APPENDIX 5D-1

BASELINE NOISE REPORT

FINAL REPORT

NOISE BASELINE STUDY
BAFFINLAND IRON MINES CORPORATION
MARY RIVER PROJECT

Project Number: #W07-5226A **November 20, 2008**

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EXECUTIVE SUMMARY

A baseline assessment of the ambient noise environment at Baffinland Iron Mines Corporation (Baffinland) Mary River Project (Project) mine and port locations has been completed. Noise levels from the existing environment would be described as faint. Average 24-hour sound exposures ranged from 25 to 30 dBA, depending on location.

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1. INTRODUCTION

1.1 Overview

This report presents the findings of a baseline noise assessment conducted in July 2007 by RWDI AIR Inc. (RWDI), for the areas of activity associated with the proposed Mary River Project (the Project) on Baffin Island.

The objective of the baseline sound monitoring surveys was to characterize the existing sound environment near the proposed project components:

- Mary River Mine Site;
- Milne Inlet Site; and,
- Steensby Inlet Port Site.

1.2 Regional Setting

The Project is in a pristine area, remote from any established human settlement. At the time of RWDI's baseline noise monitoring (June 2007), there were no existing anthropogenic noise sources that would influence ambient noise levels in the Project area with the exception of exploration activities at the proposed Mary River mine site.

2. STUDY AREA

The study areas for noise are the areas where potential noise impacts from the proposed mining and shipping operations are likely to occur.

Based on the characteristics of sound propagation in the atmospheric environment, operational and construction noise from the proposed mining and shipping locations would be expected to decrease to natural background levels at distances of 1 to 3 km from the source, though noise may still be audible at this distance. A 3 km area around the proposed Steensby Port Site, Milne Inlet Site, and the Mary River mine site was chosen as the study area for noise.

Within the study area, special consideration was given to existing sensitive land uses, and to the proposed work camps for the project. The only existing sensitive land uses within 3 km of the project are hunting camps located at Milne Inlet and Mary River.

3. NOISE METRICS

Environmental sound levels vary continuously over time. To account for both daily and short-term variations in sound levels, several single numerical descriptors have been developed based on large-scale psycho-acoustic studies of annoyance with environmental noise. These allow sound monitoring to be conducted for a constantly varying sound environment over an extended period, with the results described as a single number that accurately describes the environment.

The single number descriptor commonly used in most international standards for environmental sound measurements is the energy equivalent sound level (L_{eq}). The L_{eq} value, expressed in dBA, is the energy-averaged, A-weighted sound level for the complete measurement interval. It is the steady, continuous sound level over a given period that has the same acoustic energy as the actual varying sound levels occurring over the same period in the measured environment. It is one of the most common and useful predictors of human response to

noise, and it is also the noise descriptor that is used in the majority of to environmental noise criteria. The A-weighting accounts for the frequency content of the measured sound based on a frequency response similar to that heard by the human ear.

The descriptors specific to this study are:

- the 24-hour A-weighted energy equivalent sound level, L_{eq} (24), referred to as the daily sound level
- the 15-hour A-weighted energy equivalent sound level, L_{eq} Day or L_{eq} (15), referred to as the daytime sound level
- the 9-hour A-weighted energy equivalent sound level, L_{eq} Night or L_{eq} (9), referred to as the night time sound level
- the 1-hour A-weighted energy equivalent sound level, L_{eq} (1), referred to as the hourly sound level

Ranges of typical sound levels are presented in Table 3-1.

Table 3-1: Typical Ranges of Commonly Encountered Sound Levels

Sound Level	dBA	Common Noise Sources
Deafening	**120**	Threshold of pain
	115	Maximum noise level at a hard rock concert
	110	Accelerating motorcycle at 1 m
	105	Loud auto horn at 3 m
Very Loud	**100**	Dance club; Maximum human vocal output at 1 m
	95	Jackhammer at 15 m
	90	Inside a noisy factory
	85	Heavy truck pass-by at 15 m
Loud	**80**	School cafeteria; Noisy bar
	75	Near edge of major highway; Inside automobile travelling at 60 km/h
	70	Vacuum cleaner at 1.5 m
	65	Normal human speech, i.e., an un-raised voice, at 1 m
Moderate	**60**	Typical background noise levels in a large department store; Hair dryer
	55	Running tap water
	50	Clothes dryer; Air conditioner
	45	Typical background noise level in an office caused by HVAC; Flowing stream
Faint	**40**	Typical background noise level in a library; EUB guideline for noise at 1.5 km
	35	Average whisper; Typical quiet outdoors
	30	Broadcast studio
	25	
Very Faint	**20**	Deep woods on a calm day
	15	
	10	
	5	Human breathing
	0	Threshold of hearing, i.e., quietest sound that can be heard

4. BASELINE NOISE ASSESSMENT METHODOLOGY

In the absence of specific requirements for Nunavut, the noise measurement requirements of the Alberta Energy Board (EUB) Directive 038 guidelines (EUB 2007) and Ontario Ministry of the Environment Publications NPC-103 were followed (MOE 1977b). The basic procedure consisted of: conducting measurements and recordings of sound levels at three locations; validating the data based on the recordings and weather information, and calculating the resulting validated sound level data.

4.1 Monitoring Locations

Sound level meters were set up near the proposed Mary River mine site, near Steensby Inlet, and near Milne Inlet. Meters and sound recorders were in place for a period of approximately 10 days between July 10, 2007 and July 24, 2007.

The locations of sound monitoring stations were chosen such that there would be minimal impact from the exploration activities underway at the time. Impacts from frequent low-flying aircraft were unavoidable, but were removed during the data validation analysis. Distances of approximately 2 km from the Mary River camp site, and approximately 1 km from the Steensby and Milne sites were found to be sufficient to prevent interference from noise from most other human activity. Locations of the sound monitoring stations are shown in Figures 4-1, 4-2, and 4-3.

4.2 Equipment

Sound level readings were obtained using Larson-Davis Model 812 and 820 precision integrating sound level meters, configured to log L_{eq} (5 minute) or L_{eq} (10 minute) levels. These units meet IEC 61672 Class I sound level meter requirements, and Ontario Ministry of the Environment Publication NPC-102 requirements (IEC 2002, MOE 1977a). The sound level meters were field-calibrated at the beginning and end of measurements to ensure accuracy.

Larson-Davis Model 2560 and PCB Model 377A60 microphones were used to ensure adequate low-level response (with a "noise floor" of approximately 20 dBA). The sound level meter microphones were mounted on tripods, with the microphone located approximately 1.5 m above grade. The microphones were covered with environmental wind screens to reduce wind noise over the microphone, and to prevent damage from rain and interference from birds.

Sound recorders were placed with the meters to simultaneously record the ambient noises. Due to logistical limitations, at the Milne Inlet and Steensby Inlet sites, continuous recording was not possible, but a series of representative recordings were obtained.

Weather data were obtained from meteorological stations located near each of the monitoring sites, operated by Knight Piésold. Stations were configured to monitor wind speed, temperature, and relative humidity, logging at 1 hour intervals. The meteorological stations at Steensby and Milne inlets were located within 100 m of the sound measurement equipment. The meteorological station at Mary River was approximately 2 km from the sound measuring equipment.

4.3 Data Validation

Data collected from the sound level meters were analyzed to determine the baseline conditions at each of the three sites. Data that fell outside of acceptable meteorological conditions were excluded from the analysis. Acceptable meteorological conditions are shown in Table 4-1.

Table 4-1: Acceptable Meteorological Conditions

Parameter	Lower Limit	Upper Limit
Temperature	-10°C	40°C
Wind Speed	-	15 km/h
Relative Humidity	-	95 %
Precipitation	-	0 mm/h

In addition, any recording periods where human activity, including aircraft noise, was audible were excluded from the analysis.

5. BASELINE MEASUREMENT RESULTS AND DISCUSSION

The study areas are remote and not presently influenced by any existing permanent anthropogenic noise sources. The only anthropogenic noise generated in the study areas came from the existing mineral exploration activities, baseline environmental data collection activities associated with the Project, and the occasional traditional use of the area by hunters, trappers, and fishermen.

Background atmospheric noise levels in remote areas are typically low, ranging from about 25 to 40 dBA. These values are similar to those measured for the Milne Inlet, Steensby Inlet, and Mary River sites. Table 5-1 shows measured ambient noise values for each of these three sites. Noises of these levels would be described as faint.

Table 5-1: Baseline Monitoring Results

Site	**L_{eq} (24 h)** (dBA)	**L_{eq} (Day, 15h)** (dBA)	**L_{eq} (Night, 9h)** (dBA)	**Minimum L_{eq} (1 h)** (dBA)	**Maximum L_{eq} (1 h)** (dBA)
Mary River	25	25	26	20	34
Milne Inlet	30	31	29	21	35
Steensby Inlet	29	31	26	23	35

Noise observed at all three sites consisted mainly of wind, insect, and small animal or bird noise. At the Steensby Inlet and Milne Inlet sites, some noise from the water (i.e. flowing water sounds and waves breaking) contributed to the baseline noise levels. Differences between daytime and night time sound levels were generally small, and are attributed mainly to very low level noise from human activity which could not be screened out. Daytime and night time sound levels are typically similar in pristine Northern environments.

The measured ambient sound levels presented in Table 6-2 are quieter than those used as the basis of D038, which assumes an average rural ambient sound level of 35 dBA, and is quieter than those measured in ambient surveys conducted for other northern locations (e.g., in the Northwest Territories), and those measured by the Ontario Ministry of the Environment for

wind noise in rural locations (MOE 2004). The main reason for this is likely the relative lack of noise from vegetation (lichens and low-lying grasses/bushes in the study areas produce less noise than the trees, shrubs and tall grasses at other more southern sites).

6. SUMMARY

A baseline assessment of the ambient noise environment at propose Milne Inlet Site, Mary River Mine Site, and Steensby Port Site has been completed. Noise levels from the existing environment would be described as faint. Average 24-hour sound exposures ranged from 25 to 30 dBA.

7. REFERENCES

Alberta Energy and Utilities Board (EUB), 2007, Directive 038 "Noise Control", revised February 16, 2007, www.eub.ca

American National Standards Institute (ANSI), 1995, ANSI Standard S12-2 "Criteria for Evaluating Room Noise", Acoustical Society of America, published July 1995

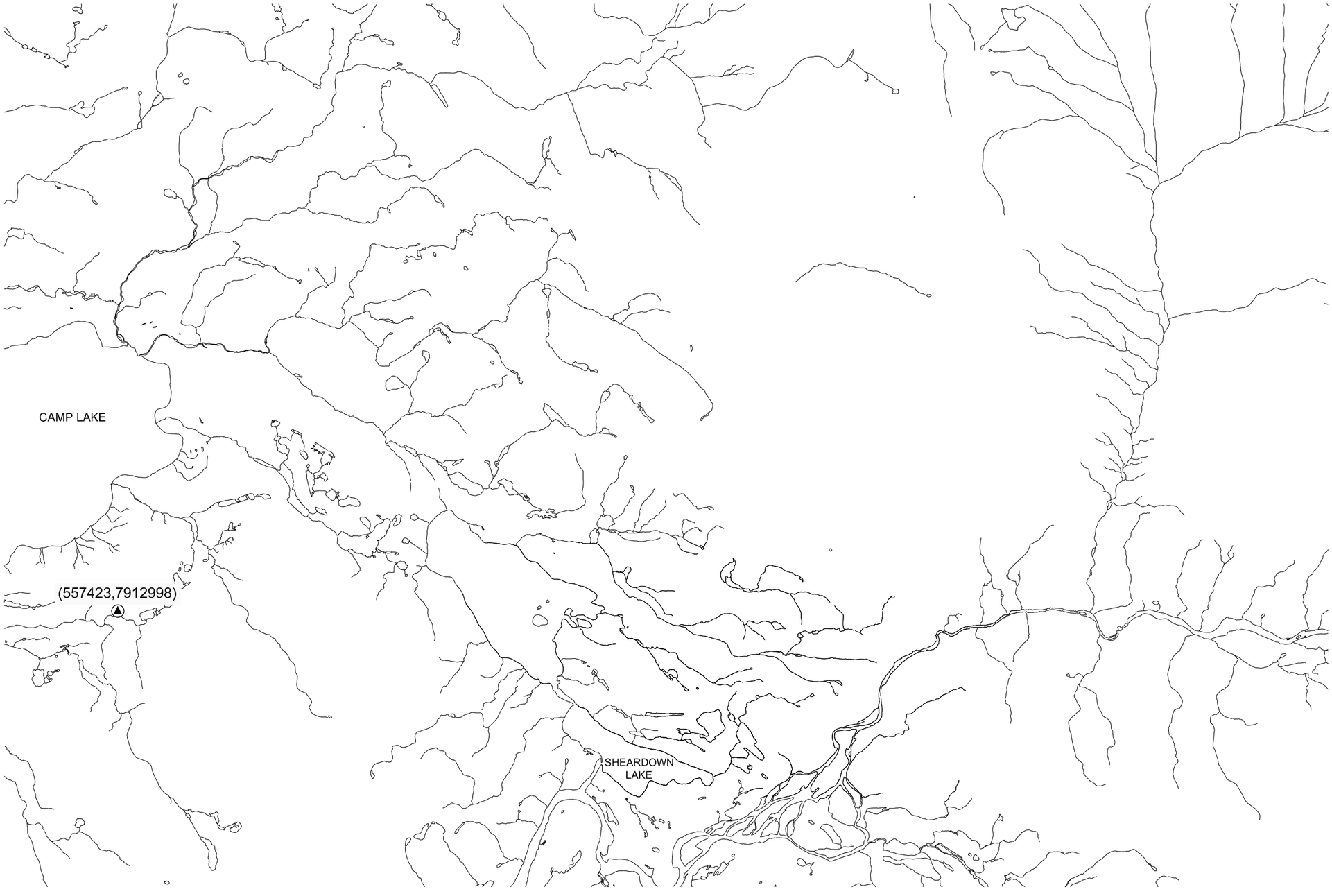
International Electrotechnical Commission (IEC), 2002, IEC Standard 61672-1 "Electroacoustics – Sound level meters – Part 1: Specifications", IEC, 2002.

Ontario Ministry of the Environment (MOE), 1977a, Publication NPC-102 "Instrumentation", Queen's Printer for Ontario, published 1977.

Ontario Ministry of the Environment (MOE), 1977b, Publication NPC-103 "Procedures", Queen's Printer for Ontario, published 1977.

Ontario Ministry of the Environment (MOE), 2004, "Interpretation for Applying MOE NPC Technical Publications to Wind Turbine Generators", Queen's Printer for Ontario, published July 2004

FIGURES



0 500 1000m

LEGEND:

▲ Sound Monitor

Mary River Baseline Noise Monitoring Location

True North

Drawn by: NTN	Figure: **4-1**	RWDI
Approx. Scale:	1:30 000	
Date Revised: Nov. 19, 2008		

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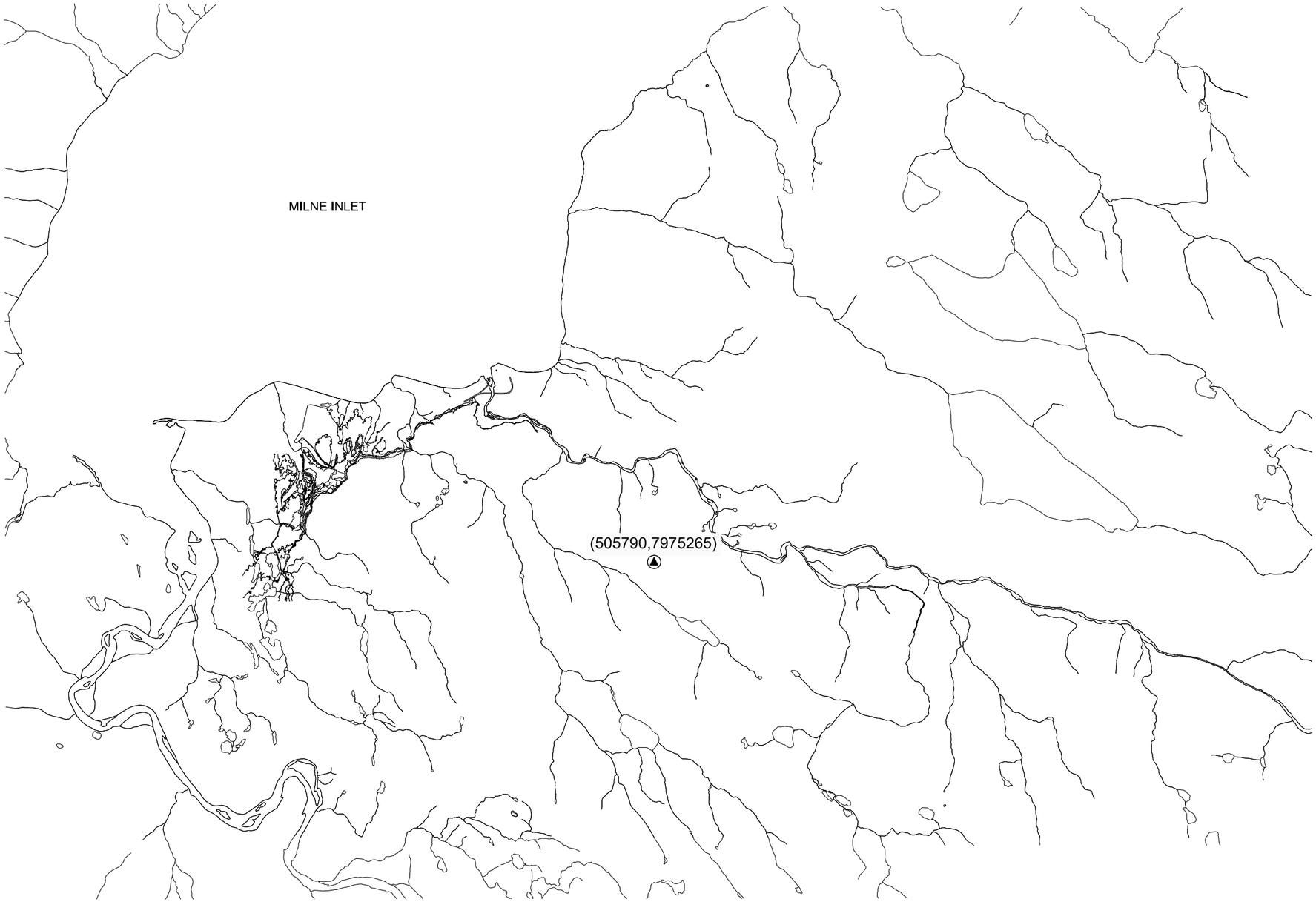

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LEGEND:

▲ Sound Monitor

Milne Inlet Baseline Noise Monitoring Location

True North

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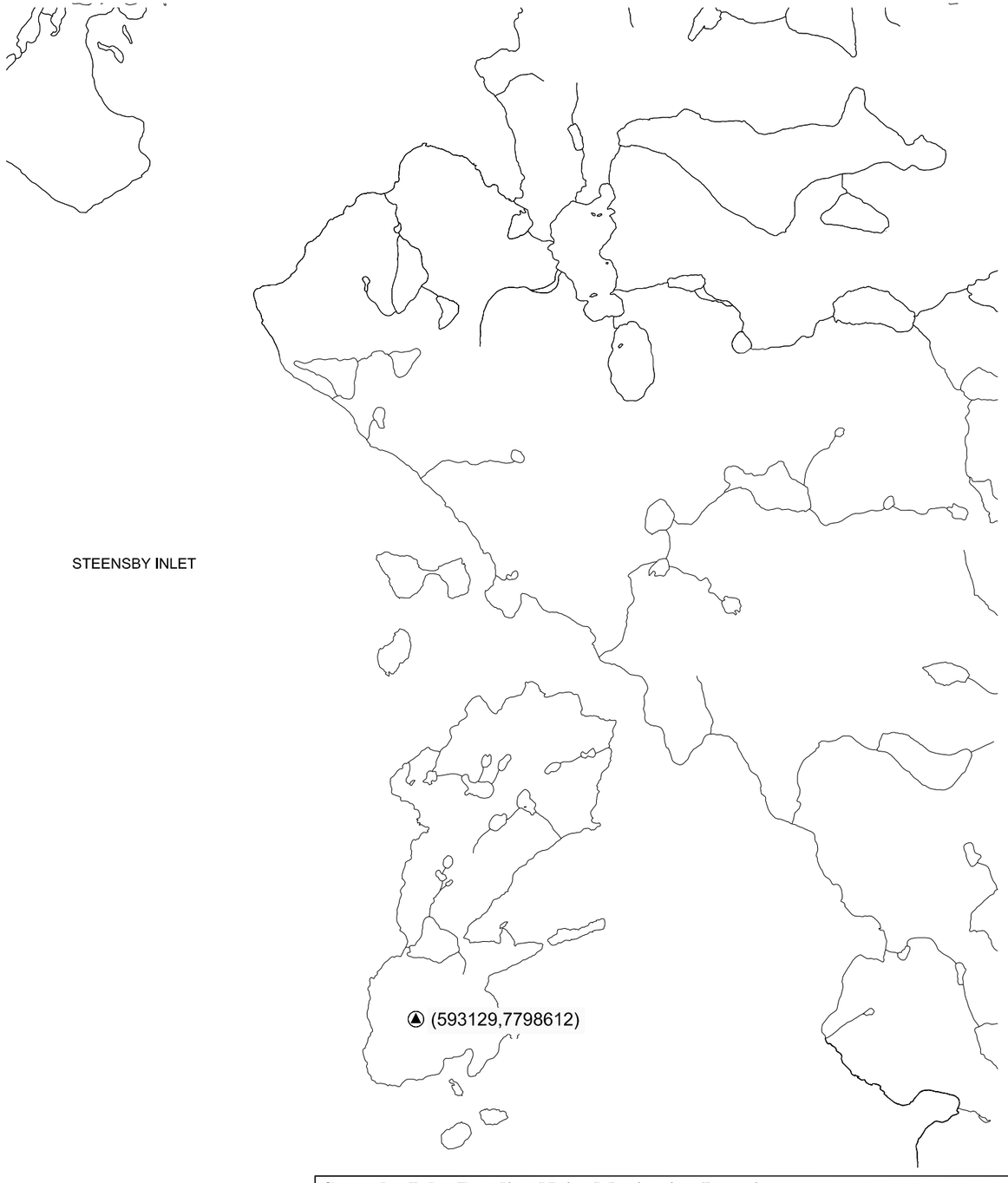
Date Revised: Nov. 19, 2008

RWDI



LEGEND:

▲ Sound Monitor

Steensby Inlet Baseline Noise Monitoring Location

True North

0 500 1000m

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Approx. Scale: 1:30 000

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