

# Drilling

## What is the Activity?

Drilling is a critical activity in mineral exploration. There are several types of drilling.

- Diamond drilling is the most common type of drilling conducted in Ontario. It produces cylindrical pieces of rock called core.
- Reverse circulation or rotary drilling produces chips of rock.
- Overburden drilling is conducted to sample glacial deposits.
- Augur drilling is used to sample soils for geotechnical purposes.

Drilling locations are selected using the results from previous studies, such as:

- Prospecting
- Geological mapping
- Geophysical surveys

All drilling activities provide samples from below the surface. This allows for the testing of the properties of the soil and rocks, including mineral and metal content.

Diamond drills range in size. There are smaller units called backpack or “Winkie” drills. One or more

individuals can carry these.

There are rigs the size of a small house. These rigs are typically mounted on skids or runners. They are dragged through the bush behind bulldozers or timber skidders. Diesel and hydraulic motors power most diamond drills.



Diamond drilling uses a hollow bit whose surface contains low quality diamonds. It produces a long cylinder of rock referred to as a core.

The core is stored in specially shaped core boxes. A geologist or technician examines the core and makes notes on the physical appearance of the rock. The geologist will also mark sections of the core to be sampled for analysis in a laboratory. The core is cut in half lengthwise to be sampled. One side is shipped to a laboratory and the other is stored as a reference sample.

The size of the core and the length of the hole drilled depend on the size of the drill, the type of exploration

program and the mineral(s) being analyzed. A diamond drill hole can range in length from a less than a few meters in length to several thousand meters. The core sizes range from less than 2 cm in diameter up to 15 cm.

## Footprint on the Land

Small areas of land must be cleared to make a drill pad. It must be large enough for safe operation of the drill and bulldozer or skidder. A typical drill pad is 20 to 40 meters in diameter. Hauling the drill rig through the bush also makes a very rough trail.

Helicopters are sometimes used, especially in remote areas. The drill rigs are taken apart, flown to the site and reassembled. The drill pad for helicopter supported drilling is typically 40 to 50 meters in diameter.

Diamond drilling uses hollow steel pipes called casing to drill through overburden such as loose soils and materials. The casing is anchored into the bedrock. The drilling is done through the casing, which provides a collar for the drill hole, keeping soil and water from running into the hole.



Companies often choose to leave the casing pipes in the ground. They must mark the casings so that they are visible in all seasons. Leaving casings in the ground allows companies to use

the hole at a later date to deepen the hole or to complete geophysical surveys.

Some types of drilling, including diamond drilling, pump water to the drill and down the hole. This cools the bit and clears the hole of the ground-up rock. The water pumps may be placed on the shores of lakes, rivers and streams. The water is pumped through heavy hoses to the drill rig. Sumps may be dug at the drill site and the return water containing the ground up rock directed to the sump where the solids can settle out.

In some cases, diamond drilling may take place on lake ice during the winter or from barges during other seasons. Special rules apply to this type of drilling.

Drill holes that are drilled in lake bottoms as well as drill holes on land that produce water require cementing of the casing, for safety purposes and to control groundwater flow.

## Mining Act Requirements

Drilling that uses a drill that weighs less than 150 kilograms requires an exploration plan.

Drilling that uses a drill that weighs more than 150 kilograms requires an exploration permit.





## Provincial Standards for Early Exploration

All early exploration activities that require an exploration plan or permit must follow the Provincial Standards for Early Exploration. There are three parts to these Provincial Standards:

1. Rules for carrying out exploration plan activities.
2. Rules for carrying out exploration permit activities.
3. Rules for rehabilitation of exploration plan and exploration permit activities.

During drilling programs, the Provincial Standards for Early Exploration must be followed for both an exploration plan and an exploration permit:

## Capping and Sealing Drill Holes

If the drill hole produces water, or if it encounters underground mine opening or solution cavities, it must be sealed. Seal the drill hole at the surface and into the upper bedrock by grouting the upper 30 metres of bedrock or the entire depth of the hole, whichever is lesser.

## Marking Drill Holes Where Casings Left

Mark all drill hole locations that still have casings with durable reflective markers that are clearly visible in all seasons.

## Drill Core

Store drill core samples more than 30 metres from any permanent water body or waterway.

**The rehabilitation requirements** in the Provincial Standards must be followed. They must be done after the exploration activity is complete, or before the exploration plan or permit expires.

## Drilling Fluids and Cuttings

Contain all drilling fluids, cuttings and mud left on site. Contain them more than 30 metres from any permanent water body or waterway.

## Drill Core

Drill core left on the exploration site must be cross-piled in an orderly manner. The height must be less than 1.5 metres. The drill core pile must be more than 30 metres from any permanent water body or waterway.

**For the official and most up to date information on the rules for carrying out these exploration and rehabilitation activities, please refer to:**

- [The Mining Act](#)
- [Exploration Plans and Exploration Permits Regulation](#)
- [Provincial Standards for Early Exploration](#)

## Ministry of Northern Development & Mines Office Contact Numbers

Sudbury: (705) 670-5815

Timmins: (705) 235-1625

Thunder Bay: (807) 475-1123

