

## TECHNICAL MEMORANDUM

**DATE:** 17 December 2019

**Project No.** 19127573-438-TM-Rev0

**TO:** Michel Groleau, Agnico Eagle Mines Limited

**CC:** Manon Turmel, Jennifer Range

**FROM:** Adwoa Cobbina, Julien Lacrampe

**EMAIL:** acobbina@golder.com

### WHALE TAIL PIT – EXPANSION PROJECT WATER BALANCE FOR LAKE C38 (NEMO LAKE)

#### 1.0 INTRODUCTION

Agnico Eagle Mines Limited (Agnico Eagle) was requested to document the water balance for Lake C38 (Nemo Lake) for the Whale Tail Pit Expansion Project (the Project) to support Commitment 21: *Provide Whale Tail Pit Expansion Project Water Balance for Nemo Lake*, which was made during the Type A Water Licence Amendment Technical Meeting on 29-30 October 2019. The water balance of Lake C38 (Nemo Lake) was considered in the Project water balance issued in May (Golder 2019) as part of the Type A Water Licence Amendment submission, but not explicitly documented.

This technical memorandum documents the operational catchment, freshwater requirements, and operational water balance for Lake C38 (Nemo Lake).

#### 2.0 LAKE C38 (NEMO LAKE) WATER BALANCE

##### 2.1 Operational Catchment

The natural catchment area of Lake C38 (Nemo Lake) is 405 ha. This area will increase by 68 ha in 2020 from the IVR Diversion which consists of the diversion of a clean catchment naturally draining towards Whale Tail Lake (Figure 1). The IVR Diversion will be decommissioned at the start of closure.

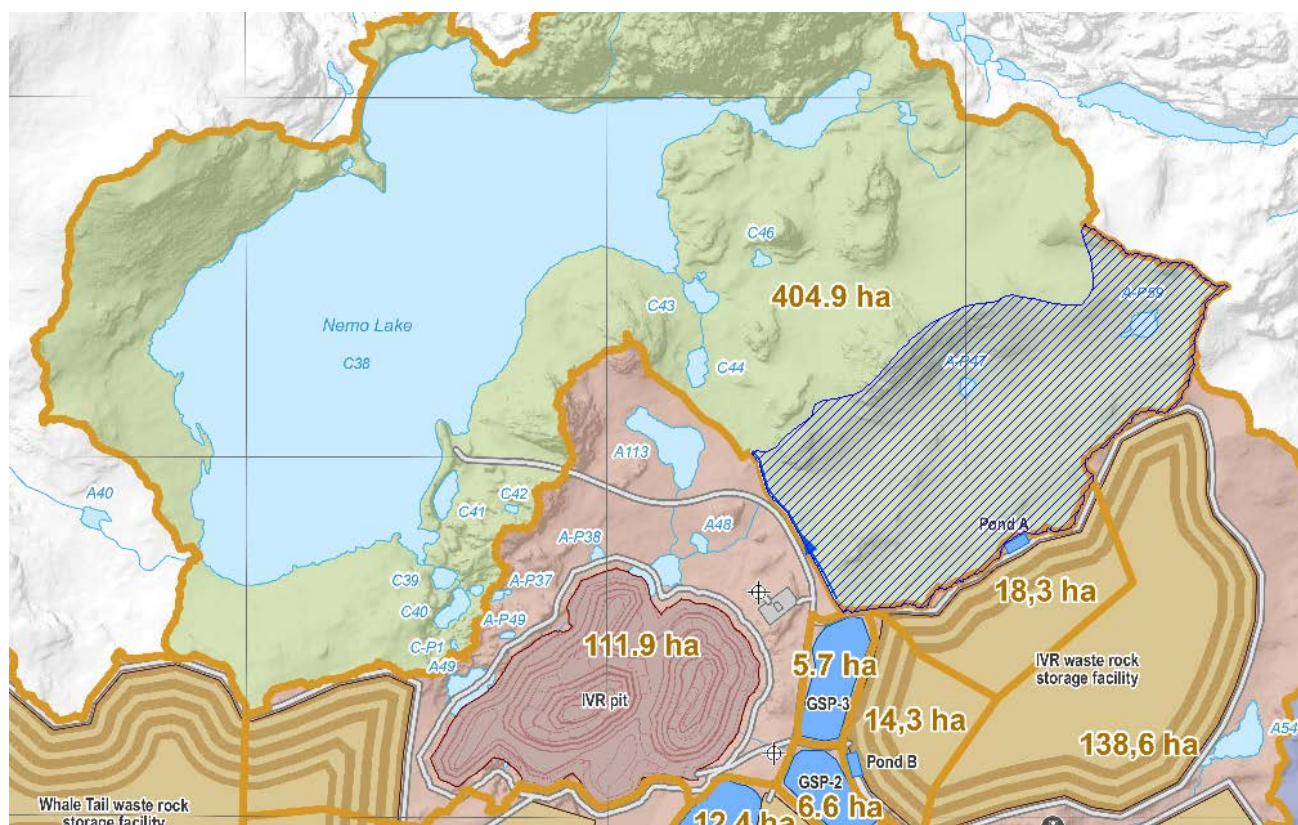


Figure 1: Lake C38 (Nemo Lake) Catchment and IVR Diversion (blue hatched area)

## 2.2 Freshwater Requirements

Freshwater requirements for the Project are listed below. Prior to September 2018, freshwater was sourced from Whale Tail Lake (South Basin). The intake was then moved to Lake C38 (Nemo Lake) where freshwater will continue to be sourced until the end of operations, with select water uses continuing into closure.

Freshwater requirements from Lake C38 (Nemo Lake) are:

- Makeup water requirements for the underground mine: 4 – 10 m<sup>3</sup>/day (2018)
- Water for camp use – 0.24 L/person/day
  - September 2018 – 2020: 325 people
  - 2021 – end of operations: 544 people
- Truck shop use: 103 m<sup>3</sup>/day (September 2018 - end of operations)
- Water for dust control: 72,240 m<sup>3</sup>/year (operations and closure)
- Water for cement: ranges from 422 m<sup>3</sup>/year to 16,792 m<sup>3</sup>/year (Q4 2020 - 2027)
- Drilling water per pit:
  - 48.0 m<sup>3</sup>/day (Q3 – Q4 2018)
  - 24.0 m<sup>3</sup>/day (Q1 – Q2 2019)
  - 48.0 m<sup>3</sup>/day (Q3 2019 - end of operations)

- Operational geological drilling: up to 25,037 m<sup>3</sup>/year. This volume represents water taken for any drilling not related to the pits.

## 2.3 Water Balance

The Lake C38 (Nemo Lake) water balance (Table 1) comprises the following inputs and outflows:

- Inflows:
  - Direct precipitation and runoff
  - Diverted runoff from the IVR Diversion (as described in Section 2.1)
- Outflows:
  - Evaporation
  - Freshwater withdrawals (as detailed in Section 2.2)
  - Water for operational geological drilling
  - Lake discharge

**Table 1: Annual Lake C38 (Nemo Lake) Water Balance**

Year	Inflows (m <sup>3</sup> )		Outflows (m <sup>3</sup> )				Change in Annual Storage (m <sup>3</sup> )
	Precipitation and Catchment Runoff	Diverted Runoff from the IVR Diversion	Evaporation	Freshwater Withdrawals	Maximum Operational Geological Drilling Withdrawal	Lake Discharge	
2017	684,549	-	307,467	-	-	377,082	0
2018	684,549	-	307,467	52,562	8,863	361,389	-45,732
2019	684,549	-	307,467	151,867	25,037	221,358	-21,180
2020	684,623	43,895	307,467	165,543	25,037	214,454	16,017
2021	684,549	116,885	307,467	201,597	25,037	274,040	-6,707
2022	684,549	116,885	307,467	209,358	25,037	261,545	-1,973
2023	684,549	116,885	307,467	208,256	25,037	260,414	260
2024	684,623	116,900	307,467	209,544	25,037	259,605	-130
2025	684,549	116,900	307,467	206,756	25,037	261,633	556
2026	684,549	-	307,467	14,211	-	308,033	54,838
2027	684,549	-	307,467	14,672	-	362,526	-116
2028	684,623	-	307,467	-	-	373,457	3,699
2029	684,549	-	307,467	-	-	377,082	-

## Closure

This technical memorandum was prepared and reviewed for Agnico Eagle by the undersigned.



Adwoa Cobbina, MASc  
Water Resources Engineer

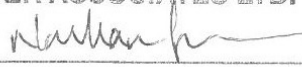


Julien Lacrampe, P.Eng. (NWT/NU)  
Senior Water Resources Engineer

## References:

Golder (Golder Associates Ltd.). 2019. Whale Tail Pit – Expansion Project 2019 Mean Annual Water Balance Update. 18108905-294-RPT-Rev1. May 2019.

[https://golderassociates.sharepoint.com/sites/113014/project\\_files/5\\_technical\\_work/stage-3\\_techmtg-phc/02\\_commitments/nemo\\_lake\\_wb/rev0/19127573-438-tm-nemolakewaterbalance-rev0.docx](https://golderassociates.sharepoint.com/sites/113014/project_files/5_technical_work/stage-3_techmtg-phc/02_commitments/nemo_lake_wb/rev0/19127573-438-tm-nemolakewaterbalance-rev0.docx)

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Signature	
Date	17 DECEMBER 2019
PERMIT NUMBER: P 049 NT/NU Association of Professional Engineers and Geoscientists	