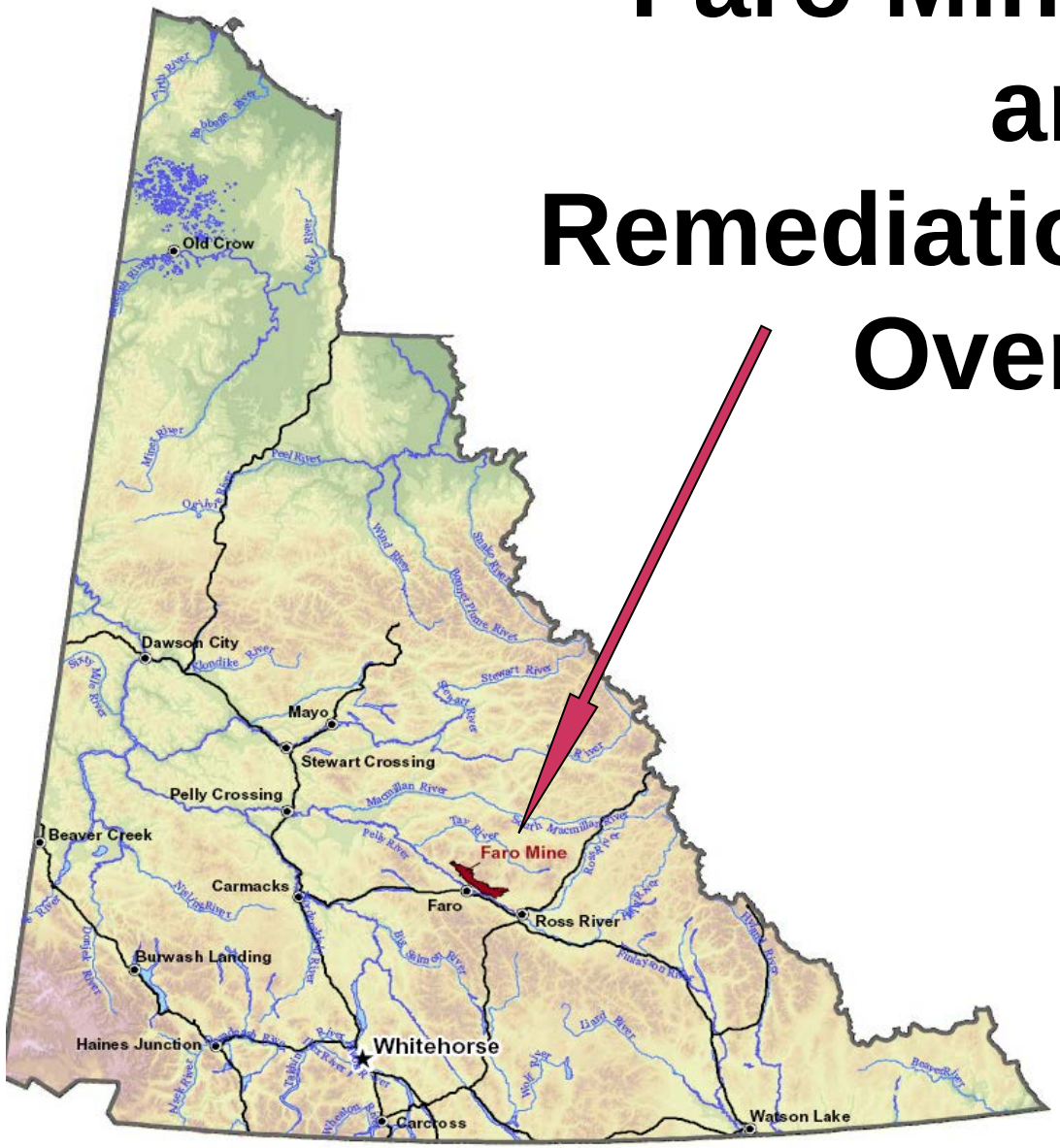
Faro Mine Closure and Remediation Planning Overview



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Faro Mine - Background

1969 Faro Mine opens & Town of Faro established

1970s Largest lead/zinc mine in Canada • 15% of world's Pb/Zn output • population of Faro reaches 2000 by early 1980's.

1982 First of numerous shutdowns • population of Faro drops to 97 by mid-1980's.

1998 After 29 years of intermittent operations, last owner placed into receivership.

Note: Mine produced approx. 6 MT of concentrate Today's value approx. $6Bn.

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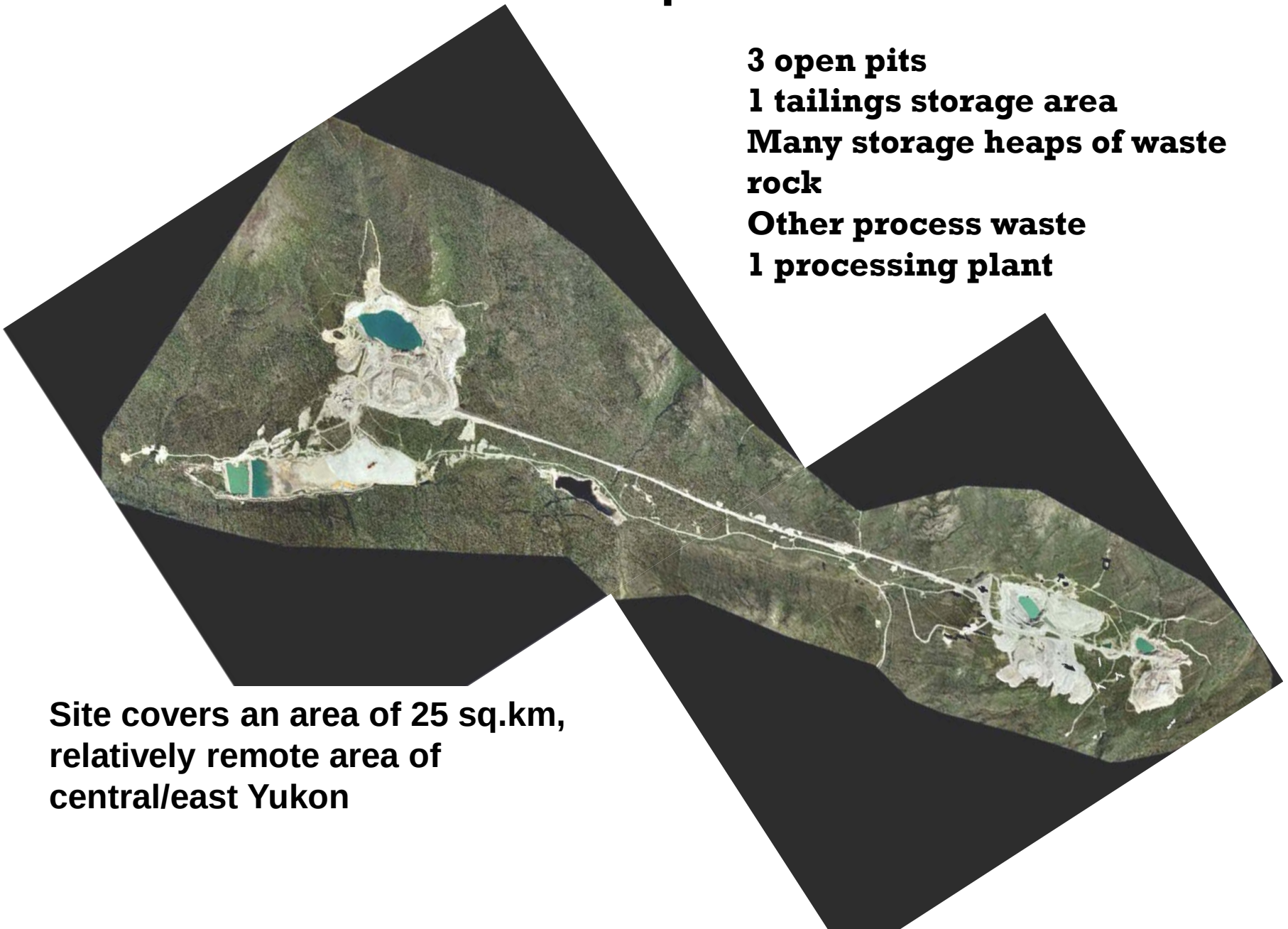
Mine comprises:



3 open pits
1 tailings storage area
Many storage heaps of waste rock
Other process waste
1 processing plant

Site covers an area of 25 sq.km, relatively remote area of central/east Yukon

Site Inventory

Faro Mine Area

13km Haul Road

Vangorda Plateau

Components

- 70 million MT tailings (3 dams)
- 1 open pit – Faro Pit
- 2 stream diversions
- 250 million MT waste rock

Components

- No tailings
- 2 open pits: Vangorda & Grum
- 1 stream diversion
- 70 million MT waste rock

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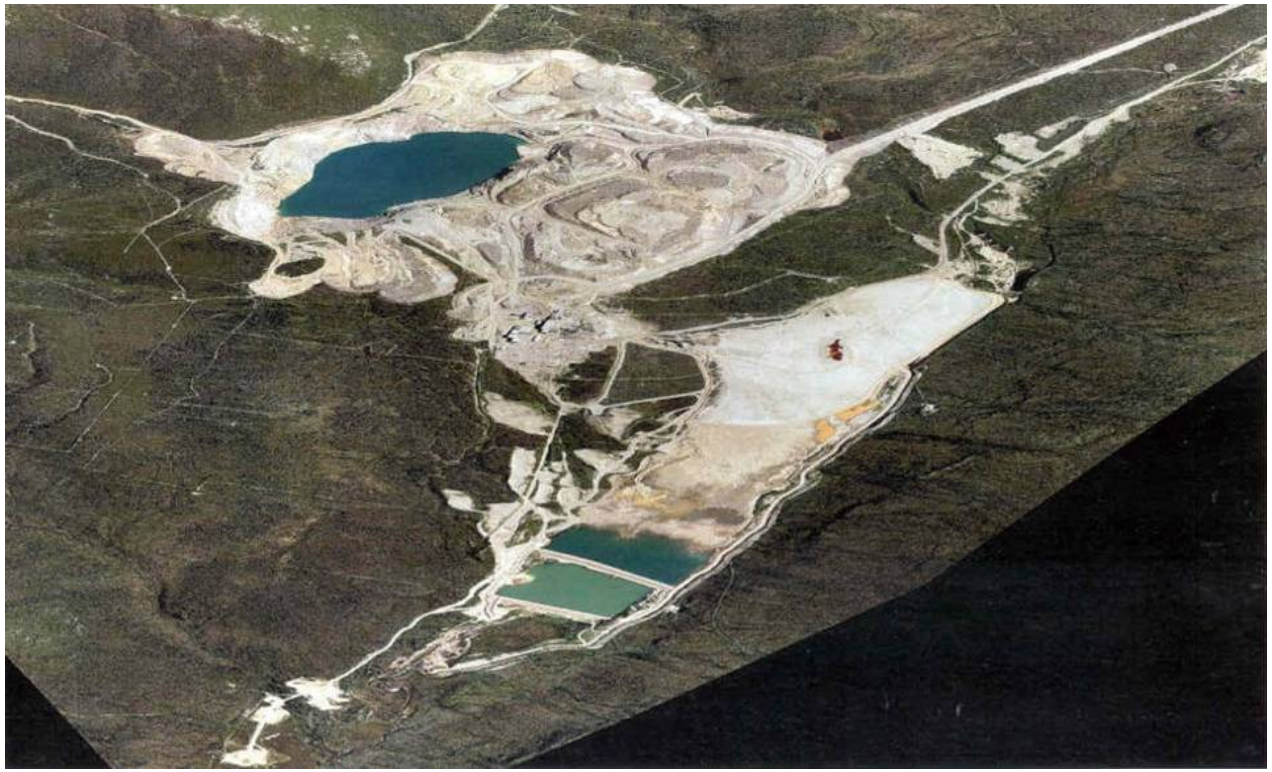
Current Site Status

- Site currently managed by the court appointed Interim Receiver. NO significant off-site impacts now.
- Acid generation, metal leaching is taking place, contaminating groundwaters and some surface waters on the site.



Project challenges

- Mine wastes
  - Serious environmental impacts are not predicted for at least 20 yrs
  - Contaminant loading from waste expected to increase over the next 100 yrs or so.
  - Contaminant production expected to continue at a very high level for many hundreds of years if not mitigated.
- Valley with deep aquifer along the valley floor
- Wide range of possible flood events
- Located in the traditional territory of the Kaska FN and upstream of the Selkirk FN
- Streams and rivers considered valuable fish habitat. General area a hunting and gathering resource.

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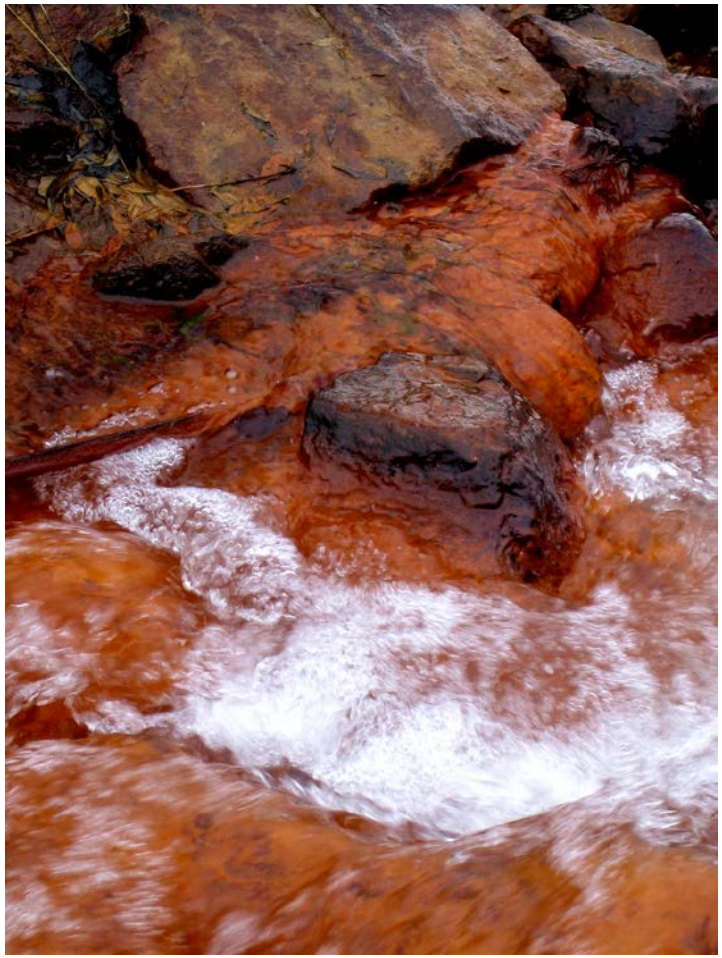
Environmental Issues - Tailings



Acid generation & release of metals
(continue to occur for at least 400-600 yrs)

→ **Ground & Surface Water Contamination**
(Groundwater "breakthrough" expected in 10-20 years)

Stability of dams/diversion
(Probable Maximum Flood & Maximum Credible Earthquake)

→ **Mass tailings release to aquatic environment after extreme event**
(Rose Creek, Anvil Creek, Pelly River)

Dust transport
(from tailings and mill area)

→ **Contamination of terrestrial environment**
(ongoing – currently no risk to human and ecological health)

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Environmental Issues - Waste Rock

Exposed Waste Rock Piles

(320 million MT in total across whole site)

→ **Direct contact by human/animals**

&

Future land use and aesthetics

Acid generation & release of metals

(continue to increase 400-600 yrs)

→ **Ground & Surface Water Contamination**

(waste rock varies in composition & potential to release metals)

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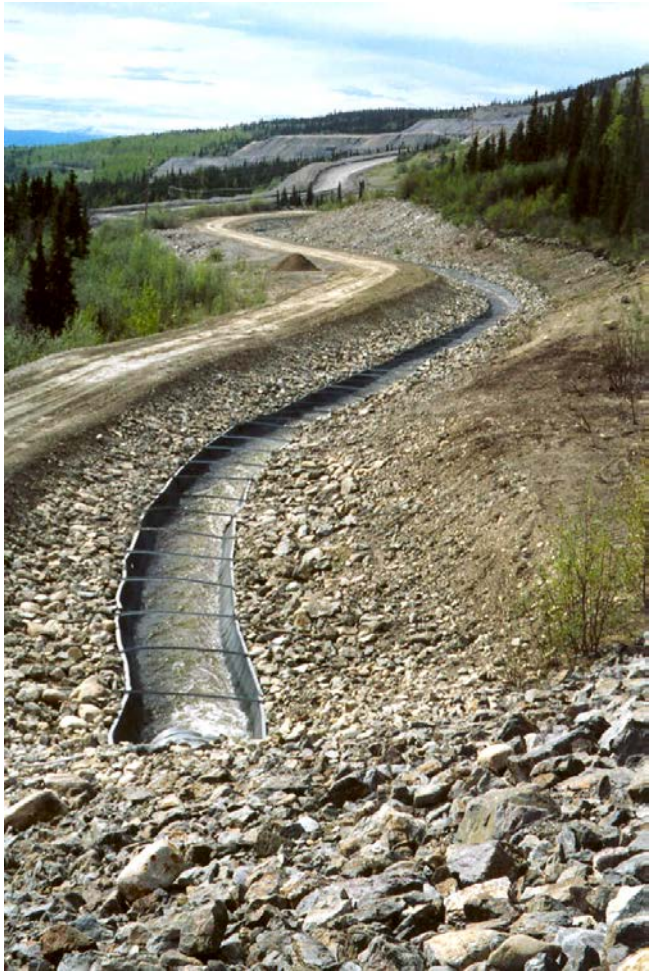
Environmental Issues - Diversions



Three main stream diversions currently keep clean surface water away from areas of contamination.

If these structures are needed for the long-term, they will need to be upgraded to withstand severe floods and earthquakes

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To address the issues in the long-term, we need a closure plan.

The Faro Mine Closure Planning Office is responsible for preparing the Closure Plan

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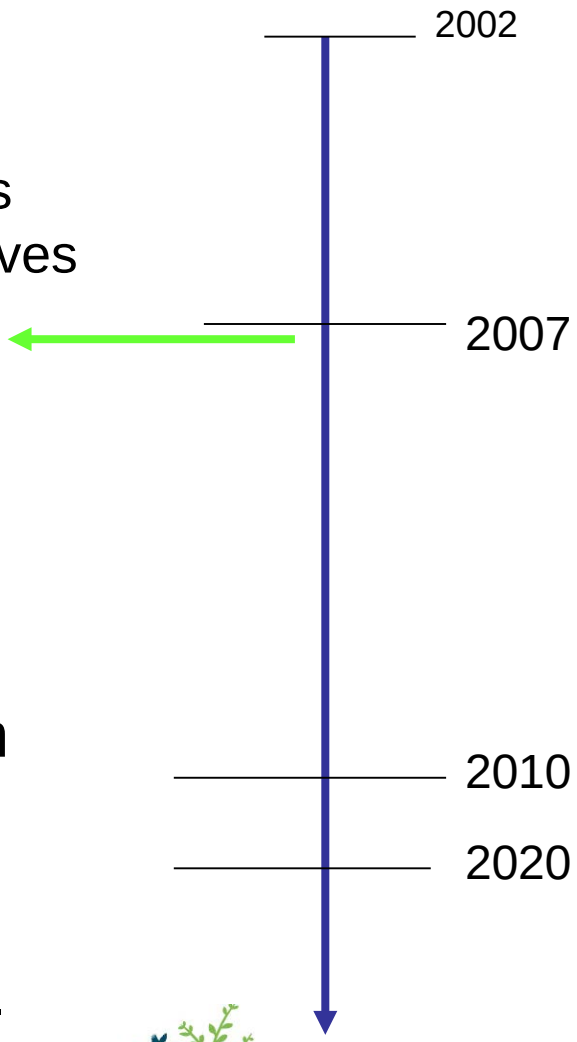
Project Steps

- Closure Plan development
  - Studies/research
  - Development of closure objectives
  - Development of example alternatives
  - Selection of preferred alternative
  - Final plan development
- Funding approval
- Closure Plan approval
  - YESAA
  - Water License
- Implementation of Closure Plan
- Post Closure
  - Monitoring and adaptive management
  - Maintenance, water treatment etc.



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Progress To-Date

Technical studies

Completed

Example Closure Alternatives Prepared

Consultation in progress

Government, Stakeholders, and Public

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Consultation Plan Overview

PHASE 1: Range of Alternatives

Information – Details - Feedback

PHASE 2: Preferred Alternative

Details - Feedback

PHASE 3: Closure & Remediation Plan

Information

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What does a closure and remediation plan need to achieve?

It needs to:

1. Protect human health and safety
2. Protect and, to the extent practicable, restore the environment, including land, air, water, fish and wildlife
3. Return the mine site to an acceptable state of use that reflects pre-mining land use where practicable
4. Maximize local and Yukon socio-economic benefits
5. Manage long-term site risk in a cost-effective manner

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Alternatives for Closure & Reclamation

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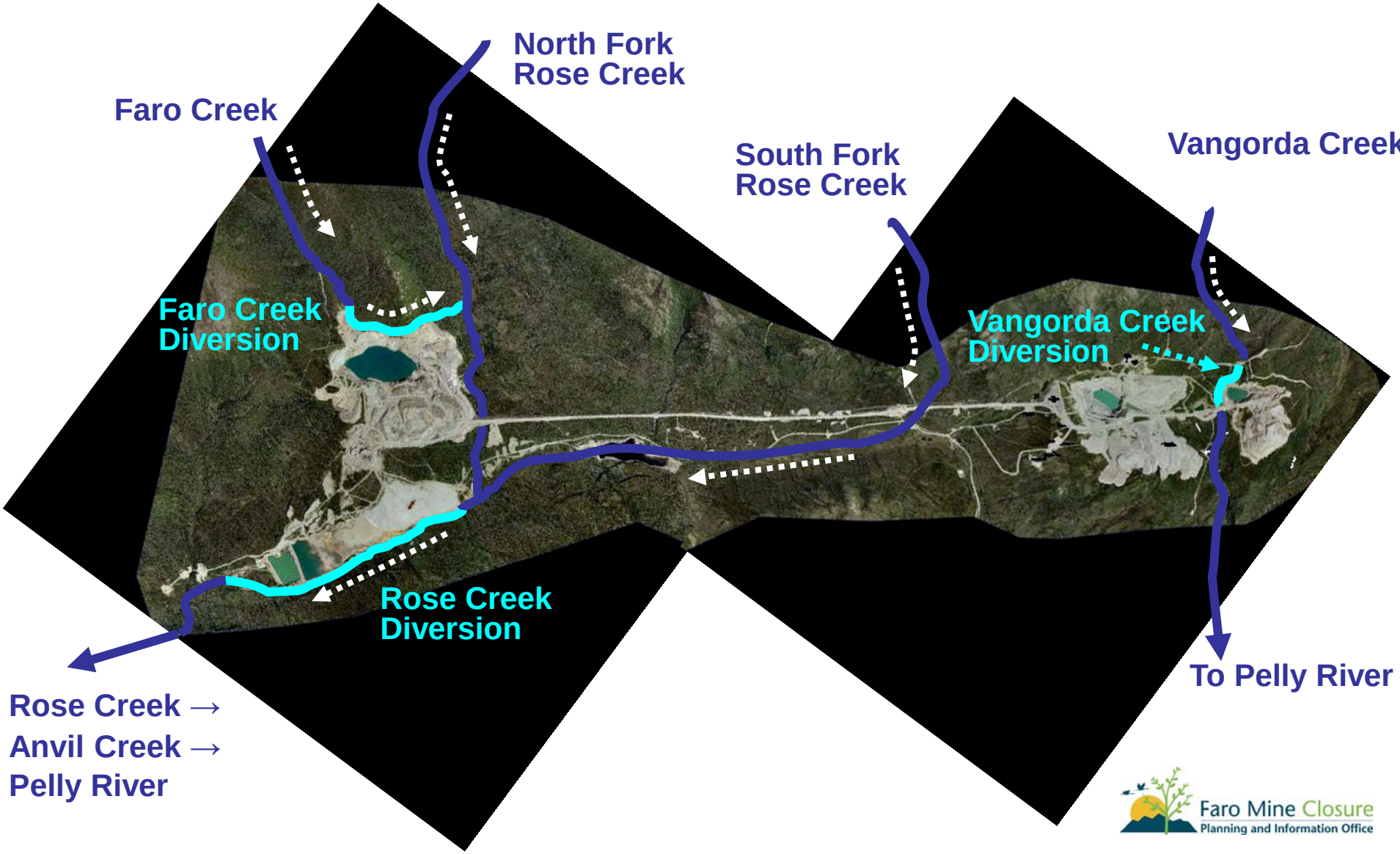
Faro Mine Complex Overview



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Closure Alternatives

- **Alternatives created from technical studies**
  - provide focus for community feedback
- **Show a range of what's possible**.
  - changes, combinations and substitutions are still possible

1. Faro Mine Area

- **Alternatives in each area**
  - **Faro Mine Area**
  - **Vangorda/Grum Area**

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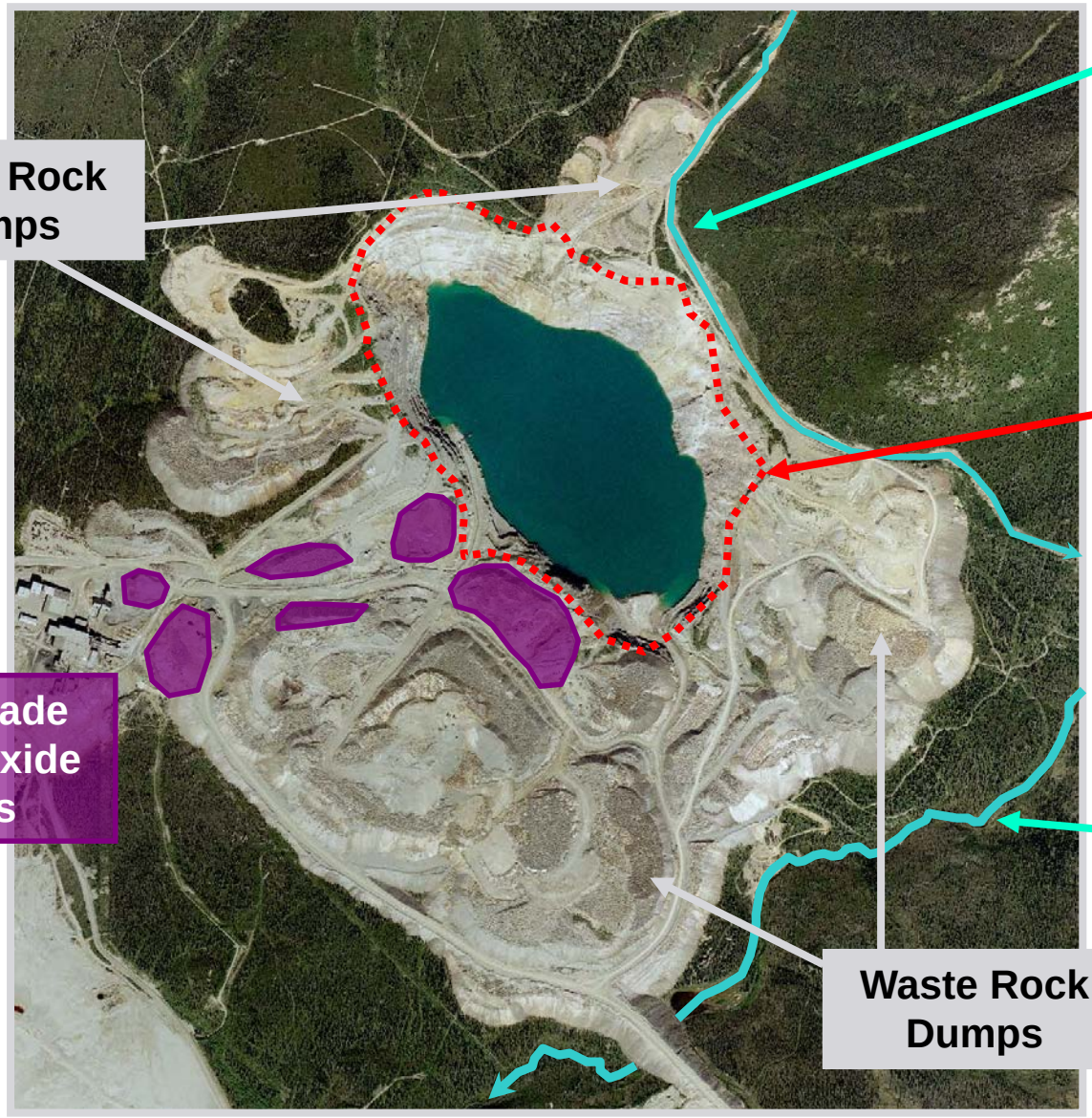
Faro Site Overview

Faro Mine Area

- Main Components
  - A large pit surrounded by waste rock
  - Tailings: Ground up rock – looks like sand

- Issues:
  - Contamination of water
  - Human and animal contact
  - Floods
  - Earthquakes
  - Dust

Faro Mine Area Components



Addressing the Issues Around the Faro Pit

Divert Faro Creek ***around*** Faro Pit

AND

Collect Groundwater

AND

Water Treatment

AND

Cover and/or Move Waste Rock

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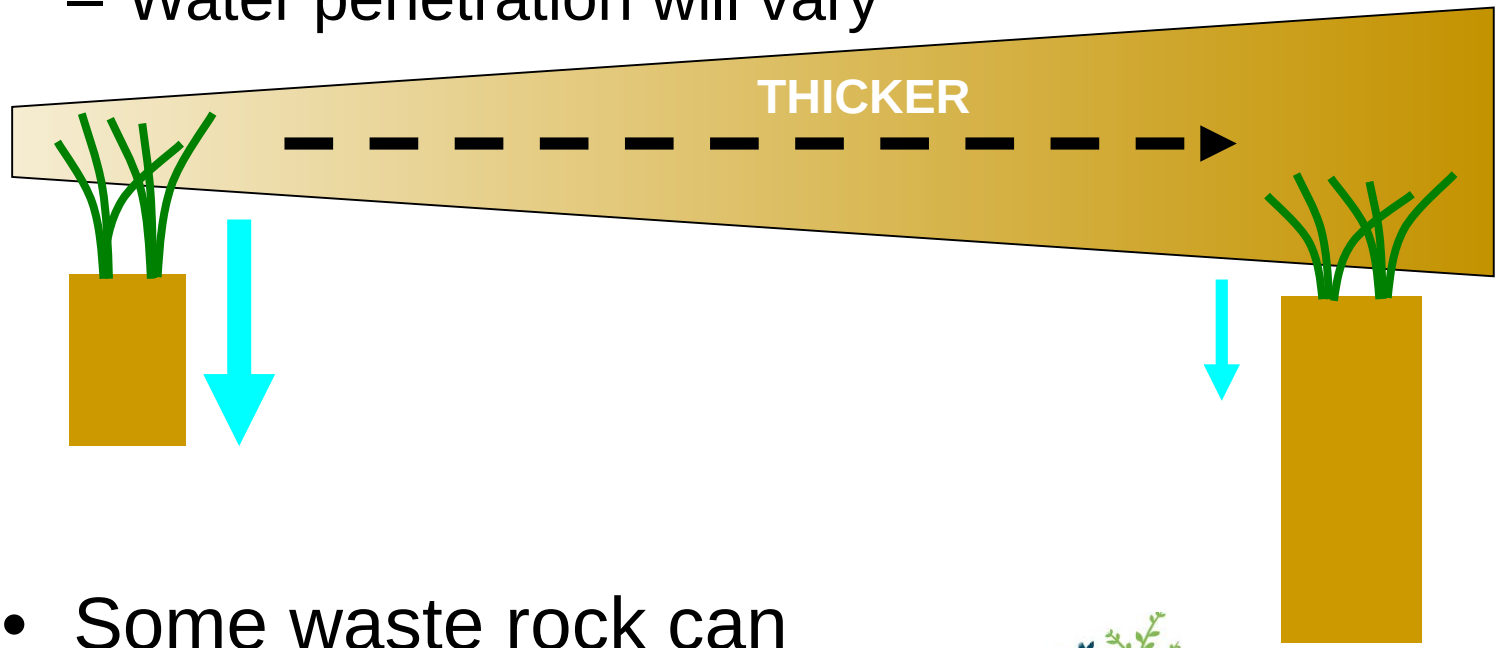
Divert Faro Creek **around** pit

Collect Groundwater and Treat Contaminated Water

Cover and/or move waste rock

- Different types of waste rock covers can be used.
  - All covers will prevent human/animal contact and allow re-vegetation
  - Water penetration will vary



- Some waste rock can be moved

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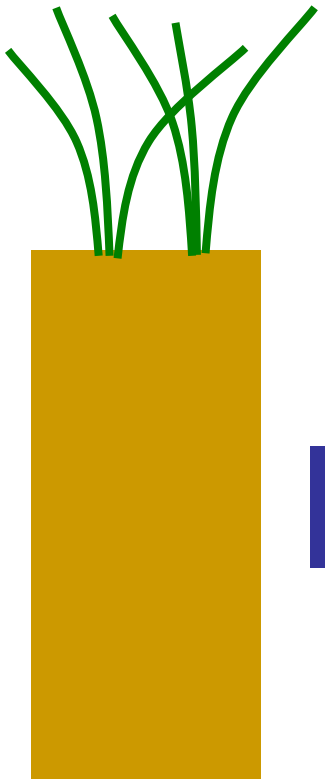
Waste Rock Covers

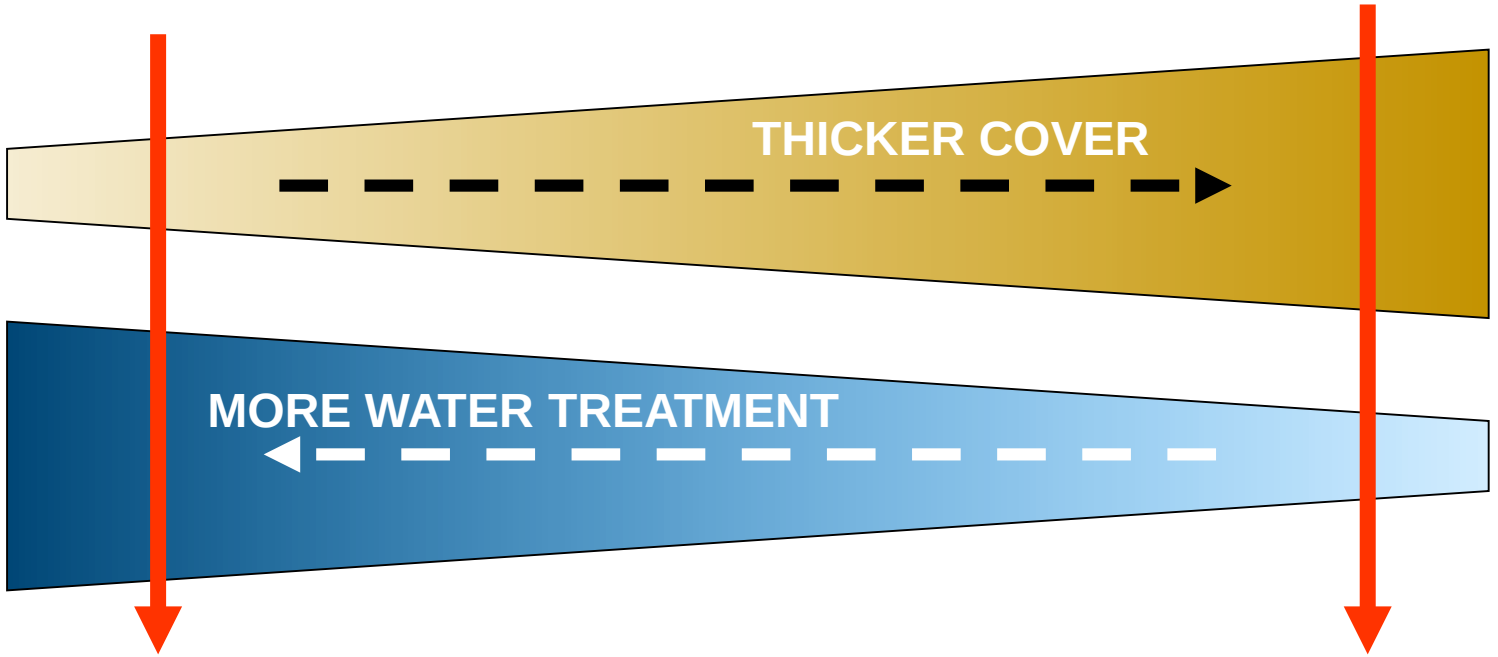
Reslope waste rock and cover with till



Re-vegetate

0.5m to 2.5m of till

What difference does a cover make?



Thin Cover = More Water Treatment

Thick Cover = Less Water Treatment

Cover thicknesses will vary depending on the nature of waste rock

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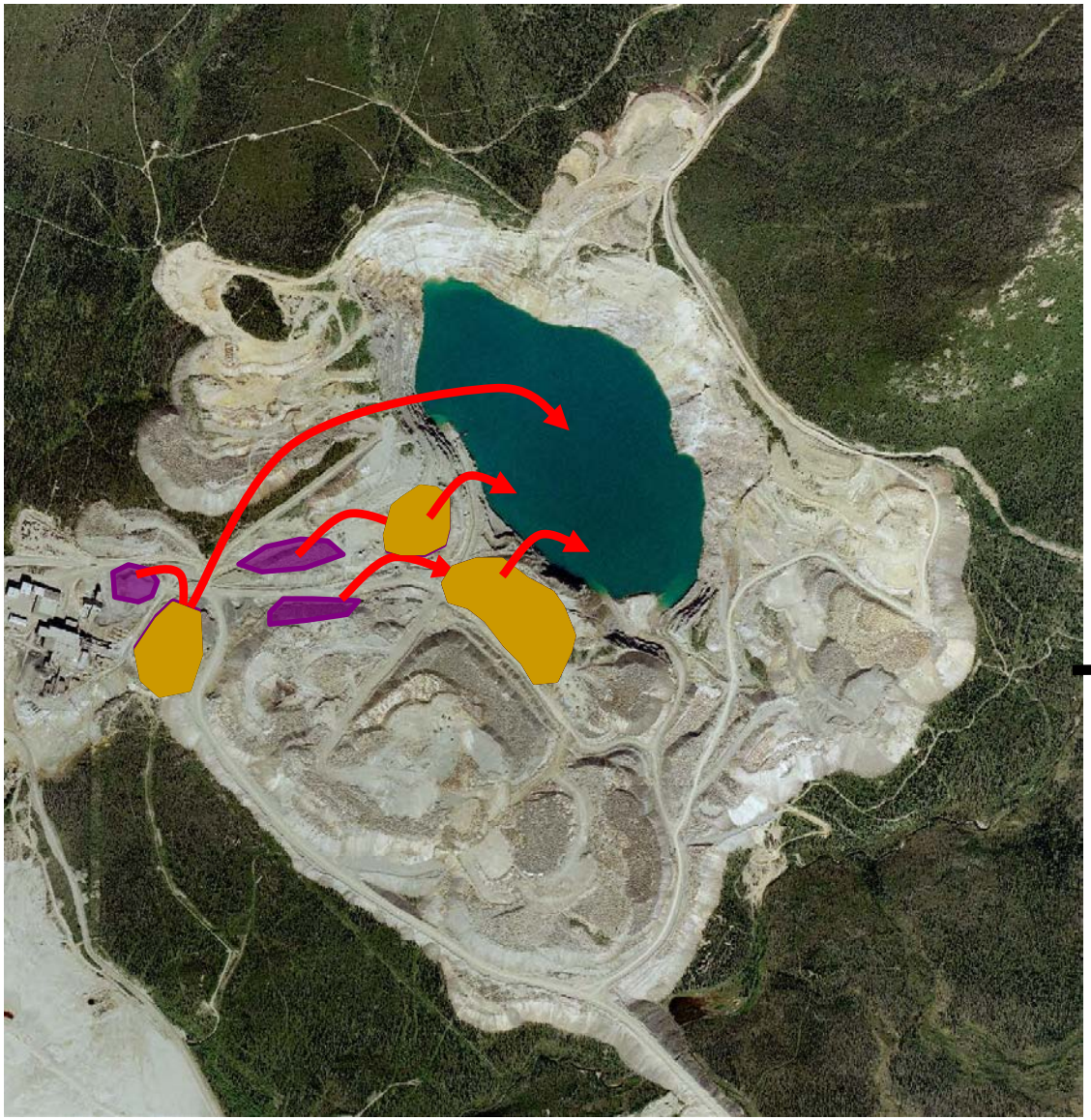
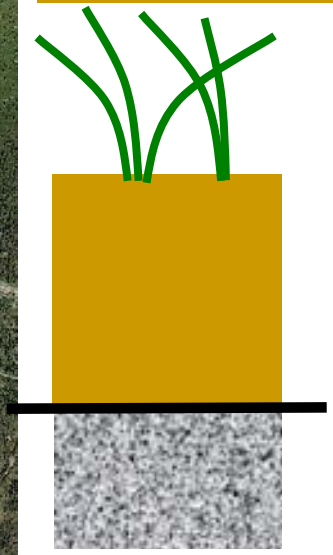
Low Grade Ore & Oxide Fines



Move oxide fines into larger piles

Cover larger piles with plastic and till



Re-vegetate

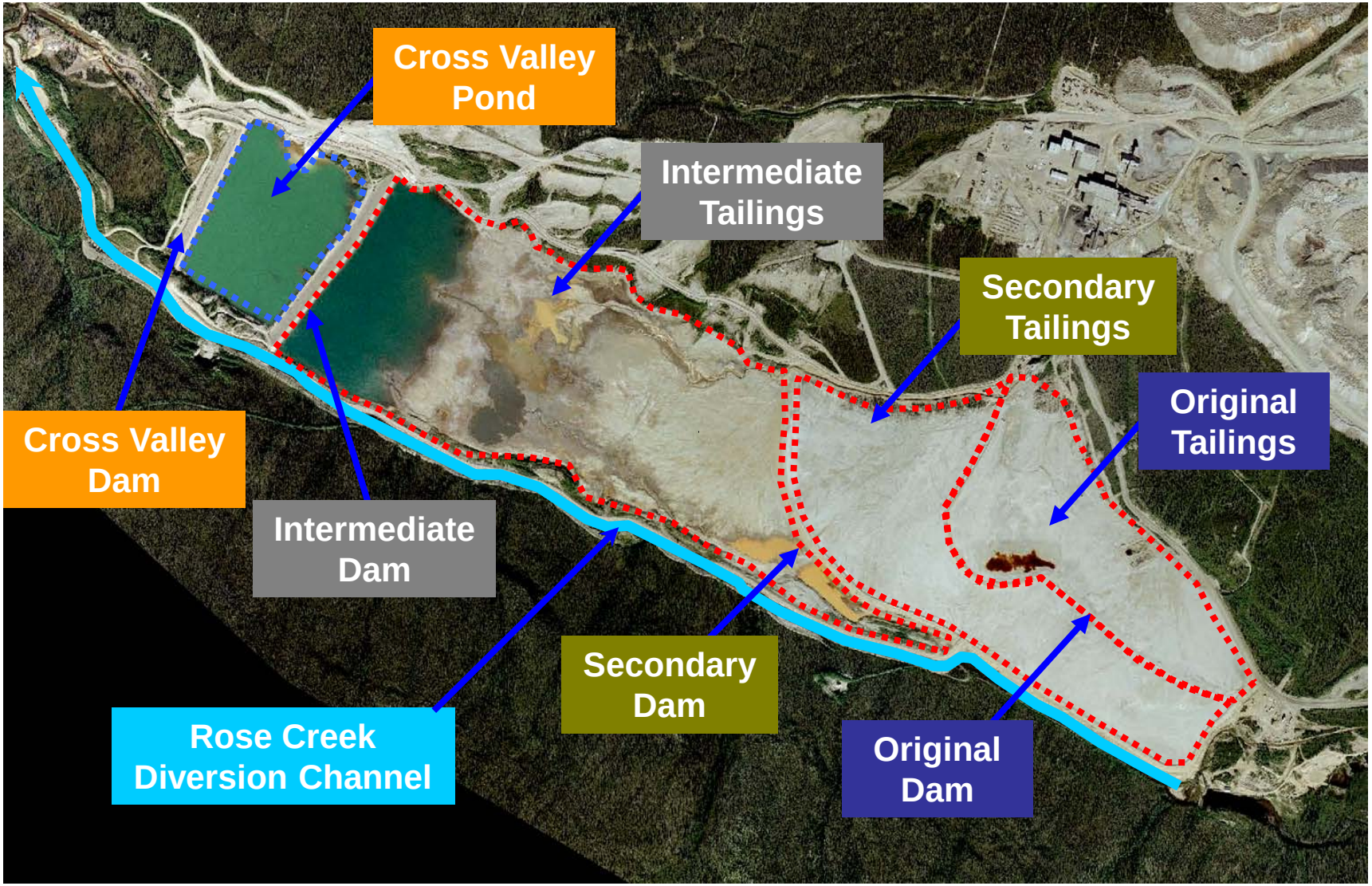
1.0 m Till Soil

Plastic

Oxide fines

Or – mix with lime and move to pit

Tailings Area Components



Tailings Area Groundwater

Addressing the Tailings Issues

1. Move the Tailings
2. Cover the Tailings with Soil
3. Move Some Tailings and Cover Some with Soil.
4. Cover the Tailings with Water

1. Move the Tailings

- Move tailings to Faro Pit
- Clean up the valley and the water in the valley

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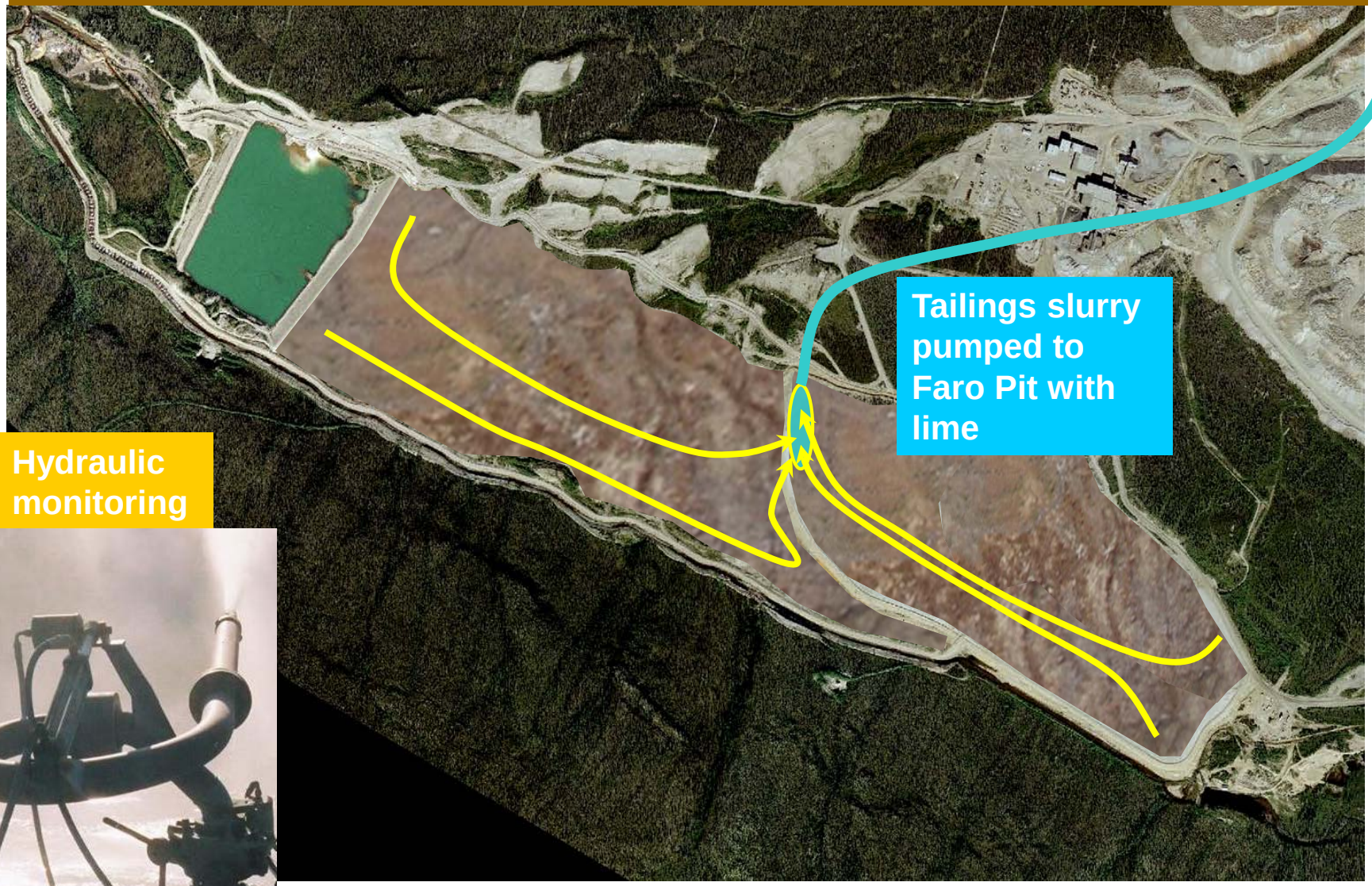
Move Tailings to Faro Pit



Hydraulic monitoring

Clean Up the Valley

1. Use trucks and excavators to clean up contaminated material left behind

2. Collect and treat water until valley is clean (10 to 20 years)

3. Cut through dams and the diversion and return Rose Creek to the valley

2. Cover Tailings with Soil

- Make sure dams and diversions can handle floods and earthquakes
- Collect and treat water
- Prevent dust and human/animal contact with tailings by covering and re-vegetating tailings surface.

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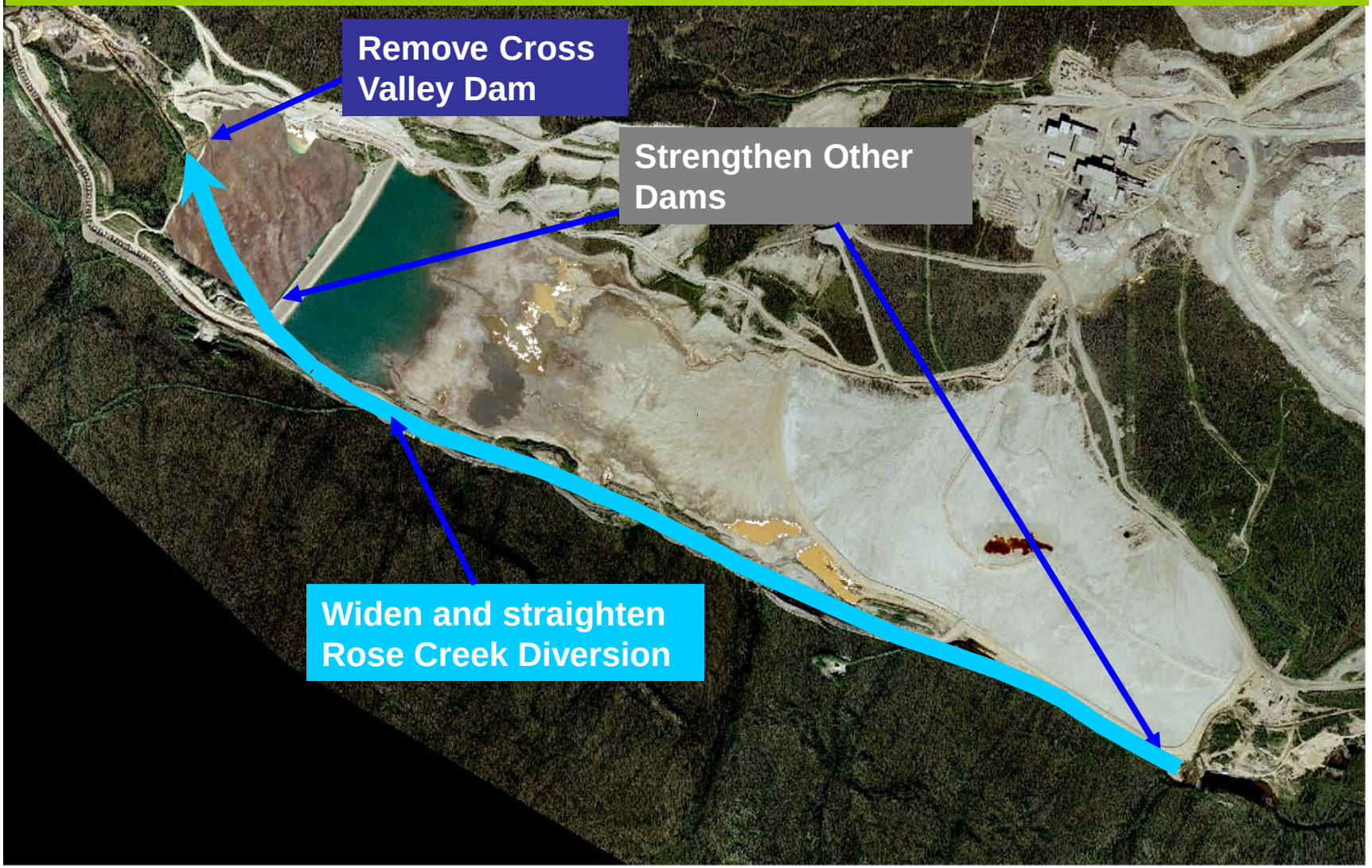
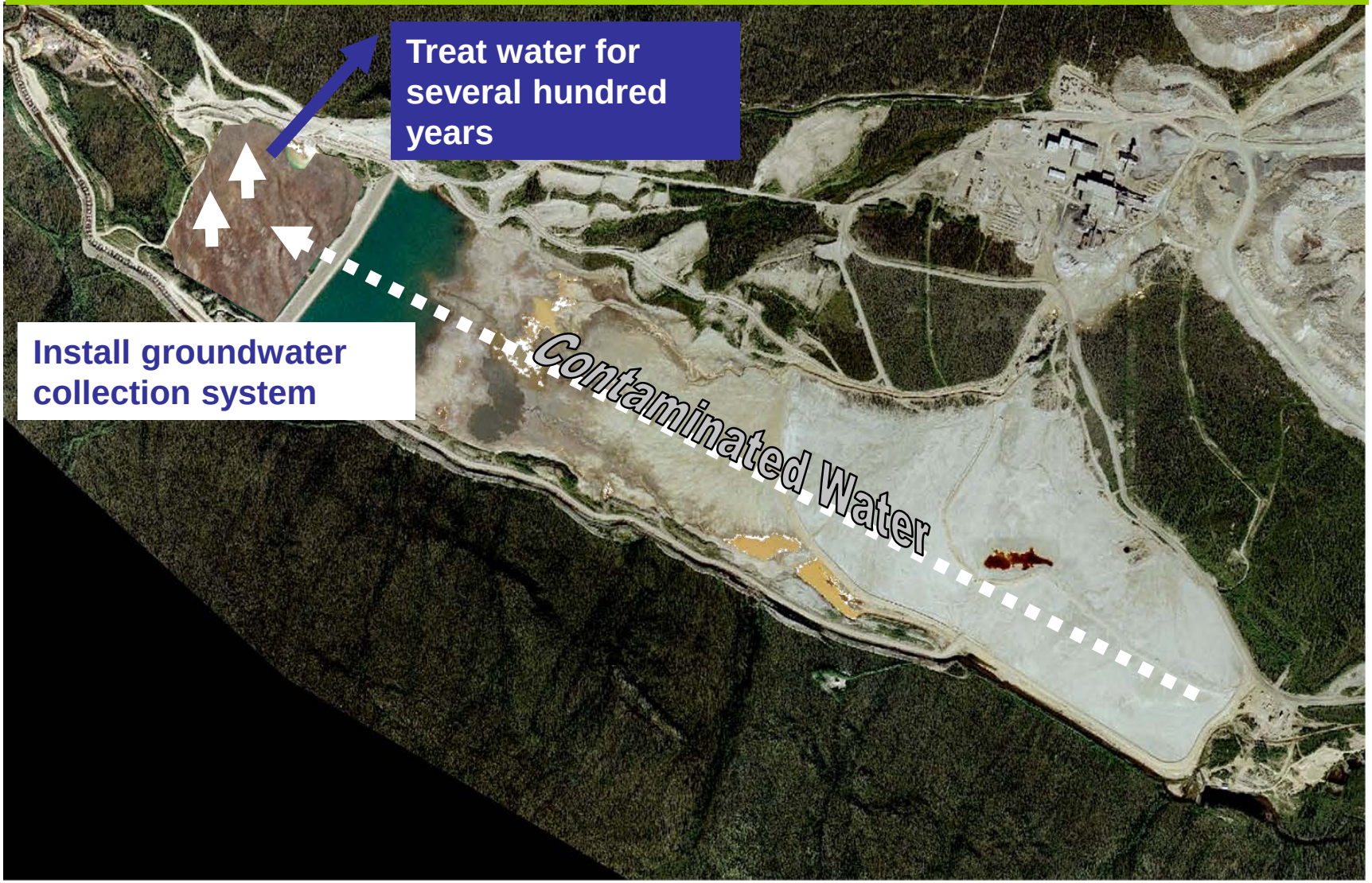
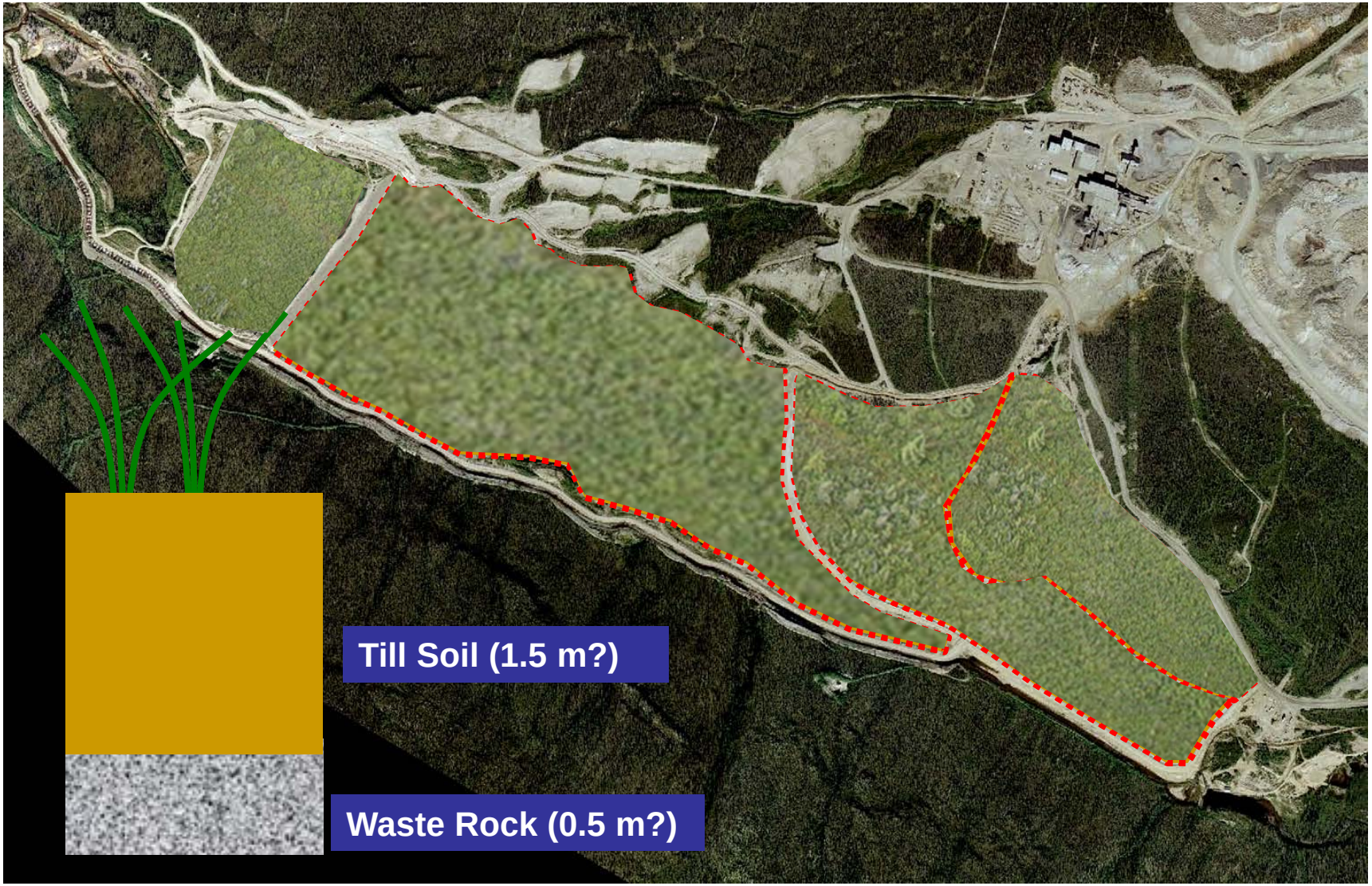
Floods and Earthquakes



Collect and Treat Water



Cover and Re-vegetate Tailings



3. Move Some Tailings Cover Some With Soil

- **Why?**
  - Avoids most costly part of Rose Creek Diversion upgrade
  - Provides additional space in the valley
- **How?**
  - Using same methods as for other alternatives – hydraulic monitoring, covers, dam and diversion upgrading, ongoing water collection and treatment.

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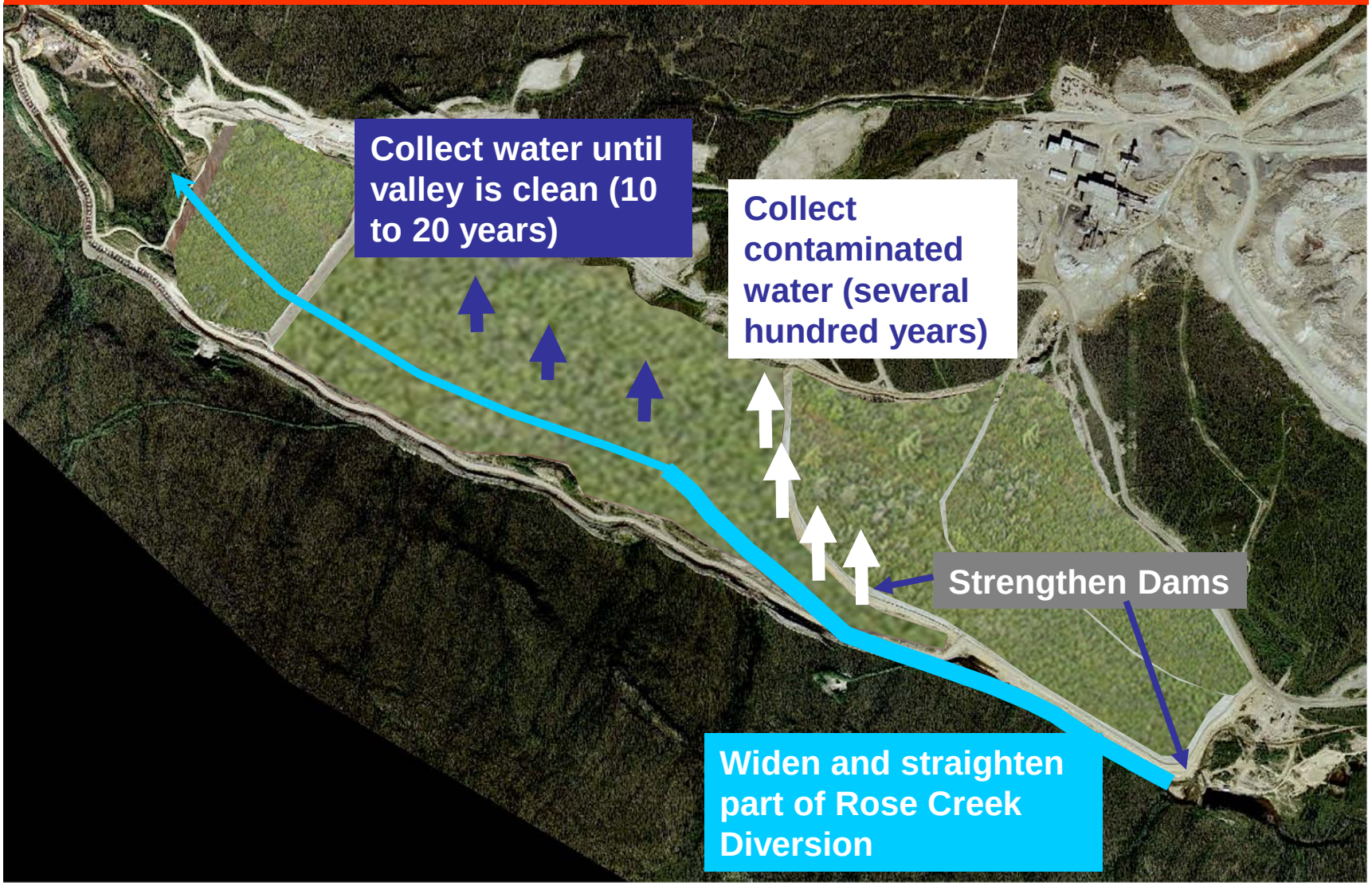
Move Some Tailings Cover Some With Soil



4. Cover Tailings with Water

- Move some tailings so the surface is more level.
- Raise the Intermediate Dam so that it all tailings can be under water.
- Provide groundwater containment.
- Collect and treat water.

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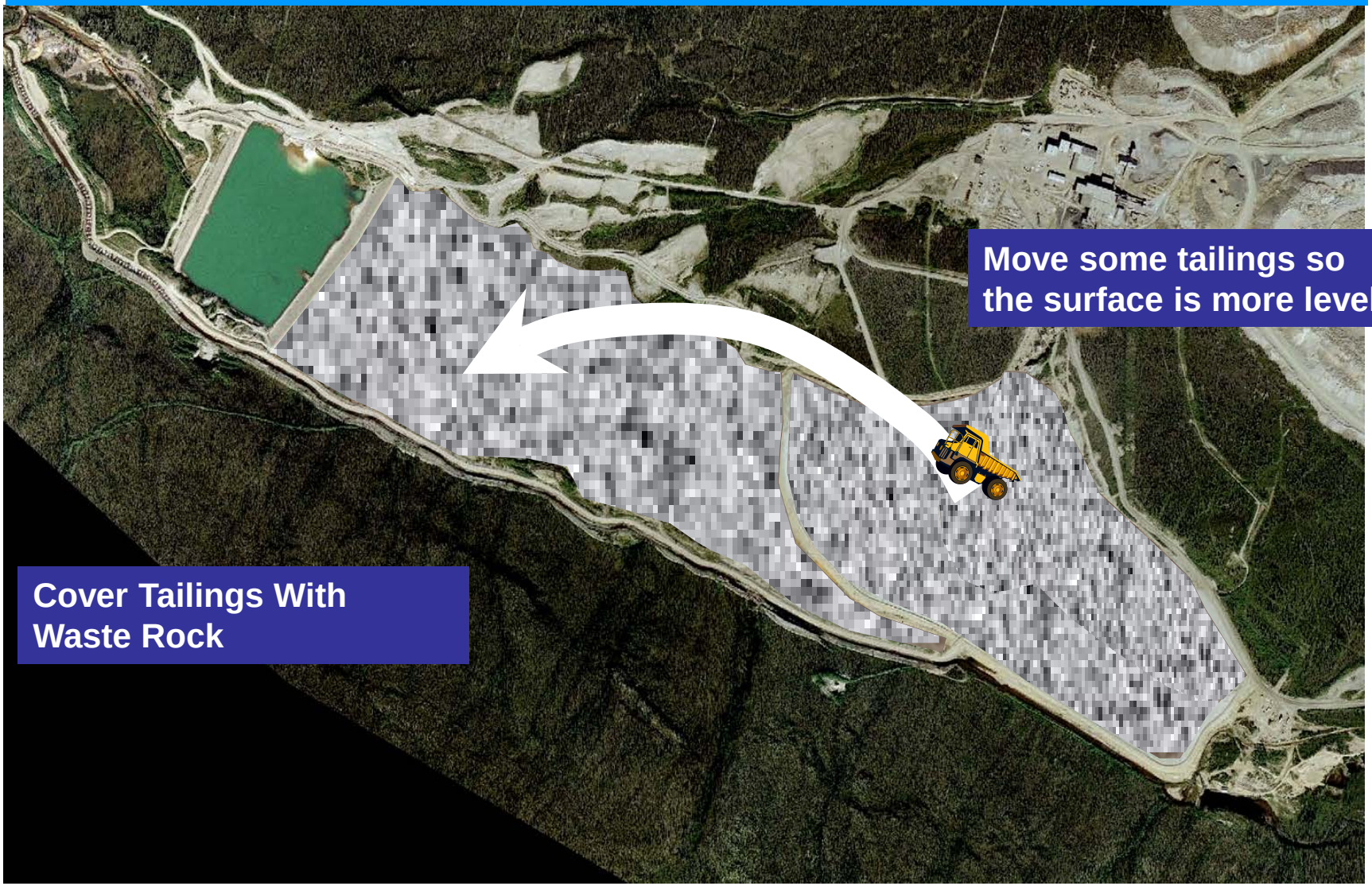
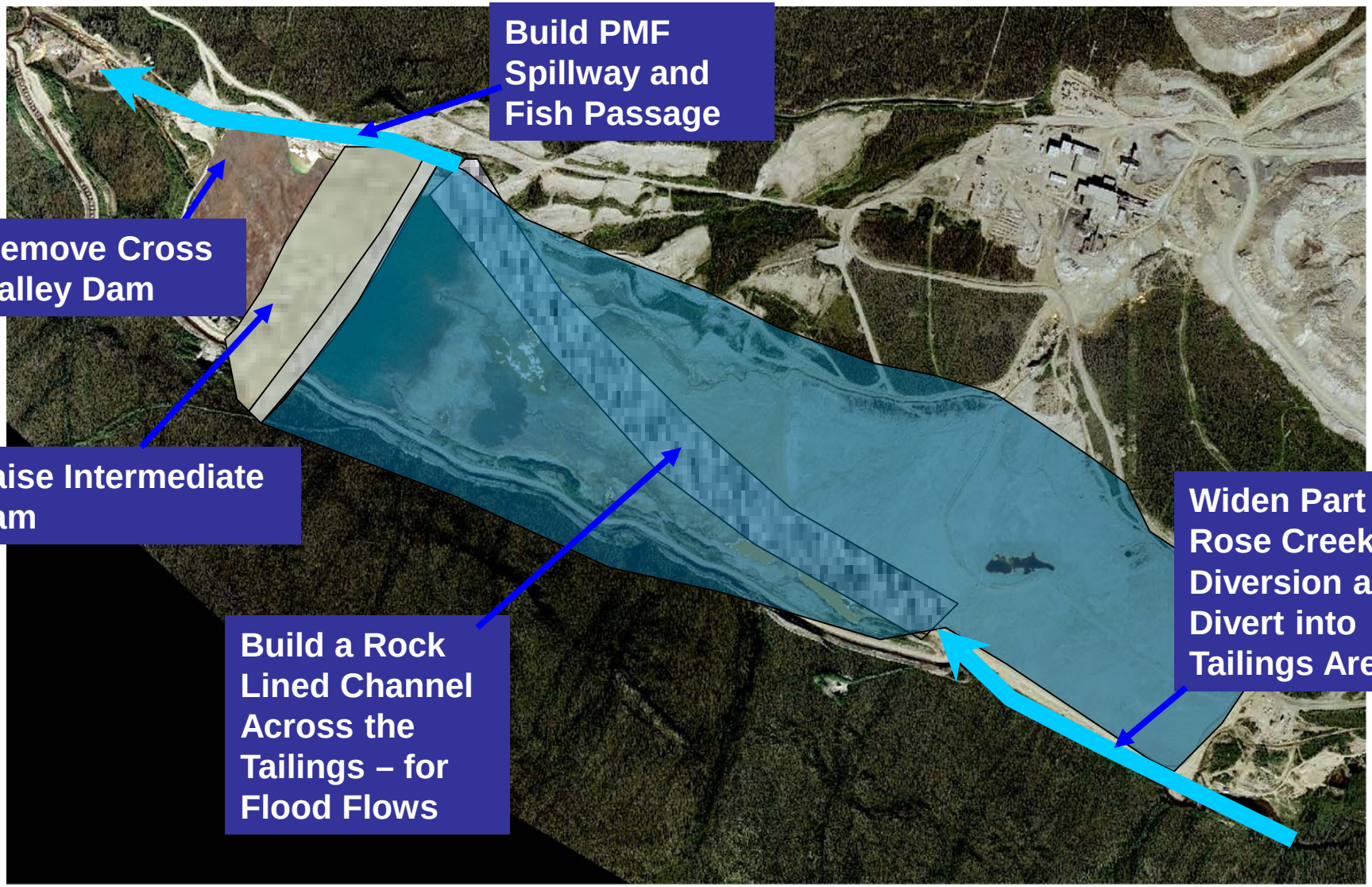
Move Some Tailings



Raise the Intermediate Dam



Contain Contaminated Groundwater

Closure Alternatives

- **Vangorda/Grum Mine Area**

- **Alternatives in each area**
  - **Faro Mine Area**
  - **Vangorda/Grum Area**

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Vangorda/Grum Mine Area

- Two large pits surrounded by waste rock

- Issues:
  - Contamination of water
  - Human & animal contact
  - Floods
  - Earthquakes

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Vangorda/Grum Site Overview

Addressing the Vangorda/Grum Mine Area Issues

1. ***Move*** Vangorda Waste into Vangorda Pit

AND

Reroute Vangorda Creek Over Top of the Pit

OR

2. ***Leave*** Vangorda Waste in Place

AND

Build a New Vangorda Creek Diversion

Both Options Include Different Amounts of

Covering Waste Rock

Collection and Treatment of Groundwater

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1. Move Vangorda Waste into Vangorda Pit

- Put Vangorda waste rock into pit
- Divert Vangorda Creek over filled pit
- Cover the Grum waste rock
- Collect and treat contaminated water

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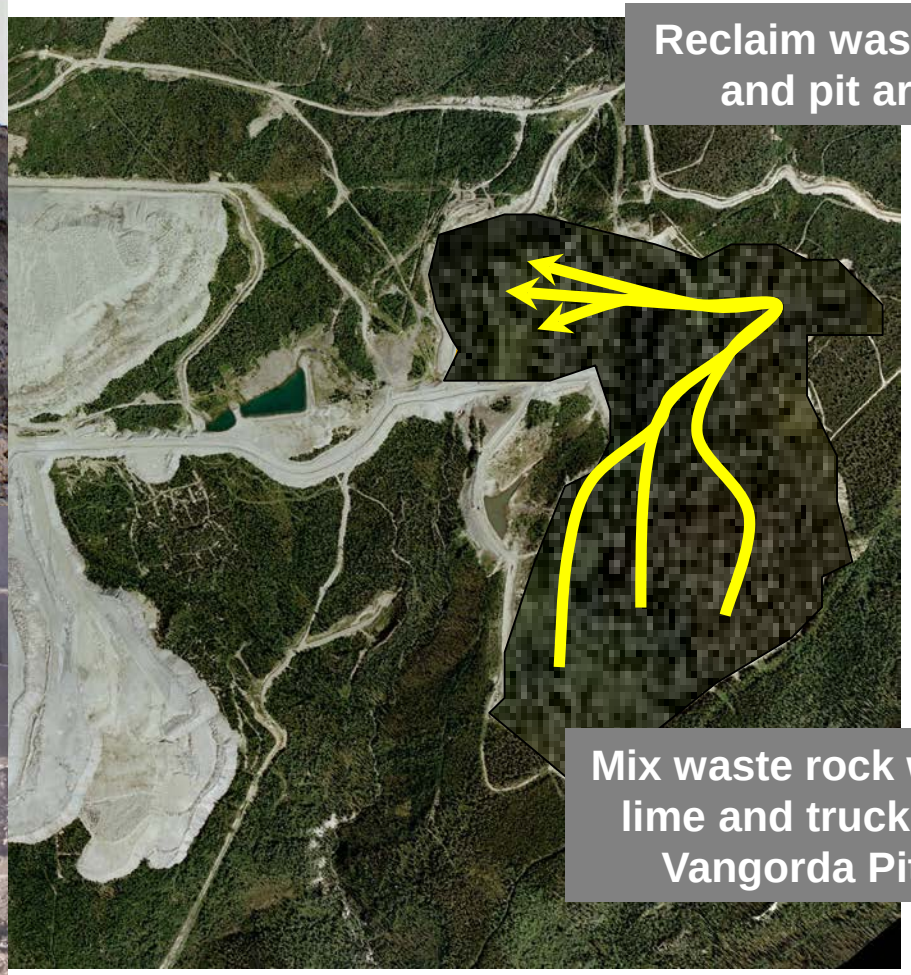
Put Vangorda waste rock into pit



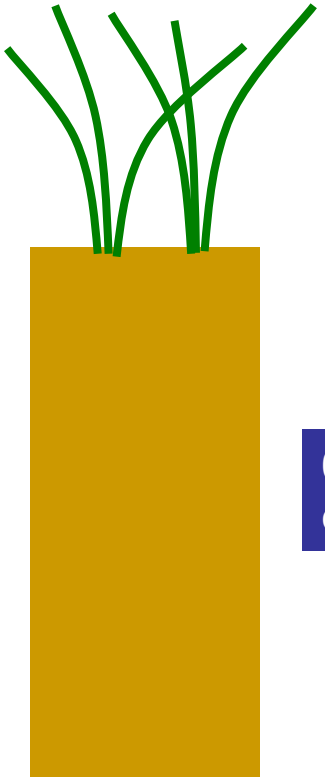
Reclaim waste rock and pit areas

Mix waste rock with lime and truck to Vangorda Pit

Divert Vangorda Creek over filled pit

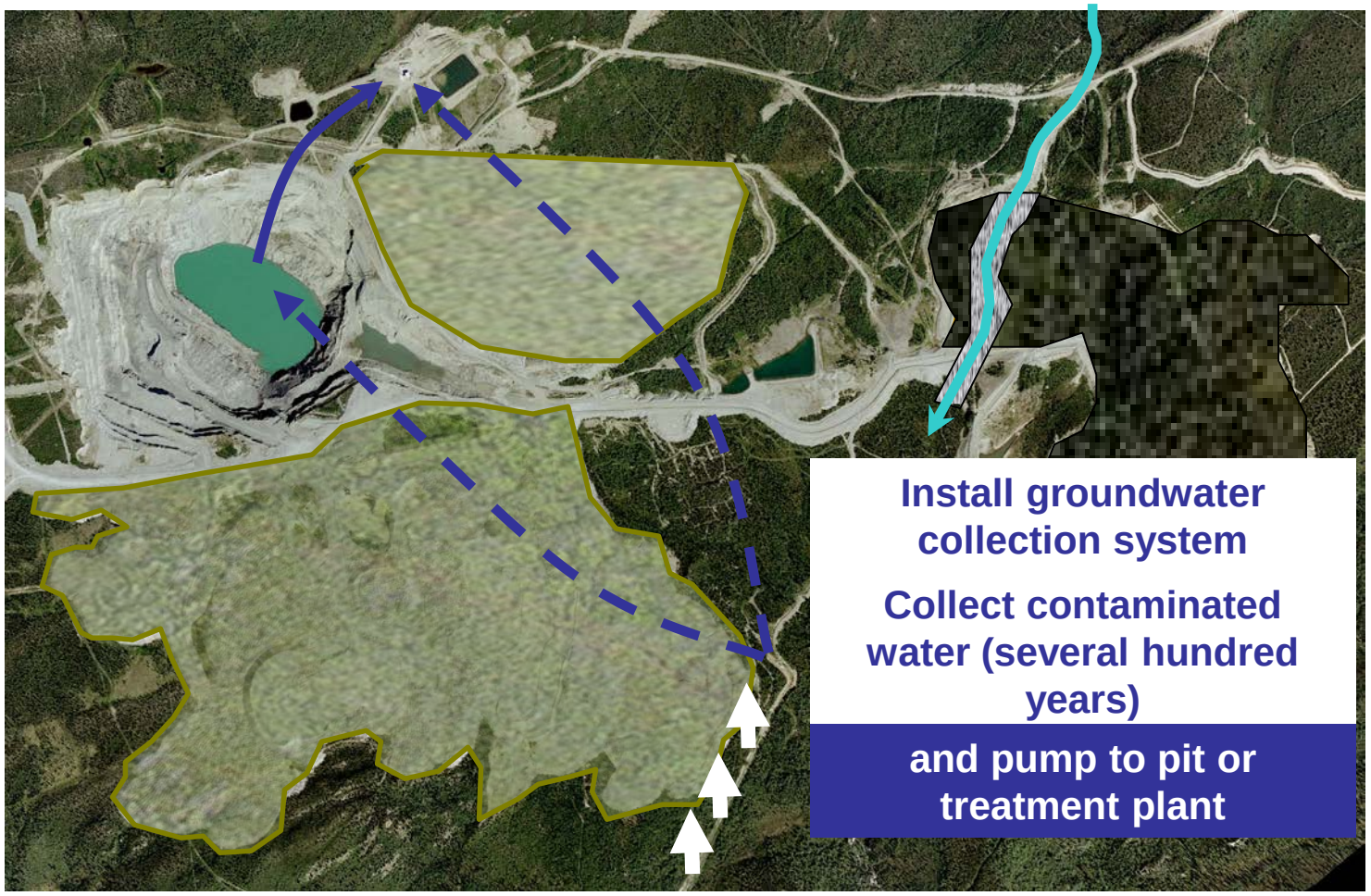
Cover Grum Waste Rock

Reslope waste rock and cover with till



0.5m to 2.5m of till

Collect and Treat Water



2. Leave Vangorda Waste in Place

- Divert Vangorda Creek around pit
- Cover Vangorda **and** Grum waste rock
- Collect and treat contaminated water

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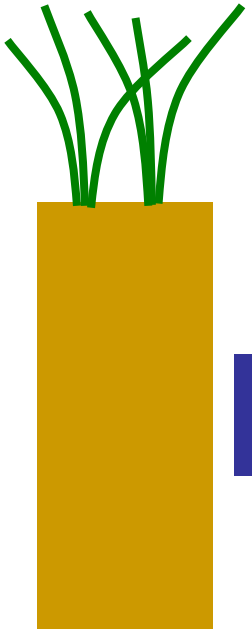
Divert Vangorda Creek Around Pit

Build a new diversion for Vangorda Creek

Cover Vangorda and Grum Waste Rock

Reslope waste rock and cover with till



0.5m to 2m of till

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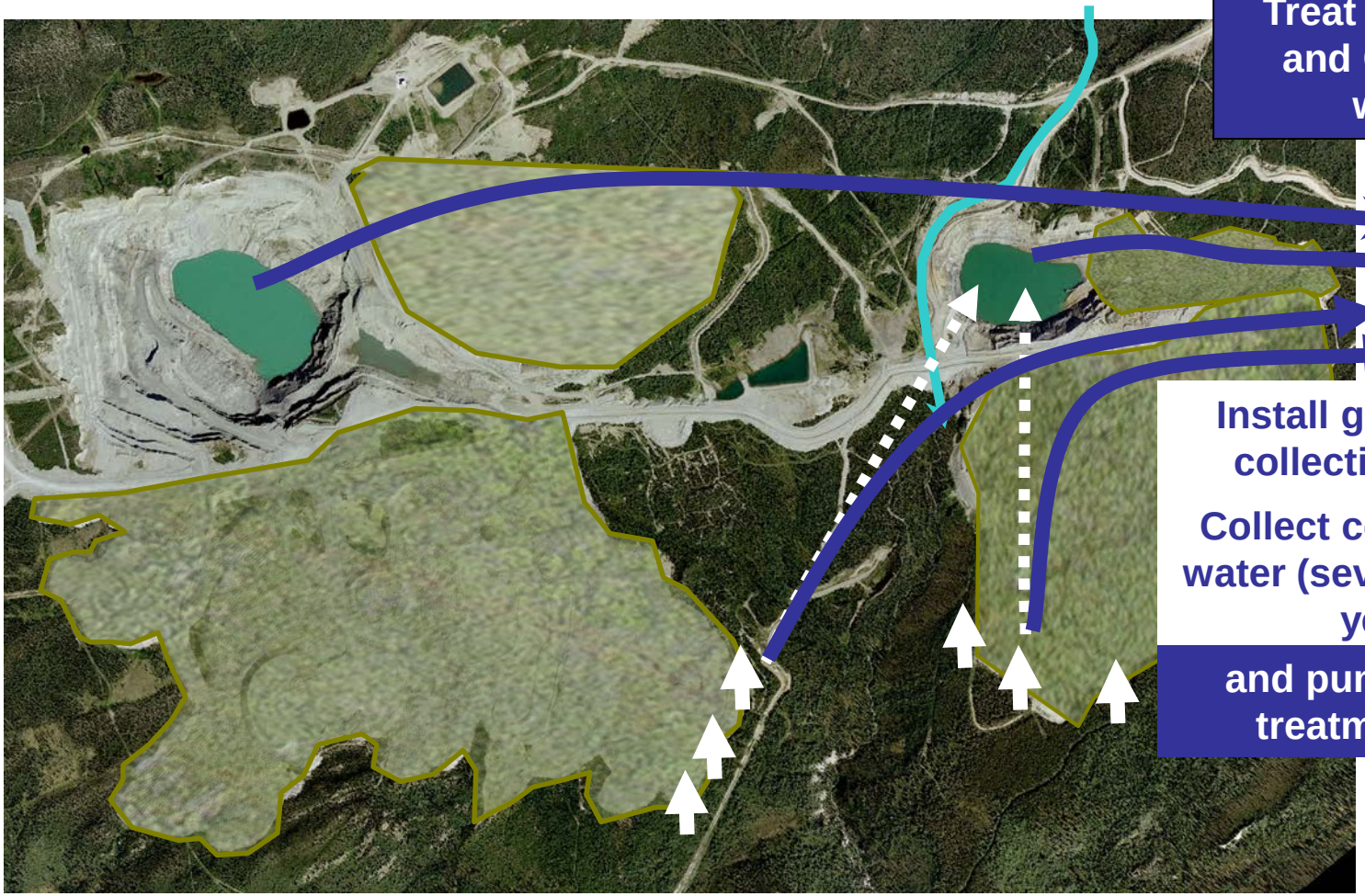
Collect and Treat Water



Treat Vangorda and Grum pit water

Install groundwater collection system

Collect contaminated water (several hundred years)

and pump to pit or treatment plant

General Conclusions for All Options

Uncertainties

Future Geochemistry

"what will happen to the rock over time"

and

- **Groundwater Collection Efficiency *(load release)***
- **Cover Effectiveness *(infiltration)***
- **Movement of contamination through ground *(timing)***

Assumptions

All alternatives include:

- **Soil covers on waste rock and/or tailings**
- **Long-term collection & treatment of contaminated water**
- **Long-term, ongoing site activities, monitoring and maintenance**

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Next Steps

- Further information about the alternatives:
  - Costs, Risks, Environmental Performance, Socio-economic Benefits.
- Process for soliciting feedback about alternatives.
- Evaluation process re: alternatives.

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END