



Giant Mine Remediation Project

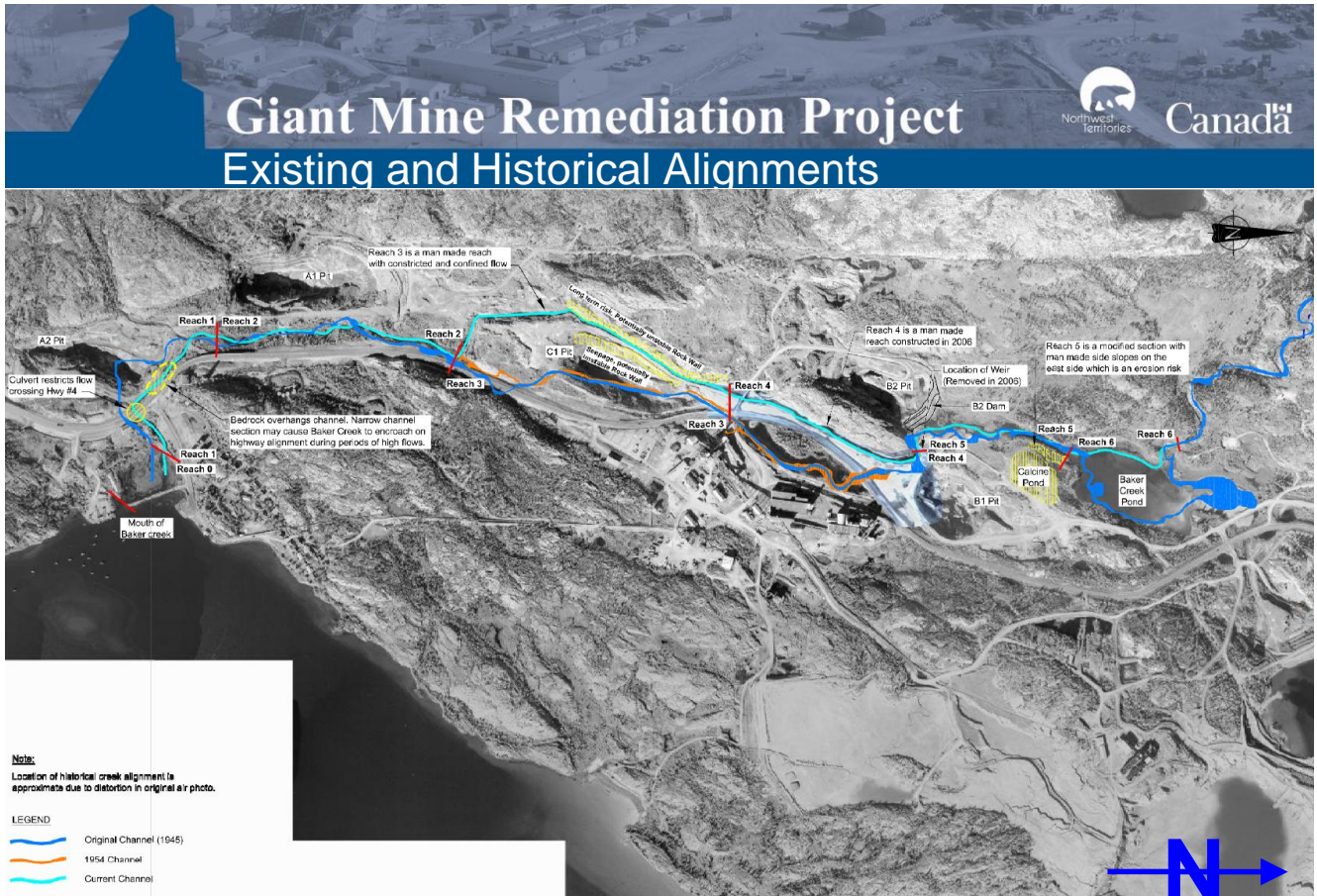


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Surface Water – Baker Creek

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GAL Doc. No. 117



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Closure Design Considerations



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Key Concerns

☐ Flood Risk:

- ☐ The existing creek may not convey extreme flood flows or lower flows under anchor ice, rockfall or bank failure conditions
- ☐ Spillage to B1 and C1 pits could occur for extreme events



☐ Environment:

- ☐ Water and sediment quality in Baker Creek are affected by historical deposits and upstream inputs
- ☐ Existing channel alignment includes alterations and diversions that limit fish habitat.



Objectives:

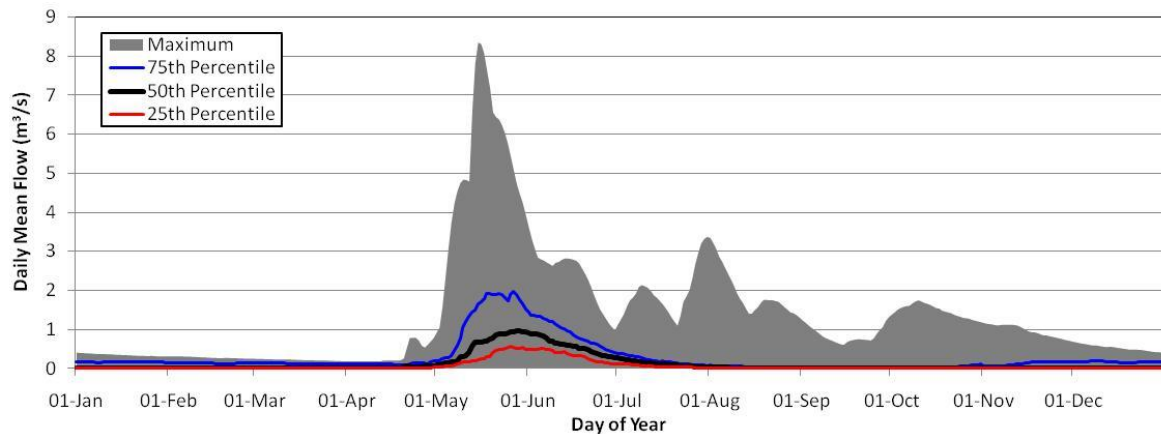
- ❑ Flood Risk: Provide flow conveyance through the site without spill to underground
 - ❑ Current design criteria consider the 500-year flood flow event, with 2 m anchor ice, plus 1 m freeboard
 - ❑ Minimize groundwater seepage to the underground workings
- ❑ Environment: Address habitat and contamination issues
 - ❑ Maintain a low flow channel for fish passage and habitat
 - ❑ Enhance/restore fish habitat in Baker Creek
 - ❑ Contaminated sediment management is still under review
- ❑ Restoring flow regime and habitat will be positive changes, as noted in the DAR

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Hydrology of the Creek



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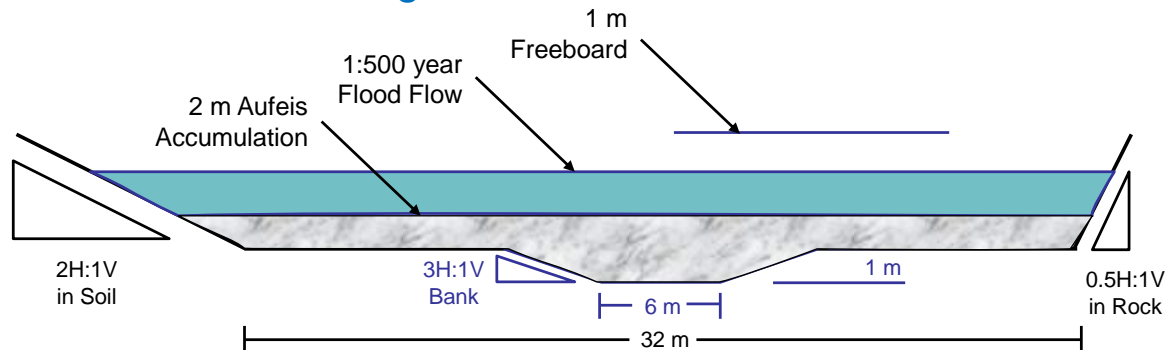
Baker Creek Flood Regime

Return Period (years)	Estimated Flood Discharge (m³/s)
2	1.7
10	5.4
50	10.8
100	13.8
200	17.3
500	25.0
Probable Maximum Flood	~200

- ❑ The greatest recorded flow (since 1968) on the creek was in the spring of 1991, at 8.45 m³/s.
- ❑ The mean annual flow is approximately 6.8 million m³
- ❑ Aufeis formation observed in recent years, and particularly in the winter of 2010-11, was considered in the design.



Current Channel Design Criteria:



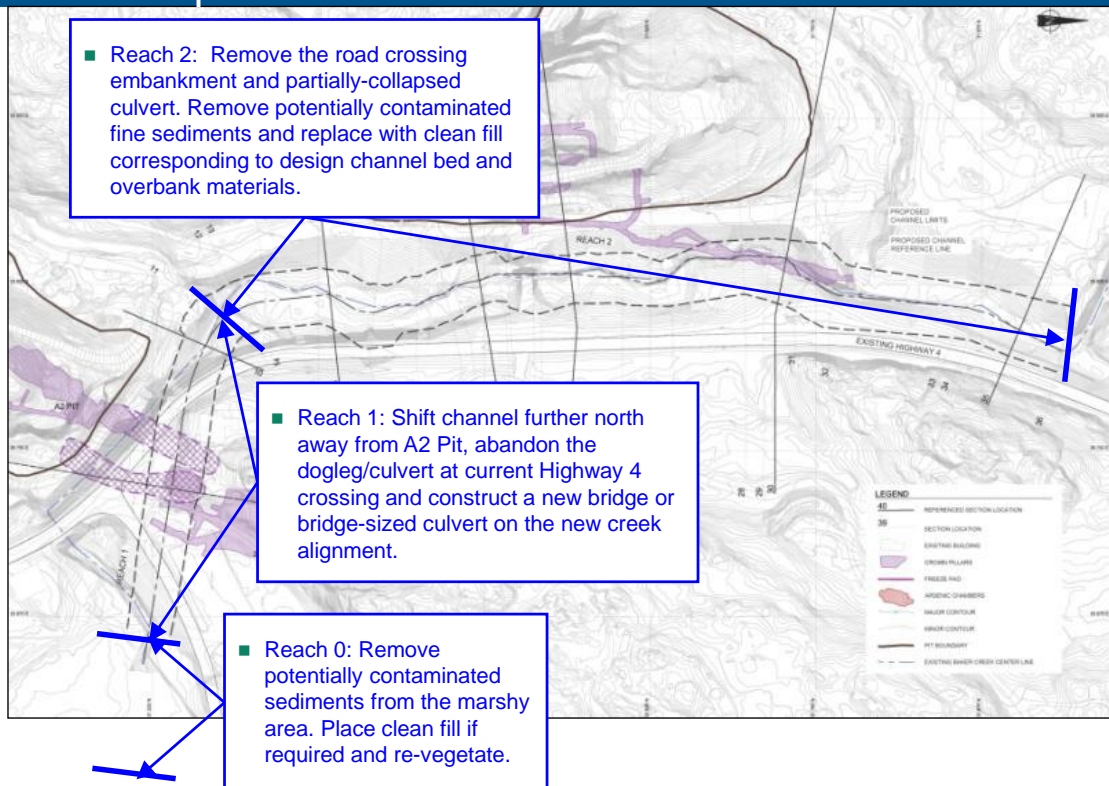
- ☐ Channel geometry and materials are based on local geomorphology investigation
- ☐ Active channel material will be graded with D50 = 120 mm
- ☐ Floodplain material will be graded with D50 = 120 to 250 mm
- ☐ Compacted till will be provided below the channel and floodplain, with a bituminous liner above shallow underground features

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Proposed Closure Activities



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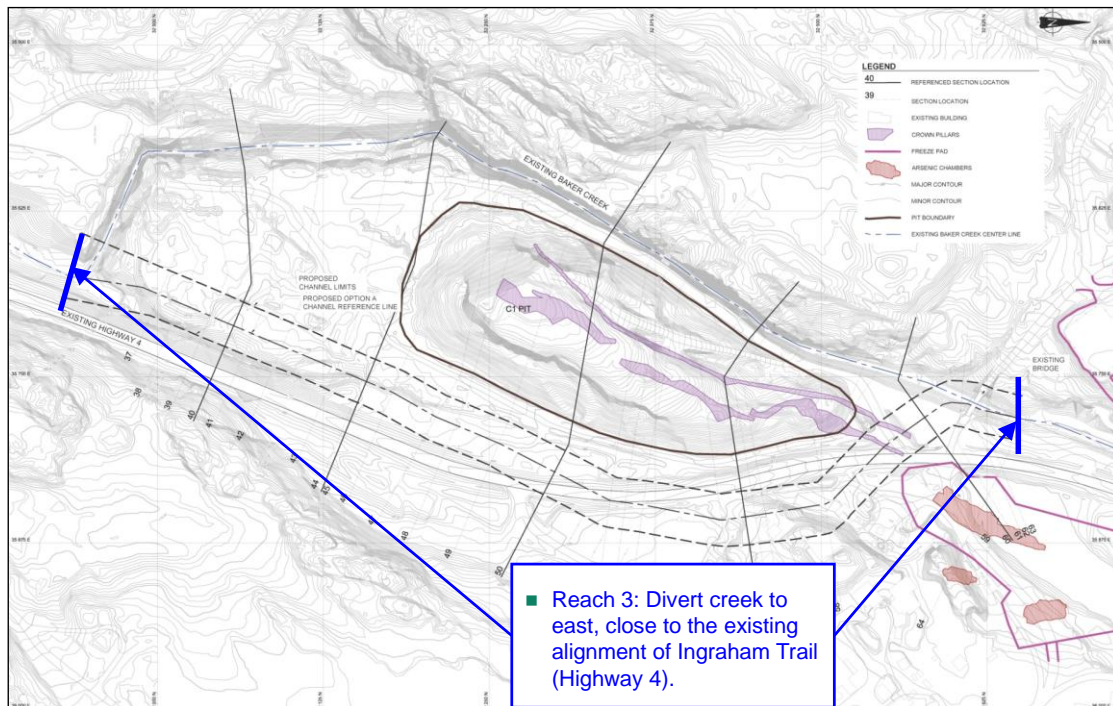


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Proposed Closure Activities



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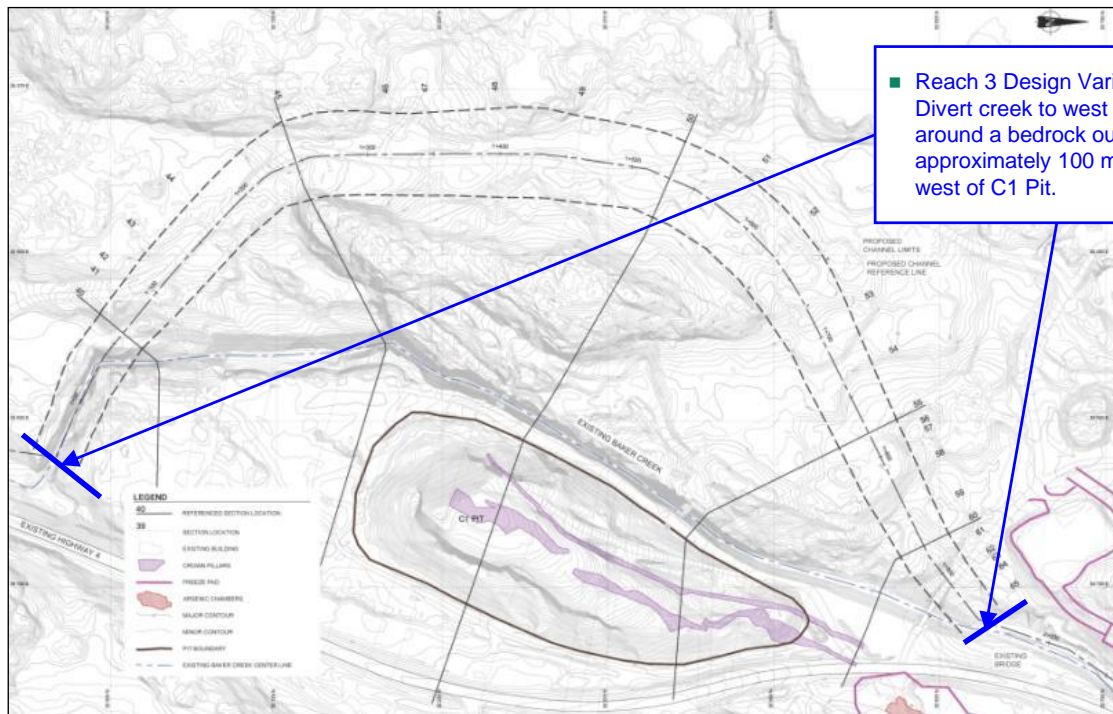


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Proposed Closure Activities



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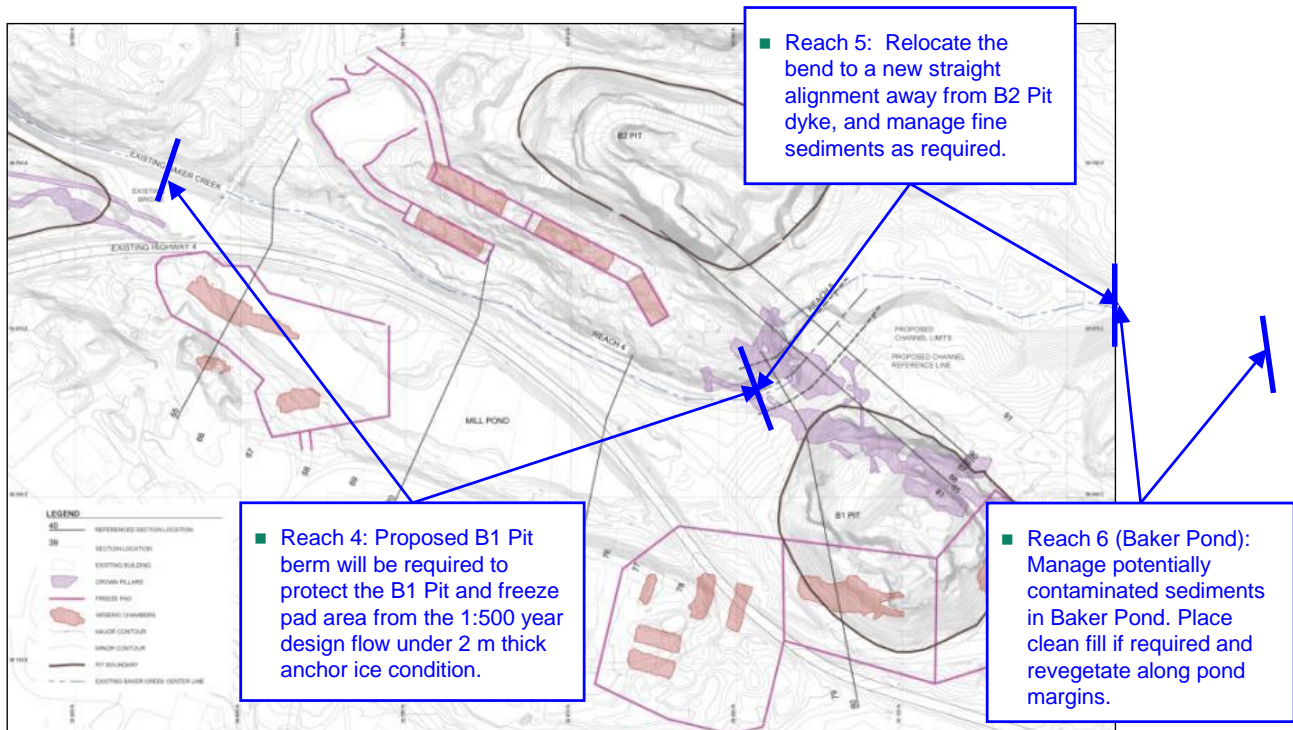


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Proposed Closure Activities



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Risk Assessment

Flooding (dyke overtopping)

- Reviewed the short term high risk elements noted in risk reviews:
 - Flooding due to over topping of dikes at A2, B1 and C1
 - Up graded dyke at B1 and C1.
 - upgraded dykes by adding fill up to 1 m
 - Reviewed conditions at A2 and re-evaluation identifies that the Baker Creek channel at A2 can handle design flows for care and maintenance period.
 - B2 dyke increased to re-establish design crest elevation.



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Risk Assessment – Channel Base Failure

- Reviewed the short term high risk elements:
 - Loss of Baker Creek channel base at A2, B1 and C1
 - Stope 2-01 – fence at Heritage Site
 - Stope 2-18 - base of channel to fail into stope
 - Stope 1-18 – base of creek fails into underground near or at sinkhole



Drilling Program – Further Work

- Plan to drill at A2 (Heritage site) to develop plan to manage and develop backfill plan.
- Plan to drill along dyke at C1 to determine rock conditions and develop plan to stabilize stopes as needed.
- Plan to drill at B1 and sinkhole to design backfill program.
- The work would be scheduled as part of final remediation if the conditions do not require immediate action.



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Contingency Plans

- Flooding due to potential dyke overtopping
 - Upgrades to dykes at B1 and C1
- Plans to be developed to manage over topping of dykes and to repair dykes if needed
- Flooding due to channel failure
 - Plan drilling to determine rock conditions at A2, B1 and C1 to develop plans to mitigate potential channel failure and then develop procedures to backfill key areas if high risk

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Questions

