

Giant Mine Remediation Project

Overcoming the Engineering Challenges

RemTech East

Niagara Falls, Ontario

May 29th to June 1st, 2023

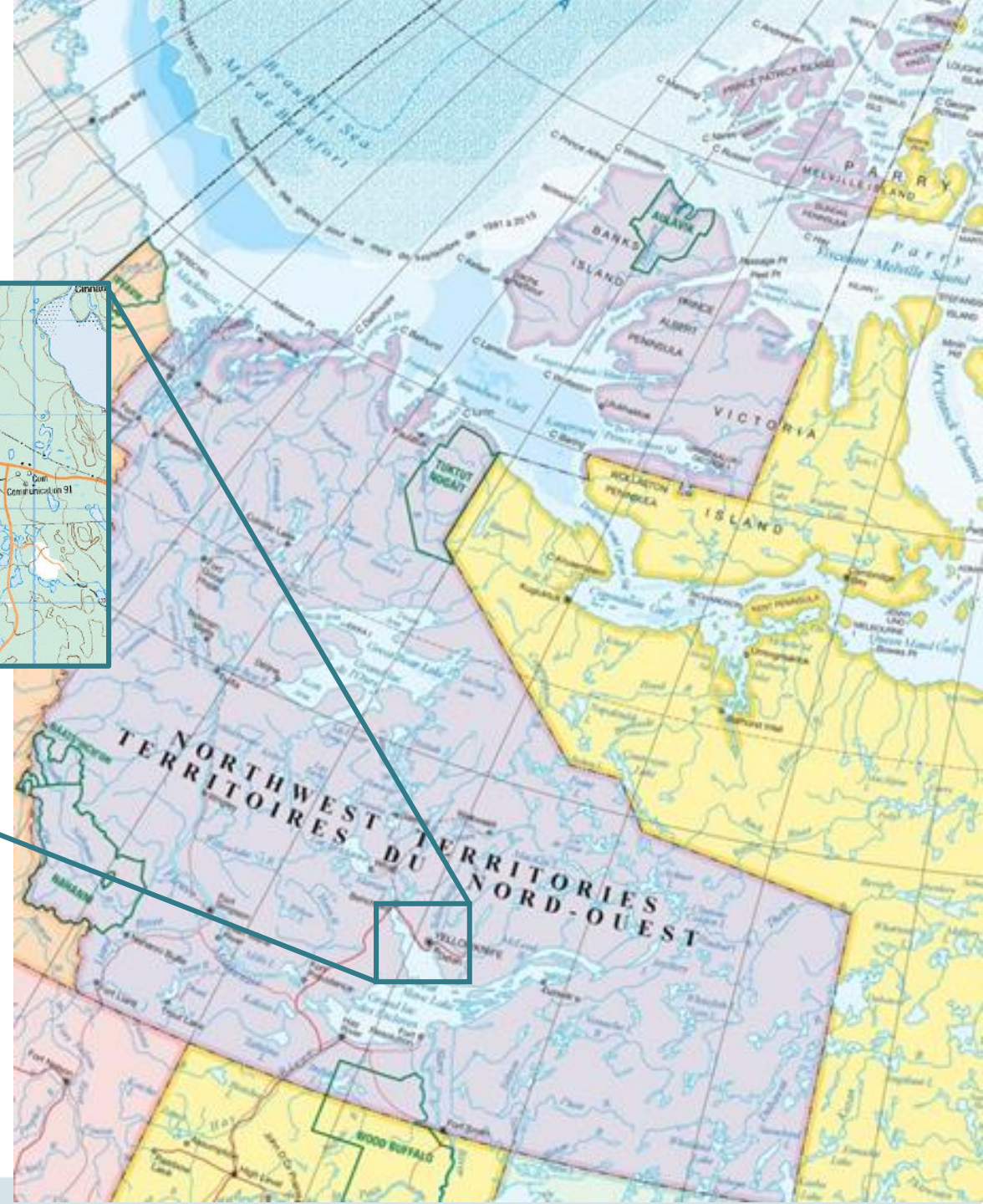
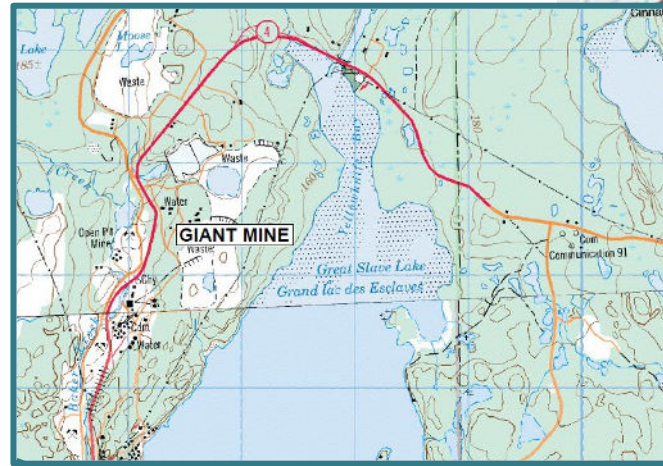


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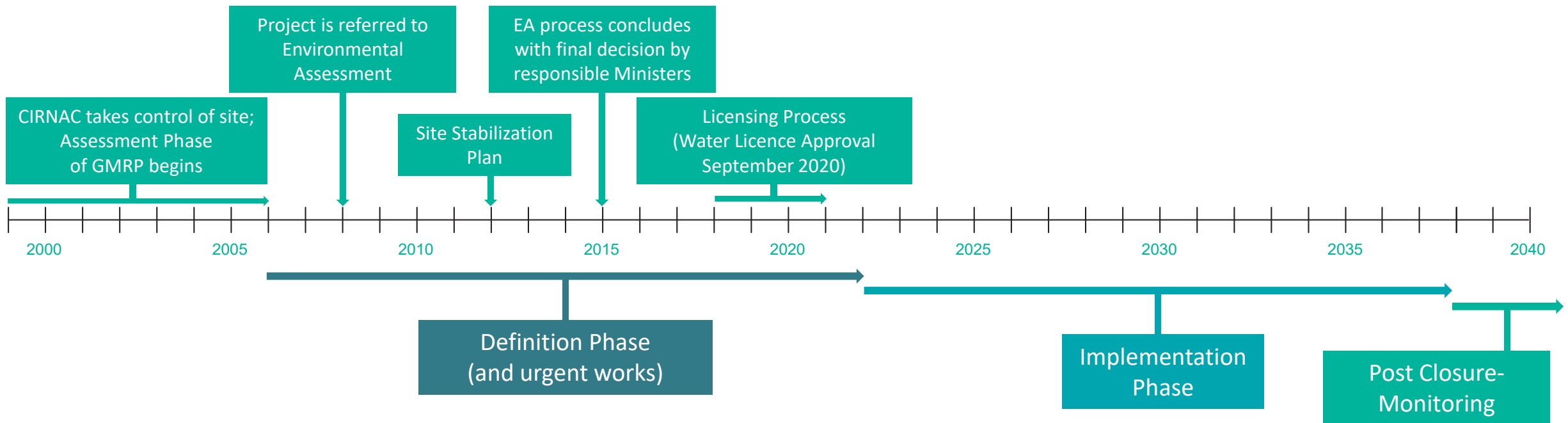
Project Overview

- Giant Mine is a historic gold mine located in the NWT
- The mine produced from 1948 until 2004
- The Crown inherited the contaminated site and is responsible for site closure
- The site has been under Care & Maintenance since 2004





GMRP Project Timeline





Project Components



Water Treatment Plant (WTP)



Contaminated Soils and Sediments



Baker Creek



Tailings Containment Areas (TCAs)



Underground Mine Workings



Freeze



Open Pits



Borrow Material



Non-Hazardous Waste Landfill (NHWL)



Buildings and Site Infrastructure



Water Treatment Plant (WTP)



NWP in spring



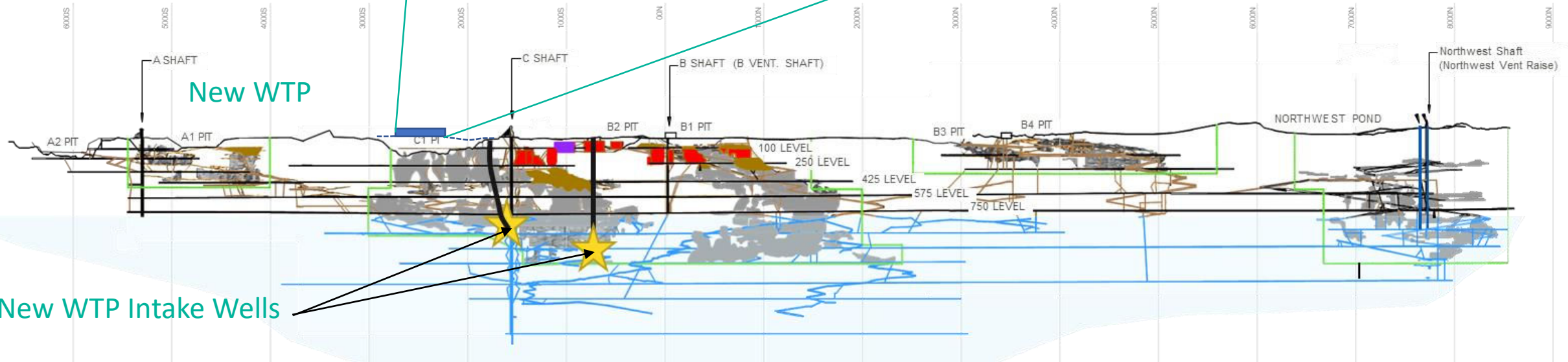
Existing Effluent Treatment Plant



Water Treatment Plant (WTP)



New WTP Rendering



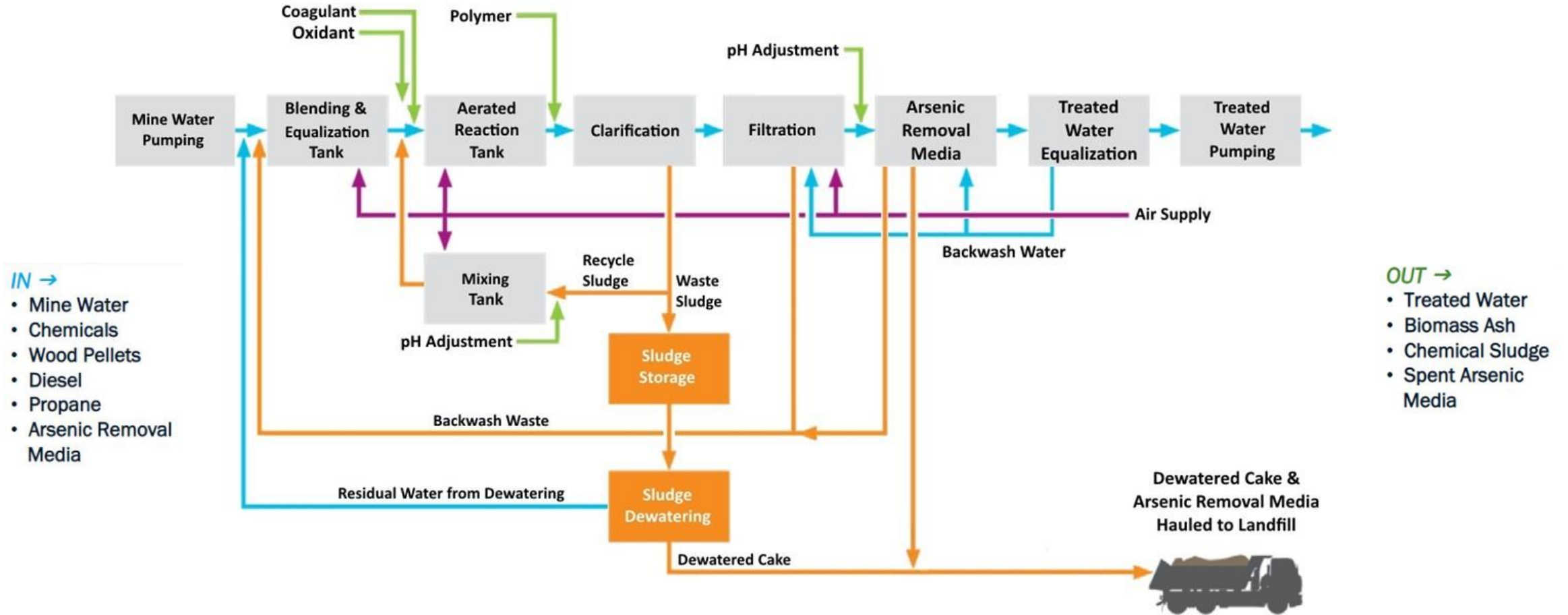


Water Treatment Plant (WTP)





Water Treatment Plant (WTP)





Baker Creek





Baker Creek



Baker Creek above C1 Pit Jan. 2022 Looking South



Baker Creek above C1 Pit Jan. 2022 Looking North



Water in C1 Pit, Jan. 2022





Baker Creek

Baker Pond

Baker Creek Reach 6
Existing Condition



Baker Creek

Calcine Pond

Wetland

Baker Pond

Baker Pond Island

Baker Creek Reach 6
Post-Remediation





Baker Creek

C1 Pit

Baker Creek

Baker Creek

Baker Creek Reach 3
Existing Condition





Baker Creek

Main Site
Access Road

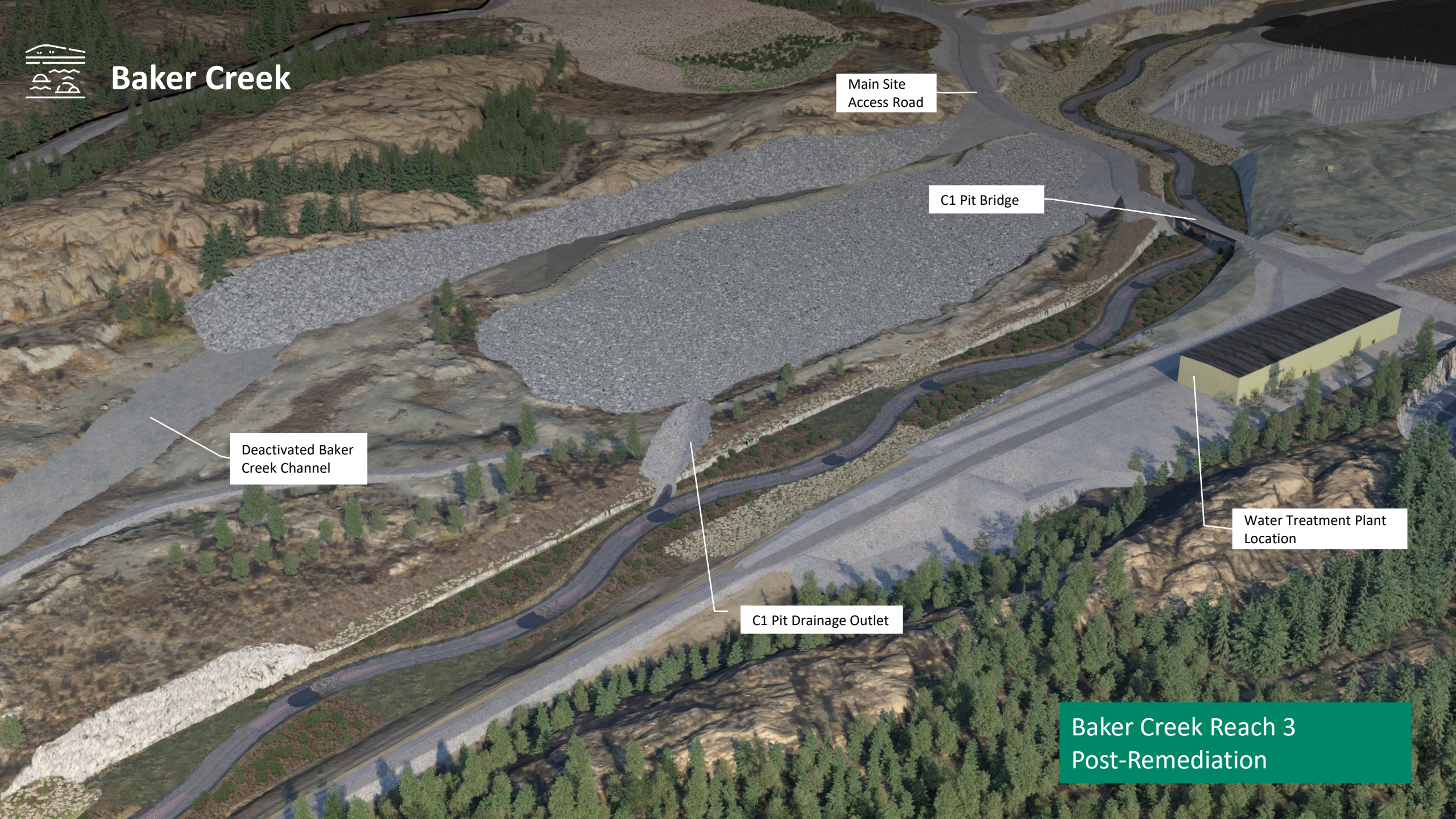
C1 Pit Bridge

Deactivated Baker
Creek Channel

C1 Pit Drainage Outlet

Water Treatment Plant
Location

Baker Creek Reach 3
Post-Remediation





Baker Creek



Boat Launch Access Road

Existing Townsite Boat Launch

Baker Creek

Great Slave Sailing Club

Baker Creek Reach 0 & Reach 1
Existing Condition
Showing water level 156.67m



Baker Creek



Townsite Bridge

Boat Launch Access Road

Wetland

Existing Townsite Boat Launch

Nearshore Sediment Cover

Great Slave Sailing Club

Baker Creek Reach 0 & Reach 1
Post-Remediation
Showing water level 156.67m



Tailings Containment Areas (TCAs)





Tailings Containment Areas (TCAs)

Tailings dewatering trials



Tailings dewatering trials

ELEVATION (m)
196
194
192
190
188
186
184
182
180
178
176
174
172
170
168
166
164
162
0+000

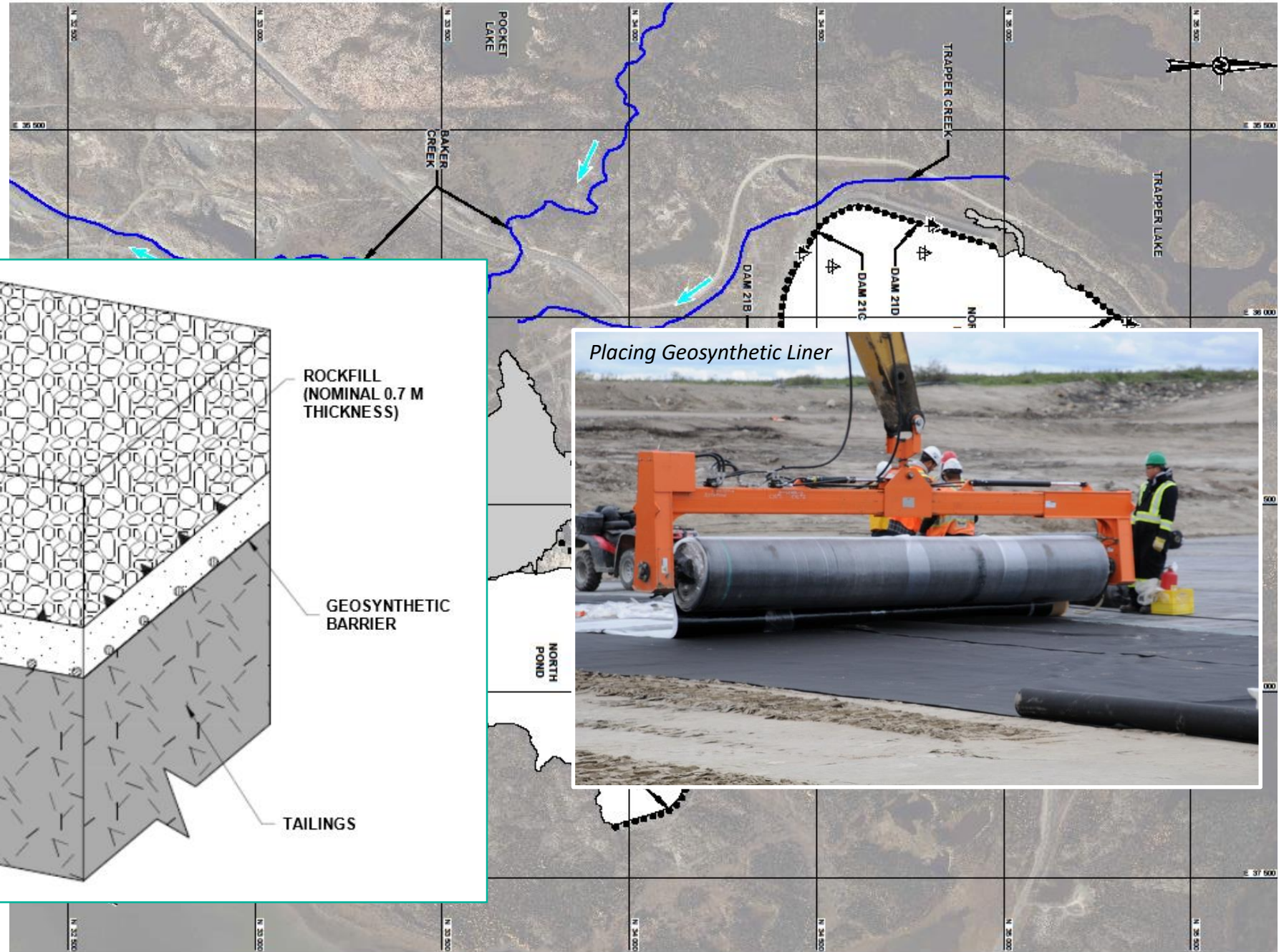
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SOUTH
(COMM)
over

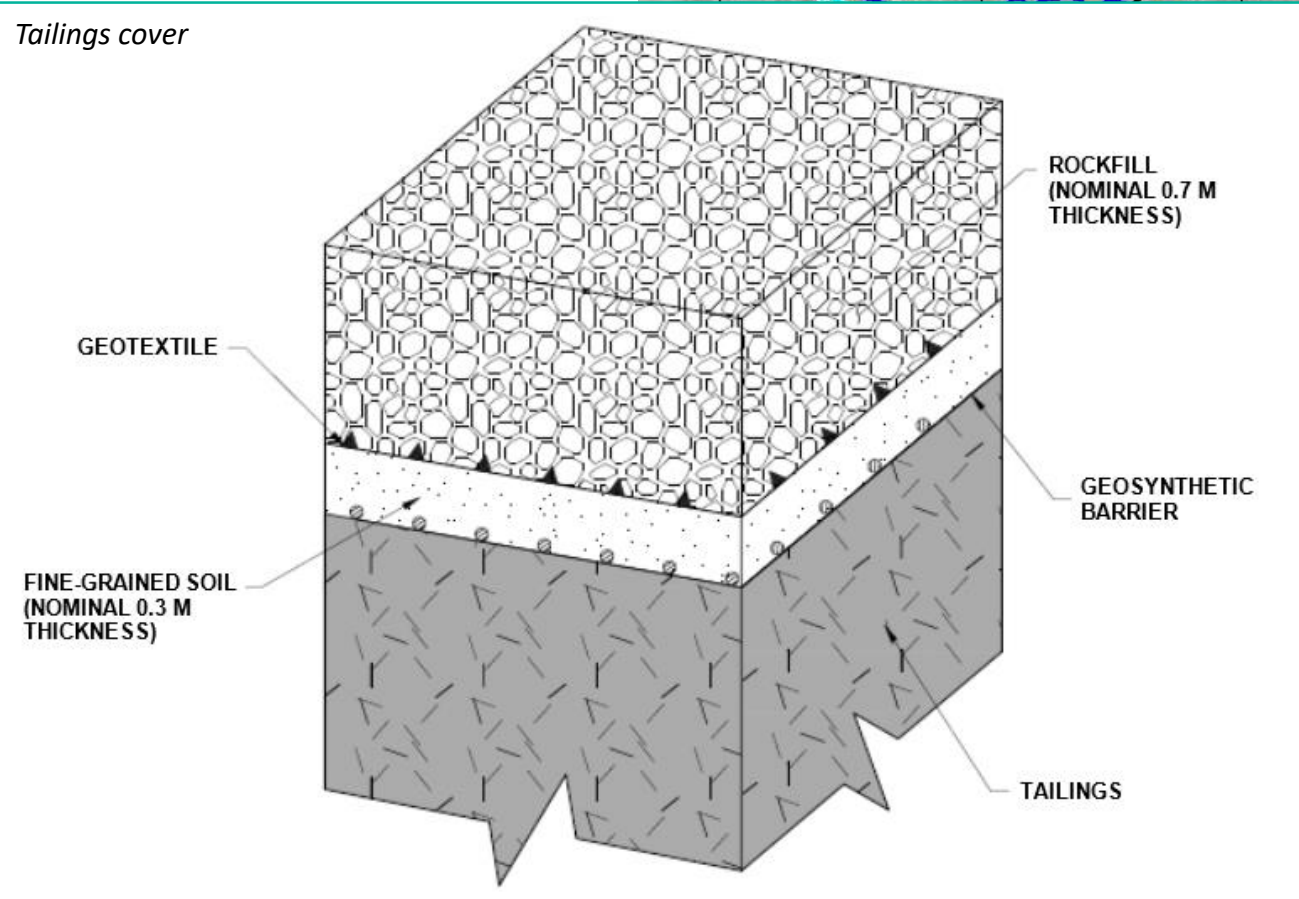
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Tailings Containment Areas (TCAs)

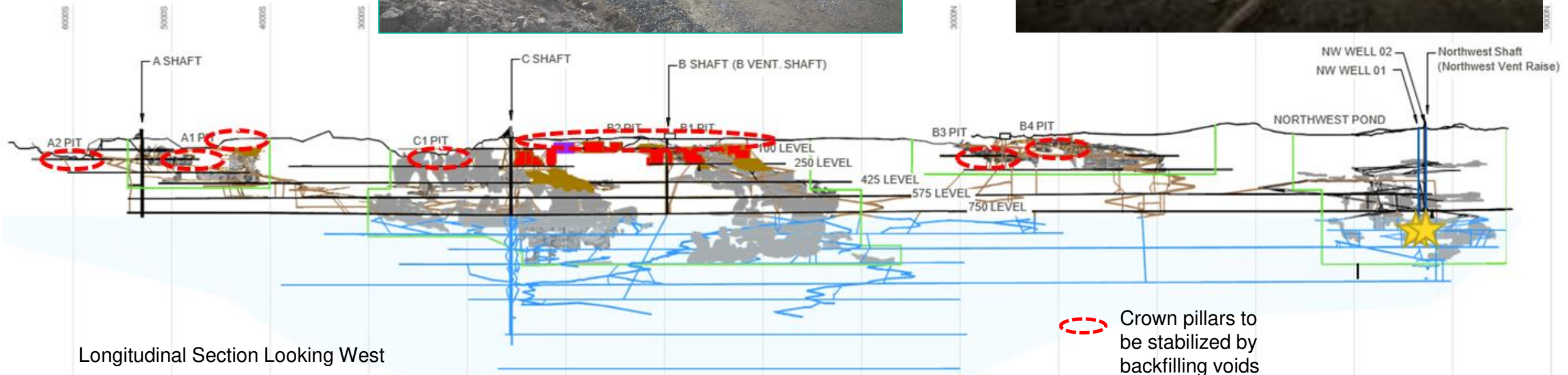


Tailings cover





Underground Mine Workings





Underground Mine Workings

Making cemented tailings paste backfill with tailings, bimer, and water at batch plant

Delivering paste to the underground via boreholes

Excavating tailings to make cemented paste backfill



Drilling cemented paste backfill hole into underground void



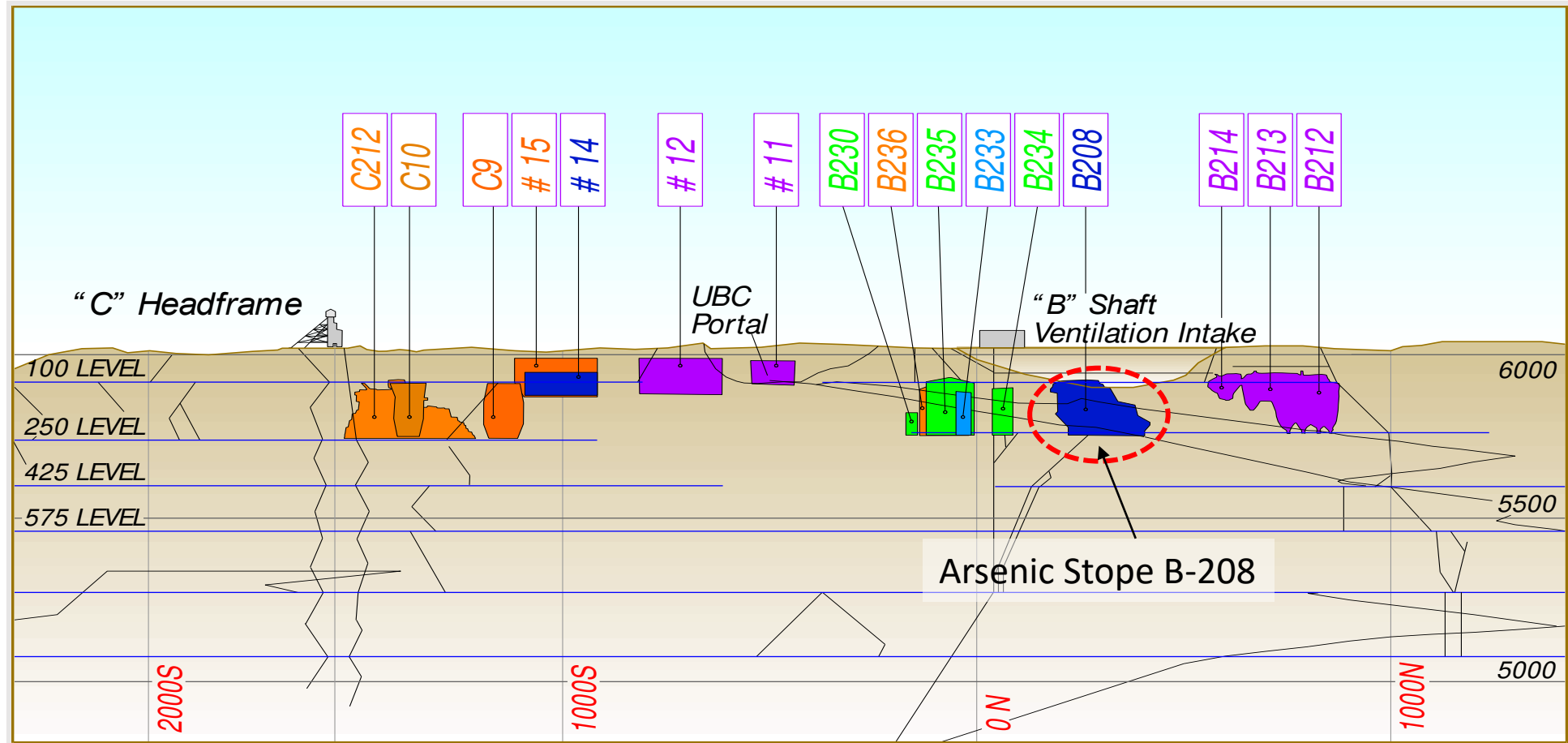
Backfilling of underground with cemented paste backfill





Freeze

Arsenic Storage Stopes and Chambers



Longitudinal Section View



Freeze

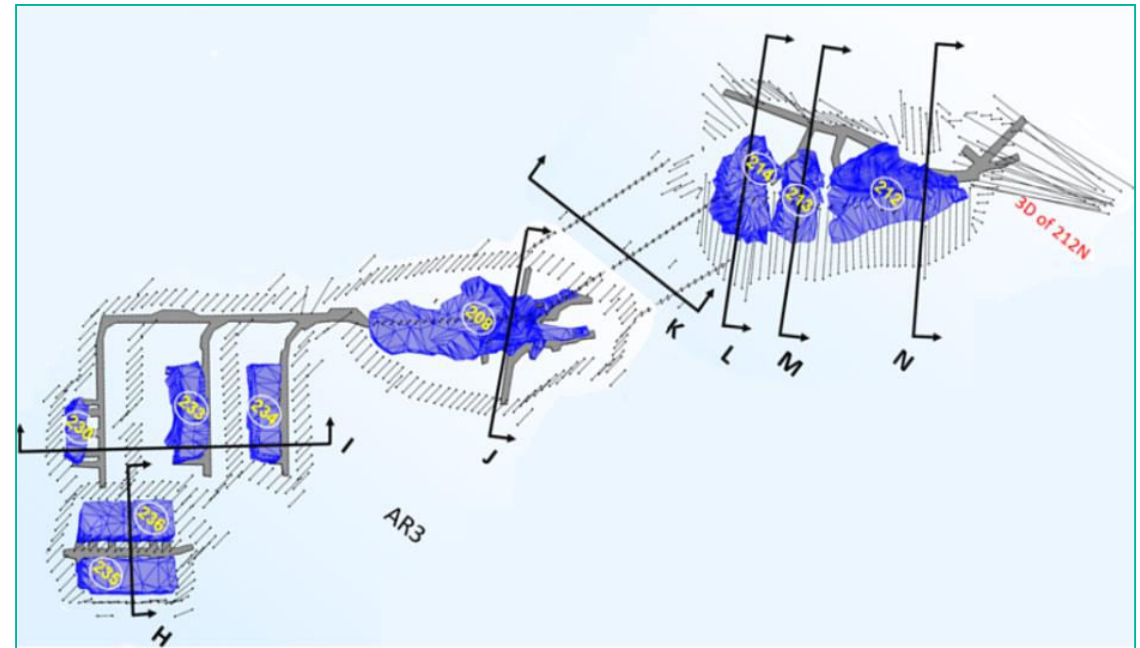
Yellowknife Office Building vs. B2-08 Arsenic Stope





Freeze - Thermosyphons

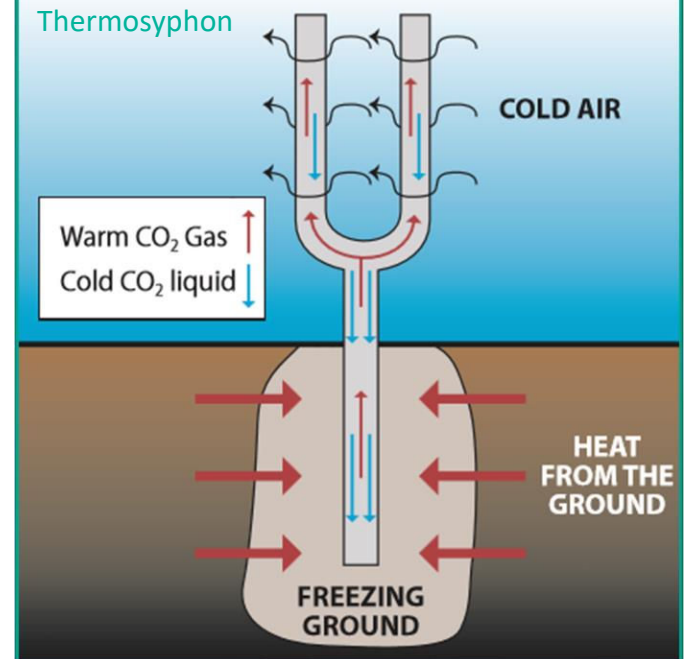
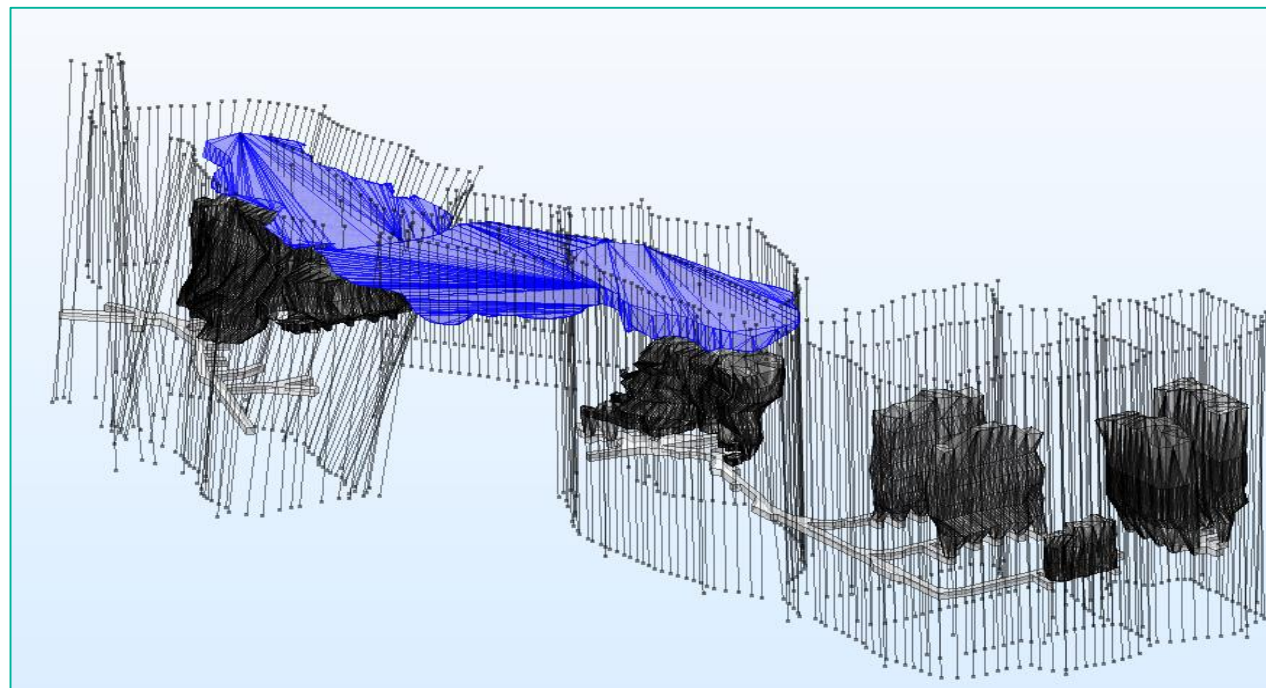
Plan view



Thermosyphons



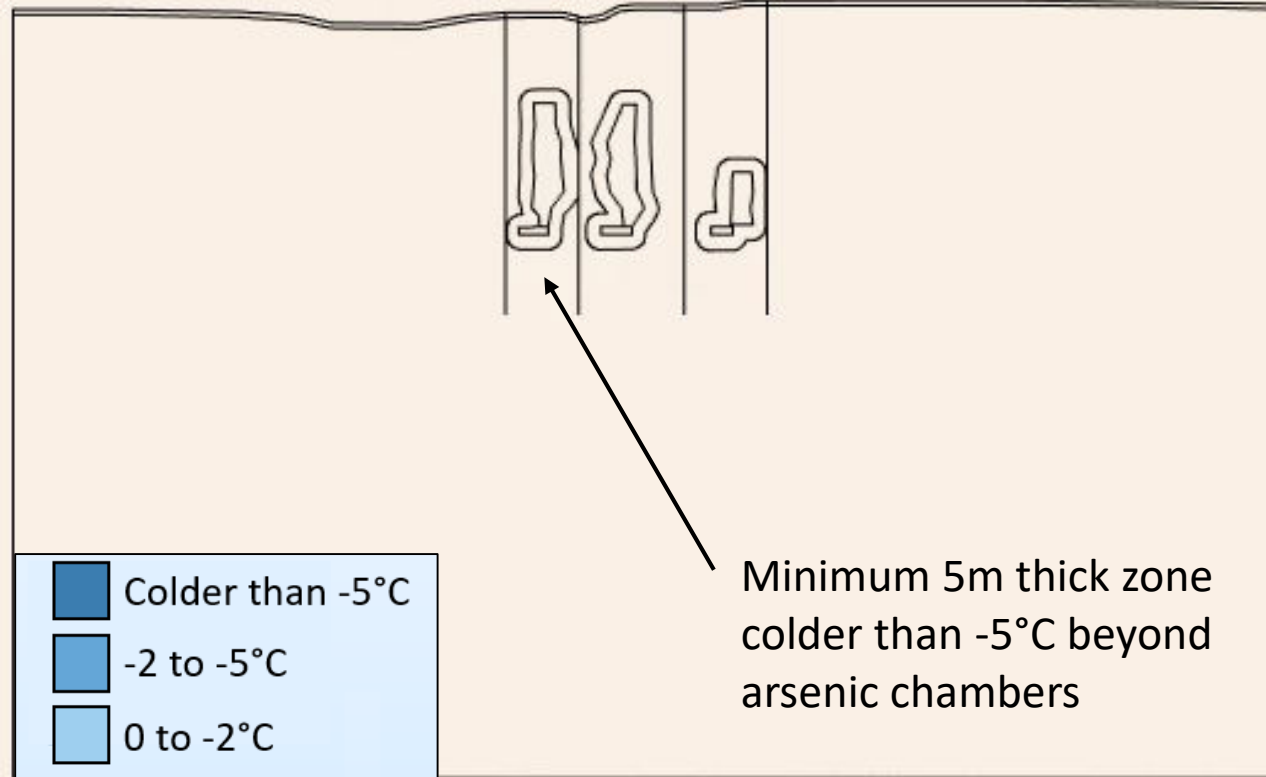
3D Isometric View





Freeze

Elapsed Years since Start of Cooling: 0.0



Arsenic stopes B-230, B-233, B-234 (Cross-Section Looking North)



Freeze – AR1

Completed AR1 Freeze PD – Fall 2022



Closure and Reclamation Plan



Water Treatment and outfall systems



Contaminated Soils and Sediments



Baker Creek and surface water drainage



Tailings Containment Areas



Underground Mine Workings



Freeze



Open Pits mine workings



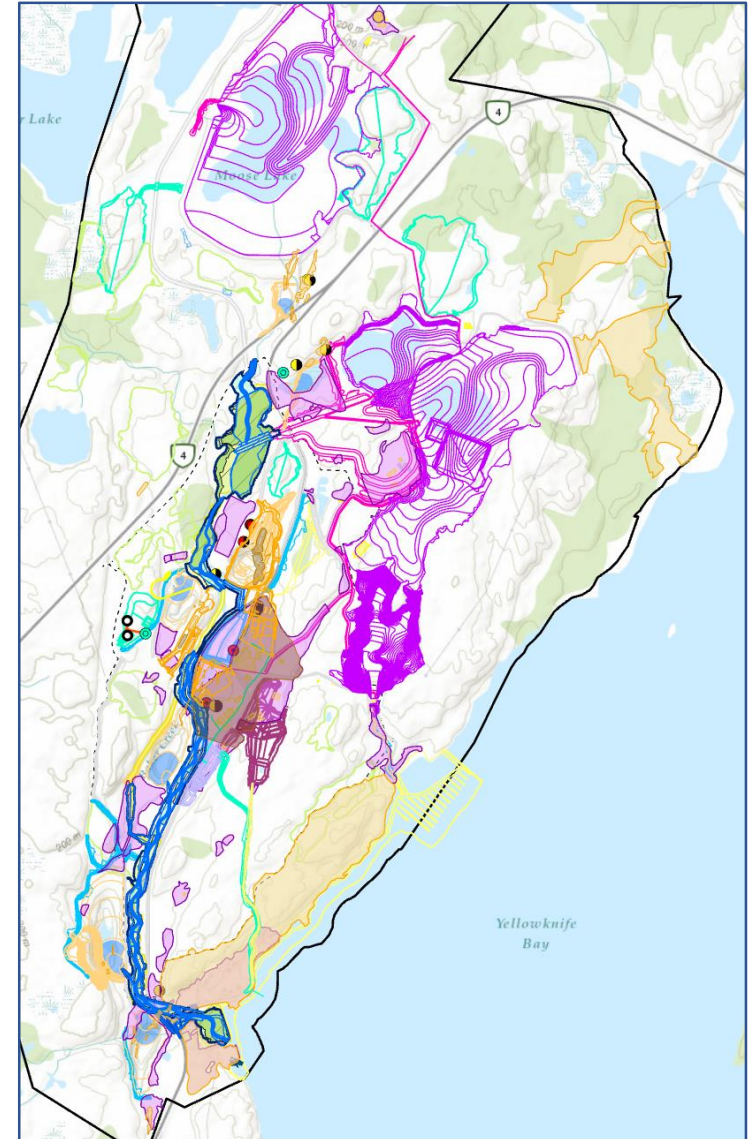
Borrow Material



Landfill



Buildings and Infrastructure





Remediation Summary

WBSE	Construction Work Package	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31	2031/32	2032/33	2033/34	2034/35	2035/36	2036/37	2037/38
1.3.2.4	Sample Drilling Program															
2.1.1	Pump 201 Replacement															
3.3.16	Revegetation Test Plot															
3.3.15	Investigative Drill Program															
4.1.6.1	Underground Stabilization															
4.1.11.2	NHW Landfill															
4.1.6.3	Underground Abandonment															
4.1.7.1	Townsite Deconstruction															
4.1.7.2	Legacy Debris Pile Disposal															
4.1.13.4	New Power Supply															
4.1.3.1	Water Treatment Plant (Const)															
4.1.3.2	Water Treatment Plant (Op)															
4.1.7.3	Demo Core Industrial Area															
4.1.10.1	Openings to Surface (Concrete)															
4.1.2.1	Cont. Soil - Washing of HAC															
4.1.2.2	Cont. Soil - All Areas															
4.1.1.1	Tailings - Orig. TCA & BGM Cell															
4.1.8.2	A1, A2, B2 & B3 Pit Backfill															
4.1.12.1	Coarse Grain Borrow															
4.1.1.2	Tailings - NW TCA/NWP Spillway															
4.1.6.2	UG Portal															
4.1.10.2	Openings to Surface (Rockfill)															
4.1.9.2	AR1 Freeze Installation															
4.1.8.1	B1 Pit Backfill															
4.1.4.1	Baker Creek (R3, R4, R5, R6)															
4.1.7.4	Demo & Debris - All Other Areas															
4.1.13.5	Communication & Cell Towers															
4.1.1.3	Tailings - NS/FS & Boat Launches															
4.1.8.3	C1 Pit Backfill & Baker Creek R3															
4.1.12.2	Fine Grain Borrow Reclamation															
4.1.9.3	AR2/AR3/AR4 Freeze Installation															
4.1.13.3	C1 Pit and Townsite Bridges															
4.1.4.2	Baker Creek (R0, R1, R2)															
4.1.13.2	Final Roads & Bridge Demo															
4.1.13.6	Site Fencing & Signage															

Investigations	
Design	
Procurement	
Construction	
Operation	
Post-Construction Monitoring	

Questions ??

