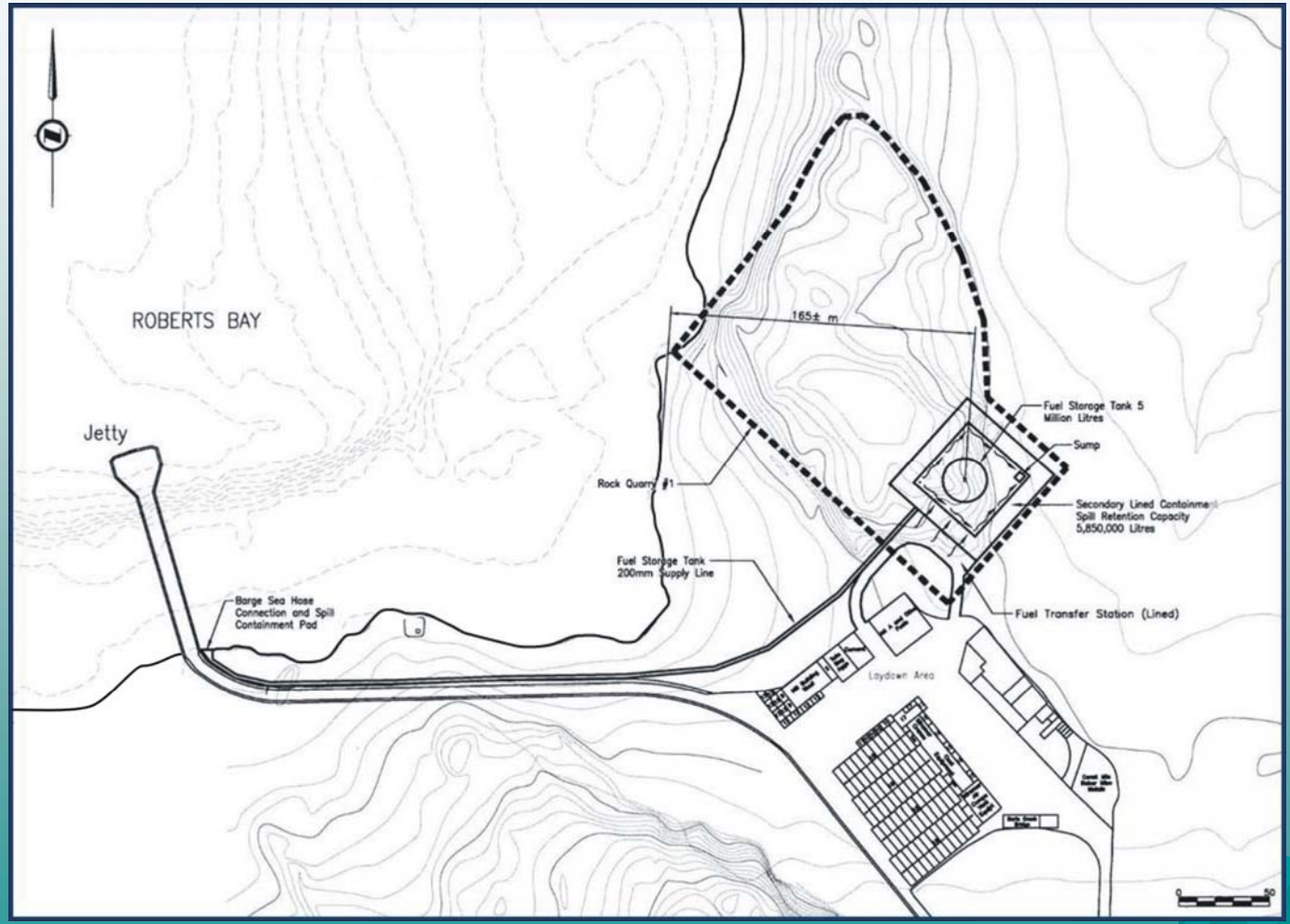
Proposed Roberts Bay Facilities

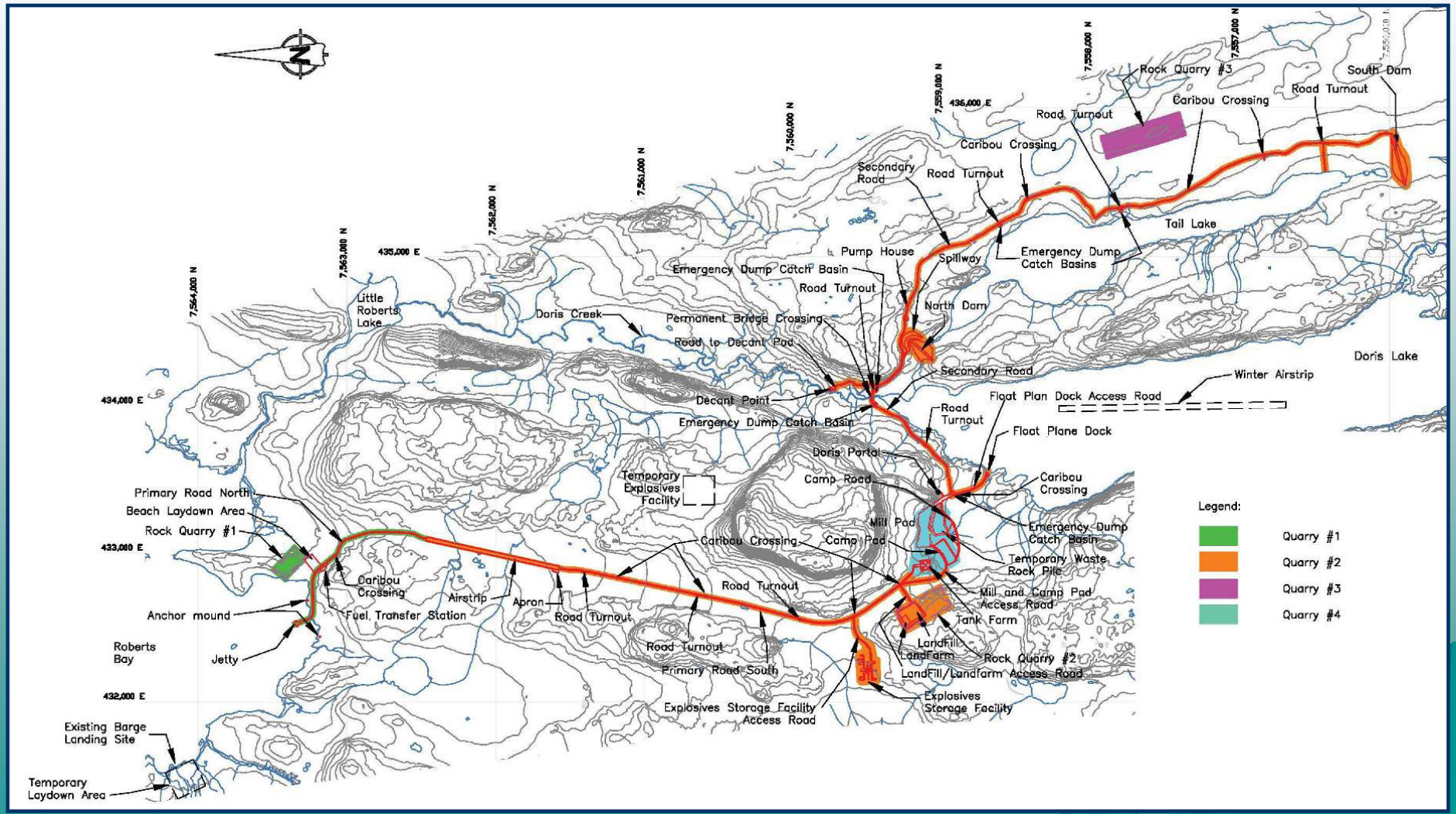


Fuel Storage Tank Facility in Quarry #1

MIRAMAR
HOPE BAY LTD.

MIRAMAR HOPE BAY LTD.

Estimated Construction Quarry Source



Planned Water Use

Planned Water Use

- The Doris North Project is projected to use the following maximum volumes of water:

Potable Water:	30,000 m^3 per year
Mill Process Water:	450,000 m^3 per year

- MHBL will maximize to the greatest practical extent the use of recycle water from the tailings containment area for use in the mill.

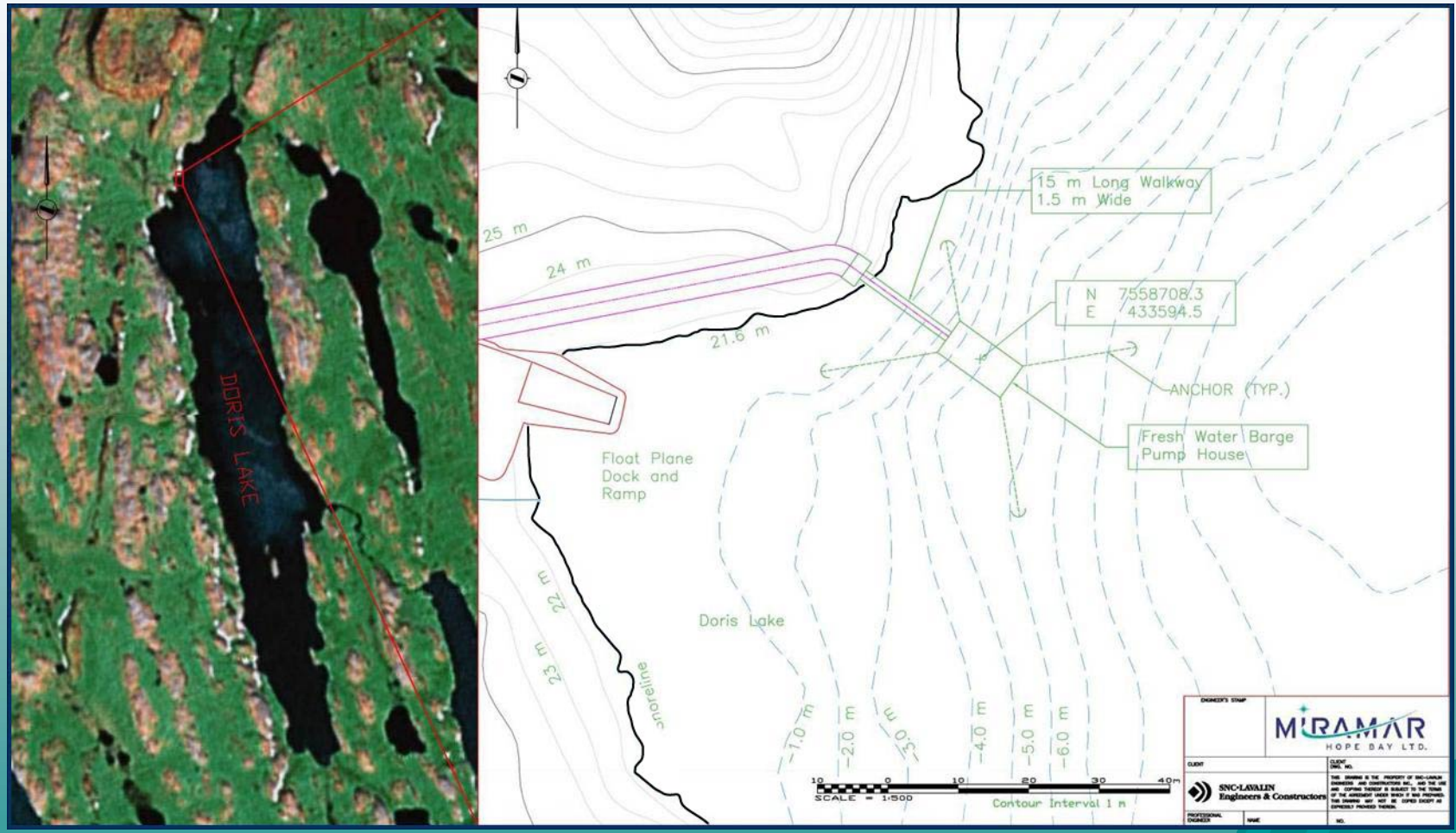
Potable Water Use

- **Potable Water:**
  - **Drawn from Doris Lake**
  - **Based on an estimated per person consumption of 0.40 m^3 per day (400 litres)**
  - **Maximum camp size of 175 persons**
  - **Added 17% contingency**
  - **Maximum Volume: 0.40 x 175 x 365 x 1.17 = 30,000 m^3 per year**

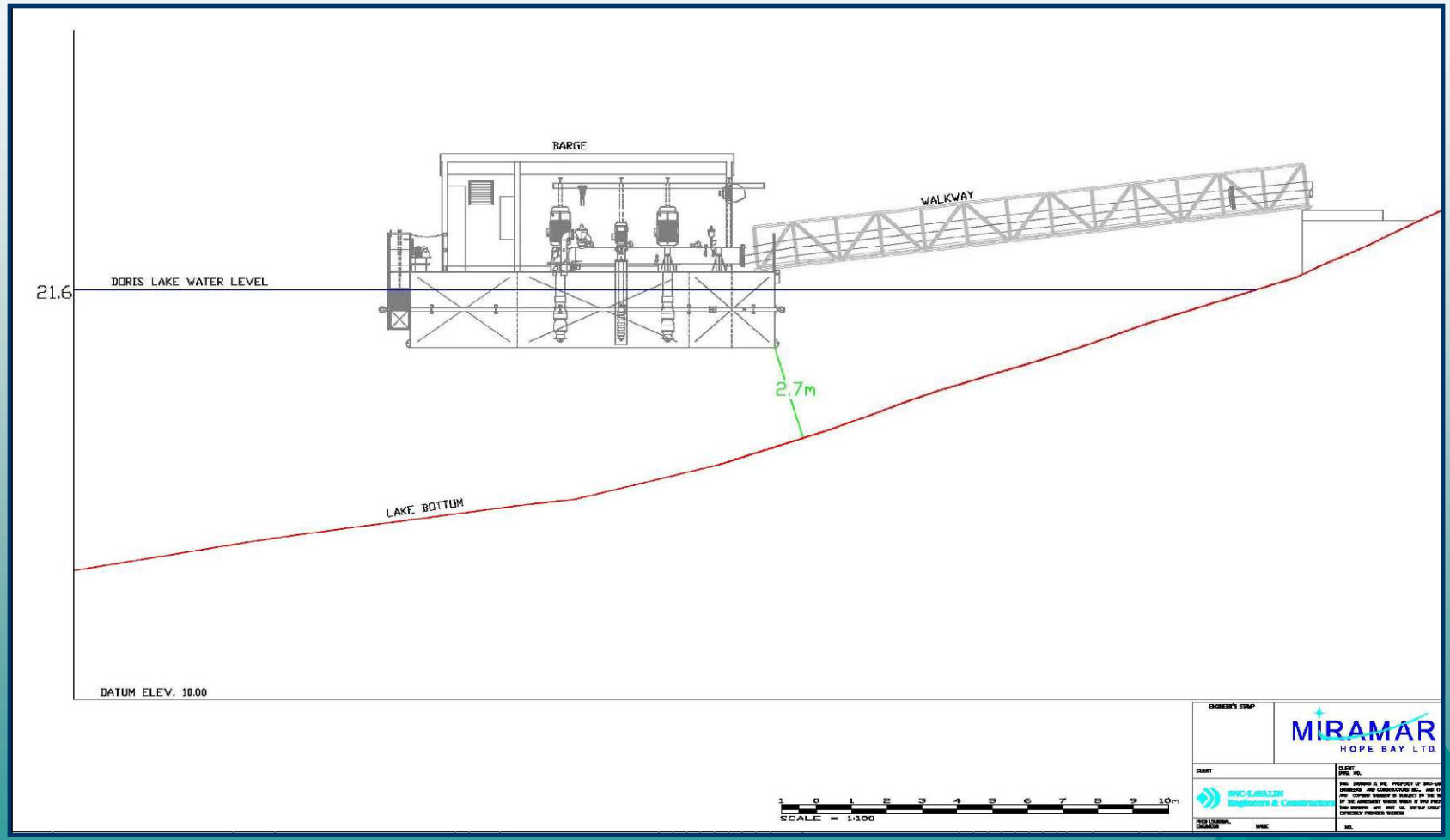
- **Potable water use will be minimized to the greatest extent possible.**

- **Water drawn from Doris Lake will be measured through a meter and reported to the NWB monthly as part of the SNP reporting.**

Doris Lake Fresh Water Pump House



Doris Lake Fresh Water Pump House



Mill Process Water

- **Mill Process Water (includes water used UG):**
  - **Combination of recycled water from tailings containment area + fresh water from Doris Lake;**
  - **Average consumption ~ 970 m^3 per day with a maximum use of ~ 1,183 m^3 per day.**
  - **Water used UG will be minimal. Brine solution will be sent UG and recycled using underground sumps.**
- **Annual maximum consumption of 450,000 m^3 per year:**

1,183 x 365 x 1.05* = 450,000 m^3 per year

* Includes a 5% contingency allowance

Mill Process Water

Fresh water use in the mill will be minimized as follows:

- **Water will be pumped back to the mill process water tank from the tailings containment area using the reclaim water pumping system. At a minimum MHBL expects to be able to reclaim 145,000 m^3 per year.**
  - MHBL will attempt to reclaim water from the tailings containment area throughout the year. However when ice is present, the water quality in Tail Lake may become too turbid due to the ongoing sub-aqueous deposition of tailings. This turbidity problem will diminish once the water level in Tail Lake rises. Consequently MHBL believes that, while it may be difficult to reclaim clean water from Tail Lake in the first winter of operation it will become easier as the pond level rises in 2009.

Mill Process Water

Fresh water use in the mill will be minimized as follows:

- **There will be three internal water recycle streams within the milling process**
  - Overflow from the regrind circuit thickener
  - Overflow from CIL circuit thickener
  - Treated barren solution from filtering the leach residue sent UG as backfill

Mill Process Water

- MHBL will maximize to the greatest extent practical its use of reclaim water in the mill to minimize fresh water use;
- Process water will be drawn from the process water tank, which will be fed from the Tail Lake reclaim water pipeline, with fresh water only used to top off the tank when reclaim water cannot be used.
- All fresh water use will be metered and reported monthly to the NWB as part of the SNP reporting.

General Conditions

General Conditions – Term of License

- **MHBL has requested a license term of 8 years**

- **The logic behind this request is based on having the water license issued to carry the Project through to the end of the projected reclamation period with the next license addressing post closure monitoring only:**

  – Year 1 – Project is under construction (mill start up scheduled for late 2008);
  – Year 2 and 3 – Mine operating life (mining and mill scheduled to be complete by end of 2010);

Cont….

General Conditions – Term of License

- Year 4 and 5 – Mine reclamation (all facilities except those required to maintain control over Tail Lake will be removed by the end of 2012);
- Years 4, 5, 6 – Continued annual managed release of water from Tail Lake (By the end of 2013 Tail Lake is predicted to have returned to its pre-development level of 28.3 m ASL and amount of water to be discharged will from then forward equal natural runoff into the lake);
- In Year 5 MHBL will complete a human health and ecological risk assessment to determine if the water quality is suitable for unregulated release starting in Year 6;
- Years 7, 8 and 9 – Continued annual managed release of water from Tail Lake if results from risk assessment do not allow for unregulated release earlier (water predicted to be at or below CCME concentrations by end of year 9);

General Conditions – Compensation

- In 2006 MHBL signed an Inuit Impact Benefits Agreement with the KIA.
- In 2006 MHBL also signed a Water Rights Compensation Agreement with the KIA.
- Fisheries Compensation - MHBL has proposed a package of compensation measures to DFO to offset the fish habit altered or destroyed by the Doris North Project. A “No-Net-Loss” compensation plan has been submitted to DFO, and after much discussion, agreement in principle has been reached. MHBL is to submit a final plan, including final engineering designs for these compensation measures to DFO by September 15, 2007.

Compensation Measures

Tail Lake:

- Increasing fish accessibility to Roberts Lake
- Stream enhancement in Roberts Outflow
- Creation of rearing habitat in Doris Lake
- Creation of pool habitat in a tributary of Roberts Lake

Tail Outflow:

- Creation of rearing habitat in Doris Lake

Jetty:

- Habitat enhancement using rock spurs and riprap

Waste Disposal

Types of Waste to be Managed

Types of waste to be managed at Doris North

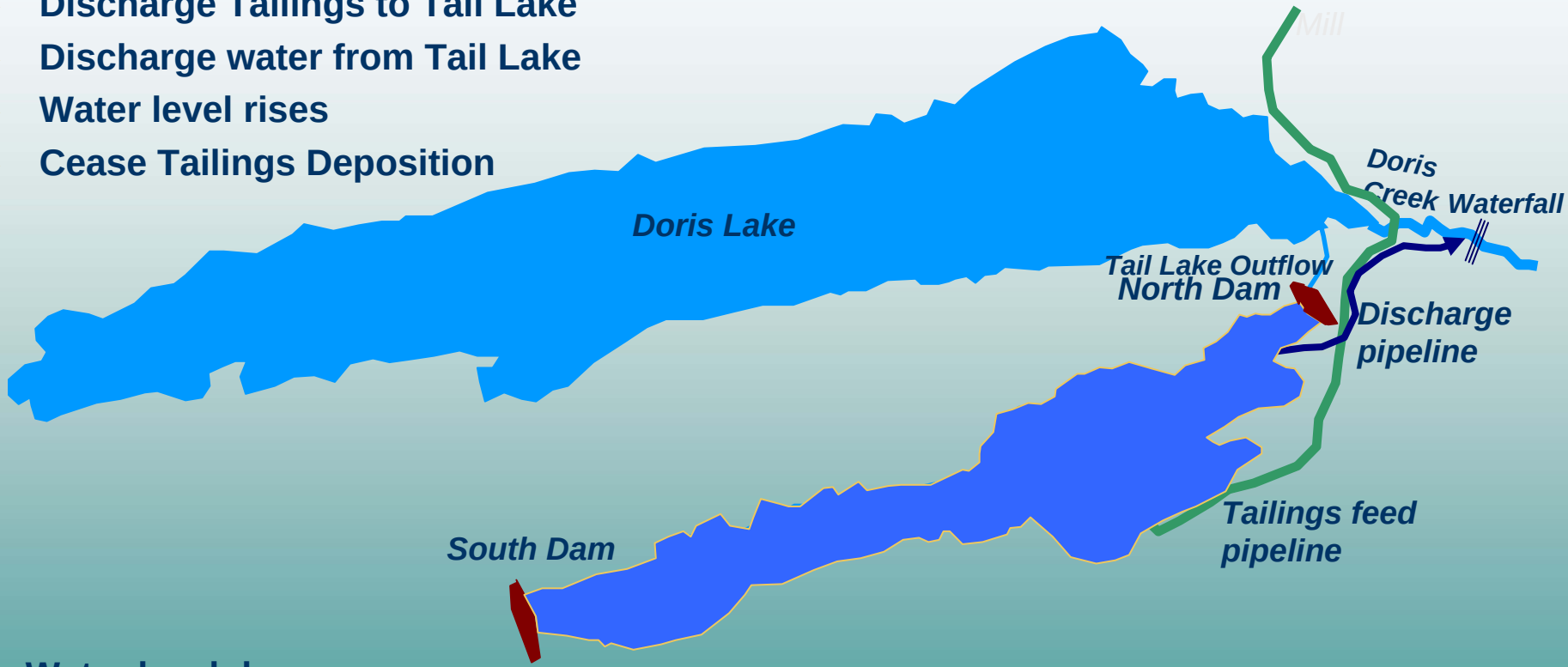
- **Mill Tailings Slurry: Sent to Tail Lake tailings containment area**
- **Cyanide leach residue solids: filtered following CN destruction and then sent UG as backfill**
- **Sewage: Treated grey water to Tail Lake. Solids filtered & incinerated**

Types of Waste to be Managed

- Non-Hazardous Solid Waste: Sent to landfill in Quarry 2
- Other Hazardous Waste (batteries, spent glycol, spent solvent, etc): shipped off site to an appropriate recycle/treatment facility in the south
- Petroleum Contaminated Soils: Sent to the landfarm facility in Quarry 2

Tailings Containment System

- Construct Dams
- Discharge Tailings to Tail Lake
- Discharge water from Tail Lake
- Water level rises
- Cease Tailings Deposition

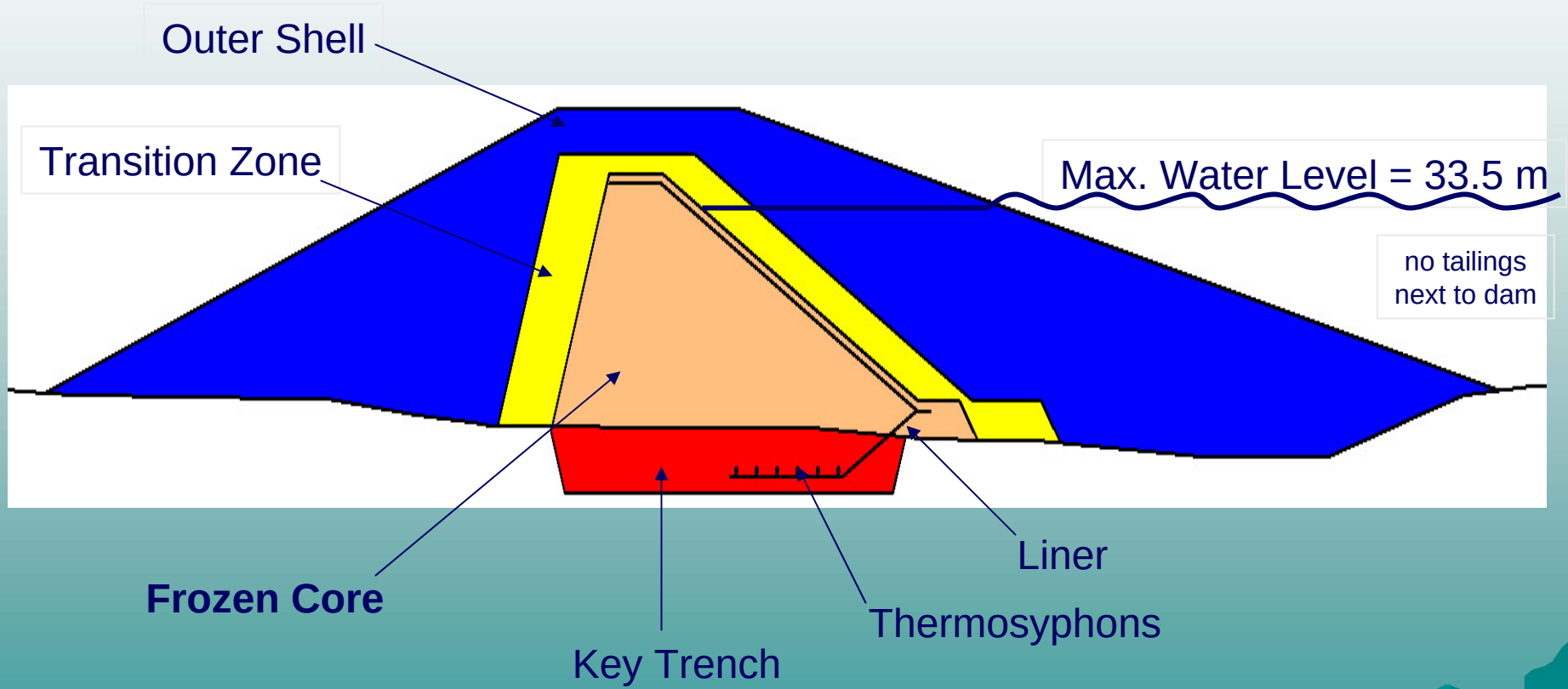


- Water level decreases
- Breach dam and re-establish outflow

Tail Lake Dam Design

- Frozen core dam – most appropriate design for this environment
- Secondary upstream liner
- Thermosyphons in key trench
- Design included input and review by leading experts in frozen core design
- Design has high level of conservatism and contingency
- Design includes large amount of instrumentation to verify dam performance
- Design life of dam; 25 years – expected life of 4 to 10 years

Typical Dam Cross Section



Typical Layout

Water Management

Site Water Management

Water management consists of the following elements:

- **Management of storm water and snowmelt runoff at the plant site, landfarm and landfill, and, at the fuel containment facilities**
- **Management of the annual release from the tailings containment area**