MEMORANDUM

TO Rick Schryer - Fortune Minerals Limited **DATE** 23 February 2012

CC Jen Gibson

FROM Chris Madland, Andrew Pickup **PROJECT No.** 09-1373-1004.9600

UNDERTAKING #14
PREDICTED ANNUAL NO_2 VALUES

During Day 3 of the Technical Sessions for the NICO Project, the predicted annual NO_2 values reported in the Fortune Minerals Limited (Fortune), NICO Project Developer's Assessment Report (DAR), Application Case were queried by Ms. Aileen Stevens of the Northwest Territories (NWT) Ministry of Environment and Natural Resources (ENR) with regard to the maximum annual value and exceedance of the relevant NWT Air Quality Standards.

The reported maximum predicted annual ground-level concentrations of NO_2 for the Regional Study Area and for the Regional Study Area excluding developed areas were 128 micrograms per cubic metre ($\mu g/m^3$) and 68 $\mu g/m^3$, respectively. The NWT annual standard is 60 $\mu g/m^3$. A commitment was made during the technical meeting (9 February 2012) (Undertaking 14) to review the NO_X emissions data for unnecessary conservatism to provide context to the excursion above the standard. In the course of review, it was determined that a calculation error in the processing of the modelling results was responsible for the reported annual exceedance, and that upon correction, the predicted maximum annual NO_2 concentration values are less than what was initially reported, and further, are in compliance with the NWT Air Quality Standards. The Baseline Case was not affected by the error.

Corrected annual predictions based on the ozone limiting method are presented in this letter, in Table 1.

The Alberta Air Quality Model Guideline (AAQMG) was referenced for the application of the ozone limiting method for NO_X to NO_2 conversion. By the AAQMG, if the period of interest is annual, then the user has 2 model options:

- **Method (1):** The hourly predictions at each location can be ozone limited, and the averages could be used to determine the maximum annual concentrations; and
- **Method (2):** The annual concentration can be determined as direct output and the average ozone concentration can be utilized.

Method (2) was the method used and reported in the DAR for NO_2 concentrations; however, a calculation error resulted in the incorrect maximum annual prediction. The original incorrect predictions are shown in Table 1, column 1, as "Previously Reported". These are shaded to reflect that they should not be used or applied. Recalculated results using Method (2) are shown in Table 1, column 2, as "Method (2)". Further, Golder Associates Ltd. has undertaken to re-model NO_2 using Method (1) of the AAQMG, which results in even lower levels of predicted NO_2 than Method (2). Results using Method (1) are shown in Table 1, column 3, as "Method (1)".

Table 1: Corrected NO_2 Concentrations (NICO Project)

	Application Case Previously Reported[e]	Application Case Method (2)[f]	Application Case Method (1)[g]
Column	**1**	**2**	**3**
Local Study Area (LSA)			
Maximum NO_2 predictions [µg/m³][a]	128.2	107.9	90.2
Maximum NO_2 predictions (excluding NICO Project Footprint)[a] [µg/m³]	68.4	52.7	27.0
Distance to NO_2 predictions[b,c] [km]	1.7	1.7	1.7
Direction to NO_2 predictions[b,c]	NW	NW	NW
Occurrences above GNWT AQS[c,d]	—	0	0
Regional Study Area (RSA)			
Maximum NO_2 predictions [µg/m³][a]	128.2	107.9	90.2
Maximum NO_2 predictions (excluding NICO Project Footprint)[a] [µg/m³]	68.4	52.7	27.0
Distance to NO_2 predictions[b,c] [km]	1.7	1.7	1.7
Direction to NO_2 predictions[b,c]	NW	NW	NW
Occurrences above GNWT AQS[c,d]	—	0	0
GNWT AQS [µg/m³][d]	**60**	**60**	**60**

[a] The maximum concentrations represent the highest annual predictions from the CALPUFF model.

[b] Locations are relative to approximate center point of the facility.

[c] Locations, number of occurrences, and areas are based on the maximum predictions outside the NICO Project Footprint.

[d] GNWT AQS = Government of Northwest Territories Air Quality Standards (2011).

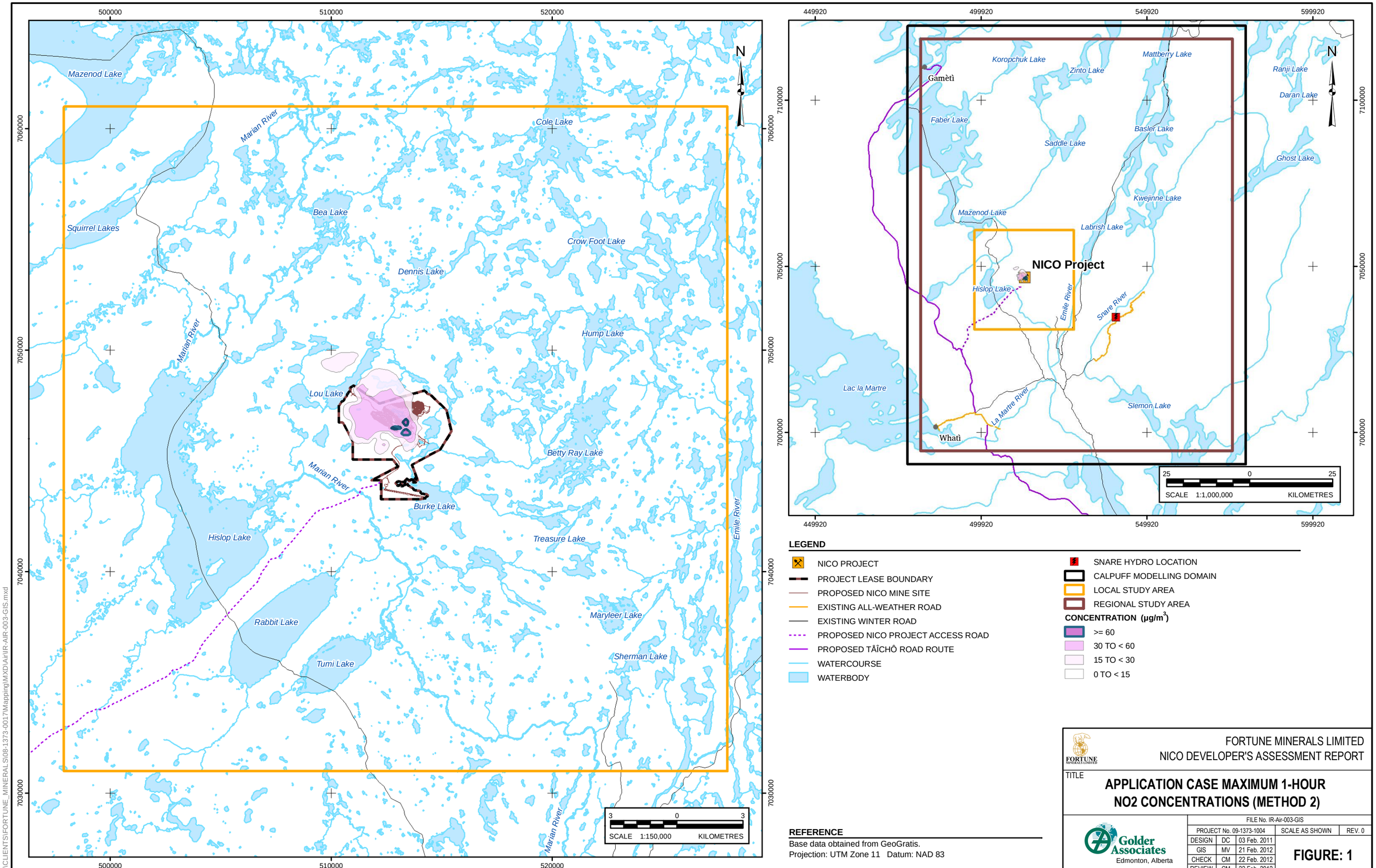
[e] Originally presented in error in the Developer's Assessment Report.

[f] Method (2) is hourly ozone limited averages applied to an annual average as per the Alberta Air Quality Model Guideline.

[g] Method (1) is annual ozone limited averages as per the Alberta Air Quality Model Guideline.

— Not applicable. ; NW = northwest; km = kilometre; µg/m^3 = micorgrams per cubic metre

Both Method (1) and Method (2) result in predicted NO_2 values in compliance with the GNWT AQS for the NICO Project. Excluding the NICO Project footprint, Method (2) results in a maximum predicted NO_2 concentration of 52.7 µg/m³, while Method (1) results in a maximum predicted NO_2 concentration of 27.0 µg/m³, both of which are in compliance with the GNWT AQS of 60 µg/m³. Figure 1 shows the corrected NO_2 annual isopleths (Method 2), and Figure 2 provides annual NO_2 isopleths derived from Method (1).



LEGEND

- NICO PROJECT
- PROJECT LEASE BOUNDARY
- PROPOSED NICO MINE SITE
- EXISTING ALL-WEATHER ROAD
- EXISTING WINTER ROAD
- PROPOSED NICO PROJECT ACCESS ROAD
- PROPOSED TÂÎCHÔ ROAD ROUTE
- WATERCOURSE
- WATERBODY
- SNARE HYDRO LOCATION
- CALPUFF MODELLING DOMAIN
- LOCAL STUDY AREA
- REGIONAL STUDY AREA

CONCENTRATION (µg/m^3)

- >= 60
- 30 TO < 60
- 15 TO < 30
- 0 TO < 15

REFERENCE

Base data obtained from GeoGratis.
Projection: UTM Zone 11 Datum: NAD 83

FORTUNE MINERALS LIMITED
NICO DEVELOPER'S ASSESSMENT REPORT

TITLE

APPLICATION CASE MAXIMUM 1-HOUR NO2 CONCENTRATIONS (METHOD 2)

Golder Associates
Edmonton, Alberta

FILE No. IR-Air-003-GIS			
PROJECT No. 09-1373-1004		SCALE AS SHOWN	REV. 0
DESIGN	DC	03 Feb. 2011	FIGURE: 1
GIS	MV	21 Feb. 2012	
CHECK	CM	22 Feb. 2012	
REVIEW	CM	22 Feb. 2012	

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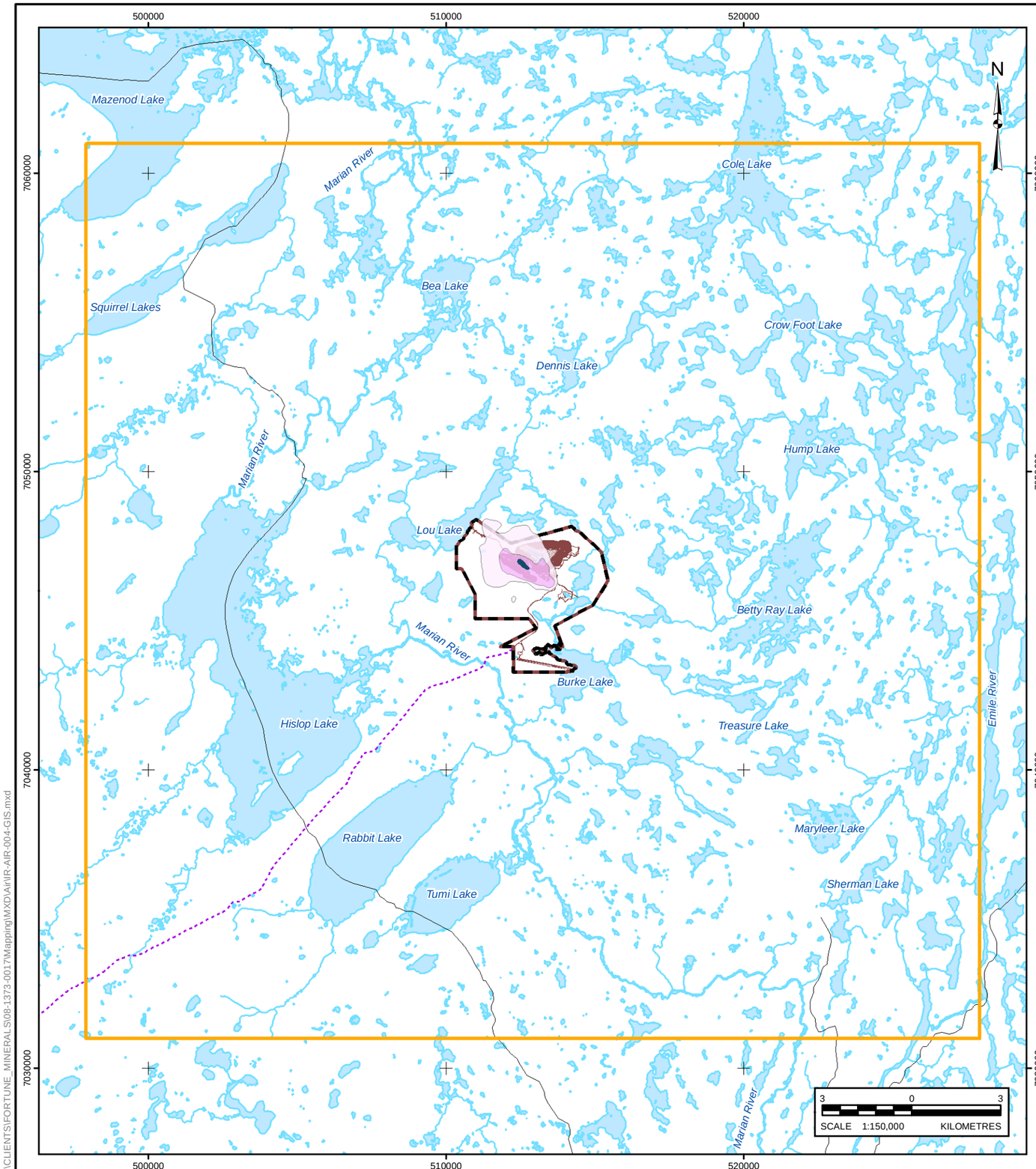

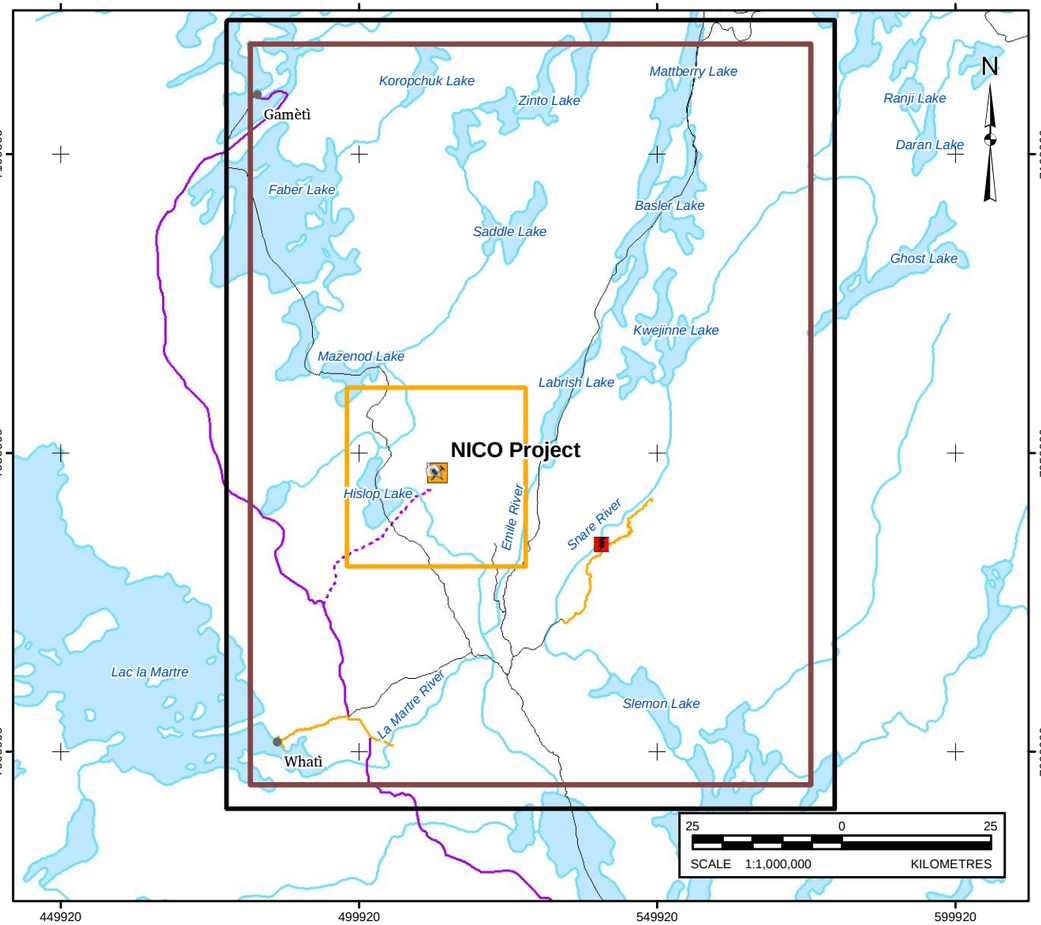

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Projection: UTM Zone 11 Datum: NAD 83

FORTUNE MINERALS LIMITED
NICO DEVELOPER'S ASSESSMENT REPORT

TITLE

APPLICATION CASE MAXIMUM 1-HOUR NO2 CONCENTRATIONS (METHOD 1)

Golder Associates
Edmonton, Alberta

FILE No. IR-Air-004-GIS			
PROJECT No. 09-1373-1004		SCALE AS SHOWN	REV. 0
DESIGN	DC	03 Feb. 2011	FIGURE: 2
GIS	MV	21 Feb. 2012	
CHECK	CM	22 Feb. 2012	
REVIEW	CM	22 Feb. 2012	

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