

## MEMORANDUM

To:	Mr. David Swisher	Date:	September 16, 2010
Copy To:	Mr. Bill Mercer	File No.:	NB101-390/2-A.01
From:	Matthew Parfitt	Cont. No.:	NB10-00473
Re:	Thor Lake Project - Nechalacho Mine and Flotation Plant Water Management Plan		

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Further to our discussions following participation in the Project technical scoping session in Yellowknife on September 9, 2010, we are providing the following summary of the water management plan for the Nechalacho Mine and Flotation Plant Project site.

The Project site is located in the Thor Lake watershed (estimated 2100 ha) area which drains into a larger watershed (estimated 6700 ha) area downstream before flowing into Great Slave Lake as shown on Figure 1. Sub-catchment areas within the Thor Lake watershed have been identified as shown on Figure 2 based on available imagery and mapping. As noted in the Project Description Report, the proposed site water management plan consists of a closed loop system to minimize impact to the natural hydrologic flows. The monthly water balance completed as part of the pre-feasibility study to estimate flows is based on:

- Average meteorological conditions from analysis of historic data from regional weather stations including precipitation (rainfall and snow), evaporation and temperature (snowmelt model)
- Natural runoff coefficients from an analysis of regional flow discharge measurements
- Project design criteria including mine production rates, tailings throughput rates, process water requirements, water recycle rates, etc.

A Project site water balance flow sheet based on the proposed mine production rate of 2000 tpd is shown on Figure 3. The flow sheet depicts the water management arrangement/model proposed for the Project and the estimated annual average flows ( $\text{m}^3/\text{day}$ ) of water between the various facilities and water bodies based on average meteorological conditions. Figures 4 and 5 summarize estimated water balance flows for the Thor Lake watershed for pre-production and during operations for average precipitation conditions.

The following comments summarize the water management plan for the Nechalacho Mine and Flotation Plant.

- Fresh water for the Project will be drawn from Thor Lake.
- Mine water and Plant site runoff will be collected and directed into the process as appropriate.
- The Tailings Management Facility (TMF) is located within the Ring and Buck Lakes basin in the upper portion of the northern watershed area reporting to Thor Lake. All excess water released from the TMF will return to Thor Lake via the Drizzle Lake / Murky Lake drainage system.
- Water will be recycled from the TMF to the greatest extent possible to minimize fresh water requirements (currently 50% recycle and 50% fresh water).
- Extraction of fresh water from Thor Lake will be managed to conform with the 2010 DFO Protocol for Winter Withdrawal<sup>1</sup> which specifies a limit of 10% of the available water under the ice.

We trust that this memo provides you with the information that you require at this time. Should you have any questions or comments, please feel free to contact us.

Signed:

  
FOR Deena Duff, P.Eng.  
Senior Engineer

Approved:

  
Matthew Parfitt, P.Eng.  
Specialist Engineer/Project Manager



References:

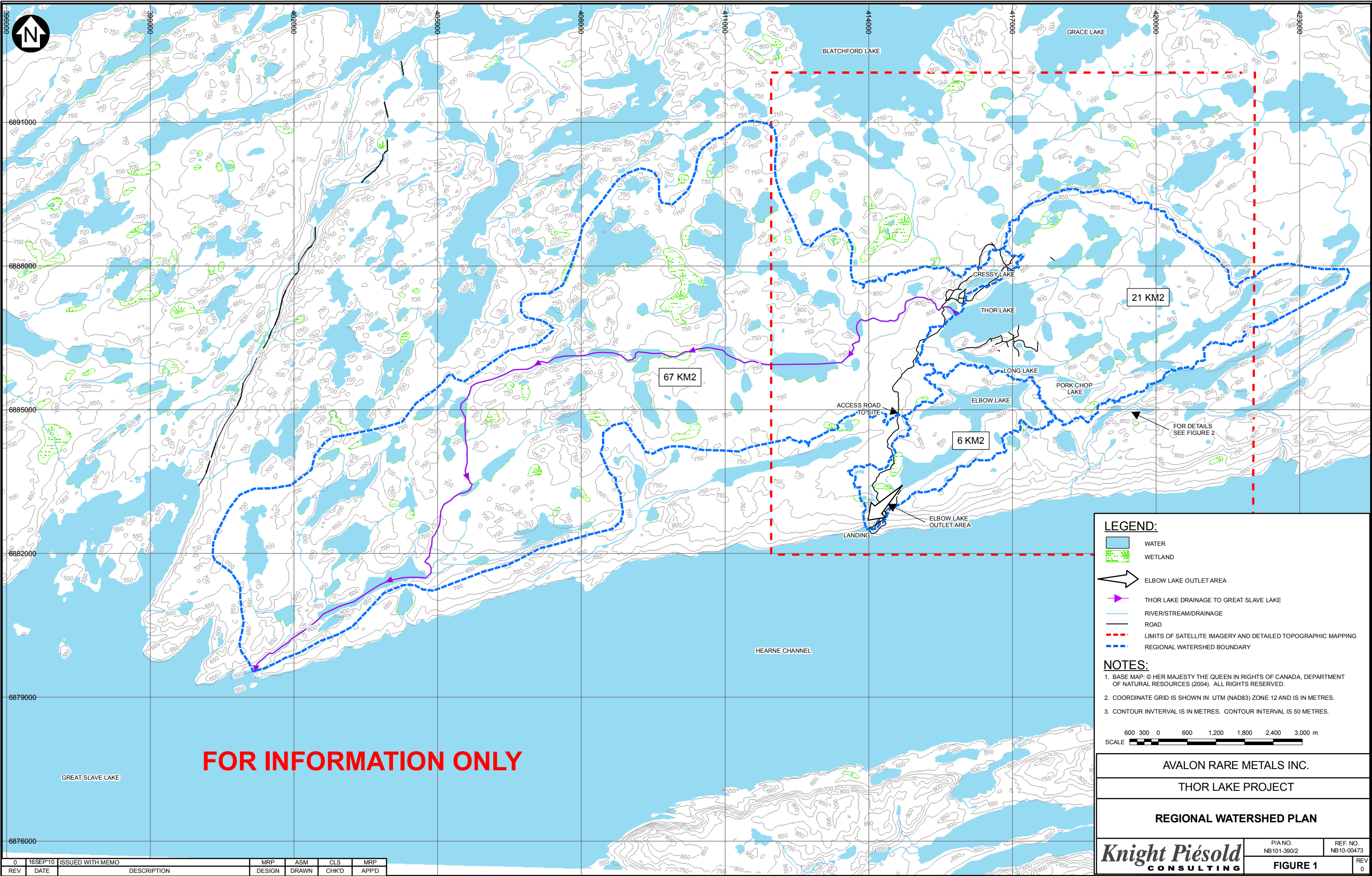
- 1) DFO Protocol for Winter Water Withdrawal in the Northwest Territories, Department of Fisheries and Oceans, Government of Canada, 2010.

Attachments:

- Figure 1 Rev 0 Regional Watershed Plan
- Figure 2 Rev 0 Estimated Project Site Watershed Areas
- Figure 3 Rev 0 Project Site Water Balance Flowsheet
- Figure 4 Rev 0 Thor Lake Watershed Flowsheet - Pre-Production
- Figure 5 Rev 0 Thor Lake Watershed Flowsheet - Mine Operations

dmd/mrp





LEGEND:

- WATER
- WETLAND
- ELBOW LAKE OUTLET AREA
- THOR LAKE DRAINAGE TO GREAT SLAVE LAKE
- RIVER/STREAM/DRAINAGE
- ROAD
- LIMITS OF SATELLITE IMAGERY AND DETAILED TOPOGRAPHIC MAPPING
- REGIONAL WATERSHED BOUNDARY

NOTES:

- BASE MAP: © HER MAJESTY THE QUEEN IN RIGHTS OF CANADA, DEPARTMENT OF NATURAL RESOURCES (2004). ALL RIGHTS RESERVED.
- COORDINATE GRID IS SHOWN IN UTM (NAD83) ZONE 12 AND IS IN METRES.
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600 300 0 600 1,200 1,800 2,400 3,000 m  
SCALE

AVALON RARE METALS INC.

THOR LAKE PROJECT

REGIONAL WATERSHED PLAN

**Knight Piésold**  
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REF. NO.  
NB10-00473

FIGURE 1

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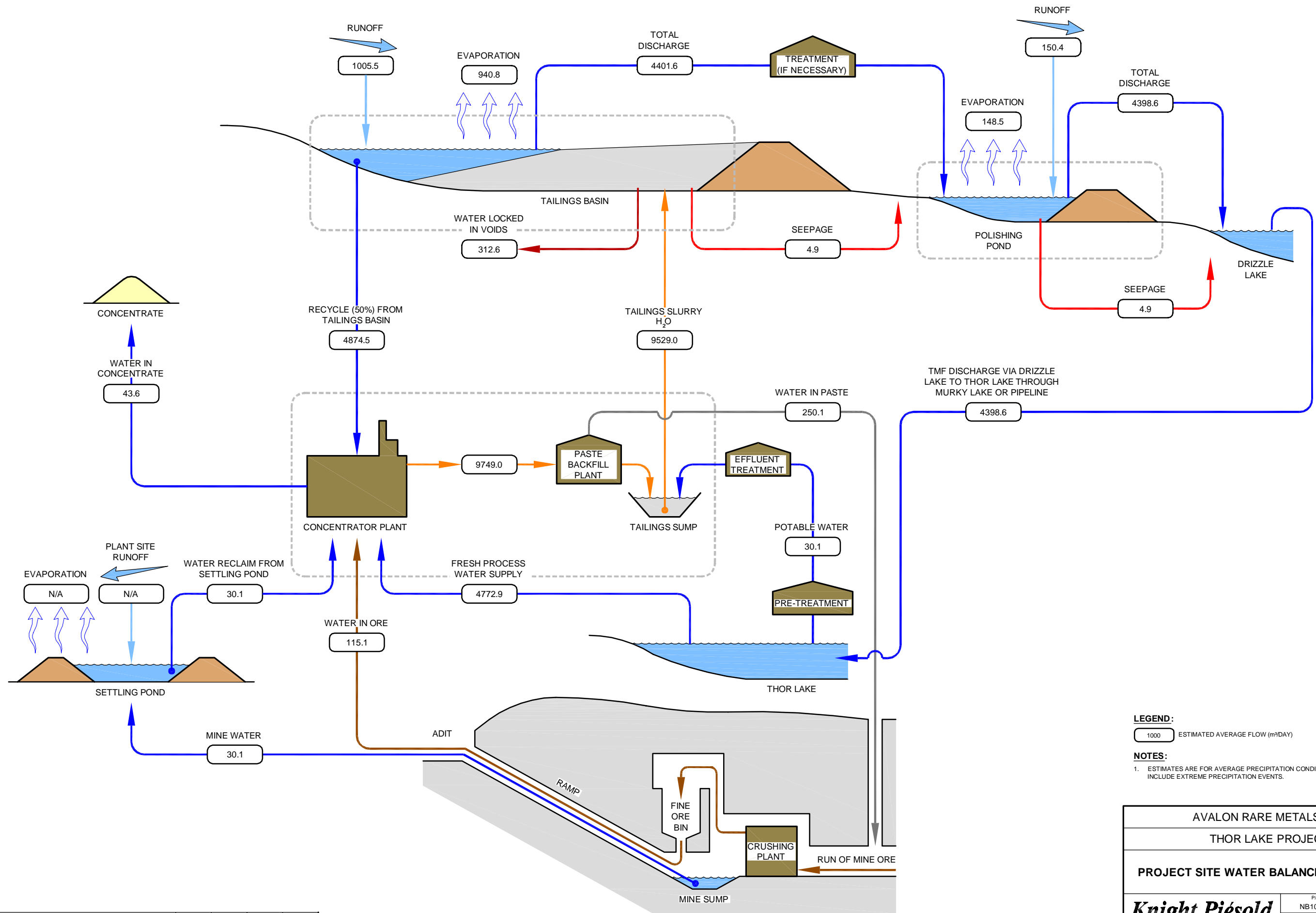
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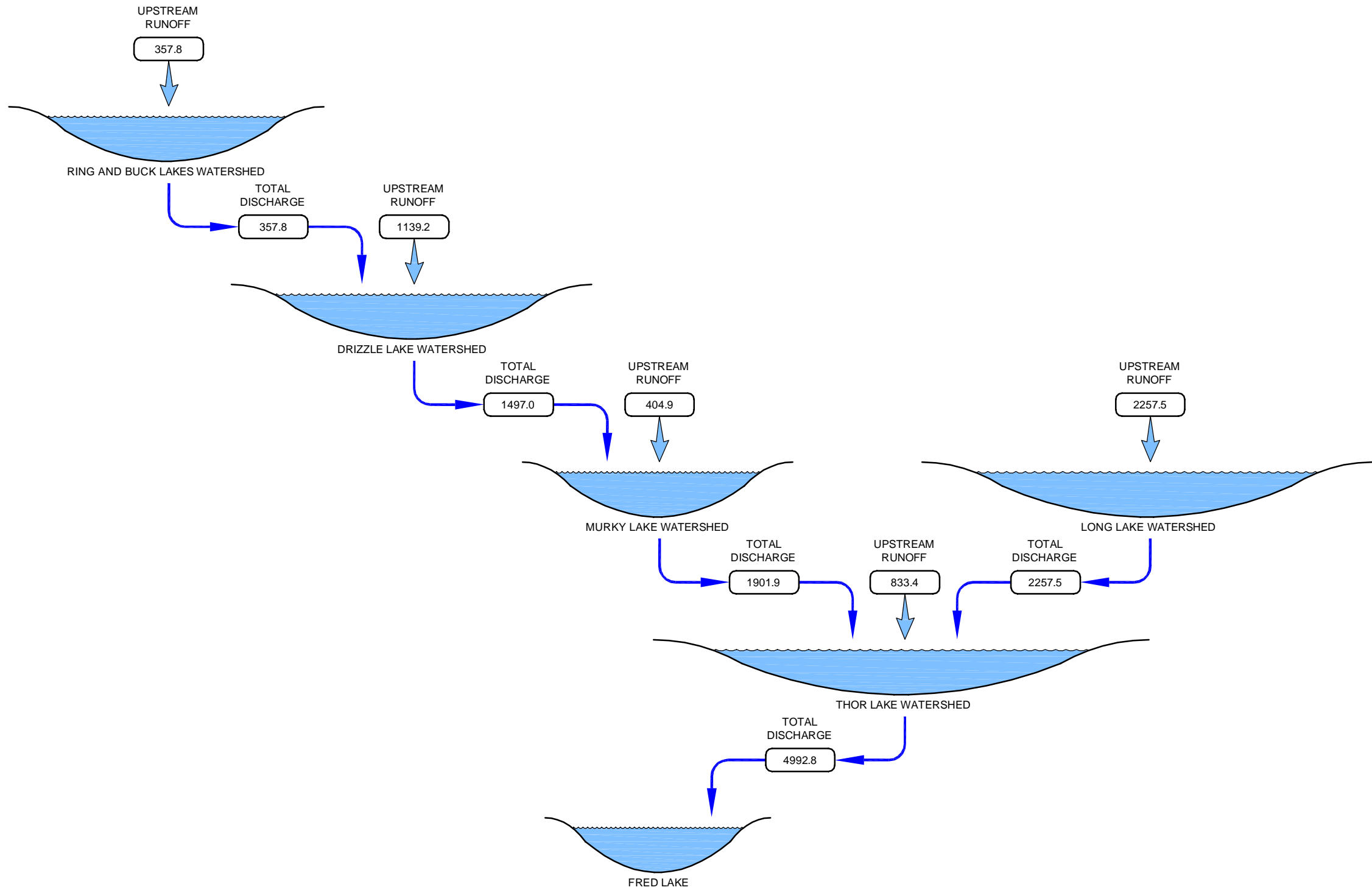
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AVALON RARE METALS INC.			
THOR LAKE PROJECT			
PROJECT SITE WATER BALANCE FLOW SHEET			
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	FIGURE 3		

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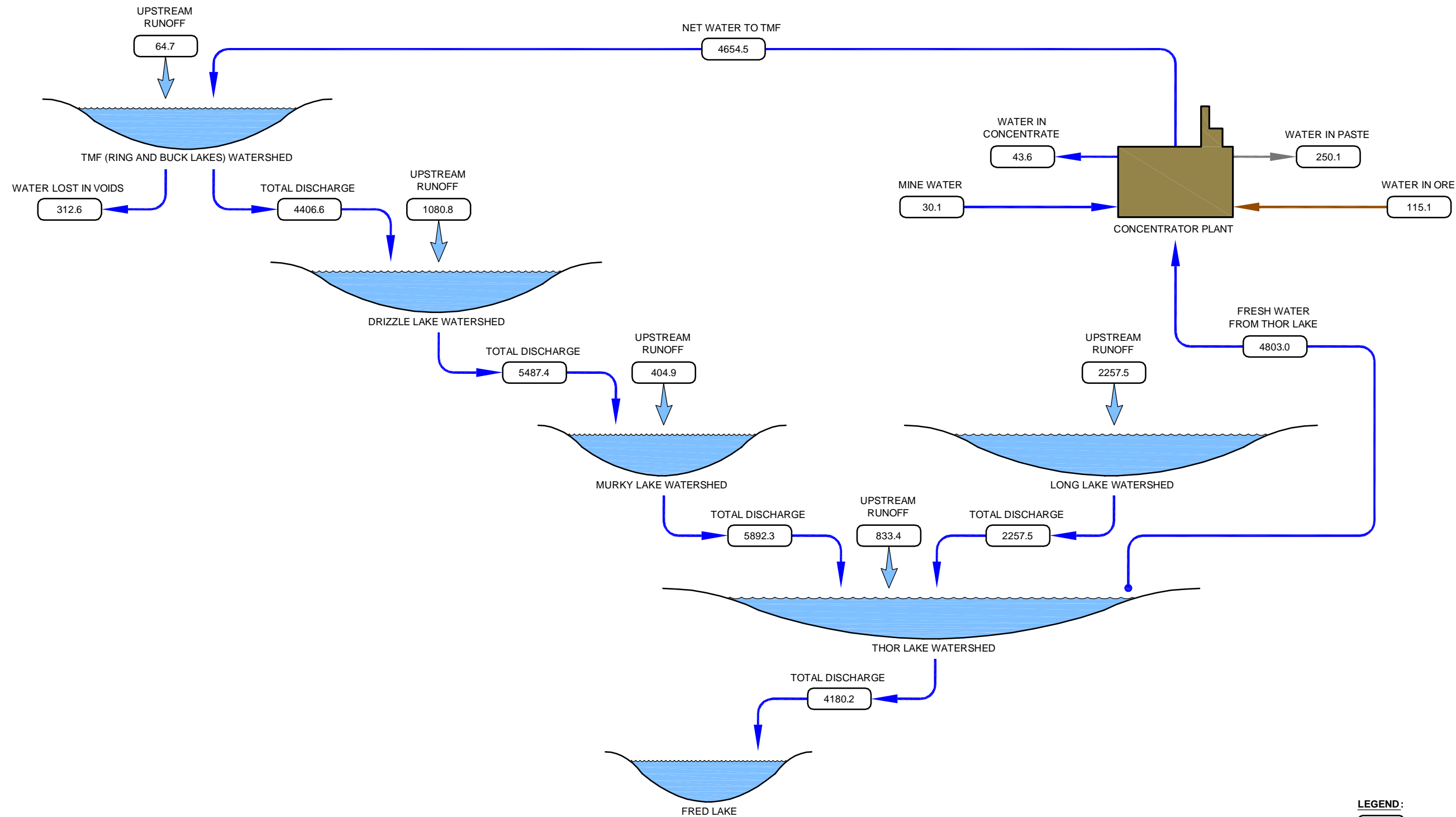


- LEGEND:**
- 130.6 ESTIMATED AVERAGE FLOW (m³/DAY)
- NOTES:**
1. ESTIMATES ARE FOR AVERAGE PRECIPITATION CONDITIONS AND DO NOT INCLUDE EXTREME PRECIPITATION EVENTS.

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AVALON RARE METALS INC.		
THOR LAKE PROJECT		
THOR LAKE WATERSHED FLOW SHEET PRE-PRODUCTION		
Knight Piesold CONSULTING	P/A NO. NB101-390/2	REF NO. NB10-00473
	FIGURE 4	
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**LEGEND:**  
1544.2 ESTIMATED AVERAGE FLOW (m³/DAY)

**NOTE:**  
1. ESTIMATES ARE FOR AVERAGE PRECIPITATION CONDITIONS AND DO NOT INCLUDE EXTREME PRECIPITATION EVENTS.

AVALON RARE METALS INC.			
THOR LAKE PROJECT			
THOR LAKE WATERSHED FLOW SHEET MINE OPERATIONS			
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	FIGURE 5		

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