GOLDER

Baker Creek Remediation

GIANT MINE REMEDIATION PROJECT

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Baker Creek Remediation at Giant Mine

OUTLINE

- Regional and local setting
- Historical mining activities
- Closure considerations
- Environmental mitigation and design features
- Future closure activities

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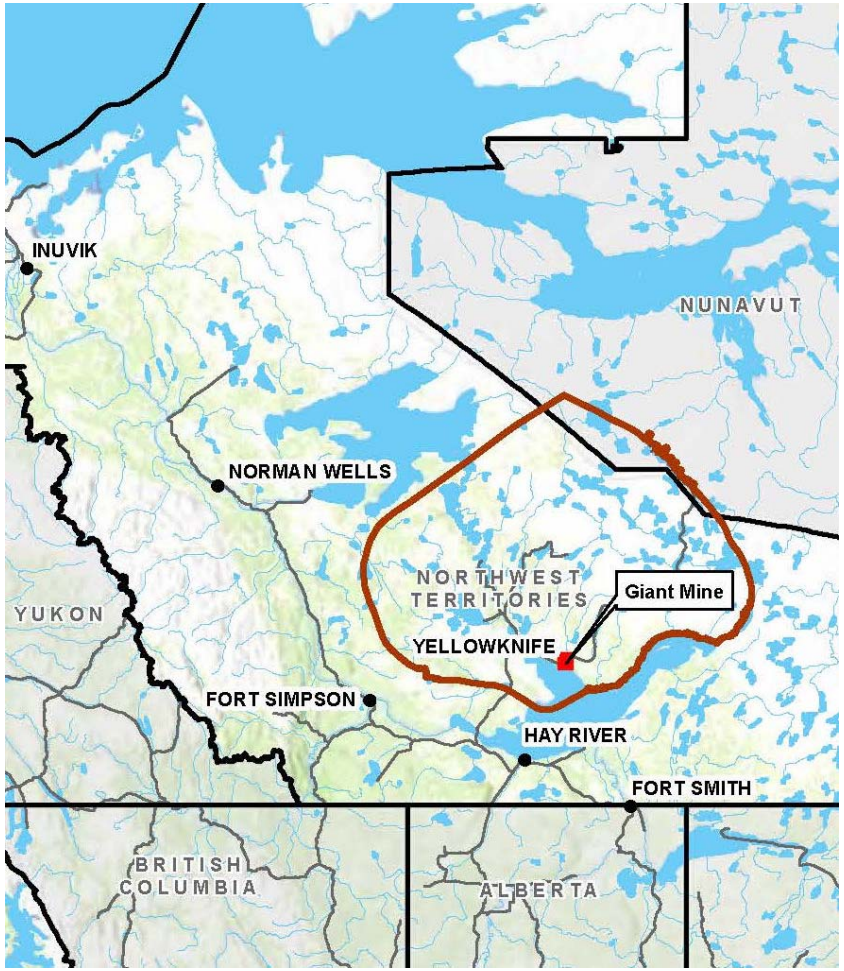
REGIONAL SETTING



- Giant Mine is located at Yellowknife, NT
- Its lease area borders Great Slave Lake
- Baker Creek, a Great Slave Lake tributary, runs through the mine site

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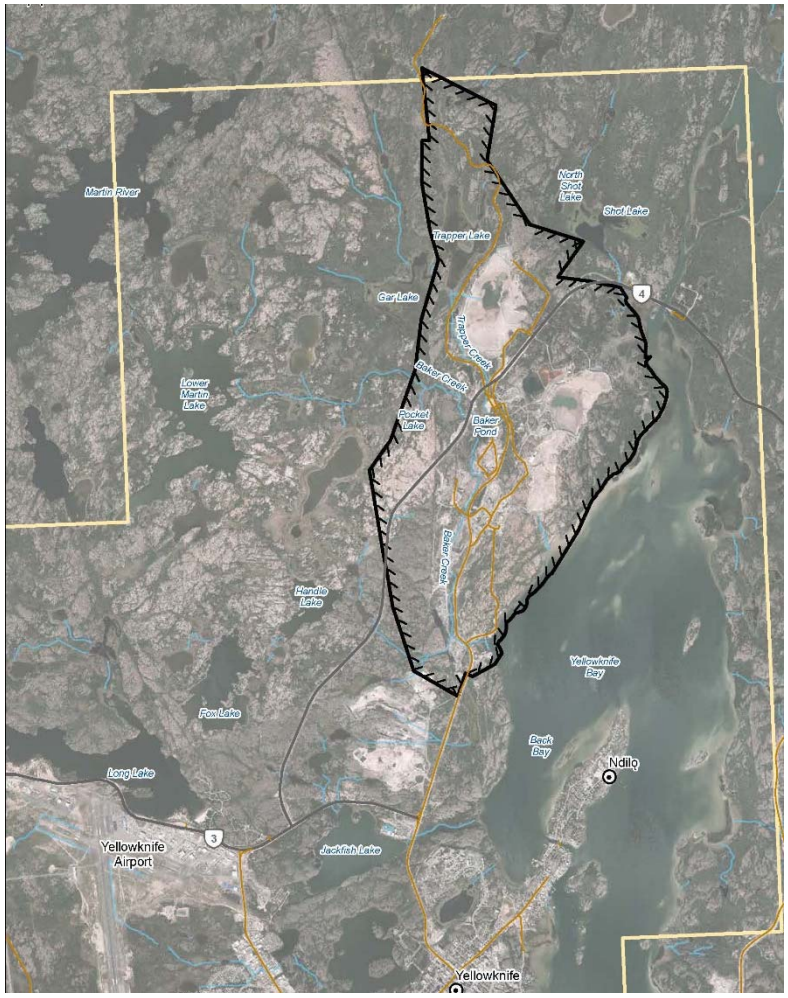
LOCAL SETTING

- The Giant Mine lease area (black outline) is located almost entirely within the City of Yellowknife (yellow outline)
- The mine is also located in close proximity to Yellowknives Dene First Nation communities of Ndilo and Dettah



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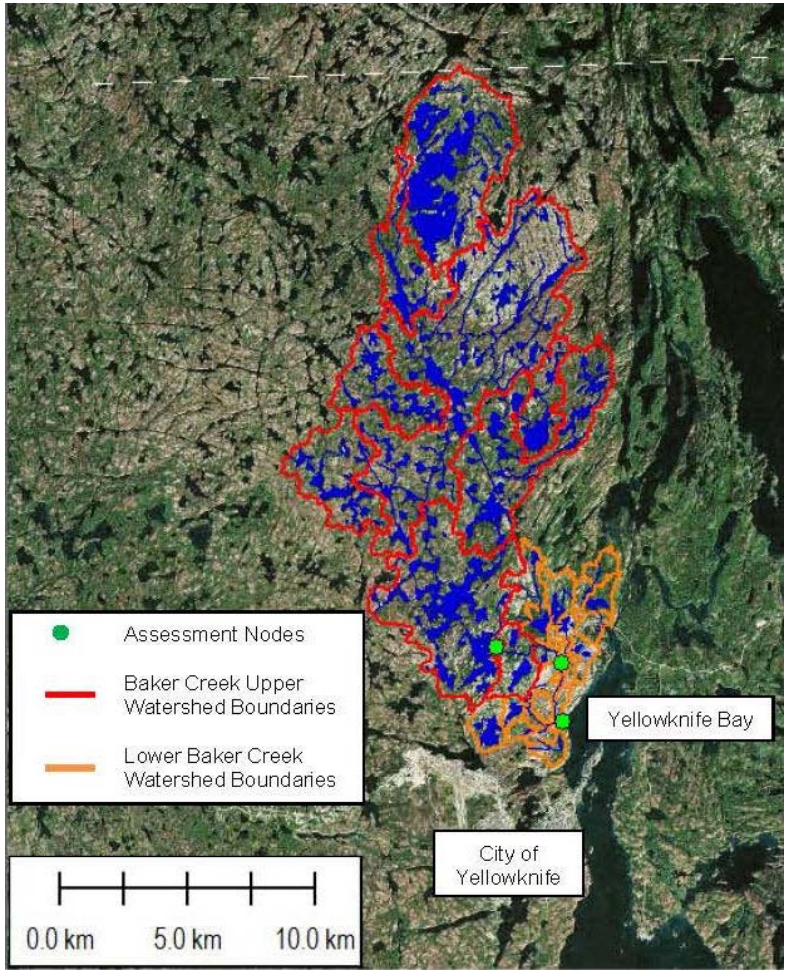
BAKER CREEK WATERSHED



- The Baker Creek watershed originates north of the mine and has a drainage area of about 176 km^2 at the mouth
- During dry periods, most of the upper watershed may cease to contribute flow

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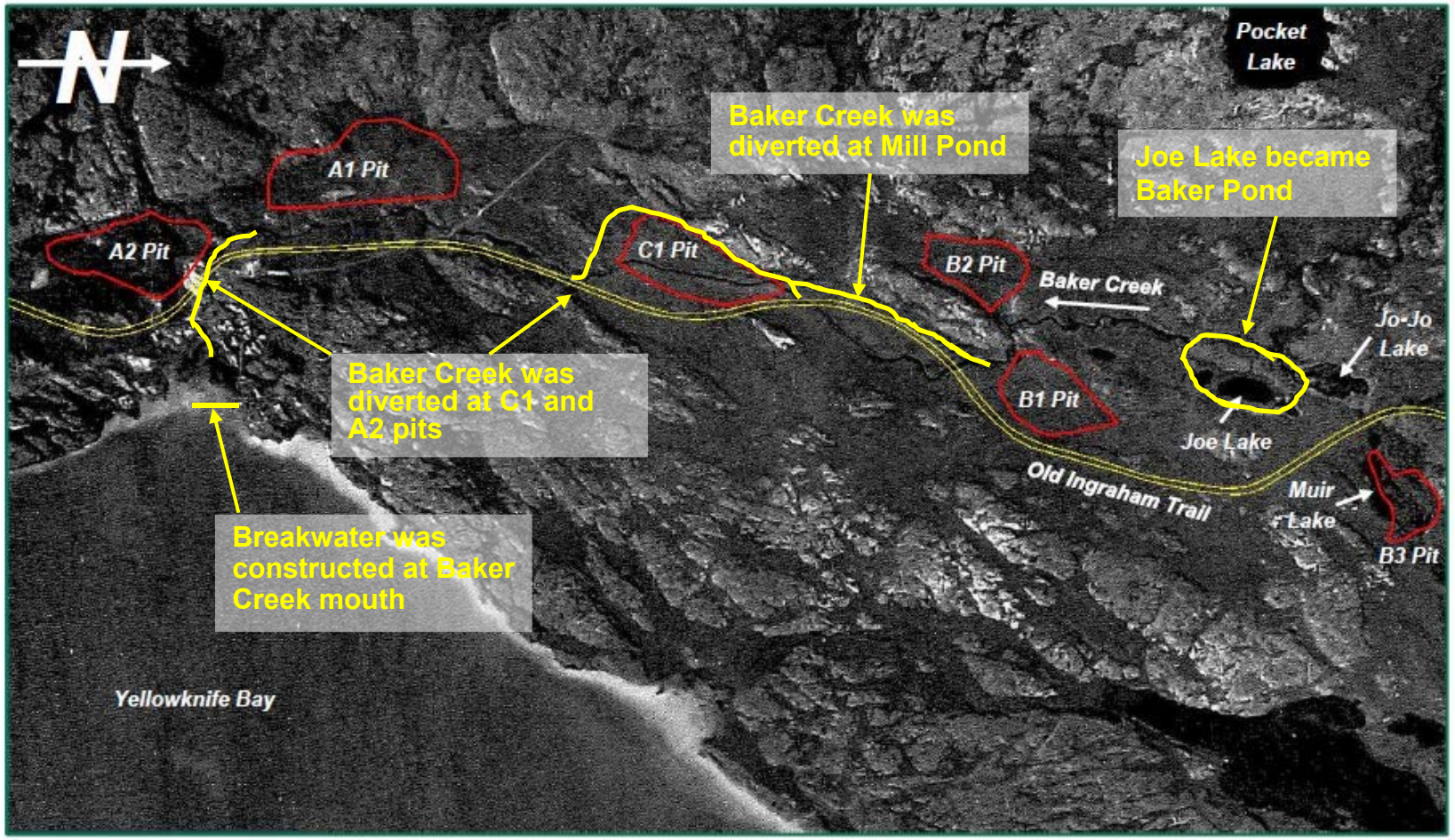
HISTORICAL CHANGES TO BAKER CREEK



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CLOSURE CONSIDERATIONS

- Flood risk to underground mine and closure infrastructure
- Mobilization of tailings and contaminated sediments
- Baker Creek water quality
- Fish habitat at closure

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BAKER CREEK FLOOD RISK

- Mine pits adjacent to Baker Creek represent a potential flow path to the underground mine
- Channelization of the creek has reduced flow capacity and increased risk of blockage due to ice and debris

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BAKER CREEK FLOOD RISK

- Underground chambers at Giant Mine contain 237,000 tonnes of arsenic trioxide which will be contained by a freeze program
- The underground mine pool also contains arsenic and requires water treatment prior to release

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BAKER CREEK TAILINGS AND SEDIMENTS

- Fine sediments in Baker Creek and Baker Pond include contaminated sediments and some tailings
- Distributions of these sediments are irregular but they contribute to ecological and water quality effects

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BAKER CREEK WATER QUALITY

- Water quality at the mine is affected by upstream and local runoff, due to historical aerial deposition of contaminants
- Baker Creek arsenic concentrations almost double from 40 to 70 µg/L through the mine site, on average

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BAKER CREEK FISH HABITAT

- Baker Creek currently provides spawning and rearing habitat for spring spawners (e.g., Arctic grayling)
- Fish passage is naturally blocked by a waterfall above Baker Pond

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ENGAGEMENT TO INFORM PLANNING AND DESIGN

- Developer's Assessment Report (EA) was completed in 2010
- Primary engagement for Baker Creek was through Surface Design Engagement (2015-16)
- Engagement continues on fish and fish habitat
- Water licence application to be submitted in 2019

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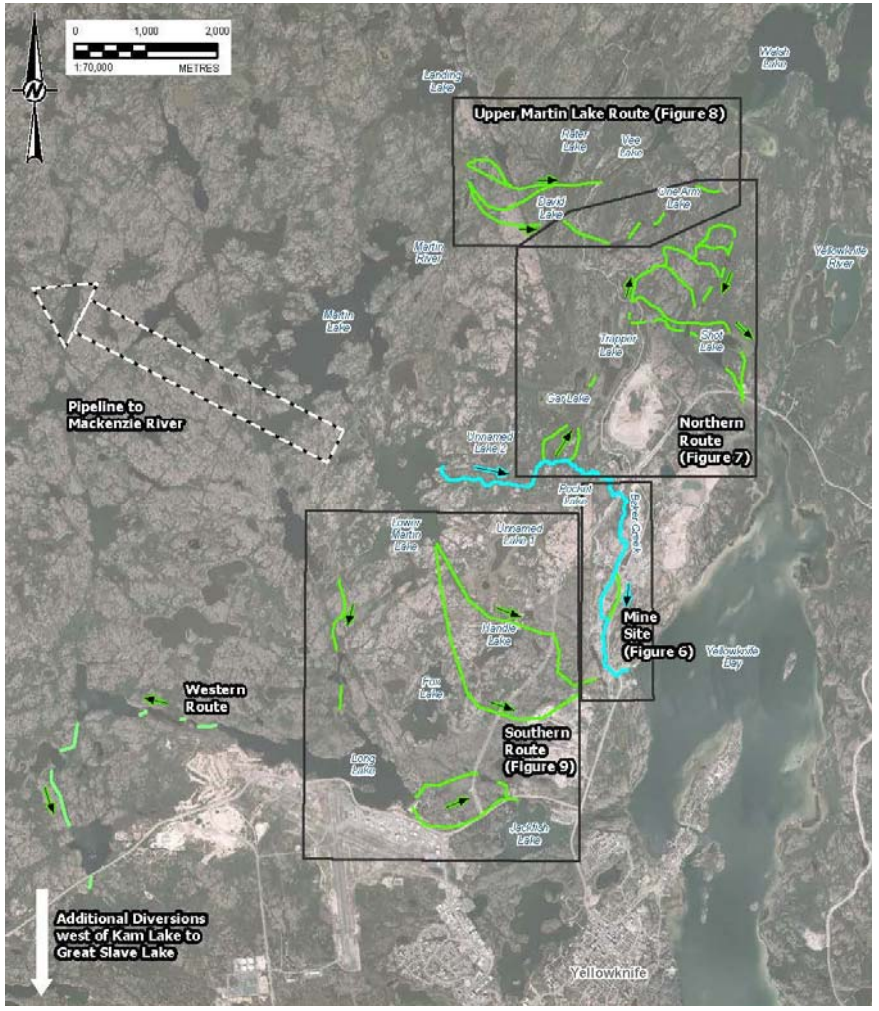
ENVIRONMENTAL MITIGATION AND DESIGN FEATURES

Creek Alignment:

- Over 20 potential creek alignments including off-site alternatives were evaluated
- Surface Design Engagement feedback strongly indicated a preference for an on-site alternative



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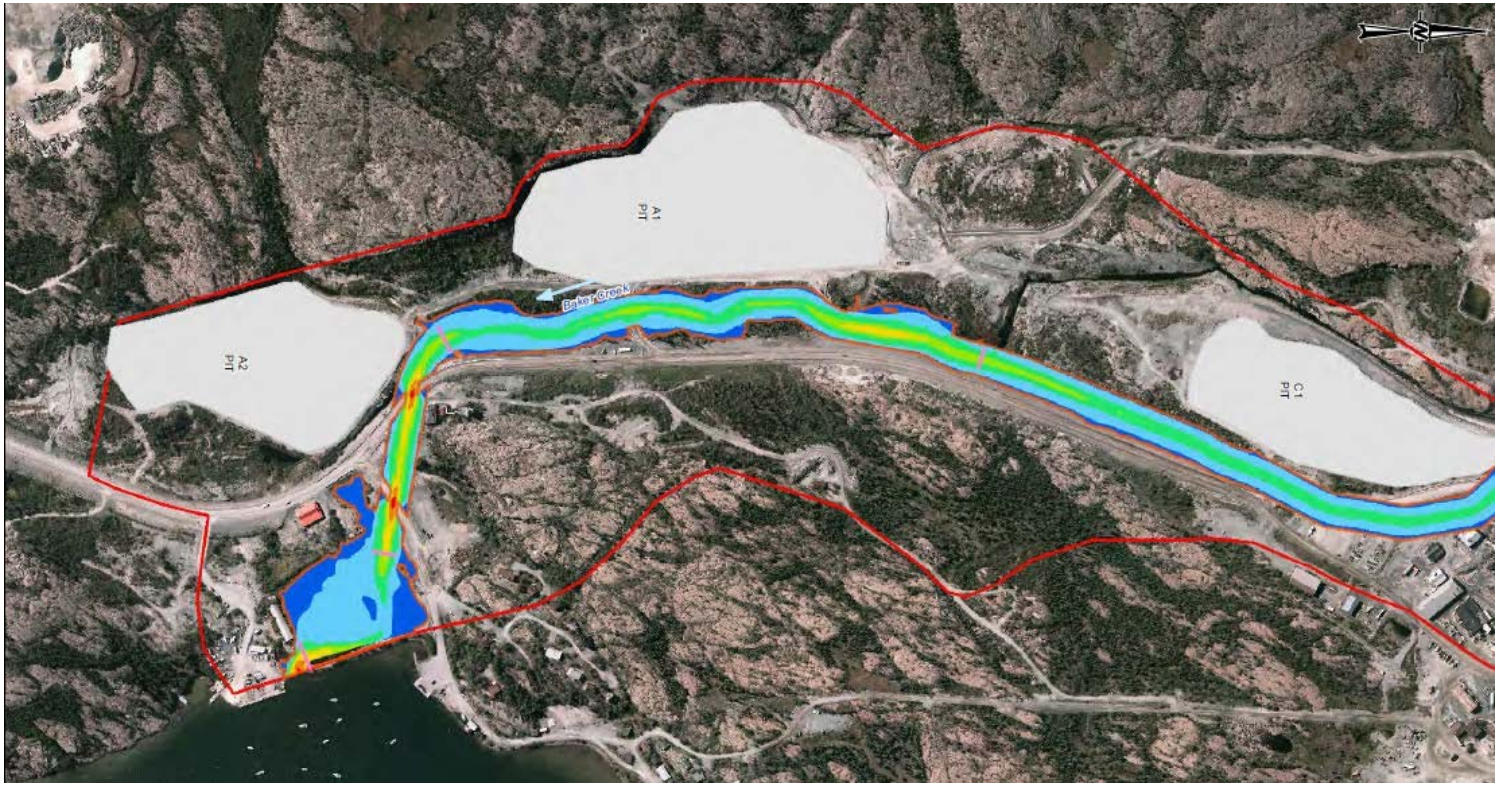
ENVIRONMENTAL MITIGATION AND DESIGN FEATURES



Flood mitigation:

- Open pits to be filled
- Channel and floodplain sized to convey PMF
- Floodplain and channel substrates provide aufeis mitigation

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ENVIRONMENTAL MITIGATION AND DESIGN FEATURES

Fine Sediments:

- Fine sediments – including tailings where present - will be removed from Baker Creek where present
- Replacement with clean substrates

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ENVIRONMENTAL MITIGATION AND DESIGN FEATURES

Water Quality:

- Treated mine water will no longer be discharged to Baker Pond
- Contaminated soil remediation, tailings covers and site water management will reduce arsenic loading
- Treatment wetlands are subject of reclamation research plan

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ENVIRONMENTAL MITIGATION AND DESIGN FEATURES

Fish Habitat:

- Whether to provide fish access and habitat at Baker Creek was discussed during Surface Design Engagement
- The Project is currently involved in discussions with Fisheries and Oceans Canada to determine fish habitat and potential offsetting requirements.

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FUTURE CLOSURE ACTIVITIES

- 2018 Advance Baker Creek to 60% design
- 2019 Type A Water Licence application
- 2020 anticipate receiving Water Licence and Land Use Permit
- 2020 Advance Baker Creek to final design
- 2020/21 commence closure activities

Thank you!

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