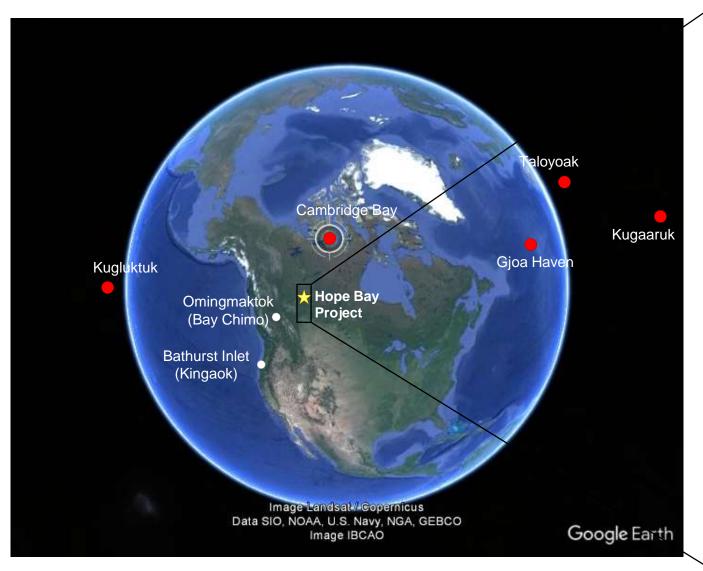
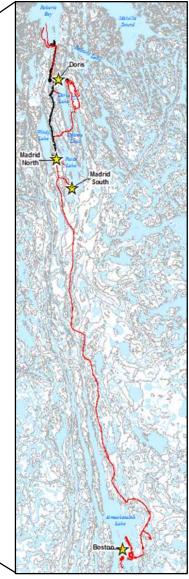


Nunavut Water Board Technical Meeting May, 2018

Project Location







Approved Doris Project (No.003 and 2AM-DOH1323)





Existing Permits and Licences - Doris



Project Certificate

- Issued 2006, Amended 2016
 - Allows Construction, Development, Production, Closure
 - Environmental compliance and protections
 - 2000 tonnes per day
 - Discharge Effluent to Roberts Bay

Type A Water Licence 2AM-DOH1323

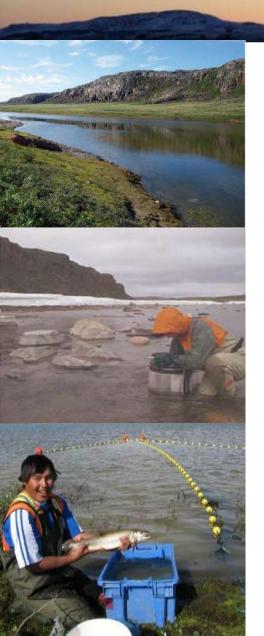
- Issued 2007, Amended 2016, Applies from 2013 to 2023
 - Water Use
 - Doris Lake 480,000 m³ per year Mining and Processing
 - Windy Lake 22,000 m3 per year Domestic
 - Reclaim Water no limit Processing
 - 2.5 million tonnes to Tailings Area
 - Reclamation Security \$31 Million

All operations comply with all Federal and Territorial laws and regulations

Effluent to comply with Metal Mining Effluent Regulation

Monitoring and Reporting





- Aquatic Effects Monitoring Plan
- Environmental Effects Monitoring Program
- Surveillance Network Program
 - Type A Water Licence –monthly
 - Type B Water Licence(s)- monthly
- NWB Annual Reports
 - Type A and Type B Water Licence
 - Due March 31

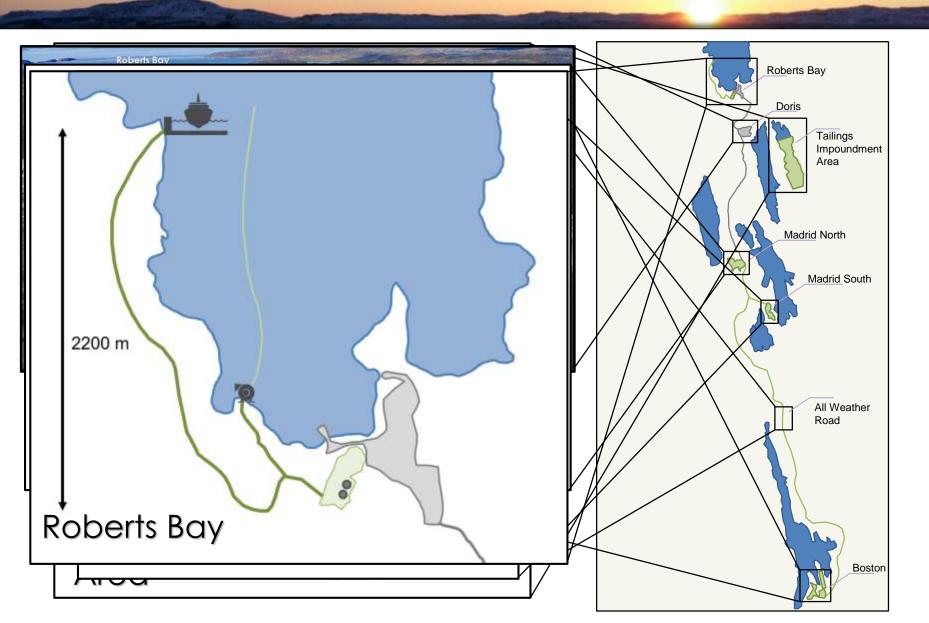
Madrid-Boston Project Highlights



Madrid and Boston Highlights	
Mining	 Mining with waste rock stored above ground temporarily and then put back into the underground mines. Some surface excavation to remove ore at and near surface.
Processing	 Approximately 5,600 tonnes of ore processed per day
Gold Production	 Gold production at Doris and Boston. Concentrates produced at Madrid North
Transportation	 Sealift arrives at Roberts Bay and utilize cargo dock and jetty Gold bars flown out to market from Doris and Boston Road connecting Madrid and Boston to Doris and Roberts Bay
Employment	 Fly in-fly out operation from Edmonton and Kitikmeot 870 workers during peak operations (for approximately 14 years)
Economic Benefit	 Royalties, mineral taxes and other payments of approximately \$500 million over the life of the Hope Bay Project for Canada, Nunavut, KIA and NTI (excluding Doris)

Hope Bay Project Layout





Proposed Amendment No. 2 Type A



Scope includes Doris, Madrid Sites and All Weather Road

- Expand 2AM-DOH1323 Amendment No. 1 by incorporating into this Licence the scope of all facilities and activities authorized under the Type B Licence 2BB-MAE1727
 - Camp Capacity 400 persons
 - Expand TIA capacity to 18 million tonnes
 - Water Allowance:
 - Domestic from Windy Lake: 43,800 m3/year
 - Industrial from Doris Lake: 1,930,000 m3/day
 - Concentrator at Madrid
 - AWR to Boston
 - Allows commercial mining

Proposed Boston Type A



Project Certificate and Boston Type A Water Licence

- Scope:
- Construct and operate Boston Site
- Camp Capacity 300 persons
- Tailings Management Area capacity of 5.1 million tonnes
 - Water Allowance:
 - Domestic from Aimaokatalok Lake 33,000m3/year
 - Industrial from Aimaokatlok Lake 450,000m3/year
- 2400 t/d process plant
- Allows water use, waste management and construction of all surface infrastructure
- Allows commercial mining

Closure and Reclamation



- Doris-Madrid Interim Closure and Reclamation Plan was updated
- Boston Conceptual Closure and Reclamation Plan was developed
- Overall objectives of closure planning at Hope Bay:
 - Physical Stability
 - Chemical Stability
 - Future use and aesthetics
- Planning provides basis to estimate financial security







Tailings and Waste Rock Mangement

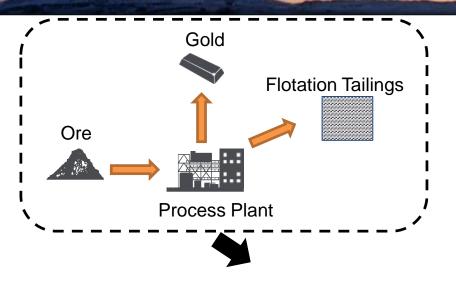
Tailings and Waste Rock

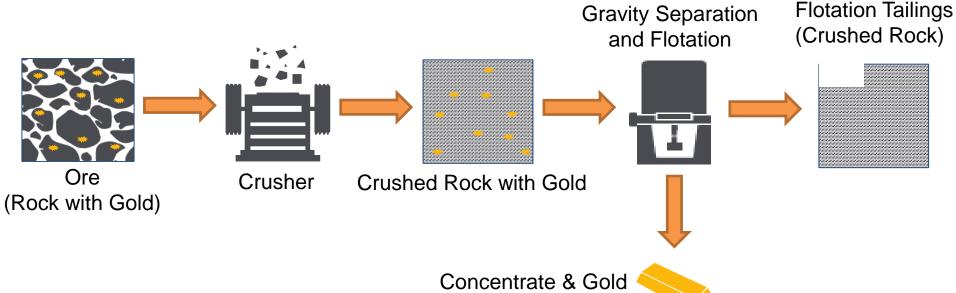




Flotation Tailings

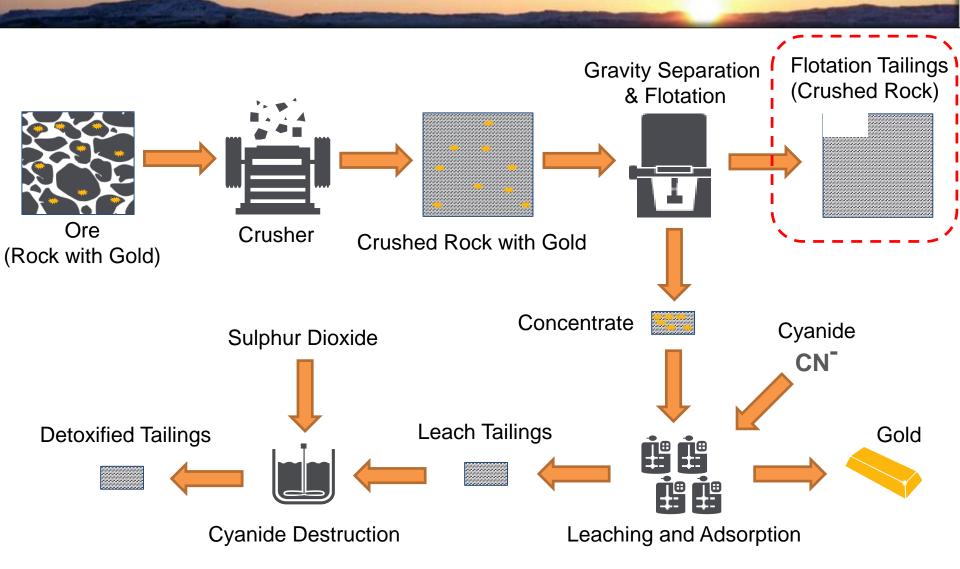






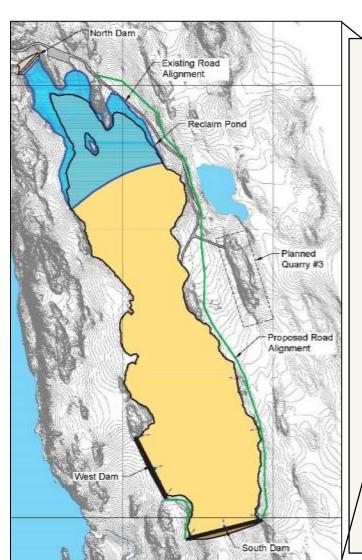
Detoxified Leach Tailings

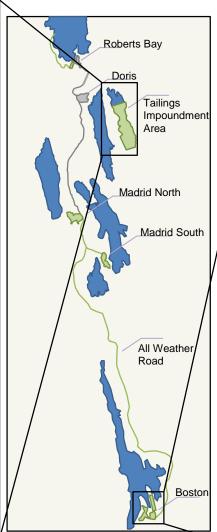




Overview of Tailings Management

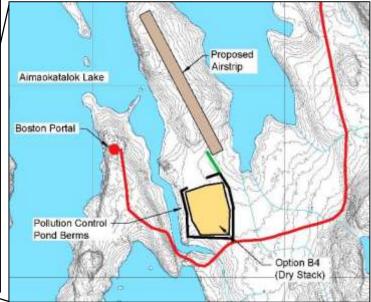






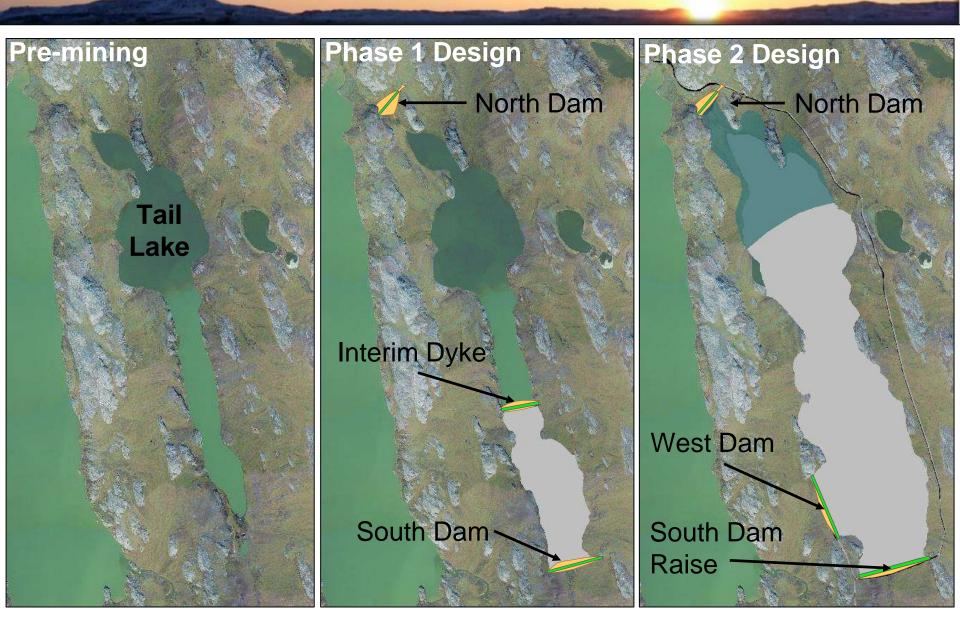
- Doris Conventional Tailings Impoundment Area
- Boston Dry Stack
 Tailings Management

 Area



Tailings Impoundment Area - Doris





North Dam





South Dam





Tailings Impoundment Area - Closure MAC







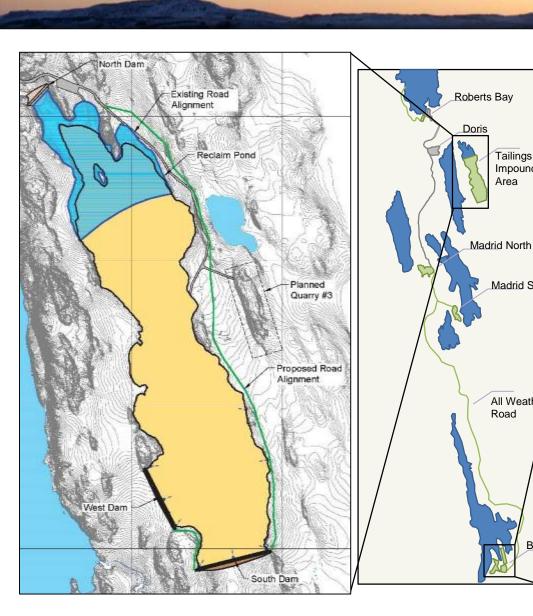


Summary of Tailings Management

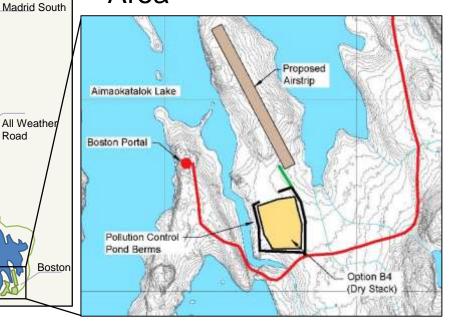
Tailings Impoundment

All Weather Road



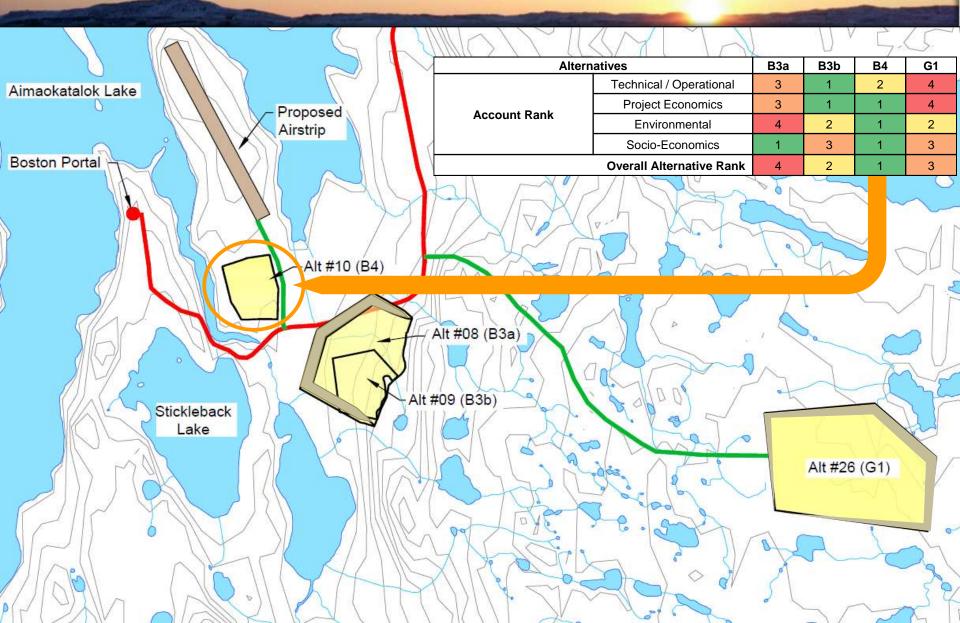


- Doris Conventional **Tailings Impoundment** Area
- Boston Dry Stack **Tailings Management** Area



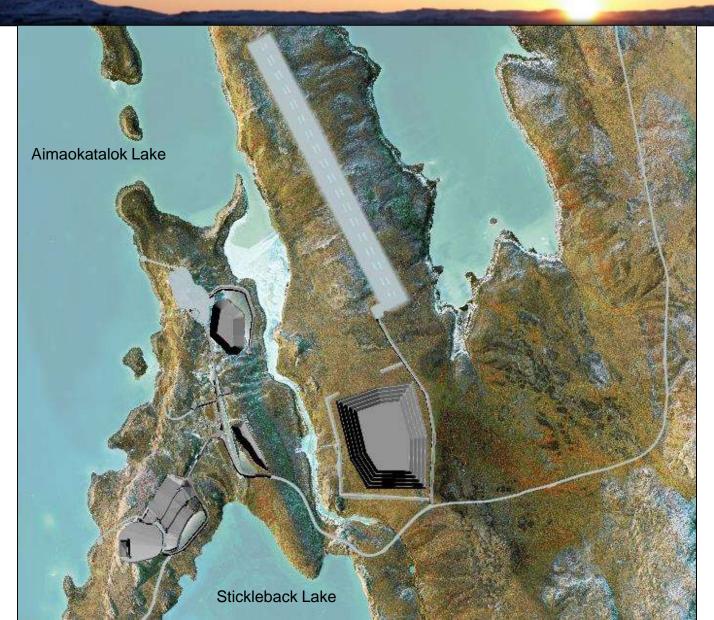
Alternative Analysis - Boston





Tailings Management Area - Boston

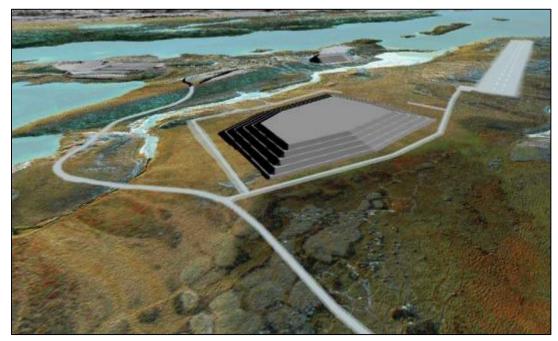




Tailings Management Area - Boston



- Filtered tailings
- Trucks, Dozers, Compactors
- Stackable and compactable
- Similar to:
 - Raglan
 - Fort Knox
 - Pogo

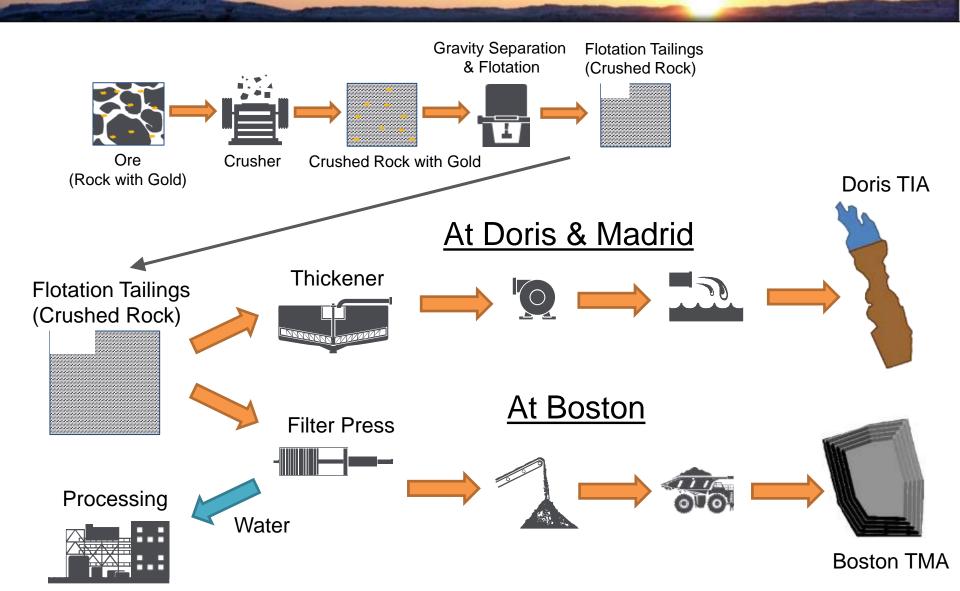






Tailings





Dust Management







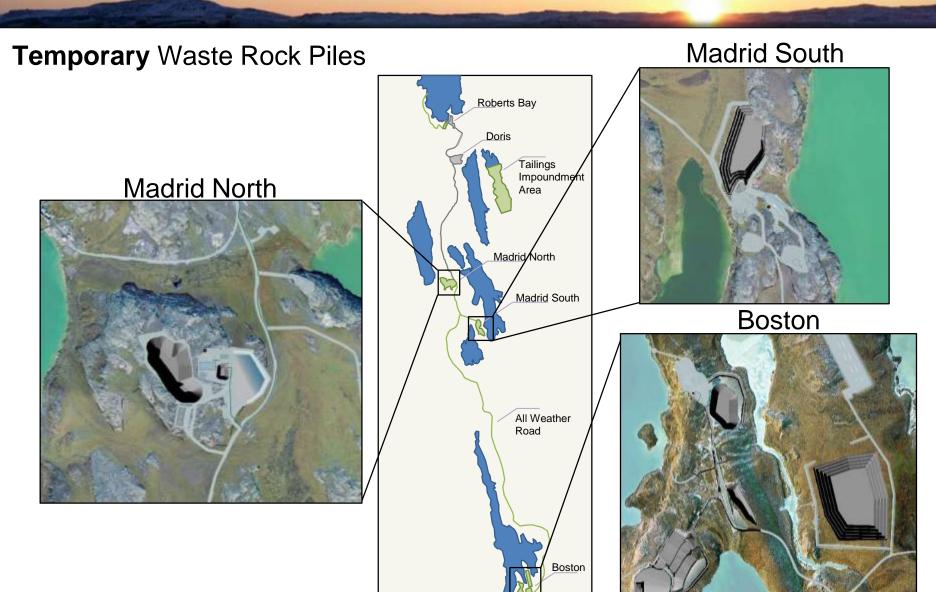






Summary of Waste Rock Management



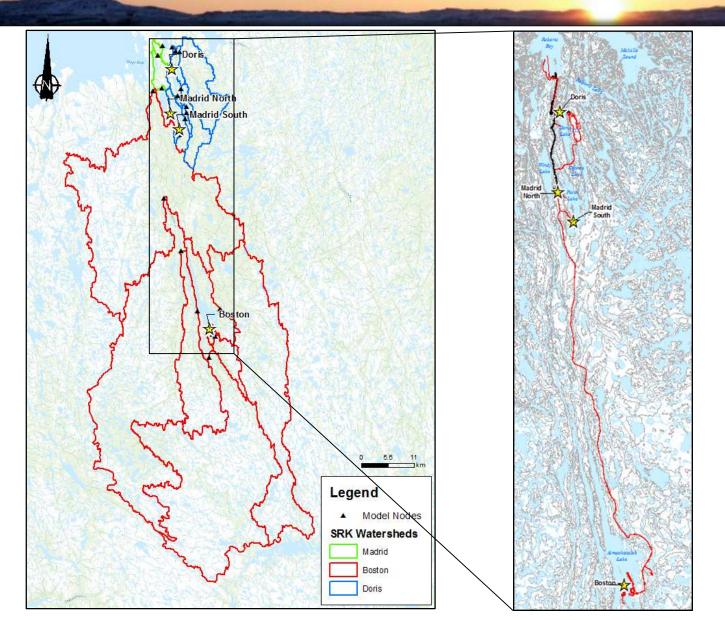




Water Management

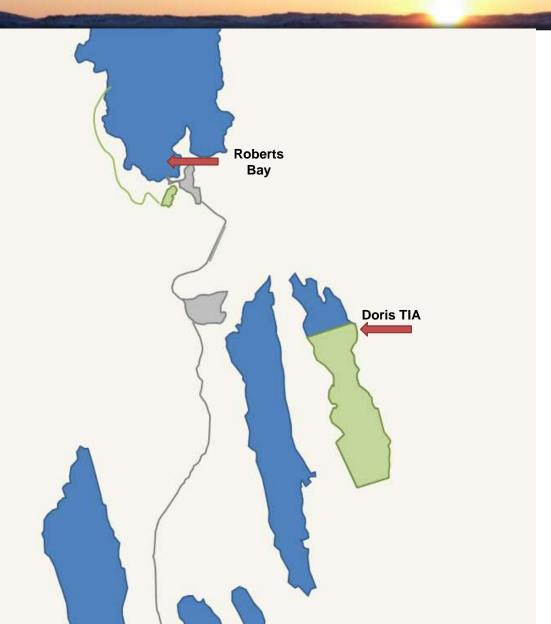
Hydrological Setting





Doris Water Management



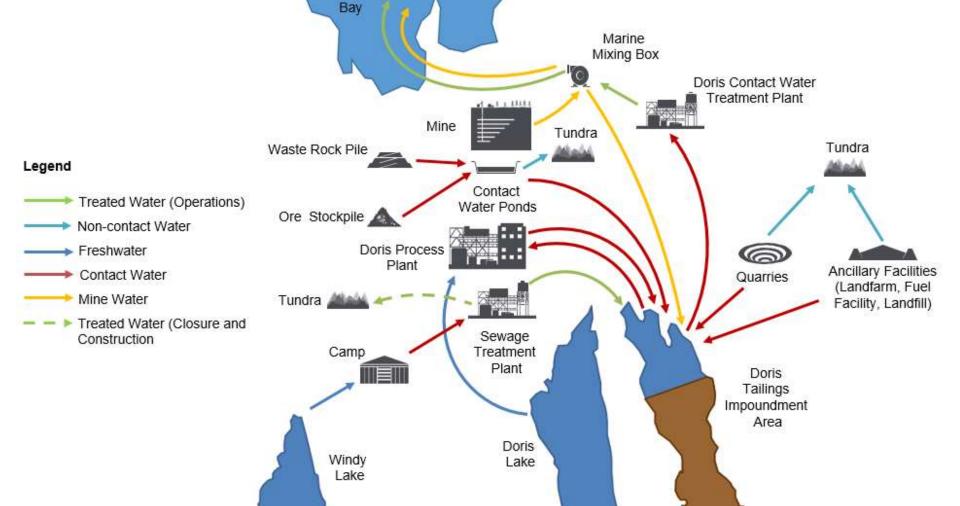


Doris Water Management

Roberts

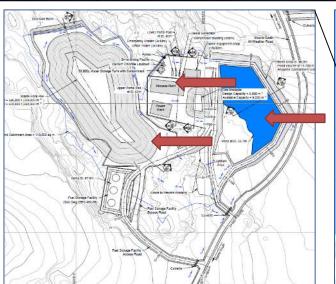


31



Madrid Site Layout

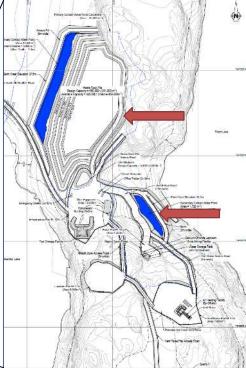




Madrid North

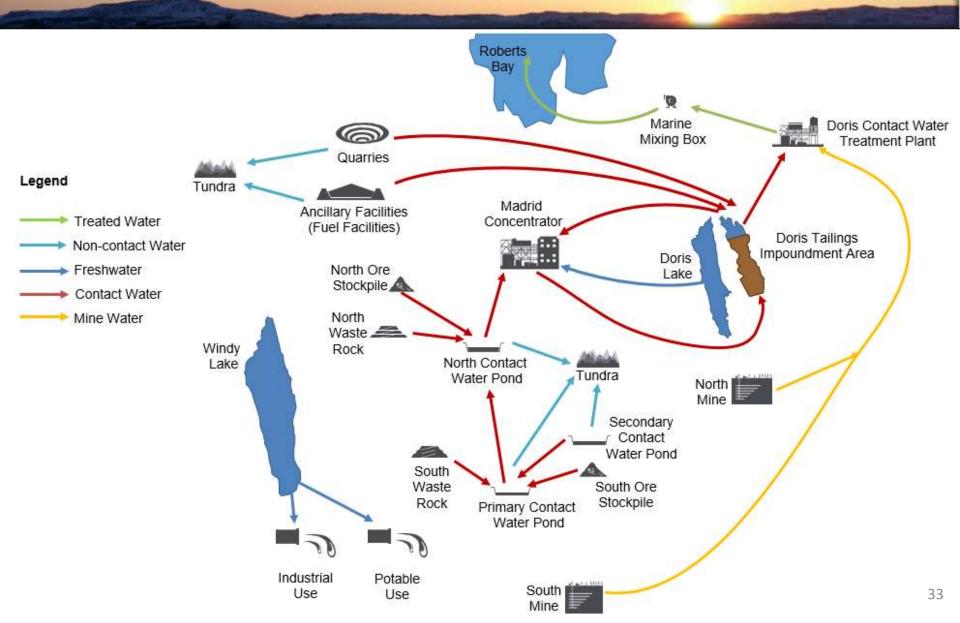


Madrid South



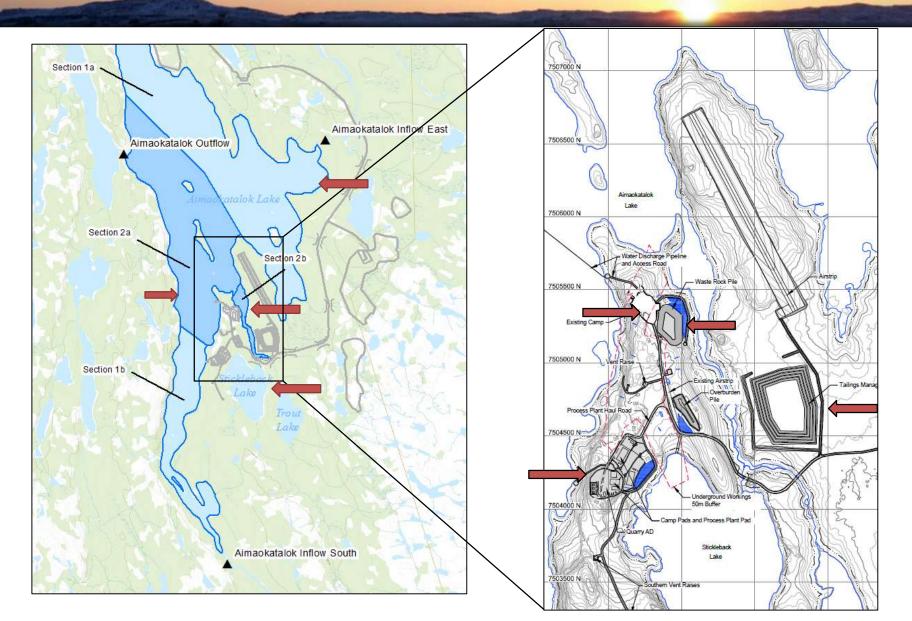
Madrid Water Management





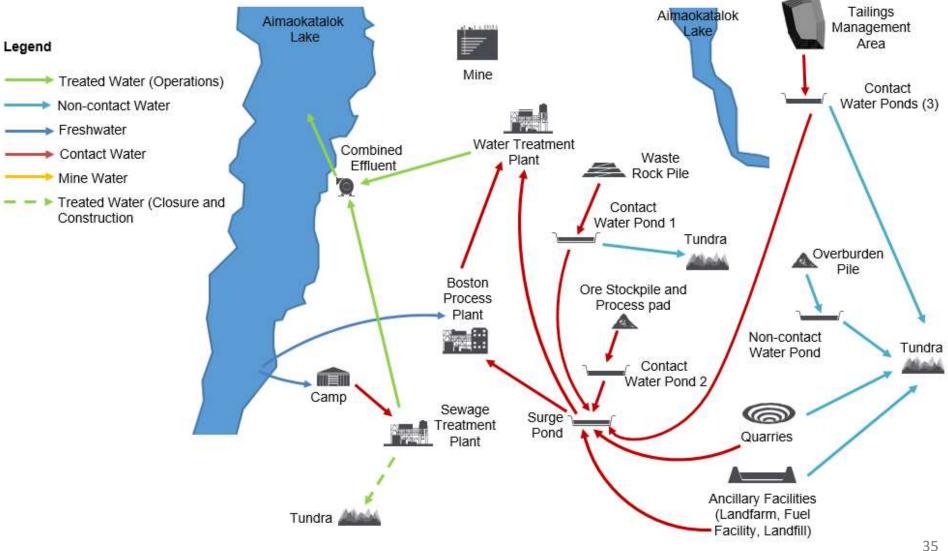
Boston Site Layout and Aimaokatalok Lake





Boston Water Management



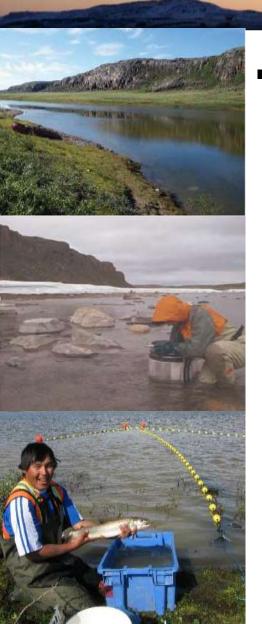




Freshwater Environment

Freshwater Environment





Valued Ecosystem Components:

- Surface Hydrology
- Surface Water Quality
- Sediment Quality
- Fish
 - Fish Community
 - Arctic Char
 - Arctic Grayling
 - Lake Trout
 - Arctic Cisco
 - Broad Whitefish
 - Fish Habitat

Assessment Approach



Early Stages of Assessment

- 1. Start with Traditional Knowledge
- 2. Identify Study Areas based on potential Project interactions
- 3. Collect baseline data from within designated Study Areas

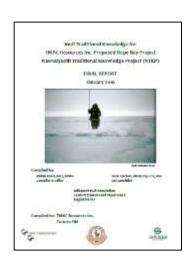
Impact Assessment Approach

- 4. Identify Project Interactions with Freshwater Environment
- 5. Identify Mitigations to reduce Project Impacts
- 6. Model Project Interactions on water quantity and quality
- 7. Assess potential Residual Effects of Project on Freshwater Environment
- 8. Develop monitoring approach based on outcome of EIS review

Inuit Engagement



Historical and Current Inuit Comments and Concerns:



- shallower lakes and lower water flows.
 - frozen to streambed in winter
- mine exploration and development
- contaminant exposure through fish consumption
- potential habitat loss and approach to fisheries offsetting
- no identified drinking water sources in Project area, but water use exists

Freshwater Environment – Study Area



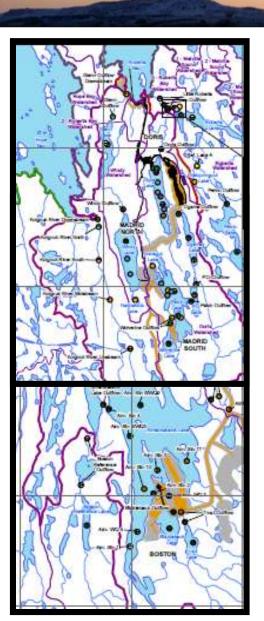


Local Study Area – Extending one watershed or sub watershed boundary from Project infrastructure

Regional Study Area – Extending one watershed or sub watershed boundary from LSA

Existing Environment





Freshwater data has been collected in Hope Bay Belt since 1993

- Project lakes and streams
- Reference lakes and streams

Freshwater lake and stream data includes:

- Hydrology (streams) and lake levels
- Water quality (winter and summer)
- Sediment quality (summer)
- Primary producers
- Secondary producers
- Fish and fish habitat, including tissue metals

Hydrology Assessment





- Potential impacts assessed:
 - Changes to surface hydrology
 - Water withdrawal from lakes
 - Construction and use of underground mines
 - Modification of natural drainages



Water and Sediment Quality Assessment





- Potential impacts assessed:
 - Changes to freshwater water or sediment quality
 - Site preparation, construction and decommissioning
 - Site and mine contact water
 - Explosives
 - Treated discharge
 - Dust Deposition

Fish Assessment





- Potential impacts assessed:
 - Fish habitat loss or alteration
 - Fish mortality or changes to population abundance
 - Project infrastructure and development
 - Water withdrawal and use
 - Changes in water and sediment quality



Freshwater – Monitoring and Management



- Aquatic Effects Monitoring Plan
 - Belt-wide plan including Doris, Madrid, and Boston
- Environmental Effects Monitoring Program
 - Aimaokatalok Lake
- Surveillance Network Program
 - Type A Water Licence
- Fisheries Offsetting Monitoring Program
- Management Plans

Conclusions of Freshwater Assessments



No significant Project or Cumulative impacts



Thank You, Questions



