Ardley Reservoir Scoping and Feasibility Study

Geotechnical Investigations

Overview

Environment and Protected Areas (EPA) is exploring a potential new dam and water storage reservoir on the Red Deer River downstream of the City of Red Deer, near Ardley to reduce the impacts of flood and drought on Albertans and the economy. The Ardley Reservoir Scoping and Feasibility Study was initiated in October 2024. As part of evaluating the technical feasibility of potential dam options, EPA has engaged the Hatch Project Team to complete geotechnical investigations that may require access to privately owned or leased land. No access will occur without the agreement of the property owner. A land access agreement will be completed prior to commencing any activities.

Why do geotechnical investigations?

The geotechnical investigation provides information about soil and rock stability for potential dam construction and the suitability for construction identifying potential foundation challenges.

- The soil, bedrock, stratigraphy, and groundwater are characterized through a geotechnical investigation.
- Potential drilling methods include sonic, auger, and mud rotary.
- Boreholes will be drilled, cuttings logged, and samples collected.
- Field testing will be conducted to assess in-situ conditions (i.e., strength and hydraulic conductivity).
- Collected samples will be transported to an off-site laboratory testing facility on select soil samples and bedrock cores.
- Observed groundwater in boreholes will be recorded.
- Instrumentation will be installed at selected locations and will be monitored throughout the project.
- Potential instrumentation types include, but are not limited to inclinometer casing, standpipe piezometers, and vibrating wire piezometers. Instruments will be encased in protective covers.

What does geotechnical drilling methodology consist of?

Equipment

- Geotechnical drilling is typically carried out with either a truck-mounted or track-mounted drill rig.
- Drill rigs range in size, typically ranging between 4-6 m in width
- The type of drill rig used depends on the anticipated subsurface conditions and borehole depth
- Drilling activities need support equipment ranging from trucks, skid steers and trailers to execute the drilling program
- Potential drilling methodologies at the site include, but are not limited to auger, mud rotary and sonic.

Boreholes

- Boreholes are typically 150 to 200 mm (6-8”) in diameter, with completion time ranging a few hours to 3 days.
- Utility locates are completed prior to commencing any ground disturbance. The first step in the locate process is submitting a ticket to Alberta One Call, notifying them of specific ground disturbance details. Marking of identified utilities is completed through this process.
- In some cases, private utility locates are required based on utility owner’s requirements and standards.
- Borehole locations are surveyed and marked, and a secondary physical utility locate sweep is conducted within a 30 m radius of the drilling location by an independent company.
- Large trees will not be harmed, although some brush clearing may be required to permit access to some of the borehole locations.
- Soil samples and bedrock cores are collected for detailed visual logging and laboratory testing.
- Boreholes are completed by:
  - Backfilling to surface in accordance with the Alberta Government Best Practice
  - Guideline for Geotechnical Hole Abandonment (2014).
  - Instrument installation (standpipe or vibrating wire piezometers)

- When standpipe piezometers are installed, the PVC pipe stick-up will be covered with a locked, steel casing.
- Decommissioning of piezometers will include steel casing removal, grouting of PVC pipe annulus, and cutting off approximately 1 m below surface.
- Landowners should anticipate some truck or track marks from the drill rig accessing the site, but minimal disturbance is anticipated overall.

What to expect during geotechnical investigation?

During geotechnical drilling, there may be minor short-term impacts such as noise and temporary land disturbance. However, all activities will be conducted with minimal disruption, and any disturbed areas will be restored to their original condition once the work is completed.

Borehole Soil Sampling

Photo: Hatch

Track Mounted Hammer Drill with Air Compressor

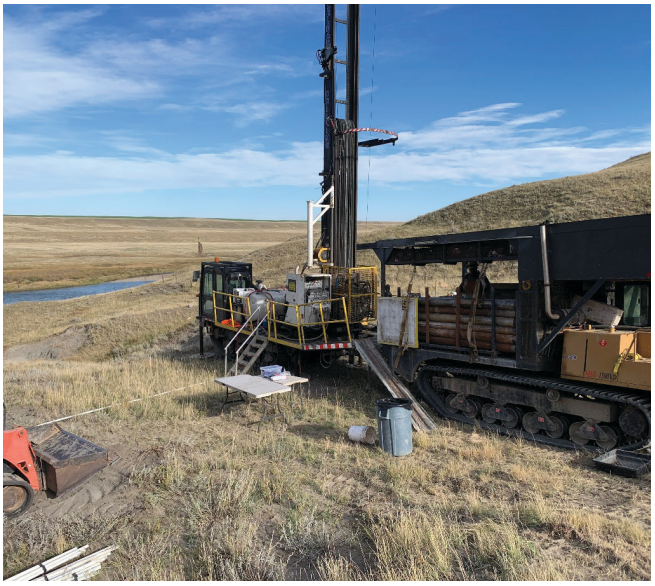

Photo: Hatch

Truck Mounted Auger Rig

Photo: Hatch

Standpipe Installation with protective steel casing riser and guards

Photo: Hatch