APPENDIX 8-E

Addendums for Environmental Protection and Monitoring Plans

June 2016
Report No. 1541520

AGNICO EAGLE

Golder Associates

8-E.2: Core Receiving Environment Monitoring Program

ADDENDUM

AGNICO EAGLE

Project Name:	Meadowbank Gold Project	
Plan / Version:	Core Receiving Environment Monitoring Program 2013	Version WT; June 2016
NIRB Requirement:	Project Certificate No. 004	**Condition:** not applicable
NWB Requirement:	2AM-MEA-1525	**Condition:** Part B, Item 14b Part I, Item 2

Addendum:		
Section Change	**Specify: Update or New**	**Details**
	New	WT Addendum

FINAL
Project No. AEM-15-03
May 2016

AGNICO EAGLE

Core Receiving Environment Monitoring Program (CREMP): 2015 Plan Update - Whale Tail Pit Addendum

Prepared for:

Agnico-Eagle Mines Ltd.
Meadowbank Division

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FINAL

Core Receiving Environment Monitoring Program (CREMP): 2015 Plan Update – Whale Tail Pit Addendum

Prepared for:

Agnico Eagle Mines Ltd.

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1. INTRODUCTION

In accordance with the terms of the renewed Nunavut Water Board (NWB) Type A Water Licence (2AM-MEA1525), Azimuth Consulting Group Partnership (Azimuth) was retained by Agnico Eagle Mines Limited (Agnico Eagle) to complete an update of the core receiving environment monitoring program (CREMP) plan (Azimuth, 2015a). This report is an addendum to the 2015 CREMP plan update, and addresses how receiving environment monitoring for the Whale Tail Pit Project fits into the Meadowbank/Baker Lake CREMP program. Note that this addendum only highlights differences and does not repeat what is already stated in the CREMP 2015 plan update (see Azimuth, 2015a).

Baseline sampling was conducted in 2014 and 2015 (Azimuth, 2016) to support the final environmental impact statement (FEIS) as well as to characterize pre-mining "before" conditions for the development of a long-term receiving environment monitoring program consistent with the Meadowbank CREMP (Azimuth, 2016). Additional baseline sampling for the CREMP is planned, prior to the onset of activities with potential to impact to the aquatic receiving environment.

2. WHALE TAIL PIT CREMP ROUTINE MONITORING

2.1. Introduction

Agnico Eagle Mines Limited – Meadowbank Division (Agnico Eagle) is proposing to develop Whale Tail Pit (Project), a satellite deposit on the Amaruq property, to continue mine operations and milling at Meadowbank Mine. Agnico Eagle is seeking approval to expand Meadowbank Mine to include development of resources from Whale Tail Pit and requests the Nunavut Impact Review Board (NIRB) reconsider under Section 112 of the Nunavut Planning and Project Assessment Act the terms and conditions set out in Project Certificate (No. 004) issued for Meadowbank Mine. Concurrent with the reconsideration of the Project Certificate by the NIRB, Agnico Eagle is seeking an amendment to Meadowbank Mine Type A Water Licence (No. 2AM-MEA1525) to include mining of Whale Tail Pit and construction and operations of associated infrastructure from the Nunavut Water Board (NWB).

The Amaruq property is a 408 square kilometre (km^2) site located on Inuit Owned Land approximately 150 kilometres (km) north of the hamlet of Baker Lake and approximately 50 km northwest of Meadowbank Mine in the Kivalliq Region of Nunavut (**Figure 2–1**). The deposit will be mined as an open pit (i.e., Whale Tail Pit), and ore will be hauled to the approved infrastructure at Meadowbank Mine for milling.

The proposed open pit mine, mined by truck-and-shovel operation, will produce 8.3 million tonnes (Mt) of ore, 46.1 Mt of waste rock, and 5.6 Mt of overburden waste. There are four phases to the development: 1 year of construction, 3 years of mine operation, 8 years of closure, and the post-closure period.

2.2. Study Design

The study design is based on a before-after-control-impact (BACI) approach, but has also incorporated the concept of gradients in exposure; the study design mirrors the approved Meadowbank Mine CREMP. Tracking spatial and temporal differences related to mining activities relied on categorizing areas using two factors:

- *Area Type* – this concept relates to an area's spatial proximity to the planned mine development (i.e., whether built or not); categories include near-field, mid-field, far-field, and reference (see **Section 2.2.2**).

- *Area Status* – this concept is temporal and has two levels: control (not exposed to mine-related activity) or impact (exposed to mine-related activity). The term "impact" is taken from the BACI statistical study design approach and does not mean that an actual impact has taken place; rather, it designates a time period when potential mine-related impacts may occur for an area (i.e., that an area has been exposed to one or more mining activities).

Together, area categorization by type and status provide a logical framework to facilitate the identification of real mining-related changes to the aquatic receiving environment (as opposed to natural regional changes due to climate or other factors).

The onset of construction activities in proximity to a CREMP monitoring area formally ends the baseline phase and changes the status of that area from "control" to "impact". Status changes are also important for any statistical analyses, as they dictate how data are grouped when assessing potential trends. The status of the Amaruq CREMP areas starting in 2015 is provided in **Table 2–1**.

Table 2–1. Status of Whale Tail Pit and Meadowbank CREMP areas.

	Meadowbank Reference Areas		Whale Tail Pit Areas					
	REF	REF	NF	NF	NF	MF	MF	FF
Year	INUG	PDL	WTS	MAM	NEM	A20	A76	DS1
2015	C	C	C	C	C			
2016	C	C	C	C	C	C	C	C
2017	C	C	C	C	C	C	C	C

Notes: Area designations: C=Control; I=Impact; REF=reference (in grey shading); NF=near-field (in blue shading); MF=mid-field (in pink shading); FF=far-field (in teal shading); Blank denotes that the area was not part of the monitoring program that year. Area IDs: INUG=Inuggugayualik Lake; PDL=Pipedream Lake; WTS=Whale Tail Lake South; MAM=Mammoth Lake; NEM=Nemo Lake.

2.2.1. Approach

The 2015 AEMP describes a two-tiered approach for decision criteria based on 'trigger' and 'threshold' level concentrations (Azimuth, 2015b). These are defined as:

- *Triggers* are early warning criteria that may lead to action. Exceedance of a trigger value does not necessarily imply that an adverse effect may be expected. The triggers may be based on absolute numbers (e.g., an increases half-way from baseline to an identified effects-based threshold) or statistical criteria (e.g., statistically significant difference from baseline-reference conditions; these are used in the absence of an effects-based threshold for a substance and may be very conservative).
- *Thresholds* are legal requirements, regulatory guidelines (e.g., CCME), or other discrete benchmarks, below which unacceptable adverse effects are not expected and above which adverse effects may occur. If effects-based thresholds do not exist or are not warranted for a particular variable, then early warning triggers (based on statistical criteria) will be developed without thresholds. In such cases, if triggers are exceeded then the implications of such exceedances can only be understood through the integration of results from other AEMP

monitoring programs, or, if important information gaps still exist, through prescribed EEM studies or targeted studies.

Thus, comparison of the data to the early warning trigger values is the initial analytical focus; only if trigger values are exceeded are data then compared to the applicable thresholds (if available). Similar to what was done for the Meadowbank CREMP (Azimuth, 2012), area-specific trigger/threshold (as appropriate) values may need to be developed after the baseline period to support management of the Whale Tail Pit Study Area.

2.2.2. Sampling Areas

The core monitoring program is intended to detect changes at a basin or lake scale of inference and to help define the extent (both spatially and temporally) of any adverse effects identified. The CREMP for the Whale Tail Pit program will be comprised of 8 sampling areas (6 new monitoring areas and continued use of the two existing reference areas), each categorized into one of the four main types of areas described below. An overview of the Whale Tail Pit sampling areas are shown in **Figure 2–2**.

- Near-field (NF) areas – Near-field locations provide the first line of early-warning for introductions of stressors into the receiving environment. These areas are situated in close proximity to the development, in particular near dikes, dewatering discharge, and proposed effluent sources. The NF areas in the Whale Tail Pit Study Area include Whale Tail Lake South (**Figure 2–3**) and Mammoth Lake (**Figure 2–4**), due to their placement in relation to the planned development and in the watershed[1]. Nemo Lake (**Figure 2–5**) is also considered a NF area due to its proximity to Whale Tail and Mammoth Lakes even though it is located in an adjacent watershed. Nemo Lake is the source of drinking water for the exploration camp, and routine water quality monitoring is scheduled for this location. Additional CREMP sampling at Nemo Lake is proposed only in the event that increased parameter concentrations are observed in the routine drinking water quality monitoring samples.
- Mid-field (MF) areas – This area designation includes two lakes: Lake A20 and Lake A76. Sampling at Lake A20 and A76 will be undertaken according to the strategy outlined in the CREMP 2015 plan update for MF areas (Azimuth, 2015a). In the case of Lake A20, the start of the "impact" monitoring period would coincide with back-flooding of Whale Tail Lake into Lake A20, and the diversion of water towards Mammoth Lake through the Northwest Channel. Lake A76 is situated at the junction of the two flow paths leading to Lake DS1. Given its morphology and location, it represents an ideal mid-field exposure area for both flow paths.
- Far-field (FF) area – The intent of this area (Lake DS1) is to monitor water and sediment quality downstream of project infrastructure to provide insights into the spatial extent of any effects observed at the near-field areas. Lake DS1 will be the key location that will ultimately determine whether or not contaminants are detectable downstream of the entire mine development (**Figure 2–2**)[2]. Beyond the baseline period, the sampling strategy for Lake DS1 will follow the same approach for FF stations outlined in the CREMP 2015 plan update (Azimuth, 2015a).

[1] The north basin of Whale Tail Lake (WTN) was sampled in 2014 and 2015 to support the FEIS, but will not be part of the routine CREMP sampling plan as it lies within the pit footprint.

[2] According to Golder (2016), the downstream flow of water splits into two paths. Downstream path 1 follows Lake A12 (immediately south of Lake A76) to Lake A76 and then flows west to the southern tip of Lake DS1. Downstream path 2 flows north from Lake A76 and A11 (east of Lake 76) through a series of small lakes and eventually enters Lake DS1 along the east shore (approximately 2/3 of the way up the bounded area shown on **Figure 2–2**). At present, Lake DS1 is shown as a single station; however, the area may be split into two stations to monitor the contribution of each flow paths.

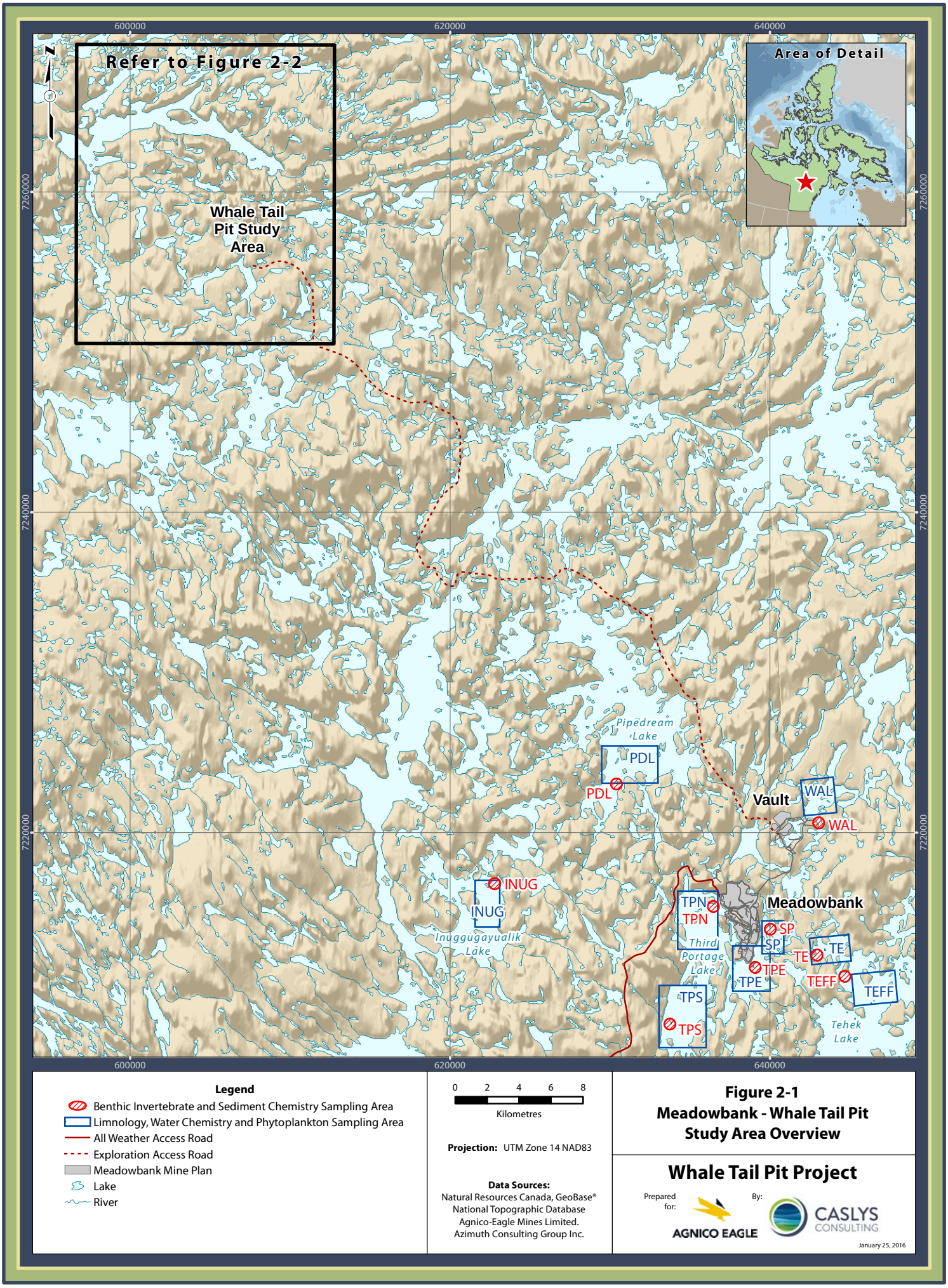
- Reference (Ref) areas – By definition, reference areas are sufficiently removed from mine activities that they are presumed to be unaffected by any infrastructure and point sources (e.g. aerial deposition and effluent) associated with mine development and activities. Inuggugayualik Lake (INUG) and Pipedream Lake (PDL) are external reference areas chosen for the purposes of making comparisons with the Meadowbank project lakes (EVS, 1999; BAER, 2005). INUG has been the core reference area since formal monitoring began in 2006. PDL was added to the Meadowbank CREMP in 2009. In relation to the Whale Tail Pit Study Area, INUG is located about 41 km southeast of the Whale Tail Pit Study Area, while PDL is located 40 km to the southeast (**Figure 2–1**). Pipedream Lake is located northeast of INUG, and the exploration access road runs along the northeast shore of this lake. INUG and PDL satisfied the requirements of an external reference lake for the Meadowbank CREMP from a physical/chemical perspective because they are at similar latitude, have similar geology, relief and climate, do not have any significant inflows and has generally similar limnology, water chemistry and aquatic biological community structure to the project lakes (BAER, 2005). It should be noted that their proximity to the proposed access road may lead to dust deposition into each of the lakes under certain conditions. However, both lakes are quite large and the sampling locations for each are away from the road (i.e., approximately 2 km for PDL and 10 km for INUG), so while road-related trends will be tracked they are not anticipated.

2.2.3. Sampling Components

As described in the CREMP 2015 plan update (Azimuth, 2015a), CREMP monitoring includes the following components, which apply to Whale Tail Pit Study Area lakes: limnology, water chemistry, sediment chemistry, phytoplankton, and benthic invertebrates.

2.2.4. Sampling Effort and Frequency

As described in the 2015 CREMP plan update (Azimuth, 2015a), CREMP sampling effort (i.e., number of replicates per event) and frequency (i.e., number of events per year) follows the recommendations from the CREMP Design Document 2012 (Azimuth, 2012). NWB interveners were consulted over several years during the re-design of the CREMP that was resubmitted following the Type A renewal in 2015 and subsequently approved by regulators. CREMP sampling at Whale Tail Pit Study Area will follow the same level of effort and frequency by area type; refer to Azimuth (2015a) for details on the decision making strategy for initiating sampling at the MF and FF stations.


600000
620000
640000
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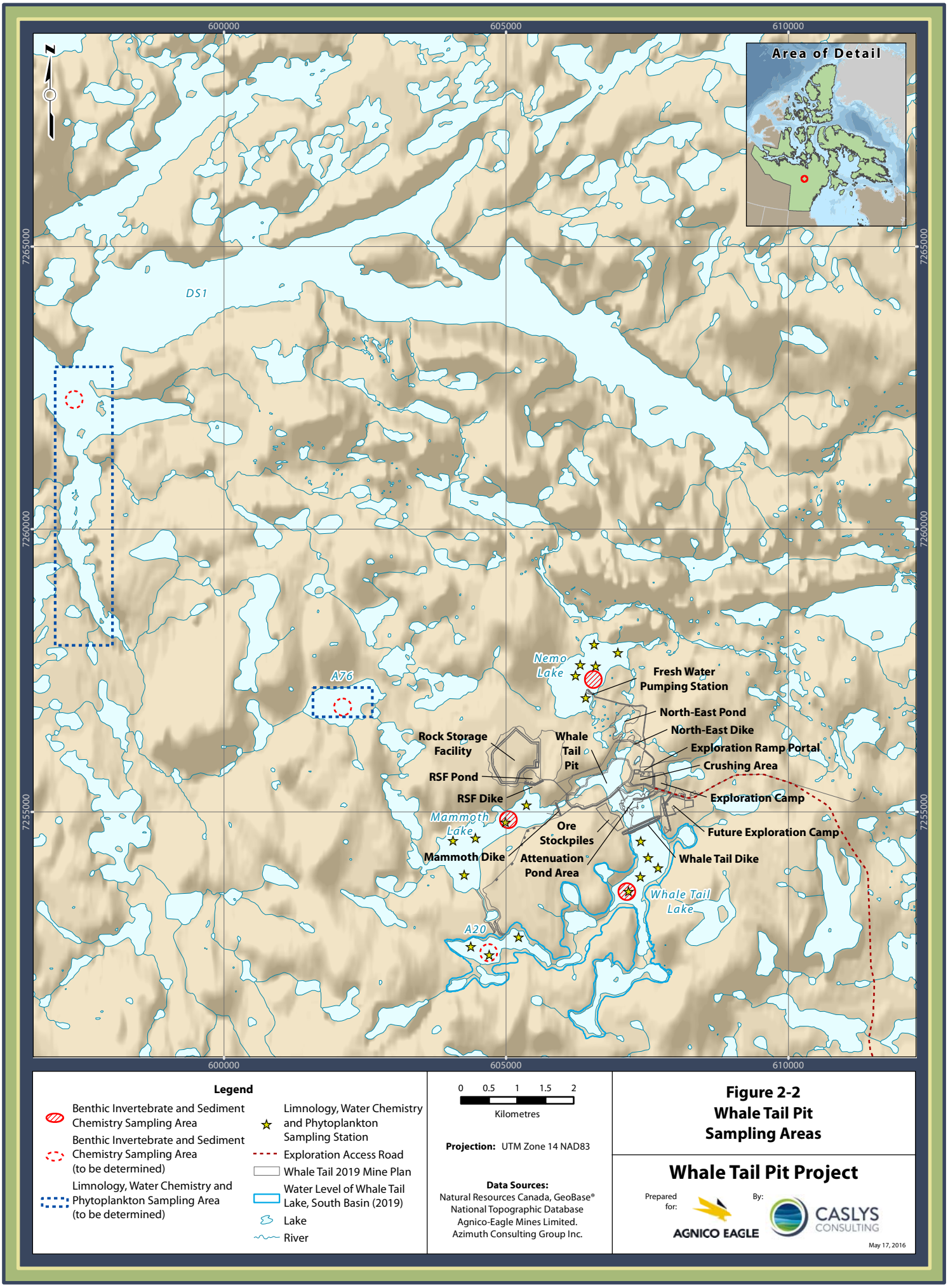
7240000
7220000
Refer to Figure 2-2
Whale Tail
Pit Study
Area
Area of Detail
Pipedream
Lake
PDL
PDL
Vault
WAL
WAL
INUG
INUG
Inuggugayualik
Lake
TPN
TPN
Meadowbank
SP
SP
TE
TE
Third
Portage
Lake
TPE
TPE
TEFF
TEFF
TPS
TPS
Tehek
Lake
Legend
Benthic Invertebrate and Sediment Chemistry Sampling Area
Limnology, Water Chemistry and Phytoplankton Sampling Area
All Weather Access Road
Exploration Access Road
Meadowbank Mine Plan
Lake
River
0 2 4 6 8
Kilometres
Projection: UTM Zone 14 NAD83
Data Sources:
Natural Resources Canada, GeoBase®
National Topographic Database
Agnico-Eagle Mines Limited.
Azimuth Consulting Group Inc.
Figure 2-1
Meadowbank - Whale Tail Pit
Study Area Overview
Whale Tail Pit Project
Prepared for:
AGNICO EAGLE
By:
CASLYS CONSULTING
January 25, 2016



Legend

- Benthic Invertebrate and Sediment Chemistry Sampling Area
- Benthic Invertebrate and Sediment Chemistry Sampling Area (to be determined)
- Limnology, Water Chemistry and Phytoplankton Sampling Area (to be determined)
- Limnology, Water Chemistry and Phytoplankton Sampling Station
- Exploration Access Road
- Whale Tail 2019 Mine Plan
- Water Level of Whale Tail Lake, South Basin (2019)
- Lake
- River

0 0.5 1 1.5 2

Kilometres

Projection: UTM Zone 14 NAD83

Data Sources:
Natural Resources Canada, GeoBase®
National Topographic Database
Agnico-Eagle Mines Limited.
Azimuth Consulting Group Inc.

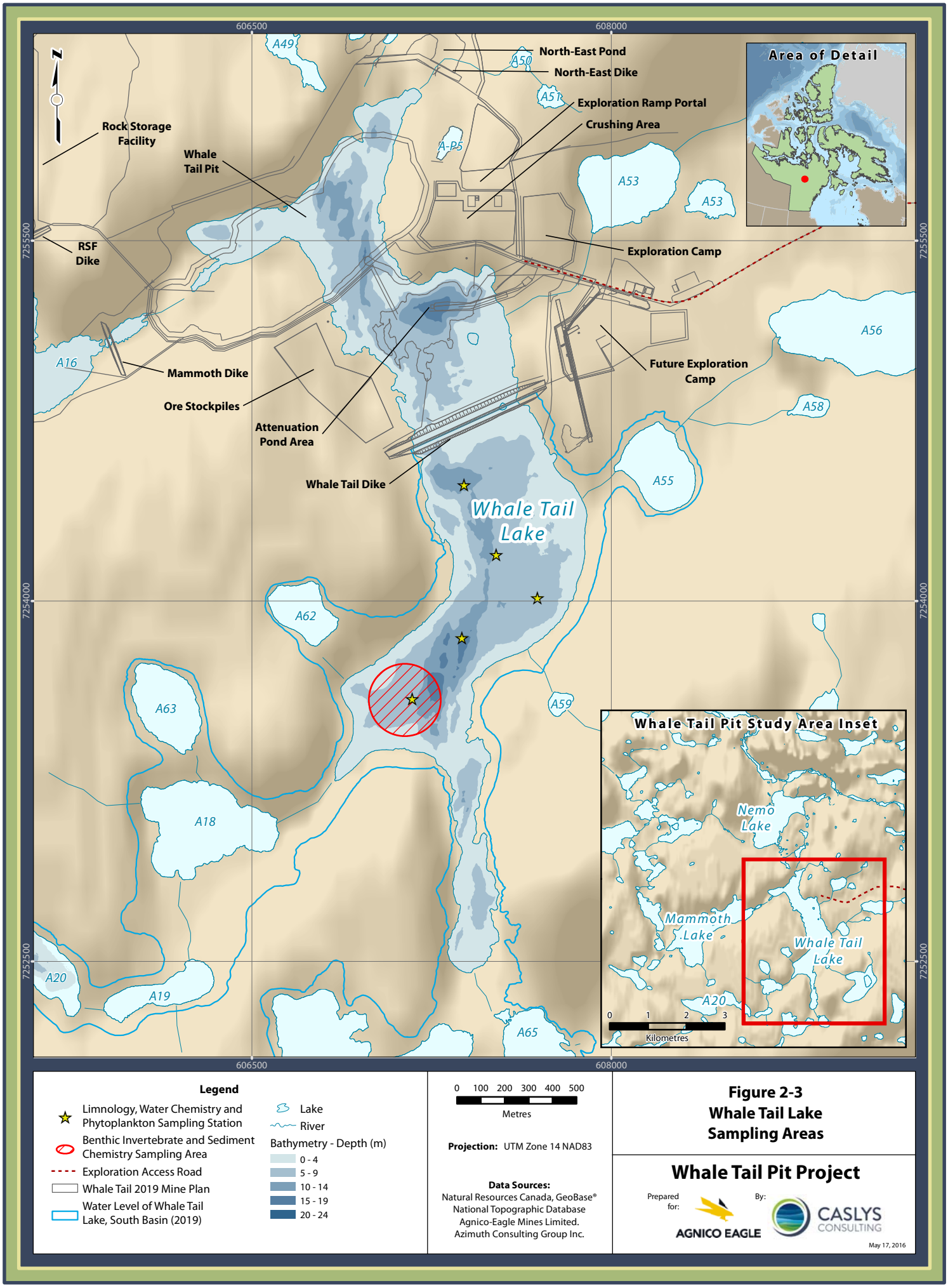
Figure 2-2
Whale Tail Pit
Sampling Areas

Whale Tail Pit Project

Prepared for: AGNICO EAGLE

By: CASLYS CONSULTING

May 17, 2016



Legend

- Limnology, Water Chemistry and Phytoplankton Sampling Station
- Benthic Invertebrate and Sediment Chemistry Sampling Area
- Exploration Access Road
- Whale Tail 2019 Mine Plan
- Water Level of Whale Tail Lake, South Basin (2019)
- Lake
- River

Bathymetry - Depth (m)

- 0 - 4
- 5 - 9
- 10 - 14
- 15 - 19
- 20 - 24

0 100 200 300 400 500
Metres

Projection: UTM Zone 14 NAD83

Data Sources:
Natural Resources Canada, GeoBase®
National Topographic Database
Agnico-Eagle Mines Limited.
Azimuth Consulting Group Inc.

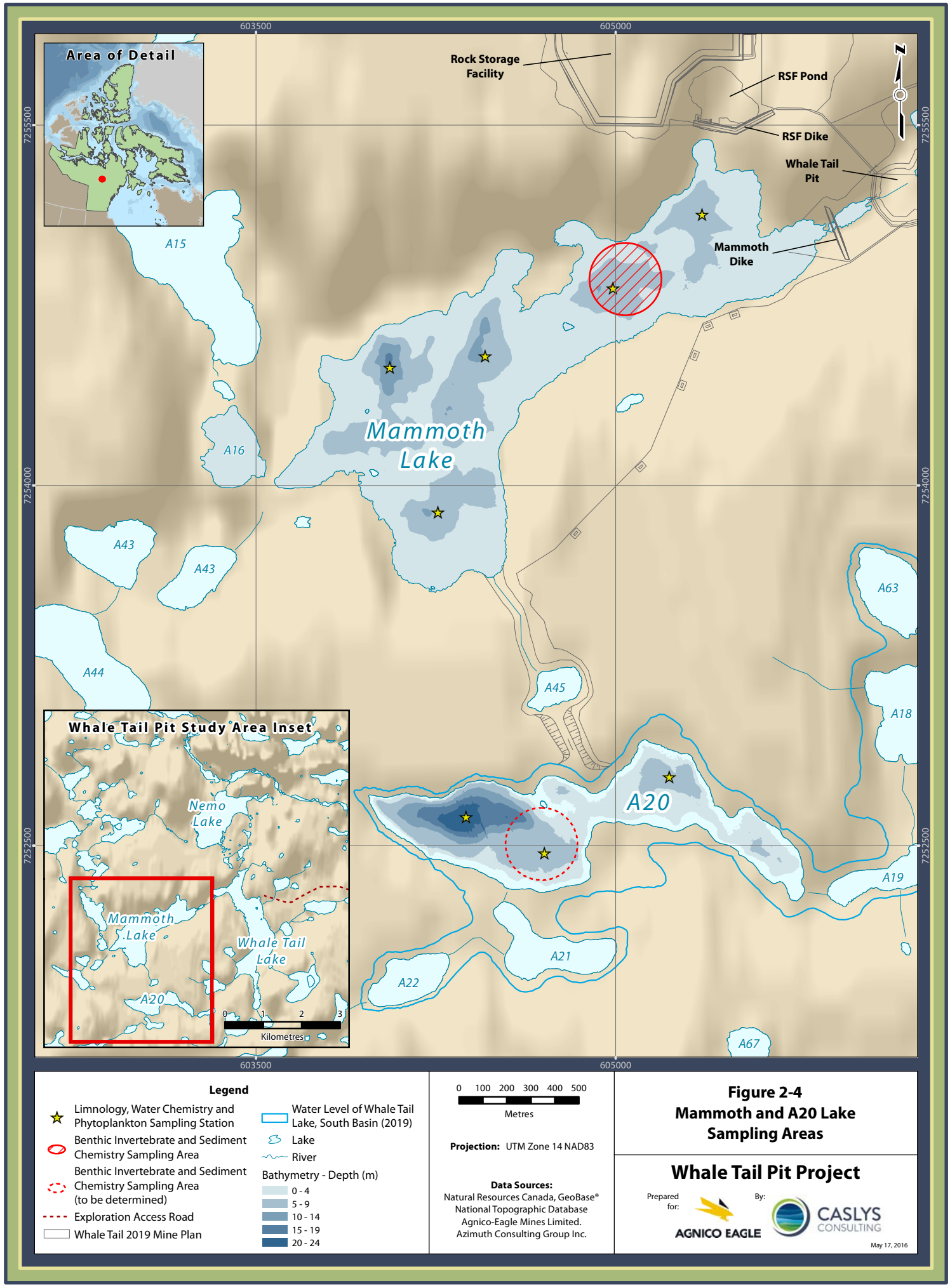
Figure 2-3
Whale Tail Lake Sampling Areas

Whale Tail Pit Project

Prepared for: AGNICO EAGLE

By: CASLYS CONSULTING

May 17, 2016



Legend

- Limnology, Water Chemistry and Phytoplankton Sampling Station
- Benthic Invertebrate and Sediment Chemistry Sampling Area
- Benthic Invertebrate and Sediment Chemistry Sampling Area (to be determined)
- Exploration Access Road
- Whale Tail 2019 Mine Plan
- Water Level of Whale Tail Lake, South Basin (2019)
- Lake
- River

Bathymetry - Depth (m)

- 0 - 4
- 5 - 9
- 10 - 14
- 15 - 19
- 20 - 24

0 100 200 300 400 500
Metres

Projection: UTM Zone 14 NAD83

Data Sources:
Natural Resources Canada, GeoBase®
National Topographic Database
Agnico-Eagle Mines Limited.
Azimuth Consulting Group Inc.

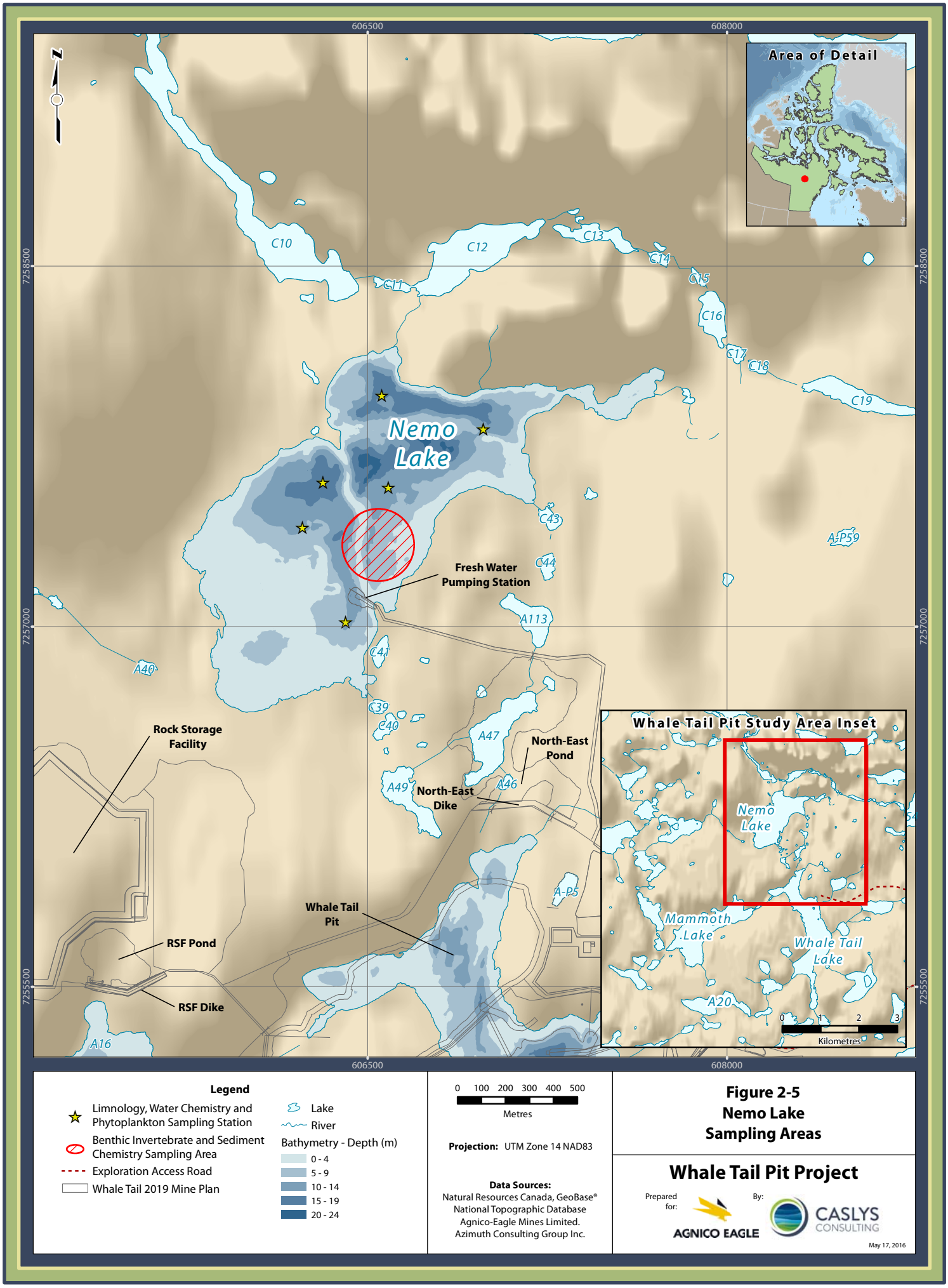
Figure 2-4
Mammoth and A20 Lake Sampling Areas

Whale Tail Pit Project

Prepared for: AGNICO EAGLE

By: CASLYS CONSULTING

May 17, 2016



Legend

- Limnology, Water Chemistry and Phytoplankton Sampling Station
- Benthic Invertebrate and Sediment Chemistry Sampling Area
- Exploration Access Road
- Whale Tail 2019 Mine Plan
- Lake
- River

Bathymetry - Depth (m)

- 0 - 4
- 5 - 9
- 10 - 14
- 15 - 19
- 20 - 24

0 100 200 300 400 500
Metres

Projection: UTM Zone 14 NAD83

Data Sources:
Natural Resources Canada, GeoBase®
National Topographic Database
Agnico-Eagle Mines Limited.
Azimuth Consulting Group Inc.

Figure 2-5
Nemo Lake
Sampling Areas

Whale Tail Pit Project

Prepared for: AGNICO EAGLE

By: CASLYS CONSULTING

May 17, 2016

2.3. Sampling Methods

A summary of timing and frequency of sampling for each of the CREMP monitoring components for the Whale Tail Pit area is shown in **Table 2–2** by sampling season and month. Important to note is that the sampling frequency by area shown in the table is representative of the full study design, and not necessarily what would need to be conducted in a given year (e.g., for MF and FF areas if no changes are detected at NF areas the previous year; see **Section 2.2.4** for more information).

Sampling for the CREMP program follows the Standard Operating Procedures (SOPs) for each of the monitoring components. The SOPs include general information on field collections, pre-trip planning, field collection materials, field quality assurance / quality control protocols, step-by-step instructions on sample collection, bottle requirements and list of parameters, sample preservation, and sample handling and transportation. The SOPs are appended to the CREMP 2015 plan update (Azimuth, 2015a):

- Water chemistry, limnology, and phytoplankton sampling methods are outlined in Appendix A
- Benthic invertebrate and sediment grab chemistry methods are outlined in Appendix B
- Sediment coring is outlined in Appendix C.

The small size of the Whale Tail Pit Project lakes and comparably shallower depths relative to the Meadowbank Lakes was not amenable to using the bounded area method of generating random water quality sampling stations (see SOP and blue rectangles in **Figure 2–1**). Instead, a number of "fixed" sampling locations for limnology, water chemistry and phytoplankton were established for the Whale Tail Pit lakes[3] in areas where the water depth is greater than 5 m (**Figure 2–2**). Prior to going in the field for each sampling event, two of the locations are randomly selected for sampling. Coordinates are recorded in MapSource and in the hand-held GPS units (NAD 83).

The specific sampling locations for benthic invertebrates and sediment chemistry are selected each year from within established depositional zones in each lake (see red circles on maps) with a target water depth of 8 m ± 1.5 m. Areas in Whale Tail Lake (WTS), Nemo Lake (NEM), and Mammoth Lake (MAM) were established during the August 2015 field program. Lakes A20, A76 and DS1 were not sampled as part of the 2015 baseline program; suitable sampling locations will be selected prior to construction.

[3] Bathymetry is currently not available for Lake DS1 and Lake A76. Sampling stations will be chosen when in the field until bathymetry data is available to establish either fixed sampling locations or bounded areas of sampling.

Table 2–2. CREMP monitoring component sampling summary for Whale Tail Pit Project.

Sampling Season	Sampling Month	Monitoring Conditions	Monitoring Components	INUG	PDL	WTS	MAM	NEM*	A20*	A76*	DS1*
				REF	REF	NF	NF	NF	MF	MF	FF
Winter	January	Ice	L			✓	✓				
	February	Ice	L			✓	✓				
	March	Ice	L			✓	✓				
Spring	April/May	Ice	L,W,P	✓	✓	✓	✓	✓	✓	✓	
	June	***Ice not safe***									
Summer	July	Open-water	L,W,P	✓	✓	✓	✓	✓	✓	✓	✓
	August	Open-water	L,W,P	✓	✓	✓	✓	✓	✓	✓	✓
			B,S,C**	✓	✓	✓	✓	✓	✓	✓	✓
	September	Open-water	L,W,P	✓	✓	✓	✓	✓	✓	✓	✓
Autumn/ Winter	***October***	***Ice not safe***									
	November/December	Ice	L,W,P	✓	✓	✓	✓	✓	✓	✓	

Notes:

Area IDs: INUG=Inuggugayualik Lake; PDL=Pipedream Lake; WTS=Whale Tail Lake South; MAM=Mammoth Lake; NEM=Nemo Lake.

Area types: REF=reference (in grey shading); NF=near-field (in blue shading); MF=mid-field (in pink shading); FF=far-field (in teal shading).

***** Sampling at NEM and the MF and FF stations during the operation phase will be conducted according to the sampling strategy outlined in the CREMP 2015 plan update (Azimuth, 2015a). NEM is the source of drinking water for the exploration camp and water quality will be monitored monthly.

Components: L=Limnology; W=Water chemistry; P=Phytoplankton; B=Benthic invertebrates; S=Sediment grab chemistry; C=Sediment coring chemistry.

✓ indicates that monitoring components are conducted at the area/month given.

** Sediment coring is conducted every three years and synchronized to the EEM field program.

2.4. Quality Assurance/Quality Control

There are no Whale Tail Pit-specific differences in QA/QC methodology and reporting. See the 2015 CREMP plan update (Azimuth, 2015a) for details.

2.5. Data Evaluation Criteria

There are no Whale Tail Pit-specific differences in data evaluation methodology and reporting. See the 2015 CREMP plan update (Azimuth, 2015a) for details.

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