Appendix C

Air Emissions Assessment

Air Emissions Assessment

Antrim Gypsum Project

CertainTeed Canada, Inc.

03 July 2024

The Power of Commitment

GHD
110, 120 Western Parkway
Bedford, Nova Scotia B4B 0V2 Canada
T +1 902 468 1248 | **F** +1 902 468 2207 | **E** info-northamerica@ghd.com | **ghd.com**

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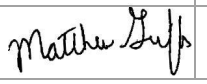
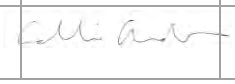
Status Code	Revision	Author	Reviewer		Approved for issue		
			Name	Signature	Name	Signature	Date
S3	00	Amin Costas	Matt Griffin	Draft	Callie Andrews	Draft	June 28, 2024
S4	01	Amin Costas	Matt Griffin		Callie Andrews		July 3, 2024

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1. Introduction

GHD Limited (GHD) performed air emission estimates and dispersion modelling for the Antrim Gypsum Project (the Project) located near Gays River, along Lake Egmont Road in the community of Cooks Brook, Nova Scotia (NS). The Project Area (PA) is defined as the footprint of Project related infrastructure and includes the following parcels of land (PID 40228389, 40228371, 40212409, 40229676, 40228009 and 40228017). Figure 1 shows the locations of the air emission sources and proposed haul roads within the PA for Phase 1 and Phase 2 of the Project.

This report summarizes the methodology used to estimate the air emissions and develop the dispersion models that were used to assess the impact of air emissions from the Project.

Air emissions compounds evaluated included total suspended particulates (TSP), particulate matter less than 10 micrometers in aerodynamic diameter (PM_{10}), particulate matter less than 2.5 micrometers in aerodynamic diameter ($PM_{2.5}$), nitrogen oxides (NO_x), sulfur dioxide (SO_2) and carbon monoxide (CO).

2. Air Emission Estimates

Particulate emission rates from Project related sources were calculated using the United States Environmental Protection Agency (US EPA) AP-42 (5th Edition) emission factors, namely for open pit mining activities and resuspended road dust (US EPA, 2020). Haul road vehicle tailpipe emissions along with non-road vehicular tailpipe emissions were estimated using MOBILE6 (M6) and MOBILE6.1 (M6.1). Two scenarios have been assessed, the worst-case years for Phase 1 and Phase 2 of the mine. Phase 1 is anticipated to account for approximately the first 6 years of the mine life while Phase 2 is expected to last approximately 16 years after Phase 1 ends, equating to a proposed mine life of approximately 23 years. The anticipated total amount of gypsum processed for each phase is 7.7M tonnes and 31M tonnes respectively equalling 38M tonnes for the entire life of the mine. The Project will produce marketable gypsum and anhydrite at an estimated average rate of production of 1.5 million tonners per year.

The worst case-year for Phase 1 is year 6 of the Life of Mine (LOM), with the anticipated total amount of material mined estimated to be 6.93M tonnes. The worst case-year for Phase 2 is year 7 of the LOM, with the anticipated total amount of material mined estimated to be 6.87M tonnes.

2.1 Sources of Particulates

The possible sources of particulate emissions in the PA include the following:

– Haul roads – two haul roads that connect the pit to the processing facility and stockpile
– Shipping Truck Route – route for filling and weighing trucks for shipping
– Mining activities at the open pit
– Processing Area Operations

2.1.1 Haul Roads/Shipping Truck Route

There are two proposed haul roads within the PA that connect the open pit to the processing facility and stockpiles. The haul road to the open pit may change during each phase of the Project to access the gypsum resource for extraction. The haul roads are used for the transportation of waste, till stockpiles, and organic material stockpiles from the pit, and for the transportation of Run-of-Mine (ROM) material to the processing area from the pit.

The LOM projection schedule predicts the probable amount of waste rock, till, and ROM material mined annually over a span of approximately 23 years (including 6 years for Phase 1 and 16 years for Phase 2). According to the LOM projection schedule, in Year 6 of operations, the amount of maximum material mined will be 6.93M tonnes. In Year 7

of operations, the amount of maximum material mined will be 6.87M tonnes. The number of round trips required to carry these materials was estimated based on the load carrying capacity of the planned trucks. Estimating the haul truck traffic using the average material mined in a given year gives a realistic maximum number of trips that will occur amongst the haul truck routes; this was used to estimate TSP, PM_{10}, $PM_{2.5}$ road dust emissions for Phases 1 and 2. The methodology for calculating the number of trips per hour used to estimate road dust emission rates for TSP, PM_{10}, and $PM_{2.5}$ is summarized in Table 1.

Haul road emission calculations assume that the haul roads and shipping truck route are unpaved, and a Fugitive Dust Management Plan will be developed for the Project and implemented. The shipping truck route is assumed to be paved for a length of 31 metres (m) at both the entrance and exit of the route. The shipping truck route extends from the entrance to the processing facility and back to the exit, as displayed on Figure 1. CertainTeed plans to have dust control measures in place to achieve a 90% level of dust mitigation. The roads will be constructed using clean waste rock, and therefore only road dust emissions were calculated and assessed. Emissions calculations for haul road particulates are provided in Table 1, including the assumptions and constants, based on the AP-42 methodology for 90% road dust mitigation. The 90% level of dust mitigation represents the level of control found to be needed to achieve acceptable results at the nearest receptors. Published studies such as the handbook "Dust Control at Hazardous Waste Sites" by Keith D. Rosbury, PEI Associates, Inc., and Golden, CO 80401 (EPA/540/2-85/003, 1985) show that a 90% level of dust mitigation is achievable. Rosbury (1985) summarized results from various studies showing that levels of control as high as 98% were attained in some cases. Rosbury went on to prescribe a watering rate that would achieve near 100% control (approximately 1.7 L/m²/h). The US EPA (AP-42, Chapter 13.2.2) showed that by maintaining a road surface moisture level of five times that of the ambient soil, a 95% level of control could be achieved. It is clear therefore that the 90% level of control is attainable through sufficient watering. The finding of the studies referenced above are consistent with GHD's professional experience in observing the effect of watering programs for dust mitigation.

The NONROAD model integrated within MOBILE6 can estimate the particulate emissions from nonroad motor vehicles such as excavators, loaders, dozers, and graders (exhaust particulates).

2.1.2 Open Pit

The major sources of dust generation at the pit include resuspension of road dust, transfer/loading operations, and surface processing through heavy machinery. There are a few non-road vehicles such as surface miners, excavators, loaders, dozers, etc., used in the pit. The list of non-road vehicles is summarized under Table 2 and Table 3 respectively. The NONROAD model integrated within the MOBILE6 emission modelling system was used to generate emission factors for the off-road equipment used in the pit. The maximum emission factor representative of each off-road vehicle was used to estimate emissions.

The road dust and the truck loading are expected to dominate the particulate generation during the operations phase. It is projected that the total material mined during year 6 of the LOM is 6,925,310 tonnes; similarly, the total material mined during year 7 of the LOM is 6,873,240 tonnes. These average production capacities were used to conservatively estimate the particulate matter generated from loading activities.

2.1.3 Processing Area

The processing area receives the ROM material. There is expected to be a ROM material stockpile with transfer operations (ROMTRANS) adjacent to the processing area where the ROM material will be unloaded from the haul trucks. The material is stored temporarily before being transferred to the crushers. Particulate generating processes related to the processing area consist of transfer conveyors, material handling, loading, and unloading operations at the ROMTRANS, and primary, secondary and tertiary ROM crushing. AP-42 standard calculations and assumptions, including controls where applicable, were used to generate these values and are provided in the Table 4.

During Phase 2, there will be a process rejects pile located in the processing area, guidance and emission factors from AP-42 section 13.2.4 were used to generate the emission rates for this source and are provided in Table 4.

2.2 Sources of Gaseous Compounds

Tailpipe emissions from haul trucks along the haul roads, dump trucks, and off-road vehicles in the pit include NO_x, SO_2 and CO. These emissions were calculated using MOBILE6.1 (which provides emission factors in a "grams/mile" format). The tailpipe emissions estimates are provided in Tables 2A, 2B, and 4. Only NO_x and SO_2 emissions were assessed. If NO_x and SO_2 show compliance, then it can be safely assumed that CO is also in compliance.

This modelling assumed that an emergency generator of 100kW will be located in the PA that is expected to emit NO_x. The generator emission calculations can be found in Table 5.

3. Baseline Air Quality Data

3.1 Regional Background

Baseline air quality concentrations were added to the modelled concentrations for the Project to obtain an estimate of the air quality conditions when the proposed operations commence. There are currently no permanent air monitoring stations within the vicinity of the Project. The Baseline Air Monitoring letter prepared for this Project (GHD Limited, LTR-4, June 2024), describing the methodology and results of the baseline program is provided in Appendix A.

The most recent four years (2017 through 2021, 2020 omitted) for which all ambient air quality data are currently available were obtained from the Environment and Natural Resources Canada National Pollutant Surveillance network (NAPS). Ambient air quality data from 2020 was omitted due to lack of data, presumably resulting from a disruption in data collection due to the global COVID-19 pandemic. The nearest representative stations which report substances of interest for this assessment are:

– Halifax, NS (station ID 030118) – NO_2, SO_2
– Lake Major-Halifax, NS (station ID 030120) – $PM_{2.5}$, NO_2, SO_2
– Port Hawkesbury, NS (station ID 030201) – $PM_{2.5}$, NO_2, SO_2
– Sydney, NS (station ID 030310) – $PM_{2.5}$, NO_2, SO_2
– Aylesford Mountain, NS (station ID 030701) – $PM_{2.5}$, NO_2
– Pictou, NS (station ID 030901) – $PM_{2.5}$, NO_2, SO_2

Baseline ambient air sampling was conducted for TSP at three monitoring locations in Antrim from October 2nd through October 7th, 2023. The average values (shown in Table 6) from this baseline monitoring were used to represent the background concentration of TSP for this assessment. It was conservatively assumed that the background concentration of PM_{10} will be the same as the background concentration of TSP.

The background air concentrations from the NAPS stations are provided in Table 6, which shows the 90th percentile values for 1-hour and 24-hour NO_2, 1-hour and 24-hour SO_2, and 24-hour $PM_{2.5}$ for the 2017 through 2021 period.

This air assessment was completed using the maximum 90th percentile measured concentration as "background" for all compounds reported by the NAPS stations listed above. This is a conservative approach but excludes extreme high values that are very rarely measured (the "maximum" values). Annual values for $PM_{2.5}$ are represented by the "Average" values for 24-hour $PM_{2.5}$ concentrations.

4. Air Quality Criteria

Air quality is provincially regulated via the NS *Air Quality Regulations*. Criteria for all parameters listed in the NS *Air Quality Regulations* were applied in this assessment. The Ontario Ministry of the Environment, Conservation and

Parks Air Contaminants Benchmarks (ACB) list as well as Ontario's Ambient Air Quality Criteria were used in this assessment. The most conservative standard was used for each contaminant in this assessment, as depicted in Tables 7A and 7B.

The proposed standards, released by the NS Department of Environment and Climate Change (NSECC), for each compound have been included to show that the facility will be in compliance with future standards set out by the NSECC.

Tables 7A and 7B provide a summary of the compounds of concern for this assessment, the identified air quality criteria and averaging periods, and the data source. The assessment criteria selected for this assessment are provided in Tables 7A and 7B.

5. Air Dispersion Modelling

Dispersion modelling was performed using the US EPA multi source dispersion model AERMOD, following methodology as described in the Air Assessment Guidance Document released by the NSECC for NS.

AERMOD model is accepted in multiple provinces and territories, as well as in the United States. AERMOD is an advanced steady state plume model that has the ability to incorporate building cavity downwash, actual source parameters, emission rates, terrain and historical meteorological information to predict ground level concentrations (GLCs) at specified locations and has been peer reviewed and compared both to other models and monitoring data.

5.1 Dispersion Modelling Executables

The following dispersion and pre-processor models were used in this assessment:

– AERMOD digital terrain pre-processor (AERMAP), version 18081
– American Meteorological Society/Environmental Protection Agency Regulatory Improvement Committee (AERMIC) air dispersion model (AERMOD), version 22112
– Building Profile Input Program (BPIP), version 04274
– AERMET meteorological preprocess (AERMET), version 19191

5.2 Meteorological Data

Several meteorological stations were reviewed to obtain data required for the air emission estimates and dispersion modelling completed for the Project. Halifax Stanfield International AP (ECCC Station # 8202251), approximately 17 kilometres (km) southwest of the PA, was selected as the most appropriate surface dataset for this assessment as it was the closest station to the Project which records cloud cover, a necessary component in calculating plume dispersal. Five years (2018-2022) of unprocessed hourly meteorological data was obtained from the Halifax Stanfield International AP station.

Upper air data (radiosonde, Yarmouth) was sourced from National Oceanic and Atmospheric Administration (NOAA). The historical meteorological data, upper air data, coupled with the Earth Observation for Sustainable Developments of Forests (EOSD) land use characteristics was processed using AERMET version 19191. The hourly data generated included many factors which affect the dispersion of air compounds including wind speed, wind direction, temperature, ceiling height, and atmospheric stability.

5.3 Averaging Periods

Air compounds were modelled with appropriate averaging periods based on their respective air quality criteria. The averaging periods of interest for each compound are provided in Tables 7A and 7B. Maximum predicted GLCs presented for the various averaging periods are as follows:

– 1-hour GLCs based on Maximum
– 24-hour GLCs based on Maximum
– Annual GLCs are the max GLC of all years

Meteorological outliers have been removed for this assessment. AERMOD does not have the capability to report ½-hour GLCs, hence ½-hour GLCs were extrapolated from 1-hour GLCs using a factor of 1.2, as suggested in the Air Dispersion Modelling Guideline for Ontario (Version 3.0).

5.4 Digital Elevation Model Data

Digital elevation model (DEM) data was obtained from Canadian Digital Elevation Data (CDED) through the WebGIS feature of AERMOD View of Lakes Environmental Software. The DEM data was used to include the effects of terrain in the modelling.

5.5 Source Input Parameters

5.5.1 Haul Roads/Dump Truck Route

The haul roads are approximately 1.43 km and 2.19 km for the gypsum hauling route and 1.06 km and 2.41 km for the waste hauling route for years 6 and 7 of the LOM respectively. The haul roads are assumed to be double laned and have a width of 21 Im, which is typical of mining Projects. The shipping truck route mentioned under Section 2.1.1 is approximately 1.33 km in length. The shipping truck route will be single laned and extends from Lake Egmont Road to the staging area. The shipping truck widths will be approximately 3 m.

The line volume feature of AERMOD was used to simulate these haul roads/dump truck routes.

5.5.2 Phase 1 Pit and Phase 2 Pit

Several operations are proposed at the base of the pit, such as extraction through use of surface miner, material handling, transfer operations, movement of off-road vehicles and mining equipment, and drilling (as required). These operations tend to generate re-suspended dust and tailpipe emissions that are not at a fixed location but constantly moving around. In the air dispersion model AERMOD, a volume source depicting the base of the Pit has been used to represent all of these activities.

Tables 2A and 2B have emission rate calculations for the pit for years 6 and 7 of the LOM respectively.

5.5.3 Process Operations

There are two main sources of particulate emissions at the mill area: one occurs at the ROMTRANS and the other occurs at the Crushers and Screeners. Each of these sources have been modelled as volume sources. During year 6 of the LOM a process rejects pile will also be present and has been modelled as an area source.

Tables 4A and 4B have emission rate calculations for the processing operations for years 6 and 7 of the LOM respectively.

5.6 Receptors

Receptor grids were set up around the PA with the following grid spacing:

– 20 m spacing within 200 m of the edge of a bounding box that encompassed all PA sources
– 50 m spacing from 200 to 500 m
– 100 m spacing from 500 to 1,000 m
– 250 m spacing from 1,000 to 2,000 m
– 500 m spacing from 2,000 to 5,000 m
– 500 m spacing from 5,000 to 8,000 m

A property line ground level receptor grid with 10 m spacing was used to evaluate the maximum PA boundary concentration. No receptors were placed inside the PA.

Modelling was also completed for selected sensitive receptors that have the potential to be impacted by air emissions. The sensitive receptors that were considered are as follows:

– Sensitive Receptor 1 (SR1) – A residence located west of the PA
– Sensitive Receptor 2 (SR2) – A residence located west of the PA
– Sensitive Receptor 3 (SR3) – A residence located south of the PA
– Sensitive Receptor 4 (SR4) – A residence located southeast of the PA
– Sensitive Receptor 5 (SR5) – A residence located east of the PA
– Sensitive Receptor 6 (SR6) – A residence located east of the PA
– Sensitive Receptor 7 (SR7) – A residence located northeast of the PA
– Sensitive Receptor 8 (SR8) – A residence located northeast of the PA

6. Results, Conclusions, and Recommendations

Tables 7A and 7B summarize the Project modelling results for years 6 and 7 of the LOM, respectively. Years 6 and 7 were determined to be the years where the maximum air emissions occurred for Phase 1 and Phase 2 of the LOM. The assessment used the most stringent criteria from the current NS air quality regulations made under Section 25 and 112 of the *NS Environment Act*, the proposed Air Quality Standards for NS set out by the ECC, Ontario's Ambient Air Quality Criteria, and the Ontario Ministry of the Environment, Conservation and Parks' Air Contaminants Benchmarks (ACB) list to evaluate compliance for all relevant averaging periods for each compound. The representative background concentrations were added to the modelling results for all compounds to assess against the most stringent criteria. The result of the assessment demonstrated that all compounds are below the most stringent air quality criteria at all locations outside the Project during both years 6 and 7 of the LOM. Based on the results of this assessment air quality monitoring is not needed.

In order to ensure compliance throughout the LOM, it is advised that the dust mitigation measures for the haul roads, as discussed in section 2.1.1, be followed. This mainly includes watering the surface of the haul roads to ensure a road surface moisture level of five times that of the ambient soil is maintained during operating hours. All equipment should be maintained to ensure they are working properly and should not be used if not working properly as this could increase emissions.

Should you have any questions on the above, please do not hesitate to contact the undersigned.

Sincerely,

GHD

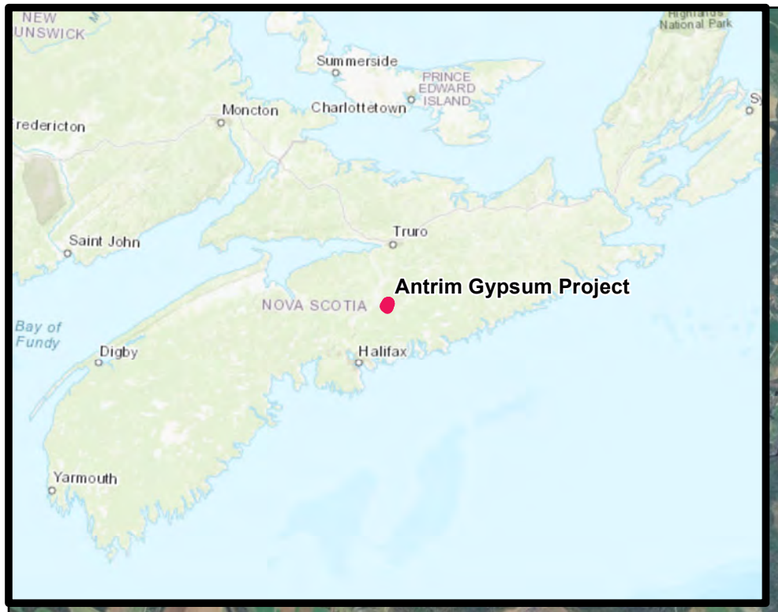
Matthew Griffin, P.Eng.

7. References

Nova Scotia Department of Environment and Climate Change (ECC). 2021. Air Assessment Guidance Document - Direction for EA/environmental approval holders and applicants Ontario Ministry of Environment and Climate

United States Environmental Protection Agency (US EPA). 2020. AP 42, Fifth Edition, Volume I

United States Environmental Protection Agency (US EPA). 1985. Handbook: Dust Control at Hazardous Waste Sites



Scale 1:50,000

0 500 1,000 1,500

Meters

Map Projection: Transverse Mercator
Horizontal Datum: North American 1983
Grid: NAD 1983 UTM Zone 20N

N

GHD

CERTAINTEED CANADA, INC
ANTRIM GYPSUM PROJECT
ANTRIM NOVA SCOTIA
ENVIRONMENTAL ASSESSMENT

PROJECT AREA LOCATION MAP

Project No. 12601021
Revision No. -
Date Jun 27, 2024

FIGURE 1

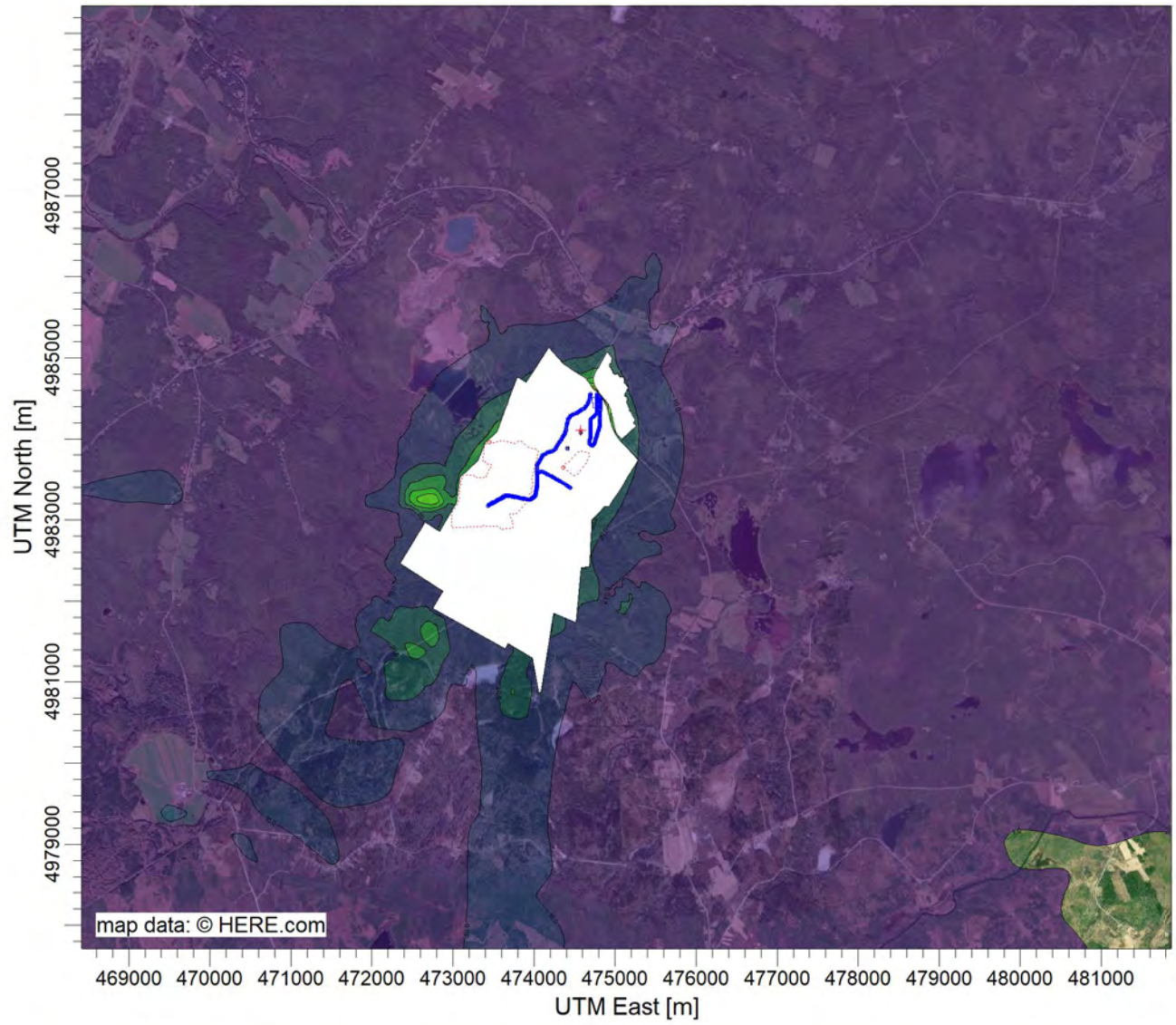
Q:\GIS\PROJECTS\12601000s\12601021\GIS\Maps\Deliverables\202404_EIA\12601021_001_EIA.mxd
Print date: 27 Jun 2024 - 14:38

Data source: Imagery: Image ©2024 Google, Imagery date: May 18, 2023; ESRI Topographic Basemap, Accessed 2024; Road and Water Body Names: Government of Nova Scotia, Accessed April 18, 2024, GHD, 2024.

Created by: tneulieb

PROJECT TITLE:

Figure 2 - TSP 24-hour Modelled Concentration for Year 7 of LOM (Worst-Case Year)
Antrim Gypsum Project, CertainTeed Canada, Inc.



PLOT FILE OF HIGH 1ST HIGH 24-HR VALUES FOR SOURCE GROUP: ALL ug/m^3

Max: 93.8 [ug/m^3] at (474839.84, 4984501.27)

1.0 10.0 20.0 30.0 40.0 50.0 60.0 70.0 80.0 90.0 95.0

COMMENTS:	SOURCES: **10**	COMPANY NAME: CertainTeed Canada Inc.	
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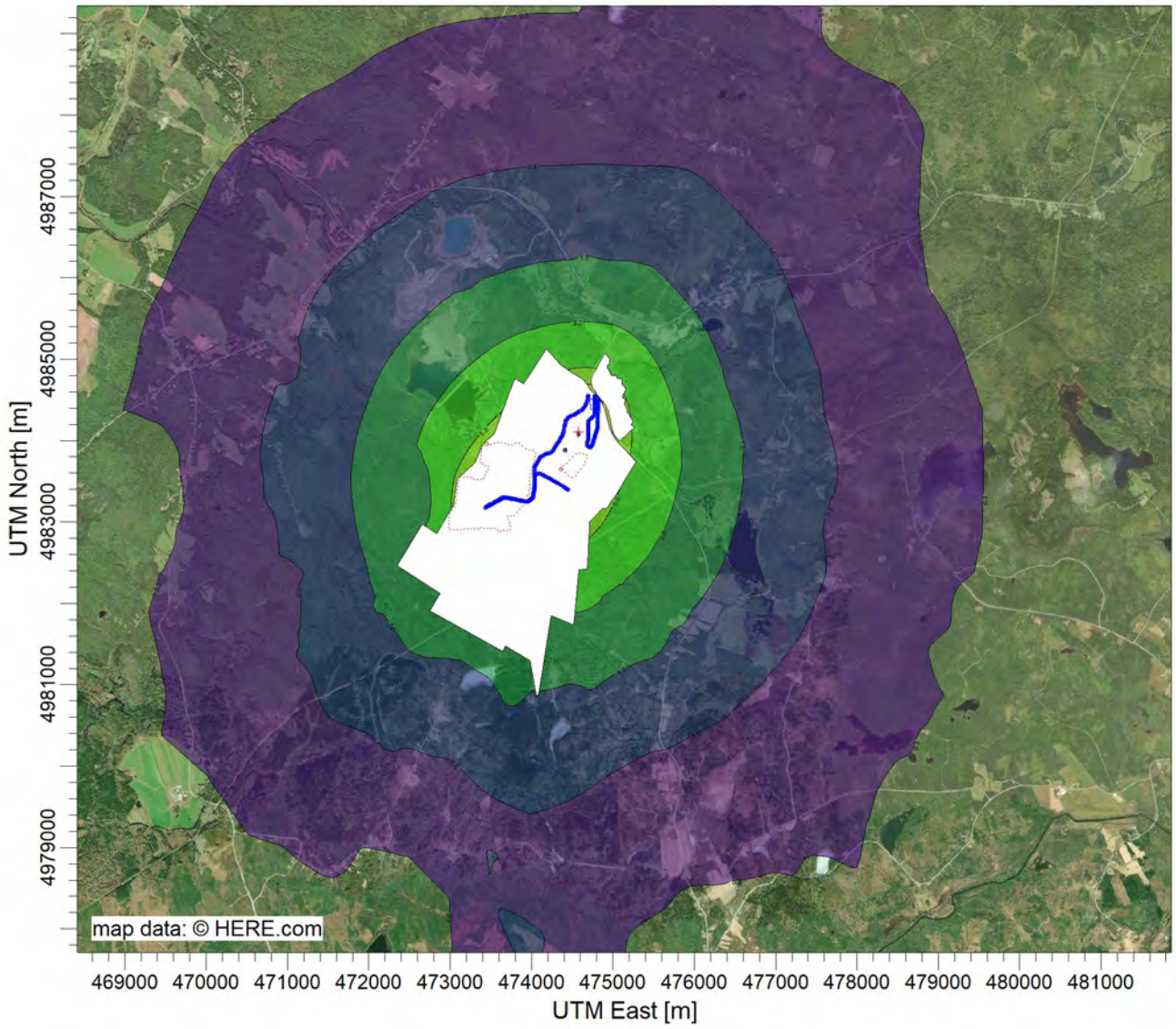
	MAX:	DATE: **4/25/2024**	PROJECT NO.: 12601021

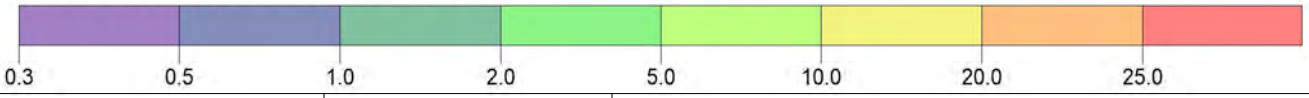
PROJECT TITLE:

Figure 3 - TSP Annual Modelled Concentration for Year 7 of LOM (Worst-Case Year)
Antrim Gypsum Project, CertainTeed Canada, Inc.



POST/PLOT FILE OF ANNUAL VALUES FOR YEAR 1 FOR SOURCE GROUP: ALL ug/m^3

Max: 24.1 [ug/m^3] at (474844.97, 4984492.71)



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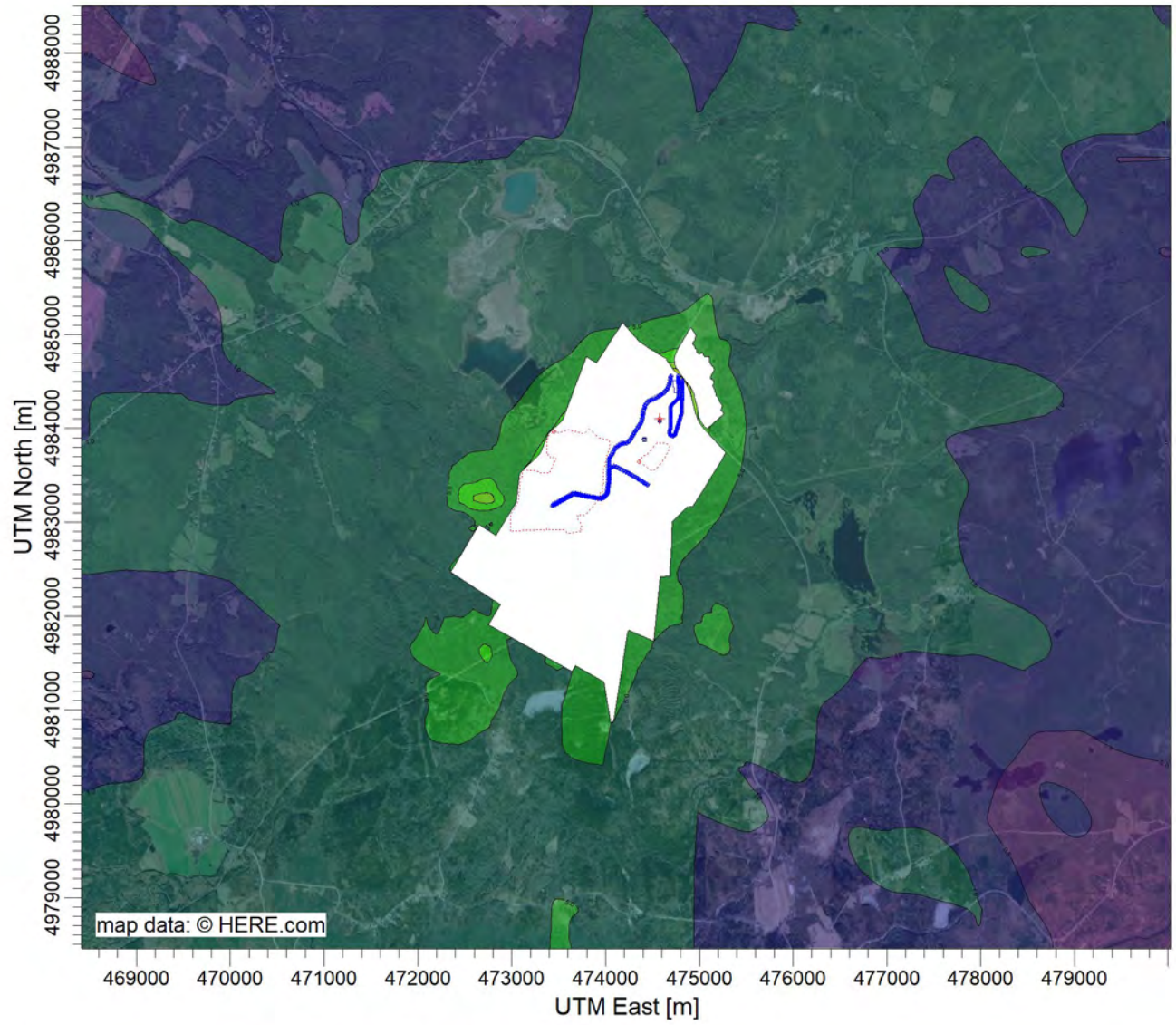
	MAX:	DATE: **4/25/2024**	PROJECT NO.: 12601021

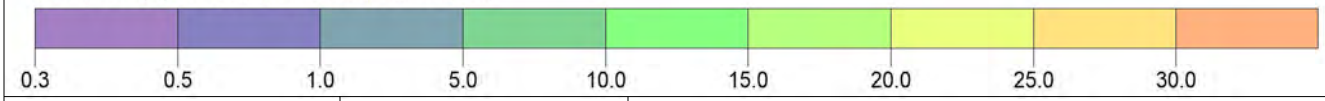
PROJECT TITLE:

Figure 4 - PM10 24-hour Modelled Concentration for Year 7 of LOM (Worst-Case Year)
Antrim Gypsum Project, CertainTeed Canada, Inc.



PLOT FILE OF HIGH 1ST HIGH 24-HR VALUES FOR SOURCE GROUP: ALL ug/m^3

Max: 29.7 [ug/m^3] at (474839.84, 4984501.27)



COMMENTS:	SOURCES: **10**	COMPANY NAME: CertainTeed Canada Inc.	
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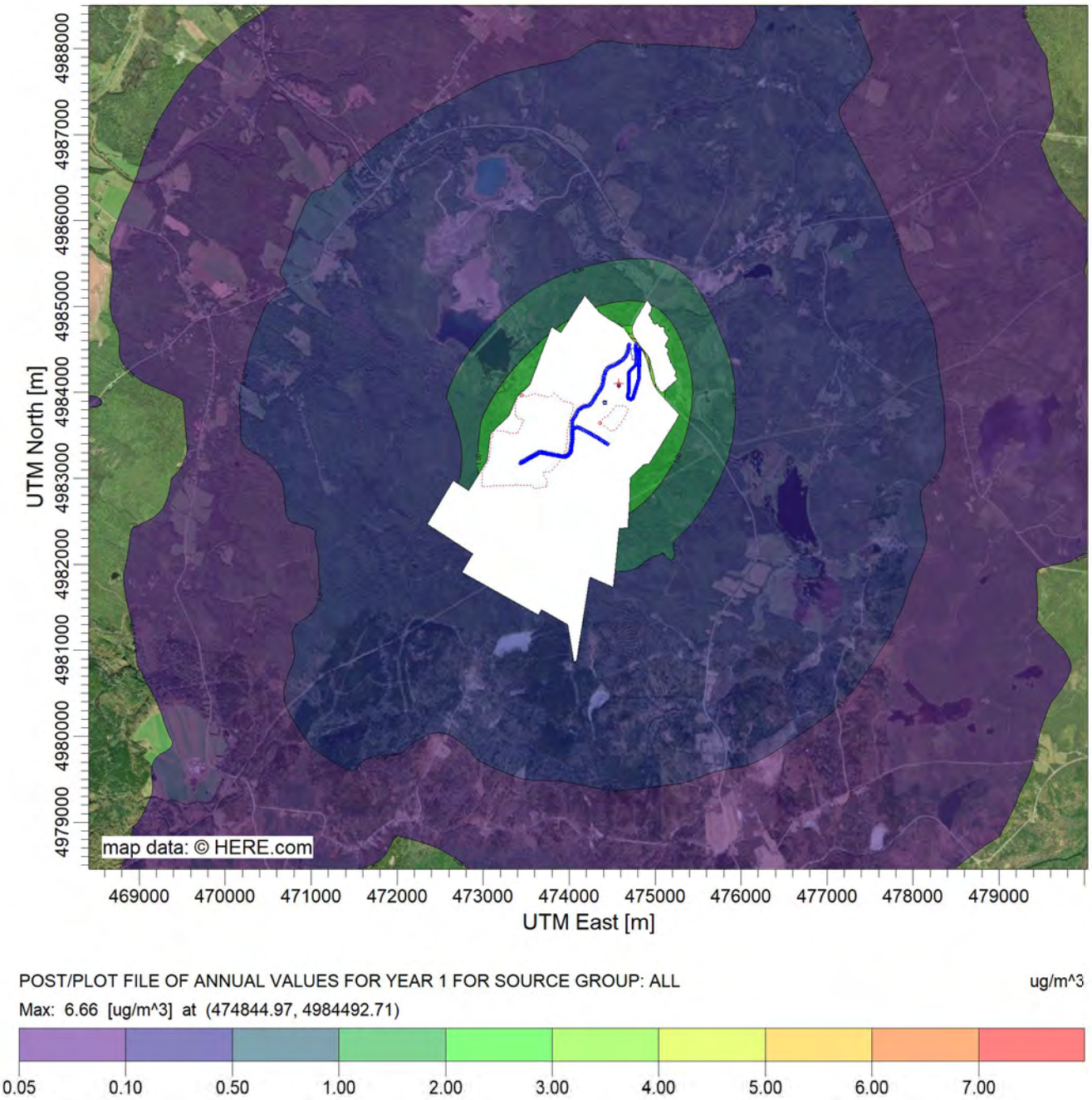
	MAX:	DATE: **4/25/2024**	PROJECT NO.: 12601021

PROJECT TITLE:

Figure 5 - PM10 Annual Modelled Concentration for Year 7 of LOM (Worst-Case Year)
Antrim Gypsum Project, CertainTeed Canada, Inc.



POST/PLOT FILE OF ANNUAL VALUES FOR YEAR 1 FOR SOURCE GROUP: ALL ug/m^3

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COMMENTS:	SOURCES: **10**	COMPANY NAME: CertainTeed Canada Inc.	
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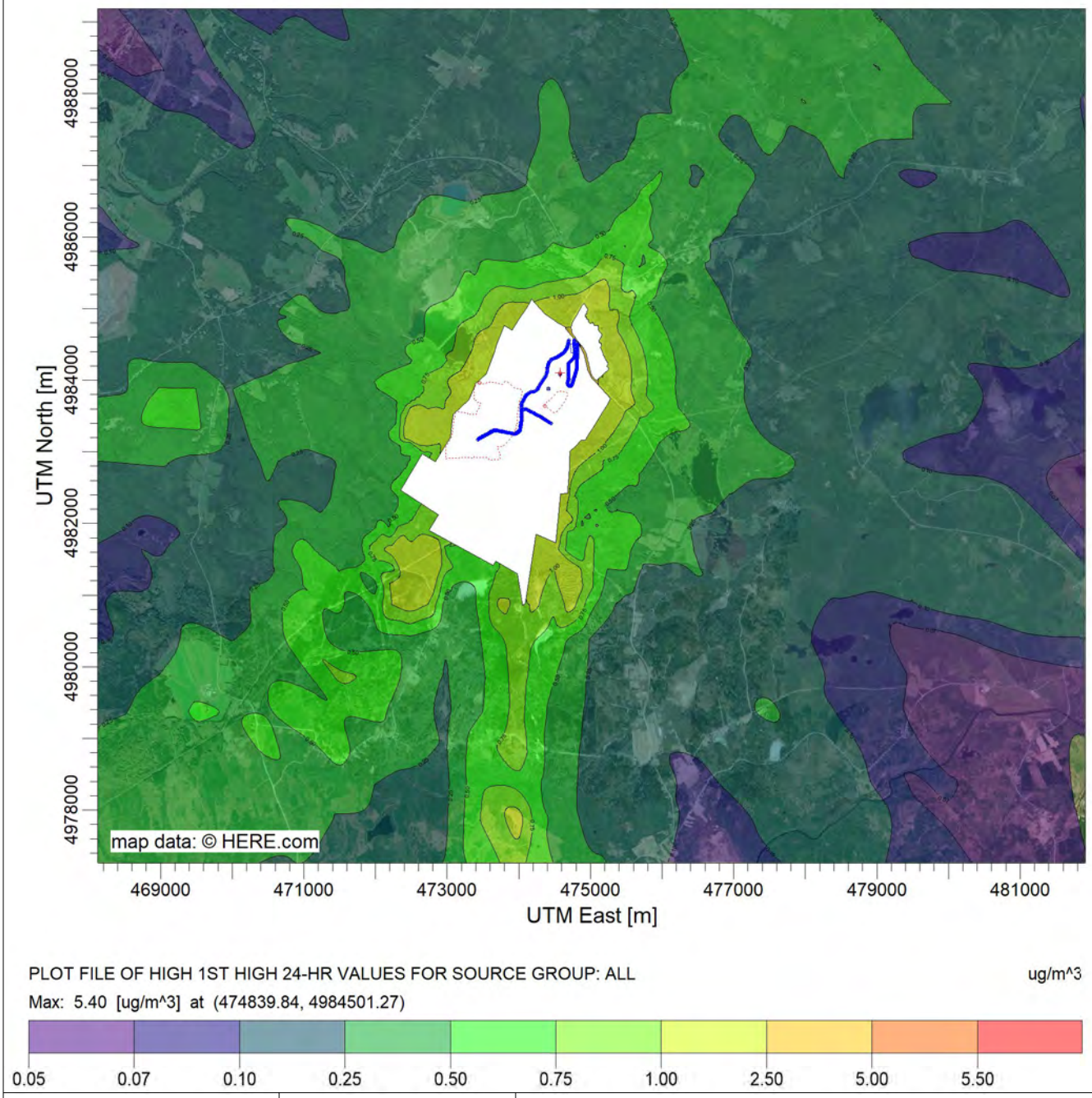
	MAX:	DATE: **4/25/2024**	PROJECT NO.: 12601021

PROJECT TITLE:

Figure 6 - PM2.5 24-hour Modelled Concentration for Year 7 of LOM (Worst-Case Year)
Antrim Gypsum Project, CertainTeed Canada, Inc.



PLOT FILE OF HIGH 1ST HIGH 24-HR VALUES FOR SOURCE GROUP: ALL ug/m^3

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COMMENTS:	SOURCES: **10**	COMPANY NAME: CertainTeed Canada Inc.	
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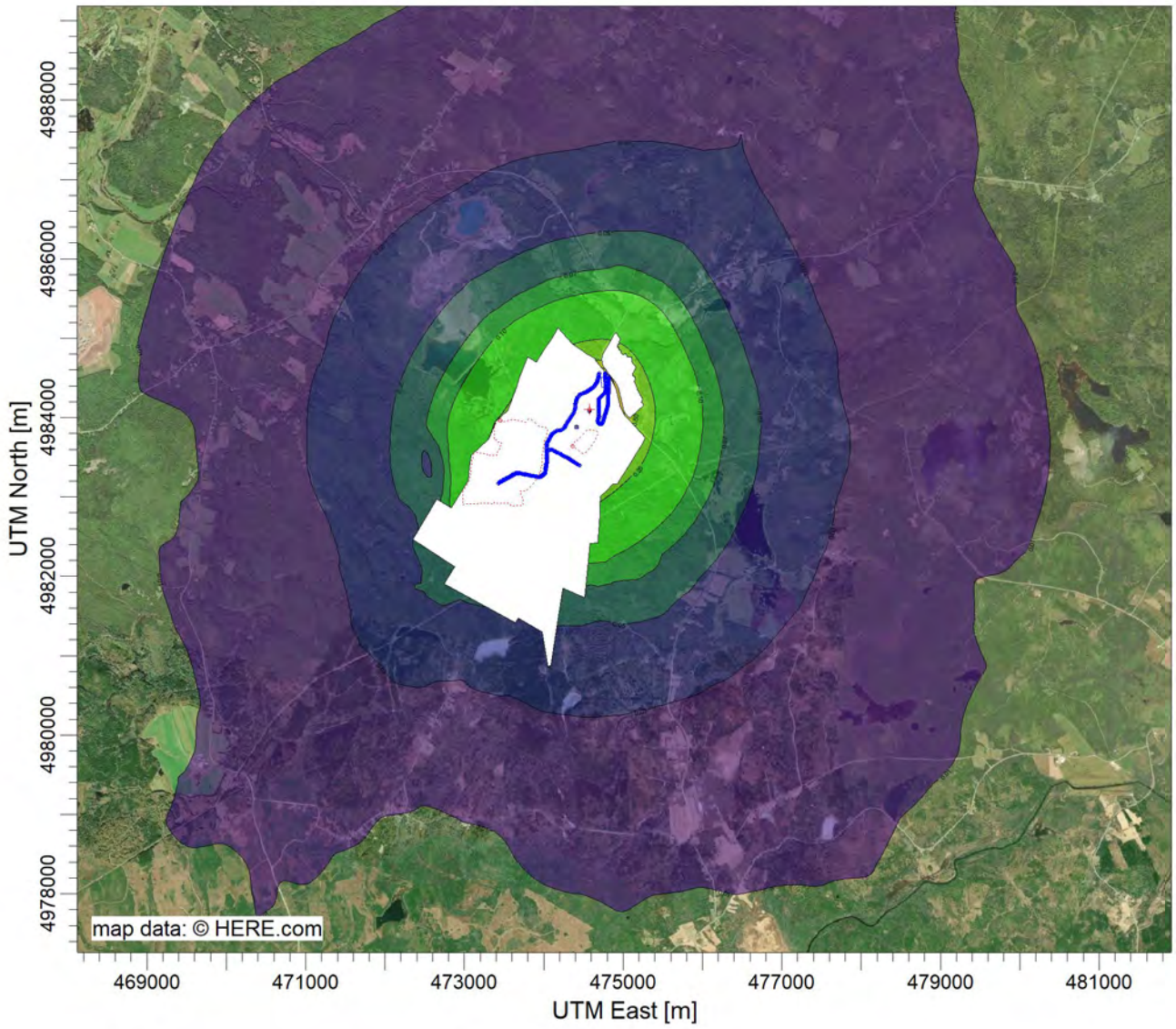
PROJECT TITLE:

Figure 7 - PM2.5 Annual Modelled Concentration for Year 7 of LOM (Worst-Case Year)
Antrim Gypsum Project, CertainTeed Canada, Inc.



POST/PLOT FILE OF ANNUAL VALUES FOR YEAR 1 FOR SOURCE GROUP: ALL ug/m^3

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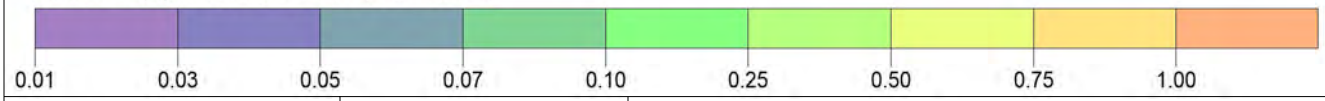

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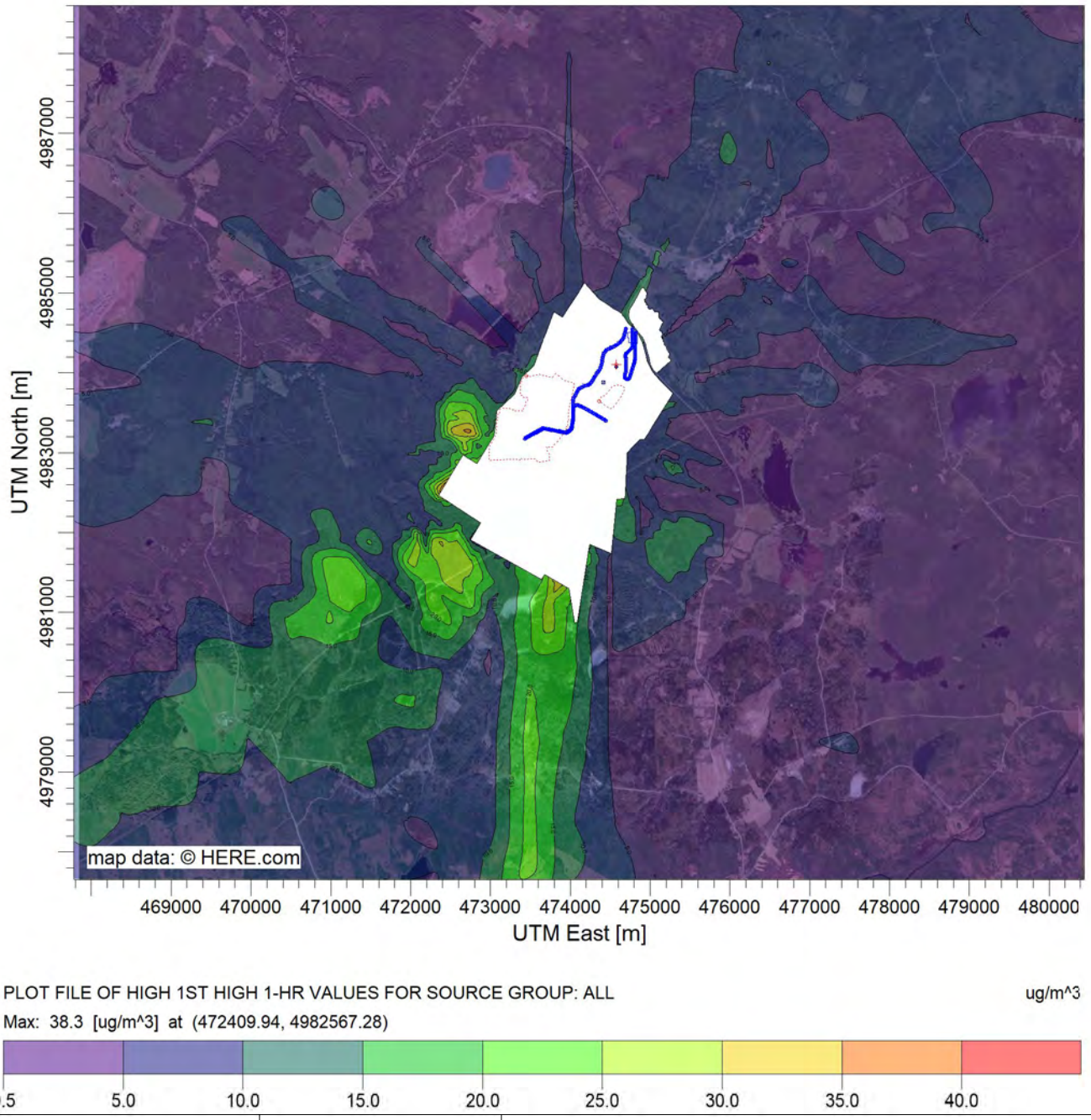
	MAX:	DATE: **4/30/2024**	PROJECT NO.: 12601021

PROJECT TITLE:

Figure 8 - NOx 1-hour Modelled Concentration for Year 7 of LOM (Worst-Case Year)
Antrim Gypsum Project, CertainTeed Canada, Inc.



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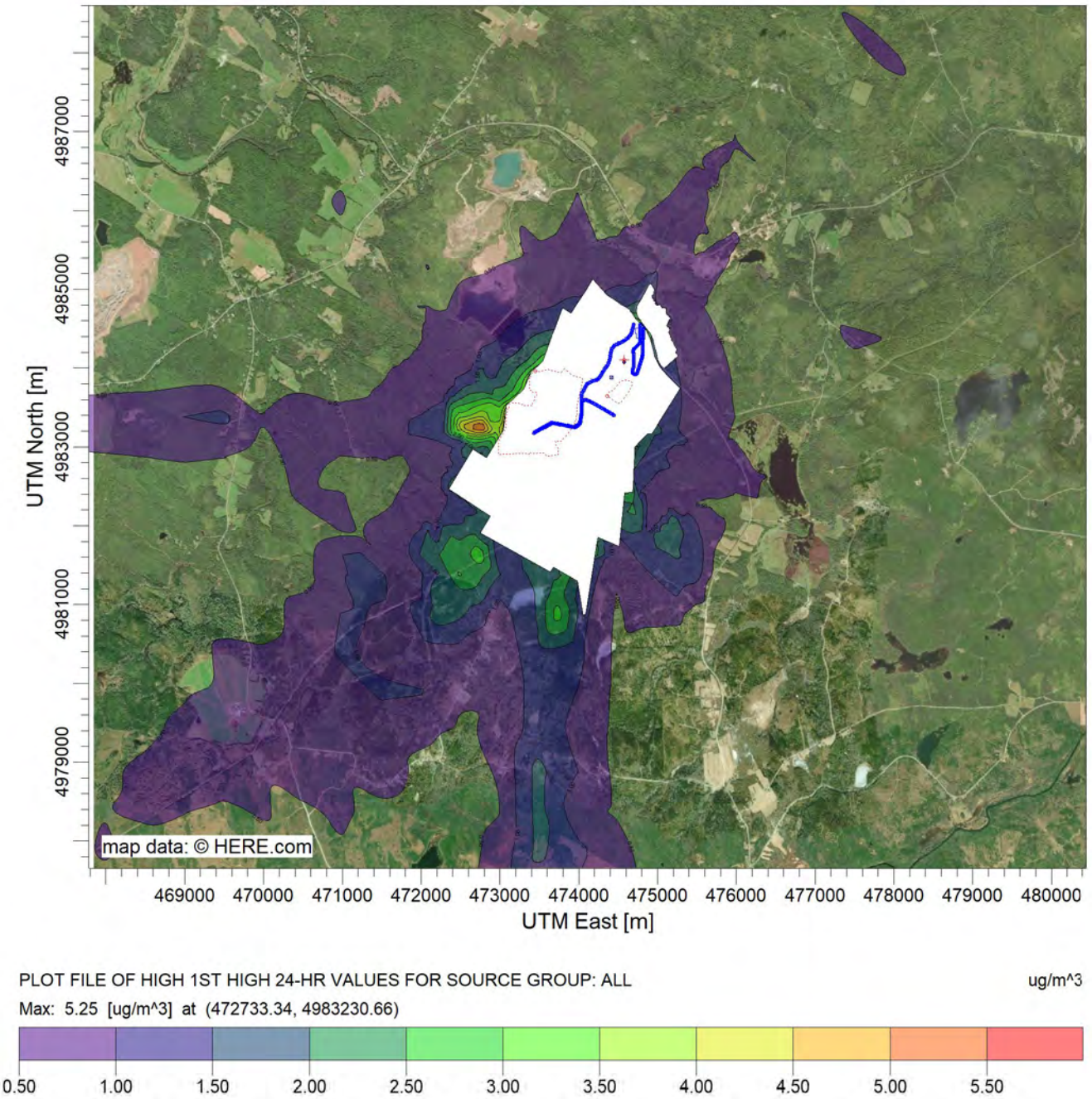
COMMENTS:	SOURCES: **10**	COMPANY NAME: CertainTeed Canada Inc.	
	RECEPTORS: **5623**	MODELER: GHD	
	OUTPUT TYPE: **Concentration**	SCALE: 1:79,618 0 3 km	
	MAX:	DATE: **4/25/2024**	PROJECT NO.: 12601021

PROJECT TITLE:

Figure 9 - NOx 24-hour Modelled Concentration for Year 7 of LOM (Worst-Case Year)
Antrim Gypsum Project, CertainTeed Canada, Inc.



PLOT FILE OF HIGH 1ST HIGH 24-HR VALUES FOR SOURCE GROUP: ALL ug/m^3

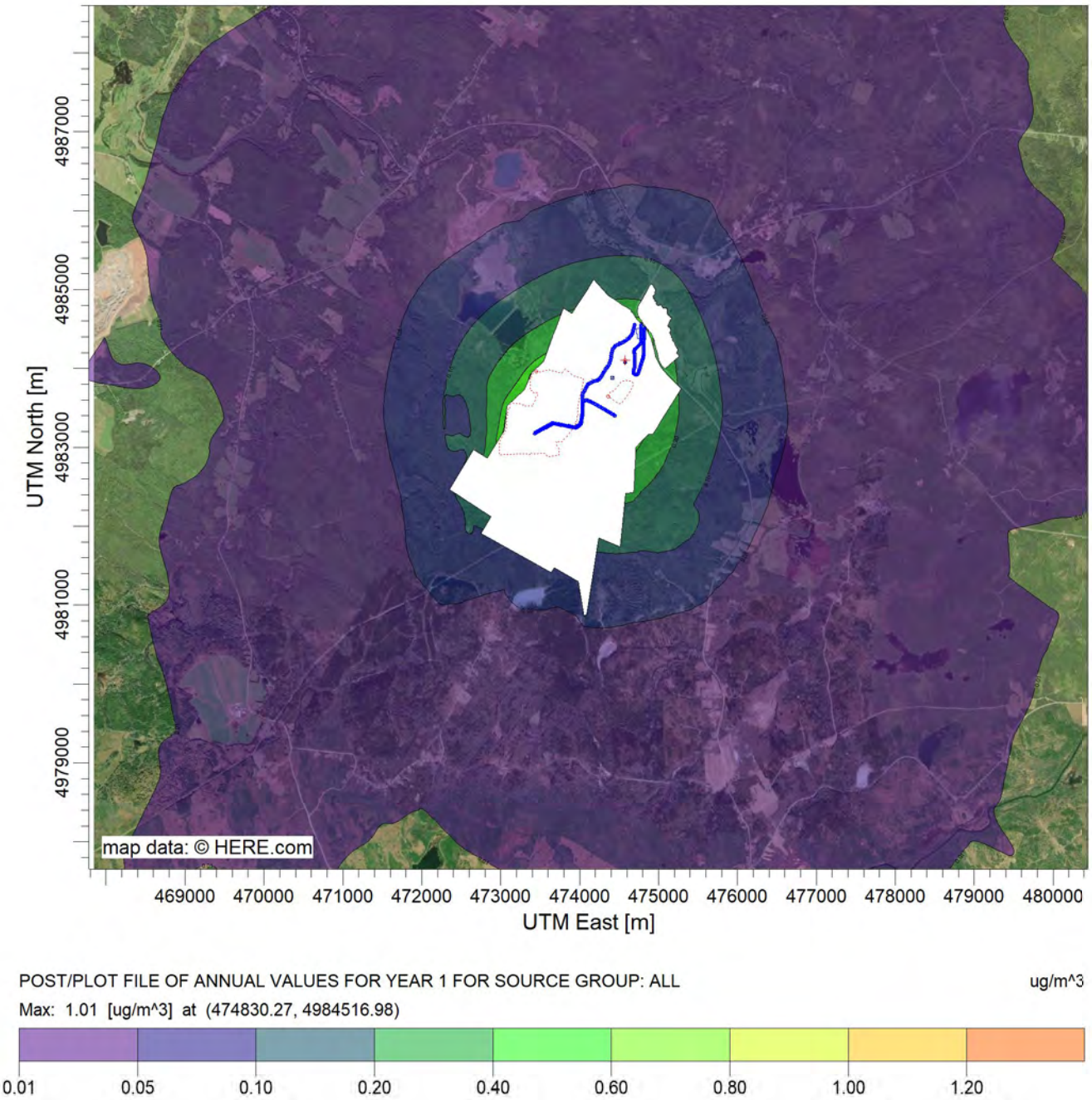
Max: 5.25 [ug/m^3] at (472733.34, 4983230.66)

0.50 1.00 1.50 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50

COMMENTS:	SOURCES: **10**	COMPANY NAME: CertainTeed Canada Inc.	
	RECEPTORS: **5623**	MODELER: GHD	
	OUTPUT TYPE: **Concentration**	SCALE: 1:79,618 (0 — 3 km)	
	MAX:	DATE: **4/25/2024**	PROJECT NO.: 12601021

PROJECT TITLE:

Figure 10 - NOx Annual Modelled Concentration for Year 7 of LOM (Worst-Case Year)
Antrim Gypsum Project, CertainTeed Canada, Inc.



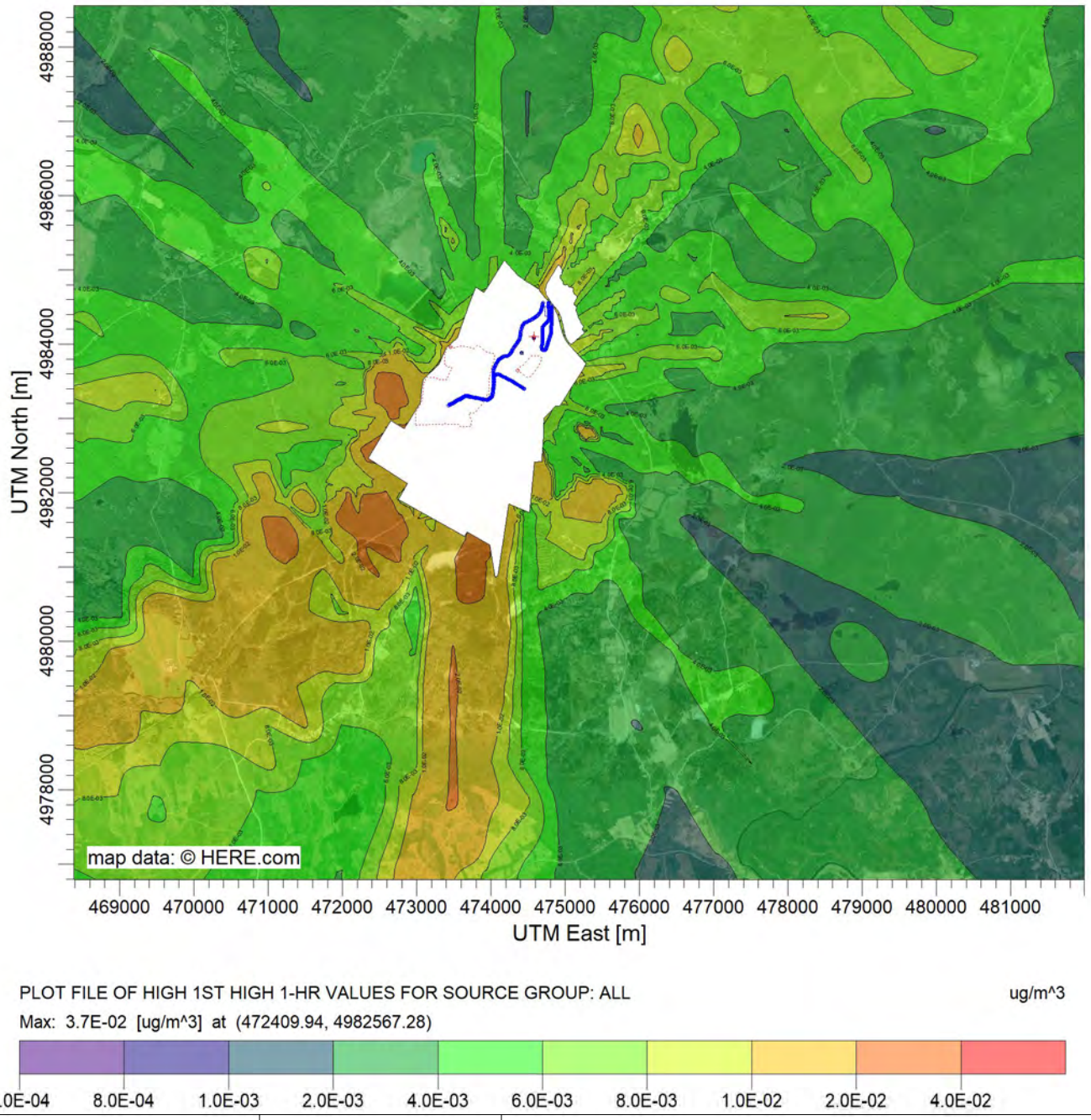
POST/PLOT FILE OF ANNUAL VALUES FOR YEAR 1 FOR SOURCE GROUP: ALL ug/m^3

Max: 1.01 [ug/m^3] at (474830.27, 4984516.98)

COMMENTS:	SOURCES: **10**	COMPANY NAME: CertainTeed Canada Inc.	
	RECEPTORS: **5623**	MODELER: GHD	
	OUTPUT TYPE: **Concentration**	SCALE: 1:79,618 (0 — 3 km)	
	MAX:	DATE: **4/25/2024**	PROJECT NO.: 12601021

PROJECT TITLE:

Figure 11 - SO2 1-hour Modelled Concentration for Year 7 of LOM (Worst-Case Year)
Antrim Gypsum Project, CertainTeed Canada, Inc.



PLOT FILE OF HIGH 1ST HIGH 1-HR VALUES FOR SOURCE GROUP: ALL ug/m^3

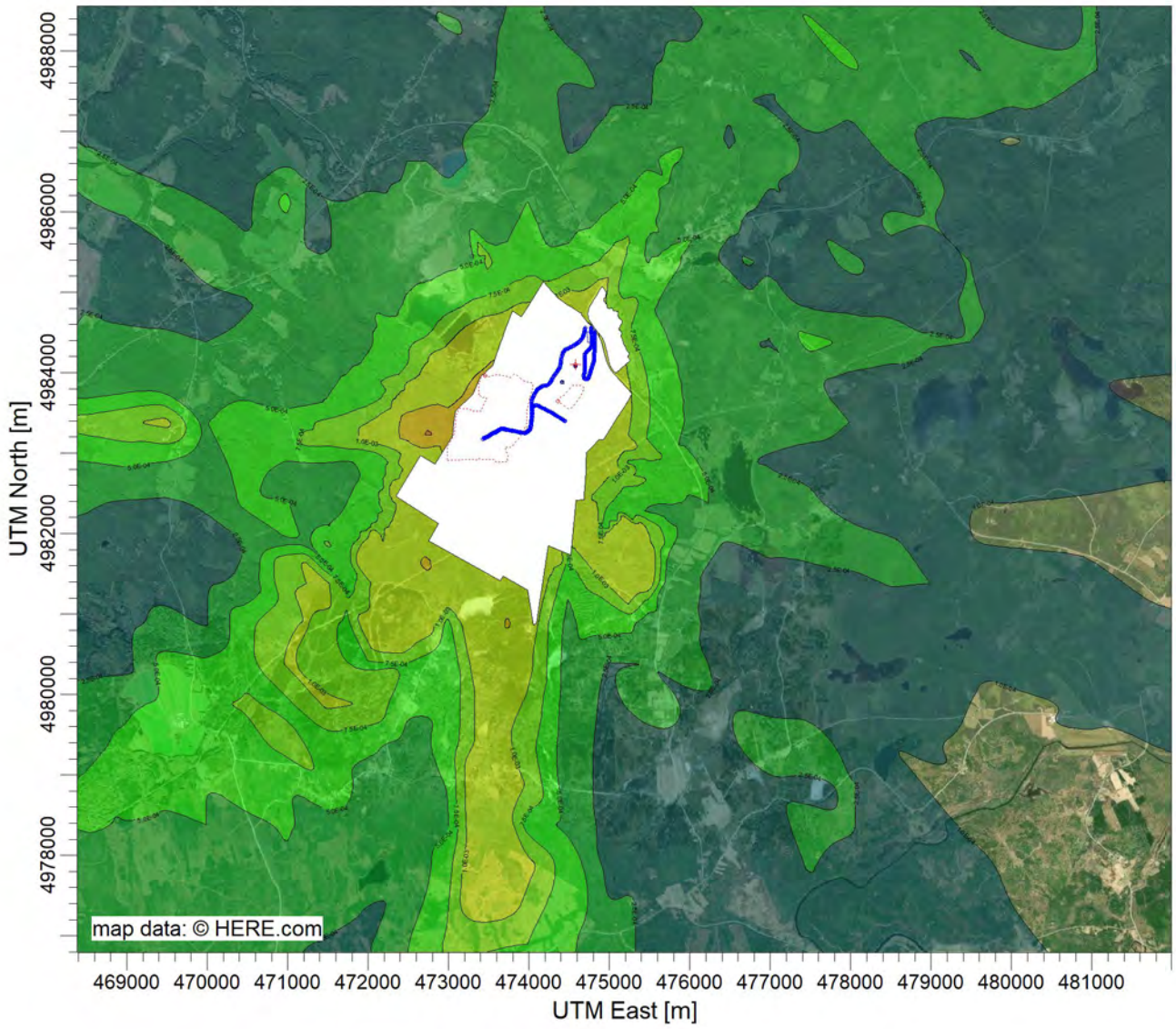
Max: 3.7E-02 [ug/m^3] at (472409.94, 4982567.28)

6.0E-04 8.0E-04 1.0E-03 2.0E-03 4.0E-03 6.0E-03 8.0E-03 1.0E-02 2.0E-02 4.0E-02

COMMENTS:	SOURCES: **10**	COMPANY NAME: CertainTeed Canada Inc.	
	RECEPTORS: **5623**	MODELER: GHD	
	OUTPUT TYPE: **Concentration**	SCALE: 1:85,566 0 3 km	
	MAX:	DATE: **4/30/2024**	PROJECT NO.: 12601021

PROJECT TITLE:

Figure 12 - SO2 24-hour Modelled Concentration for Year 7 of LOM (Worst-Case Year)
Antrim Gypsum Project, CertainTeed Canada, Inc.



PLOT FILE OF HIGH 1ST HIGH 24-HR VALUES FOR SOURCE GROUP: ALL ug/m^3

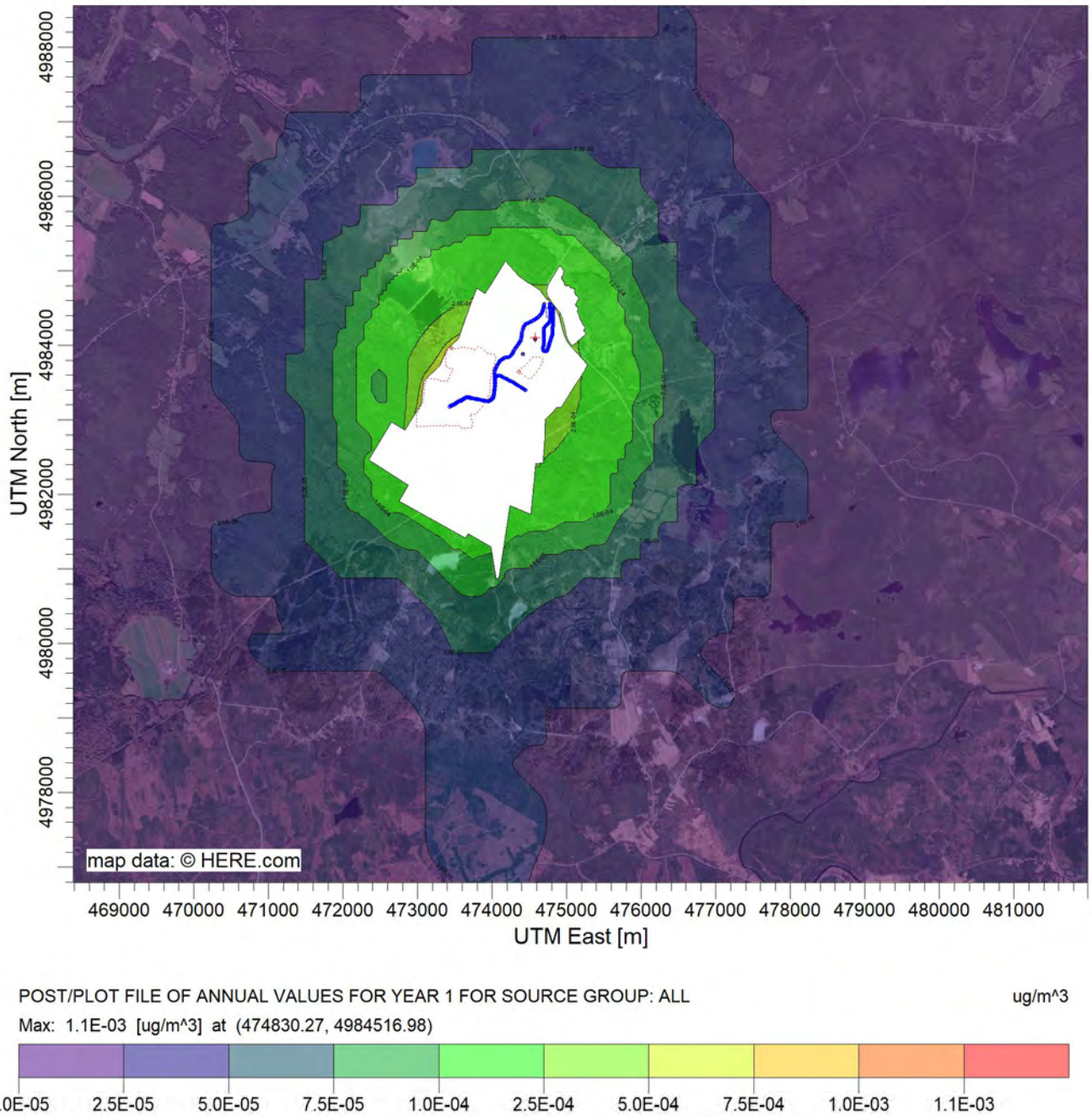
Max: 5.1E-03 [ug/m^3] at (472733.34, 4983230.66)

1.0E-04 2.5E-04 5.0E-04 7.5E-04 1.0E-03 2.5E-03 5.0E-03

COMMENTS:	SOURCES: **10**	COMPANY NAME: CertainTeed Canada Inc.	
	RECEPTORS: **5623**	MODELER: GHD	
	OUTPUT TYPE: **Concentration**	SCALE: 1:85,566 0 3 km	
	MAX:	DATE: **4/30/2024**	PROJECT NO.: 12601021

PROJECT TITLE:

Figure 13 - SO2 Annual Modelled Concentration for Year 7 of LOM (Worst-Case Year)
Antrim Gypsum Project, CertainTeed Canada, Inc.



POST/PLOT FILE OF ANNUAL VALUES FOR YEAR 1 FOR SOURCE GROUP: ALL ug/m^3

Max: 1.1E-03 [ug/m^3] at (474830.27, 4984516.98)

1.0E-05 2.5E-05 5.0E-05 7.5E-05 1.0E-04 2.5E-04 5.0E-04 7.5E-04 1.0E-03 1.1E-03

COMMENTS:	SOURCES: **10**	COMPANY NAME: CertainTeed Canada Inc.	
	RECEPTORS: **5623**	MODELER: GHD	
	OUTPUT TYPE: **Concentration**	SCALE: 1:85,566 0 3 km	
	MAX:	DATE: **4/30/2024**	PROJECT NO.: 12601021

Table 1

Estimated Particulate Emission Factors - Haul Route between Pit and Processing Facility

Variable or Constant	$PM_{2.5}$	PM_{10}	TSP
Paved Road Emission Rate (g/VKT)	1.1	4.6	24
k	0.15	1.5	4.9
a	0.9	0.9	0.7
b	0.45	0.45	0.45
S (Surface material silt content)[1]	8.3	8.3	8.3
Conversion from lb/VMT to g/VKT	281.9	281.9	281.9

Formula (AP-42 13.2.2 (1a)):
ER(g/s) = 281.9 (g/VKT / lb/VMT) * k * (S/12)^a * (M/3)^b * # of trips * Distance (km) / (# of hours per day) / (3600 s/hr)

% Dust Control = 90%
Truck hours of Operation per Day: 14

Truck Routes	Road Length (km)	Traffic	W - Mean Vehicle Weight of Haul Truck (ton)	Emission Factors TSP (g/s)	Emission Factors PM_{10} (g/s)	Emission Factors $PM_{2.5}$ (g/s)
Phase 1, Year 6 of Mine Life						
Phase 1 Gypsum Hauling Route	1.43	184 (5)	227 (3)	3.91E+00	1.11E+00	1.11E-01
Phase 1 Waste Hauling Road	1.06	781 (5)	78 (8)	7.61E+00	2.16E+00	2.16E-01
Shipping Truck Route - Segment 1	0.03	112	39 (6)	1.65E-04	3.17E-05	7.58E-06
Shipping Truck Route - Segment 2	1.26	112	39 (6)	9.54E-01	2.71E-01	2.71E-02
Shipping Truck Route - Segment 3	0.03	112	39 (6)	1.64E-04	3.15E-05	7.53E-06
Phase 2, Year 7 of Mine Life						
Phase 2 Gypsum Hauling Route	2.19	210 (5)	227 (3)	6.84E+00	1.95E+00	1.95E-01
Phase 2 Waste Hauling Road	1.41	733 (5)	78 (8)	9.53E+00	2.71E+00	2.71E-01
Shipping Truck Route - Segment 1	0.03	112	39 (6)	1.65E-04	3.17E-05	7.58E-06
Shipping Truck Route - Segment 2	1.26	112	39 (6)	9.54E-01	2.71E-01	2.71E-02
Shipping Truck Route - Segment 3	0.03	112	39 (6)	1.64E-04	3.15E-05	7.53E-06

Variable	Value	Comments
Total Material Mined (tonne)		
Phase 1, Year 6 of Mine Life	6,925,310	Phase I is from years 1 to 6 of the mine life, year 6 has the most material mined for this phase
Phase 2, Year 7 of Mine Life	6,873,240	Phase II is from years 7 to 20 of the mine life, year 7 has the most material mined for this phase
Total Gypsum Mined (tonne)		
Phase 1, Year 6 of Mine Life	1,822,450	Phase I is from years 1 to 6 of the mine life, year 6 has the most material mined for this phase
Phase 2, Year 7 of Mine Life	2,082,800	Phase II is from years 7 to 20 of the mine life, year 7 has the most material mined for this phase
Total Overburden and Waste (tonne)		
Phase 1, Year 6 of Mine Life	5,102,860	Phase I is from years 1 to 6 of the mine life, year 6 has the most material mined for this phase
Phase 2, Year 7 of Mine Life	4,790,440	Phase II is from years 7 to 20 of the mine life, year 7 has the most material mined for this phase
Total Gypsum Processed/Screened (tonne)		
Phase 1, Year 6 of Mine Life	1,586,000	Phase I is from years 1 to 6 of the mine life, year 6 has the most material mined for this phase
Phase 2, Year 7 of Mine Life	1,830,000	Phase II is from years 7 to 20 of the mine life, year 7 has the most material mined for this phase

Notes:

(1) Stone quarrying and processing haul road to/from pit silt content as provided in AP 42 Section 13.2.2 Unpaved Roads - Related Information 'https://www.epa.gov/air-emissions-factors-and-quantification/ap-42-section-1322-unpaved-roads-related-information-0
(2) Tailpipe particulate emissions have not been included as they are insignificant when compared to road dust emissions.
(3) The fully loaded Haul Truck (CAT 777) weighs 272.5 ton, and weighs 181.5 ton when empty.
(4) tonnes per year / 260 days of operation (conservative) / tonnes/trip = trips
(5) Trips x 2 = Traffic, for round trip
(6) The fully loaded Shipping Truck weighs 60.8 ton, and weighs 17.8 ton when empty.
(7) Haul trucks haul all unprocessed materials, Shipping trucks only handle processed gypsum for shipping
(8) The fully loaded Volvo A60H weighs 108.23 ton, and weighs 48.23 ton when empty.

Table 2A

Estimated Particulate and Gaseous Emissions from Material Handling - Phase 1, Year 6 of Mine Life

Summary for Pit Emissions	Emission Rate (g/s) Using AP-42, Mobile 6 and Mobile 6.1 Emission Factors				
	TSP	PM_{10}	$PM_{2.5}$	NO_x	SO_2
Truck Loading	7.63E-02	3.82E-02	1.91E-02	-	-
Excavators	3.62E-05	1.81E-05	9.06E-06	1.13E-03	1.09E-06
Loaders	2.38E-03	1.19E-03	5.94E-04	7.40E-02	7.12E-05
Dozers	1.81E-05	9.06E-06	4.53E-06	5.65E-04	5.43E-07
Grader	1.04E-05	5.22E-06	2.61E-06	3.23E-04	3.11E-07
Surface Miner	3.62E-05	1.81E-05	9.06E-06	1.13E-03	6.22E-07
TOTAL	**7.88E-02**	**3.94E-02**	**1.97E-02**	**7.61E-02**	**7.32E-05**

Open Pit - Truck Loading

Source ID	Max. Production Rate (tonnes/hour)	Species	USEPA AP-42 Emission Factor (kg/Mg)	Emission Rate (g/s)
Truck Loading	2,748.1	TSP	1.00E-04 (2)	7.63E-02
		PM_{10}	5.00E-05 (1)	3.82E-02
		$PM_{2.5}$	2.50E-05 (3)	1.91E-02

	Total Material Mined (tonne)		Comments
	Phase 1, Year 6 of Mine Life	6,925,310	From year 6 of the Life of Mine.

Off-Road Vehicular Tail Pipe Emission Rate in g/mi

Source	Number of Vehicles	Miles Travelled per Hour	PM_{10} (g/mi) (4)	$PM_{2.5}$ (g/mi) (3)	TSP (g/mi) (2)	NO_x (g/mi) (5)	SO_2 (g/mi) (5)
Excavators	2	0.13 (6)	2.52E-01	1.26E-01	5.04E-01	1.57E+01	1.51E-02
Loaders	5	3.40 (7)	2.52E-01	1.26E-01	5.04E-01	1.57E+01	1.51E-02
Dozers	1	0.13 (6)	2.52E-01	1.26E-01	5.04E-01	1.57E+01	1.51E-02
Grader	1	0.07 (8)	2.54E-01	1.27E-01	5.07E-01	1.57E+01	1.51E-02
Surface Miner	2	0.13 (6)	2.52E-01	1.26E-01	5.04E-01	1.57E+01	1.51E-02

Notes:

(1) Emission factors are from USEPA AP-42, Section 11.19.2 Crusher Stone Processing and Pulverized Mineral Processing, Table 11.19.2-1 for truck unloading of fragmented stone

(2) TSP emission factors was assumed to be the PM10 emission factor multiplied by 2

(3) PM2.5 emission factors was assumed to be the PM10 emission factor divided by 2

(4) Mobile 6 emission factors used for off-road vehicular tail pipe emission rates

(5) Mobile 6.1 emission factors used for off-road vehicular tail pipe emission rates

(6) Assumed that excavators, dozers, and surface miners travel up to 5km per day

(7) Assumed that loaders travel 50m every load

(8) Assumed to travel an amount equivalent to two passes over the haul road per day

(9) Mine Pit activities operate 240 days a year at 10.5 hours per day

(10) Surface miner open pit particulate matter emissions have been deemed insignificant as the surface miner, Vermeer T1255III, is equipped with dust suppression technology

Table 2B

Estimated Particulate and Gaseous Emissions from Material Handling - Phase 2 Year 7 of Mine Life

Summary for Pit Emissions	Emission Rate (g/s) Using AP-42, Mobile 6 and Mobile 6.1 Emission Factors				
	TSP	PM_{10}	$PM_{2.5}$	NO_x	SO_2
Truck Loading	7.58E-02	3.79E-02	1.89E-02	-	-
Excavators	3.62E-05	1.81E-05	9.06E-06	1.13E-03	1.09E-06
Loaders	5.39E-03	2.70E-03	1.35E-03	1.68E-01	1.62E-04
Dozers	1.81E-05	9.06E-06	4.53E-06	5.65E-04	5.43E-07
Grader	1.60E-05	8.00E-06	4.00E-06	4.95E-04	4.76E-07
Surface Miner	3.62E-05	1.81E-05	9.06E-06	1.13E-03	1.09E-06
TOTAL	**8.12E-02**	**4.06E-02**	**2.03E-02**	**1.70E-01**	**1.64E-04**

Open Pit - Truck Loading

Source ID	Max. Production Rate (tonnes/hour)	Species	USEPA AP-42 Emission Factor (kg/Mg)	Emission Rate (g/s)
Truck Loading	2,727.5	TSP	1.00E-04 (2)	7.58E-02
		PM_{10}	5.00E-05 (1)	3.79E-02
		$PM_{2.5}$	2.50E-05 (3)	1.89E-02

Total Material Mined (tonne)		Comments
Phase 2, Year 7 of Mine Life	6,873,240	From year 20 of the Life of Mine.

Off-Road Vehicular Tail Pipe Emission Rate in g/mi

Source	Number of Vehicles	Miles Travelled per Hour	PM_{10} (g/mi) (4)	$PM_{2.5}$ (g/mi) (3)	TSP (g/mi) (2)	NO_x (g/mi) (5)	SO_2 (g/mi) (5)
Excavators	2	0.13 (6)	2.52E-01	1.26E-01	5.04E-01	1.57E+01	1.51E-02
Loaders	5	7.70 (7)	2.52E-01	1.26E-01	5.04E-01	1.57E+01	1.51E-02
Dozers	1	0.13 (6)	2.52E-01	1.26E-01	5.04E-01	1.57E+01	1.51E-02
Grader	1	0.11 (8)	2.54E-01	1.27E-01	5.07E-01	1.57E+01	1.51E-02
Surface Miner	2	0.13 (6)	2.52E-01	1.26E-01	5.04E-01	1.57E+01	1.51E-02

Notes:

(1) Emission factors are from USEPA AP-42, Section 11.19.2 Crusher Stone Processing and Pulverized Mineral Processing, Table 11.19.2-1 for truck unloading of fragmented stone

(2) TSP emission factors was assumed to be the PM10 emission factor multiplied by 2

(3) PM2.5 emission factors was assumed to be the PM10 emission factor divided by 2

(4) Mobile 6 emission factors used for off-road vehicular tail pipe emission rates

(5) Mobile 6.1 emission factors used for off-road vehicular tail pipe emission rates

(6) Assumed that excavators,dozers, and surface miners travel up to 5km per day

(7) Assumed that loaders travel 50m every load

(8) Assumed to travel an amount equivalent to two passes over the haul road per day

(9) Mine Pit activities operate 240 days a year at 10.5 hours per day

(10) Surface miner open pit particulate matter emissions have been deemed insignificant as the surface miner, Vermeer T1255III, is equipped with dust supression technology

Table 3A

Estimated Particulate Emissions from Material Handling - Processing Facility Phase 1, Year 6 of Mine Life

Summary	AP-42 Emission Rate (g/s)		
	TSP	PM_{10}	$PM_{2.5}$
Crusher and Screening	1.61E+00	9.44E-01	4.72E-01
ROMTRANS	2.83E-01	1.06E-01	5.31E-02
Process Rejects Pile	1.24E-01	6.22E-02	3.11E-02

Crushers and Screeners

Source	Max. Production Rate (tonnes/hour)	Controlled or Uncontrolled?	Species	USEPA AP-42 Emission Factor (kg/Mg) (1)	Emission Rate (g/s)
Primary Crusher	629.4	Uncontrolled	TSP	0.0027	4.72E-01
			PM_{10}	0.0012	2.10E-01
			$PM_{2.5}$	6.00E-04	1.05E-01
Secondary Crusher	629.4	Uncontrolled	TSP	0.0027	4.72E-01
			PM_{10}	0.0012	2.10E-01
			$PM_{2.5}$	6.00E-04	1.05E-01
Tertiary Crusher	629.4	Uncontrolled	TSP	0.0027	4.72E-01
			PM_{10}	0.0012	2.10E-01
			$PM_{2.5}$	6.00E-04	1.05E-01
Fines Screening	629.4	Controlled	TSP	1.10E-03	1.92E-01
			PM_{10}	1.80E-03	3.15E-01
			$PM_{2.5}$	9.00E-04 (3)	1.57E-01

Note:
(1) Emission factors for Tertiary Crushing have been used due to a lack of Primary Crushing and Secondary Crushing emission factors. This is a conservative assumption.
(2) PM2.5 emission factors was assumed to be the PM10 emission factor divided by 2
(3) As there is no PM2.5 emission factor, emission factors were assumed to be the PM10 emission factor divided by 2.

Table 3A

Estimated Particulate Emissions from Material Handling - Processing Facility Phase 1, Year 6 of Mine Life

ROMTRANS (Transfer operations around Raw Material Storage Pile)

Source	Max. Production Rate (tonnes/hour)	Controlled or Uncontrolled?	Species	USEPA AP-42 Emission Factor (kg/Mg)	Emission Rate (g/s)
Handling, Transferring and Conveying	629.4	Uncontrolled	TSP	1.50E-03	2.62E-01
			PM_{10}	5.50E-04	9.62E-02
			$PM_{2.5}$	2.75E-04 (1)	4.81E-02
Unloading from ROM Stockpiles	629.4	Uncontrolled	TSP	1.60E-05 (2)	2.80E-03
			PM_{10}	8.00E-06	1.40E-03
			$PM_{2.5}$	4.00E-06 (3)	6.99E-04
Loading ROM Stockpiles	629.4	Uncontrolled	TSP	1.00E-04 (4)	1.75E-02
			PM_{10}	5.00E-05	8.74E-03
			$PM_{2.5}$	2.50E-05 (5)	4.37E-03

Notes:

(1) Emission factors are from USEPA AP-42, Section 11.19.1 Crushed Stone Processing and Pulverized Mineral Processing, Table 11.19.2-1 for Conveyor Transfer Point. As there is no $PM_{2.5}$ emission factor, emission factors were assumed to be the PM_{10} emission factor divided by 2.
(2) Emission factors are from USEPA AP-42, Section 11.19.1 Crushed Stone Processing and Pulverized Mineral Processing, Table 11.19.2-1 for Truck Unloading Fragmented Stone. As the emission factors are given for PM_{10} only, the TSP emission factors were assumed to be the PM_{10} emission factor times 2.
(3) Emission factors are from USEPA AP-42, Section 11.19.1 Crushed Stone Processing and Pulverized Mineral Processing, Table 11.19.2-1 for Truck Unloading Fragmented Stone. As the emission factors are given for PM_{10} only, the $PM_{2.5}$ emission factors were assumed to be the PM_{10} emission factor divided by 2.
(4) Emission factors are from USEPA AP-42, Section 11.19.1 Crushed Stone Processing and Pulverized Mineral Processing, Table 11.19.2-1 for Truck Loading Conveyor, crushed stone. As the emission factors are given for PM_{10} only, the TSP emission factors were assumed to be the PM_{10} emission factor times 2.
(5) Emission factors are from USEPA AP-42, Section 11.19.1 Crushed Stone Processing and Pulverized Mineral Processing, Table 11.19.2-1 for Truck Loading Conveyor crushed stone. As the emission factors are given for PM_{10} only, the $PM_{2.5}$ emission factors were assumed to be the PM_{10} emission factor divided by 2.
(6) The daily throughput for the processing facility is 12,134 tonne/day; with the process facility operating time being 12 hour/day, and the crusher operating time being 12 hour/day.

Process Reject Stockpile

Source	Max. Production Rate (tonnes/hour)	Controlled or Uncontrolled?	Species	USEPA AP-42 Emission Factor (kg/Mg)	Emission Rate (g/s)
Process Rejects Pile	11.9	Uncontrolled	TSP	3.76E-02 (1)	1.24E-01
			PM_{10}	1.88E-02	6.22E-02
			$PM_{2.5}$	9.41E-03 (2)	3.11E-02

Notes:

(1) Emission factors are from USEPA AP-42, Section 13.2.4 Aggregate Handling and Storage Piles As there is no TSP emission factor, emission factors were assumed to be the PM10 emission factor times 2.
(2) Emission factors are from USEPA AP-42, Section 13.2.4 Aggregate Handling and Storage Piles As there is no PM2.5 emission factor, emission factors were assumed to be the PM10 emission factor divided by 2.
Particle size was assumed to be <30um, material moisture content was assumed to be on average 0.7%, these values give a conservative Emission Factor
Mean wind speed was calculated to be 5.96 m/s using the MET data

Table 3B

Estimated Particulate Emissions from Material Handling - Processing Facility Phase 2, Year 7 of Mine Life

Summary	AP-42 Emission Rate (g/s)		
	TSP	PM_{10}	$PM_{2.5}$
Crusher and Screening	1.86E+00	1.09E+00	5.45E-01
ROMTRANS	3.26E-01	1.23E-01	6.13E-02

Crushers and Screeners

Source ID	Max. Production Rate (tonnes/hour)	Controlled or Uncontrolled?	Species	USEPA AP-42 Emission Factor (kg/Mg) (1)	Emission Rate (g/s)
Primary Crusher	726.2	Uncontrolled	TSP	0.0027	5.45E-01
			PM_{10}	0.0012	2.42E-01
			$PM_{2.5}$	6.00E-04	1.21E-01
Secondary Crusher	726.2	Uncontrolled	TSP	0.0027	5.45E-01
			PM_{10}	0.0012	2.42E-01
			$PM_{2.5}$	6.00E-04	1.21E-01
Tertiary Crusher	726.2	Uncontrolled	TSP	0.0027	5.45E-01
			PM_{10}	0.0012	2.42E-01
			$PM_{2.5}$	6.00E-04	1.21E-01
Fines Screening	726.2	Controlled	TSP	1.10E-03	2.22E-01
			PM_{10}	1.80E-03	3.63E-01
			$PM_{2.5}$	9.00E-04 (3)	1.82E-01

Note:
(1) Emission factors for Tertiary Crushing have been used due to a lack of Primary Crushing and Secondary Crushing emission factors. This is a conservative assumption.
(2) PM2.5 emission factors was assumed to be the PM10 emission factor divided by 2
(3) As there is no PM2.5 emission factor, emission factors were assumed to be the PM10 emission factor divided by 2.

ROMTRANS (Transfer operations around Raw Material Storage Pile)

Source ID	Max. Production Rate (tonnes/hour)	Controlled or Uncontrolled?	Species	USEPA AP-42 Emission Factor (kg/Mg)	Emission Rate (g/s)
Handling, Transferring and Conveying	726.2	Uncontrolled	TSP	1.50E-03	3.03E-01
			PM_{10}	5.50E-04	1.11E-01
			$PM_{2.5}$	2.75E-04 (1)	5.55E-02
Unloading from ROM Stockpiles	726.2	Uncontrolled	TSP	1.60E-05 (2)	3.23E-03
			PM_{10}	8.00E-06	1.61E-03
			$PM_{2.5}$	4.00E-06 (3)	8.07E-04
Loading ROM Stockpiles	726.2	Uncontrolled	TSP	1.00E-04 (4)	2.02E-02
			PM_{10}	5.00E-05	1.01E-02
			$PM_{2.5}$	2.50E-05 (5)	5.04E-03

Notes:

(1) Emission factors are from USEPA AP-42, Section 11.19.1 Crushed Stone Processing and Pulverized Mineral Processing, Table 11.19.2-1 for Conveyor Transfer Point. As there is no $PM_{2.5}$ emission factor, emission factors were assumed to be the PM_{10} emission factor divided by 2.
(2) Emission factors are from USEPA AP-42, Section 11.19.1 Crushed Stone Processing and Pulverized Mineral Processing, Table 11.19.2-1 for Truck Unloading Fragmented Stone. As the emission factors are given for PM_{10} only, the TSP emission factors were assumed to be the PM_{10} emission factor times 2.
(3) Emission factors are from USEPA AP-42, Section 11.19.1 Crushed Stone Processing and Pulverized Mineral Processing, Table 11.19.2-1 for Truck Unloading Fragmented Stone. As the emission factors are given for PM_{10} only, the $PM_{2.5}$ emission factors were assumed to be the PM_{10} emission factor divided by 2.
(4) Emission factors are from USEPA AP-42, Section 11.19.1 Crushed Stone Processing and Pulverized Mineral Processing, Table 11.19.2-1 for Truck Loading Conveyor, crushed stone. As the emission factors are given for PM_{10} only, the TSP emission factors were assumed to be the PM_{10} emission factor times 2.
(5) Emission factors are from USEPA AP-42, Section 11.19.1 Crushed Stone Processing and Pulverized Mineral Processing, Table 11.19.2-1 for Truck Loading Conveyor crushed stone. As the emission factors are given for PM_{10} only, the $PM_{2.5}$ emission factors were assumed to be the PM_{10} emission factor divided by 2.
(6) The daily throughput for the processing facility is 12,322 tonne/day; with the process facility operating time being 24 hour/day, and the crusher operating time being 24 hour/day.

Process Reject Stockpile

Notes:

The process reject stockpile will be backfilled in the pit during phase 2 of the project

Table 4

Estimated Tailpipe Emission Rates - Haul Routes between Pit and Processing Facility

Phase 1, Year 6 of Mine Life

Off-Road Vehicular Tail Pipe Emission Rate in g/mi

Source	Total Number of Vehicles	Average Vehicle Weight (lb)	PM_{10} (g/mi)	$PM_{2.5}$ (g/mi) (3)	TSP (g/mi) (2)	NO_x (g/mi)	SO_2 (g/mi)
Haul Truck	1	454000	2.52E-01	1.26E-01	5.04E-01	1.57E+01	1.51E-02
Waste Haul Truck	4	156452	2.52E-01	1.26E-01	5.04E-01	1.57E+01	1.51E-02
Shipping Truck	1	78509	2.52E-01	1.26E-01	5.04E-01	1.57E+01	1.51E-02

		Miles Travelled per Hour	Emission Rate (g/s) Using Mobile 6				
Truck Routes	Tonnes/Hour (6)	(mi/hr)	PM_{10}	$PM_{2.5}$	TSP	NO_x	SO_2
Phase 1 Gypsum Hauling Route	542.4	11.69	8.18E-04	4.09E-04	1.64E-03	5.10E-02	4.90E-05
Phase 1 Waste Hauling Road	1518.7	36.79	1.03E-02	5.15E-03	2.06E-02	6.42E-01	6.17E-04
Shipping Truck Route Segment 1	312.07	0.15	1.08E-05	5.39E-06	2.16E-05	6.72E-04	6.46E-07
Shipping Truck Route Segment 2	312.07	6.28	4.40E-04	2.20E-04	8.80E-04	2.74E-02	2.64E-05
Shipping Truck Route Segment 3	312.07	0.15	1.07E-05	5.36E-06	2.14E-05	6.68E-04	6.42E-07

Phase 2, Year 7 of Mine Life

Off-Road Vehicular Tail Pipe Emission Rate in g/mi

Source	Total Number of Vehicles	Average Vehicle Weight (lb)	PM_{10} (g/mi)	$PM_{2.5}$ (g/mi) (3)	TSP (g/mi) (2)	NO_x (g/mi)	SO_2 (g/mi)
Haul Truck	2	454000	2.52E-01	1.26E-01	5.04E-01	1.57E+01	1.51E-02
Waste Haul Truck	5	156452	2.52E-01	1.26E-01	5.04E-01	1.57E+01	1.51E-02
Shipping Truck	1	78509	2.52E-01	1.26E-01	5.04E-01	1.57E+01	1.51E-02

		Miles Travelled per Hour	Emission Rate (g/s) Using Mobile 6				
Truck Routes	Tonnes/Hour (6)	(mi/hr)	PM_{10}	$PM_{2.5}$	TSP	NO_x	SO_2
Phase 2 Gypsum Hauling Route	619.9	20.47	2.87E-03	1.43E-03	5.73E-03	1.79E-01	1.72E-04
Phase 2 Waste Hauling Road	1425.7	46.04	1.61E-02	8.06E-03	3.22E-02	1.00E+00	9.66E-04
Shipping Truck Route Segment 1	312.07	0.15	1.08E-05	5.39E-06	2.16E-05	6.72E-04	6.46E-07
Shipping Truck Route Segment 2	312.07	6.28	4.40E-04	2.20E-04	8.80E-04	2.74E-02	2.64E-05
Shipping Truck Route Segment 3	312.07	0.15	1.07E-05	5.36E-06	2.14E-05	6.68E-04	6.42E-07

Notes:

(1) Mobile 6 and Mobile 6.1 emission factors used
(2) TSP emission factors was assumed to be the PM10 emission factor multiplied by 2
(3) PM2.5 emission factors was assumed to be the PM10 emission factor divided by 2
(4) At peak production hour, all Haul Trucks are expected to be operating simultaneously and 8 shipping trucks are expected to be going through within the hour.
(5) tonnes per hour / tonnes per trip x road length x 2 trips = miles travelled per hour
(6) Haul trucks haul unprocessed gypsum, Waste Haul Trucks haul overburden and waste, Shipping Trucks only handle processed gypsum for shipping
(7) Single trip

Table 5

Estimated Maximum Diesel Fuelled Generator Emissions

Source ID	Source Description	Source Location	Total Power Output (kW)	Compound	CAS No.	Emission Factor [1] (lb/hp-hr)	Estimated Maximum Emission Rate (g/s)
EGen1	Emergency Generator Exhaust	Processing Plant	100	Nitrogen Oxides	10102-44-0	0.031	2.62E-01

Notes:

(1) Emission Factor from US AP-42, Chapter 3.3

Table 6

Background Ambient Air Monitoring Data (NAPS) 2017 - 2021

	Concentration (µg/m^3)		
	90th %ile	**Average**	**Maximum**
Samples collected from PA			
24-hour TSP			
Egmont Road - Cabin/House	—	11.35	—
Egmont Road - Pipeline	—	**11.79**	—
MacWilliams Road	—	11.05	—
24-hour PM10			
Egmont Road - Cabin/House	—	11.35	—
Egmont Road - Pipeline	—	**11.79**	—
MacWilliams Road	—	11.05	—
Representative Meteorological stations			
24-hour PM2.5			
Halifax (030118)	—	—	—
Lake Major - Halifax (030120)	7.5	—	—
Port Hawkesbury (030201)	8.3	—	—
Sydney (030310)	9.0	—	—
Aylesford Mountain (030701)	**10.0**	**—**	—
Pictou (030901)	9.0	—	—
1-hour NOx			
Halifax (030118)	27.7	—	—
Lake Major - Halifax (030120)	**14.2 (4)**	—	—
Port Hawkesbury (030201)	13.4	—	—
Sydney (030310)	13.4	—	—
Aylesford Mountain (030701)	0.6	—	—
Pictou (030901)	5.5	—	—
24-hour NOx			
Halifax (030118)	21.8	—	—
Lake Major - Halifax (030120)	12.0	—	—
Port Hawkesbury (030201)	**12.2 (4)**	—	—
Sydney (030310)	11.6	—	—
Aylesford Mountain (030701)	0.6	—	—
Pictou (030901)	4.4	—	—
1-hour SO2			
Halifax (030118)	**3.7**	—	—
Lake Major - Halifax (030120)	3.1	—	—
Port Hawkesbury (030201)	3.1	—	—
Sydney (030310)	1.8	—	—
Aylesford Mountain (030701)	—	—	—
Pictou (030901)	2.4	—	—
24-hour SO2			
Halifax (030118)	2.9	—	—
Lake Major - Halifax (030120)	2.9	—	—
Port Hawkesbury (030201)	**4.5**	—	—
Sydney (030310)	2.4	—	—
Aylesford Mountain (030701)	—	—	—
Pictou (030901)	2.9	—	—

Notes:

(1)Values in BOLD are the identified concentrations used to define "background" for this assessment.
(2) Data from 2020 omitted due to insufficient data
(3) PM10 conservatively assumed to be 100% of TSP concentration
(4) City of Halifax background concentration for NOx omitted as the city environment is not representative of the forested environment the mine is located in

Table 7A

Ambient Air Quality Criteria and Modelled Results for Phase 1, Year 6 of Mine Life

Substance	Averaging Period	Nova Scotia[1] (µg/m^3)	Ontario[2] (µg/m^3)	AAQS[3] (µg/m^3)	Selected for this Assessment (µg/m^3)	Background Conc.	Modelled GLC (µg/m^3)	Total GLC[4] (µg/m^3)	% of Criteria	Compliance (Yes/No)
TSP	24-hour	120	120	—	100	11.8	78.093	89.88	89.88%	Yes
	24-hour (2025 Proposed) (5)	100	—	—						
	Annual	70	60	—	60		23.191	23.19	38.65%	Yes
	Annual (2025 Proposed) (5)	60	—	—						
PM_{10}	24-hour	—	—	50	45	11.8	28.140	39.93	88.74%	Yes
	24-hour (2025 Proposed) (5)	45	—	—						
	Annual (2025 Proposed) (5)	15	—	—	15		7.153	7.15	47.69%	Yes
$PM_{2.5}$	24-hour	—	—	27	15	10.0	3.950	13.95	93.00%	Yes
	24-hour (2025 Proposed) (5)	15	—	—						
	Annual	—	—	8.8	5		1.634	1.63	32.68%	Yes
	Annual (2025 Proposed) (5)	5	—	—						
NO_x	1-hour	400	400	—	200	14.2	19.534	33.69	16.84%	Yes
	1-hour (2025 Proposed) (5)	200	—	—						
	24-hour	—	200	200	25	12.2	3.273	15.51	62.05%	Yes
	24-hour (2025 Proposed) (5)	25	—	—						
	Annual	100	—	—	10		1.015	1.01	10.15%	Yes
	Annual (2025 Proposed) (5)	10	—	—						
	Emergency	—	1800	—	1800	26.2	6.766	32.93	1.83%	Yes
SO_2	1-hour	900	100	104.8	100	3.7	0.019	3.69	3.69%	Yes
	24-hour	300	—	—	40	4.5	0.003	4.46	11.14%	Yes
	24-hour (2025 Proposed) (5)	40	—	—						
	Annual	60	10	10.5	10		0.001	0.00	0.01%	Yes

Notes:

(1) https://novascotia.ca/just/regulations/regs/envairqt.htm Accessed December, 2023.
(2) MECP ACB List (Ontario) Accessed December, 2023.
(3) https://www.ontario.ca/page/ontarios-ambient-air-quality-criteria Accessed December, 2023.
(4) Total GLC is the summation of Modelled GLC with Background Concentration.
(5) Proposed standards for Nova Scotia by the ECC

Table 7B

Ambient Air Quality Criteria and Modelled Results for Phase 2, Year 7 of Mine Life

Substance	Averaging Period	Nova Scotia[1] (µg/m^3)	Ontario[2] (µg/m^3)	AAQS[3] (µg/m^3)	Selected for this Assessment (µg/m^3)	Background Conc.	Modelled GLC (µg/m^3)	Total GLC[4] (µg/m^3)	% of Criteria	Compliance (Yes/No)
TSP	24-hour	120	120	—	100	11.8	81.879	93.670	93.67%	Yes
	24-hour (2025 Proposed) (5)	100	—	—						
	Annual	70	60	—	60		24.086	24.09	40.14%	Yes
	Annual (2025 Proposed) (5)	60	—	—						
PM_{10}	24-hour	—	—	50	45	11.8	25.415	37.21	82.68%	Yes
	24-hour (2025 Proposed) (5)	45	—	—						
	Annual (2025 Proposed) (5)	15	—	—	15		7.476	7.48	49.84%	Yes
$PM_{2.5}$	24-hour	—	—	27	15	10.0	4.266	14.27	95.11%	Yes
	24-hour (2025 Proposed) (5)	15	—	—						
	Annual	—	—	8.8	5		1.248	1.25	24.95%	Yes
	Annual (2025 Proposed) (5)	5	—	—						
NO_x	1-hour	400	400	—	200	14.2	22.281	36.43	18.22%	Yes
	1-hour (2025 Proposed) (5)	200	—	—						
	24-hour	—	200	200	25	12.2	3.671	15.91	63.64%	Yes
	24-hour (2025 Proposed) (5)	25	—	—						
	Annual	100	—	—	10		1.129	1.13	11.29%	Yes
	Annual (2025 Proposed) (5)	10	—	—						
	Emergency	—	1800	—	1800	26.2	6.766	32.93	1.83%	Yes
SO_2	1-hour	900	100	104.8	100	3.7	0.022	3.69	3.69%	Yes
	24-hour	300	—	—	40	4.5	0.004	4.46	11.14%	Yes
	24-hour (2025 Proposed) (5)	40	—	—						
	Annual	60	10	10.5	10		0.001	0.00	0.01%	Yes

Notes:

(1) https://novascotia.ca/just/regulations/regs/envairqt.htm Accessed December, 2023.
(2) MECP ACB List (Ontario) Accessed December, 2023.
(3) https://www.ontario.ca/page/ontarios-ambient-air-quality-criteria Accessed December, 2023.
(4) Total GLC is the summation of Modelled GLC with Background Concentration.
(5) Proposed standards for Nova Scotia by the ECC

Table 8A

Ambient Air Quality Criteria and Modelled Results for Phase 1, Year 6 of Mine Life, Sensitive Receptors

Sensitive Receptor 1 - 165 Sanford Rd						
Contaminant	**Modelled Concentration ($\mu g/m^3$)**	**Averaging Period**	**Assessment Criteria ($\mu g/m^3$)**	**Background Concentration ($\mu g/m^3$)**	**Modelled Concentration and Background Concentration ($\mu g/m^3$)**	**Percentage of Limit (%)**
TSP	3.04E+00	24 hour	100	11.8	1.48E+01	15%
	3.80E-01	Annual	60		3.80E-01	<1%
PM_{10}	9.50E-01	24 hour	45	11.8	1.27E+01	28%
	1.20E-01	Annual	15		1.20E-01	<1%
$PM_{2.5}$	1.60E-01	24 hour	15	10.0	1.02E+01	68%
	2.00E-02	Annual	5		2.00E-02	<1%
NO_2	2.17E+00	1-hour	200	14.2	1.63E+01	8%
	2.00E-01	24-hour	25	12.2	1.24E+01	50%
	2.00E-02	Annual	10		2.00E-02	<1%
SO_2	2.08E-03	1-hour	100	3.7	3.67E+00	4%
	2.00E-04	24-hour	40	4.5	4.45E+00	11%
	2.00E-05	Annual	10		2.00E-05	<1%

Sensitive Receptor 2 - 208 Dillman Rd						
Contaminant	**Modelled Concentration ($\mu g/m^3$)**	**Averaging Period**	**Assessment Criteria ($\mu g/m^3$)**	**Background Concentration ($\mu g/m^3$)**	**Modelled Concentration and Background Concentration ($\mu g/m^3$)**	**Percentage of Limit (%)**
TSP	2.59E+00	24 hour	100	11.8	1.44E+01	14%
	3.70E-01	Annual	60		3.70E-01	<1%
PM_{10}	8.10E-01	24 hour	45	11.8	1.26E+01	28%
	1.20E-01	Annual	15		1.20E-01	<1%
$PM_{2.5}$	1.60E-01	24 hour	15	10.0	1.02E+01	68%
	2.00E-02	Annual	5		2.00E-02	<1%
NO_2	1.89E+00	1-hour	200	14.2	1.60E+01	8%
	1.70E-01	24-hour	25	12.2	1.24E+01	50%
	2.00E-02	Annual	10		2.00E-02	<1%
SO_2	1.82E-03	1-hour	100	3.7	3.67E+00	4%
	1.60E-04	24-hour	40	4.5	4.45E+00	11%
	2.00E-05	Annual	10		2.00E-05	<1%

Sensitive Receptor 3 - 390 Antrim Rd						
Contaminant	**Modelled Concentration ($\mu g/m^3$)**	**Averaging Period**	**Assessment Criteria ($\mu g/m^3$)**	**Background Concentration ($\mu g/m^3$)**	**Modelled Concentration and Background Concentration ($\mu g/m^3$)**	**Percentage of Limit (%)**
TSP	8.37E+00	24 hour	100	11.8	2.02E+01	20%
	4.20E-01	Annual	60		4.20E-01	<1%
PM_{10}	2.69E+00	24 hour	45	11.8	1.45E+01	32%
	1.40E-01	Annual	15		1.40E-01	<1%
$PM_{2.5}$	5.40E-01	24 hour	15	10.0	1.05E+01	70%
	3.00E-02	Annual	5		3.00E-02	<1%
NO_2	4.20E+00	1-hour	200	14.2	1.84E+01	9%
	4.70E-01	24-hour	25	12.2	1.27E+01	51%
	2.00E-02	Annual	10		2.00E-02	<1%
SO_2	4.04E-03	1-hour	100	3.7	3.67E+00	4%
	4.50E-04	24-hour	40	4.5	4.45E+00	11%
	2.00E-05	Annual	10		2.00E-05	<1%

Sensitive Receptor 4 - 171 Lake Egmont Rd W						
Contaminant	**Modelled Concentration ($\mu g/m^3$)**	**Averaging Period**	**Assessment Criteria ($\mu g/m^3$)**	**Background Concentration ($\mu g/m^3$)**	**Modelled Concentration and Background Concentration ($\mu g/m^3$)**	**Percentage of Limit (%)**
TSP	8.71E+00	24 hour	100	11.8	2.05E+01	21%
	8.20E-01	Annual	60		8.20E-01	1%
PM_{10}	3.19E+00	24 hour	45	11.8	1.50E+01	33%
	3.70E-01	Annual	15		3.70E-01	2%
$PM_{2.5}$	3.90E-01	24 hour	15	10.0	1.04E+01	69%
	6.00E-02	Annual	5		6.00E-02	1%
NO_2	6.45E+00	1-hour	200	14.2	2.06E+01	10%
	4.60E-01	24-hour	25	12.2	1.27E+01	51%
	4.00E-02	Annual	10		4.00E-02	<1%
SO_2	6.20E-03	1-hour	100	3.7	3.67E+00	4%
	4.40E-04	24-hour	40	4.5	4.45E+00	11%
	4.00E-05	Annual	10		4.00E-05	<1%

Table 8A

Ambient Air Quality Criteria and Modelled Results for Phase 1, Year 6 of Mine Life, Sensitive Receptors

Sensitive Receptor 5 - 997 Lake Egmont Rd						
Contaminant	**Modelled Concentration ($\mu g/m^3$)**	**Averaging Period**	**Assessment Criteria ($\mu g/m^3$)**	**Background Concentration ($\mu g/m^3$)**	**Modelled Concentration and Background Concentration ($\mu g/m^3$)**	**Percentage of Limit (%)**
TSP	4.75E+00	24 hour	100	11.8	1.65E+01	17%
	9.50E-01	Annual	60		9.50E-01	2%
PM_{10}	1.54E+00	24 hour	45	11.8	1.33E+01	30%
	3.10E-01	Annual	15		3.10E-01	2%
$PM_{2.5}$	3.10E-01	24 hour	15	10.0	1.03E+01	69%
	6.00E-02	Annual	5		6.00E-02	1%
NO_2	1.39E+00	1-hour	200	14.2	1.55E+01	8%
	2.40E-01	24-hour	25	12.2	1.25E+01	50%
	5.00E-02	Annual	10		5.00E-02	<1%
SO_2	1.34E-03	1-hour	100	3.7	3.67E+00	4%
	2.30E-04	24-hour	40	4.5	4.45E+00	11%
	5.00E-05	Annual	10		5.00E-05	<1%

Sensitive Receptor 6 - 1322 Lake Egmont Rd						
Contaminant	**Modelled Concentration ($\mu g/m^3$)**	**Averaging Period**	**Assessment Criteria ($\mu g/m^3$)**	**Background Concentration ($\mu g/m^3$)**	**Modelled Concentration and Background Concentration ($\mu g/m^3$)**	**Percentage of Limit (%)**
TSP	1.94E+01	24 hour	100	11.8	3.12E+01	31%
	4.39E+00	Annual	60		4.39E+00	7%
PM_{10}	6.63E+00	24 hour	45	11.8	1.84E+01	41%
	1.52E+00	Annual	15		1.52E+00	10%
$PM_{2.5}$	1.63E+00	24 hour	15	10.0	1.16E+01	78%
	3.60E-01	Annual	5		3.60E-01	7%
NO_2	3.63E+00	1-hour	200	14.2	1.78E+01	9%
	8.00E-01	24-hour	25	12.2	1.30E+01	52%
	1.80E-01	Annual	10		1.80E-01	2%
SO_2	3.49E-03	1-hour	100	3.7	3.67E+00	4%
	7.70E-04	24-hour	40	4.5	4.45E+00	11%
	1.70E-04	Annual	10		1.70E-04	<1%

Sensitive Receptor 7 - 15276 NS-224						
Contaminant	**Modelled Concentration ($\mu g/m^3$)**	**Averaging Period**	**Assessment Criteria ($\mu g/m^3$)**	**Background Concentration ($\mu g/m^3$)**	**Modelled Concentration and Background Concentration ($\mu g/m^3$)**	**Percentage of Limit (%)**
TSP	1.02E+01	24 hour	100	11.8	2.20E+01	22%
	1.43E+00	Annual	60		1.43E+00	2%
PM_{10}	3.44E+00	24 hour	45	11.8	1.52E+01	34%
	4.70E-01	Annual	15		4.70E-01	3%
$PM_{2.5}$	7.90E-01	24 hour	15	10.0	1.08E+01	72%
	1.00E-01	Annual	5		1.00E-01	2%
NO_2	3.29E+00	1-hour	200	14.2	1.74E+01	9%
	4.30E-01	24-hour	25	12.2	1.27E+01	51%
	7.00E-02	Annual	10		7.00E-02	<1%
SO_2	3.16E-03	1-hour	100	3.7	3.67E+00	4%
	4.20E-04	24-hour	40	4.5	4.45E+00	11%
	6.00E-05	Annual	10		6.00E-05	<1%

Sensitive Receptor 8 - 15387 NS-224						
Contaminant	**Modelled Concentration ($\mu g/m^3$)**	**Averaging Period**	**Assessment Criteria ($\mu g/m^3$)**	**Background Concentration ($\mu g/m^3$)**	**Modelled Concentration and Background Concentration ($\mu g/m^3$)**	**Percentage of Limit (%)**
TSP	9.63E+00	24 hour	100	11.8	2.14E+01	21%
	1.62E+00	Annual	60		1.62E+00	3%
PM_{10}	3.09E+00	24 hour	45	11.8	1.49E+01	33%
	5.30E-01	Annual	15		5.30E-01	4%
$PM_{2.5}$	5.90E-01	24 hour	15	10.0	1.06E+01	71%
	1.10E-01	Annual	5		1.10E-01	2%
NO_2	3.23E+00	1-hour	200	14.2	1.74E+01	9%
	4.90E-01	24-hour	25	12.2	1.27E+01	51%
	8.00E-02	Annual	10		8.00E-02	<1%
SO_2	3.11E-03	1-hour	100	3.7	3.67E+00	4%
	4.70E-04	24-hour	40	4.5	4.45E+00	11%
	8.00E-05	Annual	10		8.00E-05	<1%

Table 8B

Ambient Air Quality Criteria and Modelled Results for Phase 2, Year 7 of Mine Life, Sensitive Receptors

Sensitive Receptor 1 - 165 Sanford Rd						
Contaminant	**Modelled Concentration ($\mu g/m^3$)**	**Averaging Period**	**Assessment Criteria ($\mu g/m^3$)**	**Background Concentration ($\mu g/m^3$)**	**Modelled Concentration and Background Concentration ($\mu g/m^3$)**	**Percentage of Limit (%)**
TSP	8.27E+00	24 hour	100	11.8	2.01E+01	20%
	6.10E-01	Annual	60		6.10E-01	1%
PM_{10}	2.45E+00	24 hour	45	11.8	1.42E+01	32%
	1.90E-01	Annual	15		1.90E-01	1%
$PM_{2.5}$	3.30E-01	24 hour	15	10.0	1.03E+01	69%
	3.10E-02	Annual	5		3.10E-02	<1%
NO_2	6.75E+00	1-hour	200	14.2	2.09E+01	10%
	8.40E-01	24-hour	25	12.2	1.31E+01	52%
	4.00E-02	Annual	10		4.00E-02	<1%
SO_2	6.51E-03	1-hour	100	3.7	3.67E+00	4%
	8.10E-04	24-hour	40	4.5	4.45E+00	11%
	4.00E-05	Annual	10		4.00E-05	<1%

Sensitive Receptor 2 - 208 Dillman Rd						
Contaminant	**Modelled Concentration ($\mu g/m^3$)**	**Averaging Period**	**Assessment Criteria ($\mu g/m^3$)**	**Background Concentration ($\mu g/m^3$)**	**Modelled Concentration and Background Concentration ($\mu g/m^3$)**	**Percentage of Limit (%)**
TSP	5.82E+00	24 hour	100	11.8	1.76E+01	18%
	5.90E-01	Annual	60		5.90E-01	<1%
PM_{10}	1.70E+00	24 hour	45	11.8	1.35E+01	30%
	1.80E-01	Annual	15		1.80E-01	1%
$PM_{2.5}$	2.10E-01	24 hour	15	10.0	1.02E+01	68%
	3.00E-02	Annual	5		3.00E-02	<1%
NO_2	9.16E+00	1-hour	200	14.2	2.33E+01	12%
	5.20E-01	24-hour	25	12.2	1.28E+01	51%
	3.00E-02	Annual	10		3.00E-02	<1%
SO_2	8.84E-03	1-hour	100	3.7	3.68E+00	4%
	5.00E-04	24-hour	40	4.5	4.45E+00	11%
	4.00E-05	Annual	10		4.00E-05	<1%

Sensitive Receptor 3 - 390 Antrim Rd						
Contaminant	**Modelled Concentration ($\mu g/m^3$)**	**Averaging Period**	**Assessment Criteria ($\mu g/m^3$)**	**Background Concentration ($\mu g/m^3$)**	**Modelled Concentration and Background Concentration ($\mu g/m^3$)**	**Percentage of Limit (%)**
TSP	1.08E+01	24 hour	100	11.8	2.26E+01	23%
	6.50E-01	Annual	60		6.50E-01	1%
PM_{10}	3.41E+00	24 hour	45	11.8	1.52E+01	34%
	2.00E-01	Annual	15		2.00E-01	1%
$PM_{2.5}$	6.10E-01	24 hour	15	10.0	1.06E+01	71%
	3.50E-02	Annual	5		3.50E-02	<1%
NO_2	8.22E+00	1-hour	200	14.2	2.24E+01	11%
	8.30E-01	24-hour	25	12.2	1.31E+01	52%
	3.00E-02	Annual	10		3.00E-02	<1%
SO_2	7.94E-03	1-hour	100	3.7	3.68E+00	4%
	8.00E-04	24-hour	40	4.5	4.45E+00	11%
	5.00E-05	Annual	10		5.00E-05	<1%

Sensitive Receptor 4 - 171 Lake Egmont Rd W						
Contaminant	**Modelled Concentration ($\mu g/m^3$)**	**Averaging Period**	**Assessment Criteria ($\mu g/m^3$)**	**Background Concentration ($\mu g/m^3$)**	**Modelled Concentration and Background Concentration ($\mu g/m^3$)**	**Percentage of Limit (%)**
TSP	1.21E+01	24 hour	100	11.8	2.39E+01	24%
	1.27E+00	Annual	60		1.27E+00	2%
PM_{10}	3.60E+00	24 hour	45	11.8	1.54E+01	34%
	4.00E-01	Annual	15		4.00E-01	3%
$PM_{2.5}$	9.60E-01	24 hour	15	10.0	1.10E+01	73%
	7.30E-02	Annual	5		7.30E-02	1%
NO_2	9.34E+00	1-hour	200	14.2	2.35E+01	12%
	1.10E+00	24-hour	25	12.2	1.33E+01	53%
	8.00E-02	Annual	10		8.00E-02	<1%
SO_2	9.02E-03	1-hour	100	3.7	3.68E+00	4%
	1.07E-03	24-hour	40	4.5	4.46E+00	11%
	9.00E-05	Annual	10		9.00E-05	<1%

Table 8B

Ambient Air Quality Criteria and Modelled Results for Phase 2, Year 7 of Mine Life, Sensitive Receptors

Sensitive Receptor 5 - 997 Lake Egmont Rd						
Contaminant	**Modelled Concentration ($\mu g/m^3$)**	**Averaging Period**	**Assessment Criteria ($\mu g/m^3$)**	**Background Concentration ($\mu g/m^3$)**	**Modelled Concentration and Background Concentration ($\mu g/m^3$)**	**Percentage of Limit (%)**
TSP	7.45E+00	24 hour	100	11.8	1.92E+01	19%
	1.25E+00	Annual	60		1.25E+00	2%
PM_{10}	2.28E+00	24 hour	45	11.8	1.41E+01	31%
	4.00E-01	Annual	15		4.00E-01	3%
$PM_{2.5}$	3.70E-01	24 hour	15	10.0	1.04E+01	69%
	7.50E-02	Annual	5		7.50E-02	2%
NO_2	4.39E+00	1-hour	200	14.2	1.85E+01	9%
	5.40E-01	24-hour	25	12.2	1.28E+01	51%
	7.00E-02	Annual	10		7.00E-02	<1%
SO_2	4.23E-03	1-hour	100	3.7	3.67E+00	4%
	5.20E-04	24-hour	40	4.5	4.45E+00	11%
	8.00E-05	Annual	10		8.00E-05	<1%

Sensitive Receptor 6 - 1322 Lake Egmont Rd						
Contaminant	**Modelled Concentration ($\mu g/m^3$)**	**Averaging Period**	**Assessment Criteria ($\mu g/m^3$)**	**Background Concentration ($\mu g/m^3$)**	**Modelled Concentration and Background Concentration ($\mu g/m^3$)**	**Percentage of Limit (%)**
TSP	2.19E+01	24 hour	100	11.8	3.37E+01	34%
	4.83E+00	Annual	60		4.83E+00	8%
PM_{10}	7.51E+00	24 hour	45	11.8	1.93E+01	43%
	1.68E+00	Annual	15		1.68E+00	11%
$PM_{2.5}$	1.86E+00	24 hour	15	10.0	1.19E+01	79%
	4.13E-01	Annual	5		4.13E-01	8%
NO_2	6.77E+00	1-hour	200	14.2	2.09E+01	10%
	1.06E+00	24-hour	25	12.2	1.33E+01	53%
	2.00E-01	Annual	10		2.00E-01	2%
SO_2	6.54E-03	1-hour	100	3.7	3.67E+00	4%
	1.02E-04	24-hour	40	4.5	4.45E+00	11%
	2.30E-04	Annual	10		2.30E-04	<1%

Sensitive Receptor 7 - 15276 NS-224						
Contaminant	**Modelled Concentration ($\mu g/m^3$)**	**Averaging Period**	**Assessment Criteria ($\mu g/m^3$)**	**Background Concentration ($\mu g/m^3$)**	**Modelled Concentration and Background Concentration ($\mu g/m^3$)**	**Percentage of Limit (%)**
TSP	1.24E+01	24 hour	100	11.8	2.42E+01	24%
	1.59E+00	Annual	60		1.59E+00	3%
PM_{10}	4.14E+00	24 hour	45	11.8	1.59E+01	35%
	5.30E-01	Annual	15		5.30E-01	4%
$PM_{2.5}$	9.20E-01	24 hour	15	10.0	1.09E+01	73%
	1.12E-01	Annual	5		1.12E-01	2%
NO_2	6.64E+00	1-hour	200	14.2	2.08E+01	10%
	6.60E-01	24-hour	25	12.2	1.29E+01	52%
	8.00E-02	Annual	10		8.00E-02	<1%
SO_2	6.41E-03	1-hour	100	3.7	3.67E+00	4%
	6.40E-04	24-hour	40	4.5	4.45E+00	11%
	8.00E-05	Annual	10		8.00E-05	<1%

Sensitive Receptor 8 - 15387 NS-224						
Contaminant	**Modelled Concentration ($\mu g/m^3$)**	**Averaging Period**	**Assessment Criteria ($\mu g/m^3$)**	**Background Concentration ($\mu g/m^3$)**	**Modelled Concentration and Background Concentration ($\mu g/m^3$)**	**Percentage of Limit (%)**
TSP	1.04E+01	24 hour	100	11.8	2.22E+01	22%
	1.73E+00	Annual	60		1.73E+00	3%
PM_{10}	3.34E+00	24 hour	45	11.8	1.51E+01	34%
	5.70E-01	Annual	15		5.70E-01	4%
$PM_{2.5}$	6.50E-01	24 hour	15	10.0	1.07E+01	71%
	1.19E-01	Annual	5		1.19E-01	2%
NO_2	6.00E+00	1-hour	200	14.2	2.02E+01	10%
	6.50E-01	24-hour	25	12.2	1.29E+01	52%
	9.00E-02	Annual	10		9.00E-02	<1%
SO_2	5.79E-03	1-hour	100	3.7	3.67E+00	4%
	6.20E-04	24-hour	40	4.5	4.45E+00	11%
	1.00E-04	Annual	10		1.00E-04	<1%

Appendix A

Baseline Air Monitoring

455 Phillip Street, Unit 100A
Waterloo, Ontario N2L 3X2
Canada
www.ghd.com

Our ref: 12601021

03 July 2024

Mr. Roberto Margutti
Director – North American Mining Operations
13500 Blue Diamond Road
Las Vegas Nevada 89161
USA

Baseline Air Quality Monitoring, Antrim Gypsum Project

Dear Mr. Margutti:

Introduction

The Antrim Gypsum Project (the Project) is located approximately 50 km from Halifax, Nova Scotia (NS), near Gays River, along Lake Egmont Road in the community of Cooks Brook, NS. For the purpose of the Environmental Assessment, the Project Area (PA) is defined as the footprint of Project related infrastructure, and comprises of PIDs 40228389, 40228371, 40212409, 40229676, 40228009 and 40228017.

Baseline air quality monitoring of total suspended particulate matter (TSP) was completed in support of an Air Emissions Assessment to determine the background (baseline) concentrations of TSP local to the PA. Air quality monitoring occurred both within the PA and the immediate surrounding areas. While there is publicly available TSP data, it is not geographically applicable to the PA and was therefore not used while quantifying baseline air quality.

Air quality sampling was performed at three (3) locations (A1, A2 and A3) within or in proximity to the PA (Figure 1), with sampling occurring between October 2nd and October 7th, 2023. Sample locations were selected based on a 5-year wind rose graphic created by Environment and Climate Change Canada (ECCC). The wind rose displays data related to wind direction and strength of wind collected at the Halifax Stanfield International Airport (ECCC Station # 8202251) during the month of October from 2018 to 2022 and was used to identify possible upwind and downwind monitoring locations for the Air Emissions Assessment. ECCC Station #8202251 was selected as it provides the closest wind data to the Project, with the station located approximately 17 kilometres (km) southwest of the PA. The wind-rose is provided in Attachment A.

When considering possible upwind and downwind monitoring locations, areas were targeted that were open, unrestricted by vegetation, largely unimpacted by anthropogenic sources of dust, and reasonably accessible by foot and/or vehicle. The monitoring locations are summarized in Table 1 below and depicted on Figure 1 (following text). A photo log containing images of the monitoring locations are provided in Attachment B.

Table 1 Baseline Air Monitoring Sample Locations

Monitoring Location ID and Coordinates (UTM NAD 20)	Location	Description	Wind Direction Relative to Project
A1 (474642, 4984647)	North Project access road	Small clearing adjacent to existing northern access road to Project, immediately south of Lake Egmont Road.	Downwind
A2 (475656, 4983303)	Maritimes and Northeast Pipeline (M&NP)	50 metres west of intersection of the M&NP right of way and Lake Egmont Road	Downwind
A3 (471956, 4983647)	MacWilliams Road	Intersection of MacWilliams Road and tributary of South Branch Gays River, equidistant between Dillman Road and Annand Bog	Upwind

Methodology

Air quality sampling for TSP was completed using Tisch® High Volume (Hi-Vol) samplers in accordance with the United States Environmental Protection Agency (US EPA) Compendium Method IO-2.1. Prior to use, the Hi-Vol samplers were calibrated to a flowrate of approximately 40 cubic feet per minute (cfm) using a Tisch Hi-Vol calibration kit and the TISCH Calibration spreadsheet for volumetric samplers. Calibration log spreadsheets are provided in Attachment C. Glass fibre filters were pre-weighed and pre-labelled by Bureau Veritas (BV) Laboratory in Bedford, NS and placed inside individual sterile envelopes. During the sampling event, the filters were removed from the envelopes and positioned on the Hi-Vol, where they were left for 24-hours to collect TSP from the surrounding environment, with the Hi-Vol sampler being powered by a propane powered generator. Once the sampling was complete, the sample end time, filter number, and count from the monitoring unit was recorded, and the sample filter was replaced inside the labelled envelope. At this time another pre-weighed, pre-labelled filter was placed on the Hi-Vol sampler and monitoring resumed for another 24-hours. This process was repeated every 24-hours for a total of four (4) repetitions and approximately 96-hours of sampling per location.

Results

TSP includes dust, dirt, soot, smoke, and liquid droplets directly emitted into the air by sources such as factories, power plants, cars, construction activity, fires, and natural windblown dust. Particles formed in the atmosphere by condensation or the transformation of emitted gases such as SO2 and Volatile Organic Compounds (VOCs) are also considered particulate matter.

Based on Nova Scotia Air Quality Regulations, a significant adverse environmental effect with respect to TSP is one that would reduce air quality such that the level of TSP matter exceeds 120 microgram per cubic meter (µg/m$_3$) over a 24-hour averaging period or 70 µg/m$_3$ over an annual averaging period (Nova Scotia Environment Act Air Quality Regulations, Effective January 1, 2015, NS Reg 179/2014).

All calculated values were reported below the maximum permissible ground level concentration of 120 µg/m$_3$ outlined in Schedule A of the Nova Scotia Air Quality Regulations. TSP values measured at the three monitoring locations over the four sampling rounds ranged from 8.0 µg/m$_3$ to 13.0 µg/m$_3$ (Table 2). Detailed air quality monitoring results are found in Table 3 (following text), with analytical lab results provided in Attachment D.

Upon arrival at monitoring location A2 on October 4, 2023, it was determined that the Hi-Vol sampler was off and had not been collecting data for the previous 24-hours. To compensate for this error, monitoring was conducted for an additional 24-hours compared to locations A1 and A3 on October 7th.

Table 2 TSP Monitoring Summary

Date	A1	A2	A3
October 2-3, 2023	12 µg/m3	13 µg/m3	12 µg/m3
October 3-4, 2023	13 µg/m3	-	8 µg/m3
October 4-5, 2023	12 µg/m3	13 µg/m3	12 µg/m3
October 5-6, 2023	9 µg/m3	12 µg/m3	13 µg/m3
October 6-7, 2023	-	9 µg/m3	-

All reported TSP values collected across the three (3) monitoring locations are below the NS Air Quality regulation concentration guideline of 120 µg/m3. The reported concentrations are considered baseline or background and are representative for the sampling environment. The reported baseline concentrations will be used to add to the predicted values for TSP in the Air Emissions Assessment Report to obtain cumulative concentrations of TSP for the Project.

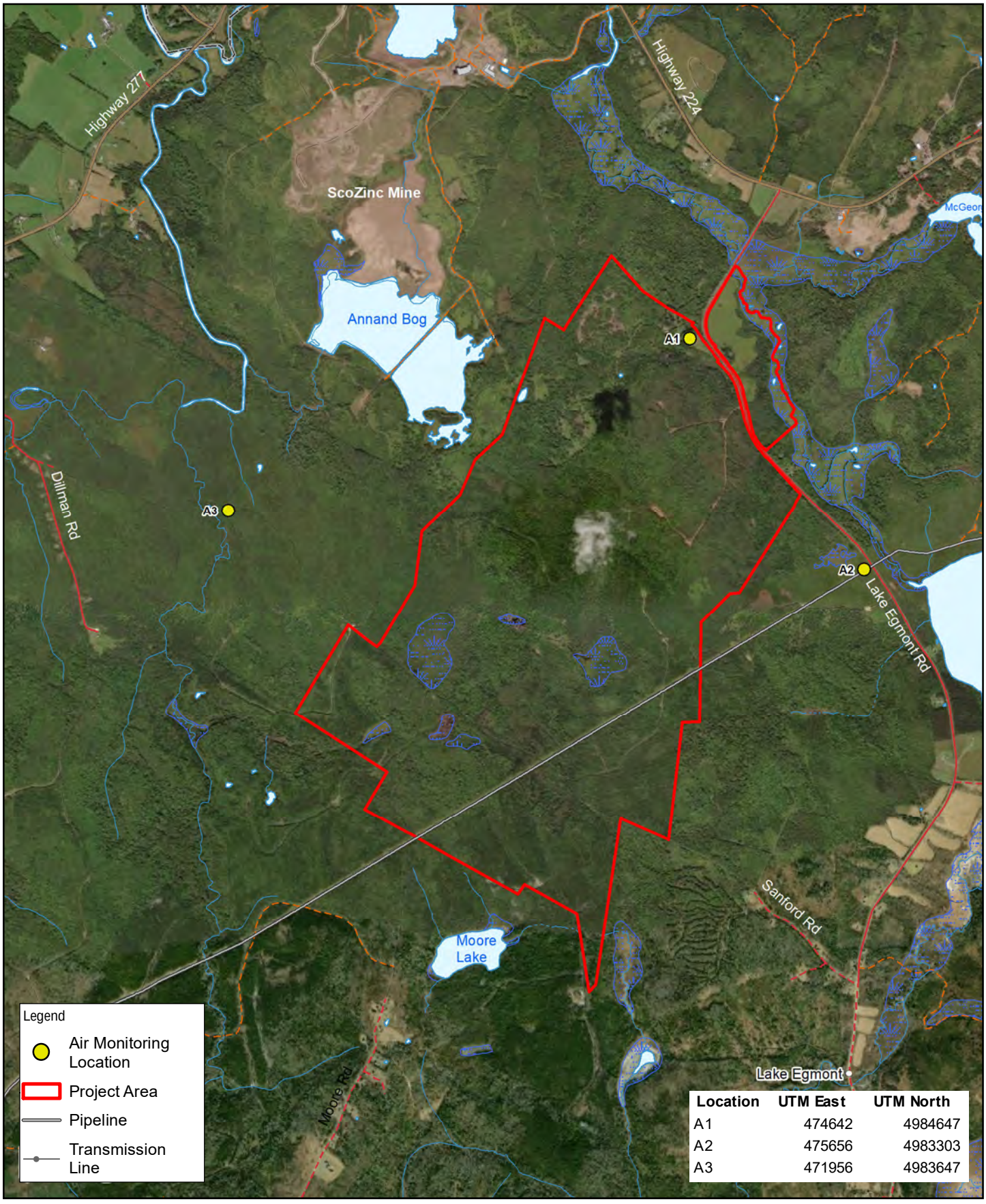
Regards,

John MacRae
Technical Leader - Air

+1 519 340-4312
john.macrae@ghd.com

JM/tj/4

Encl.



Location	UTM East	UTM North
A1	474642	4984647
A2	475656	4983303
A3	471956	4983647

Paper Size ANSI A

0 300 600 900

Metres

Map Projection: Transverse Mercator
Horizontal Datum: North American 1983 CSRS
Grid: NAD 1983 CSRS UTM Zone 20N

N

CERTAINTEED CANADA INC.
LAKE EGMONT, HALIFAX CO, NOVA SCOTIA
ANTRIM GYPSUM PROJECT

Project No. 12601021
Revision No. -
Date 06/19/2024

BASELINE AIR MONITORING

FIGURE 1

N:\CA\Halifax\Projects\661\12601021\GIS\Maps\Deliverables\12601021-RPTXX-HX001_Air_Noise Mon.mxd
Print date: 20 Jun 2024 - 09:04

Table 3: Baseline Total Suspended Particulate Concentration, Sample Results Summary
Antrim Gypsum Project, Lake Egmont, Halifax Co, NS

Date	Sample ID	Sample Number	Lab Result (mg)	Sample Duration (hr)	Volume		Concentration
					(ft3)	(m3)	(mg/m3)
October 2-3, 2023	A1 (North Project access road)	41257	19	24.1	57840	1637.85	0.012
	A2 (M&NP)	41252	22	25.12	60288	1707.17	0.013
	A3 (MacWilliams Road)	41251	20	25.56	61344	1737.07	0.012
October 3-4, 2023	A1 (North Project access road)	41254	21	24.39	58536	1657.56	0.013
	A2 (M&NP)	41256	N/A[1]	2.81	6744	190.97	N/A[1]
	A3 (MacWilliams Road)	41253	14	25.63	61512	1741.83	0.008
October 4-5, 2023	A1 (North Project access road)	41248	19	23.85	57240	1620.86	0.012
	A2 (M&NP)	41249	22	24.63	59112	1673.87	0.013
	A3 (MacWilliams Road)	41247	19	24.12	57888	1639.21	0.012
October 5-6, 2023	A1 (North Project access road)	41246	15	23.5	56400	1597.07	0.009
	A2 (M&NP)	41255	20	23.56	56544	1601.15	0.012
	A3 (MacWilliams Road)	41245	22	24.8	59520	1685.42	0.013
October 6-7, 2023	A2 (M&NP)	41250	14	23.83	57192	1619.50	0.009

Notes:

[1] Sample A2 was not collected on October 4, 2023 due to equipment malfunction. Replacement data collection occurred on October 7, 2023.

Attachments

Attachment A

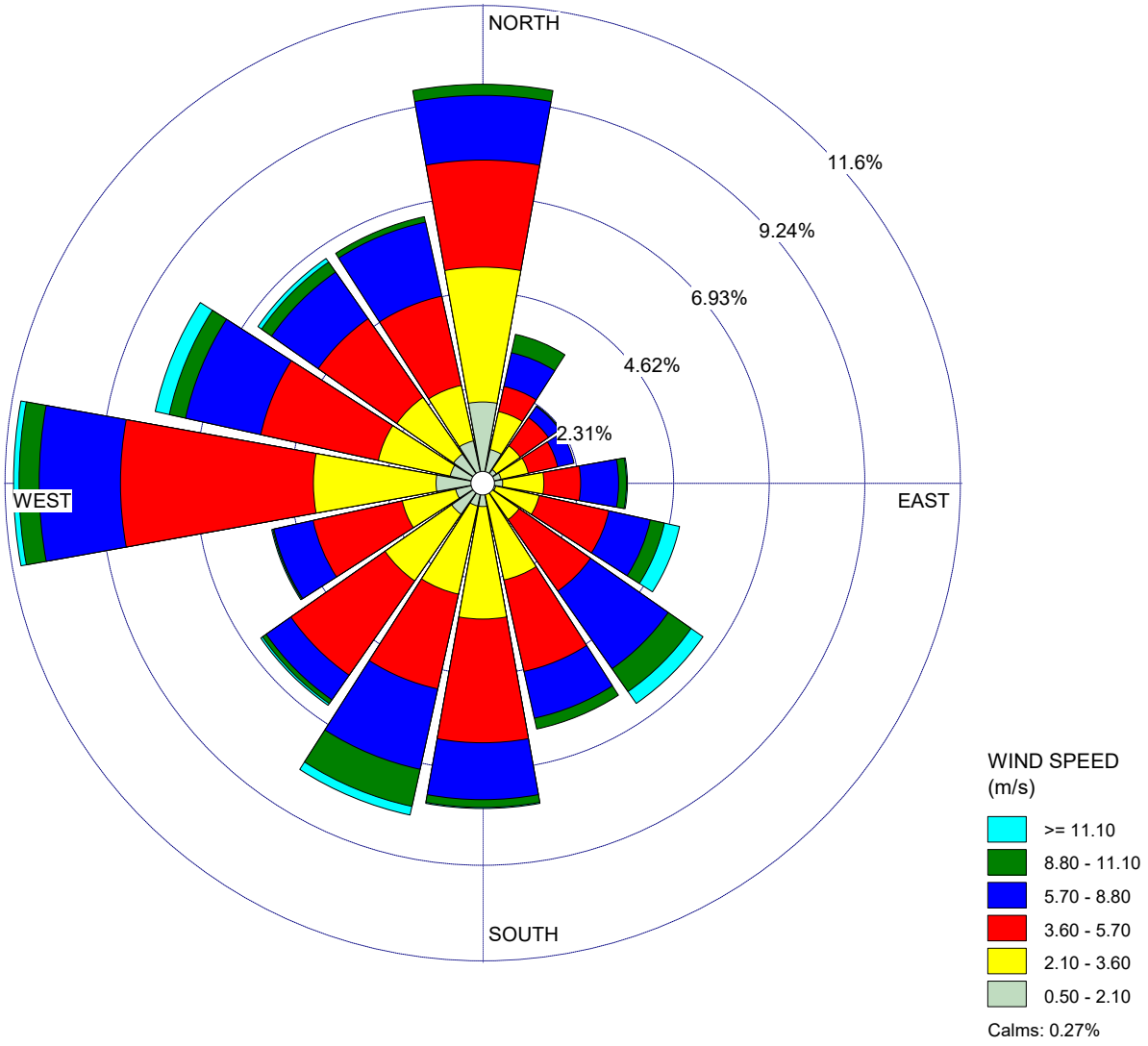
Wind Rose

WIND ROSE PLOT:

Wind Rose Plot for October Only, 2018-2022
Halifax International AP (Climate ID 8202251)

DISPLAY:

Wind Speed
Direction (blowing from)



COMMENTS: Source: Environment and Climate Change Canada	DATA PERIOD: **Start Date: 10/1/2018 - 00:00** **End Date: 10/31/2022 - 23:00**	COMPANY NAME:	
		MODELER: **GHD**	
	CALM WINDS: **0.27%**	TOTAL COUNT: **3699 hrs.**	
	AVG. WIND SPEED: **4.52 m/s**	DATE: **9/28/2023**	PROJECT NO.: **12601021-4.01**

Attachment B

Photolog

Site Photographs

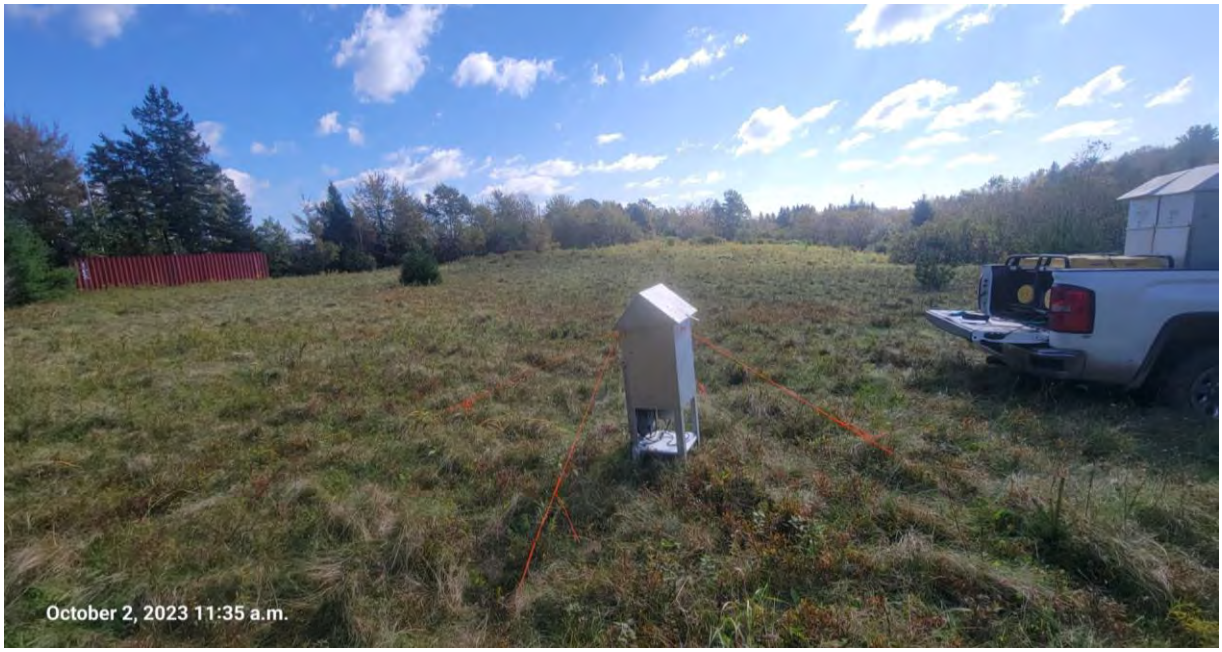


Photo 1 *Air Quality Monitoring sample location A1 (North Project access road, facing south)*

Photo 2 *Air Quality Monitoring sample location A2 (M&NP right of way, facing west)*

Photo 3 Air Quality Monitoring sample location A3 (MacWilliams Road, facing east)

Attachment C

Calibration Log

TE-5170V Calibration Worksheet

Site Information

Location:	North Project access road	**Site ID:**	12601021	**Date:**	29-Sep-23
Sampler:	TE-5170V	**Serial No:**	A1 (GHD-TSP-1)	**Tech:**	J Veniot

Site Conditions

Temp (deg F):	71.4		
Ta (deg K):	295	**Barometric Press (in Hg):**	29.36
Ta (deg C):	22	**Pa (mm Hg):**	746

Calibration Orifice

Make:	Tisch	**Qa Slope:**	0.98975
Model:	TE-5028A	**Qa Intercept:**	-0.00494
Serial#:	0717		

Calibration Data

Run Number	Orifice "H2O	Qa (m3/min)	Sampler "H2O	Pf (mm Hg)	Po/Pa	Look Up (m3/min)	% Diff
1	3.38	1.173	3.38	6.308	0.992	1.133	-3.41
2	3.37	1.171	3.40	6.345	0.991	1.133	-3.24
3	3.37	1.171	3.46	6.457	0.991	1.133	-3.24
4	3.38	1.173	3.46	6.457	0.991	1.133	-3.41
5	3.40	1.177	3.46	6.457	0.991	1.133	-3.74

Top Hose | Bottom Hose | CFM 40 =

Calculations

Calibrator Flow (Qa) = 1/Slope*(SQRT(H20*(Ta/Pa))-Intercept)

Pressure Ratio (Po/Pa) = 1-Pf/Pa

% Difference = (Look Up Flow-Calibrator Flow)/Calibrator Flow*100

TE-5170V Calibration Worksheet

Site Information

Location:	M&NP right of way	**Site ID:**	12601021	**Date:**	29-Sep-23
Sampler:	TE-5170V	**Serial No:**	A2 (GHD-TSP-2)	**Tech:**	J Veniot

Site Conditions

Temp (deg F):	71.4		
Ta (deg K):	295	**Barometric Press (in Hg):**	29.36
Ta (deg C):	22	**Pa (mm Hg):**	746

Calibration Orifice

Make:	Tisch	**Qa Slope:**	0.98975
Model:	TE-5028A	**Qa Intercept:**	-0.00494
Serial#:	0717		

Calibration Data

Run Number	Orifice "H2O	Qa (m3/min)	Sampler "H2O	Pf (mm Hg)	Po/Pa	Look Up (m3/min)	% Diff
1	3.80	1.244	3.75	6.999	0.991	1.133	-8.93
2	3.78	1.240	3.76	7.017	0.991	1.133	-8.63
3	3.80	1.244	3.74	6.980	0.991	1.133	-8.93
4	3.75	1.235	3.75	6.999	0.991	1.133	-8.26
5	3.73	1.232	3.72	6.943	0.991	1.133	-8.04

Max 10%

Calculations

Calibrator Flow (Qa) = 1/Slope*(SQRT(H20*(Ta/Pa))-Intercept)

Pressure Ratio (Po/Pa) = 1-Pf/Pa

% Difference = (Look Up Flow-Calibrator Flow)/Calibrator Flow*100

TE-5170V Calibration Worksheet

Site Information

Location:	MacWilliams Road	**Site ID:**	12601021	**Date:**	29-Sep-23
Sampler:	TE-5170V	**Serial No:**	A3 (GHD-TSP-7)	**Tech:**	J Veniot

Site Conditions

Temp (deg F):	71.4		
Ta (deg K):	295	**Barometric Press (in Hg):**	29.36
Ta (deg C):	22	**Pa (mm Hg):**	746

Calibration Orifice

Make:	Tisch	**Qa Slope:**	0.98975
Model:	TE-5028A	**Qa Intercept:**	-0.00494
Serial#:	0717		

Calibration Data

Run Number	Orifice "H2O	Qa (m3/min)	Sampler "H2O	Pf (mm Hg)	Po/Pa	Look Up (m3/min)	% Diff
1	2.76	1.061	3.31	6.177	0.992	1.133	6.79
2	2.72	1.053	3.22	6.009	0.992	1.133	7.60
3	2.70	1.049	3.23	6.028	0.992	1.133	8.01
4	2.61	1.031	3.12	5.823	0.992	1.133	9.89
5	2.55	1.020	3.02	5.636	0.992	1.133	11.08

Calculations

Calibrator Flow (Qa) = 1/Slope*(SQRT(H20*(Ta/Pa))-Intercept)
Pressure Ratio (Po/Pa) = 1-Pf/Pa
% Difference = (Look Up Flow-Calibrator Flow)/Calibrator Flow*100

Attachment D

Certificate of Analysis

Your P.O. #: 735-005520 (REV1)
Your Project #: 12601021-04
Site#: ANTRIM GYPSUM PROJECT BASEUME
Site Location: ANTRIM N.S
Your C.O.C. #: N/A

Attention: Jessica Romo

GHD Limited
120 Western Parkway
Bedford, NS
CANADA B4B 0V2

Report Date: 2023/10/24
Report #: R7876166
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C3V3108
Received: 2023/10/10, 12:57

Sample Matrix: Air
Samples Received: 12

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Particulate Matter in Air (1)	12	N/A	2023/10/16	SYD SOP 00172	EPA40 CFR Ch.1,50-Bm

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCCFP, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Bureau Veritas has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.

Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) This test was performed by Bureau Veritas Sydney, 465 George Street , Sydney, NS, B1P 1K5

Bureau Veritas 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvna.com

Your P.O. #: 735-005520 (REV1)
Your Project #: 12601021-04
Site#: ANTRIM GYPSUM PROJECT BASEUME
Site Location: ANTRIM N.S
Your C.O.C. #: N/A

Attention: Jessica Romo

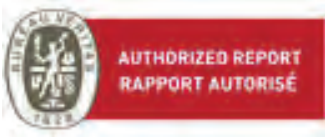
GHD Limited
120 Western Parkway
Bedford, NS
CANADA B4B 0V2

Report Date: 2023/10/24
Report #: R7876166
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C3V3108
Received: 2023/10/10, 12:57

Encryption Key



Bureau Veritas
24 Oct 2023 13:32:41

Please direct all questions regarding this Certificate of Analysis to:
Marie Muise, Key Account Specialist
Email: Marie.MUISE@bureauveritas.com
Phone# (902)420-0203 Ext:253

==========

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Bureau Veritas 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvna.com

Bureau Veritas Job #: C3V3108
Report Date: 2023/10/24

GHD Limited
Client Project #: 12601021-04
Site Location: ANTRIM N.S
Your P.O. #: 735-005520 (REV1)
Sampler Initials: JV

RESULTS OF ANALYSES OF AIR

Bureau Veritas ID		XFU366		XFU367	XFU368	XFU369	XFU370			
Sampling Date		2023/10/03 15:02		2023/10/04 15:30	2023/10/05 15:26	2023/10/06 15:01	2023/10/03 15:13			
COC Number		N/A		N/A	N/A	N/A	N/A			
	UNITS	LTM-A1 41257	QC Batch	LTM-A1 41254	LTM-A1 41248	LTM-A1 41246	LTM-A2 41252	RDL	MDL	QC Batch
Inorganics										
Total Suspended Particulate	mg	19	8972432	21	19	15	22	0.50	N/A	8972433

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

Bureau Veritas ID		XFU371	XFU372	XFU373	XFU374	XFU375			
Sampling Date		2023/10/05 15:37	2023/10/06 14:41	2023/10/07 14:04	2023/10/03 14:29	2023/10/04 14:58			
COC Number		N/A	N/A	N/A	N/A	N/A			
	UNITS	LTM-A2 41249	LTM-A2 41255	LTM-A2 41250	LTM-A3 41251	LTM-A3 41253	RDL	MDL	QC Batch
Inorganics									
Total Suspended Particulate	mg	22	20	14	20	14	0.50	N/A	8972433

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

Bureau Veritas ID		XFU376	XFU377			
Sampling Date		2023/10/05 14:10	2023/10/06 14:06			
COC Number		N/A	N/A			
	UNITS	LTM-A3 41247	LTM-A3 41255	RDL	MDL	QC Batch
Inorganics						
Total Suspended Particulate	mg	19	22	0.50	N/A	8972433

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

Bureau Veritas 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.bvna.com

Bureau Veritas Job #: C3V3108
Report Date: 2023/10/24

GHD Limited
Client Project #: 12601021-04
Site Location: ANTRIM N.S
Your P.O. #: 735-005520 (REV1)
Sampler Initials: JV

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	22.0°C

Results relate only to the items tested.

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Bureau Veritas Job #: C3V3108
Report Date: 2023/10/24

GHD Limited
Client Project #: 12601021-04
Site Location: ANTRIM N.S
Your P.O. #: 735-005520 (REV1)
Sampler Initials: JV

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:

Kathy Martin, Laboratory Manager

Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation, please refer to the Validation Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by Suzanne Rogers, General Manager responsible for Nova Scotia Environmental laboratory operations.

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Attempt to Cool: Yes ____ No ✓

www.BVNA.com
105-200 Bluewater Road, Bedford, NS B4B 1G9 | Tel: 902-420-0203 Fax: 902-420-8612 Toll Free: 1-800-565-7227
49-55 Elizabeth Avenue, St John's, NL A1A 1W9 | Tel: 709-754-0203 Fax: 709-754-8612 Toll Free: 1-888-492-7227
465 George Street ,Unit G, Sydney, NS B1P 1K5 | Tel: 902-567-1255 Fax: 902-539-6504 Toll Free: 1-888-535-7770

CHAIN OF CUSTODY RECORD

ENV COC - 00016v3

Invoice Information	Invoice to (requires report) ☐	Report Information (if differs from invoice)		Project Information	
Company :	GHD Limited - 735	Company:	GHD Limited - 735	Quotation #:	C33692
Contact Name:	Jessica Romo	Contact Name:	Jessica Romo	P.O. #/ AFE#:	735-005520 (REV1)
Street Address:	455 Phillip St,	Street Address:	110, 120 Western Parkway	Project #:	12601021-04
City: Waterloo Prov: ON Postal Code: N2L3X2		City: Bedford Prov: NS Postal Code: B4B0V2		Site #:	ANTRIM GYPSUM PROJECT BASELINE AIR
Phone:	519-884-0510	Phone:	1 902 334 1832	Site Location:	Antrim N.S.
Email:	AccountsPayableCDN@ghd.com	Email:	jessica.romo@ghd.com	Site Location Province:	N.S.
Copies:		Copies:	callie.andrews@ghd.com	Sampled By:	J Veniot

LAB USE ONLY - PLACE STICKER HERE

Rush Confirmation #:

Regulatory Criteria

**Specify matrix for each regulation: surface water (SW)/groundwater (GW)/tap water/sewage/effluent/seawater/potable water/non-potable water/tissue/soil/sludge/metal	Regulation	**Matrix

Regular Turnaround Time (TAT)

☑ 5 to 7 Day ☐ 10 Day

Rush Turnaround Time (TAT) Surcharges apply

☐ Same Day ☐ 1 Day ☐ 2 Day ☐ 3 Day ☐ 4 Day

Date Required: YY MM DD

SAMPLES MUST BE KEPT COOL (<10°C) FROM TIME OF SAMPLING UNTIL DELIVERY TO BUREAU VERITAS

	Sample Identification	Date Sampled YY	MM	DD	Time (24hr) HH	MM	Matrix	1 FIELD FILTERED	2 FIELD PRESERVED	3 LAB FILTRATION REQUIRED	4 RCAp-MS (total metals) well / surface water	5 RCAp-MS (dissolved metals) - GW	6 Total metals (default)-well/SW	7 Dissolved metals for ground water	8 Total mercury - water	9 Dissolved mercury - water	10 Metals/mercury default (acid ext.)	11 HWS boron (CCME agri/ landfill)	12 RBCA HC (BTEX, C6-C32)	13 CCME HC (F1/BTEX, F2-F4)	14 PAHs (default for water/soil)	15 PCBs - default	16 PCBs - CCME sediment	17 VOCs	18 Total coliform/E.coli (presence/absence)	19 Total coliform/E.coli (count)	20 TSP (Sydney NS)	21 # OF CONTAINERS SUBMITTED	22 HOLD - DO NOT ANALYZE	Comments
1	LTM-A1	23	10	3	15	02	Air																				x	1		Filter: 41257
2	LTM-A1	23	10	4	15	30	Air																				x	1		Filter: 41254
3	LTM-A1	23	10	5	15	26	Air																				x	1		Filter: 41248
4	LTM-A1	23	10	6	15	01	Air																				x	1		Filter: 41246
5	LTM-A2	23	10	3	15	13	Air																				x	1		Filter: 41252
6	LTM-A2	23	10	5	15	37	Air																				x	1		Filter: 41249
7	LTM-A2	23	10	6	14	41	Air																				x	1		Filter: 41255
8	LTM-A2	23	10	7	14	04	Air																				x	1		Filter: 41250
9	LTM-A3	23	10	3	14	29	Air																				x	1		Filter: 41251
10	LTM-A3	23	10	4	14	58	Air																				x	1		Filter: 41253
11	LTM-A3	23	10	5	14	10	Air																				x	1		Filter: 41247
12	LTM-A3	23	10	6	14	06	Air																				x	1		Filter: 41255

REO-2023-10-412

*UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO BUREAU VERITAS STANDARD TERMS AND CONDITIONS. SIGNING OF THIS CHAIN OF CUSTODY DOCUMENT IS ACKNOWLEDGMENT AND ACCEPTANCE OF OUR TERMS AND CONDITIONS WHICH ARE AVAILABLE FOR VIEWING AT WWW.BVNA.COM/TERMS-AND-CONDITIONS OR BY CALLING THE LABORATORY LISTED ABOVE TO OBTAIN A COPY

LAB USE ONLY	Yes	No	°C	1	2	3
Seal present						
Seal intact						
Cooling media present						

LAB USE ONLY	Yes	No	°C	1	2	3
Seal present						
Seal intact						
Cooling media present						

LAB USE ONLY	Yes	No	°C	1	2	3	Temperature reading by:
Seal present							
Seal intact							
Cooling media present							
				22	22	22	

	Relinquished by: (Signature/ Print)	Date YY	MM	DD	Time HH	MM	Received by: (Signature/ Print)	Date YY	MM	DD	Time HH	MM	Special Instructions
1	JVENOT	2023	10	10	12	55	1						
2							2 Abinacami Ramasamy						

ghd.com

The Power of Commitment

Appendix D

Noise Impact Assessment

Noise Impact Assessment Report

Antrim Gypsum Project
Nova Scotia

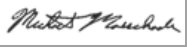
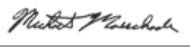
CertainTeed Canada Inc.

July 03, 2024

The Power of Commitment

GHD
110, 120 Western Parkway
Bedford, Nova Scotia B4B 0V2, Canada
T +1 902 468 1248 | **F** +1 902 468 2207 | **E** info-northamerica@ghd.com | **ghd.com**

Document status

Status Code	Revision	Author	Reviewer		Approved for issue		
			Name	Signature	Name	Signature	Date
S3	00	A. DeFaria	M. Masschaele	Draft	M. Masschaele	Draft	May 10, 2024
S4	01	A. DeFaria	M. Masschaele		M. Masschaele		July 3, 2024

Contents

Figure Index

Table Index

Table Index (following text)

Appendices

1. Introduction

The Antrim Gypsum Project (the “Project”) as proposed by CertainTeed Canada Inc. (CertainTeed) involves the development, construction, operation, and maintenance of a conventional gypsum mining operation including an open pit quarry, till and organic stockpiles, overburden storage area, rock processing plant, as well as water management infrastructure. The Project is located approximately 50 km from Halifax, Nova Scotia (NS), near Gays River, along Lake Egmont Road in the community of Cooks Brook, NS. The Project will produce marketable gypsum and anhydrite at an estimated average rate of production of 1.5 million tonnes per year. The gypsum and anhydrite products will be transported via trucks to a port facility in Sheet Harbour, NS, approximately 82 km from the Project Area (PA), for shipment to manufacturing facilities either in Canada or the United States. The life of Project is proposed to be 20-years.

1.1 Purpose of this Report

GHD Limited (GHD) was retained by CertainTeed to prepare a Noise Impact Assessment Report (Report) for the Antrim Gypsum Project (Project) located just west of Lake Egmont, NS. This Report has been prepared in support of the Environmental Assessment of the Project and to assess the potential effects of the operations of the Project (consisting of overburden removal, mining, and processing) with regards to noise and vibration, which included:

– Evaluation of baseline ambient pre-project noise levels.
– Predict noise levels from the open pit operations for the Project, based primarily on publicly available data as well as baseline programs conducted during 2023.

1.2 Scope and Limitations

This report: has been prepared by GHD for CertainTeed Canada Inc. and may only be used and relied on by CertainTeed Canada Inc. for the purpose agreed between GHD and CertainTeed Canada Inc. as set out in Section 1.1 of this report.

GHD otherwise disclaims responsibility to any person other than CertainTeed Canada Inc. arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD described in this report. GHD disclaims liability arising from any of the assumptions being incorrect.

2. Project Description

The Project includes the development, construction, operation, and maintenance of a conventional gypsum mining operation including an open pit quarry, till and organic stockpiles, overburden stockpile, rock processing plant, as well as water management infrastructure. The Project will produce marketable gypsum and anhydrite at an estimated average rate of production of 1.5 million tonnes per year. The Project is located at Antrim, NS near Gays River on a mixture of private and Crown Lands (PID 40228389, 40228371, 40212409, 40229676, 40228009 and 40228017). The proposed Project will be located and is accessible via paved roads. The gypsum and anhydrite products will be transported via trucks to a port facility in Sheet Harbour, NS, approximately 82 km from the PA, for shipment to

manufacturing facilities either in Canada or the United States. The life of Project is proposed to be approximately 23-years.

The scope of the Project includes activities associated with construction, operation, and closure. Project construction activities will include clearing and grubbing the topsoil stockpiles, overburden, and waste rock stockpile, mine pit, runof-mine (ROM) stockpile, construction of the processing facility (i.e. sizer buildings, conveyor, screening building, etc.), access roads, fuelling infrastructure, surface water management and other Project infrastructure. The operation phase will include extraction (surface miner, loading, and hauling), processing, and waste management. Blasting may be used for extraction if required. Gypsum will be screened while stockpiled. Waste rock, not used for construction or backfill, will be stockpiled. The closure phase will include earthworks and demolition required to return the PA to a safe, stable, and vegetated state, and all monitoring and treatment, if required.

After processing the raw ore, the resulting materials will be transported to a port facility for shipping. Figure A.1 of Appendix A displays a Conceptual Site Layout which shows locations of all the aforementioned elements.

The main components of the Project include:

– One open pit
– Ore extraction methods
– Ore processing methods
– Energy sources to power the Project
– Topsoil and overburden stockpiles
– Process plant complex
– Buildings and supporting infrastructure
– Water management facilities
– Access roads

The Project will be operational for a period of approximately 23 years. The PA mining activities are planned to operate from 7 a.m. to 5:30 p.m. (ten hours and thirty minutes) per day, 5 days a week. These activities are expected to produce elevated local noise levels within the surrounding area of the Project Site.

2.1 Assessment Boundaries

For the purpose of this Report, the following assessment boundaries were evaluated:

– PA - The PA encompasses the immediate area in which Project activities may occur and are likely to cause direct and indirect effects to Valued Components (VCs). The PA includes a mix of private and crown lands, and includes the following parcels: PID 40228389, 40228371, 40212409, 40229676, 40228009 and 40228017).
– Local Assessment Area (LAA) - The LAA encompasses adjacent areas outside of the PA where Project related effects to VCs are reasonably expected to occur. Generally, the LAA is limited to the area in which Project activities are likely to have indirect effects on VCs; however, the size of the LAA can vary depending on the VC being considered, and the biological and physical variables present. For the purposes of the noise impact assessment, the LAA is limited to a 1,500 m radius from the PA to capture predicted noise impacts on worst-case sensitive receptors.

3. Existing Conditions & Baseline Noise Monitoring Results

The Nova Scotia Environment and Climate Change guideline (NSECC, 2023) defines baseline as the existing sound level without any contribution from the target noise sources. To establish noise limits in accordance with the Nova

Scotia criteria (described in Section 8), pre-project baseline noise levels were required to be collected. Ambient noise levels were measured in the vicinity of the PA in 2023 from October 2nd to 6th. These measurements were taken to determine an approximate baseline where the Project could cause additional impacts to the natural environment.

The baseline noise monitoring survey was conducted in accordance with ISO 1996-2:2007 ("Acoustics –Description, measurement and assessment of environmental noise – Part 2L Determination of environmental noise levels"). Ambient sound levels were measured using Type 1 Sound Pressure Level Meters. Measurements were taken continuously for one 24-hour period at each monitoring location. Calibration checks were undertaken throughout the monitoring survey.

The results from this sampling program were obtained as a time averaged sound level (L_{eq}); a single number value that expresses the time varying sound level for the specified period (in this case, one hour) as though it were a constant sound level with the same total sound energy as the time varying level. This data was then filtered via the historical climate data obtained from nearby climate stations; noise levels during periods of inclement weather were discarded due to their atypical nature. The remaining data was then separated into the appropriate periods to obtain the average equivalent continuous A-weighted noise levels (L_{Aeq}) for day, evening, and nighttime periods.

The following Table 3.1 summarizes the average baseline noise levels for each evaluation period (day/evening/night):

Table 3.1 Baseline Noise Monitoring Summary Table

Monitoring Location ID and Coordinates	Description	Measured Noise Levels (dBA)		
		Day (7am-7pm) 12-hour L_{Aeq}	Evening (7pm-11pm) 4-hour L_{Aeq}	Night (11pm-7am) 8-hour L_{Aeq}
M1[1] (N: 474707, E: 4984610)	Lake Egmont, NS	43	33	36
M2[1] (N: 472884, E: 4980823)	Moore Lake, NS	40	40	36
M3[1] (N: 475042, E: 4981442)	Sanford Road, NS	40	33	35
M4[1] (N: 471155, E: 4982951)	Dillman Road, NS	44	36	33
Note 1: Monitoring Data was between October 2nd to October 6th of 2023				

The major contributor to sound levels during the daytime and evening were related to vehicle traffic. The major contributor to sound levels during nighttime were related to the natural environment, as well as occasional noise emissions from vehicle traffic.

The sound pressure levels measured during the baseline sound quality survey are presented in Tables B.1 through B.4 of Appendix B and the monitoring locations are shown on Figure B.1.

4. Noise Assessment Methodology

The location of the Project is displayed in Figure A.1 of Appendix A. Based on GHD's extensive experience conducting noise impact assessments, facilities or industries with significant potential environmental noise profiles or equipment evaluate the off-site environmental noise impact within the LAA (a 1,500 m radius surrounding the PA) because the noise impact beyond this distance is expected to be environmentally insignificant. The majority of the LAA is rural, with an acoustical environment that is dominated by natural sounds having little or no road traffic.

The Report presented herein provides an evaluation of the potential noise impacts from the Project generated during worst-case operations on the sensitive receptors located nearest to the PA.

GHD assessed operations after a pit depth of 10 metres was reached to account for the minimum depth of overburden removal required for ore extraction to commence. The minimum depth was confirmed by information provided by CertainTeed and represents a small portion of the overall pit. However, despite only representing a small portion of the

pit, the minimum depth was used to provide a conservative assessment of noise impacts since line-of-sight exposure to sensitive receptors would be maximized at this depth.

The acoustic modelling has been completed using the current infrastructure for the Project and estimates of truck traffic on the haul routes, which are provided in Appendix C. The noise analysis results presented herein include all sensitive receptors (i.e., human receptors – seasonal and permanent dwellings) locations (POR-01 to POR-09).

4.1 Acoustical Model

Datakustik's CadnaA Acoustical Modelling Software (CadnaA) is the industry standard for environmental noise modelling in Canada. CadnaA version 2023 was used to model the potential impacts of the significant noise sources. CadnaA calculates sound level emissions based on the ISO 9613-2 standard "Acoustics – Attenuation of Sound During Propagation Outdoors", which accounts for attenuation effects due to geometric divergence, atmospheric attenuation, barriers/berms, ground absorption, and directivity. Topography for the PA and surrounding environment was obtained from GHD's GIS department, and input in the 3-D acoustical model (5 m resolution for elevations).

CadnaA modelling assumptions used in this Report included:

- Noise Sources: All sources were modelled using full octave band data from the reference materials.
- Reflection Order: A maximum reflection order of 1.0 was used to evaluate indirect noise impact from reflecting surfaces.
- Ground Absorption: The model included a ground absorption factor of G = 1 for soft ground, and G = 0.5 was used for areas of gravel.
- Tonality: A +5 dB adjustment was applied for tonal sources, if applicable.
- Building Surfaces: Buildings are modelled as reflective surfaces.
- Noise sources whose dimensions are small in comparison to the distance to the PORs (generators, air intakes and exhausts) are modelled as point sources in CadnaA. Noise sources with a larger area such as bay doors are modelled as vertical area sources. Noise sources extending in only one direction with small dimensions in the other two directions such as trucking routes are modelled as line sources. Each of these noise source types appears in the legend provided with Figures 2A and 2B identifying the source type.
- Temperature: 10°C.
- Relative humidity: 70%.
- Wind speed: Downwind condition, wind speed of 3 m/s.
- Maximum search radius: 3,500 m.
- Noise propagation model: CadnaA version 2023 (DataKustik).
- Standard: ISO 9613.
- Terrain parameters: Digital ground terrain for LAA was incorporated.
- The overburden and waste rock stockpiles were excluded from the model to provide a conservative assessment of the LAA without the noise attenuating impacts from the piles.

5. Noise Source Summary

This Report focuses on the sound emissions from the noise sources identified herein. The Noise Source Summary is provided in Table 5.1 and the significant noise source locations are identified on Figures 2A and 2B.

In order to predict the future worst-case noise impacts from the Project activities, representative octave band noise data was used, measured from processing equipment similar to what is noted to be required for the Project. This data was obtained from equipment specifications provided by CertainTeed, past GHD projects, the Department of

Environment Food and Rural Affairs (DEFRA) "Update of Noise Database for Prediction of Noise on Construction and Open Sites, 2005 and 2006", and the United States Department of Transportation, Federal Highway Administration (FHWA) document "FHWA Roadway Construction Noise Model User's Guide, 2006."

The environmentally significant noise sources or activities occurring in the study are as follows:

Table 5.1 Phase 1 and 2 Noise Source Summary Table

Site/Location	Noise Source Description	CadnaA ID(s)
PA	Dozer (x2)	S-01, S-02
	Truck Idling on Weigh Scale (x2)	S-03, S-04
	Fuel & Lubricant Truck	S-05
	Belt Feeder Hopper	S-06
	Crusher and Screener	S-07
	Wheel Loader (x6)	S-08 to S-13
	Grader	S-14
	Dewatering Pump	S-15
	Backup Drill	S-16
	Vermeer T1255III Surface Miner (x2)	S-17 and S-18
	Hydraulic Excavator (x2)	S-19 and S-20
	Haul Truck Idling (x2)	S-21 and S-22
	Ore Hauling Truck Route – CAT 777	L-01
	Overburden/Waste Rock Haul Route – Volvo A60H	L-02
	Highway Trucks to Off-Site Route	L-03
	Tunnel Conveyor (x5)	L-04 to L-08

On-site transport truck activities for shipping and receiving is summarized below:

Type of Vehicle	Noise Source ID	Daytime: 7a.m.- 5:30 p.m. (Trips/hour)
CAT 777 Ore Hauling Trucks	L-01	2
Volvo A60H Overburden/Waste Rock Hauling Trucks	L-02	6
Shipping/Receiving Trucks	L-03	8

Note: 1 trip per hour is inclusive of an in and out movement of the same truck along the path during any given hour.

Locations of each noise source are indicated in Figures 2A and 2B. The reference sound level data for the proposed equipment are summarized in Table C.1 of Appendix C.

6. Phase Operations Summary

The Project will operate as an open pit mine with overburden removal as part of the phased operations. Each phase will consist of an initial overburden removal, after which the mining will be conducted. As part of the overburden removal, blasting may be required, however, for the purposes of this Report it has been excluded from the model in order to assess the anticipated operations at the mine. All ore processing will be done on-site and the crushed and processed ore from the Project will be transported via highway trucks to a port facility for shipping.

Relevant Project activities during the Construction and Operation Phase is summarized in Table 6.1.

Table 6.1 Potential Noise Interactions with Project Activities During the Construction & Operation Phases

Location & Project Phase	Duration	Relevant Project Activity
PA - Phase 1	Approximately 6 years	• Removal of overburden from Phase 1a and 1b area • Management of waste rock produced from crushing and/or blasting and preparing ore for transport • Processing of mined material at on-site crusher and screener • Site maintenance and repairs • General management of wastes derived from operation activities • Conduct progressive reclamation of the pit
PA - Phase 2	Approximately 14 Years	• Removal of overburden from Phase 2 area • Management of waste rock produced from crushing and/or blasting and preparing ore for transport • Processing of mined material at on-site crusher and screener • Site maintenance and repairs • General management of wastes derived from operation activities • Conduct progressive reclamation of the pit

7. Point of Reception Summary

The NSECC guideline defines the permissible sound level limits based on the geographic area classifications. For this Project, GHD has considered the LAA to be Rural in nature meaning that any residential areas are areas with a population of less than 1,000 and a population density of less than 400 persons per square kilometre. Rural areas may also include agricultural, wilderness, recreation, or other areas dominated by natural sounds.

A receptor according to the guideline is defined as a building or structure including, but not limited to, a building or structure that contains one or more dwellings, an educational facility, daycare/nursery, place of worship, hospital, or seniors' residence.

Nine worst-case sensitive receptors (i.e., human receptors – seasonal and permanent dwellings) receptor locations have been identified for assessment (POR-01 to POR-09). These receptor locations are listed below and shown on Figure 2:

– POR-01 – Existing two-storey residence located west of the PA on Dillman Road
– POR-02 – Existing two-storey residence located west of the PA on Dillman Road
– POR-03 – Existing two-storey residence located southeast of the PA on Sanford Road
– POR-04 – Existing two-storey residence located northeast of the PA on Lake Egmont Road (representing the closest residence to the PA)
– POR-05 – Existing one-storey residence located east of the PA on Lake Egmont Road
– POR-06 – Existing one-storey residence located south of the PA on Moore Road
– POR-07 – Existing two-storey residence located south of the PA on Moore Road
– POR-08 – Existing two-storey residence located north of the PA on NS-224
– POR-09 – Existing two-storey residence located north of the PA on NS-224

8. Noise Assessment Criteria

Predicted noise impacts during the operation phase were assessed at all sensitive receptors (i.e., human receptors – seasonal and permanent dwellings) using the NSECC guidelines for Environmental Noise Measurement and Assessment (2023). The PA is in what would generally be considered a rural acoustic environment as defined by the NSECC guideline and includes the following criteria:

– L_{eq} ≤ 53 dBA between 7:00 AM and 7:00 PM
– L_{eq} ≤ 48 dBA between 7:00 PM and 11:00 PM
– L_{eq} ≤ 40 dBA between 11:00 PM and 7:00 AM

The NSECC guideline requires that modelled project noise be logarithmically summed with the measured baseline noise to determine the comprehensive sound level. Comprehensive sound levels are then compared to the permissible sound levels referenced above. These levels represent the maximum comprehensive sound levels that are permitted to be experienced at sensitive receptor locations. If any of these levels are exceeded, then mitigation measures are required to reduce sound levels to within the permissible sound levels.

Given that the Project will operate from 7 a.m. to 5:30 p.m., 5 days a week, only the daytime noise limit has been considered in this analysis.

Section 9 details the summation of the baseline noise levels and the Project noise levels for comparison to the NSECC noise limits.

9. Noise Impact Assessment

The equipment and activities planned for the Phase 1 and Phase 2 operations have been assessed with respect to the applicable NSECC noise guidelines. The NSECC (2023) guidelines apply to sensitive receptors in the LAA.

9.1 Phase 1 Operations Noise Impacts

During the first phase of operations, predicted noise levels at each of the sensitive receptors are summarized below in Table 9.1. The predicted noise levels include equipment and activities associated with the Project.

Table 9.1 Phase 1 Worst-Case Noise Levels at Sensitive Receptors

POR ID	Baseline Sound Levels (dBA)	Project Noise Levels (dBA)	Baseline + Project (dBA)	NSECC Sound Level Limit (dBA)	Compliance with Limits (Yes/No)
POR-01	44	31	44	53	Yes
POR-02	44	31	44	53	Yes
POR-03	40	34	41	53	Yes
POR-04	43	48	49	53	Yes
POR-05	40	36	41	53	Yes
POR-06	40	28	40	53	Yes
POR-07	40	30	40	53	Yes
POR-08	43	41	45	53	Yes
POR-09	43	39	44	53	Yes

Predicted noise effects during the Phase 1 operations of the Project are within the applicable sound level limits at all the sensitive receptors.

9.2 Phase 2 Operations Noise Impacts

During the second phase of operations, predicted noise levels at each of the sensitive receptors are summarized in Table 9.2 and shown on Figure 3C and 3D. The predicted noise levels include equipment and activities associated with the Project.

Table 9.2 Phase 2 Worst-Case Noise Levels at Sensitive Receptors

POR ID	Baseline Sound Levels (dBA)	Project Noise Levels (dBA)	Baseline + Project (dBA)	NSECC Sound Level Limit (dBA)	Compliance with Limits (Yes/No)
POR-01	44	33	44	53	Yes
POR-02	44	33	44	53	Yes
POR-03	40	37	41	53	Yes
POR-04	43	47	49	53	Yes
POR-05	40	35	41	53	Yes
POR-06	40	32	40	53	Yes
POR-07	40	33	41	53	Yes
POR-08	43	40	45	53	Yes
POR-09	43	37	44	53	Yes

Predicted noise effects during Phase 2 of the Project are within the applicable sound level limits at all the sensitive receptors.

10. Potential Blasting Noise and Vibration Best Practices

Surface miners will be the main extraction equipment used for the Project; however, blasting may be used on an as-needed basis. Blasting has the potential to create air vibration, commonly referred to as air blasts, are pressure waves that travel through the air. They are generally caused by one or more of the following three items: a direct surface energy release, a release of inadequately confined gases (or gas escape) from improperly stemmed holes or from a plane of weakness (seam, joint and fault) in the geology in the free face of the blast. The pressure waves (air displacement) propagate at the speed of sound and have an audible noise level. Thus, air blasts are measured in decibels. Many structures have natural resonant frequencies close to or equivalent to the air pressure wave. This possibility of resonance causes repetitive pressures on the adjacent structures, which produces the vibration effects of ground-transmitted vibrations. Weather conditions, such as the presence of temperature inversions (low ceiling, clouds) and strong winds blowing towards populated areas can magnify the levels of air pressures, thus air vibrations are predominately influenced by the weather conditions at the time of the blast.

As part of the Project's overburden removal, blasting may be required in the future, however, for the purposes of this assessment it has been excluded from the model as there are no current plans or blasting programs designed.

Any potential blasts should be designed by the blasting contractor to meet the required noise and vibration limits. Blast sound and vibration levels can be controlled by adjusting various parameters such as hole spacing, explosive charge weight, and the time delay between rows.

11. General Noise Mitigation Measures and Best Practices

The Project will undertake general best practice mitigation measures to minimize noise during construction/operations phases as provided in the sections below.

11.1 Best Practices for Reducing Noise

General recommendations to assist in minimizing noise impacts during the phases of the Project are provided below Table 11.1.

Table 11.1 Project Noise Best Practices

Action Required	Details
Management Measures	
Site inductions	All employees, contractors and subcontractors are to receive an environmental induction. The induction must at least include: – All relevant project specific and standard noise mitigation measures – Relevant licence and approval conditions – Permissible hours of work – Any limitations on high noise generating activities – Location of nearest sensitive receivers – Employee parking areas – Designated loading/ unloading areas and procedures – Operational traffic routes – Site opening/closing times (including deliveries) – Environmental incident procedures
Behavioural practices	No unnecessary shouting or loud stereos/radios on site. No dropping of materials from height, throwing of metal items and slamming of doors.
Source Controls	
Equipment selection	Use equipment with lower noise levels where reasonable and feasible.
Use and siting of plant	The offset distance between project infrastructure and adjacent sensitive receptors is to be maximised. Noise-emitting exhausts to be directed away from sensitive receivers. Only have necessary equipment on-site.
Plan worksites and activities to minimise noise and vibration	Locate compounds away from sensitive receivers and discourage access from local roads. Plan traffic flow, parking and loading/unloading areas to minimise reversing movements within the site. Where additional activities or plant may only result in a marginal noise increase and speed up works, consider limiting duration of impact by concentrating noisy activities at one location and move to another as quickly as possible. Very noisy activities should be scheduled for normal working hours. If the work cannot be undertaken during the day, it should be completed before 11:00 pm.

Action Required	Details
Non-tonal reversing alarms	Non-tonal reversing beepers (or an equivalent mechanism) must be fitted and used on all construction vehicles and mobile plant regularly used on site and for any out of hours work.
Reduced equipment power	Use only the necessary size and power.
Minimise disturbance arising from delivery of materials to facility	Loading and unloading of materials/deliveries is to occur as far as possible from sensitive receivers. Select site access points and roads as far as possible away from sensitive receivers. Dedicated loading/unloading areas to be shielded if close to sensitive receivers. Delivery vehicles to be fitted with straps rather than chains for unloading, wherever possible. Avoid or minimise these out of hours movements where possible.
Path Controls	
Shield stationary noise sources such as pumps, compressors, fans etc.	Stationary noise sources should be enclosed or shielded whilst ensuring that the occupational health and safety of workers is maintained.

12. Conclusions

In general, the construction and operations of mine sites often produce elevated noise levels that have the potential to impact the surrounding environment. Thus, noise levels produced by equipment at the proposed Project have been assessed at the identified worst-case receptors to determine the future impact on residents of the nearest communities. This is not intended to preclude residents at farther distances but rather is presented to document those sensitive receptors (i.e., human receptors – seasonal and permanent dwellings) that are closest and represent a worst-case scenario.

12.1 Noise Compliance at Receptors

The predicted noise levels produced by worst-case activities during the phased operations from the PA are within the applicable guideline limits for all identified receptors. Based on these predictions, noise levels at nearby sensitive receptors are expected to be within the NSECC noise level limits.

12.2 Follow-Up and Monitoring

Follow-up and monitoring are intended to verify the accuracy of predictions made in this Report, to assess the implementation and effectiveness of mitigation, and to manage adaptively, if required. Compliance monitoring, where required by permitting or regulations, will be conducted to confirm that mitigation measures are properly implemented. Should an unexpected deterioration of the environment be observed as part of follow-up and/or monitoring, intervention mechanisms may include the application of noise mitigation measures to address it.

Based on the results of the Noise Impact Assessment Report, follow-up and monitoring are not deemed necessary.

13. References

Department for Environment, Food, and Rural Affairs. 2006. *Noise Database for Prediction of Noise on Construction and Open Sites*

Nova Scotia Environment and Climate Change. 2023. *Guidelines for Environmental Noise Measurement and Assessment*

United States Department of Transportation, Federal Highway Administration (FHWA). 2006. *FHWA Roadway Construction Noise Model User's Guide*

Prepared by:

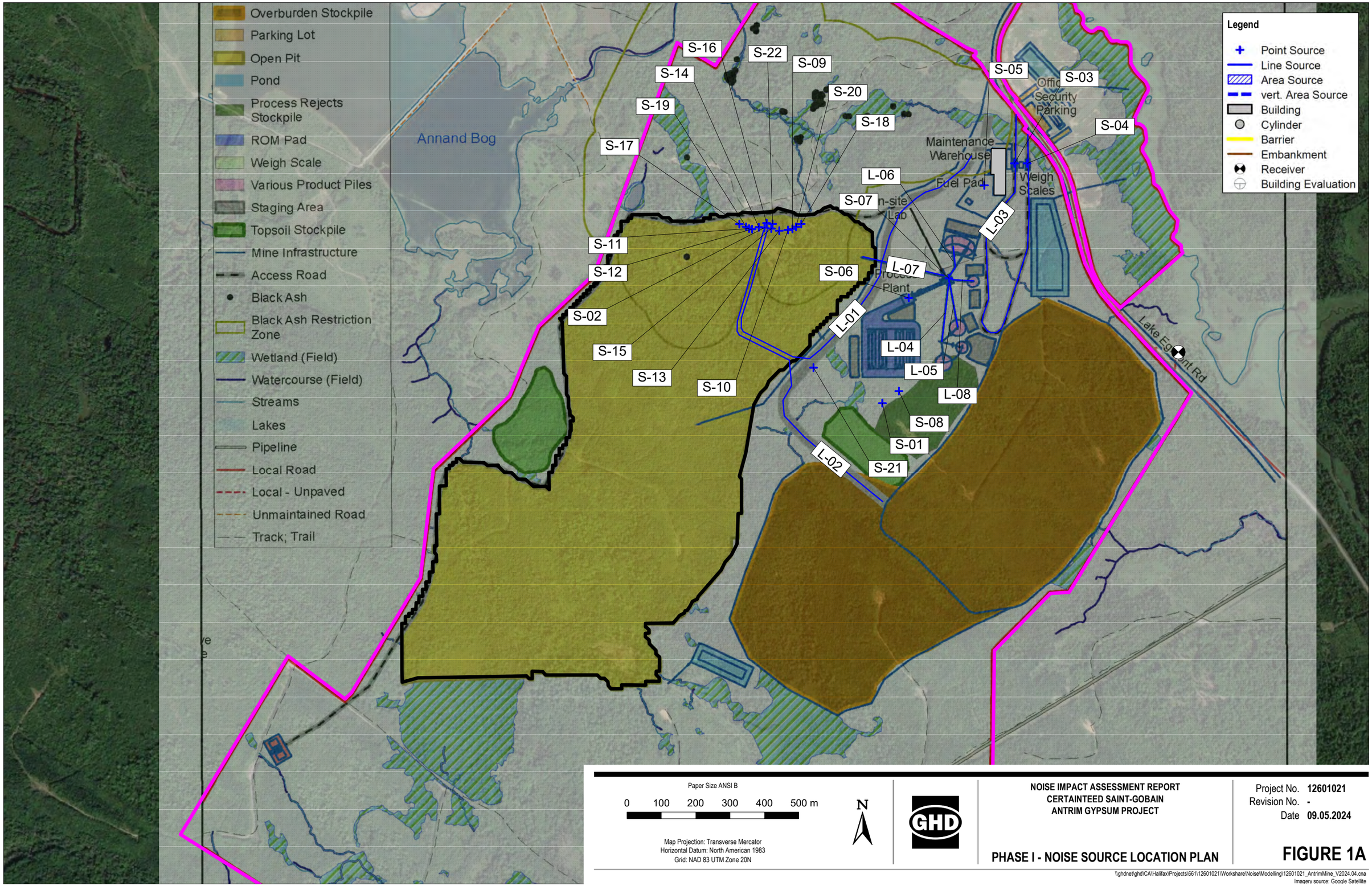
Andrew DeFaria, B.A.Sc.
Acoustical Engineering Assistant

519-340-4242
andrew.defaria@ghd.com

Reviewed by:

Michael Masschaele, BES LEL
Noise and Vibration Practice Leader – North America

519-340-3818
mike.masschaele@ghd.com


Overburden Stockpile
Parking Lot
Open Pit
Pond
Process Rejects Stockpile
ROM Pad
Weigh Scale
Various Product Piles
Staging Area
Topsoil Stockpile
Mine Infrastructure
Access Road
Black Ash
Black Ash Restriction Zone
Wetland (Field)
Watercourse (Field)
Streams
Lakes
Pipeline
Local Road
Local - Unpaved
Unmaintained Road
Track; Trail
Annand Bog
S-16
S-22
S-09
S-14
S-20
S-19
S-18
S-17
S-05
S-03
S-04
Office
Security
Parking
Maintenance Warehouse
Truck Weigh Scales
Fuel Pad
L-06
S-07
On-site Lab
L-03
S-11
S-12
S-06
L-07
Process Plant
S-02
L-01
S-15
L-04
S-13
L-05
S-10
L-08
S-08
S-01
L-02
S-21
Lake Egmont Rd
Legend
Point Source
Line Source
Area Source
vert. Area Source
Building
Cylinder
Barrier
Embankment
Receiver
Building Evaluation
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Map Projection: Transverse Mercator
Horizontal Datum: North American 1983
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NOISE IMPACT ASSESSMENT REPORT
CERTAINTEED SAINT-GOBAIN
ANTRIM GYPSUM PROJECT
PHASE I - NOISE SOURCE LOCATION PLAN
Project No. 12601021
Revision No. -
Date 09.05.2024
FIGURE 1A
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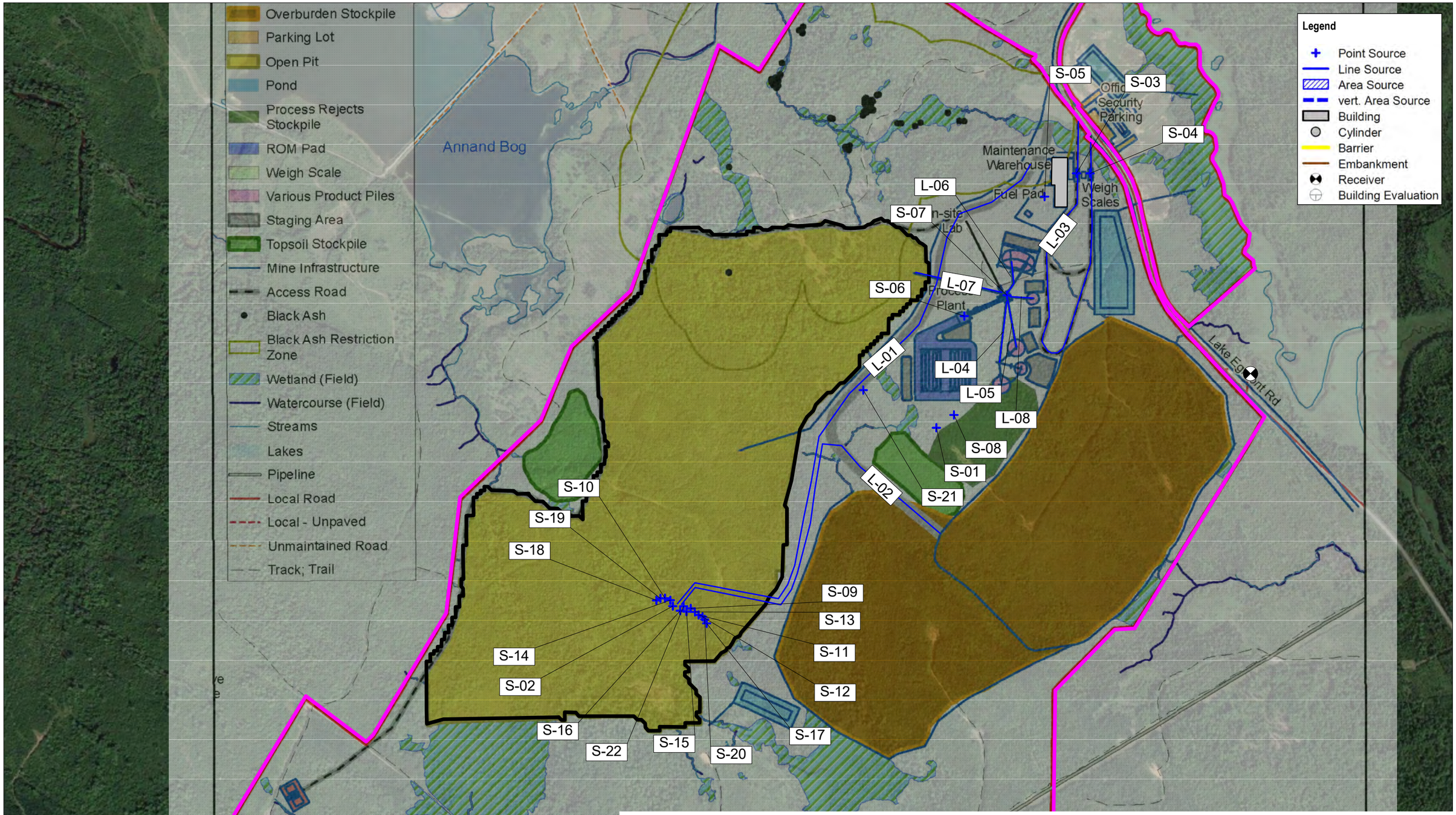
Imagery source: Google Satellite



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NOISE IMPACT ASSESSMENT REPORT
CERTAINTEED SAINT-GOBAIN
ANTRIM GYPSUM PROJECT

PHASE II - NOISE SOURCE LOCATION PLAN

Project No. **12601021**
Revision No. **-**
Date **09.05.2024**

FIGURE 1B

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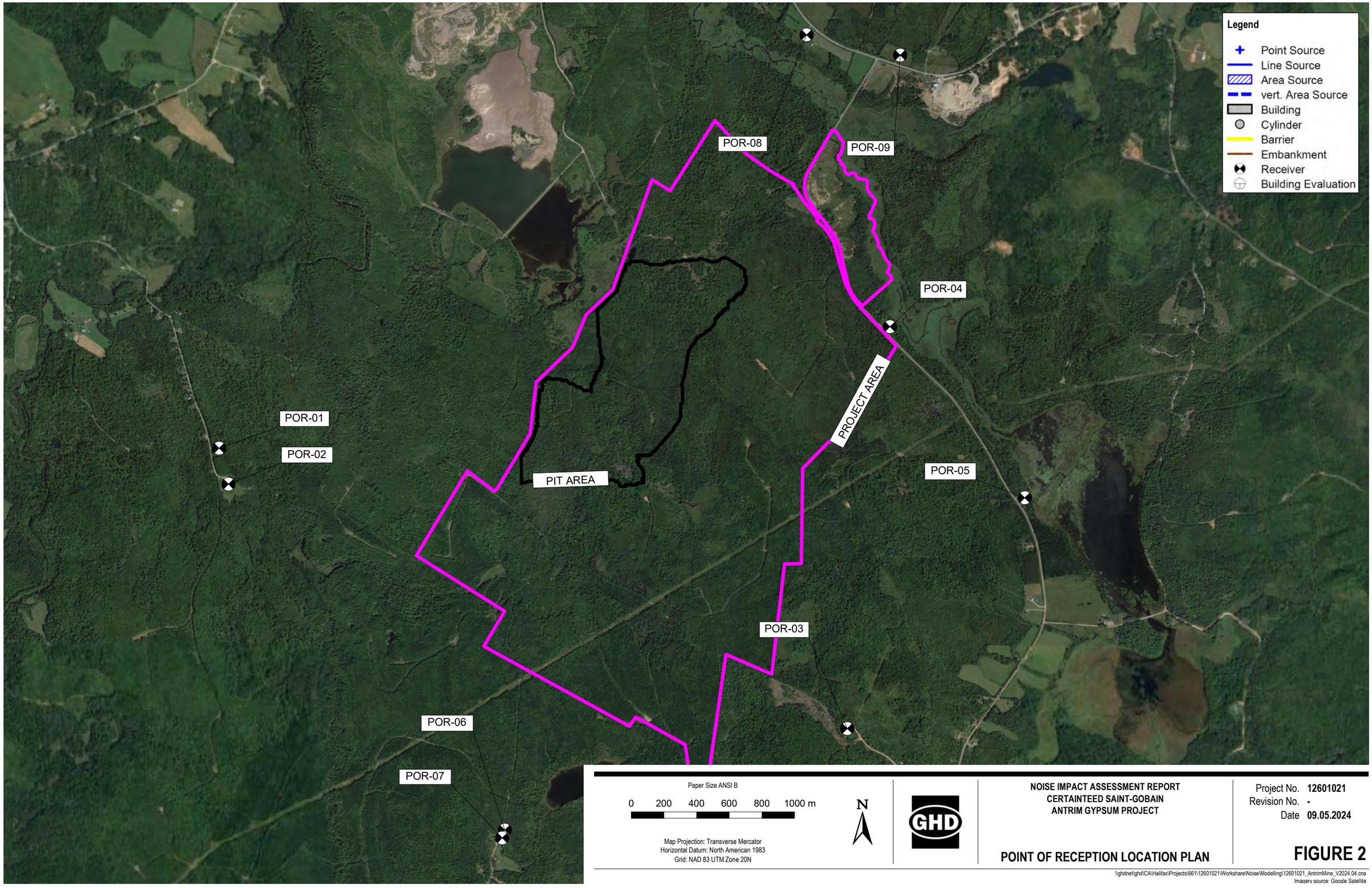
Imagery source: Google Satellite



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Grid: NAD 83 UTM Zone 20N

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NOISE IMPACT ASSESSMENT REPORT
CERTAINTEED SAINT-GOBAIN
ANTRIM GYPSUM PROJECT

POINT OF RECEPTION LOCATION PLAN

Project No. **12601021**
Revision No. **-**
Date **09.05.2024**

FIGURE 2

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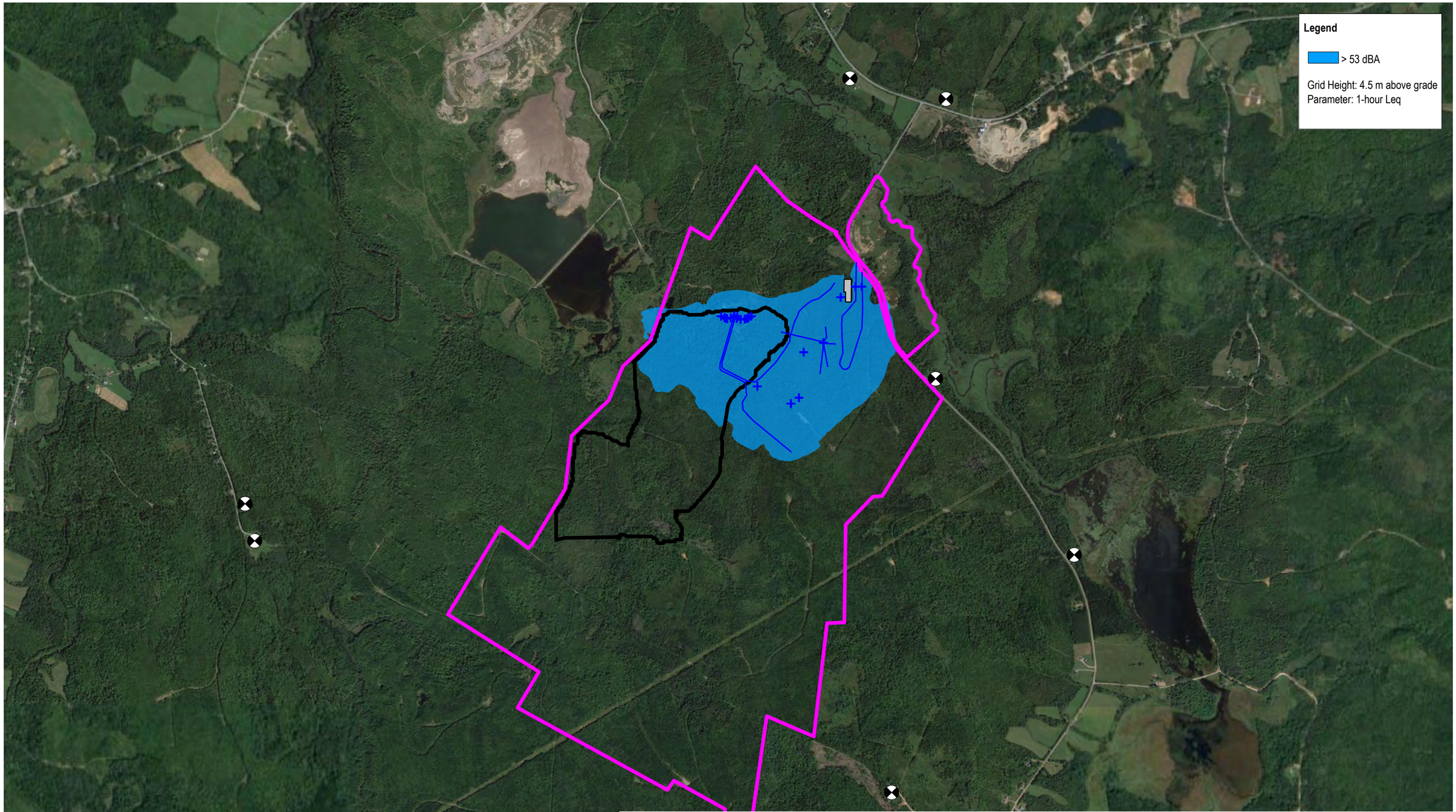
Imagery source: Google Satellite



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Map Projection: Transverse Mercator
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Grid: NAD 83 UTM Zone 20N

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NOISE IMPACT ASSESSMENT REPORT
CERTAINTEED SAINT-GOBAIN
ANTRIM GYPSUM PROJECT

NOISE CONTOUR PLOT:
PHASE I

Project No. **12601021**
Revision No. **-**
Date **09.05.2024**

FIGURE 3A

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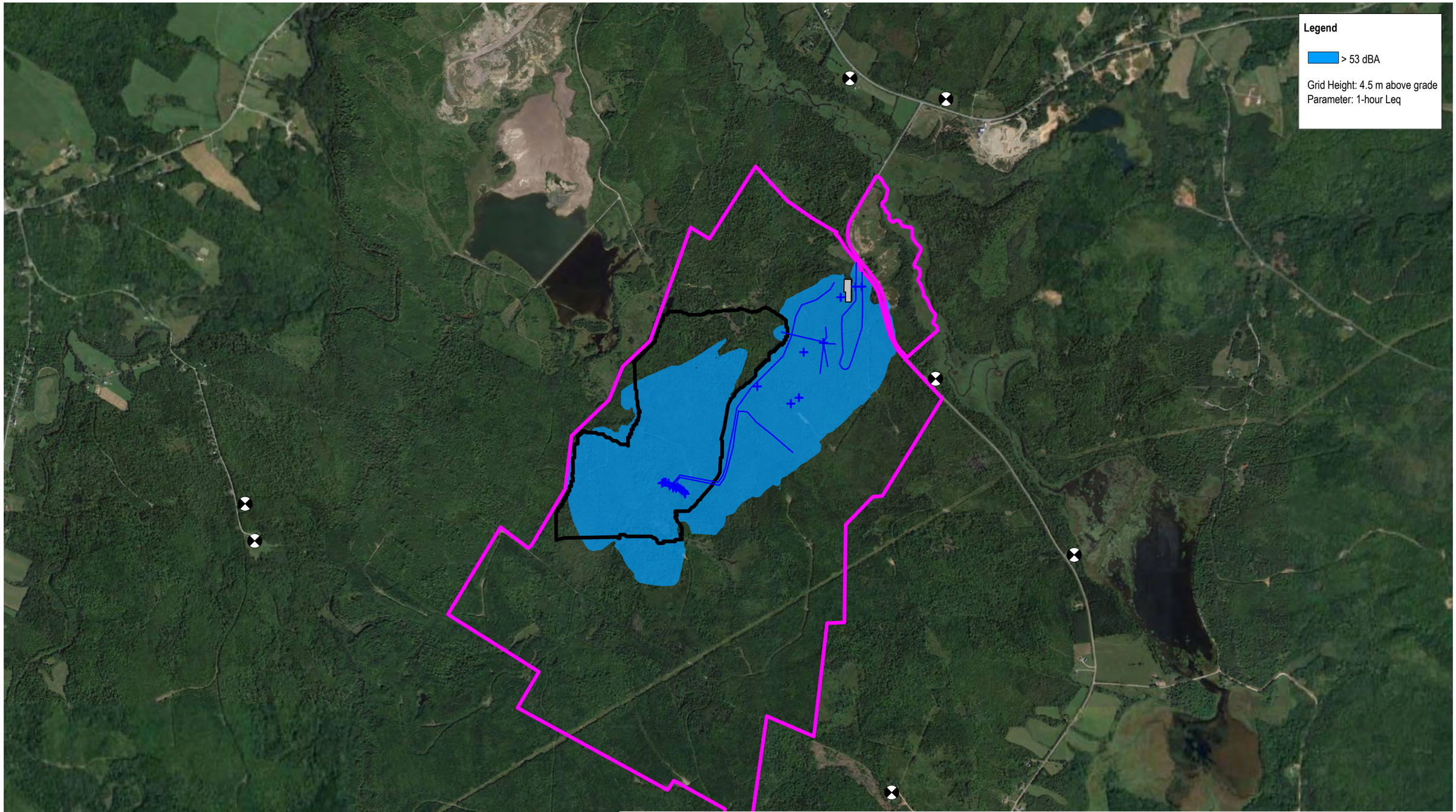
Imagery source: Google Satellite



Paper Size ANSI B

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Map Projection: Transverse Mercator
Horizontal Datum: North American 1983
Grid: NAD 83 UTM Zone 20N

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NOISE IMPACT ASSESSMENT REPORT
CERTAINTEED SAINT-GOBAIN
ANTRIM GYPSUM PROJECT

NOISE CONTOUR PLOT:
PHASE II

Project No. **12601021**
Revision No. **-**
Date **09.05.2024**

FIGURE 3B

\\ghdnet\ghd\CA\Halifax\Projects\661\12601021\Workshare\Noise\Modelling\12601021_AntrimMine_V2024.04.cna
Imagery source: Google Satellite

Table 1

Noise Source Summary
CertainTeed Canada Inc.
Antrim Mine, Antrim, Nova Scotia

Cadna A ID	Source Description	Sound Power Level[1] (dBA)	Source Characteristics[2]	Source Location[3]	Noise Control Measures[4]	Source Type
Steady State Sources						
L-01	ORE Hauling Trucks	121.3	S	O	U	Line
L-02	OB/Waste Hauling Trucks	111.0	S	O	U	Line
S-02	Dozer	114.1	S	O	U	Point
S-09	Wheeled Loader	106.7	S	O	U	Point
S-10	Wheeled Loader	106.7	S	O	U	Point
S-11	Wheeled Loader	106.7	S	O	U	Point
S-12	Wheeled Loader	106.7	S	O	U	Point
S-13	Wheeled Loader	106.7	S	O	U	Point
S-14	Grader	107.0	S	O	U	Point
S-15	Dewatering Pump	110.4	S	O	U	Point
S-16	Backup Drill	117.8	S	O	U	Point
S-17	Vermeer T1255III Surface Miner	114.0	S	O	U	Point
S-18	Vermeer T1255III Surface Miner	114.0	S	O	U	Point
S-19	Excavator	107.6	S	O	U	Point
S-20	Excavator	107.6	S	O	U	Point
S-22	Haul Truck Idling	113.8	S	O	U	Point
L-03	Trucks to Offsite	109.5	S	O	U	Line
L-04	Tunnel Conveyor	107.8	S	O	U	Line
L-05	Tunnel Conveyor	107.8	S	O	U	Line
L-06	Tunnel Conveyor	107.8	S	O	U	Line
L-07	Tunnel Conveyor	107.8	S	O	U	Line
L-08	Tunnel Conveyor	107.8	S	O	U	Line
S-01	Dozer	114.1	S	O	U	Point
S-03	Truck Idling on Weigh Scale	96.2	S	O	U	Point
S-04	Truck Idling on Weigh Scale	96.2	S	O	U	Point
S-05	Fuel & Lube Truck	107.5	S	O	U	Point
S-06	Belt Feeder Hopper	100.2	S	O	U	Point
S-07	Crusher and Screener	116.6	S	O	U	Point
S-08	Wheeled Loader	106.7	S	O	U	Point
S-21	Haul Truck Idling	113.8	S	O	U	Point

Notes:

[1] Sound Power Level (PWL) in dBA, excludes +5 dBA total penalty if applicable.
[2] Sound characteristics:
- S – Steady
- Q – Quasi-steady impulsive
- I – Impulsive
- B – Buzzing
- T – Tonal
- C – Cyclic

[3] Source location:
- O – Outside of building
- I – Inside of building

[4] Noise control measures:
- S – Silencer, acoustic louvre, muffler
- A – Acoustic lining, plenum
- B – Barrier, berm, screening
- L – Lagging
- E – Acoustic enclosure
- O – Other
- U – Uncontrolled
- AC – Administrative control

Table 2a

Point of Reception Noise Impact – Phase 1 Operations
CertainTeed Canada Inc.
Antrim Mine, Antrim, Nova Scotia

Cadna A ID	Source Description	165 Dillman Road POR-01		208 Dillman Road POR-02		171 Sanford Road POR-03		1322 Lake Egmont Road POR-04		1060 Lake Egmont Road POR-05		390 Moore Road POR-06		380 Moore Road POR-07		15387 NS-224 POR-08		15287 NS-224 POR-09	
		Distance (m)	Partial Sound Levels¹ (dBA) Day 7am–5:30pm	Distance (m)	Partial Sound Levels¹ (dBA) Day 7am–5:30pm	Distance (m)	Partial Sound Levels¹ (dBA) Day 7am–5:30pm	Distance (m)	Partial Sound Levels¹ (dBA) Day 7am–5:30pm	Distance (m)	Partial Sound Levels¹ (dBA) Day 7am–5:30pm	Distance (m)	Partial Sound Levels¹ (dBA) Day 7am–5:30pm	Distance (m)	Partial Sound Levels¹ (dBA) Day 7am–5:30pm	Distance (m)	Partial Sound Levels¹ (dBA) Day 7am–5:30pm	Distance (m)	Partial Sound Levels¹ (dBA) Day 7am–5:30pm
Steady State Noise Impact																			
L-01	ORE Hauling Trucks	2947	13.9	2962	13.8	2572	17.6	821	29.4	2108	18.9	3310	11.9	3361	13.7	1237	27.3	1297	25.5
L-02	OB/Waste Hauling Trucks	2933	13.4	2947	13.5	2231	16.7	1028	21.4	1927	16.5	3065	11.4	3116	13.1	1687	20.2	1906	18.6
S-02	Dozer	3102	19.4	3135	19.3	2971	20.1	1254	27.4	2465	21.9	3626	16.3	3678	17.0	1582	28.3	1812	26.6
S-09	Wheeled Loader	3177	12.5	3207	12.3	2943	13.6	1175	19.4	2397	13.1	3650	7.0	3701	10.4	1552	20.5	1759	19.5
S-10	Wheeled Loader	3164	12.5	3195	12.4	2944	13.6	1186	19.8	2406	13.1	3643	7.1	3694	10.4	1560	20.5	1770	19.6
S-11	Wheeled Loader	3059	13.0	3094	12.9	2983	13.3	1296	21.9	2501	12.6	3610	7.2	3661	10.5	1605	21.1	1845	19.4
S-12	Wheeled Loader	3067	13.0	3101	12.8	2979	13.4	1287	21.8	2493	12.7	3611	7.2	3662	10.5	1602	21.2	1841	19.4
S-13	Wheeled Loader	3139	14.3	3171	14.2	2949	15.2	1210	21.1	2425	15.2	3632	9.6	3683	12.3	1572	22.8	1789	21.3
S-14	Grader	3087	13.4	3121	13.2	2978	13.9	1270	21.4	2480	14.1	3623	8.4	3674	10.7	1588	22.0	1823	20.2
S-15	Dewatering Pump	3120	11.2	3152	11.0	2962	11.9	1234	19.7	2447	13.3	3630	8.1	3682	9.0	1576	19.6	1800	18.2
S-16	Backup Drill	3112	23.0	3146	22.8	2982	23.7	1252	30.6	2468	25.9	3641	19.9	3692	20.4	1568	31.2	1798	30.4
S-17	Vermeer T1255III Surface Miner	3038	21.8	3074	21.6	3005	21.9	1326	30.0	2531	22.9	3614	18.1	3665	19.3	1606	28.5	1856	27.5
S-18	Vermeer T1255III Surface Miner	3206	21.0	3237	20.9	2949	22.1	1155	26.4	2385	23.6	3672	17.8	3723	19.0	1529	28.3	1731	26.9
S-19	Excavator	3053	13.4	3088	13.2	2990	13.7	1305	21.7	2510	15.4	3612	10.1	3663	10.8	1604	21.0	1848	20.0
S-20	Excavator	3189	12.8	3220	12.7	2945	13.9	1167	18.5	2392	15.9	3659	9.9	3710	10.6	1542	21.3	1748	20.0
S-22	Haul Truck Idling	3128	21.3	3161	21.2	2974	21.9	1234	28.9	2452	22.9	3644	17.7	3695	19.1	1563	28.9	1788	27.9
L-03	Trucks to Offsite	3629	5.1	3630	5.0	2528	12.0	511	31.6	1742	16.1	3619	4.0	3669	5.0	1208	20.8	1208	21.6
L-04	Tunnel Conveyor	3529	9.6	3535	9.6	2604	19.3	687	37.4	1897	22.9	3605	11.5	3656	13.4	1678	26.0	1663	22.7
L-05	Tunnel Conveyor	3558	9.5	3565	9.5	2623	19.1	667	37.4	1892	23.0	3637	8.6	3688	8.8	1653	26.2	1637	24.2
L-06	Tunnel Conveyor	3581	9.3	3593	9.3	2720	18.4	696	37.3	1957	22.3	3722	8.1	3773	10.3	1514	27.5	1557	22.9
L-07	Tunnel Conveyor	3448	—	3464	—	2759	—	836	11.1	2076	—	3673	—	3723	—	1561	2.8	1627	13.7
L-08	Tunnel Conveyor	3601	9.2	3611	9.2	2690	19.1	661	37.5	1918	22.7	3712	8.3	3762	8.5	1580	26.9	1600	24.6
S-01	Dozer	3295	18.6	3287	18.7	2385	27.0	872	35.3	1907	25.3	3288	19.2	3339	22.2	1963	25.6	2030	25.5
S-03	Truck Idling on Weigh Scale	3847	—	3873	—	3012	0.5	725	19.2	2056	4.6	4082	—	4133	—	1237	16.3	1236	16.5
S-04	Truck Idling on Weigh Scale	3882	—	3908	—	3010	0.6	702	19.5	2033	7.3	4099	—	4150	—	1239	16.4	1221	16.6
S-05	Fuel & Lube Truck	3743	3.5	3768	3.4	2957	11.8	743	23.0	2065	14.1	3986	1.8	4037	2.5	1301	22.6	1332	17.0
S-06	Belt Feeder Hopper	3437	2.8	3447	2.8	2666	11.5	799	27.1	2007	13.6	3596	4.8	3647	6.5	1650	17.9	1725	13.2
S-07	Crusher and Screener	3565	16.6	3576	16.5	2701	24.7	700	43.2	1951	27.6	3699	14.7	3749	15.8	1578	32.7	1620	28.4
S-08	Wheeled Loader	3349	11.8	3342	11.8	2407	18.1	819	28.9	1882	18.8	3342	9.8	3392	13.1	1921	19.1	1977	18.9
S-21	Haul Truck Idling	3120	21.3	3122	21.3	2540	23.9	1060	29.5	2132	24.7	3297	19.0	3348	20.4	1910	27.3	2041	26.6
Total Facility Sound Level (1-hour Leq):			**30.9**		**30.8**		**34.1**		**47.5**		**35.6**		**28.2**		**29.8**		**40.5**		**38.7**

Note:

¹ Sound level at the receptor was calculated using Cadna A acoustical modelling software.

Table 2b

Point of Reception Noise Impact – Phase 2 Operations
CertainTeed Canada Inc.
Antrim Mine, Antrim, Nova Scotia

Cadna A ID	Source Description	165 Dillman Road POR-01		208 Dillman Road POR-02		171 Sanford Road POR-03		1322 Lake Egmont Road POR-04		1060 Lake Egmont Road POR-05		390 Moore Road POR-06		380 Moore Road POR-07		15387 NS-224 POR-08		15287 NS-224 POR-09	
		Distance (m)	Partial Sound Levels[1] (dBA) Day 7am–5:30pm	Distance (m)	Partial Sound Levels[1] (dBA) Day 7am–5:30pm	Distance (m)	Partial Sound Levels[1] (dBA) Day 7am–5:30pm	Distance (m)	Partial Sound Levels[1] (dBA) Day 7am–5:30pm	Distance (m)	Partial Sound Levels[1] (dBA) Day 7am–5:30pm	Distance (m)	Partial Sound Levels[1] (dBA) Day 7am–5:30pm	Distance (m)	Partial Sound Levels[1] (dBA) Day 7am–5:30pm	Distance (m)	Partial Sound Levels[1] (dBA) Day 7am–5:30pm	Distance (m)	Partial Sound Levels[1] (dBA) Day 7am–5:30pm
Steady State Noise Impact																			
L-01	ORE Hauling Trucks	2561	16.1	2526	16.2	2121	21.4	821	30.3	2098	20.3	2606	15.0	2658	16.6	1237	27.5	1299	25.8
L-02	OB/Waste Hauling Trucks	2567	15.5	2531	15.6	2103	20.0	987	22.8	1853	17.6	2601	13.7	2652	15.8	2078	18.6	2212	18.0
S-02	Dozer	2523	22.3	2485	22.5	2249	23.9	1702	22.5	2438	21.6	2561	21.3	2613	21.8	2646	25.5	2823	20.8
S-09	Wheeled Loader	2572	15.3	2533	15.5	2215	17.3	1659	16.2	2388	12.4	2571	12.2	2622	15.1	2633	16.9	2800	14.2
S-10	Wheeled Loader	2503	15.6	2467	15.9	2279	16.9	1714	16.9	2462	12.5	2576	12.2	2627	15.0	2635	16.8	2818	14.1
S-11	Wheeled Loader	2592	15.2	2552	15.4	2189	17.5	1647	15.9	2364	12.3	2561	12.3	2612	15.1	2641	16.8	2803	14.2
S-12	Wheeled Loader	2603	15.2	2562	15.4	2178	17.5	1639	15.6	2352	12.1	2560	12.3	2611	15.1	2641	16.8	2800	14.2
S-13	Wheeled Loader	2583	15.3	2543	15.4	2201	17.4	1653	16.1	2375	12.4	2565	12.3	2617	15.1	2637	16.8	2801	14.2
S-14	Grader	2517	16.3	2481	16.4	2266	17.7	1703	16.0	2447	14.0	2575	13.6	2626	15.6	2634	18.1	2814	14.7
S-15	Dewatering Pump	2560	13.9	2521	14.0	2215	15.8	1673	15.4	2398	12.5	2559	12.8	2610	13.6	2645	15.8	2813	12.5
S-16	Backup Drill	2543	26.0	2504	26.2	2227	27.9	1688	24.9	2415	25.3	2556	25.4	2607	25.7	2649	29.7	2821	24.5
S-17	Vermeer T1255III Surface Miner	2614	23.7	2571	24.0	2157	26.2	1636	22.6	2339	21.6	2546	22.8	2598	23.8	2654	27.2	2809	22.8
S-18	Vermeer T1255III Surface Miner	2479	24.4	2443	24.6	2288	25.4	1738	24.4	2484	23.1	2563	22.8	2615	23.7	2650	27.2	2836	22.7
S-19	Excavator	2490	16.2	2454	16.4	2286	17.4	1726	16.0	2475	15.3	2572	15.0	2623	15.5	2641	19.5	2826	14.5
S-20	Excavator	2609	15.6	2567	15.8	2169	18.2	1636	14.7	2346	13.7	2555	15.1	2606	15.6	2646	19.4	2803	14.6
S-22	Haul Truck Idling	2552	23.8	2514	24.0	2232	25.6	1675	24.6	2409	22.6	2570	22.3	2621	23.5	2635	26.5	2806	22.7
L-03	Trucks to Offsite	3629	5.1	3630	5.0	2528	12.0	511	31.6	1742	16.1	3619	4.0	3669	5.0	1208	20.8	1208	21.6
L-04	Tunnel Conveyor	3529	9.6	3535	9.6	2604	19.3	687	37.4	1897	22.9	3605	11.5	3656	13.4	1678	26.0	1663	22.7
L-05	Tunnel Conveyor	3558	9.5	3565	9.5	2623	19.1	667	37.4	1892	23.0	3637	8.6	3688	8.8	1653	26.2	1637	24.2
L-06	Tunnel Conveyor	3581	9.3	3593	9.3	2720	18.4	696	37.3	1957	22.3	3722	8.1	3773	10.3	1514	27.5	1557	22.9
L-07	Tunnel Conveyor	3448	—	3464	—	2759	—	836	11.1	2076	—	3673	—	3723	—	1561	2.8	1627	13.7
L-08	Tunnel Conveyor	3601	9.2	3611	9.2	2690	19.1	661	37.5	1918	22.7	3712	8.3	3762	8.5	1580	26.9	1600	24.6
S-01	Dozer	3295	18.6	3287	18.7	2385	27.0	872	35.3	1907	25.3	3288	19.2	3339	22.2	1963	25.6	2030	25.5
S-03	Truck Idling on Weigh Scale	3847	—	3873	—	3012	0.5	725	19.2	2056	4.6	4082	—	4133	—	1237	16.3	1236	16.5
S-04	Truck Idling on Weigh Scale	3882	—	3908	—	3010	0.6	702	19.5	2033	7.3	4099	—	4150	—	1239	16.4	1221	16.6
S-05	Fuel & Lube Truck	3743	3.5	3768	3.4	2957	11.8	743	23.0	2065	14.1	3986	1.8	4037	2.5	1301	22.6	1332	17.0
S-06	Belt Feeder Hopper	3437	2.8	3447	2.8	2666	11.5	799	27.1	2007	13.6	3596	4.8	3647	6.5	1650	17.9	1725	13.2
S-07	Crusher and Screener	3565	16.6	3576	16.5	2701	24.7	700	43.2	1951	27.6	3699	14.7	3749	15.8	1578	32.7	1620	28.4
S-08	Wheeled Loader	3349	11.8	3342	11.8	2407	18.1	819	28.9	1882	18.8	3342	9.8	3392	13.1	1921	19.1	1977	18.9
S-21	Haul Truck Idling	3120	21.3	3122	21.3	2540	27.0	1060	33.5	2132	24.7	3297	19.0	3348	20.4	1910	30.6	2041	26.6
Total Facility Sound Level (1-hour Leq):			**33.1**		**33.2**		**36.5**		**47.4**		**35.4**		**31.8**		**33.0**		**39.9**		**36.5**

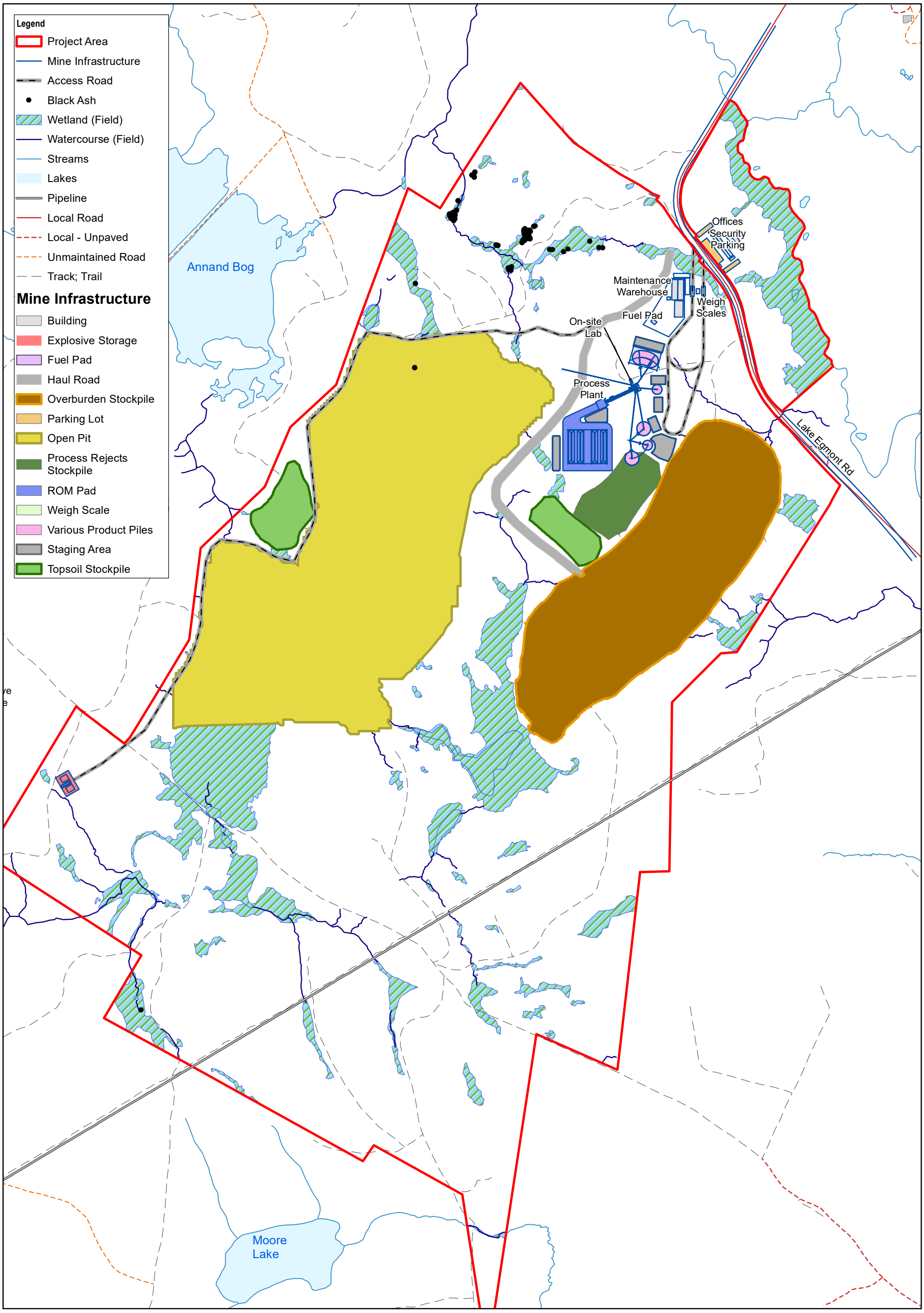
Note:

[1] Sound level at the receptor was calculated using Cadna A acoustical modelling software.

Appendices

Appendix A

Mine Concept Plan



Paper Size ANSI B

0 120 240 360 480

Metres

N

Map Projection: Transverse Mercator
Horizontal Datum: North American Datum of 1983 (CSRS) version 6
Grid: NAD 1983 (CSRS) v6 UTM Zone 20N

GHD

CERTAINTEED CANADA INC.
LAKE EGMONT, HALIFAX CO, NOVA SCOTIA
ANTRIM GYPSUM PROJECT

Project No. **12601021**
Revision No. **-**
Date **06/06/2024**

CONCEPTUAL MINE PLAN

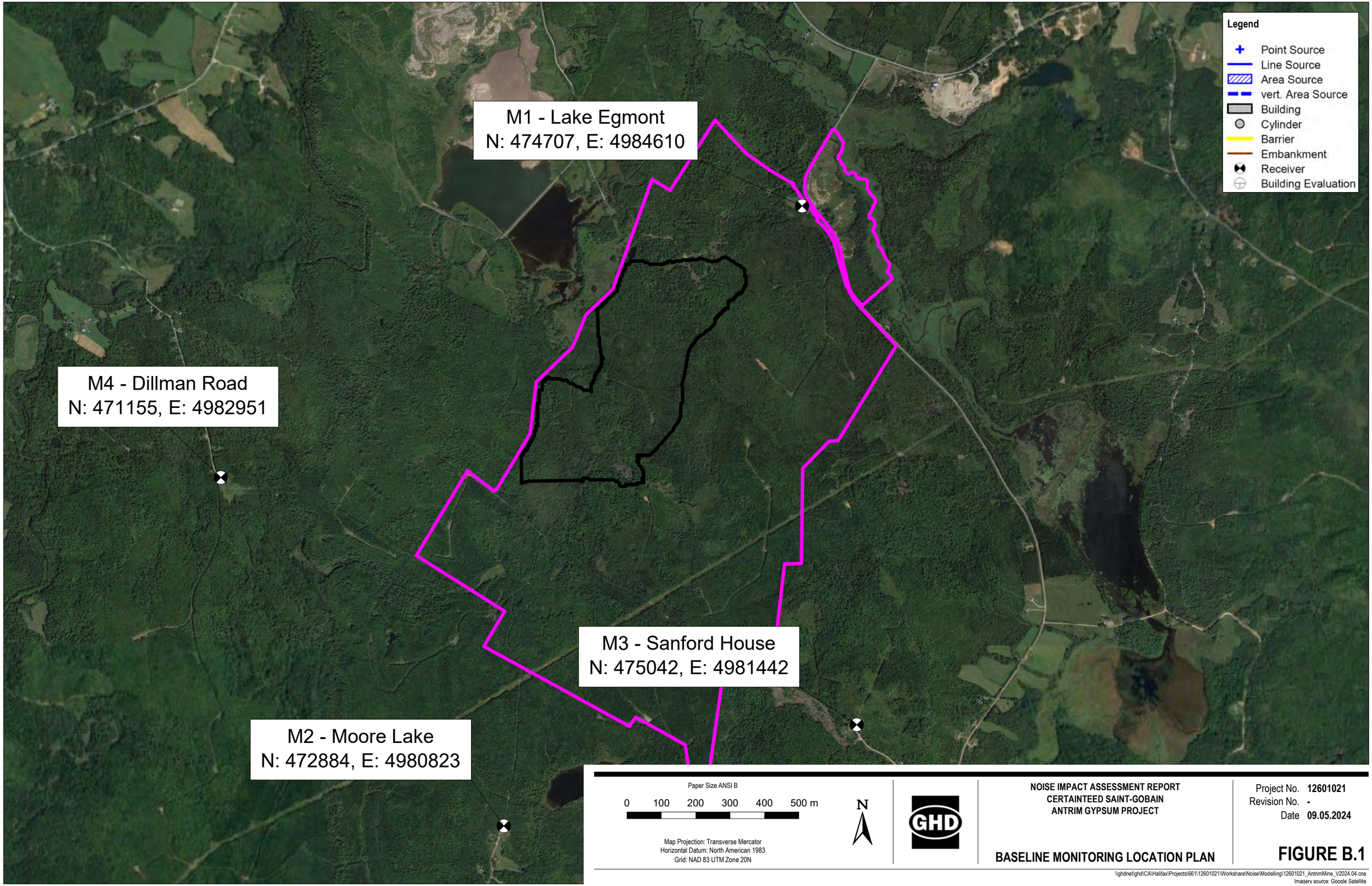
FIGURE 1

N:\CA\Halifax\Projects\661\12601021\GIS\Maps\Deliverables\12601021-HX002-FN Update Conceptual Site.mxd
Print date: 27 Jun 2024 - 13:20

Data source: ; Conceptual Design features created by GHD and/or sub-contractors of GHD. Created by: iwilson2

Appendix B

Baseline Monitoring Location Plan and Results



Paper Size ANSI B

0 100 200 300 400 500 m

Map Projection: Transverse Mercator
Horizontal Datum: North American 1983
Grid: NAD 83 UTM Zone 20N

N

GHD

NOISE IMPACT ASSESSMENT REPORT
CERTAINTEED SAINT-GOBAIN
ANTRIM GYPSUM PROJECT

BASELINE MONITORING LOCATION PLAN

Project No. **12601021**
Revision No. **-**
Date **09.05.2024**

FIGURE B.1

\\ghdnet\ghd\CA\Halifax\Projects\661\12601021\Workshare\Noise\Modelling\12601021_AntrimMine_V2024.04.cna
Imagery source: Google Satellite

Table B.1

Environmental Sound Level Measurements, LEQ - Ambient Background Baseline Measurements - M1
Antrim Mine
N: 474707, E: 4984610
Lake Egmont, Nova Scotia

Date	Time		Leq [2], [3]	L_{90}	Lmin	Lmax	Wind Spd (km/h) [1]	Temperature (°C)	Weather
2023-10-02	12:25:00		50	42	40	73	24	20	Discarded - Wind Speed > 20 km/h
2023-10-02	13:00:00		43	38	34	68	18	21	Non-inclement
2023-10-02	14:00:00		43	37	34	65	17	21	Non-inclement
2023-10-02	15:00:00		43	36	34	65	16	21	Non-inclement
2023-10-02	16:00:00		42	35	31	61	13	20	Non-inclement
2023-10-02	17:00:00		41	31	29	63	6	19	Non-inclement
2023-10-02	18:00:00		39	30	28	55	7	15	Non-inclement
2023-10-02	19:00:00		34	29	27	48	9	13	Non-inclement
2023-10-02	20:00:00		35	29	27	52	2	10	Non-inclement
2023-10-02	21:00:00		34	29	27	47	6	8	Non-inclement
2023-10-02	22:00:00		31	28	27	44	5	6	Non-inclement
2023-10-02	23:00:00		30	28	27	40	2	6	Non-inclement
2023-10-03	00:00:00		32	28	26	43	3	5	Non-inclement
2023-10-03	01:00:00		33	29	27	47	4	5	Non-inclement
2023-10-03	02:00:00		31	28	26	50	2	4	Non-inclement
2023-10-03	03:00:00		39	28	27	62	4	5	Non-inclement
2023-10-03	04:00:00		35	29	27	51	0	4	Non-inclement
2023-10-03	05:00:00		42	30	28	65	2	3	Non-inclement
2023-10-03	06:00:00		47	32	29	68	1	3	Non-inclement
2023-10-03	07:00:00		46	33	29	70	1	4	Non-inclement
2023-10-03	08:00:00		43	33	30	64	4	8	Non-inclement
2023-10-03	09:00:00		42	33	30	64	2	13	Non-inclement
2023-10-03	10:00:00		43	36	34	63	11	18	Non-inclement
2023-10-03	11:00:00		46	40	36	65	14	20	Non-inclement
2023-10-03	12:00:00		46	41	38	61	18	23	Non-inclement
2023-10-03	13:00:00		47	41	40	62	18	24	Non-inclement

	Sound Level (dBA)	# Inclement Weather Hours	Total Hours Recorded	Inclement Weather Hours
Daytime 12h Leq (07:00 - 19:00)	**43.1**	**0**	26	0.0
Evening 4h Leq (19:00 - 23:00)	**33**	**0**		
Nighttime 8h Leq (23:00 - 07:00)	**36**	**0**		

Notes:

(1) Weather data provided by Environment Canada's Upper Stewiacke RCS Climate Station.
(2) Measurements recorded during inclement weather (winds speeds greater than 20 km/h and/or rain) were disregarded.
(3) Bolded data represents the average Leq during the respective monitoring time period.

Legend
Day Time Hours
Evening Time Hours

Table B.2

Environmental Sound Level Measurements, LEQ - Ambient Background Baseline Measurements - M2
Antrim Mine
N: 472884, E: 4980823
Moore Lake, Nova Scotia

Date	Time		Leq [2], [3]	L_{90}	Lmax	Lmin	Wind Spd (km/h) [1]	Temperature (^{o}C)	Weather
2023-10-03	14:03:00		49	40	73	34	12	24	Non-inclement
2023-10-03	15:00:00		46	37	57	32	13	22	Non-inclement
2023-10-03	16:00:00		46	36	72	32	10	21	Non-inclement
2023-10-03	17:00:00		46	39	64	36	4	20	Non-inclement
2023-10-03	18:00:00		41	34	62	28	1	17	Non-inclement
2023-10-03	19:00:00		35	31	52	28	16	18	Non-inclement
2023-10-03	20:00:00		45	36	70	29	8	15	Non-inclement
2023-10-03	21:00:00		39	37	54	31	3	14	Non-inclement
2023-10-03	22:00:00		41	38	57	33	6	14	Non-inclement
2023-10-03	23:00:00		47	38	67	34	8	14	Non-inclement
2023-10-04	00:00:00		39	37	53	30	6	13	Non-inclement
2023-10-04	01:00:00		40	37	55	30	1	10	Non-inclement
2023-10-04	02:00:00		37	25	55	20	3	10	Non-inclement
2023-10-04	03:00:00		29	22	38	20	4	11	Non-inclement
2023-10-04	04:00:00		29	22	43	20	9	12	Non-inclement
2023-10-04	05:00:00		32	25	42	21	7	12	Non-inclement
2023-10-04	06:00:00		35	27	58	23	9	12	Non-inclement
2023-10-04	07:00:00		37	26	57	23	6	12	Non-inclement
2023-10-04	08:00:00		34	25	57	22	6	13	Non-inclement
2023-10-04	09:00:00		37	28	54	24	13	15	Non-inclement
2023-10-04	10:00:00		38	25	58	21	10	16	Non-inclement
2023-10-04	11:00:00		33	23	52	21	9	17	Non-inclement
2023-10-04	12:00:00		35	25	52	21	8	19	Non-inclement
2023-10-04	13:00:00		35	25	47	21	8	19	Non-inclement

	Lowest Sound Level (dBA)	# Inclement Weather Hours	Total Hours Recorded	Inclement Weather Hours
Daytime 12h Leq (07:00 - 19:00)	**40**	**0**	24	0.0
Evening 4h Leq (19:00 - 23:00)	**40**	**0**		
Nighttime 8h Leq (23:00 - 07:00)	**36**	**0**		

Notes:

(1) Weather data provided by Environment Canada's Upper Stewiacke RCS Climate Station.
(2) Measurements recorded during inclement weather (winds speeds greater than 20 km/h and/or rain) were disregarded
(3) Bolded data represents the average Leq during the respective monitoring time period.

Legend
Day Time Hours
Evening Time Hours

Table B.3

Environmental Sound Level Measurements, LEQ - Ambient Background Baseline Measurements - M3
Antrim Mine
N: 475042, E: 4981442
Sanford House, Nova Scotia

Date	Time		Leq [2], [3]	L_{90}	Lmax	Lmin	Wind Spd (km/h) [1]	Temperature (^{o}C)	Weather
2023-10-04	14:35:24		46	26	76	22	4	20	Non-inclement
2023-10-04	15:00:00		36	25	56	21	4	21	Non-inclement
2023-10-04	16:00:00		45	24	74	22	7	20	Non-inclement
2023-10-04	17:00:00		49	26	81	23	9	18	Non-inclement
2023-10-04	18:00:00		34	28	46	24	9	14	Non-inclement
2023-10-04	19:00:00		34	24	52	23	9	11	Non-inclement
2023-10-04	20:00:00		37	25	57	23	4	11	Non-inclement
2023-10-04	21:00:00		33	25	48	23	8	10	Non-inclement
2023-10-04	22:00:00		27	24	43	21	8	10	Non-inclement
2023-10-04	23:00:00		33	24	44	22	3	11	Non-inclement
2023-10-05	00:00:00		36	25	45	21	5	12	Non-inclement
2023-10-05	01:00:00		36	24	45	20	5	12	Non-inclement
2023-10-05	02:00:00		34	24	52	21	3	12	Non-inclement
2023-10-05	03:00:00		26	24	34	21	2	13	Non-inclement
2023-10-05	04:00:00		28	24	42	22	0	13	Non-inclement
2023-10-05	05:00:00		40	24	52	21	3	13	Non-inclement
2023-10-05	06:00:00		45	26	57	23	1	13	Non-inclement
2023-10-05	07:00:00		33	26	56	25	4	13	Non-inclement
2023-10-05	08:00:00		38	27	67	25	3	14	Non-inclement
2023-10-05	09:00:00		37	26	57	24	1	15	Non-inclement
2023-10-05	10:00:00		37	26	58	24	7	16	Non-inclement
2023-10-05	11:00:00		43	28	66	25	10	18	Non-inclement
2023-10-05	12:00:00		37	29	54	26	12	20	Non-inclement
2023-10-05	13:00:00		41	28	64	25	14	20	Non-inclement
2023-10-05	14:00:00		39	30	56	27	14	21	Non-inclement

	Lowest Sound Level (dBA)	# Inclement Weather Hours	Total Hours Recorded	Inclement Weather Hours
Daytime 12h Leq (07:00 - 19:00)	**40**	**0**	24	0.0
Evening 4h Leq (19:00 - 23:00)	**33**	**0**		
Nighttime 8h Leq (23:00 - 07:00)	**35**	**0**		

Notes:

(1) Weather data provided by Environment Canada's Upper Stewiacke RCS Climate Station.
(2) Measurements recorded during inclement weather (winds speeds greater than 20 km/h and/or rain) were disregarded.
(3) Bolded data represents the average Leq during the respective monitoring time period.

Legend
Day Time Hours
Evening Time Hours

Table B.4

Environmental Sound Level Measurements, LEQ - Ambient Background Baseline Measurements - M4
Antrim Mine
N: 471155, E: 4982951
Dillman Road, Nova Scotia

Date	Time		Leq [2], [3]	L_{90}	Lmax	Lmin	Wind Spd (km/h) [1]	Temperature (^{o}C)	Weather
2023-10-05	15:12:07		47	31	58	34	14	20	Non-inclement
2023-10-05	16:00:00		42	34	62	32	14	20	Non-inclement
2023-10-05	17:00:00		38	32	55	29	12	19	Non-inclement
2023-10-05	18:00:00		39	32	64	29	11	16	Non-inclement
2023-10-05	19:00:00		37	29	56	27	8	15	Non-inclement
2023-10-05	20:00:00		32	28	52	25	6	14	Non-inclement
2023-10-05	21:00:00		38	29	59	26	3	13	Non-inclement
2023-10-05	22:00:00		37	25	53	23	5	11	Non-inclement
2023-10-05	23:00:00		32	25	50	23	6	10	Non-inclement
2023-10-06	00:00:00		33	27	54	24	5	9	Non-inclement
2023-10-06	01:00:00		37	26	56	23	1	9	Non-inclement
2023-10-06	02:00:00		31	23	41	21	1	8	Non-inclement
2023-10-06	03:00:00		32	28	41	23	5	8	Non-inclement
2023-10-06	04:00:00		32	27	44	21	0	8	Non-inclement
2023-10-06	05:00:00		39	22	58	21	6	9	Non-inclement
2023-10-06	06:00:00		28	25	40	23	1	9	Non-inclement
2023-10-06	07:00:00		50	31	77	24	2	10	Non-inclement
2023-10-06	08:00:00		48	34	75	21	1	13	Non-inclement
2023-10-06	09:00:00		49	32	70	22	4	14	Non-inclement
2023-10-06	10:00:00		45	32	65	25	7	18	Non-inclement
2023-10-06	11:00:00		38	30	54	26	10	21	Non-inclement
2023-10-06	12:00:00		41	33	63	27	11	23	Non-inclement
2023-10-06	13:00:00		41	34	59	29	12	24	Non-inclement
2023-10-06	14:00:00		49	36	76	31	15	24	Non-inclement
2023-10-06	15:00:00		45	38	67	32	19	23	Non-inclement

	Lowest Sound Level (dBA)	# Inclement Weather Hours	Total Hours Recorded	Inclement Weather Hours
Daytime 12h Leq (07:00 - 19:00)	**44**	**0**	24	0.0
Evening 4h Leq (19:00 - 23:00)	**36**	**0**		
Nighttime 8h Leq (23:00 - 07:00)	**33**	**0**		

Notes:

(1) Weather data provided by Environment Canada's Upper Stewiacke RCS Climate Station.
(2) Measurements recorded during inclement weather (winds speeds greater than 20 km/h and/or rain) were disregarded.
(3) Bolded data represents the average Leq during the respective monitoring time period.

Legend
Day Time Hours
Evening Time Hours

Appendix C

Noise Source Sound Level Summary

Table C.1

Noise Source Sound Level Summary
CertainTeed Canada Inc.
Antrim Mine, Antrim, Nova Scotia

Cadna A ID	Noise Source Description		1/1 Octave Band Data									Unadjusted Total Sound Power Level	Tonal Penalty Assessment		Height Absolute	Operating Time Day	Vehicle Volumes Day	Speed	Reference/Comments
			32	63	125	250	500	1000	2000	4000	8000	(dBA)		(dBA)	(m)	(min)	(veh/hr)	(km/hr)	
L-01	ORE Hauling Trucks	PWL (dB)	116.5	116.5	117.5	118.5	117.5	116.5	114.5	109.5	105.5	125.5							
		A-weighted correction	-39.4	-26.2	-16.1	-8.6	-3.2	0.0	1.2	1.0	-1.1								
		PWL (dBA)	77.1	90.3	101.4	109.9	114.3	116.5	115.7	110.5	104.4	**121.3**	No	0	28.8	—	4	30	GHD Reference Spectra
L-02	OB/Waste Hauling Trucks	PWL (dB)	109.1	115.1	118.2	111.2	108.2	105.2	101.4	97.6	85.7	121.2							
		A-weighted correction	-39.4	-26.2	-16.1	-8.6	-3.2	0.0	1.2	1.0	-1.1								
		PWL (dBA)	69.7	88.9	102.1	102.6	105.0	105.2	102.6	98.6	84.6	**111.0**	No	0	44.3	—	12	30	GHD Reference Spectra
S-02	Dozer	PWL (dB)	82.0	112.0	118.0	109.0	111.0	108.0	108.0	102.0	95.0	120.6							
		A-weighted correction	-39.4	-26.2	-16.1	-8.6	-3.2	0.0	1.2	1.0	-1.1								
		PWL (dBA)	42.6	85.8	101.9	100.4	107.8	108.0	109.2	103.0	93.9	**114.1**	No	0	24.0	60	—	—	GHD Reference Spectra
S-09	Wheeled Loader	PWL (dB)	89.5	95.9	106.3	110.4	101.7	100.8	98.2	93.6	86.8	112.9							
		A-weighted correction	-39.4	-26.2	-16.1	-8.6	-3.2	0.0	1.2	1.0	-1.1								
		PWL (dBA)	50.1	69.7	90.2	101.8	98.5	100.8	99.4	94.6	85.7	**106.7**	No	0	22.0	60	—	—	GHD Reference Spectra
S-10	Wheeled Loader	PWL (dB)	89.5	95.9	106.3	110.4	101.7	100.8	98.2	93.6	86.8	112.9							
		A-weighted correction	-39.4	-26.2	-16.1	-8.6	-3.2	0.0	1.2	1.0	-1.1								
		PWL (dBA)	50.1	69.7	90.2	101.8	98.5	100.8	99.4	94.6	85.7	**106.7**	No	0	22.0	60	—	—	GHD Reference Spectra
S-11	Wheeled Loader	PWL (dB)	89.5	95.9	106.3	110.4	101.7	100.8	98.2	93.6	86.8	112.9							
		A-weighted correction	-39.4	-26.2	-16.1	-8.6	-3.2	0.0	1.2	1.0	-1.1								
		PWL (dBA)	50.1	69.7	90.2	101.8	98.5	100.8	99.4	94.6	85.7	**106.7**	No	0	22.0	60	—	—	GHD Reference Spectra
S-12	Wheeled Loader	PWL (dB)	89.5	95.9	106.3	110.4	101.7	100.8	98.2	93.6	86.8	112.9							
		A-weighted correction	-39.4	-26.2	-16.1	-8.6	-3.2	0.0	1.2	1.0	-1.1								
		PWL (dBA)	50.1	69.7	90.2	101.8	98.5	100.8	99.4	94.6	85.7	**106.7**	No	0	22.0	60	—	—	GHD Reference Spectra
S-13	Wheeled Loader	PWL (dB)	89.5	95.9	106.3	110.4	101.7	100.8	98.2	93.6	86.8	112.9							
		A-weighted correction	-39.4	-26.2	-16.1	-8.6	-3.2	0.0	1.2	1.0	-1.1								
		PWL (dBA)	50.1	69.7	90.2	101.8	98.5	100.8	99.4	94.6	85.7	**106.7**	No	0	22.0	60	—	—	GHD Reference Spectra
S-14	Grader	PWL (dB)	96.4	99.4	106.1	106.8	105.9	101.1	97.8	93.1	85.4	112.1							
		A-weighted correction	-39.4	-26.2	-16.1	-8.6	-3.2	0.0	1.2	1.0	-1.1								
		PWL (dBA)	57.0	73.2	90.0	98.2	102.7	101.1	99.0	94.1	84.3	**107.0**	No	0	22.0	60	—	—	GHD Reference Spectra
S-15	Dewatering Pump	PWL (dB)	31.0	112.0	113.0	98.0	103.0	102.0	105.0	104.0	97.0	116.6							
		A-weighted correction	-39.4	-26.2	-16.1	-8.6	-3.2	0.0	1.2	1.0	-1.1								
		PWL (dBA)	-8.4	85.8	96.9	89.4	99.8	102.0	106.2	105.0	95.9	**110.4**	No	0	21.0	60	—	—	GHD Reference Spectra
S-16	Backup Drill	PWL (dB)	31.0	114.0	115.0	110.0	116.0	113.0	110.0	106.0	102.0	121.5							
		A-weighted correction	-39.4	-26.2	-16.1	-8.6	-3.2	0.0	1.2	1.0	-1.1								
		PWL (dBA)	-8.4	87.8	98.9	101.4	112.8	113.0	111.2	107.0	100.9	**117.8**	No	0	23.0	60	—	—	GHD Reference Spectra
S-17	Vermeer T1255III Surface Miner	PWL (dB)	120.0	119.0	113.0	114.0	113.0	107.0	105.0	101.0	98.0	124.1							
		A-weighted correction	-39.4	-26.2	-16.1	-8.6	-3.2	0.0	1.2	1.0	-1.1								
		PWL (dBA)	80.6	92.8	96.9	105.4	109.8	107.0	106.2	102.0	96.9	**114.0**	No	0	23.0	60	—	—	GHD Reference Spectra
S-18	Vermeer T1255III Surface Miner	PWL (dB)	120.0	119.0	113.0	114.0	113.0	107.0	105.0	101.0	98.0	124.1							
		A-weighted correction	-39.4	-26.2	-16.1	-8.6	-3.2	0.0	1.2	1.0	-1.1								
		PWL (dBA)	80.6	92.8	96.9	105.4	109.8	107.0	106.2	102.0	96.9	**114.0**	No	0	23.0	60	—	—	GHD Reference Spectra
S-19	Excavator	PWL (dB)	114.9	111.1	107.1	103.4	104.0	103.3	100.6	95.7	86.6	117.6							
		A-weighted correction	-39.4	-26.2	-16.1	-8.6	-3.2	0.0	1.2	1.0	-1.1								
		PWL (dBA)	75.5	84.9	91.0	94.8	100.8	103.3	101.8	96.7	85.5	**107.6**	No	0	23.0	60	—	—	GHD Reference Spectra
S-20	Excavator	PWL (dB)	114.9	111.1	107.1	103.4	104.0	103.3	100.6	95.7	86.6	117.6							
		A-weighted correction	-39.4	-26.2	-16.1	-8.6	-3.2	0.0	1.2	1.0	-1.1								
		PWL (dBA)	75.5	84.9	91.0	94.8	100.8	103.3	101.8	96.7	85.5	**107.6**	No	0	23.0	60	—	—	GHD Reference Spectra
S-22	Haul Truck Idling	PWL (dB)	111.9	117.9	121.0	114.0	111.0	108.0	104.2	100.4	88.5	124.0							
		A-weighted correction	-39.4	-26.2	-16.1	-8.6	-3.2	0.0	1.2	1.0	-1.1								
		PWL (dBA)	72.5	91.7	104.9	105.4	107.8	108.0	105.4	101.4	87.4	**113.8**	No	0	24.0	60	—	—	GHD Reference Spectra
L-03	Trucks to Offsite	PWL (dB)	30.6	116.6	111.6	104.6	106.6	103.6	102.6	99.6	90.6	118.6							
		A-weighted correction	-39.4	-26.2	-16.1	-8.6	-3.2	0.0	1.2	1.0	-1.1								
		PWL (dBA)	—	90.4	95.5	96.0	103.4	103.6	103.8	100.6	89.5	**109.5**	No	0	42.5	—	8	60	GHD Reference Spectra

Table C.1

Noise Source Sound Level Summary
CertainTeed Canada Inc.
Antrim Mine, Antrim, Nova Scotia

Cadna A ID	Noise Source Description		1/1 Octave Band Data									Unadjusted Total Sound Power Level	Tonal Penalty Assessment		Height Absolute	Operating Time Day	Vehicle Volumes Day	Speed	Reference/Comments
			32	63	125	250	500	1000	2000	4000	8000	(dBA)		(dBA)	(m)	(min)	(veh/hr)	(km/hr)	
L-04	Tunnel Conveyor	PWL (dB)	31.0	102.0	100.0	99.0	102.0	106.0	98.0	94.0	88.0	110.0							
		A-weighted correction	-39.4	-26.2	-16.1	-8.6	-3.2	0.0	1.2	1.0	-1.1								
		PWL (dBA)	-8.4	75.8	83.9	90.4	98.8	106.0	99.2	95.0	86.9	**107.8**	No	0	61.4	60	—	—	GHD Reference Spectra
L-05	Tunnel Conveyor	PWL (dB)	31.0	102.0	100.0	99.0	102.0	106.0	98.0	94.0	88.0	110.0							
		A-weighted correction	-39.4	-26.2	-16.1	-8.6	-3.2	0.0	1.2	1.0	-1.1								
		PWL (dBA)	-8.4	75.8	83.9	90.4	98.8	106.0	99.2	95.0	86.9	**107.8**	No	0	57.7	60	—	—	GHD Reference Spectra
L-06	Tunnel Conveyor	PWL (dB)	31.0	102.0	100.0	99.0	102.0	106.0	98.0	94.0	88.0	110.0							
		A-weighted correction	-39.4	-26.2	-16.1	-8.6	-3.2	0.0	1.2	1.0	-1.1								
		PWL (dBA)	-8.4	75.8	83.9	90.4	98.8	106.0	99.2	95.0	86.9	**107.8**	No	0	58.3	60	—	—	GHD Reference Spectra
L-07	Tunnel Conveyor	PWL (dB)	31.0	102.0	100.0	99.0	102.0	106.0	98.0	94.0	88.0	110.0							
		A-weighted correction	-39.4	-26.2	-16.1	-8.6	-3.2	0.0	1.2	1.0	-1.1								
		PWL (dBA)	-8.4	75.8	83.9	90.4	98.8	106.0	99.2	95.0	86.9	**107.8**	No	0	42.5	60	—	—	GHD Reference Spectra
L-08	Tunnel Conveyor	PWL (dB)	31.0	102.0	100.0	99.0	102.0	106.0	98.0	94.0	88.0	110.0							
		A-weighted correction	-39.4	-26.2	-16.1	-8.6	-3.2	0.0	1.2	1.0	-1.1								
		PWL (dBA)	-8.4	75.8	83.9	90.4	98.8	106.0	99.2	95.0	86.9	**107.8**	No	0	57.3	60	—	—	GHD Reference Spectra
S-01	Dozer	PWL (dB)	82.0	112.0	118.0	109.0	111.0	108.0	108.0	102.0	95.0	120.6							
		A-weighted correction	-39.4	-26.2	-16.1	-8.6	-3.2	0.0	1.2	1.0	-1.1								
		PWL (dBA)	42.6	85.8	101.9	100.4	107.8	108.0	109.2	103.0	93.9	**114.1**	No	0	57.0	60	—	—	GHD Reference Spectra
S-03	Truck Idling on Weigh Scale	PWL (dB)	—	96.0	91.0	86.0	93.0	90.0	91.0	85.0	74.0	100.1							
		A-weighted correction	-39.4	-26.2	-16.1	-8.6	-3.2	0.0	1.2	1.0	-1.1								
		PWL (dBA)	-39.4	69.8	74.9	77.4	89.8	90.0	92.2	86.0	72.9	**96.2**	No	0	37.2	60	—	—	GHD Reference Spectra
S-04	Truck Idling on Weigh Scale	PWL (dB)	—	96.0	91.0	86.0	93.0	90.0	91.0	85.0	74.0	100.1							
		A-weighted correction	-39.4	-26.2	-16.1	-8.6	-3.2	0.0	1.2	1.0	-1.1								
		PWL (dBA)	-39.4	69.8	74.9	77.4	89.8	90.0	92.2	86.0	72.9	**96.2**	No	0	35.2	60	—	—	GHD Reference Spectra
S-05	Fuel & Lube Truck	PWL (dB)	31.0	110.0	104.0	102.0	106.0	103.0	100.0	90.0	81.0	113.3							
		A-weighted correction	-39.4	-26.2	-16.1	-8.6	-3.2	0.0	1.2	1.0	-1.1								
		PWL (dBA)	-8.4	83.8	87.9	93.4	102.8	103.0	101.2	91.0	79.9	**107.5**	No	0	48.6	60	—	—	GHD Reference Spectra
S-06	Belt Feeder Hopper	PWL (dB)	31.0	102.0	99.0	93.0	94.0	97.0	93.0	89.0	82.0	105.6							
		A-weighted correction	-39.4	-26.2	-16.1	-8.6	-3.2	0.0	1.2	1.0	-1.1								
		PWL (dBA)	-8.4	75.8	82.9	84.4	90.8	97.0	94.2	90.0	80.9	**100.2**	No	0	64.0	60	—	—	GHD Reference Spectra
S-07	Crusher and Screener	PWL (dB)	109.6	106.4	110.4	110.7	109.8	109.8	111.3	109.0	103.2	119.0							
		A-weighted correction	-39.4	-26.2	-16.1	-8.6	-3.2	0.0	1.2	1.0	-1.1								
		PWL (dBA)	70.2	80.2	94.3	102.1	106.6	109.8	112.5	110.0	102.1	**116.6**	No	0	59.3	60	—	—	GHD Reference Spectra
S-08	Wheeled Loader	PWL (dB)	89.5	95.9	106.3	110.4	101.7	100.8	98.2	93.6	86.8	112.9							
		A-weighted correction	-39.4	-26.2	-16.1	-8.6	-3.2	0.0	1.2	1.0	-1.1								
		PWL (dBA)	50.1	69.7	90.2	101.8	98.5	100.8	99.4	94.6	85.7	**106.7**	No	0	60.4	60	—	—	GHD Reference Spectra
S-21	Haul Truck Idling	PWL (dB)	111.9	117.9	121.0	114.0	111.0	108.0	104.2	100.4	88.5	124.0							
		A-weighted correction	-39.4	-26.2	-16.1	-8.6	-3.2	0.0	1.2	1.0	-1.1								
		PWL (dBA)	72.5	91.7	104.9	105.4	107.8	108.0	105.4	101.4	87.4	**113.8**	No	0	46.9	60	—	—	GHD Reference Spectra


GHD