

Mine Tailings Storage Facility

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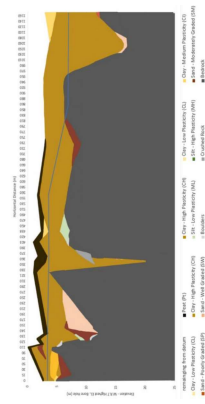
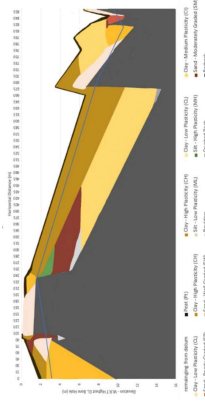
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Project Background

Mining is an imperative industry within the economy of Ontario. As part of waste management, tailings dams are constructed to contain the tailings produced from the refining process. The longevity of the practice will be measured by its ability to evolve and meet ever changing standards.

Factors that affect the design and classification of the dam include:

- A lightly travelled highway downstream
- Toxic chemicals that could have high environmental consequences if released
- Assumed effect on the city of Greater Sudbury
- Weather – wind speeds, storms, and precipitation
- Volume requirements
- Availability of materials
- Dam linearity
- Reviewed topics and data include:
 - Borehole logs: information on site geology
 - CDA dam classification criteria
 - Projected tailings: used to calculate required dam height in conjunction with IDF curves
 - Site map
 - Slug test data
 - USCS soil classification system



Considerations and Designs



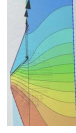
Regulations



Safety



Cost



Modeling

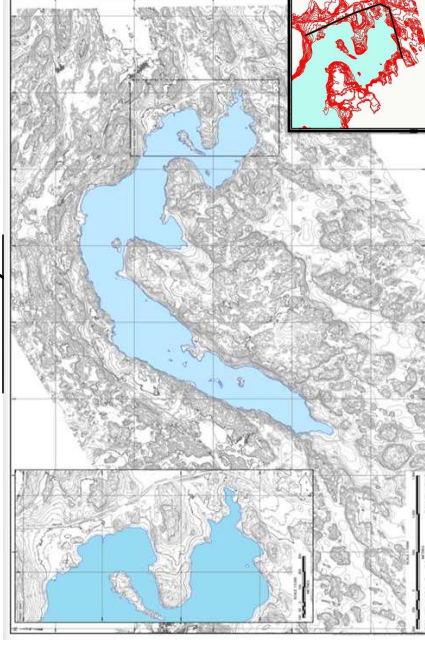
Literature Review



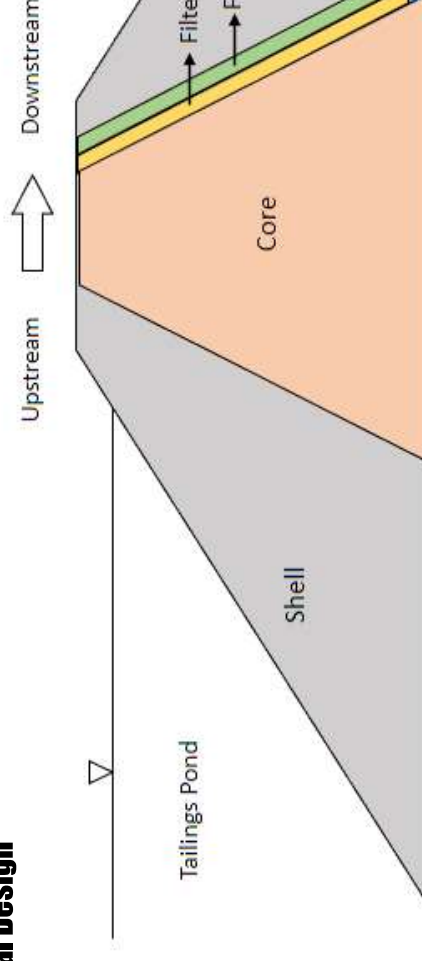
Cost Analysis



Selected Layout



Final Design



Shell: Made up of course material and is the major contributor to the dam's structural stability

Core: Heavily compacted layer of clay that aims to prevent the passing of water through to the downstream side of the dam

Filters/Chimney Drain: Layers of material that help prevent piping. With the grain size distribution of the core and the shell varying heavily, water passing through the core can push clay particles into the shell, compromising the dam's stability. The filter layers are each made up of materials that have larger grain sizes than the core and smaller than the shell, so that the grain sizes gradually increase from left to right.

Blanket Drain: If a crack was to develop in the core, the blanket drain would act in unison with the chimney drains to catch any water that passes through the core and prevent it from compromising the downstream shell's stability