



# Sherridon Orphan Mine Reclamation Project

## Reclamation Plan Enhancements (or The Importance of Having a Plan “B”)

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15<sup>th</sup> Annual BC MEND ML/ARD Workshop  
Vancouver, BC  
4 December 2008

# **Our Partners**

**SENES Consultants**

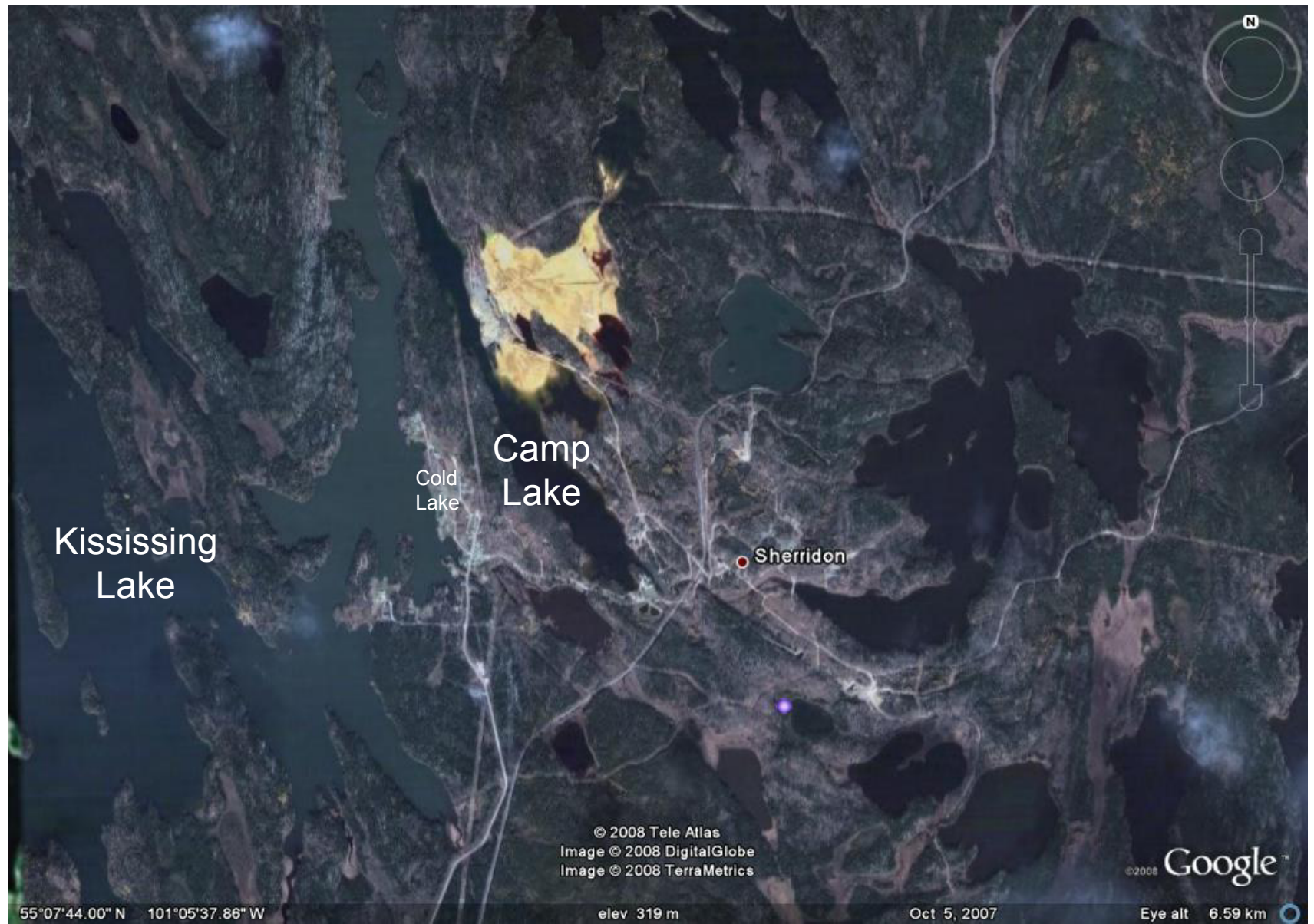
**Denison Environmental**

**Manitoba Science Technology Energy and Mines**

# Project Location



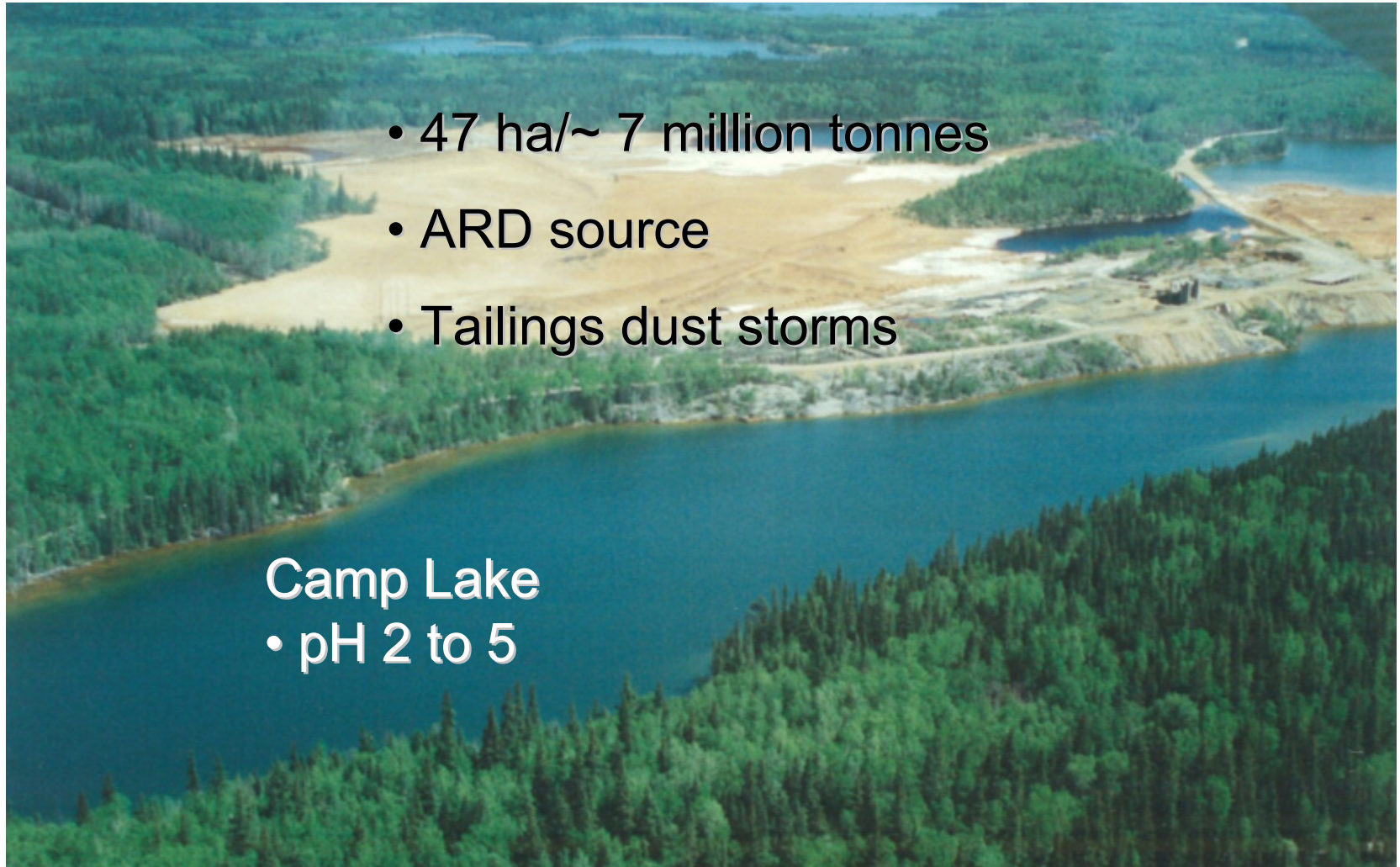
# Project Location



# Project Background

- 1929-1952 - VMS Copper-Zinc deposit mined
- ~ 7 million tonnes of tailings produced
- Primarily sub-aerial deposition, covering 47 ha
- ARD has acidified Camp Lake and is progressing into Kississing Lake
- Site is the responsibility of the Province of Manitoba

# Current Conditions



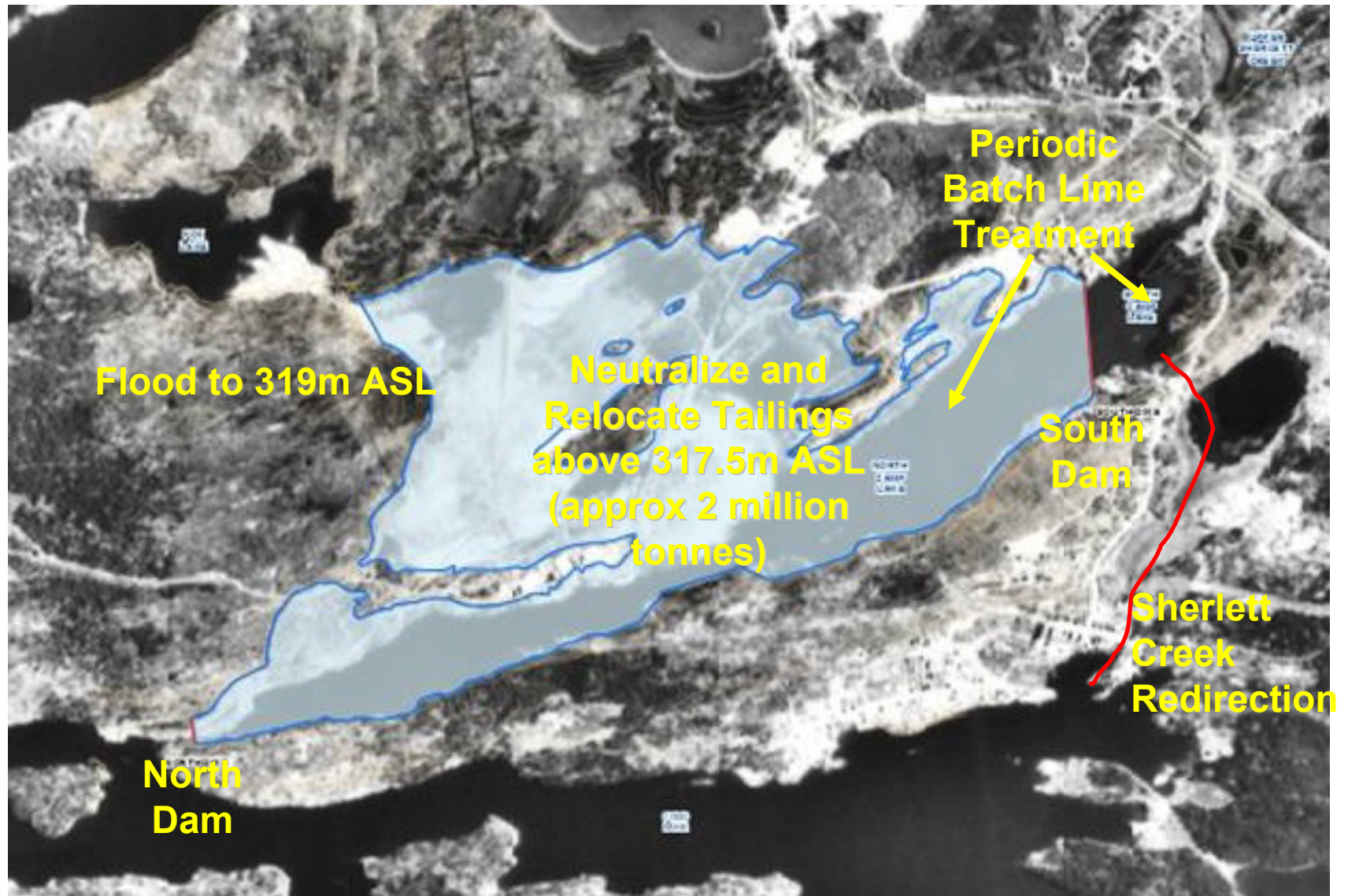
- 47 ha/~ 7 million tonnes
- ARD source
- Tailings dust storms

Camp Lake  
• pH 2 to 5

# Reclamation Plan Objectives

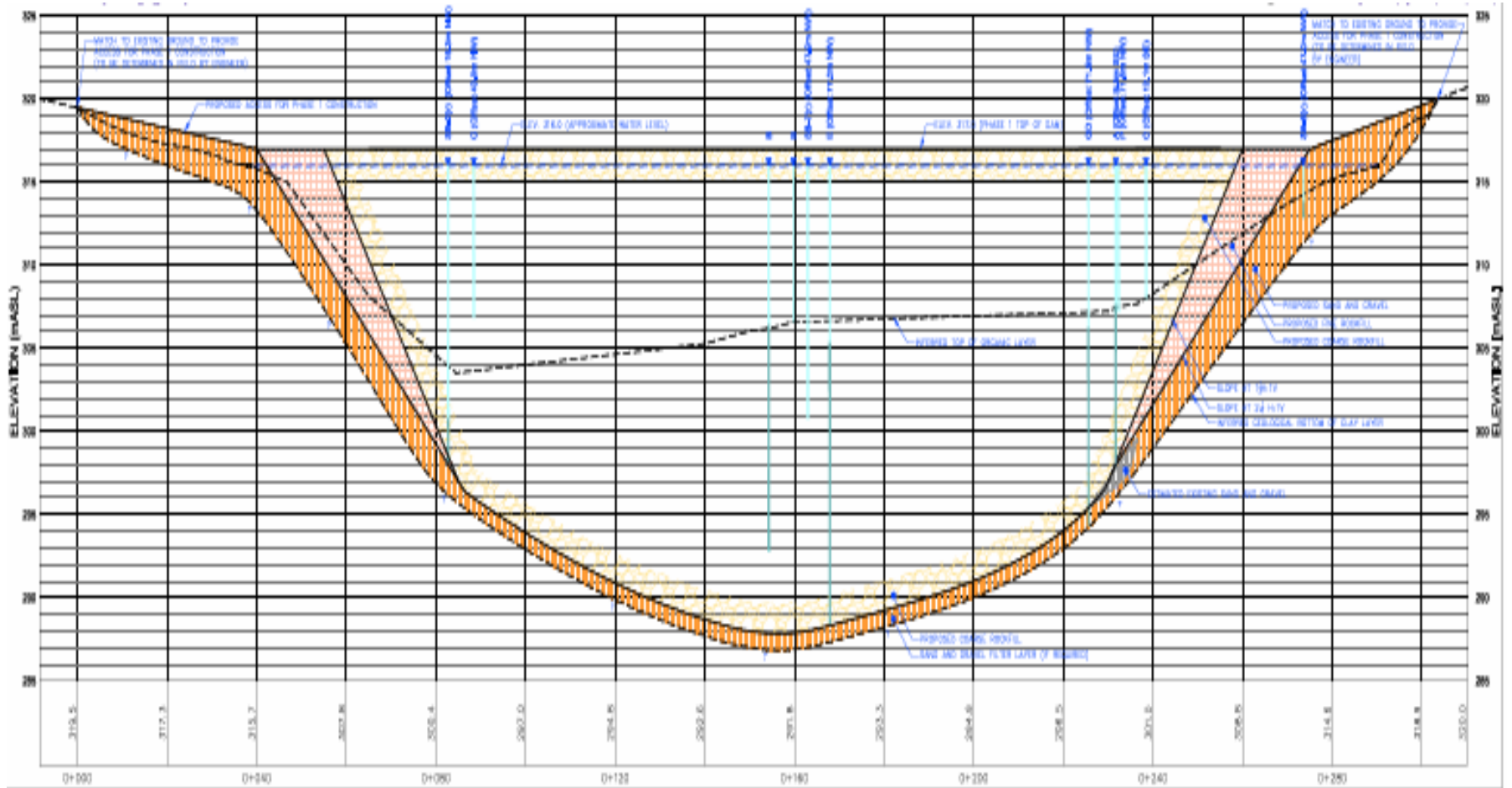
- Control wind-blown tailings
- Reduce loading of ARD and metals to Kississing Lake
- Make site safe
- Minimise future operating, maintenance, management costs
- A final walk-away solution preferred

# Plan "A"





# But!



# Plan A Issues

- 700,000+ m<sup>3</sup> sediment dredging
- Complex dam design
- 30+ m structure height
- \$25+ million capital cost for dam
- \$40+ million total project cost
- Provoked the search for Plan “B”

## Plan B

- Geotechnical investigation found extensive lacustrine sediments (10 to 15 m thick in S basin)
- Suitable for removal by dredging

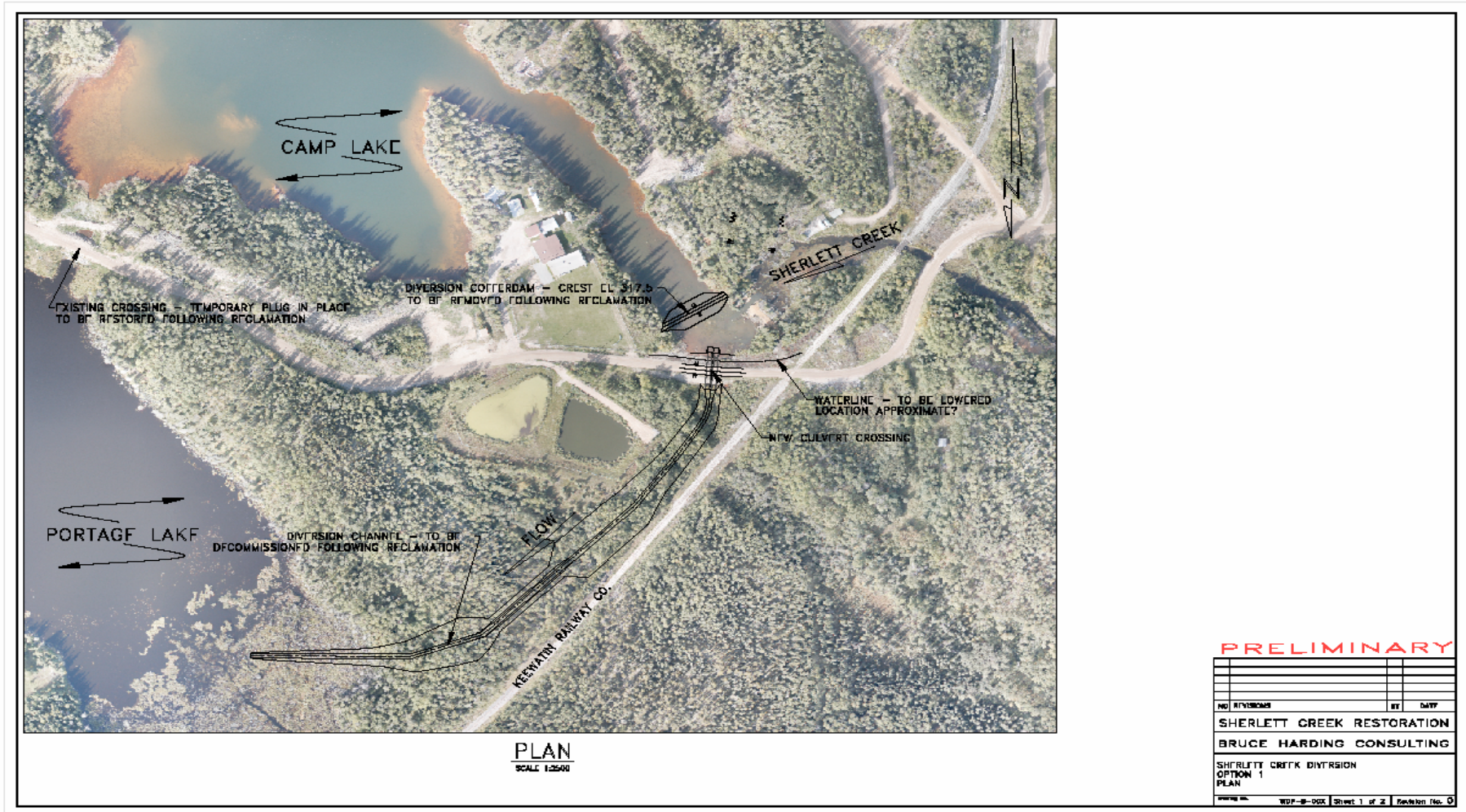
Solution: dredge lake to make room for tailings as needed – use dredge spoil for reclamation – otherwise same ARD control approach as Plan A

# Plan B Details

## Water Management

- Isolate Camp Lake from Sherlett Creek during tailings relocation and until water quality stabilizes
  - 90 to 95% reduction in hydraulic load through Camp L.
  - Allows lake level regulation to aid tailings relocation
  - Divert flow to lower (historic) Sherlett Creek channel
  
- Restore flow through Camp Lake and to lower Sherlett Creek on completion
  - Returns Sherlett Creek flow pattern to pre-mining state

# Sherlett Creek Diversion



**PRELIMINARY**

NO	REVISIONS	BY	DATE

**SHERLETT CREEK RESTORATION**  
**BRUCE HARDING CONSULTING**

SHERLETT CREEK DIVERSION  
 OPTION 1  
 PLAN  
 SHEET NO. WDP-08-004 Sheet 1 of 2 Revision No. 0

# Sherlett Creek Restoration



**PLAN**  
SCALE 1:1000

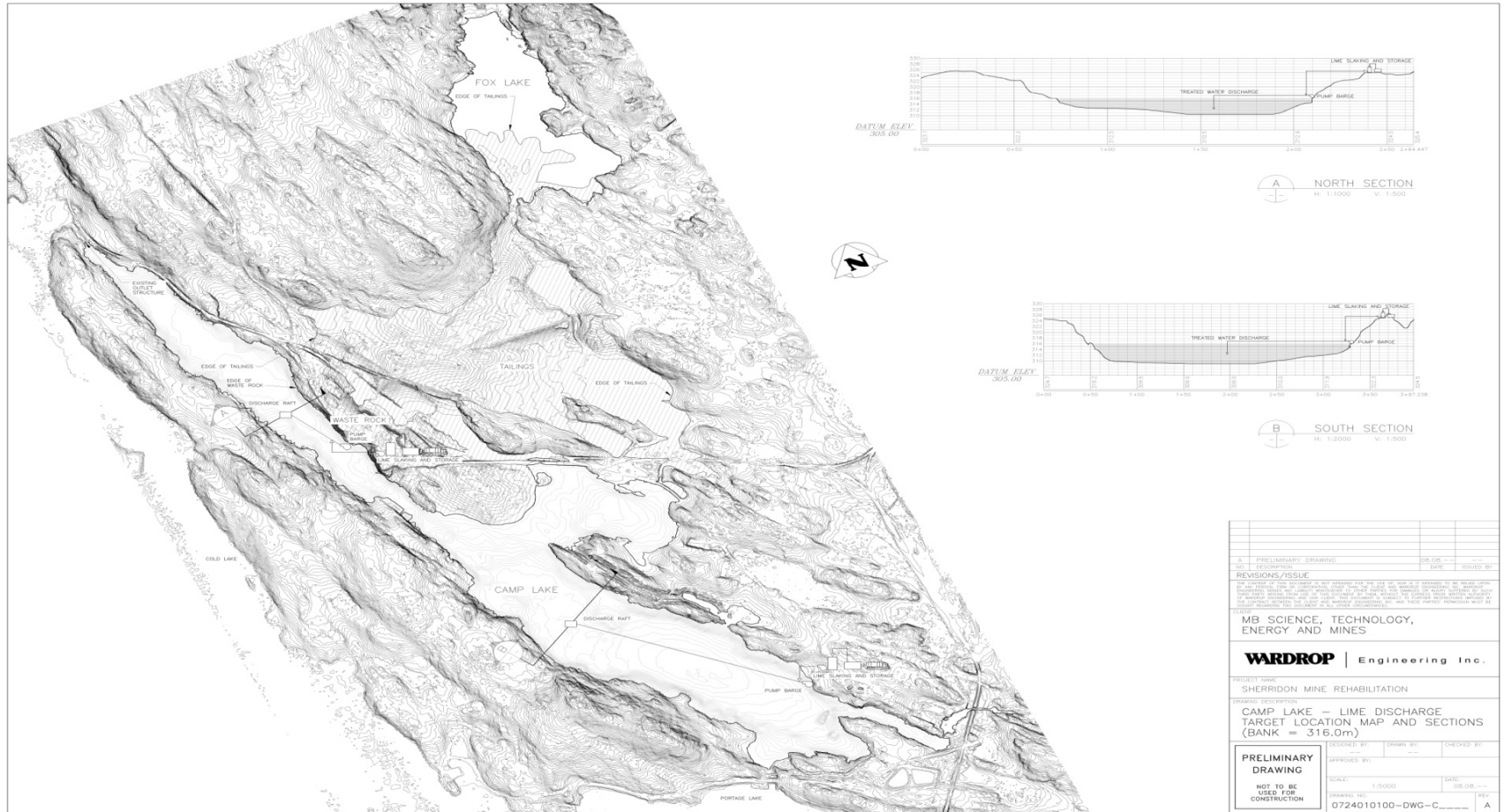
**PRELIMINARY**

APPROVED FOR REVIEW	BY DATE
NO REVISIONS	BY DATE
<b>SHERLETT CREEK RESTORATION</b>	
<b>BRUCE HARDING CONSULTING</b>	
LOWER SHERLETT CREEK HABITAT RESTORATION PLAN	
Sheet No.	WDP-20-009   Sheet 1 of 7   Revision No. A

## Plan B Details

- Neutralize Camp Lake
  - Prior to and during tailings relocation
  - Eliminates acid load and further reduces metal load to Kississing Lake from Camp L. during reclamation
  - Important for success of tailings relocation
  - Short term (<5 years) need for periodic treatment post-relocation

# Neutralizing Camp Lake



A PRELIMINARY DRAWING		38.08	---
REVISIONS/ISSUE		DATE	ISSUED BY
<p>MB SCIENCE, TECHNOLOGY, ENERGY AND MINES</p> <p><b>WARDROP   Engineering Inc.</b></p> <p>SERRIDON MINE REHABILITATION</p> <p>CAMP LAKE - LIME DISCHARGE TARGET LOCATION MAP AND SECTIONS (BANK = 316.0m)</p>			
APPROVED BY:	DRAWN BY:	CHECKED BY:	DATE:
			38.08
<p><b>PRELIMINARY DRAWING</b></p> <p>NOT TO BE USED FOR CONSTRUCTION</p>		SCALE: 1:5000	DATE: 38.08
DRAWING NO: 0724010100-DWG-C		REV: A	



# Plan B Details

## Tailings Relocation

- Dredging, water monitor, and mechanical methods
  - Sequenced with S basin sediment dredging to minimize re-handling
- Most tailings neutralized during relocation
- Some tailings also covered with diffusion barrier
- Planned as a 3 year process
- Upland reclamation and re-vegetation progress as tailings moved

# Moving Tailings - Water Monitor



# Working Around Trees



# Dredging



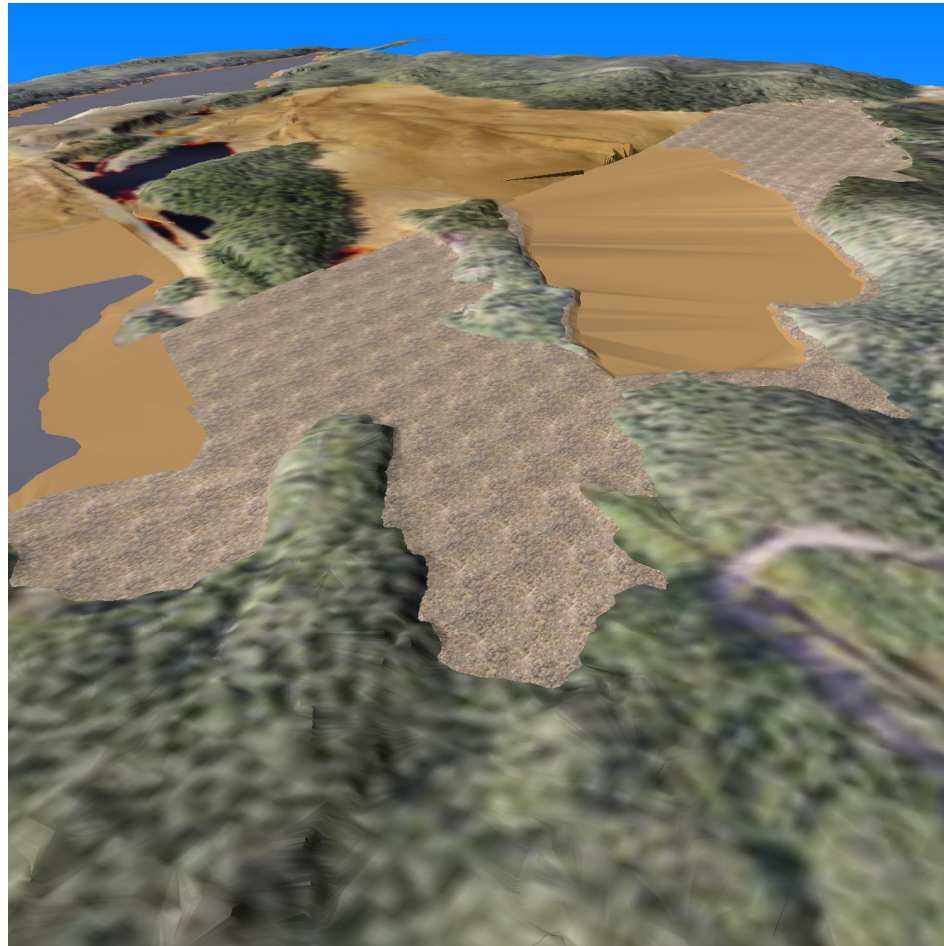
# Tailings Pumped to Lake



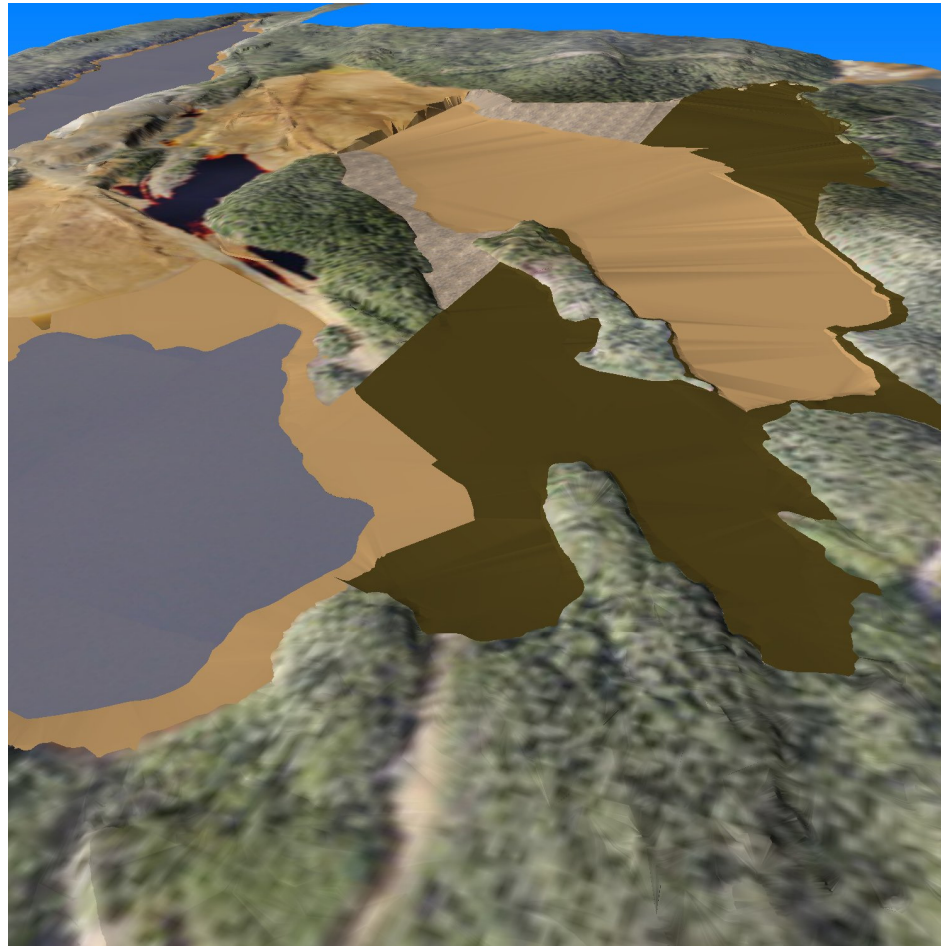
# Mechanical Relocation



# Tailings Relocation – Stage 1

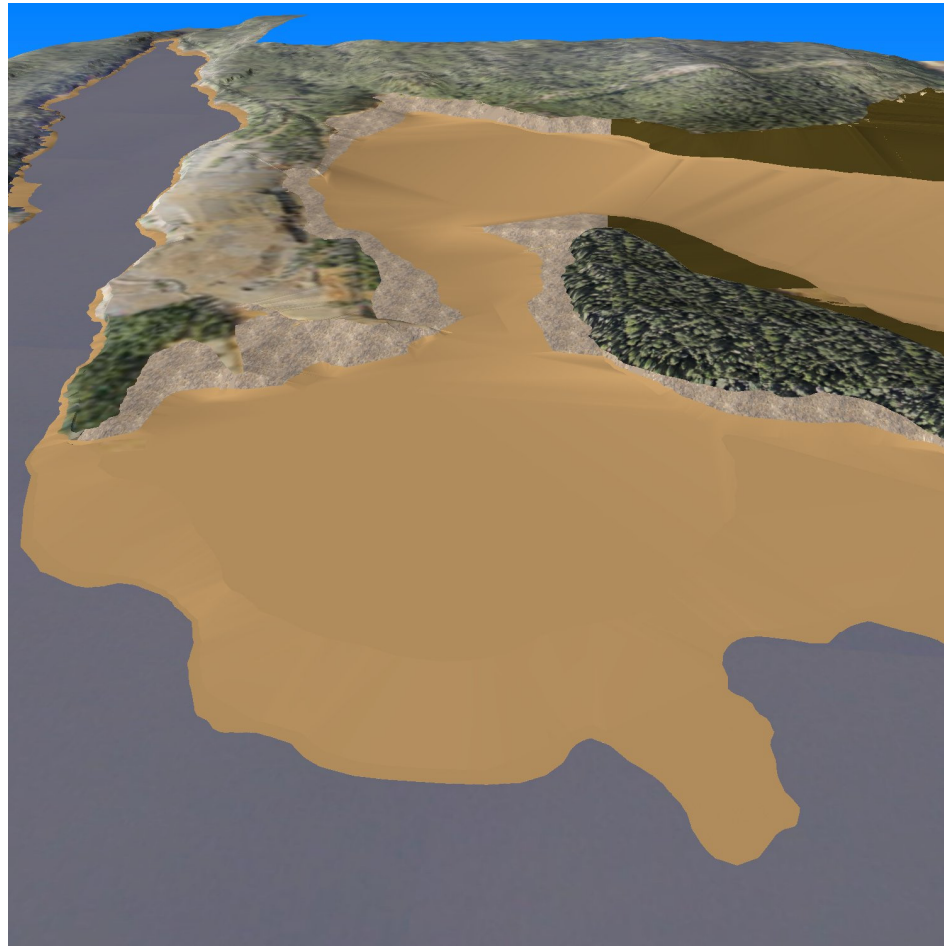


# Tailings Relocation – Stage 2

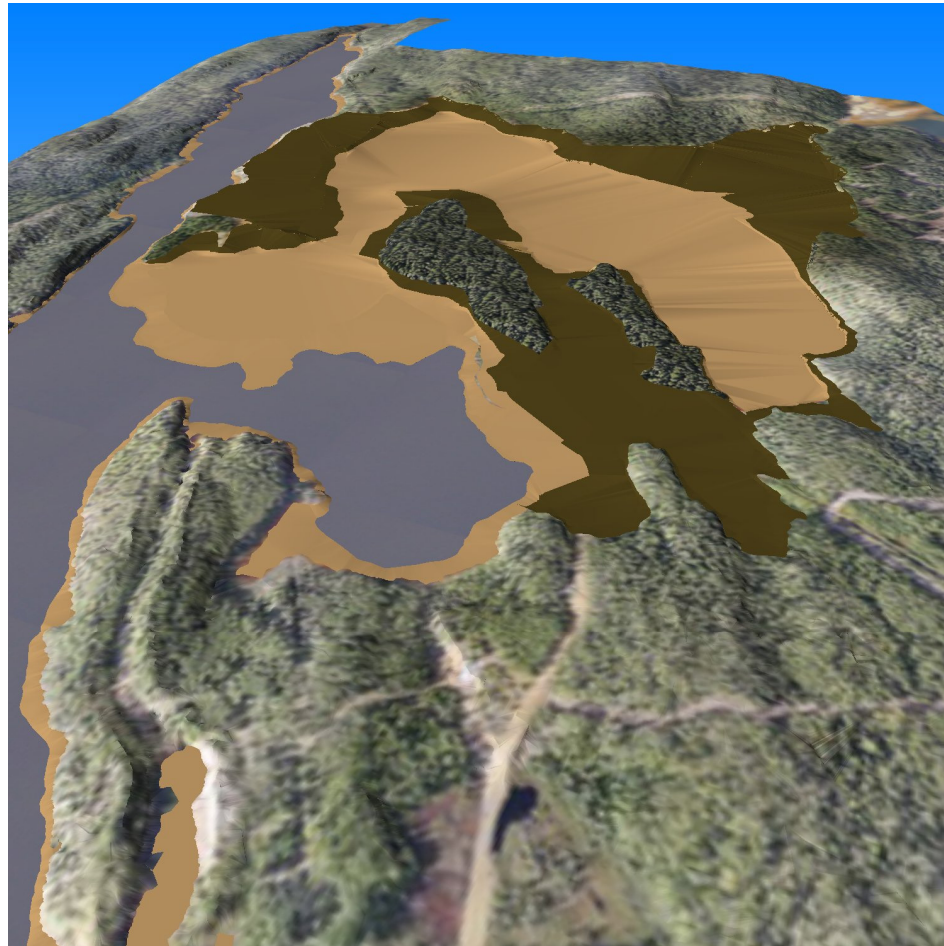




# Tailings Relocation – Stage 3



# Dredging Complete

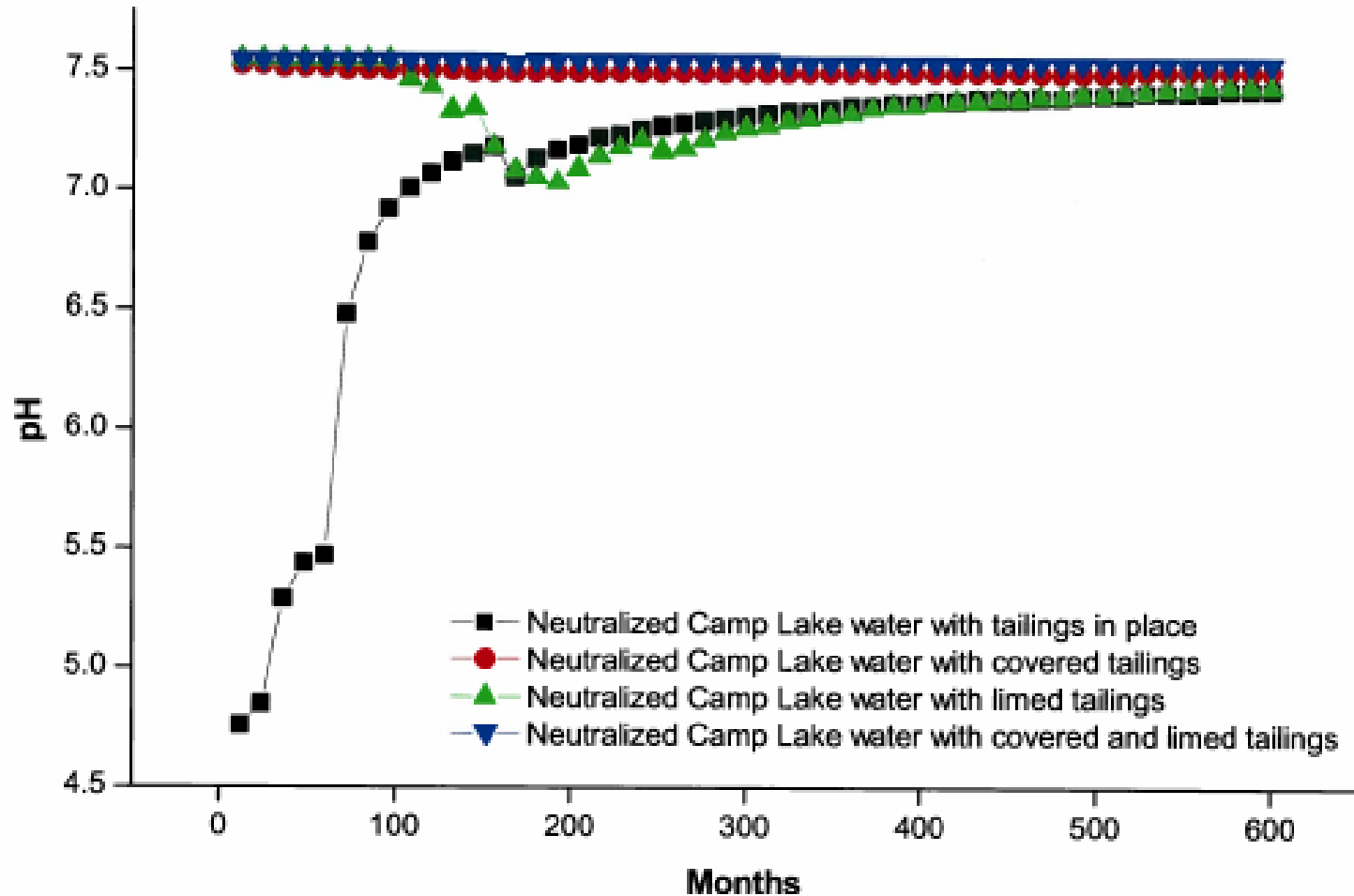


# Camp Lake - Completion



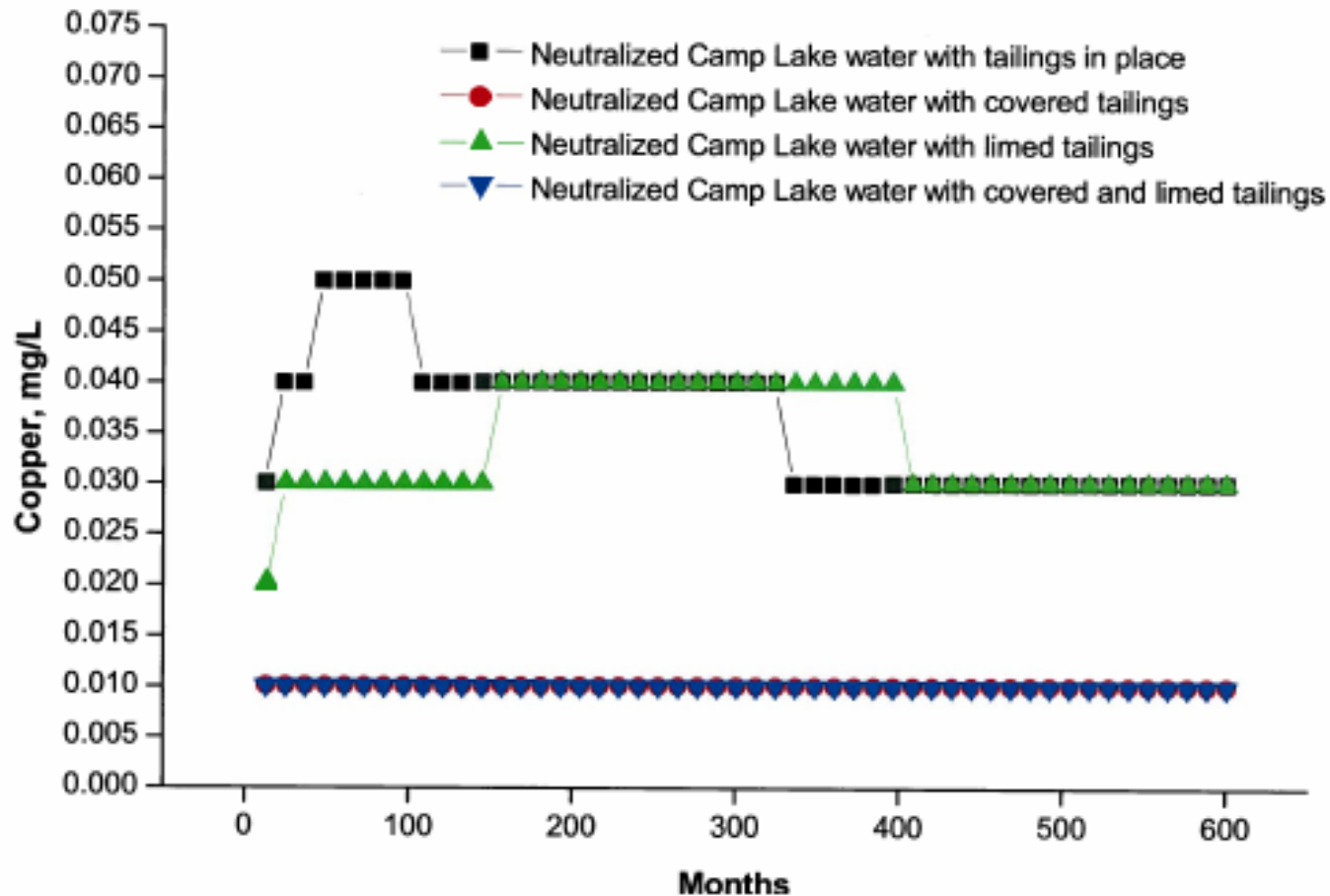
# Camp Lake – Post Reclamation

## Expected Effectiveness - pH (RATAP Model)



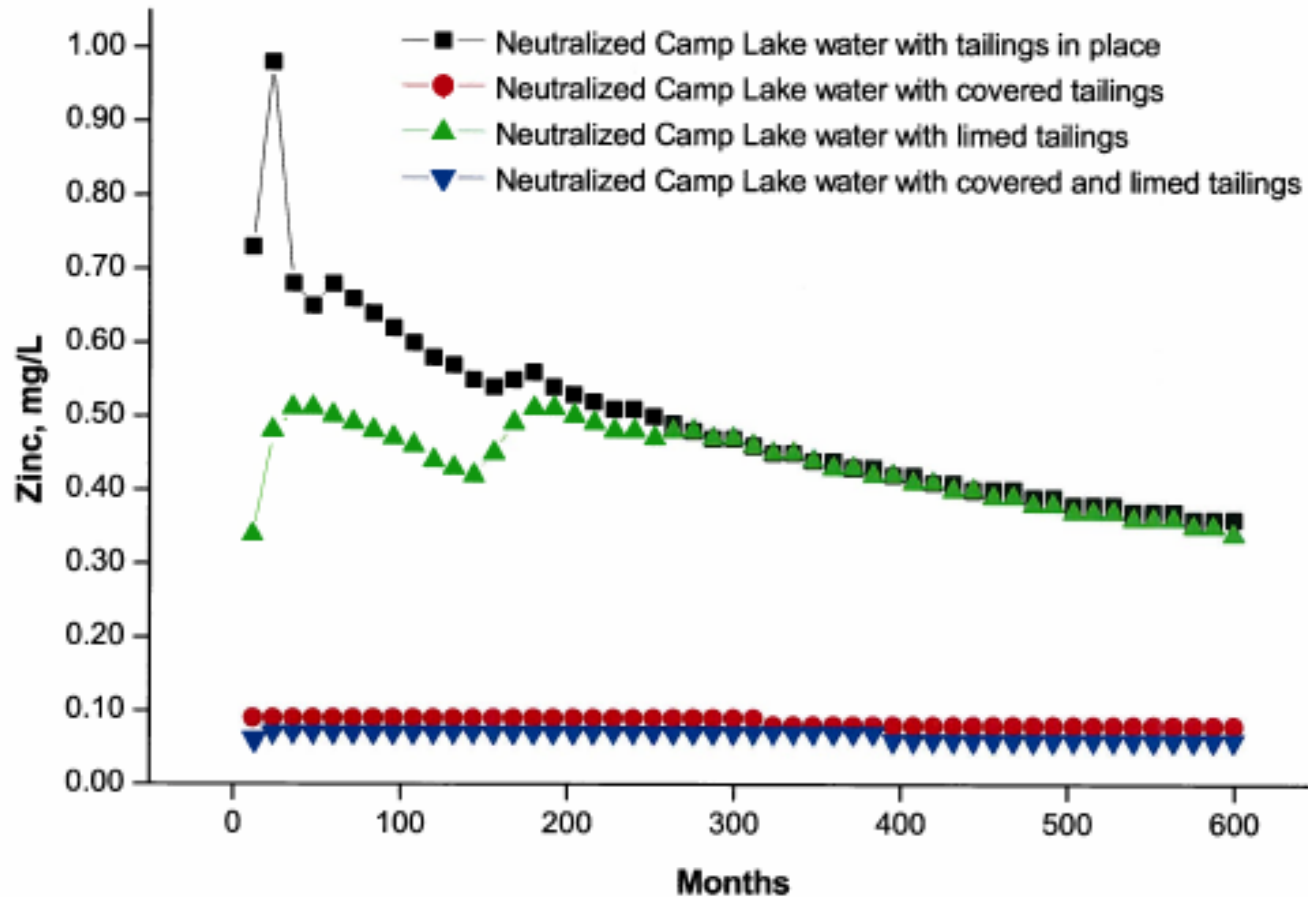
# Camp Lake – Post Reclamation

## Expected Effectiveness - Copper (RATAP Model)



# Camp Lake – Post Reclamation

## Expected Effectiveness - Zinc (RATAP Model)



# Schedule

- Lower Sherlett Creek Restoration
  - Completed fall 2008
- Sherlett Creek Diversion
  - Winter 2008/2009 (tender available shortly)
- Camp Lake Neutralization
  - Start spring 2009
  - Continue through project
- Tailings Relocation/Lake Dredging
  - Start summer 2009
  - Continue through 2011
- Upland Reclamation
  - Start summer 2010
  - Complete fall 2012
- Monitoring
  - Started
  - Continue through project and periodically thereafter

**WARDROP**

**Questions?**

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