

Prepared for:



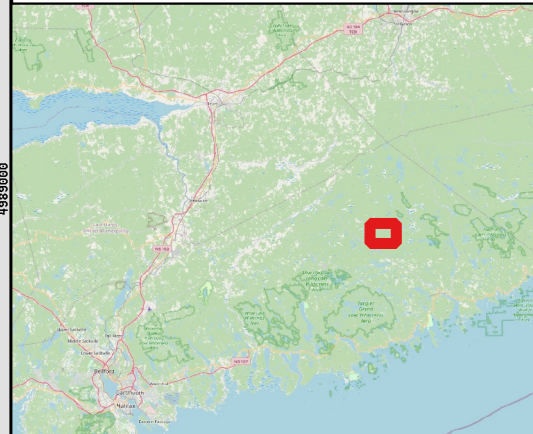
**FIGURE CEEA 2-26-1**

**Beaver Dam Mine Project**

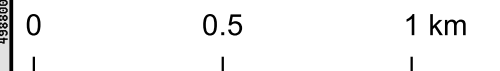
**Boreal Felt Lichen Critical Habitat Areas**

Boreal Felt Lichen Occurances

- Observed
- Observed (Field)
- Boreal Felt Lichen Critical Habitat Area
- Proposed Infrastructure
- Project Area



Coordinate System: NAD 1983 CSRS UTM Zone 20N  
 Projection: Transverse Mercator  
 Datum: North American 1983 CSRS  
 Units: Meter



Scale: 1:20,000      Scale when printed @ 11" x 17"

Drawn By: SS  
 Reviewed By: MM      2021-2-19



**McCallum Environmental Ltd.**

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**Beaver Dam Mine Project Environmental Impact Assessment  
Information Request Responses, Round 2**

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Request B: Provide details regarding the technical feasibility of transplantation of directly affected blue felt lichen as a proposed mitigation.

Included in response to Request D below.

Request C: Confirm that a 100 m habitat buffer would be maintained for all individuals of blue felt lichens and frosted glass whiskers that would not be directly affected by the Project. For any individuals where a 100 m habitat buffer would not be implemented, identify measures to avoid/minimize the effects.

Included in response to Request D below.

Request D: Provide a lichen species at risk (SAR) monitoring program that would include all sites where lichen SAR have been detected in the Local Assessment Area. Explain how adaptive management measures would be proposed and implemented in a timely manner in the event that adverse effects to lichen SAR are detected.

Baseline surveys conducted for the Updated 2021 EIS (AMNS 2021) demonstrate that Project-related development will impact known occurrences of lichen Species at Risk (SAR). As a result, a Preliminary Lichen Mitigation and Monitoring Plan (Appendix P.6, Section 5.2, PDF page 14 of the Updated 2021 EIS [AMNS 2021]) was developed to monitor the direct and indirect effects of the Project on lichen SAR, validate Project effect predictions and to present translocation as a form of mitigation against potential Project impacts

Baseline lichen surveys were conducted within a defined Study Area, inclusive of a focused lichen study area (LSA) surrounding the Beaver Dam Mine Site and along the proposed Haul Road. Additional baseline lichen SAR surveys will be conducted along the Haul Road, where the greatest impacts are expected.

The monitoring plan will include all lichens within the predicted maximum expected indirect impact area, based on the available literature and the Project-specific effects assessment (Appendix P.6, Section 5.2, PDF page 14 of the Updated 2021 EIS [AMNS 2021]). A conservative approach has been taken to determine the expected extent of Project-related impacts to lichen (i.e., upper thresholds and worst-case modeling scenarios). The monitoring plan also includes lichens beyond the predicted maximum expected indirect impact area as control sites.

Three lichen SAR were identified within the defined study area, all of which have been included in the monitoring plan:

- Boreal felt lichen (*Erioderma pedicellatum*; SARA/COSEWIC/NSESA: Endangered; ACCDC: S1);
- Blue felt lichen (*Pectenia plumbea*; SARA/COSEWIC: Species Concern; NSESA: Vulnerable; ACCDC: S3); and
- Frosted glass-whiskers (*Sclerophora peronella*; SARA/COSEWIC: Special Concern; ACCDC: S1).

Translocation and varying levels of monitoring effort are proposed on an occurrence-specific basis, depending on their location and interactions with Project infrastructure. The Project has endeavored to avoid and minimize impacts to lichen SAR and their habitat through detailed Project design and infrastructure micro-siting. As a result, the planned Project infrastructure does not interact with ECCC boreal felt lichen critical habitat polygons, and therefore, indirect impacts to known occurrences of boreal felt lichen within them are not anticipated. The 100 m habitat buffer for blue felt lichen and frosted glass-whiskers will be maintained wherever feasible. Where this buffer cannot be maintained, the Preliminary Lichen Mitigation and Monitoring Plan (Appendix P.6, Section 5.1, PDF page 8 of the Updated 2021 EIS [AMNS 2021]) proposes translocation, or consideration of, as a form of proactive mitigation for certain occurrences where impacts are unmitigable. The plan recognizes that translocation should not be considered

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**Beaver Dam Mine Project Environmental Impact Assessment  
Information Request Responses, Round 2**

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a standard mitigation and only applied when other mitigation measures are not possible or sufficient. Due to its small size, *Endosubstratic thallus* and limited translocation data on calicioid species, frosted glass-whisker occurrences are not proposed to be translocated. No frosted glass-whisker occurrences will be directly lost to Project development. The 100 m buffer of one frosted glass-whisker occurrence will be impacted by a surface water management ditch and topsoil stockpile. The ditch is an outflow to Cameron Flowage, which has been micro-sited in consideration of other biophysical constraints (i.e., fish and fish habitat, hydrology) to mitigate impacts to baseflow reduction in Cameron Flowage. Based on the effects assessment, the construction and maintenance of this ditch is not expected to have significant adverse effects on the forested glass-whisker occurrence. AMNS will endeavour to further microsite the topsoil stockpile beyond 100 m of the frosted glass-whisker occurrence during the detailed design.

All occurrences of boreal felt lichen are beyond the PA within the boreal felt lichen critical habitat areas, within which no development is proposed and will, therefore, not experience unmitigable impacts from the Project.

The specific objectives of the translocation plan are to:

- Translocate blue felt lichen that will be directly lost to the Project; and
- Assess the necessity for translocation of blue felt lichen occurrences within 60 m of Project infrastructure on an occurrence-specific basis.

The Preliminary Lichen Mitigation and Monitoring Plan (Appendix P.6, Section 5.1, PDF page 8 of the Updated 2021 EIS [AMNS 2021]) presents a review of related lichen translocation studies and techniques and discusses its feasibility in the context of the Project. Species and location specific translocation methodologies are described.

The proposed translocation plan is primarily based on the known impacts of edge effects, as this has been the focus of many studies and management policies (i.e., *At-Risk Lichens – Special Management Practices*, NSDNR 2018). Esseen and Renhorn (1998) observed adverse impacts to lichen within 60 m of edge clearings, which is further discussed in Section 6.13.7.1.2, page 6-746 of the Updated 2021 EIS (AMNS 2021). As a result, blue felt lichen within this distance of Project infrastructure are considered for potential translocation, as it has been determined that mitigation measures may not be effective within this proximity. This includes three of the blue felt lichen occurrences within Wetland 17, a potential wetland of special significance (WSS). Occurrences of blue felt lichen where a 100 m setback is maintained will not be assessed for translocation feasibility. In these instances, the risk of translocating the occurrences is determined to be greater than leaving them in-situ and monitoring.

The results of the monitoring plan, described in Appendix P.6 [Preliminary Lichen Mitigation and Monitoring Plan], Section 5.2, PDF page 14 of the Updated 2021 EIS (AMNS 2021), will aid in supplementing, where necessary, the mitigation commitments outlined in Section 6.8.9, page 6-427 and Section 6.13.8, page 6-752 of the Updated 2021 EIS (AMNS 2021). Proposed avoidance and mitigation measures for lichen SAR include:

- Maintain a 100 m buffer around lichen SAR wherever practicable;
- Continued detailed Project design to ensure no development occurs within the Boreal Felt Lichen Critical Habitat Areas;
- Implement air quality monitoring and dust suppression plans;
- Implement wetland and hydrological monitoring plans; and

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**Beaver Dam Mine Project Environmental Impact Assessment  
Information Request Responses, Round 2**

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- Flag all host trees and setback areas, and provide locations of priority lichen species and their setbacks to site personnel during construction and operation.

Efforts have been made to avoid lichen SAR occurrences, and maintain a 100 m setback where practicable, through detailed Project design and micro-siting infrastructure. The translocation plan is proposed as a form of mitigation where avoidance is not possible, due to construction or other biophysical constraints, and direct or unmitigable impacts to lichen SAR are predicted. However, it is recognized that translocation should not be considered a standard mitigation and only applied when other mitigation measures are not possible or sufficient. Currently translocation is proposed for two blue felt lichen occurrences expected to be directly impacted.

Blue felt lichen occurrences within a 100 m setback are prone to negative edge effects and are at greater risk of impact from air-borne dust/particulate. If determined to be necessary by NSL&F, additional occurrences between 60 m and 100 m from Project infrastructure may be translocated to suitable habitat within the LAA to support further research studies presented in Preliminary Lichen Mitigation and Monitoring Plan (Appendix P.6, Section 5.2.3, PDF page 20 of the Updated 2021 EIS [AMNS 2021]).

If avoidance and translocation are not possible, the Project Team proposes to collect specimens for submission to Frances Anderson or equivalent contact at time of construction (Lichen Specialist, Research Associate, and Nova Scotia Museum)

It is important to acknowledge that greater understanding of the impacts of mining activities on lichen health is still required, specifically in Nova Scotia. While limited, studies have shown that lichen translocation efforts have had high success rates. Lichen SAR monitoring and translocation is a recent initiative in Nova Scotia. As a result, best-practices, adaptive management strategies and their effectiveness are not currently well defined. Findings from the lichen SAR monitoring program, peer-reviewed studies and species-specific SARA Recovery Strategies, Action Plans, and Management Plans will be evaluated to support of adaptive management approaches, as necessary. Adaptive management strategies may include additional monitoring (of lichens and/or surrounding ecosystem), consideration of translation (in consultation with NSL&F), increased dust suppression and consideration of alternative dust suppression methods. AMNS will work to explore collaborative research opportunities who may further define research projects and objectives based on this plan. AMNS proposes the development of a working group, including lichen specialist (e.g., Lichen Recovery Team) and regulators, to further discussions on lichen SAR management with respect to the Project and broader industry best-management practices.

*Request E: Provide details on the conservation allowance for the loss of wetland function (habitat for hibernating snapping turtles) that will be implemented.*

The residual loss of wetland habitat as a result of Project development will reduce potential local hibernation and overwintering habitat for snapping turtle (SARA/COSEWIC Special Concern; NSESA Vulnerable; ACCDC S3). As a result, proposed conservation allowances approach for loss wetland function have been presented in the Preliminary Wetland Compensation Plan (Appendix H.3, Section 2.3.2, PDF page 8 of the Updated 2021 EIS [AMNS 2021]), specifically for observed turtle SAR (snapping turtle) that utilize these habitats for critical life functions (i.e., hibernation).

The wetland restoration project(s) outlined in the Preliminary Wetland Compensation Plan (Appendix H.3, Section 2.3, PDF page 7 of the Updated 2021 EIS [AMNS 2021]) will target wetland restoration and the restoration of wetland function (turtle SAR hibernation habitat), as this habitat is expected to be lost as a result of wetland alteration and the loss and degradation of aquatic and riparian habitat is noted as one of the greatest threats to snapping turtle (ECCC 2016). Overwintering habitat requirements for snapping

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**Beaver Dam Mine Project Environmental Impact Assessment  
Information Request Responses, Round 2**

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turtle are aquatic environments (e.g., lentic, lotic, and mud) where water will not freeze to the bottom (approximately 0.5 to 2 m deep), with a thick mud substrate and other cover (e.g., large woody debris; ECCC 2016).

The detailed design process will include modelling of specific hydrological conditions and detailing the groundwork activities that are required to be implemented at the site to meet the objectives of the restoration project, as it relates to restoration of wetland function (turtle SAR hibernation habitat). Specific habitat objectives and restoration activities are outlined in the Preliminary Wetland Compensation Plan (Appendix H.3 of the Updated 2021 EIS [AMNS 2021]) and include the following for snapping turtle:

- Open water (lentic or lotic) approximately 1 to 2 m deep. Deep enough to not freeze to the bottom but <2 m;
- Substrate - thick layer of mud; and
- Large woody debris and other cover built into substrate.

While the Preliminary Wetland Compensation Plan targets both breeding habitat for landbird SAR and overwintering habitat for turtle SAR habitat, some habitat requirements are similar across these species (i.e., riparian and open water features), which will be targeted to meet restoration objectives for multiple species. The exact scope required for the detailed design process will be determined in consultation with NSE, NSLF, and ECCC.

*Request F: Update the direct and cumulative effects assessment of related valued components as appropriate.*

The interactions between the Project and SAR are included in Section 6.13.7, page 6-745 (Project Activities/Interactions with Species of Conservation Interest and Species at Risk) and considered in the Project's Cumulative Effects Assessment (CEA) (Section 8.5.6 Species of Conservation Interest and Species at Risk Cumulative Effects Assessment, page 8-81), of the Updated 2021 EIS (AMNS 2021). The Cumulative Effects Assessment has been revised for all appropriate Valued Components (VCs), to ensure consistency with the Cumulative Effects Assessment Methodology Interim Technical Guidance document (version 2), prepared by CEAA (2018). Through the scoping of VCs for inclusion in the CEA, where adverse residual effects were identified, it was determined that further evaluation was warranted to assess cumulative effects to Species of Conservation Interest and Species at Risk (SOCI/SAR). Priority species of individual taxa were carried forward into the CEA. The CEA has been updated to include an expanded assessment of Project overlap with other projects located within taxa specific RAAs and the potential cumulative impacts, including a review of the proposed and current Nova Scotia Salmon Association Acid Mitigation Projects. These projects, specifically the terrestrial liming component in the Tent Lake and Keef Brook watersheds, could have an adverse effect on priority lichen. The updated Air Emission Assessment Technical Report (Appendix C.1 of the Updated 2021 EIS [AMNS 2021]) presents Project only and cumulative dust deposition rates along the Haul Road. While the cumulative use of the Haul Road west of the Highway 224 by the proposed Fifteen Mile Stream Gold Project and the Cochrane Hills Gold Project does increase deposition rates, these rates have been reviewed with respect to lichen impacts and it was found that they did not result in changes to predicted effects. However, increasing traffic levels will increase risk of collisions to wildlife, including snapping turtles. No other specific project causing loss of habitat for this species has been identified.

Project-specific impacts on SAR addressed in this Round 2, Information Request response (CEAA 2-26) have been reassessed in the Updated 2021 EIS (AMNS 2021), and summarized below, in consideration of the revised Project Description (Section 2, pages 2-1 through 2-93) and updated VCs effects assessment for Species of Conservation Interest and Species at Risk (Section 6.13, page 6-682).

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**Beaver Dam Mine Project Environmental Impact Assessment  
Information Request Responses, Round 2**

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*Lichen SAR*

Micro-siting of infrastructure has been completed to avoid priority flora and lichen species, wherever practicable, and has reduced the direct impact of the Project on flora and lichens. The division and micro-siting of the waste rock stockpiles has relocated infrastructure out of two defined boreal felt lichen critical habitat areas that interact with the PA (Figure CEAA-2-26-1). Micro-siting and PA modifications of the Beaver Dam Mine Site has allowed for avoidance of all eight of the known locations of frosted glass-whiskers and reduced the number of individuals of blue felt lichen directly impacted from three to two, which are proposed for translocation (Appendix P.6 Preliminary Lichen Mitigation and Monitoring Plan, PDF page 8 of the Updated 2021 EIS [AMNS 2021]). No priority lichens are anticipated to be directly impacted by the Haul Road.

Project activities may indirectly affect priority lichen species which have been avoided but exist in close proximity to Project infrastructure. Due to their non-vascular physiology, lichens are especially sensitive to changing environmental conditions, particularly air quality and edge effects (Boudreault et al. 2008; COSEWIC 2002). The Project is predicted to result in localized particulate and metal mobilization through dust generation during construction and operations (i.e., mining and hauling ore). Deposition of dust on flora can temporarily reduce evapotranspiration, photosynthesis and can bioaccumulate within tissue, which may reduce overall growth rates, especially for non-vascular flora such as lichen (Degtjarenko, 2016; Naeth and Wilkinson 2008; Farmer, 1993). The Haul Road contains the highest modeled particulate deposition rates at worst-case point of impingements.

Edge effects, which are a result of fragmented habitats, include alteration of humidity, higher wind velocity, increase solar radiation often resulting in vegetation, and community structure changes (Rheault et al. 2002). Poikilohydric organisms (such as lichens) which have the inability to regulate and maintain their water content are often sensitive to these effects (Rheault et al. 2002). Relevant studies show that the dept of influence of edge effects on lichen species can range from 60 to 240 m (Esseen and Renhorn, 1997; Gauslaa et al., 2019; Haughian and Harpre, 2020 [unpublished]) and is highly species and context dependant.

The Preliminary Lichen Mitigation and Monitoring Plan (Appendix P.6 of the Updated 2021 EIS [AMNS 2021]) has been designed to evaluate the predicted Project related effects on lichen SAR and the success of the proposed translocation mitigations, in consideration of Project impacts on edge effects and dust/particulate deposition (Appendix P.6, Section 5.1, PDF page 8 and Section 5.2, PDF page 14 of the Updated 2021 EIS [AMNS 2021]).

*Herpetofauna SAR*

Wetlands 8, 10, 14, 17, 29, 44, 56, 59, 61, 64, 66, 68, 69, 159, 168, 171, and 207, within the Beaver Dam Mine Site, are identified as potentially providing hibernacula for snapping turtles where open water is present (Section 6.13.7.1.3, page 6-748 of the Updated 2021 EIS [AMNS 2021]). Wetland 10 is expected to be directly impacted by the western waste rock stockpile and Wetlands 59 and 61 are expected to be impacted by construction of the open pit. All other wetlands with hibernacula potential within the Beaver Dam Mine Site will be avoided. Wetlands with potential to support snapping turtles within the Haul Road (Wetlands 66, 68, 69, 159, 168, and 171) will either be avoided or impacts from road upgrades or construction are expected to be minimal with proper mitigations (e.g., work above high-water marks unless permitted, erosion and sediment control, dust suppression).

Potential indirect effects to herpetofauna are presented in Section 6.13.7.1.3, page 6-748 of the Updated 2021 EIS (AMNS 2021) include changes to habitat availability/quality (e.g., dust, sensory disturbance), use, or fragmentation. Snapping turtle is generally more aquatic than other turtle species, and require shallow aquatic environments for overwintering/hibernations, breeding and cover. Snapping turtle can tolerate and utilize disturbed areas, such as systems with poor water quality and anthropogenic features for nesting (e.g., berms, roadsides; ECCC 2020). Snapping turtle observations within the PA have been in anthropogenic settings (i.e., berms, roadsides). While this species can tolerate, and even prefers these habitat types (turtles are drawn to the roadside to

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**Beaver Dam Mine Project Environmental Impact Assessment  
Information Request Responses, Round 2**

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nest in the gravelly shoulders in June), there is an increased risk of direct mortality, primarily due to increased traffic and activity during the construction phase.

The draft Wildlife Mitigation and Monitoring Plan has been developed to describe mitigation measures including protocols to minimize interactions between wildlife and Project activities, including herpetofauna (Appendix P.7, Section 3, PDF page 13 and Section 4, PDF page 15 of the Updated 2021 EIS [AMNS 2021]).

**References**

AMNS (Atlantic Mining NS Inc.). 2021. Updated Environmental Impact Statement. Beaver Dam Mine Project. Submitted to the Impact Assessment Agency of Canada and Nova Scotia Environment. October 2021. Middle Musquodoboit, NS.

Boudreault, C., Bergeron, Y., Drapeau, P., and M. Lopez. 2008. Edge effects on epiphytic lichens in remnant stands of managed landscapes in the eastern boreal forests of Canada. Elsevier, 1461-1471.

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Esseen and Renhorn. 1998. Growth and Vitality of Epiphytic Lichens – Responses to Microclimate along a forest edge-interior gradient. *Oecologia*:1-9

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Geiser L.H. et al. 2019. Assessing Ecological Risks from Atmospheric Deposition of Nitrogen and Sulfur to US Forests Using Epiphytic Macrolichens. *Diversity*. 11: 87.

Naeth, M. and R. Wilkinson. 2008. Lichens as Biomonitoris of Air Quality around a Diamond Mine, NWT. *J. Env. Quality*. 37:1675-1684

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**Beaver Dam Mine Project Environmental Impact Assessment  
Information Request Responses, Round 2**

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Rheault, H., Drapeau, P., Bergeron, Y. and A. Esseen, 2002. Edge Effects on Epiphytic lichens in Managed Black Spruce Forests of Eastern North America. NRC Canada.



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**Beaver Dam Mine Project Environmental Impact Assessment  
Information Request Responses, Round 2**

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Round 2 Information Request Number:	CEAA-2-27
Regulatory Agency/Indigenous Community:	CEAA, KMKNO, ESWF, Save Caribou
Topic/Discipline:	Air, Noise and Human Health
EIS Guideline Reference:	Section 6.7.3 Cumulative Effects Assessment
Revised EIS (February 28, 2019) Reference:	Section 8.5 Cumulative Effects Assessment of the Valued Components

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**Context and Rationale**

Section 8 of the revised EIS does not contain a cumulative effects assessment for noise.

The proponent states that residual adverse effects from noise will remain after the application of mitigations. Residual effects of other past, present and reasonably foreseeable projects noted in the revised EIS have the potential to interact with the residual effects of the Beaver Dam Mine Project, both spatially and temporally (Table 8.4-4). Specifically, the proposed Beaver Dam Mine, Fifteen Mile Stream Gold and Cochrane Hill Gold Projects will be operating concurrently and using the same Haul Roads to transport ore to the existing Touquoy Mine and Facility for final processing.

The proponent's rationale for not carrying noise into the cumulative effects assessment is that the residual effects from noise are anticipated to revert back to baseline conditions upon completion of the Project.

The Agency notes that noise levels were close to or exceeded thresholds during the assessment of direct Project effects. As such, the Agency requires that noise be carried forward into the cumulative effects assessment.

In addition to Fifteen Mile Stream Gold and Cochrane Hill Gold Projects, the proponent has identified forestry operations as an ongoing project in the area. Although sporadic, the proponent indicated that there is a potential for cumulative effects between forestry and the other mining projects, and stated that an overlap of these projects will likely occur.

**The Proponent is Required to ...**

Provide a cumulative effects assessment for noise, including the reasonably foreseeable projects: Fifteen Mile Stream Gold and Cochrane Hill Gold Projects.

Provide a worst-case scenario for noise along the Haul Road in consideration of Beaver Dam, Fifteen Mile Stream Gold, and Cochrane Hill Gold Projects and forestry operations.

Update the direct and cumulative effects assessment of related valued components as appropriate and include additional mitigation to reflect this scenario.

**Beaver Dam Mine Project Environmental Impact Assessment  
 Information Request Responses, Round 2**
**Response**

A noise cumulative effects assessment is included in Section 8.5.1, page 8-33 to page 8-41 of the Updated 2021 EIS (AMNS 2021). Noise cumulative effects for the Beaver Dam Mine Project (the Project) have been assessed including reasonably foreseeable projects (i.e., Fifteen Mile Stream Gold and Cochrane Hill Gold projects) and forestry operations that use the Haul Road concurrently with trucks from the Project. Due to the distance between the reasonably foreseeable projects and the Beaver Dam Mine Project Area (PA) (i.e., the PA consists of the Beaver Dam Mine Site, Touquoy Mine Site and Haul Road) noise migration from equipment and activities at those mine sites are anticipated to be below the baseline noise levels within the PA; therefore, sources from these mine sites have not been evaluated in detail. Truck traffic on the Haul Road from the reasonably foreseeable projects and forestry operations that overlap along the Haul Road were assessed and have the potential to increase the cumulative effect of noise at the identified sensitive receptor locations shown in Section 6.1.7.3.1, Table 6.1-9, page 6-25 and Appendix B.2 (Updated Noise Impact Assessment Technical Report), Section 3.3, Table 3.5, PDF page 13 of the Updated 2021 EIS [AMNS 2021] and included below as (Table CEAA-2-27-1). The predicted cumulative effects for noise levels are within the applicable Nova Scotia Environment and Labour Pit and Quarry Guidelines (NSEL 1999) sound level limits at the identified sensitive receptor locations (Table CEAA-2-27-1).

**Table CEAA-2-27-1: Operation Phase Predicted Cumulative Effects of Noise on Sensitive Receptors**

Receptor ID	Receptor Description	Noise Level (dBA) (Day/Evening/Night)	Sound Level Limit <sup>(a)</sup> (dBA) (Day/Evening/Night)	Compliance
R1	9 Beaver Dam Mine Road (Marlborough Property)	50 / 50 / 27	65 / 60 / 55	Yes
R2	4112 Highway 224 (Beaver Lake IR 17)	31 / 31 / 28	65 / 60 / 55	Yes
R3	4115 Highway 224 (Cottage on Crown Land)	33 / 33 / 28	65 / 60 / 55	Yes
R4	3492 Highway 224 (Hobbs Property)	56 / 56 / 27	65 / 60 / 55	Yes
R5	3379 Highway 224 (McLeod Property)	51 / 51 / 27	65 / 60 / 55	Yes
R6	3373 Highway 224 (Smith Property)	51 / 51 / 27	65 / 60 / 55	Yes
R7	Tangier River (Deepwood Estates Property)	55 / 55 / 20	65 / 60 / 55	Yes
R8	Tanger River (Musquodoboit Lumber Co. Ltd. Property/John Dickson Lease)	44 / 44 / 20	65 / 60 / 55	Yes
R9	5579 Mooseland Road (Lloy Property)	51 / 51 / 26	65 / 60 / 55	Yes

Source: AMNS 2021 (Section 8.5.1.2.2, Table 8.5-1, page 8-37 and Appendix B.2, Section 3.3, Table 3.5, PDF page 13 of the Updated 2021 EIS).

Notes: Truck traffic used in the noise assessment and related modelling has been adjusted to a 16-hour shift (7:00 AM to 11:00 PM). It is assumed that trucks originating from the other projects and industries will operate during the same hours for the purposes of the cumulative effects assessment.

Noise emissions from service trucks (i.e., 3/4-ton trucks, making approximately 20 round trips per day) have also been included in the cumulative effects noise model.

<sup>(a)</sup> Guidelines for Environmental Noise Measurement and Assessment (NSEL 1990).

dBA = decibels; NSEL = Nova Scotia Environment and Labour.

**Beaver Dam Mine Project Environmental Impact Assessment  
 Information Request Responses, Round 2**

The number of trucks is based on production schedule and truck availability in Nova Scotia. The number of return truck trips (i.e., round trips) per day will be an anticipated annual average of approximately 95 for 16 hours per day, 350 days per year for the duration of the mine life (5 years). The maximum number of truck trips will occur in Year 2 to 3 of operations with significant reduction in Year 1 and Year 4 to 5. The final number of trucks used in this assessment is based on Pre-Feasibility assessment (Atlantic Gold 2019) and predicted project overlap, which may be subject to change based on permitting timelines.

**Table CEAA-2-27-2: Summary of Predicted Truck Traffic along the Haul Road**

Originating Facility / Industry	Truck Traffic Volume (round trips per day, 7:00 AM to 11:00 PM)	
	Direct Effects	Cumulative Effects
Project (Beaver Dam Mine Site)	95	95
Cochrane Hill Mine	-	11
Fifteen Mine Stream Mine	-	11
Service Trucks (3/4 tons truck)	-	20
Forestry	-	7
<b>Total</b>	<b>95</b>	<b>144</b>

Source: AMNS 2021 (Section 8.5.1.2.3, page 8-37 and Appendix B.2, Section 3.3, PDF page 12 and 13 of the Updated 2021 EIS) and based on Pre-Feasibility Assessment (Atlantic Gold 2019).

Notes: It is assumed that trucks from originating from the other projects and industries will operate during the same hours for the purposes of the cumulative effects assessment.

Noise emissions from service trucks (i.e., 3/4-ton trucks, making approximately 20 round trips per day) have also been included in the cumulative effects noise model.

- = not applicable.

Additional details of the noise cumulative effects assessment are provided in Section 8.5.1.2, page 8-34 and Appendix B.2 (Updated Noise Impact Assessment Technical Report), Section 3.3, PDF page 12 and 13 of the Updated 2021 EIS (AMNS 2021).

Worst-case scenario for noise along the Haul Road includes the Beaver Dam Mine PA (i.e., Beaver Dam Mine Site, Touquoy Mine Site and along the Haul Road), Fifteen Mile Stream Gold Project, and Cochrane Hill Gold Project and forestry operations. Predicted noise levels from direct and cumulative effects are within the Nova Scotia Pit and Quarry Guidelines (NSEL 1999) criteria at the identified worst-case receptors (Table CEAA-2-27-1). Section 8.5.1.2.3, page 8-37 of the cumulative effects section in the Updated 2021 EIS (AMNS 2021) provides an assessment of noise.

**Table CEAA-2-27-3: Maximum (Worst-case) Predicted Noise Levels at Property Boundaries**

Property Line Description	Maximum Noise Level (dBA) (Day/Evening/Night)	Sound Level Limit (dBA) <sup>(a)</sup> (Day/Evening/Night)	Compliance
Beaver Dam Mine Site Property, Option A	55 / 55 / 55	65 / 60 / 55	Yes
Beaver Dam Mine Site Property, Option B	55 / 55 / 55	65 / 60 / 55	Yes
Haul Road <sup>(a)</sup> (30 m from centerline of road)	58 / 58 / -	65 / 60 / 55	Yes
Touquoy Mine Site Property	55 / 55 / 54	65 / 60 / 55	Yes

Notes: <sup>(a)</sup> Truck traffic used in the noise assessment and related modelling is considered to be a 16-hour shift between 7:00 AM to 11:00 PM (Guidelines for Environmental Noise Measurement and Assessment [NSEL 1990] and Nova Scotia Environment Pit and Quarry Guidelines [NSEL 1999]).

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**Beaver Dam Mine Project Environmental Impact Assessment  
Information Request Responses, Round 2**

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**References**

AMNS (Atlantic Mining NS Inc.). 2021. Updated Environmental Impact Statement. Beaver Dam Mine Project. Submitted to the Impact Assessment Agency of Canada and Nova Scotia Environment. October 2021. Middle Musquodoboit, NS.

NSEL (Nova Scotia Environment and Labour). 1990. Guidelines for Environmental Noise Measurement and Assessment. <http://www.noise-ordinances.com/wpcontent/uploads/2015/09/EnvironmentalNoiseMeasurement.pdf>, accessed September 2017.

NSEL (Nova Scotia Environment and Labour). 1999. Pit and Quarry Guidelines. [https://novascotia.ca/nse/issues/docs/Pit\\_and\\_Quarry\\_Guidelines.pdf](https://novascotia.ca/nse/issues/docs/Pit_and_Quarry_Guidelines.pdf), accessed November 2017.

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**Beaver Dam Mine Project Environmental Impact Assessment  
Information Request Responses, Round 2**

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Round 2 Information Request Number:	CEAA-2-28
Regulatory Agency/Indigenous Community:	CEAA, KMKNO, ESWF, Save Caribou
Topic/Discipline:	Air, Noise and Human Health
EIS Guideline Reference:	Section 6.7.3 Cumulative Effects Assessment
Revised EIS (February 28, 2019) Reference:	Section 8.5 Cumulative Effects Assessment of the Valued Components

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**Context and Rationale**

A cumulative effects assessment for air is included in section 8.5 of the revised EIS. The proponent identified projects that are certain or reasonably foreseeable that would operate concurrently with the Beaver Dam Mine Project, and use the same Haul Roads.

The Agency notes that the air dispersion model of the Haul Road (presented in C-1 and within the revised EIS) does not account for Fifteen Mile Stream and Cochrane Hill Gold Projects. Some air quality levels were close to or exceeded thresholds during the assessment of direct Project effects. As such, the Agency requires that air dispersion modelling be completed to characterize potential cumulative effects.

In addition to Fifteen Mile Stream Gold and Cochrane Hill Gold Projects, the proponent has identified forestry operations as an ongoing project in the area. Although sporadic, the proponent indicated that there is a potential for cumulative effects between forestry and the other mining projects, and stated that an overlap of these projects will likely occur.

In addition to Fifteen Mile Stream Gold and Cochrane Hill Gold Projects, the proponent has stated: "it is likely that forestry operations will occasionally coincide with those of the Beaver Dam Mine and cause greater disturbance to air quality than these operations produce individually, especially along the Haul Road.

However, such additive periods are likely to be limited in duration and frequency and are not expected to be significant." The proponent has stated that during active periods, forestry-related traffic results in approximately 100 trucks per day.

The Agency requires that the proponent provide a worst-case scenario for air quality in consideration of forestry, Fifteen Mile Stream Gold and Cochrane Hill Gold Projects.

**The Proponent is Required to ...**

Provide modelling to support the cumulative effects assessment for air quality, including the reasonably foreseeable projects: Fifteen Mile Stream Gold and Cochrane Hill Gold Projects.

Provide a worst-case scenario for air quality along the Haul Road in consideration of Beaver Dam, Fifteen Mile Stream Gold and Cochrane Hill Gold Projects and forestry operations. Update the cumulative effects assessment as required, including providing additional mitigation.

Update the direct and cumulative effects assessment of related valued components as appropriate.

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**Beaver Dam Mine Project Environmental Impact Assessment  
Information Request Responses, Round 2**

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**Response**

Air quality modelling has been updated to support the cumulative effects assessment of air quality along the Haul Road to include the reasonably foreseeable worst-case scenario of Beaver Dam Mine Project, Fifteen Mile Stream Gold Project and Cochrane Hill Gold Project and forestry operations. Results for air quality cumulative effects assessment are detailed in Section 8.5.2, page 8 - 41 and Appendix C.1 Air Emissions Assessment Technical Report of the Updated 2021 EIS (AMNS 2021).

Beaver Dam Haul Road Use by the Project, Fifteen Mile Stream Project, Cochrane Hill Gold Project and Regional Forestry

During the operational phase of the Fifteen Mile Project and the Cochrane Hill Gold Project, gold concentrate from each surface mine will be transported to the Touquoy processing site for final processing into gold doré bar. The proposed haul route for each of these projects is proposed to overlap with the Beaver Dam Haul Road west of the Highway 224, along with potential trucking activity associated with the forest industry. Eleven round-trips are proposed to carry gold concentrate from each of the Fifteen Mile Stream Gold and Cochrane Hill Gold projects per day (totaling 22 vehicle round-trips [i.e., two-way trips] or 44 one-way trips per day), plus 95 round-trips (e.g., return trips or two-way trips) per day between Beaver Dam Mine Site and Touquoy Mine Site. This could be further compounded by forestry trucks and service trucks activity (e.g., approximately seven forestry truck round-trips per day plus 20 service truck round-trips per day). The total number of trucks for cumulative effects assessment is 144 truck round-trips or 288 one-way trips (Appendix C.1, Table 1, PDF page 30). Mitigation measures proposed in the Beaver Dam Mine Project will result in an 80 to 90% targeted dust suppression efficiency.

The modelled particulate concentration results of the Cumulative Haul Road emissions scenario for the Beaver Dam Mine Project, Fifteen Mile Stream Gold Project, Cochrane Hill Gold project and regional forestry for the four road sections modelled (Figure 3 in Appendix C.1, PDF page 24) are detailed in Appendix C.1 (Air Emissions Assessment Technical Report). The modelling results are outlined in Table 7A (Road Results Particulate), PDF page 38 and Table 7B (NO<sub>2</sub>, SO<sub>2</sub>, and VOC), PDF page 39 and are included below in response to this IR2 (CEAA 2-28) as Tables CEAA 2-28-1 and Table CEAA 2-28-2.

All predicted cumulative maximum concentrations are well below the air quality assessment criteria with background added, as shown in Table CEAA-2-28-1 (Table 7A, PDF page 38 in Appendix C.1). Table CEAA-2-28-2 (Table 7B, PDF page 39 in Appendix C.1) summarizes the predicted maximum concentrations of the gaseous species (i.e., NO<sub>2</sub>, SO<sub>2</sub> and VOCs). There are no exceedances of the air quality criteria for NO<sub>2</sub> and SO<sub>2</sub>. There are no criteria applicable for total VOCs. The predicted concentrations of VOCs as presented in Table CEAA-2-28-2 show that the VOC concentrations are very low (less than 1 microgram per cubic metre) and are provided for reference only.

The maximum concentrations for all contaminants occur at 30 m from the Haul Road centerline, which is the project boundary for the Haul Road. Figure 4A, PDF page 25 to Figure 4E, PDF page 29 in Appendix C.1 are included below in response to this IR2 (CEAA 2-28) as Figure CEAA-2-28-1A to Figure CEAA-2-28-1E show the 30 km haul road contour plots for TSP, PM<sub>10</sub> and PM<sub>2.5</sub> modelled for the 80% dust mitigation scenario. As shown on these figures, there are no exceedances of the applicable criteria along the Haul Road.

**Beaver Dam Mine Project Environmental Impact Assessment  
 Information Request Responses, Round 2**
**Table CEAA 2-28-1: Particulate Modeling Results for Cumulative Truck Traffic Scenarios – 80% Road Dust Mitigation**

Parameter	Averaging Period	Assessment Criteria (Air Quality Standard) ( $\mu\text{g}/\text{m}^3$ )	Maximum Predicted Concentration ( $\mu\text{g}/\text{m}^3$ )	Background Concentration ( $\mu\text{g}/\text{m}^3$ )	Combined Effect <sup>(a)</sup> ( $\mu\text{g}/\text{m}^3$ )	Percentage of Assessment Criteria for Combined Effect (%)
<b>Road Section – R1</b>						
TSP	24-hour	120	82.63	17.10	99.73	83.11%
	Annual	70	26.41	12.10	38.51	55.01%
PM <sub>10</sub>	24-hour	50	35.41	13.10	48.51	97.02%
PM <sub>2.5</sub>	24-hour	27	3.79	9.00	12.79	47.37%
	Annual	8.8	1.46	5.7	7.16	81.34%
Deposition (g/m <sup>2</sup> /year)	Annual	-	206.10	-	-	-
<b>Haul Road Section – STP</b>						
TSP	24-hour	120	81.55	17.10	98.65	82.21%
	Annual	70	26.25	12.10	38.35	54.78%
PM <sub>10</sub>	24-hour	50	35.68	13.10	48.78	97.55%
PM <sub>2.5</sub>	24-hour	27	3.82	9.00	12.82	47.46%
	Annual	8.8	1.48	5.7	7.18	81.61%
Deposition (g/m <sup>2</sup> /year)	Annual	-	202.35	-	-	-
<b>Haul Road Section – East Corner</b>						
TSP	24-hour	120	70.97	17.10	88.07	73.39%
	Annual	70	23.07	12.10	35.17	50.24%
PM <sub>10</sub>	24-hour	50	30.77	13.10	43.87	87.74%
PM <sub>2.5</sub>	24-hour	27	3.27	9.00	12.27	45.46%
	Annual	8.8	1.25	5.7	6.94	78.92%
Deposition (g/m <sup>2</sup> /year)	Annual	-	184.36	-	-	-
<b>Haul Road Section – R9</b>						
TSP	24-hour	120	66.92	17.10	84.02	70.02%
	Annual	70	22.52	12.10	34.62	49.46%
PM <sub>10</sub>	24-hour	50	30.04	13.10	43.17	86.27%
PM <sub>2.5</sub>	24-hour	27	3.20	9.00	12.20	45.20%
	Annual	8.8	1.25	5.7	6.95	79.00%
Deposition (g/m <sup>2</sup> /year)	Annual	-	176.10	-	-	-

Source: AMNS 2021, Appendix C.1 (Air Emissions Assessment), Table 7A, PDF page 38.

 Notes: <sup>(a)</sup> "Combined Effect" equals predicted maximum concentration and background concentration.

**Beaver Dam Mine Project Environmental Impact Assessment  
 Information Request Responses, Round 2**
**Table CEAA 2-28-2: The NO<sub>2</sub>, SO<sub>2</sub> and VOC Modeling Results for Cumulative Truck Traffic Scenarios**

Parameter	Averaging Period	Assessment Criteria (Air Quality Standard) (µg/m <sup>3</sup> )	Maximum Predicted Concentration (µg/m <sup>3</sup> )	Background Concentration (µg/m <sup>3</sup> )	Combined Effect <sup>(a)</sup> (µg/m <sup>3</sup> )	Percentage of Assessment Criteria for Combined Effect (%)
<b>Road Section – R1</b>						
NO <sub>2</sub>	1-hour	400	16.1	41.4	57.5	14%
	24-hour	200	9.0	17.0	26.0	13%
	Annual	100	4.0	3.3	7.3	7%
SO <sub>2</sub>	1-hour	900	0.0	7.9	7.9	<1%
	24-hour	300	0.0	5.2	5.2	2%
	Annual	60	0.0	1.9	1.9	3%
VOC	1-hour	-	0.7	-	-	-
	24-hour	-	0.4	-	-	-
	Annual	-	0.2	-	-	-
<b>Haul Road Section – STP</b>						
NO <sub>2</sub>	1-hour	400	15.4	41.4	56.8	14%
	24-hour	200	9.1	17.0	26.1	13%
	Annual	100	4.0	3.3	7.3	7%
SO <sub>2</sub>	1-hour	900	0.0	7.9	7.9	<1%
	24-hour	300	0.0	5.2	5.2	2%
	Annual	60	0.0	1.9	1.9	3%
VOC	1-hour	-	0.6	-	-	-
	24-hour	-	0.4	-	-	-
	Annual	-	0.2	-	-	-
<b>Haul Road Section – East Corner</b>						
NO <sub>2</sub>	1-hour	400	14.9	41.4	56.3	14%
	24-hour	200	7.7	17.0	24.7	12%
	Annual	100	3.4	3.3	6.7	7%
SO <sub>2</sub>	1-hour	900	0.0	7.9	7.9	<1%
	24-hour	300	0.0	5.2	5.2	2%
	Annual	60	0.0	1.9	1.9	3%
VOC	1-hour	-	0.6	-	-	-
	24-hour	-	0.3	-	-	-
	Annual	-	0.1	-	-	-
<b>Haul Road Section – R9</b>						
NO <sub>2</sub>	1-hour	400	21.5	41.4	62.9	16%
	24-hour	200	10.2	17.0	27.2	14%
	Annual	100	3.4	3.3	6.7	7%



**Beaver Dam Mine Project Environmental Impact Assessment  
 Information Request Responses, Round 2**

Parameter	Averaging Period	Assessment Criteria (Air Quality Standard) ( $\mu\text{g}/\text{m}^3$ )	Maximum Predicted Concentration ( $\mu\text{g}/\text{m}^3$ )	Background Concentration ( $\mu\text{g}/\text{m}^3$ )	Combined Effect <sup>(a)</sup> ( $\mu\text{g}/\text{m}^3$ )	Percentage of Assessment Criteria for Combined Effect (%)
SO <sub>2</sub>	1-hour	900	0.0	7.9	7.9	<1%
	24-hour	300	0.0	5.2	5.2	2%
	Annual	60	0.0	1.9	1.9	3%
VOC	1-hour	-	0.9	-	-	-
	24-hour	-	0.4	-	-	-
	Annual	-	0.1	-	-	-

Source: AMNS 2021, Appendix C.1 (Air Emissions Assessment), Table 7B, PDF page 39.

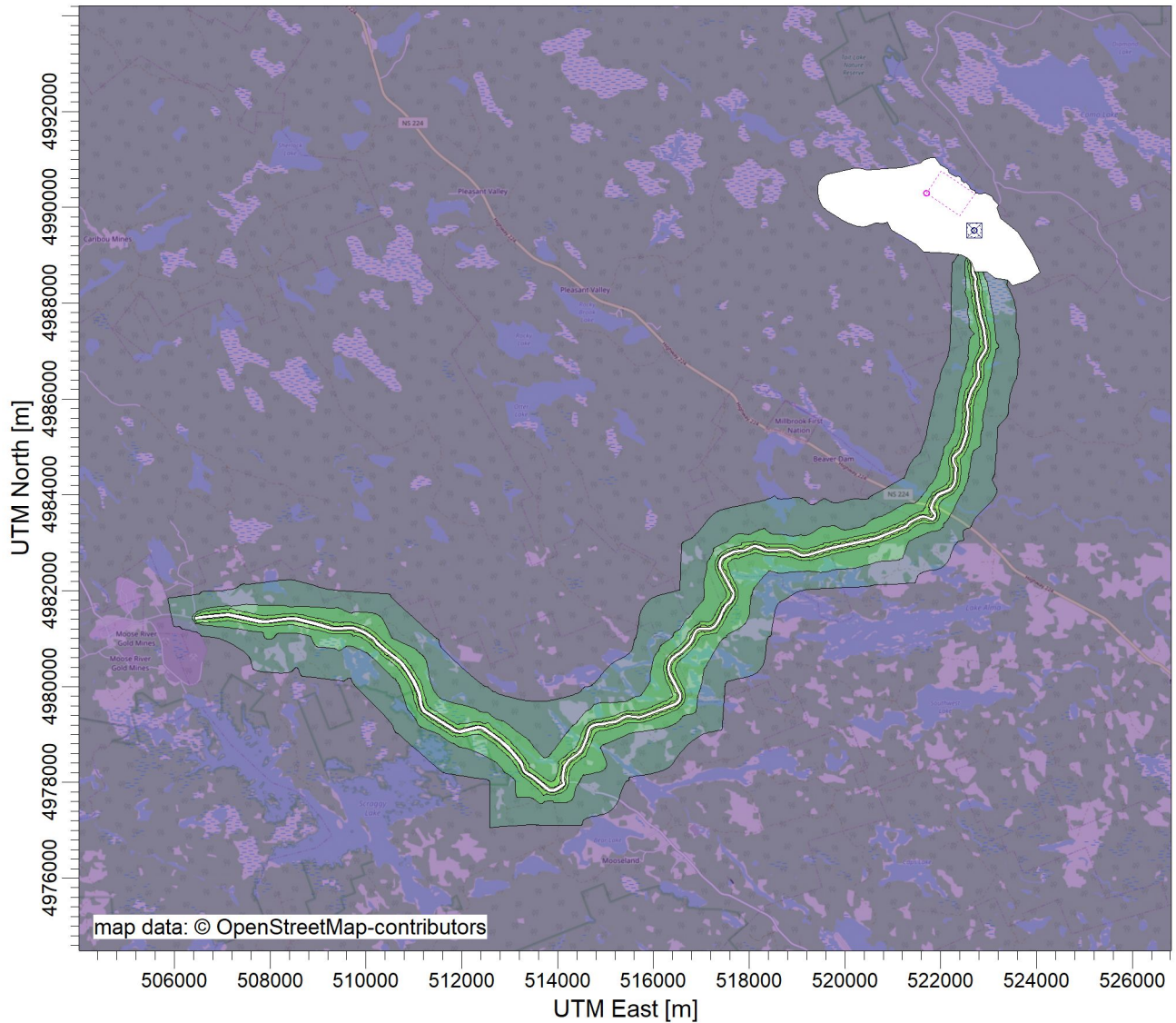
Notes: <sup>(a)</sup> "Combined Effect" equals predicted maximum concentration and background concentration.

**References**

AMNS (Atlantic Mining NS Inc.). 2021. Updated Environmental Impact Statement. Beaver Dam Mine Project. Submitted to the Impact Assessment Agency of Canada and Nova Scotia Environment. October 2021. Middle Musquodoboit, NS.

PROJECT TITLE:

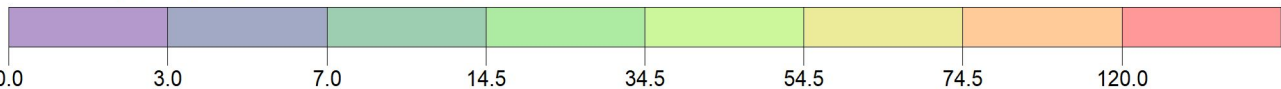
**Figure CEAA 2-28-1A - TSP, 24hour  
Cumulative Truck Traffic Scenario, 80% Road Dust Mitigation**



PLOT FILE OF HIGH 1ST HIGH 24-HR VALUES FOR SOURCE GROUP: ALL\_TSP

ug/m<sup>3</sup>

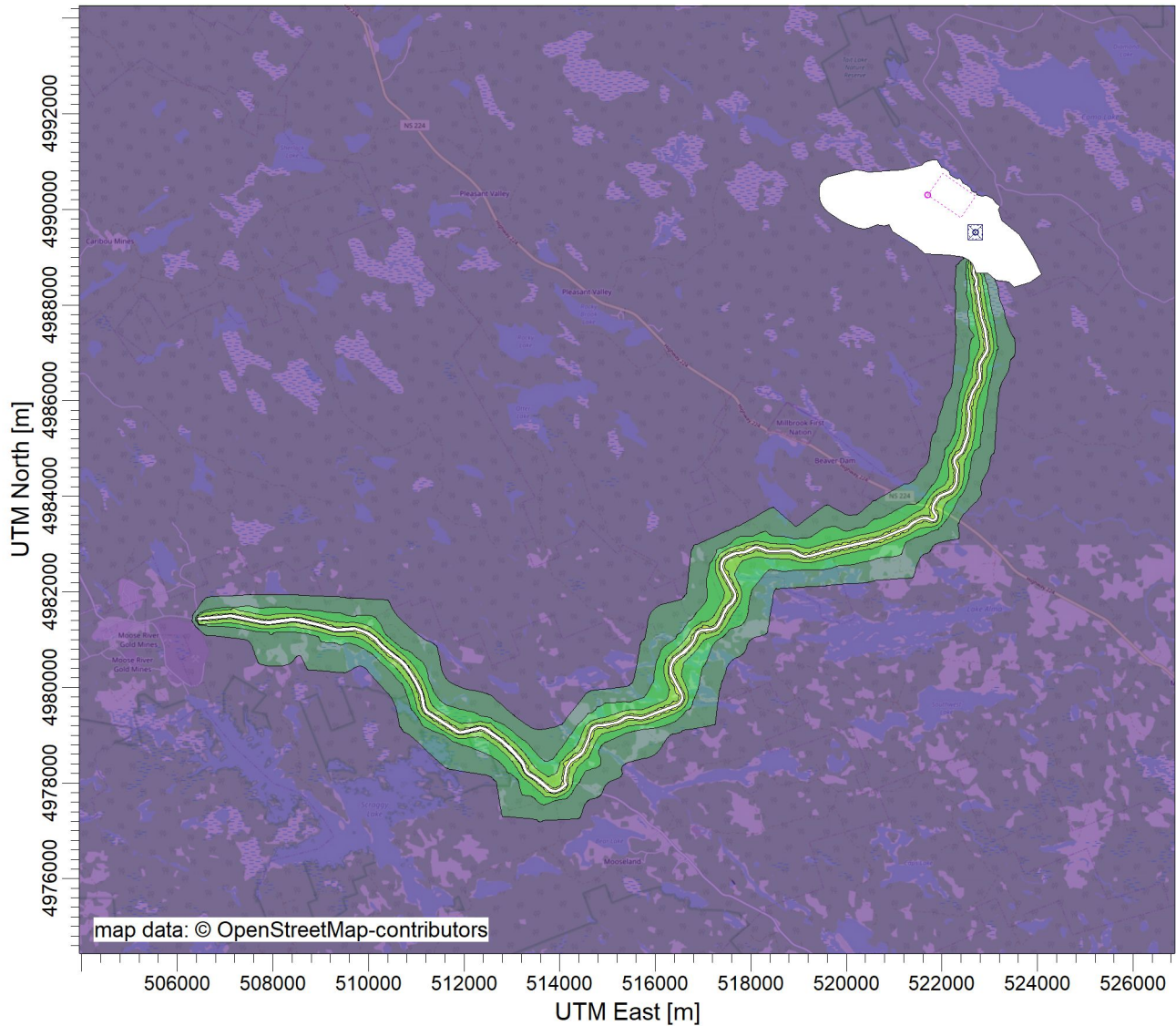
Max: 94.5 [ug/m<sup>3</sup>] at (522682.40, 4988743.33)



COMMENTS: 24hour TSP Limit = 120 ug/m <sup>3</sup>	SOURCES: <b>9</b>	COMPANY NAME:	
	RECEPTORS: <b>4800</b>	MODELER: <b>GHD Limited</b>	
	OUTPUT TYPE: <b>Concentration</b>	SCALE: 1:143,461	
	MAX:	DATE: <b>2/8/2021</b>	PROJECT NO.: <b>088664</b>

PROJECT TITLE:

**Figure CEAA 2-28-1B - TSP, Annual  
Cumulative Truck Traffic Scenario, 80% Road Dust Mitigation**



PLOT FILE OF ANNUAL VALUES AVERAGED ACROSS 5 YEARS FOR SOURCE GROUP: ALL\_TSP

ug/m<sup>3</sup>

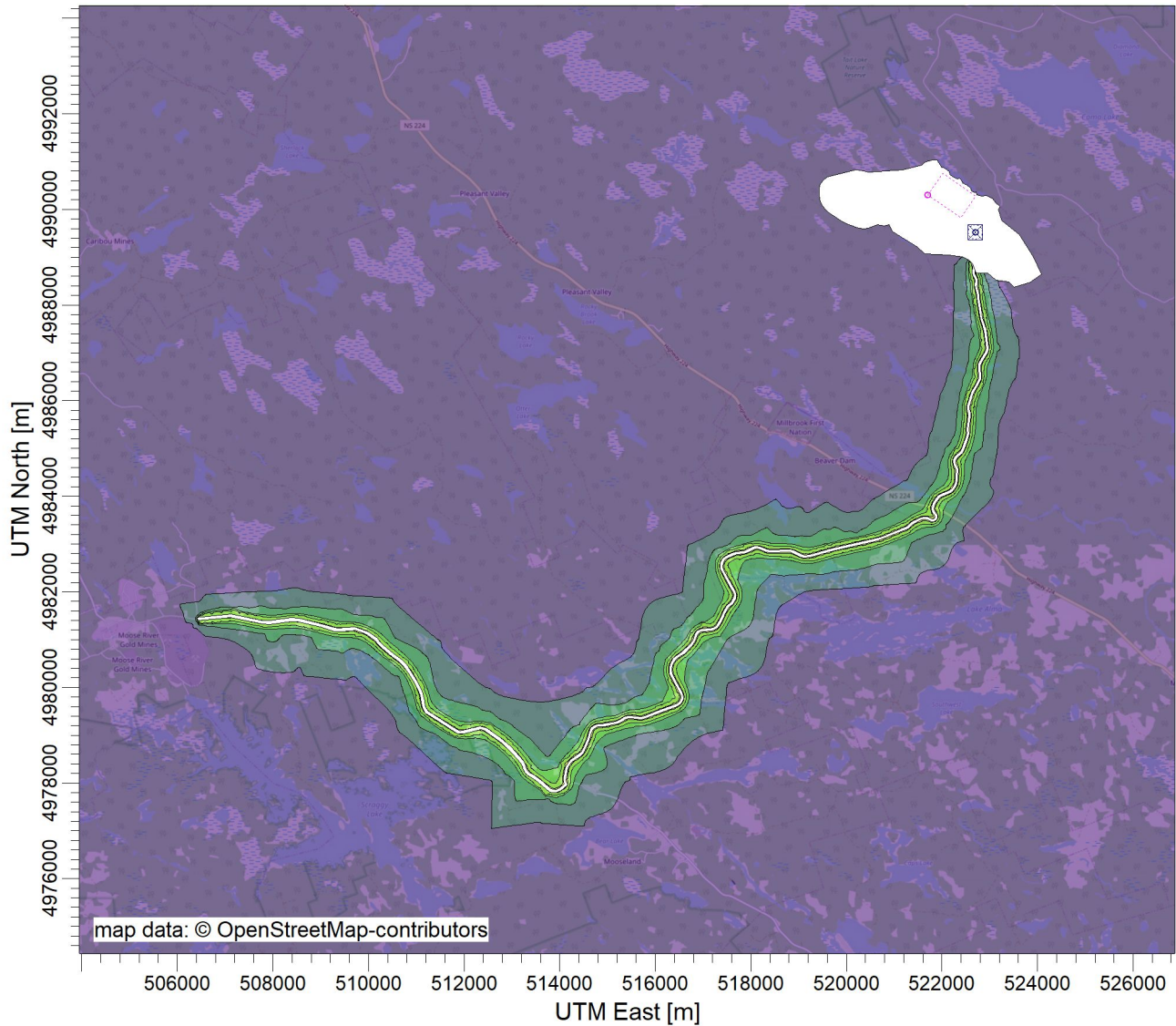
Max: 28.8 [ug/m<sup>3</sup>] at (522682.40, 4988743.33)



<p>COMMENTS:</p> <p>Annual TSP Limit = 70 ug/m<sup>3</sup></p>	<p>SOURCES:</p> <p><b>9</b></p>	<p>COMPANY NAME:</p>	
	<p>RECEPTORS:</p> <p><b>4800</b></p>	<p>MODELER:</p> <p><b>GHD Limited</b></p>	
	<p>OUTPUT TYPE:</p> <p><b>Concentration</b></p>	<p>SCALE:</p> <p>1:144,229</p> <p>0  5 km</p>	
	<p>MAX:</p>	<p>DATE:</p> <p><b>2/8/2021</b></p>	<p>PROJECT NO.:</p> <p><b>088664</b></p>

PROJECT TITLE:

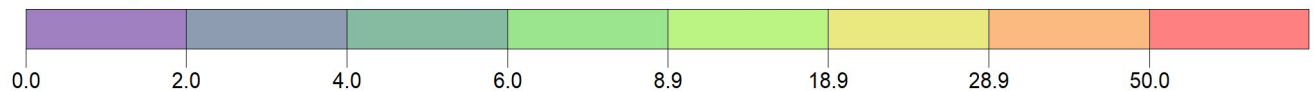
**Figure CEAA 2-28-1C - PM10, 24hour  
Cumulative Truck Traffic Scenario, 80% Road Dust Mitigation**



PLOT FILE OF HIGH 1ST HIGH 24-HR VALUES FOR SOURCE GROUP: ALL\_PM10

ug/m<sup>3</sup>

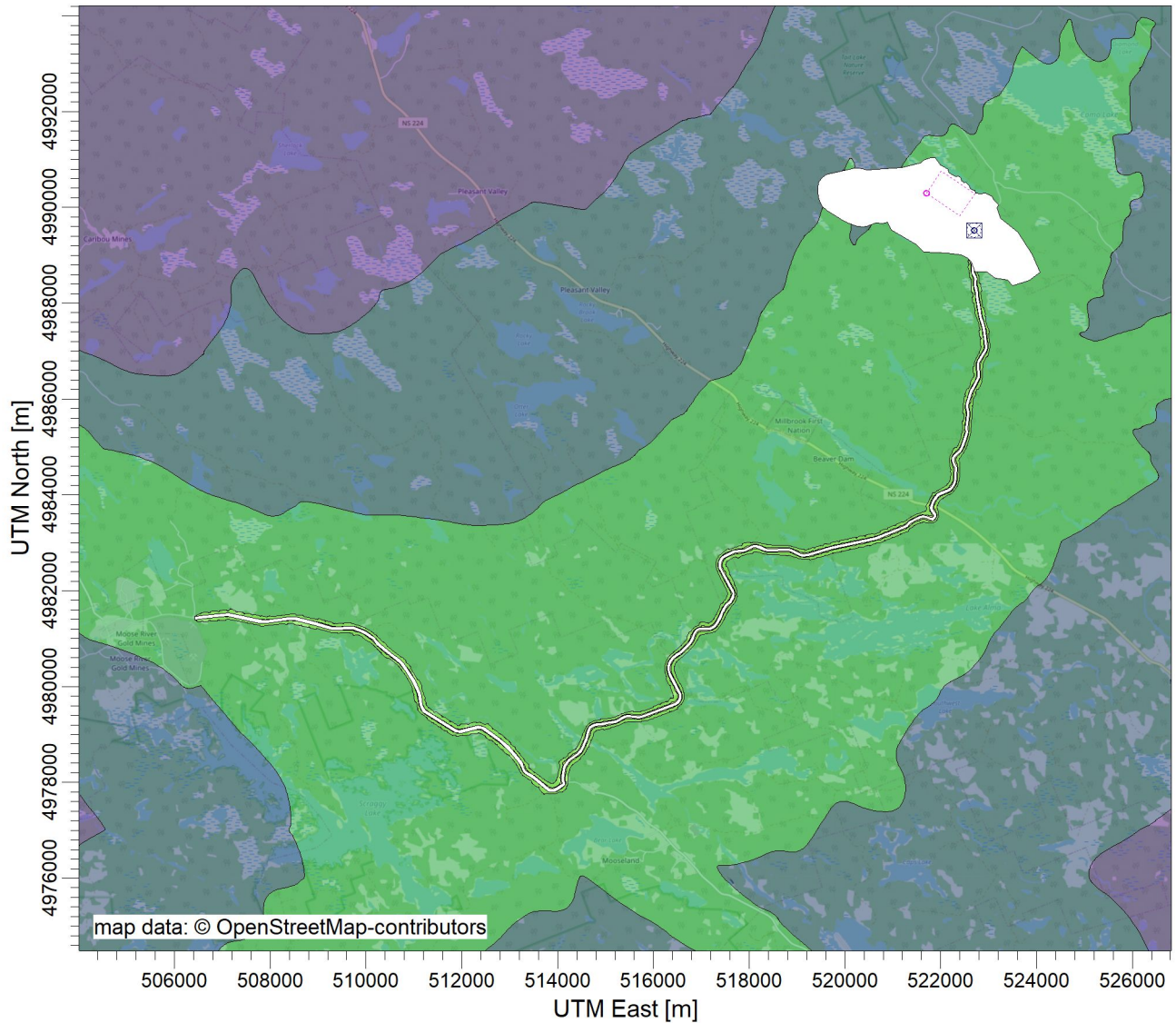
Max: 38.9 [ug/m<sup>3</sup>] at (522682.40, 4988743.33)



<p>COMMENTS:</p> <p>24hour PM10 Limit = 50 ug/m<sup>3</sup></p>	<p>SOURCES:</p> <p><b>9</b></p>	<p>COMPANY NAME:</p>	
	<p>RECEPTORS:</p> <p><b>4800</b></p>	<p>MODELER:</p> <p><b>GHD Limited</b></p>	
	<p>OUTPUT TYPE:</p> <p><b>Concentration</b></p>	<p>SCALE:</p> <p>1:144,229</p>	
	<p>MAX:</p>	<p>DATE:</p> <p><b>2/8/2021</b></p>	<p>PROJECT NO.:</p> <p><b>088664</b></p>

PROJECT TITLE:

**Figure CEAA 2-28-1D - PM2.5, 24hour  
Cumulative Truck Traffic Scenario, 80% Road Dust Mitigation**



PLOT FILE OF HIGH 1ST HIGH 24-HR VALUES FOR SOURCE GROUP: ALL\_PM25

ug/m<sup>3</sup>

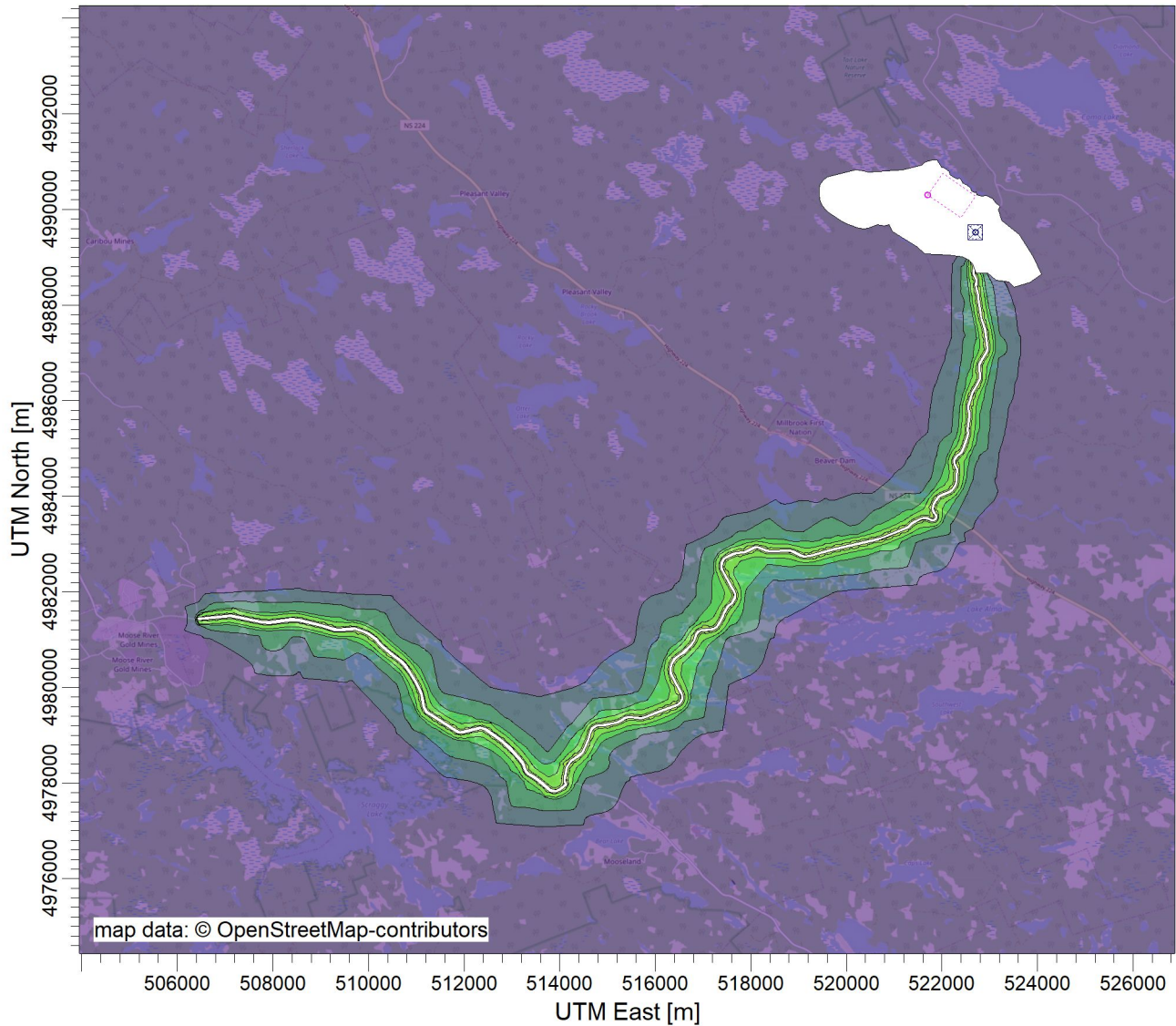
Max: 4.02 [ug/m<sup>3</sup>] at (522682.40, 4988743.33)



COMMENTS: 24hour PM2.5 Limit = 27 ug/m3	SOURCES: <b>9</b>	COMPANY NAME:	
	RECEPTORS: <b>4800</b>	MODELER: <b>GHD Limited</b>	
	OUTPUT TYPE: <b>Concentration</b>	SCALE: 1:143,461	
	MAX:	DATE: <b>2/8/2021</b>	PROJECT NO.: <b>088664</b>

PROJECT TITLE:

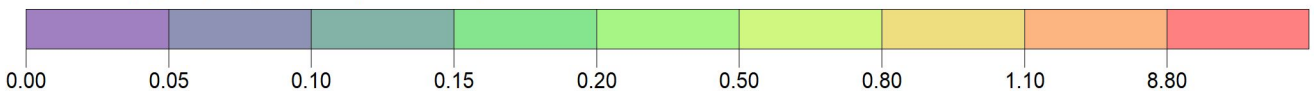
**Figure CEA 2-28-1E - PM2.5, Annual  
Cumulative Truck Traffic Scenario, 80% Road Dust Mitigation**



PLOT FILE OF ANNUAL VALUES AVERAGED ACROSS 5 YEARS FOR SOURCE GROUP: ALL\_PM25

ug/m<sup>3</sup>

Max: 1.40 [ug/m<sup>3</sup>] at (522682.40, 4988743.33)



COMMENTS:

Annual PM2.5 Limit = 8.8 ug/m<sup>3</sup>

SOURCES:

**9**

COMPANY NAME:

RECEPTORS:

**4800**

MODELER:

**GHD Limited**

OUTPUT TYPE:

**Concentration**

SCALE:

1:144,229



MAX:

DATE:

**2/8/2021**

PROJECT NO.:

**088664**

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**Beaver Dam Mine Project Environmental Impact Assessment  
Information Request Responses, Round 2**

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Round 2 Information Request Number:	CEAA-2-29
Regulatory Agency/Indigenous Community:	HC
Topic/Discipline:	Air, Noise and Human Health
EIS Guideline Reference:	Section 6.1.1 Atmospheric Environment
Revised EIS (February 28, 2019) Reference:	Section 6.2.6, p238; Section 6.2.9, p242; Table 6.2-12, p238; Table 6.2-15, p242

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**Context and Rationale**

In Table 6.2-12, the maximum cumulative (i.e. baseline + project) concentrations of TSP, PM10 and PM2.5 (annual average) are predicted to exceed the relevant air quality criteria in the Haul Road operations scenario. Consequently, at one of the sensitive receptor locations (i.e. Deepwood Estates), the maximum cumulative concentrations of TSP and PM10 would exceed the criteria and PM2.5 would reach 95% of the criteria (Table 6.2-15).

However, the proponent states that these elevated contaminant levels are “likely to be overestimated ... due to conservatism related to the lack of local background data (as well as conservatism inherent in the dispersion modelling)” (p238). The proponent also concludes that “[t]here is a great deal of uncertainty in the presented background concentrations for both TSP and PM10, which reduces the proposed significance of these findings. The overall significance of these exceedances is therefore also assessed as ‘not significant’” (EIS Section 6.2.9, p242).

Although cumulative effects may be overestimated due to conservative approaches employed (e.g. use of the maximum measured 24-hour TSP background concentration instead of 90th percentile value) to compensate for insufficient background data, the conservative approaches are not sufficient to conclude that the adverse effect is not significant.

As such, the assessment with respect to air quality is inconclusive given the lack of background data, and, as such, determination of significance cannot be conclusively defined for PM2.5.

**The Proponent is Required to ...**

Provide additional justification to support the conclusion and related significance determination on the PM2.5 health effects. This could include measures to reduce uncertainty and increase confidence in the predictions and/or to further mitigate effects.

**Response**

Section 6.2.6.2, page 6-44 of the Updated 2021 EIS provides the thresholds for determination of significance for Air VC, which includes PM<sub>2.5</sub> (AMNS 2021). The screening of project effects, and mitigation measures, are assessed in aggregate to determine whether the residual impacts are “Not Significant” or “Significant” according to definitions provided in Section 6.2.6.2, Table 6.2-5, page 6-44 of the Updated 2021 EIS (AMNS 2021). Uncertainty is assessed using the 90<sup>th</sup> percentile measured concentration as “background”. This is a conservative approach but excludes extreme high values that are very rarely measured (the “maximum” values). The bolded values in Section 6.2.4.4, Table 6.2-3, page 6-37 are those that were carried forward for use in the combined assessment case (i.e., proposed Beaver Dam Mine site, existing Touquoy Mine Site). Specifically, for background uses 24-hour PM<sub>2.5</sub> the 90<sup>th</sup> percentile of 9.0 µg/m<sup>3</sup> and average of 5.7 µg/m<sup>3</sup> from Port Hawkesbury, Nova Scotia NAPS (Section 6.2.4.4, Table 6.2-3, page 6-37-), which is a more industrialized area than Beaver Dam Mine Project Area. The maximum predicted PM<sub>2.5</sub> concentrations did not exceed the Canadian Ambient Air Quality Standards (CAAQS) for either the 24-hour or annual averaging

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**Beaver Dam Mine Project Environmental Impact Assessment  
Information Request Responses, Round 2**

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periods at any of the sensitive receptor locations, based on Project alone predictions, Project plus background and Cumulative Effects.

A fugitive dust monitoring program will be developed for Beaver Dam Mine Project. A conceptual monitoring fugitive dust monitoring program is provided in Appendix C.3 (draft Fugitive Dust Control Plan), Section 5, PDF page 12 of the Updated 2021 EIS (AMNS 2021).

**Reference**

AMNS (Atlantic Mining NS Inc.). 2021. Updated Environmental Impact Statement. Beaver Dam Mine Project. Submitted to the Impact Assessment Agency of Canada and Nova Scotia Environment. October 2021. Middle Musquodoboit, NS.



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**Beaver Dam Mine Project Environmental Impact Assessment  
Information Request Responses, Round 2**

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Round 2 Information Request Number:	CEAA-2-30
Regulatory Agency/Indigenous Community:	HC
Topic/Discipline:	Air, Noise and Human Health
EIS Guideline Reference:	Section 4.1 Guidance; Section 3.2 Factors to be Considered
Revised EIS (February 28, 2019) Reference:	Section 6.1.9, p223; Appendix B.1 - Section 2.0 Methodology

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**Context and Rationale**

The EIS states that during construction “noise will be elevated above baseline for limited periods but for a short duration (12-24 months)”. According to Section 6.3.1 of Health Canada (2016), construction noise lasting longer than one year should be assessed as operational noise. The methods to evaluate operational noise are also presented in Health Canada (2016). Guidance for Evaluating Human Health Impacts in Environmental Assessment: Noise. Healthy Environments and Consumer Safety Branch, Health Canada, Ottawa, Ontario.

**The Proponent is Required to ...**

Provide a quantitative evaluation of construction noise as operational noise using the approach described in Health Canada (2016) given the expected duration of the construction phase (up to 2 years).

**Response**

The noise assessment has been updated and is provided in Section 6.1, page 6-1, Appendix B.1 (Beaver Dam Mine Construction Noise Assessment) and Appendix B.2 (Updated Noise Impact Assessment Technical Report) of the Updated 2021 EIS (AMNS 2021). Construction period has been updated to 1 year and is no longer 2 years (Project Description Section 2, page 2-1). Construction activities at the Project have a planned duration of less than one year (Section 6.1.7, Table 6.1-5, page 6-19) of the Updated 2021 EIS (AMNS 2021) The Health Canada guideline for noise suggests that noise from construction activities lasting less than one year (i.e., short-term construction) be assessed using the United States Environmental Protection Agency (US EPA 1974) methodology. This methodology provides mitigation noise levels (MNLs) as criteria with various correction factors to evaluate whether adverse effects are likely, and if mitigation should be considered.

To support the Noise Assessment for Construction, the suggested base MNL is 47 dBA, which is specified in terms of the day-night sound level (Ldn), and assumes that the dominant sources of noise are tonal/impulsive. Ldn is an equivalent continuous sound level taken over 24 hours, with the night-time (11:00 PM to 7:00 AM) sound levels adjusted by +10 dB to account for increased noise sensitivity at night (Health Canada 2017). The Health Canada guideline also specifies correction factors that should be applied to the base MNL dependent on the type of community in which the construction activities occur, as well as some other additional corrections. These correction factors are summarized in Section 6.1.7.2, Table 6.1-7, page 6-22 of the Updated 2021 EIS (AMNS 2021). The key conclusion from the updated assessment during construction states (Section 6.1.7.2, page 6-22):

“During the worst-case scenario, noise effects from the Construction Phase activities are within the suggested MNL criteria. For Scenario A, these worst-case effects are predicted at the start of construction of Section 3B of the Haul Road and will diminish significantly as construction progresses due to the increased distance from

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**Beaver Dam Mine Project Environmental Impact Assessment  
Information Request Responses, Round 2**

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the receptors. Based on these results, adverse effects are expected to be unlikely, and mitigation is not required. “

**References**

AMNS (Atlantic Mining NS Inc.). 2021. Updated Environmental Impact Statement. Beaver Dam Mine Project. Submitted to the Impact Assessment Agency of Canada and Nova Scotia Environment. October 2021. Middle Musquodoboit, NS.

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**Beaver Dam Mine Project Environmental Impact Assessment  
Information Request Responses, Round 2**

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Round 2 Information Request Number:	CEAA-2-31
Regulatory Agency/Indigenous Community:	HC
Topic/Discipline:	Air, Noise and Human Health
EIS Guideline Reference:	Section 3.2.2 Operation; 6.1.1 Atmospheric Environment; 6.2 Predicted Changes to the Physical Environment; 6.3.4 Aboriginal Peoples
Revised EIS (February 28, 2019) Reference:	Section 6.1.6, p214; 6.1.7.3, p218; Table 6.14-1, p808; Figure 2.1-2 Appendix B.1, Figures 3 and 4 Appendix B.1 Section 6.1; Section 6.1.3.2, p211 Appendix B.1 - Section 6.2 Section 6.2.6.4, p235

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**Context and Rationale**

The locations of the nearest human receptors that were evaluated in the air and noise assessments are not clear. Several seasonal and permanent dwelling locations appear on the maps provided; however, it is not clear if all relevant receptors were identified. For example, the locations of traditional land use were not identified. Where traditional land use is practiced closer to the project site than the permanent/seasonal dwellings, these areas should also be evaluated for potential health impacts.

**Noise**

Given that the Nova Scotia (NSE) Noise Guidelines are intended not only for dwellings but also for recreational areas, any area used for recreational or traditional purposes by Indigenous peoples located closer to the project site should be included in the noise assessment. This is particularly relevant because of the predicted exceedances of the provincial noise guidelines at the Beaver Dam Mine site property boundary.

In terms of noise, section 6.1 of Appendix B.1 states that “the Nova Scotia Guidelines for Environmental Noise Measurement and Assessment state that their guideline limit values are intended to be applied where people normally live, work, or take part in recreation”. According to section 6.1.7.3 of the EIS, “activities in the project site area include recreational use (hunting, ATVs, etc)”. According to Table 6.14-1, “Mi’kmaq families also enjoy camps in the area for recreational purposes.”

Additionally, the EIS states that “the highest predicted noise levels at the property boundaries of the Beaver Dam Mine Site exceed the criteria NSE Pit and Quarry Guidelines (1999) for all time periods ... . While the limits stated in these guidelines are clear and specific, they are not considered practical to meet for open pit mines with operations located close to property lines.”

However, according to section 6.2 of Appendix B, The NSEL document Pit and Quarry Guidelines, May 1999 specifies the following sound level limits at the property boundaries of pits and quarries.

**Air Quality**

In terms of air quality, it appears that the predicted air pollutant concentrations were screened against air quality criteria at the “sensitive receptor” locations throughout the EIS (e.g. Table 6.2- 12). However, it is not clear what these sensitive receptors represent and how they are selected and located.

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**Beaver Dam Mine Project Environmental Impact Assessment  
Information Request Responses, Round 2**

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In the vicinity of the Beaver Dam and Touquoy Mine sites and Haul Road operations area, Indigenous traditional land users may be exposed to higher concentrations of airborne contaminants than those at the identified 'sensitive receptor' locations. The proponent should screen and assess the exposure to air contaminants at the maximum point of impingement (MPOI) in addition to at the nearest permanent and seasonal dwellings.

**The Proponent is Required to ...**

1. Provide all human receptor locations, including locations of traditional land use and recreational use which may be closer to the project area than seasonal and/or permanent dwellings (for both air quality and noise VCs) on maps and in summary tables.
2. Update the noise and air modelling and human health assessment as required.
3. Provide further justification for the conclusion that the noise limits in the NSE Pit and Quarry Guidelines (1999) are not valid at the property boundary of the Beaver Dam Mine Site .
4. Provide additional mitigation measures that reduce noise at the property boundary given the predicted exceedances.
5. Update any monitoring or follow up programs at the property boundary to verify predicted noise levels and evaluate the level of conservatism used in the modelling .
6. Provide the predicted exposure levels to air pollutants at the maximum point of impingement (MPOI).
7. Assess the health risks from air pollutants using the revised exposure levels at the MPOI .
8. Illustrate the predicted air and noise isopleths for the regional study area, in graphic/map format with all the human receptor locations identified above.

**Response**

1. CEAA 2-31 Part A.

Atlantic Mining NS Inc. (AMNS) has included all human receptors (i.e., seasonal and permanent dwellings) for noise and air quality Valued Components (VCs) in the summary tables and figures included in this IR2 response included below. Furthermore, AMNS has provided and referenced property boundary results in tabular and figure form to serve as a proxy for traditional and recreational land use areas present outside of the Project Area (PA). Traditional land use has been documented within the PA as well, however, these areas will have restricted access once the Project is constructed and thus, on-going traditional and recreational activities will be limited to areas outside of the operational footprint of the Project. Specific locations of Mi'kmaq traditional use are confidential, so for the purposes of this information request, AMNS has considered the property boundary conditions as a proxy for "worse case" conditions for traditional and recreation practices for air parameters and noise and have included these tables and figures within the technical reports and/or EIS sections, and this Round 2, Information Request (IR2; CEAA 2-31) response.

**Beaver Dam Mine Project Environmental Impact Assessment  
 Information Request Responses, Round 2**
**Air**

The modelled maximum predicted concentrations for air parameters (i.e., TSP, PM<sub>10</sub>, PM<sub>2.5</sub>, NO<sub>2</sub>, SO<sub>2</sub> and VOCs) at the property boundaries are detailed in Appendix C.1 (Air Emissions Assessment Technical Report), with the modelling results outlined in Table 7A (Road Results Particulate), PDF page 38, Table 7B (NO<sub>2</sub>, SO<sub>2</sub>, and VOC), PDF page 39, and Table 9B (Beaver Dam Mine Site and Touquoy Mine Site), PDF page 45. The maximum predicted concentrations are summarized in the Updated 2021 EIS Section 6.2.7, Table 6.2-8, page 6-85, Table 6.2-11, page 6-87 and Table 6.2-14, page 6-88 (AMNS 2021). As outlined in the Air Emissions Assessment Technical Report (Appendix C.1, Section 4, PDF page 12), where Nova Scotia has air criteria, these have been used as the Assessment criteria. If there were no Nova Scotia criteria for compounds of interest, then Canada-wide standards have been assumed to applied.

The predicted maximum concentrations of the gaseous species (i.e., NO<sub>2</sub>, SO<sub>2</sub> and VOCs) did not exceed the selected air quality criteria for these parameters and are shown to be negligible at the property boundaries of the PA (i.e., Beaver Dam Mine Site, Haul Road and Touquoy Mine Site) (Appendix C.1, Table 7B, PDF page 39 and Table 9B, PDF page 45 of the Updated 2021 EIS [AMNS 2021]). There is no air quality criteria for total VOCs, and the predicted maximum concentrations of total VOCs in Appendix C.1, Table 7B, PDF page 39 are shown to be negligible. The selected air quality criteria used for the air assessment are presented in Appendix C.1, Table 6, PDF page 37.

The summarized maximum predicted concentrations tables presented in the Updated 2021 EIS (AMNS 2021). Air effects assessment (Section 6.2, page 6-32) discussed above are included below in response to this IR2 (CEAA 2-31) as (Tables CEAA 2-31-1 to CEAA 2-31-3. These three tables demonstrate compliance at the property boundaries of the PA (i.e., Beaver Dam Mine Site, Haul Road and Touquoy Mine Site) (Tables CEAA 2-31-1 to CEAA 2-31-3). To support the response to this IR2 (CEAA 2-31) gaseous species (i.e., NO<sub>2</sub>, SO<sub>2</sub> and VOCs) have been added to Tables CEAA 2-31-1 to CEAA 2-31-3.

**Table CEAA 2-31-1: Maximum Predicted Concentrations due to Beaver Dam Mine Site Operations**

Parameter	Averaging Period	Assessment Criteria (Ambient Air Quality Standard) (µg/m <sup>3</sup> )	Maximum Predicted Concentration (µg/m <sup>3</sup> )	Percentage of Assessment Criteria (%)	Background Concentration (µg/m <sup>3</sup> )	Combined Effect <sup>(a)</sup> (µg/m <sup>3</sup> )	Percentage of Assessment Criteria for Cumulative Effect (%)
TSP	24-hour	120	55.4	46	17.1	72.5	60
	Annual	70	21.0	30	12.1	33.1	47
PM <sub>10</sub>	24-hour	50	25.9	52	13.1	39.0	78
PM <sub>2.5</sub>	24-hour	27	2.9	11	9.0	11.9	44
	Annual	8.8	1.2	14	5.7	6.9	79
NO <sub>2</sub>	1-hour	400	74.9	19	41.4	116.3	29
	24-hour	200	0.5	<1	17.0	17.5	9
	Annual	100	0.2	<1	3.3	3.4	3
SO <sub>2</sub>	1-hour	900	9.4	1	7.9	17.3	2
	24-hour	300	0.1	<1	5.2	5.3	2
	Annual	60	0.0	<1	1.9	1.9	3
VOC	1-hour	–	–	–	–	–	–
	24-hour	–	–	–	–	–	–
	Annual	–	–	–	–	–	–

Source: Adapted from AMNS 2021, Section 6.2.7, Table 6.2-8, page 6-85 and Appendix C.1, Table 9B, PDF page 45.

Notes: <sup>(a)</sup> "Combined Effect" equals predicted maximum concentration and background concentration. µg/m<sup>3</sup> = micrograms per cubic metre; PM<sub>10</sub> = coarse particulate matter; PM<sub>2.5</sub> = fine particulate matter; TSP = total suspended particulate.

**Beaver Dam Mine Project Environmental Impact Assessment  
 Information Request Responses, Round 2**
**Table CEAA 2-31-2: Maximum Predicted Concentrations due to Haul Road Operations**

Parameter	Averaging Period	Assessment Criteria (Ambient Air Quality Standard) ( $\mu\text{g}/\text{m}^3$ )	Maximum Predicted Concentration ( $\mu\text{g}/\text{m}^3$ )	Percentage of Assessment Criteria (%)	Background Concentration ( $\mu\text{g}/\text{m}^3$ )	Combined Effect <sup>(a)</sup> ( $\mu\text{g}/\text{m}^3$ )	Percentage of Assessment Criteria for Combined Effect (%)
TSP	24-hour	120	54.64	46	17.1	71.04	60
	Annual	70	17.46	25	12.1	29.56	42
PM <sub>10</sub>	24-hour	50	23.59	47	13.1	36.69	73
PM <sub>2.5</sub>	24-hour	27	2.52	9	9.0	11.52	43
	Annual	8.8	0.98	11	5.7	6.68	76
NO <sub>2</sub>	1-hour	400	14.2	4	41.4	55.6	14
	24-hour	200	6.7	3	17.0	23.7	12
	Annual	100	2.7	3	3.3	6.0	6
SO <sub>2</sub>	1-hour	900	0.0	0	7.9	7.9	1
	24-hour	300	0.0	0	5.2	5.2	2
	Annual	60	0.0	0	1.9	1.9	3
VOC	1-hour	–	0.6	–	–	–	–
	24-hour	–	0.3	–	–	–	–
	Annual	–	0.1	–	–	–	–

Source: Adapted from AMNS 2021, Section 6.2.7, Table 6.2-11, page 6-87 and Appendix C.1, Table 9B, PDF page 45.

 Notes: <sup>(a)</sup> "Combined Effect" equals predicted maximum concentration and background concentration.  $\mu\text{g}/\text{m}^3$  = micrograms per cubic metre; PM<sub>10</sub> = coarse particulate matter; PM<sub>2.5</sub> = fine particulate matter; TSP = total suspended particulate.

**Table CEAA 2-31-3: Maximum Predicted Concentrations due to Touquoy Mine Site Operations**

Parameter	Averaging Period	Assessment Criteria (Ambient Air Quality Standard) ( $\mu\text{g}/\text{m}^3$ )	Maximum Predicted Concentration ( $\mu\text{g}/\text{m}^3$ )	Percentage of Assessment Criteria (%)	Background Concentration ( $\mu\text{g}/\text{m}^3$ )	Combined Effect <sup>(a)</sup> ( $\mu\text{g}/\text{m}^3$ )	Percentage of Assessment Criteria for Combined Effect (%)
TSP	24-hour	120	3.1	3	17.1	20.2	17
	Annual	70	1.1	2	12.1	13.2	19
PM <sub>10</sub>	24-hour	50	3.1	6	13.1	16.2	32
PM <sub>2.5</sub>	24-hour	27	1.3	5	9.0	10.3	38
	Annual	8.8	0.4	5	5.7	6.1	70
NO <sub>x</sub>	1-hour	400	5.82E+01	15	41.4	9.96E+01	25
	24-hour	200	2.33E+01	12	17.0	4.03E+01	20
	Annual	100	2.50E+01	<1	3.3	5.55E+00	4
SO <sub>2</sub>	1-hour	900	1.79E+01	2	7.9	2.58E+01	3
	24-hour	300	1.06E+00	<1	5.2	6.26E+00	2
	Annual	60	6.48E-02	<1	1.9	1.96E+00	3
VOC	1-hour	–	–	–	–	–	–
	24-hour	–	–	–	–	–	–
	Annual	–	–	–	–	–	–

Source: Adapted from AMNS 2021, Section 6.2.7, Table 6.2-14, page 6-88 and Appendix C.1, Table 9B, PDF page 45.

 Notes: <sup>(a)</sup> "Combined Effect" equals predicted maximum concentration and background concentration.  $\mu\text{g}/\text{m}^3$  = micrograms per cubic metre; PM<sub>10</sub> = coarse particulate matter; PM<sub>2.5</sub> = fine particulate matter; TSP = total suspended particulate.

**Beaver Dam Mine Project Environmental Impact Assessment  
 Information Request Responses, Round 2**

The predicted modelling results for air parameters (i.e., TSP, PM<sub>10</sub> and PM<sub>2.5</sub>) at sensitive receptors (i.e., human receptors – seasonal and permanent dwellings) are in compliance with the selected air quality criteria. The detailed modelling results are shown in Appendix C.1, Table 8, PDF page 41 and are provided below as Table CEAA 2-31-4.

**Table CEAA 2-31-4: Particulate Modelling Results at Sensitive Receptors – 80% Road Dust Mitigation**

Parameter	Averaging Period	Assessment Criteria (Air Quality Standard) (µg/m <sup>3</sup> )	Maximum Predicted Concentration (µg/m <sup>3</sup> )	Percentage of Assessment Criteria (%)	Background Concentration (µg/m <sup>3</sup> )	Combined Effect <sup>(a)</sup> (µg/m <sup>3</sup> )	Percentage of Assessment Criteria for Combined Effect (%)
<b>R1 – 9 Beaver Dam Mines Road (Marlborough/Goodland Property)</b>							
TSP	24-hour	120	9.1	8%	17.1	26.2	22%
	Annual	70	13.0	19%	12.1	25.1	36%
PM <sub>10</sub>	24-hour	50	4.6	9%	13.1	17.7	35%
PM <sub>2.5</sub>	24-hour	27	0.5	2%	9.0	9.5	35%
	Annual	8.8	0.2	2%	5.7	5.9	66%
<b>R2 – 4112 Highway 224 (Beaver Lake IR 17)</b>							
TSP	24-hour	120	0.6	<1%	17.1	17.7	15%
	Annual	70	0.1	<1%	12.1	12.2	17%
PM <sub>10</sub>	24-hour	50	0.4	<1%	13.1	13.5	27%
PM <sub>2.5</sub>	24-hour	27	0.0	<1%	9.0	9.0	33%
	Annual	8.8	0.0	<1%	5.7	9.0	33%
<b>R3 – 4115 Highway 224 (Cottage on Crown Land)</b>							
TSP	24-hour	120	1.1	<1%	17.1	18.2	15%
	Annual	70	0.4	<1%	12.1	12.5	18%
PM <sub>10</sub>	24-hour	50	0.6	1%	13.1	13.7	27%
PM <sub>2.5</sub>	24-hour	27	0.1	<1%	9.0	9.1	34%
	Annual	8.8	0.0	<1%	5.7	5.7	65%
<b>R4 – 3492 Highway 224 (Hobbs Property)</b>							
TSP	24-hour	120	13.6	11%	17.1	30.7	26%
	Annual	70	20.9	30%	12.1	33.0	47%
PM <sub>10</sub>	24-hour	50	7.1	14%	13.1	20.2	40%
PM <sub>2.5</sub>	24-hour	27	0.8	3%	9.0	9.8	36%
	Annual	8.8	0.8	3%	5.7	5.9	67%
<b>R5 – 3379 Highway 224 (McLeod Property)</b>							
TSP	24-hour	120	2.7	2%	17.1	19.8	16%
	Annual	70	2.7	4%	12.1	14.8	21%
PM <sub>10</sub>	24-hour	50	1.4	3%	13.1	14.5	29%
PM <sub>2.5</sub>	24-hour	27	0.2	<1%	9.0	9.2	34%
	Annual	8.8	0.0	<1%	5.7	5.7	65%

**Beaver Dam Mine Project Environmental Impact Assessment  
 Information Request Responses, Round 2**
**Table CEAA 2-31-4: Particulate Modelling Results at Sensitive Receptors – 80% Road Dust Mitigation (continued)**

Parameter	Averaging Period	Assessment Criteria (Air Quality Standard) ( $\mu\text{g}/\text{m}^3$ )	Maximum Predicted Concentration ( $\mu\text{g}/\text{m}^3$ )	Percentage of Assessment Criteria (%)	Background Concentration ( $\mu\text{g}/\text{m}^3$ )	Combined Effect <sup>(a)</sup> ( $\mu\text{g}/\text{m}^3$ )	Percentage of Assessment Criteria for Combined Effect (%)
<b>R6 – 3373 Highway 224 (Smith Property)</b>							
TSP	24-hour	120	2.3	2%	17.1	19.4	16%
	Annual	70	2.3	3%	12.1	14.4	21%
PM <sub>10</sub>	24-hour	50	1.2	2%	13.1	14.3	29%
PM <sub>2.5</sub>	24-hour	27	0.1	<1%	9.0	9.1	34%
	Annual	8.8	0.0	<1%	5.7	5.7	65%
<b>R7 – Tangier River (Deepwood Estates Property)<sup>(b)</sup></b>							
TSP	24-hour	120	24.3	20%	17.1	41.4	35%
	Annual	70	6.7	10%	12.1	18.8	27%
PM <sub>10</sub>	24-hour	50	12.4	25%	13.1	25.5	51%
PM <sub>2.5</sub>	24-hour	27	1.3	5%	9.0	10.3	38%
	Annual	8.8	0.4	5%	5.7	6.1	69%
<b>R8 – Tangier River (Musquodoboit Lumber Co Ltd. Property/John Dickson Lease)</b>							
TSP	24-hour	120	4.2	4%	17.1	21.3	18%
	Annual	70	1.0	1%	12.1	13.1	19%
PM <sub>10</sub>	24-hour	50	2.4	5%	13.1	15.5	31%
PM <sub>2.5</sub>	24-hour	27	0.3	<1%	9.0	9.3	34%
	Annual	8.8	0.1	<1%	5.7	5.8	66%
<b>R9 – 5579 Mooseland Road (Lloy Property)</b>							
TSP	24-hour	120	11.4	9%	17.1	28.5	24%
	Annual	70	3.0	4%	12.1	15.1	22%
PM <sub>10</sub>	24-hour	50	6.1	12%	13.1	19.2	38%
PM <sub>2.5</sub>	24-hour	27	0.7	2%	9.0	9.7	36%
	Annual	8.8	0.2	2%	5.7	5.9	67%

Source: AMNS 2021, Appendix C.1 (Air Emissions Assessment), Table 8, PDF page 41.

 Notes: <sup>(a)</sup> "Combined Effect" equals predicted maximum concentration and background concentration.

<sup>(b)</sup> The Deepwood Estate property, the most impacted, has been acquired by AMNS so there will be no permanent or seasonal resident at this property.  $\mu\text{g}/\text{m}^3$  = micrograms per cubic metre; PM<sub>10</sub> = coarse particulate matter; PM<sub>2.5</sub> = fine particulate matter; TSP = total suspended particulate;  $\text{g}/\text{m}^2/\text{yr}$  = grams per square metre per year.

 The predicted modelling results for gaseous compounds (i.e., NO<sub>2</sub>, SO<sub>2</sub> and VOC) at sensitive receptors (i.e., human receptors – seasonal and permanent dwellings) are in compliance with the selected air quality criteria. The detailed modelling results are shown in Attachment CEAA-2-31-A, Table A and are provided below as Table CEAA 2-31-5.



**Beaver Dam Mine Project Environmental Impact Assessment  
 Information Request Responses, Round 2**
**Table CEAA 2-31-5: Gaseous Compounds Modelling Results at Sensitive Receptors**

Parameter	Averaging Period	Assessment Criteria (Air Quality Standard) ( $\mu\text{g}/\text{m}^3$ )	Maximum Predicted Concentration ( $\mu\text{g}/\text{m}^3$ )	Percentage of Assessment Criteria (%)	Background Concentration ( $\mu\text{g}/\text{m}^3$ )	Combined Effect <sup>(a)</sup> ( $\mu\text{g}/\text{m}^3$ )	Percentage of Assessment Criteria for Combined Effect (%)
<b>R1 – 9 Beaver Dam Mines Road (Marlborough/Goodland Property)</b>							
NO <sub>2</sub>	1-hour	78.96	6.37	8%	41.40	47.77	60%
	24-hour	200	1.03	1%	17.00	18.03	9%
	Annual	22.56	0.30	1%	3.30	3.60	16%
SO <sub>2</sub>	1-hour	170.3	0.00	<1%	7.90	7.90	5%
	24-hour	300	0.00	<1%	5.20	5.20	2%
	Annual	10.48	0.00	<1%	1.90	1.90	18%
VOCs	1-hour	-	0.27	-	-	-	-
	24-hour	-	0.04	-	-	-	-
	Annual	-	0.01	-	-	-	-
<b>R2 – 4112 Highway 224 (Beaver Lake IR 17)</b>							
NO <sub>2</sub>	1-hour	78.96	6.17	8%	41.40	47.57	60%
	24-hour	200	0.46	0%	17.00	17.46	9%
	Annual	22.56	0.07	0%	3.30	3.37	15%
SO <sub>2</sub>	1-hour	170.3	0.00	<1%	7.90	7.90	5%
	24-hour	300	0.00	<1%	5.20	5.20	2%
	Annual	10.48	0.00	<1%	1.90	1.90	18%
VOCs	1-hour	-	0.26	-	-	-	-
	24-hour	-	0.02	-	-	-	-
	Annual	-	0.00	-	-	-	-
<b>R3 – 4115 Highway 224 (Cottage on Crown Land)</b>							
NO <sub>2</sub>	1-hour	78.96	3.99	5%	41.40	45.39	57%
	24-hour	200	0.41	0%	17.00	17.41	9%
	Annual	22.56	0.10	0%	3.30	3.40	15%
SO <sub>2</sub>	1-hour	170.3	0.00	<1%	7.90	7.90	5%
	24-hour	300	0.00	<1%	5.20	5.20	2%
	Annual	10.48	0.00	<1%	1.90	1.90	18%
VOCs	1-hour	-	0.17	-	-	-	-
	24-hour	-	0.02	-	-	-	-
	Annual	-	0.00	-	-	-	-
<b>R4 – 3492 Highway 224 (Hobbs Property)</b>							
NO <sub>2</sub>	1-hour	78.96	11.93	15%	41.40	53.33	68%
	24-hour	200	2.74	1%	17.00	19.74	10%
	Annual	22.56	0.84	4%	3.30	4.14	18%

**Beaver Dam Mine Project Environmental Impact Assessment  
 Information Request Responses, Round 2**
**Table CEAA 2-31-5: Gaseous Compounds Modelling Results at Sensitive Receptors (continued)**

Parameter	Averaging Period	Assessment Criteria (Air Quality Standard) ( $\mu\text{g}/\text{m}^3$ )	Maximum Predicted Concentration ( $\mu\text{g}/\text{m}^3$ )	Percentage of Assessment Criteria (%)	Background Concentration ( $\mu\text{g}/\text{m}^3$ )	Combined Effect <sup>(a)</sup> ( $\mu\text{g}/\text{m}^3$ )	Percentage of Assessment Criteria for Combined Effect (%)
SO <sub>2</sub>	1-hour	170.3	0.00	<1%	7.90	7.90	5%
	24-hour	300	0.00	<1%	5.20	5.20	2%
	Annual	10.48	0.00	<1%	1.90	1.90	18%
VOCs	1-hour	-	0.50	-	-	-	-
	24-hour	-	0.11	-	-	-	-
	Annual	-	0.03	-	-	-	-
<b>R5 – 3379 Highway 224 (McLeod Property)</b>							
NO <sub>2</sub>	1-hour	78.96	6.31	8%	41.40	47.71	60%
	24-hour	200	0.69	0%	17.00	17.69	9%
	Annual	22.56	0.18	1%	3.30	3.48	15%
SO <sub>2</sub>	1-hour	170.3	0.00	<1%	7.90	7.90	5%
	24-hour	300	0.00	<1%	5.20	5.20	2%
	Annual	10.48	0.00	<1%	1.90	1.90	18%
VOCs	1-hour	-	0.26	-	-	-	-
	24-hour	-	0.03	-	-	-	-
	Annual	-	0.01	-	-	-	-
<b>R6 – 3373 Highway 224 (Smith Property)</b>							
NO <sub>2</sub>	1-hour	78.96	6.27	8%	41.40	47.67	60%
	24-hour	200	0.63	0%	17.00	17.63	9%
	Annual	22.56	0.16	1%	3.30	3.46	15%
SO <sub>2</sub>	1-hour	170.3	0.00	<1%	7.90	7.90	5%
	24-hour	300	0.00	<1%	5.20	5.20	2%
	Annual	10.48	0.00	<1%	1.90	1.90	18%
VOCs	1-hour	-	0.26	-	-	-	-
	24-hour	-	0.03	-	-	-	-
	Annual	-	0.01	-	-	-	-
<b>R7 – Tangier River (Deepwood Estates Property)<sup>(b)</sup></b>							
NO <sub>2</sub>	1-hour	78.96	13.29	17%	41.40	54.69	69%
	24-hour	200	4.43	2%	17.00	21.43	11%
	Annual	22.56	1.37	6%	3.30	4.67	21%
SO <sub>2</sub>	1-hour	170.3	0.00	<1%	7.90	7.90	5%
	24-hour	300	0.00	<1%	5.20	5.20	2%
	Annual	10.48	0.00	<1%	1.90	1.90	18%

**Beaver Dam Mine Project Environmental Impact Assessment  
 Information Request Responses, Round 2**
**Table CEAA 2-31-5: Gaseous Compounds Modelling Results at Sensitive Receptors (continued)**

Parameter	Averaging Period	Assessment Criteria (Air Quality Standard) ( $\mu\text{g}/\text{m}^3$ )	Maximum Predicted Concentration ( $\mu\text{g}/\text{m}^3$ )	Percentage of Assessment Criteria (%)	Background Concentration ( $\mu\text{g}/\text{m}^3$ )	Combined Effect <sup>(a)</sup> ( $\mu\text{g}/\text{m}^3$ )	Percentage of Assessment Criteria for Combined Effect (%)
VOCs	1-hour	-	0.55	-	-	-	-
	24-hour	-	0.18	-	-	-	-
	Annual	-	0.06	-	-	-	-
<b>R8 – Tangier River (Musquodoboit Lumber Co Ltd. Property/John Dickson Lease)</b>							
NO <sub>2</sub>	1-hour	78.96	8.00	10%	41.40	49.40	63%
	24-hour	200	1.17	1%	17.00	18.17	9%
	Annual	22.56	0.30	1%	3.30	3.60	16%
SO <sub>2</sub>	1-hour	170.3	0.00	<1%	7.90	7.90	5%
	24-hour	300	0.00	<1%	5.20	5.20	2%
	Annual	10.48	0.00	<1%	1.90	1.90	18%
VOCs	1-hour	-	0.33	-	-	-	-
	24-hour	-	0.05	-	-	-	-
	Annual	-	0.01	-	-	-	-
<b>R9 – 5579 Mooseland Road (Lloy Property)</b>							
NO <sub>2</sub>	1-hour	78.96	9.16	12%	41.40	50.56	64%
	24-hour	200	2.93	1%	17.00	19.93	10%
	Annual	22.56	0.87	4%	3.30	4.17	18%
SO <sub>2</sub>	1-hour	170.3	0.00	<1%	7.90	7.90	5%
	24-hour	300	0.00	<1%	5.20	5.20	2%
	Annual	10.48	0.00	<1%	1.90	1.90	18%
VOCs	1-hour	-	0.38	-	-	-	-
	24-hour	-	0.12	-	-	-	-
	Annual	-	0.03	-	-	-	-

Source: AMNS 2021, Attachment CEAA-2-31-A (Gaseous Compounds Impacts at Residential Receptors Technical Memo), Table A.

 Notes: <sup>(a)</sup> "Combined Effect" equals predicted maximum concentration and background concentration.

<sup>(b)</sup> The Deepwood Estate property, the most impacted, has been acquired by AMNS so there will be no permanent or seasonal resident at this property.

 $\mu\text{g}/\text{m}^3$  = micrograms per cubic metre;  $\text{PM}_{10}$  = coarse particulate matter;  $\text{PM}_{2.5}$  = fine particulate matter; TSP = total suspended particulate;  $\text{g}/\text{m}^2/\text{yr}$  = grams per square metre per year.

The following figures illustrate the isopleths for the maximum predicted concentrations for air parameters (i.e., TSP,  $\text{PM}_{10}$ ,  $\text{PM}_{2.5}$ , NO<sub>2</sub>, SO<sub>2</sub> and VOCs) at the property boundaries of the PA (i.e., Beaver Dam Mine Site, Haul Road and Touquoy Mine Site) and at sensitive receptors locations (i.e., human receptors – seasonal and permanent dwellings) that are summarized in Tables CEAA 2-31-1 to CEAA 2-31-5. These figure series are as follows:

- Figure series CEAA 2-31-1A to CEAA 2-31-1G – Beaver Dam Mine Project Air Contour Total Suspended Particulate Matter 24-Hour Levels

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**Beaver Dam Mine Project Environmental Impact Assessment  
Information Request Responses, Round 2**

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- Figure series CEAA 2-31-2A to CEAA 2-31-2G – Beaver Dam Mine Project Air Contour Annual Total Suspended Particulate Matter
- Figure series CEAA 2-31-3A to CEAA 2-31-3G – Beaver Dam Mine Project Air Contour PM<sub>10</sub> 24-Hour Levels
- Figure series CEAA 2-31-4A to CEAA 2-31-4G – Beaver Dam Mine Project Air Contour PM<sub>2.5</sub> 24-Hour Levels
- Figure series CEAA 2-31-5A to CEAA 2-31-5G – Beaver Dam Mine Project Air Contour PM<sub>2.5</sub> Annual Levels
- Figure series CEAA 2-31-6A to CEAA 2-31-6G – Beaver Dam Mine Project Air Contours NO<sub>2</sub> 1-Hour Levels
- Figure series CEAA 2-31-7A to CEAA 2-31-7G – Beaver Dam Mine Project Air Contours NO<sub>2</sub> 24-Hour Levels
- Figure series CEAA 2-31-8A to CEAA 2-31-8G – Beaver Dam Mine Project Air Contours NO<sub>2</sub> Averaged Annual Levels
- Figure series CEAA 2-31-9A to CEAA 2-31-9G – Beaver Dam Mine Project Air Contours SO<sub>2</sub> 1-Hour Levels
- Figure series CEAA 2-31-10A to CEAA 2-31-10G – Beaver Dam Mine Project Air Contours SO<sub>2</sub> 24-Hour Levels
- Figure series CEAA 2-31-11A to CEAA 2-31-11G – Beaver Dam Mine Project Air Contours SO<sub>2</sub> Averaged Annual Levels
- Figure series CEAA 2-31-12A to CEAA 2-31-12G – Beaver Dam Mine Project Air Contours VOC 1-Hour Levels
- Figure series CEAA 2-31-13A to CEAA 2-31-13G – Beaver Dam Mine Project Air Contours VOC 24-Hour Levels
- Figure series CEAA 2-31-14A to CEAA 2-31-14G – Beaver Dam Mine Project Air Contours VOC Averaged Annual Levels

As per discussions with IAAC on October 18, 2021, the Health Canada request of providing modeling results without mitigation will be provided as an attachment to this IR (CEAA-2-31) at a later date.

**Noise**

The modelled maximum (worst-case) predicted noise levels during operations at the property boundaries of the PA (i.e., Beaver Dam Mine Site, Haul Road and Touquoy Mine Site) are provided in the Updated 2021 EIS [AMNS 2021] in Section 6.1.7.3.2, Table 6.1-10, page 6-26 and Appendix B.2, Section 3.2, Table 3.3, PDF page 13 and included below as Table CEAA 2-31-6 in response to this IR2 (CEAA 2-31). The maximum (worst-case) predicted noise level at the property boundaries are in compliance with sound level limits (Table CEAA 2-31-6). The noise level guideline includes the following criteria: daytime (7:00 AM to 7:00 PM), evening (7:00 PM to 11:00 PM), and nighttime (11:00 PM to 7:00 AM). As described in Section 3.2, PDF page 13 in Appendix B2 of the Updated 2021 EIS (AMNS 2021), Option A and Option B that are presented in Table CEAA 2-31-6 are reflective of the height of the safety berm that is required along the north boundary of the pit.

**Beaver Dam Mine Project Environmental Impact Assessment  
 Information Request Responses, Round 2**
**Table CEAA 2-31-6: Maximum (Worst-case) Predicted Noise Levels at Property Boundaries during Operations**

Property Line Description	Maximum Noise Level (dBA) (Day/Evening/Night)	Sound Level Limit (dBA) (Day/Evening/Night)	Compliance
Beaver Dam Mine Site Property, Option A <sup>(b)</sup>	55 / 55 / 55	65 / 60 / 55	Yes
Beaver Dam Mine Site Property, Option B <sup>(b)</sup>	55 / 55 / 55	65 / 60 / 55	Yes
Haul Road <sup>(a)</sup> (30 m from centerline of road)	58 / 58 / -	65 / 60 / 55	Yes
Touquoy Mine Site Property <sup>(b)</sup>	55 / 55 / 54	65 / 60 / 55	Yes

Source: AMNS 2021, Section 6.1.7.3.2, Table 6.1-10, page 6-26 and in Appendix B.2, Table 3.3, PDF page 13.

Notes: <sup>(a)</sup> Truck traffic used in the noise assessment and related modelling is considered to be a 16-hour shift between 7:00 AM to 11:00 PM (Guidelines for Environmental Noise Measurement and Assessment [NSEL 1990]).

<sup>(b)</sup> Nova Scotia Environment Pit and Quarry Guidelines (NSEL 1999) and Guidelines for Environmental Noise Measurement and Assessment. (NSEL 1990).  
 dBA = decibels; m = metre.

The predicted modelling results for noise levels at the sensitive receptors during operations (i.e., human receptors – seasonal and permanent dwellings) are in compliance with noise level limits. The detailed modelling results are provided in the Updated 2021 EIS [AMNS 2021] in Section 6.1.7.2, Table 6.1-9, page 6-25 and Appendix B.2, Table 3.5, PDF page 14 and are included below as Table CEAA 2-31-7.

**Table CEAA 2-31-7: Predicted Noise Level at the Sensitive Receptors during Operations**

Sensitive Receptor	Receptor Description	Noise Level (dBA) (Day/Evening/Night)	Sound Level Limit <sup>(a)</sup> (dBA) (Day/Evening/Night)	Compliance
R1	9 Beaver Dam Mine Road (Marlborough Property)	50 / 50 / 27	65 / 60 / 55	Yes
R2	4112 Highway 224 (Beaver Lake IR 17)	31 / 31 / 28	65 / 60 / 55	Yes
R3	4115 Highway 224 (Cottage on Crown Land)	33 / 33 / 28	65 / 60 / 55	Yes
R4	3492 Highway 224 (Hobbs Property)	56 / 56 / 27	65 / 60 / 55	Yes
R5	3379 Highway 224 (McLeod Property)	51 / 51 / 27	65 / 60 / 55	Yes
R6	3373 Highway 224 (Smith Property)	51 / 51 / 27	65 / 60 / 55	Yes
R7	Tangier River (Deepwood Estates Property)	55 / 55 / 20	65 / 60 / 55	Yes
R8	Tanger River (Musquodoboit Lumber Co. Ltd. Property/John Dickson Lease)	44 / 44 / 20	65 / 60 / 55	Yes
R9	5579 Mooseland Road (Lloy Property)	51 / 51 / 26	65 / 60 / 55	Yes

Source: AMNS 2021, Section 6.1.7.2, Table 6.1-9, page 6-25 and Appendix B.2, Table 3.5, PDF page 14.

Notes: (a) NSEL 1990.

dBA = decibels; m = metre.

Noise level predictions at the property boundaries of the PA (i.e., Beaver Dam Mine Site, Haul Road and Touquoy Mine Site) and at sensitive receptors locations (i.e., human receptors – seasonal and permanent dwellings) that are presented in Tables CEAA 2-31-6 and CEAA 2-31-7 are illustrated on Figure series CEAA 2-31-15A to CEAA 2-31-15E (Daytime-Evening) and Figure CEAA 2-31-16 (Nighttime).

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**Beaver Dam Mine Project Environmental Impact Assessment  
Information Request Responses, Round 2**

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As per discussions with IAAC on October 18, 2021, the Health Canada request of providing modeling results without mitigation will be provided as an attachment to this IR (CEAA-2-31) at a later date (i.e., prior to the end of 2021).

**Traditional Land and Resource Use**

The traditional land and resource use areas were shared with AMNS by the Millbrook First Nation under confidential cover. The figures, predicted air parameters concentrations (i.e., TSP, PM<sub>10</sub>, PM<sub>2.5</sub>, NO<sub>2</sub>, SO<sub>2</sub> and VOC) and the predicted noise levels during operations, that were created to include the traditional land and resource use areas have only been shared directly with Millbrook First Nation on May 31, 2021 (original IR2 response). On October 15, 2021, the update figures included in this IR2 response (CEAA 2-31) were shared with Millbrook First Nation, note the update figures provided on October 15, 2021 did not include the traditional land and resource use areas and will be provided at a later date. Given the confidential nature of the data (i.e., traditional land and resource use areas), Millbrook First Nation should be contacted directly to request a review of these figures.

It should be noted that the property boundary conditions along the haul road were applied to serve as a proxy to represent areas of traditional land and resource use (recreational practice areas) outside of the PA. As mentioned, inside the property boundaries, access will be limited along the haul road and restricted within the Beaver Dam Mine property boundary. There is no fixed sensitive receptor (i.e., human receptors – seasonal and permanent dwellings) location within the proposed Beaver Dam Mine site, therefore the property boundary serve as a proxy to represent areas of traditional land and resource use (recreational practice areas). Compliance is met at the property boundaries for all air and noise parameters, as shown in the tables and maps referenced above, and thus, by proxy, also met at all traditional land and resource use areas outside of the PA.

**2. CEAA 2-31 Part B**

Updates to the noise and air assessments are provided in Section 6.1, page 6-1 and Section 6.2, page 6-32 and Appendix B.1 (Beaver Dam Mine Construction Noise Assessment – memo), Appendix B.2 (Updated Noise Impact Assessment Technical Report) and Appendix C.1 (Air Emissions Assessment Technical Report) of the Updated 2021 EIS (AMNS 2021, under the Beaver Dam Mine 2021 EIS Appendices Portfolio PDF file). The updated Human Health Risk Assessment is provided in the technical report “Evaluation of Potential Human Exposures and Risks related to Emissions from the Beaver Dam Mine Project (Dust deposition; Recreational water usage; and country foods) included as Appendix C.2 of the Updated 2021 EIS. It should be noted that specific updates to the noise and air assessments in the Updated 2021 EIS have been highlighted in yellow and the Appendices B.1, B.2, C.1 and C.2 have been updated and replaced the versions from the Revised 2019 EIS.

**3. CEAA 2-31 Part C**

Predicted noise levels at the property boundaries (i.e., Beaver Dam Mine Site, Haul Road and Touquoy Mine Site) are within the sound level limits specified in the NSEL Pit and Quarry Guidelines (NSEL 1999) provided that the recommended mitigation measures (e.g., safety berm/road around the open pit) are applied to attenuate noise levels (Section 6.1.7.3.2, page 6-25 and Appendix B.2, Section 3.2, PDF page 13 in the Updated 2021 EIS [AMNS 2021]). The adjusted Project design has been updated in consideration of the Pit and Quarry Guidelines at the property boundaries.

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**Beaver Dam Mine Project Environmental Impact Assessment  
Information Request Responses, Round 2**

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**4. CEAA 2-31 Part D**

Mitigation measures include the provision of a safety berm/road to mitigate noise (Section 6.1.7.3.2, page 6-25, Section 6.1.8, Table 6.1-11, page 6-28 and Appendix B.2, Section 3.2, PDF page 13 and Section 4, PDF page 15 in the Updated 2021 EIS [AMNS 2021]) and predicted noise levels with updated Project design meet compliance at the property boundaries.

**5. CEAA 2-31 Part E**

Noise monitoring would be completed during each blasting event, as required by the NSEL Pit and Quarry Guidelines (NSEL 1999). Blast monitoring generally involves noise and vibration monitoring during each blasting event and includes monitoring at the nearest residence to the Beaver Dam Mine Site, which in this case would be at Beaver Lake IR 17 (R2). Monitoring and mitigations explicit to blasting will be described in the Explosive Management Plan that will be submitted as part of the permitting process (Section 6.1.8, page 6-28 of the Updated 2021 EIS [AMNS 2021]).

Under the existing Industrial Approval for the Touquoy Mine, maximum sound levels are prescribed at property boundaries for days, evenings and weekends, and monitoring is only required when requested by NSE in response to a complaint or concern. Mitigation measures will be implemented as necessary where sound levels are a concern, i.e., causing annoyance, and monitoring demonstrates exceedances. Mitigation of noise excesses at the property lines are not considered to be critical, as predicted noise levels at the worst-case points of reception are within the applicable noise limits. To date, no noise complaints have been received or are anticipated. A complaint from the public and/or a First Nation community member would be a trigger for consideration of mitigation, as described below (Section 6.1.8, page 6-28 of the Updated 2021 EIS [AMNS 2021]).

Noise monitoring will be completed as directed by regulators or as a result of a complaint or engagement. A draft Engagement Plan (Appendix A.6 of the Updated 2021 EIS [AMNS 2021]) will be implemented and based on feedback, additional mitigations will be considered (Section 6.1.8, page 6-28 of the Updated 2021 EIS [AMNS 2021]).

The existing community complaints process existing for the Touquoy Mine will be expanded to include the Beaver Dam Project. Complaints regarding noise will be documented and investigated immediately. AMNS will work with the local communities to understand specific concerns to determine if additional mitigation measures, adaptive management, will be necessary. This process will evolve through regulatory permitting, as well as public and Mi'kmaq of Nova Scotia engagement (Section 6.1.8, page 6-28 of the Updated 2021 EIS [AMNS 2021]).

Additional details regarding the complaint registry for the Beaver Dam Mine Project are included in IR2 response to CEAA 2-32.

**6. CEAA 2-31 Part F**

The modelled maximum predicted concentrations for air parameters (i.e., TSP, PM<sub>10</sub>, PM<sub>2.5</sub>, NO<sub>2</sub>, SO<sub>2</sub> and VOCs) at the property boundaries are detailed in Appendix C.1 (Air Emissions Assessment Technical Report), with the modelling results outlined in Table 7A (Road Results Particulate), PDF page 38, Table 7B (NO<sub>2</sub>, SO<sub>2</sub>, and VOC), PDF page 39, and Table 9B (Beaver Dam Mine Site and Touquoy Mine Site), PDF page 45. The maximum predicted concentrations are summarized in the Updated 2021 EIS Section 6.2.7, Table 6.2-8, page 6-85, Table 6.2-11, page 6-87 and Table 6.2-14, page 6-88 (AMNS 2021).

The summarized maximum predicted concentrations tables presented in the Updated 2021 EIS Air effects assessment (Section 6.2, page 6-32) discussed above are included below in response to this IR2 (CEAA 2-31) as (Tables CEAA 2-31-1 to

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**Beaver Dam Mine Project Environmental Impact Assessment  
Information Request Responses, Round 2**

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CEAA 2-31-3. These three tables demonstrate compliance at the property boundaries of the PA (i.e., Beaver Dam Mine Site, Haul Road and Touquoy Mine Site) (Tables CEAA 2-31-1 to CEAA 2-31-3). To support the response to this IR2 (CEAA 2-31) gaseous species (i.e., NO<sub>2</sub>, SO<sub>2</sub> and VOCs) have been added to Tables CEAA 2-31-1 to CEAA 2-31-3 and CEAA 2-31-5.

Deposition was modelled and the results are included in Appendix C.1, Table 7A, PDF page 38, Table 7B, PDF page 39 and Table 8, PDF page 41 and were used in the Human Health Risk Assessment (AMNS 2021).

Site access will be restricted on the proposed Beaver Dam Mine site through a combination of signage, fencing, and security patrolling. The Haul Road will be restricted by have a bypass road for light truck and recreation vehicles, signage, security patrolling and public and Indigenous engagement to communicate the risk of ingesting country foods within 30 m from the centerline of the Haul Road.

7. CEAA 2-31 Part G

Updates to health risks from air pollutants using the revised exposure levels at the maximum point of impingement (MPOI) are provided in Appendix C.2 Evaluation of Potential Human Exposures and Risk Related to Emissions from the Beaver Dam Mine Project (Dust Deposition; Recreational Water Usage; Country Foods) in the Updated 2021 EIS (AMNS 2021).

8. CEAA 2-31 Part H

Air and noise isopleths at the Regional Assessment Area (RAA) are illustrated on Figures CEAA 2-31-17 to CEAA 2-31-24. Due to the scale required to include the air and noise isopleths at the RAA level detailed contours are difficult to interpret. For detailed maps please refer to Figures CEAA 2-31-1A to CEAA 2-31-1G through Figures CEAA 2-31-15A to CEAA 2-31-15E and Figure CEAA 2-31-16.

It should be noted that the property boundary conditions serve as a proxy for traditional and recreational practice areas outside of the PA. Compliance is met at the property boundaries for all air and noise parameters, as shown in the tables and maps referenced in CEAA 2-31 Part A, and thus, by proxy, also met at all traditional land and resource use areas outside of the PA.

As per discussions with IAAC on October 18, 2021, the Health Canada request of providing air and noise isopleths without mitigation will be provided as an attachment to this IR (CEAA-2-31) at a later date (i.e., prior to the end of 2021).

## References

AMNS (Atlantic Mining NS Inc.). 2021. Updated Environmental Impact Statement. Beaver Dam Mine Project. Submitted to the Impact Assessment Agency of Canada and Nova Scotia Environment. October 2021. Middle Musquodoboit, NS.

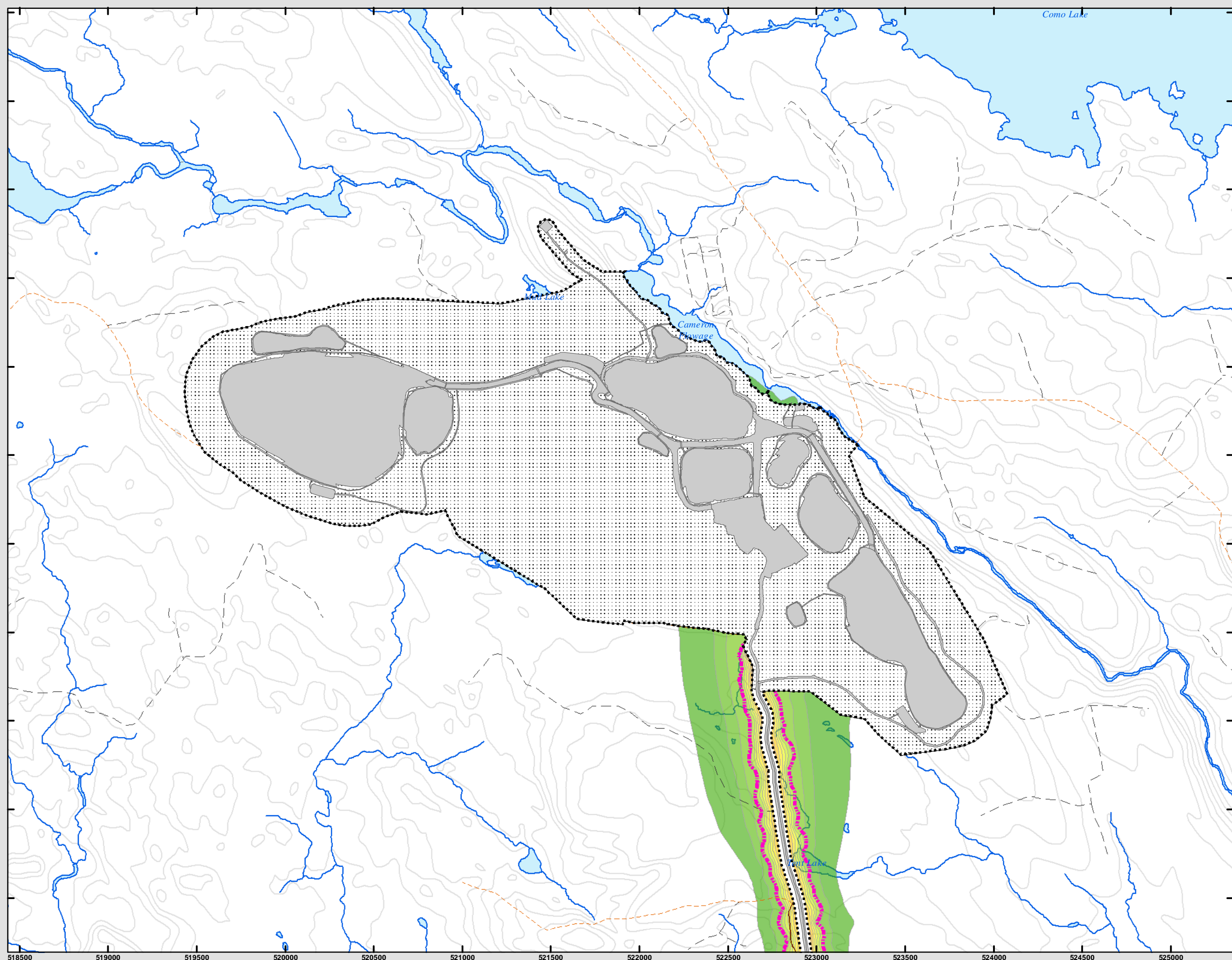
NSEL (Nova Scotia Environment and Labour). 1990. Guidelines for Environmental Noise Measurement and Assessment. <http://www.noise-ordinances.com/wpcontent/uploads/2015/09/EnvironmentalNoiseMeasurement.pdf>, accessed September 2017.

NSEL. 1999. Pit and Quarry Guidelines. [https://novascotia.ca/nse/issues/docs/Pit\\_and\\_Quarry\\_Guidelines.pdf](https://novascotia.ca/nse/issues/docs/Pit_and_Quarry_Guidelines.pdf), accessed November 2017.



**FIGURE CEAA 2-31-1A**

**Beaver Dam Mine Project  
 Air Contour Total  
 Suspended Particulate  
 Matter 24-Hour Levels**

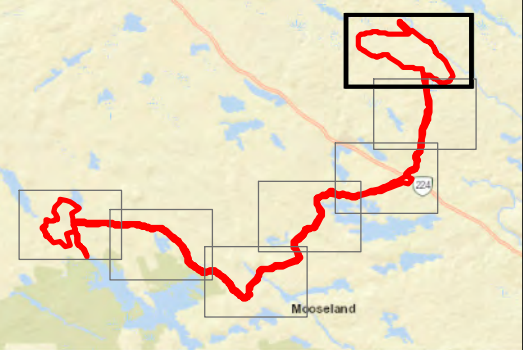


- 17.1 ug/m<sup>3</sup> TSP 24 hr Background Level Concentration
- Proposed Property Boundary
- Mine Site concentrations reach background within boundary
- Local Road
- Dry Weather / Seasonal Road
- Track
- NSTDB Mapped Watercourses
- Lakes
- Planned Infrastructure

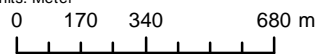
**TSP Ranges (ug/m<sup>3</sup>)**

- 5
- 5 - 10
- 10 - 15
- 15 - 17.1
- 17.1 - 20
- 20 - 25
- 25 - 30
- 30 - 35
- 35 - 40
- 40 - 45
- 45 - 50
- 50 - 55
- 55 - 60
- 60 - 65

Note: Based on 80% Road Dust Mitigation  
 Ambient air quality criteria: Averaging period 24 hr - TSP limit: 120 ug/m<sup>3</sup>



Coordinate System: NAD 1983 CSRS UTM Zone 20N  
 Projection: Transverse Mercator  
 Datum: North American 1983 CSRS  
 Units: Meter



1:20,000 Scale when printed @ 11" x 17"

Drawn By: EP Date: 2021-09-21  
 Reviewed By: LP

Service Layer Credits: Sources: Esri, HERE, Gamin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community



**McCallum Environmental Ltd.**

Prepared For:



**Atlantic Gold**

**FIGURE CEA 2-31-1B**

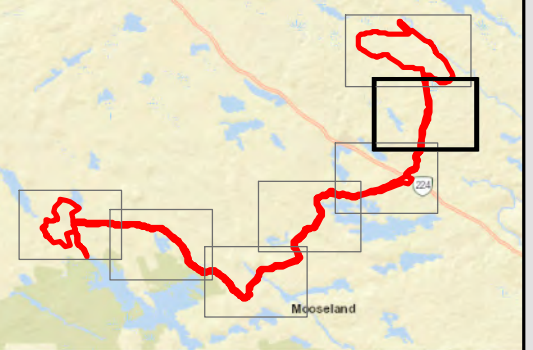
**Beaver Dam Mine Project  
Air Contour Total  
Suspended Particulate  
Matter 24-Hour Levels**

- 17.1 ug/m3 TSP 24 hr Background Level Concentration
- Proposed Property Boundary
- Mine Site concentrations reach background within boundary
- Local Road
- Dry Weather / Seasonal Road
- Track
- NSTDB Mapped Watercourses
- Lakes
- Planned Infrastructure

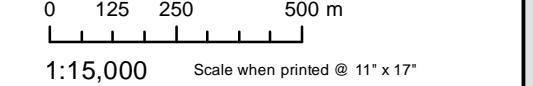
**TSP Ranges (ug/m3)**

- 5
- 5 - 10
- 10 - 15
- 15 - 17.1
- 17.1 - 20
- 20 - 25
- 25 - 30
- 30 - 35
- 35 - 40
- 40 - 45
- 45 - 50
- 50 - 55
- 55 - 60
- 60 - 65

Note: Based on 80% Road Dust Mitigation  
Ambient air quality criteria: Averaging period 24 hr - TSP limit: 120 ug/m3



Coordinate System: NAD 1983 CSRS UTM Zone 20N  
Projection: Transverse Mercator  
Datum: North American 1983 CSRS  
Units: Meter

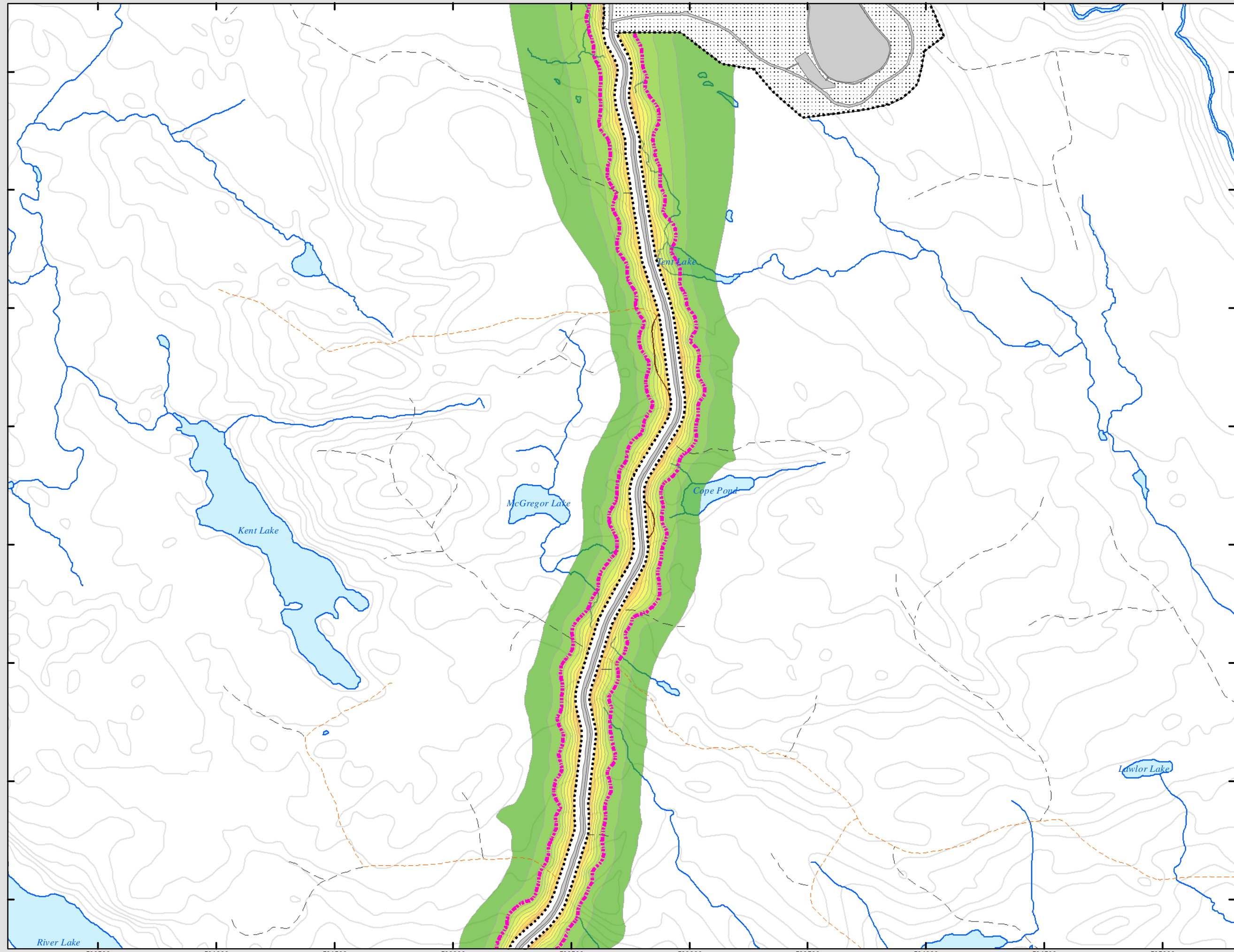


Drawn By: EP  
Reviewed By: LP  
Date: 2021-09-21

Service Layer Credits: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community



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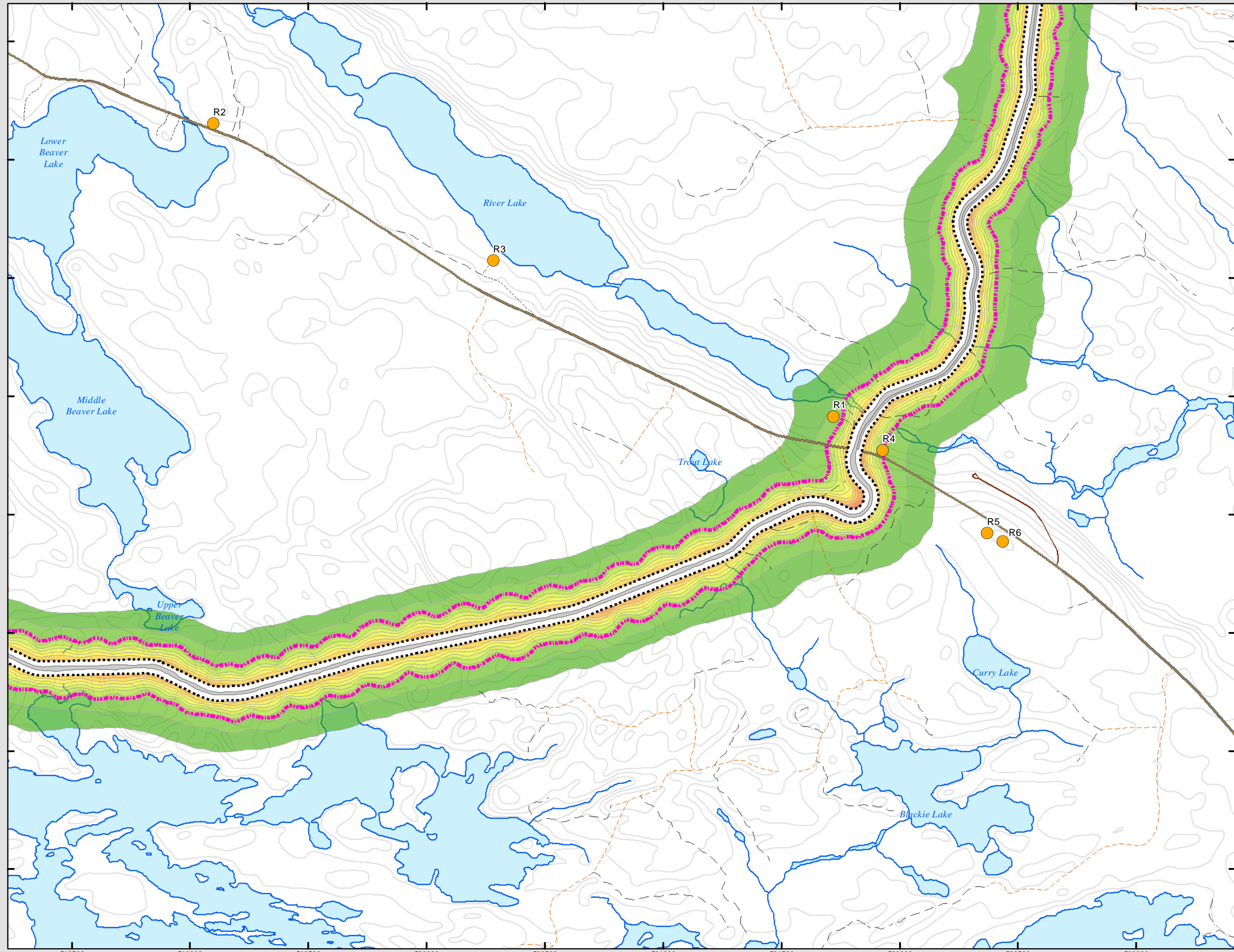
Prepared For:



**Atlantic Gold**

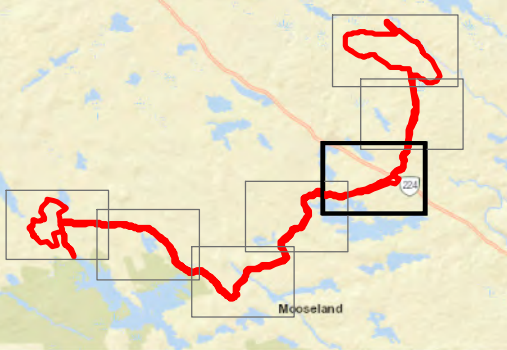
**FIGURE CEA 2-31-1C**

**Beaver Dam Mine Project  
Air Contour Total  
Suspended Particulate  
Matter 24-Hour Levels**

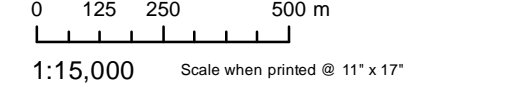


- Receptor
- 17.1 ug/m<sup>3</sup> TSP 24 hr Background Level Concentration
- Proposed Property Boundary
- 5
- 5 - 10
- 10 - 15
- 15 - 17.1
- 17.1 - 20
- 20 - 25
- 25 - 30
- 30 - 35
- 35 - 40
- 40 - 45
- 45 - 50
- 50 - 55
- 55 - 60
- Collector Road
- Local Road
- Dry Weather / Seasonal Road
- Diveways (>300 m)
- Track
- NSTDB Mapped Watercourses
- Lakes
- Planned Infrastructure

Note: Based on 80% Road Dust Mitigation  
Ambient air quality criteria: Averaging period 24 hr - TSP limit: 120 ug/m<sup>3</sup>



Coordinate System: NAD 1983 CSRS UTM Zone 20N  
Projection: Transverse Mercator  
Datum: North American 1983 CSRS  
Units: Meter



Drawn By: EP  
Reviewed By: LP  
Date: 2021-09-21

Service Layer Credits: Sources: Esri, HERE, Gamin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community



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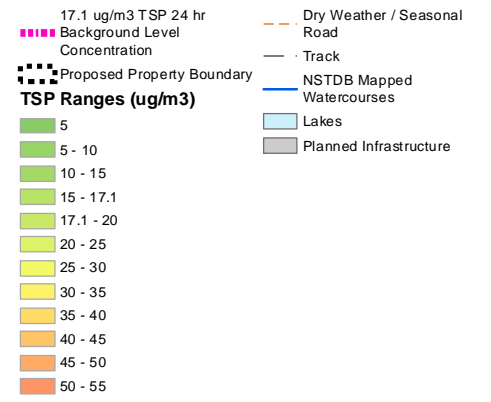
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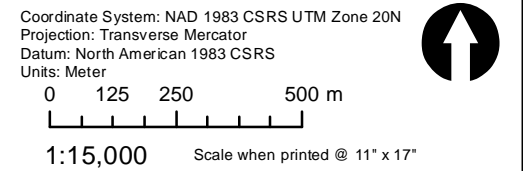
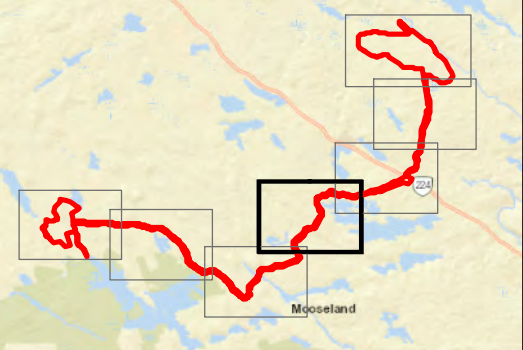
**Atlantic Gold**

**FIGURE CEEA 2-31-1D**

**Beaver Dam Mine Project  
Air Contour Total  
Suspended Particulate  
Matter 24-Hour Levels**



Note: Based on 80% Road Dust Mitigation  
Ambient air quality criteria: Averaging period 24 hr - TSP limit: 120 ug/m<sup>3</sup>

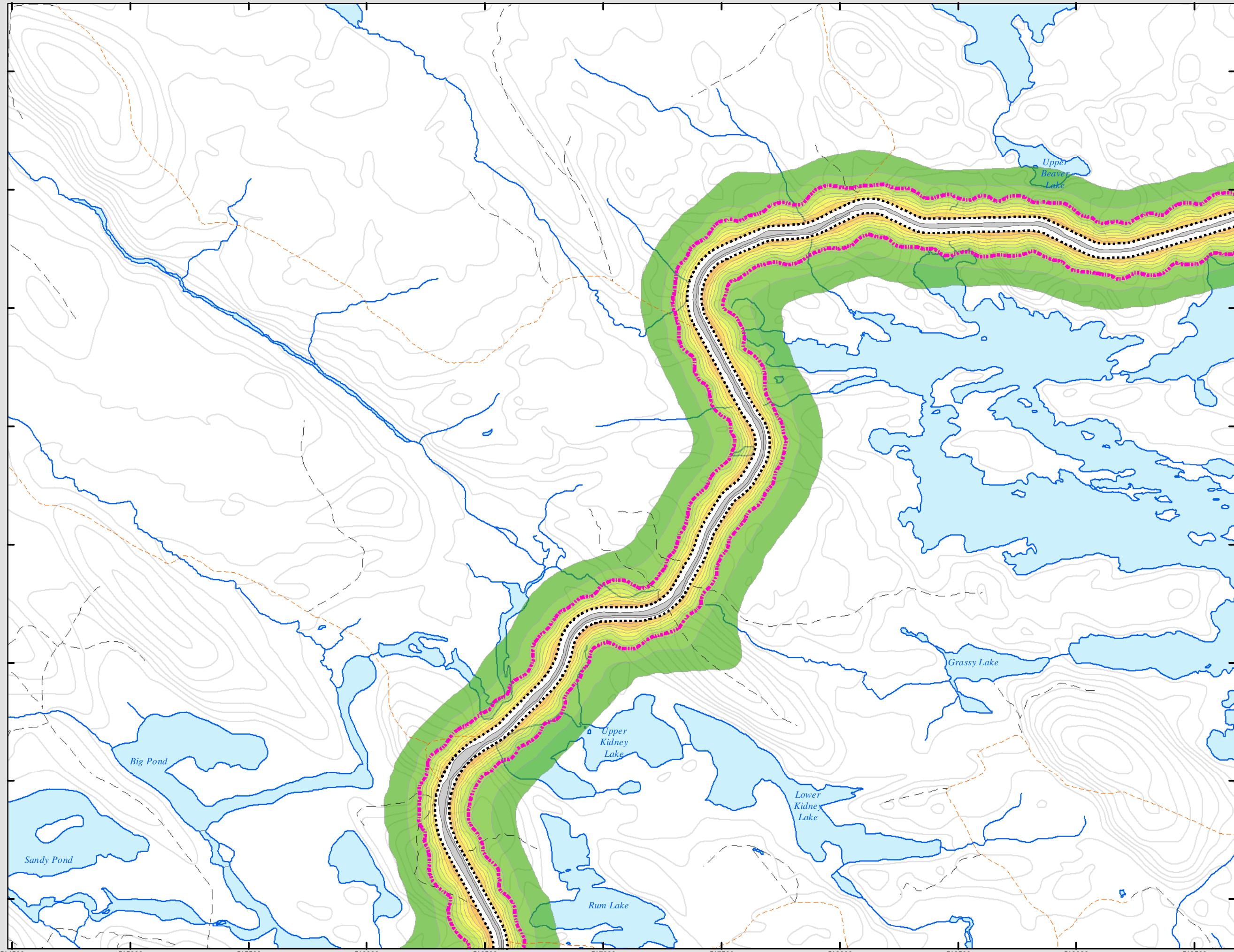


Drawn By: EP Date: 2021-09-21  
Reviewed By: LP

Service Layer Credits: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community



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FIGURE CEA 2-31-1E

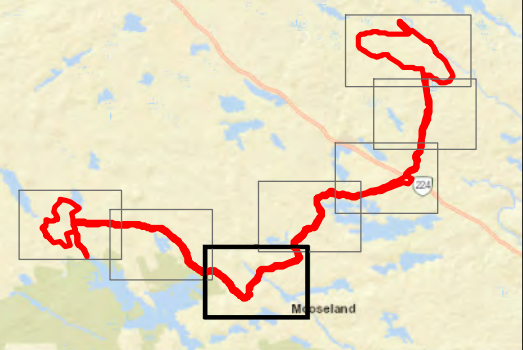
### Beaver Dam Mine Project Air Contour Total Suspended Particulate Matter 24-Hour Levels

● Receptor  
■ 17.1 ug/m<sup>3</sup> TSP 24 hr Concentration  
■ Background Level  
 Proposed Property Boundary  
 Mooseland\_Road 30m Buffer  
— Local Road  
- - - Dry Weather / Seasonal Road  
- - - Diveways (>300 m)  
- - - Track  
— NSTDB Mapped Watercourses  
■ Lakes  
■ Planned Infrastructure

**TSP Ranges (ug/m<sup>3</sup>)**

- 5
- 5 - 10
- 10 - 15
- 15 - 17.1
- 17.1 - 20
- 20 - 25
- 25 - 30
- 30 - 35
- 35 - 40
- 40 - 45
- 45 - 50
- 50 - 55
- 55 - 60

Note: Based on 80% Road Dust Mitigation  
 Ambient air quality criteria: Averaging period 24 hr - TSP limit: 120 ug/m<sup>3</sup>



Coordinate System: NAD 1983 CSRS UTM Zone 20N  
 Projection: Transverse Mercator  
 Datum: North American 1983 CSRS  
 Units: Meter

0 125 250 500 m

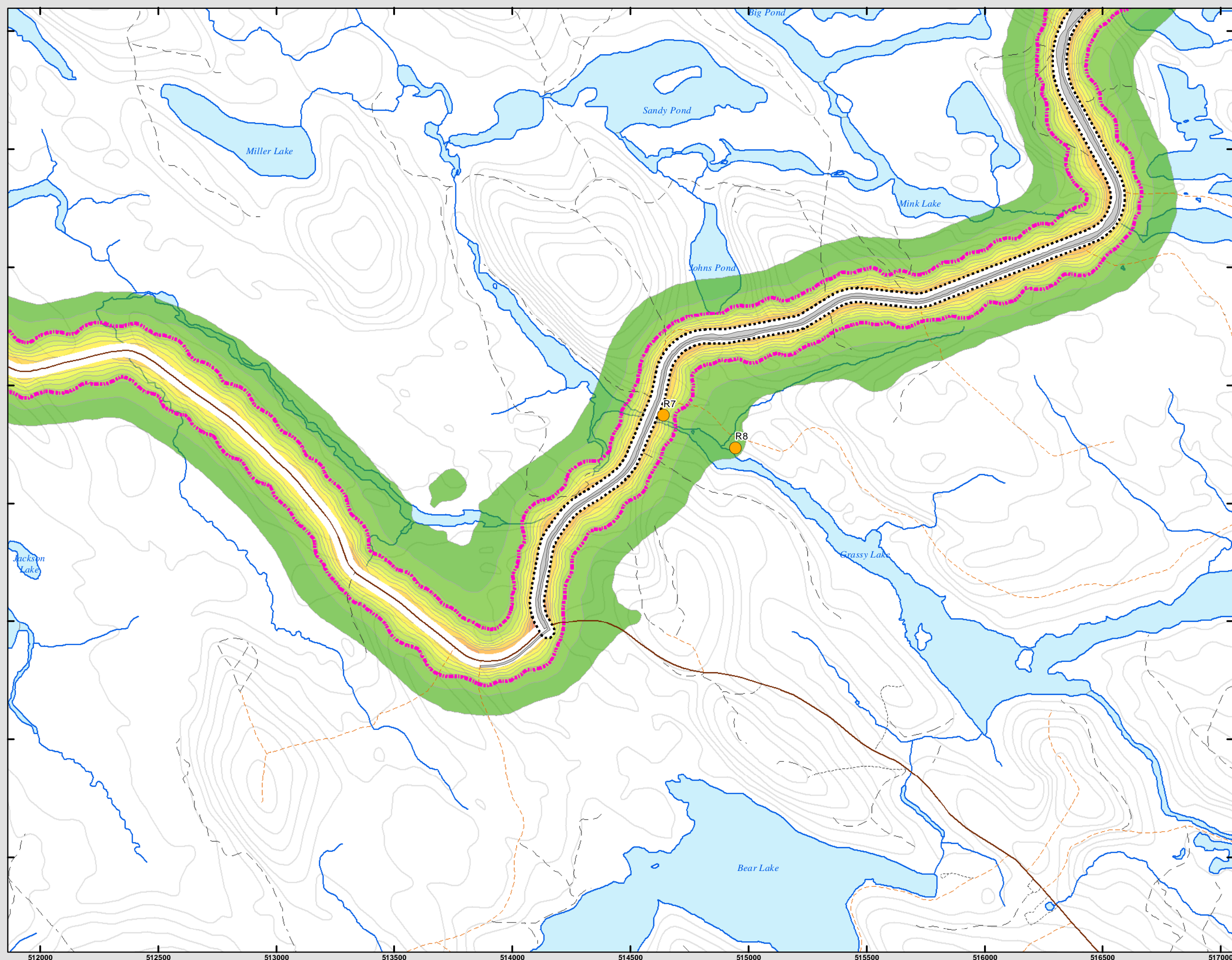
1:15,000 Scale when printed @ 11" x 17"

Drawn By: EP Date: 2021-09-21  
Reviewed By: LP

Service Layer Credits: Sources: Esri, HERE, Gamin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community



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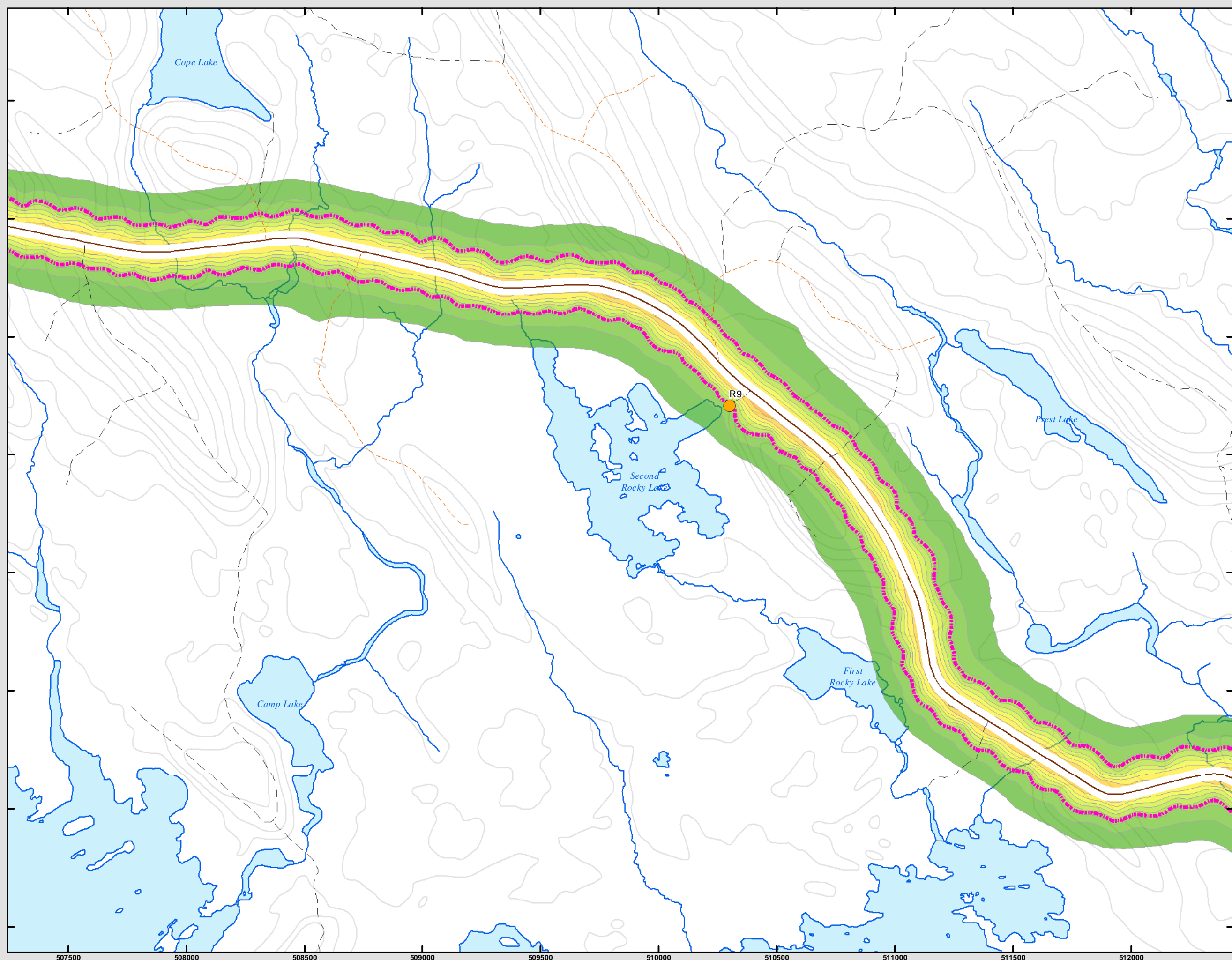
Prepared For:



**Atlantic Gold**

**FIGURE CEA 2-31-1F**

**Beaver Dam Mine Project  
Air Contour Total  
Suspended Particulate  
Matter 24-Hour Levels**

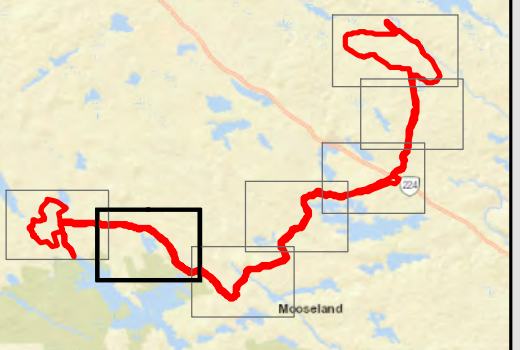


- Receptor  
17.1 ug/m<sup>3</sup> TSP 24 hr
- - - Background Level Concentration
- - - Mooseland\_Road 30m Buffer
- Local Road
- - - Dry Weather / Seasonal Road
- - - Diveways (>300 m)
- - - Track
- NSTDB Mapped Watercourses
- Lakes
- Planned Infrastructure

**TSP Ranges (ug/m<sup>3</sup>)**

- 5
- 5 - 10
- 10 - 15
- 15 - 17.1
- 17.1 - 20
- 20 - 25
- 25 - 30
- 30 - 35
- 35 - 40
- 40 - 45

Note: Based on 80% Road Dust Mitigation  
Ambient air quality criteria: Averaging period 24 hr - TSP limit: 120 ug/m<sup>3</sup>



Coordinate System: NAD 1983 CSRS UTM Zone 20N  
Projection: Transverse Mercator  
Datum: North American 1983 CSRS  
Units: Meter



0 125 250 500 m

1:15,000 Scale when printed @ 11" x 17"

Drawn By: EP  
Reviewed By: LP

Date: 2021-09-21

Service Layer Credits: Sources: Esri, HERE, Gamin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community



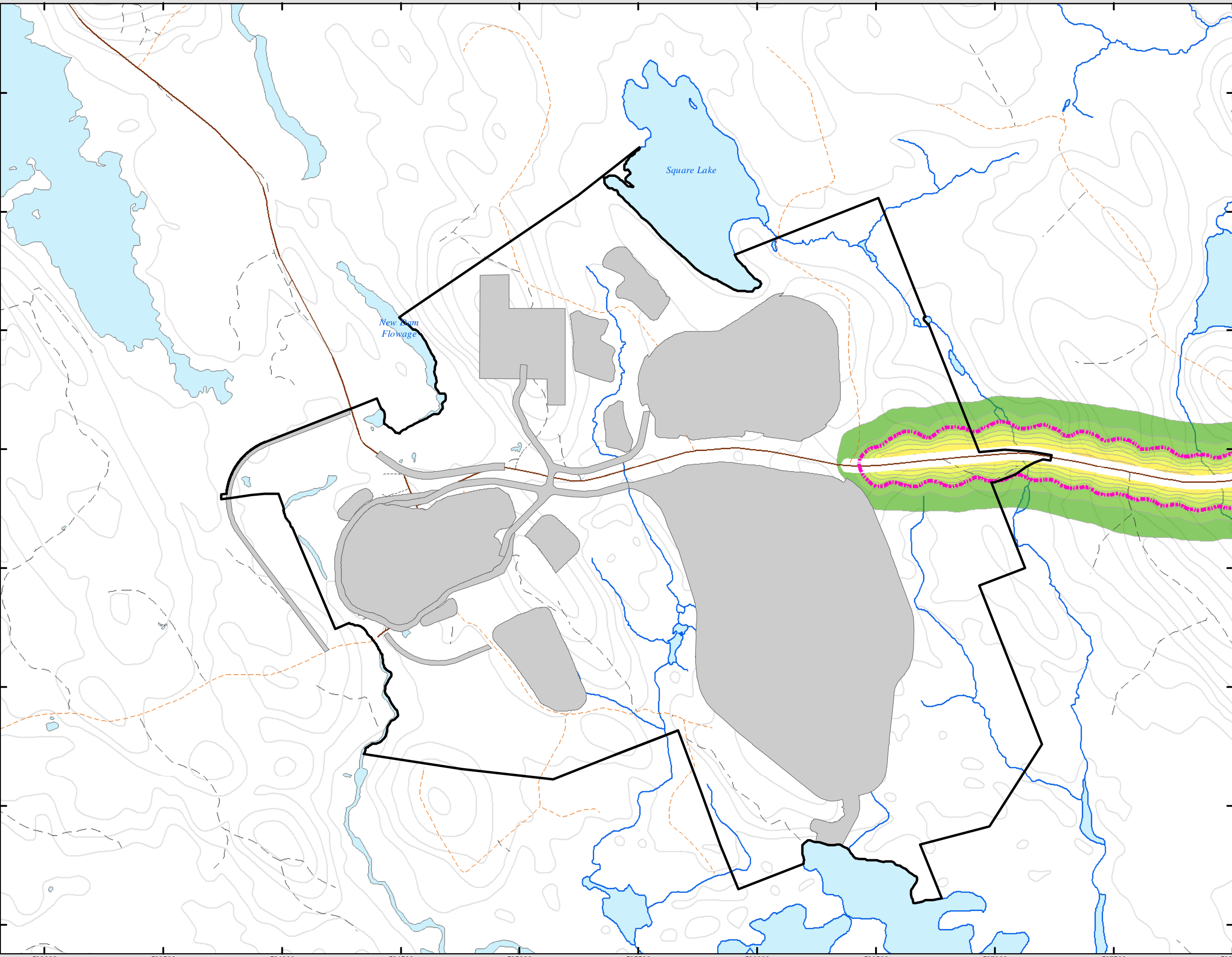
**McCallum Environmental Ltd.**

Prepared For:



**FIGURE CEA 2-31-1G**

**Beaver Dam Mine Project  
Air Contour Total  
Suspended Particulate  
Matter 24-Hour Levels**

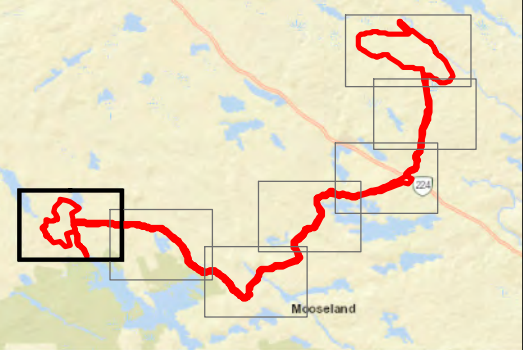


- Existing Touquoy Property Boundary
- 17.1 ug/m3 TSP 24 hr Background Level Concentration
- Mooseland\_Road 30m Buffer
- Local Road
- Dry Weather / Seasonal Road
- Diveways (>300 m)
- Track
- NSTDB Mapped Watercourses
- Lakes
- Planned Infrastructure
- Touquoy Infrastructure Layout

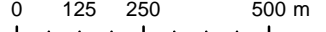
**TSP Ranges (ug/m3)**

- 5
- 5 - 10
- 10 - 15
- 15 - 17.1
- 17.1 - 20
- 20 - 25
- 25 - 30
- 30 - 35
- 35 - 40

Note: Based on 80% Road Dust Mitigation  
Ambient air quality criteria: Averaging period 24 hr - TSP limit: 120 ug/m3



Coordinate System: NAD 1983 CSRS UTM Zone 20N  
Projection: Transverse Mercator  
Datum: North American 1983 CSRS  
Units: Meter



1:15,000 Scale when printed @ 11" x 17"

Drawn By: EP Date: 2021-09-21  
Reviewed By: LP

Service Layer Credits: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community



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FIGURE CEAA 2-31-2A

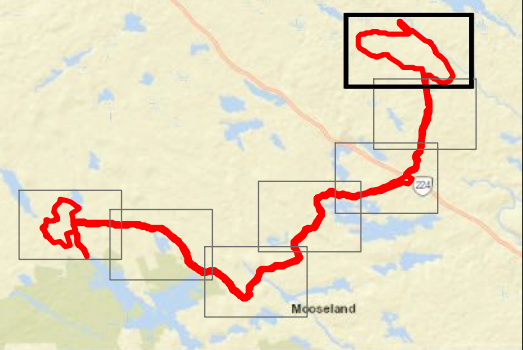
### Beaver Dam Mine Project Air Contour Annual Average Total Particulate Matter

- Proposed Property Boundary
- 12.1 ug/m<sup>3</sup> TSP Annual Concentration
- Background Level Concentration
- Mine Site concentrations reach background within boundary
- Local Road
- Dry Weather / Seasonal Road
- Track
- NSTDB Mapped Watercourses
- Lakes
- Planned Infrastructure

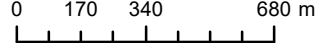
**TSP Ranges (ug/m<sup>3</sup>)**

- 2
- 2 - 4
- 4 - 6
- 6 - 8
- 8 - 10
- 10 - 12
- 12 - 12.1
- 12.1 - 14
- 14 - 16
- 16 - 18
- 18 - 20

Note: Based on 80% Road Dust Mitigation  
Ambient air quality criteria: Averaging period Annual - TSP limit: 70ug/m<sup>3</sup>



Coordinate System: NAD 1983 CSRS UTM Zone 20N  
Projection: Transverse Mercator  
Datum: North American 1983 CSRS  
Units: Meter



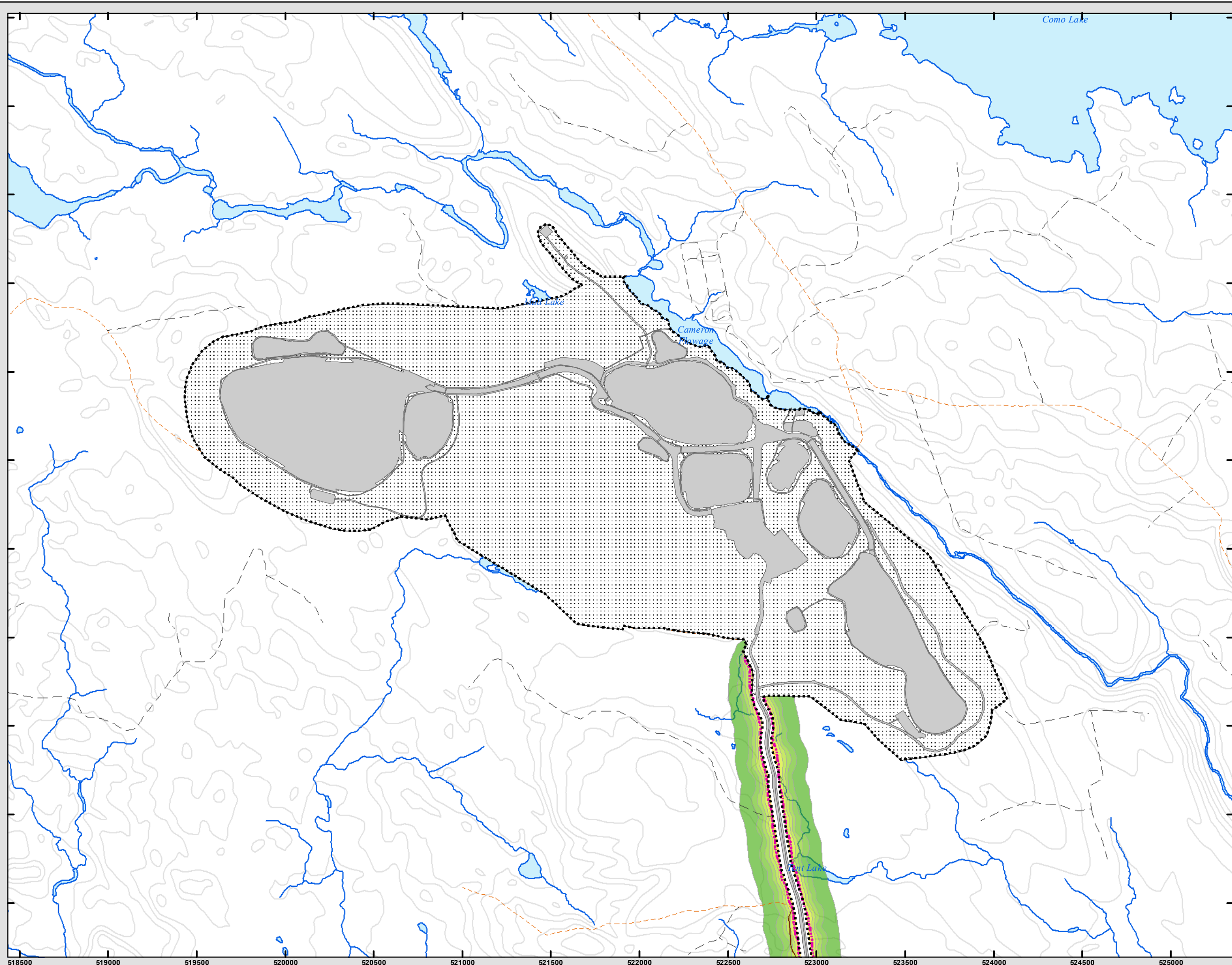
1:20,000 Scale when printed @ 11" x 17"

Drawn By: EP Date: 2021-09-22  
Reviewed By: LP

Service Layer Credits: Sources: Esri, HERE, Gamin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community



McCallum Environmental Ltd.



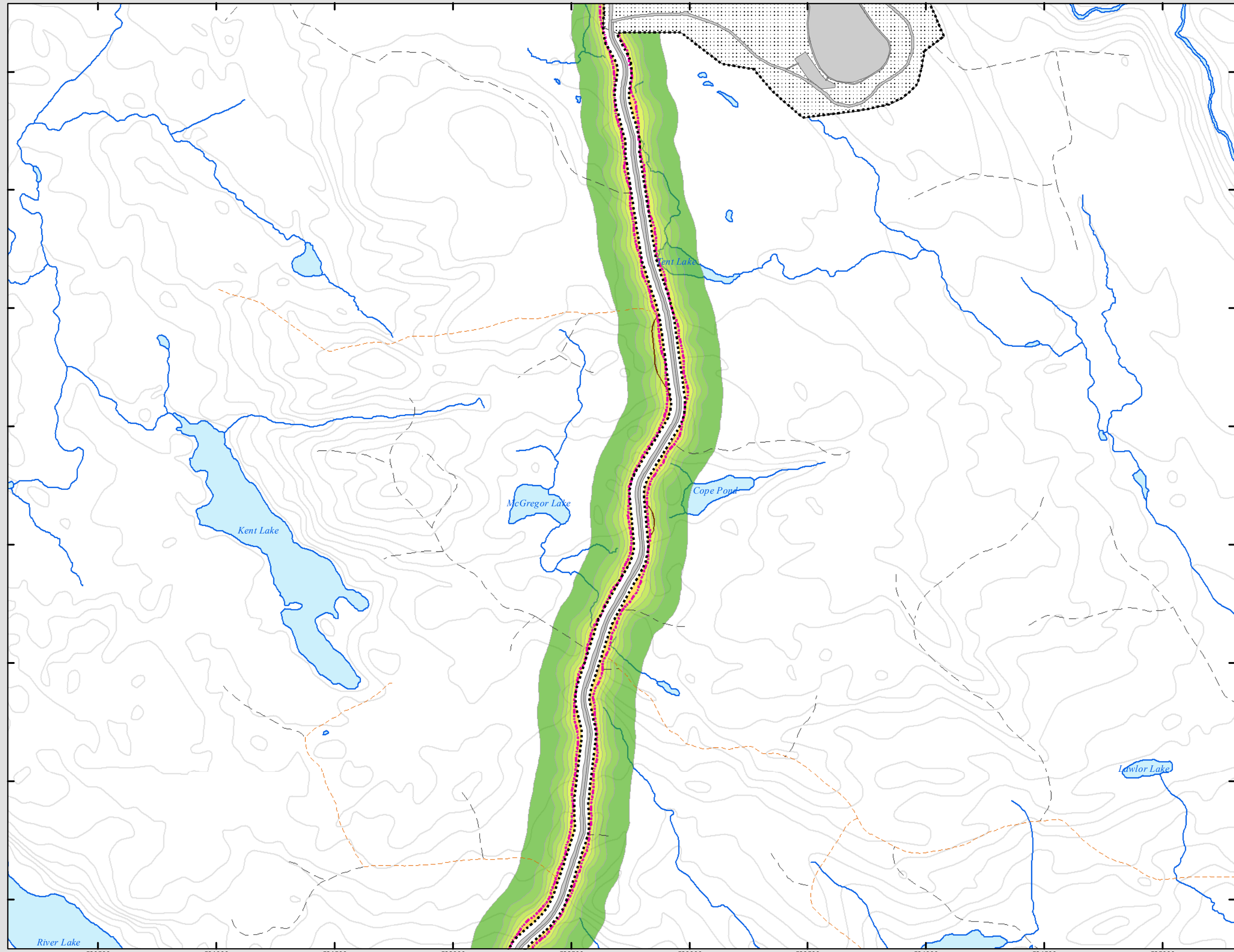


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**FIGURE CEEA 2-31-2B**

**Beaver Dam Mine Project  
Air Contour Annual  
Average Total Particulate  
Matter**

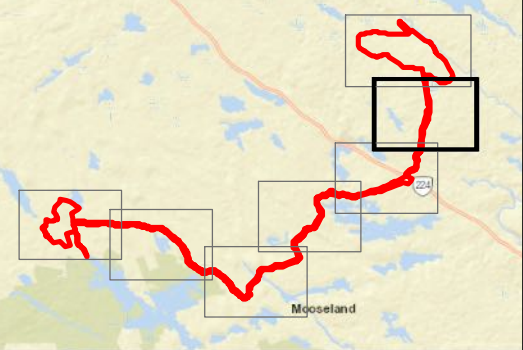


- Proposed Property Boundary
- 12.1 ug/m3 TSP Annual Background Level Concentration
- Mine Site concentrations reach background within boundary
- Local Road
- Dry Weather / Seasonal Road
- Track
- NSTDB Mapped Watercourses
- Lakes
- Planned Infrastructure

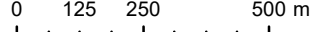
**TSP Ranges (ug/m3)**

- 2
- 2 - 4
- 4 - 6
- 6 - 8
- 8 - 10
- 10 - 12
- 12 - 12.1
- 12.1 - 14
- 14 - 16
- 16 - 18
- 18 - 20

Note: Based on 80% Road Dust Mitigation  
Ambient air quality criteria: Averaging period Annual - TSP limit: 70ug/m3



Coordinate System: NAD 1983 CSRS UTM Zone 20N  
Projection: Transverse Mercator  
Datum: North American 1983 CSRS  
Units: Meter



1:15,000 Scale when printed @ 11" x 17"

Drawn By: EP Date: 2021-09-22  
Reviewed By: LP

Service Layer Credits: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community



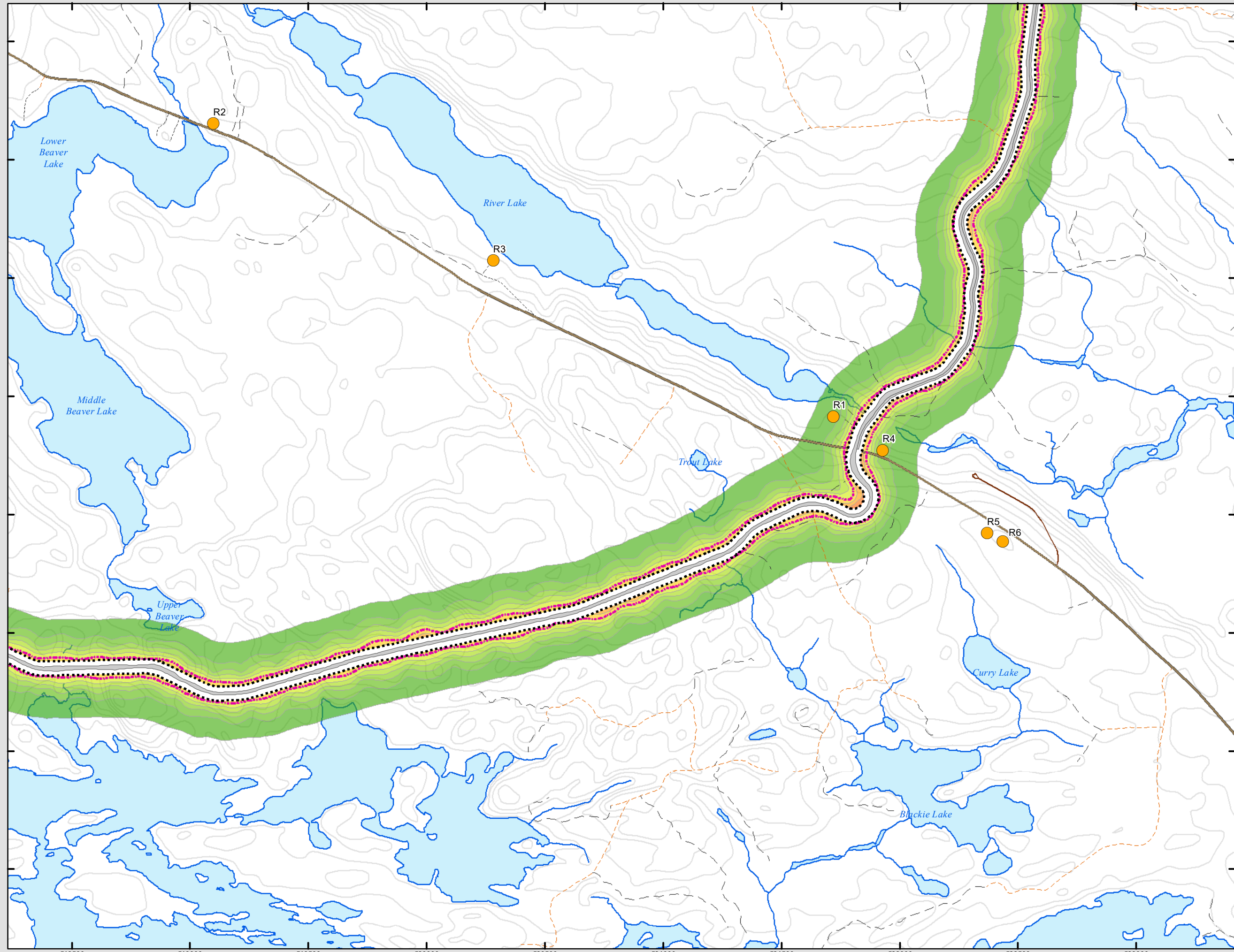
**McCallum Environmental Ltd.**

Prepared For:



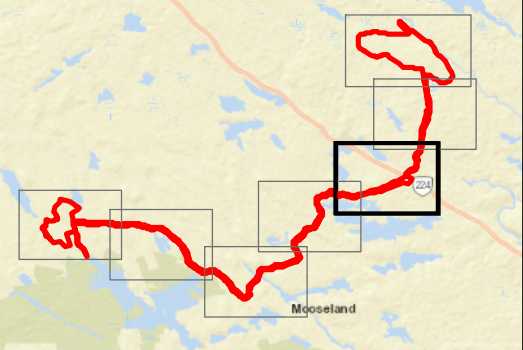
FIGURE CEA 2-31-2C

### Beaver Dam Mine Project Air Contour Annual Average Total Particulate Matter

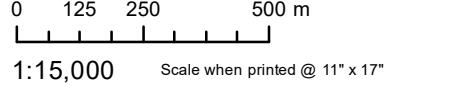


- Proposed Property Boundary
- Receptor
- 12.1 ug/m3 TSP Annual Background Level Concentration
- TSP Ranges (ug/m3)
  - 2
  - 2 - 4
  - 4 - 6
  - 6 - 8
  - 8 - 10
  - 10 - 12
  - 12 - 12.1
  - 12.1 - 14
  - 14 - 16
  - 16 - 18
- Collector Road
- Local Road
- Dry Weather / Seasonal Road
- Diveways (>300 m)
- Track
- NSTDB Mapped Watercourses
- Lakes
- Planned Infrastructure

Note: Based on 80% Road Dust Mitigation  
Ambient air quality criteria: Averaging period Annual - TSP limit: 70ug/m3



Coordinate System: NAD 1983 CSRS UTM Zone 20N  
Projection: Transverse Mercator  
Datum: North American 1983 CSRS  
Units: Meter



Drawn By: EP  
Reviewed By: LP  
Date: 2021-09-22

Service Layer Credits: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community



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Prepared For:



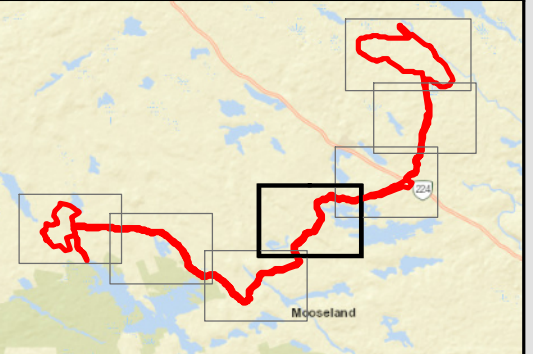
**Atlantic Gold**

**FIGURE CEA 2-31-2D**

**Beaver Dam Mine Project  
Air Contour Annual  
Average Total Particulate  
Matter**

- Proposed Property Boundary
- Dry Weather / Seasonal Road
- 12.1 ug/m3 TSP Annual Background Level Concentration
- Track
- TSP Ranges (ug/m3)
- NSTDB Mapped Watercourses
- Lakes
- Planned Infrastructure

Note: Based on 80% Road Dust Mitigation  
Ambient air quality criteria: Averaging period Annual - TSP limit: 70ug/m3



Coordinate System: NAD 1983 CSRS UTM Zone 20N  
 Projection: Transverse Mercator  
 Datum: North American 1983 CSRS  
 Units: Meter

0 125 250 500 m

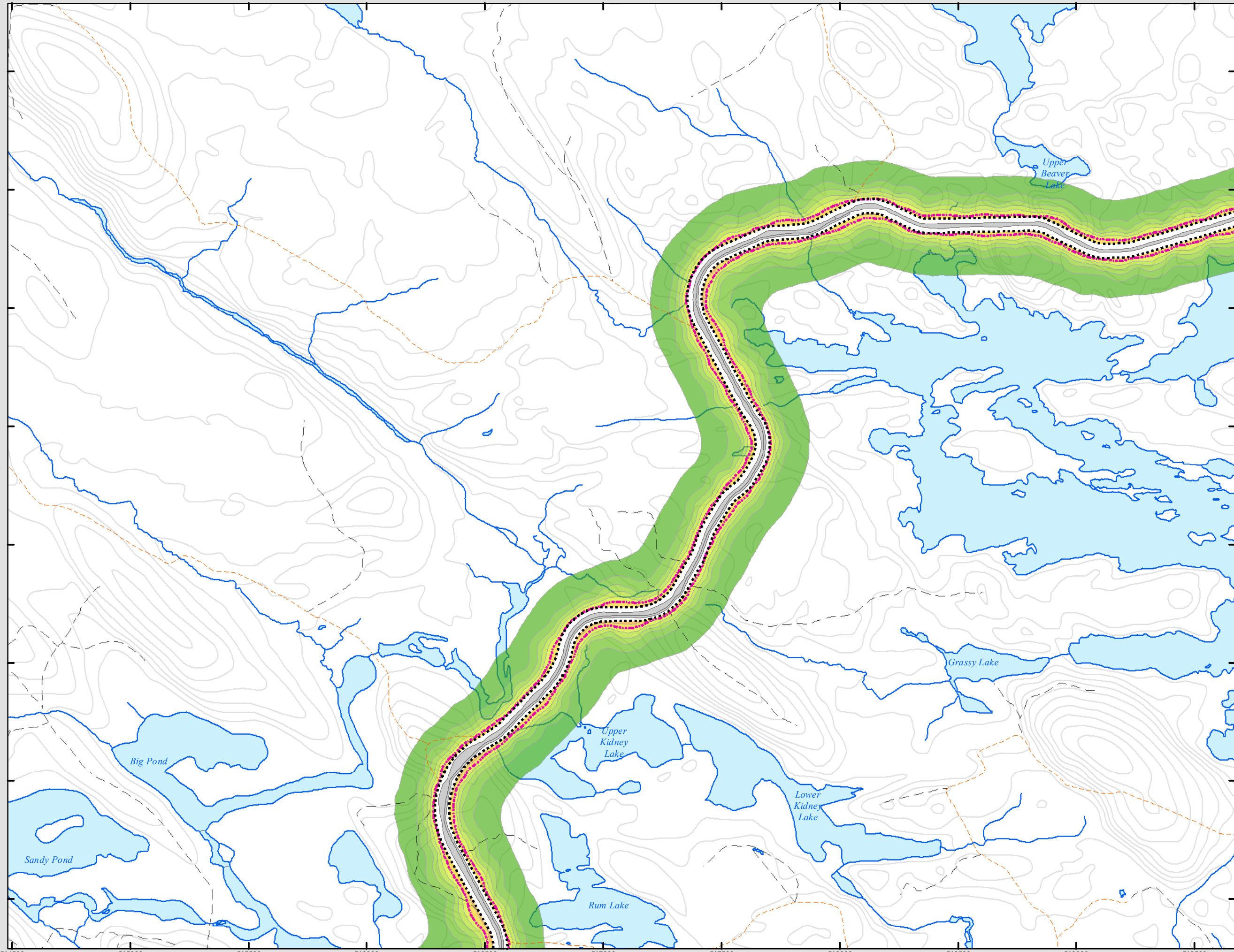
1:15,000 Scale when printed @ 11" x 17"

Drawn By: EP Date: 2021-09-22  
Reviewed By: LP

Service Layer Credits: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community



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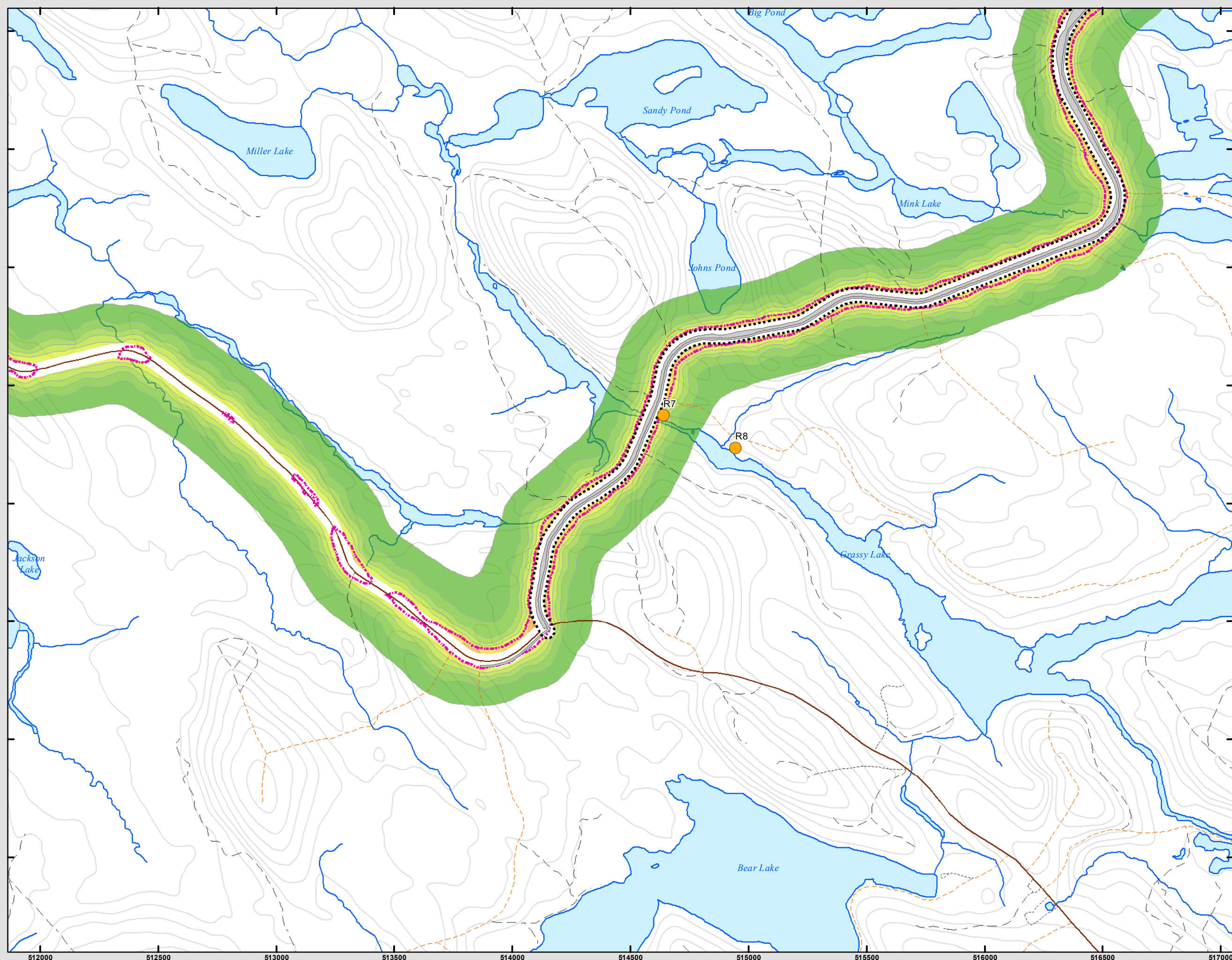
Prepared For:



**Atlantic Gold**

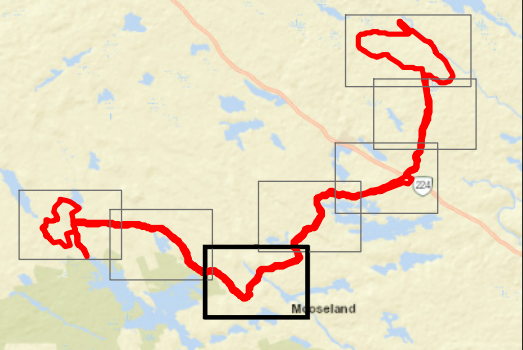
**FIGURE CEAA 2-31-2E**

**Beaver Dam Mine Project  
Air Contour Annual  
Average Total Particulate  
Matter**



- Mooseland\_Road 30m Buffer
- Proposed Property Boundary
- Receptor
- 12.1 ug/m3 TSP Annual
- Background Level Concentration
- TSP Ranges (ug/m3)
- 2
- 2 - 4
- 4 - 6
- 6 - 8
- 8 - 10
- 10 - 12
- 12 - 12.1
- 12.1 - 14
- 14 - 16
- 16 - 18
- Local Road
- Dry Weather / Seasonal Road
- Diveways (>300 m)
- Track
- NSTDB Mapped Watercourses
- Lakes
- Planned Infrastructure

Note: Based on 80% Road Dust Mitigation  
Ambient air quality criteria: Averaging period Annual - TSP limit: 70ug/m3



Coordinate System: NAD 1983 CSRS UTM Zone 20N  
 Projection: Transverse Mercator  
 Datum: North American 1983 CSRS  
 Units: Meter

0 125 250 500 m

1:15,000 Scale when printed @ 11" x 17"

Drawn By: EP Date: 2021-09-22  
Reviewed By: LP

Service Layer Credits: Sources: Esri, HERE, Gamin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community



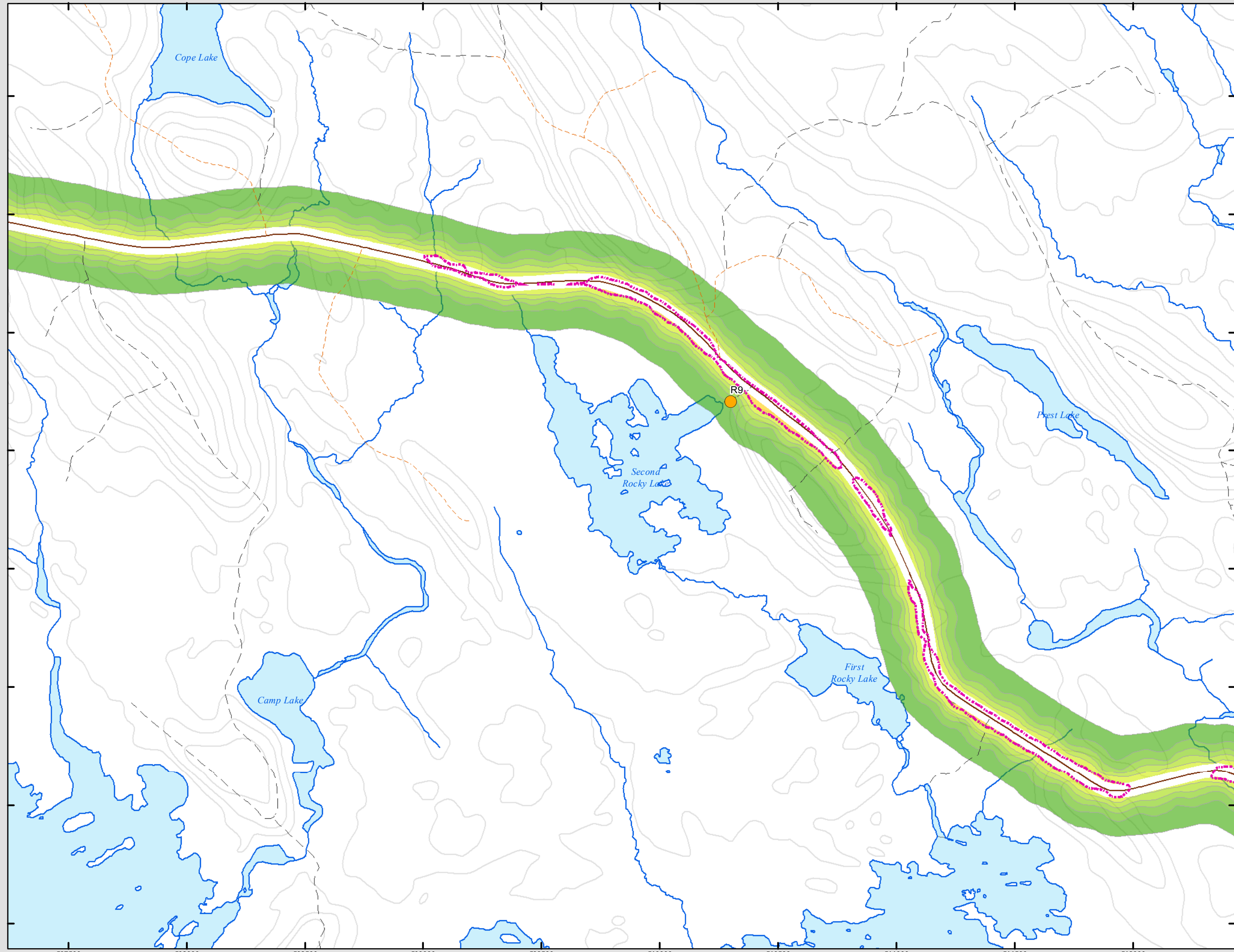
**McCallum Environmental Ltd.**

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FIGURE CEA 2-31-2F

### Beaver Dam Mine Project Air Contour Annual Average Total Particulate Matter



Mooseland\_Road 30m Buffer

- Local Road
- Dry Weather / Seasonal Road
- Diveways (>300 m)
- Track
- NSTDB Mapped Watercourses
- Lakes
- Planned Infrastructure

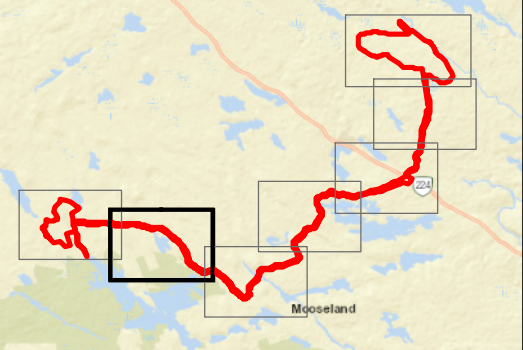
Receptor

- 12.1 ug/m3 TSP Annual Concentration
- Background Level Concentration

TSP Ranges (ug/m3)

- 2
- 2 - 4
- 4 - 6
- 6 - 8
- 8 - 10
- 10 - 12
- 12 - 12.1

Note: Based on 80% Road Dust Mitigation  
Ambient air quality criteria: Averaging period Annual - TSP limit: 70ug/m3



Coordinate System: NAD 1983 CSRS UTM Zone 20N  
Projection: Transverse Mercator  
Datum: North American 1983 CSRS  
Units: Meter

0 125 250 500 m

1:15,000 Scale when printed @ 11" x 17"

Drawn By: EP  
Reviewed By: LP

Date: 2021-09-22

Service Layer Credits: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community



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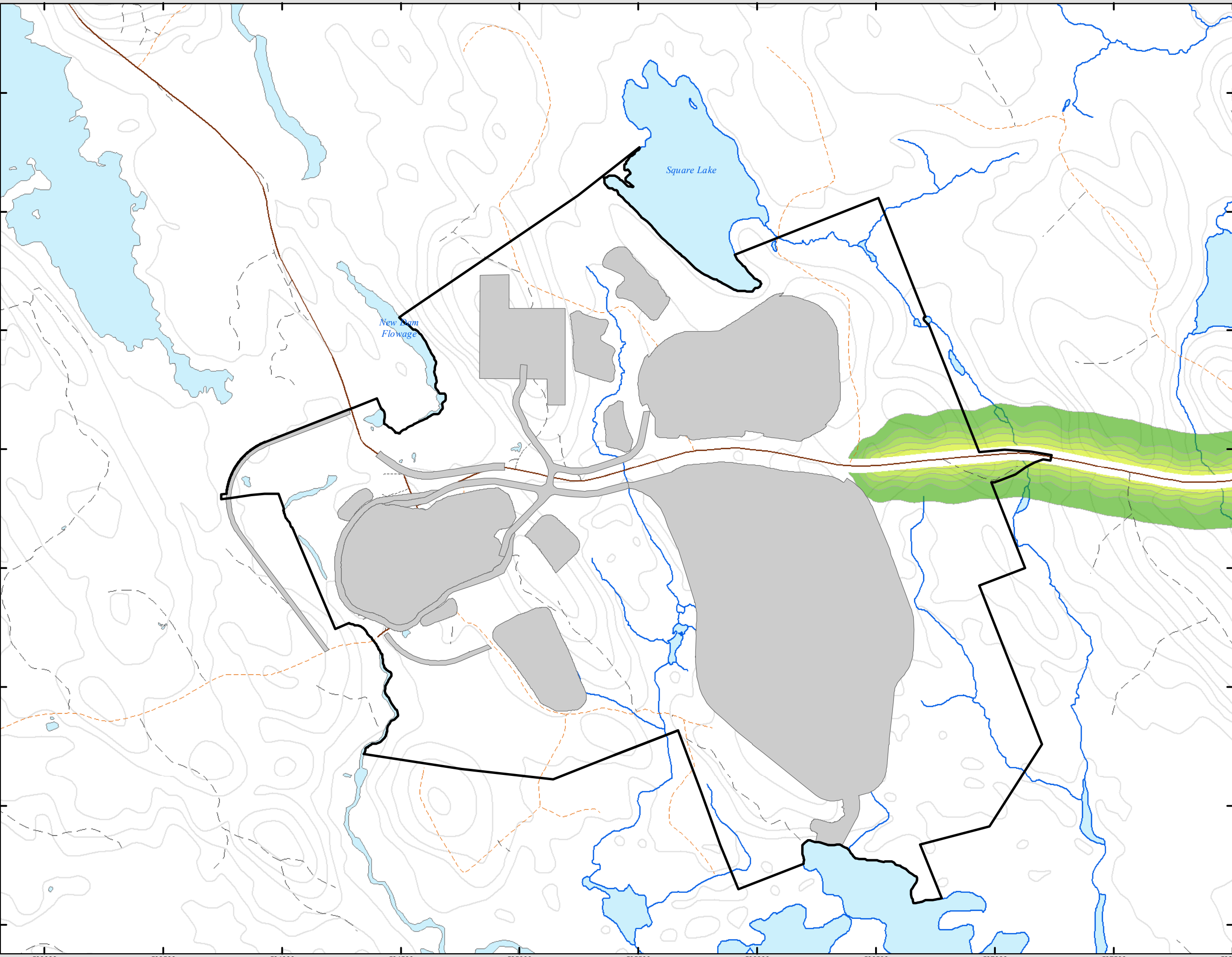
Prepared For:



**Atlantic Gold**

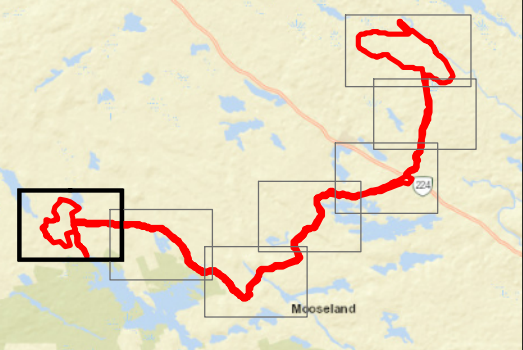
**FIGURE CEEA 2-31-2G**

**Beaver Dam Mine Project  
Air Contour Annual  
Average Total Particulate  
Matter**



- Mooseland\_Road 30m Buffer
- Existing Touquoy Property Boundary
- TSP Ranges (ug/m3)
  - 2
  - 2 - 4
  - 4 - 6
  - 6 - 8
  - 8 - 10
- Local Road
- Dry Weather / Seasonal Road
- Diveways (>300 m)
- Track
- NSTDB Mapped Watercourses
- Lakes
- Planned Infrastructure
- Touquoy Infrastructure Layout

Note: Based on 80% Road Dust Mitigation  
Ambient air quality criteria: Averaging period Annual - TSP limit: 70ug/m<sup>3</sup>



Coordinate System: NAD 1983 CSRS UTM Zone 20N  
 Projection: Transverse Mercator  
 Datum: North American 1983 CSRS  
 Units: Meter

0 125 250 500 m

1:15,000 Scale when printed @ 11" x 17"

Drawn By: EP Date: 2021-09-22  
Reviewed By: LP

Service Layer Credits: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community



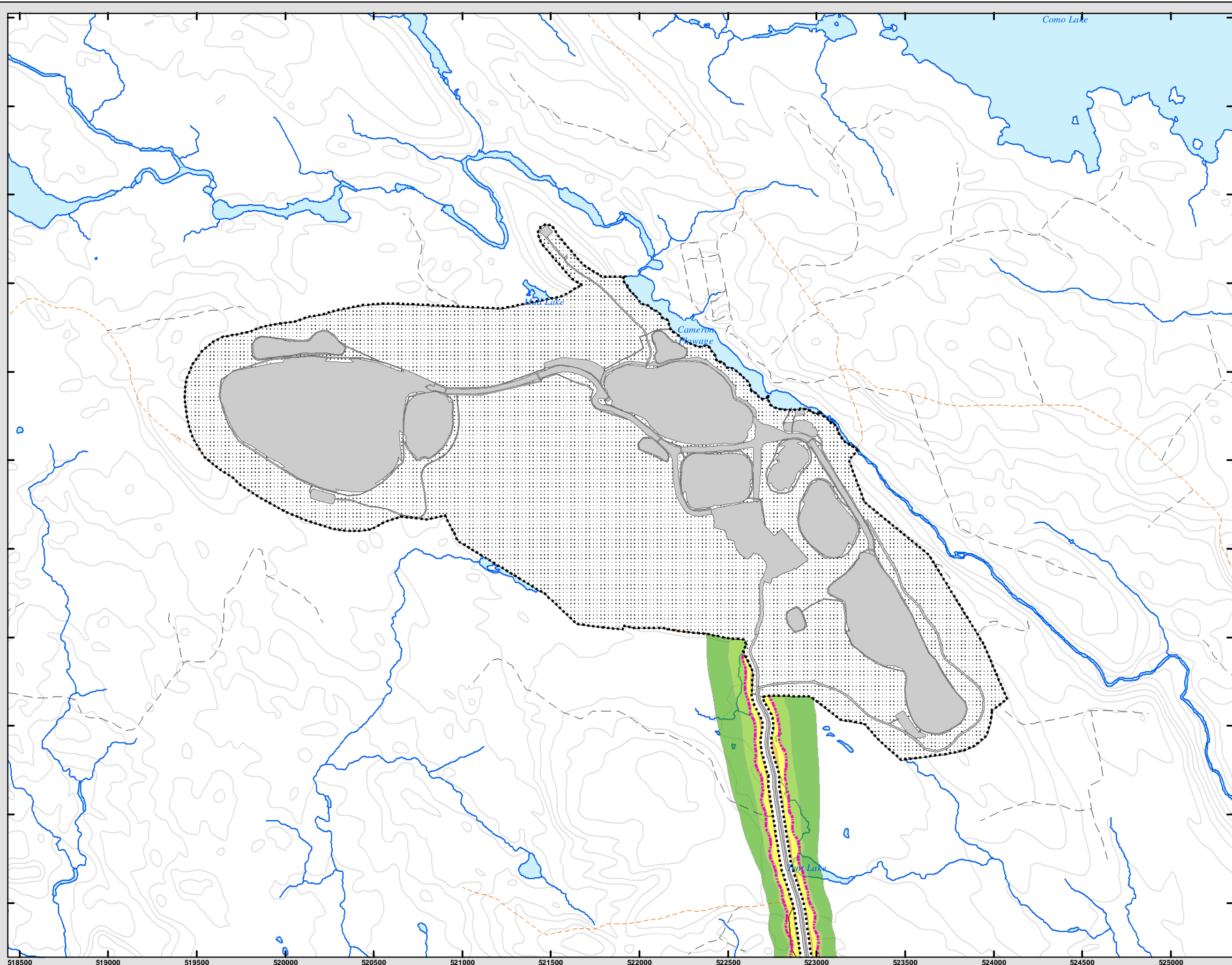
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FIGURE CEAA 2-31-3A

### Beaver Dam Mine Project Air Contour PM10 24-Hour Levels

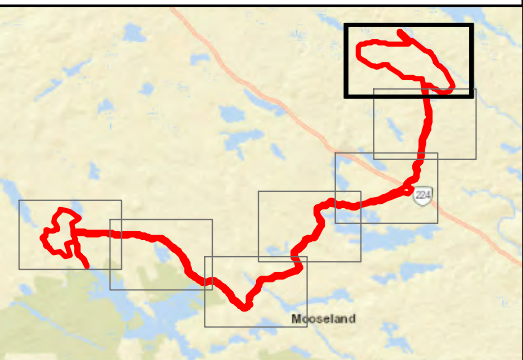


- 210128 BDProperty Boundary\_HR
- 13.1 ug/m3 PM10 24 hr Background Level Concentration
- Mine Site concentrations reach background within boundary
- Proposed Property Boundary
- Local Road
- Dry Weather / Seasonal Road
- Track
- NSTDB Mapped Watercourses
- Lakes
- Planned Infrastructure

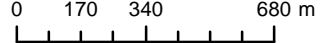
#### PM10 Ranges (um/m3)

- 5
- 5 - 10
- 10 - 13.5
- 13.5 - 15
- 15 - 20
- 20 - 25

Note: Based on 80% Road Dust Mitigation  
Ambient air quality criteria: Averaging period 24 hr - PM10 limit: 50ug/m3



Coordinate System: NAD 1983 CSRS UTM Zone 20N  
Projection: Transverse Mercator  
Datum: North American 1983 CSRS  
Units: Meter



1:20,000 Scale when printed @ 11" x 17"

Drawn By: EP Date: 2021-09-21  
Reviewed By: LP

Service Layer Credits: Sources: Esri, HERE, Gamin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community



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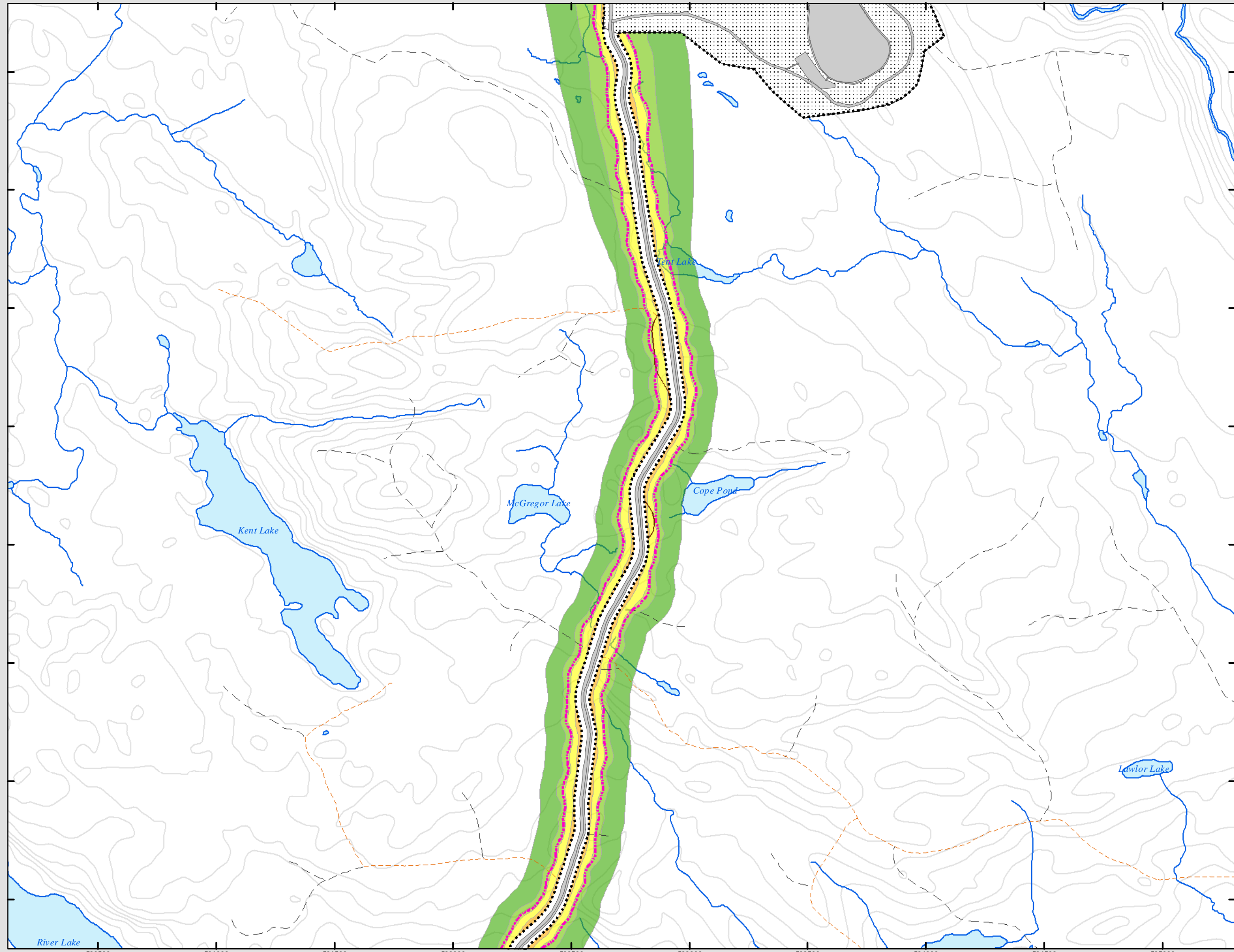
Prepared For:



**Atlantic Gold**

**FIGURE CEEA 2-31-3B**

**Beaver Dam Mine Project  
Air Contour PM10 24-Hour  
Levels**

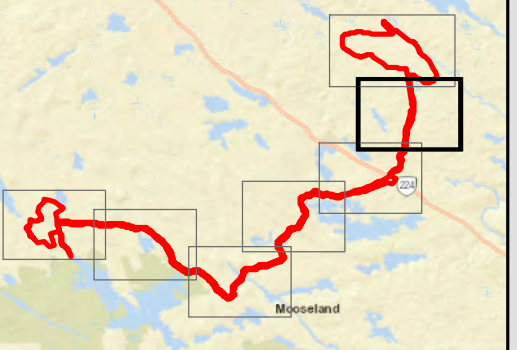


- 210128 BDProperty Boundary\_HR
- 13.1 ug/m3 PM10 24 hr Background Level Concentration
- Mine Site concentrations reach background within boundary
- Proposed Property Boundary
- Local Road
- Dry Weather / Seasonal Road
- Track
- NSTDB Mapped Watercourses
- Lakes
- Planned Infrastructure

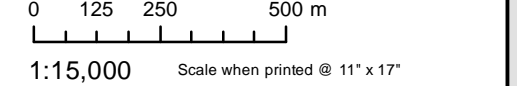
**PM10 Ranges (ug/m3)**

5
5 - 10
10 - 13.5
13.5 - 15
15 - 20
20 - 25

Note: Based on 80% Road Dust Mitigation  
Ambient air quality criteria: Averaging period 24 hr - PM10 limit: 50ug/m3



Coordinate System: NAD 1983 CSRS UTM Zone 20N  
Projection: Transverse Mercator  
Datum: North American 1983 CSRS  
Units: Meter



Drawn By: EP  
Reviewed By: LP  
Date: 2021-09-21

Service Layer Credits: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community

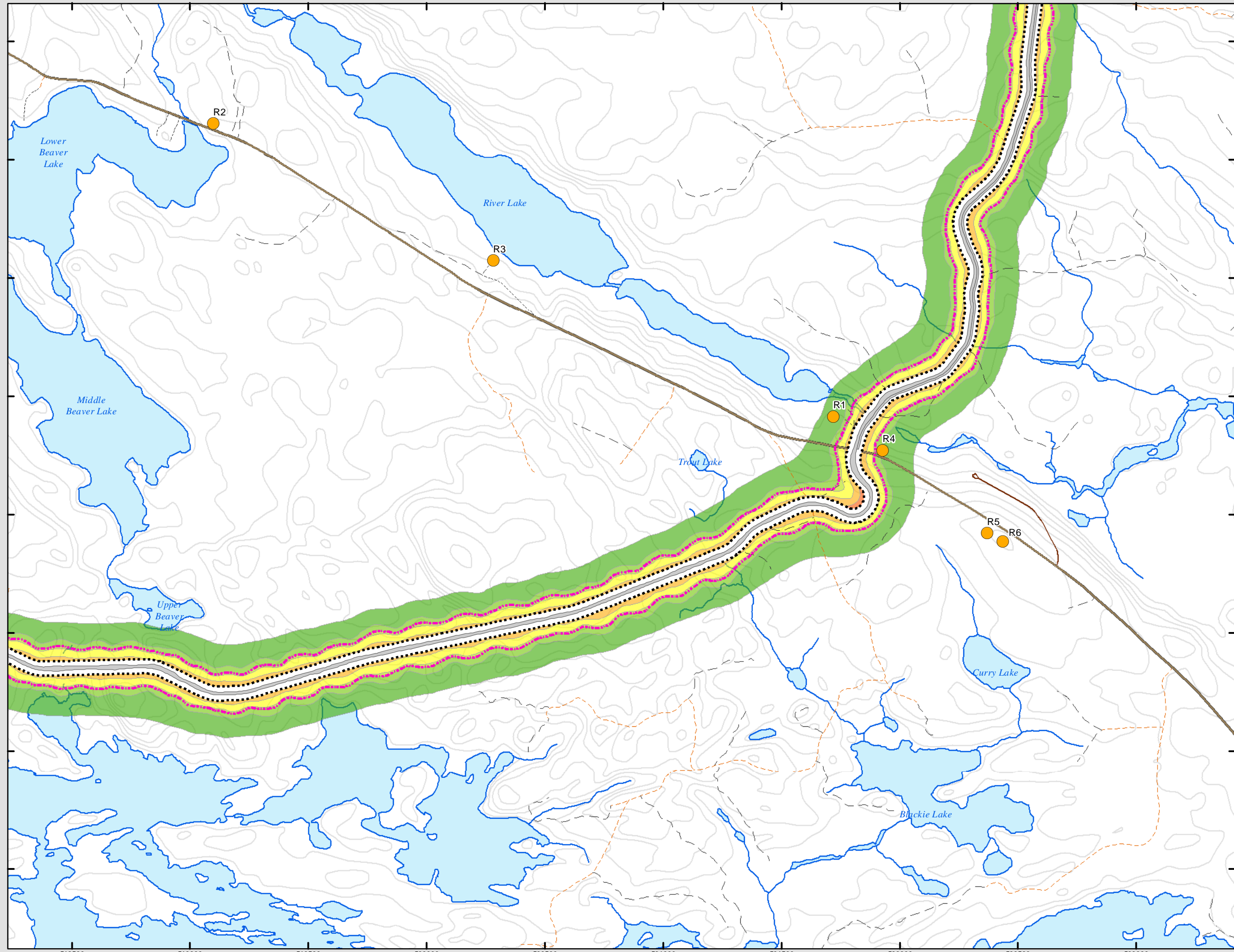





















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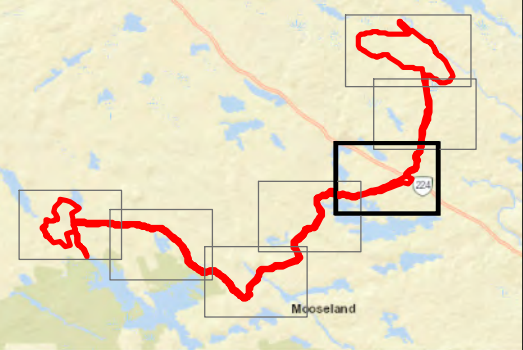
**FIGURE CEA 2-31-3C**

**Beaver Dam Mine Project  
 Air Contour PM10 24-Hour  
 Levels**


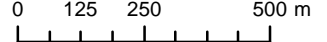


 Receptor	 Collector Road
 210128 BDProperty Boundary_HR	 Local Road
 13.1 ug/m3 PM10 24 hr Background Level Concentration	 Dry Weather / Seasonal Road
 Proposed Property Boundary	 Diveways (>300 m)
 PM10 Ranges (um/m3)	 Track
 5	 NSTDB Mapped Watercourses
 5 - 10	 Lakes
 10 - 13.5	 Planned Infrastructure
 13.5 - 15	
 15 - 20	
 20 - 25	

Note: Based on 80% Road Dust Mitigation  
 Ambient air quality criteria: Averaging period 24 hr - PM10 limit: 50ug/m3



Coordinate System: NAD 1983 CSRS UTM Zone 20N  
 Projection: Transverse Mercator  
 Datum: North American 1983 CSRS  
 Units: Meter

**1:15,000** Scale when printed @ 11" x 17"

Drawn By: EP  
 Reviewed By: LP  
 Date: 2021-09-21

Service Layer Credits: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community

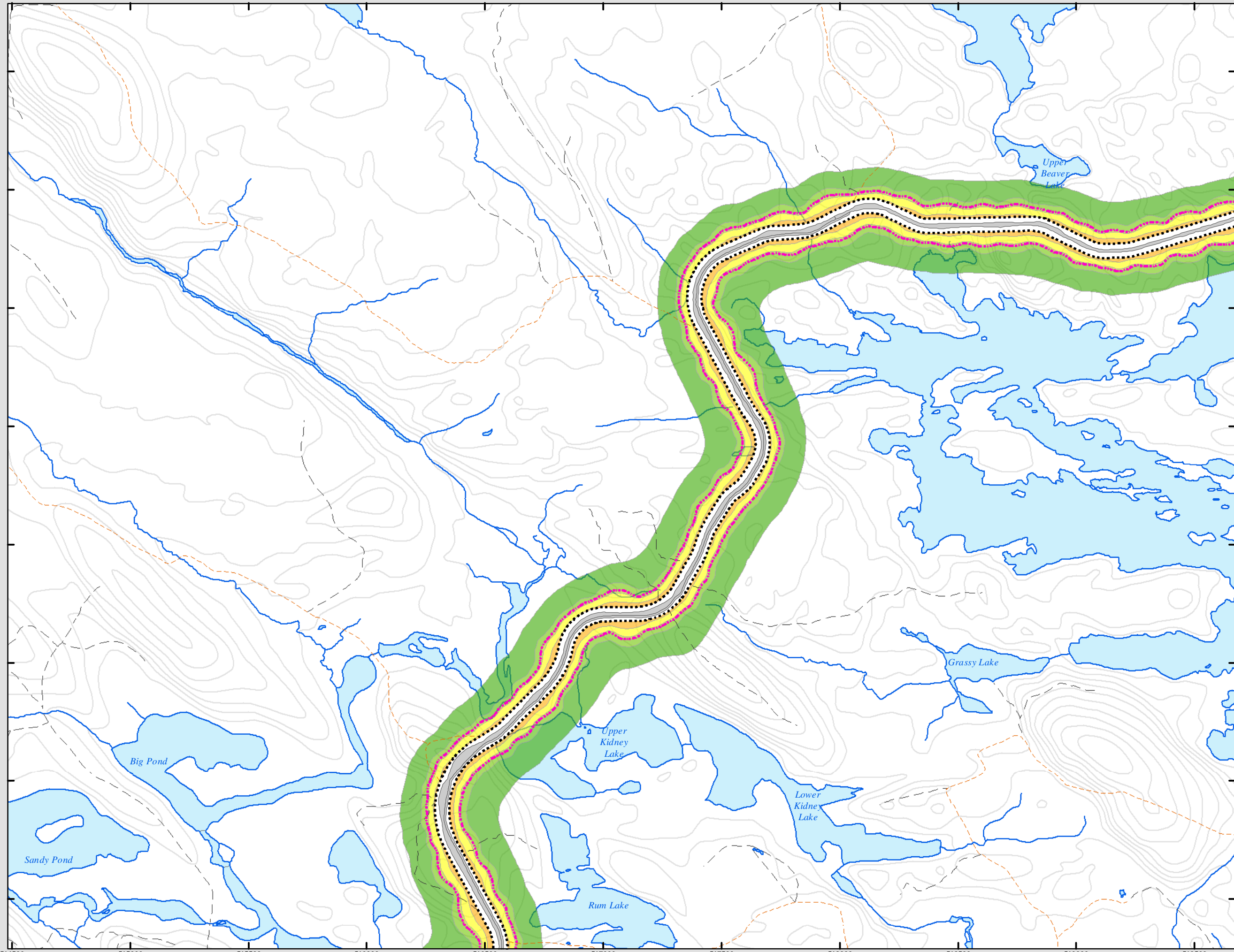


Prepared For:



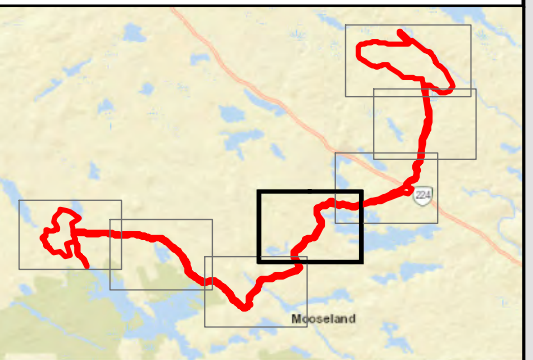
FIGURE CEAA 2-31-3D

Beaver Dam Mine Project  
Air Contour PM10 24-Hour  
Levels



- 210128 BDProperty Boundary\_HR
- 13.1 ug/m3 PM10 24 hr Background Level Concentration
- Proposed Property Boundary
- PM10 Ranges (um/m3)
  - 5
  - 5 - 10
  - 10 - 13.5
  - 13.5 - 15
  - 15 - 20
  - 20 - 25
- Dry Weather / Seasonal Road
- Track
- NSTDB Mapped Watercourses
- Lakes
- Planned Infrastructure

Note: Based on 80% Road Dust Mitigation  
Ambient air quality criteria: Averaging period 24 hr - PM10 limit: 50ug/m3



Coordinate System: NAD 1983 CSRS UTM Zone 20N  
 Projection: Transverse Mercator  
 Datum: North American 1983 CSRS  
 Units: Meter

0 125 250 500 m

1:15,000 Scale when printed @ 11" x 17"

Drawn By: EP Date: 2021-09-21  
Reviewed By: LP

Service Layer Credits: Sources: Esri, HERE, Gamin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community



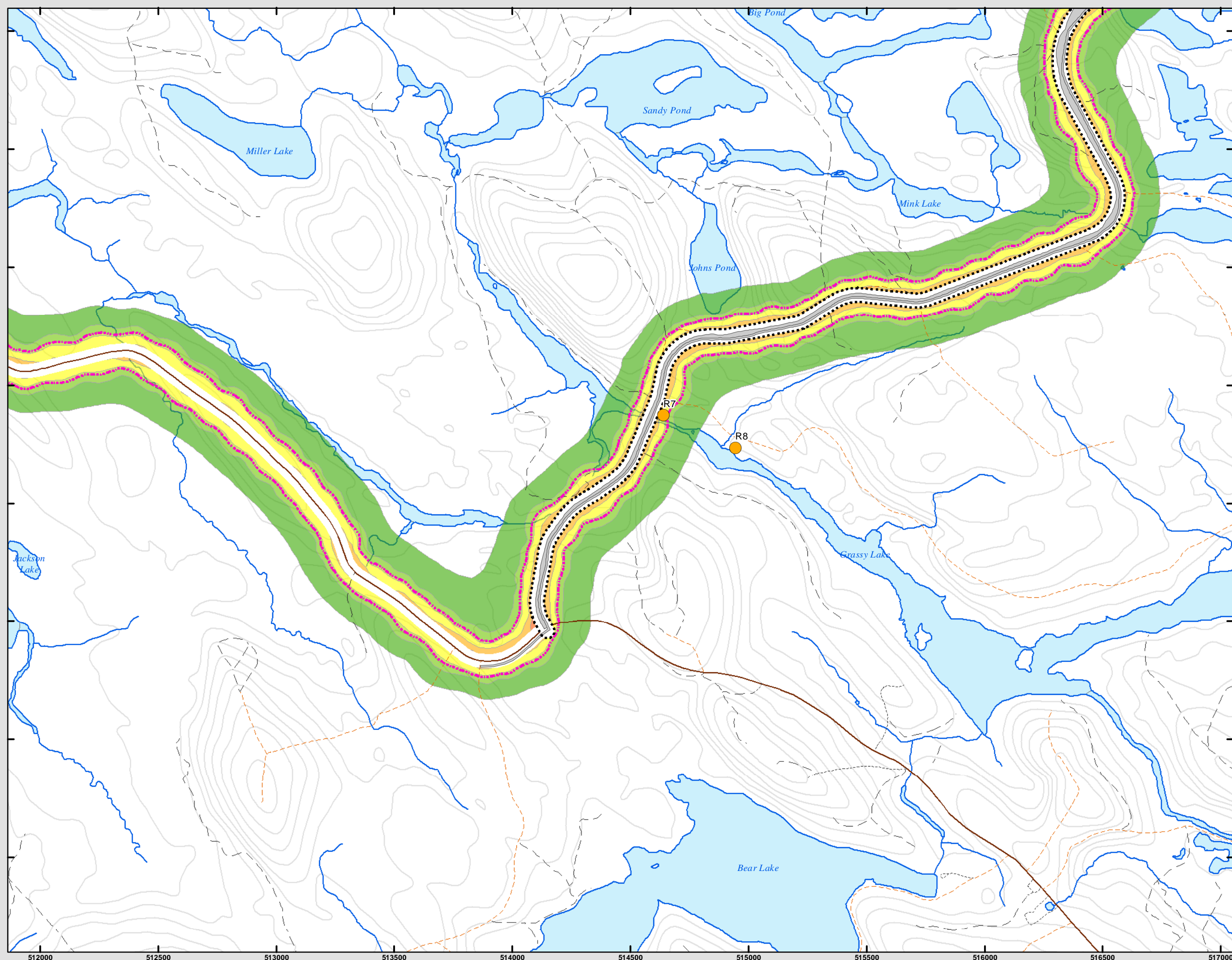
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FIGURE CEA 2-31-3E

### Beaver Dam Mine Project Air Contour PM10 24-Hour Levels

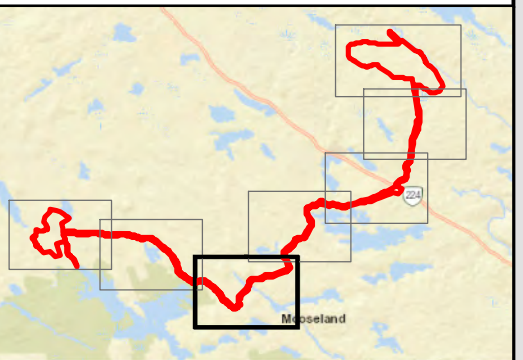


- Receptor
- 210128 BDP Property Boundary\_HR
- Mooseland\_Road 30m Buffer
- 13.1 ug/m3 PM10 24 hr Background Level Concentration
- Proposed Property Boundary
- Local Road
- Dry Weather / Seasonal Road
- Diveways (>300 m)
- Track
- NSTDB Mapped Watercourses
- Lakes
- Planned Infrastructure

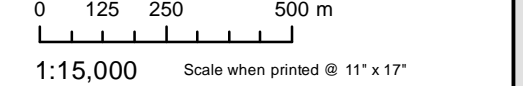
**PM10 Ranges (ug/m3)**

5
5 - 10
10 - 13.5
13.5 - 15
15 - 20
20 - 25
25 - 30

Note: Based on 80% Road Dust Mitigation  
Ambient air quality criteria: Averaging period 24 hr - PM10 limit: 50ug/m3



Coordinate System: NAD 1983 CSRS UTM Zone 20N  
Projection: Transverse Mercator  
Datum: North American 1983 CSRS  
Units: Meter



Drawn By: EP Date: 2021-09-21  
Reviewed By: LP

Service Layer Credits: Sources: Esri, HERE, Gamin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community



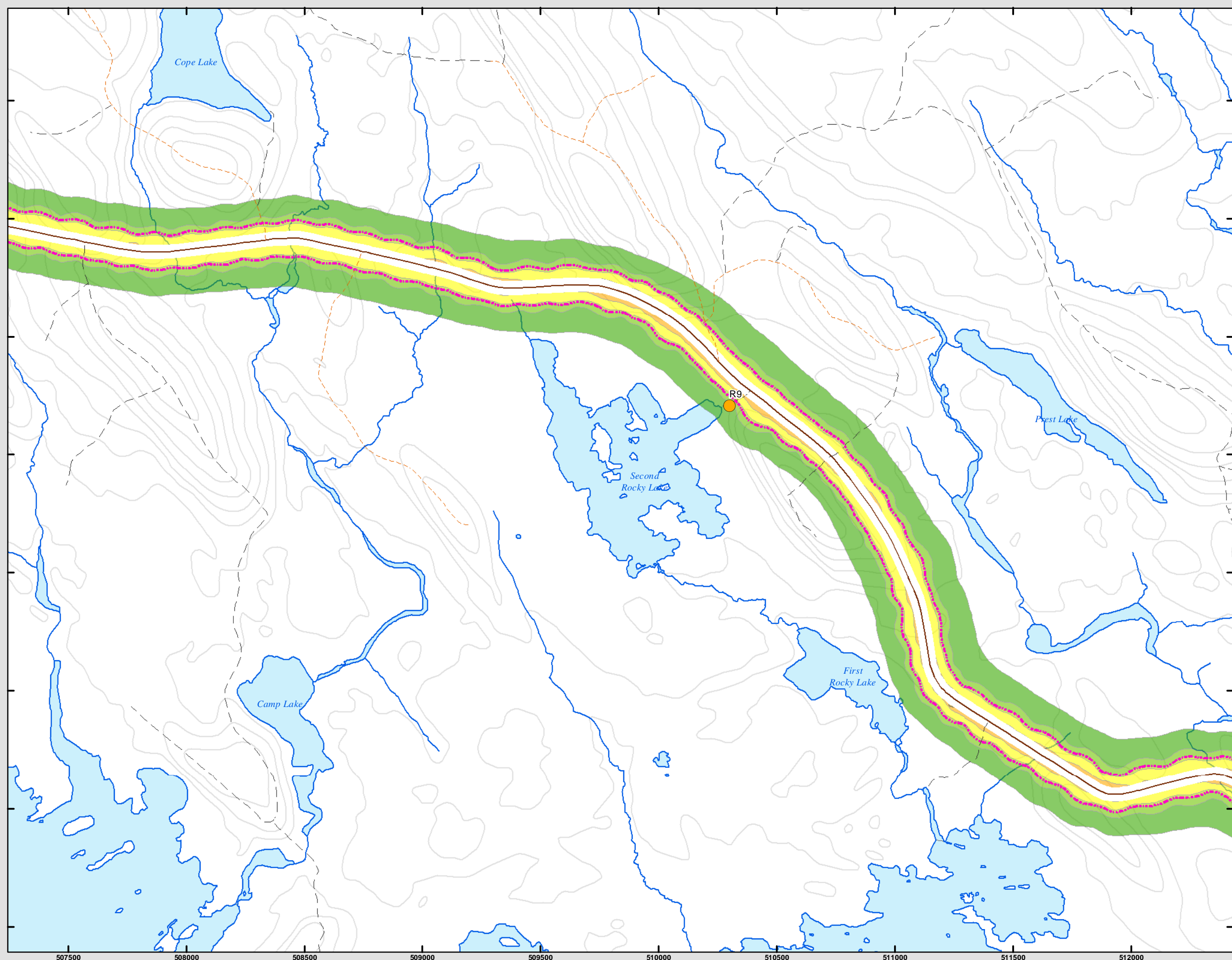
McCallum Environmental Ltd.

Prepared For:



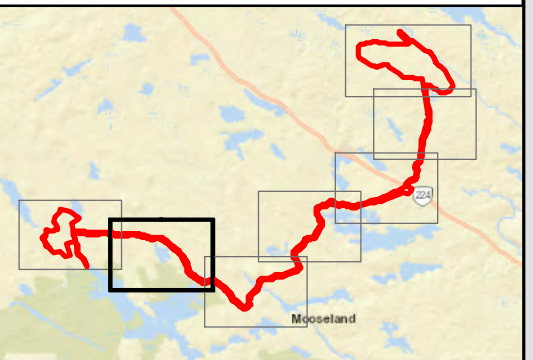
FIGURE CEAA 2-31-3F

Beaver Dam Mine Project  
Air Contour PM10 24-Hour  
Levels

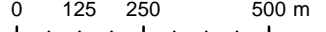


- Receptor
- Mooseland\_Road 30m Buffer
- 13.1 ug/m3 PM10 24 hr Background Level Concentration
- PM10 Ranges (ug/m3)
  - 5
  - 5 - 10
  - 10 - 13.5
  - 13.5 - 15
  - 15 - 20
- Local Road
- - - Dry Weather / Seasonal Road
- - - Diveways (>300 m)
- - - Track
- NSTDB Mapped Watercourses
- Lakes
- Planned Infrastructure

Note: Based on 80% Road Dust Mitigation  
Ambient air quality criteria: Averaging period 24 hr - PM10 limit: 50ug/m3



Coordinate System: NAD 1983 CSRS UTM Zone 20N  
Projection: Transverse Mercator  
Datum: North American 1983 CSRS  
Units: Meter



1:15,000 Scale when printed @ 11" x 17"

Drawn By: EP  
Reviewed By: LP  
Date: 2021-09-21

Service Layer Credits: Sources: Esri, HERE, Gamin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community



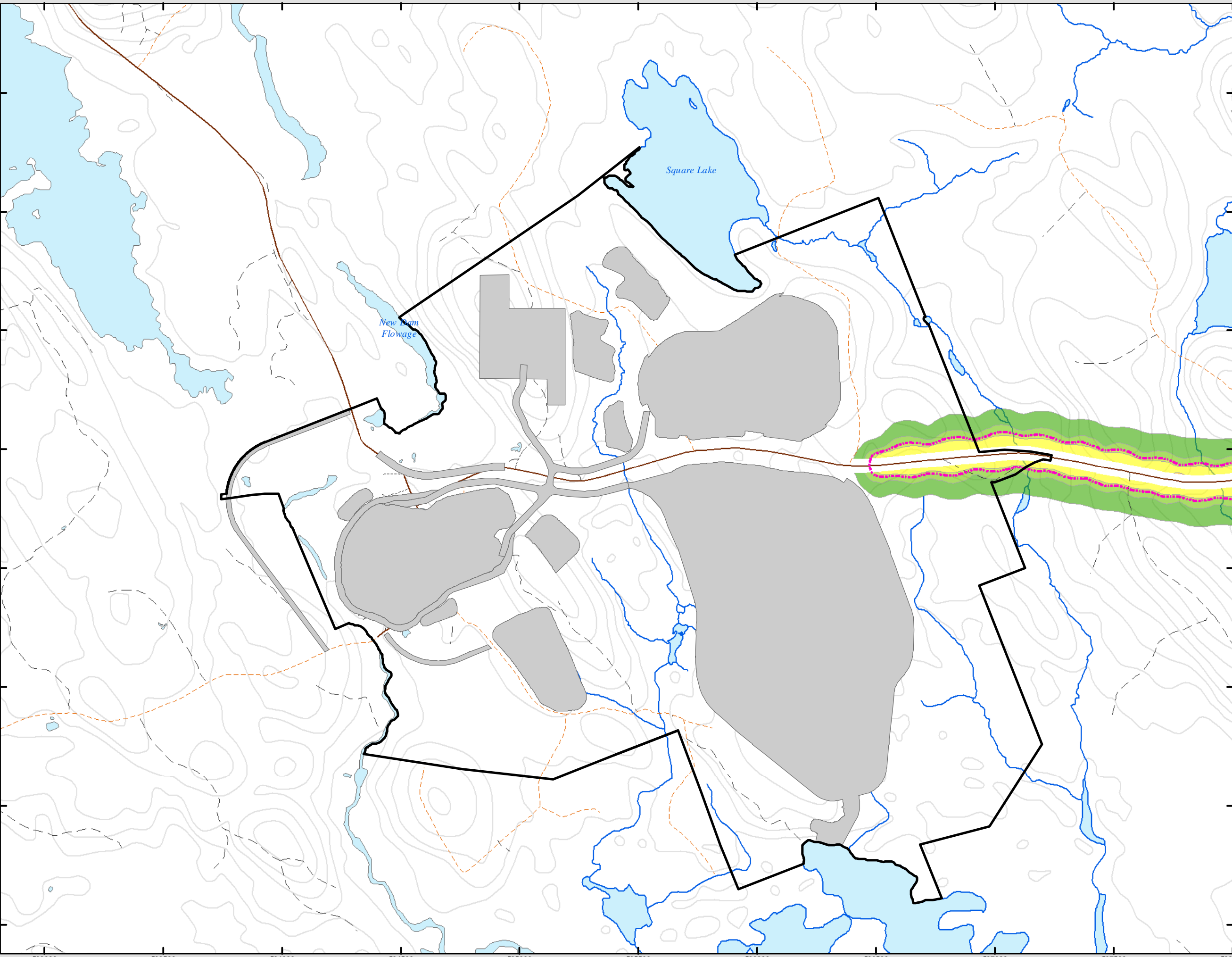
McCallum Environmental Ltd.

Prepared For:



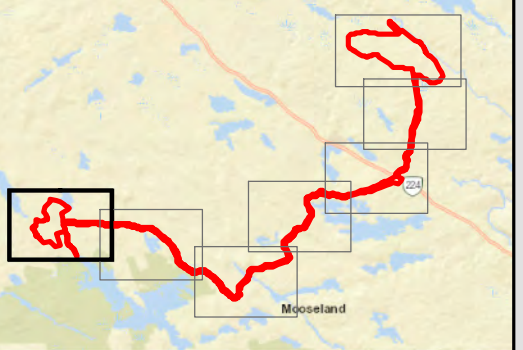
FIGURE CEEA 2-31-3G

### Beaver Dam Mine Project Air Contour PM10 24-Hour Levels



- Mooseland\_Road 30m Buffer
- 13.1 ug/m3 PM10 24 hr Background Level Concentration
- Existing Touquoy Property Boundary
- PM10 Ranges (um/m3)
  - 5
  - 5 - 10
  - 10 - 13.5
  - 13.5 - 15
  - 15 - 20
- Local Road
- Dry Weather / Seasonal Road
- Diveways (>300 m)
- Track
- NSTDB Mapped Watercourses
- Lakes
- Planned Infrastructure

Note: Based on 80% Road Dust Mitigation  
Ambient air quality criteria: Averaging period 24 hr - PM10 limit: 50ug/m3



Coordinate System: NAD 1983 CSRS UTM Zone 20N  
 Projection: Transverse Mercator  
 Datum: North American 1983 CSRS  
 Units: Meter

0 125 250 500 m

1:15,000 Scale when printed @ 11" x 17"

Drawn By: EP Date: 2021-09-21  
Reviewed By: LP

Service Layer Credits: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community



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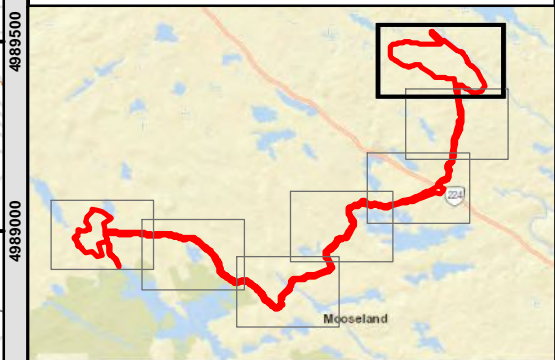


FIGURE CEAA 2-31-4A

### Beaver Dam Mine Project Air Contour PM2.5 24-Hour Levels

Proposed Property Boundary	Local Road
Mine Site concentrations reach background within boundary	Dry Weather / Seasonal Road
0.5	Track
0.5 - 1	NSTDB Mapped Watercourses
1 - 1.5	Lakes
1.5 - 2	Planned Infrastructure
2 - 2.5	
2.5 - 3	

Note: Based on 80% Road Dust mitigation  
 All contours shown well below limits or background values  
 Ambient air quality criteria: Averaging period 24 hr PM2.5 limit: 27 ug/m<sup>3</sup>  
 Background 24 hr PM 2.5 level: 9 ug/m<sup>3</sup>



Coordinate System: NAD 1983 CSRS UTM Zone 20N  
 Projection: Transverse Mercator  
 Datum: North American 1983 CSRS  
 Units: Meter

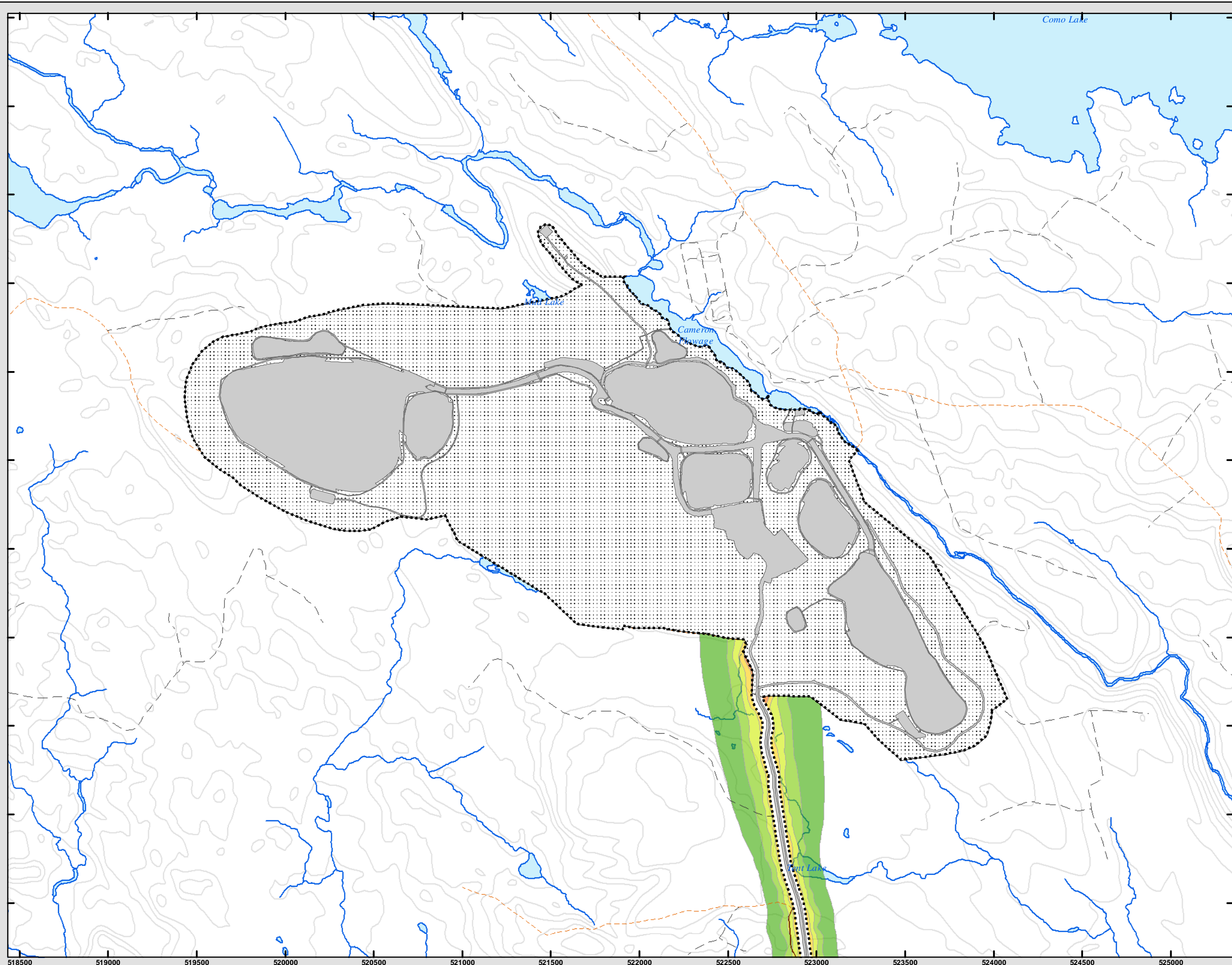
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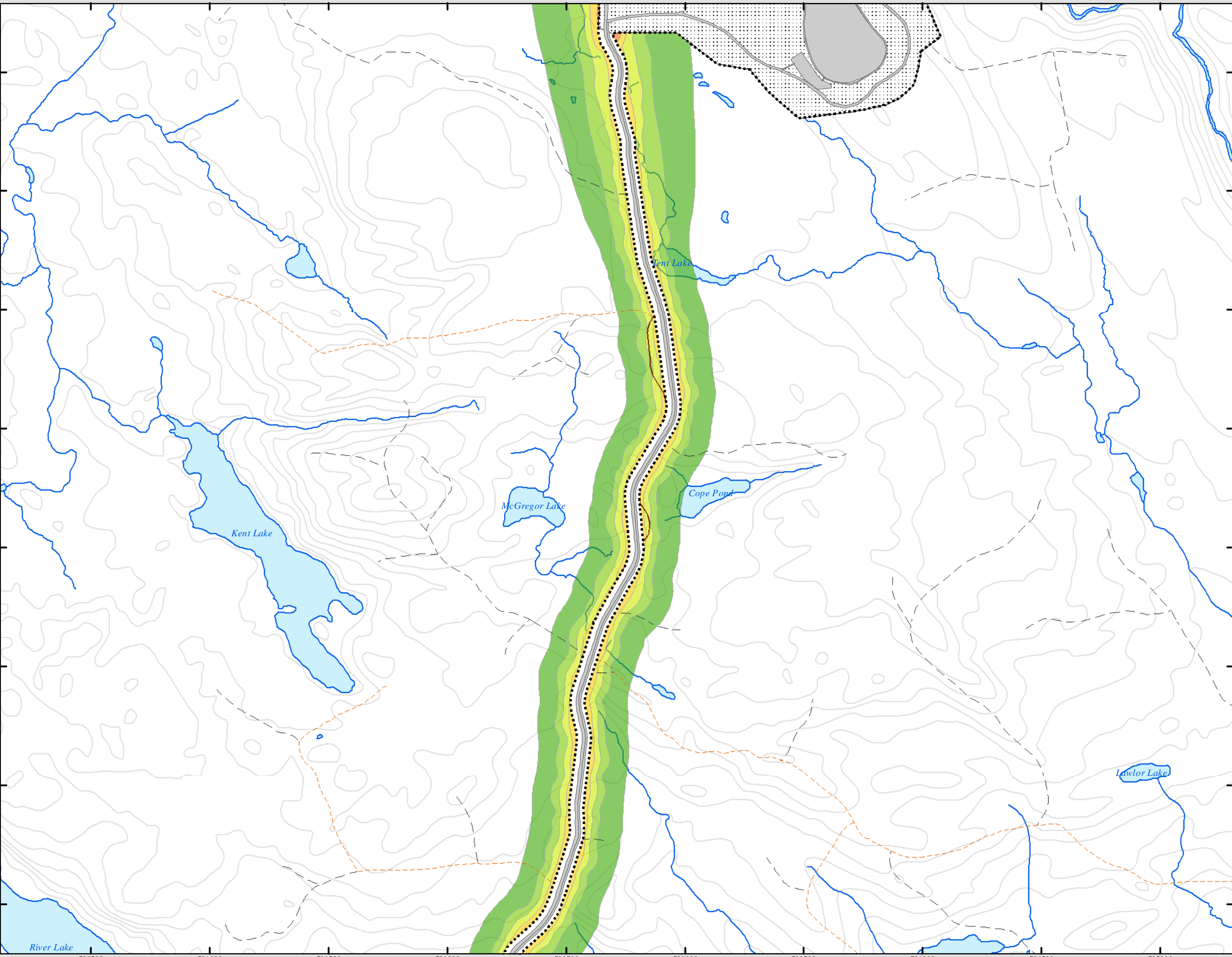
Prepared For:



**Atlantic Gold**

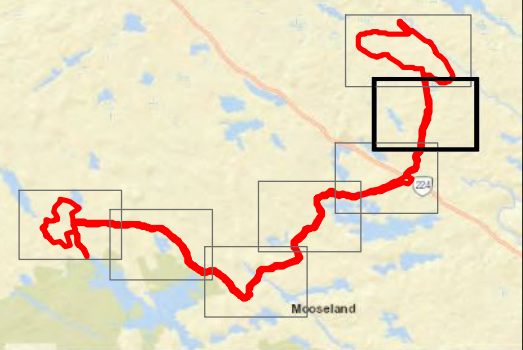
**FIGURE CEEA 2-31-4B**

**Beaver Dam Mine Project  
Air Contour PM2.5 24-Hour  
Levels**



Proposed Property Boundary	Local Road
Mine Site concentrations reach background within boundary	Dry Weather / Seasonal Road
	Track
<b>PM 2.5 Ranges (ug/m3)</b>	NSTDB Mapped Watercourses
0.5	Lakes
0.5 - 1	Planned Infrastructure
1 - 1.5	
1.5 - 2	
2 - 2.5	
2.5 - 3	

Note: Based on 80% Road Dust mitigation  
All contours shown well below limits or background values  
Ambient air quality criteria: Averaging period 24 hr PM2.5 limit: 27 ug/m3  
Background 24 hr PM 2.5 level: 9 ug/m3



Coordinate System: NAD 1983 CSRS UTM Zone 20N  
Projection: Transverse Mercator  
Datum: North American 1983 CSRS  
Units: Meter

0 125 250 500 m

1:15,000 Scale when printed @ 11" x 17"

Drawn By: EP Date: 2021-09-21  
Reviewed By: LP

Service Layer Credits: Sources: Esri, HERE, Gamin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community



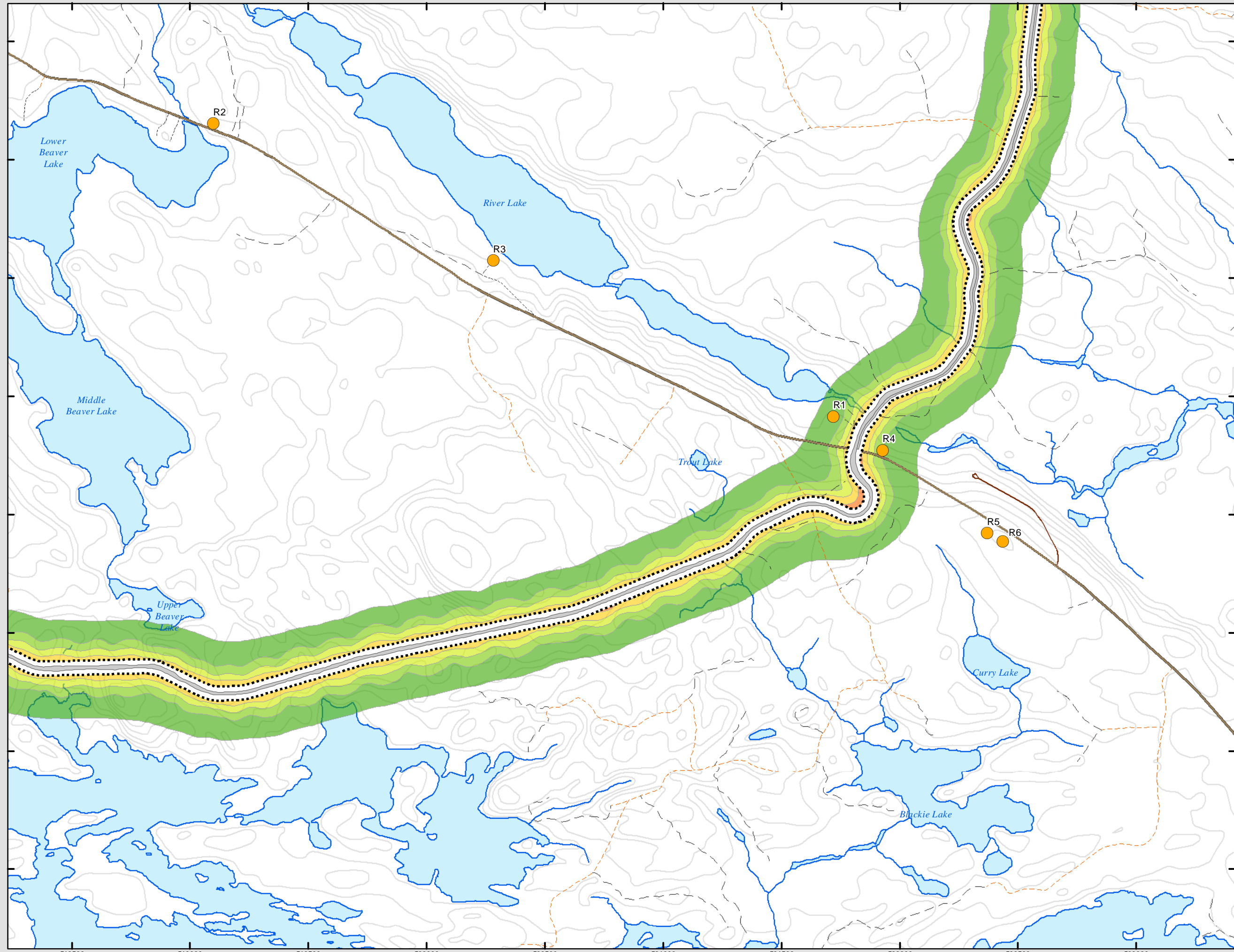
**McCallum Environmental Ltd.**

Prepared For:



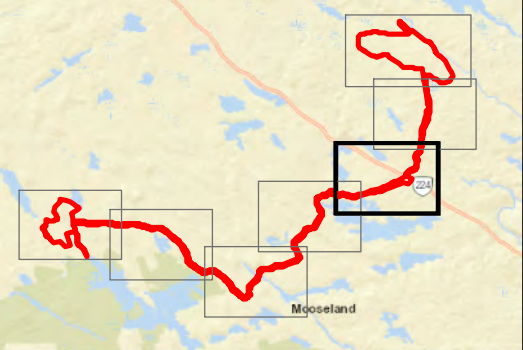
FIGURE CEEA 2-31-4C

Beaver Dam Mine Project  
Air Contour PM2.5 24-Hour  
Levels



Proposed Property Boundary  
 Receptor  
**PM 2.5 Ranges (ug/m3)**  
 0.5  
 0.5 - 1  
 1 - 1.5  
 1.5 - 2  
 2 - 2.5  
 2.5 - 3  
 Collector Road  
 Local Road  
 Dry Weather / Seasonal Road  
 Diveways (>300 m)  
 Track  
 NSTDB Mapped Watercourses  
 Lakes  
 Planned Infrastructure

Note: Based on 80% Road Dust mitigation  
 All contours shown well below limits or background values  
 Ambient air quality criteria: Averaging period 24 hr PM2.5 limit: 27 ug/m3  
 Background 24 hr PM 2.5 level: 9 ug/m3



Coordinate System: NAD 1983 CSRS UTM Zone 20N  
 Projection: Transverse Mercator  
 Datum: North American 1983 CSRS  
 Units: Meter  
  
 1:15,000 Scale when printed @ 11" x 17"

Drawn By: EP  
 Reviewed By: LP  
 Date: 2021-09-21

Service Layer Credits: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community



McCallum Environmental Ltd.

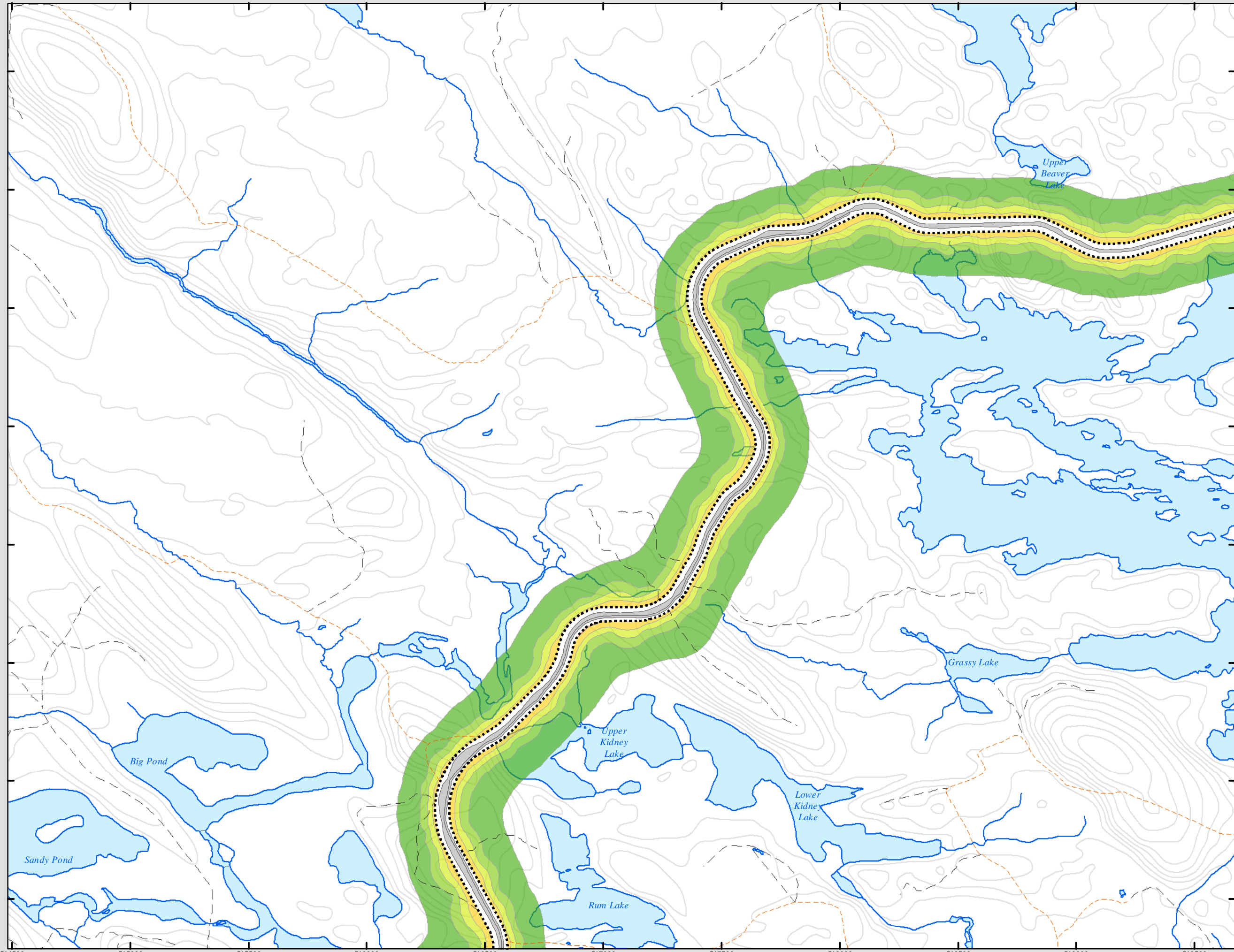


Prepared For:



FIGURE CEEA 2-31-4D

Beaver Dam Mine Project  
Air Contour PM2.5 24-Hour Levels

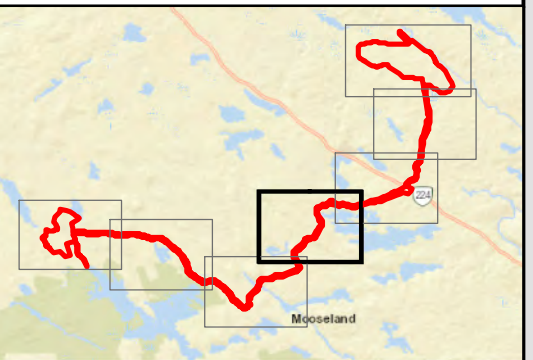


Proposed Property Boundary    Dry Weather / Seasonal Road  
 Track    NSTDB Mapped Watercourses  
 Lakes  
 Planned Infrastructure

**PM 2.5 Ranges (ug/m3)**

- 0.5
- 0.5 - 1
- 1 - 1.5
- 1.5 - 2
- 2 - 2.5

Note: Based on 80% Road Dust mitigation  
 All contours shown well below limits or background values  
 Ambient air quality criteria: Averaging period 24 hr PM2.5 limit: 27 ug/m3  
 Background 24 hr PM 2.5 level: 9 ug/m3



Coordinate System: NAD 1983 CSRS UTM Zone 20N  
 Projection: Transverse Mercator  
 Datum: North American 1983 CSRS  
 Units: Meter

0 125 250 500 m

1:15,000    Scale when printed @ 11" x 17"

Drawn By: EP    Date: 2021-09-21  
 Reviewed By: LP

Service Layer Credits: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community



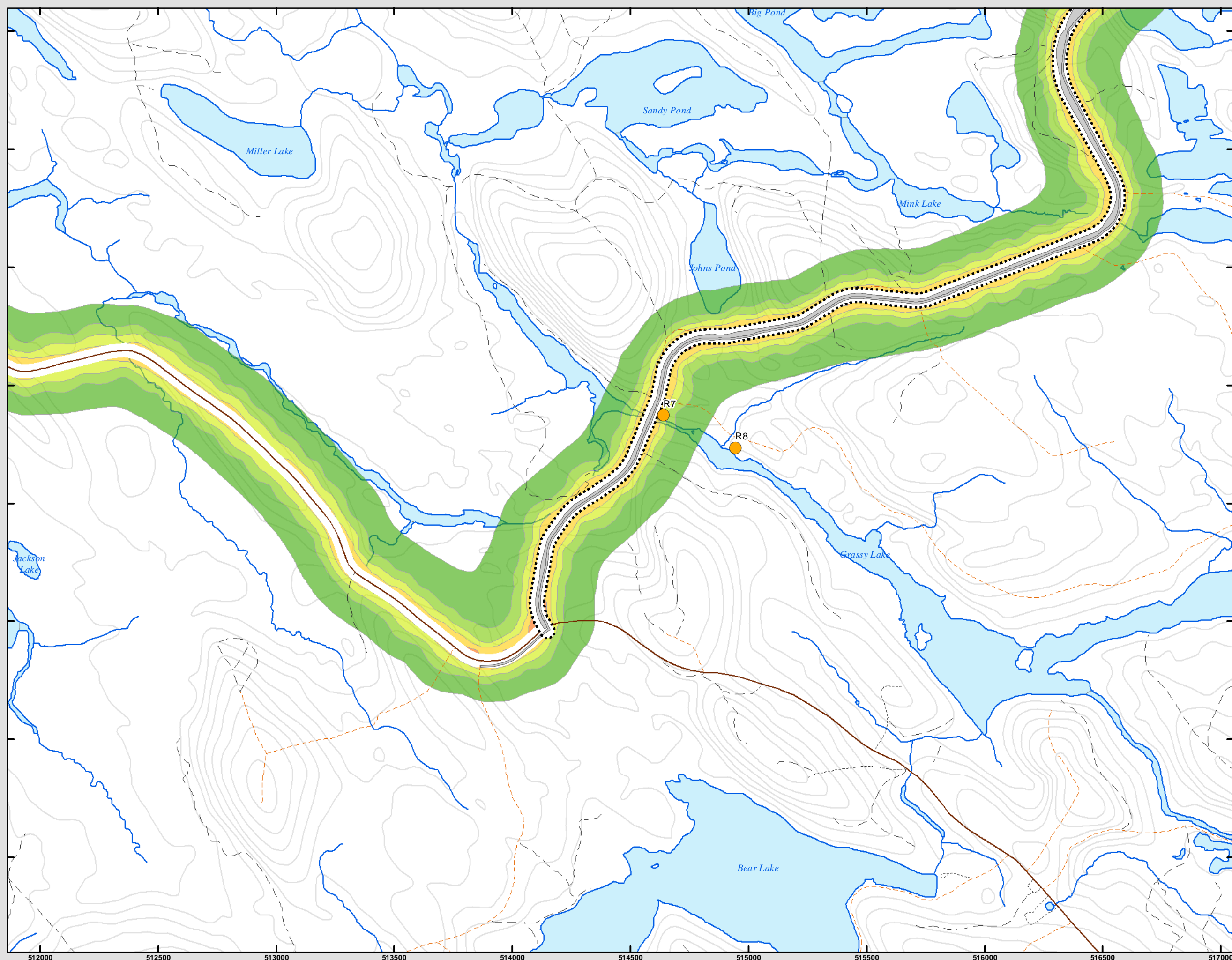
McCallum Environmental Ltd.

Prepared For:



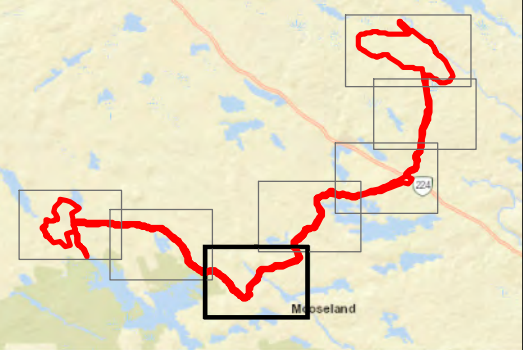
**FIGURE CEEA 2-31-4E**

**Beaver Dam Mine Project  
Air Contour PM2.5 24-Hour  
Levels**



Proposed Property Boundary    Local Road  
 Receptor    Dry Weather / Seasonal Road  
**PM 2.5 Ranges (ug/m3)**  
 0.5  
 0.5 - 1  
 1 - 1.5  
 1.5 - 2  
 2 - 2.5  
 2.5 - 3  
 Diverways (>300 m)  
 Track  
 NSTDB Mapped Watercourses  
 Lakes  
 Planned Infrastructure

Note: Based on 80% Road Dust mitigation  
 All contours shown well below limits or background values  
 Ambient air quality criteria: Averaging period 24 hr PM2.5 limit: 27 ug/m3  
 Background 24 hr PM 2.5 level: 9 ug/m3



Coordinate System: NAD 1983 CSRS UTM Zone 20N  
 Projection: Transverse Mercator  
 Datum: North American 1983 CSRS  
 Units: Meter  
  
**1:15,000**    Scale when printed @ 11" x 17"

Drawn By: EP    Date: 2021-09-21  
 Reviewed By: LP

Service Layer Credits: Sources: Esri, HERE, Gamin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community



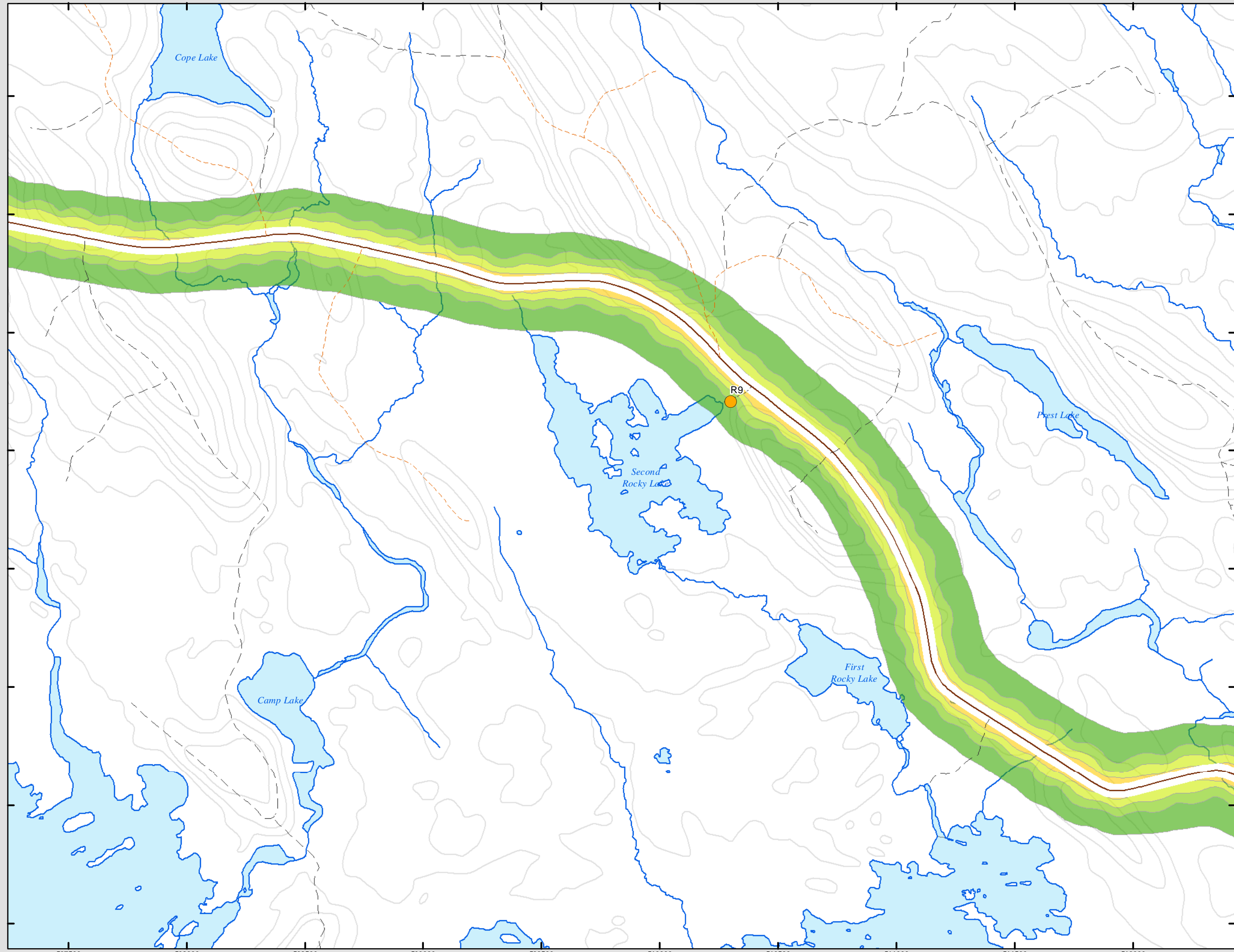
**McCallum Environmental Ltd.**

Prepared For:



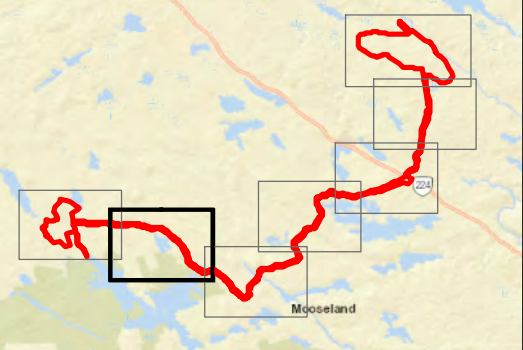
FIGURE CEAA 2-31-4F

Beaver Dam Mine Project  
Air Contour PM2.5 24-Hour  
Levels



- Receptor
- Local Road
- - - Dry Weather / Seasonal Road
- - - Diveways (>300 m)
- Track
- NSTDB Mapped Watercourses
- Lakes
- Planned Infrastructure

Note: Based on 80% Road Dust mitigation  
 All contours shown well below limits or background values  
 Ambient air quality criteria: Averaging period 24 hr PM2.5 limit: 27 ug/m3  
 Background 24 hr PM 2.5 level: 9 ug/m3



Coordinate System: NAD 1983 CSRS UTM Zone 20N  
 Projection: Transverse Mercator  
 Datum: North American 1983 CSRS  
 Units: Meter

0 125 250 500 m

1:15,000 Scale when printed @ 11" x 17"

Drawn By: EP Date: 2021-09-21  
 Reviewed By: LP

Service Layer Credits: Sources: Esri, HERE, Gamin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community



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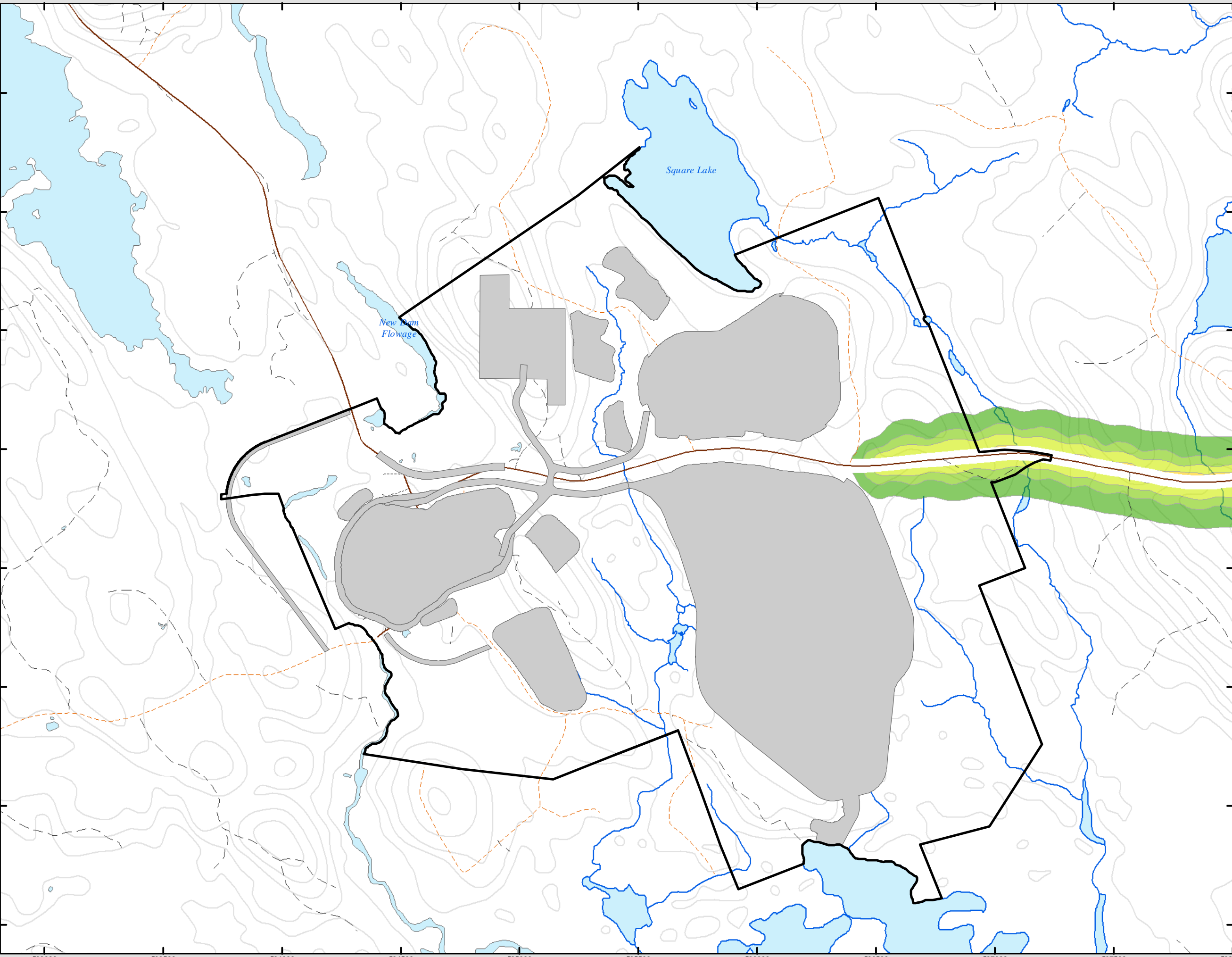
Prepared For:



**Atlantic Gold**

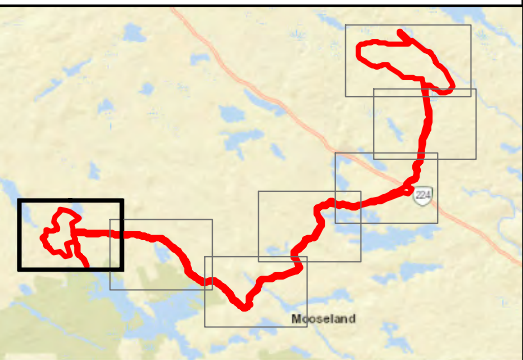
**FIGURE CEA 2-31-4G**

**Beaver Dam Mine Project  
Air Contour PM2.5 24-Hour  
Levels**



- Existing Touquoy Property Boundary
  - Local Road
  - Dry Weather / Seasonal Road
  - Diveways (>300 m)
  - Track
  - NSTDB Mapped Watercourses
  - Lakes
  - Planned Infrastructure
- PM 2.5 Ranges (ug/m3)**
- 0.5
  - 0.5 - 1
  - 1 - 1.5
  - 1.5 - 2

Note: Based on 80% Road Dust mitigation  
All contours shown well below limits or background values  
Ambient air quality criteria: Averaging period 24 hr PM2.5 limit: 27 ug/m3  
Background 24 hr PM 2.5 level: 9 ug/m3



Coordinate System: NAD 1983 CSRS UTM Zone 20N  
Projection: Transverse Mercator  
Datum: North American 1983 CSRS  
Units: Meter  
0 125 250 500 m  
1:15,000 Scale when printed @ 11" x 17"

Drawn By: EP Date: 2021-09-21  
Reviewed By: LP

Service Layer Credits: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community



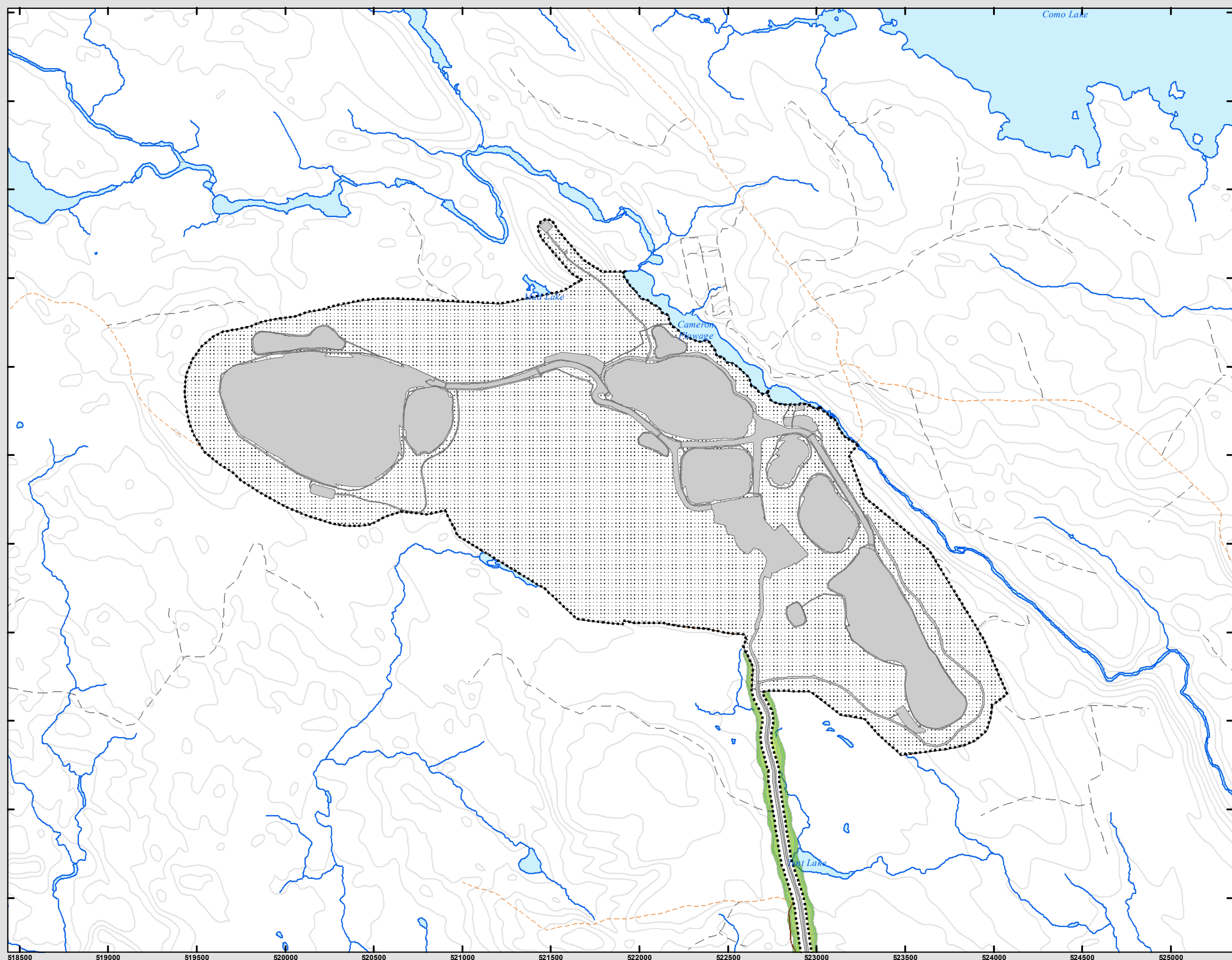
**McCallum Environmental Ltd.**

Prepared For:



FIGURE CEEA 2-31-5A

Beaver Dam Mine Project  
Air Contour PM2.5 Annual  
Levels

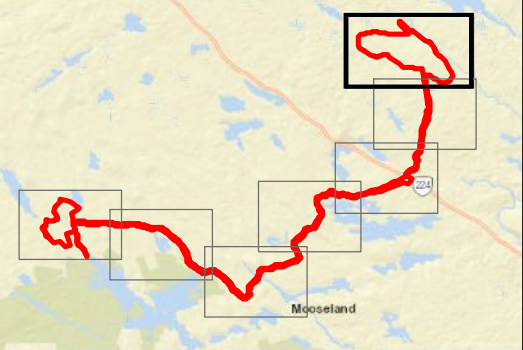


Proposed Property Boundary  
 Mine Site concentrations reach background within boundary  
 Local Road  
 Dry Weather / Seasonal Road  
 Track  
 NSTDB Mapped Watercourses  
 Lakes  
 Planned Infrastructure

**PM 2.5 Ranges (ug/m3)**

- 0.5 - 0.6
- 0.6 - 0.7
- 0.75 - 0.8
- 0.85 - 0.9
- 0.9 - 1

Note: Based on 80% Road Dust mitigation  
 All contours shown well below limits or background values  
 Ambient air quality criteria: Averaging period Annual PM2.5 limit: 8.8 ug/m3  
 Background Annual PM 2.5 level: 5.7 ug/m3



Coordinate System: NAD 1983 CSRS UTM Zone 20N  
 Projection: Transverse Mercator  
 Datum: North American 1983 CSRS  
 Units: Meter

0 170 340 680 m  
 1:20,000 Scale when printed @ 11" x 17"

Drawn By: EP Date: 2021-09-22  
 Reviewed By: LP

Service Layer Credits: Sources: Esri, HERE, Gamin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community



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Prepared For:

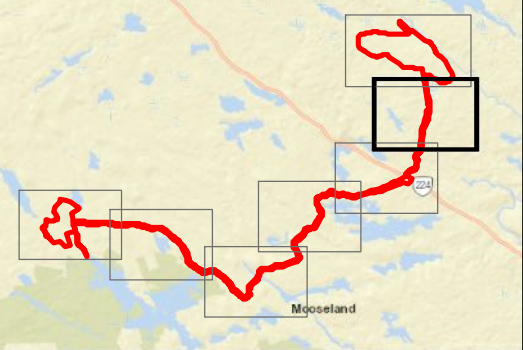


**FIGURE CEEA 2-31-5B**

**Beaver Dam Mine Project  
Air Contour PM2.5 Annual  
Levels**

- Proposed Property Boundary
  - Mine Site concentrations reach background within boundary
  - Local Road
  - Dry Weather / Seasonal Road
  - Track
  - NSTDB Mapped Watercourses
  - Lakes
  - Planned Infrastructure
- PM 2.5 Ranges (ug/m3)**
- 0.5
  - 0.5 - 0.6
  - 0.6 - 0.7
  - 0.75 - 0.8
  - 0.8 - 0.85
  - 0.85 - 0.9
  - 0.9 - 1

Note: Based on 80% Road Dust mitigation  
 All contours shown well below limits or background values  
 Ambient air quality criteria: Averaging period Annual PM2.5 limit: 8.8 ug/m3  
 Background Annual PM 2.5 level: 5.7 ug/m3



Coordinate System: NAD 1983 CSRS UTM Zone 20N  
 Projection: Transverse Mercator  
 Datum: North American 1983 CSRS  
 Units: Meter

0 125 250 500 m

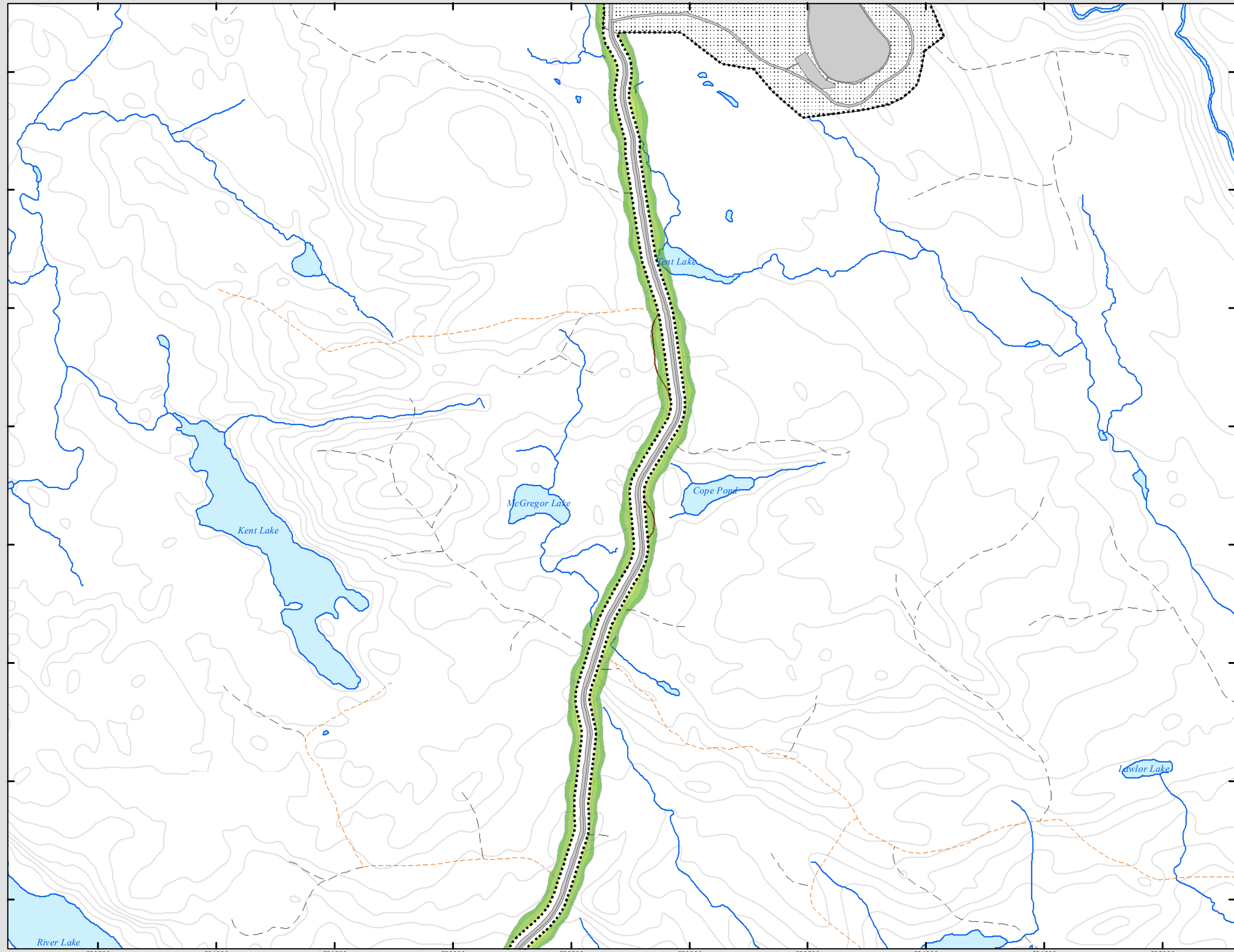
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Drawn By: EP Date: 2021-09-22  
 Reviewed By: LP

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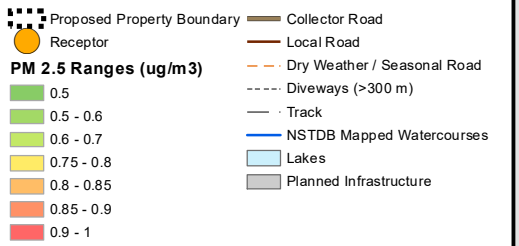


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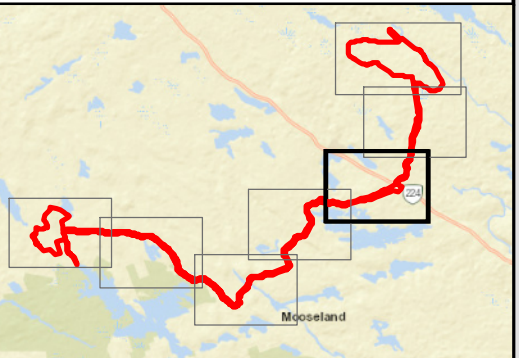


**FIGURE CEA 2-31-5C**

**Beaver Dam Mine Project  
Air Contour PM2.5 Annual  
Levels**



Note: Based on 80% Road Dust mitigation  
 All contours shown well below limits or background values  
 Ambient air quality criteria: Averaging period Annual PM2.5 limit: 8.8 ug/m3  
 Background Annual PM 2.5 level: 5.7 ug/m3



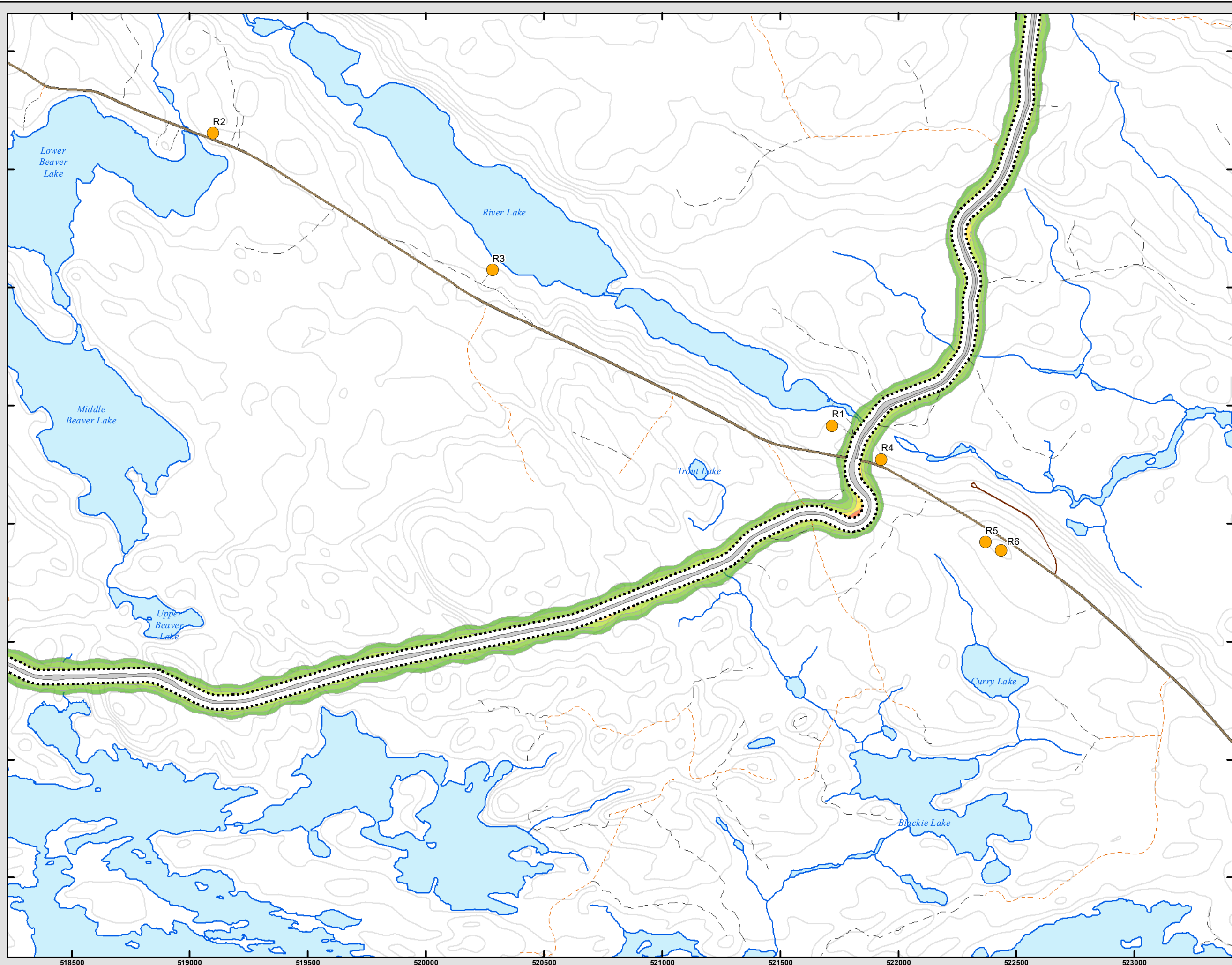
Coordinate System: NAD 1983 CSRS UTM Zone 20N  
 Projection: Transverse Mercator  
 Datum: North American 1983 CSRS  
 Units: Meter  
  
 1:15,000 Scale when printed @ 11" x 17"

Drawn By: EP Date: 2021-09-22  
 Reviewed By: LP

Service Layer Credits: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community



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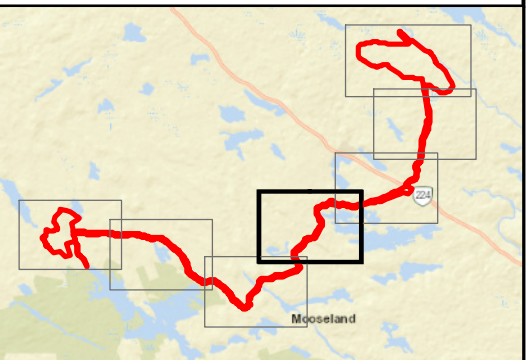
**Atlantic Gold**

**FIGURE CEA 2-31-5D**

**Beaver Dam Mine Project  
Air Contour PM2.5 Annual  
Levels**

- Proposed Property Boundary
  - Dry Weather / Seasonal Road
  - Track
  - NSTDB Mapped Watercourses
  - Lakes
  - Planned Infrastructure
- PM 2.5 Ranges (ug/m3)**
- 0.5
  - 0.5 - 0.6
  - 0.6 - 0.7
  - 0.75 - 0.8
  - 0.8 - 0.85

Note: Based on 80% Road Dust mitigation  
 All contours shown well below limits or background values  
 Ambient air quality criteria: Averaging period Annual PM2.5 limit: 8.8 ug/m3  
 Background Annual PM 2.5 level: 5.7 ug/m3



Coordinate System: NAD 1983 CSRS UTM Zone 20N  
 Projection: Transverse Mercator  
 Datum: North American 1983 CSRS  
 Units: Meter

0 125 250 500 m

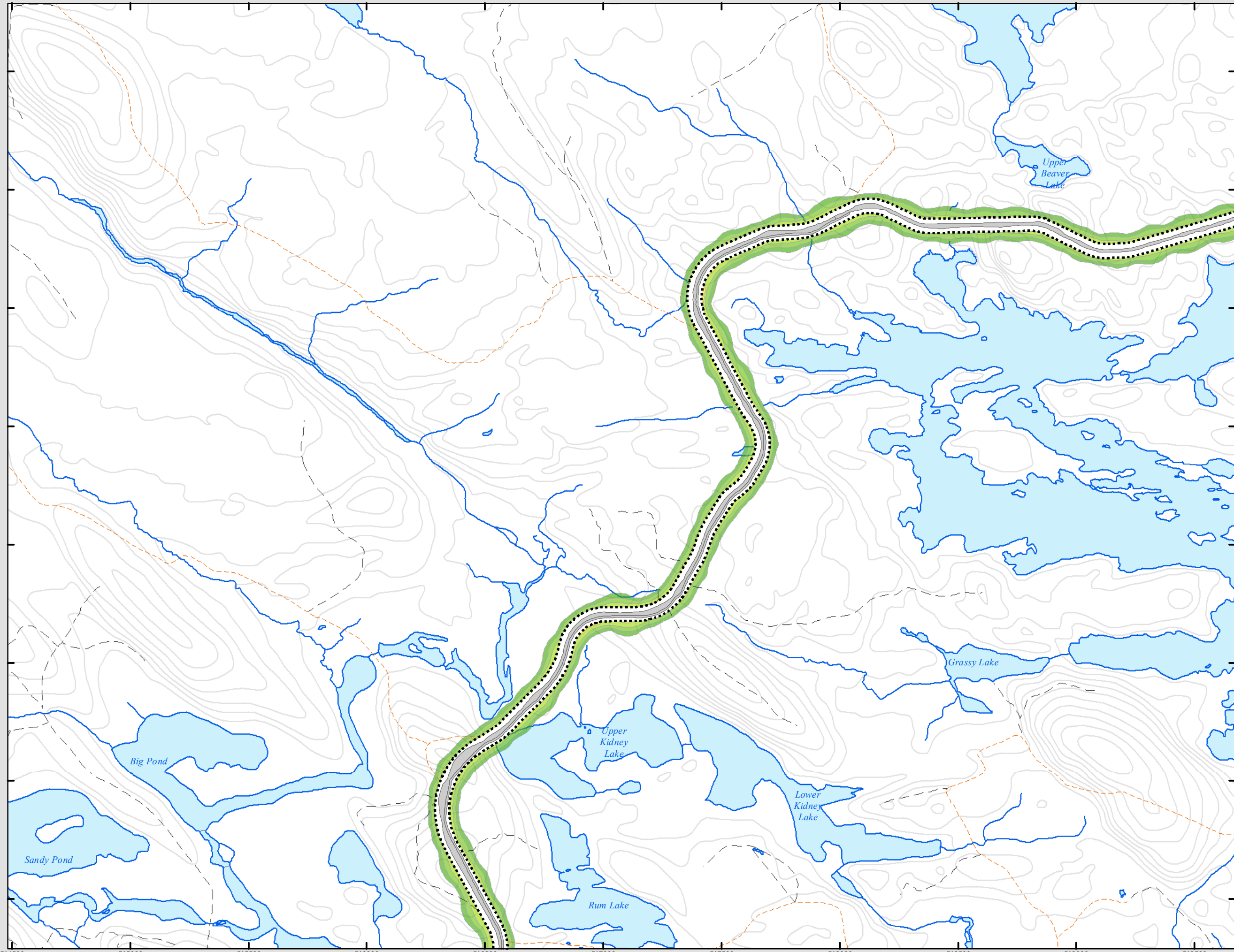
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Drawn By: EP Date: 2021-09-22  
 Reviewed By: LP

Service Layer Credits: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community



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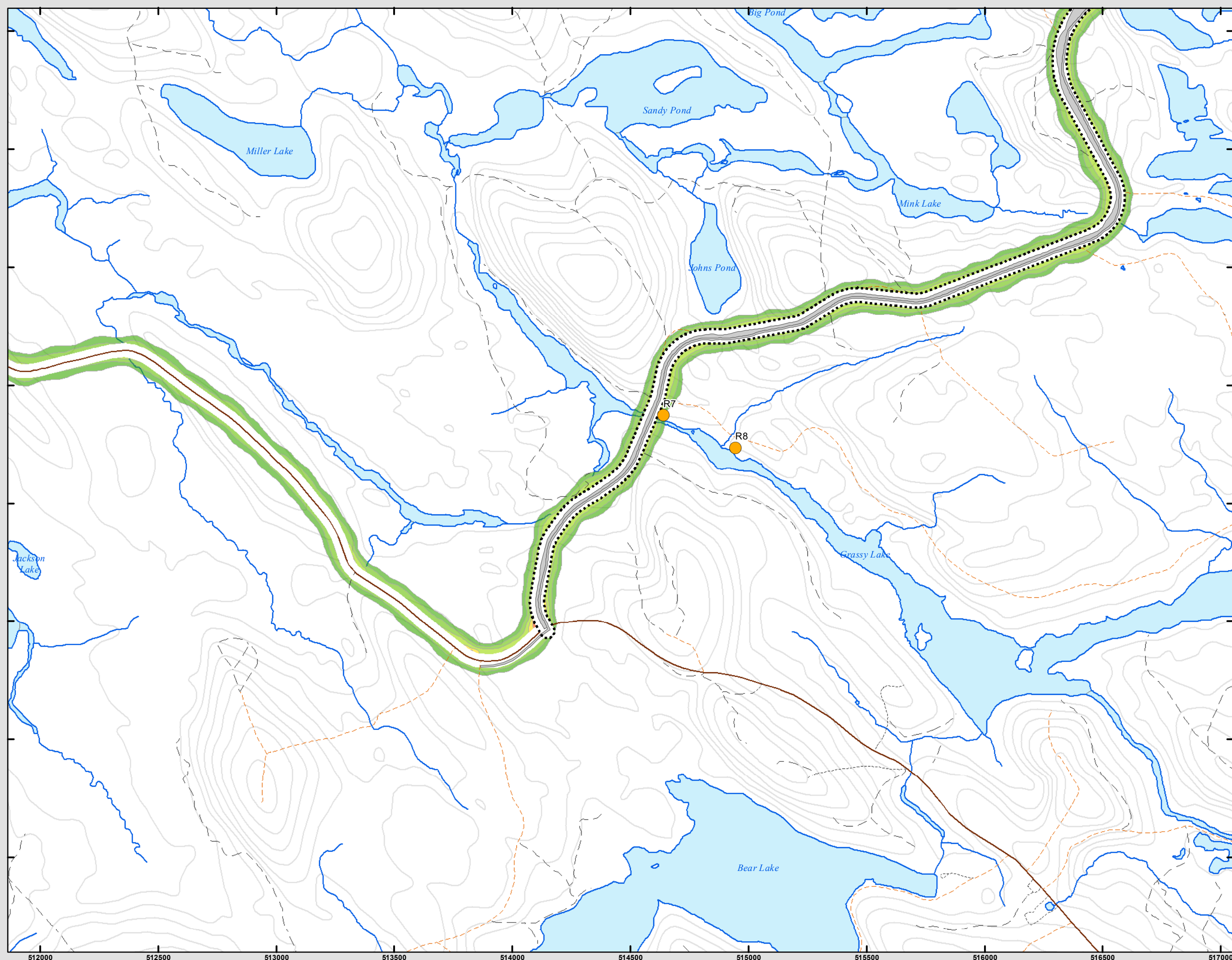
Prepared For:



**Atlantic Gold**

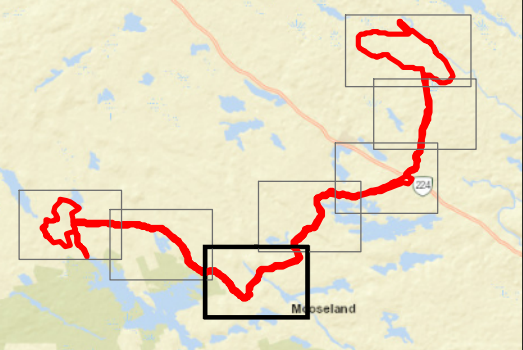
**FIGURE CEAA 2-31-5E**

**Beaver Dam Mine Project  
Air Contour PM2.5 Annual  
Levels**



- Proposed Property Boundary
- Mooseland\_Road 30m Buffer
- Receptor
- PM 2.5 Ranges (ug/m3)
  - 0.5
  - 0.5 - 0.6
  - 0.6 - 0.7
  - 0.75 - 0.8
  - 0.8 - 0.85
  - 0.85 - 0.9
  - 0.9 - 1
- Local Road
- Dry Weather / Seasonal Road
- Diveways (>300 m)
- Track
- NSTDB Mapped Watercourses
- Lakes
- Planned Infrastructure

Note: Based on 80% Road Dust mitigation  
 All contours shown well below limits or background values  
 Ambient air quality criteria: Averaging period Annual PM2.5 limit: 8.8 ug/m3  
 Background Annual PM 2.5 level: 5.7 ug/m3



Coordinate System: NAD 1983 CSRS UTM Zone 20N  
 Projection: Transverse Mercator  
 Datum: North American 1983 CSRS  
 Units: Meter  
 0 125 250 500 m  
 1:15,000 Scale when printed @ 11" x 17"

Drawn By: EP Date: 2021-09-22  
 Reviewed By: LP

Service Layer Credits: Sources: Esri, HERE, Gamin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community



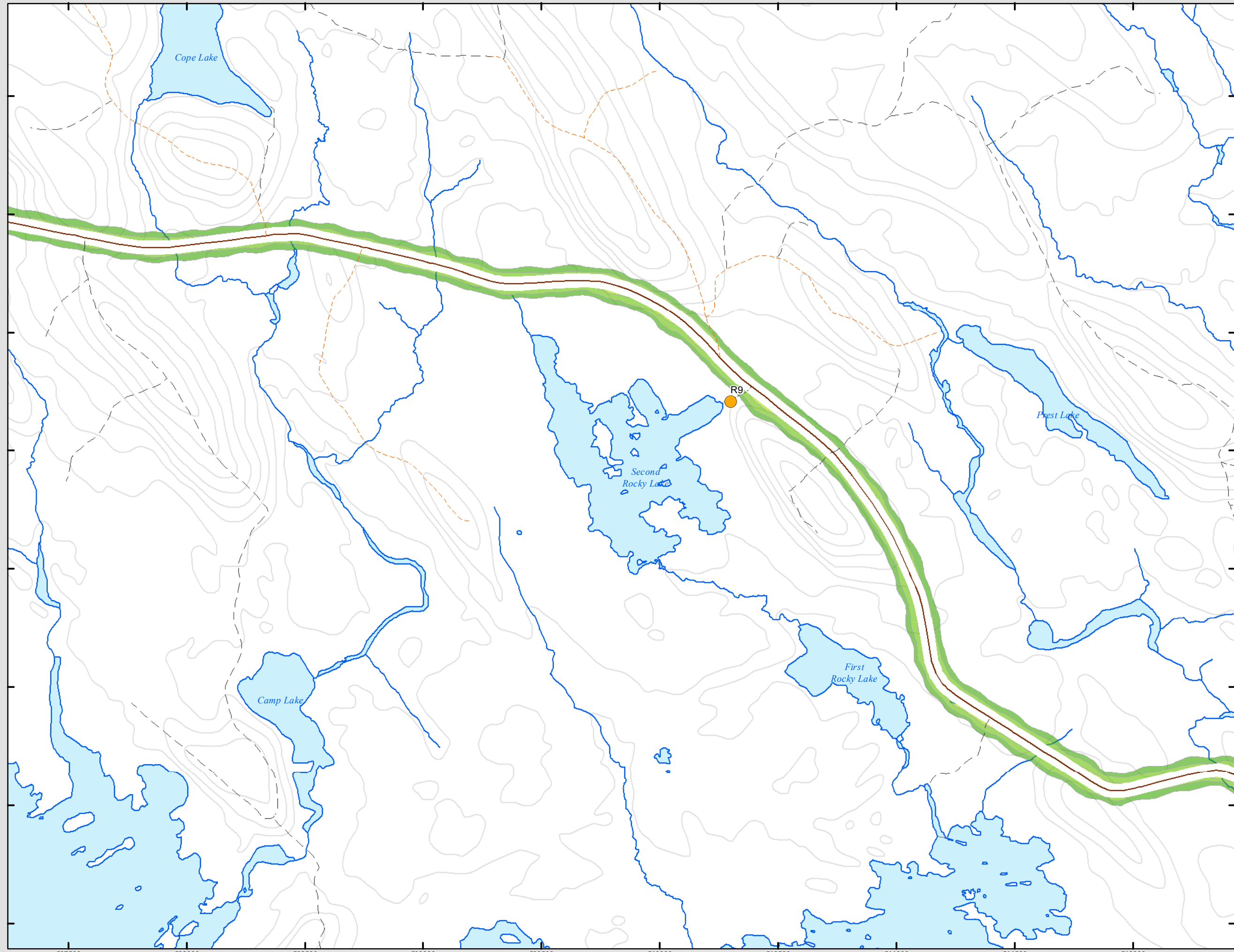
**McCallum Environmental Ltd.**

Prepared For:



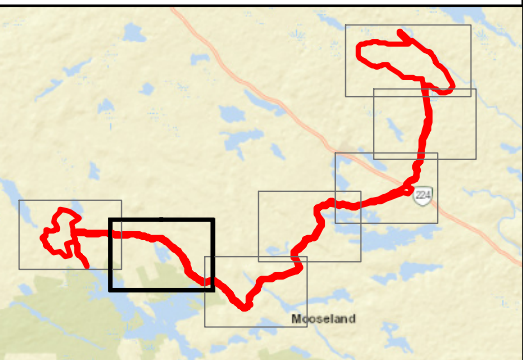
FIGURE CEA 2-31-5F

### Beaver Dam Mine Project Air Contour PM2.5 Annual Levels

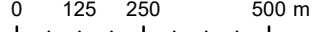


- Mooseland\_Road 30m Buffer
- Receptor
- PM 2.5 Ranges (ug/m3)
  - 0.5
  - 0.5 - 0.6
  - 0.6 - 0.7
  - 0.7 - 0.75
- Local Road
- Dry Weather / Seasonal Road
- Diveways (>300 m)
- Track
- NSTDB Mapped Watercourses
- Lakes
- Planned Infrastructure

Note: Based on 80% Road Dust mitigation  
 All contours shown well below limits or background values  
 Ambient air quality criteria: Averaging period Annual PM2.5 limit: 8.8 ug/m3  
 Background Annual PM 2.5 level: 5.7 ug/m3



Coordinate System: NAD 1983 CSRS UTM Zone 20N  
 Projection: Transverse Mercator  
 Datum: North American 1983 CSRS  
 Units: Meter



1:15,000 Scale when printed @ 11" x 17"

Drawn By: EP Date: 2021-09-22  
 Reviewed By: LP

Service Layer Credits: Sources: Esri, HERE, Gamin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community



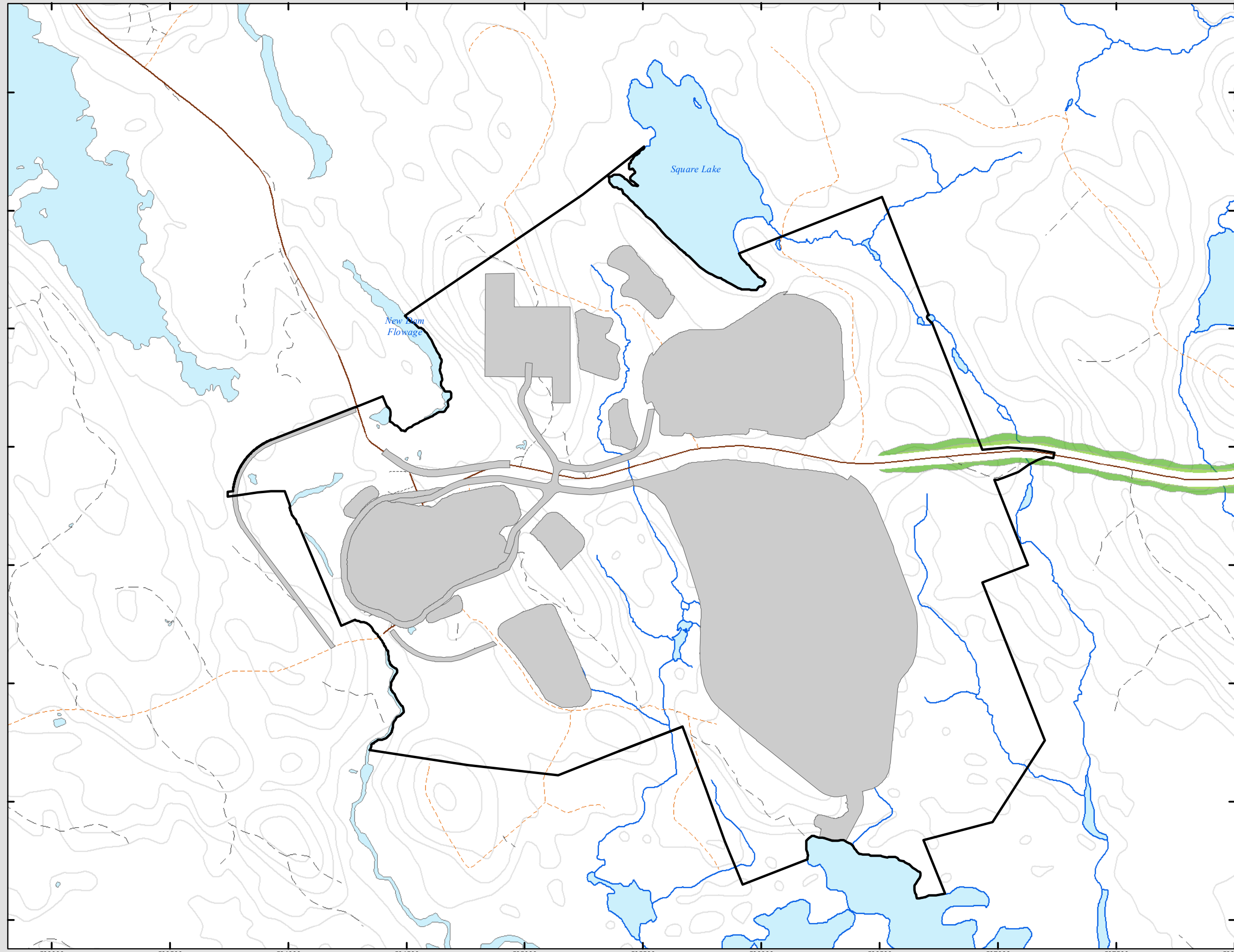
McCallum Environmental Ltd.

Prepared For:



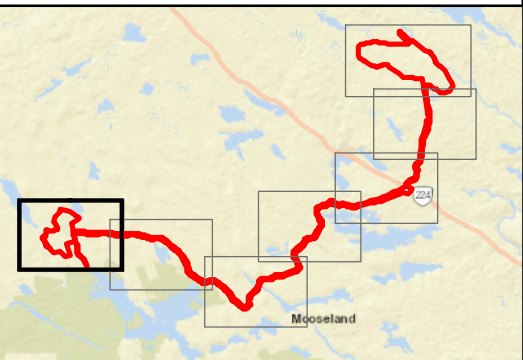
FIGURE CEAA 2-31-5G

Beaver Dam Mine Project  
Air Contour PM2.5 Annual Levels

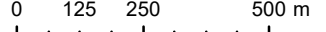


- Existing Touquoy Property Boundary
- Mooseland\_Road 30m Buffer
- Local Road
- Dry Weather / Seasonal Road
- PM 2.5 Ranges (ug/m3)
  - 0.5
  - 0.5 - 0.6
- Diveways (>300 m)
- Track
- NSTDB Mapped Watercourses
- Lakes
- Planned Infrastructure

Note: Based on 80% Road Dust mitigation  
 All contours shown well below limits or background values  
 Ambient air quality criteria: Averaging period Annual PM2.5 limit: 8.8 ug/m3  
 Background Annual PM 2.5 level: 5.7 ug/m3



Coordinate System: NAD 1983 CSRS UTM Zone 20N  
 Projection: Transverse Mercator  
 Datum: North American 1983 CSRS  
 Units: Meter



1:15,000 Scale when printed @ 11" x 17"

Drawn By: EP Date: 2021-09-22  
 Reviewed By: LP

Service Layer Credits: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community



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Prepared For:

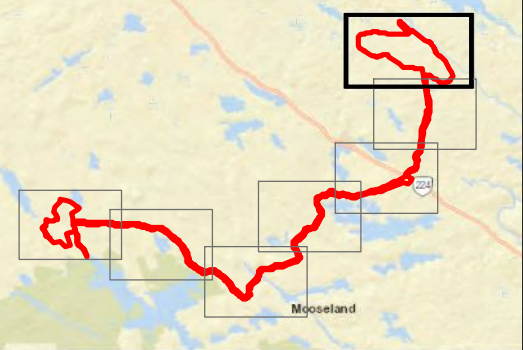


FIGURE CEAA 2-31-6A

### Beaver Dam Mine Project Air Contours NO2 1-Hour Levels

- Beaver Dam Mine Site (concentrations beyond property boundary shown)
- NO2 Ranges (ug/m3)
  - 3 - 6
  - 6 - 9
  - 9 - 12
  - 12 - 15
  - 15 - 18
  - 18
- Local Road
- Dry Weather / Seasonal Road
- Track
- NSTDB Mapped Watercourses
- Lakes
- Proposed Project Infrastructure
- Proposed Property Boundary

NO2 1 Hour Guideline: 400 ug/m3 (not shown on map)  
Background Concentration Used: 41.1 ug/m3 (not shown on map)



Coordinate System: NAD 1983 CSRS UTM Zone 20N  
 Projection: Transverse Mercator  
 Datum: North American 1983 CSRS  
 Units: Meter

0 170 340 680 m

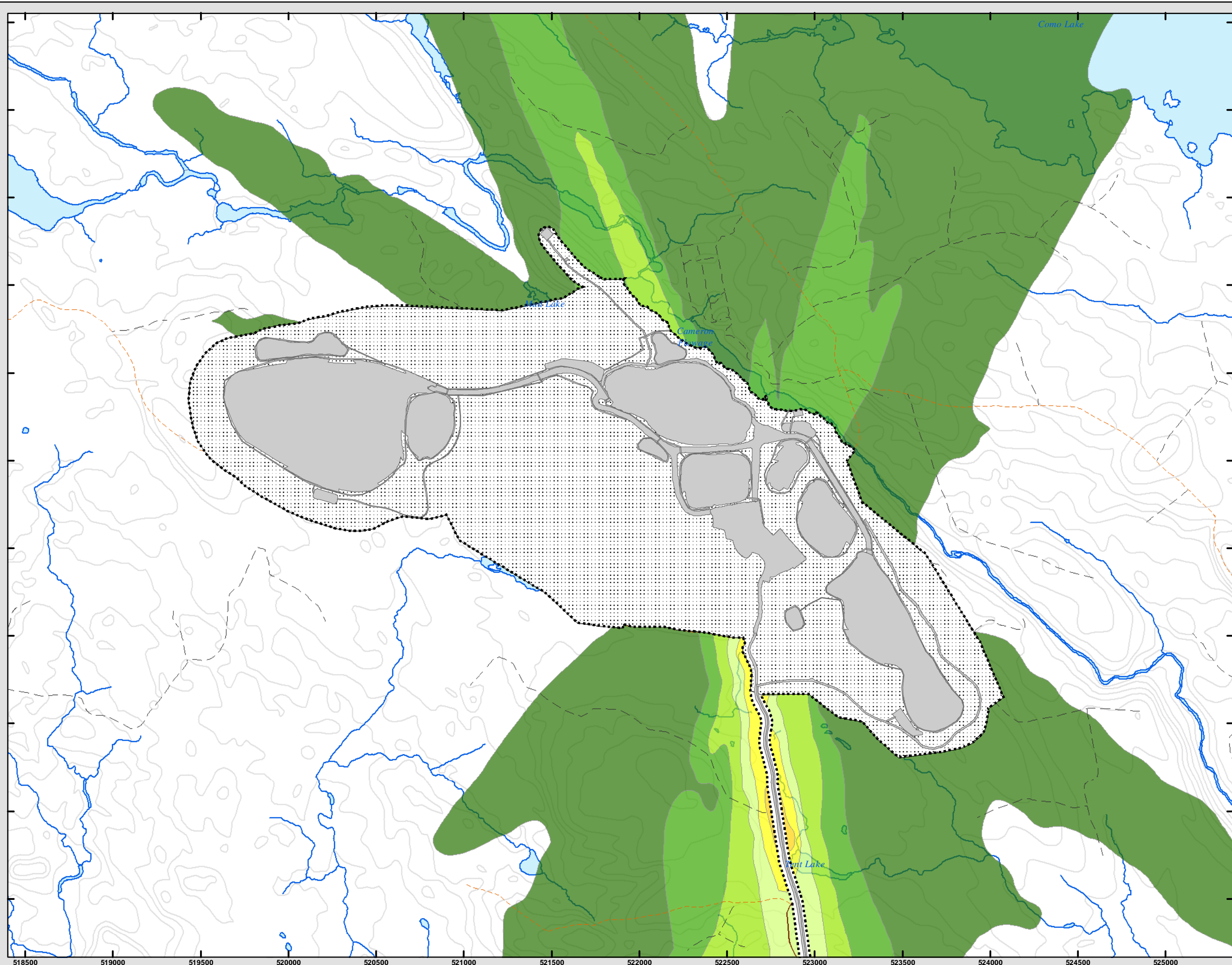
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Drawn By: SS Date: 2021-09-21  
Reviewed By: MM

Service Layer Credits: Sources: Esri, HERE, Gamin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community



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Prepared For:

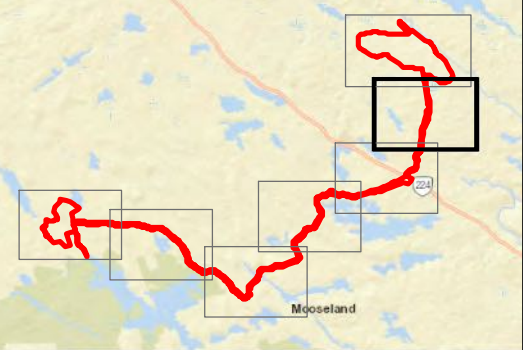


FIGURE CEA 2-31-6B

### Beaver Dam Mine Project Air Contours NO2 1-Hour Levels

- Receptor
- Beaver Dam Mine Site (concentrations beyond property boundary shown)
- NO2 Ranges (ug/m3)
  - 3 - 6
  - 6 - 9
  - 9 - 12
  - 12 - 15
  - 15 - 18
  - 18
- Collector Road
- Local Road
- Dry Weather / Seasonal Road
- Track
- NSTDB Mapped Watercourses
- Lakes
- Proposed Project Infrastructure
- Proposed Property Boundary

NO2 1 Hour Guideline: 400 ug/m3 (not shown on map)  
Background Concentration Used: 41.1 ug/m3 (not shown on map)



Coordinate System: NAD 1983 CSRS UTM Zone 20N  
Projection: Transverse Mercator  
Datum: North American 1983 CSRS  
Units: Meter

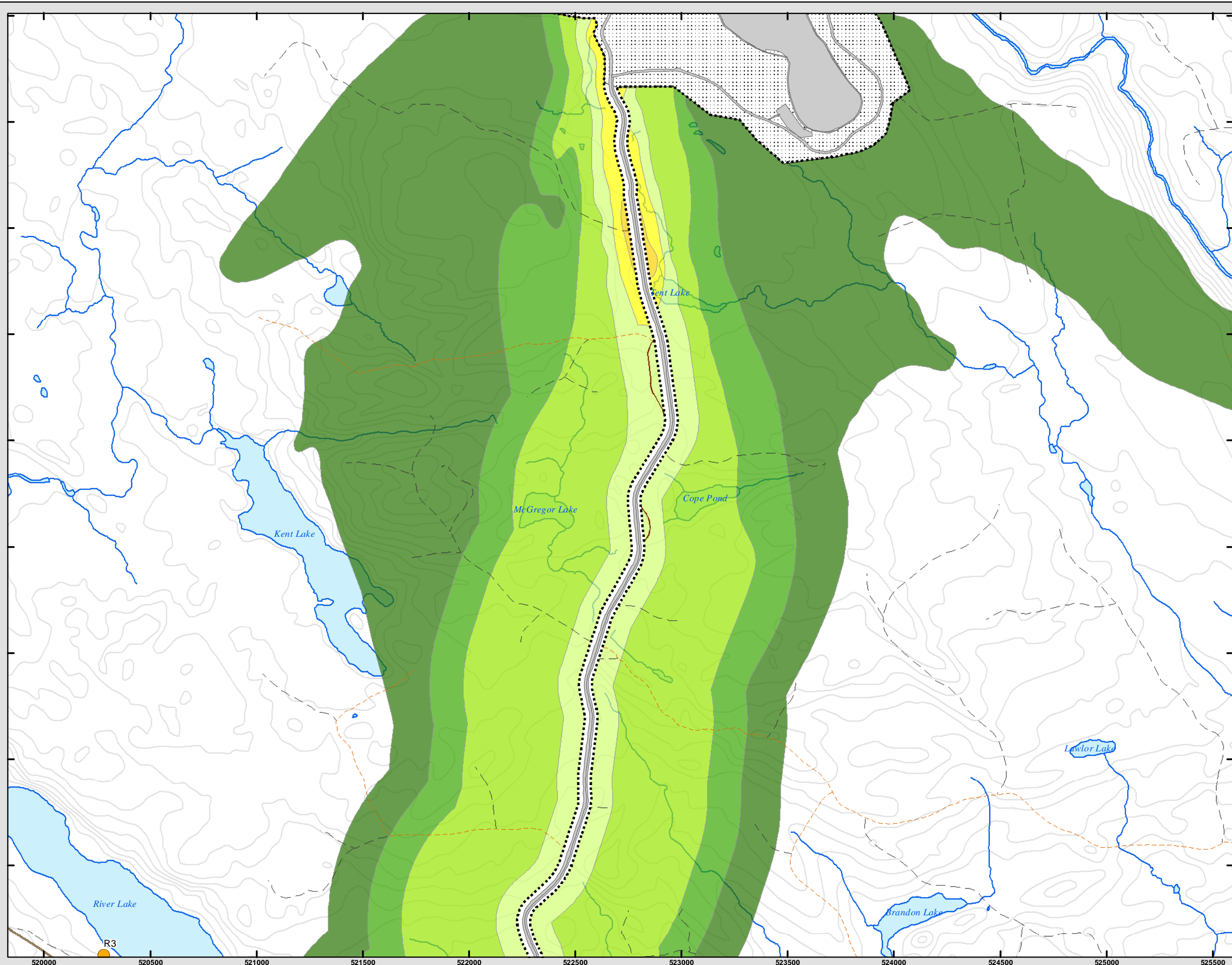
0 140 280 560 m  
1:16,670 Scale when printed @ 11" x 17"

Drawn By: SS Date: 2021-09-21  
Reviewed By: MM

Service Layer Credits: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community



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Prepared For:



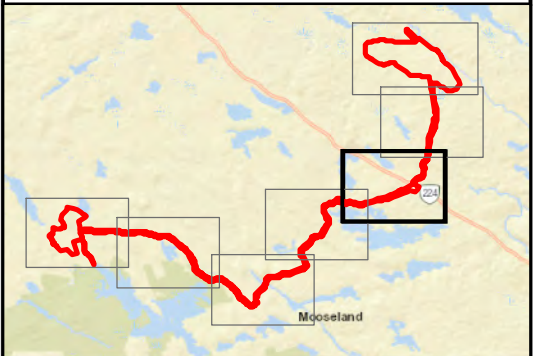
**Atlantic Gold**

**FIGURE CEA 2-31-6C**

**Beaver Dam Mine Project  
Air Contours  
NO2 1-Hour Levels**

- Receptor
- NO2 Ranges (ug/m3)**
  - 3 - 6
  - 6 - 9
  - 9 - 12
  - 12 - 15
- Collector Road
- Local Road
- Dry Weather / Seasonal Road
- Diveways (>300 m)
- Track
- NSTDB Mapped Watercourses
- Lakes
- Proposed Project Infrastructure
- Proposed Property Boundary

NO2 1 Hour Guideline: 400 ug/m3 (not shown on map)  
Background Concentration Used: 41.1 ug/m3 (not shown on map)



Coordinate System: NAD 1983 CSRS UTM Zone 20N  
Projection: Transverse Mercator  
Datum: North American 1983 CSRS  
Units: Meter



0 140 280 560 m

1:16,670 Scale when printed @ 11" x 17"

Drawn By: SS Date: 2021-09-21  
Reviewed By: MM

Service Layer Credits: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community



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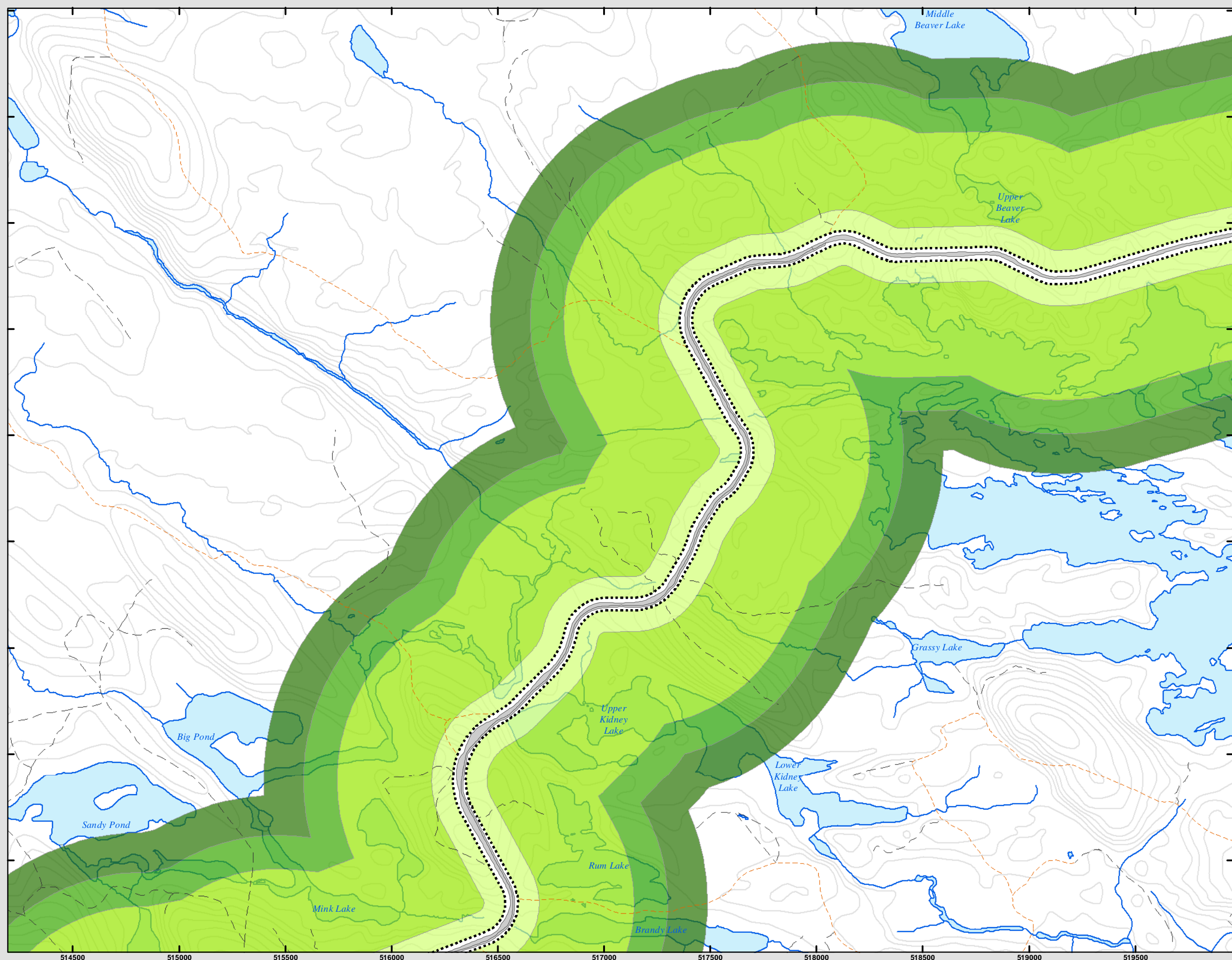
Prepared For:



**Atlantic Gold**

**FIGURE CEEA 2-31-6D**

**Beaver Dam Mine Project  
Air Contours  
NO2 1-Hour Levels**

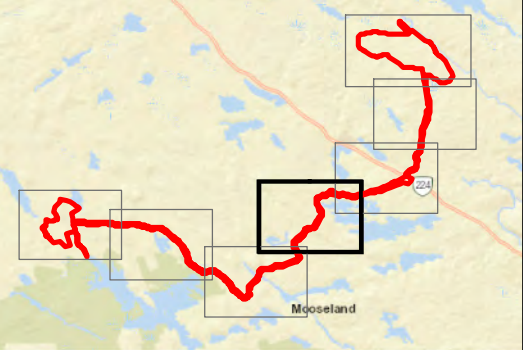


**NO2 Ranges (ug/m3)**

- 3 - 6
- 6 - 9
- 9 - 12
- 12 - 15

- - - Dry Weather / Seasonal Road  
- - - Track  
— NSTDB Mapped Watercourses  
■ Lakes  
■ Proposed Project Infrastructure  
  Proposed Property Boundary

NO2 1 Hour Guideline: 400 ug/m3 (not shown on map)  
Background Concentration Used: 41.1 ug/m3 (not shown on map)



Coordinate System: NAD 1983 CSRS UTM Zone 20N  
 Projection: Transverse Mercator  
 Datum: North American 1983 CSRS  
 Units: Meter

0 140 280 560 m

**1:16,670** Scale when printed @ 11" x 17"

Drawn By: SS Date: 2021-09-21  
Reviewed By: MM

Service Layer Credits: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community



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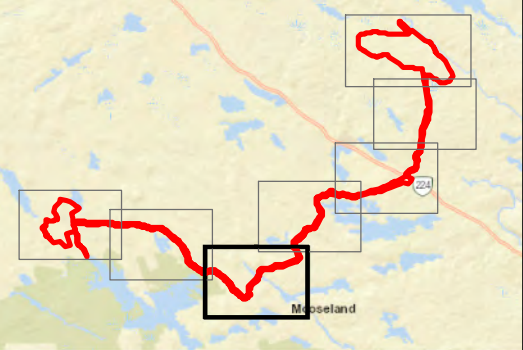
**Atlantic Gold**

**FIGURE CEA 2-31-6E**

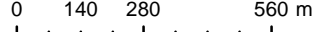
**Beaver Dam Mine Project  
Air Contours  
NO2 1-Hour Levels**

- Receptor
- NO2 Ranges (ug/m3)**
- 3 - 6
- 6 - 9
- 9 - 12
- 12 - 15
- Local Road
- Dry Weather / Seasonal Road
- Diveways (>300 m)
- Track
- NSTDB Mapped Watercourses
- Lakes
- Proposed Project Infrastructure
- Proposed Property Boundary

NO2 1 Hour Guideline: 400 ug/m3 (not shown on map)  
Background Concentration Used: 41.1 ug/m3 (not shown on map)



Coordinate System: NAD 1983 CSRS UTM Zone 20N  
Projection: Transverse Mercator  
Datum: North American 1983 CSRS  
Units: Meter



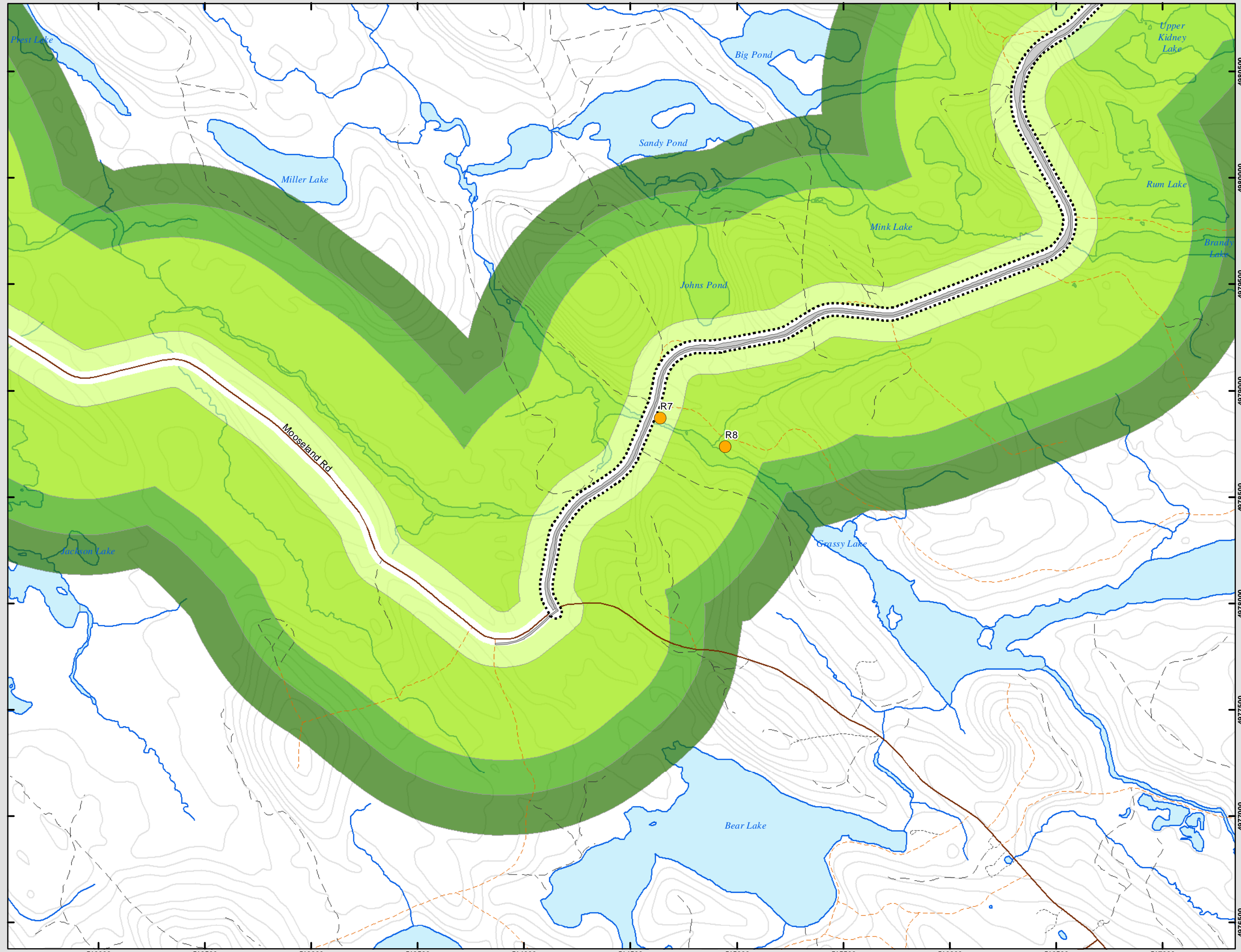
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Drawn By: SS Date: 2021-09-21  
Reviewed By: MM

Service Layer Credits: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community



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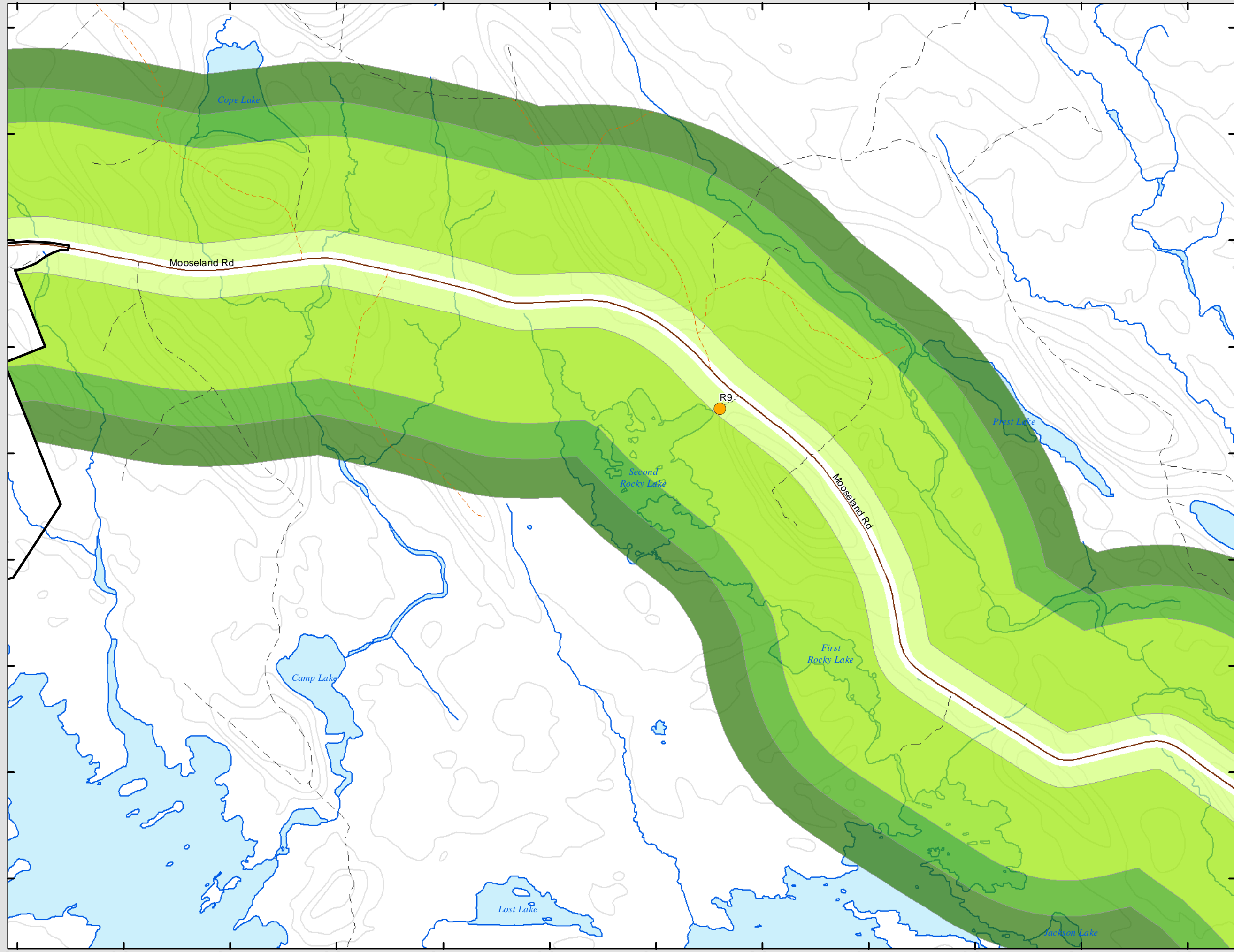


Prepared For:



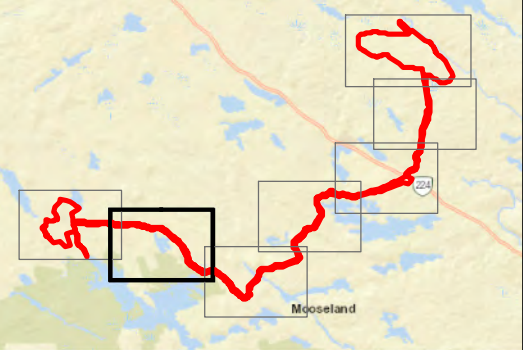
FIGURE CEAA 2-31-6F

Beaver Dam Mine Project  
Air Contours  
NO2 1-Hour Levels

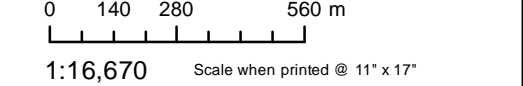


- Receptor
- 3 - 6
- 6 - 9
- 9 - 12
- 12 - 15
- Local Road
- Dry Weather / Seasonal Road
- Diveways (>300 m)
- Track
- NSTDB Mapped Watercourses
- Lakes
- Proposed Project Infrastructure
- Existing Touquoy Property Boundary

NO2 1 Hour Guideline: 400 ug/m3 (not shown on map)  
Background Concentration Used: 41.1 ug/m3 (not shown on map)



Coordinate System: NAD 1983 CSRS UTM Zone 20N  
Projection: Transverse Mercator  
Datum: North American 1983 CSRS  
Units: Meter



1:16,670 Scale when printed @ 11" x 17"  
Drawn By: SS Date: 2021-09-21  
Reviewed By: MM

Service Layer Credits: Sources: Esri, HERE, Gamin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community



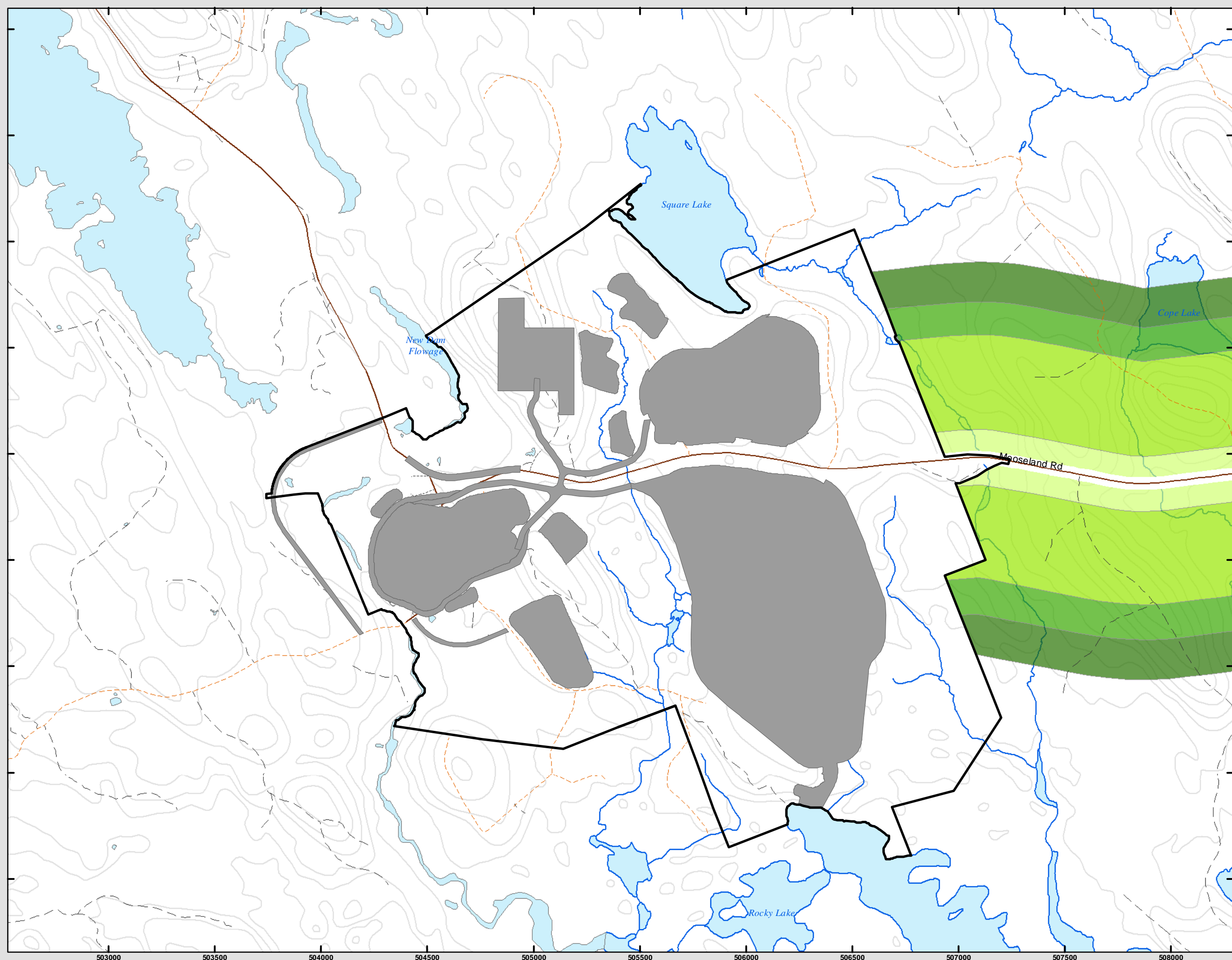
McCallum Environmental Ltd.

Prepared For:



**FIGURE CEAA 2-31-6G**

**Beaver Dam Mine Project  
Air Contours  
NO2 1-Hour Levels**

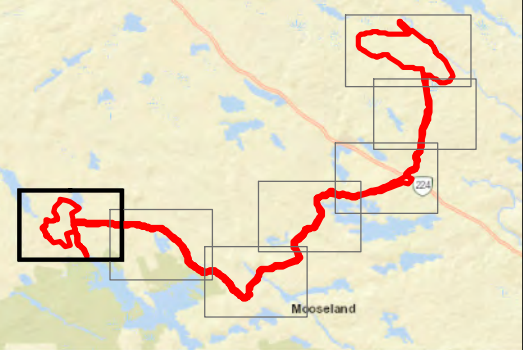


**NO2 Ranges (ug/m3)**

- 3 - 6
- 6 - 9
- 9 - 12
- 12 - 15

- Local Road
- Dry Weather / Seasonal Road
- Diveways (>300 m)
- Track
- NSTDB Mapped Watercourses
- Lakes
- Proposed Project Infrastructure
- Existing Touquoy Infrastructure Layout
- Existing Touquoy Property Boundary

NO2 1 Hour Guideline: 400 ug/m3 (not shown on map)  
Background Concentration Used: 41.1 ug/m3 (not shown on map)



Coordinate System: NAD 1983 CSRS UTM Zone 20N  
Projection: Transverse Mercator  
Datum: North American 1983 CSRS  
Units: Meter

0 140 280 560 m

1:16,670 Scale when printed @ 11" x 17"

Drawn By: SS Date: 2021-09-21  
Reviewed By: MM

Service Layer Credits: Sources: Esri, HERE, Gamin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community



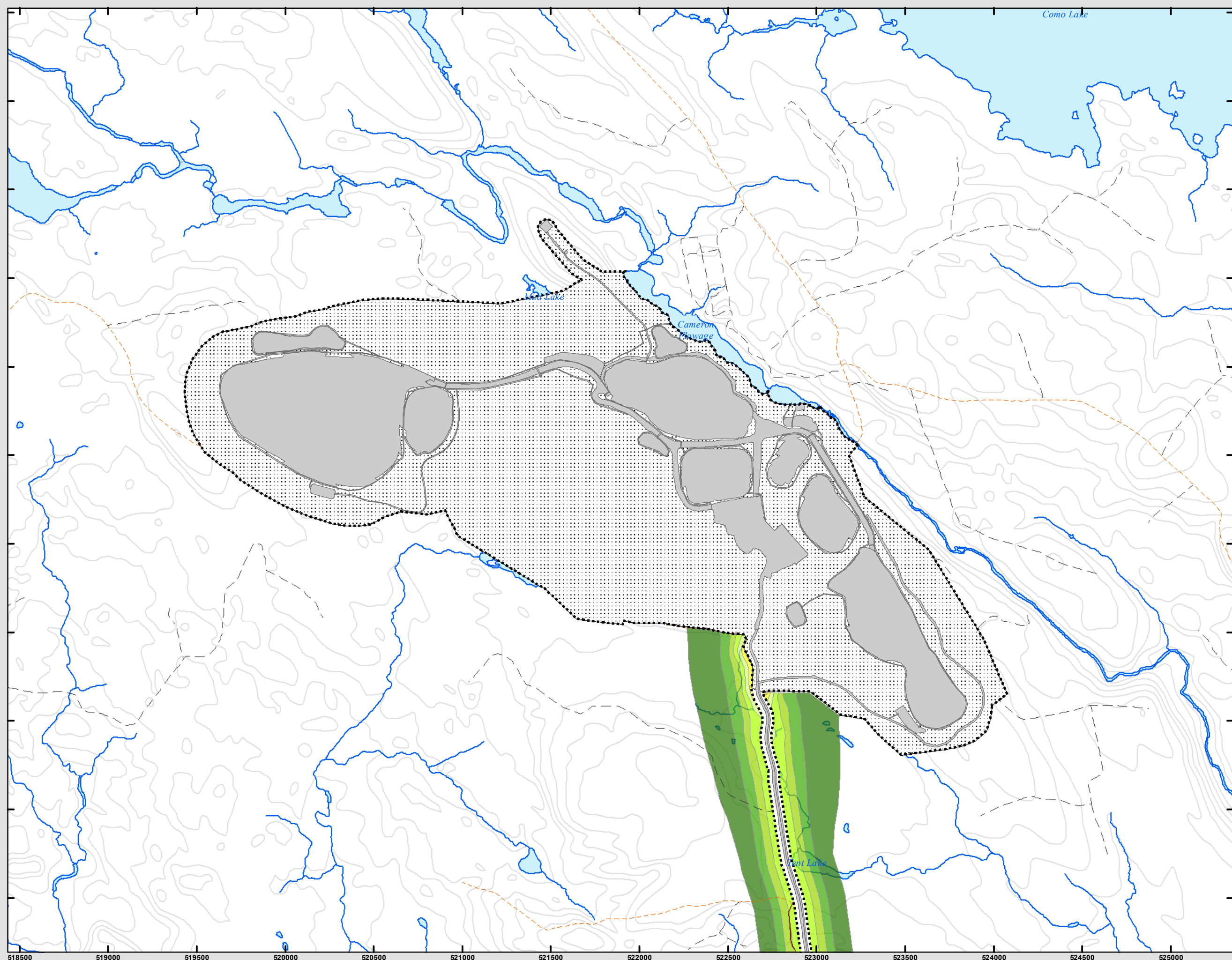
**McCallum Environmental Ltd.**

Prepared For:



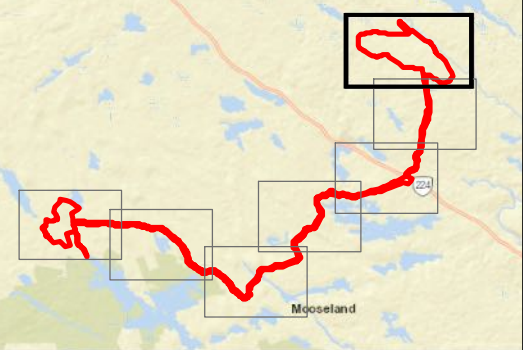
FIGURE CEEA 2-31-7A

Beaver Dam Mine Project  
Air Contours  
NO2 24-Hour Levels



- Beaver Dam Mine Site (concentrations reach background within boundary)
- NO2 Ranges (ug/m3)
  - 1 - 2
  - 2 - 3
  - 3 - 4
  - 4 - 5
  - 5 - 6
  - 6 - 7
  - 7
- Local Road
- Dry Weather / Seasonal Road
- Track
- NSTDB Mapped Watercourses
- Lakes
- Proposed Project Infrastructure
- Proposed Property Boundary

NO2 24 Hour Guideline: 200 ug/m3 (not shown on map)  
Background Concentration Used: 17 ug/m3 (not shown on map)



Coordinate System: NAD 1983 CSRS UTM Zone 20N  
 Projection: Transverse Mercator  
 Datum: North American 1983 CSRS  
 Units: Meter

0 170 340 680 m

1:20,000 Scale when printed @ 11" x 17"

Drawn By: MEL Date: 2021-09-21  
Reviewed By: GHD

Service Layer Credits: Sources: Esri, HERE, Gamin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community



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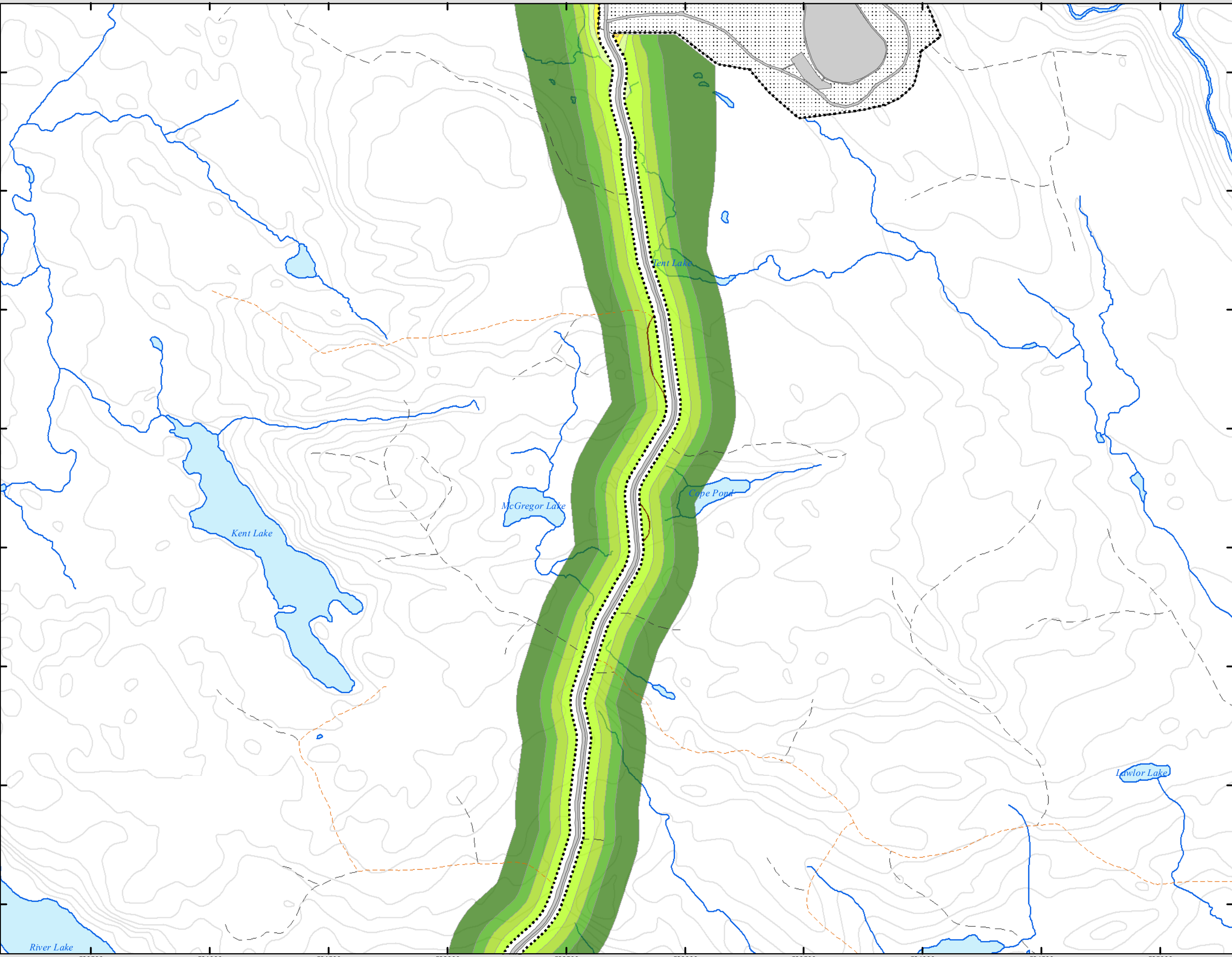
Prepared For:



**Atlantic Gold**

**FIGURE CEA 2-31-7B**

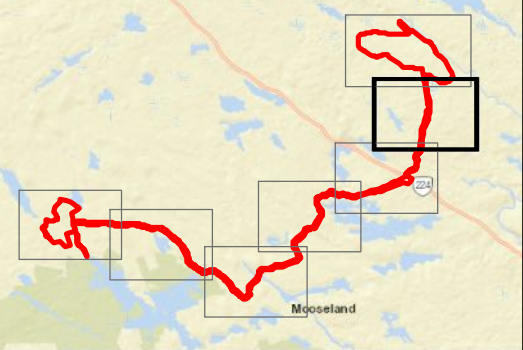
**Beaver Dam Mine Project  
Air Contours  
NO2 24-Hour Levels**



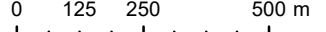
- Beaver Dam Mine Site (concentrations reach background within boundary)
- Local Road
- Dry Weather / Seasonal Road
- Track
- NSTDB Mapped Watercourses
- Lakes
- Proposed Project Infrastructure
- Proposed Property Boundary

- NO2 Ranges (ug/m3)**
- 1 - 2
  - 2 - 3
  - 3 - 4
  - 4 - 5
  - 5 - 6
  - 6 - 7
  - 7

NO2 24 Hour Guideline: 200 ug/m3 (not shown on map)  
Background Concentration Used: 17 ug/m3 (not shown on map)



Coordinate System: NAD 1983 CSRS UTM Zone 20N  
Projection: Transverse Mercator  
Datum: North American 1983 CSRS  
Units: Meter



1:15,000 Scale when printed @ 11" x 17"

Drawn By: MEL Date: 2021-09-21  
Reviewed By: GHD

Service Layer Credits: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community



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Prepared For:

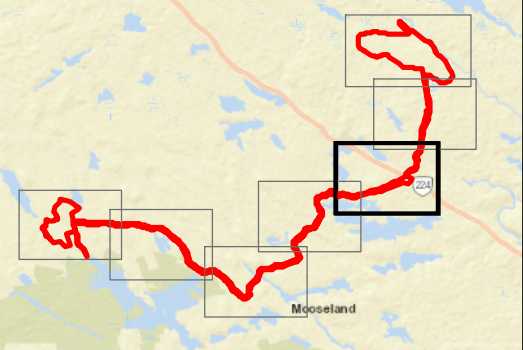


FIGURE CEA 2-31-7C

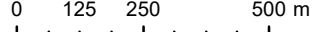
### Beaver Dam Mine Project Air Contours NO2 24-Hour Levels

- Receptor
- NO2 Ranges (ug/m3)**
- 1 - 2
- 2 - 3
- 3 - 4
- 4 - 5
- Collector Road
- Local Road
- Dry Weather / Seasonal Road
- Diveways (>300 m)
- Track
- NSTDB Mapped Watercourses
- Lakes
- Proposed Project Infrastructure
- Proposed Property Boundary

NO2 24 Hour Guideline: 200 ug/m3 (not shown on map)  
Background Concentration Used: 17 ug/m3 (not shown on map)



Coordinate System: NAD 1983 CSRS UTM Zone 20N  
Projection: Transverse Mercator  
Datum: North American 1983 CSRS  
Units: Meter



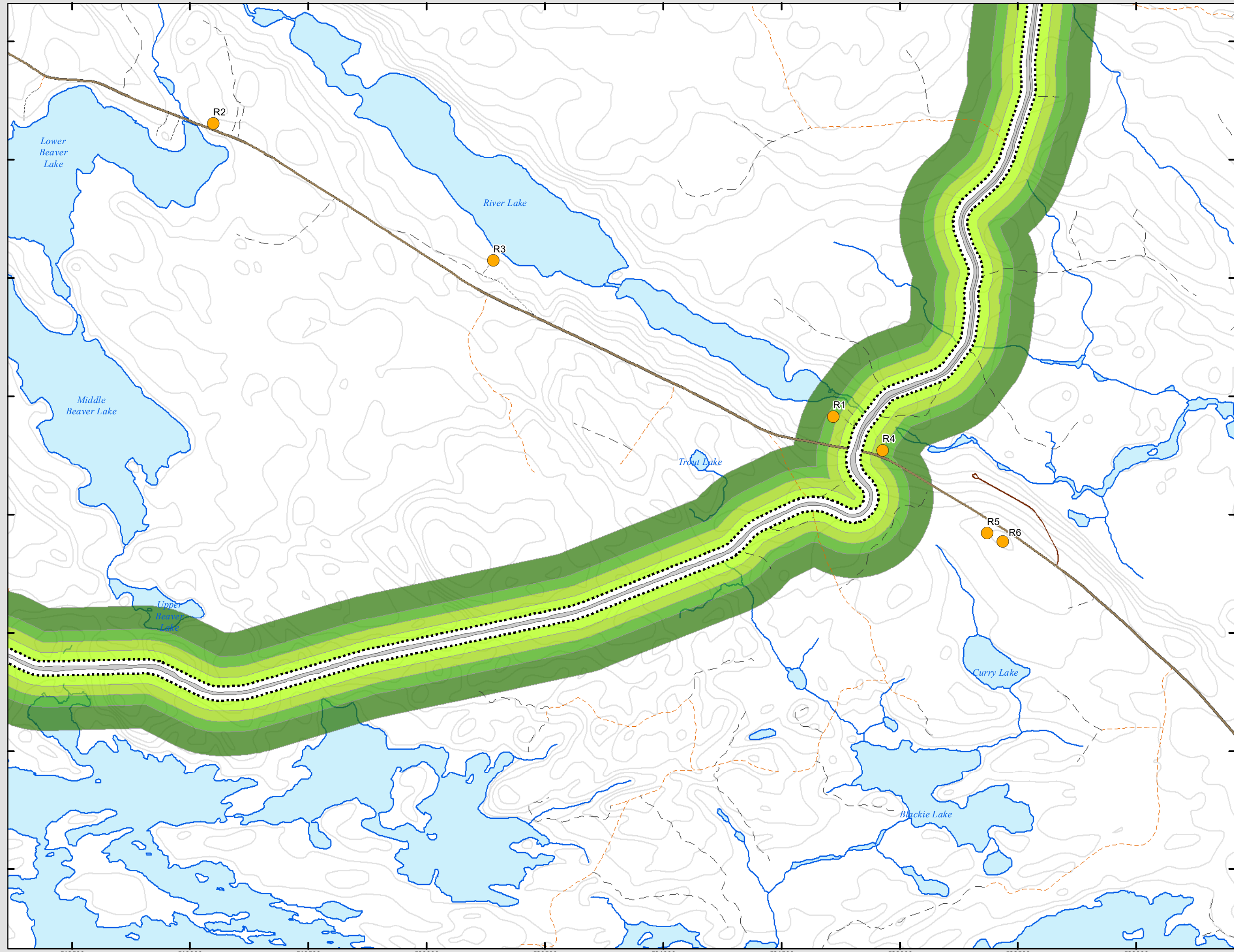
1:15,000 Scale when printed @ 11" x 17"

Drawn By: MEL Date: 2021-09-21  
Reviewed By: GHD

Service Layer Credits: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community



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**FIGURE CEEA 2-31-7D**

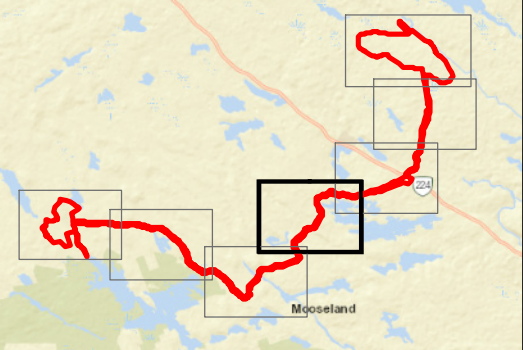
**Beaver Dam Mine Project  
Air Contours  
NO2 24-Hour Levels**

**NO2 Ranges (ug/m3)**

- 1 - 2
- 2 - 3
- 3 - 4
- 4 - 5

- Dry Weather / Seasonal Road
- Track
- NSTDB Mapped Watercourses
- Lakes
- Proposed Project Infrastructure
- Proposed Property Boundary

NO2 24 Hour Guideline: 200 ug/m3 (not shown on map)  
Background Concentration Used: 17 ug/m3 (not shown on map)



Coordinate System: NAD 1983 CSRS UTM Zone 20N  
 Projection: Transverse Mercator  
 Datum: North American 1983 CSRS  
 Units: Meter

0 125 250 500 m

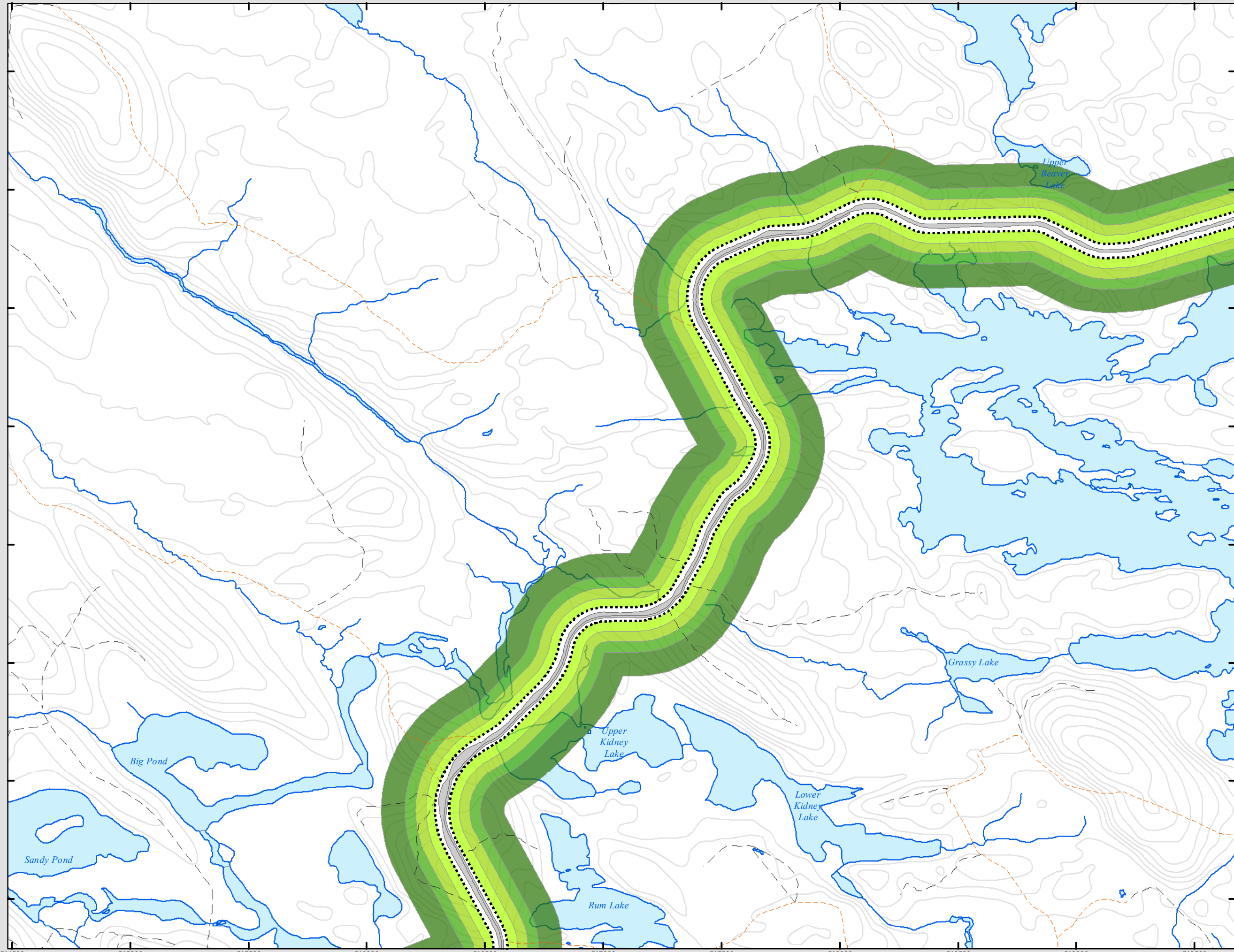
**1:15,000** Scale when printed @ 11" x 17"

Drawn By: MEL Date: 2021-09-21  
Reviewed By: GHD

Service Layer Credits: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community



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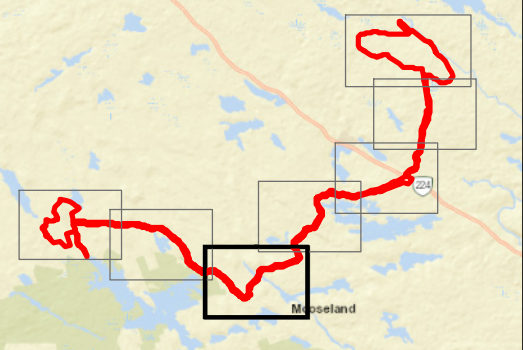


FIGURE CEA 2-31-7E

### Beaver Dam Mine Project Air Contours NO2 24-Hour Levels

- Receptor
- NO2 Ranges (ug/m3)
  - 1 - 2
  - 2 - 3
  - 3 - 4
  - 4 - 5
- Local Road
- Dry Weather / Seasonal Road
- Diveways (>300 m)
- Track
- NSTDB Mapped Watercourses
- Lakes
- Proposed Project Infrastructure
- Proposed Property Boundary

NO2 24 Hour Guideline: 200 ug/m3 (not shown on map)  
Background Concentration Used: 17 ug/m3 (not shown on map)



Coordinate System: NAD 1983 CSRS UTM Zone 20N  
 Projection: Transverse Mercator  
 Datum: North American 1983 CSRS  
 Units: Meter

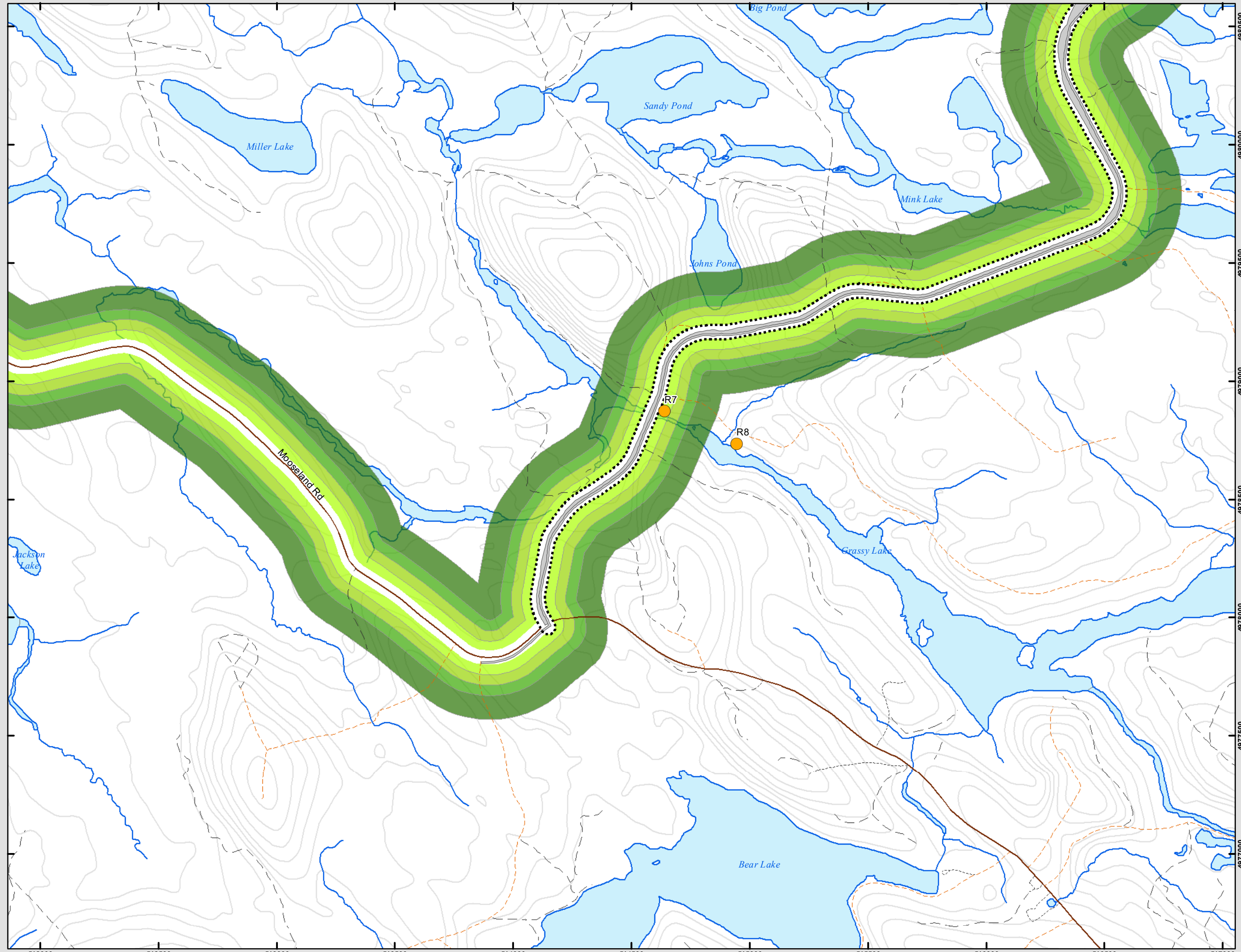
1:15,000 Scale when printed @ 11" x 17"

Drawn By: MEL Date: 2021-09-21  
Reviewed By: GHD

Service Layer Credits: Sources: Esri, HERE, Gamin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community



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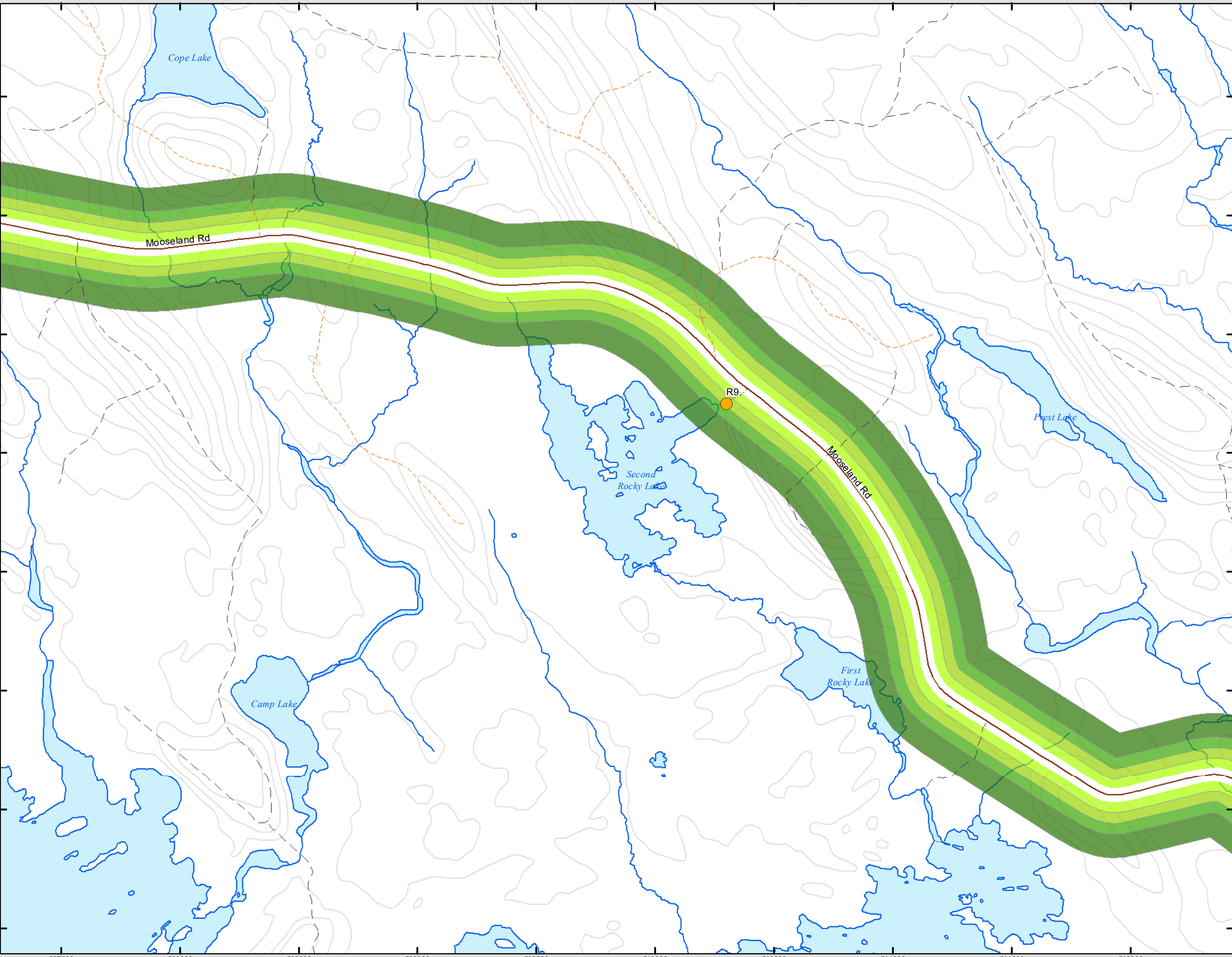


Prepared For:



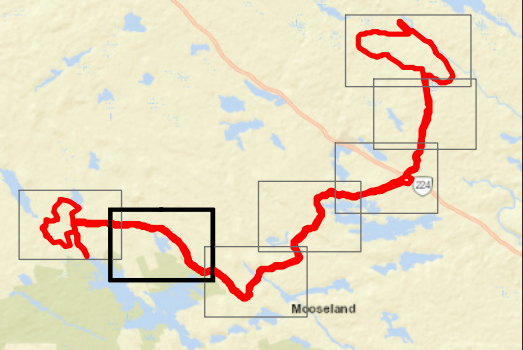
FIGURE CEA 2-31-7F

### Beaver Dam Mine Project Air Contours NO2 24-Hour Levels



- Receptor
- Local Road
- - - Dry Weather / Seasonal Road
- NO2 Ranges (ug/m3)
  - 1 - 2
  - 2 - 3
  - 3 - 4
  - 4 - 5
- - - Diveways (>300 m)
- - - Track
- NSTDB Mapped Watercourses
- Lakes
- Proposed Project Infrastructure

NO2 24 Hour Guideline: 200 ug/m3 (not shown on map)  
Background Concentration Used: 17 ug/m3 (not shown on map)



Coordinate System: NAD 1983 CSRS UTM Zone 20N  
 Projection: Transverse Mercator  
 Datum: North American 1983 CSRS  
 Units: Meter

0 125 250 500 m

1:15,000 Scale when printed @ 11" x 17"

Drawn By: MEL Date: 2021-09-21  
Reviewed By: GHD

Service Layer Credits: Sources: Esri, HERE, Gamin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community



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Prepared For:



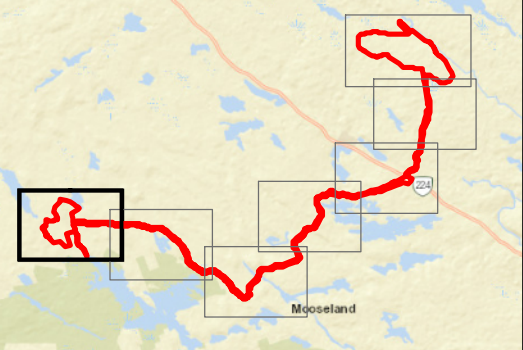
**Atlantic Gold**

**FIGURE CEAA 2-31-7G**

**Beaver Dam Mine Project  
Air Contours  
NO2 24-Hour Levels**

- NO2 Ranges (ug/m3)**
- 1 - 2
  - 2 - 3
  - 3 - 4
  - 4 - 5
- Local Road
  - Dry Weather / Seasonal Road
  - Diveways (>300 m)
  - Track
  - NSTDB Mapped Watercourses
  - Lakes
  - Proposed Project Infrastructure
  - Existing Touquoy Infrastructure Layout
  - Existing Touquoy Property Boundary

NO2 24 Hour Guideline: 200 ug/m3 (not shown on map)  
Background Concentration Used: 17 ug/m3 (not shown on map)



Coordinate System: NAD 1983 CSRS UTM Zone 20N  
 Projection: Transverse Mercator  
 Datum: North American 1983 CSRS  
 Units: Meter

0 125 250 500 m

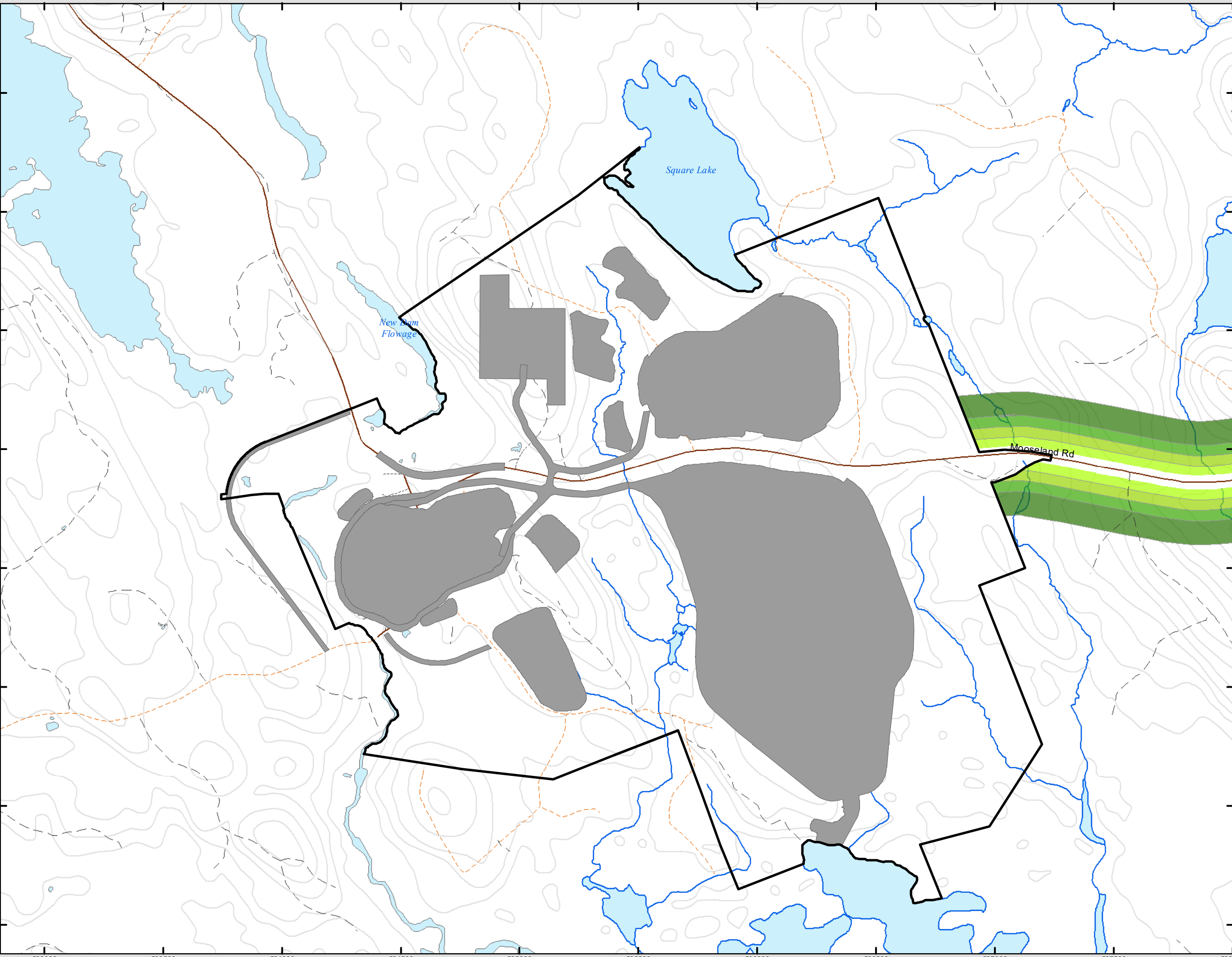
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Drawn By: MEL Date: 2021-09-21  
Reviewed By: GHD

Service Layer Credits: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community



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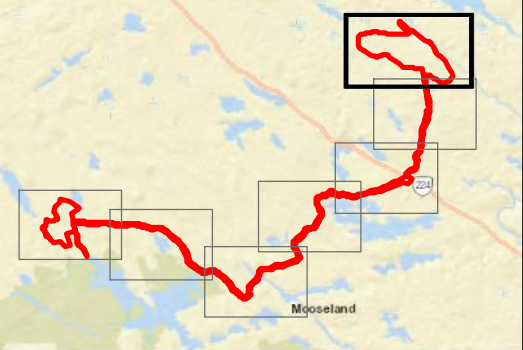


FIGURE CEAA 2-31-8A

### Beaver Dam Mine Project Air Contours NO2 Averaged Annual Levels

- Beaver Dam Mine Site (concentrations reach background within boundary)
- NO2 Ranges (ug/m3)
  - 0.5 - 1
  - 1 - 1.5
  - 1.5 - 2
  - 2 - 2.5
  - 2.5
- Local Road
- Dry Weather / Seasonal Road
- Track
- NSTDB Mapped Watercourses
- Lakes
- Proposed Project Infrastructure
- Proposed Property Boundary

NO2 Annual Guideline: 100 ug/m3 (not shown on map)  
Background Concentration Used: 3.3 ug/m3 (not shown on map)



Coordinate System: NAD 1983 CSRS UTM Zone 20N  
 Projection: Transverse Mercator  
 Datum: North American 1983 CSRS  
 Units: Meter

0 170 340 680 m

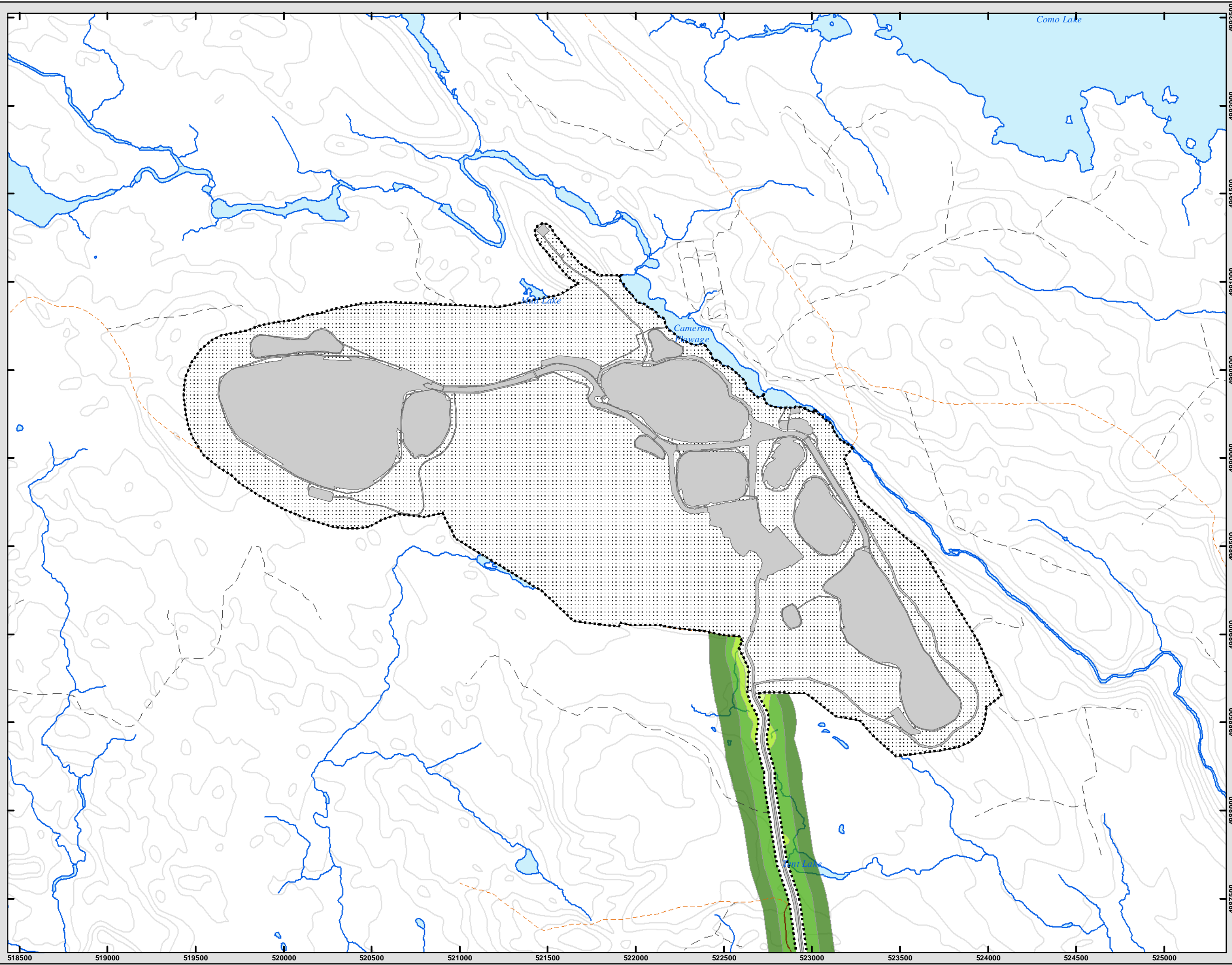
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Drawn By: MEL Date: 2021-09-21  
Reviewed By: GHD

Service Layer Credits: Sources: Esri, HERE, Gamin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community



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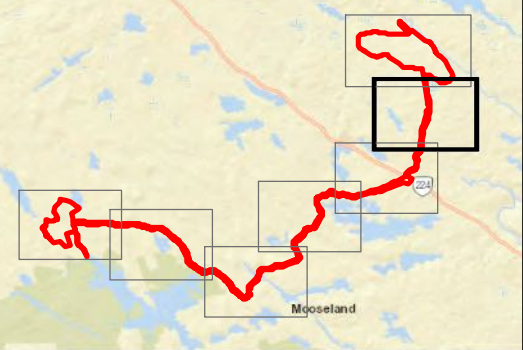
**Atlantic Gold**

**FIGURE CEEA 2-31-8B**

**Beaver Dam Mine Project  
Air Contours  
NO2 Averaged Annual  
Levels**

- Beaver Dam Mine Site (concentrations reach background within boundary)
- NO2 Ranges (ug/m3)
  - 0.5 - 1
  - 1 - 1.5
  - 1.5 - 2
  - 2 - 2.5
  - 2.5
- Local Road
- Dry Weather / Seasonal Road
- Track
- NSTDB Mapped Watercourses
- Lakes
- Proposed Project Infrastructure
- Proposed Property Boundary

NO2 Annual Guideline: 100 ug/m3 (not shown on map)  
Background Concentration Used: 3.3 ug/m3 (not shown on map)



Coordinate System: NAD 1983 CSRS UTM Zone 20N  
 Projection: Transverse Mercator  
 Datum: North American 1983 CSRS  
 Units: Meter

0 125 250 500 m

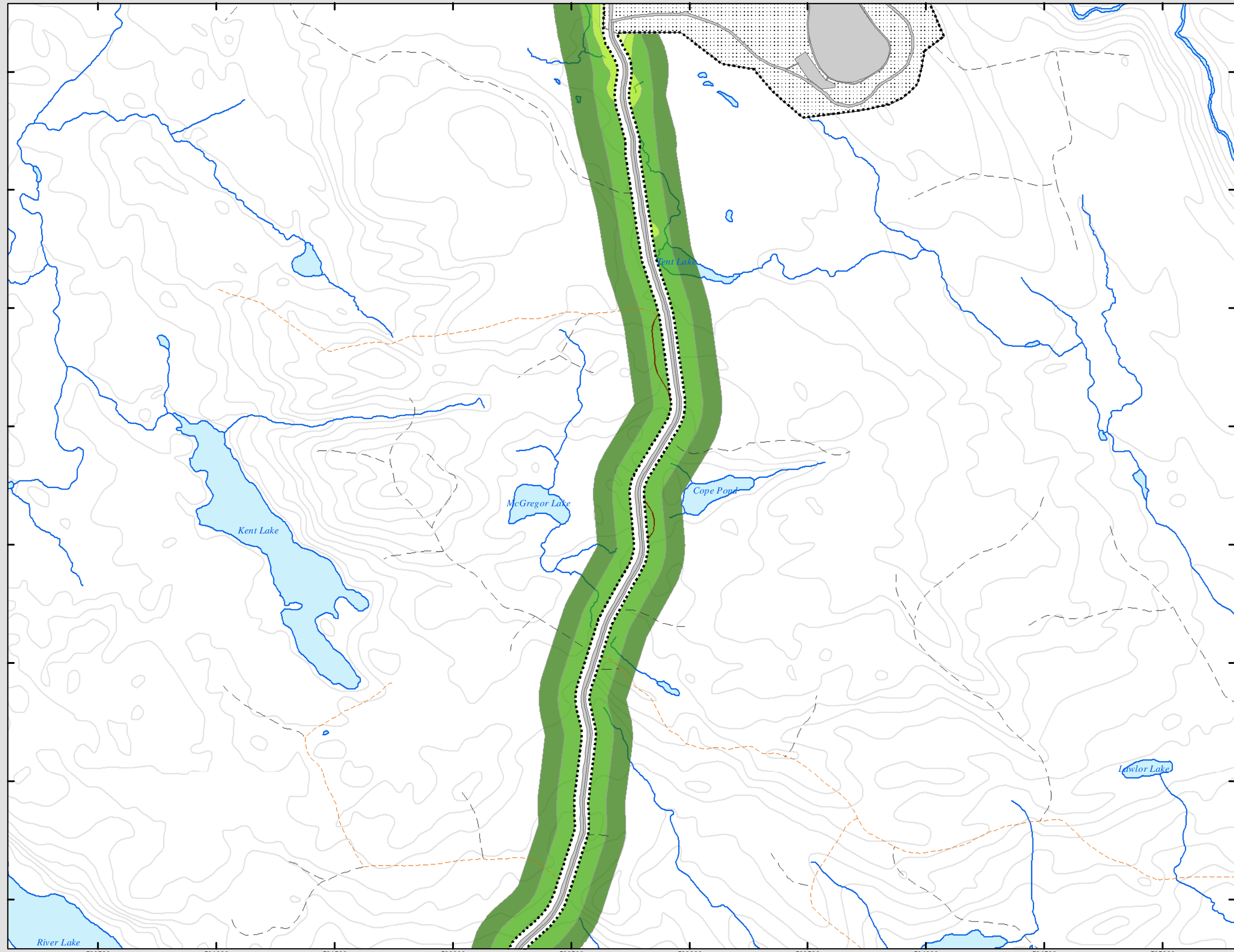
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Drawn By: MEL Date: 2021-09-21  
Reviewed By: GHD

Service Layer Credits: Sources: Esri, HERE, Gamin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community



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Prepared For:

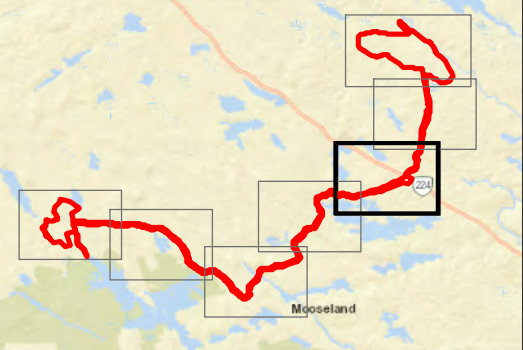


FIGURE CEA 2-31-8C

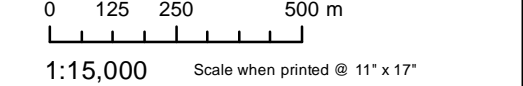
### Beaver Dam Mine Project Air Contours NO2 Averaged Annual Levels

- Receptor
- NO2 Ranges (ug/m3)**
- 0.5 - 1
- 1 - 1.5
- Collector Road
- Local Road
- Dry Weather / Seasonal Road
- Diveways (>300 m)
- Track
- NSTDB Mapped Watercourses
- Lakes
- Proposed Project Infrastructure
- Proposed Property Boundary

NO2 Annual Guideline: 100 ug/m3 (not shown on map)  
Background Concentration Used: 3.3 ug/m3 (not shown on map)



Coordinate System: NAD 1983 CSRS UTM Zone 20N  
Projection: Transverse Mercator  
Datum: North American 1983 CSRS  
Units: Meter

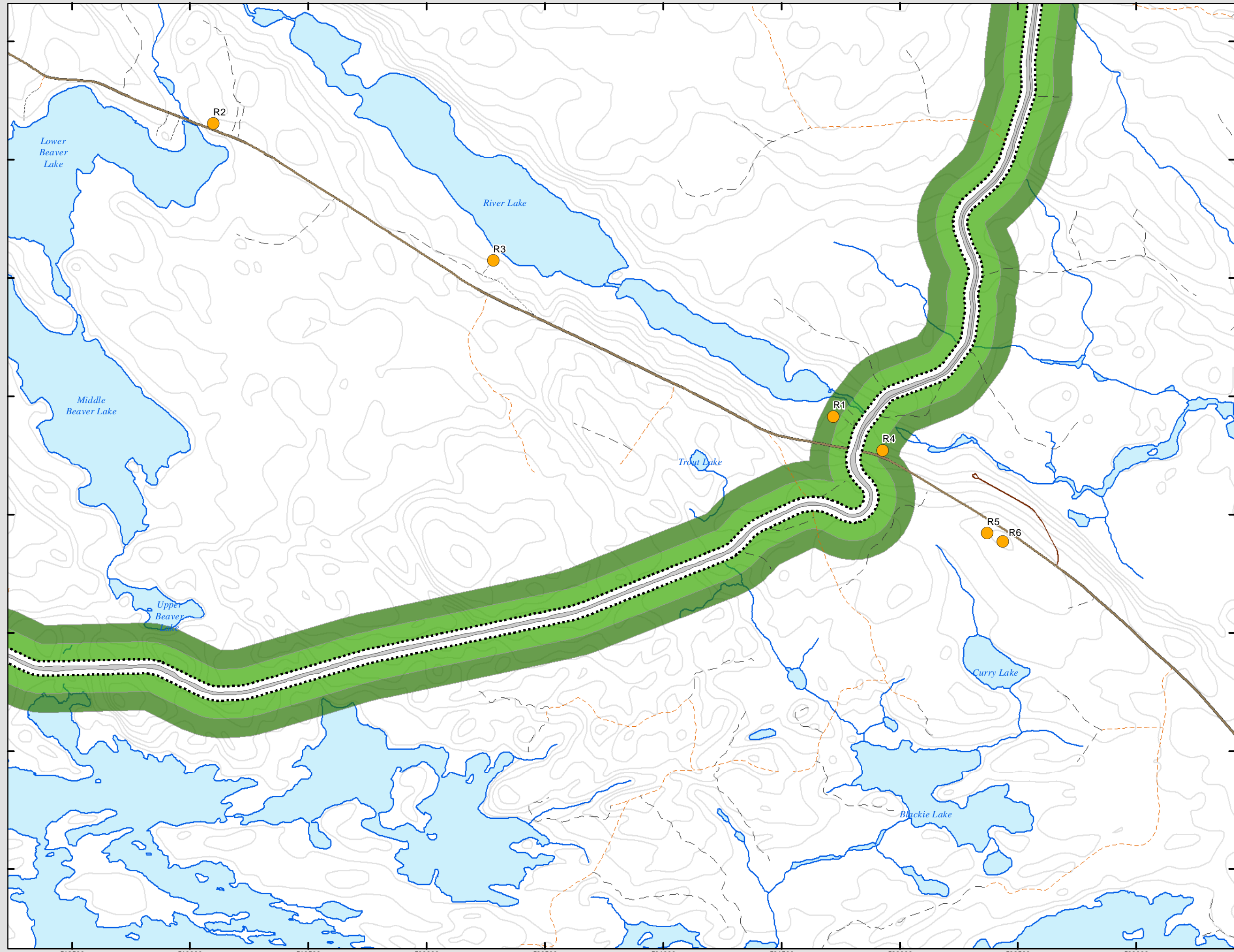


Drawn By: MEL Date: 2021-09-21  
Reviewed By: GHD

Service Layer Credits: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community



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Prepared For:

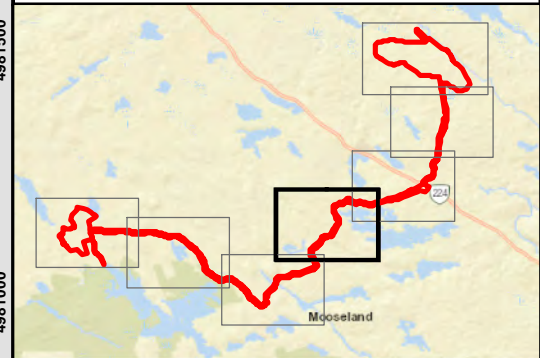


FIGURE CEEA 2-31-8D

### Beaver Dam Mine Project Air Contours NO2 Averaged Annual Levels

- NO2 Ranges (ug/m3)**
- 0.5 - 1
  - 1 - 1.5
- Dry Weather / Seasonal Road
  - Track
  - NSTDB Mapped Watercourses
  - Lakes
  - Proposed Project Infrastructure
  - Proposed Property Boundary

NO2 Annual Guideline: 100 ug/m3 (not shown on map)  
Background Concentration Used: 3.3 ug/m3 (not shown on map)



Coordinate System: NAD 1983 CSRS UTM Zone 20N  
Projection: Transverse Mercator  
Datum: North American 1983 CSRS  
Units: Meter



0 125 250 500 m

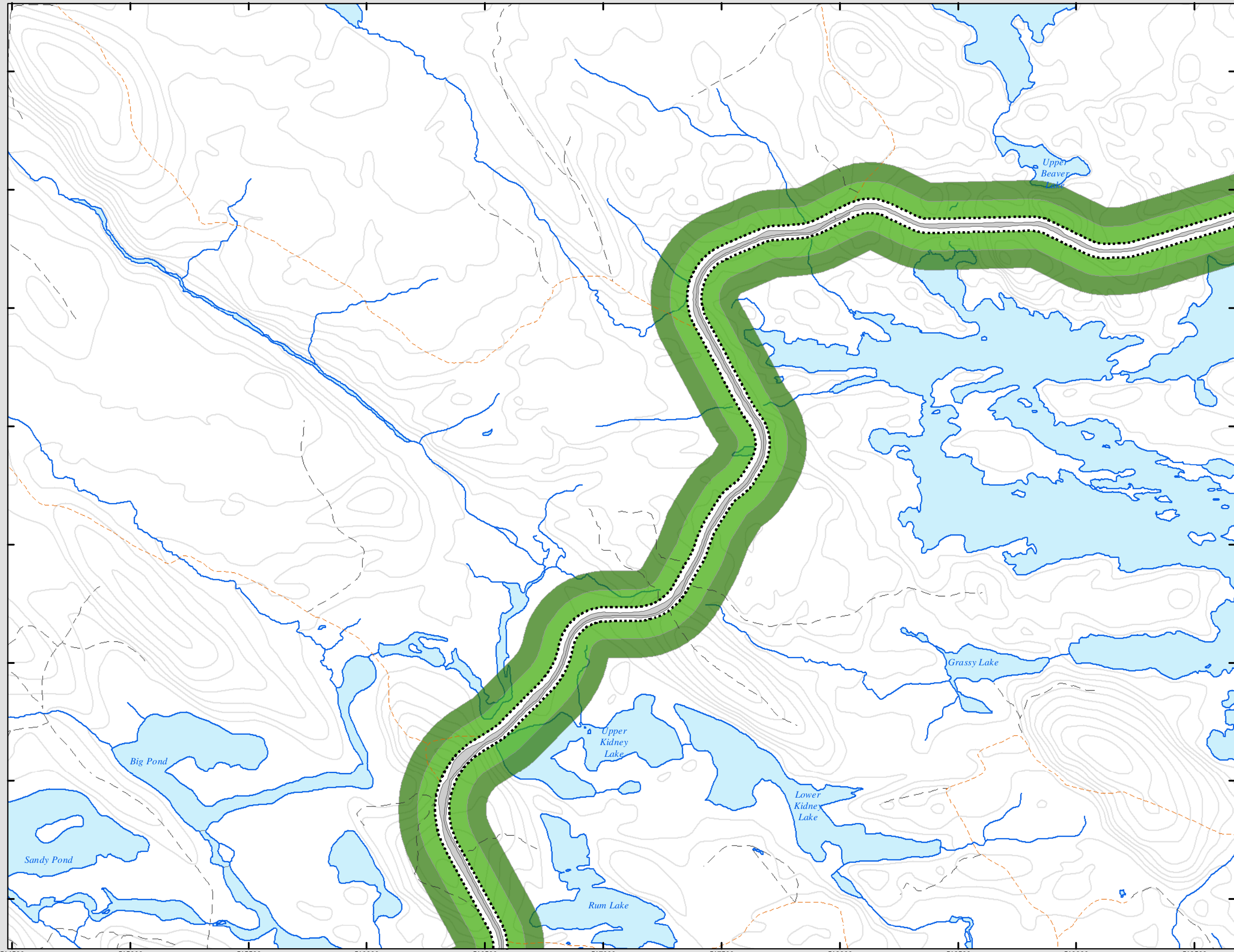
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Drawn By: MEL Date: 2021-09-21  
Reviewed By: GHD

Service Layer Credits: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community



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Prepared For:



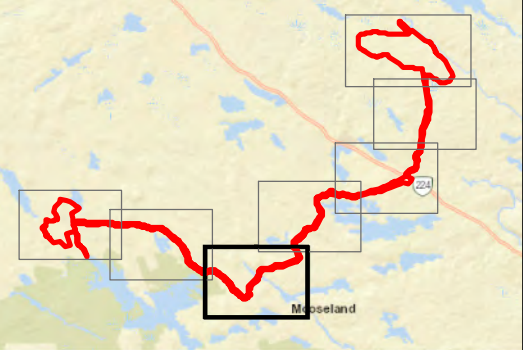
**Atlantic Gold**

**FIGURE CEEA 2-31-8E**

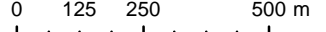
**Beaver Dam Mine Project  
Air Contours  
NO2 Averaged Annual  
Levels**

- Receptor
- NO2 Ranges (ug/m3)
  - 0.5 - 1
  - 1 - 1.5
- Local Road
- Dry Weather / Seasonal Road
- Diveways (>300 m)
- Track
- NSTDB Mapped Watercourses
- Lakes
- Proposed Project Infrastructure
- Proposed Property Boundary

NO2 Annual Guideline: 100 ug/m3 (not shown on map)  
Background Concentration Used: 3.3 ug/m3 (not shown on map)



Coordinate System: NAD 1983 CSRS UTM Zone 20N  
Projection: Transverse Mercator  
Datum: North American 1983 CSRS  
Units: Meter



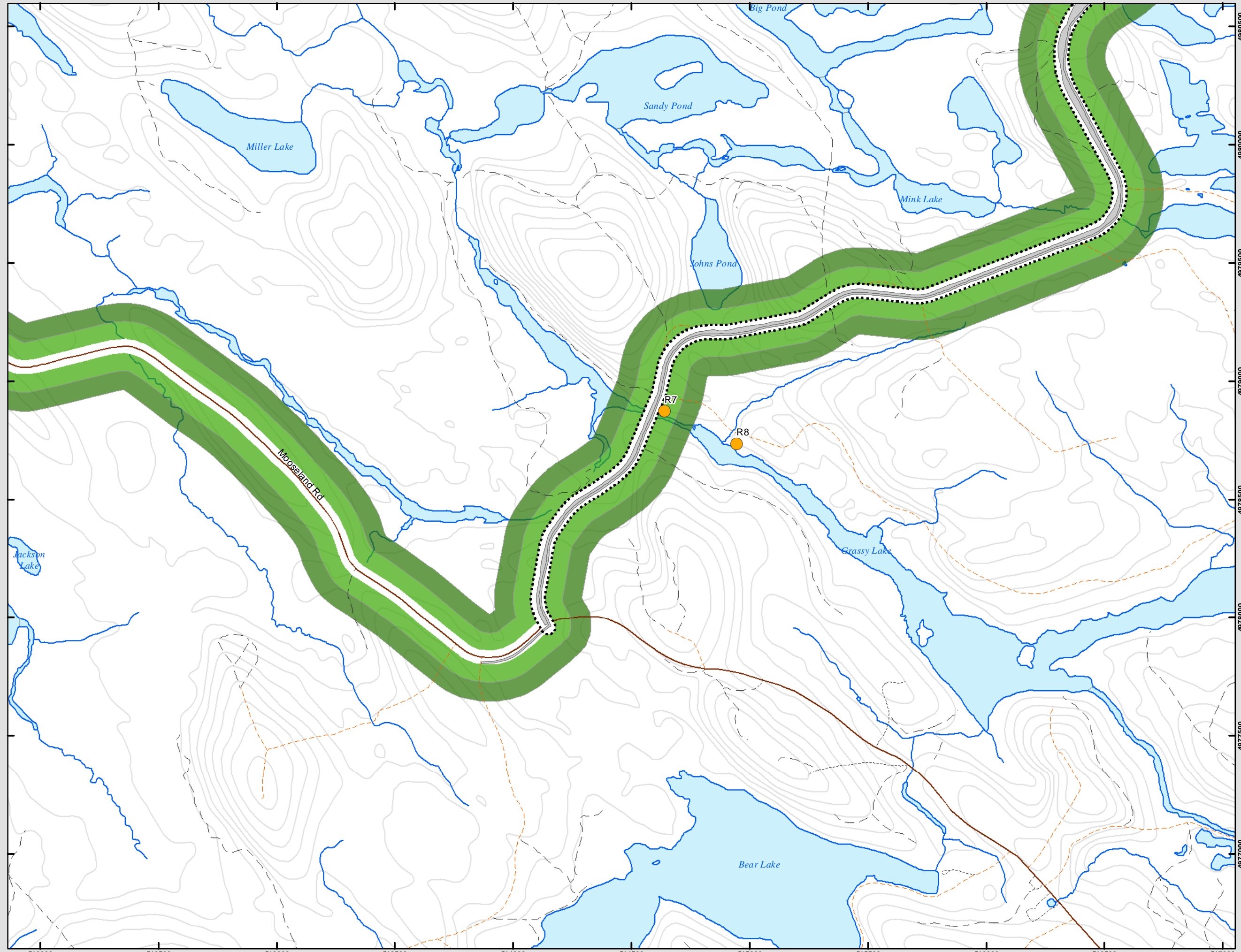
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Drawn By: MEL Date: 2021-09-21  
Reviewed By: GHD

Service Layer Credits: Sources: Esri, HERE, Gamin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community



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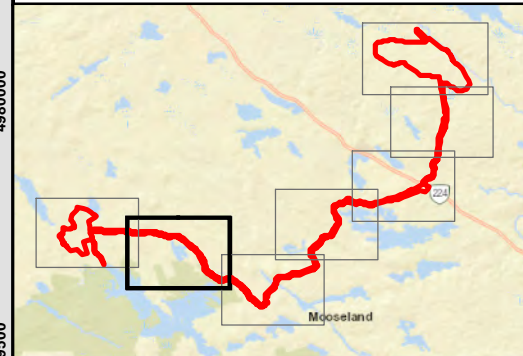


FIGURE CEA 2-31-8F

### Beaver Dam Mine Project Air Contours NO2 Averaged Annual Levels

- Receptor
- NO2 Ranges (ug/m3)
  - 0.5 - 1
  - 1 - 1.5
- Local Road
- Dry Weather / Seasonal Road
- Diveways (>300 m)
- Track
- NSTDB Mapped Watercourses
- Lakes
- Proposed Project Infrastructure

NO2 Annual Guideline: 100 ug/m3 (not shown on map)  
Background Concentration Used: 3.3 ug/m3 (not shown on map)



Coordinate System: NAD 1983 CSRS UTM Zone 20N  
Projection: Transverse Mercator  
Datum: North American 1983 CSRS  
Units: Meter



0 125 250 500 m

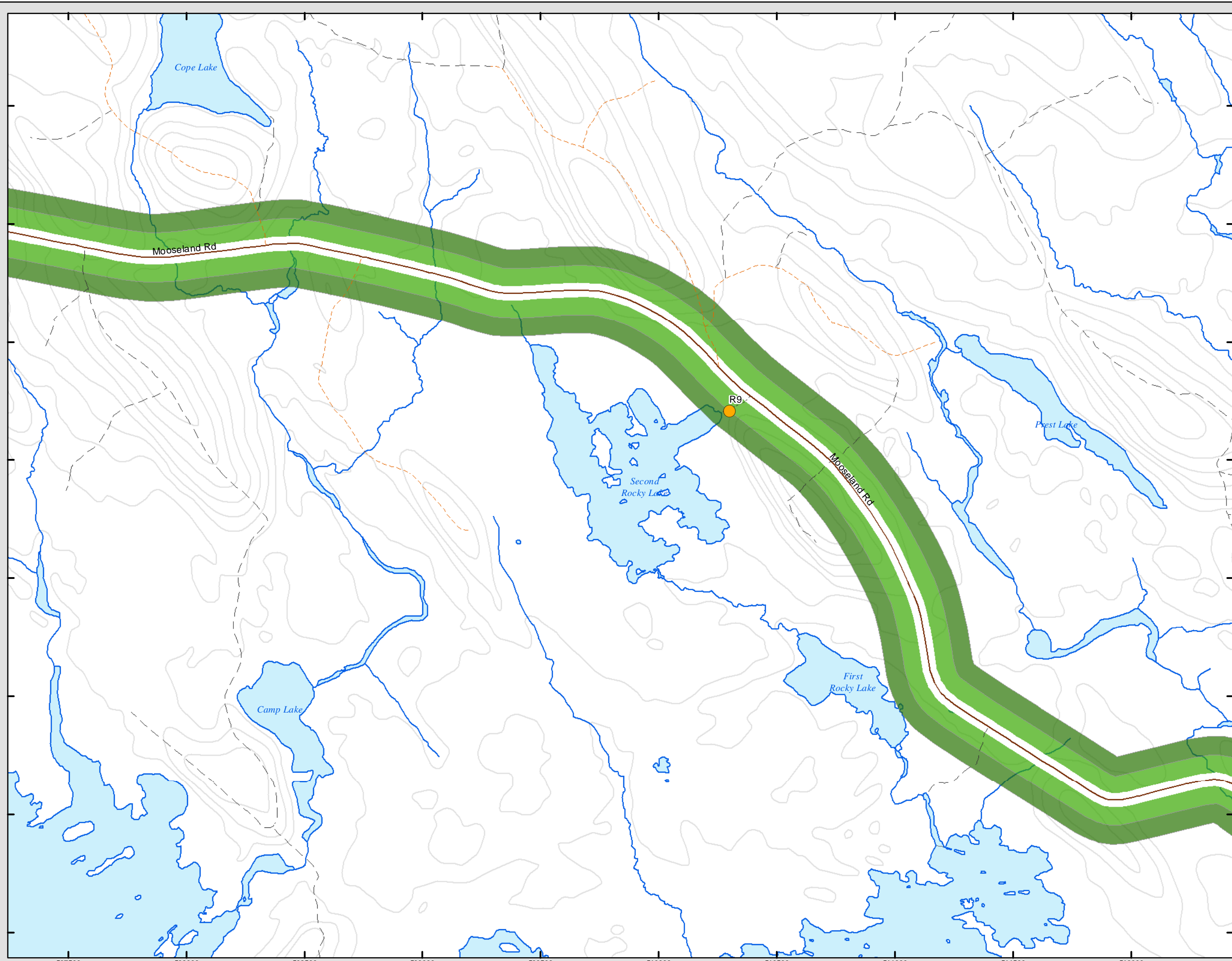
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Drawn By: MEL Date: 2021-09-21  
Reviewed By: GHD

Service Layer Credits: Sources: Esri, HERE, Gamin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community



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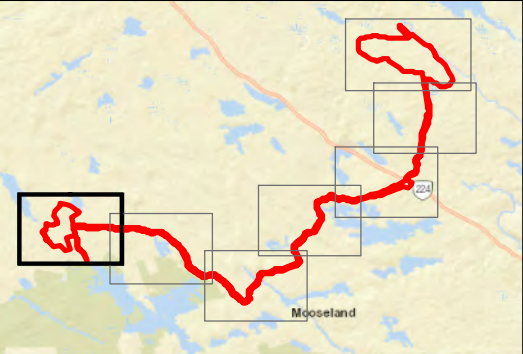
**Atlantic Gold**

**FIGURE CEAA 2-31-8G**

**Beaver Dam Mine Project  
Air Contours  
NO2 Averaged Annual  
Levels**

- NO2 Ranges (ug/m3)**
- 0.5 - 1
  - 1 - 1.5
- Local Road
  - Dry Weather / Seasonal Road
  - Diveways (>300 m)
  - Track
  - NSTDB Mapped Watercourses
  - Lakes
  - Proposed Project Infrastructure
  - Existing Touquoy Infrastructure Layout
  - Existing Touquoy Property Boundary

NO2 Annual Guideline: 100 ug/m3 (not shown on map)  
Background Concentration Used: 3.3 ug/m3 (not shown on map)



Coordinate System: NAD 1983 CSRS UTM Zone 20N  
 Projection: Transverse Mercator  
 Datum: North American 1983 CSRS  
 Units: Meter

0 125 250 500 m

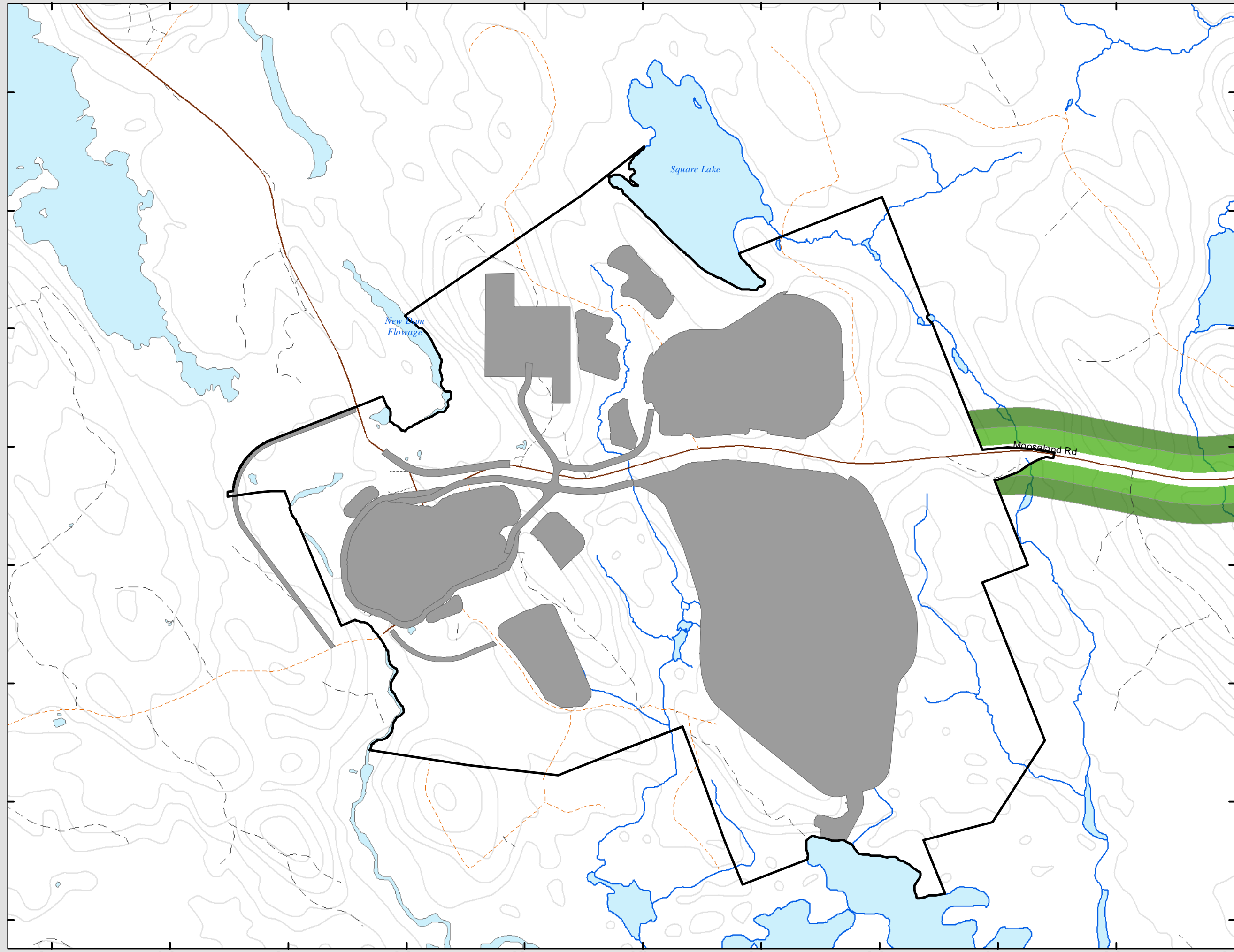
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Drawn By: MEL Date: 2021-09-21  
Reviewed By: GHD

Service Layer Credits: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community



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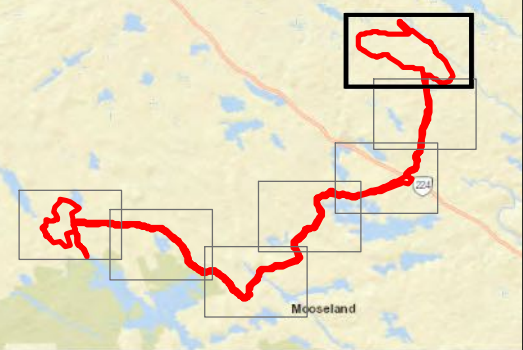


**FIGURE CEA 2-31-9A**

**Beaver Dam Mine Project  
Air Contours  
SO2 1-Hour Levels**

- Beaver Dam Mine Site (concentrations beyond property boundary shown)
- SO2 Ranges (ug/m3)
  - 0.2 - 0.4
  - 0.4 - 0.6
  - 0.6 - 0.8
  - 0.8
- Local Road
- Dry Weather / Seasonal Road
- Track
- NSTDB Mapped Watercourses
- Lakes
- Proposed Project Infrastructure
- Proposed Property Boundary

SO2 1-Hour Guideline: 900 ug/m3 (not shown on map)  
Background Concentration Used: 7.9 ug/m3 (not shown on map)



Coordinate System: NAD 1983 CSRS UTM Zone 20N  
 Projection: Transverse Mercator  
 Datum: North American 1983 CSRS  
 Units: Meter

0 170 340 680 m

1:20,000 Scale when printed @ 11" x 17"

Drawn By: SS Date: 2021-09-21  
Reviewed By: MM

Service Layer Credits: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community



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