Volume 2, Section 4 Snake Lake Reservoir Expansion Project
Environmental Impact Assessment
Air Quality

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Executive Summary

This document provides the Air Quality Assessment (Assessment) for the Eastern Irrigation District (EID) Snake Lake Reservoir (SLR) Expansion Project (the Project). The following cases were included in this Assessment:

- **Baseline Case.** Emissions from applicable Alberta Criteria Air Contaminants (CACs) were quantified for existing emission sources within approximately 7.5 km of the centre of the Project area during the Baseline year of 2023 and air quality dispersion modelling was performed. Annual Baseline Greenhouse Gas (GHG) emissions were also quantified.
- **Project Construction Case.** CACs emissions associated with worst-case emissions during the 2027 construction months were quantified and modelling was performed assuming no mitigation for dust suppression.
- **Cumulative Construction Case.** CACs emissions were estimated for regional emission sources during 2027 and modelling was performed that overlapped these emissions with the Project Construction Case, again assuming no mitigation for dust suppression.
- **Project Construction Mitigation Case.** Fine particulate matter (i.e., less than 2.5 microns in diameter; $PM_{2.5}$) emissions were quantified and modelled for the 2027 construction months, assuming watering for dust mitigation more than twice per day, when required.
- **Cumulative Construction Mitigation Case.** $PM_{2.5}$ modelling was also performed for the Cumulative Construction Mitigation case overlapped with background regional emission sources in 2027.
- **Operational Case.** Only GHG will be emitted during the operational phase of the Project. GHG emissions were quantified for 2030, assuming the Project has been in operation for a period of one year**.**

The results from the Air Quality Dispersion Modelling Assessment are as follows:

- **Nitrogen Dioxide (NO_2).** The modelling for NO_2 indicates the following:
  - **Baseline Case.** Maximum predicted ground-level NO_2 concentrations for the one-hour and annual averaging periods exceed the appliable Alberta Ambient Air Quality Objectives (AAAQOs) for NO_2 in a small area that is near the northeast side of the Trans-Canada Highway (TCH).
  - **Project Construction Case.** Maximum one-hour ground-level NO_2 concentrations are predicted to exceed the AAAQO 2.3% of the time under worst case meteorological conditions and based on the conservative approach used to estimate the Project emissions. The annual ground-level concentrations comply with the applicable AAAQO.
  - **Cumulative Construction Case.** Maximum predicted one-hour and annual ground-level NO_2 concentrations exceed the applicable AAAQO in the vicinity of the Project as indicated for the Project Construction Case and in the vicinity of the TCH as indicated for the Baseline Case. However, the overall maximum predicted NO_2 concentrations near the TCH are less than predicted for the 2023 Baseline Case because of the assumed number of increased electric vehicles (EVs) in 2027.
- **Sulphur Dioxide (SO_2).** The maximum predicted ground-level SO_2 concentrations for all cases and all averaging periods comply with the applicable AAAQOs.

- **$PM_{2.5}$.** The modelling for $PM_{2.5}$ indicates the following:
  - **Baseline Case.** Maximum predicted ground-level $PM_{2.5}$ concentrations for the 24-hour averaging period slightly exceeds the appliable AAAQO for $PM_{2.5}$ in a small area that is near the northeast side of the TCH.
  - **Project Construction Case.** Maximum predicted 24-hour ground-level $PM_{2.5}$ concentrations exceed the applicable AAAQO assuming no mitigation. However, modelling with mitigation (i.e., assuming gravel roads and construction area will be watered more than twice per day, when necessary, to prevent fugitive dust emissions), indicates that while the maximum 24-hour ground-level $PM_{2.5}$ concentrations are still predicted to exceed the applicable AAAQO, the non-compliance events are predicted to occur 2.2% of the time beyond the construction site boundary. $PM_{2.5}$ modelling was also completed for sensitive receptors in the area. This modelling indicates that the AAAQO will be exceeded at the nearby Antelope Creek Ranch and TCH Twinning Monument (TCHTM) a maximum of one day during the five-year construction period. To further mitigate fugitive dust emissions, dust fencing can be installed around the construction site, as needed. With the use of this fencing and on-going watering to prevent fugitive dust emissions, is it highly unlikely that $PM_{2.5}$ concentrations will be exceeded at either of these two locations.
  - **Cumulative Construction Case.** Maximum predicted 24-hour ground-level $PM_{2.5}$ modelling results are only slightly higher than the Project Construction Case, thereby indicating that other regional sources contribute very little to the overall maximum predicted concentrations in comparison to dust emissions from the on-site construction activities.

Baseline GHGs are briefly discussed, with estimated current and Project emissions summarized. A more in-depth discussion is presented in the Climate Change section of the Environmental Impact Assessment (EIA; Volume 2, Section 12).

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Abbreviations

AAAQGs	Alberta Ambient Air Quality Guidelines
AAAQOs	Alberta Ambient Air Quality Objectives
AADT	Annual Average Daily Traffic
AERMOD	American Meteorological Society/Environmental Protection Agency Regulatory Model *(air dispersion model)*
Alberta EPA	Alberta Environment and Protected Areas
AQMG	Alberta Air Quality Model Guideline
asl	Above sea level
CAC	Criteria Air Contaminant
CAPP	Canadian Association of Petroleum Producers
CH_4	Methane
CO_2	Carbon dioxide
CO_2eq	Carbon dioxide equivalent
CPKCR	Canadian Pacific Kansas City Railway
d/a	Days per annum
ECCC	Environment and Climate Change Canada
EIA	Environmental impact assessment
EID	Eastern Irrigation District
EVs	Electric vehicles
FSL	Full Supply Level
GHG	Greenhouse gas
GWP	Global Warming Potential
h/a	Hours per annum
h/d	Hours per day
ISR	In-Stack Ratio
LSA	Local Study Area
NO_2	Nitrogen dioxide
NO_x	Nitrogen oxides
N_2O	Nitrous oxide
NPRI	National Pollutant Release Inventory
O_3	Ozone
PVMRM	Plume Volume Molar Ratio Method
$PM_{2.5}$	Fine particulate matter *(i.e., particulate matter less than 2.5 microns in diameter)*
SLR	Snake Lake Reservoir
SO_2	Sulphur dioxide
TCH	Trans-Canada Highway
TCHTM	Trans-Canada Highway Twinning Monument
US EPA	United States Environmental Protection Agency
WRF	Weather Research and Forecasting

4.1 INTRODUCTION

4.1.1 Background

The existing Snake Lake Reservoir (SLR) is located within Townships 19 and 20, Ranges 16 and 17, west of the fourth meridian, approximately 18 km southeast of Bassano and 23 km northwest of Brooks, Alberta (see Appendix B1, Figure B1-1). The reservoir is contained by two earth-fill dams: the first along the east end (East Dam) located on Section 31-19-16 W4M and the second along the west end (West Dam) located on Section 3-20-17 W4M. The reservoir is an off-stream irrigation storage facility originally constructed from 1995 to 1997 and is owned and operated by the Eastern Irrigation District (EID).

The existing reservoir covers 299 ha with a storage volume of 19.25 million m^3 at Full Supply Level (FSL) with a geodetic elevation of 781.7 m above sea level (asl). However, the EID plans to increase the FSL of the existing reservoir by 0.3 m to 782.0 m asl as part of the expansion. Water sourced from the Bow River at Bassano Dam is diverted into the reservoir from EID East Branch Canal via a gated inlet chute combined with an inline check structure. Outflow from the reservoir is through the East Dam Low-Level Outlet, located near the north end of the East Dam.

The Project will expand in Sections 29, 30, 31, and 32 in Township 19, Range 16, W4M, extending the reservoir approximately 3 km to the south and 3 km to the east (see Appendix B1, Figure B1-2). The Project will increase the current reservoir area by 827 ha for a total area of 1,069 ha, at the new FSL. The volume of stored water will increase to 87.4 million m^3. The dam and reservoir will be permanent features and as such, decommissioning has not been included in this Air Quality Assessment.

Earthworks will include the construction of approximately 8 km of earthen banks up to 20 m in height. Total earthworks are estimated to require 7 million m^3 of material. The Project will attempt to excavate the material within the footprint of the dam. Removal of all or a portion of the existing East Dam will connect the current SLR with the reservoir expansion.

4.1.2 Purpose

The purpose of the Air Quality Assessment is to assess baseline air quality conditions and the associated impacts from fugitive dust emissions and combustion emissions from equipment used during the construction and operational phases of the Project. Estimates of existing and future anthropogenic and naturally-occurring Greenhouse Gas (GHG) emissions have also been included in this Assessment.

4.1.3 Project Setting

The proposed Project occurs within the Dry Mixedgrass Natural Subregion within the Grassland Natural Region of Aberta (Adams et al., 2013). Specifically, the proposed expansion site has a combination of native grasslands and some wetlands. Parent materials include clay soils and rocky/sandy soils. Previously, the site was used for seasonal cattle grazing. The terrain in the area has low relief with flat to undulating terrain (see Appendix B1, Figure B1-3). The LO

Temperature and precipitation data were obtained from the Environment and Climate Change Canada (ECCC; GOCa) Gem Monitoring Station, located approximately 33 km north of the Project, and the Brooks North Monitoring Station, located approximately 24 km west-southwest of the Project. The data cover the period of 1981 to 2010 and indicate the following:

- **Temperature.** The daily average temperatures range from -11.2 to 18.5°C, while the maximum daily temperatures range from -5.5 to 26.2°C (Figure 4-1). The minimum daily temperatures range from -16.9 to 10.7°C.
- **Precipitation**. Monthly average precipitation ranges from 8.9 to 68.0 mm and 12.0 to 64.5 mm for the Gem (Figure 4-2) and Brooks North (Figure 4-3) Monitoring Stations, respectively.
- **Wind.** Appendix B1, Figure B1-4 presents wind data obtained from the Alberta Environment and Protected Areas (Alberta EPA) Weather Research and Forecasting (WRF) Meteorological Data Repository. As indicated in the windrose, the predominant hourly average winds are from the northwest and southwest.

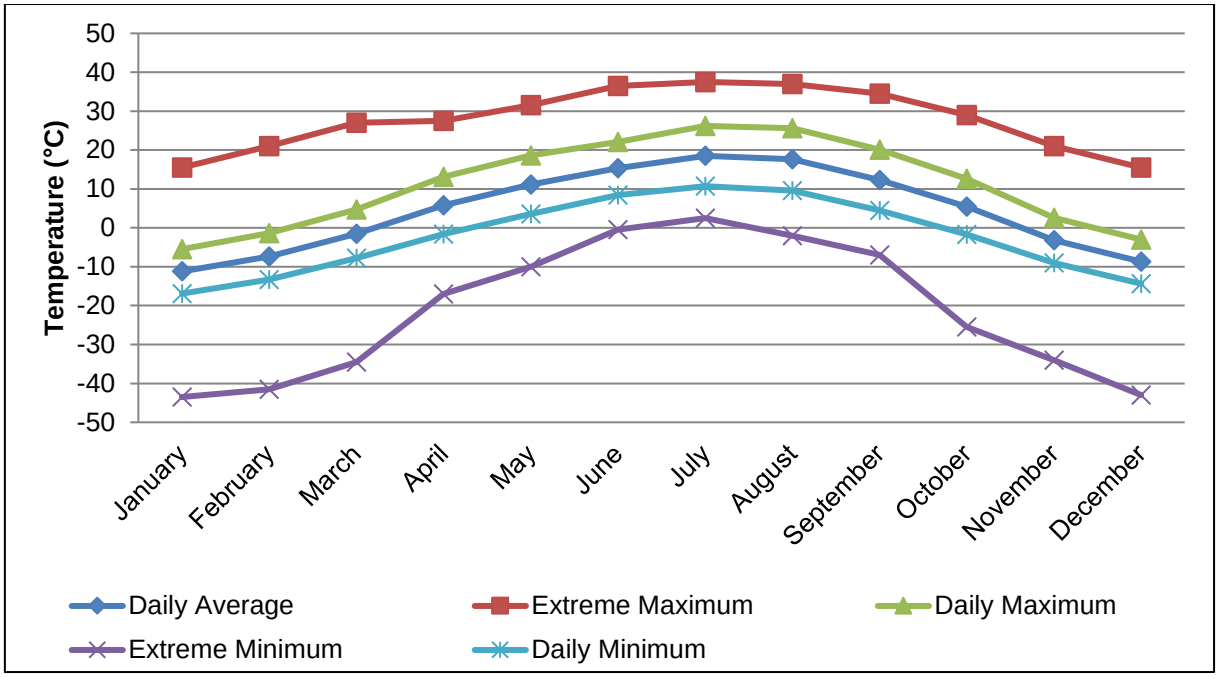

Figure 4-1: Minimum, mean, and maximum daily temperatures by month and monthly extreme temperatures over the normal period of 1981 – 2010 recorded at the Gem Monitoring Station

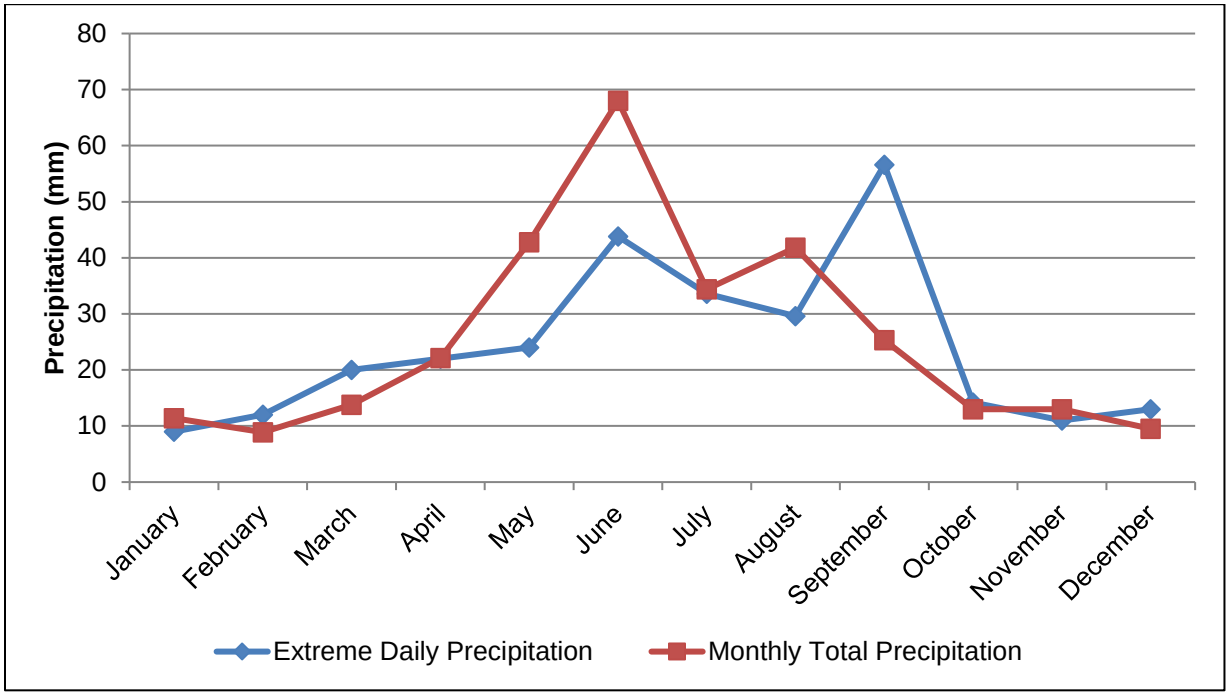

Figure 4-2: Extreme daily precipitation by month and monthly average total precipitation over the normal period of 1981 – 2010 recorded at the Gem Monitoring Station

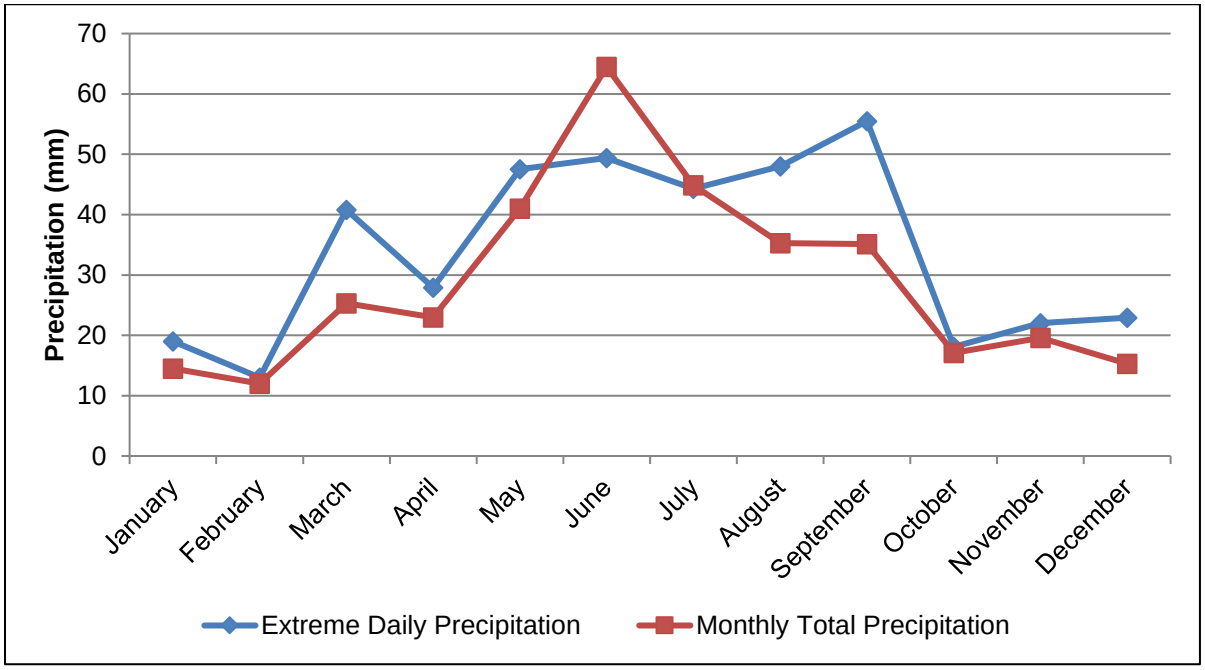

Figure 4-3: Extreme daily precipitation by month and monthly average total precipitation over the normal period of 1981 – 2010 recorded at the Brooks North Monitoring Station

4.1.4 Regulatory Context

Table 4-1 presents the Alberta Ambient Air Quality Objectives (AAAQOs) and/or Guideline (AAAQG) for the air contaminants considered for this Assessment (GOA 2024a). It should be noted that in Alberta, the 9th highest hourly-average concentration predicted by the dispersion modelling is the standard value used in Alberta for comparison to the applicable AAAQO, noting that the Alberta Air Quality Model Guideline (AQMG) recognizes that extreme, rare and transient meteorological conditions can affect the predicted one-hour average concentrations (GOA 2021a). However, for averaging periods longer than one hour, the overall maximum predicted concentrations are compared to the AAAQO. It should also be noted that for the purpose of this Assessment, particulate emissions have been conservatively modelled as particulate matter less than 2.5 microns in diameter ($PM_{2.5}$).

Table 4-1: Air contaminants of potential concern during the construction phase of the Project

Substance	Averaging Period	AAAQO (µg/m^3)	AAAQG (µg/m^3)	Potential Emission Source
NO_2[(a)]	1-hour	300	-	Emissions from off-site traffic and on-site construction equipment
	Annual	45	-	
SO_2[(b)]	1-hour	450	-	Emissions from on-site diesel-fired construction equipment
	24-hour	125	-	
	30-day	30	-	
	Annual	20	-	
$PM_{2.5}$	1-hour	-	80	Fugitive emissions from nearby roadways and construction activities
	24-hour	29	-	

(a) NO_2 = Nitrogen dioxide

(b) SO_2 = Sulphur dioxide

4.2 STUDY AREA

As required by the Alberta AQMG, to ensure that impacts are considered out to a minimum of 5 km in every direction from the border of the Project site, a Local Study Area (LSA) out to 7.5 km from the assumed centre point of the Project area was used for this Assessment (Appendix B1, Figure B1-5; GOA 2021a). Table 4-2 provides a summary of the sensitive receptors located within the LSA.

Table 4-2: Sensitive receptors located in or adjacent to the LSA

Sensitive Receptor ID	Sensitive Receptor	Distance from Project area (km)	UTM Easting (m)	UTM Northing (m)
1	Residence A (Acreage)	4.88	418657	5604955
2	Residence B (Acreage)	3.50	410679	5614305
3	Residence C (Acreage)	4.64	422200	5612468
4	Residence D (Acreage)	5.44	422806	5612895
5	Antelope Creek Ranch	5.11	418529	5604712
6	Lathom Hutterite Colony	5.75	409285	5607279
7	Snake Lake Feedlot - Home Yard	4.80	408992	5613217
8	Trans-Canada Highway Twinning Monument (TCHTM)	1.95	417159	5615320

4.3 ISSUE SCOPING

The following cases were included in the Air Quality Dispersion Modelling Assessment (Table 4-3).

- **Baseline Case.** The Baseline Case identifies key contaminants of concern, including significant Criteria Air Contaminants (CACs) regulated by Alberta EPA (GOA 2024b). Air quality dispersion modelling was completed for the LSA during the Baseline year of 2023 (i.e., the most recent year for which existing emission data are publicly available). The modelling also considers the sensitive receptors previously indicated in Table 4-2. The potential for soil drifting from the footprint of the existing reservoir during reservoir drawdown is discussed in Table 4-3.
- **Project Construction Case.** Air quality impacts during Project construction in 2027 were assessed, taking into consideration nature, severity, extent and duration of activities likely to produce dust or result in other air quality contaminants that could impact residences, livestock, other facilities or sensitive receptors during construction. Modelling was performed assuming no mitigation for dust suppression for this case, noting that 2027 is indicated as the year with highest construction activity and emissions.
- **Cumulative Construction Case.** CACs emissions were estimated for regional emission sources during 2027 and modelling was performed overlapping these emissions with the Project Construction Case, again assuming no mitigation for dust suppression.
- **Project Construction Mitigation Case.** Air quality impacts during Project construction in 2027 were reassessed assuming watering of unpaved roads and the Project construction area more than twice per day, when required, to suppress fugitive dust emission.
- **Cumulative Construction Mitigation Case.** Modelling was performed for the Project Mitigation case overlapped with regional emission sources in 2027.
- **Project Operations Case.** The operational phase of the Project will not have any significant NO_2, SO_2 or particulate emissions. However, GHG from the Project operations were assessed for 2030, assuming the Project was in operation for one year.

Table 4-3: Issue scoping for air quality

Project Activities and Risks	Resources	Indicators or Measures	Potential Issues	Screening
• Combustion emissions from workers travelling to and from the site • Emissions from earthmoving equipment and other diesel fuel equipment on the site (e.g., lighting, space heaters, generators, etc.) and emissions from truck bringing equipment or materials to the site • Dust generated from construction activities • Dust during reservoir drawdown periods	• Ambient Air Quality Assessed in Comparison with AAAQO Guidelines	• NOx ground level concentrations (converted to NO_2) • One-Hour • 24-Hour • 30-Day • Annual	• Increased nitrogen oxide (NO_x) emissions	• Likely - during construction phase
		• SO_2 ground level concentrations • One-Hour • 24-Hour • 30-Day • Annual	• Increased sulphur dioxide (SO_2) emissions	• Likely - during construction phase
		• PM2.5 ground level concentrations • One-Hour • 24-Hour • 30-Day • Annual	• Increased particulate matter <2.5 µm (PM2.5) emissions	• Likely - during construction phase, but unlikely under drawdown periods due to rip rap coverage, remaining pooled water and saturated sediments.
• Removal of trees/vegetation • Loss of cattle grazing areas • Changes in GHG emissions	• Global Climate	• Changes in GHG Emissions	• Changes in GHG emissions and sequestration (Results will be assessed in Volume 2, Section 12: Climate Change)	• Likely negligible change due to loss of trees and vegetation and removal of cattle grazing areas • Likely for increased GHG emissions from expanded reservoir, which will decrease over time

Because the expanded reservoir is a permanent fixture, decommissioning of the Project is not anticipated.

It should be noted that in the absence of a detailed construction plan, the work area used for the modelling ("Modelled Construction Area") was conservatively assumed to be a portion of the proposed SLR expansion site, as opposed to the entire expansion area, with all applicable construction equipment operating in this smaller area. The selected area was based on the proposed schedule (see Appendix B2) for land clearing. In short, the selected area was based on the month in which the largest area of land was being cleared. This allows a representation of the greatest emissions expected at any given time. It is important to note that the actual area of air emissions will vary based on where within the Project area the work is taking place at any given time.

4.4 BASELINE CASE

4.4.1 Methods: Baseline Case

To assess the Baseline Case for the Project area and surrounding region, regional background air quality was assessed using regional monitoring stations. Data were then used for air quality dispersion modelling. GHG emissions for the LSA were also estimated.

4.4.1.1 Regional Air Quality Monitoring Data

Air quality data were compiled from various regional monitoring stations that report to the Alberta Air Data Warehouse. The two air quality monitoring stations that are closest to the Project site and that have sufficient years of monitoring data are as follows:

- **Brooks Airpointer Monitoring Station.** This station is located approximately 25 km east-southeast of the Project site and has data for background NO_2 and $PM_{2.5}$ for the period from 04-Jun-2021 to 30-Apr-2024 (GOA 2024a).
- **Medicine Hat Monitoring Station.** This station is located approximately 126 km east-southeast of the Project site and has data for background SO_2 for the period from 01-May-2021 to 30-Apr-2024 (GOA 2024a).

The AQMG requires that three years of data be used to calculate background concentrations for modelling purposes (GOA 2021a). Although the Brooks Airpointer Monitoring Station has only 35 months of data as opposed to the required 36 months, the data from this monitoring station were deemed to be more appropriate for use in the modelling because this monitoring station is located much closer to the Project site than any other monitoring station.

As required by the AQMG, the 90th percentile value of all measured hourly-average data are used to estimate the one-hour average background concentrations for each of the three years available and then the average of those three concentrations was used for the modelling. The maximum calculated 24-hour and 30-day averages are based on the reduced hourly data set, with the greater than 90th percentile data removed. The maximum annual average concentrations were calculated for each of the three years and then the maximum of those three values was used as the annual background concentration, based on this same reduced data set.

4.4.1.2 Baseline Air Quality Dispersion Modelling

Modelling was performed for NO_x, SO_2 and $PM_{2.5}$ emissions that occur in the area based on 2023 data, which was the most recent data available at the time of modelling. It should be noted that NO_x modelling results were converted to NO_2 using the Plume Volume Molar Ratio Method

(PVMRM) as outlined in the 2021 Alberta AQMG (GOA, 2021b) and as required for comparison with the AAAQO (GOA, 2024a). The following modelling options were also selected in AERMOD for the PVMRM calculations, as required by the 2021 Alberta AQMG:

- The default equilibrium NO_2/NO_x ratio of 0.90 was used;
- NO_2/NO_x In-Stack Ratio (ISR) was not available for the emission sources and as such, a value of 0.2 was assigned; and
- Onsite ozone (O_3) concentrations were not available and as such, rural O_3 concentration background data from Appendix F of the 2021 Alberta AQMG and were used for the PVMRM conversions.

The modelling was performed in accordance with the protocol required by the most current version of the AQMG (GOA 2021a). The following emitters were included in the Baseline Air Quality Assessment:

- **Neighbouring Industrial Emitter.** NO_x emissions from the Journey Energy Inc. (Journey) Countess Oil Battery, located at LSD 10-09-020-16 W4M, were included in the modelling. Emission data were based on the 2023 National Pollutant Release Inventory (NPRI) for the facility (i.e., the latest year for which data were publicly available at the time of modelling; GOC 2024b). Information is not available on the actual combustion sources at the site. As such, it was assumed that the reported emissions were from one compressor and one heater. The other parameters required for modelling the two assumed sources (i.e., stack height, stack diameter, exit velocity and exit temperature) were based on typical parameters from the numerous other oil battery sites in Alberta that Calvin Consulting has modelled in the past. The assumed stack and emission parameters used for this modelling are provided in Table 4-4.

Table 4-4: Stack and emission parameters assumed for the Journey Countess Oil Battery

Sources	NO_x Emission Rate (g/s)	Stack Height (m)	Exit Diameter (m)	Exit Velocity (m/s)	Exit Temperature (°C)
Compressor	0.5162	8.4	0.32	42.1	507
Heater	0.0911	9.4	0.65	10.0	404

- **Trans-Canada Highway (TCH).** NO_x, SO_2 and particulate emissions were estimated from 2023 traffic statistics (Table 4-5) for the intersection of the TCH and Highway 36 west of Brooks, Alberta as indicated on the Alberta Transportation website, using the methodology outlined in the United States Environmental Protection Agency (US EPA) NR-009d (US EPA 2010a).

Table 4-5: Alberta Transportation traffic statistics associated with the TCH between Bassano and Brooks in 2023

Type of Vehicle	No. of Vehicles/hour
Passenger	593
Recreational	47
Bus	1
Single Unit Truck	26
Tractor Trailer	206

The resulting emissions are provided in Table 4-6. The assumptions were used for quantifying the vehicle emissions:

- For the one-hour averaging period, the maximum vehicle volume of the *AM 100th Highest Hour* or *PM 100th Highest Hour* maximum traffic (i.e., in morning or evening), whichever was highest for each vehicle type, was used in the modelling. For 24-h, 30-day and annual modelling, the Annual Average Daily Traffic (AADT) values were used (GOA 2024c).
- Passenger, recreational and single unit truck vehicles included in the model were assumed to be fuelled by gasoline, as opposed to diesel.
- Passenger vehicles were conservatively all assumed to be Toyota Rav4s (i.e., a popular midsize SUV) for the purpose of estimating a passenger vehicle engine power rating and resulting emissions.
- The number of passenger vehicles on the TCH in 2023, as indicated by Alberta Transportation statistics was reduced by 1.59% to account for the percentage of electric vehicles (EVs) based on Statistics Canada information (GOC, 2024e).
- Hybrid vehicles were assumed to be operating on gasoline given the speed on the TCH.
- Single unit trucks were all assumed to be U-Haul cube vans for the purpose of estimating a single unit truck engine power rating.
- Generic engine power ratings for recreational vehicles, buses and tractor trailers were obtained from various online sources.
- Buses and tractor trailers were assumed to be fuelled by diesel with fuel consumption rates obtained from the Government of Canada (GOC, 2019; 2021b).
- When quantifying emissions from diesel-fuelled vehicles, the emission factors vary by year and by the number of operating hours per year. As such, all diesel-fuelled vehicles were conservatively assumed to be 2019 models and were conservatively assumed to operate 12 hours per day throughout the year.
- All vehicles were assumed to travel 110 km/h.
- The highway was assumed to be 14.8 m wide for the purpose of modelling the highway emissions as an area source.

Applicable engine specification sheets were used to quantify emissions for the Baseline Case (see Appendix B9 – Annex).

Table 4-6: Combined emission rates of vehicles travelling on the TCH

Averaging Period for Modelling Purposes	NO_x ($g/s\text{-}m^2$)	SO_2 ($g/s\text{-}m^2$)	$PM_{2.5}$ ($g/s\text{-}m^2$)
One-Hour	6.59E-05	1.07E-07	-
24-Hour	-	3.96E-08	4.70E-07
30-Day	-	3.96E-08	-
Annual	2.40E-05	3.96E-08	-

- **Canadian Pacific Kansas City Railway (CPKCR).** NO_x, SO_2 and particulate emissions were also estimated for trains that pass by the site. Based on information received from the CPKCR, it was assumed that there were 20 trains per day on average, travelling 90 km/h and that each train hauled an average of 114 railcars weighing 58 t each. Also, it was assumed that the trains had an average of three engines each, with a power rating of

4400 HP/locomotive based on information for the most popular train engines obtained from the Railway Association of Canada (2020; 2022). The associated SO_2 emissions were estimated based on US EPA AP-42 and Method NR-009d (US EPA 1996b; 2010a), while the NO_x and particulate emission factors were obtained from Table 1 of the National Archive Code of Federal Regulations, Title 40, 1033.101, *Line Haul Locomotive Emission Standards for Tier 3 Engines* (US EPA 2008). It was assumed that the railway was 3 m wide for the purpose of modelling the train emissions as an area source. The resulting railway emissions are provided in Table 4-7, noting that $PM_{2.5}$ emission factors for trains were not available and as such, all particulate emissions were conservatively assumed to be $PM_{2.5}$**.**

Table 4-7: Emission rates of the CPKCR Trains

Source	NO_x (g/s-m^2)	SO_2 (g/s-m^2)	$PM_{2.5}$ (g/s-m^2)
Trains	7.35E-05	1.34E-06	7.36E-08

As previously indicated, the modelling was performed as per the 2021 Alberta AQMG using the US EPA American Meteorological Society/Environmental Protection Agency Regulatory Model (AERMOD, previously AERMET) v.23132 dispersion model, five years of meteorological data and elevated terrain as described in the following:

- **Meteorological Data.** Meteorological data were obtained from the Alberta EPA WRF Meteorological Data Repository as previously presented in Appendix B1, Figure B1-4 (GOA 2021b). The data cover the period from 01-Jan-2015 to 31-Dec-2019 and are centred on the geographical point at 50.655°N and 112.223°W. Five years of the data were processed in AERMET v.23132 to produce meteorological files suitable for use in AERMOD.
- **Terrain Data.** Terrain data were obtained from the GOC, Department of Natural Resources Geobase online portal, which provides public access to a base of quality geospatial data for all of Canada (GOC 2024d). The domain used for this Air Quality Assessment incorporates topographic data from map identified as 082I09.
- **Modelling Receptors.** The following receptor grids, referenced from the assumed centre point of the SLR expansion site, were used in the Air Quality Assessment as required by the 2021 Alberta AQMG:
    - **Grid 1** Every 50 m out to 500 m
    - **Grid 2** Every 250 m out to 2000 m
    - **Grid 3** Every 500 m out to 5000 m
    - **Grid 3** Every 1000 m out to 7500 m
    - **Grid 5** Every 20 m along the Project boundary
    - **Grid 6** Every 20 m out to 200 m surrounding each maximum ground-level concentration predicted by the previous runs
    - **Grid 7** Sensitive Receptors as previously indicated on Appendix B1, Figure B1-5 and in Table 4-2

4.4.1.3 Baseline GHG Emissions

Baseline GHG emissions and GHG sequestration were estimated for the following within the LSA:

- **Trees**. GHG emissions/sequestration were estimated only for the trees that will be removed from the reservoir expansion area. It has been assumed that emissions from other trees within the LSA will remain relatively unchanged in the future. The methodology used was from ECCC *National Inventory Report 1990 to 2022 Greenhouse Gas Sources and Sinks in Canada* (GOC 2024b). The area of trees to be removed from the expansion site was estimated from aerial imaging and the emission factor used was for semi-arid prairie land. It should be noted that ECCC assumes that other types of vegetation (e.g., prairie grassland) do not emit or sequester GHGs.
- **Grazing Cattle.** Similarly, because data are not available for the number of cattle in the neighbouring feedlot or farms, GHG emissions were only estimated for the cattle (i.e., 269 cow/calf pairs, based on calculations for the Project area, using guidelines from the Dry Mixedgrass Range Plant Community Guide; Adams et al. 2013) that were grazing on the Project site prior to the commencement of construction. It was conservatively assumed that these cattle were grazing on the Project site area throughout the year, which is likely an over-estimation.
- **Existing SLR.** Emissions from the existing SLR were based on the year of construction (i.e., 1998) and Baseline year of 2023 using the ECCC methodology (GOC 2024c).
- **Vehicles.** GHG emissions were estimated also using the ECCC methodology (GOC 2024b) and the same assumptions previously indicated for the air quality dispersion modelling of vehicles on the TCH, with the exception of passenger vehicle fuel consumption obtained from the GOC (2023b). It should be noted that for the purposes of estimating annual GHG emissions, the AADT data were used in place of the overall highest hourly data.
- **Railway.** Again, GHG emissions were estimated also using the ECCC methodology (GOC 2024b) and the same assumptions indicated for the air quality dispersion modelling.

GHG emissions from the Journey Countess Oil Battery could not be estimated because fuel usage data for the facility are not available.

4.4.2 Results: Baseline Case

Background air quality monitoring data were analyzed for the Baseline Case (Table 4-8) and were used for dispersion modelling purposes.

4.4.2.1 Baseline NO_2 Modelling Results

Maximum predicted ground-level NO_2 concentrations, including background NO_2 concentrations, are provided in Table 4-9. The maximum predicted ground-level NO_2 concentrations for the one-hour and annual averaging periods exceed the appliable AAAQOs for NO_2 (see Table 4-1) in a small area close to the northeast side of the TCH (Table 4-9; see Appendix B1, Figure B1-6 and Figure B1-7). The location of each maximum NO_2 concentration in relation to the assumed centre point of the SLR expansion site is also provided in Table 4-9, along with figure numbers for the associated isopleth drawings. Input and output files associated with NO_2 modelling for the Baseline Case are included in Appendix B3.

Table 4-8: Background concentrations

Averaging Period	Concentration ($\mu g/m^3$)		
	NO_2	SO_2	$PM_{2.5}$
One-Hour	14.3	0.5	-
24-Hour	-	0.5	15.3
30-Day	-	0.4	-
Annual	5.6	0.2	-

Modelling was also conducted for the Sensitive Receptors previously indicated in Table 4-2. The results of this modelling are indicated in Table 4-10. All maximum predicted ground-level concentrations associated with the Baseline Case comply with the applicable AAAQOs for NO_2 at each Sensitive Receptor (Table 4-10; GOA 2024a).

Table 4-9: Maximum predicted ground-level NO_2 concentrations associated with baseline case

Averaging Period	Background Concentrations (µg/m³)	Predicted Concentration (µg/m³)	Predicted Concentration with Background (µg/m³)	AAAQO (µg/m3)	Location of Maximum		Isopleth Figure Number
					Distance (m)	Direction	
One-Hour	14.3	1,179.9[(a)]	**1,192.2**	**300**	5,961	ENE	Appendix B1, B1-6
Annual	5.6	69.3[(b)]	**74.9**	**45**	6,648	ENE	Appendix B1, B1-7

(a) Ninth-highest hourly average predicted concentration as per the 2021 Alberta AQMG
(b) Overall maximum predicted concentration as per the 2021 Alberta AQMG

Table 4-10: Maximum predicted ground-level NO_2 concentrations[1] at sensitive receptors for the baseline case

Sensitive Receptor	Location (UTM)		Location Relative to Assumed Centre Point		Maximum Predicted NO_2 Concentration (µg/m³)		AAAQO (µg/m³)	
	Easting (m)	Northing (m)	Distance (m)	Direction	One-Hour	Annual	1h	Annual
1	418657	5604955	6,854	SSE	28.9	6.1	**300**	**45**
2	410679	5614305	5,793	NW	38.8	6.4		
3	422200	5612468	6,914	ENE	174.3	11.5		
4	422806	5612895	7,602	ENE	83.5	8.5		
5	418529	5604712	7,012	SSE	29.5	6.1		
6	409285	5607279	7,198	WSW	31.0	5.9		
7	408992	5613217	6,818	WNW	36.2	6.1		
8	417159	5615320	4,642	NNE	83.3	10.0		

[1] Includes background concentrations

4.4.2.2 Baseline SO_2 Modelling Results

Maximum predicted ground-level SO_2 concentrations, including background SO_2 concentrations, are provided in Table 4-11. The maximum predicted ground-level SO_2 concentrations for all averaging periods comply with the appliable AAAQOs for SO_2 (see Table 4-1). It should be noted that isopleth figures were not generated for SO_2 modelling since the predicted results are less than 10% of the applicable AAAQOs for SO_2 for all averaging periods.

Results of SO_2 modelling for the sensitive receptors previously indicated in Table 4-2 are summarized in Table 4-12. All maximum predicted ground-level concentrations associated with the Baseline Case comply with the applicable AAAQOs (see Table 4-1) for SO_2 at each sensitive receptor. Input and output files associated with SO_2 modelling for the Baseline Case are included in Appendix B4.

4.4.2.3 Baseline $PM_{2.5}$ Modelling Results

Maximum predicted ground-level $PM_{2.5}$ concentrations, including background $PM_{2.5}$ concentrations, are provided in Table 4-13, noting that for all averaging periods greater than one-hour, the first-highest predicted concentration is the value that is required to be reported for Air Quality Dispersion Modelling Assessments in Alberta. The maximum predicted ground-level $PM_{2.5}$ concentration for the 24-hour averaging period slightly exceeds the appliable AAAQO for $PM_{2.5}$ (see Table 4-1) in a small area close to the northeast side of the TCH. The location of the maximum $PM_{2.5}$ concentration in relation to the assumed centre point of the SLR expansion site is also provided in Table 4-13 along with the associated isopleth figure number (Appendix B1, Figure B1-8).

Results of $PM_{2.5}$ modelling for the sensitive receptors previously indicated in Table 4-2 are summarized in Table 4-14. All maximum predicted ground-level concentrations associated with the Baseline Case comply with the applicable AAAQOs for $PM_{2.5}$ (see Table 4-1) at each sensitive receptor. Input and output files associated with $PM_{2.5}$ modelling for the Baseline Case are included in Appendix B5.

4.4.2.4 Baseline GHG Emissions

Values for Carbon Dioxide (CO_2), Methane (CH_4) and Nitrous Oxide (N_2O) are converted to CO_2eq using the current Global Warming Potentials (GWPs) as stated in the *Canada Gazette, Part 1, Volume 157, Number 4: Supplement Notice with Respect to Reporting of Greenhouse Gases (GHGs) for 2022 and 2023* (Canada GHG Notice; Table 4-15; GOC 2023a). GWPs are used to convert other GHGs to the equivalent thermal warming potential of CO_2. For example, CH_4 has 28 times the warming potential of CO_2. A summary of the GHG emissions associated with the Baseline Air Quality Assessment is provided in Table 4-16.

Table 4-11: Maximum predicted ground-level SO_2 concentrations associated with baseline case

Averaging Period	Background Concentrations (µg/m³)	Predicted Concentration (µg/m³)	Predicted Concentration with Background (µg/m³)	AAAQO (µg/m3)	Location of Maximum	
					Distance (m)	Direction
One-Hour	0.5	8.0[(a)]	8.5	**450**	6,256	ENE
24-Hour	0.5	1.2[(b)]	1.7	**125**	6,394	ENE
30-Day	0.4	0.4[(b)]	0.8	**30**	4,686	NNE
Annual	0.2	0.3[(b)]	0.5	**20**	4,686	NNE

(a) Ninth-highest hourly average predicted concentration as per the 2021 Alberta AQMG
(b) Overall maximum predicted concentration as per the 2021 Alberta AQMG

Table 4-12: Maximum predicted ground-level SO_2 concentrations[1] at sensitive receptors for the baseline case

Sensitive Receptor	Location (UTM)		Location Relative to Assumed Centre Point		Maximum Predicted SO_2 Concentration (µg/m³)				AAAQO (µg/m³)			
	Easting (m)	Northing (m)	Distance (m)	Direction	One-Hour	24-Hour	30-Day	Annual	One-Hour	24-Hour	30-Day	Annual
1	418657	5604955	6,854	SSE	0.6	0.5	0.4	0.2	**450**	**125**	**30**	**20**
2	410679	5614305	5,793	NW	0.6	0.5	0.4	0.2				
3	422200	5612468	6,914	ENE	1.4	0.7	0.4	0.2				
4	422806	5612895	7,602	ENE	0.8	0.6	0.4	0.2				
5	418529	5604712	7,012	SSE	0.6	0.5	0.4	0.2				
6	409285	5607279	7,198	WSW	0.6	0.5	0.4	0.2				
7	408992	5613217	6,818	WNW	0.6	0.5	0.4	0.2				
8	417159	5615320	4,642	NNE	0.7	0.6	0.4	0.2				

[1] Includes background concentrations

Table 4-13: Maximum predicted ground-level $PM_{2.5}$ concentrations associated with baseline case

Averaging Period	Background Concentrations (µg/m³)	Predicted Concentration (µg/m³)	Predicted Concentration with Background (µg/m³)	AAAQO (µg/m3)	Location of Maximum		Isopleth Figure Numbers
					Distance (m)	Direction	
24-Hour	15.3	13.8[(a)]	**29.1**	**29**	6,394	ENE	Appendix B1, B1-8

(a) Overall maximum predicted concentration as per the 2021 Alberta AQMG

Table 4-14: Maximum predicted ground-level $PM_{2.5}$ concentrations[1] at sensitive receptors for the baseline case

Sensitive Receptor	Location (UTM)		Location Relative to Assumed Centre Point		Maximum Predicted $PM_{2.5}$ Concentration (µg/m³)	AAAQO (µg/m³)
	Easting (m)	Northing (m)	Distance (m)	Direction	Baseline	24-Hour
1	418657	5604955	6,854	SSE	15.5	**29**
2	410679	5614305	5,793	NW	15.6	
3	422200	5612468	6,914	ENE	17.0	
4	422806	5612895	7,602	ENE	15.9	
5	418529	5604712	7,012	SSE	15.5	
6	409285	5607279	7,198	WSW	15.4	
7	408992	5613217	6,818	WNW	15.5	
8	417159	5615320	4,642	NNE	16.3	

[1] Includes background concentrations

Table 4-15: Current GWPs for GHG emission estimations

Substance	GWP
CO_2	1
CH_4	28
N_2O	265

Table 4-16: Summary of baseline GHG emissions[(a)]

Source	Emissions (t/a)			
	CO_2	CH_4	N_2O	CO_2eq
Trees	-227.0	-	-	-227.0
Existing SLR	398.3	-	-	398.3
Cattle	-	2.0	-	56.0
Vehicles (Trans-Canada Highway)	16,010.3	1.1	0.3	16,191.0
Trains	11,107.1	0.6	4.6	12,263.4
TOTAL	**27,288.7**	**3.7**	**4.6**	**28,611.3**

(a) Values for CO_2, CH_4, and N_2O are converted to CO_2eq using the current GWPs presented in the Canada GHG Notice (Table 4-15; GOC 2023a).

4.5 PROJECT CONSTRUCTION CASE

The following two emission inventories were modelled for the Project Construction Case:

- **Project Emissions.** Emissions from only the Project during the construction phase of the Project in 2027.
- **Cumulative Emissions.** Emissions from the Project and other industrial and vehicular emissions in the area in 2027.

4.5.1 Methods: Construction Case

4.5.1.1 Project Emissions for Construction Case

Modelling was performed for NO_2, SO_2 and $PM_{2.5}$ associated with the Project only, assuming no mitigation to suppress fugitive dust emissions from construction activities. Table 4-17 provides a summary of the number of on-site vehicles associated with the Project. For the purposes of modelling the worst-case Project emissions, it was assumed that the month with the largest area being cleared would best represent a worst-case scenario. As such, emissions from this worst-case month were modelled as if these emissions occurred throughout the entire year of 2027. This is a conservative assumption since emissions will be less during the winter months when less construction is expected to take place according to current schedules.

All on-site construction equipment listed in Table 4-17 were assumed to be diesel-fuelled and operate 12 hours per day, with the exception of the water trucks**.** Emissions associated with the water trucks were modelled for the Mitigation Cases only. The emissions rates for combustion associated with the on-site mobile equipment and fugitive $PM_{2.5}$ emissions associated with site activities are provided in Table 4-18.

Table 4-17: Summary of on-site construction vehicles used for modelling purposes

Equipment	Number	Usage (h/d)
Bulldozers	4	12
Dump Trucks	12	12
Excavators	8	12
Loaders	10	12
Scrapers	12	12
Water Trucks[(a)]	4	12

(a) Modelled for the Mitigation Case only

Table 4-18: Project emission rates for mobile and fugitive area sources

Source	NO_2 ($g/s\text{-}m^2$)		SO_2 ($g/s\text{-}m^2$)				$PM_{2.5}$ ($g/s\text{-}m^2$)
	One-Hour	Annual	One-Hour	24-Hour	30-Day	Annual	24-Hour
Vehicle Exhaust	7.22E-06	1.37E-06	1.55E-08	7.76E-09	7.76E-09	2.94E-09	1.31E-08
Scraping	-	-	-	-	-	-	3.09E-07
Bulldozing	-	-	-	-	-	-	5.53E-08
Grading	-	-	-	-	-	-	6.51E-08
Material Transfers	-	-	-	-	-	-	3.85E-09
Road Dust	-	-	-	-	-	-	6.16E-06

In addition to the on-site mobile equipment, the following additional on-site point sources were also included in the modelling:

- **Heaters.** These were assumed to be diesel-fuelled, have a power rating of 390,000 BTU/h (i.e., 117.3 kW) and operate a total of 12 hour per day (h/d). It should be noted that these heaters would not operate during the hot summer months but were included in the worst-case one-hour modelling. For annual modelling, it was assumed these sources operate a total of 115 days in the winter for a total of 1,380 hours per annum (h/a). Although it will vary with the weather conditions, the actual hours that heaters will run are expected to be less than the above estimate.
- **Lighting.** These were assumed to be diesel-fuelled, have a power rating of 8 kW each and assumed to operate for 5 h/d for one-hour, 24-h and 30-day averaging periods. For the annual modelling it was assumed that the lighting would operate a maximum of 2 h/d in the summer months and 5 h/d in the winter months for a total annual runtime of 1,035 h/a.
- **Electrical Generators.** These were assumed to be diesel-fuelled, have a power rating of >447 kW each and operate a maximum of 12 h/d for a maximum of 345 days per annum (d/a). This is likely an overestimation of the actual hours that generators will run each year of construction.
- **Portable Water Pump.** This was assumed to be diesel-fuelled, have a power rating of 60 kW and to operate a 12 h/d throughout the year, noting that this pump would only operate on an as-needed basis.

Methodologies used in quantifying releases for the construction phase include Canadian Association of Petroleum Producers (CAPP, 2014), US EPA AP-42 (US EPA 1996a, 1996b, 1998, 2006, 2008, 2010a and 2010b) and the Alberta Annual Emissions Inventory Report Standard and Guidance Document (GOA 2024d). A summary of on-site point sources is provided in Table 4-19 and their associated emissions are summarized in Table 4-20. Applicable specification sheets for on-site construction vehicles are provided in Appendix B9 – Annex.

Table 4-19: Summary of on-site point sources

Equipment	Power Rating[a] (kW)	Number[a]	Usage	
			(h/d)	(h/a)
Heaters	117	4	12	1,380[b]
Lighting	8	4	5	1,035[c]
Emergency Generators	650	2	12	4,140[d]
Pump	80	1	12	2,760[e]

(a) Assumed
(b) Assumes 12 h/d for 115 d/a (i.e. winter days)
(c) Assumes 2 h/d in the summer months and 5 h/d in the winter months
(d) Assumes 12 h/d for 245 d/a
(e) Assumes 12 h/d for 230 d/a (i.e. summer days)

Table 4-20: Project emission rates for on-site point sources

Source	NO_2 (g/s)		SO_2 (g/s)				$PM_{2.5}$ (g/s)
	One-Hour	Annual	One-Hour	24-Hour	30-Day	Annual	24-Hour
Heaters[a]	0.0363	0.0057	-	-	-	-	0.0018
Lighting	0.0419	0.0050	0.0028	0.0006	0.0006	0.0003	0.0006
Emergency Generator	0.5386	0.2545	0.0010	0.0005	0.0005	0.0005	0.0287
Pump	0.1914	0.0603	0.0127	0.0063	0.0063	0.0040	0.0068

(a) All four heaters were assumed to be in the same location

4.5.1.2 Cumulative Emissions for the Construction Case

For the cumulative modelling case, the Project emissions are as previously described in Subsection 4.5.1.1, while the emissions for the other sources in the area were quantified as previously described in Subsection 4.4.1.2 for the Baseline Case, noting the following:

- **Neighbouring Industrial Emitter.** The NO_x emissions from the Journey Countess Oil Battery were assumed to be unchanged from those in the Baseline year of 2023 (see Table 4-4).
- **Trans-Canada Highway (TCH).** The number of gasoline-fuelled passenger vehicles was assumed to be reduced by a factor of 4.7% each year based on data from Statistics Canada, which indicate that EVs registered increased by 8.6% between 2023 and 2024 and that 55% of those vehicles were battery operated, with the rest being hybrids (GOC 2023c). For this Assessment, it was assumed that the hybrid vehicles on the TCH would be operating on gasoline given the speed limit of 110 km/h. The number of gasoline-fuelled

passenger vehicles were then assumed to increase by a factor of 1.59% per year based on population growth statistics from Statistics Canada (GOC 2024). The emissions for 2027 traffic on the TCH are provided in Table 4-21.

- **Trains.** The emissions from trains were assumed to be unchanged from the Baseline year of 2023 (Table 4-7).

Table 4-21: Combined emission rates of vehicles travelling on the TCH

Source	NO_2 ($g/s\text{-}m^2$)		SO_2 ($g/s\text{-}m^2$)				$PM_{2.5}$ ($g/s\text{-}m^2$)
	One-Hour	Annual	One-Hour	24-Hour	30-Day	Annual	24-Hour
All Vehicles	6.37E-05	2.32E-05	1.07E-07	3.96E-08			4.00E-07

4.5.1.3 GHG Emissions for Construction Case

These emissions were quantified using the ECCC methodology (GOC 2024b) and the monthly equipment usage (see Appendix B2). Fuel consumption for construction equipment was obtained from manufacturer specification sheets, when available (see Appendix B9 – Annex). In the absence of manufacturer specification sheets, fuel consumption data for a few construction vehicles were obtained from a previous Environmental Impact Assessment (EIA; Stantec 2019). The following comments also pertain to GHG quantification for the Project Construction Phase:

- **Existing SLR.** GHG emissions from reservoirs follow a decreasing trend for approximately 42 years, after which time the reservoir will begin sequestering carbon. (GOC 2024b). As such, emissions for the Construction Case are less than indicated for the 2023 Baseline year.
- **Worker Vehicles.** Worker vehicles were included in the GHG quantification assuming that there would be 80 round trips of 50 km/d each (i.e., 25 km each way) to the Project site from Brooks and that the workers would all drive pickup trucks. The workers were assumed to work five days per week. An estimated work truck fuel consumption rate was obtained from the 2021 Fuel Consumption Guide (GOC 2021a).
- **Flatbed Trailers.** Emissions from flatbed trucks were also including in the GHG estimates assuming one flatbed truck per industrial vehicle travelling 8 km each from the TCH to the Project site for delivery of supplies, including the return trip. Emissions also include the pick-up of industrial vehicles for a total of roughly32 km per industrial vehicle used on site. An estimated flatbed trailer fuel consumption rate was obtained from the 2019 Fuel Efficiency Benchmarking in Canada's Trucking Industry (GOC 2019).
- **Trans-Canada Highway (TCH).** As previously indicated for the dispersion modelling, the number of gasoline-fuelled passenger vehicles was assumed to be reduced by a factor of 4.7% each year based on data from Statistic Canada, which indicate that the number of EVs registered annually increased by 8.6% between 2023 and 2024 and that 55% of those vehicles were battery operated, with the rest being hybrids (GOC 2023c). For this Assessment, it was assumed that on the TCH, hybrid vehicles would be operating on gasoline given the speed limit of 110 km/h. The number of gasoline-fuelled passenger vehicles was then assumed to increase by a factor of 1.59% per year based on population

growth statistics from Statistics Canada (GOC 2024e). The emissions for 2027 traffic on the TCH were previously provided in Table 4-21.

- **Trains.** The emissions from trains were assumed to be unchanged from the Baseline year of 2023 (Table 4-7).

4.5.2 Results: Construction Case

Background concentration data for all modelling cases are as previously indicated in Table 4-8.

4.5.2.1 Construction Case Modelling Results for NO_2

The maximum predicted ground-level NO_2 modelling results for the Project Construction Case and Cumulative Case are presented in Table 4-22, noting the following:

- **Project Construction Case.** The maximum predicted one-hour ground-level NO_2 concentrations exceed the applicable AAAQO out to 2,275 m to the north and 2,800 m to the southeast of the Project boundary (Table 4-1; Appendix B1, Figure B-9). Beyond the Project boundary, the hourly-average AAAQO is predicted to be exceeded 2.3% of the time under worst-case meteorological conditions and based on the conservative approach used to estimate the Project emissions (GOA 2024a; GOA 2021b). The annual ground-level concentrations comply with the applicable AAAQO (Table 4-1; Appendix B1, Figure B1-10).
- **Cumulative Construction Case.** For the Cumulative Construction Case, the maximum predicted one-hour and annual ground-level NO_2 concentrations exceed the applicable AAAQO (Table 4-1, Appendix B1, Figures B1-11 and B1-12). However, it is important to note that the overall maximum predicted NO_2 concentrations near the TCH are associated with emissions from traffic on the TCH and are actually less than predicted for the 2023 Baseline Case because of the assumed number of increased EVs in 2027.

The location of each maximum NO_2 concentration in relation to the assumed centre point of the SLR expansion site is also provided in Table 4-22 along with figure numbers for the associated isopleth drawings. Input and output files associated with NO_2 modelling for the Construction Case are included in Appendix B6.

Modelling was also conducted for the sensitive receptors previously indicated in Table 4-2. The results of this modelling are provided in Table 4-23. As shown in Table 4-23, all maximum predicted ground-level concentrations associated with the Project Construction Case and Cumulative Construction Case comply with the applicable AAAQOs for NO_2 at each sensitive receptor.

Table 4-22: Maximum predicted ground-level NO_2 concentrations for construction case

Averaging Period	Background Concentrations (µg/m³)	Predicted Concentration (µg/m³)	Predicted Concentration with Background (µg/m³)	AAAQO (µg/m3)	Location of Maximum		Isopleth Figure Numbers
					Distance (m)	Direction	
Project Construction Case							
One-Hour	14.3	471.4[(a)]	**485.7**	**300**	2,526	NW	Appendix B1, B1-9
Annual	5.6	6.7[(b)]	12.3	**45**	1,306	SW	Appendix B1, B1-10
Cumulative Construction Case							
One-Hour	14.3	1,139.3[(a)]	**1,153.6**	**300**	5,961	ENE	Appendix B1, B1-11
Annual	5.6	67.7[(b)]	**73.3**	**45**	6,648	ENE	Appendix B1, B1-12

(a) Ninth-highest hourly average predicted concentration as per the 2021 Alberta AQMG (GOA 2021a)
(b) Overall maximum predicted concentration as per the 2021 Alberta AQMG (GOA 2021a)

Table 4-23: Maximum predicted ground-level NO_2 concentrations[1] at sensitive receptors for construction case

Sensitive Receptor	Location (UTM)		Location Relative to Assumed Centre Point		Maximum Predicted NO_2 Concentration (µg/m³)				AAAQO (µg/m³)	
	Easting (m)	Northing (m)	Distance (m)	Direction	Project Construction Case		Cumulative Construction Case		1h	Annual
					One-Hour	Annual	One-Hour	Annual		
1	418657	5604955	6,854	SSE	179.3	6.0	183.5	6.5	**300**	**45**
2	410679	5614305	5,793	NW	251.9	5.9	251.9	6.7		
3	422200	5612468	6,914	ENE	135.6	5.9	173.7	11.7		
4	422806	5612895	7,602	ENE	123.0	5.9	212.9	8.6		
5	418529	5604712	7,012	SSE	175.3	5.9	178.4	6.5		
6	409285	5607279	7,198	WSW	145.2	5.8	157.8	6.1		
7	408992	5613217	6,818	WNW	173.4	5.8	178.6	6.3		
8	417159	5615320	4,642	NNE	200.8	6.3	210.3	10.8		

[1] Includes background concentrations

4.5.2.2 Construction Case Modelling Results for SO_2

SO_2 modelling was also completed for the Project Construction Case and Cumulative Construction Case. The maximum predicted ground-level SO_2 concentrations, including background SO_2 concentrations, are provided in Table 4-24. The maximum predicted ground-level SO_2 concentrations for all averaging periods comply with the applicable AAAQOs for SO_2 (Table 4-24; GOA 2024a). The location of the maximum SO_2 concentration in relation to the assumed centre point of the SLR expansion site is also provided in Table 4-24. It should be noted that isopleth figures were not generated for SO_2 modelling since the predicted results are <10% of the applicable AAAQOs (see Table 4-1) for SO_2 for all averaging periods. Input and output files associated with SO_2 modelling for the Construction Case are included in Appendix B7.

Modelling was also conducted for the sensitive receptors previously indicated in Table 4-2. The results of this modelling are indicated in Table 4-25. As indicated, all maximum predicted ground-level concentrations associated with the Project Construction Case and Cumulative Construction Case comply with the applicable AAAQOs for SO_2 (see Table 4-1) at each sensitive receptor (GOA 2024a).

Table 4-24: Maximum predicted ground-level SO_2 concentrations for construction case

Averaging Period	Background Concentrations (µg/m³)	Predicted Concentration (µg/m³)	Predicted Concentration with Background (µg/m³)	AAAQO (µg/m³)	Location of Maximum	
					Distance (m)	Direction
Project Construction Case						
One-Hour	0.5	15.9[(a)]	16.4	**450**	1,824	WNW
24-Hour	0.5	4.5[(b)]	5.0	**125**	1,786	WNW
30-Day	0.4	0.9[(b)]	1.3	**30**	1,824	WNW
Annual	0.2	0.2[(b)]	0.4	**20**	1,786	WNW
Cumulative Construction Case						
One-Hour	0.5	15.9[(a)]	16.4	**450**	1,824	WNW
24-Hour	0.5	4.5[(b)]	5.0	**125**	1,786	WNW
30-Day	0.4	0.9[(b)]	1.3	**30**	1,824	WNW
Annual	0.2	0.2[(b)]	0.4	**20**	1,786	WNW

(a) Ninth-highest hourly average predicted concentration as per the 2021 Alberta AQMG (GOA 2021a)
(b) Overall maximum predicted concentration as per the 2021 Alberta AQMG (GOA 2021a)

Table 4-25: Maximum predicted ground-level SO_2 concentrations[1] at sensitive receptors for construction case

Sensitive Receptor	Location (UTM)		Location Relative to Assumed Centre Point		Maximum Predicted SO_2 Concentration ($\mu g/m^3$)				AAAQO ($\mu g/m^3$)			
	Easting (m)	Northing (m)	Distance (m)	Direction	One-Hour	24-Hour	30-Day	Annual	One-Hour	24-Hour	30-Day	Annual
Project Construction Case												
1	418657	5604955	6,854	SSE	1.1	0.6	0.4	0.2	**450**	**125**	**30**	**20**
2	410679	5614305	5,793	NW	1.6	0.6	0.4	0.2				
3	422200	5612468	6,914	ENE	0.9	0.6	0.4	0.2				
4	422806	5612895	7,602	ENE	0.9	0.5	0.4	0.2				
5	418529	5604712	7,012	SSE	1.1	0.6	0.4	0.2				
6	409285	5607279	7,198	WSW	0.9	0.6	0.4	0.2				
7	408992	5613217	6,818	WNW	1.2	0.6	0.4	0.2				
8	417159	5615320	4,642	NNE	1.1	0.6	0.4	0.2				
Cumulative Construction Case												
1	418657	5604955	6,854	SSE	1.1	0.6	0.4	0.2	**450**	**125**	**30**	**20**
2	410679	5614305	5,793	NW	1.6	0.6	0.4	0.2				
3	422200	5612468	6,914	ENE	1.4	0.7	0.4	0.2				
4	422806	5612895	7,602	ENE	1.1	0.6	0.4	0.2				
5	418529	5604712	7,012	SSE	1.1	0.6	0.4	0.2				
6	409285	5607279	7,198	WSW	1.0	0.6	0.4	0.2				
7	408992	5613217	6,818	WNW	1.2	0.6	0.4	0.2				
8	417159	5615320	4,642	NNE	1.8	0.7	0.4	0.2				

[1] Includes background concentrations

4.5.2.3 Construction Case Modelling Results for $PM_{2.5}$

The maximum predicted ground-level $PM_{2.5}$ modelling results, including background $PM_{2.5}$ concentrations, for the Project Construction Case and Cumulative Construction Case are presented in Table 4-26, noting the following:

- **Project Construction Case.** The maximum predicted 24-hour ground-level $PM_{2.5}$ concentration exceeds the applicable AAAQO beyond the LSA in all directions, assuming no mitigation (Table 4-1; Appendix B1, Figure B1-13). However, assuming gravel roads and construction area are watered more than twice per day, when necessary, to prevent fugitive dust emissions, although the maximum 24-hour ground-level $PM_{2.5}$ concentrations are still predicted to exceed the applicable AAAQO, the concentrations are only predicted to exceed 2.2% of the time beyond the construction site in the north, northwest and/or south directions (Table 4-26 and Appendix B1, Figure B1-14; GOA 2024b).
- **Cumulative Construction Case.** The Cumulative Construction Case maximum predicted $PM_{2.5}$ modelling results are only slightly higher than the Project Construction Case (Table 4-1; Appendix B1, Figures B1-15 and B1-16, respectively).

The location of each maximum $PM_{2.5}$ concentration in relation to the assumed centre point of the SLR expansion site is also provided in Table 4-26 along with figure numbers for the associated isopleth drawings. Input and output files associated with $PM_{2.5}$ modelling for the Construction Cases are included in Appendix B8.

Modelling was also conducted for the sensitive receptors previously indicated in Table 4-2. The results of this modelling are indicated in Table 4-27. As shown in Table 4-27, maximum predicted ground-level concentrations associated with the Project Construction Case and Cumulative Construction Case, assuming no mitigation, are predicted to exceed the applicable AAAQO at all sensitive receptors. However, maximum predicted ground-level concentrations associated with the Project Construction Case and Cumulative Construction Case assuming watering more than twice a day to control fugitive dust emissions are predicted to exceed the applicable AAAQO at the nearby Antelope Creek Ranch (Sensitive Receptor 5) and the Trans-Canada Highway Twinning Monument (TCHTM; Sensitive Receptor 8) a maximum of one day during the five-year construction period. To further mitigate fugitive dust emissions, dust fencing can be installed around parts of the construction site, as needed. With the use of this fencing and on-going watering to prevent fugitive dust emissions, is it highly unlikely that $PM_{2.5}$ concentrations will be exceeded at any of the sensitive receptor locations.

4.5.2.4 GHG Emissions During Project Construction

A summary of the GHG emissions estimated for the five-year Construction Phase is provided in Table 4-28. For discussion on this data and expected Project effects on climate change, see Volume 2, Section 12 (Climate Change).

Table 4-26: Maximum predicted ground-level $PM_{2.5}$ concentrations for construction case

Averaging Period	Background Concentrations (µg/m³)	Predicted Concentration (µg/m³)	Predicted Concentration with Background (µg/m³)	AAAQO (µg/m3)	Location of Maximum		Isopleth Figure Numbers
					Distance (m)	Direction	
Project Construction Case without Mitigation							
24-Hour	15.3	533.4[(a)]	**548.7**	**29**	1,476	SW	Appendix B1, B1-13
Project Construction Case assuming Watering							
24-Hour	15.3	170.2[(a)]	**185.6**	**29**	1,476	SW	Appendix B1, B1-14
Cumulative Construction Case without Mitigation							
24-Hour	15.3	533.5[(a)]	**548.8**	**29**	1,476	SW	Appendix B1, B1-15
Cumulative Construction Case assuming Watering							
24-Hour	15.3	170.4[(a)]	**185.7**	**29**	1,476	SW	Appendix B1, B1-16

(a) Overall maximum predicted concentration as per the 2021 Alberta AQMG (GOA 2021a)

Table 4-27: Maximum predicted ground-level $PM_{2.5}$ concentrations[1] at sensitive receptors for construction case

Sensitive Receptor	Location (UTM)		Location Relative to Assumed Centre Point		Maximum Predicted $PM_{2.5}$ Concentration (µg/m³)				AAAQO (µg/m³)
	Easting (m)	Northing (m)	Distance (m)	Direction	No Mitigation		With Mitigation		24-Hour
					Project	Cumulative	Project	Cumulative	
1	418657	5604955	6,854	SSE	**56.9**	**57.0**	28.6	28.7	**29**
2	410679	5614305	5,793	NW	**49.8**	**49.9**	26.4	26.5	
3	422200	5612468	6,914	ENE	**35.3**	**35.4**	21.8	21.8	
4	422806	5612895	7,602	ENE	**32.9**	**33.3**	21.0	21.3	
5	418529	5604712	7,012	SSE	**64.2**	**64.3**	**30.9**	**31.0**	
6	409285	5607279	7,198	WSW	**37.0**	**37.0**	22.3	22.3	
7	408992	5613217	6,818	WNW	**44.6**	**44.7**	24.7	24.8	
8	417159	5615320	4,642	NNE	**63.1**	**63.2**	**30.6**	**30.8**	

[1] Includes background concentrations

Table 4-28: Summary of GHG emissions for construction case

	Emission Category	Emissions (t/a)			
		CO_2	CH_4	N_2O	CO_2eq[(a)]
2025	**Project Only**				
	On-Site Construction Equipment	11,253.0	0.3	0.6	11,415.0
	Existing SLR	334.9	-	-	334.9
	Sub-Total	11,587.9	0.3	0.6	**11,749.9**
	Other Emission Sources in LSA				
	Vehicles on Trans-Canada Hwy	15,623.3	1.0	0.3	15,730.8
	Trains	11,107.1	0.6	4.3	12,263.4
	Sub-Total	**26,730.4**	**1.6**	**4.6**	**2,7994.2**
	TOTAL	**38,318.3**	**1.9**	**5.2**	**39,744.1**
2026	**Project Only**				
	On-Site Construction Equipment	11,605.3	0.3	0.6	11,775.5
	Existing SLR	304.8	-	-	304.8
	Sub-Total	**11,910.1**	**0.3**	**0.6**	**12,080.3**
	Other Emission Sources in LSA				
	Vehicles on Trans-Canada Hwy	15,406.2	1.0	0.3	15,513.7
	Trains	11,107.1	0.6	4.3	12,263.4
	Sub-Total	**26,513.3**	**1.6**	**4.6**	**27,777.1**
	TOTAL	**38,423.4**	**1.9**	**5.2**	**39,857.4**
2027	**Project Only**				
	On-Site Construction Equipment	22,737.7	0.6	1.5	23,165.1
	Existing SLR	275.7	-	-	275.7
	Sub-Total	**23,013.4**	**0.6**	**1.5**	**23,440.8**
	Other Emission Sources in LSA				
	Vehicles on Trans-Canada Hwy	15,198.1	1.0	0.3	15,305.6
	Trains	11,107.1	0.6	4.3	12,263.4
	Sub-Total	**26,305.2**	**1.6**	**4.6**	**27,569.0**
	TOTAL	**49,318.6**	**2.2**	**6.1**	**51,009.8**
2028	**Project Only**				
	On-Site Construction Equipment	27,271.3	0.8	1.9	27,803.1
	Existing SLR	247.6	-	-	247.6
	Sub-Total	**27,518.9**	**0.8**	**1.9**	**28,050.7**
	Other Emission Sources in LSA				
	Vehicles on Trans-Canada Hwy	15,001.0	1.0	0.3	15,108.5
	Trains	11,107.1	0.6	4.3	12,263.4
	Sub-Total	**26,108.1**	**1.6**	**4.6**	**27,371.9**
	TOTAL	**53,627.0**	**2.4**	**6.5**	**55,422.6**
2029	**Project Only**				
	On-Site Construction Equipment	7,501.4	0.2	0.3	7,576.0
	Existing SLR	220.4	-	-	220.4
	Sub-Total	**7,721.8**	**0.2**	**0.3**	**7,796.4**
	Other Emission Sources in LSA				
	Vehicles on Trans-Canada Hwy	14,813.1	1.0	0.3	14,920.6
	Trains	11,107.1	0.6	4.3	12,263.4
	Sub-Total	**25,920.2**	**1.6**	**4.6**	**27,184.0**
	TOTAL	**33,642.0**	**1.8**	**4.9**	**34,980.4**
	FIVE YEAR TOTAL	**213,329.2**	**10.2**	**27.9**	**221,014.3**

(a) Values for CO_2, CH_4, N_2O are converted to CO_2eq using the current GWPs presented in the Canada GHG Notice (Table 4-15; GOC 2023a)

4.5.3 Measures to Mitigate Adverse Effects

To mitigate adverse effects during the construction phase of the Project, all on-site vehicles will be limited to a maximum idle time of 10 minutes. Additionally, nearby unpaved roads and the construction area will be sprayed with water more than twice per day, when required, to suppress dust emissions. To further mitigate fugitive dust emissions, wind fencing can be installed around portions of the construction site, as needed. The effectiveness of this type of fencing depends on several factors, including soil type, local wind conditions and the presence of other dust control practices. Again, it should be noted that in the absence of detailed data regarding the area where clearing will occur during any one day, the previous modelling has been based on conservative assumptions.

4.5.4 Residual Effects Rating

Table 4-29 present the criteria for the Cumulative Effect Assessment assuming that watering is used for dust suppression. Air emissions will either be negative or neutral Project effects. Table 4-30 provides the assessed rating for each predicted impact.

NO_x is predicted to exceed the AAAQO only 2.3% of the time and under worst-case meteorological conditions, based on the conservative approach used in this analysis. Any Project effects of NO_x emissions will therefore be brief and confined to the construction period (including materials shipping and reclamation; i.e., 5 years) and to the LSA. Following the rating methods described in the EIA Approach (Volume 2, Section 2), this amounts to a final impact rating of **Low**.

SO_2 is rated neutral, as Project SO_2 emissions are predicted to remain well within AAAQO guidelines. The additional criteria were not addressed as per the EIA Approach (Volume 2, Section 2). Thus, the final impact rating for SO_2 is **Neutral**.

$PM_{2.5}$ modelling indicated a high magnitude effect that may occur beyond the LSA, into the regional area, however this effect will be limited to the construction (including materials shipping and reclamation; i.e., 5 years), and all effects are fully reversible. Therefore, the final impact rating for $PM_{2.5}$ Project effects are **Low**.

Greenhouse Gas Emissions were determined in this section but have been rated in Volume 2, Section 12, (Climate Change).

Table 4-29: Assessment criteria for the environmental impact assessment and cumulative effects assessment

Criteria	Description	Ratings
Direction	An assessment which determines if the change benefits (improves) or is detrimental (negative effects) to a resource or indicator	Positive, Negative, Neutral
Magnitude	The severity of the effect, or the amount of change relative to baseline, after consideration of mitigation measures and offsets	Low (< 5%), Medium (5 to 25%), High (>25%)
Geographic Extent	The spatial area within which direct and/or indirect effects on the receptor occur	Footprint, Local, Regional, Extra-Regional
Duration	Total time the receptor remains different from baseline levels	Temporary (<6 months), Short-term (6 months to 5 years), Medium term (5 to 25 years), Long term (>25/ never reversed)
Confidence	The ability to assess if a change has occurred, given uncertainty in the data and analysis used to derive results and conclusions.	High (Very Certain), Medium (some uncertainty), Low (unreliable certainty)
Social/ Ecological Context	An additional consideration which addresses functioning and uniqueness of the site and how it is expected to respond to change.	High Importance, Not Applicable (n/a)

Table 4-30: Environmental impact assessment results for construction phase

Activity	Effect Description	Evaluation Criteria for Assessing Residual Effects						
		Direction	Magnitude	Geographic Extent	Duration	Confidence	Ecological/ Social Context	Residual Impact Rating
Construction Case								
	Increase in NO_x exceeding AAAQO Guideline Concentrations	Negative	Low	Local	Short-term	High	n/a	Low Negative
	Increase in SO_2 exceeding AAAQO Guideline Concentrations	Neutral						Neutral
	Increase in $PM_{2.5}$ exceeding AAAQO Guideline Concentrations	Negative	Low	Regional	Short-term	High	n/a	Low Negative

4.6 PROJECT OPERATIONS CASE

When the reservoir is in operation, there will be no significant emissions of NO_2, SO_2 or particulates, noting that the sides of the expanded portion of the SLR will be rip-rapped to prevent soil erosion even during drawdown periods. As such, for the Project Operations Case, only GHG emissions for the year 2030 have been quantified, noting the following:

- **SLR Expansion.** It has been assumed that, by 2030, the SLR Expansion will have been in operation for one year.
- **Existing Reservoir.** As indicated previously, GHG emissions increase annually up to approximately 42 years, after which the expanded reservoir will begin sequestering carbon (GOC 2024b).
- **Vehicles on TCH.** The number of vehicles on the TCH was adjusted as indicated for the Project Case.
- **Trains.** The number of trains was conservatively assumed to remain constant from previous years since data are not available.

The resulting emissions are provided in Table 4-31. Effects from GHG emissions are assessed in the Climate Change section of this EIA (Volume 2, Section 12).

Table 4-31: GHG emissions from Project operations case in year 2030

Source	Emissions (t/a)			
	CO_2	CH_4	N_2O	CO_2eq
SLR Expansion	885.5			885.5
Existing SLR	194.0	-	-	194.0
Vehicles on TCH	14,635.1	1.0	0.3	14,750.1
Trains	11,107.1	0.6	4.3	12,263.4
TOTAL	**26,821.7**	**1.6**	**4.6**	**28,093.0**

4.7 MONITORING

It is recommended that, as needed, dustfall monitoring be conducted at the eight sensitive receptors indicated in Table 4-2 and that the monitoring results be compared with the 30-day AAAQG (GOA 2024b). It is further recommended that this monitoring commence prior to the start of construction and throughout the five-year construction period, as appropriate. The dustfall monitoring may be needed if complaints are received from area residents, agricultural and industrial workers, or members of the public.

4.8 CONCLUSIONS

The conclusions from this Air Quality Dispersion Modelling Assessment are as follows:

- **NO_2.** The modelling for NO_2 indicates the following:
  - **Baseline Case.** Maximum predicted ground-level NO_2 concentrations for the one-hour and annual averaging periods exceed the appliable AAAQOs for NO_2 in a small area near the northeast side of the TCH.
  - **Project Construction Case.** Maximum one-hour ground-level NO_2 concentrations are predicted to exceed the AAAQO 2.3% of the time under worst-case meteorological

conditions and based on the conservative approach used to estimate the Project emissions. The annual ground-level concentrations comply with the applicable AAAQO.

  - **Cumulative Construction Case.** Maximum predicted one-hour and annual ground-level NO_2 concentration exceed the applicable AAAQO in the vicinity of the Project as indicated for the Project Construction Case and in the vicinity of the TCH as indicated for the Baseline Case. However, the overall maximum predicted NO_2 concentrations near the TCH are actually less than predicted for the 2023 Baseline Case because of the assumed number of increased EVs in 2027.

- **SO_2.** The maximum predicted ground-level SO_2 concentrations for all cases and all averaging periods comply with the applicable AAAQOs.
- **$PM_{2.5}$.** The modelling for $PM_{2.5}$ indicates the following:
  - **Baseline Case.** Maximum predicted ground-level $PM_{2.5}$ concentrations for the 24-hour averaging period slightly exceeds the appliable AAAQO for $PM_{2.5}$ in a small area that near the northeast side of the TCH.
  - **Project Construction Case.** Maximum predicted 24-hour ground-level $PM_{2.5}$ concentrations exceed the applicable AAAQO assuming no mitigation. However, modelling with mitigation (i.e., assuming gravel roads and construction area will be watered more than twice per day, when necessary, to prevent fugitive dust emissions), indicates that while the maximum 24-hour ground-level $PM_{2.5}$ concentrations are still predicted to exceed the applicable AAAQO, the non-compliance events are predicted to occur 2.2% of the time beyond the construction site boundary. $PM_{2.5}$ modelling was also completed for sensitive receptors in the area. This modelling indicates that the AAAQO will be exceeded at the nearby Antelope Creek Ranch (Sensitive Receptor 5) and TCHTM (Sensitive Receptor 8) a maximum of one day during the five-year construction period (including materials transport and reclamation). To further mitigate fugitive dust emissions, dust fencing can be installed around the construction site, as needed. With the use of this fencing and on-going watering to prevent fugitive dust emissions is it highly unlikely that $PM_{2.5}$ concentrations will be exceeded at either of these two locations.
  - **Cumulative Construction Case.** Maximum predicted 24-hour ground-level $PM_{2.5}$ modelling results are only slightly higher than the Project Construction Case, thereby indicating that other regional sources contribute very little to the overall maximum predicted concentrations in comparison to dust emissions from the on-site construction activities.

Conclusions related to the GHG emissions are presented in the Climate Change Section of the EIA (Volume 2, Section 12).

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Appendix B

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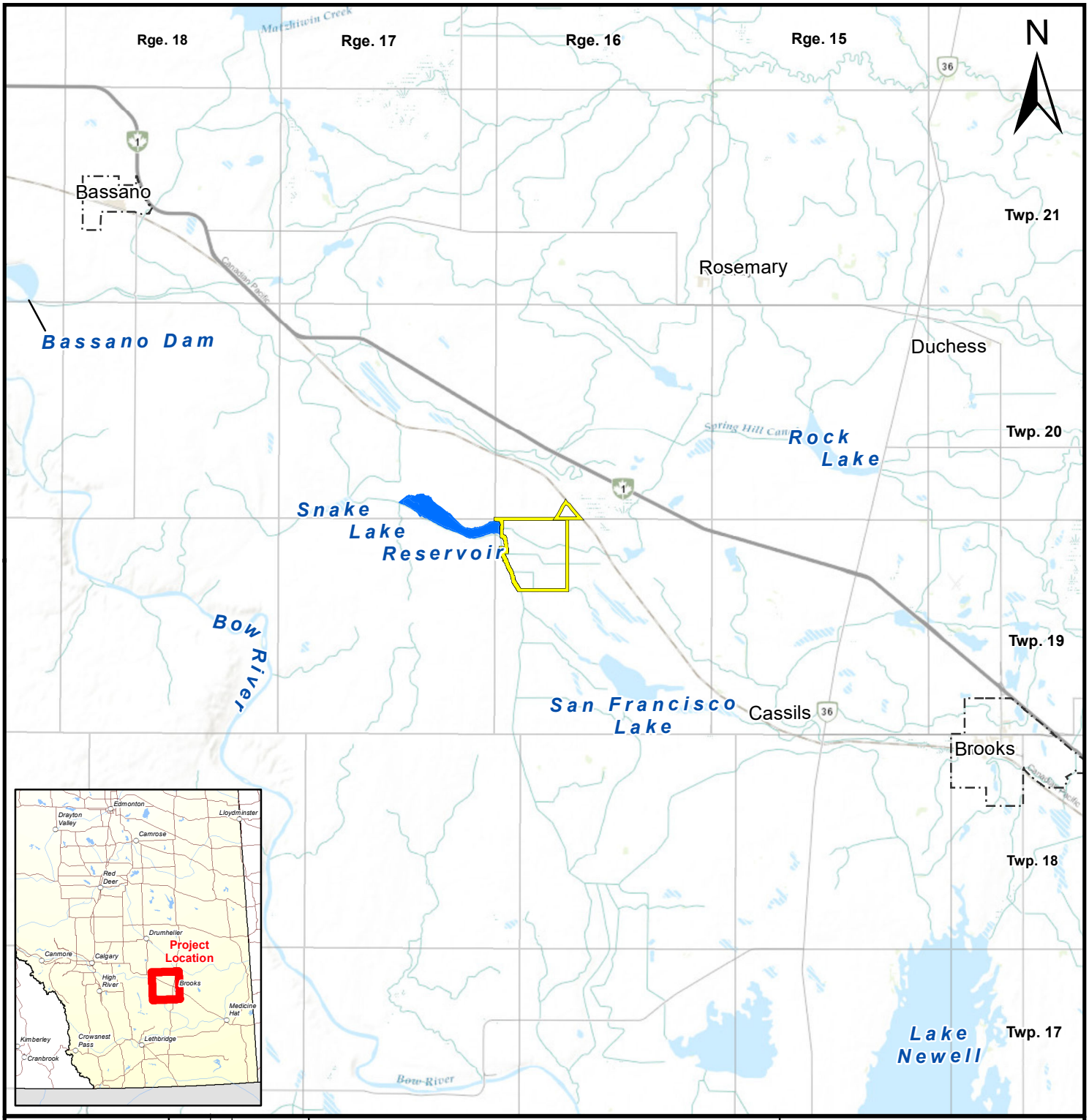
Appendix B1: Figures



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Approved:	VL	Revision:	0
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CAD Survey		Revision:	0

Data Sources:
ATS Grid: AltaLIS 2007.

AAR Environmental Services

Please contact AARES for all other sources.

Please note that the topographic map is from 2010 (NRCAN) and although we have no reason to doubt the accuracy and completeness of it, users should be aware discrepancies may be present.

Legend

- Snake Lake Reservoir Expansion Project Area
- Existing Snake Lake Reservoir at Full Supply
- Corporate Limits

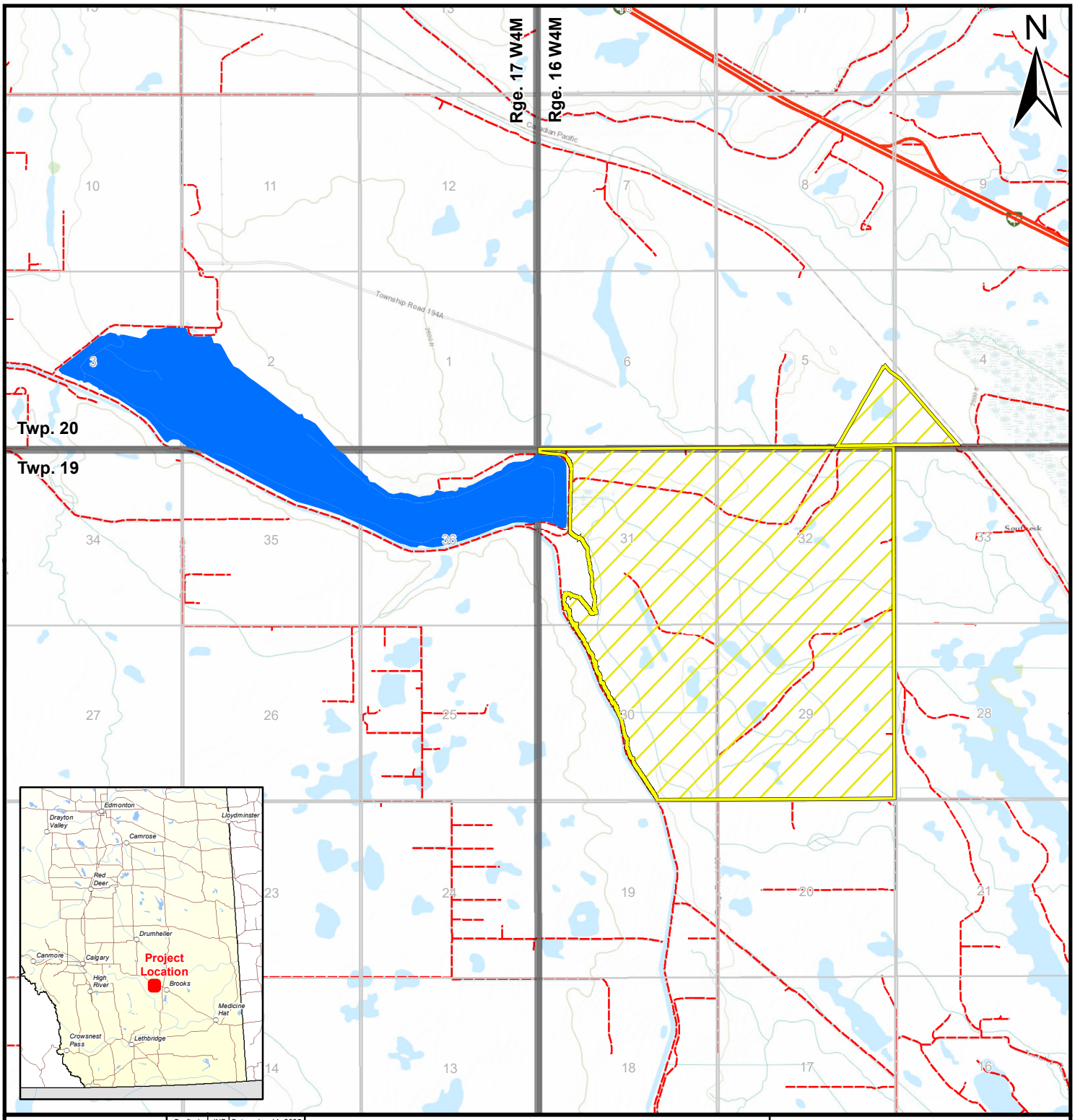
EID

Regional Project Location

January 2025

REF.: AARES21-127
(Air Quality)

Figure B1-1



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Drafted:	JNB	Date:	Jan 14, 2025
Approved:	VL	Revision:	0
Route Source:		Date:	Feb 18, 2022
CAD Survey		Revision:	0

Data Sources:
ESRI World Topographic Map
ATS Grid: AltaLIS 2007.

AAR Environmental Services

Please contact AARES for all other sources.

Please note that the topographic map is from 2010 (NRCAN) and although we have no reason to doubt the accuracy and completeness of it, users should be aware discrepancies may be present.

Legend

- Snake Lake Reservoir Expansion Project Area
- Existing Snake Lake Reservoir at Full Supply
- Highway
- Unpaved Road

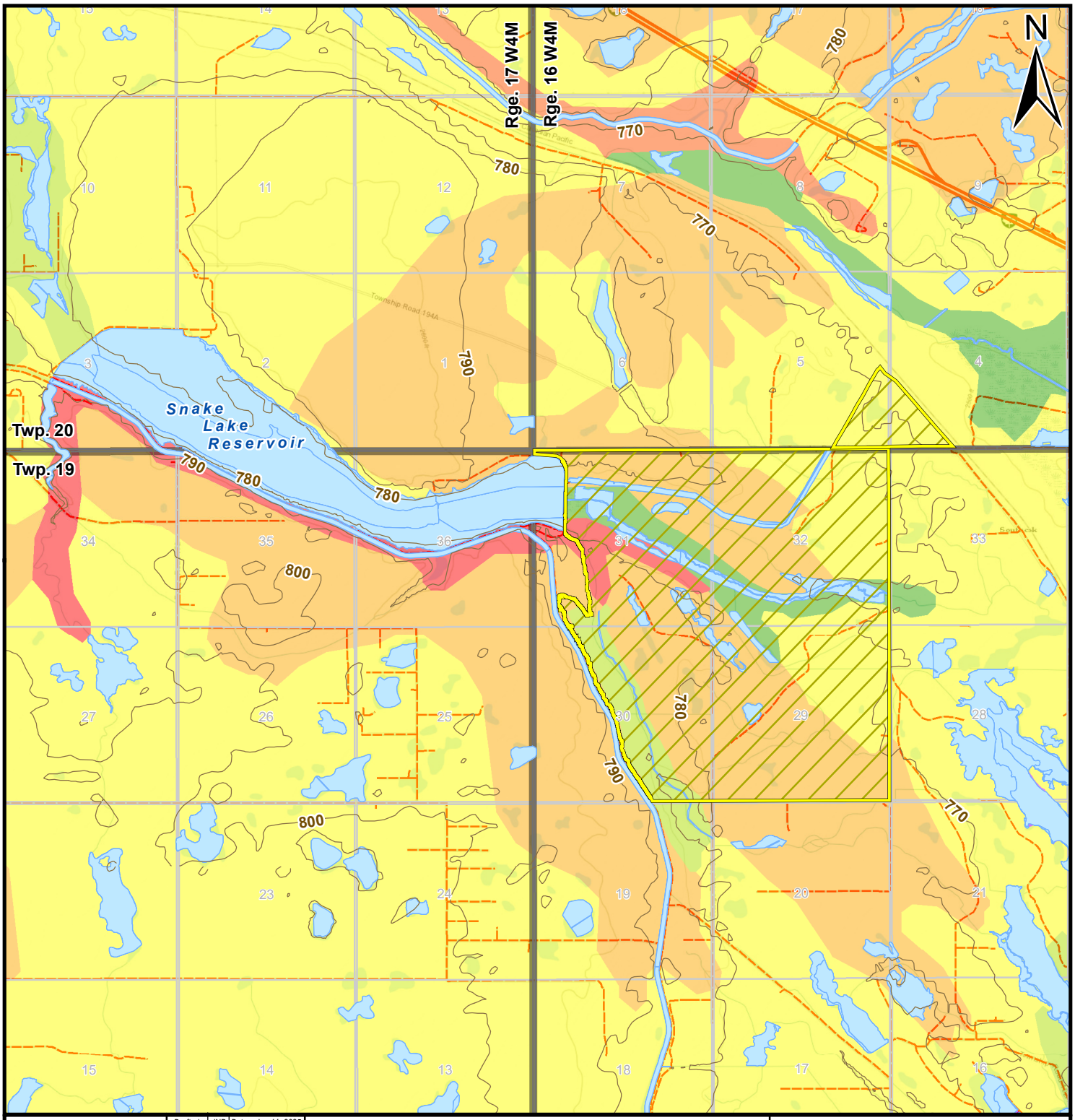
EID

Snake Lake Reservoir Expansion Site Plan

January 2025

REF.: AARES21-127
(Air Quality)

Figure B1-2



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Route Source:		Date:	Feb 18, 2022
CAD Survey		Revision:	0

Data Sources:
ESRI World Topographic Map
ATS Grid: AltaLIS 2007.

AAR Environmental Services

Please contact AARES for all other sources.

Please note that the topographic map is from 2010 (NRCAN) and although we have no reason to doubt the accuracy and completeness of it, users should be aware discrepancies may be present.

Routing:

Legend

- Snake Lake Reservoir Expansion Project Area
- Water Feature

Slope Class:

- 1-2: Level to Nearly Level
- 1-4: Level to Gentle Slopes
- 2: Nearly Level
- 2-3: Nearly Level to Very Gentle Slopes
- 3-4: Very Gentle to Gentle Slopes
- 4-5: Gentle to Moderate Slopes
- 5-6: Moderate to Strong Slopes
- Unmapped
- Disturbance
- Contours (10m)

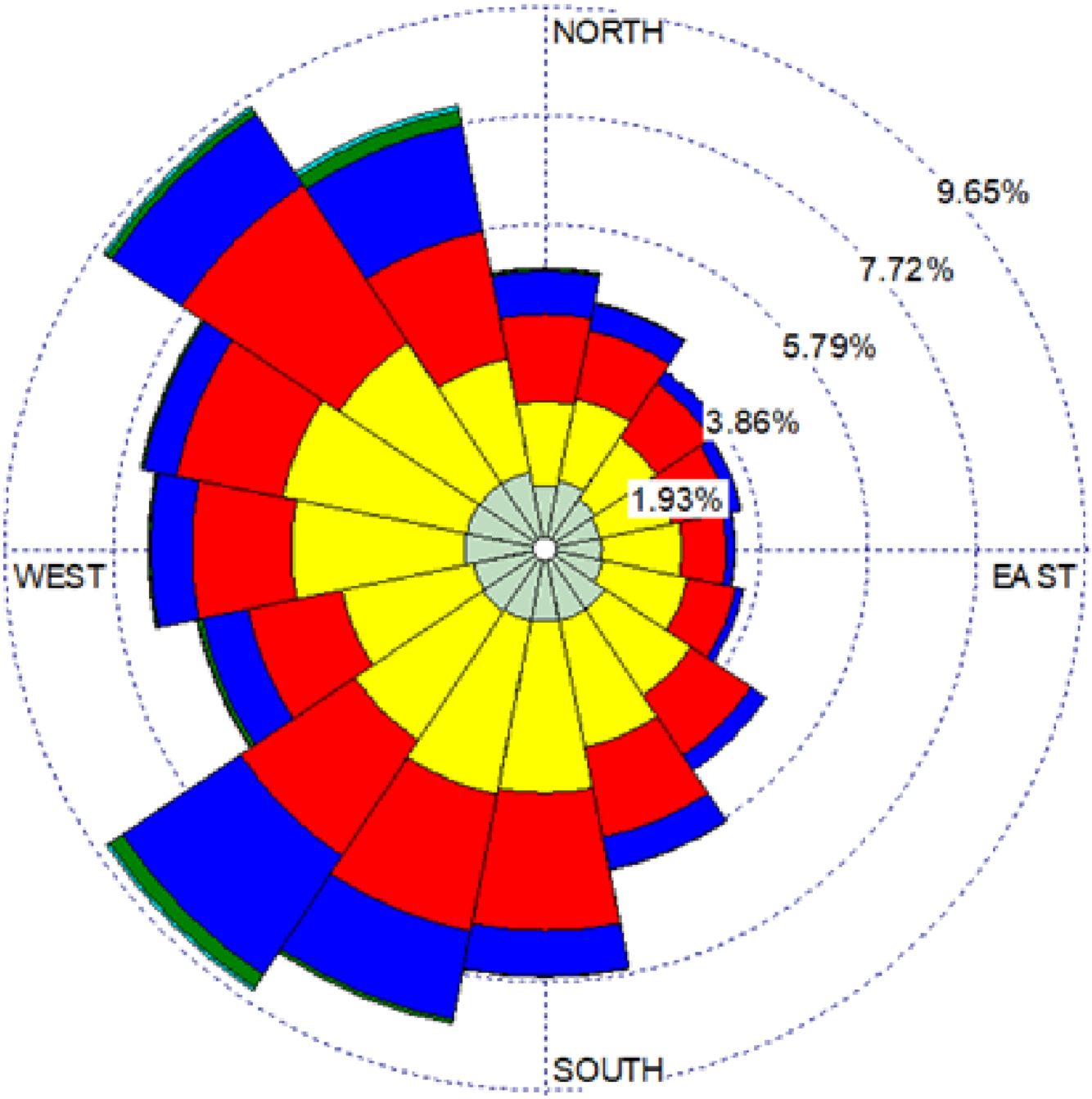
EID

Terrain in the Snake Lake Project Area

January 2025

REF.: AARES21-127
(Air Quality)

Figure B1-3



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	Approved:	TB	Revision: 0
	Route Source:		Date: Dec 10, 2024
	PDF		Revision: 0

Data Sources:
Calvin Consulting Group Ltd.

AAR Environmental Services

Please contact AARES for all other sources.

Legend

WIND SPEED (m/s)

- >= 11.10
- 8.80 - 11.10
- 5.70 - 8.80
- 3.60 - 5.70
- 2.10 - 3.60
- 0.50 - 2.10

Calms: 1.60%

EID

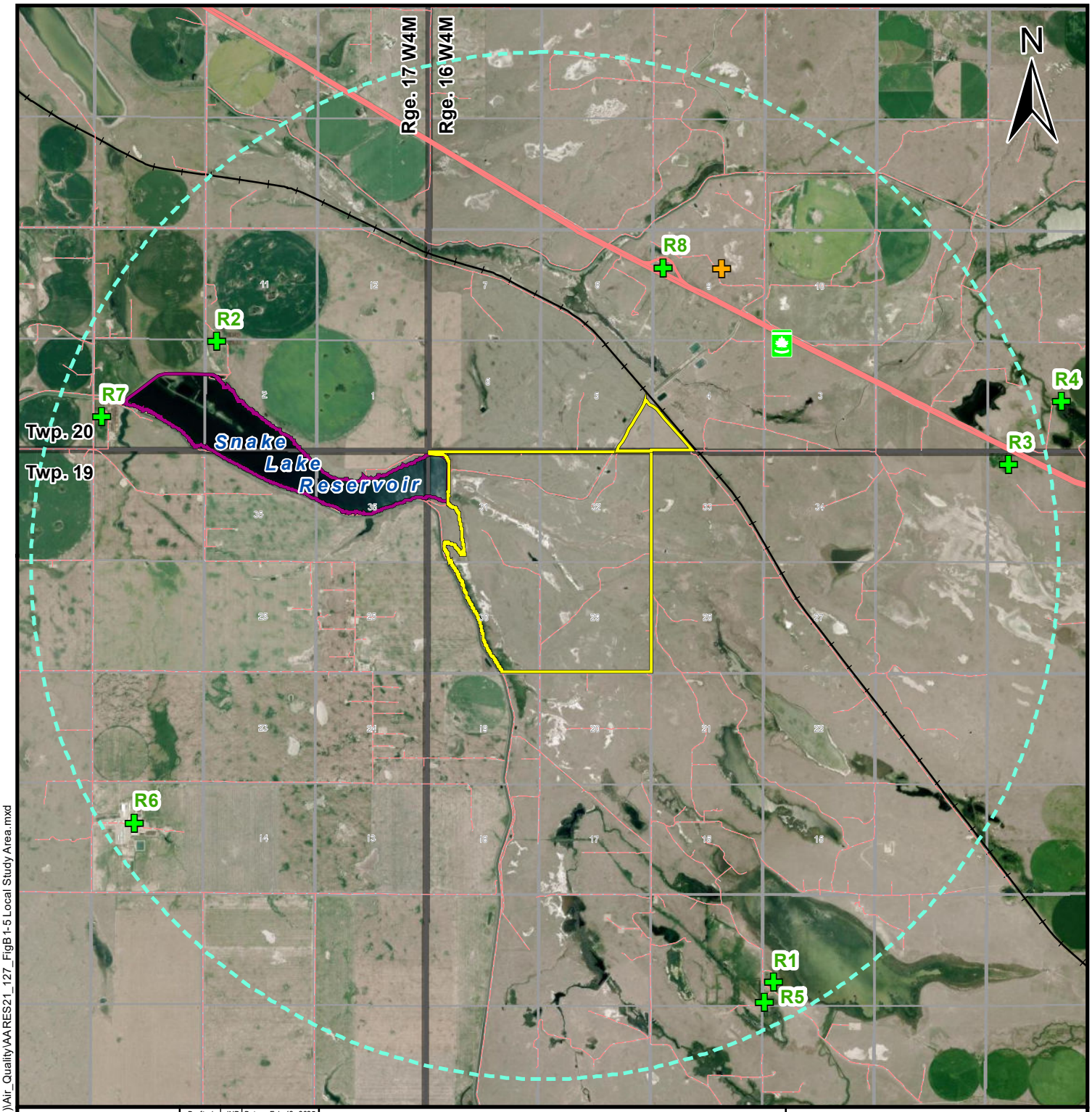
Windrose for the Snake Lake Project Area

January 2025

REF.: AARES21-127 (Air Quality)

Figure B1-4

Map Location: Y:\01_GIS\Project\AARES_21\AARES21_127 (5653)\Air_Quality\AARES21_127_FigB1-4 Windrose.mxd



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Approved:	VL	Revision:	0
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Surfer Shp		Revision:	0

Data Sources:
Imagery Reference: ESRI 2021/07/10
ATS Grid: AltaLIS 2007.
Calvin Consulting Group Ltd.

AAR Environmental Services

Please contact AARES for all other sources.

Please note that the imagery is from 2021 and although we have no reason to doubt the accuracy and completeness of it, users should be aware that discrepancies may be present.

Legend

- Snake Lake Reservoir Expansion Project Area
- Air Quality Local Study Area - 7.5 km
- Reservoir
- Sensitive Receptors
- Countess Oil Battery Source
- Highway
- Gravel Road
- Railway

EID

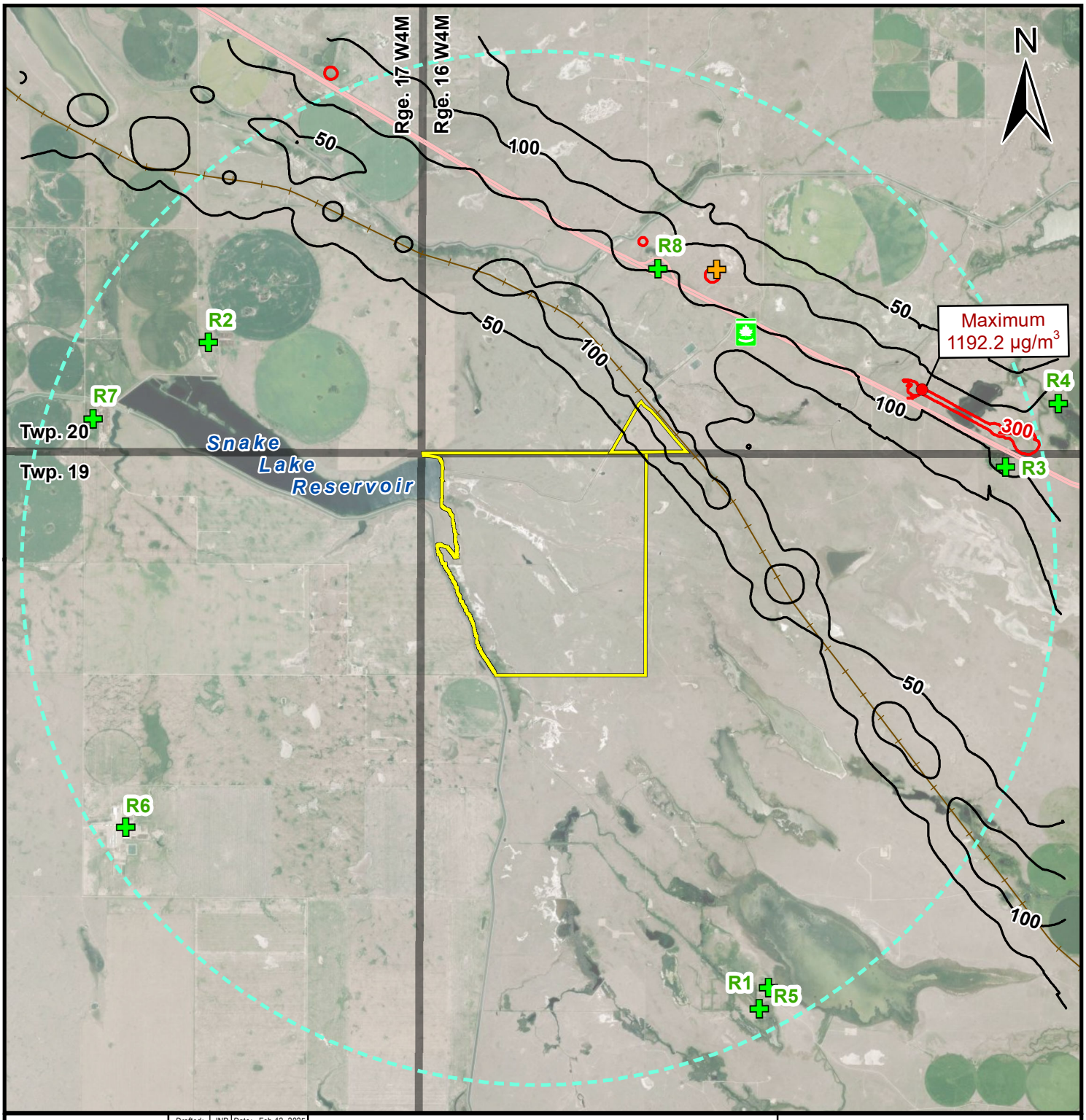
Air Quality
Local Study Area

February 2025

REF.: AARES21-127
(Air Quality)

Figure B1-5

Map Location: Y:\01_GISProject\AARES_21\AARES21_127 (5653)\Air_Quality\AARES21_127_FigB1-5 Local Study Area.mxd



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Drafted:	JNB	Date:	Feb 12, 2025
Approved:	VL	Revision:	0
Route Source:		Date:	Jan 7, 2025
Surfer Shp		Revision:	0

Data Sources:
Imagery: ESRI. Date: 2021/07/10
ATS Grid: AltaLIS 2007.
Calvin Consulting Group Ltd.

AAR Environmental Services

Please contact AARES for all other sources.

Please note that the imagery is from 2021 and although we have no reason to doubt the accuracy and completeness of it, users should be aware that discrepancies may be present.

Legend

- Snake Lake Reservoir Expansion Project Area
- Air Quality Local Study Area - 7.5 km
- Maximum Location
- Sensitive Receptors
- Countess Oil Battery Source
- Predicted Exceedance Contour (µg/m^3)
- Predicted Concentration Contour (µg/m^3)
- Highway
- Railway

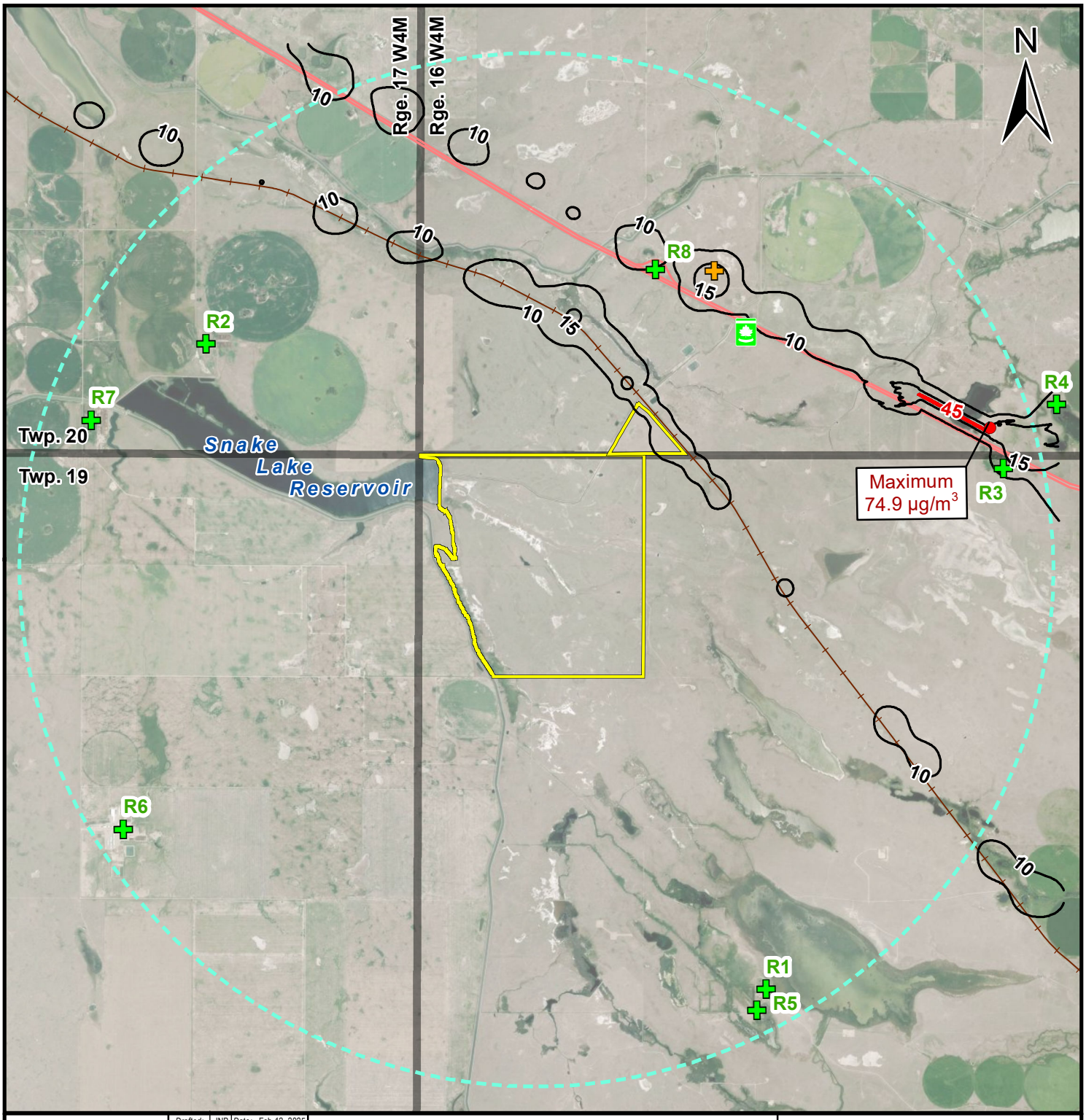
EID

9th Highest Predicted 1-h Average NO_2 Concentrations Baseline Case

February 2025

REF.: AARES21-127 (Air Quality)

Figure B1-6



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Approved:	VL	Revision:	0
Route Source:		Date:	Jan 7, 2025
Surfer Shp		Revision:	0

Data Sources:
Imagery: ESRI. Date: 2021/7/10
ATS Grid: AltaLIS 2007.
Calvin Consulting Group Ltd.

AAR Environmental Services

Please contact AARES for all other sources.

Please note that the imagery is from 2021 and although we have no reason to doubt the accuracy and completeness of it, users should be aware that discrepancies may be present.

Legend

- Snake Lake Reservoir Expansion Project Area
- Air Quality Local Study Area - 7.5 km
- Maximum Location
- Sensitive Receptors
- Countess Oil Battery Source
- Predicted Exceedance Contour (µg/m^3)
- Predicted Concentration Contour (µg/m^3)
- Highway
- Railway

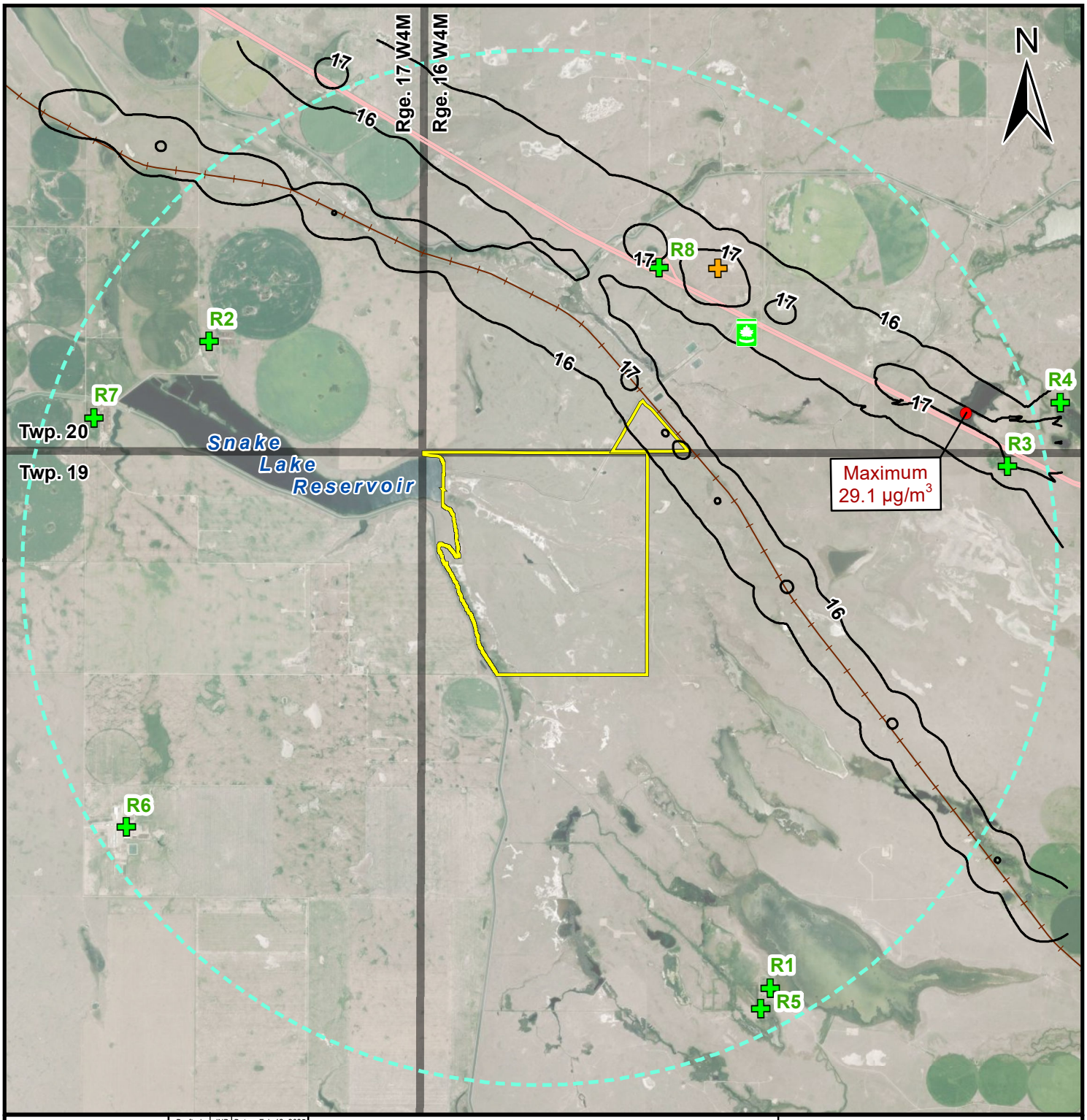
EID

Maximum Predicted Annual NO_2 Concentrations Baseline Case

February 2025

REF.: AARES21-127
(Air Quality)

Figure B1-7



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Route Source:		Date:	Jan 7, 2025
Surfer shp		Revision:	0

Data Sources:
Imagery: ESRI. Date: 2021/07/10
ATS Grid: AltaLIS 2007.
Calvin Consulting Group Ltd.

AAR Environmental Services

Please contact AARES for all other sources.

Please note that the imagery is from 2021 and although we have no reason to doubt the accuracy and completeness of it, users should be aware that discrepancies may be present.

Legend

- Snake Lake Reservoir Expansion Project Area
- Air Quality Local Study Area - 7.5 km
- Maximum Location
- Sensitive Receptors
- Countess Oil Battery Source
- Predicted Concentration Contour (µg/m^3)
- Highway
- Railway

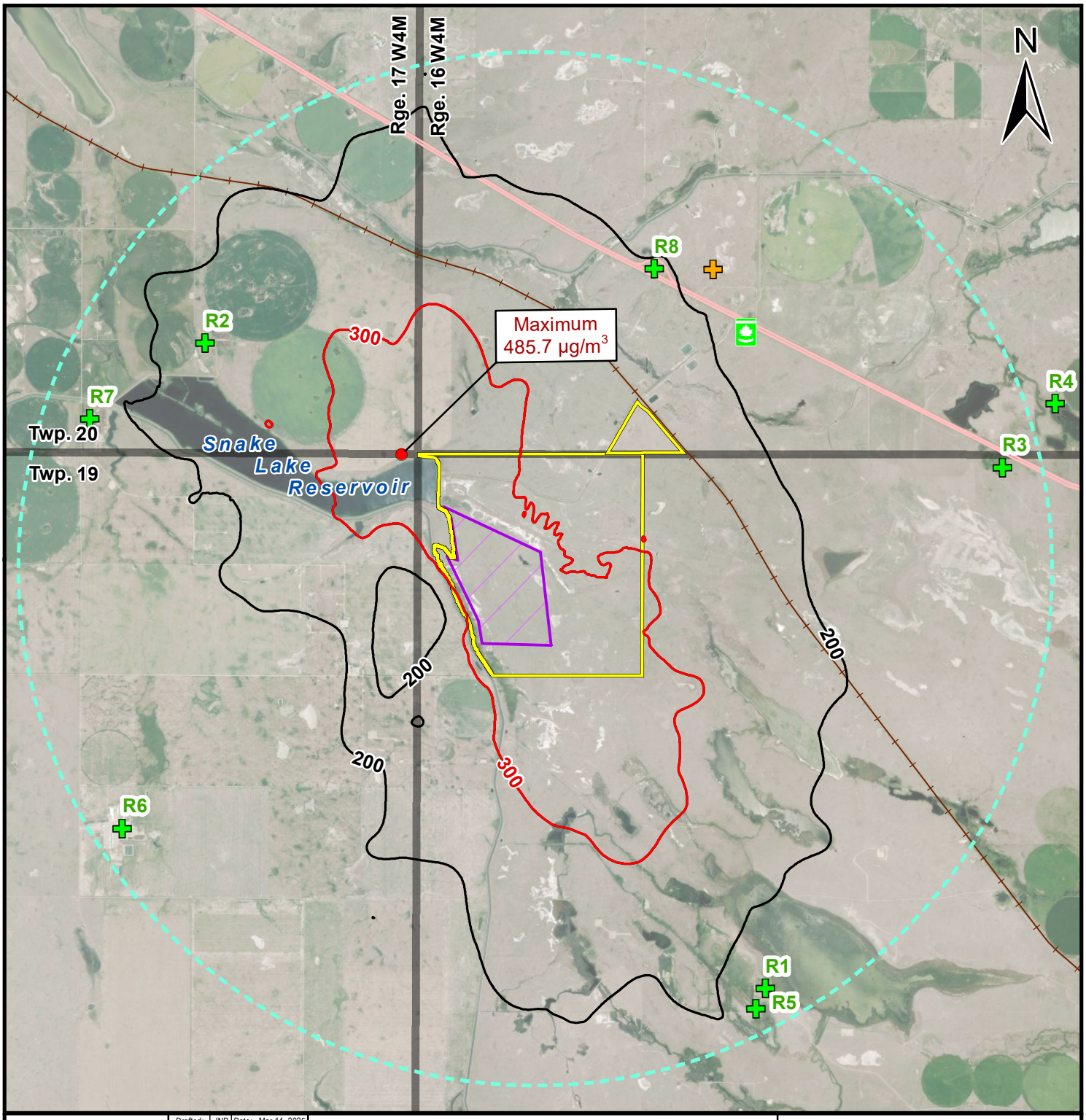
EID

Maximum Predicted 24-h Average $PM_{2.5}$ Baseline Case

February 2025

REF.: AARES21-127
(Air Quality)

Figure B1-8



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Approved:	VL	Revision:	0
Route Source:		Date:	Jan 7, 2025
Surfer shp		Revision:	0

Data Sources:
Imagery: ESRI. Date: 2021/07/10
ATS Grid: AltaLIS 2007.
Calvin Consulting Group Ltd.

AAR Environmental Services

Please contact AARES for all other sources.

Please note that the imagery is from 2021 and although we have no reason to doubt the accuracy and completeness of it, users should be aware that discrepancies may be present.

Legend

- Snake Lake Reservoir Expansion Project Area
- Modelled Construction Area
- Air Quality Local Study Area - 7.5 km
- Maximum Location
- Sensitive Receptors
- Countess Oil Battery Source
- Predicted Exceedance Contour (µg/m^3)
- Predicted Concentration Contour (µg/m^3)
- Highway
- Railway

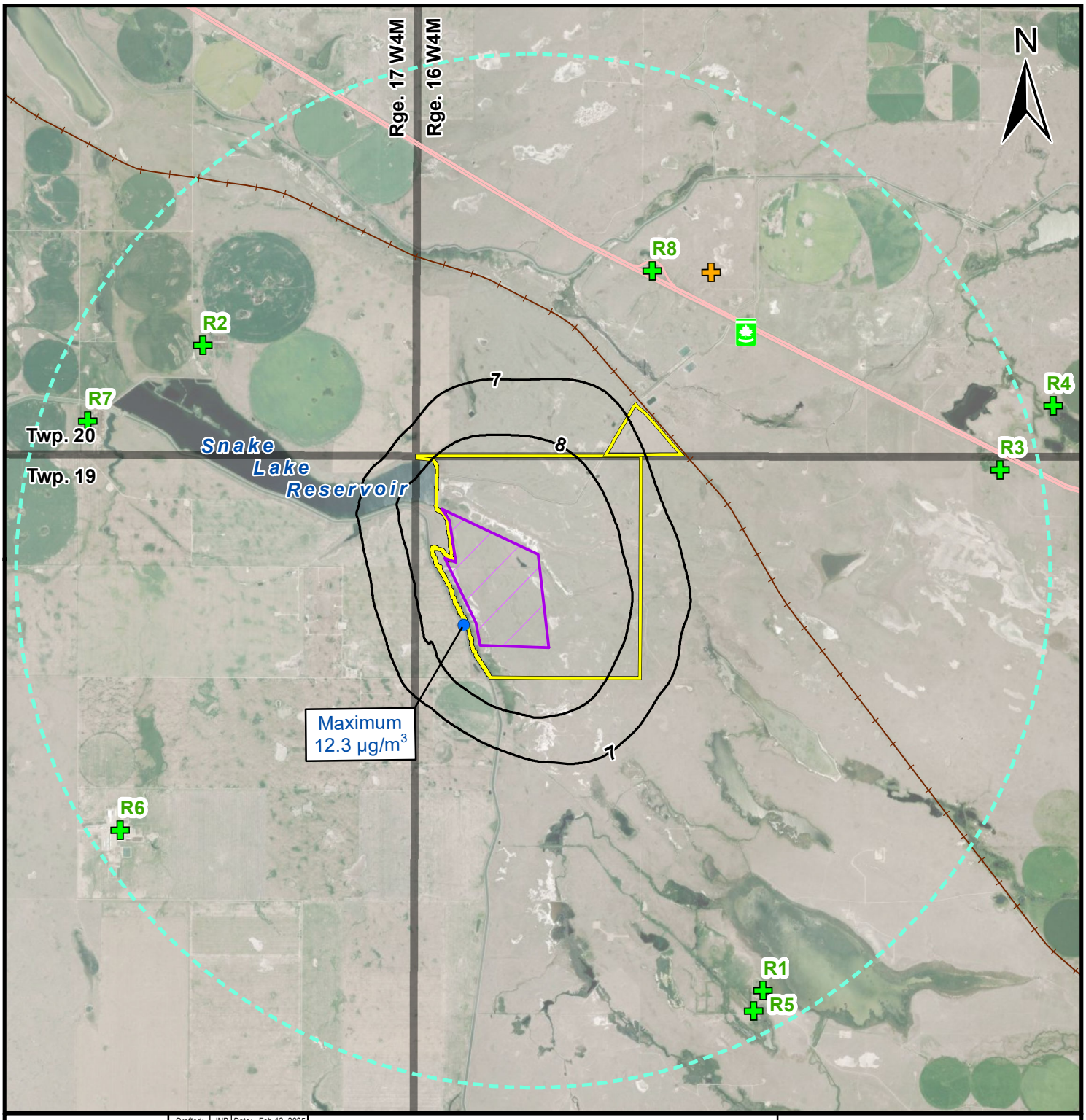
EID

9th Highest Predicted 1-h Average NO_2 Concentrations Project Construction Case

March 2025

REF.: AARES21-127 (Air Quality)

Figure B1-9



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Approved:	VL	Revision:	0
Route Source:		Date:	Jan 7, 2025
Surfer Shp		Revision:	0

Data Sources:
Imagery: ESRI. Date: 2021/07/10
ATS Grid: AltaLIS 2007.
Calvin Consulting Group Ltd.

AAR Environmental Services

Please contact AARES for all other sources.

Please note that the imagery is from 2021 and although we have no reason to doubt the accuracy and completeness of it, users should be aware that discrepancies may be present.

Legend

- Snake Lake Reservoir Expansion Project Area
- Modelled Construction Area
- Air Quality Local Study Area - 7.5 km
- Maximum Location
- Sensitive Receptors
- Countess Oil Battery Source
- Predicted Concentration Contour (µg/m^3)
- Highway
- Railway

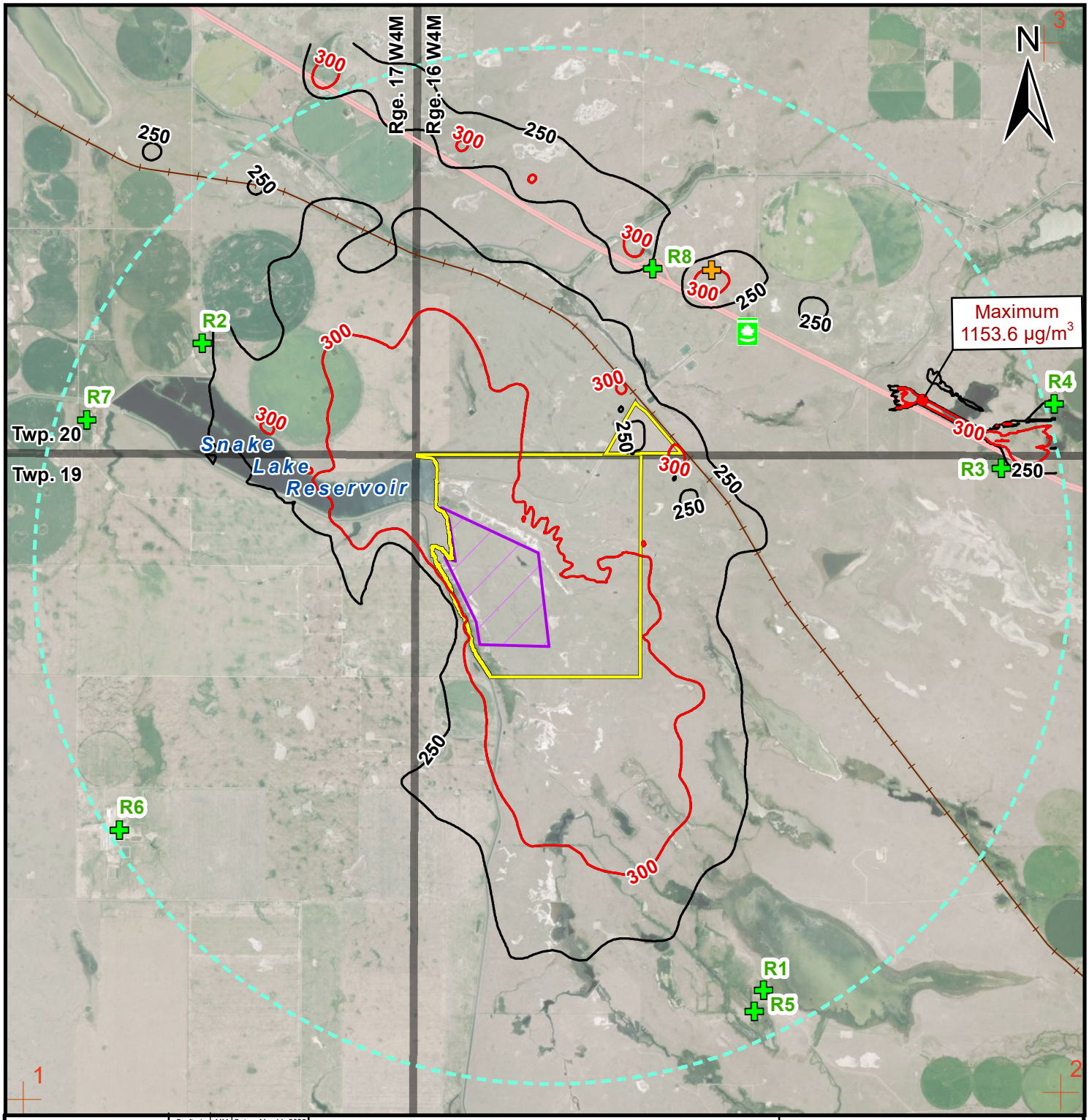
EID

Maximum Predicted Annual NO_2 Concentrations Project Construction Case

February 2025

REF.: AARES21-127 (Air Quality)

Figure B1-10



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Approved:	VL	Revision:	0
Route Source:		Date:	Jan 7, 2025
Surfer Shp		Revision:	0

Data Sources:
Imagery: ESRI. Date: 2021/07/10
ATS Grid: AltaLIS 2007.
Calvin Consulting Group Ltd.

AAR Environmental Services

Please contact AARES for all other sources.

Please note that the imagery is from 2021 and although we have no reason to doubt the accuracy and completeness of it, users should be aware that discrepancies may be present.

Legend

- Snake Lake Reservoir Expansion Project Area
- Modelled Construction Area
- Air Quality Local Study Area - 7.5 km
- Maximum Location
- Sensitive Receptors
- Countess Oil Battery Source
- Predicted Exceedance Contour (µg/m^3)
- Predicted Concentration Contour (µg/m^3)
- Highway
- Railway

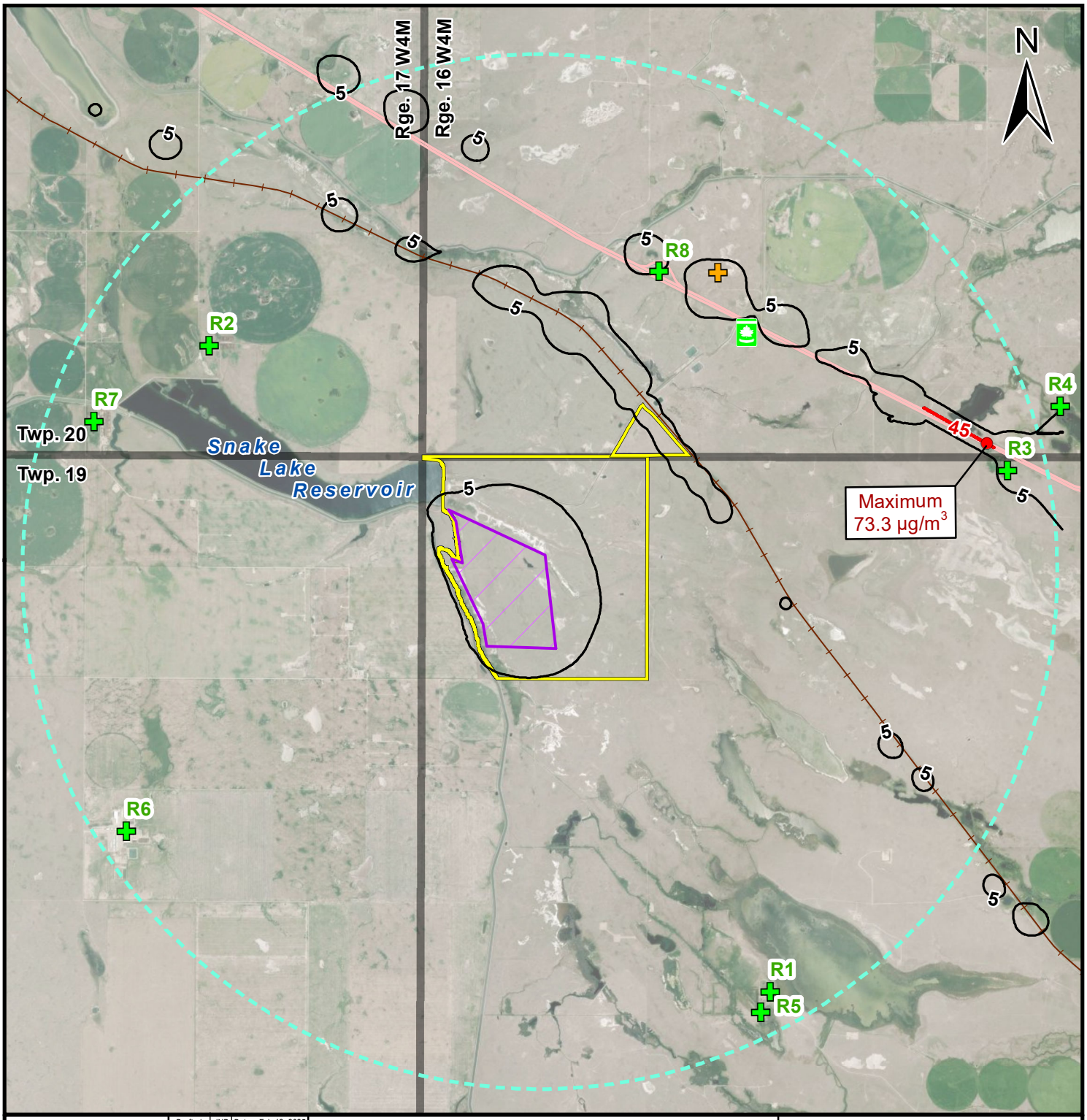
EID

9th Highest Predicted 1-h Average NO_2 Concentrations Cumulative Construction Case

March 2025

REF.: AARES21-127 (PublicHealth)

Figure B1-11



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Surfer shp		Revision:	0

Data Sources:
Imagery: ESRI. Date: 2021/07/10
ATS Grid: AltaLIS 2007.
Calvin Consulting Group Ltd.

AAR Environmental Services

Please contact AARES for all other sources.

Please note that the imagery is from 2021 and although we have no reason to doubt the accuracy and completeness of it, users should be aware that discrepancies may be present.

Legend

- Snake Lake Reservoir Expansion Project Area
- Modelled Construction Area
- Air Quality Local Study Area - 7.5 km
- Maximum Location
- Sensitive Receptors
- Countess Oil Battery Source
- Predicted Exceedance Contour (µg/m^3)
- Predicted Concentration Contour (µg/m^3)
- Highway
- Railway

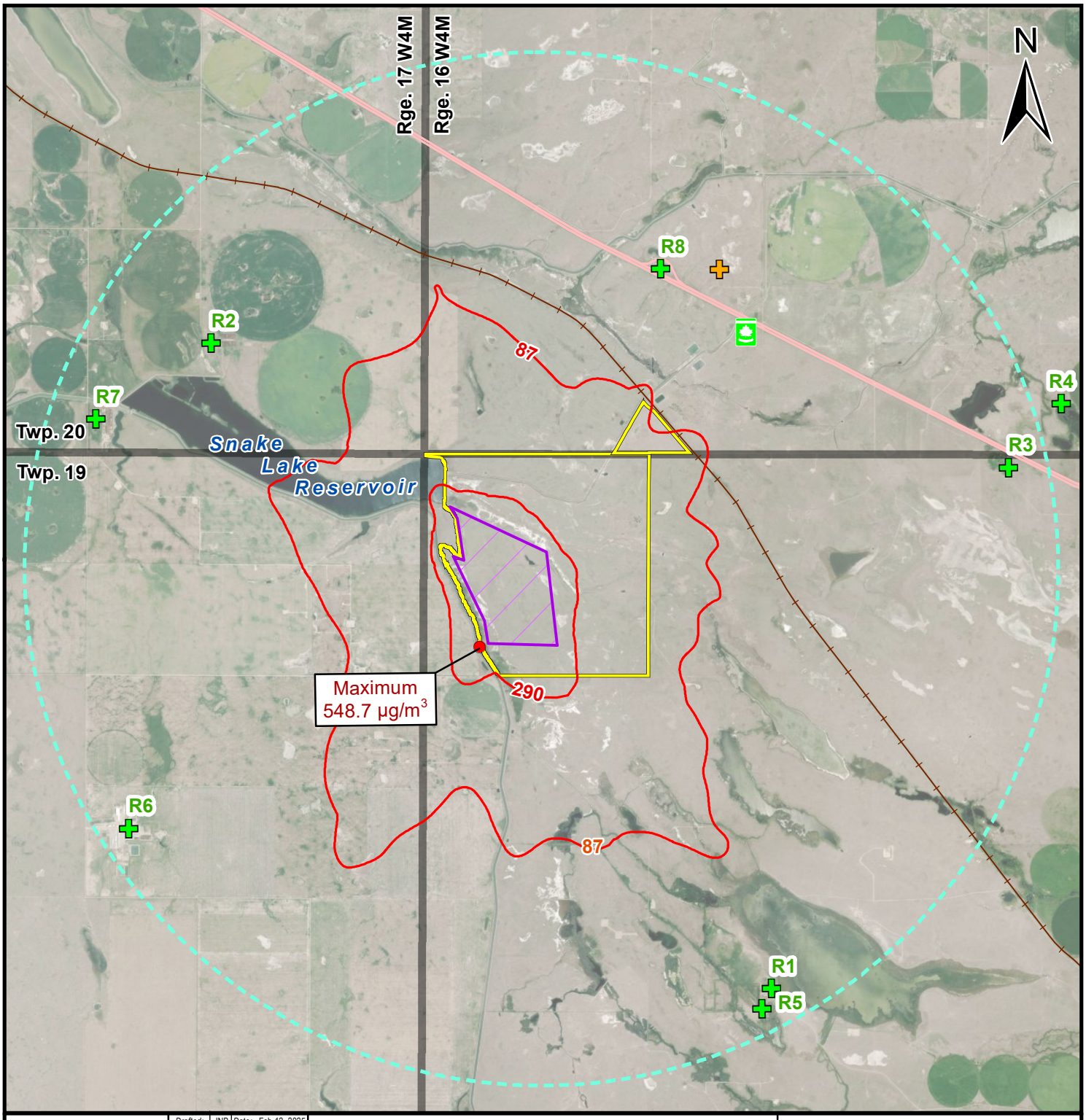
EID

Maximum Predicted Annual NO_2 Concentrations Cumulative Construction Case

February 2025

REF.: AARES21-127
(Air Quality)

Figure B1-12



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Surfer shp		Revision:	0

Data Sources:
Imagery Reference: Unkown
ATS Grid: AltaLIS 2007.
Calvin Consulting Group Ltd.

AAR Environmental Services

Please contact AARES for all other sources.

Please note that the imagery is from 2021 and although we have no reason to doubt the accuracy and completeness of it, users should be aware that discrepancies may be present.

Legend

- Snake Lake Reservoir Expansion Project Area
- Modelled Construction Area
- Air Quality Local Study Area - 7.5 km
- Maximum Location
- Sensitive Receptors
- Countess Oil Battery Source
- Predicted Exceedance Contour (µg/m^3)
- Highway
- Railway

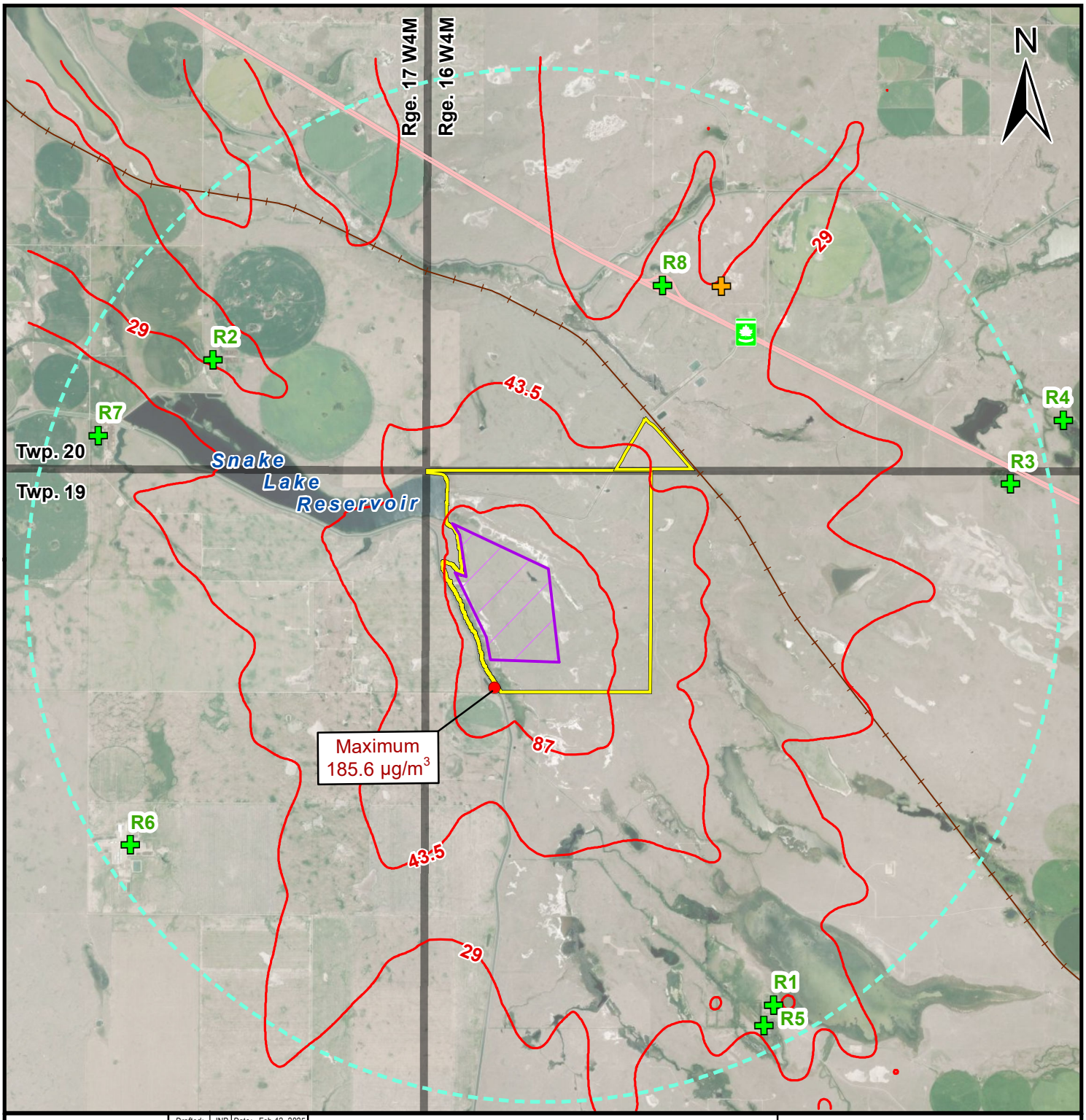
EID

Maximum Predicted 24-h Average $PM_{2.5}$ Assuming No Mitigation Project Construction Case

February 2025

REF.: AARES21-127 (Air Quality)

Figure B1-13



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Approved:	VL	Revision:	0
Route Source:		Date:	Jan 7, 2025
Surfer shp		Revision:	0

Data Sources:
Imagery: ESRI. Date: 2021/07/10
ATS Grid: AltaLIS 2007.
Calvin Consulting Group Ltd.

AAR Environmental Services

Please contact AARES for all other sources.

Please note that the imagery is from 2021 and although we have no reason to doubt the accuracy and completeness of it, users should be aware that discrepancies may be present.

Legend

- Snake Lake Reservoir Expansion Project Area
- Modelled Construction Area
- Air Quality Local Study Area - 7.5 km
- Maximum Location
- Sensitive Receptors
- Countess Oil Battery Source
- Predicted Exceedance Contour (µg/m^3)
- Highway
- Railway

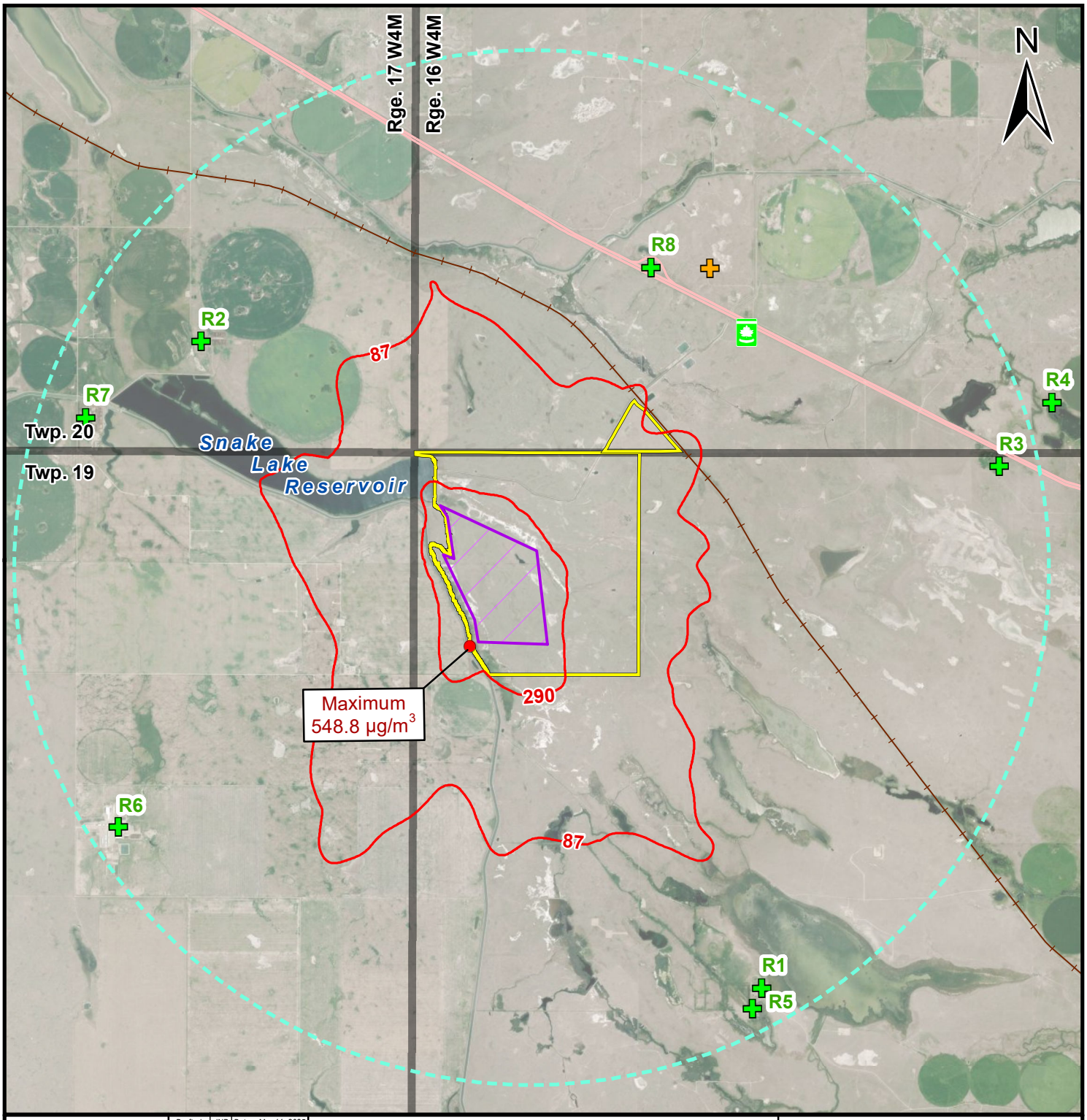
EID

Maximum Predicted 24-h Average $PM_{2.5}$ Assuming Watering Project Construction Case

February 2025

REF.: AARES21-127 (Air Quality)

Figure B1-14



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Route Source:		Date:	Jan 7, 2025
Surfer Shp		Revision:	0

Data Sources:
Imagery: ESRI. Date: 2021/07/10
ATS Grid: AltaLIS 2007.
Calvin Consulting Group Ltd.

AAR Environmental Services

Please contact AARES for all other sources.

Please note that the imagery is from 2021 and although we have no reason to doubt the accuracy and completeness of it, users should be aware that discrepancies may be present.

Legend

- Snake Lake Reservoir Expansion Project Area
- Modelled Construction Area
- Air Quality Local Study Area - 7.5 km
- Maximum Location
- Sensitive Receptors
- Countess Oil Battery Source
- Predicted Exceedance Contour (µg/m^3)
- Highway
- Railway

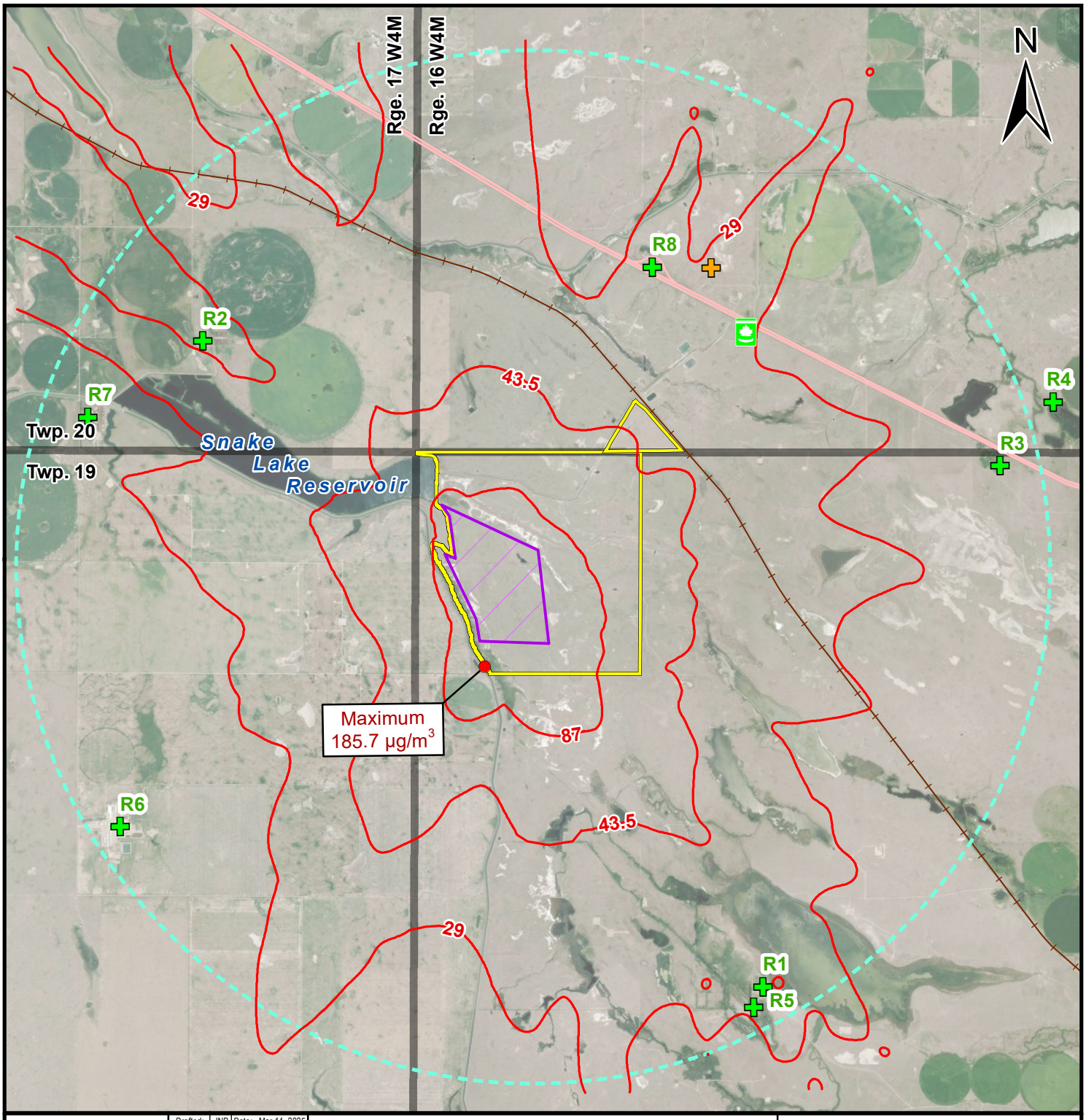
EID

Maximum Predicted 24-h Average $PM_{2.5}$ Assuming No Mitigation Cumulative Construction Case

March 2025

REF.: AARES21-127 (Air Quality)

Figure B1-15



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Route Source:		Date:	Jan 7, 2025
Surfer Shp		Revision:	0

Data Sources:
Imagery: ESRI. Date: 2021/07/10
ATS Grid: AltaLIS 2007.
Calvin Consulting Group Ltd.

AAR Environmental Services

Please contact AARES for all other sources.

Please note that the imagery is from 2021 and although we have no reason to doubt the accuracy and completeness of it, users should be aware that discrepancies may be present.

Legend

- Snake Lake Reservoir Expansion Project Area
- Modelled Construction Area
- Air Quality Local Study Area - 7.5 km
- Maximum Location
- Sensitive Receptors
- Countess Oil Battery Source
- Predicted Exceedance Contour (µg/m^3)
- Highway
- Railway

EID

Maximum Predicted 24-hr Average $PM_{2.5}$ Assuming Watering Cumulative Construction Case

March 2025

REF.: AARES21-127
(Air Quality)

Figure B1-16

Appendix B2: Construction Schedule (Modelling)

Start Date	End Date	Days in Period	Equipment in Use	Number of Units	Days in Use	Hours per day	Land Area Cleared (ha)
2025 Mar 01	2025 Mar 31	31	Dozers	4	20	12	0
			Dump Trucks	9	20	12	
			Excavators	1	20	12	
			Loaders	3	20	12	
2025 Apr 01	2025 Apr 30	30	Dozers	4	20	12	0
			Dump Trucks	9	20	12	
			Excavators	1	20	12	
			Loaders	3	20	12	
2025 May 01	2025 May 31	31	Dozers	4	20	12	0
			Dump Trucks	9	20	12	
			Excavators	1	20	12	
			Loaders	3	20	12	
2025 Jun 01	2025 Jun 30	30	Dozers	4	20	12	0
			Dump Trucks	9	20	12	
			Excavators	1	20	12	
			Loaders	3	20	12	
2025 Jul 01	2025 Jul 31	31	Dozers	4	20	12	0
			Dump Trucks	9	20	12	
			Excavators	1	20	12	
			Loaders	3	20	12	
2025 Aug 01	2025 Aug 31	31	Dozers	4	20	12	0
			Dump Trucks	9	20	12	
			Excavators	1	20	12	
			Loaders	3	20	12	
2025 Sep 01	2025 Sep 30	30	Dozers	4	20	12	0
			Dump Trucks	9	20	12	
			Excavators	1	20	12	
			Loaders	3	20	12	
2025 Oct 01	2025 Oct 31	31	Dozers	4	20	12	0
			Dump Trucks	9	20	12	
			Excavators	1	20	12	
			Loaders	3	20	12	
2025 Nov 01	2025 Nov 30	30	Dozers	4	20	12	0

Start Date	End Date	Days in Period	Equipment in Use	Number of Units	Days in Use	Hours per day	Land Area Cleared (ha)
			Dump Trucks	9	20	12	
			Excavators	1	20	12	
			Loaders	3	20	12	
2025 Dec 01	2025 Dec 31	31	Dozers	4	20	12	0
			Dump Trucks	9	20	12	
			Excavators	1	20	12	
			Loaders	3	20	12	
2026 Jan 01	2026 Jan 31	31	Dozers	4	20	12	0
			Dump Trucks	9	20	12	
			Excavators	1	20	12	
			Loaders	3	20	12	
2026 Feb 01	2026 Feb 28	28	Dozers	4	20	12	0
			Dump Trucks	9	20	12	
			Excavators	1	20	12	
			Loaders	3	20	12	
2026 Mar 01	2026 Mar 31	31	Dozers	4	20	12	0
			Dump Trucks	9	20	12	
			Excavators	1	20	12	
			Loaders	3	20	12	
2026 Apr 01	2026 Apr 30	30	Dozers	4	20	12	0
			Dump Trucks	9	20	12	
			Excavators	1	20	12	
			Loaders	3	20	12	
2026 May 01	2026 May 31	31	Dozers	4	20	12	0
			Dump Trucks	9	20	12	
			Excavators	1	20	12	
			Loaders	3	20	12	
2026 Jun 01	2026 Jun 30	30	Dozers	4	20	12	0
			Dump Trucks	9	20	12	
			Excavators	1	20	12	
			Loaders	3	20	12	
2026 Jul 01	2026 Jul 31	31	Dozers	4	20	12	0
			Dump Trucks	9	20	12	
			Excavators	1	20	12	
			Loaders	3	20	12	

Start Date	End Date	Days in Period	Equipment in Use	Number of Units	Days in Use	Hours per day	Land Area Cleared (ha)
2026 Aug 01	2026 Aug 31	31	Dozers	4	20	12	0
			Dump Trucks	9	20	12	
			Excavators	1	20	12	
			Loaders	3	20	12	
2026 Sep 01	2026 Sep 30	30	Dozers	4	20	12	0
			Dump Trucks	9	20	12	
			Excavators	1	20	12	
			Loaders	3	20	12	
2026 Oct 01	2026 Oct 31	31	Dozers	4	20	12	0
			Dump Trucks	9	20	12	
			Excavators	1	20	12	
			Loaders	3	20	12	
2026 Nov 01	2026 Nov 30	30	Dozers	4	20	12	0
			Dump Trucks	9	20	12	
			Excavators	1	20	12	
			Loaders	3	20	12	
2026 Dec 01	2026 Dec 31	31	No Activity	0	0	0	0
2027 Jan 01	2027 Jan 31	31	Dump Trucks	4	20	12	0
			Loaders	2	20	12	
			Mower / cutter	2	20	12	
			Rock Picker:	2	10	12	
2027 Feb 01	2027 Feb 28	28	Dump Trucks	4	20	12	0
			Loaders	2	20	12	
			Mower / cutter	2	20	12	
			Rock Picker:	2	20	12	
2027 Mar 01	2027 Mar 31	31	Bulldozers	4	20	12	94.4
			Dump Trucks	8	20	12	
			Loaders	2	20	12	
			Scrapers/rippers	12	20	12	
2027 Apr 01	2027 Apr 30	30	Bulldozers	4	20	12	283.1
			Dump Trucks	32	20	12	
			Excavators	8	20	12	
			Loaders	10	20	12	
			Portable Pump	1	30	12	
			Scrapers/rippers	12	20	12	

Start Date	End Date	Days in Period	Equipment in Use	Number of Units	Days in Use	Hours per day	Land Area Cleared (ha)
			Water trucks	4	10	12	
2027 May 01	2027 May 31	31	Bulldozers	4	20	12	471.7
			Dump Trucks	32	20	12	
			Excavators	8	20	12	
			Loaders	10	20	12	
			Portable Pump	1	30	12	
			Scrapers/rippers	12	20	12	
			Water trucks	4	30	12	
2027 Jun 01	2027 Jun 30	30	Bulldozers	4	20	12	547.4
			Dump Trucks	32	20	12	
			Excavators	8	20	12	
			Loaders	10	20	12	
			Portable Pump	1	30	12	
			Scrapers/rippers	12	20	12	
			Water trucks	4	30	12	
2027 Jul 01	2027 Jul 31	31	Compactors	2	25	12	660.4
			Dump Trucks	6	25	12	
			Dump Trucks	12	20	12	
			Excavators	4	20	12	
			Loaders	4	20	12	
			Loaders	4	25	12	
			Mixer	2	25	12	
			Portable Pump	1	30	12	
			Water trucks	6	30	12	
2027 Aug 01	2027 Aug 31	31	Compactors	2	25	12	754.7
			Dump Trucks	6	25	12	
			Dump Trucks	12	20	12	
			Excavators	4	20	12	
			Loaders	4	20	12	
			Loaders	4	25	12	
			Mixer	2	25	12	
			Portable Pump	1	30	12	
			Water trucks	6	30	12	
2027 Sep 01	2027 Sep 30	30	Compactors	5	25	12	754.7
			Dump Trucks	12	25	12	

Start Date	End Date	Days in Period	Equipment in Use	Number of Units	Days in Use	Hours per day	Land Area Cleared (ha)
			Dump Trucks	12	20	12	
			Excavators	4	20	12	
			Loaders	8	25	12	
			Loaders	4	20	12	
			Mixer	2	25	12	
			Portable Pump	1	30	12	
			Water Trucks	2	15	12	
			Water trucks	4	30	12	
2027 Oct 01	2027 Oct 31	31	Compactors	5	25	12	754.7
			Dump Trucks	12	25	12	
			Dump Trucks	12	20	12	
			Excavators	4	20	12	
			Loaders	8	25	12	
			Loaders	4	20	12	
			Mixer	2	25	12	
			Portable Pump	1	30	12	
			Water trucks	4	30	12	
2027 Nov 01	2027 Nov 30	30	Compactors	5	25	12	754.7
			Dump Trucks	12	25	12	
			Dump Trucks	12	20	12	
			Excavators	4	20	12	
			Loaders	8	25	12	
			Loaders	4	20	12	
			Mixer	2	25	12	
			Portable Pump	1	30	12	
			Water trucks	4	30	12	
2027 Dec 01	2027 Dec 31	31	Compactors	5	25	12	754.7
			Dump Trucks	12	25	12	
			Dump Trucks	12	20	12	
			Excavators	4	20	12	
			Loaders	8	25	12	
			Loaders	4	20	12	
			Mixer	2	25	12	
2028 Jan 01	2028 Jan 31	31	Compactors	5	25	12	754.7
			Dump Trucks	12	25	12	

Start Date	End Date	Days in Period	Equipment in Use	Number of Units	Days in Use	Hours per day	Land Area Cleared (ha)
			Dump Trucks	12	20	12	
			Excavators	4	20	12	
			Loaders	8	25	12	
			Loaders	4	20	12	
			Mixer	2	25	12	
2028 Feb 01	2028 Feb 29	29	Compactors	5	25	12	754.7
			Dump Trucks	12	25	12	
			Dump Trucks	12	20	12	
			Excavators	4	20	12	
			Loaders	8	25	12	
			Loaders	4	20	12	
			Mixer	2	25	12	
2028 Mar 01	2028 Mar 31	31	Compactors	5	25	12	754.7
			Dump Trucks	12	25	12	
			Dump Trucks	12	20	12	
			Excavators	4	20	12	
			Loaders	8	25	12	
			Loaders	4	20	12	
			Mixer	2	25	12	
2028 Apr 01	2028 Apr 30	30	Compactors	5	25	12	754.7
			Dump Trucks	12	25	12	
			Dump Trucks	12	20	12	
			Excavators	4	20	12	
			Loaders	8	25	12	
			Loaders	4	20	12	
			Mixer	2	25	12	
			Portable Pump	1	10	12	
			Water trucks	4	10	12	
2028 May 01	2028 May 31	31	Compactors	5	25	12	754.7
			Dump Trucks	12	25	12	
			Dump Trucks	12	20	12	
			Excavators	4	20	12	
			Loaders	8	25	12	
			Loaders	4	20	12	
			Mixer	2	25	12	

Start Date	End Date	Days in Period	Equipment in Use	Number of Units	Days in Use	Hours per day	Land Area Cleared (ha)
			Portable Pump	1	30	12	
			Water trucks	4	30	12	
2028 Jun 01	2028 Jun 30	30	Compactors	5	25	12	754.7
			Dump Trucks	12	25	12	
			Dump Trucks	12	20	12	
			Excavators	4	20	12	
			Loaders	8	25	12	
			Loaders	4	20	12	
			Mixer	2	25	12	
			Portable Pump	1	30	12	
			Water trucks	4	30	12	
2028 Jul 01	2028 Jul 31	31	Compactors	5	25	12	754.7
			Dump Trucks	12	25	12	
			Dump Trucks	12	20	12	
			Excavators	4	20	12	
			Loaders	8	25	12	
			Loaders	4	20	12	
			Mixer	2	25	12	
			Portable Pump	1	30	12	
			Water trucks	6	30	12	
2028 Aug 01	2028 Aug 31	31	Compactors	5	25	12	754.7
			Dump Trucks	12	25	12	
			Dump Trucks	12	20	12	
			Excavators	4	20	12	
			Loaders	8	25	12	
			Loaders	4	20	12	
			Mixer	2	25	12	
			Portable Pump	1	30	12	
			Water trucks	6	30	12	
2028 Sep 01	2028 Sep 30	30	Bulldozers	1	10	12	754.7
			Compactors	5	25	12	
			Compactor	1	10	12	
			Dump Trucks	12	20	12	
			Dump Trucks	2	10	12	
			Dump Trucks	12	25	12	

Start Date	End Date	Days in Period	Equipment in Use	Number of Units	Days in Use	Hours per day	Land Area Cleared (ha)
			Excavators	4	20	12	
			Grader	2	10	12	
			Loaders	1	10	12	
			Loaders	8	25	12	
			Loaders	4	20	12	
			Mixer	2	25	12	
			Portable Pump	1	30	12	
			Small Excavator	2	10	12	
			Water Trucks	2	15	12	
			Water trucks	4	30	12	
2028 Oct 01	2028 Oct 31	31	Bulldozers	1	10	12	754.7
			Compactors	5	25	12	
			Compactor	1	10	12	
			Dump Trucks	12	20	12	
			Dump Trucks	2	10	12	
			Dump Trucks	12	25	12	
			Excavators	4	20	12	
			Grader	2	10	12	
			Loaders	1	10	12	
			Loaders	8	25	12	
			Loaders	4	20	12	
			Mixer	2	25	12	
			Portable Pump	1	30	12	
			Small Excavator	2	10	12	
			Water trucks	4	30	12	
2028 Nov 01	2028 Nov 30	30	Bulldozers	1	10	12	754.7
			Bulldozers	1	20	12	
			Compactors	3	25	12	
			Compactors	1	10	12	
			Compactors	2	15	12	
			Dump Trucks	14	20	12	
			Dump Trucks	6	25	12	
			Dump Trucks	2	10	12	
			Excavators	4	20	12	
			Grader	2	10	12	

Start Date	End Date	Days in Period	Equipment in Use	Number of Units	Days in Use	Hours per day	Land Area Cleared (ha)
			Graders	1	20	12	
			Loader	4	25	12	
			Loader	1	10	12	
			Loaders	5	20	12	
			Portable Pump	1	30	12	
			Small Excavator	2	10	12	
			Water trucks	4	30	12	
2028 Dec 01	2028 Dec 31	31	Bulldozers	1	10	12	754.7
			Bulldozers	1	20	12	
			Compactors	3	25	12	
			Compactors	2	15	12	
			Compactors	1	10	12	
			Dump Trucks	6	25	12	
			Dump Trucks	2	10	12	
			Dump Trucks	2	20	12	
			Graders	2	10	12	
			Graders	1	20	12	
			Loaders	4	25	12	
			Loaders	1	10	12	
			Loaders	1	20	12	
			Small Excavator	2	10	12	
2029 Jan 01	2029 Jan 31	31	Bulldozers	1	20	12	754.7
			Compactors	2	15	12	
			Dump Trucks	2	20	12	
			Graders	1	20	12	
			Loaders	1	20	12	
2029 Feb 01	2029 Feb 28	28	Bulldozers	1	20	12	754.7
			Compactors	2	15	12	
			Dump Trucks	2	20	12	
			Graders	1	20	12	
			Loaders	1	20	12	
2029 Mar 01	2029 Mar 31	31	Cement Trucks	2	10	12	754.7
			Excavators	2	20	12	
			Portable seeders	2	20	12	
			Tractors	2	20	12	

Start Date	End Date	Days in Period	Equipment in Use	Number of Units	Days in Use	Hours per day	Land Area Cleared (ha)
2029 Apr 01	2029 Apr 30	30	Dump Trucks	6	30	12	743.6
			Loaders	3	30	12	
			Portable cranes	1	30	12	
			Portable Pump	1	10	12	
			Water trucks	4	10	12	
2029 May 01	2029 May 31	31	Dump Trucks	6	30	12	721.6
			Loaders	3	30	12	
			Portable cranes	1	30	12	
			Portable Pump	1	30	12	
			Water trucks	4	30	12	
2029 Jun 01	2029 Jun 30	30	Dump Trucks	6	20	12	652.4
			Loaders	3	20	12	
			Portable cranes	1	20	12	
			Portable Pump	1	30	12	
			Water trucks	4	30	12	
2029 Jul 01	2029 Jul 31	31	None	0	0	0	569.6
2029 Aug 01	2029 Aug 31	31	None	0	0	0	357.7
2029 Sep 01	2029 Sep 30	30	None	0	0	0	250.4
2029 Oct 01	2029 Oct 31	31	None	0	0	0	143.1
2029 Nov 01	2029 Nov 30	30	None	0	0	0	71.6
2029 Dec 01	2029 Dec 31	31	None	0	0	0	0

Appendix B3: NO_2 Dispersion Modelling Input and Output Files for the Baseline Case

Hourly Average NO_2 Input File for the Baseline Case

```
CO STARTING
   TITLEONE  Snake Lake Reservoir Baseline
   MODELOPT  CONC   ELEV   BETA   PVMRM
   AVERTIME  1
   POLLUTID  NO2  H1H
   OZONEFIL  "C:\Modelling\O3rur.txt" ppm
   NO2EQUIL  0.90
   NO2STACK  0.20
   RUNORNOT  RUN
   ERRORFIL  ERRORS.OUT
CO FINISHED

SO STARTING

** Trans Canada Highway and CP Rail
   LOCATION   Highway    LINE          411687.00  5618458.00   423093.00  5612110.00      771.0
   LOCATION   Train1     LINE          408087.00  5617797.00   415910.00  5614532.00      772.0
   LOCATION   Train2     LINE          415910.00  5614532.00   422967.00  5605205.00      766.5

** Journey Energy Countess
   LOCATION   Comp       POINT         418069.96  5615258.56      774.0
   LOCATION   Heater     POINT         418034.46  5615282.06      774.0

** Trans Canada Highway and CP Rail
**                      Q          H          W
   SRCPARAM   Highway      6.59E-05     0.4220     14.8000
   SRCPARAM   Train1       7.35E-05     4.5720     3.0480
   SRCPARAM   Train2       7.35E-05     4.5720     3.0480

**Journey Energy Countess
**                      Q          H          T          V          D
   SRCPARAM   Comp          0.5162       8.44       780.3       42.1      0.3227
   SRCPARAM   Heater        0.0911       9.38       676.9       10.0      0.6520


   SRCGROUP  ALL
SO FINISHED

RE STARTING
   INCLUDED  "C:\Modelling\SLR\Baselineloc.ROU"
RE FINISHED

ME STARTING
   SURFFILE  "C:\Modelling\SLR\AERMET.SFC"
   PROFFILE  "C:\Modelling\SLR\AERMET.PFL"
   SURFDATA  12345  2015
   UAIRDATA  12345678  2015
   PROFBASE  779.7 METERS
   STARTEND  15 01 01  15 12 31
ME FINISHED

OU STARTING
   RECTABLE  ALLAVE  ninth
   MAXTABLE  ALLAVE  100
   PLOTFILE  1 ALL ninth NO21h15.plt
   SUMMFILE  max.SUM
OU FINISHED
```

Hourly Average NO_2 Output File for the Baseline Case

```
*** AERMOD - VERSION 23132  ***   ***  Snake Lake Reservoir Baseline                         ***       10/28/24
 *** AERMET - VERSION  23132 ***   ***                                                  ***        17:53:04
                                                                                 PAGE  72
 *** MODELOPTs:    NonDFAULT  CONC  ELEV  PVMRM  BETA  RURAL  ADJ_U*

                                        *** THE SUMMARY OF HIGHEST  1-HR RESULTS ***


                                  ** CONC OF NO2      IN MICROGRAMS/M**3                      **

                                             DATE                                          NETWORK
GROUP ID                     AVERAGE CONC     (YYMMDDHH)          RECEPTOR  (XR, YR, ZELEV, ZHILL, ZFLAG)    OF TYPE
GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

ALL      HIGH   9TH HIGH VALUE IS    1177.86267  ON 15070306: AT (  420942.00,  5613308.00,   764.66,   764.66,    0.00)  DC


 *** RECEPTOR TYPES:  GC = GRIDCART
                      GP = GRIDPOLR
                      DC = DISCCART
                      DP = DISCPOLR
```

Annual NO_2 Input File for the Baseline Case

```
CO STARTING
   TITLEONE  Snake Lake Reservoir Baseline
   MODELOPT  CONC   ELEV   BETA   PVMRM
   AVERTIME  Annual
   POLLUTID  NO2
   OZONEFIL  "C:\Modelling\O3rur.txt" ppm
   NO2EQUIL  0.90
   NO2STACK  0.20
   RUNORNOT  RUN
   ERRORFIL  ERRORS.OUT
CO FINISHED

SO STARTING

** Trans Canada Highway and CP Rail
   LOCATION   Highway    LINE          411687.00  5618458.00   423093.00  5612110.00      771.0
   LOCATION   Train1     LINE          408087.00  5617797.00   415910.00  5614532.00      772.0
   LOCATION   Train2     LINE          415910.00  5614532.00   422967.00  5605205.00      766.5

** Journey Energy Countess
   LOCATION   Comp       POINT         418069.96  5615258.56      774.0
   LOCATION   Heater     POINT         418034.46  5615282.06      774.0

** Trans Canada Highway and CP Rail
**                      Q          H          W
   SRCPARAM   Highway      2.40E-05     0.4220     14.8000
   SRCPARAM   Train1       7.35E-05     4.5720     3.0480
   SRCPARAM   Train2       7.35E-05     4.5720     3.0480

**Journey Energy Countess
**                      Q          H          T          V          D
   SRCPARAM   Comp          0.5162       8.44       780.3       42.1      0.3227
   SRCPARAM   Heater        0.0911       9.38       676.9       10.0      0.6520


   SRCGROUP  ALL
SO FINISHED

RE STARTING
   INCLUDED  "C:\Modelling\SLR\Baselineloc.ROU"
RE FINISHED

ME STARTING
   SURFFILE  "C:\Modelling\SLR\AERMET.SFC"
   PROFFILE  "C:\Modelling\SLR\AERMET.PFL"
   SURFDATA  12345  2015
   UAIRDATA  12345678  2015
   PROFBASE  779.7 METERS
   STARTEND  18 01 01  18 12 31
ME FINISHED

OU STARTING
   RECTABLE  ALLAVE  first
   MAXTABLE  ALLAVE  100
   PLOTFILE  annual ALL NO2Ann18.plt
   SUMMFILE  max.SUM
OU FINISHED
```

Annual NO_2 Output File for the Baseline Case

```
*** AERMOD - VERSION 23132  ***  *** Snake Lake Reservoir Baseline                    ***       10/28/24
 *** AERMET - VERSION  23132 ***  ***                                                ***       20:57:01
                                                                                  PAGE  70
 *** MODELOPTs:    NonDFAULT  CONC  ELEV  PVMRM  BETA  RURAL  ADJ_U*

                        *** THE SUMMARY OF MAXIMUM ANNUAL RESULTS AVERAGED OVER   1 YEARS ***


                        ** CONC OF NO2      IN MICROGRAMS/M**3                  **

                                                                                 NETWORK
GROUP ID                AVERAGE CONC            RECEPTOR  (XR, YR, ZELEV, ZHILL, ZFLAG)  OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

ALL       1ST HIGHEST VALUE IS     69.29993 AT (  421842.00,  5612808.00,   761.00,   761.00,    0.00)  DC
          2ND HIGHEST VALUE IS     69.08128 AT (  421662.00,  5612908.00,   761.00,   761.00,    0.00)  DC
          3RD HIGHEST VALUE IS     68.85742 AT (  421482.00,  5613008.00,   761.00,   761.00,    0.00)  DC
          4TH HIGHEST VALUE IS     68.66994 AT (  421802.00,  5612828.00,   761.00,   761.00,    0.00)  DC
          5TH HIGHEST VALUE IS     68.49379 AT (  421302.00,  5613108.00,   763.00,   763.00,    0.00)  DC
          6TH HIGHEST VALUE IS     68.07021 AT (  421122.00,  5613208.00,   764.00,   764.00,    0.00)  DC
          7TH HIGHEST VALUE IS     68.03495 AT (  421622.00,  5612928.00,   761.00,   761.00,    0.00)  DC
          8TH HIGHEST VALUE IS     67.45281 AT (  421442.00,  5613028.00,   761.88,   761.88,    0.00)  DC
          9TH HIGHEST VALUE IS     66.88034 AT (  421262.00,  5613128.00,   763.44,   763.44,    0.00)  DC
         10TH HIGHEST VALUE IS     66.57796 AT (  421942.00,  5612748.00,   762.00,   762.00,    0.00)  DC


 *** RECEPTOR TYPES:  GC = GRIDCART
                      GP = GRIDPOLR
                      DC = DISCCART
                      DP = DISCPOLR
```

Appendix B4: SO_2 Dispersion Modelling Input and Output Files for the Baseline Case

Hourly Average SO_2 Input File for the Baseline Case

```
CO STARTING
   TITLEONE  Snake Lake Reservoir Baseline
   MODELOPT  CONC   ELEV   BETA
   AVERTIME  1
   POLLUTID  SO2 H1H
   RUNORNOT  RUN
   ERRORFIL  ERRORS.OUT
CO FINISHED

SO STARTING

** Trans Canada Highway and CP Rail
   LOCATION   Highway    LINE          411687.00  5618458.00   423093.00  5612110.00      771.0
   LOCATION   Train1     LINE          408087.00  5617797.00   415910.00  5614532.00      772.0
   LOCATION   Train2     LINE          415910.00  5614532.00   422967.00  5605205.00      766.5

** Trans Canada Highway and CP Rail
**                         Q          H          W
   SRCPARAM   Highway       1.07E-07     0.4220     14.8000
   SRCPARAM   Train1        7.36E-08     4.5720     3.0480
   SRCPARAM   Train2        7.36E-08     4.5720     3.0480



   SRCGROUP  ALL
SO FINISHED

RE STARTING
   INCLUDED  "C:\Modelling\SLR\Baselineloc.ROU"
RE FINISHED

ME STARTING
   SURFFILE  "C:\Modelling\SLR\AERMET.SFC"
   PROFFILE  "C:\Modelling\SLR\AERMET.PFL"
   SURFDATA  12345  2015
   UAIRDATA  12345678  2015
   PROFBASE  779.7 METERS
   STARTEND  15 01 01  15 12 31
ME FINISHED

OU STARTING
   RECTABLE  ALLAVE  ninth
   MAXTABLE  ALLAVE  100
   PLOTFILE  1 ALL ninth SO21h15.plt
   SUMMFILE  max.SUM
OU FINISHED
```

Hourly Average SO_2 Output File for the Baseline Case

*** AERMOD - VERSION 23132 *** *** Snake Lake Reservoir Baseline *** 10/28/24
*** AERMET - VERSION 23132 *** *** *** 18:23:31
PAGE 70

*** MODELOPTs: NonDFAULT CONC ELEV BETA RURAL ADJ_U*

*** THE SUMMARY OF HIGHEST 1-HR RESULTS ***

** CONC OF SO2 IN MICROGRAMS/M**3 **

GROUP ID	AVERAGE CONC	DATE (YYMMDDHH)	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)	NETWORK OF TYPE GRID-ID
ALL	HIGH 9TH HIGH VALUE IS	**7.97153**	ON 15040807: AT (421342.00, 5613088.00, 762.46, 762.46, 0.00)	DC

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR

24-Hour SO_2 Input File for the Baseline Case

```
CO STARTING
   TITLEONE  Snake Lake Reservoir Baseline
   MODELOPT  CONC   ELEV   BETA
   AVERTIME  24
   POLLUTID  SO2
   RUNORNOT  RUN
   ERRORFIL  ERRORS.OUT
CO FINISHED

SO STARTING

** Trans Canada Highway and CP Rail
   LOCATION   Highway    LINE          411687.00  5618458.00   423093.00  5612110.00      771.0
   LOCATION   Train1     LINE          408087.00  5617797.00   415910.00  5614532.00      772.0
   LOCATION   Train2     LINE          415910.00  5614532.00   422967.00  5605205.00      766.5

** Trans Canada Highway and CP Rail
**                         Q          H          W
   SRCPARAM   Highway       3.96E-08     0.4220     14.8000
   SRCPARAM   Train1        7.36E-08     4.5720     3.0480
   SRCPARAM   Train2        7.36E-08     4.5720     3.0480



   SRCGROUP  ALL
SO FINISHED

RE STARTING
   INCLUDED  "C:\Modelling\SLR\Baselineloc.ROU"
RE FINISHED

ME STARTING
   SURFFILE  "C:\Modelling\SLR\AERMET.SFC"
   PROFFILE  "C:\Modelling\SLR\AERMET.PFL"
   SURFDATA  12345  2015
   UAIRDATA  12345678  2015
   PROFBASE  779.7 METERS
   STARTEND  18 01 01  18 12 31
ME FINISHED

OU STARTING
   RECTABLE  ALLAVE  first
   MAXTABLE  ALLAVE  100
   PLOTFILE  24 ALL FIRST SO224h18.plt
   SUMMFILE  max.SUM
OU FINISHED
```

24-Hour SO_2 Output File for the Baseline Case

```
*** AERMOD - VERSION 23132  ***   ***  Snake Lake Reservoir Baseline                         ***       10/28/24
 *** AERMET - VERSION  23132 ***   ***                                                  ***       21:09:57
                                                                               PAGE  70
 *** MODELOPTs:    NonDFAULT  CONC  ELEV  BETA  RURAL  ADJ_U*

                                  *** THE SUMMARY OF HIGHEST 24-HR RESULTS ***


                            ** CONC OF SO2      IN MICROGRAMS/M**3                    **

                                       DATE                                          NETWORK
GROUP ID                      AVERAGE CONC     (YYMMDDHH)          RECEPTOR  (XR, YR, ZELEV, ZHILL, ZFLAG)    OF TYPE
GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

ALL     HIGH   1ST HIGH VALUE IS       1.15857c ON 18031124: AT (  421522.00,  5612988.00,    761.00,    761.00,    0.00)  DC


 *** RECEPTOR TYPES:  GC = GRIDCART
                      GP = GRIDPOLR
                      DC = DISCCART
                      DP = DISCPOLR
```

30-Day SO_2 Input File for the Baseline Case

```
CO STARTING
   TITLEONE  Snake Lake Reservoir Baseline
   MODELOPT  CONC   ELEV   BETA
   AVERTIME  MONTH
   POLLUTID  SO2
   RUNORNOT  RUN
   ERRORFIL  ERRORS.OUT
CO FINISHED

SO STARTING

** Trans Canada Highway and CP Rail
   LOCATION   Highway    LINE          411687.00  5618458.00   423093.00  5612110.00      771.0
   LOCATION   Train1     LINE          408087.00  5617797.00   415910.00  5614532.00      772.0
   LOCATION   Train2     LINE          415910.00  5614532.00   422967.00  5605205.00      766.5

** Trans Canada Highway and CP Rail
**                         Q          H          W
   SRCPARAM   Highway       3.96E-08     0.4220     14.8000
   SRCPARAM   Train1        7.36E-08     4.5720     3.0480
   SRCPARAM   Train2        7.36E-08     4.5720     3.0480


   SRCGROUP  ALL
SO FINISHED

RE STARTING
   INCLUDED  "C:\Modelling\SLR\Baselineloc2.ROU"
RE FINISHED

ME STARTING
   SURFFILE  "C:\Modelling\SLR\AERMET.SFC"
   PROFFILE  "C:\Modelling\SLR\AERMET.PFL"
   SURFDATA  12345  2015
   UAIRDATA  12345678  2015
   PROFBASE  779.7 METERS
   STARTEND  18 01 01  18 12 31
ME FINISHED

OU STARTING
   RECTABLE  ALLAVE  first
   MAXTABLE  ALLAVE  100
   PLOTFILE  MONTH ALL FIRST SO230d18.plt
   SUMMFILE  max.SUM
OU FINISHED
```

30-Day SO_2 Output File for the Baseline Case

```
*** AERMOD - VERSION 23132  ***   ***  Snake Lake Reservoir Baseline                    ***       10/28/24
 *** AERMET - VERSION  23132 ***   ***                                                  ***       21:14:58
                                                                                    PAGE  70
 *** MODELOPTs:    NonDFAULT  CONC  ELEV  BETA  RURAL  ADJ_U*

                                *** THE SUMMARY OF HIGHEST MONTH RESULTS ***


                            ** CONC OF SO2      IN MICROGRAMS/M**3                  **

                                          DATE                                          NETWORK
GROUP ID                    AVERAGE CONC     (YYMMDDHH)          RECEPTOR  (XR, YR, ZELEV, ZHILL, ZFLAG)    OF TYPE
GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

ALL      HIGH   1ST HIGH VALUE IS      0.43705c ON 18033124: AT (  417882.00,  5615008.00,   771.00,   771.00,    0.00)  DC


 *** RECEPTOR TYPES:  GC = GRIDCART
                      GP = GRIDPOLR
                      DC = DISCCART
                      DP = DISCPOLR
```

Annual SO_2 Input File for the Baseline Case

```
CO STARTING
   TITLEONE  Snake Lake Reservoir Baseline
   MODELOPT  CONC   ELEV   BETA
   AVERTIME  Annual
   POLLUTID  SO2
   RUNORNOT  RUN
   ERRORFIL  ERRORS.OUT
CO FINISHED

SO STARTING

** Trans Canada Highway and CP Rail
   LOCATION   Highway    LINE          411687.00  5618458.00   423093.00  5612110.00      771.0
   LOCATION   Train1     LINE         408087.00  5617797.00   415910.00  5614532.00      772.0
   LOCATION   Train2     LINE         415910.00  5614532.00   422967.00  5605205.00      766.5

** Trans Canada Highway and CP Rail
**                        Q          H          W
   SRCPARAM   Highway       3.96E-08     0.4220     14.8000
   SRCPARAM   Train1        7.36E-08     4.5720     3.0480
   SRCPARAM   Train2        7.36E-08     4.5720     3.0480



   SRCGROUP  ALL
SO FINISHED

RE STARTING
   INCLUDED  "C:\Modelling\SLR\Baselineloc2.ROU"
RE FINISHED

ME STARTING
   SURFFILE  "C:\Modelling\SLR\AERMET.SFC"
   PROFFILE  "C:\Modelling\SLR\AERMET.PFL"
   SURFDATA  12345  2015
   UAIRDATA  12345678  2015
   PROFBASE  779.7 METERS
   STARTEND  18 01 01  18 12 31
ME FINISHED

OU STARTING
   RECTABLE  ALLAVE  first
   MAXTABLE  ALLAVE  100
   PLOTFILE  annual ALL SO2Ann18.plt
   SUMMFILE  max.SUM
OU FINISHED
```

Annual SO_2 Output File for the Baseline Case

```
*** AERMOD - VERSION 23132  ***  *** Snake Lake Reservoir Baseline                    ***       10/28/24
 *** AERMET - VERSION  23132 ***  ***                                                ***       21:15:14
                                                                                  PAGE  68
 *** MODELOPTs:    NonDFAULT  CONC  ELEV  BETA  RURAL  ADJ_U*

                        *** THE SUMMARY OF MAXIMUM ANNUAL RESULTS AVERAGED OVER   1 YEARS ***


                        ** CONC OF SO2      IN MICROGRAMS/M**3                  **

                                                                                 NETWORK
GROUP ID                AVERAGE CONC            RECEPTOR  (XR, YR, ZELEV, ZHILL, ZFLAG)  OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

ALL       1ST HIGHEST VALUE IS      0.28608 AT (  417882.00,  5615008.00,   771.00,   771.00,    0.00)  DC
          2ND HIGHEST VALUE IS      0.27744 AT (  417862.00,  5615028.00,   771.15,   771.15,    0.00)  DC
          3RD HIGHEST VALUE IS      0.24978 AT (  417902.00,  5615008.00,   771.00,   771.00,    0.00)  DC
          4TH HIGHEST VALUE IS      0.24348 AT (  417922.00,  5614988.00,   770.24,   770.24,    0.00)  DC
          5TH HIGHEST VALUE IS      0.24152 AT (  417962.00,  5614968.00,   770.00,   770.00,    0.00)  DC
          6TH HIGHEST VALUE IS      0.24139 AT (  418142.00,  5614868.00,   770.00,   770.00,    0.00)  DC
          7TH HIGHEST VALUE IS      0.24110 AT (  418322.00,  5614768.00,   770.00,   770.00,    0.00)  DC
          8TH HIGHEST VALUE IS      0.24046 AT (  418282.00,  5614788.00,   770.00,   770.00,    0.00)  DC
          9TH HIGHEST VALUE IS      0.24004 AT (  418102.00,  5614888.00,   770.00,   770.00,    0.00)  DC
         10TH HIGHEST VALUE IS      0.23618 AT (  418002.00,  5614948.00,   770.00,   770.00,    0.00)  DC


 *** RECEPTOR TYPES:  GC = GRIDCART
                      GP = GRIDPOLR
                      DC = DISCCART
                      DP = DISCPOLR
```

Appendix B5: $PM_{2.5}$ Dispersion Modelling Input and Output Files for the Baseline Case

24-Hour $PM_{2.5}$ Input File for the Baseline Case

```
CO STARTING
   TITLEONE  Snake Lake Reservoir Baseline
   MODELOPT  CONC   ELEV   BETA
   AVERTIME  24
   POLLUTID  PM25
   RUNORNOT  RUN
   ERRORFIL  ERRORS.OUT
CO FINISHED

SO STARTING

** Trans Canada Highway and CP Rail
   LOCATION   Highway    LINE          411687.00  5618458.00   423093.00  5612110.00      771.0
   LOCATION   Train1     LINE          408087.00  5617797.00   415910.00  5614532.00      772.0
   LOCATION   Train2     LINE          415910.00  5614532.00   422967.00  5605205.00      766.5

** Trans Canada Highway and CP Rail
**                        Q          H          W
   SRCPARAM   Highway       4.70E-07     0.4220     14.8000
   SRCPARAM   Train1        1.34E-06     4.5720     3.0480
   SRCPARAM   Train2        1.34E-06     4.5720     3.0480


   SRCGROUP  ALL
SO FINISHED

RE STARTING
   INCLUDED  "C:\Modelling\SLR\Baselineloc.ROU"
RE FINISHED

ME STARTING
   SURFFILE  "C:\Modelling\SLR\AERMET.SFC"
   PROFFILE  "C:\Modelling\SLR\AERMET.PFL"
   SURFDATA  12345  2015
   UAIRDATA  12345678  2015
   PROFBASE  779.7 METERS
   STARTEND  18 01 01  18 12 31
ME FINISHED

OU STARTING
   RECTABLE  ALLAVE  first
   MAXTABLE  ALLAVE  100
   PLOTFILE  24 ALL FIRST PM24h18.plt
   SUMMFILE  max.SUM
OU FINISHED
```

24-Hour $PM_{2.5}$ Output File for the Baseline Case

```
*** AERMOD - VERSION 23132  ***   ***  Snake Lake Reservoir Baseline                    ***       10/28/24
 *** AERMET - VERSION  23132 ***   ***                                                  ***       20:54:37
                                                                                    PAGE  70
 *** MODELOPTs:    NonDFAULT  CONC  ELEV  BETA  RURAL  ADJ_U*

                    *** THE SUMMARY OF MAXIMUM   1ST-HIGHEST 24-HR RESULTS AVERAGED OVER   1 YEARS ***


                          ** CONC OF PM25     IN MICROGRAMS/M**3                  **

                                                                                    NETWORK
GROUP ID                AVERAGE CONC           RECEPTOR  (XR, YR, ZELEV, ZHILL, ZFLAG)  OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

ALL      1ST HIGHEST VALUE IS     13.77350 AT (  421522.00,  5612988.00,   761.00,   761.00,    0.00)  DC
        2ND HIGHEST VALUE IS     13.72929 AT (  421702.00,  5612888.00,   761.00,   761.00,    0.00)  DC
        3RD HIGHEST VALUE IS     13.65236 AT (  421882.00,  5612788.00,   761.00,   761.00,    0.00)  DC
        4TH HIGHEST VALUE IS     13.61516 AT (  420982.00,  5613288.00,   764.00,   764.00,    0.00)  DC
        5TH HIGHEST VALUE IS     13.59983 AT (  421162.00,  5613188.00,   764.00,   764.00,    0.00)  DC
        6TH HIGHEST VALUE IS     13.51893 AT (  421342.00,  5613088.00,   762.46,   762.46,    0.00)  DC
        7TH HIGHEST VALUE IS     13.47734 AT (  421022.00,  5613268.00,   764.00,   764.00,    0.00)  DC
        8TH HIGHEST VALUE IS     13.46730 AT (  420942.00,  5613308.00,   764.66,   764.66,    0.00)  DC
        9TH HIGHEST VALUE IS     13.45924 AT (  421122.00,  5613208.00,   764.00,   764.00,    0.00)  DC
       10TH HIGHEST VALUE IS     13.44415 AT (  421302.00,  5613108.00,   763.00,   763.00,    0.00)  DC


 *** RECEPTOR TYPES:  GC = GRIDCART
                      GP = GRIDPOLR
                      DC = DISCCART
                      DP = DISCPOLR
```

Appendix B6: NO_2 Dispersion Modelling Input and Output Files for the Construction Case

Hourly Average NO_2 Input File for the Project Construction Case

```
CO STARTING
   TITLEONE  Snake Lake Reservoir Project Construction No Watering Project
   MODELOPT  CONC   ELEV   BETA   PVMRM
   AVERTIME  1
   POLLUTID  NO2  H1H
   OZONEFIL  "C:\Modelling\O3rur.txt" ppm
   NO2EQUIL  0.90
   NO2STACK  0.20
   RUNORNOT  RUN
   ERRORFIL  ERRORS.OUT
CO FINISHED

SO STARTING

** SLR Locations
** Generators
   LOCATION   Gen1      POINT        414297.83  5610586.83      786.0
   LOCATION   Gen2      POINT        414522.61  5610102.23      785.0

** Space Heaters
   LOCATION   SH        POINT        413971.99  5611461.47      786.0

** Mobile Diesel Equipment
   LOCATION   Light     POINT        414051.90  5611074.50      786.0
   LOCATION   Light2    POINT        414014.80  5611591.93      789.0
   LOCATION   Light3    POINT        414033.30  5611347.46      787.0
   LOCATION   Light4    POINT        414119.38  5610947.92      785.0
   LOCATION   Pump      POINT        413863.18  5611851.58      791.0

**Vehicle Exhaust Emissions
** Constuction Equipment in SLR Expansion
   LOCATION   V1        AREAPOLY      414040.95  5611878.78      781.0

** SLR Emission Parameters
** Generators
**                    Q         H         T         V         D
   SRCPARAM   Gen1          0.5386      6.00     676.40     19.40      0.30
   SRCPARAM   Gen2          0.5386      6.00     676.40     19.40      0.30
** Space Heaters
**                    Q         H         T         V         D
   SRCPARAM   SH           0.0363      1.00     394.26     12.40      0.13
** Mobile Diesel Equipment
**                    Q         H         T         V         D
   SRCPARAM   Light         0.0419      1.50     829.32     33.09      0.05
   SRCPARAM   Light2        0.0419      1.50     829.32     33.09      0.05
   SRCPARAM   Light3        0.0419      1.50     829.32     33.09      0.05
   SRCPARAM   Light4        0.0419      1.50     829.32     33.09      0.05
   SRCPARAM   Pump          0.1914      2.66     539.43      5.86      0.14
** Vehicle Exhaust Emissions
**                    Q         H      No. of Vertices
   SRCPARAM   V1          7.22E-06         3         6
   AREAVERT   V1         414040.95  5611878.78   415423.85  5611175.77   415558.17  5609891.11   414600.91  5609887.25
414502.79  5610273.32   414141.04  5611063.43


   SRCGROUP  ALL
SO FINISHED

RE STARTING
   INCLUDED  "C:\Modelling\SLR\fence.ROU"
RE FINISHED

ME STARTING
   SURFFILE  "C:\Modelling\SLR\AERMET.SFC"
   PROFFILE  "C:\Modelling\SLR\AERMET.PFL"
   SURFDATA  12345  2015
```

```
   UAIRDATA  12345678  2015
   PROFBASE  779.7 METERS
   STARTEND  18 01 01  18 12 31
ME FINISHED

OU STARTING
   RECTABLE  ALLAVE  ninth
   MAXTABLE  ALLAVE  100
OU MAXIFILE  1  ALL  285.7  1h18Exceed.txt
   PLOTFILE  1 ALL ninth NO21h18.plt
   SUMMFILE  max.SUM
OU FINISHED
```

Hourly Average NO_2 Output File for the Project Construction Case

*** AERMOD - VERSION 23132 *** *** Snake Lake Reservoir Project Construction No Watering Project *** 11/15/24
*** AERMET - VERSION 23132 *** *** *** 20:16:05
PAGE 37
*** MODELOPTs: NonDFAULT CONC ELEV PVMRM BETA RURAL ADJ_U*

*** THE SUMMARY OF HIGHEST 1-HR RESULTS ***

** CONC OF NO2 IN MICROGRAMS/M**3 **

GROUP ID	AVERAGE CONC	DATE (YYMMDDHH)	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)	NETWORK OF TYPE GRID-ID
ALL	HIGH 9TH HIGH VALUE IS	**471.35780**	ON 18010502: AT (413480.20, 5612598.40, 785.66, 785.66, 0.00)	DC

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR

Annual NO_2 Input File for the Project Construction Case

```
CO STARTING
   TITLEONE  Snake Lake Reservoir Project Construction No Watering Project
   MODELOPT  CONC   ELEV   BETA   PVMRM
   AVERTIME  Annual
   POLLUTID  NO2
   OZONEFIL  "C:\Modelling\O3rur.txt" ppm
   NO2EQUIL  0.90
   NO2STACK  0.20
   RUNORNOT  RUN
   ERRORFIL  ERRORS.OUT
CO FINISHED

SO STARTING

** SLR Locations
** Generators
   LOCATION   Gen1      POINT        414297.83  5610586.83      786.0
   LOCATION   Gen2      POINT        414522.61  5610102.23      785.0

** Space Heaters
   LOCATION   SH        POINT        413971.99  5611461.47      786.0

** Mobile Diesel Equipment
   LOCATION   Light     POINT        414051.90  5611074.50      786.0
   LOCATION   Light2    POINT        414014.80  5611591.93      789.0
   LOCATION   Light3    POINT        414033.30  5611347.46      787.0
   LOCATION   Light4    POINT        414119.38  5610947.92      785.0
   LOCATION   Pump      POINT        413863.18  5611851.58      791.0

**Vehicle Exhaust Emissions
** Constuction Equipment in SLR Expansion
   LOCATION   V1        AREAPOLY      414040.95  5611878.78      781.0

** SLR Emission Parameters
** Generators
**                    Q         H         T         V         D
   SRCPARAM   Gen1          0.2545      6.00     676.40      19.40       0.30
   SRCPARAM   Gen2          0.2545      6.00     676.40      19.40       0.30
** Space Heaters
**                    Q         H         T         V         D
   SRCPARAM   SH           0.0057      1.00     394.26      12.40       0.13
** Mobile Diesel Equipment
**                    Q         H         T         V         D
   SRCPARAM   Light         0.0050      1.50     829.32      33.09       0.05
   SRCPARAM   Light2        0.0050      1.50     829.32      33.09       0.05
   SRCPARAM   Light3        0.0050      1.50     829.32      33.09       0.05
   SRCPARAM   Light4        0.0050      1.50     829.32      33.09       0.05
   SRCPARAM   Pump          0.0603      2.66     539.43       5.86       0.14
** Vehicle Exhaust Emissions
**                    Q         H      No. of Vertices
   SRCPARAM   V1          1.37E-06         3         6
   AREAVERT   V1         414040.95  5611878.78   415423.85  5611175.77   415558.17  5609891.11   414600.91  5609887.25
414502.79  5610273.32   414141.04  5611063.43


   SRCGROUP  ALL
SO FINISHED

RE STARTING
   INCLUDED  "C:\Modelling\SLR\fence.ROU"
RE FINISHED

ME STARTING
   SURFFILE  "C:\Modelling\SLR\AERMET.SFC"
   PROFFILE  "C:\Modelling\SLR\AERMET.PFL"
   SURFDATA  12345  2015
```

```
   UAIRDATA  12345678  2015
   PROFBASE  779.7 METERS
   STARTEND  19 01 01  19 12 31
ME FINISHED

OU STARTING
   RECTABLE  ALLAVE  first
   MAXTABLE  ALLAVE  100
   PLOTFILE  annual ALL NO2Ann19.plt
   SUMMFILE  max.SUM
OU FINISHED
```

Annual NO_2 Output File for the Project Construction Case

```
*** AERMOD - VERSION 23132  ***   ***  Snake Lake Reservoir Project Construction No Watering Project      ***       11/15/24
 *** AERMET - VERSION  23132 ***   ***                                                                   ***       21:03:54
                                                                                                      PAGE  35
 *** MODELOPTs:    NonDFAULT  CONC  ELEV  PVMRM  BETA  RURAL  ADJ_U*

                        *** THE SUMMARY OF MAXIMUM ANNUAL RESULTS AVERAGED OVER   1 YEARS ***


                        ** CONC OF NO2      IN MICROGRAMS/M**3                  **

                                                                                          NETWORK
GROUP ID                AVERAGE CONC            RECEPTOR  (XR, YR, ZELEV, ZHILL, ZFLAG)  OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

ALL       1ST HIGHEST VALUE IS      6.70946 AT (  414416.20,  5610199.60,   786.00,   786.00,    0.00)  DC
          2ND HIGHEST VALUE IS      6.58712 AT (  414426.10,  5610182.60,   786.00,   786.00,    0.00)  DC
          3RD HIGHEST VALUE IS      6.53872 AT (  414406.30,  5610216.60,   786.03,   786.03,    0.00)  DC
          4TH HIGHEST VALUE IS      6.52077 AT (  414433.10,  5610143.50,   786.13,   786.13,    0.00)  DC
          5TH HIGHEST VALUE IS      6.45067 AT (  414454.10,  5610026.10,   786.00,   786.00,    0.00)  DC
          6TH HIGHEST VALUE IS      6.43542 AT (  414450.60,  5610045.70,   786.00,   786.00,    0.00)  DC
          7TH HIGHEST VALUE IS      6.42344 AT (  414457.60,  5610006.60,   786.00,   786.00,    0.00)  DC
          8TH HIGHEST VALUE IS      6.40269 AT (  414429.60,  5610163.00,   786.07,   786.07,    0.00)  DC
          9TH HIGHEST VALUE IS      6.34961 AT (  414461.10,  5609987.00,   786.00,   786.00,    0.00)  DC
         10TH HIGHEST VALUE IS      6.33479 AT (  414436.60,  5610123.90,   786.00,   786.00,    0.00)  DC


 *** RECEPTOR TYPES:  GC = GRIDCART
                      GP = GRIDPOLR
                      DC = DISCCART
                      DP = DISCPOLR
```

Hourly Average NO_2 Input File for the Cumulative Construction Case

```
CO STARTING
   TITLEONE  Snake Lake Reservoir Project Construction No Watering All
   MODELOPT  CONC   ELEV   BETA   PVMRM
   AVERTIME  1
   POLLUTID  NO2  H1H
   OZONEFIL  "C:\Modelling\O3rur.txt" ppm
   NO2EQUIL  0.90
   NO2STACK  0.20
   RUNORNOT  RUN
   ERRORFIL  ERRORS.OUT
CO FINISHED

SO STARTING

** Trans Canada Highway and CP Rail
   LOCATION   Highway    LINE          411687.00  5618458.00   423093.00  5612110.00      771.0
   LOCATION   Train1     LINE          408087.00  5617797.00   415910.00  5614532.00      772.0
   LOCATION   Train2     LINE          415910.00  5614532.00   422967.00  5605205.00      766.5

** Journey Energy Countess
   LOCATION   Comp       POINT         418069.96  5615258.56      774.0
   LOCATION   Heater     POINT         418034.46  5615282.06      774.0

** SLR Locations
** Generators
   LOCATION   Gen1       POINT         414297.83  5610586.83      786.0
   LOCATION   Gen2       POINT         414522.61  5610102.23      785.0

** Space Heaters
   LOCATION   SH         POINT         413971.99  5611461.47      786.0

** Mobile Diesel Equipment
   LOCATION   Light      POINT         414051.90  5611074.50      786.0
   LOCATION   Light2     POINT         414014.80  5611591.93      789.0
   LOCATION   Light3     POINT         414033.30  5611347.46      787.0
   LOCATION   Light4     POINT         414119.38  5610947.92      785.0
   LOCATION   Pump       POINT         413863.18  5611851.58      791.0

**Vehicle Exhaust Emissions
** Constuction Equipment in SLR Expansion
   LOCATION   V1         AREAPOLY      414040.95  5611878.78      781.0

** Trans Canada Highway and CP Rail
**                      Q          H          W
   SRCPARAM   Highway    6.37E-05     0.4220     14.8000
   SRCPARAM   Train1     7.35E-05     4.5720      3.0480
   SRCPARAM   Train2     7.35E-05     4.5720      3.0480

**Journey Energy Countess
**                      Q          H          T          V          D
   SRCPARAM   Comp       0.5162       8.44      780.3       42.1      0.3227
   SRCPARAM   Heater     0.0911       9.38      676.9       10.0      0.6520
** SLR Emission Parameters
** Generators
**                      Q          H          T          V          D
   SRCPARAM   Gen1       0.5386       6.00      676.40      19.40       0.30
   SRCPARAM   Gen2       0.5386       6.00      676.40      19.40       0.30
** Space Heaters
**                      Q          H          T          V          D
   SRCPARAM   SH         0.0363       1.00      394.26      12.40       0.13
** Mobile Diesel Equipment
**                      Q          H          T          V          D
   SRCPARAM   Light      0.0419       1.50      829.32      33.09       0.05
   SRCPARAM   Light2     0.0419       1.50      829.32      33.09       0.05
   SRCPARAM   Light3     0.0419       1.50      829.32      33.09       0.05
   SRCPARAM   Light4     0.0419       1.50      829.32      33.09       0.05
```

```
   SRCPARAM   Pump          0.1914       2.66      539.43       5.86       0.14
** Vehicle Exhaust Emissions
**                        Q          H      No. of Vertices
   SRCPARAM   V1          7.22E-06         3         6
   AREAVERT   V1         414040.95  5611878.78   415423.85  5611175.77   415558.17  5609891.11   414600.91  5609887.25
414502.79  5610273.32   414141.04  5611063.43


   SRCGROUP  ALL
SO FINISHED

RE STARTING
   INCLUDED  "C:\Modelling\SLR\Baselineloc.ROU"
RE FINISHED

ME STARTING
   SURFFILE  "C:\Modelling\SLR\AERMET.SFC"
   PROFFILE  "C:\Modelling\SLR\AERMET.PFL"
   SURFDATA  12345  2015
   UAIRDATA  12345678  2015
   PROFBASE  779.7 METERS
   STARTEND  15 01 01  15 12 31
ME FINISHED

OU STARTING
   RECTABLE  ALLAVE  ninth
   MAXTABLE  ALLAVE  100
OU MAXIFILE  1  ALL  285.7  1h15Exceed.txt
   PLOTFILE  1 ALL ninth NO21h15.plt
   SUMMFILE  max.SUM
OU FINISHED
```

Hourly Average NO_2 Output File for the Cumulative Construction Case

```
*** AERMOD - VERSION 23132  ***   ***  Snake Lake Reservoir Project Construction No Watering All         ***       11/19/24
 *** AERMET - VERSION  23132 ***   ***                                                          ***       08:27:54
                                                                                          PAGE  73
 *** MODELOPTs:    NonDFAULT  CONC  ELEV  PVMRM  BETA  RURAL  ADJ_U*

                                  *** THE SUMMARY OF HIGHEST  1-HR RESULTS ***


                             ** CONC OF NO2      IN MICROGRAMS/M**3                    **

                                                  DATE                                                NETWORK
GROUP ID                        AVERAGE CONC      (YYMMDDHH)          RECEPTOR  (XR, YR, ZELEV, ZHILL, ZFLAG)    OF TYPE
GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

ALL      HIGH   9TH HIGH VALUE IS    1139.29663  ON 15070306: AT (  420942.00,  5613308.00,   764.66,   764.66,    0.00)  DC


 *** RECEPTOR TYPES:  GC = GRIDCART
                      GP = GRIDPOLR
                      DC = DISCCART
                      DP = DISCPOLR
```

Annual NO_2 Input File for the Cumulative Construction Case

```
CO STARTING
   TITLEONE  Snake Lake Reservoir Project Construction No Watering All
   MODELOPT  CONC   ELEV   BETA   PVMRM
   AVERTIME  Annual
   POLLUTID  NO2
   OZONEFIL  "C:\Modelling\O3rur.txt" ppm
   NO2EQUIL  0.90
   NO2STACK  0.20
   RUNORNOT  RUN
   ERRORFIL  ERRORS.OUT
CO FINISHED

SO STARTING

** Trans Canada Highway and CP Rail
   LOCATION   Highway    LINE         411687.00  5618458.00   423093.00  5612110.00      771.0
   LOCATION   Train1     LINE         408087.00  5617797.00   415910.00  5614532.00      772.0
   LOCATION   Train2     LINE         415910.00  5614532.00   422967.00  5605205.00      766.5

** Journey Energy Countess
   LOCATION   Comp       POINT         418069.96  5615258.56      774.0
   LOCATION   Heater     POINT         418034.46  5615282.06      774.0

** SLR Locations
** Generators
   LOCATION   Gen1       POINT         414297.83  5610586.83      786.0
   LOCATION   Gen2       POINT         414522.61  5610102.23      785.0

** Space Heaters
   LOCATION   SH         POINT         413971.99  5611461.47      786.0

** Mobile Diesel Equipment
   LOCATION   Light      POINT         414051.90  5611074.50      786.0
   LOCATION   Light2     POINT         414014.80  5611591.93      789.0
   LOCATION   Light3     POINT         414033.30  5611347.46      787.0
   LOCATION   Light4     POINT         414119.38  5610947.92      785.0
   LOCATION   Pump       POINT         413863.18  5611851.58      791.0

**Vehicle Exhaust Emissions
** Constuction Equipment in SLR Expansion
   LOCATION   V1         AREAPOLY      414040.95  5611878.78      781.0

** Trans Canada Highway and CP Rail
**                       Q          H          W
   SRCPARAM   Highway     2.32E-05     0.4220     14.8000
   SRCPARAM   Train1      7.35E-05     4.5720     3.0480
   SRCPARAM   Train2      7.35E-05     4.5720     3.0480

**Journey Energy Countess
**                       Q          H          T          V          D
   SRCPARAM   Comp        0.5162       8.44       780.3      42.1       0.3227
   SRCPARAM   Heater      0.0911       9.38       676.9      10.0       0.6520
** SLR Emission Parameters
** Generators
**                       Q          H          T          V          D
   SRCPARAM   Gen1        0.2545       6.00       676.40     19.40      0.30
   SRCPARAM   Gen2        0.2545       6.00       676.40     19.40      0.30
** Space Heaters
**                       Q          H          T          V          D
   SRCPARAM   SH          0.0057       1.00       394.26     12.40      0.13
** Mobile Diesel Equipment
**                       Q          H          T          V          D
   SRCPARAM   Light       0.0050       1.50       829.32     33.09      0.05
   SRCPARAM   Light2      0.0050       1.50       829.32     33.09      0.05
   SRCPARAM   Light3      0.0050       1.50       829.32     33.09      0.05
   SRCPARAM   Light4      0.0050       1.50       829.32     33.09      0.05
```

```
   SRCPARAM    Pump           0.0603       2.66      539.43       5.86       0.14
** Vehicle Exhaust Emissions
**                        Q          H      No. of Vertices
   SRCPARAM    V1          1.37E-06          3          6
   AREAVERT    V1         414040.95  5611878.78   415423.85  5611175.77   415558.17  5609891.11   414600.91  5609887.25
414502.79  5610273.32   414141.04  5611063.43


   SRCGROUP  ALL
SO FINISHED

RE STARTING
   INCLUDED  "C:\Modelling\SLR\baselineloc.ROU"
RE FINISHED

ME STARTING
   SURFFILE  "C:\Modelling\SLR\AERMET.SFC"
   PROFFILE  "C:\Modelling\SLR\AERMET.PFL"
   SURFDATA  12345  2015
   UAIRDATA  12345678  2015
   PROFBASE  779.7 METERS
   STARTEND  18 01 01  18 12 31
ME FINISHED

OU STARTING
   RECTABLE  ALLAVE  first
   MAXTABLE  ALLAVE  100
   PLOTFILE  annual ALL NO2Ann18.plt
   SUMMFILE  max.SUM
OU FINISHED
```

Annual NO_2 Output File for the Cumulative Construction Case

```
*** AERMOD - VERSION 23132  ***  *** Snake Lake Reservoir Project Construction No Watering All        ***       11/17/24
 *** AERMET - VERSION  23132 ***  ***                                                                 ***       13:06:48
                                                                                                    PAGE  71
 *** MODELOPTs:    NonDFAULT  CONC  ELEV  PVMRM  BETA  RURAL  ADJ_U*

                        *** THE SUMMARY OF MAXIMUM ANNUAL RESULTS AVERAGED OVER   1 YEARS ***


                        ** CONC OF NO2      IN MICROGRAMS/M**3                  **

                                                                                                NETWORK
GROUP ID                AVERAGE CONC            RECEPTOR  (XR, YR, ZELEV, ZHILL, ZFLAG)  OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

ALL       1ST HIGHEST VALUE IS     67.65674 AT (  421842.00,  5612808.00,   761.00,   761.00,    0.00)  DC
          2ND HIGHEST VALUE IS     67.45027 AT (  421662.00,  5612908.00,   761.00,   761.00,    0.00)  DC
          3RD HIGHEST VALUE IS     67.24879 AT (  421482.00,  5613008.00,   761.00,   761.00,    0.00)  DC
          4TH HIGHEST VALUE IS     67.07802 AT (  421802.00,  5612828.00,   761.00,   761.00,    0.00)  DC
          5TH HIGHEST VALUE IS     66.91111 AT (  421302.00,  5613108.00,   763.00,   763.00,    0.00)  DC
          6TH HIGHEST VALUE IS     66.51045 AT (  421122.00,  5613208.00,   764.00,   764.00,    0.00)  DC
          7TH HIGHEST VALUE IS     66.47947 AT (  421622.00,  5612928.00,   761.00,   761.00,    0.00)  DC
          8TH HIGHEST VALUE IS     65.92530 AT (  421442.00,  5613028.00,   761.88,   761.88,    0.00)  DC
          9TH HIGHEST VALUE IS     65.38167 AT (  421262.00,  5613128.00,   763.44,   763.44,    0.00)  DC
         10TH HIGHEST VALUE IS     65.20186 AT (  420942.00,  5613308.00,   764.66,   764.66,    0.00)  DC


 *** RECEPTOR TYPES:  GC = GRIDCART
                      GP = GRIDPOLR
                      DC = DISCCART
                      DP = DISCPOLR
```

Appendix B7: SO_2 Dispersion Modelling Input and Output Files for the Construction Case

Hourly Average SO_2 Input File for the Project Construction Case

```
CO STARTING
   TITLEONE  Snake Lake Reservoir Project Construction No Watering Project
   MODELOPT  CONC   ELEV   BETA
   AVERTIME  1
   POLLUTID  SO2 H1H
   RUNORNOT  RUN
   ERRORFIL  ERRORS.OUT
CO FINISHED

SO STARTING

** SLR Locations
** Generators
   LOCATION   Gen1      POINT        414297.83  5610586.83      786.0
   LOCATION   Gen2      POINT        414522.61  5610102.23      785.0

** Mobile Diesel Equipment
   LOCATION   Light     POINT        414051.90  5611074.50      786.0
   LOCATION   Light2    POINT        414014.80  5611591.93      789.0
   LOCATION   Light3    POINT        414033.30  5611347.46      787.0
   LOCATION   Light4    POINT        414119.38  5610947.92      785.0
   LOCATION   Pump      POINT        413863.18  5611851.58      791.0

**Vehicle Exhaust Emissions
** Constuction Equipment in SLR Expansion
   LOCATION   V1        AREAPOLY      414040.95  5611878.78      781.0

** SLR Emission Parameters
** Generators
**                      Q         H         T         V         D
   SRCPARAM   Gen1          0.0010      6.00     676.40      19.40      0.30
   SRCPARAM   Gen2          0.0010      6.00     676.40      19.40      0.30
** Mobile Diesel Equipment
**                      Q         H         T         V         D
   SRCPARAM   Light         0.0028      1.50     829.32      33.09      0.05
   SRCPARAM   Light2         0.0028      1.50     829.32      33.09      0.05
   SRCPARAM   Light3         0.0028      1.50     829.32      33.09      0.05
   SRCPARAM   Light4         0.0028      1.50     829.32      33.09      0.05
   SRCPARAM   Pump          0.0127      2.66     539.43      5.86       0.14
** Vehicle Exhaust Emissions
**                      Q         H      No. of Vertices
   SRCPARAM   V1          1.55E-08         3         6
   AREAVERT   V1         414040.95  5611878.78   415423.85  5611175.77   415558.17  5609891.11   414600.91  5609887.25
414502.79  5610273.32   414141.04  5611063.43



   SRCGROUP  ALL
SO FINISHED

RE STARTING
   INCLUDED  "C:\Modelling\SLR\fence.ROU"
RE FINISHED

ME STARTING
   SURFFILE  "C:\Modelling\SLR\AERMET.SFC"
   PROFFILE  "C:\Modelling\SLR\AERMET.PFL"
   SURFDATA  12345  2015
   UAIRDATA  12345678  2015
   PROFBASE  779.7 METERS
   STARTEND  17 01 01  17 12 31
ME FINISHED

OU STARTING
   RECTABLE  ALLAVE  ninth
   MAXTABLE  ALLAVE  100
```

```
   PLOTFILE  1 ALL ninth SO21h17.plt
   SUMMFILE  max.SUM
OU FINISHED
```

Hourly Average SO_2 Output File for the Project Construction Case

```
*** AERMOD - VERSION 23132  ***   ***  Snake Lake Reservoir Project Construction No Watering Project      ***        11/15/24
 *** AERMET - VERSION  23132 ***   ***                                                                     ***        19:27:56
                                                                                                  PAGE  36
 *** MODELOPTs:    NonDFAULT  CONC  ELEV  BETA  RURAL  ADJ_U*

                                        *** THE SUMMARY OF HIGHEST  1-HR RESULTS ***


                              ** CONC OF SO2      IN MICROGRAMS/M**3                       **

                                              DATE                                          NETWORK
GROUP ID                        AVERAGE CONC     (YYMMDDHH)          RECEPTOR  (XR, YR, ZELEV, ZHILL, ZFLAG)    OF TYPE
GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

ALL      HIGH   9TH HIGH VALUE IS      15.85602  ON 17041901: AT (  413804.70,  5611811.50,    790.00,    790.00,     0.00)  DC

 *** RECEPTOR TYPES:  GC = GRIDCART
                      GP = GRIDPOLR
                      DC = DISCCART
                      DP = DISCPOLR
```

24-Hour SO_2 Input File for the Project Construction Case

```
CO STARTING
   TITLEONE  Snake Lake Reservoir Project Construction No Watering Project
   MODELOPT  CONC   ELEV   BETA
   AVERTIME  24
   POLLUTID  SO2
   RUNORNOT  RUN
   ERRORFIL  ERRORS.OUT
CO FINISHED

SO STARTING

** SLR Locations
** Generators
   LOCATION   Gen1      POINT        414297.83  5610586.83      786.0
   LOCATION   Gen2      POINT        414522.61  5610102.23      785.0

** Mobile Diesel Equipment
   LOCATION   Light     POINT        414051.90  5611074.50      786.0
   LOCATION   Light2    POINT        414014.80  5611591.93      789.0
   LOCATION   Light3    POINT        414033.30  5611347.46      787.0
   LOCATION   Light4    POINT        414119.38  5610947.92      785.0
   LOCATION   Pump      POINT        413863.18  5611851.58      791.0

**Vehicle Exhaust Emissions
** Constuction Equipment in SLR Expansion
   LOCATION   V1        AREAPOLY      414040.95  5611878.78      781.0

** SLR Emission Parameters
** Generators
**                      Q         H         T         V         D
   SRCPARAM   Gen1          0.0005      6.00     676.40      19.40      0.30
   SRCPARAM   Gen2          0.0005      6.00     676.40      19.40      0.30
** Mobile Diesel Equipment
**                      Q         H         T         V         D
   SRCPARAM   Light         0.0006      1.50     829.32      33.09      0.05
   SRCPARAM   Light2         0.0006      1.50     829.32      33.09      0.05
   SRCPARAM   Light3         0.0006      1.50     829.32      33.09      0.05
   SRCPARAM   Light4         0.0006      1.50     829.32      33.09      0.05
   SRCPARAM   Pump          0.0063      2.66     539.43      5.86       0.14
** Vehicle Exhaust Emissions
**                      Q         H      No. of Vertices
   SRCPARAM   V1          7.76E-09         3         6
   AREAVERT   V1         414040.95  5611878.78   415423.85  5611175.77   415558.17  5609891.11   414600.91  5609887.25
414502.79  5610273.32   414141.04  5611063.43



   SRCGROUP  ALL
SO FINISHED

RE STARTING
   INCLUDED  "C:\Modelling\SLR\fence.ROU"
RE FINISHED

ME STARTING
   SURFFILE  "C:\Modelling\SLR\AERMET.SFC"
   PROFFILE  "C:\Modelling\SLR\AERMET.PFL"
   SURFDATA  12345  2015
   UAIRDATA  12345678  2015
   PROFBASE  779.7 METERS
   STARTEND  17 01 01  17 12 31
ME FINISHED

OU STARTING
   RECTABLE  ALLAVE  first
   MAXTABLE  ALLAVE  100
```

```
   PLOTFILE  24 ALL FIRST SO224h17.plt
   SUMMFILE  max.SUM
OU FINISHED
```

24-Hour SO_2 Output File for the Project Construction Case

*** AERMOD - VERSION 23132 *** *** Snake Lake Reservoir Project Construction No Watering Project *** 11/15/24
*** AERMET - VERSION 23132 *** *** *** 19:29:42
PAGE 36

*** MODELOPTs: NonDFAULT CONC ELEV BETA RURAL ADJ_U*

*** THE SUMMARY OF HIGHEST 24-HR RESULTS ***

** CONC OF SO2 IN MICROGRAMS/M**3 **

GROUP ID	AVERAGE	CONC	DATE (YYMMDDHH)	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)	NETWORK OF TYPE GRID-ID
ALL	HIGH	1ST HIGH VALUE IS	**4.53986c**	ON 17110224: AT (413834.80, 5611786.90, 790.00, 790.00, 0.00)	DC

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR

30-Day SO_2 Input File for the Project Construction Case

```
CO STARTING
   TITLEONE  Snake Lake Reservoir Project Construction No Watering Project
   MODELOPT  CONC   ELEV   BETA
   AVERTIME  MONTH
   POLLUTID  SO2
   RUNORNOT  RUN
   ERRORFIL  ERRORS.OUT
CO FINISHED

SO STARTING

** SLR Locations
** Generators
   LOCATION   Gen1      POINT        414297.83  5610586.83      786.0
   LOCATION   Gen2      POINT        414522.61  5610102.23      785.0

** Mobile Diesel Equipment
   LOCATION   Light     POINT        414051.90  5611074.50      786.0
   LOCATION   Light2    POINT        414014.80  5611591.93      789.0
   LOCATION   Light3    POINT        414033.30  5611347.46      787.0
   LOCATION   Light4    POINT        414119.38  5610947.92      785.0
   LOCATION   Pump      POINT        413863.18  5611851.58      791.0

**Vehicle Exhaust Emissions
** Constuction Equipment in SLR Expansion
   LOCATION   V1        AREAPOLY      414040.95  5611878.78      781.0

** SLR Emission Parameters
** Generators
**                      Q         H         T         V         D
   SRCPARAM   Gen1          0.0005      6.00     676.40      19.40      0.30
   SRCPARAM   Gen2          0.0005      6.00     676.40      19.40      0.30
** Mobile Diesel Equipment
**                      Q         H         T         V         D
   SRCPARAM   Light         0.0006      1.50     829.32      33.09      0.05
   SRCPARAM   Light2         0.0006      1.50     829.32      33.09      0.05
   SRCPARAM   Light3         0.0006      1.50     829.32      33.09      0.05
   SRCPARAM   Light4         0.0006      1.50     829.32      33.09      0.05
   SRCPARAM   Pump          0.0063      2.66     539.43      5.86       0.14
** Vehicle Exhaust Emissions
**                      Q         H      No. of Vertices
   SRCPARAM   V1          7.76E-09         3         6
   AREAVERT   V1         414040.95  5611878.78   415423.85  5611175.77   415558.17  5609891.11   414600.91  5609887.25
414502.79  5610273.32   414141.04  5611063.43


   SRCGROUP  ALL
SO FINISHED

RE STARTING
   INCLUDED  "C:\Modelling\SLR\fence.ROU"
RE FINISHED

ME STARTING
   SURFFILE  "C:\Modelling\SLR\AERMET.SFC"
   PROFFILE  "C:\Modelling\SLR\AERMET.PFL"
   SURFDATA  12345  2015
   UAIRDATA  12345678  2015
   PROFBASE  779.7 METERS
   STARTEND  18 01 01  18 12 31
ME FINISHED

OU STARTING
   RECTABLE  ALLAVE  first
   MAXTABLE  ALLAVE  100
   PLOTFILE  MONTH ALL FIRST SO230d18.plt
```

```
  SUMMFILE  max.SUM
OU FINISHED
```

30-Day SO_2 Output File for the Project Construction Case

*** AERMOD - VERSION 23132 *** *** Snake Lake Reservoir Project Construction No Watering Project *** 11/15/24
*** AERMET - VERSION 23132 *** *** *** 19:59:36
PAGE 36
*** MODELOPTs: NonDFAULT CONC ELEV BETA RURAL ADJ_U*

*** THE SUMMARY OF HIGHEST MONTH RESULTS ***

** CONC OF SO2 IN MICROGRAMS/M**3 **

GROUP ID	AVERAGE	CONC	DATE (YYMMDDHH)	NETWORK RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)	OF TYPE GRID-ID
ALL	HIGH	1ST HIGH VALUE IS	**0.90538c**	ON 18093024: AT (413804.70, 5611811.50, 790.00, 790.00, 0.00)	DC

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR

Annual SO_2 Input File for the Project Construction Case

```
CO STARTING
   TITLEONE  Snake Lake Reservoir Project Construction No Watering Project
   MODELOPT  CONC   ELEV   BETA
   AVERTIME  Annual
   POLLUTID  SO2
   RUNORNOT  RUN
   ERRORFIL  ERRORS.OUT
CO FINISHED

SO STARTING

** SLR Locations
** Generators
   LOCATION   Gen1      POINT        414297.83  5610586.83      786.0
   LOCATION   Gen2      POINT        414522.61  5610102.23      785.0

** Mobile Diesel Equipment
   LOCATION   Light     POINT        414051.90  5611074.50      786.0
   LOCATION   Light2    POINT        414014.80  5611591.93      789.0
   LOCATION   Light3    POINT        414033.30  5611347.46      787.0
   LOCATION   Light4    POINT        414119.38  5610947.92      785.0
   LOCATION   Pump      POINT        413863.18  5611851.58      791.0

**Vehicle Exhaust Emissions
** Constuction Equipment in SLR Expansion
   LOCATION   V1        AREAPOLY      414040.95  5611878.78      781.0

** SLR Emission Parameters
** Generators
**                      Q         H         T         V         D
   SRCPARAM   Gen1          0.0005      6.00     676.40      19.40      0.30
   SRCPARAM   Gen2          0.0005      6.00     676.40      19.40      0.30
** Mobile Diesel Equipment
**                      Q         H         T         V         D
   SRCPARAM   Light         0.0003      1.50     829.32      33.09      0.05
   SRCPARAM   Light2         0.0003      1.50     829.32      33.09      0.05
   SRCPARAM   Light3         0.0003      1.50     829.32      33.09      0.05
   SRCPARAM   Light4         0.0003      1.50     829.32      33.09      0.05
   SRCPARAM   Pump          0.0040      2.66     539.43       5.86      0.14
** Vehicle Exhaust Emissions
**                      Q         H      No. of Vertices
   SRCPARAM   V1          2.94E-09         3         6
   AREAVERT   V1         414040.95  5611878.78   415423.85  5611175.77   415558.17  5609891.11   414600.91  5609887.25
414502.79  5610273.32   414141.04  5611063.43


   SRCGROUP  ALL
SO FINISHED

RE STARTING
   INCLUDED  "C:\Modelling\SLR\fence.ROU"
RE FINISHED

ME STARTING
   SURFFILE  "C:\Modelling\SLR\AERMET.SFC"
   PROFFILE  "C:\Modelling\SLR\AERMET.PFL"
   SURFDATA  12345  2015
   UAIRDATA  12345678  2015
   PROFBASE  779.7 METERS
   STARTEND  18 01 01  18 12 31
ME FINISHED

OU STARTING
   RECTABLE  ALLAVE  first
   MAXTABLE  ALLAVE  100
   PLOTFILE  annual ALL SO2Ann18.plt
```

```
   SUMMFILE  max.SUM
OU FINISHED
```

Annual SO_2 Output File for the Project Construction Case

```
*** AERMOD - VERSION 23132  ***  ***  Snake Lake Reservoir Project Construction No Watering Project      ***       11/15/24
 *** AERMET - VERSION  23132 ***  ***                                                          ***       20:00:56
                                                                                          PAGE  34
 *** MODELOPTs:    NonDFAULT  CONC  ELEV  BETA  RURAL  ADJ_U*

                        *** THE SUMMARY OF MAXIMUM ANNUAL RESULTS AVERAGED OVER   1 YEARS ***


                        ** CONC OF SO2      IN MICROGRAMS/M**3                    **

                                                                                    NETWORK
GROUP ID                AVERAGE CONC            RECEPTOR  (XR, YR, ZELEV, ZHILL, ZFLAG)  OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

ALL       1ST HIGHEST VALUE IS      0.20584 AT (  413834.80,  5611786.90,   790.00,   790.00,    0.00)  DC
          2ND HIGHEST VALUE IS      0.19595 AT (  413819.70,  5611799.20,   790.00,   790.00,    0.00)  DC
          3RD HIGHEST VALUE IS      0.19375 AT (  413849.90,  5611774.70,   790.00,   790.00,    0.00)  DC
          4TH HIGHEST VALUE IS      0.19337 AT (  413864.90,  5611762.40,   790.00,   790.00,    0.00)  DC
          5TH HIGHEST VALUE IS      0.18386 AT (  413804.70,  5611811.50,   790.00,   790.00,    0.00)  DC
          6TH HIGHEST VALUE IS      0.17138 AT (  413872.10,  5611743.90,   790.00,   790.00,    0.00)  DC
          7TH HIGHEST VALUE IS      0.15754 AT (  413789.60,  5611823.70,   790.00,   790.00,    0.00)  DC
          8TH HIGHEST VALUE IS      0.15189 AT (  413879.30,  5611725.30,   790.00,   790.00,    0.00)  DC
          9TH HIGHEST VALUE IS      0.13552 AT (  413886.50,  5611706.80,   790.00,   790.00,    0.00)  DC
         10TH HIGHEST VALUE IS      0.12685 AT (  413774.50,  5611836.00,   790.31,   790.31,    0.00)  DC


 *** RECEPTOR TYPES:  GC = GRIDCART
                      GP = GRIDPOLR
                      DC = DISCCART
                      DP = DISCPOLR
```

Hourly Average SO_2 Input File for the Cumulative Construction Case

```
CO STARTING
   TITLEONE  Snake Lake Reservoir Project Construction No Watering All
   MODELOPT  CONC   ELEV   BETA
   AVERTIME  1
   POLLUTID  SO2 H1H
   RUNORNOT  RUN
   ERRORFIL  ERRORS.OUT
CO FINISHED

SO STARTING

** Trans Canada Highway and CP Rail
   LOCATION   Highway    LINE          411687.00  5618458.00   423093.00  5612110.00      771.0
   LOCATION   Train1     LINE          408087.00  5617797.00   415910.00  5614532.00      772.0
   LOCATION   Train2     LINE          415910.00  5614532.00   422967.00  5605205.00      766.5

** SLR Locations
** Generators
   LOCATION   Gen1       POINT         414297.83  5610586.83      786.0
   LOCATION   Gen2       POINT         414522.61  5610102.23      785.0

** Mobile Diesel Equipment
   LOCATION   Light      POINT         414051.90  5611074.50      786.0
   LOCATION   Light2     POINT         414014.80  5611591.93      789.0
   LOCATION   Light3     POINT         414033.30  5611347.46      787.0
   LOCATION   Light4     POINT         414119.38  5610947.92      785.0
   LOCATION   Pump       POINT         413863.18  5611851.58      791.0

**Vehicle Exhaust Emissions
** Constuction Equipment in SLR Expansion
   LOCATION   V1         AREAPOLY      414040.95  5611878.78      781.0

** Trans Canada Highway and CP Rail
**                        Q          H          W
   SRCPARAM   Highway      1.07E-07     0.4220     14.8000
   SRCPARAM   Train1       7.36E-08     4.5720      3.0480
   SRCPARAM   Train2       7.36E-08     4.5720      3.0480

** SLR Emission Parameters
** Generators
**                        Q          H          T          V          D
   SRCPARAM   Gen1          0.0010       6.00     676.40      19.40       0.30
   SRCPARAM   Gen2          0.0010       6.00     676.40      19.40       0.30
** Mobile Diesel Equipment
**                        Q          H          T          V          D
   SRCPARAM   Light         0.0028       1.50     829.32      33.09       0.05
   SRCPARAM   Light2        0.0028       1.50     829.32      33.09       0.05
   SRCPARAM   Light3        0.0028       1.50     829.32      33.09       0.05
   SRCPARAM   Light4        0.0028       1.50     829.32      33.09       0.05
   SRCPARAM   Pump          0.0127       2.66     539.43       5.86       0.14
** Vehicle Exhaust Emissions
**                        Q          H      No. of Vertices
   SRCPARAM   V1          1.55E-08          3          6
   AREAVERT   V1         414040.95  5611878.78   415423.85  5611175.77   415558.17  5609891.11   414600.91  5609887.25
414502.79  5610273.32   414141.04  5611063.43



   SRCGROUP  ALL
SO FINISHED

RE STARTING
   INCLUDED  "C:\Modelling\SLR\fence.ROU"
RE FINISHED

ME STARTING
```

```
   SURFFILE  "C:\Modelling\SLR\AERMET.SFC"
   PROFFILE  "C:\Modelling\SLR\AERMET.PFL"
   SURFDATA  12345  2015
   UAIRDATA  12345678  2015
   PROFBASE  779.7 METERS
   STARTEND  17 01 01  17 12 31
ME FINISHED

OU STARTING
   RECTABLE  ALLAVE  ninth
   MAXTABLE  ALLAVE  100
   PLOTFILE  1 ALL ninth SO21h17.plt
   SUMMFILE  max.SUM
OU FINISHED
```

Hourly Average SO_2 Output File for the Cumulative Construction Case

*** AERMOD - VERSION 23132 *** *** Snake Lake Reservoir Project Construction No Watering All *** 11/15/24
*** AERMET - VERSION 23132 *** *** *** 18:35:59
PAGE 37

*** MODELOPTs: NonDFAULT CONC ELEV BETA RURAL ADJ_U*

*** THE SUMMARY OF HIGHEST 1-HR RESULTS ***

** CONC OF SO2 IN MICROGRAMS/M**3 **

GROUP ID	AVERAGE CONC	DATE (YYMMDDHH)	NETWORK RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)	OF TYPE GRID-ID
ALL	HIGH 9TH HIGH VALUE IS	**15.86583**	ON 17041901: AT (413804.70, 5611811.50, 790.00, 790.00, 0.00)	DC

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR

24-Hour SO_2 Input File for the Cumulative Construction Case

```
CO STARTING
   TITLEONE  Snake Lake Reservoir Project Construction No Watering All
   MODELOPT  CONC   ELEV   BETA
   AVERTIME  24
   POLLUTID  SO2
   RUNORNOT  RUN
   ERRORFIL  ERRORS.OUT
CO FINISHED

SO STARTING

** Trans Canada Highway and CP Rail
   LOCATION   Highway    LINE          411687.00  5618458.00   423093.00  5612110.00      771.0
   LOCATION   Train1     LINE          408087.00  5617797.00   415910.00  5614532.00      772.0
   LOCATION   Train2     LINE          415910.00  5614532.00   422967.00  5605205.00      766.5

** SLR Locations
** Generators
   LOCATION   Gen1       POINT         414297.83  5610586.83      786.0
   LOCATION   Gen2       POINT         414522.61  5610102.23      785.0

** Mobile Diesel Equipment
   LOCATION   Light      POINT         414051.90  5611074.50      786.0
   LOCATION   Light2     POINT         414014.80  5611591.93      789.0
   LOCATION   Light3     POINT         414033.30  5611347.46      787.0
   LOCATION   Light4     POINT         414119.38  5610947.92      785.0
   LOCATION   Pump       POINT         413863.18  5611851.58      791.0

**Vehicle Exhaust Emissions
** Constuction Equipment in SLR Expansion
   LOCATION   V1         AREAPOLY      414040.95  5611878.78      781.0

** Trans Canada Highway and CP Rail
**                      Q          H          W
   SRCPARAM   Highway     3.96E-08     0.4220     14.8000
   SRCPARAM   Train1      7.36E-08     4.5720      3.0480
   SRCPARAM   Train2      7.36E-08     4.5720      3.0480

** SLR Emission Parameters
** Generators
**                      Q          H          T          V          D
   SRCPARAM   Gen1          0.0005       6.00      676.40       19.40       0.30
   SRCPARAM   Gen2          0.0005       6.00      676.40       19.40       0.30
** Mobile Diesel Equipment
**                      Q          H          T          V          D
   SRCPARAM   Light         0.0006       1.50      829.32       33.09       0.05
   SRCPARAM   Light2        0.0006       1.50      829.32       33.09       0.05
   SRCPARAM   Light3        0.0006       1.50      829.32       33.09       0.05
   SRCPARAM   Light4        0.0006       1.50      829.32       33.09       0.05
   SRCPARAM   Pump          0.0063       2.66      539.43        5.86       0.14
** Vehicle Exhaust Emissions
**                      Q          H      No. of Vertices
   SRCPARAM   V1          7.76E-09          3          6
   AREAVERT   V1         414040.95  5611878.78   415423.85  5611175.77   415558.17  5609891.11   414600.91  5609887.25
414502.79  5610273.32   414141.04  5611063.43



   SRCGROUP  ALL
SO FINISHED

RE STARTING
   INCLUDED  "C:\Modelling\SLR\fence.ROU"
RE FINISHED

ME STARTING
```

```
   SURFFILE  "C:\Modelling\SLR\AERMET.SFC"
   PROFFILE  "C:\Modelling\SLR\AERMET.PFL"
   SURFDATA  12345  2015
   UAIRDATA  12345678  2015
   PROFBASE  779.7 METERS
   STARTEND  17 01 01  17 12 31
ME FINISHED

OU STARTING
   RECTABLE  ALLAVE  first
   MAXTABLE  ALLAVE  100
   PLOTFILE  24 ALL FIRST SO224h17.plt
   SUMMFILE  max.SUM
OU FINISHED
```

24-Hour SO_2 Output File for the Cumulative Construction Case

```
*** AERMOD - VERSION 23132  ***   ***  Snake Lake Reservoir Project Construction No Watering All          ***        11/15/24
 *** AERMET - VERSION  23132 ***   ***                                                            ***        18:36:11
                                                                                          PAGE  37
 *** MODELOPTs:    NonDFAULT  CONC  ELEV  BETA  RURAL  ADJ_U*

                                        *** THE SUMMARY OF HIGHEST 24-HR RESULTS ***


                              ** CONC OF SO2       IN MICROGRAMS/M**3                        **

                                              DATE                                          NETWORK
GROUP ID                      AVERAGE CONC     (YYMMDDHH)           RECEPTOR  (XR, YR, ZELEV, ZHILL, ZFLAG)    OF TYPE
GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

ALL      HIGH   1ST HIGH VALUE IS       4.54333c ON 17110224: AT (  413834.80,  5611786.90,   790.00,   790.00,    0.00)  DC

 *** RECEPTOR TYPES:  GC = GRIDCART
                      GP = GRIDPOLR
                      DC = DISCCART
                      DP = DISCPOLR
```

30-Day SO_2 Input File for the Cumulative Construction Case

```
CO STARTING
   TITLEONE  Snake Lake Reservoir Project Construction No Watering All
   MODELOPT  CONC   ELEV   BETA
   AVERTIME  MONTH
   POLLUTID  SO2
   RUNORNOT  RUN
   ERRORFIL  ERRORS.OUT
CO FINISHED

SO STARTING

** Trans Canada Highway and CP Rail
   LOCATION   Highway    LINE          411687.00  5618458.00   423093.00  5612110.00      771.0
   LOCATION   Train1     LINE          408087.00  5617797.00   415910.00  5614532.00      772.0
   LOCATION   Train2     LINE          415910.00  5614532.00   422967.00  5605205.00      766.5

** SLR Locations
** Generators
   LOCATION   Gen1       POINT         414297.83  5610586.83      786.0
   LOCATION   Gen2       POINT         414522.61  5610102.23      785.0

** Mobile Diesel Equipment
   LOCATION   Light      POINT         414051.90  5611074.50      786.0
   LOCATION   Light2     POINT         414014.80  5611591.93      789.0
   LOCATION   Light3     POINT         414033.30  5611347.46      787.0
   LOCATION   Light4     POINT         414119.38  5610947.92      785.0
   LOCATION   Pump       POINT         413863.18  5611851.58      791.0

**Vehicle Exhaust Emissions
** Constuction Equipment in SLR Expansion
   LOCATION   V1         AREAPOLY      414040.95  5611878.78      781.0

** Trans Canada Highway and CP Rail
**                      Q          H          W
   SRCPARAM   Highway     3.96E-08     0.4220     14.8000
   SRCPARAM   Train1      7.36E-08     4.5720      3.0480
   SRCPARAM   Train2      7.36E-08     4.5720      3.0480

** SLR Emission Parameters
** Generators
**                      Q          H          T          V          D
   SRCPARAM   Gen1          0.0005       6.00      676.40       19.40       0.30
   SRCPARAM   Gen2          0.0005       6.00      676.40       19.40       0.30
** Mobile Diesel Equipment
**                      Q          H          T          V          D
   SRCPARAM   Light         0.0006       1.50      829.32       33.09       0.05
   SRCPARAM   Light2        0.0006       1.50      829.32       33.09       0.05
   SRCPARAM   Light3        0.0006       1.50      829.32       33.09       0.05
   SRCPARAM   Light4        0.0006       1.50      829.32       33.09       0.05
   SRCPARAM   Pump          0.0063       2.66      539.43        5.86       0.14
** Vehicle Exhaust Emissions
**                      Q          H      No. of Vertices
   SRCPARAM   V1          7.76E-09          3          6
   AREAVERT   V1         414040.95  5611878.78   415423.85  5611175.77   415558.17  5609891.11   414600.91  5609887.25
414502.79  5610273.32   414141.04  5611063.43


   SRCGROUP  ALL
SO FINISHED

RE STARTING
   INCLUDED  "C:\Modelling\SLR\fence.ROU"
RE FINISHED

ME STARTING
   SURFFILE  "C:\Modelling\SLR\AERMET.SFC"
```

```
   PROFFILE  "C:\Modelling\SLR\AERMET.PFL"
   SURFDATA  12345  2015
   UAIRDATA  12345678  2015
   PROFBASE  779.7 METERS
   STARTEND  18 01 01  18 12 31
ME FINISHED

OU STARTING
   RECTABLE  ALLAVE  first
   MAXTABLE  ALLAVE  100
   PLOTFILE  MONTH ALL FIRST SO230d18.plt
   SUMMFILE  max.SUM
OU FINISHED
```

30-Day SO_2 Output File for the Cumulative Construction Case

```
*** AERMOD - VERSION 23132  ***   ***  Snake Lake Reservoir Project Construction No Watering All         ***        11/15/24
 *** AERMET - VERSION  23132 ***   ***                                                                    ***       18:53:59
                                                                                                  PAGE  37
 *** MODELOPTs:    NonDFAULT  CONC  ELEV  BETA  RURAL  ADJ_U*

                                   *** THE SUMMARY OF HIGHEST MONTH RESULTS ***


                          ** CONC OF SO2      IN MICROGRAMS/M**3                       **

                                         DATE                                          NETWORK
GROUP ID                    AVERAGE CONC     (YYMMDDHH)          RECEPTOR  (XR, YR, ZELEV, ZHILL, ZFLAG)    OF TYPE
GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

ALL      HIGH   1ST HIGH VALUE IS       0.90712c ON 18093024: AT (  413804.70,  5611811.50,    790.00,    790.00,     0.00)  DC

 *** RECEPTOR TYPES:  GC = GRIDCART
                      GP = GRIDPOLR
                      DC = DISCCART
                      DP = DISCPOLR
```

Annual SO_2 Input File for the Cumulative Construction Case

```
CO STARTING
   TITLEONE  Snake Lake Reservoir Project Construction No Watering All
   MODELOPT  CONC   ELEV   BETA
   AVERTIME  Annual
   POLLUTID  SO2
   RUNORNOT  RUN
   ERRORFIL  ERRORS.OUT
CO FINISHED

SO STARTING

** Trans Canada Highway and CP Rail
   LOCATION   Highway    LINE          411687.00  5618458.00   423093.00  5612110.00      771.0
   LOCATION   Train1     LINE          408087.00  5617797.00   415910.00  5614532.00      772.0
   LOCATION   Train2     LINE          415910.00  5614532.00   422967.00  5605205.00      766.5

** SLR Locations
** Generators
   LOCATION   Gen1       POINT         414297.83  5610586.83      786.0
   LOCATION   Gen2       POINT         414522.61  5610102.23      785.0

** Mobile Diesel Equipment
   LOCATION   Light      POINT         414051.90  5611074.50      786.0
   LOCATION   Light2     POINT         414014.80  5611591.93      789.0
   LOCATION   Light3     POINT         414033.30  5611347.46      787.0
   LOCATION   Light4     POINT         414119.38  5610947.92      785.0
   LOCATION   Pump       POINT         413863.18  5611851.58      791.0

**Vehicle Exhaust Emissions
** Constuction Equipment in SLR Expansion
   LOCATION   V1         AREAPOLY      414040.95  5611878.78      781.0

** Trans Canada Highway and CP Rail
**                        Q          H          W
   SRCPARAM   Highway      3.96E-08     0.4220     14.8000
   SRCPARAM   Train1       7.36E-08     4.5720      3.0480
   SRCPARAM   Train2       7.36E-08     4.5720      3.0480

** SLR Emission Parameters
** Generators
**                        Q          H          T          V          D
   SRCPARAM   Gen1          0.0005       6.00     676.40      19.40       0.30
   SRCPARAM   Gen2          0.0005       6.00     676.40      19.40       0.30
** Mobile Diesel Equipment
**                        Q          H          T          V          D
   SRCPARAM   Light         0.0003       1.50     829.32      33.09       0.05
   SRCPARAM   Light2        0.0003       1.50     829.32      33.09       0.05
   SRCPARAM   Light3        0.0003       1.50     829.32      33.09       0.05
   SRCPARAM   Light4        0.0003       1.50     829.32      33.09       0.05
   SRCPARAM   Pump          0.0040       2.66     539.43       5.86       0.14
** Vehicle Exhaust Emissions
**                        Q          H      No. of Vertices
   SRCPARAM   V1          2.94E-09          3          6
   AREAVERT   V1         414040.95  5611878.78   415423.85  5611175.77   415558.17  5609891.11   414600.91  5609887.25
414502.79  5610273.32   414141.04  5611063.43


   SRCGROUP  ALL
SO FINISHED

RE STARTING
   INCLUDED  "C:\Modelling\SLR\loc2WNW.ROU"
RE FINISHED

ME STARTING
   SURFFILE  "C:\Modelling\SLR\AERMET.SFC"
```

```
   PROFFILE  "C:\Modelling\SLR\AERMET.PFL"
   SURFDATA  12345  2015
   UAIRDATA  12345678  2015
   PROFBASE  779.7 METERS
   STARTEND  18 01 01  18 12 31
ME FINISHED

OU STARTING
   RECTABLE  ALLAVE  first
   MAXTABLE  ALLAVE  100
   PLOTFILE  annual ALL SO2Ann18.plt
   SUMMFILE  max.SUM
OU FINISHED
```

Annual SO_2 Output File for the Cumulative Construction Case

```
*** AERMOD - VERSION 23132  ***   ***  Snake Lake Reservoir Project Construction No Watering All         ***       11/17/24
 *** AERMET - VERSION  23132 ***   ***                                                          ***       11:46:24
                                                                                                PAGE  30
 *** MODELOPTs:    NonDFAULT  CONC  ELEV  BETA  RURAL  ADJ_U*

                          *** THE SUMMARY OF MAXIMUM ANNUAL RESULTS AVERAGED OVER   1 YEARS ***


                          ** CONC OF SO2      IN MICROGRAMS/M**3                    **

                                                                                          NETWORK
GROUP ID                    AVERAGE CONC            RECEPTOR  (XR, YR, ZELEV, ZHILL, ZFLAG)  OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

ALL       1ST HIGHEST VALUE IS      0.18556 AT (  413855.00,  5611767.00,   790.00,   790.00,    0.00)  DC
          2ND HIGHEST VALUE IS      0.17226 AT (  413815.00,  5611787.00,   790.00,   790.00,    0.00)  DC
          3RD HIGHEST VALUE IS      0.17199 AT (  413835.00,  5611767.00,   790.00,   790.00,    0.00)  DC
          4TH HIGHEST VALUE IS      0.16526 AT (  413795.00,  5611807.00,   790.20,   790.20,    0.00)  DC
          5TH HIGHEST VALUE IS      0.15399 AT (  413855.00,  5611747.00,   790.00,   790.00,    0.00)  DC
          6TH HIGHEST VALUE IS      0.15160 AT (  413875.00,  5611727.00,   790.00,   790.00,    0.00)  DC
          7TH HIGHEST VALUE IS      0.15098 AT (  413815.00,  5611767.00,   790.00,   790.00,    0.00)  DC
          8TH HIGHEST VALUE IS      0.14610 AT (  413795.00,  5611787.00,   790.27,   790.27,    0.00)  DC
          9TH HIGHEST VALUE IS      0.14354 AT (  413835.00,  5611747.00,   790.00,   790.00,    0.00)  DC
         10TH HIGHEST VALUE IS      0.13953 AT (  413775.00,  5611807.00,   790.89,   790.89,    0.00)  DC


 *** RECEPTOR TYPES:  GC = GRIDCART
                      GP = GRIDPOLR
                      DC = DISCCART
                      DP = DISCPOLR
```

Appendix B8: $PM_{2.5}$ Dispersion Modelling Input and Output Files for the Construction Case

24-Hour $PM_{2.5}$ Input File for the Project Construction Case Without Mitigation

```
CO STARTING
   TITLEONE  Snake Lake Reservoir Project Construction No Watering Project
   MODELOPT  CONC   ELEV   BETA
   AVERTIME  24
   POLLUTID  PM25
   RUNORNOT  RUN
   ERRORFIL  ERRORS.OUT
CO FINISHED

SO STARTING

** SLR Locations
** Generators
   LOCATION   Gen1       POINT        414297.83  5610586.83      786.0
   LOCATION   Gen2       POINT        414522.61  5610102.23      785.0

** Space Heaters
   LOCATION   SH         POINT        413971.99  5611461.47      786.0

** Mobile Diesel Equipment
   LOCATION   Light      POINT        414051.90  5611074.50      786.0
   LOCATION   Light2     POINT        414014.80  5611591.93      789.0
   LOCATION   Light3     POINT        414033.30  5611347.46      787.0
   LOCATION   Light4     POINT        414119.38  5610947.92      785.0
   LOCATION   Pump       POINT        413863.18  5611851.58      791.0

**Vehicle Exhaust Emissions
** Constuction Equipment in SLR Expansion
   LOCATION   V1         AREAPOLY      414040.95  5611878.78      781.0

** Fugitive Dust Emissions
** Area Sources
   LOCATION   Scraping   AREAPOLY      414040.95  5611878.78      781.0
   LOCATION   Bulldozing AREAPOLY      414040.95  5611878.78      781.0
   LOCATION   G1         AREAPOLY      414040.95  5611878.78      781.0
   LOCATION   MT1        AREAPOLY      414040.95  5611878.78      781.0
   LOCATION   RD1        AREAPOLY      414040.95  5611878.78      781.0

** SLR Emission Parameters
** Generators
**                      Q         H         T         V         D
   SRCPARAM   Gen1          0.0287      6.00     676.40      19.40       0.30
   SRCPARAM   Gen2          0.0287      6.00     676.40      19.40       0.30
** Space Heaters
**                      Q         H         T         V         D
   SRCPARAM   SH            0.0018      1.00     394.26      12.40       0.13
** Mobile Diesel Equipment
**                      Q         H         T         V         D
   SRCPARAM   Light         0.0006      1.50     829.32      33.09       0.05
   SRCPARAM   Light2        0.0006      1.50     829.32      33.09       0.05
   SRCPARAM   Light3        0.0006      1.50     829.32      33.09       0.05
   SRCPARAM   Light4        0.0006      1.50     829.32      33.09       0.05
   SRCPARAM   Pump          0.0068      2.66     539.43       5.86       0.14
** Vehicle Exhaust Emissions
**                      Q         H      No. of Vertices
   SRCPARAM   V1          1.31E-08         3         6
   AREAVERT   V1         414040.95  5611878.78   415423.85  5611175.77   415558.17  5609891.11   414600.91  5609887.25
414502.79  5610273.32   414141.04  5611063.43

** Fugitive Dust Emissions
** Area Sources
**                      Q         H      No. of Vertices
   SRCPARAM   Scraping      3.09E-07       0.50         6
   AREAVERT   Scraping     414040.95  5611878.78   415423.85  5611175.77   415558.17  5609891.11   414600.91  5609887.25
414502.79  5610273.32   414141.04  5611063.43
```

```
   SRCPARAM   Bulldozing     5.53E-08       0.50          6
   AREAVERT   Bulldozing    414040.95  5611878.78   415423.85  5611175.77   415558.17  5609891.11   414600.91  5609887.25
414502.79  5610273.32   414141.04  5611063.43
   SRCPARAM   G1            6.15E-08       0.50          6
   AREAVERT   G1           414040.95  5611878.78   415423.85  5611175.77   415558.17  5609891.11   414600.91  5609887.25
414502.79  5610273.32   414141.04  5611063.43
   SRCPARAM   MT1           3.85E-09       0.50          6
   AREAVERT   MT1          414040.95  5611878.78   415423.85  5611175.77   415558.17  5609891.11   414600.91  5609887.25
414502.79  5610273.32   414141.04  5611063.43
   SRCPARAM   RD1           6.16E-06       0.50          6
   AREAVERT   RD1          414040.95  5611878.78   415423.85  5611175.77   415558.17  5609891.11   414600.91  5609887.25
414502.79  5610273.32   414141.04  5611063.43



   SRCGROUP  ALL
SO FINISHED

RE STARTING
   INCLUDED  "C:\Modelling\SLR\fence.ROU"
RE FINISHED

ME STARTING
   SURFFILE  "C:\Modelling\SLR\AERMET.SFC"
   PROFFILE  "C:\Modelling\SLR\AERMET.PFL"
   SURFDATA  12345  2015
   UAIRDATA  12345678  2015
   PROFBASE  779.7 METERS
   STARTEND  17 01 01  17 12 31
ME FINISHED

OU STARTING
   RECTABLE  ALLAVE  first
   MAXTABLE  ALLAVE  100
OU MAXIFILE  24  ALL  13.7  24h17Exceed.txt
   PLOTFILE  24 ALL FIRST PM24h17.plt
   SUMMFILE  max.SUM
OU FINISHED
```

24-Hour $PM_{2.5}$ Output File for the Project Construction Case Without Mitigation

*** AERMOD - VERSION 23132 *** *** Snake Lake Reservoir Project Construction No Watering Project *** 11/15/24
*** AERMET - VERSION 23132 *** *** *** 16:38:44
PAGE 36

*** MODELOPTs: NonDFAULT CONC ELEV BETA RURAL ADJ_U*

*** THE SUMMARY OF MAXIMUM 1ST-HIGHEST 24-HR RESULTS AVERAGED OVER 1 YEARS ***

** CONC OF PM25 IN MICROGRAMS/M**3 **

GROUP ID		AVERAGE CONC	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)	NETWORK OF TYPE	GRID-ID
ALL	1ST HIGHEST VALUE IS	**533.35929**	AT (414478.60, 5609889.20, 786.00, 786.00, 0.00)	DC	
	2ND HIGHEST VALUE IS	533.33857	AT (414475.10, 5609908.80, 786.00, 786.00, 0.00)	DC	
	3RD HIGHEST VALUE IS	533.23638	AT (414471.60, 5609928.30, 786.00, 786.00, 0.00)	DC	
	4TH HIGHEST VALUE IS	533.09453	AT (414468.10, 5609947.90, 786.00, 786.00, 0.00)	DC	
	5TH HIGHEST VALUE IS	532.88374	AT (414464.60, 5609967.40, 786.00, 786.00, 0.00)	DC	
	6TH HIGHEST VALUE IS	532.64317	AT (414461.10, 5609987.00, 786.00, 786.00, 0.00)	DC	
	7TH HIGHEST VALUE IS	532.48191	AT (414426.10, 5610182.60, 786.00, 786.00, 0.00)	DC	
	8TH HIGHEST VALUE IS	532.35865	AT (414457.60, 5610006.60, 786.00, 786.00, 0.00)	DC	
	9TH HIGHEST VALUE IS	532.01740	AT (414454.10, 5610026.10, 786.00, 786.00, 0.00)	DC	
	10TH HIGHEST VALUE IS	531.66269	AT (414450.60, 5610045.70, 786.00, 786.00, 0.00)	DC	

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR

24-Hour $PM_{2.5}$ Input File for the Project Construction Case With Watering

```
CO STARTING
   TITLEONE  Snake Lake Reservoir Project Construction Watering Project
   MODELOPT  CONC   ELEV   BETA
   AVERTIME  24
   POLLUTID  PM25
   RUNORNOT  RUN
   ERRORFIL  ERRORS.OUT
CO FINISHED

SO STARTING

** SLR Locations
** Generators
   LOCATION   Gen1       POINT        414297.83  5610586.83      786.0
   LOCATION   Gen2       POINT        414522.61  5610102.23      785.0

** Space Heaters
   LOCATION   SH         POINT        413971.99  5611461.47      786.0

** Mobile Diesel Equipment
   LOCATION   Light      POINT        414051.90  5611074.50      786.0
   LOCATION   Light2     POINT        414014.80  5611591.93      789.0
   LOCATION   Light3     POINT        414033.30  5611347.46      787.0
   LOCATION   Light4     POINT        414119.38  5610947.92      785.0
   LOCATION   Pump       POINT        413863.18  5611851.58      791.0

**Vehicle Exhaust Emissions
** Constuction Equipment in SLR Expansion
   LOCATION   V1         AREAPOLY      414040.95  5611878.78      781.0

** Fugitive Dust Emissions
** Area Sources
   LOCATION   Scraping   AREAPOLY      414040.95  5611878.78      781.0
   LOCATION   Bulldozing AREAPOLY      414040.95  5611878.78      781.0
   LOCATION   G1         AREAPOLY      414040.95  5611878.78      781.0
   LOCATION   MT1        AREAPOLY      414040.95  5611878.78      781.0
   LOCATION   RD1        AREAPOLY      414040.95  5611878.78      781.0

** SLR Emission Parameters
** Generators
**                      Q         H         T         V         D
   SRCPARAM   Gen1          0.0287      6.00     676.40      19.40       0.30
   SRCPARAM   Gen2          0.0287      6.00     676.40      19.40       0.30
** Space Heaters
**                      Q         H         T         V         D
   SRCPARAM   SH            0.0018      1.00     394.26      12.40       0.13
** Mobile Diesel Equipment
**                      Q         H         T         V         D
   SRCPARAM   Light         0.0006      1.50     829.32      33.09       0.05
   SRCPARAM   Light2        0.0006      1.50     829.32      33.09       0.05
   SRCPARAM   Light3        0.0006      1.50     829.32      33.09       0.05
   SRCPARAM   Light4        0.0006      1.50     829.32      33.09       0.05
   SRCPARAM   Pump          0.0068      2.66     539.43       5.86       0.14
** Vehicle Exhaust Emissions
**                      Q         H      No. of Vertices
   SRCPARAM   V1          1.84E-08         3         6
   AREAVERT   V1         414040.95  5611878.78   415423.85  5611175.77   415558.17  5609891.11   414600.91  5609887.25
414502.79  5610273.32   414141.04  5611063.43

** Fugitive Dust Emissions
** Area Sources
**                      Q         H      No. of Vertices
   SRCPARAM   Scraping      9.28E-08       0.50         6
   AREAVERT   Scraping     414040.95  5611878.78   415423.85  5611175.77   415558.17  5609891.11   414600.91  5609887.25
414502.79  5610273.32   414141.04  5611063.43
```

```
  SRCPARAM   Bulldozing    1.66E-08       0.50         6
  AREAVERT   Bulldozing   414040.95  5611878.78   415423.85  5611175.77   415558.17  5609891.11   414600.91  5609887.25
414502.79  5610273.32   414141.04  5611063.43
  SRCPARAM   G1           1.84E-08       0.50         6
  AREAVERT   G1          414040.95  5611878.78   415423.85  5611175.77   415558.17  5609891.11   414600.91  5609887.25
414502.79  5610273.32   414141.04  5611063.43
  SRCPARAM   MT1          1.16E-09       0.50         6
  AREAVERT   MT1         414040.95  5611878.78   415423.85  5611175.77   415558.17  5609891.11   414600.91  5609887.25
414502.79  5610273.32   414141.04  5611063.43
  SRCPARAM   RD1          1.96E-06       0.50         6
  AREAVERT   RD1         414040.95  5611878.78   415423.85  5611175.77   415558.17  5609891.11   414600.91  5609887.25
414502.79  5610273.32   414141.04  5611063.43


  SRCGROUP  ALL
SO FINISHED

RE STARTING
  INCLUDED  "C:\Modelling\SLR\fence.ROU"
RE FINISHED

ME STARTING
  SURFFILE  "C:\Modelling\SLR\AERMET.SFC"
  PROFFILE  "C:\Modelling\SLR\AERMET.PFL"
  SURFDATA  12345  2015
  UAIRDATA  12345678  2015
  PROFBASE  779.7 METERS
  STARTEND  17 01 01  17 12 31
ME FINISHED

OU STARTING
  RECTABLE  ALLAVE  first
  MAXTABLE  ALLAVE  100
OU MAXIFILE  24  ALL  13.7  24h17Exceed.txt
  PLOTFILE  24 ALL FIRST PM24h17.plt
  SUMMFILE  max.SUM
OU FINISHED
```

24-Hour $PM_{2.5}$ Output File for the Project Construction Case With Watering

*** AERMOD - VERSION 23132 *** *** Snake Lake Reservoir Project Construction Watering Project *** 11/15/24
*** AERMET - VERSION 23132 *** *** *** 18:55:55
PAGE 36

*** MODELOPTs: NonDFAULT CONC ELEV BETA RURAL ADJ_U*

*** THE SUMMARY OF MAXIMUM 1ST-HIGHEST 24-HR RESULTS AVERAGED OVER 1 YEARS ***

** CONC OF PM25 IN MICROGRAMS/M**3 **

GROUP ID		AVERAGE CONC	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)	NETWORK OF TYPE	GRID-ID
ALL	1ST HIGHEST VALUE IS	**170.23687**	AT (414478.60, 5609889.20, 786.00, 786.00, 0.00)	DC	
	2ND HIGHEST VALUE IS	170.23036	AT (414475.10, 5609908.80, 786.00, 786.00, 0.00)	DC	
	3RD HIGHEST VALUE IS	170.19788	AT (414471.60, 5609928.30, 786.00, 786.00, 0.00)	DC	
	4TH HIGHEST VALUE IS	170.15278	AT (414468.10, 5609947.90, 786.00, 786.00, 0.00)	DC	
	5TH HIGHEST VALUE IS	170.08585	AT (414464.60, 5609967.40, 786.00, 786.00, 0.00)	DC	
	6TH HIGHEST VALUE IS	170.00970	AT (414461.10, 5609987.00, 786.00, 786.00, 0.00)	DC	
	7TH HIGHEST VALUE IS	169.95463	AT (414426.10, 5610182.60, 786.00, 786.00, 0.00)	DC	
	8TH HIGHEST VALUE IS	169.91945	AT (414457.60, 5610006.60, 786.00, 786.00, 0.00)	DC	
	9TH HIGHEST VALUE IS	169.81013	AT (414454.10, 5610026.10, 786.00, 786.00, 0.00)	DC	
	10TH HIGHEST VALUE IS	169.69598	AT (414450.60, 5610045.70, 786.00, 786.00, 0.00)	DC	

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR

24-Hour $PM_{2.5}$ Input File for the Cumulative Construction Case Without Mitigation

```
CO STARTING
   TITLEONE  Snake Lake Reservoir Project Construction No Watering All
   MODELOPT  CONC   ELEV   BETA
   AVERTIME  24
   POLLUTID  PM25
   RUNORNOT  RUN
   ERRORFIL  ERRORS.OUT
CO FINISHED

SO STARTING

** Trans Canada Highway and CP Rail
   LOCATION   Highway    LINE          411687.00  5618458.00   423093.00  5612110.00      771.0
   LOCATION   Train1     LINE          408087.00  5617797.00   415910.00  5614532.00      772.0
   LOCATION   Train2     LINE          415910.00  5614532.00   422967.00  5605205.00      766.5

** SLR Locations
** Generators
   LOCATION   Gen1       POINT         414297.83  5610586.83      786.0
   LOCATION   Gen2       POINT         414522.61  5610102.23      785.0

** Space Heaters
   LOCATION   SH         POINT         413971.99  5611461.47      786.0

** Mobile Diesel Equipment
   LOCATION   Light      POINT         414051.90  5611074.50      786.0
   LOCATION   Light2     POINT         414014.80  5611591.93      789.0
   LOCATION   Light3     POINT         414033.30  5611347.46      787.0
   LOCATION   Light4     POINT         414119.38  5610947.92      785.0
   LOCATION   Pump       POINT         413863.18  5611851.58      791.0

**Vehicle Exhaust Emissions
** Constuction Equipment in SLR Expansion
   LOCATION   V1         AREAPOLY      414040.95  5611878.78      781.0

** Fugitive Dust Emissions
** Area Sources
   LOCATION   Scraping   AREAPOLY      414040.95  5611878.78      781.0
   LOCATION   Bulldozing AREAPOLY      414040.95  5611878.78      781.0
   LOCATION   G1         AREAPOLY      414040.95  5611878.78      781.0
   LOCATION   MT1        AREAPOLY      414040.95  5611878.78      781.0
   LOCATION   RD1        AREAPOLY      414040.95  5611878.78      781.0

** Trans Canada Highway and CP Rail
**                        Q          H          W
   SRCPARAM   Highway     4.00E-07     0.4220     14.800
   SRCPARAM   Train1      1.34E-06     4.5720      3.048
   SRCPARAM   Train2      1.34E-06     4.5720      3.048

** SLR Emission Parameters
** Generators
**                        Q          H          T          V          D
   SRCPARAM   Gen1          0.0287      6.00     676.40      19.40       0.30
   SRCPARAM   Gen2          0.0287      6.00     676.40      19.40       0.30
** Space Heaters
**                        Q          H          T          V          D
   SRCPARAM   SH            0.0018      1.00     394.26      12.40       0.13
** Mobile Diesel Equipment
**                        Q          H          T          V          D
   SRCPARAM   Light         0.0006      1.50     829.32      33.09       0.05
   SRCPARAM   Light2        0.0006      1.50     829.32      33.09       0.05
   SRCPARAM   Light3        0.0006      1.50     829.32      33.09       0.05
   SRCPARAM   Light4        0.0006      1.50     829.32      33.09       0.05
   SRCPARAM   Pump          0.0068      2.66     539.43       5.86       0.14
** Vehicle Exhaust Emissions
```

```
**                    Q         H      No. of Vertices
  SRCPARAM   V1          1.31E-08         3         6
  AREAVERT   V1         414040.95  5611878.78   415423.85  5611175.77   415558.17  5609891.11   414600.91  5609887.25
414502.79  5610273.32   414141.04  5611063.43

** Fugitive Dust Emissions
** Area Sources
**                    Q         H      No. of Vertices
  SRCPARAM   Scraping      3.09E-07       0.50         6
  AREAVERT   Scraping      414040.95  5611878.78   415423.85  5611175.77   415558.17  5609891.11   414600.91  5609887.25
414502.79  5610273.32   414141.04  5611063.43
  SRCPARAM   Bulldozing     5.53E-08       0.50         6
  AREAVERT   Bulldozing    414040.95  5611878.78   415423.85  5611175.77   415558.17  5609891.11   414600.91  5609887.25
414502.79  5610273.32   414141.04  5611063.43
  SRCPARAM   G1          6.15E-08       0.50         6
  AREAVERT   G1          414040.95  5611878.78   415423.85  5611175.77   415558.17  5609891.11   414600.91  5609887.25
414502.79  5610273.32   414141.04  5611063.43
  SRCPARAM   MT1         3.85E-09       0.50         6
  AREAVERT   MT1         414040.95  5611878.78   415423.85  5611175.77   415558.17  5609891.11   414600.91  5609887.25
414502.79  5610273.32   414141.04  5611063.43
  SRCPARAM   RD1         6.16E-06       0.50         6
  AREAVERT   RD1         414040.95  5611878.78   415423.85  5611175.77   415558.17  5609891.11   414600.91  5609887.25
414502.79  5610273.32   414141.04  5611063.43



  SRCGROUP  ALL
SO FINISHED

RE STARTING
  INCLUDED  "C:\Modelling\SLR\fence.ROU"
RE FINISHED

ME STARTING
  SURFFILE  "C:\Modelling\SLR\AERMET.SFC"
  PROFFILE  "C:\Modelling\SLR\AERMET.PFL"
  SURFDATA  12345  2015
  UAIRDATA  12345678  2015
  PROFBASE  779.7 METERS
  STARTEND  17 01 01  17 12 31
ME FINISHED

OU STARTING
  RECTABLE  ALLAVE  first
  MAXTABLE  ALLAVE  100
OU MAXIFILE  24  ALL  13.7  24h17Exceed.txt
  PLOTFILE  24 ALL FIRST PM24h17.plt
  SUMMFILE  max.SUM
OU FINISHED
```

24-Hour $PM_{2.5}$ Output File for the Cumulative Construction Case Without Mitigation

*** AERMOD - VERSION 23132 *** *** Snake Lake Reservoir Project Construction No Watering All *** 11/15/24
*** AERMET - VERSION 23132 *** *** *** 16:41:44
PAGE 37

*** MODELOPTs: NonDFAULT CONC ELEV BETA RURAL ADJ_U*

*** THE SUMMARY OF MAXIMUM 1ST-HIGHEST 24-HR RESULTS AVERAGED OVER 1 YEARS ***

** CONC OF PM25 IN MICROGRAMS/M**3 **

GROUP ID		AVERAGE CONC	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)	NETWORK OF TYPE	GRID-ID
ALL	1ST HIGHEST VALUE IS	**533.51431**	AT (414478.60, 5609889.20, 786.00, 786.00, 0.00)	DC	
	2ND HIGHEST VALUE IS	533.49378	AT (414475.10, 5609908.80, 786.00, 786.00, 0.00)	DC	
	3RD HIGHEST VALUE IS	533.39180	AT (414471.60, 5609928.30, 786.00, 786.00, 0.00)	DC	
	4TH HIGHEST VALUE IS	533.25016	AT (414468.10, 5609947.90, 786.00, 786.00, 0.00)	DC	
	5TH HIGHEST VALUE IS	533.03957	AT (414464.60, 5609967.40, 786.00, 786.00, 0.00)	DC	
	6TH HIGHEST VALUE IS	532.79921	AT (414461.10, 5609987.00, 786.00, 786.00, 0.00)	DC	
	7TH HIGHEST VALUE IS	532.64011	AT (414426.10, 5610182.60, 786.00, 786.00, 0.00)	DC	
	8TH HIGHEST VALUE IS	532.51489	AT (414457.60, 5610006.60, 786.00, 786.00, 0.00)	DC	
	9TH HIGHEST VALUE IS	532.17388	AT (414454.10, 5610026.10, 786.00, 786.00, 0.00)	DC	
	10TH HIGHEST VALUE IS	531.81936	AT (414450.60, 5610045.70, 786.00, 786.00, 0.00)	DC	

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR

24-Hour $PM_{2.5}$ Input File for the Cumulative Construction Case With Watering

```
CO STARTING
   TITLEONE  Snake Lake Reservoir Project Construction Watering All
   MODELOPT  CONC   ELEV   BETA
   AVERTIME  24
   POLLUTID  PM25
   RUNORNOT  RUN
   ERRORFIL  ERRORS.OUT
CO FINISHED

SO STARTING

** Trans Canada Highway and CP Rail
   LOCATION   Highway    LINE         411687.00  5618458.00   423093.00  5612110.00      771.0
   LOCATION   Train1     LINE         408087.00  5617797.00   415910.00  5614532.00      772.0
   LOCATION   Train2     LINE         415910.00  5614532.00   422967.00  5605205.00      766.5

** SLR Locations
** Generators
   LOCATION   Gen1       POINT        414297.83  5610586.83      786.0
   LOCATION   Gen2       POINT        414522.61  5610102.23      785.0

** Space Heaters
   LOCATION   SH         POINT        413971.99  5611461.47      786.0

** Mobile Diesel Equipment
   LOCATION   Light      POINT        414051.90  5611074.50      786.0
   LOCATION   Light2     POINT        414014.80  5611591.93      789.0
   LOCATION   Light3     POINT        414033.30  5611347.46      787.0
   LOCATION   Light4     POINT        414119.38  5610947.92      785.0
   LOCATION   Pump       POINT        413863.18  5611851.58      791.0

**Vehicle Exhaust Emissions
** Constuction Equipment in SLR Expansion
   LOCATION   V1         AREAPOLY     414040.95  5611878.78      781.0

** Fugitive Dust Emissions
** Area Sources
   LOCATION   Scraping   AREAPOLY     414040.95  5611878.78      781.0
   LOCATION   Bulldozing AREAPOLY     414040.95  5611878.78      781.0
   LOCATION   G1         AREAPOLY     414040.95  5611878.78      781.0
   LOCATION   MT1        AREAPOLY     414040.95  5611878.78      781.0
   LOCATION   RD1        AREAPOLY     414040.95  5611878.78      781.0

** Trans Canada Highway and CP Rail
**                      Q          H          W
   SRCPARAM   Highway    4.00E-07     0.4220     14.800
   SRCPARAM   Train1     1.34E-06     4.5720      3.048
   SRCPARAM   Train2     1.34E-06     4.5720      3.048

** SLR Emission Parameters
** Generators
**                      Q          H          T          V          D
   SRCPARAM   Gen1          0.0287       6.00     676.40      19.40       0.30
   SRCPARAM   Gen2          0.0287       6.00     676.40      19.40       0.30
** Space Heaters
**                      Q          H          T          V          D
   SRCPARAM   SH            0.0018       1.00     394.26      12.40       0.13
** Mobile Diesel Equipment
**                      Q          H          T          V          D
   SRCPARAM   Light         0.0006       1.50     829.32      33.09       0.05
   SRCPARAM   Light2        0.0006       1.50     829.32      33.09       0.05
   SRCPARAM   Light3        0.0006       1.50     829.32      33.09       0.05
   SRCPARAM   Light4        0.0006       1.50     829.32      33.09       0.05
   SRCPARAM   Pump          0.0068       2.66     539.43       5.86       0.14
** Vehicle Exhaust Emissions
```

```
**                    Q         H      No. of Vertices
  SRCPARAM   V1          1.84E-08        3         6
  AREAVERT   V1         414040.95  5611878.78   415423.85  5611175.77   415558.17  5609891.11   414600.91  5609887.25
414502.79  5610273.32   414141.04  5611063.43

** Fugitive Dust Emissions
** Area Sources
**                    Q         H      No. of Vertices
  SRCPARAM   Scraping      9.28E-08       0.50         6
  AREAVERT   Scraping      414040.95  5611878.78   415423.85  5611175.77   415558.17  5609891.11   414600.91  5609887.25
414502.79  5610273.32   414141.04  5611063.43
  SRCPARAM   Bulldozing     1.66E-08       0.50         6
  AREAVERT   Bulldozing    414040.95  5611878.78   415423.85  5611175.77   415558.17  5609891.11   414600.91  5609887.25
414502.79  5610273.32   414141.04  5611063.43
  SRCPARAM   G1          1.84E-08       0.50         6
  AREAVERT   G1          414040.95  5611878.78   415423.85  5611175.77   415558.17  5609891.11   414600.91  5609887.25
414502.79  5610273.32   414141.04  5611063.43
  SRCPARAM   MT1         1.16E-09       0.50         6
  AREAVERT   MT1         414040.95  5611878.78   415423.85  5611175.77   415558.17  5609891.11   414600.91  5609887.25
414502.79  5610273.32   414141.04  5611063.43
  SRCPARAM   RD1         1.96E-06       0.50         6
  AREAVERT   RD1         414040.95  5611878.78   415423.85  5611175.77   415558.17  5609891.11   414600.91  5609887.25
414502.79  5610273.32   414141.04  5611063.43


  SRCGROUP  ALL
SO FINISHED

RE STARTING
  INCLUDED  "C:\Modelling\SLR\fence.ROU"
RE FINISHED

ME STARTING
  SURFFILE  "C:\Modelling\SLR\AERMET.SFC"
  PROFFILE  "C:\Modelling\SLR\AERMET.PFL"
  SURFDATA  12345  2015
  UAIRDATA  12345678  2015
  PROFBASE  779.7 METERS
  STARTEND  17 01 01  17 12 31
ME FINISHED

OU STARTING
  RECTABLE  ALLAVE  first
  MAXTABLE  ALLAVE  100
OU MAXIFILE  24  ALL  13.7  24h17Exceed.txt
  PLOTFILE  24 ALL FIRST PM24h17.plt
  SUMMFILE  max.SUM
OU FINISHED
```

24-Hour $PM_{2.5}$ Output File for the Cumulative Construction Case With Watering

*** AERMOD - VERSION 23132 *** *** Snake Lake Reservoir Project Construction Watering All *** 11/15/24
*** AERMET - VERSION 23132 *** *** *** 18:54:58
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*** MODELOPTs: NonDFAULT CONC ELEV BETA RURAL ADJ_U*

*** THE SUMMARY OF MAXIMUM 1ST-HIGHEST 24-HR RESULTS AVERAGED OVER 1 YEARS ***

** CONC OF PM25 IN MICROGRAMS/M**3 **

GROUP ID	AVERAGE CONC	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)	NETWORK OF TYPE	GRID-ID
ALL	1ST HIGHEST VALUE IS	**170.39188** AT (414478.60, 5609889.20, 786.00, 786.00, 0.00)	DC	
	2ND HIGHEST VALUE IS	170.38557 AT (414475.10, 5609908.80, 786.00, 786.00, 0.00)	DC	
	3RD HIGHEST VALUE IS	170.35330 AT (414471.60, 5609928.30, 786.00, 786.00, 0.00)	DC	
	4TH HIGHEST VALUE IS	170.30841 AT (414468.10, 5609947.90, 786.00, 786.00, 0.00)	DC	
	5TH HIGHEST VALUE IS	170.24168 AT (414464.60, 5609967.40, 786.00, 786.00, 0.00)	DC	
	6TH HIGHEST VALUE IS	170.16574 AT (414461.10, 5609987.00, 786.00, 786.00, 0.00)	DC	
	7TH HIGHEST VALUE IS	170.11283 AT (414426.10, 5610182.60, 786.00, 786.00, 0.00)	DC	
	8TH HIGHEST VALUE IS	170.07568 AT (414457.60, 5610006.60, 786.00, 786.00, 0.00)	DC	
	9TH HIGHEST VALUE IS	169.96662 AT (414454.10, 5610026.10, 786.00, 786.00, 0.00)	DC	
	10TH HIGHEST VALUE IS	169.85265 AT (414450.60, 5610045.70, 786.00, 786.00, 0.00)	DC	

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR

Appendix B9: Equipment Specification Sheets (Used for Modelling and Estimations) [DIGITAL ONLY]

Note: this document is provided as a digital copy only [See Annex]