall be provided as per Sections 8.2 and 8.3, and, Figure 37.
- Noise barriers and berms must be solid, having no gaps, and must have a surface density of no less than 20 kg/m^2. Examples of suitable barriers or berms are as follow:
  - Lift face or existing terrain.
  - Earth, gravel or aggregate berms or stockpiles.
  - Concrete or brick walls.
  - Commercial noise barriers.
  - 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.
  - Noise barriers shielding portable equipment may be progressively established to provide shielding from location of operation to the identified noise sensitive point of reception (POR).

8.2 Rock Drilling:

- The operation of a Standard Hydraulic Rock Drill shall take place only during the daytime period (07:00 – 19:00), and shall comply with the following.

  - Points of Reception POR 1, POR 2, POR 9 and POR 10 must be shielded from the noise of rock drilling by a portable noise barrier when rock drilling is occurring in the areas and lifts described in the following Table and Figure 37.

- The portable noise barrier shall be a minimum 6 m high and a minimum of 12 m long and located no more than 5 m from the rock drill in the direction of the shielded point of reception.

- In some locations, multiple points of reception need shielding, hence multiple portable barriers must be provided at these locations. Lines of sight to points of reception in the Table shall be fully shielded from rock drilling.

Point of Reception	**Portable Barriers must shield line of sight from the Rock Drill to the Point of Reception in the Areas Described Refer to Figure 37 for Line Locations**			
	Extension Area Lift 1 (Rock Drill at Approx. 150 masl)	Extension Area Lift 2 (Rock Drill at Approx. 142 masl)	Extension Area Lift 3 (Rock Drill at Approx. 134 masl)	Extension Area Lifts 4 & 5 (Rock Drill at or below Approx. 134 masl)
POR 1	North of Line AA	North of Line AA	Barrier required	Barrier not required
POR 2	Barrier required	Barrier required	Barrier required	Barrier not required
POR 9	East of Line CC	Barrier not required	Barrier not required	Barrier not required
POR 10	East of Line CC	Barrier not required	Barrier not required	Barrier not required

8.3 Portable Crushing and Screening Plant and Generator

- The operation of the portable crushing and screening plant and associated diesel generator (crushing plant) shall take place only during the daytime period (07:00 to 19:00) and shall comply with the following:
  - The crushing plant shall be located on the quarry floor at a maximum elevation of 142 masl.
- The crushing plant shall be located within 30 m of the advancing lift face such that the lift face provides acoustic shielding as follows:
  - Shielding for POR 1 and POR 2 when the lift face is advancing to the north, as in Lifts 1 and 2 in Zones 1 and 2.
  - Shielding for POR 7 when the lift face is advancing south as in Lifts 3, 4 and 5 in Zones 1 and 2.

- POR 9 and POR 10 shall be shielded from portable crushing plant by a barrier, berm or stockpile when required as detailed in the following Table and Figure 29.
    - The noise barrier, berm or stockpile shall be a minimum 6 m high and a minimum of 30 m long and located no more than 30 m from the plant in the direction of POR 9 and POR 10. Lines of sight to points of reception POR 9 and POR 10 must be fully shielded from the portable crushing plant and the generator.

Point of Reception	**A Barrier, Berm or Stockpile must shield line of sight From the crushing plant and generator to POR 9 and POR 10 in the Areas Described Refer to Figure 37 for Line Locations**			
	Extension Area Lift 1 (Plant at approx. 142 masl	Extension Area Lift 2 (Plant at approx. 134 masl	Extension Area Lift 3 (Plant at approx. 125 masl	Extension Area Lifts 4 & 5 (Plant at or below approx. 115 masl
POR 9	East of Line CC	Barrier not required	Barrier not required	Barrier not required
POR 10	East of Line CC	Barrier not required	Barrier not required	Barrier not required

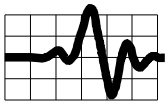
- The generator exhaust shall be fitted with an exhaust silencer with minimum insertion loss given in Table 9. (The generator is currently fitted with an exhaust silencer which meets this requirement.)
- The generator trailer rear opening and side vents shall be fitted with acoustic louvres that meet the minimum insertion loss requirements listed in Table 9. The louvres shall be constructed of weather resistant material and fully seal all openings in the generator trailer.

8.4 Loaders

- During the daytime period (07:00 to 19:00): A maximum of two loaders shall be in operation carrying out extraction, stockpiling and loading operations.
- During the evening period (19:00 to 23:00): A maximum of one loader shall be in operation carrying out stockpiling and loading operations. Extraction operations shall not occur during the evening (19:00 to 23:00) and nighttime (23:00 to 07:00) periods.

8.5 Highway Trucks

- The loading and shipping of product using highway trucks shall take place only during the daytime (07:00 to 19:00) and evening (19:00 to 23:00) periods and shall comply with the following:
    - When operating on-site, highway trucks shall not exceed 20 km/h and shall not use compression braking (Jake Brakes).



8.6 Quarry Trucks (Rock Trucks)

- The delivery of aggregate fines from the crushing and screening plant area to the wash plant on the original West Carleton Quarry using quarry trucks shall take place only during the daytime period (07:00 to 19:00) and shall comply with the following:
    - When operating on-site, highway trucks shall not exceed 20 km/h and shall not use compression braking (Jake Brakes).

8.7 Portable construction equipment

- Portable construction equipment used for site preparation (e.g. land clearing and construction of berms) and rehabilitation shall comply with MECP Publication NPC-115, Construction Equipment, August 1978. (This publication gives noise standards to be met by construction equipment in Ontario.) Site preparation and rehabilitation activities shall take place only during daytime hours (07:00 – 19:00).

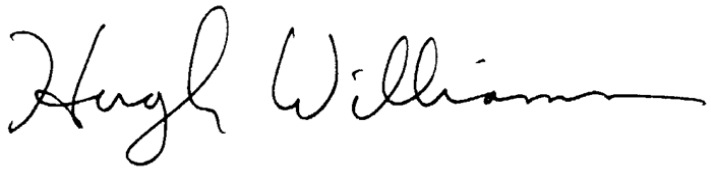
8.8 New Process and Alternative Extraction Procedures

- If a new process or alternative extraction procedure not described in this report is introduced to the site, then this process or alternative procedure shall be assessed by a qualified acoustical consultant prior to implementation. Noise mitigation measures shall be reviewed, and altered if necessary, to ensure that MECP sound level limits are met at all points of reception.

9.0 Conclusions

An acoustic assessment of operations at the West Carleton Quarry Extension has been conducted according to MECP noise assessment procedures. The analysis includes operations and mitigation at the existing West Carleton Quarry as well as the Extension. Operations include preparing for blasting with rock drills, crushing using a portable crushing and screening plant, processing fines using permanent wash plant, and, delivery and shipping of product using highway trucks.

It has been found that noise levels from the operations are in compliance with MECP sound level limits at nearby noise sensitive receptors, provided that the noise mitigation measures described in Section 7.0 of this report are followed. Section 8.0 contains a sub-set of the mitigation measures which applies only to the extraction of the Extension.



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

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

References

1. Ministry of Environment, Conservation and Parks Publication NPC-233, *Information to be Submitted for Approval of Stationary Sources of Sound*, October 1995.

2. 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.

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

4. Ministry of Environment, Conservation and Parks, NPC-115, *Construction Equipment*, August 1978.

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

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

7. Ministry of Environment, Conservation and Parks, STAMSON Software, Version 5.03, 1996. (Software implementation of reference 4).

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

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

TABLES

Table 1: Point of Reception Summary Table*

Point of Reception	Location*
POR 1	Residence 4061 March Rd Two storey
POR 2	Residence 1616 Burnt Lands Rd. Two storey
POR 3	Residence 4512 March Rd. Two storey
POR 4	Residence 1491 Golden Line Rd. Two storey
POR 5	Residence 1350 Golden Line Rd. Two storey
POR 6	Residence 1120 Golden Line Rd. Two storey
POR 7	Residence xxx Upper Dwyer Hill Rd.** Two storey assumed
POR 7A	Residence 1331 Upper Dwyer Hill Rd. Two storey
POR 8	Residence 1486 Upper Dwyer Hill Rd. Two storey
POR 9	Residence 1500 Upper Dwyer Hill Rd. Two storey

POR 10	Residence 1550 Upper Dwyer Hill Rd. Two storey
POR 11	Residence 3950 March Rd. Two storey
POR 12	Residence 1661 Upper Dwyer Hill Rd. Two storey

* For assessment purposes, points of reception, (POR), have been taken as upper floor windows (2 m above grade for single storey and 4.5 m above grade to represent two storey residences) and Outdoor Point of Reception (30 m from residence, 1.5 m above grade) in acoustic calculations. POR's located on vacant land have been assessed at 2 stories in height.

**POR 7 No lot number or street address was available for this vacant lot.

Table 2: Noise Source Summary Table

Name	Source ID	Sound Power (dBA)	Source Location Ht. above ground (m)*	Sound Character-istics	Noise Control Measures
Standard Rockdrill	Rock_Drill	120.8	2	Steady, non-tonal, non-directional	As noted in section 7.0
Low_Noise _Rockdrill	Rockdrill_SmartRig	108.3	0.5	Steady, non-tonal, non-directional	-
Portable Crushing Plant (without generator)	Crush	122.3	4	Steady, non-tonal, non-directional	As noted in section 7.0
Generator exhaust	Gen_Exhaust	108.1	5.24	Steady, non-tonal, non-directional	As noted in section 7.0
Generator Open End Door	Gen_OpenEnd	116.9	3.6	Steady, non-tonal, non-directional	As noted in section 7.0
Generator Side Louvres (left and right)	Gen_RightLouvre, Gen_Leftouvre	113.1	2.6	Steady, non-tonal, non-directional	As noted in section 7.0
Wash Plant	Wash	111.3	8	Steady, non-tonal, non-directional	-
Highway Trucks (slow moving)	Trucks_Ship*	107.8	3	Steady, non-tonal, non-directional	-
Quarry Trucks	QTrucks_Wash	113.5	3.4	Steady, non-tonal, non-directional	-

*Height measured from grade at location of equipment operation.

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

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	58	57	45
POR_1_OPR	58	57	-
POR_2_POW	50	50	45
POR_2_OPR	50	45	-
POR_3_POW	50	50	45
POR_3_OPR	50	45	-
POR_4_POW	45	40	40
POR_4_OPR	45	40	-
POR_5_POW	45	40	40
POR_5_OPR	45	40	-
POR_6_POW	45	40	40
POR_6_OPR	45	40	-
POR_7_POW	50	50	45
POR_7_OPR	50	45	-
POR_7A_POW	50	50	45
POR_7A_OPR	50	45	-
POR_8_POW	50	50	45
POR_8_OPR	50	45	-
POR_9_POW	50	50	45
POR_9_OPR	50	45	-
POR_10_POW	53	51	45
POR_10_OPR	53	51	-
POR_11_POW	56	54	40
POR_11_OPR	56	54	-
POR_12_POW	50	50	45
POR_12_OPR	50	45	-

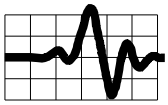


Table 6A: Acoustic Assessment Summary Table, Worst Cases, Daytime Period of Operation, 7 am to 7 pm

Location	Scenario 1 Calc -ulated Sound Level (dBA)	Scenario 2A Calc -ulated Sound Level (dBA)	Scenario 2B Calc -ulated Sound Level (dBA)	Scenario 2C Calc -ulated Sound Level (dBA))	Scenario 3 Calc -ulated Sound Level (dBA)	Scenario 4 Calc -ulated Sound Level (dBA)	Scenario 5 Calc -ulated Sound Level (dBA)	Scenario 6 Calc -ulated Sound Level (dBA)	Scenario 7 Calc -ulated Sound Level (dBA)	Scenario 8 Calc -ulated Sound Level (dBA)	Scenario 9 Calc -ulated Sound Level (dBA)	Performance Limit* (dBA)	Compliance with Performance Limit (Yes/No)	Verified by Acoustic Audit (Yes/No)
POR1_W	52.0	54.4	52.3	52.1	53.7	51.3	52.9	53.5	57.2	53.4	54.2	58	Yes	No
POR2_W	45.0	48.5	48.9	44.5	48.9	47.8	45.8	46.1	46.2	47.5	48.2	50	Yes	No
POR3_W	37.1	38.9	39.3	37.2	37.9	34.1	37.2	30.8	37.1	35.7	38.3	50	Yes	No
POR4_W	38.4	40.2	39.4	40.8	39.5	34.3	37.1	30.8	38.0	37.8	39.3	45	Yes	No
POR5_W	37.7	37.1	37.6	39.8	39.1	33.2	36.7	30.4	37.4	37.9	36.5	45	Yes	No
POR6_W	32.5	31.7	31.8	33.6	33.7	29.6	31.8	29.2	30.7	30.3	30.8	45	Yes	No
POR7_W	47.9	46.8	44.9	48.9	49.7	43.6	46.2	42.5	45.6	41.9	45.0	50	Yes	No
POR7A_W	45.4	45.5	42.2	45.6	45.9	42.1	44.4	42.2	44.3	43.8	42.8	50	Yes	No
POR8_W	46.7	43.7	45.1	45.0	43.8	43.4	45.5	43.7	44.8	43.8	44.4	50	Yes	No
POR9_W	49.8	48.8	48.5	48.9	48.8	47.6	49.4	47.3	49.8	48.0	49.4	50	Yes	No
POR10_W	50.3	50.7	48.9	50.1	49.1	49.0	52.0	49.3	50.5	49.0	50.0	53	Yes	No
POR11_W	45.1	49.3	45.2	45.7	45.3	45.0	50.0	45.4	46.8	45.1	46.5	56	Yes	No
POR12_W	42.5	42.7	42.1	43.1	43.6	42.4	44.1	43.1	44.6	43.0	44.6	50	Yes	No
POR1_O	50.1	51.9	50.1	50.3	50.0	49.6	51.1	50.8	52.0	51.1	52.3	58	Yes	No
POR2_O	41.5	43.5	47.5	41.3	45.5	46.4	42.3	44.3	42.6	41.8	44.3	50	Yes	No
POR3_O	33.5	37.8	37.0	34.5	36.2	32.0	34.9	29.5	35.8	34.3	37.0	50	Yes	No
POR4_O	38.6	40.3	39.4	41.0	39.7	34.3	37.6	31.1	38.2	38.0	39.5	45	Yes	No
POR5_O	32.8	35.2	34.9	37.5	37.0	30.1	32.6	28.1	33.4	34.7	33.0	45	Yes	No
POR6_O	31.0	30.6	31.1	32.7	32.8	29.0	30.2	28.5	28.5	27.0	28.6	45	Yes	No
POR7_O	42.8	41.8	40.9	44.2	45.9	40.8	43.1	39.0	42.0	40.0	40.8	50	Yes	No
POR7A_O	41.9	39.3	38.4	40.8	41.4	38.4	41.0	37.7	39.6	38.0	38.7	50	Yes	No
POR8_O	44.9	42.7	42.4	43.6	42.9	42.0	43.8	41.9	44.0	42.8	43.5	50	Yes	No
POR9_O	45.2	43.3	43.6	44.6	44.8	43.5	44.8	43.1	45.4	43.6	44.7	50	Yes	No
POR10_O	48.9	49.2	47.3	49.0	47.7	47.4	51.0	47.6	49.3	47.6	48.6	53	Yes	No
POR11_O	44.1	47.8	44.0	44.5	44.2	44.1	49.1	44.4	46.1	44.1	45.5	56	Yes	No
POR12_O	39.9	40.1	39.6	40.5	41.1	39.9	41.4	40.5	42.0	40.6	42.0	50	Yes	No

*Performance limits are based on 1-hour equivalent sound levels, Leq.

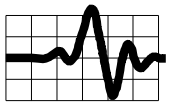


Table 6A: Acoustic Assessment Summary Table, Worst Cases, Daytime Period of Operation, 7 am to 7 pm Continued

Location	Scenario 10 Calc -ulated Sound Level (dBA)	Scenario 11 Calc -ulated Sound Level (dBA)	Scenario 12 Calc -ulated Sound Level (dBA)	Scenario 13 Calc -ulated Sound Level (dBA))	Performance Limit* (dBA)	Compliance with Performance Limit (Yes/No)	Verified by Acoustic Audit (Yes/No)
POR1_W	53.3	52.1	57.0	57.1	58	Yes	No
POR2_W	47.1	44.7	46.2	44.9	50	Yes	No
POR3_W	35.4	35.2	36.7	36.0	50	Yes	No
POR4_W	37.5	36.7	36.6	36.6	45	Yes	No
POR5_W	37.4	36.8	35.8	36.1	45	Yes	No
POR6_W	26.1	32.0	31.2	31.8	45	Yes	No
POR7_W	43.2	48.7	46.3	47.8	50	Yes	No
POR7A_W	41.0	46.8	45.0	46.1	50	Yes	No
POR8_W	40.9	41.8	45.2	39.1	50	Yes	No
POR9_W	47.2	47.2	48.3	42.9	50	Yes	No
POR10_W	49.2	49.4	49.9	46.8	53	Yes	No
POR11_W	45.1	45.5	47.1	42.2	56	Yes	No
POR12_W	43.0	44.1	49.1	46.5	50	Yes	No
POR1_O	50.0	50.1	56.0	54.9	58	Yes	No
POR2_O	41.4	41.2	42.6	42.3	50	Yes	No
POR3_O	34.1	33.7	35.4	34.6	50	Yes	No
POR4_O	37.7	36.9	36.7	36.8	45	Yes	No
POR5_O	32.6	34.7	33.7	33.7	45	Yes	No
POR6_O	24.0	30.0	30.1	30.8	45	Yes	No
POR7_O	40.9	42.8	42.1	44.0	50	Yes	No
POR7A_O	37.0	38.4	40.6	39.6	50	Yes	No
POR8_O	40.0	40.4	44.4	38.6	50	Yes	No
POR9_O	42.6	42.3	42.6	37.1	50	Yes	No
POR10_O	47.5	47.8	49.1	45.8	53	Yes	No
POR11_O	43.7	44.2	46.4	41.0	56	Yes	No
POR12_O	39.9	41.3	43.6	42.9	50	Yes	No

*Performance limits are based on 1-hour equivalent sound levels, Leq.

Table 6B: Acoustic Assessment Summary Table, Worst Cases, Evening Period of Operation, 7 pm to 11 pm

Location	Scenario 1 Calc -ulated Sound Level (dBA)	Scenario 2A Calc -ulated Sound Level (dBA)	Scenario 2B Calc -ulated Sound Level (dBA)	Scenario 2C Calc -ulated Sound Level (dBA))	Scenario 3 Calc -ulated Sound Level (dBA)	Scenario 4 Calc -ulated Sound Level (dBA)	Scenario 5 Calc -ulated Sound Level (dBA)	Scenario 6 Calc -ulated Sound Level (dBA)	Scenario 7 Calc -ulated Sound Level (dBA)	Scenario 8 Calc -ulated Sound Level (dBA)	Scenario 9 Calc -ulated Sound Level (dBA)	Performance Limit* (dBA)	Compliance with Performance Limit (Yes/No)	Verified by Acoustic Audit (Yes/No)
POR1_W	45.4	48.3	45.5	45.9	45.1	45.3	45.6	45.3	46.2	45.3	45.3	57	Yes	No
POR2_W	32.5	35.0	37.5	34.9	31.9	35.3	31.9	31.4	31.4	32.6	32.5	50	Yes	No
POR3_W	22.5	23.5	25.5	24.1	22.7	21.2	22.0	21.8	21.8	21.6	22.7	50	Yes	No
POR4_W	23.3	23.2	24.7	25.0	23.8	21.2	22.2	21.8	22.2	22.7	23.2	40	Yes	No
POR5_W	22.5	22.1	23.2	24.2	23.5	20.5	21.4	21.0	21.6	22.7	22.5	40	Yes	No
POR6_W	17.5	17.1	17.5	18.7	18.6	17.4	16.9	17.3	17.1	18.5	17.5	40	Yes	No
POR7_W	31.7	33.4	30.8	33.0	34.3	30.8	31.4	30.7	31.9	32.4	32.0	50	Yes	No
POR7A_W	31.6	32.7	31.2	32.2	32.5	31.2	31.6	31.7	31.9	31.6	31.6	50	Yes	No
POR8_W	32.6	33.8	32.6	34.4	33.2	32.4	34.5	32.8	32.7	32.2	32.7	50	Yes	No
POR9_W	37.9	38.9	37.7	39.3	38.2	37.7	38.2	37.6	37.5	37.4	37.9	50	Yes	No
POR10_W	43.4	43.6	43.0	45.1	43.1	43.0	44.0	43.1	43.0	42.8	43.0	51	Yes	No
POR11_W	37.5	38.5	37.5	38.9	37.7	37.5	39.2	37.7	37.7	37.2	37.5	54	Yes	No
POR12_W	34.2	34.7	34.1	34.9	34.1	34.0	36.3	33.7	34.2	33.7	34.1	50	Yes	No
POR1_O	44.4	45.7	44.5	44.8	44.4	44.5	45.0	44.6	44.6	44.5	44.6	57	Yes	No
POR2_O	29.9	32.5	36.2	32.3	29.9	34.2	29.7	30.2	29.4	28.5	29.9	45	Yes	No
POR3_O	21.0	23.1	24.2	23.3	22.2	20.4	21.4	20.7	21.4	21.1	22.3	45	Yes	No
POR4_O	23.5	23.4	25.0	25.2	23.9	21.5	22.3	21.9	22.3	22.9	23.3	40	Yes	No
POR5_O	18.7	20.5	20.8	22.5	21.5	17.9	19.8	18.1	20.0	21.2	20.2	40	Yes	No
POR6_O	17.2	16.8	17.2	18.4	18.3	17.1	16.6	16.9	16.0	16.9	16.1	40	Yes	No
POR7_O	29.4	28.9	28.7	30.6	31.2	28.6	28.8	28.0	28.9	30.1	28.4	45	Yes	No
POR7A_O	27.1	26.9	26.5	28.0	28.4	26.5	27.1	26.4	26.9	26.3	26.8	45	Yes	No
POR8_O	32.1	33.2	32.0	33.7	32.5	31.8	32.4	32.2	32.1	31.6	32.1	45	Yes	No
POR9_O	31.5	31.7	31.0	32.2	31.8	30.9	32.1	30.8	30.5	30.2	31.3	45	Yes	No
POR10_O	42.3	42.3	41.7	44.3	41.9	41.8	43.0	41.9	41.9	41.6	41.8	51	Yes	No
POR11_O	36.8	37.8	36.6	37.9	36.9	36.7	38.5	36.9	37.0	36.4	36.7	54	Yes	No
POR12_O	31.5	32.1	31.4	32.1	31.5	31.3	33.5	30.8	31.5	31.1	31.3	45	Yes	No

*Performance limits are based on 1-hour equivalent sound levels, Leq.

Table 6B: Acoustic Assessment Summary Table, Worst Cases, Evening Period of Operation, 7 pm to 11 pm Continued

Location	Scenario 10 Calc -ulated Sound Level (dBA)	Scenario 11 Calc -ulated Sound Level (dBA)	Scenario 12 Calc -ulated Sound Level (dBA)	Scenario 13 Calc -ulated Sound Level (dBA))	Performance Limit* (dBA)	Compliance with Performance Limit (Yes/No)	Verified by Acoustic Audit (Yes/No)
POR1_W	45.2	45.0	44.3	45.2	57	Yes	No
POR2_W	32.2	30.6	30.1	32.2	50	Yes	No
POR3_W	21.6	21.4	21.3	21.6	50	Yes	No
POR4_W	22.7	22.2	21.3	22.7	40	Yes	No
POR5_W	22.7	22.1	20.6	22.7	40	Yes	No
POR6_W	15.9	18.0	16.3	15.9	40	Yes	No
POR7_W	30.5	33.8	30.7	30.5	50	Yes	No
POR7A_W	30.3	33.8	30.9	30.3	50	Yes	No
POR8_W	31.8	32.4	32.6	31.8	50	Yes	No
POR9_W	37.2	37.4	37.2	37.2	50	Yes	No
POR10_W	42.7	42.8	42.7	42.7	51	Yes	No
POR11_W	36.9	37.1	37.3	36.9	54	Yes	No
POR12_W	33.3	33.7	32.6	33.3	50	Yes	No
POR1_O	44.3	44.3	43.8	44.3	57	Yes	No
POR2_O	28.4	28.4	27.6	28.4	45	Yes	No
POR3_O	21.1	20.9	20.9	21.1	45	Yes	No
POR4_O	22.9	22.4	21.4	22.9	40	Yes	No
POR5_O	18.7	20.2	19.1	18.7	40	Yes	No
POR6_O	14.2	17.2	16.0	14.2	40	Yes	No
POR7_O	27.6	29.7	27.8	27.6	45	Yes	No
POR7A_O	24.4	27.2	26.4	24.4	45	Yes	No
POR8_O	31.2	31.6	32.2	31.2	45	Yes	No
POR9_O	29.5	29.9	29.6	29.5	45	Yes	No
POR10_O	41.5	41.6	42.2	41.5	51	Yes	No
POR11_O	36.1	36.3	36.5	36.1	54	Yes	No
POR12_O	30.5	31.0	29.8	30.5	45	Yes	No

*Performance limits are based on 1-hour equivalent sound levels, Leq.

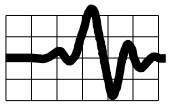


Table 7A: Requirements for Portable Noise Barriers for Rock Drilling – Zones 1 and 2

- Points of Reception POR 1, POR 2, POR 9 and POR 10 must be shielded from the noise of rock drilling by a portable noise barrier when rock drilling is occurring in the areas described in this Table and Figure 28.

- The portable noise barrier shall be a minimum 6 m high and a minimum of 12 m long and located no more than 5 m from the rock drill in the direction of the shielded point of reception.

- In some locations, multiple points of reception need shielding, hence multiple portable barriers will be needed at these locations. Lines of sight to points of reception in this Table must be fully shielded from rock drilling.

Point of Reception	Portable Barriers must shield line of sight to the Point of Reception in the Areas Described Refer to Figure 28 for Line Locations				
	Zone 1 Lift 1 (Rock Drill at approx. 150 masl)	Zone 1 Lift 2 (Rock Drill at approx. 142 masl)	Zone 2 Lift 2 (Rock Drill at approx. 142 masl)	Zones 1 & 2 Lift 3 (Rock Drill at approx. 134 masl)	Zones 1 & 2 Lifts 4 & 5 (Rock Drill at or below approx. 134 masl)
POR 1	North of Line AA	North of Line AA	North of Line AA	North of Line BB	Barrier not required
POR 2	North of Line BB	North of Line BB	North of Line BB	North of Line BB	Barrier not required
POR 9	East of Line CC	East of Line DD	East of Line DD	East of Line DD	Barrier not required
POR 10	East of Line CC	East of Line DD	East of Line DD	East of Line DD	Barrier not required

Table 7B: Requirements for Portable Noise Barriers for Rock Drilling – Zone 3

- The portable noise barrier shall be a minimum 6 m high and a minimum of 12 m long and located no more than 5 m from the rock drill in the direction of the shielded point of reception.

- In some locations, multiple points of reception need shielding, hence multiple portable barriers will be needed at these locations. Lines of sight to points of reception in this Table must be fully shielded from rock drilling.

- A barrier to shield POR 7 is only required if a residence is built on this property.

Points of Reception	Zone 3A	Zone 3B	Zone 3A
POR 7	No barrier Required	No barrier Required	• Barrier required when rock drill is operating at surface grade. • Barrier not required when rock drill is operating at least 9 m below grade.
POR 9 and POR 10	• Barrier required when rock drill is operating at surface grade. • Barrier not required when rock drill is operating at least 9 m below grade.	• Barrier required when rock drill is operating at surface grade. • Barrier not required when rock drill is operating at least 9 m below grade.	• Barrier required when rock drill is operating at surface grade. • Barrier not required when rock drill is operating at least 9 m below grade.

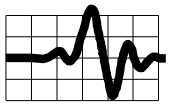


Table 8: Requirements for Noise Barriers for the Portable Crushing Plant (including the Generator)

- In Zones 1 and 2, Points of Reception POR 9 and POR 10 must be shielded from the noise of portable crushing plant and generator when crushing is occurring in the areas described in this Table and Figure 28.

- In Zones 1 and 2, the noise barrier, berm or stockpile shall be a minimum 6 m high and a minimum of 30 m long and located no more than 30 m from the plant in the direction of POR 9 and POR 10. Lines of sight to points of reception POR 9 and POR 10 must be fully shielded from the portable crushing plant and the generator.

Point of Reception	A Barrier, Berm or Stockpile must shield line of sight to POR 9 and POR 10 in the Areas Described Refer to Figure 28 for Line Locations				
	Zone 1 Lift 1 (Plant at approx. 142 masl)	Zone 1 Lift 2 (Plant at approx. 134 masl)	Zone 2 Lift 2 (Plant at approx. 134 masl)	Zones 1 & 2 Lift 3 (Plant at approx. 125 masl)	Zones 1 & 2 Lifts 4 & 5 (Plant at or below approx. 116 masl)
POR 9	East of Line CC	Barrier not required	East of Line DD	Barrier not required	Barrier not required
POR 10	East of Line CC	Barrier not required	East of Line DD	Barrier not required	Barrier not required

- In Zone 3, the portable crushing plant, including crushers, screener and generator, shall be located below grade and within 30 m of the advancing lift face such that the lift face provides shielding for POR 9 and POR 10.

Table 9: Minimum Insertion Loss for Exhaust Silencers and Acoustic Louvres at Generator

Source ID	Octave Band Centre Frequency, Hz Minimum Dynamic Insertion Loss (dB)[1]								**Rw**
	63	125	250	500	1000	2000	4000	8000	
Exhaust silencer • The generator I currently fitted with a silencer which meets this requirement, (Insertion loss based on SMS Silencer Model SM2)	2	11	25	28	24	19	18	19	**23**
Acoustic louvres to be installed at: • Genset Rear_Door • Genset Left Side Louvre • Genset Right Side Louvre (Insertion loss based on Vibro-Acoustics Acoustic Louvre Model ALV-MV-12)	7	7	10	13	20	21	20	20	**18**

1. Alternative louvers/silencers are permissible providing the overall insertion loss meets the overall insertion loss (Rw) as noted above and the resultant sound is not tonal in character.

FIGURES

Figure 1: Scaled Area Location Plan showing Receptor Locations

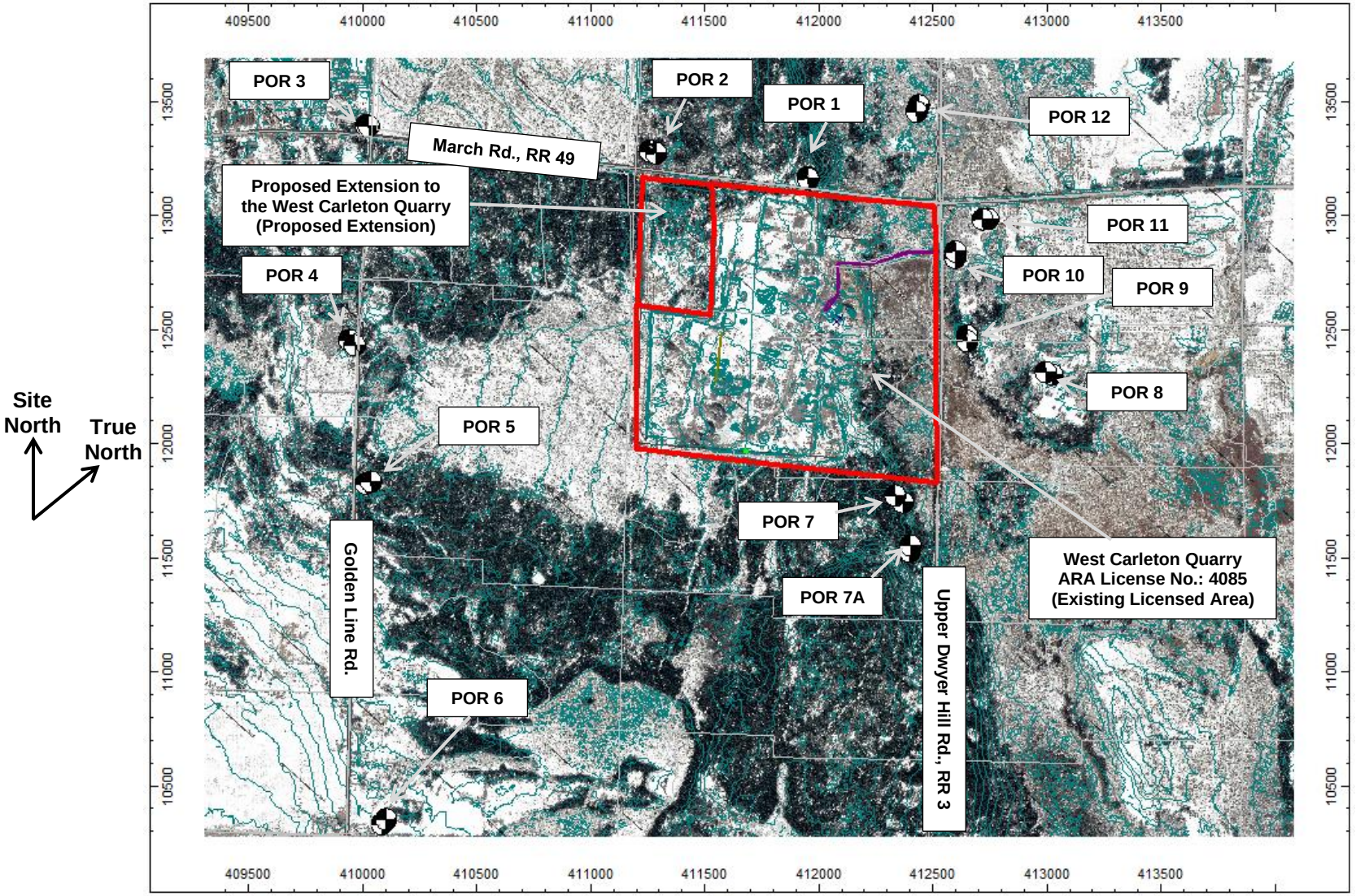


Figure 2: **Detail Site Layout & Surface Elevation Contours** (elevation contours based on Land Information Ontario (LIO), Provincial Digital Elevation Model, at 2-meter intervals)

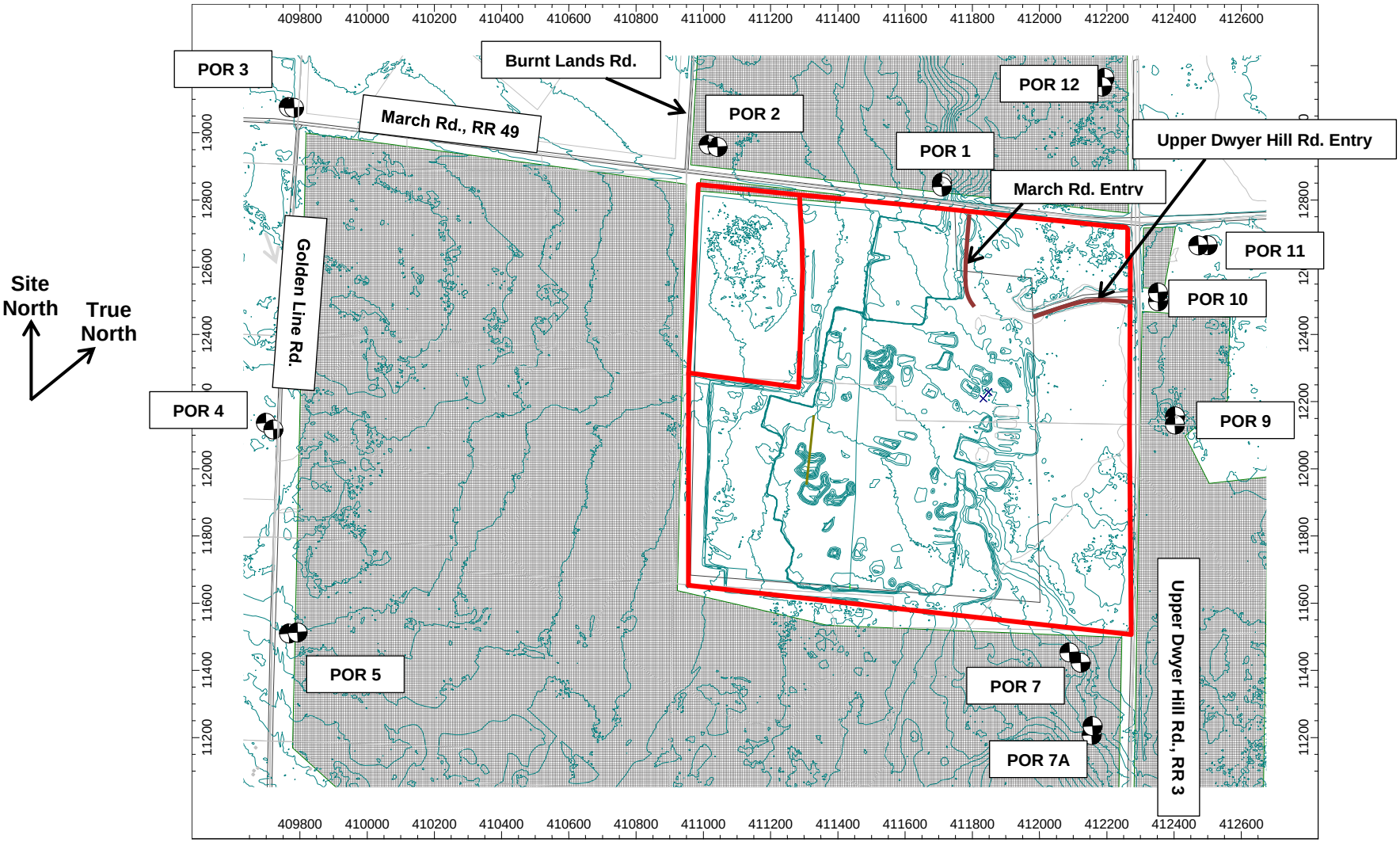


Figure 3: **Site Details, Extraction Zones & Spot Elevations (masl)** (elevation contours at 2 m intervals)

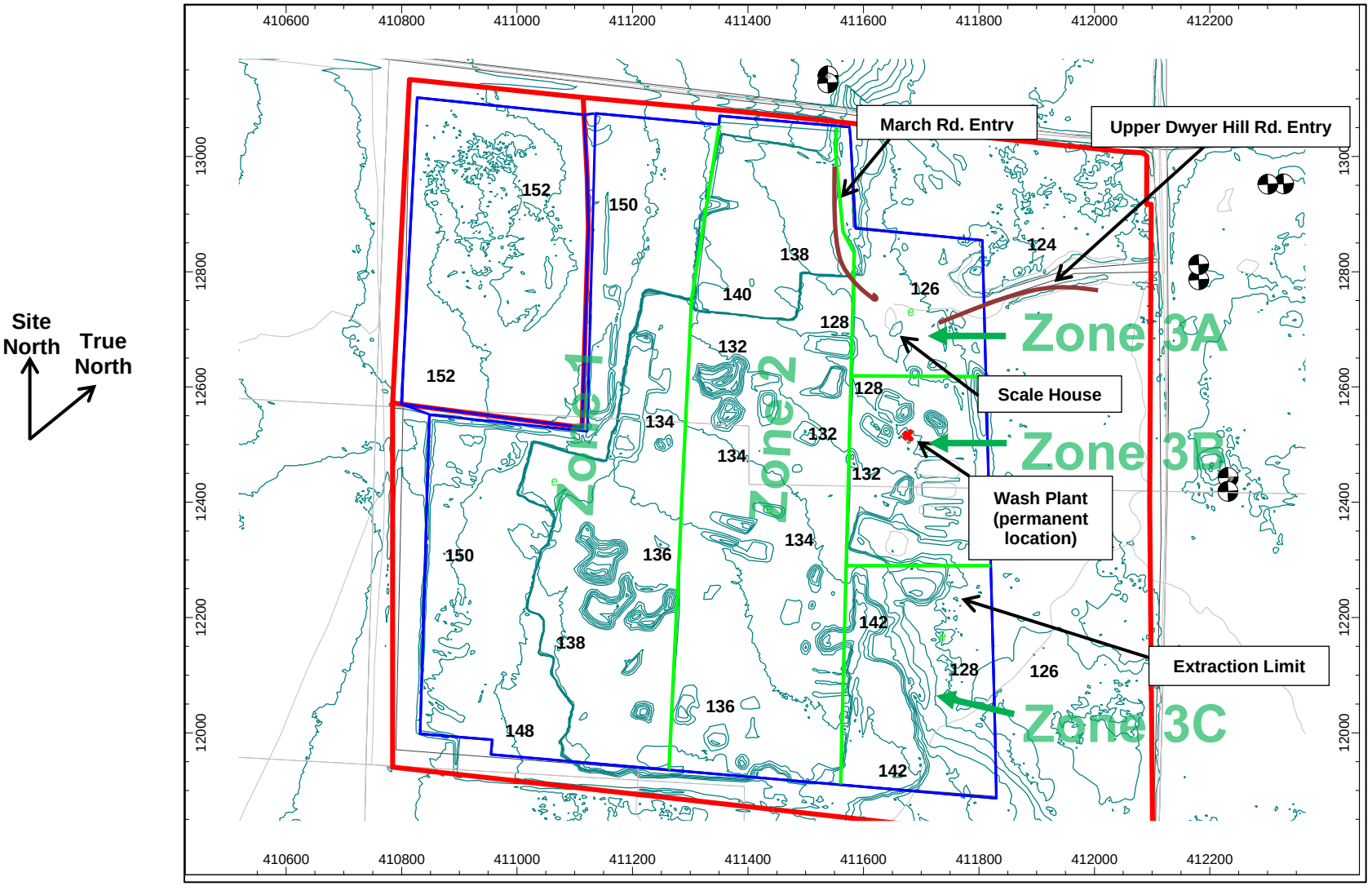


Figure 4: Portable Crushing Plant & Generator, Typical Arrangement

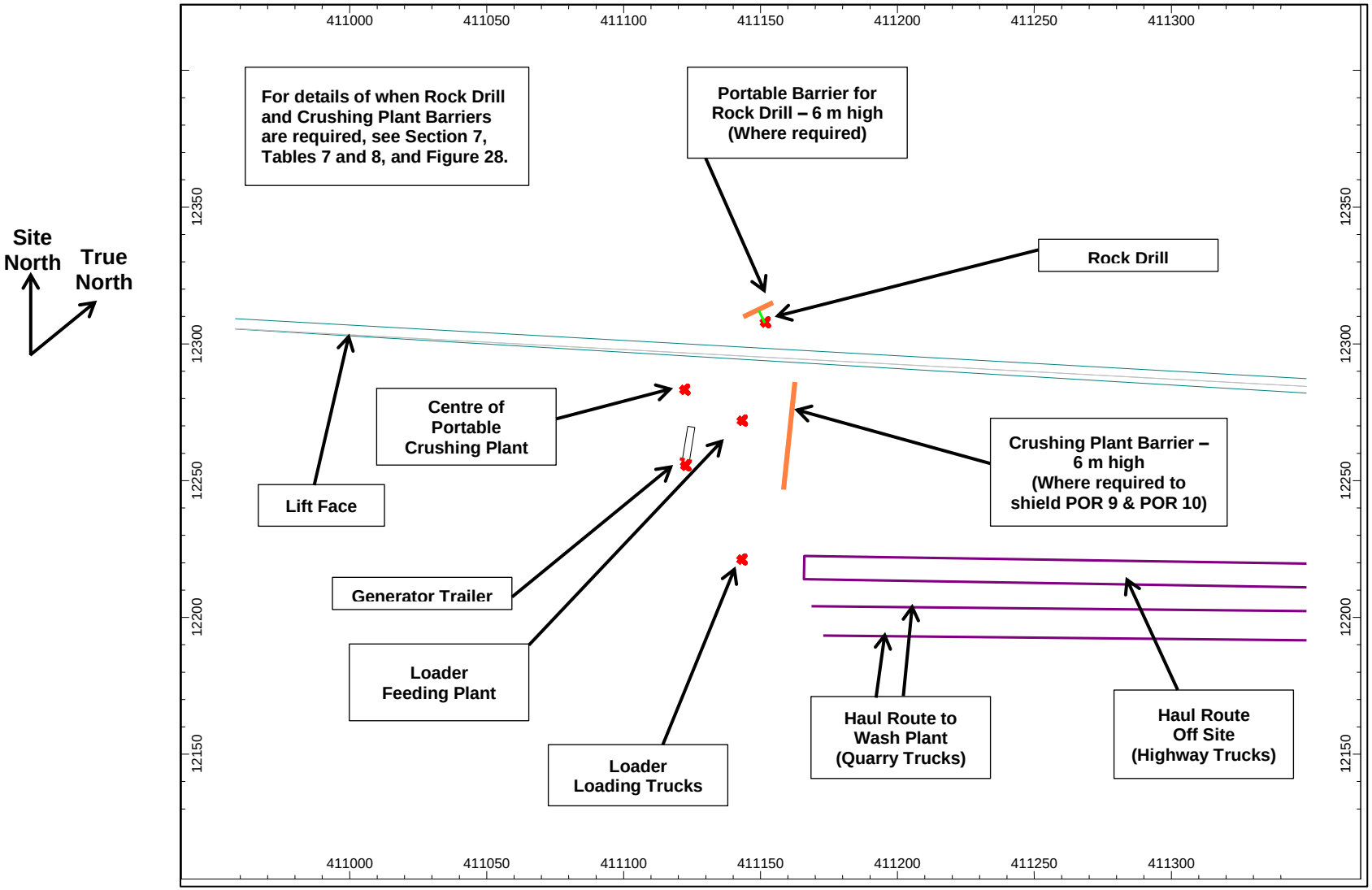


Figure 5: Permanent Wash Plant in Zone 3B, Detail

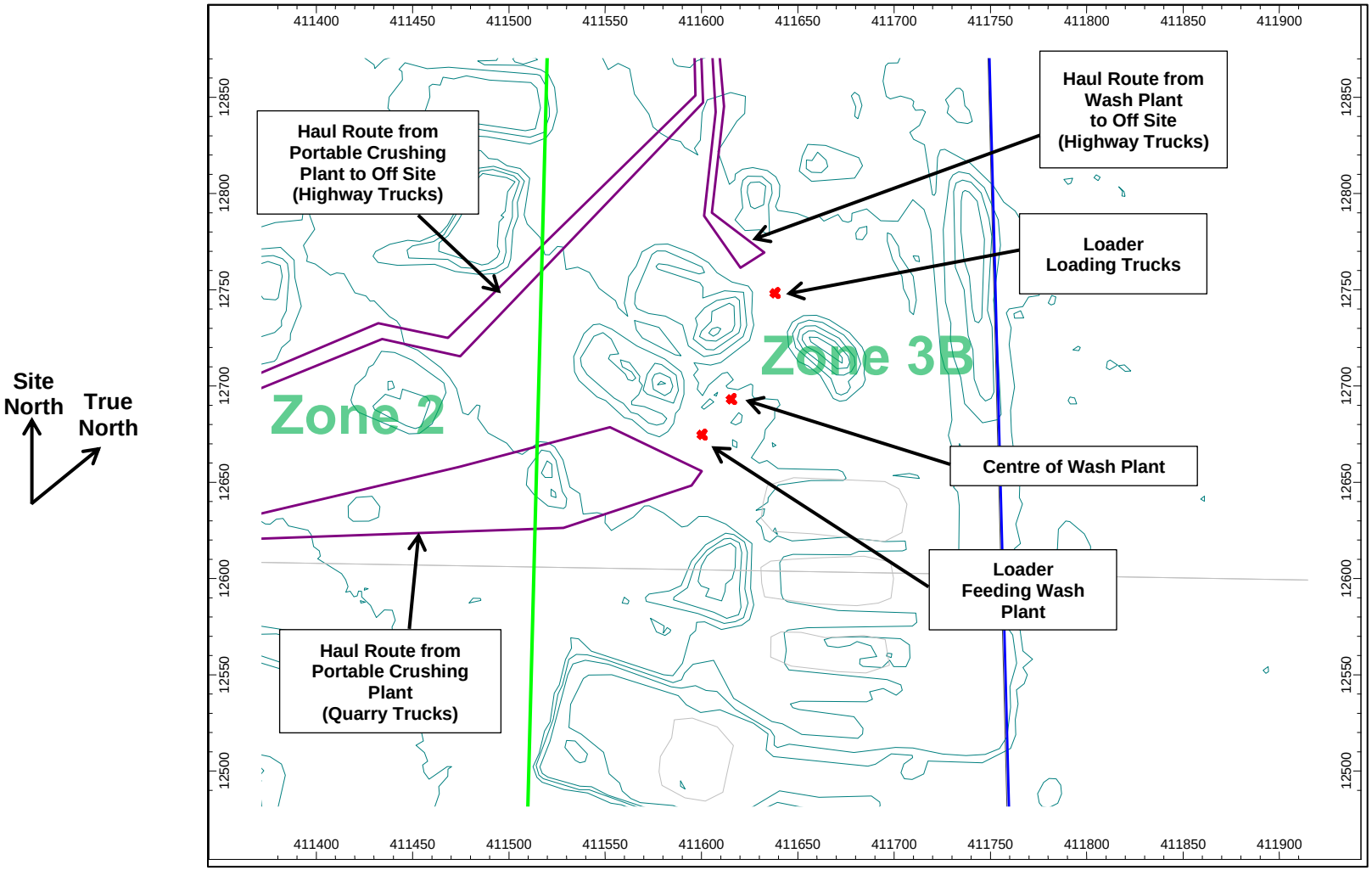


Figure 6: Scenario 1: At a current lift face in Zone 1, Extracting Lifts 1 and 2 together (Daytime)

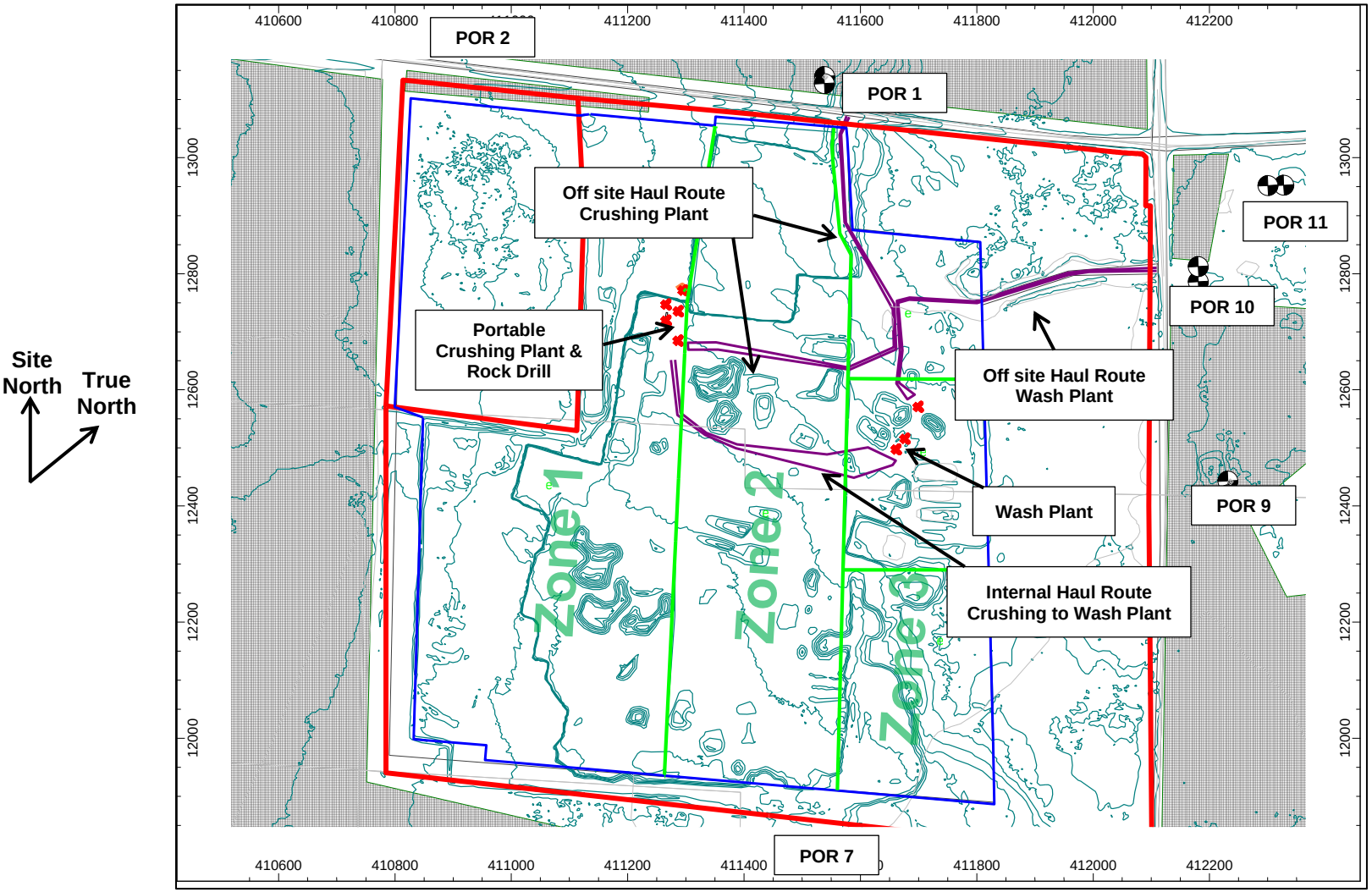


Figure 7: Prediction Results, Scenario 1: At a current lift face in Zone 1, Extracting Lifts 1 and 2 together (Daytime), (Noise levels at 4.5 m)

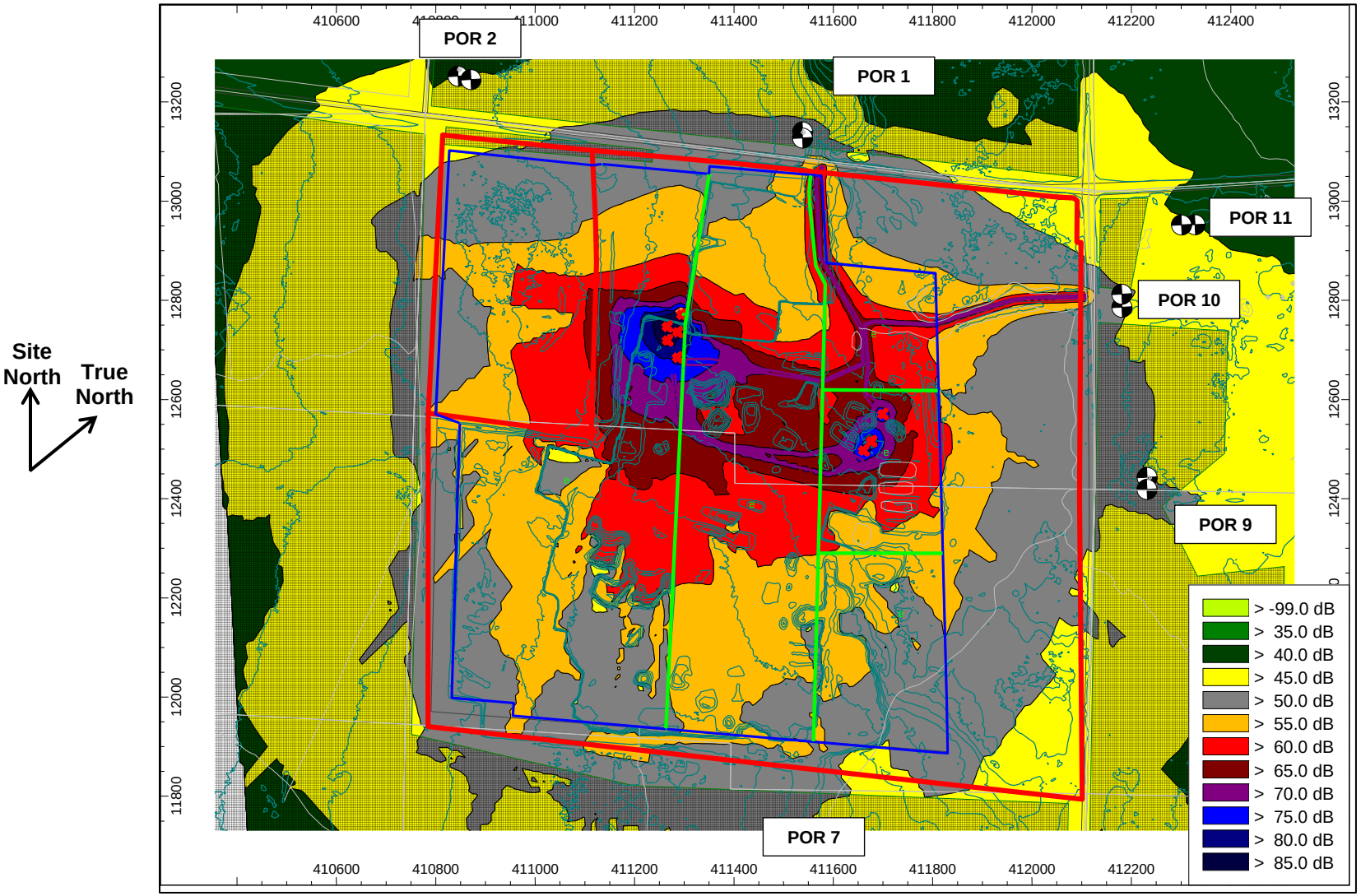


Figure 8: Scenario 2A: Extraction in Zone 1, Lift 1, near POR 1, (Daytime)

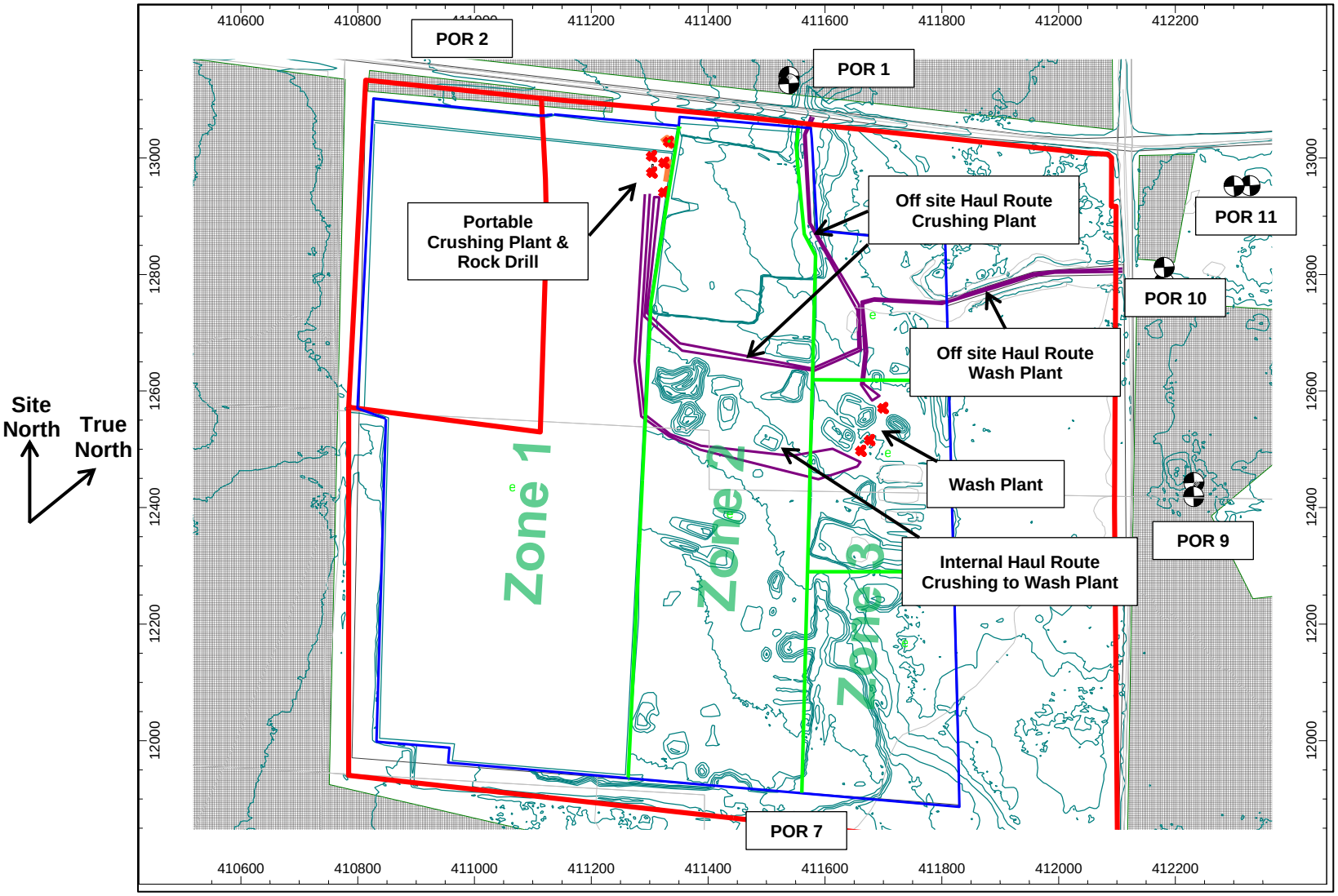


Figure 9: Prediction Results, Scenario 2A: Extraction in Zone 1, Lift 1, near POR 1, (Daytime), (Noise levels at 4.5 m)

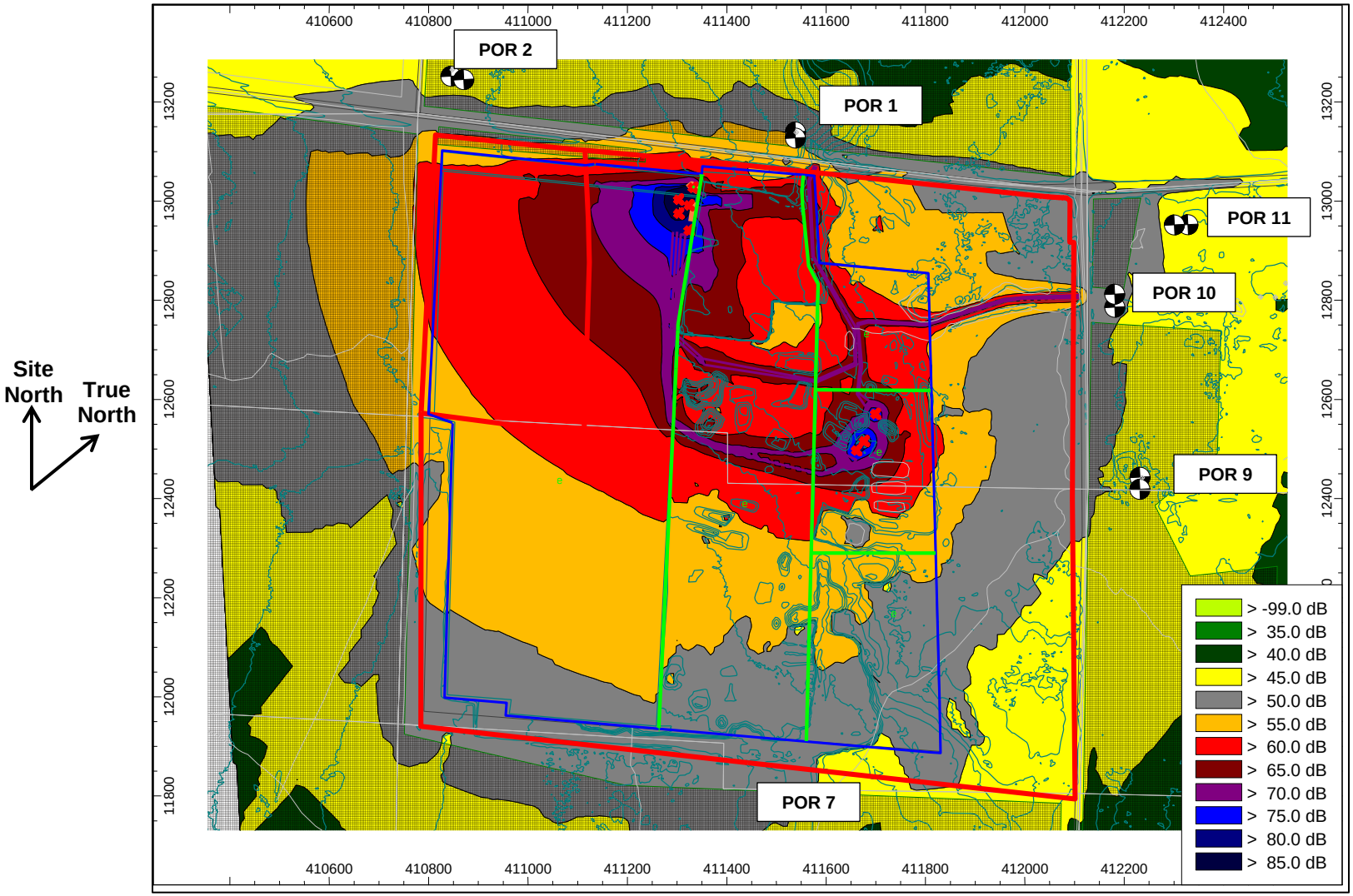


Figure 10: Scenario 2B: Extraction in Zone 1, Lift 1, near POR 2, (Daytime)

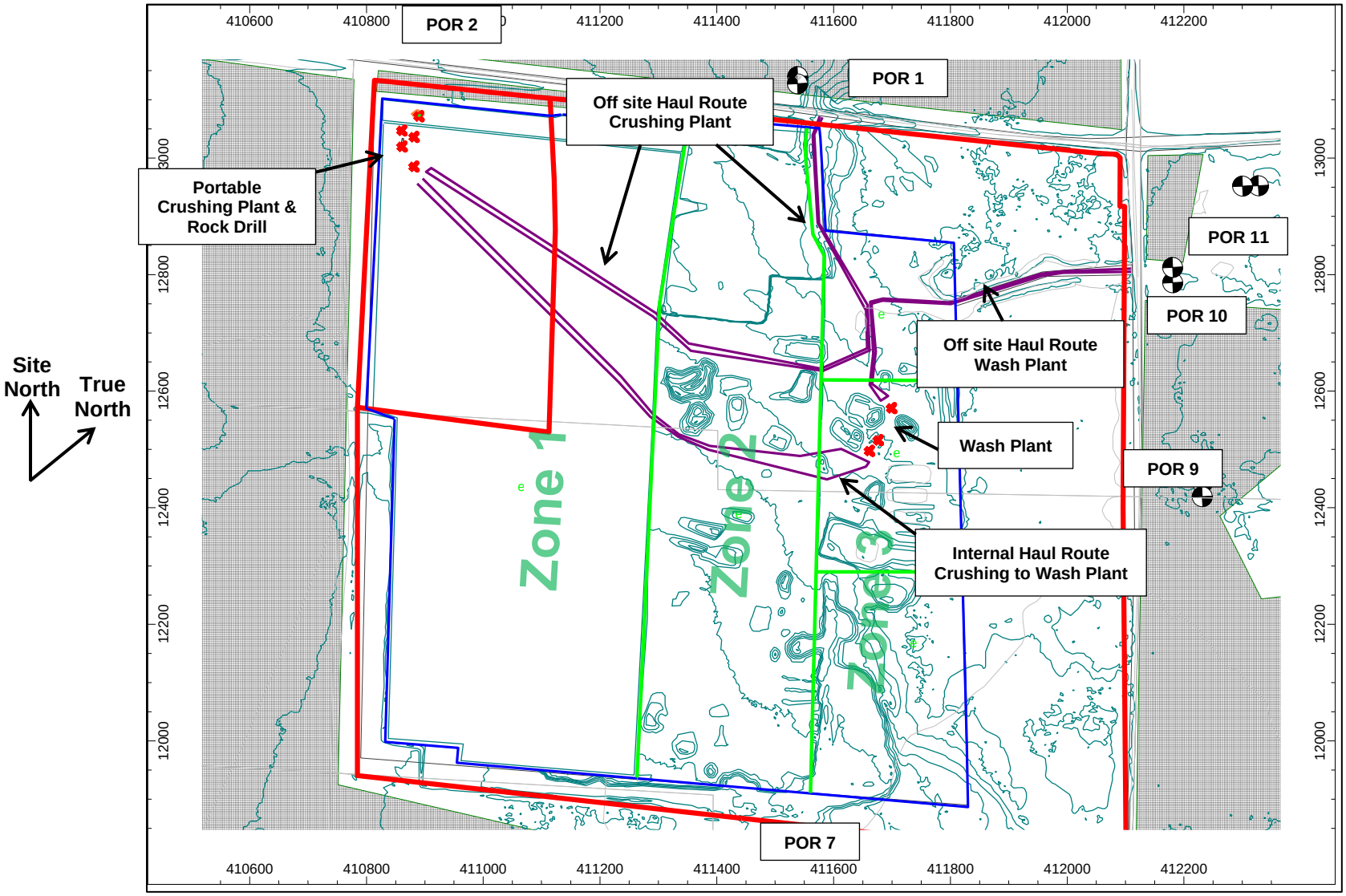


Figure 11: Prediction Results, Scenario 2B: Extraction in Zone 1, Lift 1, near POR 2 (Daytime), (Noise levels at 4.5 m)

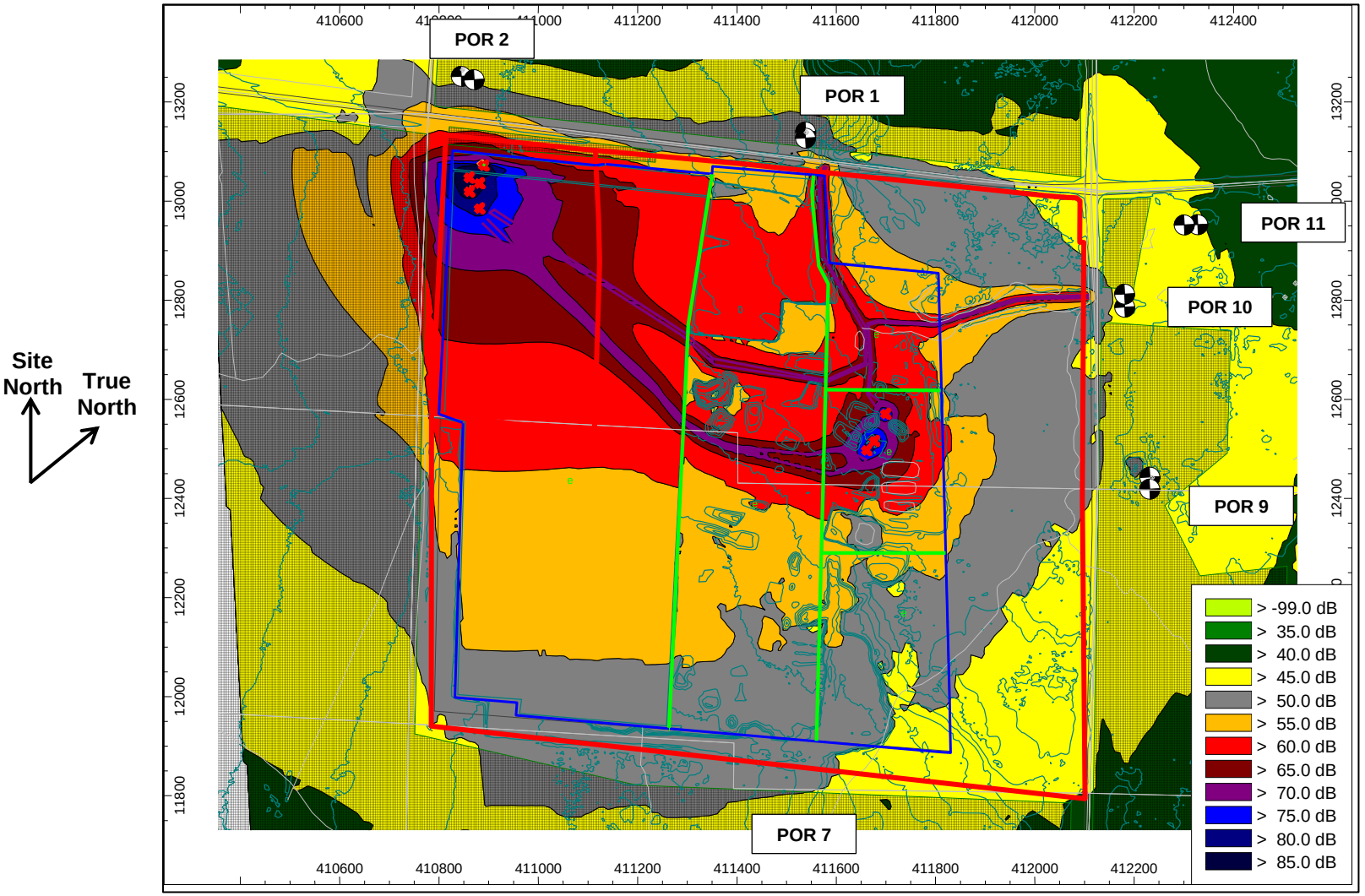


Figure 12: Scenario 2C: Extraction in Zone 1, Lift 1, middle of Zone 1, impacting POR 9 & 10, (Daytime)

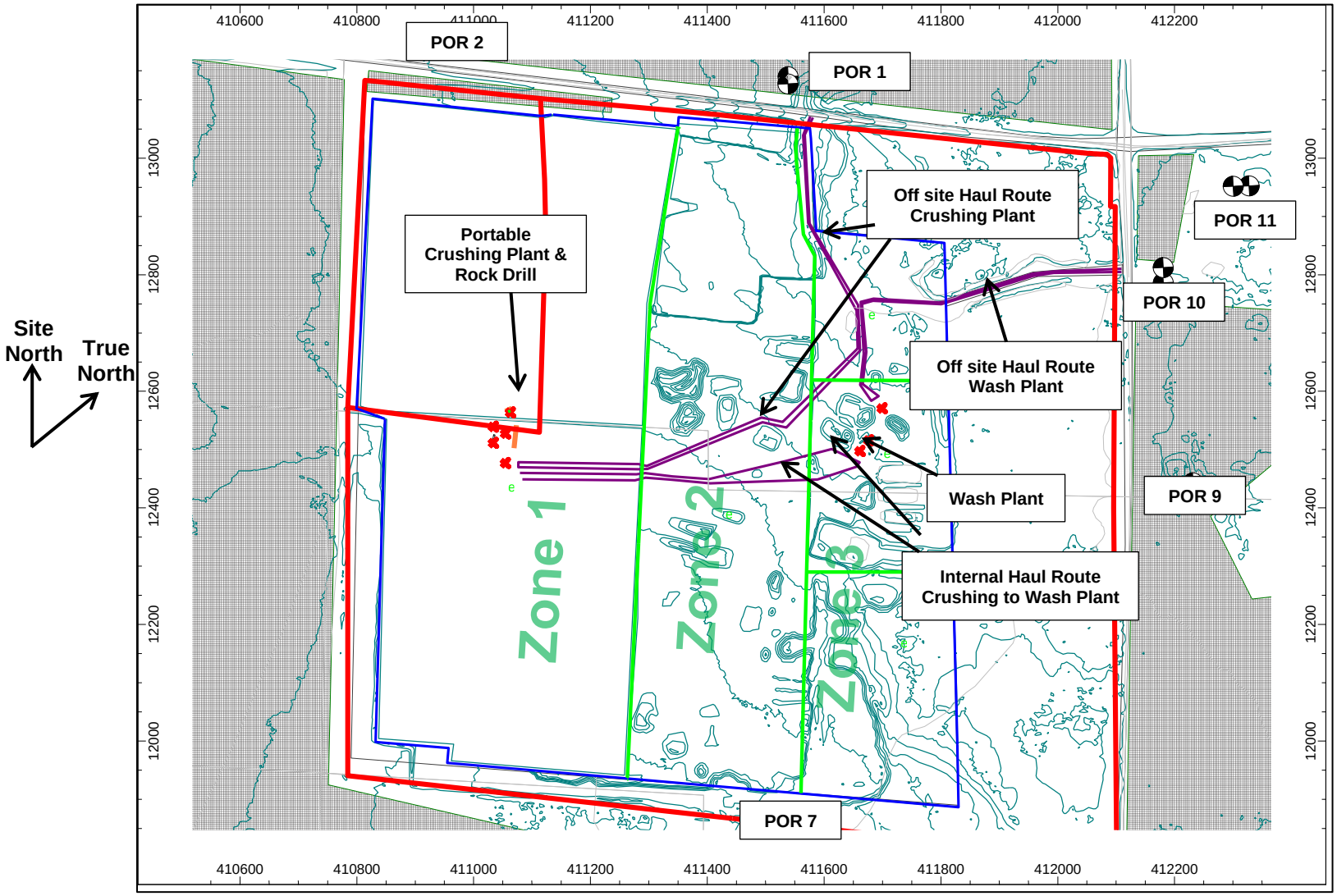


Figure 13: Prediction Results, Scenario 2C: Extraction in Zone 1, Lift 1, middle of Zone 1, impacting POR 9 & 10, (Daytime), (Noise levels at 4.5 m)

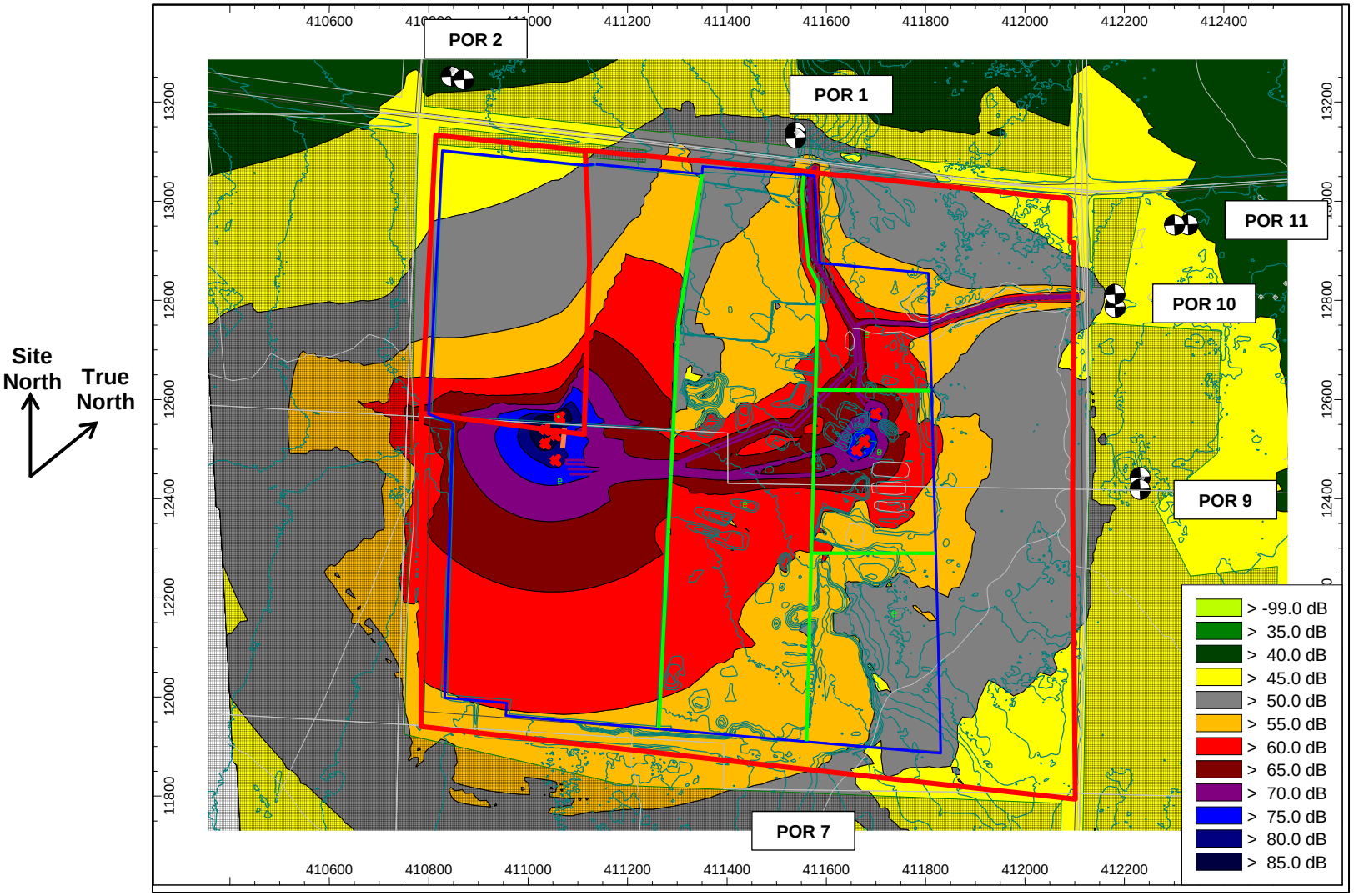


Figure 14: Scenario 3: Extraction in Zone 1, Lift 2, middle of Zone 1, impacting POR 9 & 10, (Daytime)

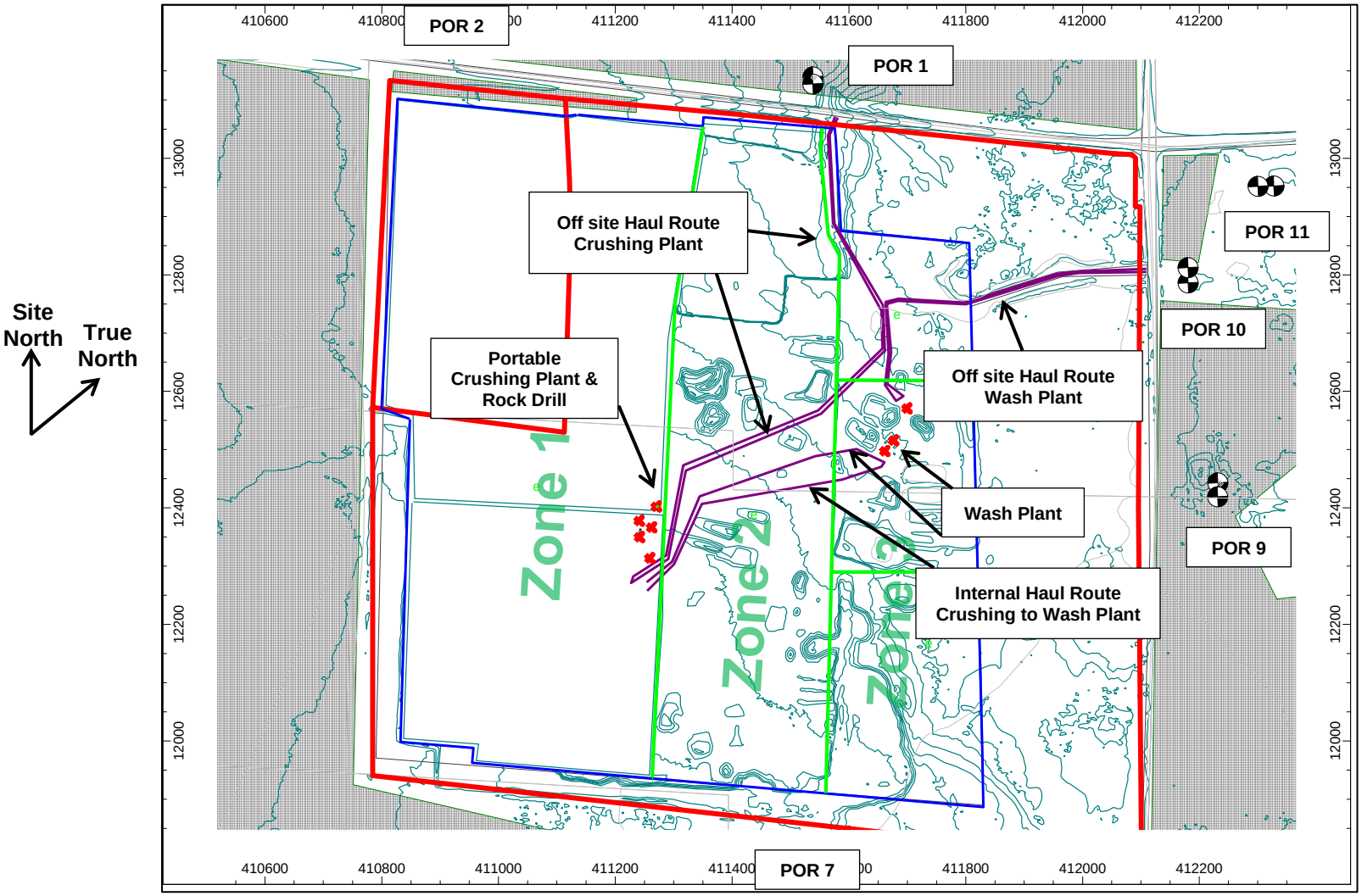


Figure 15: Prediction Results, Scenario 3: Extraction in Zone 1, Lift 2, middle of Zone 1, impacting POR 9 & 10, (Daytime), (Noise levels at 4.5 m)

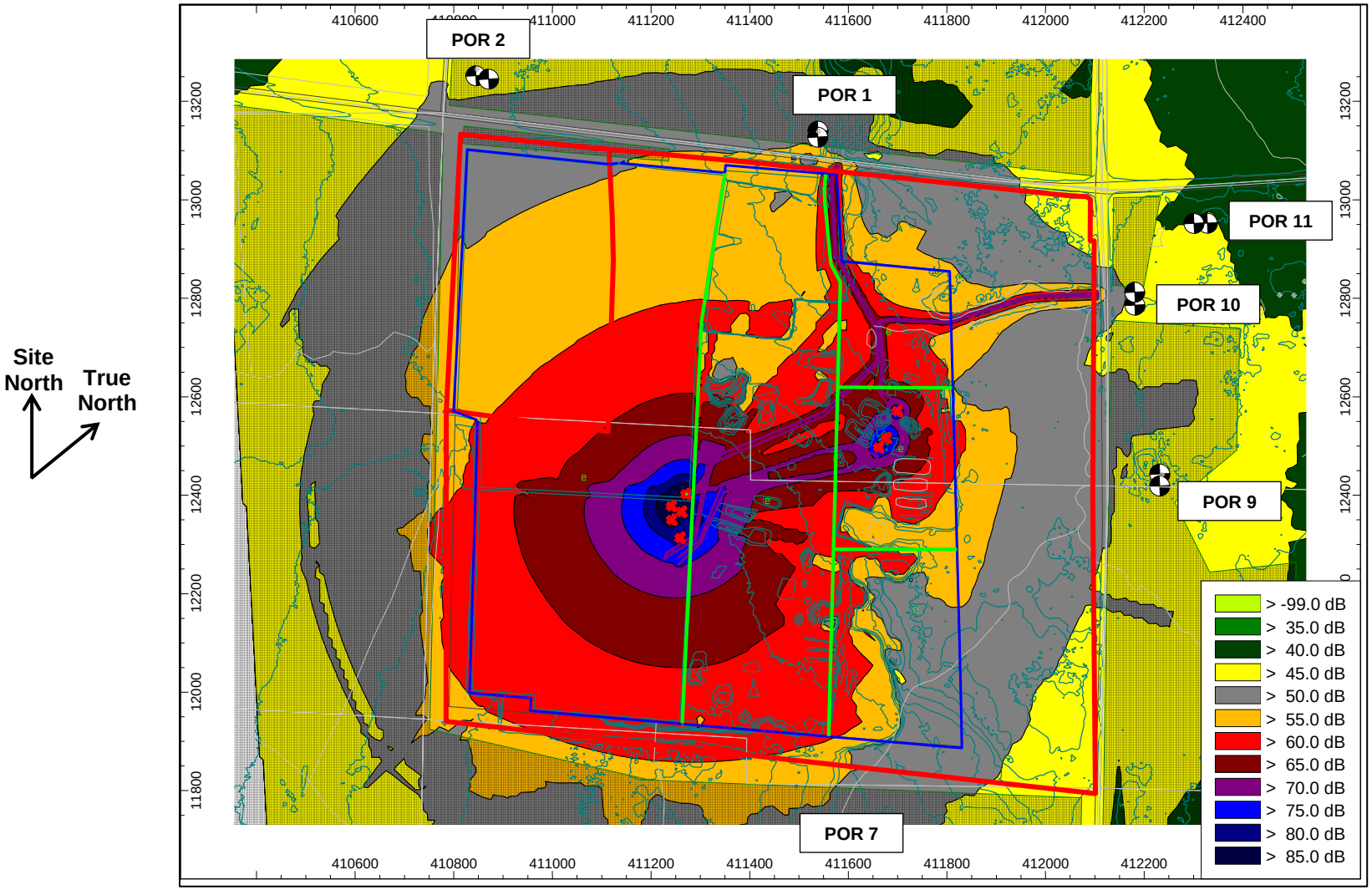


Figure 16: Scenario 4: Extraction in Zone 1, Lift 2, near POR 2, (Daytime)

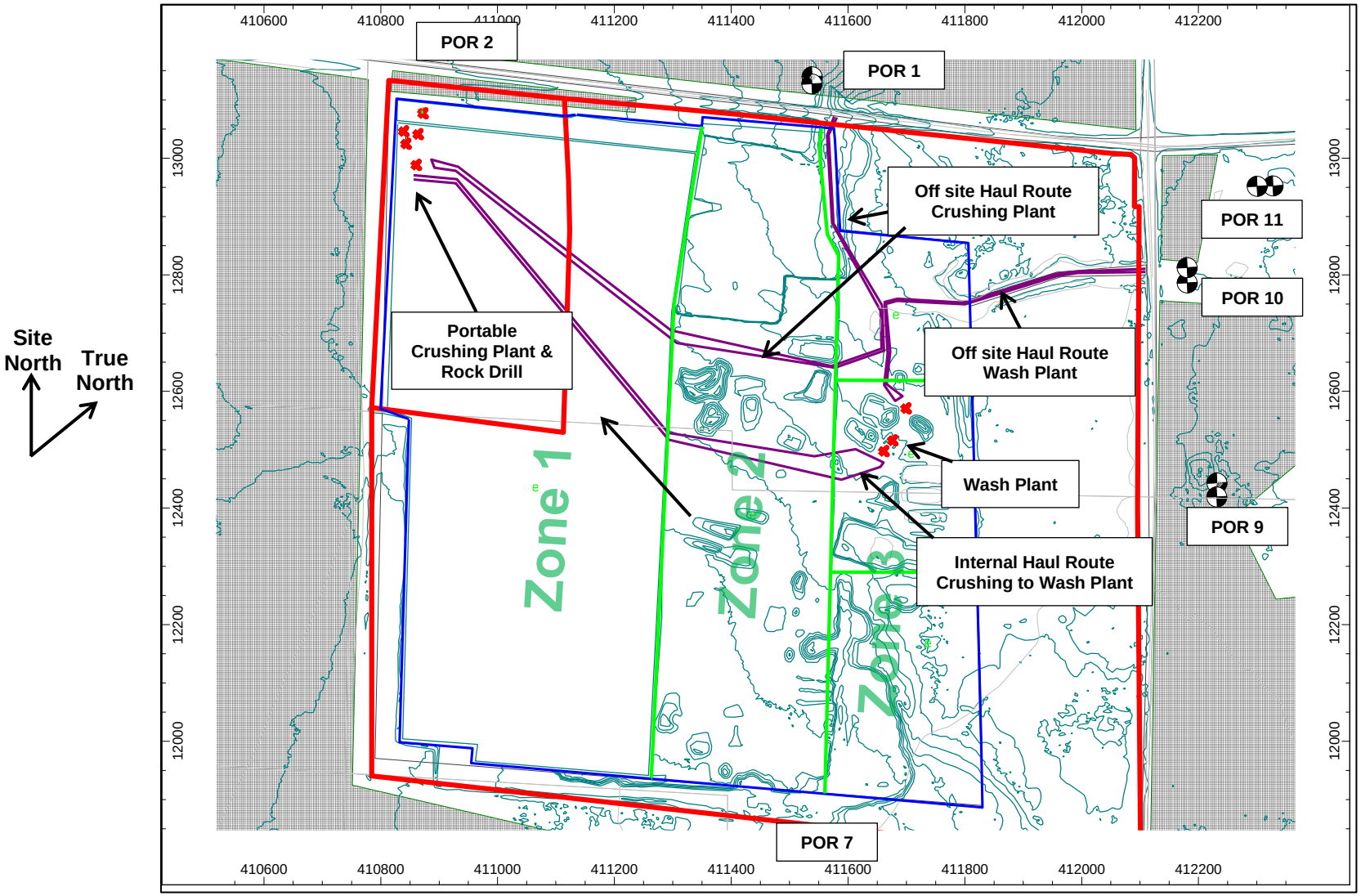


Figure 17: Prediction Results, Scenario 4: Extraction in Zone 1, Lift 2, near POR 2, (Daytime), (Noise levels at 4.5 m)

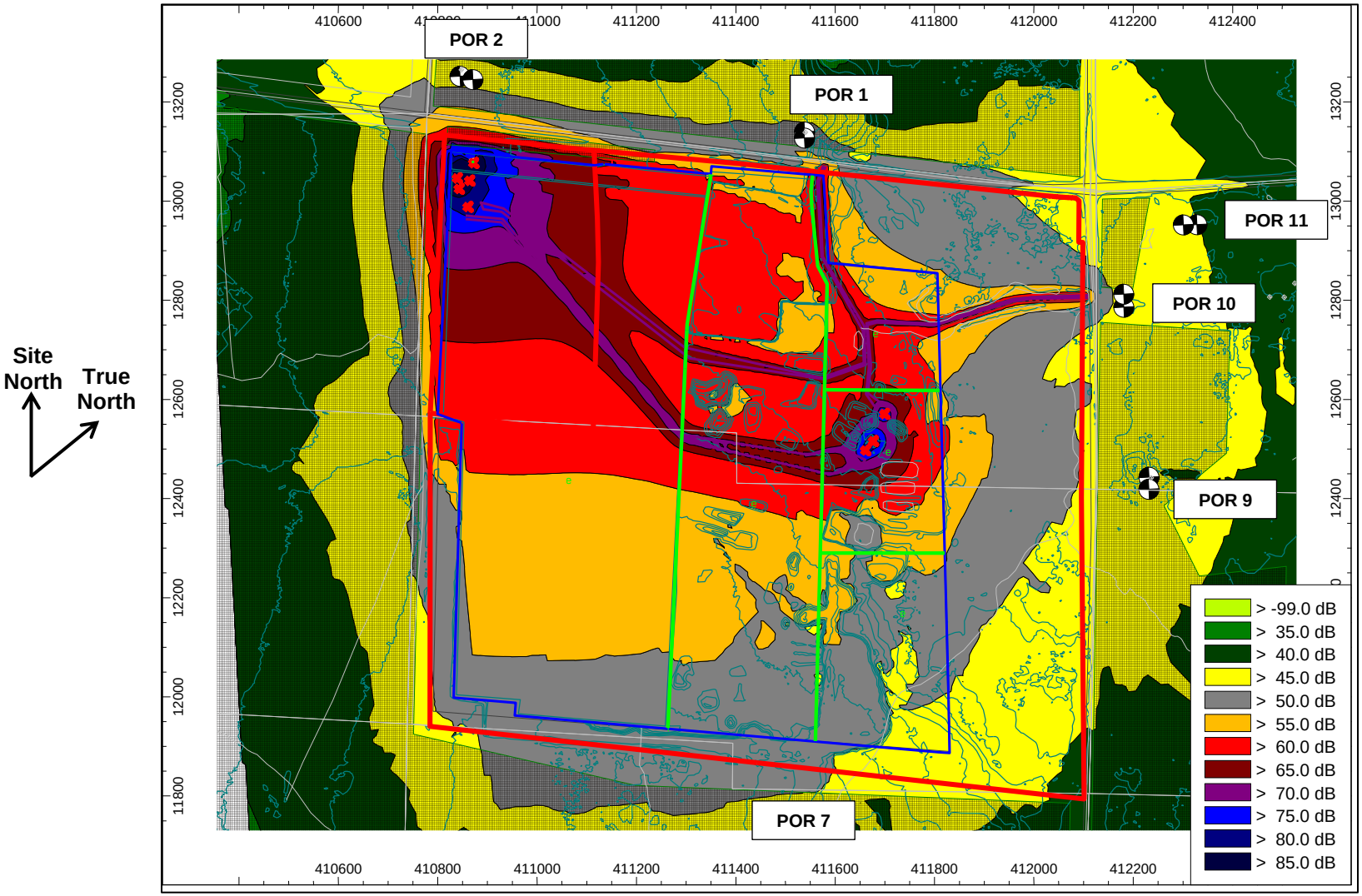


Figure 18: Scenario 5: Extraction in Zone 2, Lift 2, at current lift face, (Daytime)

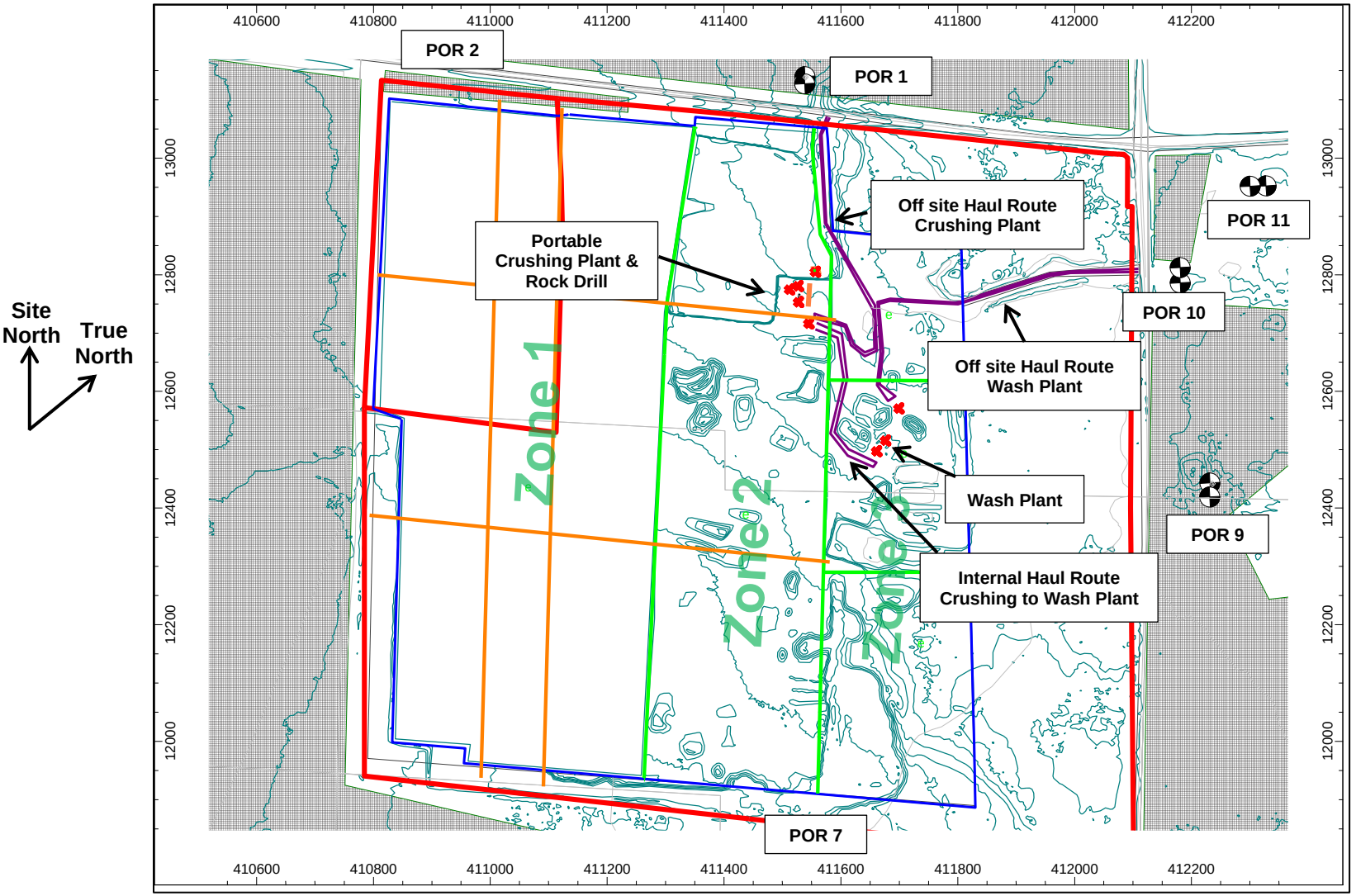


Figure 19: Prediction Results, Scenario 5: Extraction in Zone 2, Lift 2, at current lift face, (Noise levels at 4.5 m)

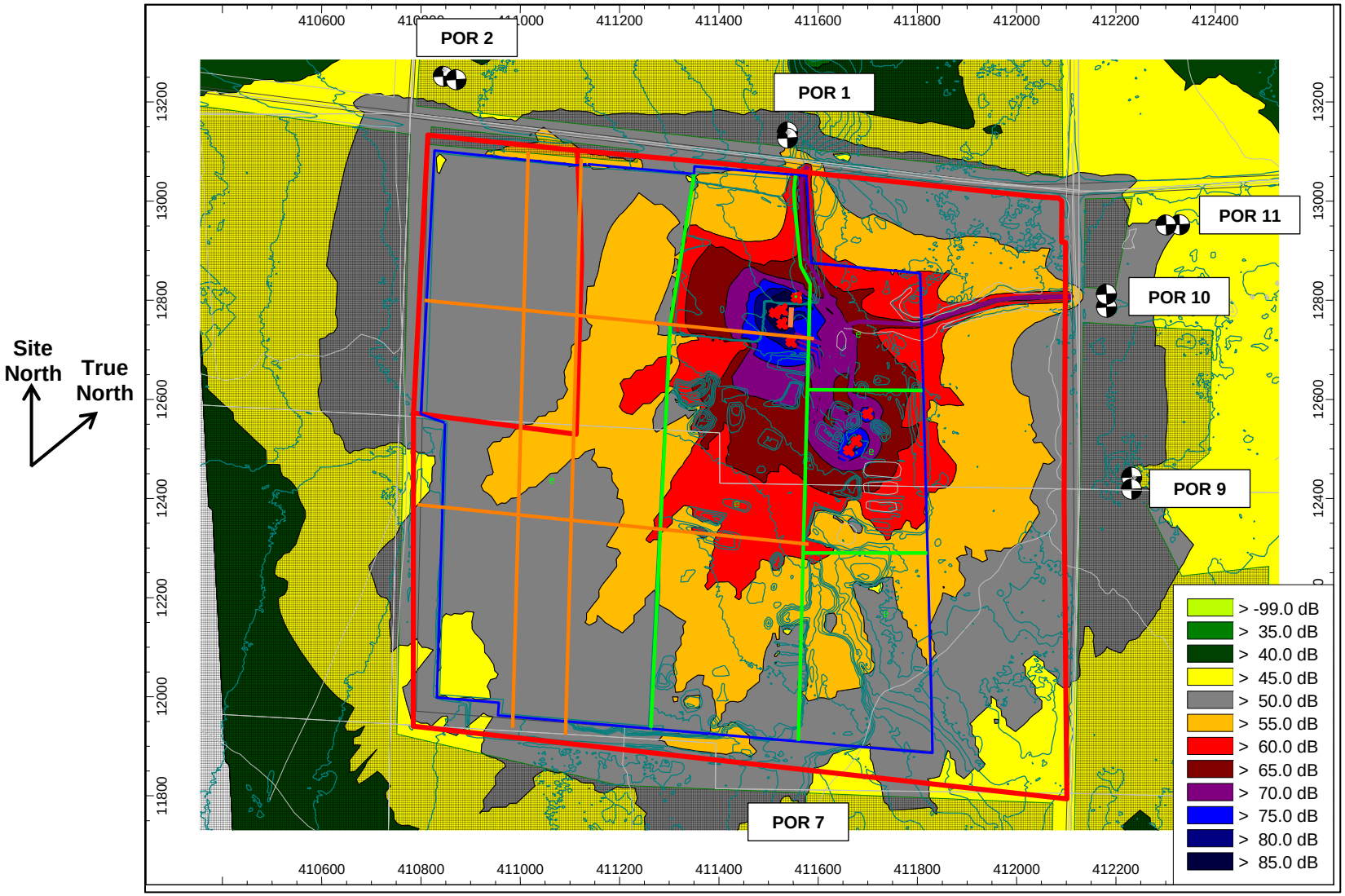


Figure 20: Scenario 6: Extraction in Zones 1 & 2, Lift 3, near POR 2, (Daytime)

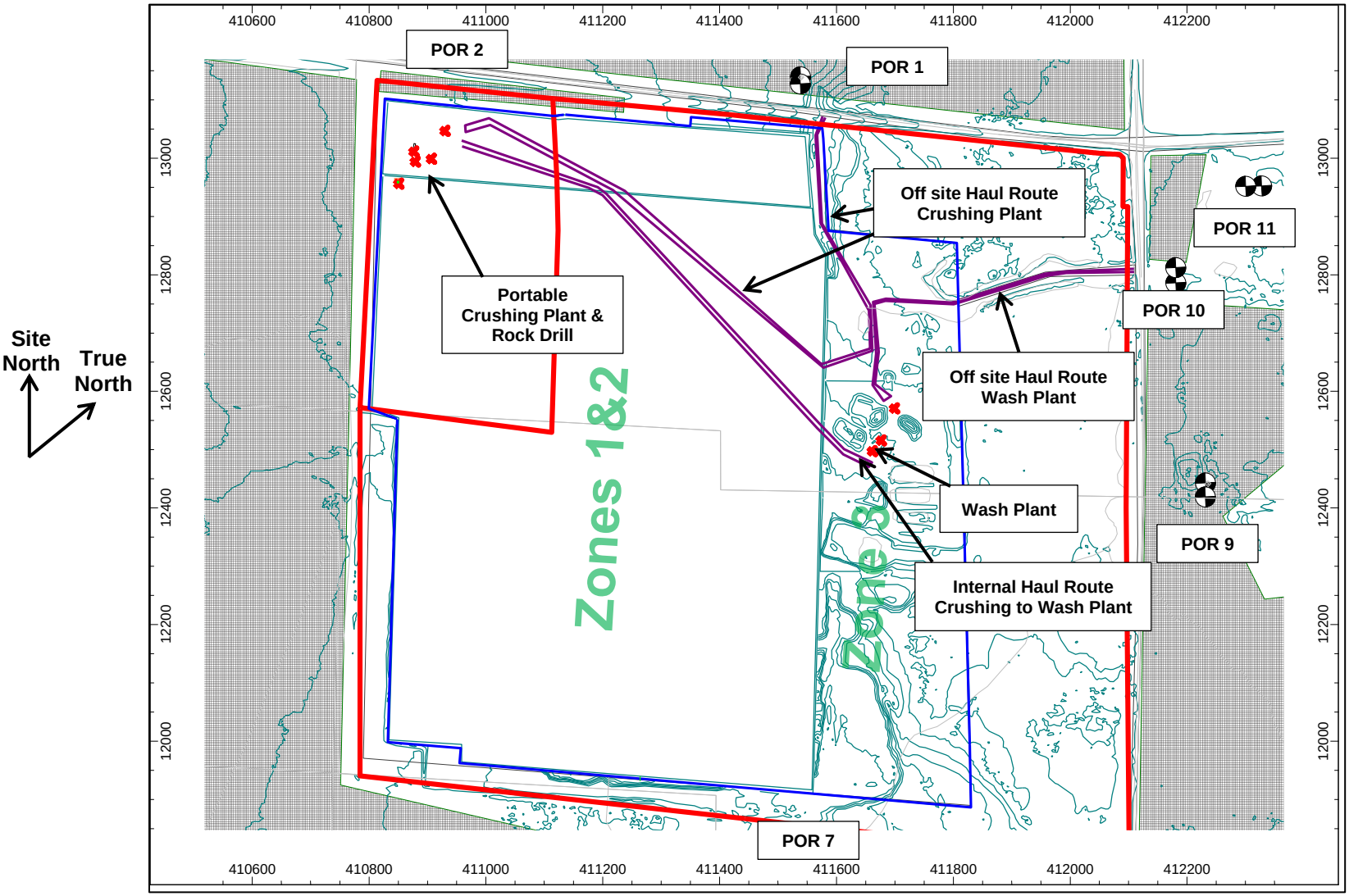


Figure 21: Prediction Results, Scenario 6: Extraction in Zones 1 & 2, Lift 3, near POR 2, (Daytime), (Noise levels at 4.5 m)

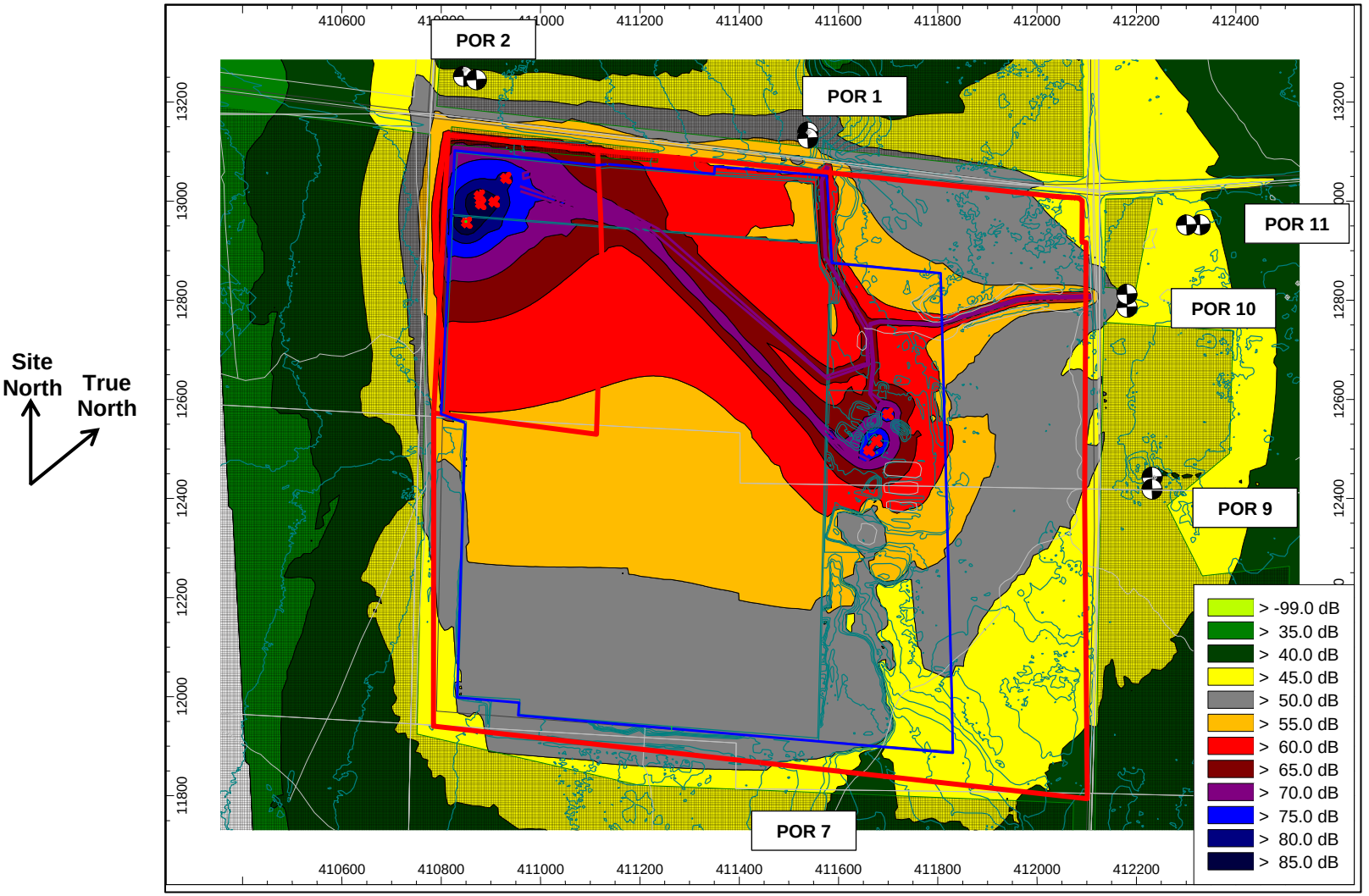


Figure 22: Scenario 7: Extraction in Zones 1 & 2, Lift 3, impacting POR 9 & 10, (Daytime)

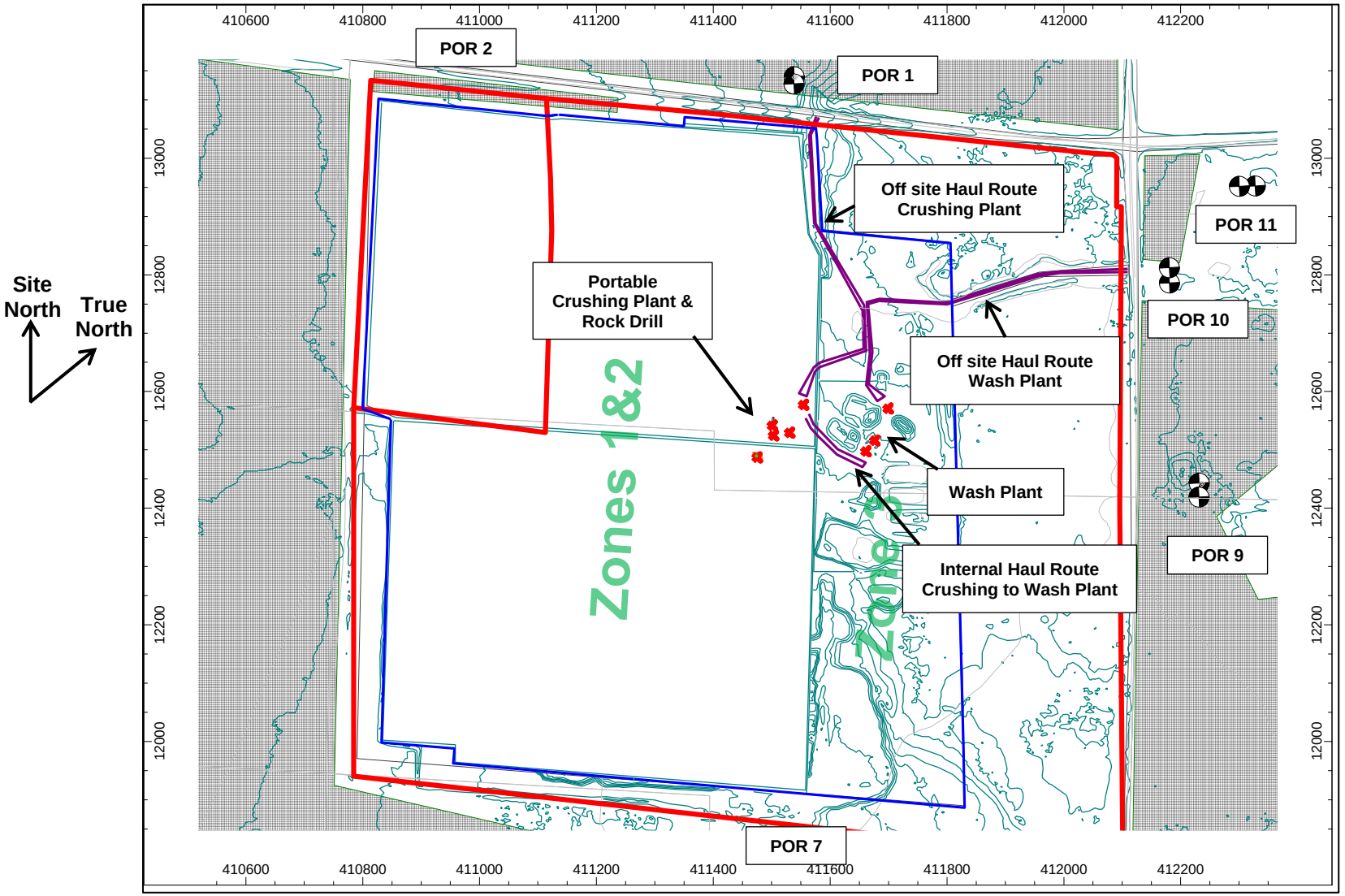


Figure 23: Prediction Results, Scenario 7: Extraction in Zones 1 & 2, Lift 3, impacting POR 9 & 10, (Daytime), (Noise levels at 4.5 m)

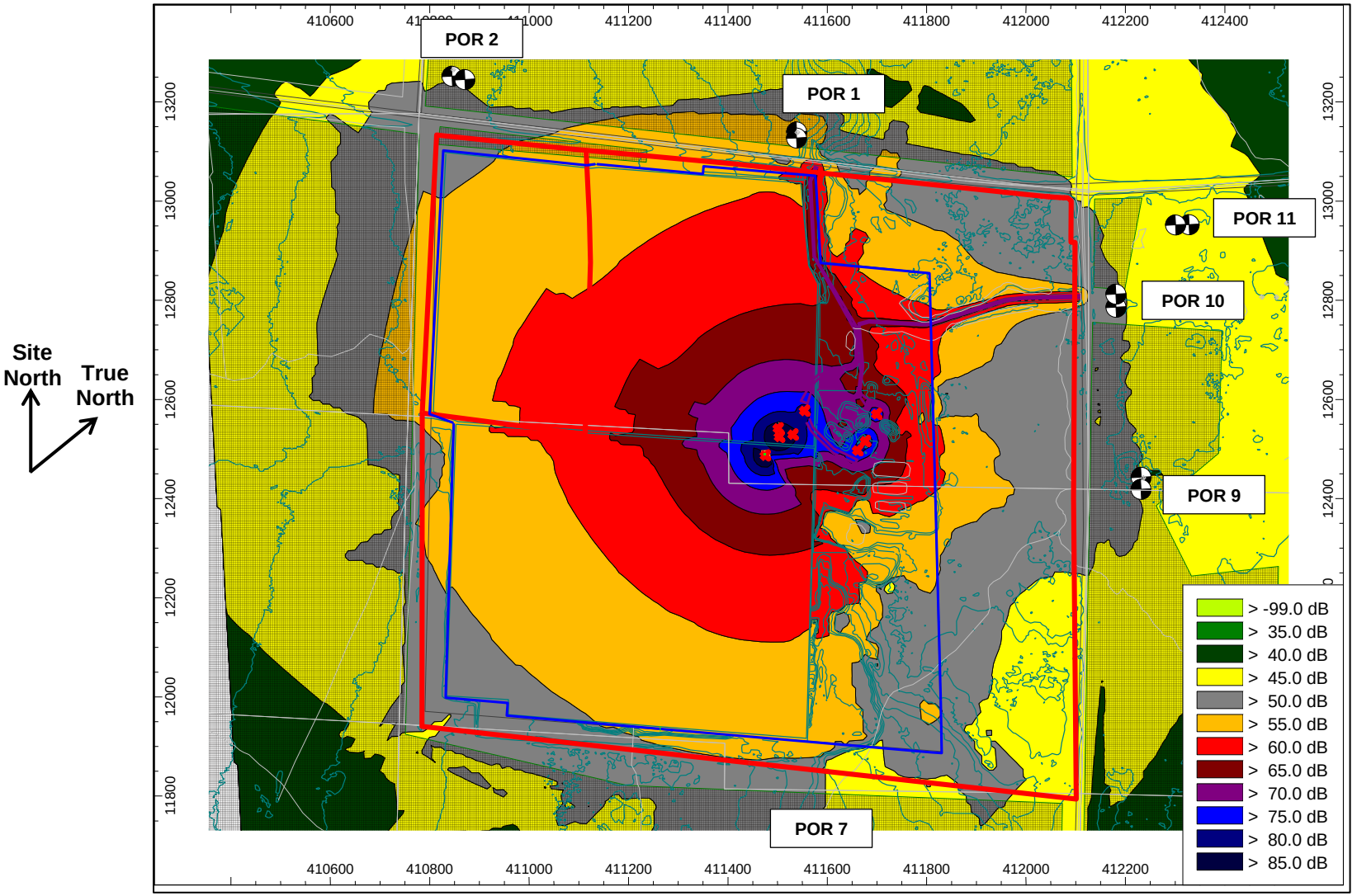


Figure 24: Scenario 8: Extraction in Zones 1 & 2, Lift 3, near POR 7, (Daytime)

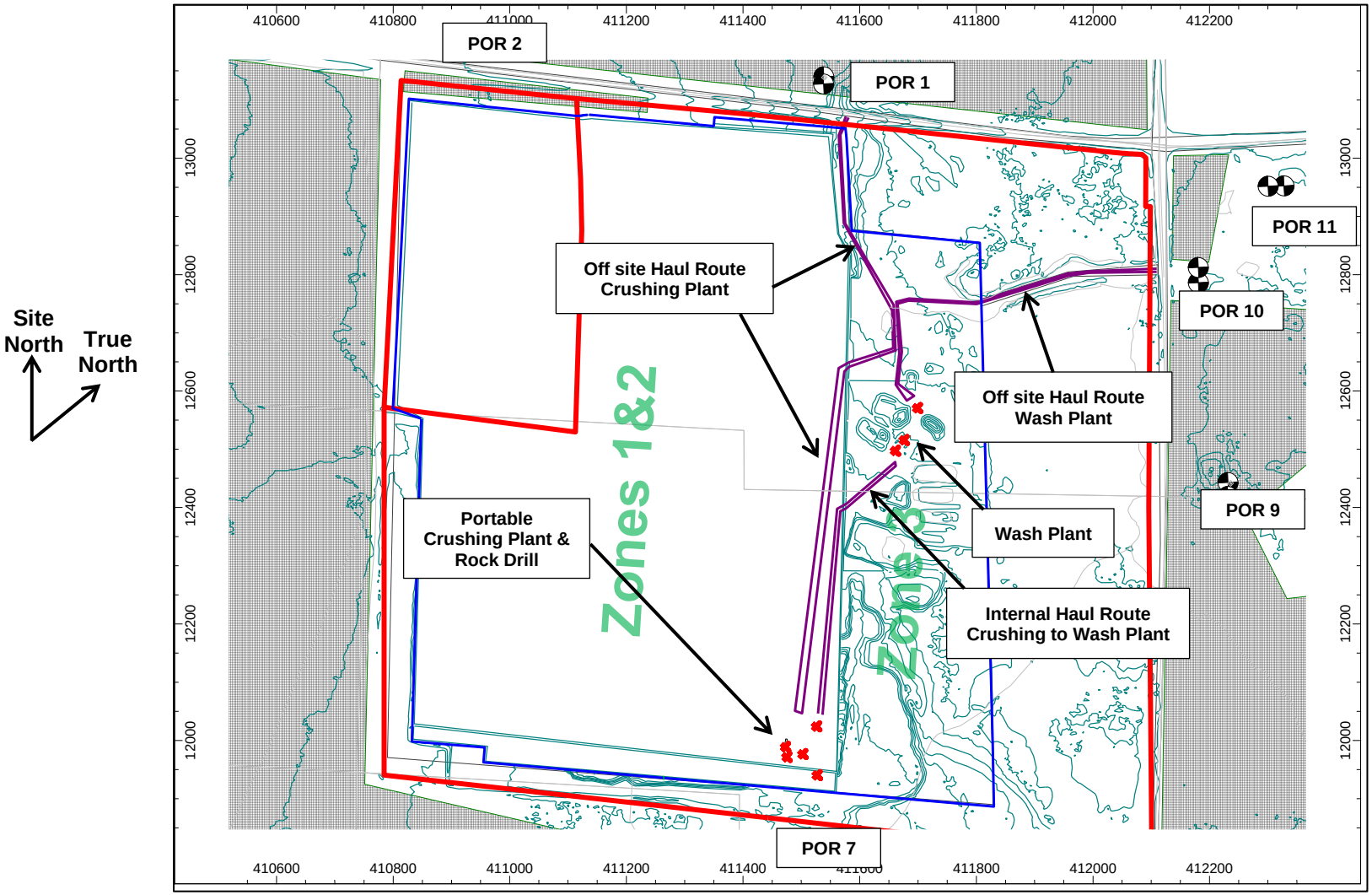


Figure 25: Prediction Results, Scenario 8: Extraction in Zones 1 & 2, Lift 3, near POR 7, (Daytime), (Noise levels at 4.5 m)

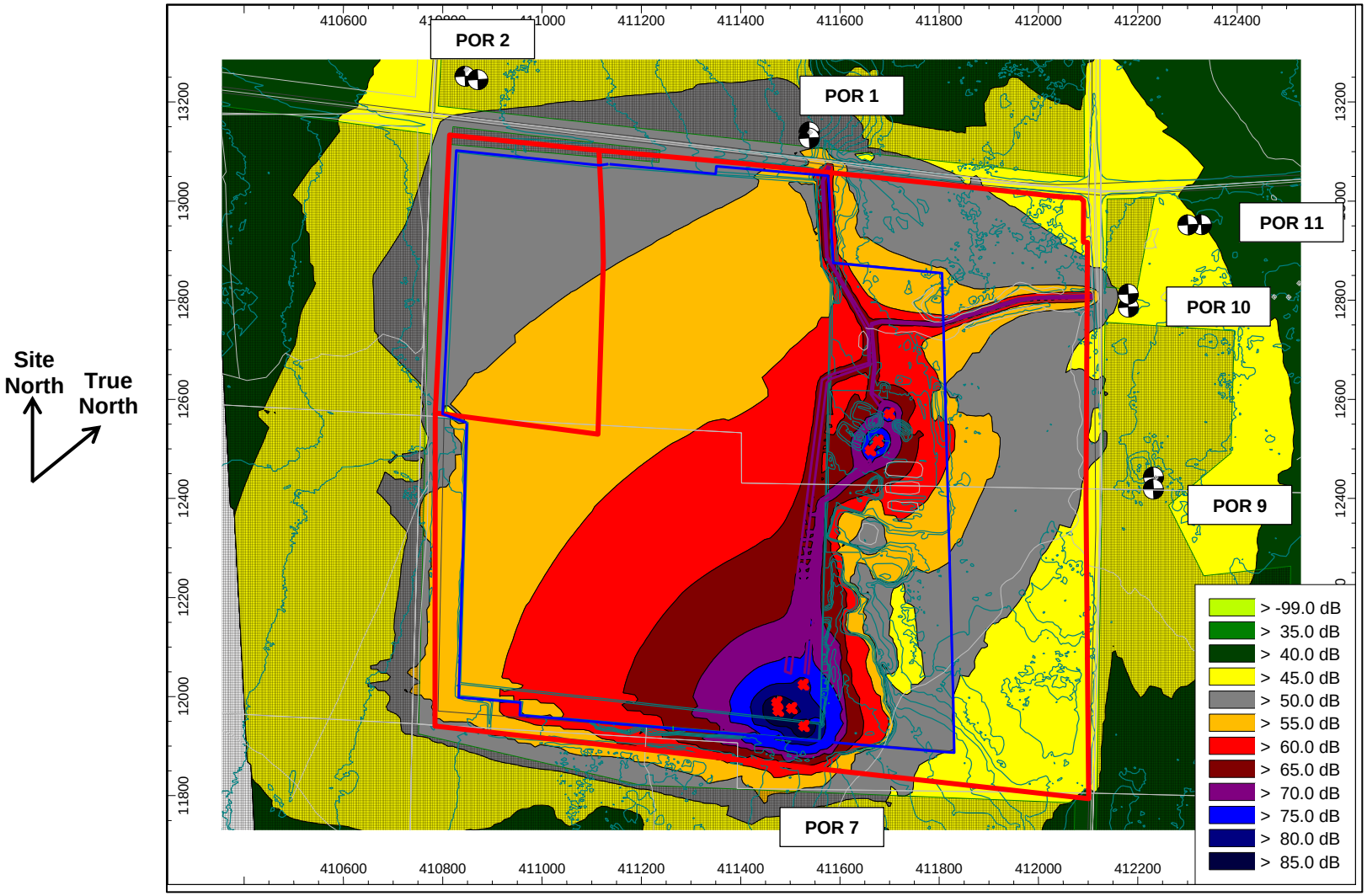


Figure 26: Scenario 9: Extraction in Zones 1 & 2, Lift 4, middle of Zones 1 & 2, (Daytime)

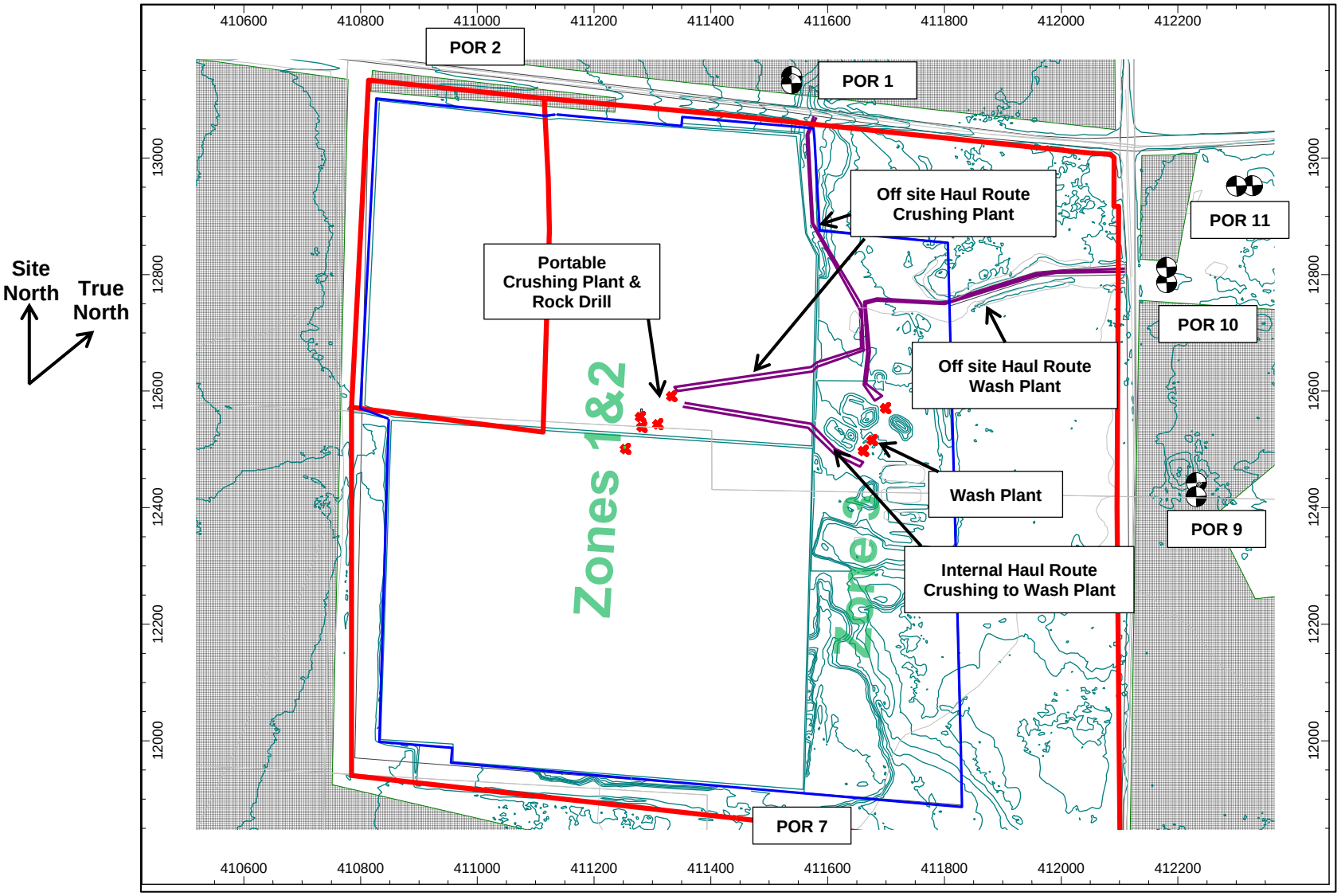


Figure 27: Prediction Results, Scenario 9: Extraction in Zones 1 & 2, Lift 4, middle of Zones 1 & 2, (Daytime), (Noise levels at 4.5 m)

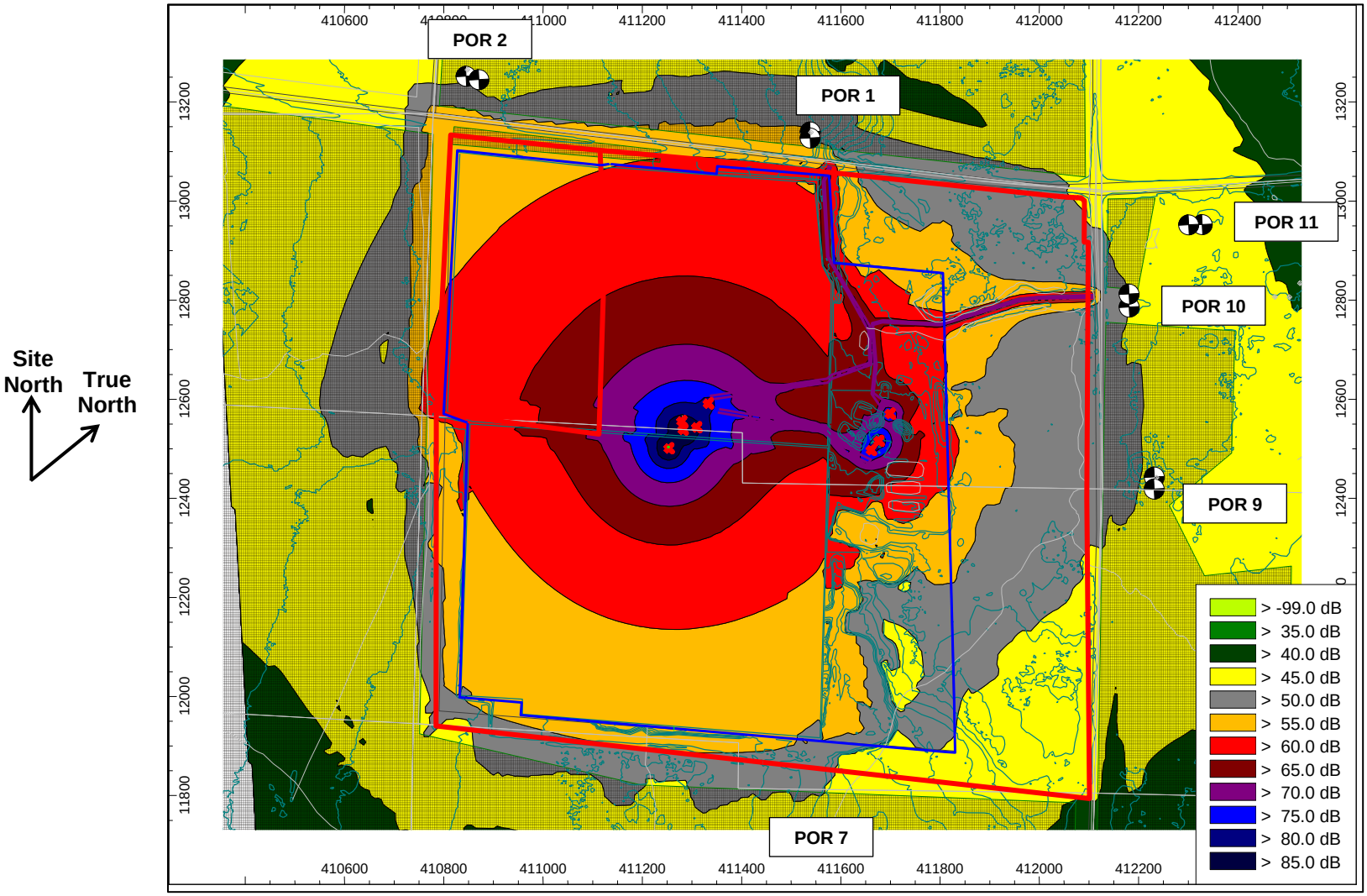


Figure 28: Mitigation Limit Lines, Extended Quarry (showing when barriers are needed in Zones 1 and 2, see Tables 7A and 8)

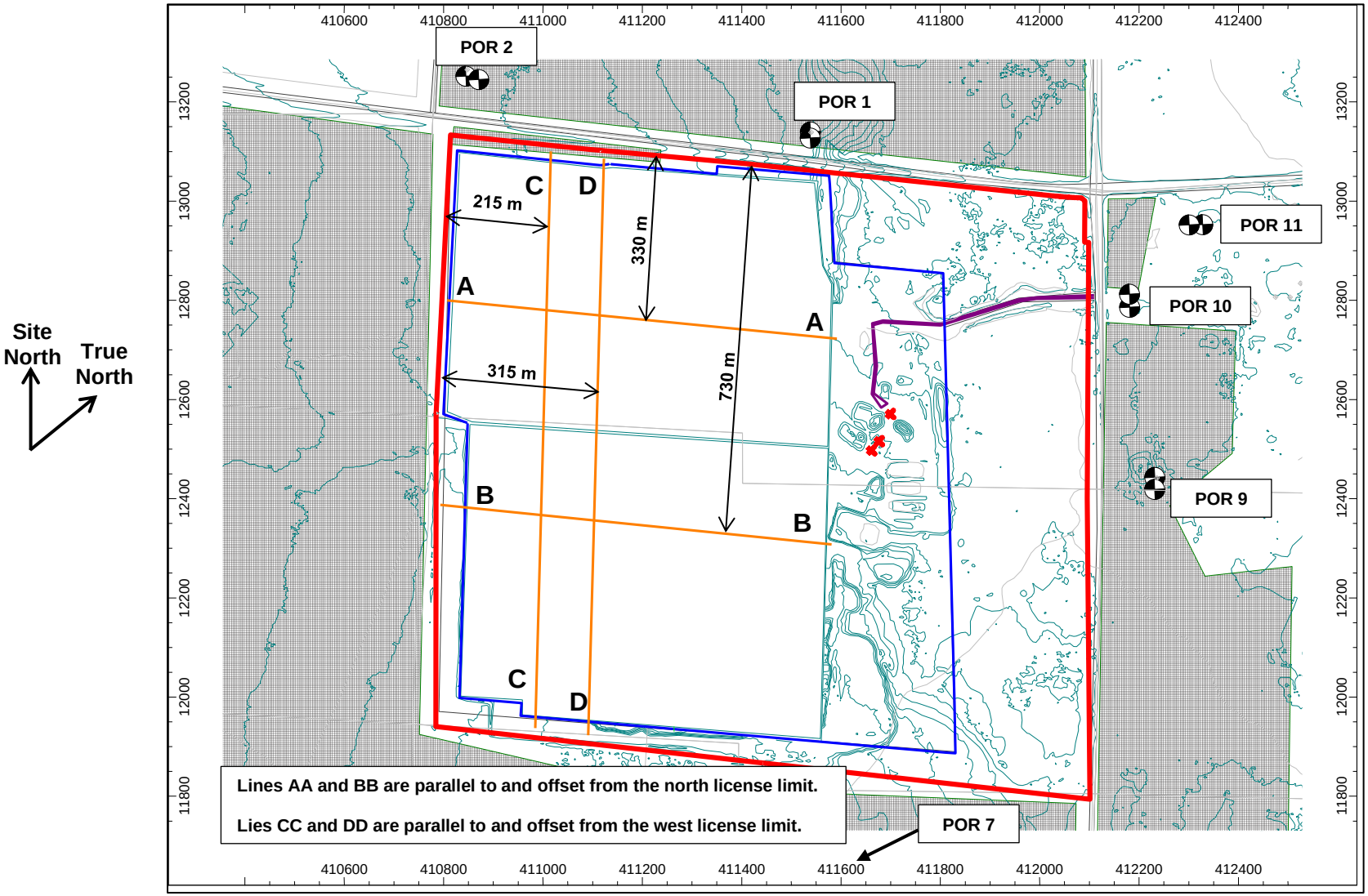


Figure 29: Scenario 10: Extraction in Zone 3C, Elevated portion of Zone 3C, (Daytime)

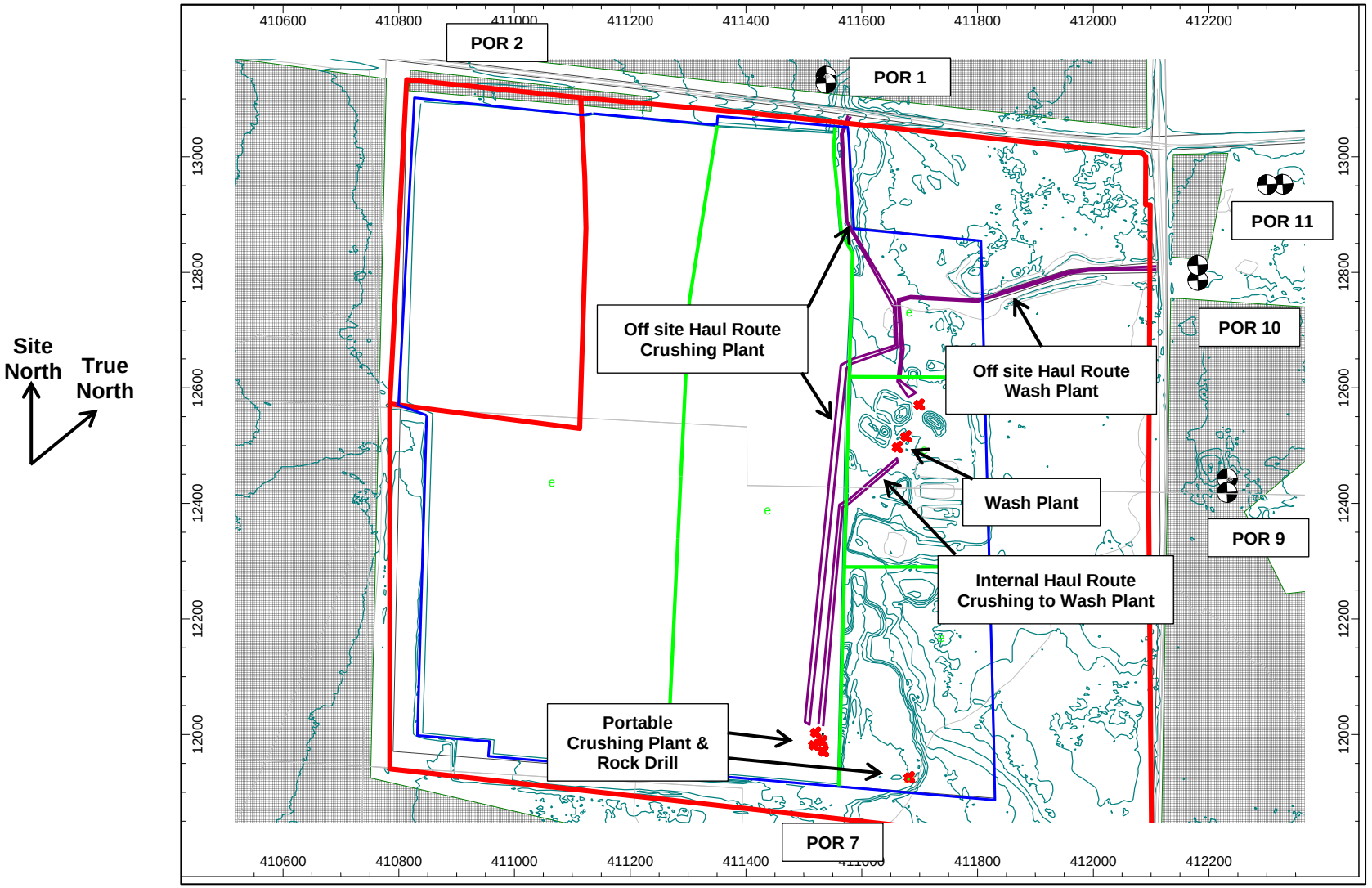


Figure 30: Prediction Results, Scenario 10: Extraction in Zone 3C, Elevated portion of Zone 3C, (Daytime), (Noise levels at 4.5 m)

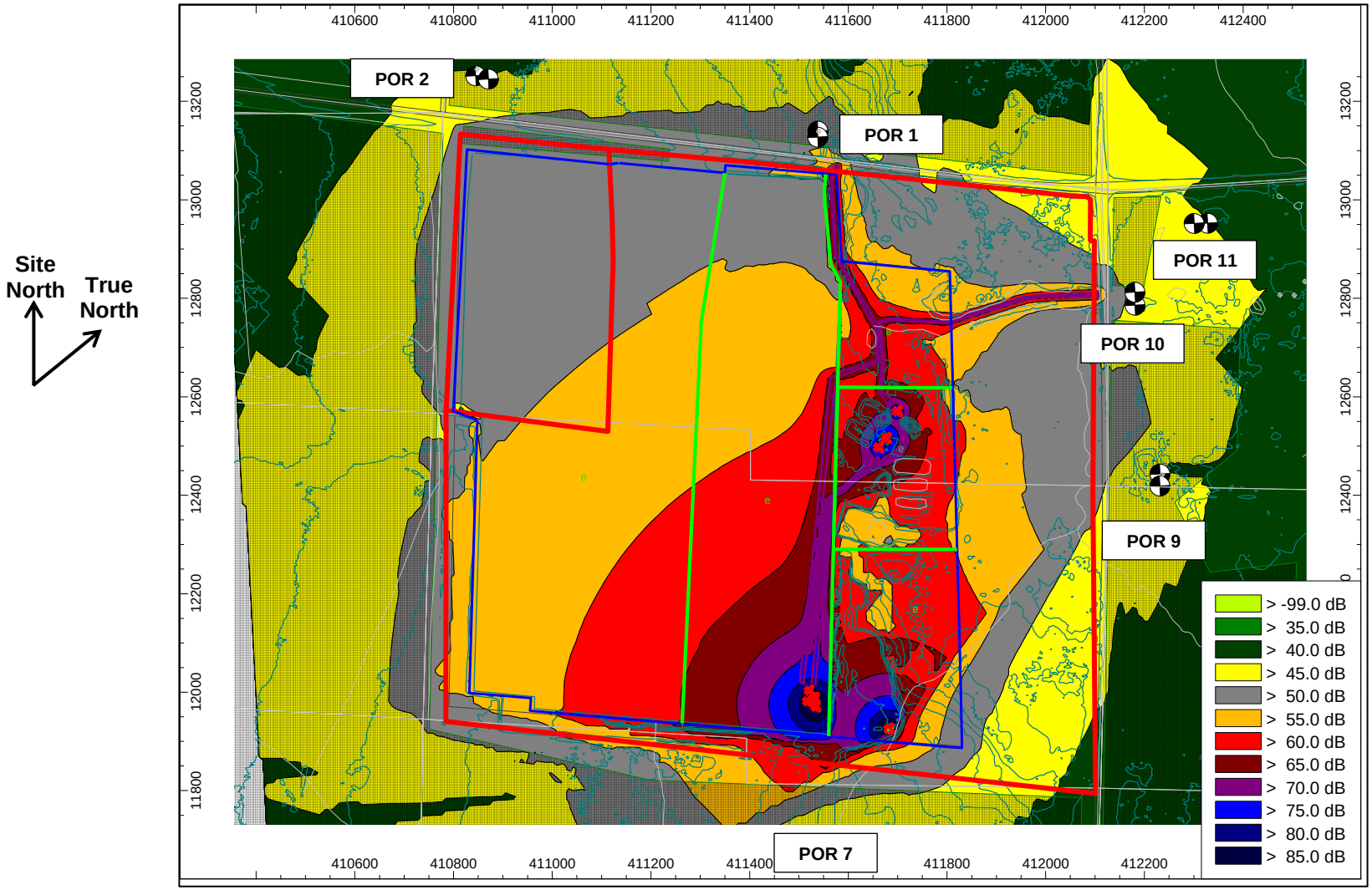


Figure 31: Scenario 11: Extraction in Zone 3C, Lift 4, (Daytime)

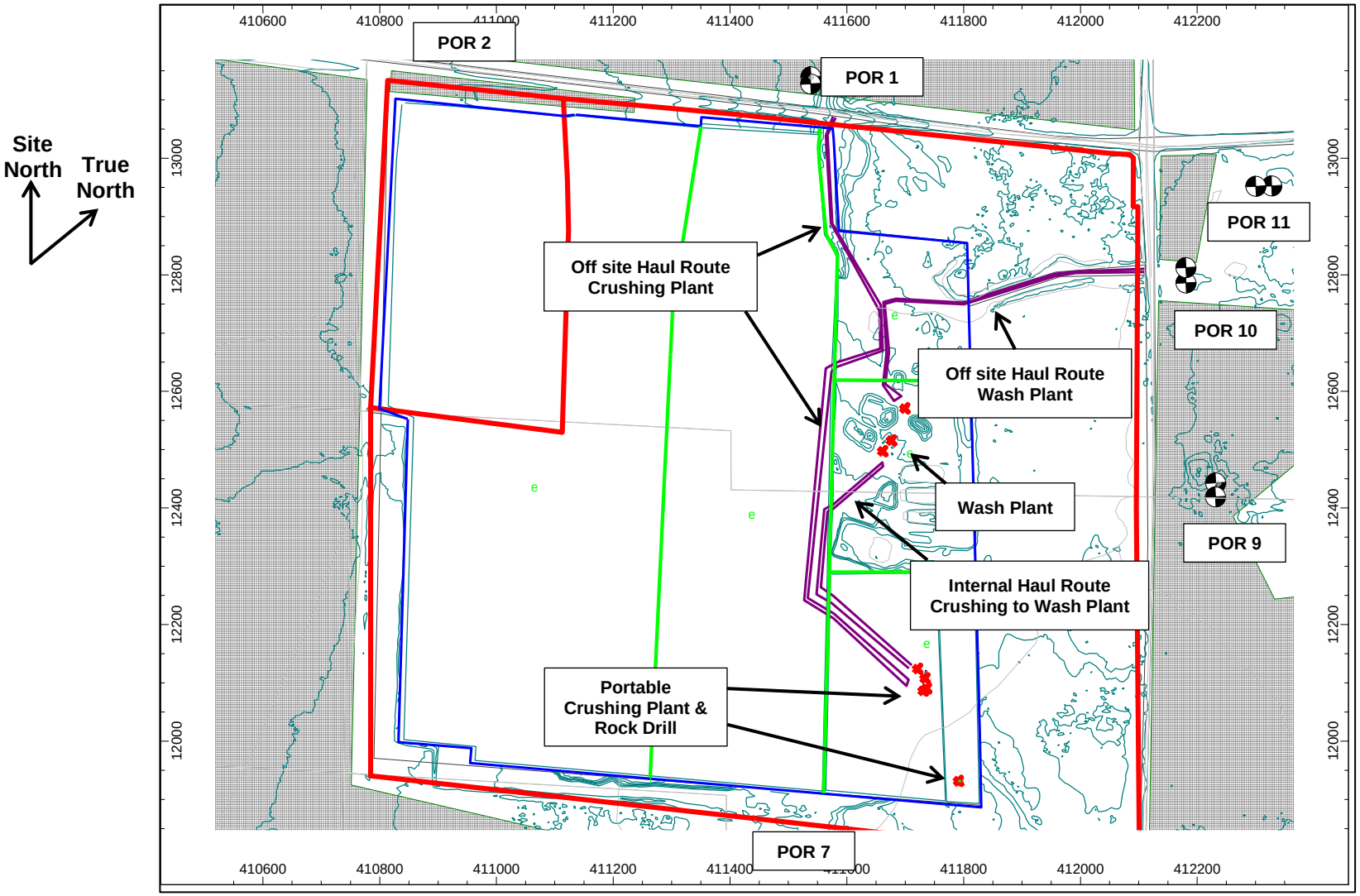


Figure 32: Prediction Results, Scenario 11: Extraction in Zone 3C, Lift 4, (Daytime), (Noise levels at 4.5 m)

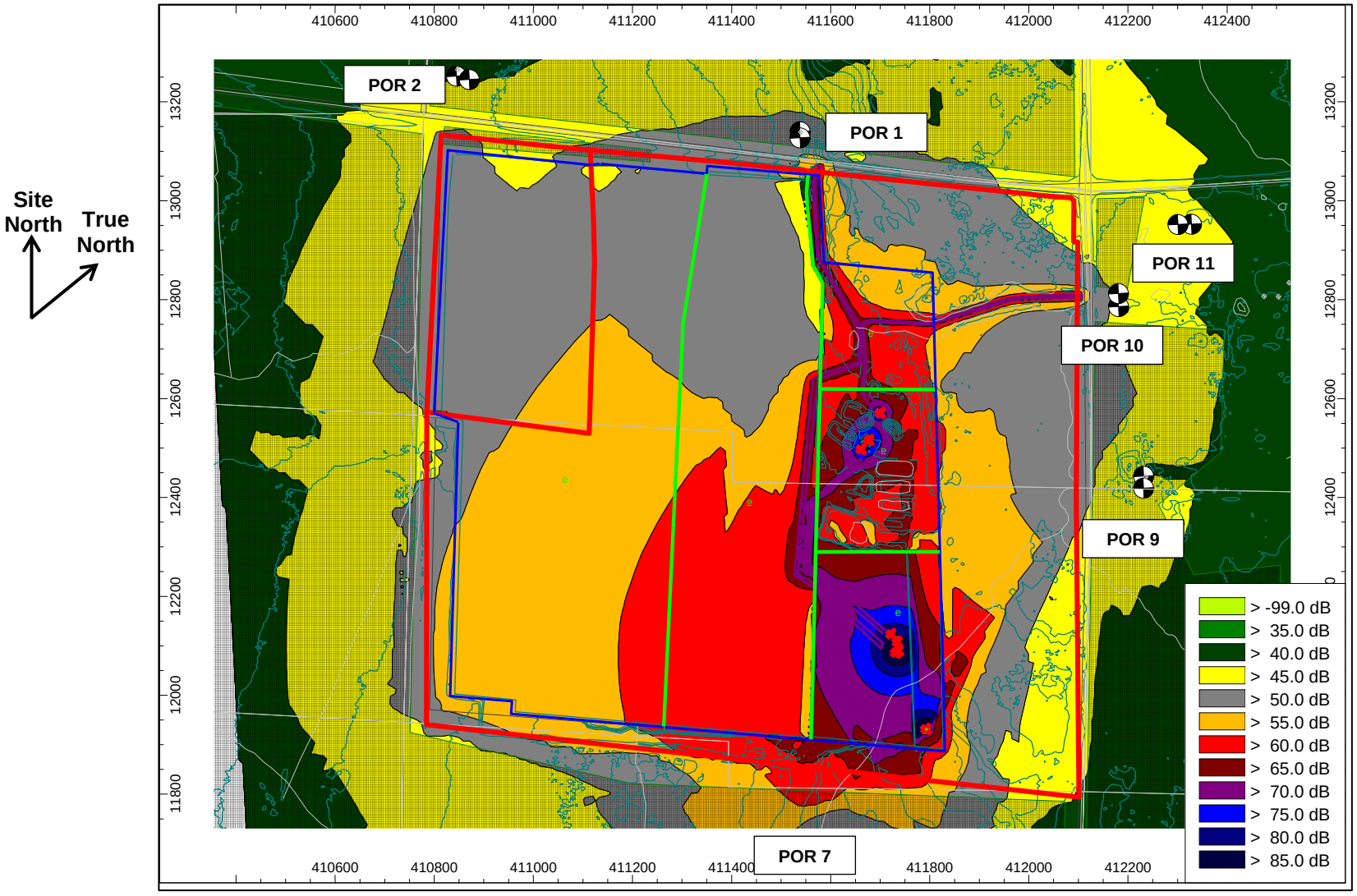


Figure 33: Scenario 12: Extraction in Zone 3A, Lift 4, (Daytime)

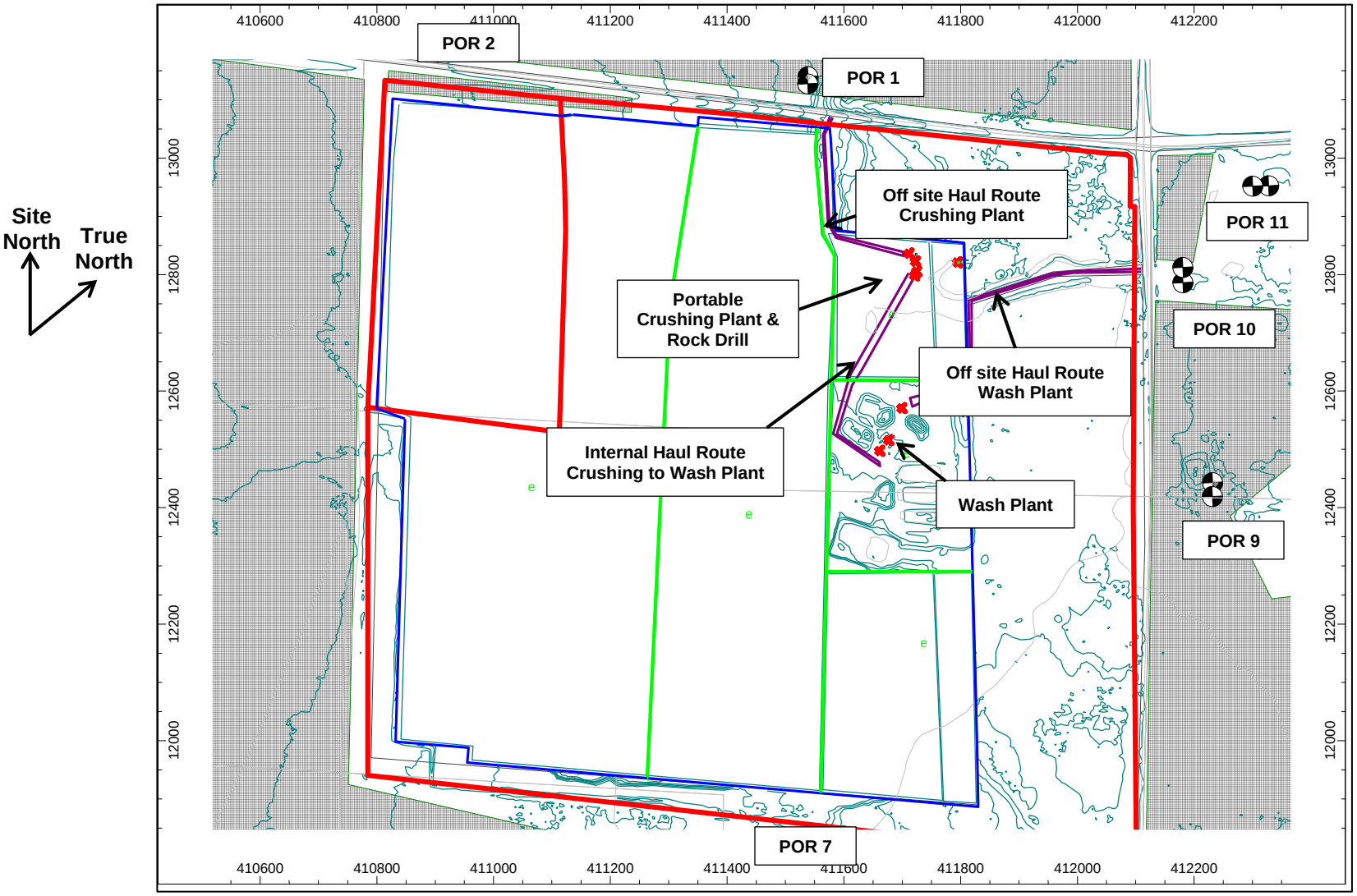


Figure 34: Prediction Results, Scenario 12: Extraction in Zone 3A, Lift 4, (Daytime), (Noise levels at 4.5 m)

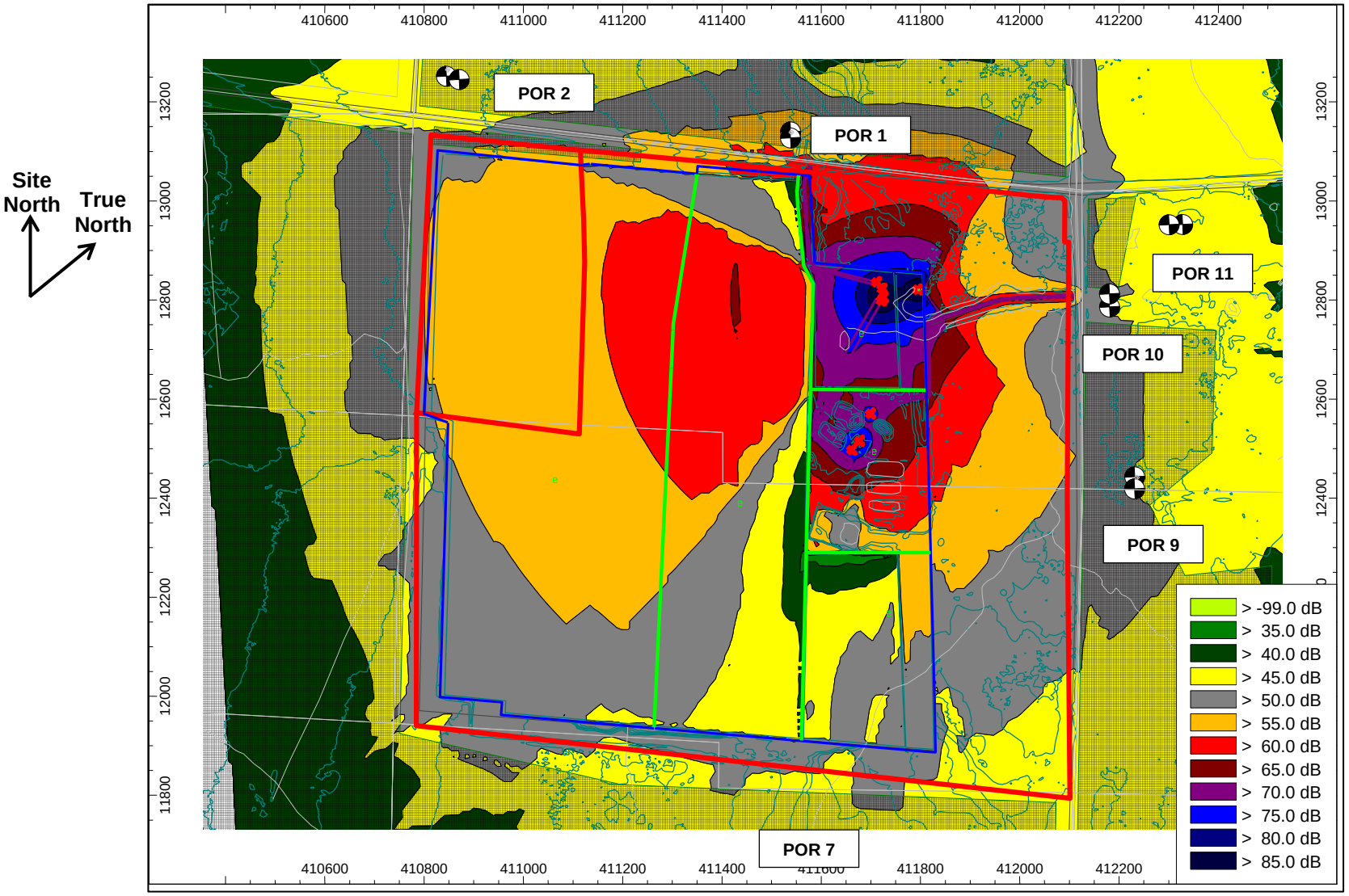


Figure 36: Scenario 13: Extraction in Zone 3B, Lift 5, (Daytime)

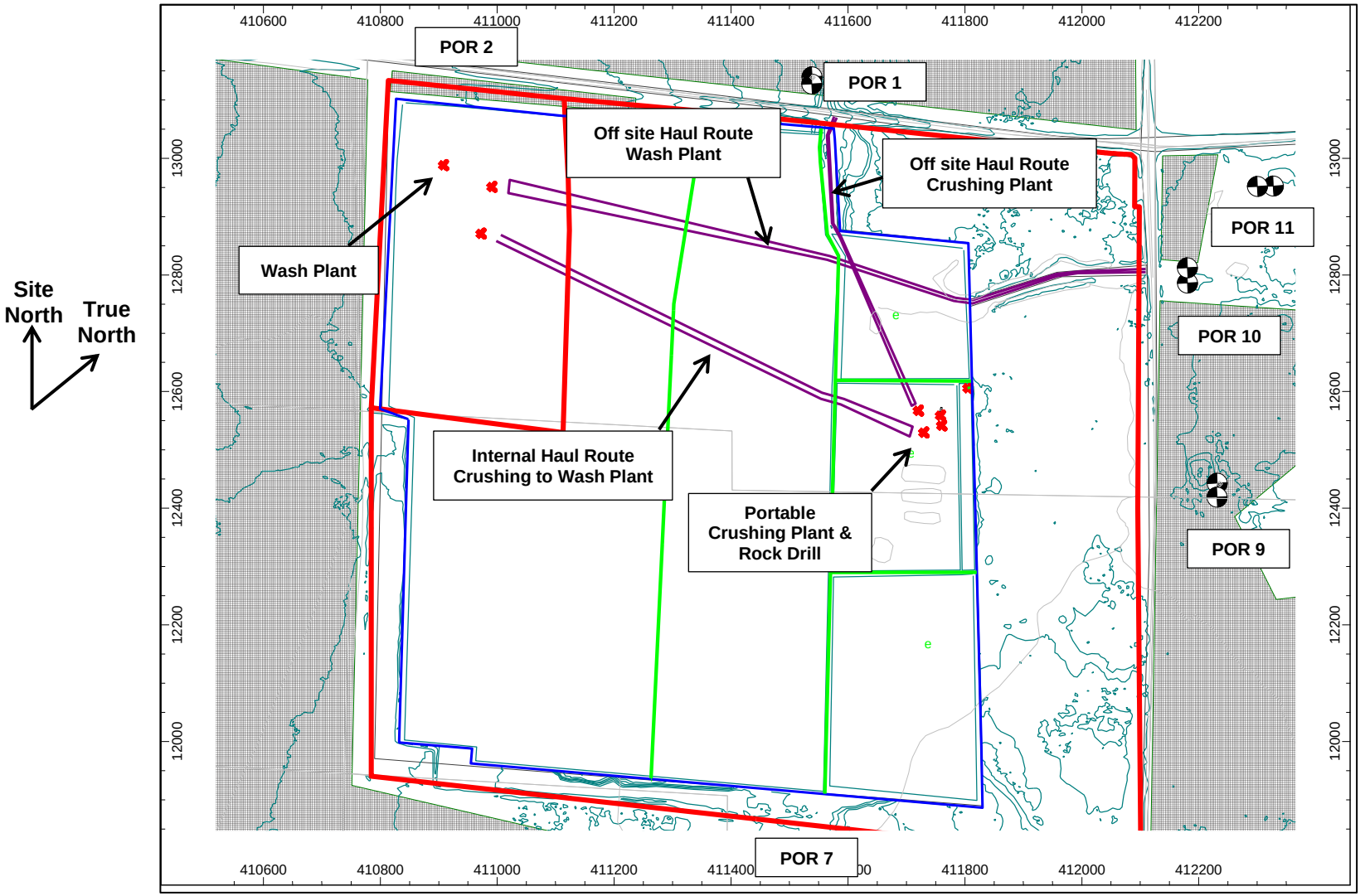


Figure 36: Prediction Results, Scenario 13: Extraction in Zone 3B, Lift 5, (Daytime), (Noise levels at 4.5 m)

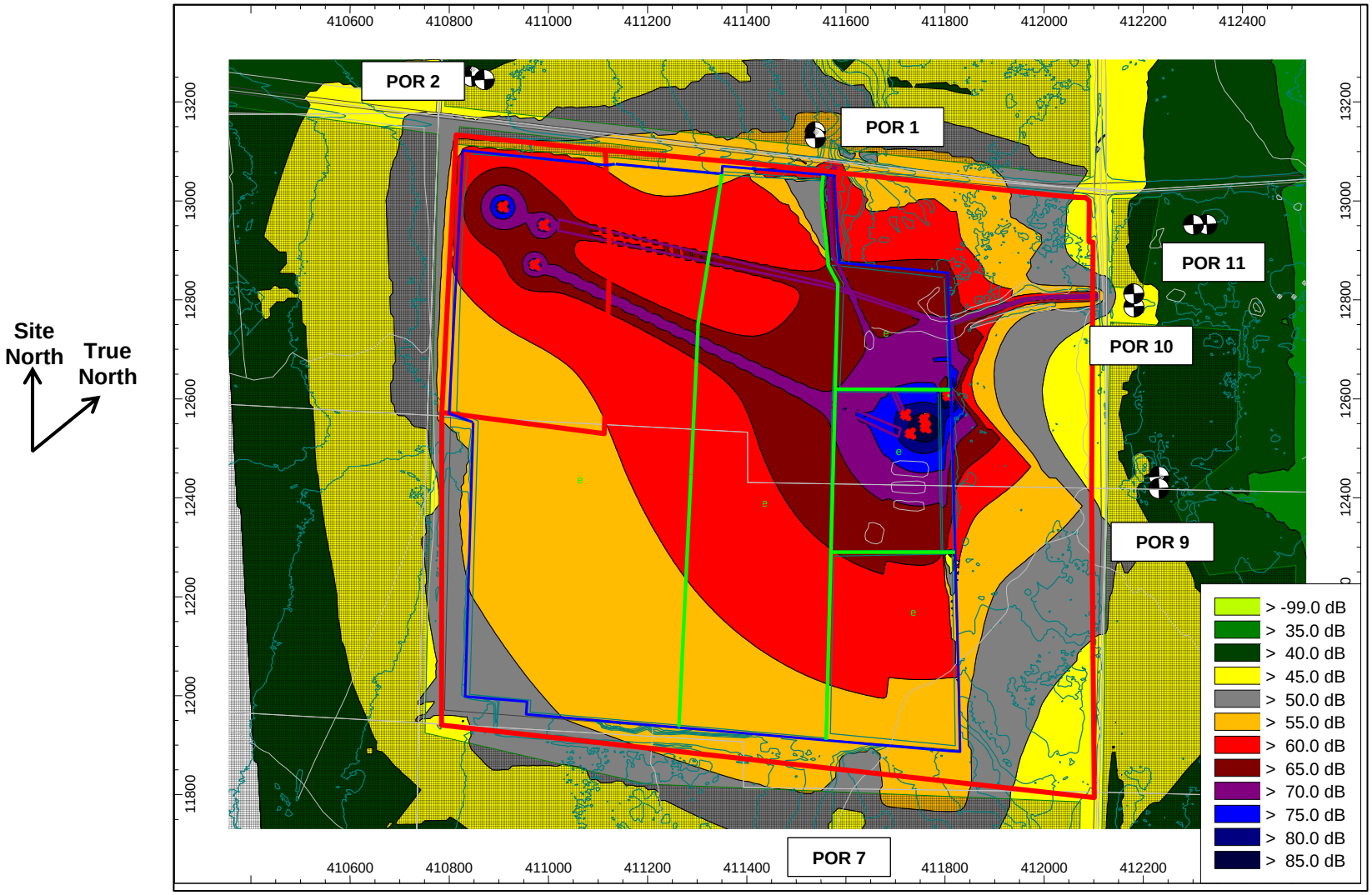
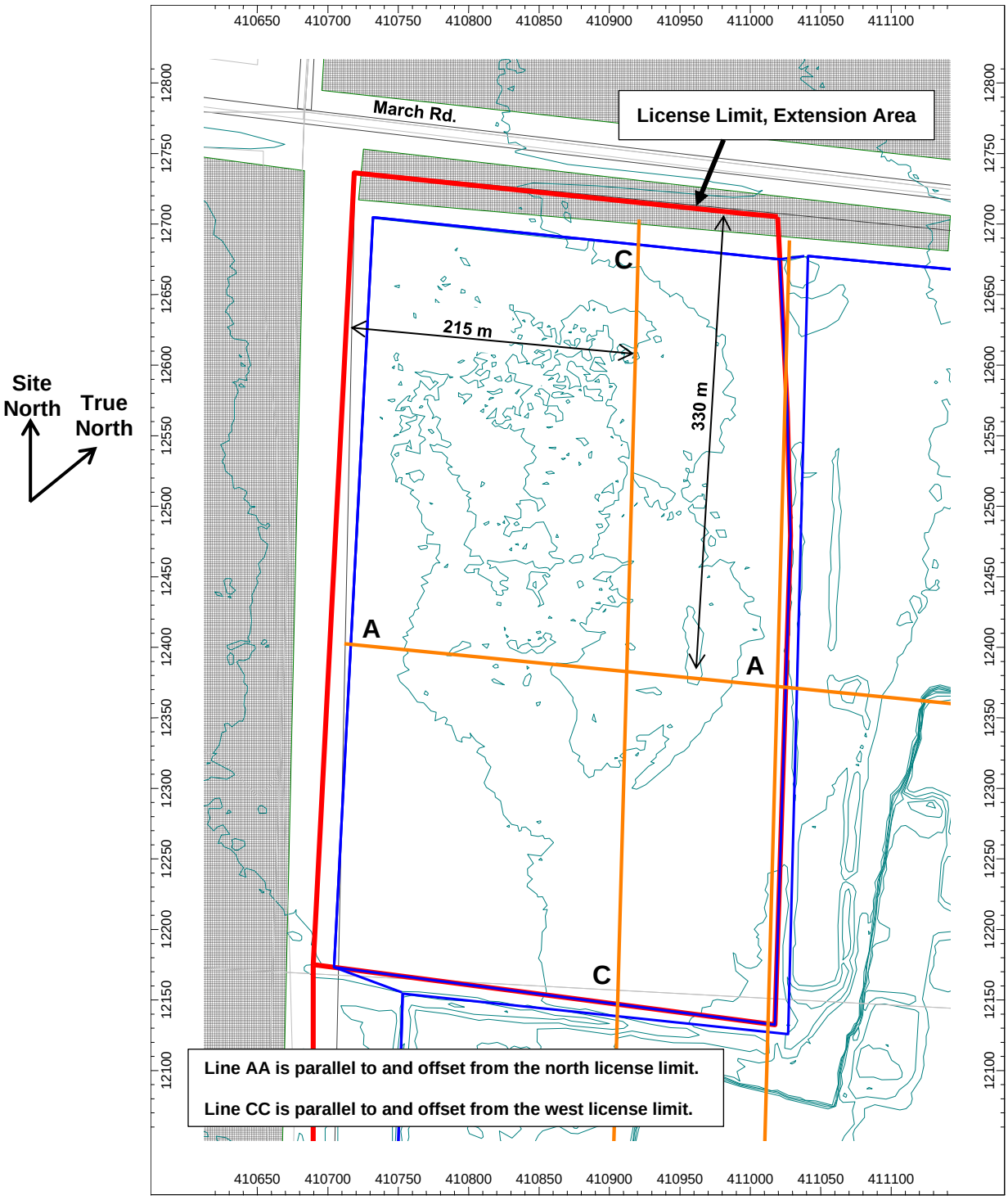


Figure 37: Mitigation Limit Lines in Extension Area (showing when barriers are needed)



Appendix 1

Zoning Plan and Land Use Designations

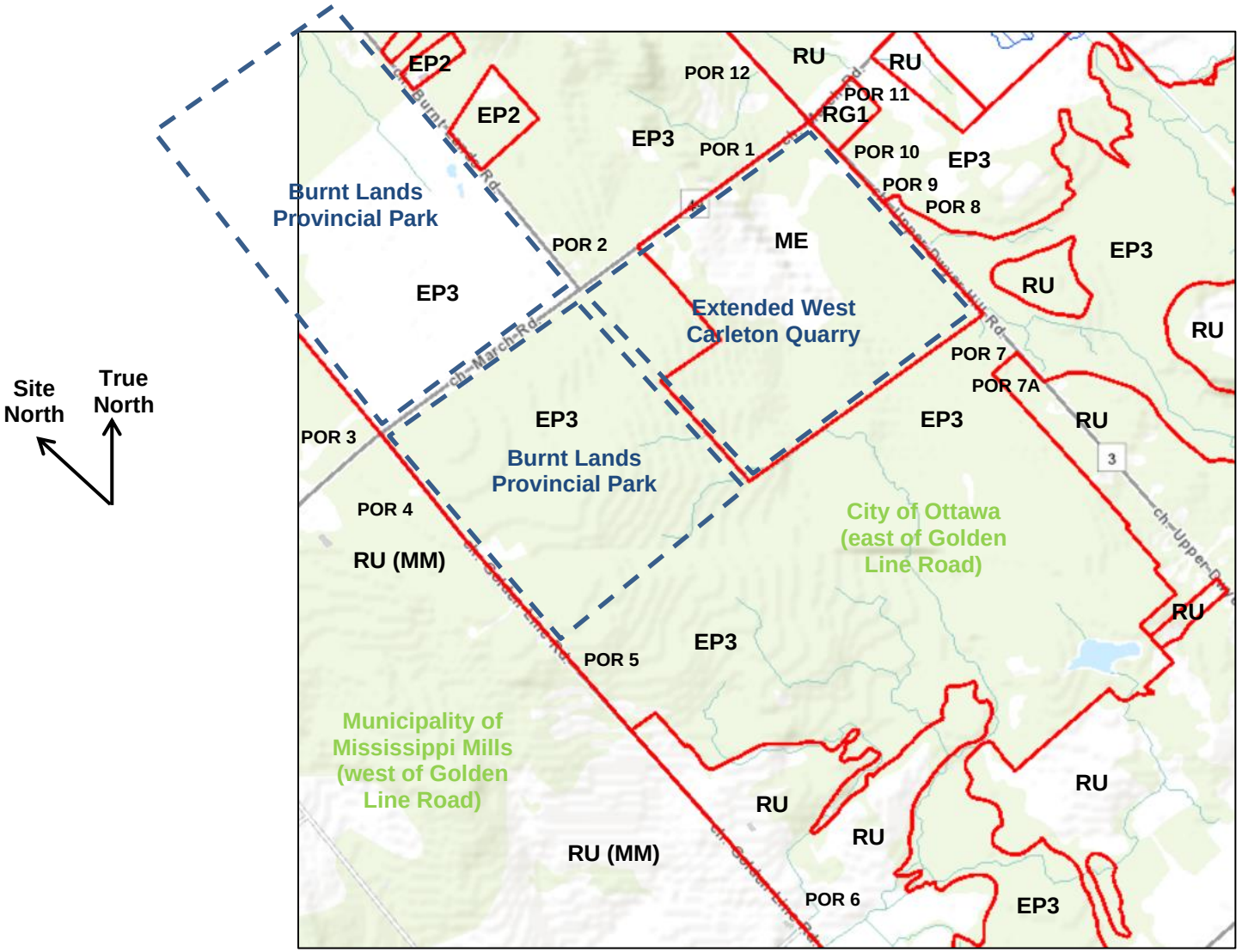
Contents:

- **Zoning Map:**
  - City of Ottawa, Zoning By-law 2008 - 250 (source: GeoOttawa)
  - Municipality of Mississippi Mills, Zoning By-lay 11-83, 2020 Consolidation

Legend:

Symbol	Zone
ME	Mineral Extraction Zone, (City of Ottawa)
EP3, EP2	Environmental Protection Zone, (City of Ottawa)
RU	Rural Countryside Zone, (City of Ottawa)
RG1	Rural General Industrial Zone, (City of Ottawa)
RU (MM)	Rural Zone (Mississippi Mills)

Zoning Map: (City of Ottawa Zoning By-law 2008-250, Municipality of Mississippi Mills, Zoning By-lay 11-83)



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 extraction area is modelled as reflective, absorption coefficient of 0.0. Nearby roads are also modelled as reflective. The surrounding area is modeled with an absorption coefficient of 1.0 indicative of a generally rural area.
4. MECP favored 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

ID	Address	Height	Coordinates		
			X	Y	Z
		(m)	(m)	(m)	(m)
POR1_W	4061 March Rd	4.5	411091.2	13041.9	146.6
POR2_W	1616 Burnt Lands Rd.	4.5	410500.5	12661.2	158.5
POR3_W	4512 March Rd.	4.5	409497.0	11908.7	164.5
POR4_W	1491 Golden Line Rd.	4.5	410075.3	11164.9	166.5
POR5_W	1350 Golden Line Rd.	4.5	410546.0	10744.5	160.5
POR6_W	1120 Golden Line Rd.	4.5	411601.0	9682.1	142.5
POR7_W	xxx* Upper Dwyer Hill Rd.	4.5	412354.2	12255.9	137.0
POR7A_W	1331 Upper Dwyer Hill Rd.	4.5	412522.7	12117.8	137.2
POR8_W	1486 Upper Dwyer Hill Rd.	4.5	412462.7	13111.2	132.5
POR9_W	1500 Upper Dwyer Hill Rd.	4.5	412072.5	12988.2	131.6
POR10_W	1550 Upper Dwyer Hill Rd.	4.5	411805.3	13209.0	130.3
POR11_W	3950 March Rd.	4.5	411803.1	13431.5	130.5
POR12_W	1661 Upper Dwyer Hill Rd.	4.5	411242.0	13597.0	130.2
POR1_O	4061 March Rd	1.5	411099.1	13032.6	143.5
POR2_O	1616 Burnt Lands Rd.	1.5	410524.1	12673.5	155.2
POR3_O	4512 March Rd.	1.5	409510.0	11917.6	161.5
POR4_O	1491 Golden Line Rd.	4.5	410105.3	11164.9	166.5
POR5_O	1350 Golden Line Rd.	1.5	410562.4	10764.0	157.9
POR6_O	1120 Golden Line Rd.	1.5	411598.8	9709.2	139.5
POR7_O	xxx* Upper Dwyer Hill Rd.	1.5	412308.4	12255.8	135.5
POR7A_O	1331 Upper Dwyer Hill Rd.	1.5	412506.6	12138.9	132.8
POR8_O	1486 Upper Dwyer Hill Rd.	1.5	412439.2	13099.1	129.5
POR9_O	1500 Upper Dwyer Hill Rd.	1.5	412088.4	12970.1	127.5
POR10_O	1550 Upper Dwyer Hill Rd.	1.5	411787.6	13228.5	127.0
POR11_O	3950 March Rd.	1.5	411783.3	13412.8	127.1
POR12_O	1661 Upper Dwyer Hill Rd.	1.5	411253.9	13573.0	127.2

* POR7 is located immediately north of POR 7A. No address is assigned to this vacant lot on the City of Ottawa GeoOttawa maps.

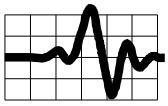


Table A2.2.1 Point Sources

ID	Result. PWL			Lw / Li	Noise Source Library File	Attenuation	Operating Time			Direct.	Height
	Day	Evening	Night	Type	Value		Day	Evening	Night		
	(dBA)	(dBA)	(dBA)				(min)	(min)	(min)		(m)
Gen_Exhaust_Scn*	103.1	103.1	103.1	Lw	Gen_Exh		60	0	0	Chimney	5.2
Crush_Scn*	122.3	122.3	122.3	Lw	Crush		60	0	0		4.0
Loader_Cr_Scn*	107.9	107.9	107.9	Lw	SA1_LOADER_1		60	0	0		3.0
Loader_ShipCr_Scn*	107.9	107.9	107.9	Lw	SA1_LOADER_1		60	30	0		3.0
Drill_Scn*	120.8	120.8	120.8	Lw	Rock_Drill_Unit112		60	0	0		2.0

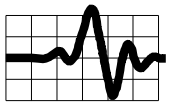


Table A2.2.2 Line Sources

ID	Result. PWL			Lw / Li	Noise Source Library File	Operating Time			Direct.	Moving Pt. Src			
	Day	Evening	Night	Type	Value	Day	Evening	Night		Number			Speed
	(dBA)	(dBA)	(dBA)			(min/hour)	(min/hour)	(min/hour)		Day	Evening	Night	(km/h)
Trucks_ShipWash	101.9	98.8	-4.2	PWL-Pt	Truck_Slow_Lw	60	60	0	(none)	4	2	0	20
Trucks_ShipCr_Scn1	105.8	102.8	-3.2	PWL-Pt	Truck_Slow_Lw	60	60	0	(none)	8	4	0	20
QTrucks_Wash_Scn1	108.2	0.4	0.4	PWL-Pt	Rock_Truck_CAT773F	60	0	0	(none)	6	0	0	20
Trucks_ShipCr_Scn2	107	104	-2.1	PWL-Pt	Truck_Slow_Lw	60	60	0	(none)	8	4	0	20
QTrucks_Wash_Scn2	110.2	2.4	2.4	PWL-Pt	Rock_Truck_CAT773F	60	0	0	(none)	6	0	0	20
Trucks_ShipCr_Scn2B	107.9	104.9	-1.1	PWL-Pt	Truck_Slow_Lw	60	60	0	(none)	8	4	0	20
QTrucks_Wash_Scn2B	111.1	3.3	3.3	PWL-Pt	Rock_Truck_CAT773F	60	0	0	(none)	6	0	0	20
Trucks_ShipCr_Scn2C	107.2	104.2	-1.8	PWL-Pt	Truck_Slow_Lw	60	60	0	(none)	8	4	0	20
QTrucks_Wash_Scn2C	109	1.2	1.2	PWL-Pt	Rock_Truck_CAT773F	60	0	0	(none)	6	0	0	20
Trucks_ShipCr_Scn3	107.1	104.1	-1.9	PWL-Pt	Truck_Slow_Lw	60	60	0	(none)	8	4	0	20
QTrucks_Wash_Scn3	108.3	0.5	0.5	PWL-Pt	Rock_Truck_CAT773F	60	0	0	(none)	6	0	0	20
Trucks_ShipCr_Scn4	108	105	-1	PWL-Pt	Truck_Slow_Lw	60	60	0	(none)	8	4	0	20
QTrucks_Wash_Scn4	111.3	3.6	3.6	PWL-Pt	Rock_Truck_CAT773F	60	0	0	(none)	6	0	0	20
Trucks_ShipCr_Scn5	104.4	101.3	-4.7	PWL-Pt	Truck_Slow_Lw	60	60	0	(none)	8	4	0	20
QTrucks_Wash_Scn5	106.2	-1.6	-1.6	PWL-Pt	Rock_Truck_CAT773F	60	0	0	(none)	6	0	0	20
Trucks_ShipCr_Scn6	107.9	104.9	-1.1	PWL-Pt	Truck_Slow_Lw	60	60	0	(none)	8	4	0	20
QTrucks_Wash_Scn6	110.9	3.1	3.1	PWL-Pt	Rock_Truck_CAT773F	60	0	0	(none)	6	0	0	20
Trucks_ShipCr_Scn7	104.4	101.4	-4.6	PWL-Pt	Truck_Slow_Lw	60	60	0	(none)	8	4	0	20
QTrucks_Wash_Scn7	102.6	-5.2	-5.2	PWL-Pt	Rock_Truck_CAT773F	60	0	0	(none)	6	0	0	20
Trucks_ShipCr_Scn8	107.3	104.3	-1.7	PWL-Pt	Truck_Slow_Lw	60	60	0	(none)	8	4	0	20
QTrucks_Wash_Scn8	108.1	0.3	0.3	PWL-Pt	Rock_Truck_CAT773F	60	0	0	(none)	6	0	0	20
Trucks_ShipCr_Scn9	105.7	102.7	-3.4	PWL-Pt	Truck_Slow_Lw	60	60	0	(none)	8	4	0	20
QTrucks_Wash_Scn9	106.6	-1.2	-1.2	PWL-Pt	Rock_Truck_CAT773F	60	0	0	(none)	6	0	0	20

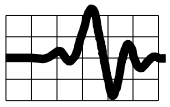


Table A2.2.3 Vertical Area Sources

ID	Result. PWL			Lw / Li	Noise Source Library File	Attenuation	Operating Time			Direct.	Height
	Day	Evening	Night	Type	Value		Day	Evening	Night		(m)
	(dBA)	(dBA)	(dBA)				(min/hour)	(min/hour)	(min/hour)		
Gen_OpenEnd_Scn*	100.5	100.5	100.5	Lw	Gen_OpenEnd	ALV_MV_12	60	0	0	(none)	3.6
Gen_RightLouvre_Scn*	96.5	96.5	96.5	Lw	Gen_Louvre	ALV_MV_12	60	0	0	(none)	2.6
Gen_LeftLouvre_Scn*	96.5	96.5	96.5	Lw	Gen_Louvre	ALV_MV_12	60	0	0	(none)	2.6

Table A2.3 Noise Source Library

ID	Type	Spectra (dB)											Source
		31.5	63	125	250	500	1000	2000	4000	8000	A	lin	
Wash_Meas_Lw	Lw	124.2	121.5	104.4	100.1	104	97.9	99.3	100.6	93.2	111.3	127	Measured 8 Oct 2020
Gen_OpenEnd	Lw	109.3	107.2	111.6	112.5	112.8	112.9	110.5	103.7	91.6	116.9	119.9	Measured 8 Oct 2020
Gen_Louvre	Lw	105.1	101.6	108	105.2	109.8	108.5	107	101.1	92.5	113.1	115.7	Measured 8 Oct 2020
Gen_Exh	Lw	101.8	110.2	110.4	108	108	101.4	97.5	89.1	76.5	108.1	115.8	Measured 8 Oct 2020
Crush	Lw	120.5	115.5	115.5	111.9	112.9	110.8	113	107.5	99.6	122.3	127.7	Measured Pakenham Q, 31 Aug 2020
Rock_Drill_Unit112	Lw	108.5	112.3	119.8	112.5	114.9	112.5	114.8	114	111.4	120.8	124.1	Site Measurements 23rd August 2017 at 8.0m
Truck_Slow_Lw	Lw	103.4	102.2	99.8	97.6	94.3	105.7	101.8	86.1	86.1	107.8	110.4	McNamee Measurements, 4 March 2016
SA1_LOADER_1	Lw	115.1	121	111.1	99.3	99.9	105.9	98.6	90.8	82.8	107.9	122.5	Albion_Pit_30 April 2018
Rock_Truck_CAT773F	Lw	113.4	114.1	117	110	107.2	111.1	104.3	96.2	89.9	113.5	121.1	Site Measurements 23rd August 2017

Table A2.4 Noise Measurement Data

ID	Type	Spectra (dB)											Source
		31.5	63	125	250	500	1000	2000	4000	8000	A	lin	
Wash_Meas_AMT1	Li	85.4	82.6	66.3	59	60.6	56.5	55.6	53.1	46.4	67.9	88.5	Measured 8 Oct 2020, 37.0 m
Wash_Meas_AMT2	Li	82.5	79	67	62.6	61.6	61.4	59.7	58.3	53.3	71.9	86.6	Measured 8 Oct 2020, 34.1 m
Wash_Meas_AMT3	Li	81.4	74	64.3	60.6	61.2	61.4	60.8	60	56.3	72.7	85.4	Measured 8 Oct 2020, 30.5 m
Wash_Meas_AMT4	Li	82.6	75.5	67.3	61.2	61	61.8	62.1	62.8	57.7	73.5	86	Measured 8 Oct 2020, 28.0 m
Wash_Meas_AMT5	Li	82.2	77.9	67.6	61.3	60.3	59.4	59.7	59.3	55.2	71.4	86.5	Measured 8 Oct 2020, 32.3 m
Wash_Meas_AMT6	Li	86.7	84	66.9	62.6	66.5	60.4	61.8	63.1	55.7	73.8	89.5	Measured 8 Oct 2020, 26.1 m
Gen_OpenEnd_45	Li	84.2	79.8	89.1	86.6	88	88.4	84.8	78.7	67.9	97.4	100.5	Measured 8 Oct 2020, 5 m, 45 deg
Gen_OpenEnd_0	Li	84.5	82.4	86.8	87.7	88	88.1	85.7	78.9	66.8	97.4	100	Measured 8 Oct 2020, 5 m, 0 deg
Gen_OpenEnd_-45	Li	84.8	82.8	86.6	86.4	87.9	87.6	84.5	79	68.8	96.9	99.5	Measured 8 Oct 2020, 5 m, -45 deg
Gen_Louvre_2m	Li	86.3	82.8	89.2	86.4	91	89.7	88.2	82.3	73.7	99.6	101.6	Measured 8 Oct 2020, 2 m, 0 deg
Gen_Exh_1.3m	Li	86	94.4	94.6	92.2	92.2	85.6	81.7	73.3	60.7	97	105.4	Measured 8 Oct 2020, 1.3 m, 90 deg
Gen_G1_12mRight	Li	85	80.1	77.5	76.6	78.6	78.2	76	68.8	59.8	88	92.1	Measured 8 Oct 2020, 12 m Right
Gen_G2_12mRear	Li	80.6	83.4	80.2	77.8	81.8	80.1	77.5	70.3	57.8	89.7	93.6	Measured 8 Oct 2020, 12 m rear
Gen_G3_12mLeft	Li	85.4	82.1	82.2	77.5	80.9	78.9	76.8	70.7	61.9	88.8	93.9	Measured 8 Oct 2020, 12 m Left
Truck_Slow_Li	Li	72.9	71.2	71.9	70.3	66.3	76	70.3	56.9	55.6	77.7	80.6	McNamee Measurements, 4 March 2016
Meas_SA1_LOADER_1	Li	90.7	96.6	86.7	74.9	75.5	81.5	74.2	66.4	58.4	83.5	98.1	Albion_Pit_30 April 2018 at 6.5m
Meas_Rock_Truck_CAT773F	Li	83.1	83.8	86.7	79.7	76.9	80.8	74	65.9	59.6	83.2	90.8	Site Measurements 23rd August 2017 at 12.0m

Table A2.5.1 Point of Reception Noise Impacts by Source for Scenario 1, Daytime Sound Level and Distance

Source	POR 1_W	POR 2_W	POR 3_W	POR 4_W	POR 5_W	POR 6_W	POR 7_W	POR 7A_W	POR 8_W	POR 9_W	POR 10_W	POR 11_W	POR 12_W	POR 1_O	POR 2_O	POR 3_O	POR 4_O	POR 5_O	POR 6_O	POR 7_O	POR 7A_O	POR 8_O	POR 9_O	POR 10_O	POR 11_O	POR 12_O
	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA
Wash	42.5	30.9	22.9	23.4	23.1	19.3	33.8	36.1	36.2	42.1	37.3	33.9	35.8	40.4	29.0	22.1	23.6	22.0	18.9	31.3	29.3	35.1	38.1	36.5	33.8	33.2
Loader_Wash1	39.1	27.3	18.7	19.4	19.1	15.0	30.5	27.9	32.8	38.6	33.4	30.2	32.0	37.5	25.7	17.4	19.5	18.1	14.8	28.1	25.8	32.3	35.0	32.5	30.1	30.0
Loader_Wash2	39.7	27.4	18.7	19.2	18.7	14.7	29.6	31.9	32.9	38.9	39.4	35.9	32.8	38.1	25.9	18.3	19.3	15.5	14.4	27.4	25.4	32.4	30.7	33.9	35.5	30.6
Gen_Exhaust	20.9	23.8	26.6	28.5	27.3	22.0	34.7	31.9	36.8	41.1	34.5	29.8	18.4	18.2	19.5	20.7	28.6	19.9	20.2	31.0	28.6	33.6	32.8	31.8	28.1	16.4
Crush	35.2	33.4	32.4	34.8	34.3	29.3	42.9	39.8	44.0	44.0	45.2	38.0	26.8	32.8	29.2	27.7	34.9	24.8	27.2	38.6	37.0	41.7	40.6	43.7	36.4	24.5
Loader_Cr	27.5	24.7	23.1	24.1	23.3	18.3	30.7	27.8	32.2	31.8	29.0	27.2	24.0	27.4	23.0	20.7	24.2	19.1	18.0	28.7	26.2	31.6	29.5	28.4	26.9	23.1
Loader_ShipCr	39.4	33.0	23.3	24.4	23.5	18.4	31.2	28.1	27.6	32.0	37.7	30.7	29.9	34.7	30.2	21.0	24.5	19.3	18.2	29.1	26.3	27.3	29.6	37.0	30.4	28.1
Drill	46.6	43.3	32.7	32.9	31.6	25.9	44.5	41.4	35.8	40.1	41.0	38.7	37.2	43.9	39.6	29.0	33.0	29.7	24.7	36.8	37.9	34.6	36.2	39.5	37.5	34.5
Trucks_ShipWash	35.8	22.0	11.4	11.7	10.9	4.9	22.2	23.6	27.7	32.3	43.9	35.9	29.3	34.6	19.9	10.8	11.8	9.2	4.2	19.8	19.7	26.5	23.8	43.5	34.1	25.7
Trucks_ShipCr	46.7	29.0	17.6	17.7	16.5	10.4	27.5	26.6	27.4	30.8	37.0	33.8	31.9	46.3	26.3	16.7	17.8	13.1	9.4	24.6	22.1	27.0	27.2	36.2	33.6	28.5
QTrucks_Wash	41.1	32.1	22.0	22.9	22.3	17.0	33.1	31.2	32.0	38.2	36.4	32.3	30.1	36.0	29.3	20.6	23.1	20.1	16.3	30.1	27.3	29.9	33.4	34.1	31.5	26.8
Gen_OpenEnd	22.1	19.6	6.0	19.7	19.4	14.6	27.1	24.2	25.9	32.6	27.3	15.9	10.3	19.0	15.5	3.8	19.8	11.0	12.5	23.5	21.0	22.2	24.2	23.9	14.3	8.3
Gen_RightLouvre	20.1	15.0	1.0	1.6	0.5	-3.9	23.0	20.2	22.7	28.6	25.0	22.7	17.3	16.9	10.7	-1.2	1.7	-2.4	-5.8	19.2	16.8	18.0	20.0	22.7	21.0	14.7
Gen_LeftLouvre	17.6	21.2	14.5	15.6	15.4	10.4	8.1	5.7	9.4	12.8	14	8.5	5.8	14.5	16.3	7.7	15.7	6.7	8	4.6	2.8	8.3	5.9	11.2	7.2	3.4
Total	52.0	45.0	37.1	38.4	37.7	32.5	47.9	45.4	46.7	49.8	50.3	45.1	42.5	50.1	41.5	33.5	38.6	32.8	31.0	42.8	41.9	44.9	45.2	48.9	44.1	39.9
	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m
Wash	639	1111	2247	2150	2200	2988	851	1066	959	561	573	785	998	627	1087	2232	2129	2175	2961	811	1041	933	564	586	763	971
Loader_Wash1	654	1112	2240	2134	2180	2964	838	1053	970	574	595	808	1020	642	1088	2225	2113	2155	2937	798	1028	943	576	608	786	994
Loader_Wash2	591	1092	2248	2176	2240	3044	896	1113	953	548	528	737	938	579	1068	2232	2155	2215	3017	858	1088	927	554	540	713	911
Gen_Exhaust	502	679	1790	1763	1907	2897	1219	1419	1411	1005	918	1088	1053	491	658	1775	1744	1883	2870	1175	1398	1384	1012	920	1061	1030
Crush	479	657	1780	1767	1920	2920	1243	1443	1420	1013	917	1083	1034	469	636	1765	1749	1897	2893	1198	1422	1394	1020	918	1056	1011
Loader_Cr	477	680	1804	1786	1933	2922	1222	1423	1397	990	896	1065	1027	466	658	1788	1767	1909	2895	1178	1401	1370	997	898	1038	1004
Loader_ShipCr	520	719	1822	1778	1909	2880	1180	1379	1381	976	901	1076	1063	510	698	1807	1759	1885	2853	1135	1358	1354	982	904	1050	1039
Drill	442	658	1799	1800	1958	2956	1247	1450	1401	993	887	1050	996	432	636	1784	1782	1934	2929	1204	1428	1375	1001	888	1023	973
Trucks_ShipWash	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var
Trucks_ShipCr	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var
QTrucks_Wash	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var
Gen_OpenEnd	502	679	1790	1763	1907	2897	1219	1419	1411	1005	918	1088	1053	491	658	1775	1744	1883	2870	1175	1398	1384	1012	920	1061	1030
Gen_RightLouvre	502	679	1790	1763	1907	2897	1219	1419	1411	1005	918	1088	1053	491	658	1775	1744	1883	2870	1175	1398	1384	1012	920	1061	1030
Gen_LeftLouvre	502	679	1790	1763	1907	2897	1219	1419	1411	1005	918	1088	1053	491	658	1775	1744	1883	2870	1175	1398	1384	1012	920	1061	1030

Table A2.5.2 Point of Reception Impacts by Source for Scenario 2A, Daytime Sound Levels & Distances

Source	POR 1_W	POR 2_W	POR 3_W	POR 4_W	POR 5_W	POR 6_W	POR 7_W	POR 7A_W	POR 8_W	POR 9_W	POR 10_W	POR 11_W	POR 12_W	POR 1_O	POR 2_O	POR 3_O	POR 4_O	POR 5_O	POR 6_O	POR 7_O	POR 7A_O	POR 8_O	POR 9_O	POR 10_O	POR 11_O	POR 12_O
	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA
Wash	42.5	35.7	22.9	23.4	23.1	19.3	33.8	36.1	36.2	42.1	37.3	33.9	35.8	40.4	29.0	22.1	23.6	22.0	18.9	31.3	29.3	35.1	38.1	36.5	33.8	33.2
Loader_Wash1	39.1	27.3	18.7	19.4	19.1	15.0	30.5	27.9	32.8	38.6	33.4	30.2	32.0	37.5	25.7	18.0	19.5	18.1	14.8	28.1	25.8	32.3	35.0	32.5	30.1	30.0
Loader_Wash2	39.7	27.4	18.7	19.2	18.7	14.7	29.6	31.9	32.9	38.9	39.4	35.9	32.8	38.1	25.9	18.3	19.3	15.5	14.4	27.4	25.4	32.4	30.7	33.9	35.5	30.6
Gen_Exhaust	35.6	34.3	29.2	27.8	26.3	21.0	37.5	35.2	31.2	35.4	37.6	33.4	23.0	32.3	30.5	27.8	27.9	24.1	19.5	29.2	30.5	29.8	30.6	35.2	32.4	20.9
Crush	43.3	45.1	36.5	35.5	33.9	28.2	40.7	43.0	38.6	43.1	46.6	47.6	32.7	42.3	38.9	35.3	35.6	31.9	26.9	37.8	35.5	37.5	35.6	45.0	45.8	30.4
Loader_Cr	44.1	34.9	24.6	23.7	22.3	17.3	28.5	26.0	25.1	27.9	29.4	27.5	32.0	41.4	31.3	24.2	23.8	21.5	17.1	24.7	21.4	24.8	20.9	28.8	28.2	28.2
Loader_ShipCr	48.2	36.3	24.4	23.8	22.5	17.5	33.7	31.3	31.7	36.1	38.1	35.6	31.8	43.2	33.7	24.1	23.9	21.8	17.3	27.3	25.1	31.1	29.1	36.6	35.2	29.7
Drill	43.4	40.3	30.8	36.8	30.5	24.8	42.2	31.1	29.8	32.6	34.4	33.2	31.7	42.6	36.9	29.4	37.0	28.5	23.6	34.6	28.3	28.5	22.2	32.7	32.1	29.4
Trucks_ShipWash	35.8	22.0	11.4	11.7	10.9	4.9	22.2	23.6	27.7	32.3	43.9	35.9	29.3	34.6	19.9	10.8	11.8	9.3	4.2	19.8	19.7	26.5	23.8	43.5	34.1	25.7
Trucks_ShipCr	47.5	31.5	19.2	19.2	17.9	11.6	29.6	28.0	28.8	32.8	37.7	34.6	32.3	46.5	28.7	18.6	19.3	15.1	10.9	25.8	23.2	28.4	28.5	36.7	34.3	29.0
QTrucks_Wash	45.9	39.7	24.7	25.1	24.3	18.8	35.8	32.1	34.2	39.9	39.4	36.1	32.8	39.9	33.5	23.9	25.3	22.6	18.0	31.3	28.6	32.4	35.6	37.6	35.1	29.9
Gen_OpenEnd	27.1	29.1	14.2	20.2	18.8	13.6	29.8	27.6	23.0	26.9	28.9	19.9	16.3	25.8	23.3	12.1	20.3	16.8	12.4	21.7	19.7	21.6	17.9	26.4	19.2	13.7
Gen_RightLouvre	35.0	17.1	4.3	3.7	1.9	-1.9	25.8	23.5	18.9	22.8	24.6	22.3	23.1	32.3	12.9	2.6	3.8	0.1	-4.1	17.4	15.4	17.3	13.0	22.1	21.1	19.9
Gen_LeftLouvre	26.0	28.3	16.9	16.1	14.7	9.4	12.0	9.9	6.8	9.9	12.2	9.6	12.2	21.2	22.7	15.3	16.2	12.4	7.9	4.3	7.1	5.7	5.1	10.1	9.1	8.8
Total	54.4	48.5	38.9	40.2	37.1	31.7	46.8	45.5	43.7	48.8	50.7	49.3	42.7	51.9	43.5	37.8	40.3	35.2	30.6	41.8	39.3	42.7	43.3	49.2	47.8	40.1
	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m
Wash	639	1111	2247	2150	2200	2988	851	1066	959	561	573	785	998	627	1087	2232	2129	2175	2961	811	1041	933	564	586	763	971
Loader_Wash1	654	1112	2240	2134	2180	2964	838	1053	970	574	595	808	1020	642	1088	2225	2113	2155	2937	798	1028	943	576	608	786	994
Loader_Wash2	591	1092	2248	2176	2240	3044	896	1113	953	548	528	737	938	579	1068	2232	2155	2215	3017	858	1088	927	554	540	713	911
Gen_Exhaust	288	535	1751	1859	2074	3133	1421	1629	1478	1070	898	1026	863	280	510	1735	1843	2051	3106	1378	1606	1453	1082	893	998	843
Crush	273	521	1745	1867	2089	3156	1446	1655	1492	1085	905	1027	848	267	495	1729	1852	2067	3129	1403	1631	1466	1097	899	1000	828
Loader_Cr	261	545	1768	1883	2100	3158	1426	1636	1468	1061	882	1005	836	254	519	1752	1868	2077	3131	1384	1612	1443	1073	876	978	816
Loader_ShipCr	293	571	1779	1868	2072	3115	1381	1589	1444	1036	871	1005	865	285	546	1763	1853	2049	3087	1338	1566	1418	1047	867	978	844
Drill	236	536	1769	1902	2127	3192	1455	1665	1479	1073	883	999	810	230	510	1753	1887	2105	3165	1413	1642	1453	1086	876	972	791
Trucks_ShipWash	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var
Trucks_ShipCr	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var
QTrucks_Wash	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var
Gen_OpenEnd	288	535	1751	1859	2074	3133	1421	1629	1478	1070	898	1026	863	280	510	1735	1843	2051	3106	1378	1606	1453	1082	893	998	843
Gen_RightLouvre	288	535	1751	1859	2074	3133	1421	1629	1478	1070	898	1026	863	280	510	1735	1843	2051	3106	1378	1606	1453	1082	893	998	843
Gen_LeftLouvre	288	535	1751	1859	2074	3133	1421	1629	1478	1070	898	1026	863	280	510	1735	1843	2051	3106	1378	1606	1453	1082	893	998	843

Table A2.5.3 Point of Reception Impacts by Source for Scenario 2B, Daytime Sound Levels & Distances

Source	POR 1_W	POR 2_W	POR 3_W	POR 4_W	POR 5_W	POR 6_W	POR 7_W	POR 7A_W	POR 8_W	POR 9_W	POR 10_W	POR 11_W	POR 12_W	POR 1_O	POR 2_O	POR 3_O	POR 4_O	POR 5_O	POR 6_O	POR 7_O	POR 7A_O	POR 8_O	POR 9_O	POR 10_O	POR 11_O	POR 12_O
	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA
Wash	42.5	35.7	22.9	23.4	23.1	19.3	33.8	36.1	36.2	42.1	37.3	33.9	35.8	40.4	29.0	22.1	23.6	22.0	18.9	31.3	29.3	35.1	38.1	36.5	33.8	33.2
Loader_Wash1	39.1	27.3	18.7	19.4	19.1	15.0	30.5	27.9	32.8	38.6	33.4	30.2	32.0	37.5	25.7	18.0	19.5	18.1	14.8	28.1	25.8	32.3	35.0	32.5	30.1	30.0
Loader_Wash2	39.7	27.4	18.7	19.2	18.7	14.7	29.6	31.9	32.9	38.9	39.4	35.9	32.8	38.1	25.9	18.3	19.3	15.5	14.4	27.4	25.4	32.4	30.7	33.9	35.5	30.6
Gen_Exhaust	33.8	28.4	29.6	28.7	26.8	20.8	31.3	28.7	33.6	32.4	34.1	30.8	24.3	31.5	27.6	27.4	28.8	23.6	19.9	27.8	25.4	30.1	28.9	31.2	29.2	22.5
Crush	43.8	43.8	35.9	35.0	33.6	28.2	39.1	36.3	40.6	39.5	41.3	39.1	33.8	40.1	43.3	32.2	35.0	29.5	27.4	36.2	33.6	34.4	36.4	38.9	37.9	31.8
Loader_Cr	33.5	34.3	26.6	25.5	23.7	17.7	27.1	24.4	24.1	27.5	29.2	27.2	25.3	30.9	34.6	25.0	25.6	21.4	17.6	25.5	23.3	23.7	25.7	27.8	26.9	24.0
Loader_ShipCr	35.3	38.5	26.8	25.7	23.9	17.9	27.4	24.7	24.2	27.7	29.5	27.2	27.9	33.8	38.1	25.2	26.0	21.6	17.8	25.8	23.6	23.9	25.8	27.9	26.9	26.4
Drill	42.2	42.5	32.3	34.6	32.0	25.0	40.7	33.1	37.5	41.4	38.3	36.2	28.9	39.5	42.1	31.4	34.7	30.4	24.1	33.1	30.5	35.0	33.5	36.1	35.0	22.1
Trucks_ShipWash	35.8	22.0	11.4	11.7	10.9	4.9	22.2	23.6	27.7	32.3	43.9	35.9	29.3	34.6	19.9	10.8	11.8	9.3	4.2	19.8	19.7	26.5	23.8	43.5	34.1	25.7
Trucks_ShipCr	47.3	35.5	21.2	21.1	19.5	12.7	28.9	27.5	29.3	32.1	37.9	34.8	32.4	46.5	31.2	20.6	21.2	17.1	12.0	26.4	23.7	28.8	28.7	36.4	33.9	29.2
QTrucks_Wash	44.2	41.6	26.6	26.9	25.8	19.8	34.6	32.3	34.5	40.0	37.9	36.0	32.8	38.8	35.7	25.9	27.1	24.0	19.1	31.7	28.9	32.7	34.7	36.0	33.5	30.0
Gen_OpenEnd	24.5	29.5	10.6	19.0	17.9	13.7	23.7	21.1	22.9	24.0	25.7	17.9	12.2	21.4	27.7	9.4	19.0	13.9	12.8	20.3	18.0	18.8	20.5	22.7	16.4	10.4
Gen_RightLouvre	26.6	26.3	4.2	3.8	2.0	-2.0	19.6	17.0	16.5	19.9	21.6	19.3	18.8	23.4	25.2	3.4	3.9	0.3	-2.6	16.0	13.7	14.5	16.2	18.4	17.5	16.4
Gen_LeftLouvre	15.8	28.2	14.3	14.3	13.5	9.4	6.0	4.0	8.1	5.6	8.7	6.6	5.4	12.6	26.9	11.4	14.3	9.0	8.5	2.7	1.4	3.0	2.6	5.8	5.1	3.5
Total	52.3	48.9	39.3	39.4	37.6	31.8	44.9	42.2	45.1	48.5	48.9	45.2	42.1	50.1	47.5	37	39.4	34.9	31.1	40.9	38.4	42.4	43.6	47.3	44	39.6
	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m
Wash	639	1111	2247	2150	2200	2988	851	1066	959	561	573	785	998	627	1087	2232	2129	2175	2961	811	1041	933	564	586	763	971
Loader_Wash1	654	1112	2240	2134	2180	2964	838	1053	970	574	595	808	1020	642	1088	2225	2113	2155	2937	798	1028	943	576	608	786	994
Loader_Wash2	591	1092	2248	2176	2240	3044	896	1113	953	548	528	737	938	579	1068	2232	2155	2215	3017	858	1088	927	554	540	713	911
Gen_Exhaust	689	233	1311	1459	1758	2967	1704	1894	1897	1488	1341	1470	1240	687	226	1295	1447	1738	2941	1659	1874	1871	1497	1337	1442	1224
Crush	685	206	1304	1470	1777	2992	1725	1916	1908	1499	1347	1471	1230	683	199	1288	1459	1757	2966	1680	1896	1882	1509	1342	1444	1215
Loader_Cr	666	219	1327	1485	1785	2991	1703	1895	1884	1475	1324	1450	1214	664	210	1311	1473	1764	2964	1658	1875	1858	1485	1319	1423	1199
Loader_ShipCr	676	269	1340	1465	1750	2944	1664	1854	1864	1456	1315	1448	1233	673	261	1324	1452	1729	2918	1619	1834	1838	1465	1311	1421	1217
Drill	653	186	1326	1507	1815	3026	1726	1919	1892	1482	1323	1444	1195	652	175	1311	1496	1795	3000	1681	1899	1866	1493	1318	1417	1180
Trucks_ShipWash	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var
Trucks_ShipCr	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var
QTrucks_Wash	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var
Gen_OpenEnd	689	233	1311	1459	1758	2967	1704	1894	1897	1488	1341	1470	1240	687	226	1295	1447	1738	2941	1659	1874	1871	1497	1337	1442	1224
Gen_RightLouvre	689	233	1311	1459	1758	2967	1704	1894	1897	1488	1341	1470	1240	687	226	1295	1447	1738	2941	1659	1874	1871	1497	1337	1442	1224
Gen_LeftLouvre	689	233	1311	1459	1758	2967	1704	1894	1897	1488	1341	1470	1240	687	226	1295	1447	1738	2941	1659	1874	1871	1497	1337	1442	1224

Table A2.5.4 Point of Reception Impacts by Source for Scenario 2C, Daytime Sound Levels & Distances

Source	POR 1_W	POR 2_W	POR 3_W	POR 4_W	POR 5_W	POR 6_W	POR 7_W	POR 7A_W	POR 8_W	POR 9_W	POR 10_W	POR 11_W	POR 12_W	POR 1_O	POR 2_O	POR 3_O	POR 4_O	POR 5_O	POR 6_O	POR 7_O	POR 7A_O	POR 8_O	POR 9_O	POR 10_O	POR 11_O	POR 12_O
	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA
Wash	42.5	30.9	22.9	23.4	23.1	19.3	33.8	36.1	36.2	42.1	37.3	33.9	35.8	40.4	29.0	22.1	23.6	22.0	18.9	31.3	29.3	35.1	38.1	36.5	33.8	33.2
Loader_Wash1	39.1	27.2	18.7	19.4	19.1	15.0	30.5	27.9	32.8	38.6	33.4	30.2	32.0	37.5	25.5	16.7	19.5	18.1	14.8	28.1	25.8	32.3	35.0	32.5	30.1	30.0
Loader_Wash2	39.7	27.4	18.7	19.2	18.7	14.7	29.6	31.9	32.9	38.9	39.4	35.9	32.8	38.1	25.9	18.3	19.3	15.5	14.4	27.4	25.4	32.4	30.7	33.9	35.5	30.6
Gen_Exhaust	23.3	23.5	25.5	30.7	29.0	23.1	35.6	31.9	31.0	33.4	29.4	26.0	18.0	19.2	19.9	24.0	30.9	26.8	22.0	31.8	28.7	29.4	30.1	26.6	24.0	15.8
Crush	36.5	40.7	34.5	37.9	36.9	30.5	43.9	39.9	38.0	42.1	41.6	39.2	32.9	33.1	36.8	31.6	38.1	34.4	29.5	40.7	37.1	36.8	39.0	39.3	37.4	30.4
Loader_Cr	27.4	30.6	24.4	26.0	25.1	19.5	31.8	26.9	26.1	29.4	26.4	25.3	24.3	26.2	28.4	23.0	26.2	21.5	19.3	29.6	24.9	25.7	27.4	25.5	24.8	23.1
Loader_ShipCr	33.7	34.0	24.8	26.0	25.3	19.7	32.2	28.2	31.0	34.8	30.2	28.2	27.2	31.4	31.6	24.3	26.2	24.1	19.5	29.9	26.5	30.4	28.0	29.4	27.8	25.9
Drill	46.0	37.0	28.4	34.6	33.6	27.2	45.7	41.6	39.9	39.4	39.9	37.6	36.7	43.3	33.4	20.5	34.8	31.5	26.1	37.8	34.1	37.6	36.3	38.2	36.4	34.5
Trucks_ShipWash	35.8	22.0	11.4	11.7	10.9	4.9	22.2	23.6	27.7	32.3	43.9	35.9	29.3	34.6	19.9	10.8	11.8	9.2	4.2	19.8	19.7	26.5	23.8	43.5	34.1	25.7
Trucks_ShipCr	47.0	29.8	19.2	19.7	18.9	12.6	30.0	28.3	30.5	34.8	38.2	34.7	32.3	46.4	27.3	17.5	19.9	16.8	11.9	27.2	24.1	29.3	30.0	37.4	34.4	29.1
QTrucks_Wash	40.7	32.5	22.9	24.1	23.6	18.2	34.3	31.9	32.7	39.2	36.8	34.6	32.0	37.3	30.0	21.9	24.2	21.6	17.4	31.1	28.2	31.2	33.3	34.7	33.0	28.9
Gen_OpenEnd	21.2	23.8	9.8	22.3	21.5	15.7	27.9	24.2	22.5	20.7	15.6	13.5	10.4	17.1	19.0	8.3	22.5	19.1	14.7	24.3	21.2	20.9	18.0	13.1	11.7	8.4
Gen_RightLouvre	22.3	18.5	3.9	5.1	4.8	-0.3	23.9	20.2	18.4	22.1	21.2	19.8	18.2	17.8	14.1	2.4	5.2	1.6	-2.2	20.0	16.9	16.6	18.3	18.3	17.5	15.3
Gen_LeftLouvre	16.6	24.9	17.1	18.2	17.4	11.5	9.9	6.9	6.3	9.1	8.2	6.6	5.2	12.4	20.4	15.4	18.4	14.8	10.3	12.6	3.7	5.0	6.1	6.0	4.9	2.9
Total	52.1	44.5	37.2	40.8	39.8	33.6	48.9	45.6	45.0	48.9	50.1	45.7	43.1	50.3	41.3	34.5	41.0	37.5	32.7	44.2	40.8	43.6	44.6	49.0	44.5	40.5
	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m
Wash	639	1111	2247	2150	2200	2988	851	1066	959	561	573	785	998	627	1087	2232	2129	2175	2961	811	1041	933	564	586	763	971
Loader_Wash1	654	1112	2240	2134	2180	2964	838	1053	970	574	595	808	1020	642	1088	2225	2113	2155	2937	798	1028	943	576	608	786	994
Loader_Wash2	591	1092	2248	2176	2240	3044	896	1113	953	548	528	737	938	579	1068	2232	2155	2215	3017	858	1088	927	554	540	713	911
Gen_Exhaust	806	765	1672	1508	1605	2597	1218	1391	1589	1200	1180	1368	1364	797	752	1657	1487	1581	2569	1172	1374	1562	1202	1186	1342	1341
Crush	785	738	1658	1510	1617	2620	1237	1412	1593	1203	1174	1360	1346	776	725	1643	1489	1593	2593	1191	1394	1567	1205	1180	1334	1323
Loader_Cr	781	754	1681	1530	1631	2621	1213	1390	1571	1181	1156	1343	1338	771	741	1667	1509	1607	2594	1168	1372	1544	1182	1162	1317	1315
Loader_ShipCr	821	803	1707	1527	1608	2578	1180	1352	1564	1178	1169	1360	1374	811	790	1693	1506	1584	2551	1134	1335	1537	1179	1176	1335	1350
Drill	747	722	1671	1541	1655	2656	1232	1411	1569	1176	1141	1324	1307	738	708	1657	1521	1631	2629	1186	1392	1542	1178	1146	1298	1285
Trucks_ShipWash	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var
Trucks_ShipCr	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var
QTrucks_Wash	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var
Gen_OpenEnd	806	765	1672	1508	1605	2597	1218	1391	1589	1200	1180	1368	1364	797	752	1657	1487	1581	2569	1172	1374	1562	1202	1186	1342	1341
Gen_RightLouvre	806	765	1672	1508	1605	2597	1218	1391	1589	1200	1180	1368	1364	797	752	1657	1487	1581	2569	1172	1374	1562	1202	1186	1342	1341
Gen_LeftLouvre	806	765	1672	1508	1605	2597	1218	1391	1589	1200	1180	1368	1364	797	752	1657	1487	1581	2569	1172	1374	1562	1202	1186	1342	1341

Table A2.5.5 Point of Reception Impacts by Source for Scenario 3, Daytime Sound Levels & Distances

Source	POR 1_W	POR 2_W	POR 3_W	POR 4_W	POR 5_W	POR 6_W	POR 7_W	POR 7A_W	POR 8_W	POR 9_W	POR 10_W	POR 11_W	POR 12_W	POR 1_O	POR 2_O	POR 3_O	POR 4_O	POR 5_O	POR 6_O	POR 7_O	POR 7A_O	POR 8_O	POR 9_O	POR 10_O	POR 11_O	POR 12_O
	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA
Wash	42.5	35.7	22.9	23.4	23.1	19.3	33.8	36.1	36.2	42.1	37.3	33.9	35.8	40.4	29.0	22.1	23.6	22.0	18.9	31.3	29.3	35.1	38.1	36.5	33.8	33.2
Loader_Wash1	39.1	27.3	18.7	19.4	19.1	15.0	30.5	27.9	32.8	38.6	33.4	30.2	32.0	37.5	25.7	18.0	19.5	18.1	14.8	28.1	25.8	32.3	35.0	32.5	30.1	30.0
Loader_Wash2	39.7	27.4	18.7	19.2	18.7	14.7	29.6	31.9	32.9	38.9	39.4	35.9	32.8	38.1	25.9	18.3	19.3	15.5	14.4	27.4	25.4	32.4	30.7	33.9	35.5	30.6
Gen_Exhaust	24.4	21.3	24.2	29.5	28.4	23.3	38.1	33.9	31.4	33.2	26.4	27.9	16.5	19.8	17.9	22.6	29.7	26.1	22.0	33.7	30.6	29.9	30.0	23.8	24.3	14.4
Crush	42.9	43.5	35.1	36.5	36.2	30.6	46.7	42.2	39.8	44.2	44.0	41.3	37.2	35.6	40.2	32.8	36.7	34.1	29.6	42.7	39.2	38.7	40.9	42.2	40.0	34.7
Loader_Cr	32.2	31.5	23.4	24.7	24.4	19.5	34.5	30.2	27.9	32.1	31.7	29.4	27.6	25.9	29.5	22.6	24.9	20.6	19.3	31.4	28.1	27.6	29.7	30.9	29.0	26.2
Loader_ShipCr	34.6	31.4	23.2	24.7	24.6	19.7	35.1	30.5	27.9	32.0	31.5	29.1	27.2	32.9	29.5	22.8	24.9	22.9	19.5	31.6	28.3	27.6	29.6	30.6	28.7	25.9
Drill	50.3	46.5	32.0	33.3	32.9	27.3	43.8	39.2	28.8	34.0	35.3	30.9	36.6	43.0	43.1	30.6	33.4	30.8	26.2	40.2	24.0	27.6	30.3	33.0	29.5	34.4
Trucks_ShipWash	35.8	22.0	11.4	11.7	10.9	4.9	22.2	23.6	27.7	32.3	43.9	35.9	29.3	34.6	19.9	10.8	11.8	9.3	4.2	19.8	19.7	26.5	23.8	43.5	34.1	25.7
Trucks_ShipCr	46.9	29.9	18.7	19.4	18.7	12.5	30.5	28.2	30.0	33.6	37.9	35.0	32.7	46.4	27.5	17.8	19.5	16.5	11.8	27.4	24.3	29.0	28.5	37.1	34.7	29.6
QTrucks_Wash	40.3	32.6	21.9	23.0	22.8	17.5	34.5	31.8	32.1	37.3	35.4	33.0	32.2	35.8	28.8	20.9	23.2	21.1	16.8	31.0	28.0	31.1	32.5	32.8	30.4	28.9
Gen_OpenEnd	24.0	22.3	8.7	21.1	20.9	15.8	30.5	26.3	18.9	25.0	16.9	18.1	9.9	19.1	17.8	7.0	21.3	18.7	14.8	25.8	23.0	17.4	20.1	14.8	13.5	8.5
Gen_RightLouvre	26.1	15.0	2.8	4.5	4.1	-0.6	26.5	22.3	20.0	24.0	23.7	21.4	17.5	17.9	11.1	1.1	4.6	0.8	-2.4	21.8	18.8	18.3	20.1	21.2	19.5	16.7
Gen_LeftLouvre	19.4	23.9	15.7	17.0	16.8	11.6	21.0	8.6	7.4	13.0	9.9	11.6	4.5	14.5	20.1	14.0	17.2	14.3	10.4	15.1	5.5	6.2	9.1	7.9	6.8	2.4
Total	53.7	48.9	37.9	39.5	39.1	33.7	49.7	45.9	43.8	48.8	49.1	45.3	43.6	50	45.5	36.2	39.7	37	32.8	45.9	41.4	42.9	44.8	47.7	44.2	41.1
	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m
Wash	639	1111	2247	2150	2200	2988	851	1066	959	561	573	785	998	627	1087	2232	2129	2175	2961	811	1041	933	564	586	763	971
Loader_Wash1	654	1112	2240	2134	2180	2964	838	1053	970	574	595	808	1020	642	1088	2225	2113	2155	2937	798	1028	943	576	608	786	994
Loader_Wash2	591	1092	2248	2176	2240	3044	896	1113	953	548	528	737	938	579	1068	2232	2155	2215	3017	858	1088	927	554	540	713	911
Gen_Exhaust	844	985	1933	1715	1735	2581	956	1133	1366	996	1037	1244	1350	833	969	1918	1692	1710	2554	910	1114	1340	993	1048	1219	1325
Crush	818	960	1918	1713	1744	2603	975	1154	1368	994	1026	1231	1328	807	943	1904	1691	1719	2576	929	1135	1342	992	1036	1206	1303
Loader_Cr	822	979	1942	1735	1760	2607	952	1132	1346	973	1011	1217	1325	810	962	1927	1712	1735	2580	906	1113	1320	972	1022	1193	1300
Loader_ShipCr	873	1026	1967	1734	1740	2563	918	1094	1346	982	1037	1247	1371	861	1010	1953	1711	1715	2536	873	1075	1321	979	1049	1223	1345
Drill	785	950	1931	1742	1779	2640	971	1154	1341	963	989	1193	1291	774	933	1916	1720	1754	2613	925	1135	1315	962	1000	1169	1266
Trucks_ShipWash	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var
Trucks_ShipCr	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var
QTrucks_Wash	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var
Gen_OpenEnd	844	985	1933	1715	1735	2581	956	1133	1366	996	1037	1244	1350	833	969	1918	1692	1710	2554	910	1114	1340	993	1048	1219	1325
Gen_RightLouvre	844	985	1933	1715	1735	2581	956	1133	1366	996	1037	1244	1350	833	969	1918	1692	1710	2554	910	1114	1340	993	1048	1219	1325
Gen_LeftLouvre	844	985	1933	1715	1735	2581	956	1133	1366	996	1037	1244	1350	833	969	1918	1692	1710	2554	910	1114	1340	993	1048	1219	1325

Table A2.5.6 Point of Reception Impacts by Source for Scenario 4, Daytime Sound Levels & Distances

Source	POR 1_W	POR 2_W	POR 3_W	POR 4_W	POR 5_W	POR 6_W	POR 7_W	POR 7A_W	POR 8_W	POR 9_W	POR 10_W	POR 11_W	POR 12_W	POR 1_O	POR 2_O	POR 3_O	POR 4_O	POR 5_O	POR 6_O	POR 7_O	POR 7A_O	POR 8_O	POR 9_O	POR 10_O	POR 11_O	POR 12_O
	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA
Wash	42.5	35.7	22.9	23.4	23.1	19.3	33.8	36.1	36.2	42.1	37.3	33.9	35.8	40.4	29.0	22.1	23.6	22.0	18.9	31.3	29.3	35.1	38.1	36.5	33.8	33.2
Loader_Wash1	39.1	27.3	18.7	19.4	19.1	15.0	30.5	27.9	32.8	38.6	33.4	30.2	32.0	37.5	25.7	18.0	19.5	18.1	14.8	28.1	25.8	32.3	35.0	32.5	30.1	30.0
Loader_Wash2	39.7	27.4	18.7	19.2	18.7	14.7	29.6	31.9	32.9	38.9	39.4	35.9	32.8	38.1	25.9	18.3	19.3	15.5	14.4	27.4	25.4	32.4	30.7	33.9	35.5	30.6
Gen_Exhaust	33.8	25.6	11.8	11.8	12.7	18.0	31.2	28.6	28.8	32.3	33.9	30.7	23.9	30.1	24.6	10.4	11.9	10.1	17.5	27.6	25.3	27.0	28.8	31.1	29.1	22.0
Crush	41.7	44.0	16.3	16.3	16.8	21.2	39.1	36.2	35.7	39.4	41.1	38.9	35.2	38.7	43.0	15.3	16.4	14.7	20.8	36.1	33.5	34.2	36.2	38.7	37.7	32.8
Loader_Cr	30.2	33.5	16.3	16.4	17.1	17.6	27.0	24.3	24.0	27.4	29.0	27.1	24.0	29.1	33.5	14.7	16.4	14.5	17.4	25.4	23.3	23.6	25.5	27.7	26.7	22.8
Loader_ShipCr	35.1	36.3	16.7	16.1	16.9	17.7	27.3	24.6	24.1	27.5	29.3	27.1	27.4	32.8	35.7	14.7	16.9	14.2	17.6	25.7	23.5	23.7	25.6	27.7	26.7	25.9
Drill	37.9	40.4	31.8	31.7	30.4	25.0	35.9	33.0	37.4	36.4	38.2	36.1	28.4	30.9	40.0	28.4	31.8	25.6	24.1	32.9	30.4	34.9	33.3	35.9	34.9	26.2
Trucks_ShipWash	35.8	22.0	11.4	11.7	10.9	4.9	22.2	23.6	27.7	32.3	43.9	35.9	29.3	34.6	19.9	10.8	11.8	9.3	4.2	19.8	19.7	26.5	23.8	43.5	34.1	25.7
Trucks_ShipCr	47.1	32.8	21.1	21.0	19.4	12.8	28.9	27.5	28.4	32.6	37.6	34.9	32.5	46.5	30.0	20.5	21.2	17.2	11.9	26.5	23.7	27.6	28.3	36.8	34.6	29.2
QTrucks_Wash	42.3	39.8	26.5	26.9	25.8	20.0	34.7	32.4	32.8	38.0	39.5	35.4	33.7	39.3	35.3	25.7	27.1	23.9	19.4	31.8	29.0	31.0	34.2	36.8	34.4	31.1
Gen_OpenEnd	23.7	28.5	0.4	2.9	3.8	9.5	23.6	21.0	20.5	23.8	25.6	17.8	10.9	19.2	26.4	0.0	2.9	1.4	8.9	20.2	17.9	18.7	20.3	22.5	16.1	9.1
Gen_RightLouvre	23.9	23.9	-4.0	-3.9	-3.7	-5.8	19.5	16.9	16.4	19.7	21.4	19.2	18.0	21.7	22.9	-4.4	-3.8	-4.9	-6.2	15.9	13.6	14.4	16.0	18.3	17.4	15.6
Gen_LeftLouvre	13.1	25.8	-2.3	-2.1	-1.2	4.4	5.9	3.8	4.3	5.4	8.4	6.2	4.1	10.9	24.5	-3.5	-2.1	-3.6	3.8	2.5	1.2	2.7	2.3	5.5	4.7	2.2
Total	51.3	47.8	34.1	34.3	33.2	29.6	43.6	42.1	43.4	47.6	49.0	45.0	42.4	49.6	46.4	32.0	34.3	30.1	29.0	40.8	38.4	42.0	43.5	47.4	44.1	39.9
	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m
Wash	639	1111	2247	2150	2200	2988	851	1066	959	561	573	785	998	627	1087	2232	2129	2175	2961	811	1041	933	564	586	763	971
Loader_Wash1	654	1112	2240	2134	2180	2964	838	1053	970	574	595	808	1020	642	1088	2225	2113	2155	2937	798	1028	943	576	608	786	994
Loader_Wash2	591	1092	2248	2176	2240	3044	896	1113	953	548	528	737	938	579	1068	2232	2155	2215	3017	858	1088	927	554	540	713	911
Gen_Exhaust	705	228	1292	1445	1749	2965	1719	1908	1915	1506	1360	1487	1254	703	223	1277	1434	1729	2938	1674	1889	1889	1515	1355	1460	1239
Crush	706	206	1283	1450	1761	2983	1738	1928	1927	1518	1367	1493	1251	705	202	1267	1439	1741	2956	1693	1908	1901	1528	1363	1466	1236
Loader_Cr	682	212	1308	1471	1776	2988	1719	1909	1902	1493	1342	1468	1229	680	204	1293	1460	1755	2962	1673	1889	1876	1503	1337	1440	1214
Loader_ShipCr	695	265	1320	1447	1737	2938	1680	1869	1885	1476	1336	1468	1251	692	258	1304	1434	1716	2912	1635	1849	1858	1485	1332	1441	1235
Drill	670	177	1308	1494	1807	3024	1741	1934	1910	1501	1341	1462	1210	669	169	1292	1483	1786	2998	1696	1913	1884	1511	1336	1435	1195
Trucks_ShipWash	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var
Trucks_ShipCr	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var
QTrucks_Wash	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var
Gen_OpenEnd	705	228	1292	1445	1749	2965	1719	1908	1915	1506	1360	1487	1254	703	223	1277	1434	1729	2938	1674	1889	1889	1515	1355	1460	1239
Gen_RightLouvre	705	228	1292	1445	1749	2965	1719	1908	1915	1506	1360	1487	1254	703	223	1277	1434	1729	2938	1674	1889	1889	1515	1355	1460	1239
Gen_LeftLouvre	705	228	1292	1445	1749	2965	1719	1908	1915	1506	1360	1487	1254	703	223	1277	1434	1729	2938	1674	1889	1889	1515	1355	1460	1239

Table A2.5.7 Point of Reception Impacts by Source for Scenario 5, Daytime Sound Levels & Distances

Source	POR 1_W	POR 2_W	POR 3_W	POR 4_W	POR 5_W	POR 6_W	POR 7_W	POR 7A_W	POR 8_W	POR 9_W	POR 10_W	POR 11_W	POR 12_W	POR 1_O	POR 2_O	POR 3_O	POR 4_O	POR 5_O	POR 6_O	POR 7_O	POR 7A_O	POR 8_O	POR 9_O	POR 10_O	POR 11_O	POR 12_O
	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA
Wash	42.5	35.7	22.9	23.4	23.1	19.3	33.8	36.1	36.2	42.1	37.3	33.9	35.8	40.4	29.0	22.1	23.6	22.0	18.9	31.3	29.3	35.1	38.1	36.5	33.8	33.2
Loader_Wash1	39.1	27.3	18.7	19.4	19.1	15.0	30.5	27.9	32.8	38.6	33.4	30.2	32.0	37.5	25.7	18.0	19.5	18.1	14.8	28.1	25.8	32.3	35.0	32.5	30.1	30.0
Loader_Wash2	39.7	27.4	18.7	19.2	18.7	14.7	29.6	31.9	32.9	38.9	39.4	35.9	32.8	38.1	25.9	18.3	19.3	15.5	14.4	27.4	25.4	32.4	30.7	33.9	35.5	30.6
Gen_Exhaust	30.7	29.7	27.0	27.4	26.1	21.3	34.8	32.5	38.4	38.7	37.3	31.2	20.2	28.1	25.6	25.1	27.5	21.5	19.8	31.1	29.2	35.3	34.9	35.0	29.9	17.6
Crush	46.6	40.0	34.1	33.6	33.6	28.5	42.9	40.5	41.0	41.7	48.8	48.4	38.3	42.9	35.6	30.5	34.5	26.9	26.4	39.8	37.6	39.5	37.3	48.0	47.3	35.3
Loader_Cr	36.0	26.8	20.2	19.6	21.3	17.4	30.6	28.3	28.9	31.1	36.2	34.7	29.0	33.2	24.9	18.1	21.0	16.7	15.4	28.7	26.6	28.6	28.5	36.1	34.5	27.2
Loader_ShipCr	41.5	32.7	22.8	22.9	22.2	17.7	31.2	28.8	34.1	34.6	40.9	38.1	36.3	40.3	30.3	22.2	23.0	21.2	17.5	28.2	26.8	29.2	31.7	40.3	37.7	33.7
Drill	44.2	42.6	31.4	31.3	30.3	25.1	39.7	37.2	32.8	43.4	39.0	35.9	34.1	42.2	39.5	30.0	31.4	28.1	23.8	36.7	34.5	31.9	38.1	37.2	34.7	31.4
Trucks_ShipWash	35.8	22.0	11.4	11.7	10.9	4.9	22.2	23.6	27.7	32.3	43.9	35.9	29.3	34.6	19.9	10.8	11.8	9.3	4.2	19.8	19.7	26.5	23.8	43.5	34.1	25.7
Trucks_ShipCr	46.6	27.5	15.9	15.6	14.5	8.4	25.5	25.7	26.9	29.6	36.8	33.7	31.8	46.3	24.8	15.2	15.8	12.5	7.5	22.9	20.2	26.2	25.9	36.1	33.5	28.3
QTrucks_Wash	41.4	31.0	19.3	19.8	19.2	14.2	30.5	27.8	29.8	35.2	38.2	35.0	32.2	39.0	26.7	18.3	19.9	17.4	13.2	27.4	24.8	29.0	31.0	36.7	34.1	29.0
Gen_OpenEnd	31.9	20.8	9.7	19.3	18.4	13.9	27.1	24.9	28.9	30.1	25.7	22.1	14.6	28.3	17.0	7.7	19.4	11.8	12.6	23.2	21.6	24.1	26.3	23.4	20.8	12.0
Gen_RightLouvre	31.0	14.2	2.9	3.7	2.5	-1.6	23.1	20.8	20.6	24.5	26.4	24.2	20.9	24.5	10.3	1.0	3.8	-0.7	-3.7	19.0	17.3	19.4	19.7	24.4	22.8	17.5
Gen_LeftLouvre	32.6	21.9	14.6	15.2	14.2	9.6	12.1	9.8	10.2	16.5	16.2	13.7	10.0	27.4	17.5	10.9	15.3	6.8	8.1	8.0	5.9	9.4	12.1	14.6	12.8	7.1
Total	52.9	45.8	37.2	37.1	36.7	31.8	46.2	44.4	45.5	49.4	52.0	50.0	44.1	51.1	42.3	34.9	37.6	32.6	30.2	43.1	41.0	43.8	44.8	51.0	49.1	41.4
	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m
Wash	639	1111	2247	2150	2200	2988	851	1066	959	561	573	785	998	627	1087	2232	2129	2175	2961	811	1041	933	564	586	763	971
Loader_Wash1	654	1112	2240	2134	2180	2964	838	1053	970	574	595	808	1020	642	1088	2225	2113	2155	2937	798	1028	943	576	608	786	994
Loader_Wash2	591	1092	2248	2176	2240	3044	896	1113	953	548	528	737	938	579	1068	2232	2155	2215	3017	858	1088	927	554	540	713	911
Gen_Exhaust	387	845	2026	2026	2154	3075	1125	1338	1179	770	655	826	856	375	821	2010	2007	2130	3048	1084	1314	1153	780	657	800	831
Crush	359	829	2017	2030	2166	3097	1151	1364	1191	782	655	820	834	347	804	2002	2012	2142	3070	1110	1340	1165	792	655	793	809
Loader_Cr	366	820	2004	2014	2150	3083	1151	1364	1202	793	670	836	848	354	795	1989	1996	2126	3056	1110	1340	1176	803	671	810	823
Loader_ShipCr	424	881	2054	2038	2154	3057	1085	1298	1149	740	640	819	877	411	857	2038	2019	2130	3030	1044	1274	1122	749	644	793	851
Drill	335	840	2038	2063	2203	3134	1164	1378	1175	767	626	787	797	323	814	2023	2045	2179	3107	1123	1354	1150	778	625	760	772
Trucks_ShipWash	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var
Trucks_ShipCr	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var
QTrucks_Wash	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var
Gen_OpenEnd	387	845	2026	2026	2154	3075	1125	1338	1179	770	655	826	856	375	821	2010	2007	2130	3048	1084	1314	1153	780	657	800	831
Gen_RightLouvre	387	845	2026	2026	2154	3075	1125	1338	1179	770	655	826	856	375	821	2010	2007	2130	3048	1084	1314	1153	780	657	800	831
Gen_LeftLouvre	387	845	2026	2026	2154	3075	1125	1338	1179	770	655	826	856	375	821	2010	2007	2130	3048	1084	1314	1153	780	657	800	831

Table A2.5.8 Point of Reception Impacts by Source for Scenario 6, Daytime Sound Levels & Distances

Source	POR 1_W	POR 2_W	POR 3_W	POR 4_W	POR 5_W	POR 6_W	POR 7_W	POR 7A_W	POR 8_W	POR 9_W	POR 10_W	POR 11_W	POR 12_W	POR 1_O	POR 2_O	POR 3_O	POR 4_O	POR 5_O	POR 6_O	POR 7_O	POR 7A_O	POR 8_O	POR 9_O	POR 10_O	POR 11_O	POR 12_O
	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA
Wash	42.5	35.7	22.9	23.4	23.1	19.3	33.8	36.1	36.2	42.1	37.3	33.9	35.8	40.4	29.0	22.1	23.6	22.0	18.9	31.3	29.3	35.1	38.1	36.5	33.8	33.2
Loader_Wash1	39.1	27.3	18.7	19.4	19.1	15.0	30.5	27.9	32.8	38.6	33.4	30.2	32.0	37.5	25.7	18.0	19.5	18.1	14.8	28.1	25.8	32.3	35.0	32.5	30.1	30.0
Loader_Wash2	39.7	27.4	18.7	19.1	18.7	14.7	29.6	31.9	32.9	38.9	39.4	35.9	32.8	38.1	25.9	18.3	19.3	15.5	14.4	27.4	25.4	32.4	30.7	33.9	35.5	30.6
Gen_Exhaust	32.8	21.6	12.7	13.0	14.9	18.0	31.2	28.7	29.0	32.4	34.3	30.8	19.2	27.5	21.0	10.2	13.0	11.0	17.0	25.8	25.3	27.2	28.5	31.3	29.2	17.0
Crush	47.3	42.9	19.7	19.9	22.0	22.5	35.6	34.9	36.1	37.3	41.8	39.2	35.3	41.2	41.7	17.2	21.0	18.0	21.7	29.4	31.2	34.6	33.3	39.1	38.0	32.3
Loader_Cr	34.8	31.9	17.2	17.1	18.1	15.8	24.0	23.2	24.3	25.4	29.5	27.4	22.6	29.9	32.2	14.9	18.1	14.8	15.7	20.8	21.6	24.0	23.3	28.1	27.1	21.5
Loader_ShipCr	26.8	28.7	19.5	19.9	19.8	17.6	27.0	24.5	24.4	27.6	29.5	27.6	17.8	25.3	29.6	17.2	19.9	16.4	17.5	24.1	23.4	24.0	25.4	28.2	27.2	17.1
Drill	44.6	37.9	16.6	16.2	17.7	23.8	36.6	33.6	37.6	36.7	38.5	36.0	36.2	42.4	37.0	14.5	17.0	14.3	23.0	33.6	31.0	31.4	33.5	36.2	34.7	33.8
Trucks_ShipWash	35.8	22.0	11.4	11.7	10.9	4.9	22.2	23.6	27.7	32.3	43.9	35.9	29.3	34.6	19.9	10.8	11.8	9.3	4.2	19.8	19.7	26.5	23.8	43.5	34.1	25.7
Trucks_ShipCr	47.4	31.2	20.9	20.3	18.4	12.1	28.9	29.5	30.0	31.5	38.4	35.4	32.7	46.8	28.3	20.0	20.5	16.2	10.9	25.5	23.3	29.5	28.0	37.3	35.1	29.4
QTrucks_Wash	46.0	37.8	26.2	25.9	23.7	18.6	32.8	34.2	34.0	38.4	40.1	37.1	34.2	41.9	32.6	25.0	26.0	21.9	17.3	30.0	27.8	32.8	34.6	37.5	35.2	31.3
Gen_OpenEnd	24.0	25.0	-0.4	4.5	6.4	9.5	21.7	20.5	20.7	22.7	25.9	17.6	6.4	17.5	24.2	-1.2	4.5	2.7	8.8	15.6	17.0	18.9	18.6	22.8	16.0	4.4
Gen_RightLouvre	25.7	20.5	-4.9	-4.4	-3.5	-5.9	17.8	16.5	16.6	18.7	21.7	19.4	12.1	19.0	19.6	-5.7	-4.3	-5.2	-6.4	11.3	12.8	14.6	14.4	18.6	17.7	9.7
Gen_LeftLouvre	14.8	22.1	-0.7	-0.2	1.7	5.3	5.4	3.2	4.0	5.4	8.5	6.3	0.2	11.5	21.1	-3.1	-0.2	-2.1	4.4	1.9	0.5	2.5	2.3	5.5	4.8	-1.7
Total	53.5	46.1	30.8	30.8	30.4	29.2	42.5	42.2	43.7	47.3	49.3	45.4	43.1	50.8	44.3	29.5	31.1	28.1	28.5	39.0	37.7	41.9	43.1	47.6	44.4	40.5
	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m
Wash	639	1111	2247	2150	2200	2988	851	1066	959	561	573	785	998	627	1087	2232	2129	2175	2961	811	1041	933	564	586	763	971
Loader_Wash1	654	1112	2240	2134	2180	2964	838	1053	970	574	595	808	1020	642	1088	2225	2113	2155	2937	798	1028	943	576	608	786	994
Loader_Wash2	591	1092	2248	2176	2240	3044	896	1113	953	548	528	737	938	579	1068	2232	2155	2215	3017	858	1088	927	554	540	713	911
Gen_Exhaust	675	243	1328	1470	1764	2966	1687	1877	1879	1470	1324	1453	1228	672	235	1313	1458	1743	2939	1642	1857	1853	1479	1320	1426	1212
Crush	676	260	1335	1466	1754	2951	1673	1862	1870	1461	1319	1450	1232	673	252	1320	1453	1733	2925	1627	1842	1844	1470	1315	1423	1216
Loader_Cr	648	261	1360	1493	1777	2967	1659	1850	1847	1438	1293	1423	1205	645	249	1345	1480	1756	2940	1614	1830	1821	1447	1289	1396	1188
Loader_ShipCr	616	222	1371	1533	1827	3020	1682	1876	1845	1435	1279	1402	1165	614	207	1355	1521	1806	2994	1637	1855	1819	1445	1273	1375	1150
Drill	712	296	1319	1425	1707	2905	1662	1849	1882	1474	1342	1478	1272	709	290	1304	1412	1687	2879	1617	1830	1856	1482	1338	1451	1256
Trucks_ShipWash	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var
Trucks_ShipCr	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var
QTrucks_Wash	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var
Gen_OpenEnd	675	243	1328	1470	1764	2966	1687	1877	1879	1470	1324	1453	1228	672	235	1313	1458	1743	2939	1642	1857	1853	1479	1320	1426	1212
Gen_RightLouvre	675	243	1328	1470	1764	2966	1687	1877	1879	1470	1324	1453	1228	672	235	1313	1458	1743	2939	1642	1857	1853	1479	1320	1426	1212
Gen_LeftLouvre	675	243	1328	1470	1764	2966	1687	1877	1879	1470	1324	1453	1228	672	235	1313	1458	1743	2939	1642	1857	1853	1479	1320	1426	1212

Table A2.5.9 Point of Reception Impacts by Source for Scenario 7, Daytime Sound Levels & Distances

Source	POR 1_W	POR 2_W	POR 3_W	POR 4_W	POR 5_W	POR 6_W	POR 7_W	POR 7A_W	POR 8_W	POR 9_W	POR 10_W	POR 11_W	POR 12_W	POR 1_O	POR 2_O	POR 3_O	POR 4_O	POR 5_O	POR 6_O	POR 7_O	POR 7A_O	POR 8_O	POR 9_O	POR 10_O	POR 11_O	POR 12_O
	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA
Wash	42.5	35.7	22.9	23.4	23.1	19.3	33.8	36.1	36.2	42.1	37.3	33.9	35.8	40.4	29.0	22.1	23.6	22.0	18.9	31.3	29.3	35.1	38.1	36.5	33.8	33.2
Loader_Wash1	39.1	27.3	18.7	19.4	19.1	15.0	30.5	27.9	32.8	38.6	33.4	30.2	32.0	37.5	25.7	18.0	19.5	18.1	14.8	28.1	25.8	32.3	35.0	32.5	30.1	30.0
Loader_Wash2	39.7	27.4	18.7	19.1	18.7	14.7	29.6	31.9	32.9	38.9	39.4	35.9	32.8	38.1	25.9	18.3	19.3	15.5	14.4	27.4	25.4	32.4	30.7	33.9	35.5	30.6
Gen_Exhaust	32.1	25.2	25.6	28.0	26.7	21.8	35.3	34.0	34.2	37.9	30.7	26.1	23.8	24.0	21.6	24.1	28.1	23.1	18.3	29.7	28.5	33.1	34.4	28.4	24.7	16.8
Crush	55.7	44.1	34.2	34.9	34.3	24.5	35.9	37.5	41.7	46.6	47.5	44.4	41.8	48.6	41.0	32.9	35.1	27.3	18.5	31.4	30.0	41.0	42.2	46.2	43.7	39.1
Loader_Cr	43.0	31.6	22.4	23.1	22.6	17.0	25.5	26.8	29.1	31.7	34.6	32.3	30.0	36.7	29.6	21.7	23.2	19.3	14.3	23.4	22.4	28.7	28.8	33.8	32.0	28.1
Loader_ShipCr	43.7	31.7	22.4	22.9	22.4	18.0	31.9	30.0	28.4	29.6	34.6	32.8	30.5	37.5	29.7	22.1	23.1	21.4	16.4	28.5	26.4	28.0	26.7	33.6	32.6	28.5
Drill	38.8	38.0	31.1	32.0	31.5	26.4	43.3	39.8	31.0	35.4	35.2	33.1	31.2	35.7	32.0	29.7	32.1	29.4	25.2	39.7	36.8	30.0	31.7	33.4	31.8	28.8
Trucks_ShipWash	35.8	22.0	11.4	11.7	10.9	4.9	22.2	23.6	27.7	32.3	43.9	35.9	29.3	34.6	19.9	10.8	11.8	9.4	4.2	19.8	19.7	26.5	23.8	43.5	34.1	25.7
Trucks_ShipCr	46.7	27.5	15.9	15.7	14.7	8.6	27.0	25.8	26.6	29.4	36.4	33.3	31.5	46.3	24.9	15.3	15.9	13.1	7.8	23.1	20.2	26.2	25.4	35.7	33.1	28.0
QTrucks_Wash	36.1	29.0	15.4	16.1	15.5	10.7	27.1	24.1	27.4	32.6	29.3	25.7	24.0	33.9	22.6	14.4	16.2	13.5	9.6	23.9	21.1	26.3	28.3	28.0	25.3	21.7
Gen_OpenEnd	29.2	24.1	8.5	19.7	19.2	13.8	23.5	24.8	25.6	29.5	27.0	24.5	14.4	23.7	19.2	6.5	19.8	14.6	9.1	18.6	17.2	24.5	25.6	23.8	21.4	12.1
Gen_RightLouvre	29.4	13.7	2.3	2.7	2.5	-2.6	19.5	21.0	21.5	25.3	26.9	24.2	21.8	24.8	9.7	0.3	2.8	-0.8	-4.5	14.3	13.0	20.3	21.1	24.9	22.7	18.8
Gen_LeftLouvre	35.3	24.0	14.9	15.6	15.0	9.7	14.9	8.3	7.9	15.7	16.2	13.8	9.1	26.9	20.1	13.2	15.7	10.5	4.8	10.6	4.5	6.9	11.4	13.6	11.9	6.6
Total	57.2	46.2	37.1	38.0	37.4	30.7	45.6	44.3	44.8	49.8	50.5	46.8	44.6	52.0	42.6	35.8	38.2	33.4	28.5	42.0	39.6	44.0	45.4	49.3	46.1	42.0
	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m
Wash	639	1111	2247	2150	2200	2988	851	1066	959	561	573	785	998	627	1087	2232	2129	2175	2961	811	1041	933	564	586	763	971
Loader_Wash1	654	1112	2240	2134	2180	2964	838	1053	970	574	595	808	1020	642	1088	2225	2113	2155	2937	798	1028	943	576	608	786	994
Loader_Wash2	591	1092	2248	2176	2240	3044	896	1113	953	548	528	737	938	579	1068	2232	2155	2215	3017	858	1088	927	554	540	713	911
Gen_Exhaust	599	967	2075	1976	2045	2893	945	1153	1136	738	723	924	1049	587	945	2060	1955	2020	2866	902	1130	1109	741	732	900	1023
Crush	616	981	2084	1978	2041	2881	929	1136	1130	734	727	930	1062	604	959	2069	1957	2016	2854	886	1113	1103	736	737	906	1036
Loader_Cr	611	996	2107	2005	2068	2903	921	1129	1104	707	700	904	1045	598	974	2092	1984	2043	2875	878	1106	1077	710	710	879	1019
Loader_ShipCr	563	979	2111	2032	2107	2954	953	1164	1093	691	661	861	992	551	956	2095	2011	2083	2927	912	1141	1067	696	670	836	966
Drill	656	991	2074	1948	2001	2834	911	1115	1149	758	767	973	1109	644	970	2059	1926	1976	2807	867	1092	1123	760	778	949	1083
Trucks_ShipWash	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var
Trucks_ShipCr	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var
QTrucks_Wash	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var
Gen_OpenEnd	599	967	2075	1976	2045	2893	945	1153	1136	738	723	924	1049	587	945	2060	1955	2020	2866	902	1130	1109	741	732	900	1023
Gen_RightLouvre	599	967	2075	1976	2045	2893	945	1153	1136	738	723	924	1049	587	945	2060	1955	2020	2866	902	1130	1109	741	732	900	1023
Gen_LeftLouvre	599	967	2075	1976	2045	2893	945	1153	1136	738	723	924	1049	587	945	2060	1955	2020	2866	902	1130	1109	741	732	900	1023

Table A2.5.10 Point of Reception Impacts by Source for Scenario 8, Daytime Sound Levels & Distances

Source	POR 1_W	POR 2_W	POR 3_W	POR 4_W	POR 5_W	POR 6_W	POR 7_W	POR 7A_W	POR 8_W	POR 9_W	POR 10_W	POR 11_W	POR 12_W	POR 1_O	POR 2_O	POR 3_O	POR 4_O	POR 5_O	POR 6_O	POR 7_O	POR 7A_O	POR 8_O	POR 9_O	POR 10_O	POR 11_O	POR 12_O
	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA
Wash	42.5	35.7	22.9	23.4	23.1	19.3	33.8	36.1	36.2	42.1	37.3	33.9	35.8	40.4	29.0	22.1	23.6	22.0	18.9	31.3	29.3	35.1	38.1	36.5	33.8	33.2
Loader_Wash1	39.1	27.3	18.7	19.4	19.1	15.0	30.5	27.9	32.8	38.6	33.4	30.2	32.0	37.5	25.7	18.0	19.5	18.1	14.8	28.1	25.8	32.3	35.0	32.5	30.1	30.0
Loader_Wash2	39.7	27.4	18.7	19.1	18.7	14.7	29.6	31.9	32.9	38.9	39.4	35.9	32.8	38.1	25.9	18.3	19.3	15.5	14.4	27.4	25.4	32.4	30.7	33.9	35.5	30.6
Gen_Exhaust	26.2	23.3	21.5	28.0	27.9	22.1	30.2	35.3	27.5	23.7	20.4	18.3	15.6	21.7	18.9	19.7	28.1	25.5	16.6	26.7	28.1	26.0	20.4	18.3	16.9	13.5
Crush	48.7	44.6	32.7	34.8	34.9	22.1	30.7	35.4	39.2	42.0	42.9	40.3	37.5	45.4	37.2	31.2	35.0	29.5	18.0	31.5	30.3	37.9	37.9	41.1	39.2	35.4
Loader_Cr	36.2	32.4	21.1	23.0	23.3	17.8	25.7	28.1	25.4	28.2	29.3	27.8	25.8	34.4	26.2	20.7	23.1	20.8	14.1	26.4	23.2	25.2	26.4	28.4	27.3	24.7
Loader_ShipCr	36.7	32.6	21.2	22.9	23.3	19.5	29.0	26.7	24.2	27.0	27.3	26.2	26.1	34.9	26.5	20.7	23.1	22.4	17.2	29.6	24.1	24.2	24.9	26.8	25.9	24.9
Drill	45.4	42.0	29.3	31.3	31.2	25.3	33.2	39.1	36.9	40.2	39.9	37.3	35.2	42.2	38.0	27.7	31.5	29.5	20.5	34.1	33.1	35.8	36.2	38.1	36.2	32.2
Trucks_ShipWash	35.8	22.0	11.4	11.7	10.9	4.9	22.2	23.6	27.7	32.3	43.9	35.9	29.3	34.6	19.9	10.8	11.8	9.4	4.2	19.8	19.7	26.5	23.8	43.5	34.1	25.7
Trucks_ShipCr	47.0	30.5	18.5	19.0	18.5	12.6	32.2	28.1	27.1	30.0	36.6	33.6	32.0	46.4	26.9	17.7	19.2	16.7	12.0	27.0	22.2	26.6	25.7	35.8	33.3	28.7
QTrucks_Wash	39.6	32.9	20.6	21.9	21.9	17.2	35.5	26.3	24.9	30.2	34.2	30.8	27.0	36.0	26.9	19.6	22.1	20.2	16.4	30.1	23.2	24.3	26.0	32.6	28.5	24.9
Gen_OpenEnd	20.8	17.3	6.1	11.6	19.7	14.2	22.1	25.7	13	18.2	12.7	10.7	10.9	11.8	9.5	4.2	12.1	17	8.3	18.6	18.8	11.9	14.8	10.8	9.5	8.8
Gen_RightLouvre	16.5	12	0.6	3	3	-3.3	17.8	20.9	19.9	21.8	22.4	20.4	18	7.1	3.7	-1.3	3.1	-0.4	-4.6	14.2	14.4	18.4	17.3	20	18.7	15.4
Gen_LeftLouvre	28.9	24.9	13.6	15.4	15.6	10.1	15.1	13.2	5.6	13.5	7.9	5.9	6	19.8	16.7	11.8	15.6	12.6	3.9	12	9.1	4.6	8.8	5.9	4.6	3.8
Total	53.4	47.5	35.7	37.8	37.9	30.3	41.9	43.8	43.8	48	49	45.1	43	51.1	41.8	34.3	38	34.7	27	40	38	42.8	43.6	47.6	44.1	40.6
	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m
Wash	639	1111	2247	2150	2200	2988	851	1066	959	561	573	785	998	627	1087	2232	2129	2175	2961	811	1041	933	564	586	763	971
Loader_Wash1	654	1112	2240	2134	2180	2964	838	1053	970	574	595	808	1020	642	1088	2225	2113	2155	2937	798	1028	943	576	608	786	994
Loader_Wash2	591	1092	2248	2176	2240	3044	896	1113	953	548	528	737	938	579	1068	2232	2155	2215	3017	858	1088	927	554	540	713	911
Gen_Exhaust	1153	1411	2327	1993	1886	2469	554	711	1167	885	1067	1289	1563	1141	1394	2313	1967	1861	2442	509	694	1144	873	1087	1271	1536
Crush	1170	1427	2339	1999	1887	2459	543	697	1169	892	1078	1301	1578	1158	1410	2325	1973	1861	2432	499	681	1146	879	1098	1283	1551
Loader_Cr	1164	1435	2358	2025	1914	2482	522	681	1141	866	1057	1279	1564	1152	1418	2345	1999	1889	2456	477	664	1119	853	1077	1261	1537
Loader_ShipCr	1116	1404	2350	2038	1943	2532	529	700	1107	821	1005	1228	1511	1104	1386	2336	2012	1917	2505	483	682	1084	809	1025	1210	1485
Drill	1200	1479	2400	2057	1936	2477	483	638	1128	866	1069	1291	1590	1187	1461	2386	2031	1911	2450	438	622	1105	852	1090	1274	1563
Trucks_ShipWash	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var
Trucks_ShipCr	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var
QTrucks_Wash	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var
Gen_OpenEnd	1153	1411	2327	1993	1886	2469	554	711	1167	885	1067	1289	1563	1141	1394	2313	1967	1861	2442	509	694	1144	873	1087	1271	1536
Gen_RightLouvre	1153	1411	2327	1993	1886	2469	554	711	1167	885	1067	1289	1563	1141	1394	2313	1967	1861	2442	509	694	1144	873	1087	1271	1536
Gen_LeftLouvre	1153	1411	2327	1993	1886	2469	554	711	1167	885	1067	1289	1563	1141	1394	2313	1967	1861	2442	509	694	1144	873	1087	1271	1536

Table A2.5.11 Point of Reception Impacts by Source for Scenario 9, Daytime Sound Levels & Distances

Source	POR 1_W	POR 2_W	POR 3_W	POR 4_W	POR 5_W	POR 6_W	POR 7_W	POR 7A_W	POR 8_W	POR 9_W	POR 10_W	POR 11_W	POR 12_W	POR 1_O	POR 2_O	POR 3_O	POR 4_O	POR 5_O	POR 6_O	POR 7_O	POR 7A_O	POR 8_O	POR 9_O	POR 10_O	POR 11_O	POR 12_O
	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA
Wash	42.5	35.7	22.9	23.4	23.1	19.3	33.8	36.1	36.2	42.1	37.3	33.9	35.8	40.4	29.0	22.1	23.6	22.0	18.9	31.3	29.3	35.1	38.1	36.5	33.8	33.2
Loader_Wash1	39.1	27.3	18.7	19.4	19.1	15.0	30.5	27.9	32.8	38.6	33.4	30.2	32.0	37.5	25.7	18.0	19.5	18.1	14.8	28.1	25.8	32.3	35.0	32.5	30.1	30.0
Loader_Wash2	39.7	27.4	18.7	19.1	18.7	14.7	29.6	31.9	32.9	38.9	39.4	35.9	32.8	38.1	25.9	18.3	19.3	15.5	14.4	27.4	25.4	32.4	30.7	33.9	35.5	30.6
Gen_Exhaust	26.8	23.9	26.2	29.2	27.7	20.9	34.0	31.1	32.5	35.9	30.8	26.9	18.3	23.2	19.5	24.7	29.3	23.9	15.0	26.9	26.5	31.2	32.2	28.2	25.1	15.8
Crush	50.3	45.6	35.5	36.3	30.4	24.1	35.1	33.4	39.9	44.6	45.0	42.8	40.6	47.8	41.5	34.1	36.4	24.2	19.0	29.4	29.4	38.9	38.6	43.5	41.5	37.9
Loader_Cr	37.7	33.0	23.6	24.4	21.1	16.1	25.1	23.4	28.1	32.5	32.9	30.7	28.9	36.1	30.2	23.2	24.5	17.5	13.1	22.1	21.7	27.8	29.6	32.1	30.3	27.0
Loader_ShipCr	38.6	33.2	23.6	24.2	23.5	18.5	31.5	28.5	28.2	32.6	33.3	30.8	29.4	37.0	30.3	23.2	24.4	21.4	16.3	26.8	25.8	27.9	29.6	32.5	30.5	27.3
Drill	46.8	42.7	32.4	33.4	32.7	27.0	42.5	38.4	36.7	41.4	41.7	39.2	37.3	44.3	39.0	31.1	33.5	29.7	25.9	38.3	35.4	35.6	37.8	40.1	38.1	34.7
Trucks_ShipWash	35.8	22.0	11.4	11.7	10.9	4.9	22.2	23.6	27.7	32.3	43.9	35.9	29.3	34.6	19.9	10.8	11.8	9.4	4.2	19.8	19.7	26.5	23.8	43.5	34.1	25.7
Trucks_ShipCr	46.7	28.8	17.3	17.4	16.4	10.2	28.3	26.6	27.1	30.1	36.7	33.6	31.7	46.4	26.1	16.7	17.5	14.6	8.9	24.2	21.6	26.6	25.9	35.9	33.4	28.3
QTrucks_Wash	38.0	31.5	19.9	20.6	20.0	14.6	29.4	27.2	29.0	33.4	32.3	30.0	27.7	35.9	27.0	19.1	20.8	16.2	11.9	25.4	22.5	28.0	29.0	31.1	29.2	25.0
Gen_OpenEnd	27.0	24.3	7.2	20.9	17.5	12.3	22.9	21.2	24.0	25.8	26.1	15.9	12.1	22.9	18.6	5.5	21.0	11.1	6.7	16.6	17.2	22.7	24.2	22.5	14.3	9.6
Gen_RightLouvre	29.8	15.4	1.9	1.8	1.1	-3.2	18.9	17.3	20.0	24.3	24.7	22.4	20.8	26.1	10.6	0.1	1.9	-1.2	-5.0	12.4	13.0	18.4	20.0	22.4	20.7	17.7
Gen_LeftLouvre	24.2	25.4	16.1	16.7	13.4	8.3	14.2	6.3	6.6	13.5	14.0	8.8	7.1	19.9	20.5	14.5	16.9	6.6	2.3	9.3	3.1	5.3	8.9	11.2	7.3	4.3
Total	54.2	48.2	38.3	39.3	36.5	30.8	45.0	42.8	44.4	49.4	50.0	46.5	44.6	52.3	44.3	37.0	39.5	33.0	28.6	40.8	38.7	43.5	44.7	48.6	45.5	42.0
	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m
Wash	639	1111	2247	2150	2200	2988	851	1066	959	561	573	785	998	627	1087	2232	2129	2175	2961	811	1041	933	564	586	763	971
Loader_Wash1	654	1112	2240	2134	2180	2964	838	1053	970	574	595	808	1020	642	1088	2225	2113	2155	2937	798	1028	943	576	608	786	994
Loader_Wash2	591	1092	2248	2176	2240	3044	896	1113	953	548	528	737	938	579	1068	2232	2155	2215	3017	858	1088	927	554	540	713	911
Gen_Exhaust	639	821	1868	1756	1846	2770	1080	1273	1355	959	931	1122	1164	628	802	1853	1736	1821	2742	1035	1253	1328	962	938	1096	1139
Crush	654	837	1877	1757	1841	2757	1065	1258	1349	955	933	1126	1176	643	818	1862	1737	1816	2730	1020	1237	1323	958	940	1101	1151
Loader_Cr	639	847	1900	1785	1868	2777	1052	1247	1323	929	906	1099	1155	628	828	1885	1764	1843	2750	1007	1226	1297	931	913	1073	1130
Loader_ShipCr	586	821	1901	1812	1909	2829	1076	1275	1311	912	871	1060	1103	575	801	1886	1792	1885	2802	1032	1254	1285	916	877	1034	1078
Drill	700	855	1869	1727	1800	2710	1054	1243	1370	980	971	1166	1223	689	837	1854	1706	1775	2683	1009	1223	1344	982	979	1141	1198
Trucks_ShipWash	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var
Trucks_ShipCr	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var
QTrucks_Wash	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var
Gen_OpenEnd	639	821	1868	1756	1846	2770	1080	1273	1355	959	931	1122	1164	628	802	1853	1736	1821	2742	1035	1253	1328	962	938	1096	1139
Gen_RightLouvre	639	821	1868	1756	1846	2770	1080	1273	1355	959	931	1122	1164	628	802	1853	1736	1821	2742	1035	1253	1328	962	938	1096	1139

Table A2.5.12 Point of Reception Impacts by Source for Scenario 10, Daytime Sound Levels & Distances

Source	POR 1_W	POR 2_W	POR 3_W	POR 4_W	POR 5_W	POR 6_W	POR 7_W	POR 7A_W	POR 8_W	POR 9_W	POR 10_W	POR 11_W	POR 12_W	POR 1_O	POR 2_O	POR 3_O	POR 4_O	POR 5_O	POR 6_O	POR 7_O	POR 7A_O	POR 8_O	POR 9_O	POR 10_O	POR 11_O	POR 12_O
	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA
Wash	42.5	35.7	22.9	23.4	23.1	19.3	33.8	36.1	36.2	42.1	37.3	33.9	35.8	40.4	29.0	22.1	23.6	22.0	18.9	31.3	29.3	35.1	38.1	36.5	33.8	33.2
Loader_Wash1	39.1	27.3	18.7	19.4	19.1	15.0	30.5	27.9	32.8	38.6	33.4	30.2	32.0	37.5	25.7	18.0	19.5	18.1	14.8	28.1	25.8	32.3	35.0	32.5	30.1	30.0
Loader_Wash2	39.7	27.4	18.7	19.1	18.7	14.7	29.6	31.9	32.9	38.9	39.4	35.9	32.8	38.1	25.9	18.3	19.3	15.5	14.4	27.4	25.4	32.4	30.7	33.9	35.5	30.6
Gen_Exhaust	26.2	23.5	21.6	27.7	27.6	13.2	19.5	10.6	9.7	7.2	5.7	4.5	10.1	17.3	15.5	19.8	27.8	20.7	7.5	20.4	9.4	8.9	4.4	4.9	4.1	6.8
Crush	48.7	44.3	32.5	34.5	34.4	18.0	26.4	18.2	22.3	26.0	24.8	22.8	28.9	40.7	36.8	30.9	34.6	26.6	13.3	28.1	17.0	21.6	21.7	23.5	22.0	25.0
Loader_Cr	36.3	32.4	21.1	22.9	23.2	11.6	21.3	15.2	16.0	18.6	19.7	18.8	22.6	29.7	26.1	20.6	23.1	18.1	7.5	21.3	12.2	16.1	16.8	19.8	19.1	21.4
Loader_ShipCr	36.5	32.5	21.1	22.9	23.3	14.1	22.4	14.7	16.1	18.5	18.9	18.0	22.5	29.9	26.2	20.7	23.1	18.7	9.4	22.5	12.5	16.3	16.5	18.8	18.1	21.4
Drill	45.2	41.2	28.6	30.4	30.2	17.4	41.2	37.3	34.4	42.5	45.4	42.4	39.6	41.8	37.3	26.9	30.6	28.5	14.6	38.8	34.7	33.2	38.0	42.8	40.4	35.8
Trucks_ShipWash	35.8	22.0	11.4	11.7	10.9	4.9	22.2	23.6	27.7	32.3	43.9	35.9	29.3	34.6	19.9	10.8	11.8	9.4	4.2	19.8	19.7	26.5	23.8	43.5	34.1	25.7
Trucks_ShipCr	46.9	29.3	18.6	19.1	18.7	12.8	29.9	25.5	26.4	29.1	36.3	33.2	31.4	46.4	26.8	17.8	19.3	14.6	11.5	25.0	19.9	26.0	25.3	35.5	33.0	28.0
QTrucks_Wash	39.8	29.3	20.9	22.2	22.3	17.5	32.2	25.2	24.5	30.1	34.0	30.5	23.5	32.9	27.0	19.9	22.4	18.3	14.8	27.4	22.4	24.0	25.8	32.4	27.9	21.3
Gen_OpenEnd	20.9	17.2	4.2	8.6	19.4	5.5	12.5	3.9	6.0	9.6	7.7	5.2	4.1	11.8	9.2	2.3	16.3	12.2	0.2	13.4	2.3	5.1	5.2	5.9	4.1	1.9
Gen_RightLouvre	16.2	11.9	-1.0	1.4	0.8	-7.0	8.2	-0.8	2.9	6.1	5.5	3.9	9.4	6.8	3.4	-2.8	1.6	-2.3	-7.9	9.0	-2.2	2.0	1.8	4.1	3.0	5.4
Gen_LeftLouvre	28.9	23.2	13.4	15.1	15.3	1.4	7.0	-1.7	1.9	5.6	3.7	1.2	-0.1	19.8	16.4	11.5	15.3	7.6	-4.2	8.1	-2.7	0.8	1.0	1.7	0.0	-2.4
Total	53.3	47.1	35.4	37.5	37.4	26.1	43.2	41.0	40.9	47.2	49.2	45.1	43.0	50.0	41.4	34.1	37.7	32.6	24.0	40.9	37.0	40.0	42.6	47.5	43.7	39.9
	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m
Wash	639	1111	2247	2150	2200	2988	886	1066	959	561	573	785	998	627	1087	2232	2129	2175	2961	856	1041	933	564	586	763	971
Loader_Wash1	654	1112	2240	2134	2180	2964	866	1053	970	574	595	808	1020	642	1088	2225	2113	2155	2937	835	1028	943	576	608	786	994
Loader_Wash2	591	1092	2248	2176	2240	3044	944	1113	953	548	528	737	938	579	1068	2232	2155	2215	3017	914	1088	927	554	540	713	911
Gen_Exhaust	1152	1438	2375	2050	1944	2512	349	670	1111	836	1030	1252	1544	1140	1420	2361	2024	1918	2485	318	652	1088	823	1050	1234	1517
Crush	1169	1454	2387	2056	1945	2502	332	656	1113	844	1042	1264	1559	1157	1436	2373	2030	1919	2475	301	638	1090	830	1062	1246	1533
Loader_Cr	1158	1437	2367	2038	1929	2497	343	675	1126	851	1044	1266	1554	1146	1419	2353	2012	1904	2470	313	657	1103	838	1064	1248	1528
Loader_ShipCr	1137	1420	2357	2036	1935	2514	364	688	1118	837	1025	1247	1533	1125	1402	2343	2010	1909	2487	334	670	1095	825	1045	1230	1506
Drill	1223	1568	2534	2211	2089	2586	318	526	986	756	995	1214	1563	1210	1549	2520	2185	2064	2559	290	506	965	739	1018	1199	1537
Trucks_ShipWash	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var
Trucks_ShipCr	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var
QTrucks_Wash	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var
Gen_OpenEnd	1152	1438	2375	2050	1944	2512	349	670	1111	836	1030	1252	1544	1140	1420	2361	2024	1918	2485	318	652	1088	823	1050	1234	1517
Gen_RightLouvre	1152	1438	2375	2050	1944	2512	349	670	1111	836	1030	1252	1544	1140	1420	2361	2024	1918	2485	318	652	1088	823	1050	1234	1517

Table A2.5.13 Point of Reception Impacts by Source for Scenario 11, Daytime Sound Levels & Distances

Source	POR 1_W	POR 2_W	POR 3_W	POR 4_W	POR 5_W	POR 6_W	POR 7_W	POR 7A_W	POR 8_W	POR 9_W	POR 10_W	POR 11_W	POR 12_W	POR 1_O	POR 2_O	POR 3_O	POR 4_O	POR 5_O	POR 6_O	POR 7_O	POR 7A_O	POR 8_O	POR 9_O	POR 10_O	POR 11_O	POR 12_O
	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA
Wash	42.5	35.7	22.9	23.4	23.1	19.3	38.5	36.1	36.2	42.1	37.3	33.9	35.8	40.4	29.0	22.1	23.6	22.0	18.9	31.3	29.3	35.1	38.1	36.5	33.8	33.2
Loader_Wash1	39.1	27.3	18.7	19.4	19.1	15.0	30.5	27.9	32.8	38.6	33.4	30.2	32.0	37.5	25.7	18.0	19.5	18.1	14.8	28.1	25.8	32.3	35.0	32.5	30.1	30.0
Loader_Wash2	39.7	27.4	18.7	19.1	18.7	14.7	29.6	31.9	32.9	38.9	39.4	35.9	32.8	38.1	25.9	18.3	19.3	15.5	14.4	27.4	25.4	32.4	30.7	33.9	35.5	30.6
Gen_Exhaust	22.2	20.5	23.0	26.8	26.7	22.2	39.4	36.7	23.6	15.4	15.9	14.4	16.2	18.3	17.4	21.0	26.9	24.1	20.3	31.5	26.8	19.0	11.9	15.0	14.0	14.5
Crush	44.8	39.4	32.1	33.5	33.8	29.7	43.4	44.1	33.9	32.5	34.9	33.2	38.0	41.8	36.8	30.4	33.7	31.4	27.3	39.1	32.1	29.3	27.3	33.7	32.6	36.0
Loader_Cr	32.3	27.4	20.6	21.9	22.2	18.9	28.8	32.1	24.9	24.6	25.6	24.3	26.5	30.5	26.0	20.1	22.0	21.3	17.5	29.4	23.8	22.2	21.5	25.4	24.3	25.3
Loader_ShipCr	32.6	27.6	20.7	22.0	22.3	18.8	34.0	33.6	26.0	25.8	27.0	25.6	26.9	30.8	26.2	20.2	22.1	21.2	17.8	29.3	26.4	23.4	22.8	26.6	25.6	25.7
Drill	44.9	40.8	28.2	29.9	29.6	19.5	44.0	36.3	32.7	41.5	45.3	42.6	39.1	41.5	36.8	26.5	30.0	27.9	15.5	35.9	32.6	32.2	36.4	43.0	40.6	35.2
Trucks_ShipWash	35.8	22.0	11.4	11.7	10.9	4.9	22.4	23.6	27.7	32.3	43.9	35.9	29.3	34.6	19.9	10.8	11.8	9.4	4.2	19.8	19.7	26.5	23.8	43.5	34.1	25.7
Trucks_ShipCr	46.9	29.9	18.5	19.0	18.5	12.7	30.7	28.6	27.5	30.0	36.5	33.4	31.5	46.4	26.8	17.8	19.2	15.3	11.5	25.4	22.5	26.8	25.7	35.7	33.2	28.1
QTrucks_Wash	39.2	31.1	20.7	21.8	21.7	17.1	34.7	32.7	28.3	31.8	35.2	31.7	25.8	33.0	26.9	19.6	21.9	19.1	15.9	28.3	26.6	27.1	27.0	33.6	29.8	23.7
Gen_OpenEnd	16.1	12.7	6.0	18.4	18.7	14.8	27.8	27.9	15.6	14.8	14.4	10.2	9.2	12.0	8.7	4.0	18.6	16.2	12.7	23.8	17.0	11.1	10.0	13.1	9.6	7.6
Gen_RightLouvre	11.1	7.2	0.1	1.9	1.1	-3.4	18.7	23.5	13.9	12.5	14.4	12.8	18.2	7.0	3.0	-1.8	2.0	-1.6	-5.0	14.2	12.1	9.1	7.4	13.1	12.0	16.0
Gen_LeftLouvre	24.9	19.8	13.0	14.3	14.6	10.6	24.1	18.4	11.2	10.5	10.1	5.7	6.1	20.7	16.4	11.0	14.4	11.8	8.2	19.2	8.6	6.5	5.5	8.7	5.1	4.2
Total	52.1	44.7	35.2	36.7	36.8	32.0	48.7	46.8	41.8	47.2	49.4	45.5	44.1	50.1	41.2	33.7	36.9	34.7	30.0	42.8	38.4	40.4	42.3	47.8	44.2	41.3
	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m
Wash	639	1111	2247	2150	2200	2988	886	1066	959	561	573	785	998	627	1087	2232	2129	2175	2961	856	1041	933	564	586	763	971
Loader_Wash1	654	1112	2240	2134	2180	2964	866	1053	970	574	595	808	1020	642	1088	2225	2113	2155	2937	835	1028	943	576	608	786	994
Loader_Wash2	591	1092	2248	2176	2240	3044	944	1113	953	548	528	737	938	579	1068	2232	2155	2215	3017	914	1088	927	554	540	713	911
Gen_Exhaust	1051	1449	2480	2229	2160	2742	506	661	886	601	813	1034	1375	1039	1428	2466	2204	2134	2716	476	638	863	588	835	1018	1348
Crush	1068	1464	2491	2233	2160	2733	491	645	888	609	826	1047	1391	1056	1443	2476	2208	2134	2706	462	621	864	595	849	1031	1364
Loader_Cr	1071	1464	2488	2228	2153	2726	485	644	894	616	833	1053	1396	1059	1443	2473	2203	2128	2699	456	620	871	602	855	1037	1369
Loader_ShipCr	1032	1428	2461	2213	2149	2744	516	681	896	603	807	1028	1362	1020	1407	2446	2189	2124	2717	487	658	872	590	829	1012	1335
Drill	1234	1624	2621	2316	2199	2675	384	477	882	676	940	1154	1537	1222	1604	2607	2290	2173	2649	359	454	862	657	964	1141	1511
Trucks_ShipWash	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var
Trucks_ShipCr	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var
QTrucks_Wash	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var
Gen_OpenEnd	1051	1449	2480	2229	2160	2742	506	661	886	601	813	1034	1375	1039	1428	2466	2204	2134	2716	476	638	863	588	835	1018	1348
Gen_RightLouvre	1051	1449	2480	2229	2160	2742	506	661	886	601	813	1034	1375	1039	1428	2466	2204	2134	2716	476	638	863	588	835	1018	1348

Table A2.5.14 Point of Reception Impacts by Source for Scenario 12, Daytime Sound Levels & Distances

Source	POR 1_W	POR 2_W	POR 3_W	POR 4_W	POR 5_W	POR 6_W	POR 7_W	POR 7A_W	POR 8_W	POR 9_W	POR 10_W	POR 11_W	POR 12_W	POR 1_O	POR 2_O	POR 3_O	POR 4_O	POR 5_O	POR 6_O	POR 7_O	POR 7A_O	POR 8_O	POR 9_O	POR 10_O	POR 11_O	POR 12_O
	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA
Wash	42.5	35.7	22.9	23.4	23.1	19.3	38.5	36.1	36.2	42.1	37.3	33.9	35.8	40.4	29.0	22.1	23.6	22.0	18.9	31.3	29.3	35.1	38.1	36.5	33.8	33.2
Loader_Wash1	39.1	27.3	18.7	19.4	19.1	15.0	30.5	27.9	32.8	38.6	33.4	30.2	32.0	37.5	25.7	18.0	19.5	18.1	14.8	28.1	25.8	32.3	35.0	32.5	30.1	30.0
Loader_Wash2	39.7	27.4	18.7	19.1	18.7	14.7	29.6	31.9	32.9	38.9	39.4	35.9	32.8	38.1	25.9	18.3	19.3	15.5	14.4	27.4	25.4	32.4	30.7	38.4	35.5	30.6
Gen_Exhaust	28.8	31.3	26.9	26.2	25.1	20.5	34.0	31.6	34.0	34.7	40.0	32.8	21.2	28.4	27.8	25.2	26.3	22.5	19.0	30.0	28.8	33.3	28.1	37.9	32.0	15.3
Crush	52.2	43.2	33.7	33.5	32.7	27.9	42.6	39.9	41.8	39.6	44.0	44.1	44.0	51.6	39.6	32.2	33.6	30.4	26.6	38.3	37.3	41.1	33.6	43.1	43.2	36.5
Loader_Cr	39.6	31.3	22.0	21.9	21.2	17.1	30.3	28.0	29.8	28.4	32.3	32.1	32.0	39.2	29.0	21.6	22.0	20.4	16.9	26.9	26.1	27.1	24.9	32.0	31.9	26.3
Loader_ShipCr	38.0	30.6	22.1	21.9	21.1	17.0	30.0	27.7	29.9	29.2	35.1	34.0	26.9	37.4	27.7	21.7	22.0	20.4	16.8	26.9	26.1	29.7	25.5	35.5	33.7	23.7
Drill	53.6	39.6	30.2	30.0	29.1	24.4	39.3	40.7	34.8	42.6	40.2	36.5	46.3	52.3	36.9	28.6	30.1	26.8	23.1	36.2	33.9	33.8	33.6	39.3	36.4	41.0
Trucks_ShipWash	33.7	20.5	10.3	10.6	10.0	4.1	22.6	23.2	27.2	32.1	43.8	35.6	28.2	32.4	18.6	9.7	10.8	8.3	3.4	19.0	19.0	26.6	23.5	43.4	33.7	24.7
Trucks_ShipCr	45.5	23.6	13.6	13.1	11.8	5.6	24.5	21.3	22.6	24.7	31.4	28.6	27.6	45.4	20.5	12.9	13.3	10.3	5.0	19.2	15.8	22.2	19.7	30.5	28.4	23.8
QTrucks_Wash	42.8	32.7	20.3	20.7	19.8	14.9	30.5	27.9	30.7	34.9	37.6	34.4	31.5	39.7	27.6	19.4	20.8	18.2	13.8	26.3	23.4	29.9	30.2	36.4	33.6	28.1
Gen_OpenEnd	29.4	18.7	9.3	18.4	17.6	13.2	26.4	23.9	25.3	23.0	28.6	24.9	18.9	27.2	15.1	7.0	18.5	15.2	11.9	22.0	21.2	24.5	17.6	25.1	24.3	12.1
Gen_RightLouvre	21.0	12.5	1.6	1.3	1.0	-3.4	22.3	19.9	21.1	18.2	25.6	23.8	19.9	19.5	8.5	-0.4	2.1	-2.5	-5.5	17.7	17.0	20.1	12.7	23.8	23.0	12.9
Gen_LeftLouvre	30.7	22.8	14.4	14.2	13.4	8.9	22.3	7.1	8.5	17.0	17.9	16.3	13.9	29.8	18.5	12.6	14.3	10.9	7.5	17.6	3.7	8.0	11.5	15.7	14.9	7.8
Total	57.0	46.2	36.7	36.6	35.8	31.2	46.3	45.0	45.2	48.3	49.9	47.1	49.1	56.0	42.6	35.4	36.7	33.7	30.1	42.1	40.6	44.4	42.6	49.1	46.4	43.6
	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m
Wash	639	1111	2247	2150	2200	2988	886	1066	959	561	573	785	998	627	1087	2232	2129	2175	2961	856	1041	933	564	586	763	971
Loader_Wash1	654	1112	2240	2134	2180	2964	866	1053	970	574	595	808	1020	642	1088	2225	2113	2155	2937	835	1028	943	576	608	786	994
Loader_Wash2	591	1092	2248	2176	2240	3044	944	1113	953	548	528	737	938	579	1068	2232	2155	2215	3017	914	1088	927	554	540	713	911
Gen_Exhaust	367	977	2194	2230	2360	3251	1197	1353	1039	635	461	620	697	356	951	2179	2212	2336	3223	1166	1327	1014	650	459	594	671
Crush	383	986	2201	2229	2355	3239	1180	1336	1028	624	457	622	712	372	960	2185	2211	2330	3212	1149	1310	1003	638	457	595	685
Loader_Cr	387	986	2199	2224	2348	3231	1173	1330	1028	623	461	627	719	376	960	2183	2206	2324	3204	1142	1304	1003	637	461	601	693
Loader_ShipCr	349	961	2181	2222	2356	3254	1208	1368	1055	652	473	628	690	339	935	2165	2204	2332	3227	1178	1343	1030	667	470	601	663
Drill	408	1042	2264	2301	2424	3295	1208	1339	978	578	389	550	670	399	1016	2249	2282	2400	3268	1178	1314	953	594	387	524	644
Trucks_ShipWash	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var
Trucks_ShipCr	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var
QTrucks_Wash	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var
Gen_OpenEnd	367	977	2194	2230	2360	3251	1197	1353	1039	635	461	620	697	356	951	2179	2212	2336	3223	1166	1327	1014	650	459	594	671
Gen_RightLouvre	367	977	2194	2230	2360	3251	1197	1353	1039	635	461	620	697	356	951	2179	2212	2336	3223	1166	1327	1014	650	459	594	671

Table A2.5.15 Point of Reception Impacts by Source for Scenario 13, Daytime Sound Levels & Distances

Source	POR 1_W	POR 2_W	POR 3_W	POR 4_W	POR 5_W	POR 6_W	POR 7_W	POR 7A_W	POR 8_W	POR 9_W	POR 10_W	POR 11_W	POR 12_W	POR 1_O	POR 2_O	POR 3_O	POR 4_O	POR 5_O	POR 6_O	POR 7_O	POR 7A_O	POR 8_O	POR 9_O	POR 10_O	POR 11_O	POR 12_O
	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA
Wash	33.1	29.7	11.4	11.5	13.2	18.7	28.3	25.8	25.4	28.6	30.3	28.2	20.8	31.4	29.5	9.5	12.4	10.3	18.4	26.0	23.8	24.5	26.2	28.5	27.5	19.9
Loader_Wash1	32.8	28.1	13.0	12.8	13.7	15.1	25.6	22.6	22.1	25.7	27.0	24.9	23.5	28.7	27.7	9.8	12.8	9.5	14.9	23.5	21.1	21.7	23.5	26.1	24.6	21.2
Loader_Wash2	29.8	25.5	14.2	14.5	14.8	14.9	25.0	22.3	22.0	25.6	27.4	25.1	19.9	28.5	25.7	10.9	14.6	10.8	14.7	23.1	20.8	21.6	23.4	25.9	24.8	18.1
Gen_Exhaust	30.6	27.2	25.3	26.6	25.5	21.1	36.4	33.6	26.0	28.8	19.7	16.5	19.8	26.4	23.6	23.5	26.7	22.9	19.8	31.9	27.1	25.8	19.1	15.2	13.0	16.9
Crush	54.3	42.0	32.9	33.5	33.1	28.5	45.2	42.2	31.6	34.8	37.2	34.3	42.3	51.7	39.0	31.5	33.6	30.7	27.3	41.0	33.4	31.4	25.4	32.3	30.2	38.9
Loader_Cr	41.8	30.0	21.5	22.0	21.7	17.8	33.0	30.5	26.1	28.5	30.0	28.3	30.3	40.3	28.1	21.1	22.1	20.8	17.5	29.8	28.3	26.1	20.6	27.7	26.4	27.9
Loader_ShipCr	42.4	30.3	21.6	22.0	21.7	17.7	32.6	30.1	26.9	29.4	30.5	29.0	30.6	40.8	28.3	21.2	22.2	20.8	17.5	29.6	28.0	26.8	21.0	28.7	29.0	27.9
Drill	51.8	39.0	29.7	30.1	29.6	25.0	41.5	42.4	34.8	39.5	39.9	36.9	43.5	49.6	36.3	28.2	30.2	27.3	23.8	38.3	35.7	33.9	34.4	39.2	36.7	39.6
Trucks_ShipWash	31.9	22.9	16.5	16.1	14.5	8.2	24.1	22.8	26.7	31.2	43.5	35.1	26.4	30.4	20.1	15.3	16.2	11.1	7.5	21.6	20.7	26.2	22.2	43.2	32.9	22.5
Trucks_ShipCr	45.6	26.6	15.3	15.2	14.1	7.9	26.5	23.5	24.1	23.4	32.4	29.6	28.6	45.5	23.6	14.6	15.4	12.5	7.3	22.1	19.7	23.4	19.4	31.2	29.0	24.1
QTrucks_Wash	41.2	33.4	25.0	25.3	24.3	18.7	33.2	30.2	29.7	33.5	35.9	33.2	30.9	38.0	29.5	23.7	25.5	18.2	17.8	29.7	27.6	29.1	28.1	34.7	32.6	27.5
Gen_OpenEnd	28.3	14.0	6.9	18.4	18.0	13.8	28.7	26.0	16.6	18.4	19.6	16.4	19.2	24.9	10.6	4.7	18.5	15.6	12.6	24.3	18.4	16.4	10.2	15.3	12.7	14.6
Gen_RightLouvre	21.9	8.2	0.8	0.9	0.8	-3.6	21.8	21.9	11.9	13.5	17.0	14.5	22.3	18.8	4.8	-1.3	0.9	-2.6	-5.7	13.6	13.5	11.5	5.4	12.3	10.3	18.6
Gen_LeftLouvre	33.8	22.0	13.8	14.2	13.8	9.5	24.7	7.4	9.1	12.3	15.4	12.0	17.1	29.7	18.4	11.9	14.4	11.2	8.2	20.0	3.9	8.6	5.2	10.9	8.2	13.3
Total	57.1	44.9	36.0	36.6	36.1	31.8	47.8	46.1	39.1	42.9	46.8	42.2	46.5	54.9	42.3	34.6	36.8	33.7	30.8	44.0	39.6	38.6	37.1	45.8	41.0	42.9
	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m
Wash	649	271	1365	1490	1771	2958	1491	1841	1841	1432	1289	1421	1207	646	260	1349	1478	1751	2931	1464	1821	1815	1441	1285	1394	1191
Loader_Wash1	627	402	1462	1512	1745	2880	1357	1708	1738	1331	1212	1359	1200	622	388	1447	1496	1723	2854	1330	1688	1712	1338	1210	1332	1181
Loader_Wash2	580	334	1455	1554	1810	2960	1423	1763	1750	1341	1202	1338	1147	576	318	1439	1541	1788	2934	1396	1742	1724	1350	1199	1311	1129
Gen_Exhaust	621	1146	2307	2234	2292	3075	944	1087	893	488	481	694	931	610	1122	2292	2213	2267	3048	914	1062	867	494	494	671	904
Crush	638	1158	2315	2235	2288	3064	928	1070	886	482	487	702	947	626	1134	2300	2214	2263	3037	898	1045	859	487	501	679	920
Loader_Cr	639	1142	2291	2204	2255	3034	910	1066	912	510	520	734	967	627	1118	2276	2183	2230	3007	879	1040	885	515	533	711	940
Loader_ShipCr	601	1111	2269	2197	2259	3055	945	1104	932	527	511	721	935	589	1087	2253	2176	2234	3028	914	1079	905	533	522	697	908
Drill	596	1157	2336	2284	2352	3142	1002	1125	866	457	417	628	873	586	1132	2320	2264	2327	3114	972	1100	840	466	429	605	846
Trucks_ShipWash	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var
Trucks_ShipCr	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var
QTrucks_Wash	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var
Gen_OpenEnd	621	1146	2307	2234	2292	3075	944	1087	893	488	481	694	931	610	1122	2292	2213	2267	3048	914	1062	867	494	494	671	904
Gen_RightLouvre	621	1146	2307	2234	2292	3075	944	1087	893	488	481	694	931	610	1122	2292	2213	2267	3048	914	1062	867	494	494	671	904

Table A2.6 Sample Calculation – Scenario 1

Receiver
Name: POR1_W 4061 March Rd
ID: POR1_W
X: 411091.21 m
Y: 13041.89 m
Z: 146.60 m

Point Source, ISO 9613, Name: "Crushing Plant wo Generator", ID: "Crush_Scn1"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	I/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	411151.02	12566.91	138.00	0	D	32	82.4	0.0	0.0	0.0	0.0	64.6	0.0	-4.4	0.0	0.0	9.1	0.0	0.0	13.0
1	411151.02	12566.91	138.00	0	D	63	93.4	0.0	0.0	0.0	0.0	64.6	0.1	-4.4	0.0	0.0	12.5	0.0	0.0	20.6
1	411151.02	12566.91	138.00	0	D	125	104.3	0.0	0.0	0.0	0.0	64.6	0.2	-1.7	0.0	0.0	16.1	0.0	0.0	25.0
1	411151.02	12566.91	138.00	0	D	250	109.3	0.0	0.0	0.0	0.0	64.6	0.5	-2.8	0.0	0.0	19.4	0.0	0.0	27.6
1	411151.02	12566.91	138.00	0	D	500	114.7	0.0	0.0	0.0	0.0	64.6	0.9	-3.6	0.0	0.0	22.5	0.0	0.0	30.2
1	411151.02	12566.91	138.00	0	D	1000	115.7	0.0	0.0	0.0	0.0	64.6	1.8	-3.6	0.0	0.0	25.0	0.0	0.0	27.9
1	411151.02	12566.91	138.00	0	D	2000	118.3	0.0	0.0	0.0	0.0	64.6	4.6	-3.6	0.0	0.0	25.0	0.0	0.0	27.6
1	411151.02	12566.91	138.00	0	D	4000	113.3	0.0	0.0	0.0	0.0	64.6	15.7	-3.6	0.0	0.0	25.0	0.0	0.0	11.5
1	411151.02	12566.91	138.00	0	D	8000	103.9	0.0	0.0	0.0	0.0	64.6	56.0	-3.6	0.0	0.0	25.0	0.0	0.0	-38.1
1	411151.02	12566.91	138.00	0	N	32	82.4	0.0	-188.0	0.0	0.0	64.6	0.0	-4.4	0.0	0.0	9.1	0.0	0.0	-175.0
1	411151.02	12566.91	138.00	0	N	63	93.4	0.0	-188.0	0.0	0.0	64.6	0.1	-4.4	0.0	0.0	12.5	0.0	0.0	-167.4
1	411151.02	12566.91	138.00	0	N	125	104.3	0.0	-188.0	0.0	0.0	64.6	0.2	-1.7	0.0	0.0	16.1	0.0	0.0	-163.0
1	411151.02	12566.91	138.00	0	N	250	109.3	0.0	-188.0	0.0	0.0	64.6	0.5	-2.8	0.0	0.0	19.4	0.0	0.0	-160.4
1	411151.02	12566.91	138.00	0	N	500	114.7	0.0	-188.0	0.0	0.0	64.6	0.9	-3.6	0.0	0.0	22.5	0.0	0.0	-157.8
1	411151.02	12566.91	138.00	0	N	1000	115.7	0.0	-188.0	0.0	0.0	64.6	1.8	-3.6	0.0	0.0	25.0	0.0	0.0	-160.1
1	411151.02	12566.91	138.00	0	N	2000	118.3	0.0	-188.0	0.0	0.0	64.6	4.6	-3.6	0.0	0.0	25.0	0.0	0.0	-160.4
1	411151.02	12566.91	138.00	0	N	4000	113.3	0.0	-188.0	0.0	0.0	64.6	15.7	-3.6	0.0	0.0	25.0	0.0	0.0	-176.5
1	411151.02	12566.91	138.00	0	N	8000	103.9	0.0	-188.0	0.0	0.0	64.6	56.0	-3.6	0.0	0.0	25.0	0.0	0.0	-226.1
1	411151.02	12566.91	138.00	0	E	32	82.4	0.0	-188.0	0.0	0.0	64.6	0.0	-4.4	0.0	0.0	9.1	0.0	0.0	-175.0
1	411151.02	12566.91	138.00	0	E	63	93.4	0.0	-188.0	0.0	0.0	64.6	0.1	-4.4	0.0	0.0	12.5	0.0	0.0	-167.4
1	411151.02	12566.91	138.00	0	E	125	104.3	0.0	-188.0	0.0	0.0	64.6	0.2	-1.7	0.0	0.0	16.1	0.0	0.0	-163.0
1	411151.02	12566.91	138.00	0	E	250	109.3	0.0	-188.0	0.0	0.0	64.6	0.5	-2.8	0.0	0.0	19.4	0.0	0.0	-160.4
1	411151.02	12566.91	138.00	0	E	500	114.7	0.0	-188.0	0.0	0.0	64.6	0.9	-3.6	0.0	0.0	22.5	0.0	0.0	-157.8
1	411151.02	12566.91	138.00	0	E	1000	115.7	0.0	-188.0	0.0	0.0	64.6	1.8	-3.6	0.0	0.0	25.0	0.0	0.0	-160.1
1	411151.02	12566.91	138.00	0	E	2000	118.3	0.0	-188.0	0.0	0.0	64.6	4.6	-3.6	0.0	0.0	25.0	0.0	0.0	-160.4
1	411151.02	12566.91	138.00	0	E	4000	113.3	0.0	-188.0	0.0	0.0	64.6	15.7	-3.6	0.0	0.0	25.0	0.0	0.0	-176.5
1	411151.02	12566.91	138.00	0	E	8000	103.9	0.0	-188.0	0.0	0.0	64.6	56.0	-3.6	0.0	0.0	25.0	0.0	0.0	-226.1

Point Source, ISO 9613, Name: "Standard Rock Drill", ID: "Drill_Scn1"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	I/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)
3	411156.43	12604.48	150.00	0	D	32	69.1	0.0	0.0	0.0	0.0	63.9	0.0	-4.7	0.0	0.0	4.2	0.0	0.0	5.7
3	411156.43	12604.48	150.00	0	D	63	86.1	0.0	0.0	0.0	0.0	63.9	0.1	-4.7	0.0	0.0	4.9	0.0	0.0	21.9
3	411156.43	12604.48	150.00	0	D	125	103.7	0.0	0.0	0.0	0.0	63.9	0.2	-2.0	0.0	0.0	5.7	0.0	0.0	35.9
3	411156.43	12604.48	150.00	0	D	250	103.9	0.0	0.0	0.0	0.0	63.9	0.5	-3.1	0.0	0.0	6.8	0.0	0.0	35.8
3	411156.43	12604.48	150.00	0	D	500	111.7	0.0	0.0	0.0	0.0	63.9	0.9	-3.8	0.0	0.0	8.3	0.0	0.0	42.5
3	411156.43	12604.48	150.00	0	D	1000	112.5	0.0	0.0	0.0	0.0	63.9	1.6	-3.8	0.0	0.0	10.3	0.0	0.0	40.6
3	411156.43	12604.48	150.00	0	D	2000	116.0	0.0	0.0	0.0	0.0	63.9	4.3	-3.8	0.0	0.0	12.6	0.0	0.0	39.0
3	411156.43	12604.48	150.00	0	D	4000	115.0	0.0	0.0	0.0	0.0	63.9	14.5	-3.8	0.0	0.0	15.3	0.0	0.0	25.1
3	411156.43	12604.48	150.00	0	D	8000	110.3	0.0	0.0	0.0	0.0	63.9	51.7	-3.8	0.0	0.0	18.1	0.0	0.0	-19.6
3	411156.43	12604.48	150.00	0	N	32	69.1	0.0	-188.0	0.0	0.0	63.9	0.0	-4.7	0.0	0.0	4.2	0.0	0.0	-182.3
3	411156.43	12604.48	150.00	0	N	63	86.1	0.0	-188.0	0.0	0.0	63.9	0.1	-4.7	0.0	0.0	4.9	0.0	0.0	-166.1
3	411156.43	12604.48	150.00	0	N	125	103.7	0.0	-188.0	0.0	0.0	63.9	0.2	-2.0	0.0	0.0	5.7	0.0	0.0	-152.1
3	411156.43	12604.48	150.00	0	N	250	103.9	0.0	-188.0	0.0	0.0	63.9	0.5	-3.1	0.0	0.0	6.8	0.0	0.0	-152.2
3	411156.43	12604.48	150.00	0	N	500	111.7	0.0	-188.0	0.0	0.0	63.9	0.9	-3.8	0.0	0.0	8.3	0.0	0.0	-145.5
3	411156.43	12604.48	150.00	0	N	1000	112.5	0.0	-188.0	0.0	0.0	63.9	1.6	-3.8	0.0	0.0	10.3	0.0	0.0	-147.4
3	411156.43	12604.48	150.00	0	N	2000	116.0	0.0	-188.0	0.0	0.0	63.9	4.3	-3.8	0.0	0.0	12.6	0.0	0.0	-149.0
3	411156.43	12604.48	150.00	0	N	4000	115.0	0.0	-188.0	0.0	0.0	63.9	14.5	-3.8	0.0	0.0	15.3	0.0	0.0	-162.9
3	411156.43	12604.48	150.00	0	N	8000	110.3	0.0	-188.0	0.0	0.0	63.9	51.7	-3.8	0.0	0.0	18.1	0.0	0.0	-207.6
3	411156.43	12604.48	150.00	0	E	32	69.1	0.0	-188.0	0.0	0.0	63.9	0.0	-4.7	0.0	0.0	4.2	0.0	0.0	-182.3
3	411156.43	12604.48	150.00	0	E	63	86.1	0.0	-188.0	0.0	0.0	63.9	0.1	-4.7	0.0	0.0	4.9	0.0	0.0	-166.1
3	411156.43	12604.48	150.00	0	E	125	103.7	0.0	-188.0	0.0	0.0	63.9	0.2	-2.0	0.0	0.0	5.7	0.0	0.0	-152.1
3	411156.43	12604.48	150.00	0	E	250	103.9	0.0	-188.0	0.0	0.0	63.9	0.5	-3.1	0.0	0.0	6.8	0.0	0.0	-152.2

Point Source, ISO 9613, Name: "Standard Rock Drill", ID: "Drill_Scn1"																				
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)
3	411156.43	12604.48	150.00	0	E	500	111.7	0.0	-188.0	0.0	0.0	63.9	0.9	-3.8	0.0	0.0	8.3	0.0	0.0	-145.5
3	411156.43	12604.48	150.00	0	E	1000	112.5	0.0	-188.0	0.0	0.0	63.9	1.6	-3.8	0.0	0.0	10.3	0.0	0.0	-147.4
3	411156.43	12604.48	150.00	0	E	2000	116.0	0.0	-188.0	0.0	0.0	63.9	4.3	-3.8	0.0	0.0	12.6	0.0	0.0	-149.0
3	411156.43	12604.48	150.00	0	E	4000	115.0	0.0	-188.0	0.0	0.0	63.9	14.5	-3.8	0.0	0.0	15.3	0.0	0.0	-162.9
3	411156.43	12604.48	150.00	0	E	8000	110.3	0.0	-188.0	0.0	0.0	63.9	51.7	-3.8	0.0	0.0	18.1	0.0	0.0	-207.6

Line Source, ISO 9613, Name: "Shipping Highway Trucks Crusher", ID: "Trucks_ShipCr_Scn1"																				
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	411259.93	12906.19	137.39	0	D	32	30.0	18.8	0.0	0.0	0.0	57.7	0.0	-3.0	0.0	0.0	0.0	0.0	0.0	-5.9
4	411259.93	12906.19	137.39	0	D	63	42.0	18.8	0.0	0.0	0.0	57.7	0.0	-3.0	0.0	0.0	0.0	0.0	0.0	6.1
4	411259.93	12906.19	137.39	0	D	125	49.7	18.8	0.0	0.0	0.0	57.7	0.1	-0.8	0.0	0.0	0.0	0.0	0.0	11.5
4	411259.93	12906.19	137.39	0	D	250	55.0	18.8	0.0	0.0	0.0	57.7	0.2	-1.6	0.0	0.0	0.0	0.0	0.0	17.5
4	411259.93	12906.19	137.39	0	D	500	57.1	18.8	0.0	0.0	0.0	57.7	0.4	-2.2	0.0	0.0	0.0	0.0	0.0	20.1
4	411259.93	12906.19	137.39	0	D	1000	71.7	18.8	0.0	0.0	0.0	57.7	0.8	-2.3	0.0	0.0	0.0	0.0	0.0	34.3
4	411259.93	12906.19	137.39	0	D	2000	69.0	18.8	0.0	0.0	0.0	57.7	2.1	-2.3	0.0	0.0	0.0	0.0	0.0	30.3
4	411259.93	12906.19	137.39	0	D	4000	53.1	18.8	0.0	0.0	0.0	57.7	7.1	-2.3	0.0	0.0	0.0	0.0	0.0	9.4
4	411259.93	12906.19	137.39	0	D	8000	51.0	18.8	0.0	0.0	0.0	57.7	25.3	-2.3	0.0	0.0	0.0	0.0	0.0	-11.0
4	411259.93	12906.19	137.39	0	N	32	-79.0	18.8	-188.0	0.0	0.0	57.7	0.0	-3.0	0.0	0.0	0.0	0.0	0.0	-302.9
4	411259.93	12906.19	137.39	0	N	63	-67.0	18.8	-188.0	0.0	0.0	57.7	0.0	-3.0	0.0	0.0	0.0	0.0	0.0	-290.9
4	411259.93	12906.19	137.39	0	N	125	-59.3	18.8	-188.0	0.0	0.0	57.7	0.1	-0.8	0.0	0.0	0.0	0.0	0.0	-285.5
4	411259.93	12906.19	137.39	0	N	250	-54.0	18.8	-188.0	0.0	0.0	57.7	0.2	-1.6	0.0	0.0	0.0	0.0	0.0	-279.6
4	411259.93	12906.19	137.39	0	N	500	-51.9	18.8	-188.0	0.0	0.0	57.7	0.4	-2.2	0.0	0.0	0.0	0.0	0.0	-277.0
4	411259.93	12906.19	137.39	0	N	1000	-37.3	18.8	-188.0	0.0	0.0	57.7	0.8	-2.3	0.0	0.0	0.0	0.0	0.0	-262.8
4	411259.93	12906.19	137.39	0	N	2000	-40.0	18.8	-188.0	0.0	0.0	57.7	2.1	-2.3	0.0	0.0	0.0	0.0	0.0	-266.8
4	411259.93	12906.19	137.39	0	N	4000	-55.9	18.8	-188.0	0.0	0.0	57.7	7.1	-2.3	0.0	0.0	0.0	0.0	0.0	-287.7
4	411259.93	12906.19	137.39	0	N	8000	-58.0	18.8	-188.0	0.0	0.0	57.7	25.3	-2.3	0.0	0.0	0.0	0.0	0.0	-308.0
4	411259.93	12906.19	137.39	0	E	32	27.0	18.8	0.0	0.0	0.0	57.7	0.0	-3.0	0.0	0.0	0.0	0.0	0.0	-8.9
4	411259.93	12906.19	137.39	0	E	63	39.0	18.8	0.0	0.0	0.0	57.7	0.0	-3.0	0.0	0.0	0.0	0.0	0.0	3.1
4	411259.93	12906.19	137.39	0	E	125	46.7	18.8	0.0	0.0	0.0	57.7	0.1	-0.8	0.0	0.0	0.0	0.0	0.0	8.5
4	411259.93	12906.19	137.39	0	E	250	52.0	18.8	0.0	0.0	0.0	57.7	0.2	-1.6	0.0	0.0	0.0	0.0	0.0	14.5
4	411259.93	12906.19	137.39	0	E	500	54.1	18.8	0.0	0.0	0.0	57.7	0.4	-2.2	0.0	0.0	0.0	0.0	0.0	17.0
4	411259.93	12906.19	137.39	0	E	1000	68.7	18.8	0.0	0.0	0.0	57.7	0.8	-2.3	0.0	0.0	0.0	0.0	0.0	31.3
4	411259.93	12906.19	137.39	0	E	2000	66.0	18.8	0.0	0.0	0.0	57.7	2.1	-2.3	0.0	0.0	0.0	0.0	0.0	27.3
4	411259.93	12906.19	137.39	0	E	4000	50.1	18.8	0.0	0.0	0.0	57.7	7.1	-2.3	0.0	0.0	0.0	0.0	0.0	6.4
4	411259.93	12906.19	137.39	0	E	8000	48.0	18.8	0.0	0.0	0.0	57.7	25.3	-2.3	0.0	0.0	0.0	0.0	0.0	-14.0
6	411219.51	12946.60	137.98	0	D	32	30.0	15.8	0.0	0.0	0.0	55.1	0.0	-3.0	0.0	0.0	0.0	0.0	0.0	-6.3
6	411219.51	12946.60	137.98	0	D	63	42.0	15.8	0.0	0.0	0.0	55.1	0.0	-3.0	0.0	0.0	0.0	0.0	0.0	5.7
6	411219.51	12946.60	137.98	0	D	125	49.7	15.8	0.0	0.0	0.0	55.1	0.1	-0.4	0.0	0.0	0.0	0.0	0.0	10.8
6	411219.51	12946.60	137.98	0	D	250	55.0	15.8	0.0	0.0	0.0	55.1	0.2	-1.0	1.0	0.0	0.0	0.0	0.0	15.6
6	411219.51	12946.60	137.98	0	D	500	57.1	15.8	0.0	0.0	0.0	55.1	0.3	-2.1	1.0	0.0	0.0	0.0	0.0	18.6
6	411219.51	12946.60	137.98	0	D	1000	71.7	15.8	0.0	0.0	0.0	55.1	0.6	-2.1	1.0	0.0	0.0	0.0	0.0	32.9
6	411219.51	12946.60	137.98	0	D	2000	69.0	15.8	0.0	0.0	0.0	55.1	1.5	-2.1	1.0	0.0	0.0	0.0	0.0	29.3
6	411219.51	12946.60	137.98	0	D	4000	53.1	15.8	0.0	0.0	0.0	55.1	5.2	-2.1	2.0	0.0	0.0	0.0	0.0	8.7
6	411219.51	12946.60	137.98	0	D	8000	51.0	15.8	0.0	0.0	0.0	55.1	18.7	-2.1	3.0	0.0	0.0	0.0	0.0	-7.9
6	411219.51	12946.60	137.98	0	N	32	-79.0	15.8	-188.0	0.0	0.0	55.1	0.0	-3.0	0.0	0.0	0.0	0.0	0.0	-303.3
6	411219.51	12946.60	137.98	0	N	63	-67.0	15.8	-188.0	0.0	0.0	55.1	0.0	-3.0	0.0	0.0	0.0	0.0	0.0	-291.3
6	411219.51	12946.60	137.98	0	N	125	-59.3	15.8	-188.0	0.0	0.0	55.1	0.1	-0.4	0.0	0.0	0.0	0.0	0.0	-286.2
6	411219.51	12946.60	137.98	0	N	250	-54.0	15.8	-188.0	0.0	0.0	55.1	0.2	-1.0	1.0	0.0	0.0	0.0	0.0	-281.5
6	411219.51	12946.60	137.98	0	N	500	-51.9	15.8	-188.0	0.0	0.0	55.1	0.3	-2.1	1.0	0.0	0.0	0.0	0.0	-278.4
6	411219.51	12946.60	137.98	0	N	1000	-37.3	15.8	-188.0	0.0	0.0	55.1	0.6	-2.1	1.0	0.0	0.0	0.0	0.0	-264.1
6	411219.51	12946.60	137.98	0	N	2000	-40.0	15.8	-188.0	0.0	0.0	55.1	1.5	-2.1	1.0	0.0	0.0	0.0	0.0	-267.8
6	411219.51	12946.60	137.98	0	N	4000	-55.9	15.8	-188.0	0.0	0.0	55.1	5.2	-2.1	2.0	0.0	0.0	0.0	0.0	-288.4
6	411219.51	12946.60	137.98	0	N	8000	-58.0	15.8	-188.0	0.0	0.0	55.1	18.7	-2.1	3.0	0.0	0.0	0.0	0.0	-304.9
6	411219.51	12946.60	137.98	0	E	32	27.0	15.8	0.0	0.0	0.0	55.1	0.0	-3.0	0.0	0.0	0.0	0.0	0.0	-9.3
6	411219.51	12946.60	137.98	0	E	63	39.0	15.8	0.0	0.0	0.0	55.1	0.0	-3.0	0.0	0.0	0.0	0.0	0.0	2.7
6	411219.51	12946.60	137.98	0	E	125	46.7	15.8	0.0	0.0	0.0	55.1	0.1	-0.4	0.0	0.0	0.0	0.0	0.0	7.8
6	411219.51	12946.60	137.98	0	E	250	52.0	15.8	0.0	0.0	0.0	55.1	0.2	-1.0	1.0	0.0	0.0	0.0	0.0	12.6
6	411219.51	12946.60	137.98	0	E	500	54.1	15.8	0.0	0.0	0.0	55.1	0.3	-2.1	1.0	0.0	0.0	0.0	0.0	15.6
6	411219.51	12946.60	137.98	0	E	1000	68.7	15.8	0.0	0.0	0.0	55.1	0.6	-2.1	1.0	0.0	0.0	0.0	0.0	29.9
6	411219.51	12946.60	137.98	0	E	2000	66.0	15.8	0.0	0.0	0.0	55.1	1.5	-2.1	1.0	0.0	0.0	0.0	0.0	26.3
6	411219.51	12946.60	137.98	0	E	4000	50.1	15.8	0.0	0.0	0.0	55.1	5.2	-2.1	2.0	0.0	0.0	0.0	0.0	5.7
6	411219.51	12946.60	137.98	0	E	8000	48.0	15.8	0.0	0.0	0.0	55.1	18.7	-2.1	3.0	0.0	0.0	0.0	0.0	-10.9

Appendix 3

Background Traffic Noise Analysis

This appendix presents the results of an analysis of background noise from road traffic on March Road (Regional Road 59) and Upper Dwyer Hill Road (Regional Road 3) at receptors in the vicinity of the proposed Extended West Carleton Quarry.

Noise generated by road traffic is calculated from traffic data using STAMSON[6,7], a traffic noise model developed by the MECP. STAMSON takes into account such factors as traffic speed, 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 Tables A3.1 at the relevant points of reception. Samples of the outputs of the STAMSON software are also provided.

Noise calculations are based on the most recently available traffic data for the intersection of March Road and Upper Dwyer Hill Road provided by the City of Ottawa, attached. Data provided by the City is an intersection turning movement traffic survey for this intersection.

March Road and Upper Dwyer Hill Road, Thursday, 1st December 2017

The City data provides peak hour counts, a breakdown of heavy vehicle counts, and an estimate of 24-hour counts (AADT).

In order to consider the lowest background noise occurring during the daytime hours (07:00 to 19:00), hourly traffic volumes were calculated from AADT based on the methodology contained RWDI AIR Inc. Publication, "Typical Hourly Traffic Distribution for Noise Modelling", Vol. 36 No. 3 (2008)[9]. The calculated noise at each point of reception for the hour with the least traffic volume is taken to be the sound level limit for the whole daytime period. Where there are adjacent houses, the lowest sound level limit is assumed to apply to all the adjacent houses.

Contents:

Outputs, Traffic Noise Calculations from STAMSON

Traffic Data from the City of Ottawa, extract for:

- March Road and Upper Dwyer Hill Road, Thursday, 1st December 2017

Table A3.1: Background Sound Level at Receptors Impacted by Noise from March Rd. and Upper Dwyer Hill Rd., daytime & evening

Point of Reception (applied both to plane of window and outdoor points of reception)	Sound Level Limit 1-hour L_{AEQ} dBA (Daytime Period, 07:00 – 19:00)	Sound Level Limit 1-hour L_{AEQ} dBA (Evening Period, 19:00 – 23:00)
POR 1	58	57
POR 2	50 (exclusion limit)	45/50 (exclusion limit)
POR 10	53	51
POR 11	56	54

See calculated traffic noise for daytime hour with least traffic, Tables A3.3, A3.4 & A3.5

Table A3.2 Calculation of Road Volumes, March Rd. @ Upper Dwyer Hill Rd.
Source Data: City of Ottawa, March Rd. @ Upper Dwyer Hill Rd., Thursday 1st December 2016
Count Hours: 7 - 10 am, 11:30 am - 1:30 pm, 3 - 6 pm, 8 hours total

Turning Movement Counts	Upper Dwyer Hill Northbound			Upper Dwyer Hill Southbound			March Eastbound			March Westbound		
	LT	ST	RT	LT	ST	RT	LT	ST	RT	LT	ST	RT
8 hr totals, all vehicles	266	217	121	67	149	154	166	2186	226	128	2255	73
8 hr Total, Heavy vehicles	25	15	23	5	8	6	9	62	13	28	62	6
24 hr estimates, all vehicles	456	372	208	115	256	264	285	3751	388	220	3870	125

Road Volumes	Upper Dwyer Hill, North of Rideau			Upper Dwyer Hill, South of Rideau			March, East of Bank			March, West of Bank		
	N bound	S bound	2-way Tot	N bound	S bound	2-way Tot	E Bound	W Bound	2-way Tot	E Bound	W Bound	2-way Tot
8 hr totals, all vehicles	456	370	826	604	503	1107	2374	2456	4830	2578	2675	5253
8 hr Total, Heavy vehicles	30	19	49	63	49	112	90	96	186	84	93	177
% Heavy Vehicles	6.58	5.14	5.93	10.43	9.74	10.12	3.79	3.91	3.85	3.26	3.48	3.37
24 hr estimates, all vehicles	782	635	**1417**	1036	864	**1900**	4074	4215	**8289**	4424	4590	**9014**

Table A3.3: Traffic Volumes and Calculated Noise, March Road, East of Upper Dwyer Hill Road

Posted Speed Limit: 80 km/h Vehicle Classification based on count data and City Guidelines

Note: 7 am to 8 am is the hour with the least traffic in the daytime (7 am to 7 pm)

Hour Beginning	Typical Distribution See Ref. 9 %	Estimated Total Vehicles	Estimated volumes by Vehicle Classification			Estimated Noise Levels by STAMSON			
			Cars 89.2%	Medium Trucks 7%	Heavy Trucks 3.8%	POR10_Od = 240 m -90 to 90 h = 1.5 m	POR11_Od = 73 m -90 to 90 h = 1.5 m		
Midnight	0.87	70.7	63.1	5.0	2.7				
1:00	0.49	39.8	35.5	2.8	1.5				
2:00	0.36	29.3	26.1	2.0	1.1				
3:00	0.30	24.4	21.8	1.7	0.9				
4:00	0.36	29.3	26.1	2.0	1.1				
5:00	0.95	77.3	68.9	5.4	2.9				
6:00	2.75	223.6	199.5	15.7	8.5				
7:00	**5.05**	**410.7**	**366.3**	**28.7**	**15.6**	**47.23**	**55.81**		
8:00	6.55	532.6	475.1	37.3	20.2				
9:00	5.62	457.0	407.7	32.0	17.4				
10:00	5.50	447.3	399.0	31.3	17.0				
11:00	6.04	491.2	438.1	34.4	18.7				
12:00	6.48	527.0	470.0	36.9	20.0				
13:00	6.26	509.1	454.1	35.6	19.3				
14:00	6.60	536.7	478.8	37.6	20.4				
15:00	7.41	602.6	537.5	42.2	22.9				
16:00	7.82	635.9	567.2	44.5	24.2				
17:00	7.65	622.1	554.9	43.5	23.6				
18:00	6.27	509.9	454.8	35.7	19.4				
19:00	5.12	416.4	371.4	29.1	15.8				
20:00	4.99	405.8	362.0	28.4	15.4				
21:00	3.41	277.3	247.4	19.4	10.5				
22:00	3.41	277.3	247.4	19.4	10.5	45.46	54.04		
23:00	1.67	135.8	121.1	9.5	5.2				
Total	AADT	8289							

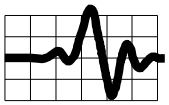


Table A3.4: Traffic Volumes and Calculated Noise, March Road, West of Upper Dwyer Hill Road

Posted Speed Limit: 80 km/h Vehicle Classification based on count data and City Guidelines

Note: 7 am to 8 am is the hour with the least traffic in the daytime (7 am to 7 pm)

Hour	Typical Distribution See Ref. 9	Estimated Total Vehicles	Estimated volumes by Vehicle Classification			Estimated Noise Levels by STAMSON			
			Cars 89.6%	Medium Trucks 7%	Heavy Trucks 3.4%	POR1_O* d = 39/44 m -90 to 90 5% grade west	POR2_O d = 85 m -90 to 90 woods		
Beginning	**%**					**h = 1.5 m**	**h = 1.5 m**		
Midnight	0.87	76.9	68.9	5.4	2.6				
1:00	0.49	43.3	38.8	3.0	1.5				
2:00	0.36	31.8	28.5	2.2	1.1				
3:00	0.30	26.5	23.8	1.9	0.9				
4:00	0.36	31.8	28.5	2.2	1.1				
5:00	0.95	84.0	75.3	5.9	2.9				
6:00	2.75	243.2	217.9	17.0	8.3				
7:00	**5.05**	**446.6**	**400.1**	**31.3**	**15.2**	**58.62**	**47.69**		
8:00	6.55	579.2	519.0	40.5	19.7				
9:00	5.62	497.0	445.3	34.8	16.9				
10:00	5.50	486.4	435.8	34.0	16.5				
11:00	6.04	534.1	478.6	37.4	18.2				
12:00	6.48	573.0	513.5	40.1	19.5				
13:00	6.26	553.6	496.0	38.8	18.8				
14:00	6.60	583.7	523.0	40.9	19.8				
15:00	7.41	655.3	587.1	45.9	22.3				
16:00	7.82	691.5	619.6	48.4	23.5				
17:00	7.65	676.5	606.2	47.4	23.0				
18:00	6.27	554.5	496.8	38.8	18.9				
19:00	5.12	452.8	405.7	31.7	15.4				
20:00	4.99	441.3	395.4	30.9	15.0				
21:00	3.41	301.6	270.2	21.1	10.3				
22:00	3.41	301.6	270.2	21.1	10.3	57.01	45.97		
23:00	1.67	147.7	132.3	10.3	5.0				
Total	AADT	9014							

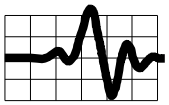
* March Road is in a cutting, approx. 4 m below grade, at POR 1. This shielding is accounted for in the calculations. See sample outputs.

Table A3.5: Traffic Volumes and Calculated Noise, Upper Dwyer Hill Road, South of March Road

Posted Speed Limit: 80 km/h Vehicle Classification based on count data and City Guidelines

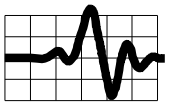
Note: 7 am to 8 am is the hour with the least traffic in the daytime (7 am to 7 pm)

Hour Beginning	Typical Distribution See Ref. 9 %	Estimated Total Vehicles	Estimated volumes by Vehicle Classification			Estimated Noise Levels by STAMSON			
			Cars 83%	Medium Trucks 7%	Heavy Trucks 10%	POR10_Od = 62 m -90 to 90 h = 1.5 m			
Midnight	0.87	16.2	13.5	1.1	1.6				
1:00	0.49	9.1	7.6	0.6	0.9				
2:00	0.36	6.7	5.6	0.5	0.7				
3:00	0.30	5.6	4.6	0.4	0.6				
4:00	0.36	6.7	5.6	0.5	0.7				
5:00	0.95	17.7	14.7	1.2	1.8				
6:00	2.75	51.3	42.5	3.6	5.1				
7:00	**5.05**	**94.1**	**78.1**	**6.6**	**9.4**	**52.73**			
8:00	6.55	122.1	101.3	8.5	12.2				
9:00	5.62	104.8	86.9	7.3	10.5				
10:00	5.50	102.5	85.1	7.2	10.3				
11:00	6.04	112.6	93.4	7.9	11.3				
12:00	6.48	120.8	100.3	8.5	12.1				
13:00	6.26	116.7	96.9	8.2	11.7				
14:00	6.60	123.0	102.1	8.6	12.3				
15:00	7.41	138.1	114.6	9.7	13.8				
16:00	7.82	145.8	121.0	10.2	14.6				
17:00	7.65	142.6	118.4	10.0	14.3				
18:00	6.27	116.9	97.0	8.2	11.7				
19:00	5.12	95.4	79.2	6.7	9.5				
20:00	4.99	93.0	77.2	6.5	9.3				
21:00	3.41	63.6	52.8	4.4	6.4				
22:00	3.41	63.6	52.8	4.4	6.4	50.99			
23:00	1.67	31.1	25.8	2.2	3.1				
Total	AADT	1900							



Sample Outputs, Traffic Noise Calculations using STAMSON

Contents:



STAMSON 5.0 NORMAL REPORT Date: 13-01-2021 15:01:15
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r1_o_d.te Time Period: 1 hours

Description: POR1 Daytime March Rd Traffic

Road data, segment # 1: March_EB_E

Car traffic volume : 200 veh/TimePeriod
Medium truck volume : 15 veh/TimePeriod
Heavy truck volume : 7 veh/TimePeriod
Posted speed limit : 80 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

Data for Segment # 1: March_EB_E

Angle1 Angle2 : -90.00 deg -30.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 44.00 m
Receiver height : 1.50 m
Topography : 3 (Elevated; no barrier)
Elevation : 4.00 m
Reference angle : 0.00

Road data, segment # 2: March_EB_F

Car traffic volume : 200 veh/TimePeriod
Medium truck volume : 15 veh/TimePeriod
Heavy truck volume : 7 veh/TimePeriod
Posted speed limit : 80 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

Data for Segment # 2: March_EB_F

Angle1 Angle2 : -30.00 deg 30.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 44.00 m
Receiver height : 1.50 m
Topography : 4 (Elevated; with barrier)
Barrier angle1 : -30.00 deg Angle2 : 30.00 deg
Barrier height : 4.00 m
Elevation : 4.00 m
Barrier receiver distance : 35.00 m
Source elevation : 0.00 m
Receiver elevation : 4.00 m
Barrier elevation : 0.00 m
Reference angle : 0.00

Road data, segment # 3: March_EB_W

Car traffic volume : 200 veh/TimePeriod
Medium truck volume : 15 veh/TimePeriod
Heavy truck volume : 7 veh/TimePeriod
Posted speed limit : 80 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

Data for Segment # 3: March_EB_W

Angle1 Angle2 : 30.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 44.00 m
Receiver height : 1.50 m
Topography : 3 (Elevated; no barrier)

Elevation : 2.00 m
Reference angle : 0.00

Road data, segment # 4: March_WB_E

Car traffic volume : 200 veh/TimePeriod
Medium truck volume : 15 veh/TimePeriod
Heavy truck volume : 7 veh/TimePeriod
Posted speed limit : 80 km/h
Road gradient : 5 %
Road pavement : 1 (Typical asphalt or concrete)

Data for Segment # 4: March_WB_E

Angle1 Angle2 : -90.00 deg -30.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 39.00 m
Receiver height : 1.50 m
Topography : 3 (Elevated; no barrier)
Elevation : 4.00 m
Reference angle : 0.00

Road data, segment # 5: March_WB_F

Car traffic volume : 200 veh/TimePeriod
Medium truck volume : 15 veh/TimePeriod
Heavy truck volume : 7 veh/TimePeriod
Posted speed limit : 80 km/h
Road gradient : 5 %
Road pavement : 1 (Typical asphalt or concrete)

Data for Segment # 5: March_WB_F

Angle1 Angle2 : -30.00 deg 30.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 39.00 m
Receiver height : 1.50 m
Topography : 4 (Elevated; with barrier)
Barrier angle1 : -30.00 deg Angle2 : 30.00 deg
Barrier height : 4.00 m
Elevation : 4.00 m
Barrier receiver distance : 35.00 m
Source elevation : 0.00 m
Receiver elevation : 4.00 m
Barrier elevation : 0.00 m
Reference angle : 0.00

Road data, segment # 6: March_WB_W

Car traffic volume : 200 veh/TimePeriod
Medium truck volume : 15 veh/TimePeriod
Heavy truck volume : 7 veh/TimePeriod
Posted speed limit : 80 km/h
Road gradient : 5 %
Road pavement : 1 (Typical asphalt or concrete)

Data for Segment # 6: March_WB_W

Angle1 Angle2 : 30.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 39.00 m
Receiver height : 1.50 m
Topography : 3 (Elevated; no barrier)
Elevation : 2.00 m
Reference angle : 0.00

Results segment # 1: March_EB_E

Source height = 1.33 m

ROAD (0.00 + 51.75 + 0.00) = 51.75 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj
B.Adj SubLeq

-90 -30 0.55 65.71 0.00 -7.22 -6.74 0.00 0.00 0.00 51.75

Segment Leq : 51.75 dBA

Results segment # 2: March_EB_F

Source height = 1.33 m

Barrier height for grazing incidence

Source ! Receiver ! Barrier ! Elevation of
Height (m) ! Height (m) ! Height (m) ! Barrier Top (m)
---+---+---+---
1.33 ! 1.50 ! 2.18 ! 2.18

ROAD (0.00 + 43.55 + 0.00) = 43.55 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj
B.Adj SubLeq

-30 30 0.31 65.71 0.00 -6.10 -4.83 0.00 0.00 -11.23
43.55

Segment Leq : 43.55 dBA

Results segment # 3: March_EB_W

Source height = 1.33 m

ROAD (0.00 + 51.29 + 0.00) = 51.29 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj
B.Adj SubLeq
---
30 90 0.61 65.71 0.00 -7.50 -6.92 0.00 0.00 0.00 51.29

Segment Leq : 51.29 dBA

Results segment # 4: March_WB_E

Source height = 1.33 m

ROAD (0.00 + 53.31 + 0.00) = 53.31 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj
B.Adj SubLeq

-90 -30 0.55 66.46 0.00 -6.41 -6.74 0.00 0.00 0.00 53.31

Segment Leq : 53.31 dBA

Results segment # 5: March_WB_F

Source height = 1.33 m

Barrier height for grazing incidence

Source ! Receiver ! Barrier ! Elevation of
Height (m) ! Height (m) ! Height (m) ! Barrier Top (m)
---+---+---+---

1.33 ! 1.50 ! 1.76 ! 1.76

ROAD (0.00 + 40.86 + 0.00) = 40.86 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj
B.Adj SubLeq

-30 30 0.31 66.46 0.00 -5.42 -4.83 0.00 0.00 -15.35
40.86

Segment Leq : 40.86 dBA

Results segment # 6: March_WB_W

Source height = 1.33 m

ROAD (0.00 + 52.88 + 0.00) = 52.88 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj
B.Adj SubLeq
---
30 90 0.61 66.46 0.00 -6.66 -6.92 0.00 0.00 0.00 52.88

Segment Leq : 52.88 dBA

Total Leq All Segments: 58.62 dBA

TOTAL Leq FROM ALL SOURCES: 58.62

STAMSON 5.0 NORMAL REPORT Date: 13-01-2021 15:19:08
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r2_o_d.te Time Period: 1 hours

Description: POR2 Daytime March Rd Traffic

Road data, segment # 1: March Rd

Car traffic volume : 400 veh/TimePeriod
Medium truck volume : 31 veh/TimePeriod
Heavy truck volume : 15 veh/TimePeriod
Posted speed limit : 80 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

Data for Segment # 1: March Rd

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 2 (Wood depth 60 metres or more)
No of house rows : 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 85.00 m
Receiver height : 1.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: March Rd

Source height = 1.35 m

ROAD (0.00 + 47.69 + 0.00) = 47.69 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq
---
-90 90 0.36 68.88 0.00 -10.28 -0.91 -10.00 0.00 0.00 47.69

Segment Leq : 47.69 dBA

Total Leq All Segments: 47.69 dBA

TOTAL Leq FROM ALL SOURCES: 47.69

STAMSON 5.0 NORMAL REPORT Date: 13-01-2021 15:35:43
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r10D_o_d.te Time Period: 1 hours
Description: POR10 Daytime Dwyer Hill Rd Traffic

Road data, segment # 1: Dwyer Hill

Car traffic volume : 78 veh/TimePeriod
Medium truck volume : 6 veh/TimePeriod
Heavy truck volume : 9 veh/TimePeriod
Posted speed limit : 80 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

Data for Segment # 1: Dwyer Hill

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 : 62.00 m
Receiver height : 1.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Dwyer Hill

Source height = 1.76 m

ROAD (0.00 + 52.73 + 0.00) = 52.73 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq
---
-90 90 0.65 64.36 0.00 -10.18 -1.44 0.00 0.00 0.00 52.73

Segment Leq : 52.73 dBA

Total Leq All Segments: 52.73 dBA

TOTAL Leq FROM ALL SOURCES: 52.73

STAMSON 5.0 NORMAL REPORT Date: 13-01-2021 15:22:50
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r11_o_d.te Time Period: 1 hours
Description: POR11 Daytime March Rd Traffic

Road data, segment # 1: March Rd

Car traffic volume : 366 veh/TimePeriod
Medium truck volume : 29 veh/TimePeriod
Heavy truck volume : 15 veh/TimePeriod
Posted speed limit : 80 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

Data for Segment # 1: March 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 : 73.00 m
Receiver height : 1.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: March Rd

Source height = 1.38 m

ROAD (0.00 + 55.81 + 0.00) = 55.81 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq
---
-90 90 0.66 68.68 0.00 -11.41 -1.46 0.00 0.00 0.00 55.81

Segment Leq : 55.81 dBA

Total Leq All Segments: 55.81 dBA

TOTAL Leq FROM ALL SOURCES: 55.81

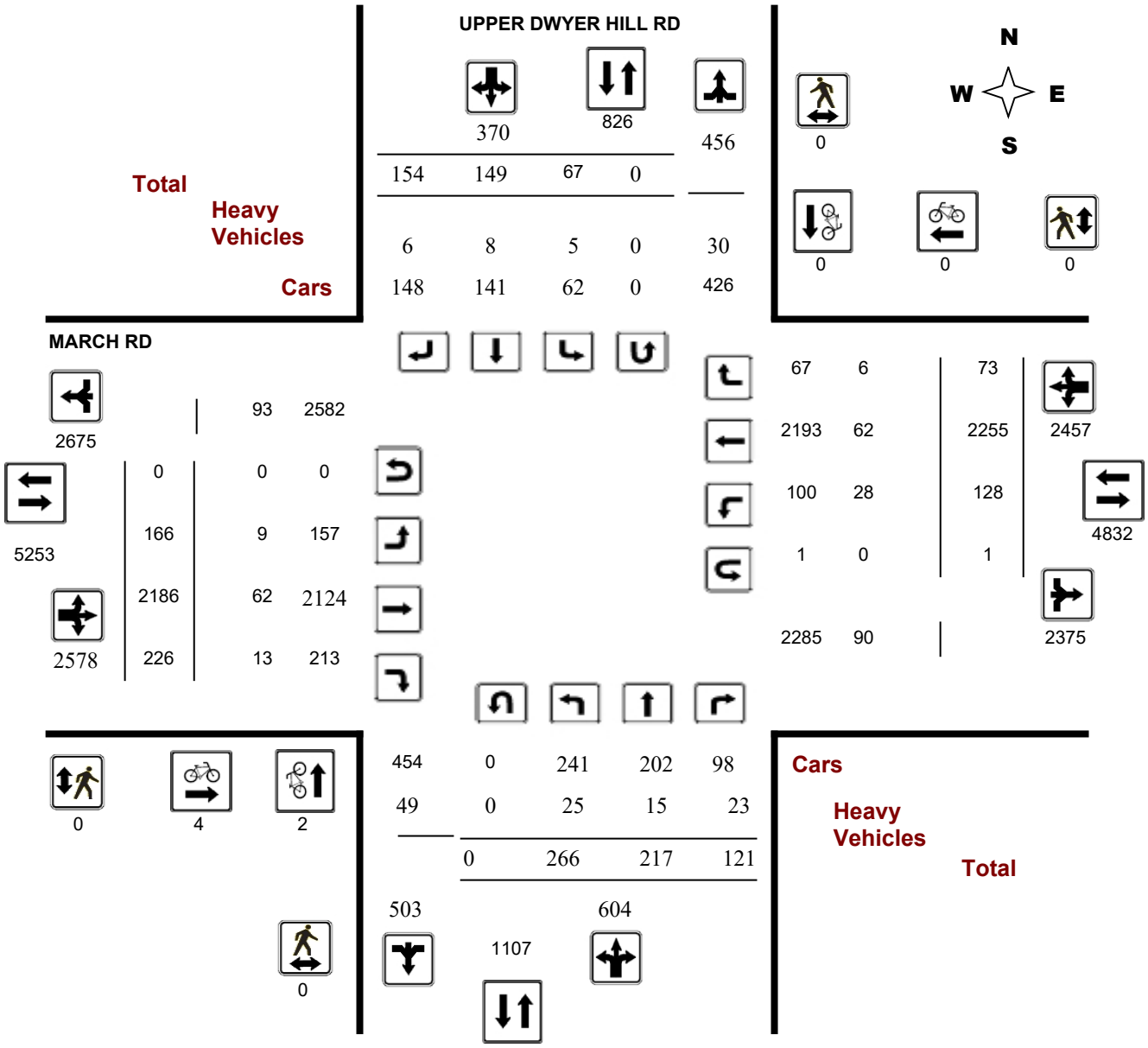
Transportation Services - Traffic Services

Turning Movement Count - Study Results

MARCH RD @ UPPER DWYER HILL RD

Survey Date: Thursday, December 01, 2016
Start Time: 07:00
WO No: 36577
Device: Miovision

Full Study Diagram



Transportation Services - Traffic Services

Turning Movement Count - Study Results

MARCH RD @ UPPER DWYER HILL RD

Survey Date: Thursday, December 01, 2016 **WO No:** 36577

Start Time: 07:00 **Device:** Miovision

Full Study Summary (8 HR Standard)

Survey Date: Thursday, December 01, 2016

Total Observed U-Turns

Northbound: 0 Southbound: 0

Eastbound: 0 Westbound: 1

AADT Factor

1.00

	UPPER DWYER HILL RD								MARCH RD									
	Northbound				Southbound					Eastbound				Westbound					
Period	LT	ST	RT	NB TOT	LT	ST	RT	SB TOT	STR TOT	LT	ST	RT	EB TOT	LT	ST	RT	WB TOT	STR TOT	Grand Total
07:00 08:00	12	21	28	**61**	13	22	24	**59**	**120**	17	466	37	**520**	10	119	8	**137**	**657**	**777**
08:00 09:00	28	25	23	**76**	15	22	25	**62**	**138**	11	375	30	**416**	15	166	9	**190**	**606**	**744**
09:00 10:00	20	18	15	**53**	6	8	14	**28**	**81**	11	308	28	**347**	13	155	4	**172**	**519**	**600**
11:30 12:30	30	13	13	**56**	4	19	11	**34**	**90**	16	188	26	**230**	11	204	8	**223**	**453**	**543**
12:30 13:30	25	26	12	**63**	2	9	14	**25**	**88**	18	208	23	**249**	13	181	5	**199**	**448**	**536**
15:00 16:00	41	35	11	**87**	11	24	18	**53**	**140**	36	209	31	**276**	22	412	6	**440**	**716**	**856**
16:00 17:00	48	38	12	**98**	12	24	20	**56**	**154**	29	229	31	**289**	29	542	20	**591**	**880**	**1034**
17:00 18:00	62	41	7	**110**	4	21	28	**53**	**163**	28	203	20	**251**	15	476	13	**504**	**755**	**918**
Sub Total	266	217	121	**604**	67	149	154	**370**	**974**	166	2186	226	**2578**	128	2255	73	**2456**	**5034**	**6008**
U Turns				**0**				**0**	**0**				**0**				**0**	**0**	**0**
Total	266	217	121	**604**	67	149	154	**370**	**974**	166	2186	226	**2578**	128	2255	73	**2456**	**5034**	**6008**
EQ 12Hr	370	302	168	**840**	93	207	214	**514**	**1354**	231	3039	314	**3583**	178	3134	101	**3415**	**6999**	**8353**
Note: These values are calculated by multiplying the totals by the appropriate expansion factor.														**1.39**					
AVG 12Hr	348	284	159	**791**	88	195	202	**485**	**1354**	217	2864	296	**3377**	168	2954	96	**3219**	**6999**	**8353**
Note: These volumes are calculated by multiplying the Equivalent 12 hr. totals by the AADT factor.														**1**					
AVG 24Hr	456	372	208	**1037**	115	256	264	**635**	**1672**	285	3751	388	**4424**	220	3870	125	**4216**	**8640**	**10312**
Note: These volumes are calculated by multiplying the Average Daily 12 hr. totals by 12 to 24 expansion factor.														**1.31**					

Note: U-Turns provided for approach totals. Refer to 'U-Turn' Report for specific breakdown.

Transportation Services - Traffic Services

Turning Movement Count - Study Results

MARCH RD @ UPPER DWYER HILL RD

Survey Date: Thursday, December 01, 2016 **WO No:** 36577

Start Time: 07:00 **Device:** Miovision

Full Study Heavy Vehicles

		UPPER DWYER HILL RD									MARCH RD									
		Northbound				Southbound					Eastbound				Westbound					
Time Period		LT	ST	RT	N TOT	LT	ST	RT	S TOT	STR TOT	LT	ST	RT	E TOT	LT	ST	RT	W TOT	STR TOT	Grand Total
07:00	07:15	1	2	1	**4**	1	0	0	**1**	**5**	0	3	0	**3**	1	3	0	**4**	**7**	**12**
07:15	07:30	0	1	2	**3**	0	0	1	**1**	**4**	0	2	0	**2**	1	2	0	**3**	**5**	**9**
07:30	07:45	0	0	3	**3**	0	2	0	**2**	**5**	0	2	0	**2**	0	1	1	**2**	**4**	**9**
07:45	08:00	0	0	4	**4**	1	0	0	**1**	**5**	0	3	1	**4**	0	1	0	**1**	**5**	**10**
08:00	08:15	1	2	2	**5**	0	1	1	**2**	**7**	2	1	1	**4**	0	2	0	**2**	**6**	**13**
08:15	08:30	1	1	1	**3**	0	1	0	**1**	**4**	0	2	1	**3**	1	3	0	**4**	**7**	**11**
08:30	08:45	0	0	0	**0**	0	0	0	**0**	**0**	1	1	0	**2**	0	1	0	**1**	**3**	**3**
08:45	09:00	2	1	0	**3**	0	0	0	**0**	**3**	1	6	0	**7**	1	4	0	**5**	**12**	**15**
09:00	09:15	0	0	2	**2**	0	0	0	**0**	**2**	0	1	1	**2**	3	2	1	**6**	**8**	**10**
09:15	09:30	1	1	0	**2**	0	0	1	**1**	**3**	0	2	0	**2**	0	2	0	**2**	**4**	**7**
09:30	09:45	1	0	2	**3**	0	0	0	**0**	**3**	1	0	0	**1**	0	1	1	**2**	**3**	**6**
09:45	10:00	1	2	0	**3**	1	0	0	**1**	**4**	0	1	1	**2**	1	1	0	**2**	**4**	**8**
11:30	11:45	3	0	0	**3**	0	0	0	**0**	**3**	0	0	0	**0**	3	2	0	**5**	**5**	**8**
11:45	12:00	0	0	1	**1**	0	2	0	**2**	**3**	0	2	1	**3**	1	0	1	**2**	**5**	**8**
12:00	12:15	3	0	0	**3**	0	0	1	**1**	**4**	1	2	0	**3**	1	2	0	**3**	**6**	**10**
12:15	12:30	0	0	0	**0**	0	0	0	**0**	**0**	0	0	1	**1**	0	3	0	**3**	**4**	**4**
12:30	12:45	1	0	0	**1**	0	0	0	**0**	**1**	0	2	0	**2**	1	1	0	**2**	**4**	**5**
12:45	13:00	0	1	0	**1**	0	0	0	**0**	**1**	0	4	0	**4**	1	1	0	**2**	**6**	**7**
13:00	13:15	1	1	1	**3**	0	0	0	**0**	**3**	0	4	1	**5**	0	0	0	**0**	**5**	**8**
13:15	13:30	0	0	1	**1**	0	0	1	**1**	**2**	0	1	2	**3**	0	1	0	**1**	**4**	**6**
15:00	15:15	0	1	0	**1**	0	0	0	**0**	**1**	2	5	1	**8**	1	5	0	**6**	**14**	**15**
15:15	15:30	2	0	0	**2**	2	0	0	**2**	**4**	0	2	0	**2**	0	3	1	**4**	**6**	**10**
15:30	15:45	1	1	2	**4**	0	0	0	**0**	**4**	0	2	0	**2**	3	1	0	**4**	**6**	**10**
15:45	16:00	1	0	1	**2**	0	0	0	**0**	**2**	0	3	1	**4**	2	2	0	**4**	**8**	**10**
16:00	16:15	1	0	0	**1**	0	0	0	**0**	**1**	1	2	0	**3**	0	4	0	**4**	**7**	**8**
16:15	16:30	0	0	0	**0**	0	0	0	**0**	**0**	0	1	0	**1**	0	4	1	**5**	**6**	**6**
16:30	16:45	2	0	0	**2**	0	1	1	**2**	**4**	0	0	0	**0**	4	5	0	**9**	**9**	**13**
16:45	17:00	1	0	0	**1**	0	1	0	**1**	**2**	0	3	0	**3**	3	1	0	**4**	**7**	**9**
17:00	17:15	0	0	0	**0**	0	0	0	**0**	**0**	0	2	0	**2**	0	1	0	**1**	**3**	**3**
17:15	17:30	0	1	0	**1**	0	0	0	**0**	**1**	0	2	0	**2**	0	2	0	**2**	**4**	**5**
17:30	17:45	1	0	0	**1**	0	0	0	**0**	**1**	0	0	1	**1**	0	1	0	**1**	**2**	**3**
17:45	18:00	0	0	0	**0**	0	0	0	**0**	**0**	0	1	0	**1**	0	0	0	**0**	**1**	**1**
Total:	None	25	15	23	**63**	5	8	6	**19**	**82**	9	62	13	**84**	28	62	6	**96**	**180**	**262**

Appendix 4

Instrument Calibration Certificates

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Pylon Electronics Inc.
147 Colonnade Road
Ottawa, ON K2E 7L9

CERTIFICATE OF CALIBRATION

Description	**SOUND LEVEL CALIBRATOR**	**Work Order**	**N0833134**
Model Number	**4231**	**Serial Number**	**2730374**
Instrument Id	**N/A**	**Cal Procedure**	**33K3-4-2871-1**
Manufacturer	**BRUEL & KJAER**	**Cal Date**	**30 Jan 2020**
Customer Name	**FREEFIELD LTD.**	**Recall Cycle**	**52 Weeks**
		Next Cal Date	**30 Jan 2021**
		Purchase Order	**Credit Card**

Calibration Environment: Temperature **23.0 °C** Relative Humidity **35.2 %RH**

Received Condition: **Within Tolerance**

Completed Condition: **Within Tolerance**

Remarks: **Optimized sound level.**

Standards Used to Establish Traceability

Instrument Type	Model	Asset #	Cal Due Date
4145 BRUEL&KJAER 1" MICROPHONE	4145	240-054	4 Dec 2020
1/2" MICROPHONE	4166	240-709	18 Jun 2020
PISTONPHONE	4220	354-017	1 Apr 2020
FFT SIGNAL ANALYZER SYSTEM	3550	354-759	10 Oct 2020
MICROPHONE PREAMP	2639T	355-164	27 Feb 2020

Pylon certifies that, at the time of calibration, the above listed instrument meets or exceeds all of the specifications defined on the Test Data Sheet (TDS), unless otherwise indicated. The Certificate received and completed conditions and the TDS specifications are based on the procedure(s) and/or specification(s) referenced on the TDS unless otherwise indicated. Any statement of compliance is made without taking measurement uncertainty into account and is based on the instrument's performance against the test limits documented on the test data sheet.

The above listed instrument has been calibrated using standards that are traceable to the International System of Units (SI) through a National Metrological Institute (such as NRC or NIST). Pylon's quality system meets the requirements of ISO/IEC 17025:2005. Unless otherwise specified, Pylon maintains a minimum of a 4:1 ratio between the equipment under test and the measurement system.

Test data As Found and Final (as left) results are the same unless reported otherwise. Certificate remarks identify if adjustments were performed.

Metrologist : *062* Quality Assurance: *301* Date of Issue: **30 Jan 2020** F083 Rev 15

PYLON

Calibration Test Data

Description:	**SOUND LEVEL CALIBRATOR**	Work order:	**N0833134**
Model:	**4231**	Serial:	**2730374**
Customer ID.:	**N/A**	Procedure:	**33K3-4-2871-1**
Manufacturer:	**BRUEL & KJAER**	Proc. Rev.:	**30-Oct-2006**
Customer:	**FREEFIELD LTD.**	Cal Date:	**30-Jan-2020**

TEST REF.	TEST DESCRIPTION	RESULTS MIN	AS FOUND	FINAL	MAX
4.1	**Sound Level Calibration:**				
	Nominal dB_{SPL}	dB_{SPL}	dB_{SPL}	dB_{SPL}	dB_{SPL}
	94.0	93.80	94.15	94.02	94.20
	(+20 dB Button) 114.0	113.80	114.13	114.01	114.20
4.2	**Frequency Calibration:**				
	Nominal (Hz)	Hz	Hz		Hz
	1 k	999.0	1000.0		1001.0
4.3	**Distortion Calibration :**				
	Measured Value	-	0.37 %		1.00 %
	ADDITIONAL TEST:				
	AUTO SHUT OFF	Pass / Fail	Pass		

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CERTIFICATE OF CALIBRATION

Description	**SOUND ANALYZER**	**Work Order**	**N0833130**
Model Number	**2270**	**Serial Number**	**3008643**
Instrument Id	**N/A**	**Cal Procedure**	**BE1713-32**
Manufacturer	**BRUEL & KJAER**	**Cal Date**	**30 Jan 2020**
Customer Name	**FREEFIELD LTD.**	**Recall Cycle**	**52 Weeks**
		Next Cal Date	**30 Jan 2021**
		Purchase Order	**Credit Card**

Calibration Environment: Temperature **23.0 °C** Relative Humidity **35.2 %RH**

Received Condition: **Within Tolerance**

Completed Condition: **Within Tolerance**

Remarks: **Unit calibrated with Preamp ZC 0032 S/N 23073 AND MIC 4189 S/N 2985656**

Standards Used to Establish Traceability

Instrument Type	Model	Asset #	Cal Due Date
SOUND LEVEL CALIBRATOR	4231	240-1151	17 Sep 2020
PISTONPHONE	4220	354-017	1 Apr 2020

Pylon certifies that, at the time of calibration, the above listed instrument meets or exceeds all of the specifications defined on the Test Data Sheet (TDS), unless otherwise indicated. The Certificate received and completed conditions and the TDS specifications are based on the procedure(s) and/or specification(s) referenced on the TDS unless otherwise indicated. Any statement of compliance is made without taking measurement uncertainty into account and is based on the instrument's performance against the test limits documented on the test data sheet.

The above listed instrument has been calibrated using standards that are traceable to the International System of Units (SI) through a National Metrological Institute (such as NRC or NIST). Pylon's quality system meets the requirements of ISO/IEC 17025:2005. Unless otherwise specified, Pylon maintains a minimum of a 4:1 ratio between the equipment under test and the measurement system.

Test data As Found and Final (as left) results are the same unless reported otherwise. Certificate remarks identify if adjustments were performed.

Metrologist : ***062*** Quality Assurance: ***301*** Date of Issue: **30 Jan 2020** F083 Rev 15

PYLON

Calibration Test Data

Description:	**SOUND ANALYZER**	Work order:	**N0833130**
Model:	**2270**	Serial:	**3008643**
Customer ID.:	**N/A**	Procedure:	**BE1713-32**
Manufacturer:	**BRUEL & KJAER**	Proc. Rev.:	**23-Feb-2016**
Customer:	**FREEFIELD LTD.**	Cal Date:	**30-Jan-2020**

TEST REF.	TEST DESCRIPTION	RESULTS MIN	AS FOUND	FINAL	MAX
P. 52	**SOUND LEVEL CALIBRATION**				
	CONNECT TI TO SOUND CALIBRATOR MODEL 4231,				
	SWITCH ON THE CALIBRATOR, PRESS "START" ON TI,				
	NOTE THAT TI INDICATING "DETECTING LEVEL"	Pass / Fail	Pass		
	WHILE TI SEARCHING FOR SIGNAL & SIGNAL IS				
	STABILISING, THE "TRAFFIC LIGHT" INDICATES				
	SHORT GREEN FLASH EVERY SECOND	Pass / Fail	Pass		
	WHEN SIGNAL IS STABLE, THE GREEN LIGHT IS				
	STABLE	Pass / Fail	Pass		
	WHEN CALIBRATION IS COMPLETED SUCCESSFULLY				
	THE TRAFFIC LIGHT INDICATES A SHORT YELLOW				
	FLASH EVERY 5 SECONDS	Pass / Fail	Pass		
	Nominal SPL with 4189 Microphone attached	dB	dB		dB
	93.8 dB	92.8	93.8		94.8
	CALIBRATION COMPLETED	Pass / Fail	Pass		

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CERTIFICATE OF CALIBRATION

Description	SOUND ANALYZER	**Work Order**	N0867793
Model Number	2250	**Serial Number**	2645066
Instrument Id	N/A	**Cal Procedure**	BE1713-16
Manufacturer	BRUEL & KJAER	**Cal Date**	19 Aug 2020
Customer Name	FREEFIELD LTD.	**Recall Cycle**	52 Weeks
		Next Cal Date	19 Aug 2021
		Purchase Order	Credit Card

Calibration Environment: Temperature 23.2 °C Relative Humidity 36.7 %RH

Received Condition: Within Tolerance

Completed Condition: Within Tolerance

Remarks: The unit calibrated with Preamp ZC 0032 S/N 9181 and Mic 4189 S/N 2638609.

Standards Used to Establish Traceability

Instrument Type	Model	Asset #	Cal Due Date
SOUND LEVEL CALIBRATOR	4231	240-1151	17 Sep 2020
PISTONPHONE	4220	354-017	1 Oct 2020

Pylon certifies that, at the time of calibration, the above listed instrument meets or exceeds all of the specifications defined on the Test Data Sheet (TDS), unless otherwise indicated. The Certificate received and completed conditions and the TDS specifications are based on the procedure(s) and/or specification(s) referenced on the TDS unless otherwise indicated. Any statement of compliance is made without taking measurement uncertainty into account and is based on the instrument's performance against the test limits documented on the test data sheet.

The above listed instrument has been calibrated using standards that are traceable to the International System of Units (SI) through a National Metrological Institute (such as NRC or NIST). Pylon's quality system meets the requirements of ISO/IEC 17025:2017. Unless otherwise specified, Pylon maintains a minimum of a 4:1 ratio between the equipment under test and the measurement system.

Test data As Found and Final (as left) results are the same unless reported otherwise. Certificate remarks identify if adjustments were performed.

Metrologist : *062* Quality Assurance: *325* Date of Issue: **19 Aug 2020** F083 Rev 15

PYLON

Calibration Test Data

Description:	**SOUND ANALYZER**	Work order:	**N0867793**
Model:	**2250**	Serial:	**2645066**
Customer ID.:	**N/A**	Procedure:	**BE1713-16**
Manufacturer:	**BRUEL & KJAER**	Proc. Rev.:	**01-Dec-2005**
Customer:	**FREEFIELD LTD.**	Cal Date:	**19-Aug-2020**

Rev:25Jan2007
AF=0
F=0

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TEST REF.	TEST DESCRIPTION	RESULTS MIN	AS FOUND	FINAL	MAX
P. 37	**SOUND LEVEL CALIBRATION**				
	CONNECT TI TO SOUND CALIBRATOR MODEL 4231,				
	SWITCH ON THE CALIBRATOR, PRESS "START" ON TI,				
	NOTE THAT TI INDICATING "DETECTING LEVEL"	Pass / Fail	Pass		
	WHILE TI SEARCHING FOR SIGNAL & SIGNAL IS				
	STABILISING, THE "TRAFFIC LIGHT" INDICATES				
	SHORT GREEN FLASH EVERY SECOND	Pass / Fail	Pass		
	WHEN SIGNAL IS STABLE, THE GREEN LIGHT IS				
	STABLE	Pass / Fail	Pass		
	WHEN CALIBRATION IS COMPLETED SUCCESSFULLY				
	THE TRAFFIC LIGHT INDICATES A SHORT YELLOW				
	FLASH EVERY 5 SECONDS	Pass / Fail	Pass		
	Nominal SPL with 4189 Microphone attached	dB	dB		dB
	93.8 dB	92.8	93.6		94.8
	CALIBRATION COMPLETED	Pass / Fail	Pass		

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CERTIFICATE OF CALIBRATION

Description	SOUND LEVEL CALIBRATOR	**Work Order**	N0867795
Model Number	4231	**Serial Number**	2122785
Instrument Id	N/A	**Cal Procedure**	33K3-4-2871-1
Manufacturer	BRUEL & KJAER	**Cal Date**	19 Aug 2020
Customer Name	FREEFIELD LTD.	**Recall Cycle**	52 Weeks
		Next Cal Date	19 Aug 2021
		Purchase Order	Credit Card

Calibration Environment: Temperature 23.2 °C Relative Humidity 36.7 %RH

Received Condition: Within Tolerance

Completed Condition: Within Tolerance

Standards Used to Establish Traceability

Instrument Type	Model	Asset #	Cal Due Date
4145 BRUEL&KJAER 1" MICROPHONE	4145	240-054	4 Dec 2020
1/2" MICROPHONE	4166	240-709	20 Jun 2021
PISTONPHONE	4220	354-017	1 Oct 2020
FFT SIGNAL ANALYZER SYSTEM	3550	354-759	10 Oct 2020
MICROPHONE PREAMP	2639T	355-164	24 Feb 2021

Pylon certifies that, at the time of calibration, the above listed instrument meets or exceeds all of the specifications defined on the Test Data Sheet (TDS), unless otherwise indicated. The Certificate received and completed conditions and the TDS specifications are based on the procedure(s) and/or specification(s) referenced on the TDS unless otherwise indicated. Any statement of compliance is made without taking measurement uncertainty into account and is based on the instrument's performance against the test limits documented on the test data sheet.

The above listed instrument has been calibrated using standards that are traceable to the International System of Units (SI) through a National Metrological Institute (such as NRC or NIST). Pylon's quality system meets the requirements of ISO/IEC 17025:2017. Unless otherwise specified, Pylon maintains a minimum of a 4:1 ratio between the equipment under test and the measurement system.

Test data As Found and Final (as left) results are the same unless reported otherwise. Certificate remarks identify if adjustments were performed.

PYLON

Calibration Test Data

Description:	**SOUND LEVEL CALIBRATOR**	Work order:	**N0867795**
Model:	**4231**	Serial:	**2122785**
Customer ID.:	**N/A**	Procedure:	**33K3-4-2871-1**
Manufacturer:	**BRUEL & KJAER**	Proc. Rev.:	**30-Oct-2006**
Customer:	**FREEFIELD LTD.**	Cal Date:	**19-Aug-2020**

Rev:03Jul2009

AF=0

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TEST REF.	TEST DESCRIPTION	RESULTS MIN	AS FOUND	FINAL	MAX
4.1	**Sound Level Calibration:**				
	Nominal dB_{SPL}	dB_{SPL}	dB_{SPL}		dB_{SPL}
	94.0	93.80	94.06		94.20
	(+20 dB Button) 114.0	113.80	114.06		114.20
4.2	**Frequency Calibration:**				
	Nominal (Hz)	Hz	Hz		Hz
	1 k	999.0	999.9		1001.0
4.3	**Distortion Calibration :**				
	Measured Value	-	0.21 %		1.00 %
	ADDITIONAL TEST:				
	AUTO SHUT OFF	Pass / Fail	Pass		

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

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, J. L. Richards & Associates, Barry Padolsky Associates, Atkinson Schroeter Design Group, R. W. Tomlinson Limited, Geo. Tackaberry Construction, Miller Paving, City of Ottawa.

Postal Address: PO Box 74056, RPO Beechwood, Ottawa, Ontario, K1M 2H9, Canada
Phone: 613-747-0983, Email: hugh@freefieldacoustics.com, http://www.freefieldacoustics.com

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 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.

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