

# 3. Geology

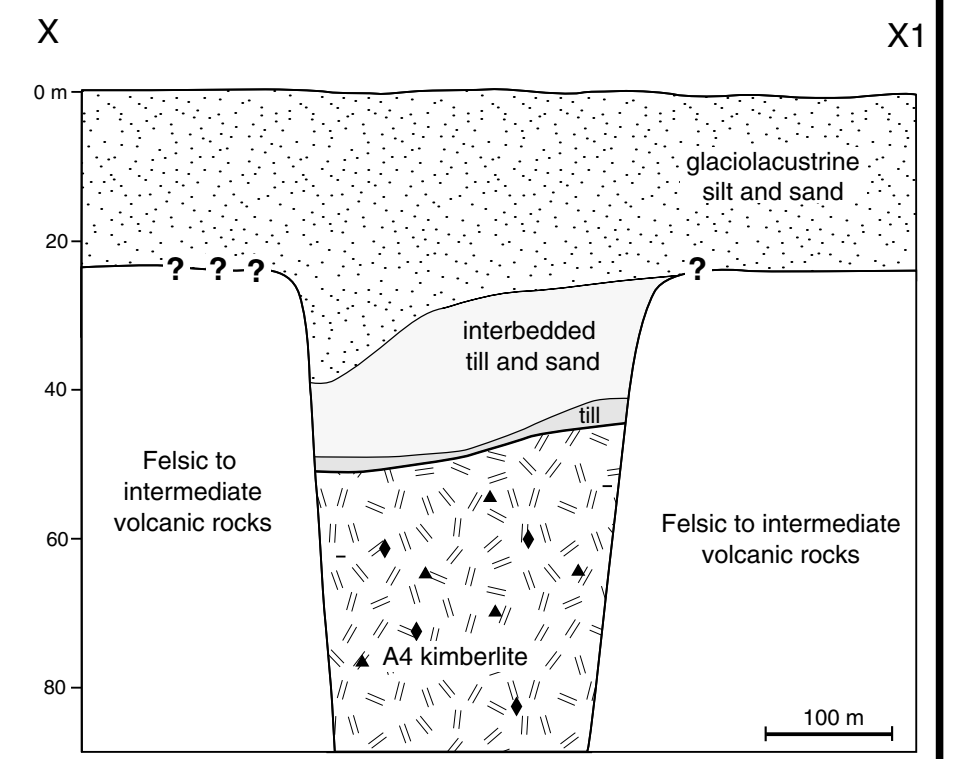
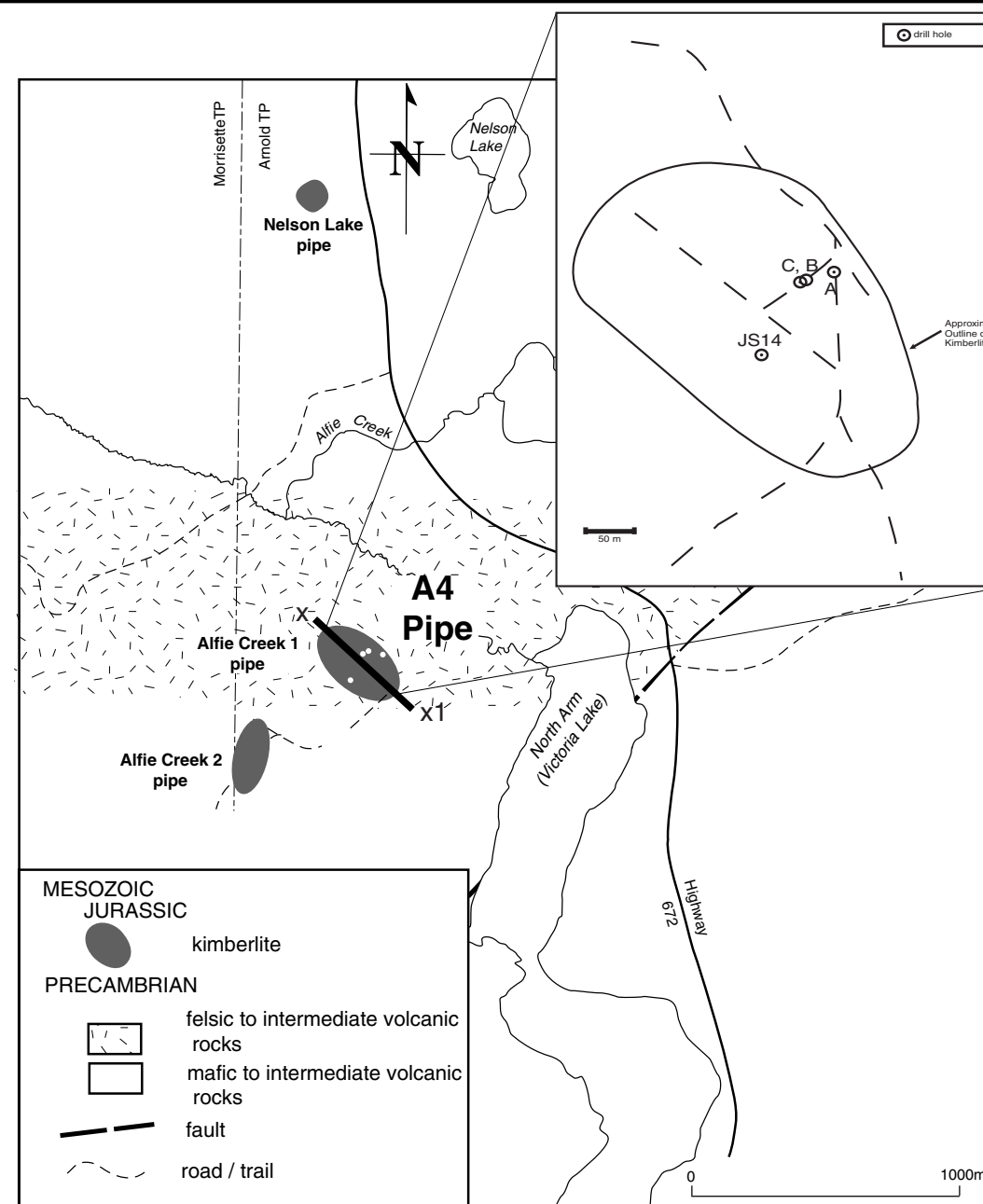
Bedrock geology of the A4 kimberlite area and location of drill holes sampled. Geology modified from Hogg (1964) and Rupert and Lovell (1970) (modified from McClenaghan et al., 1999b)

## Kimberlite A4

**Location:** in Arnold Township, located at UTM coordinates (NAD 27) 0583142 E and 5341294 N in UTM Zone 17 and is close to the North Arm of Victoria Lake.

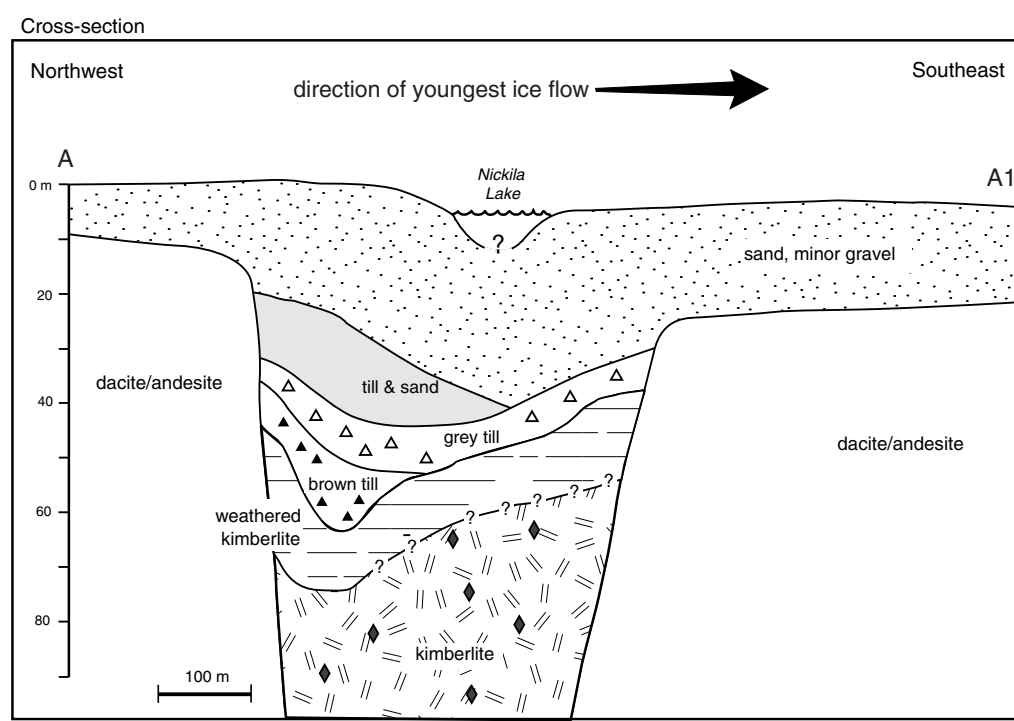
**Age:** 156Ma

**Geology:** The kimberlite contains 10 to 14 % clasts which are up to 4 mm in size and consist of limestone and calcareous mudstone, minor volcanic rock and ultramafic nodules (Brummer et al. 1992a). There are also macrocrysts of olivine, garnet, ilmenite and phlogopite that are abundant (Brummer et al. 1992a). Xenoliths of Archean metavolcanics and Paleozoic carbonates are present in sizes between <1 to 4 cm (McClenaghan et al., 1999b).

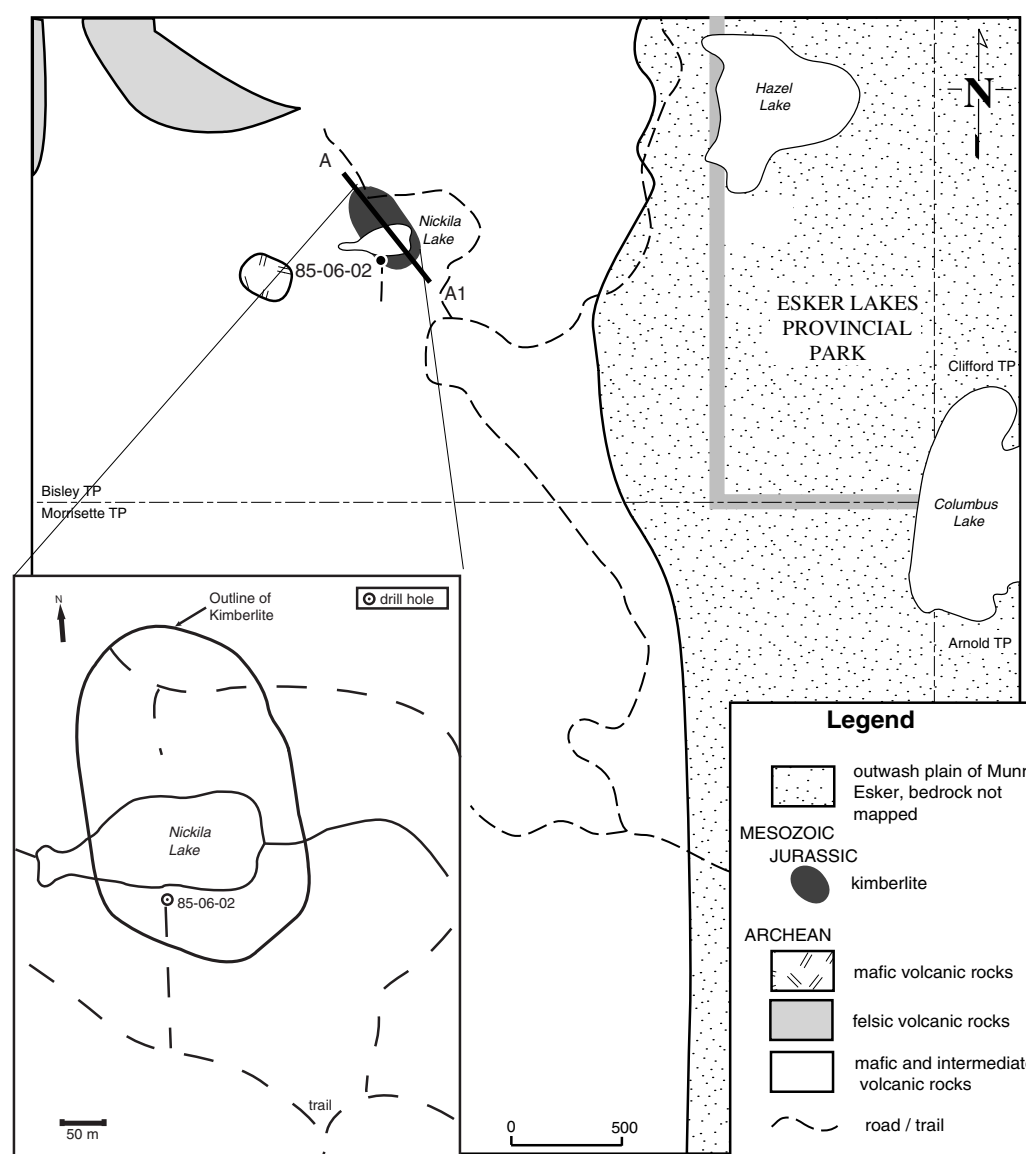


A North-south cross-section over the A4 kimberlite showing glacial sediment thickness, stratigraphy and surrounding Archean rocks (modified from McClenaghan et al., 1999b)

## Kimberlite B30



North-south cross-section of the B30 kimberlite pipe and overburden thickness (modified from McClenaghan et al., 1996).



**Location:** in Bisley Township at UTM coordinates (NAD27) 0580322 E and 5348175 N in UTM Zone 17.

**Age:** 157 Ma

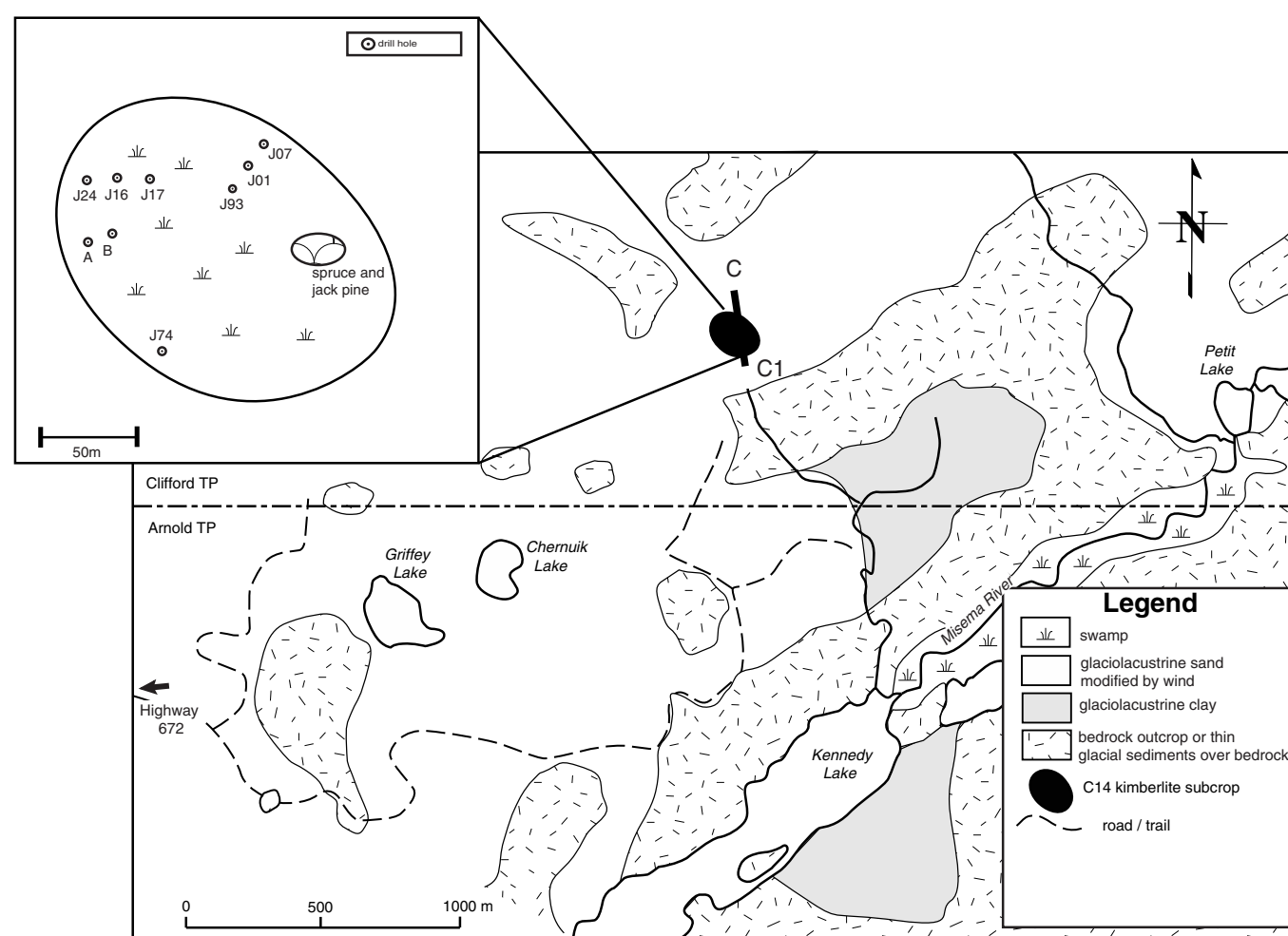
**Geology:** is lithic-tuffistic breccia to pelletal-tuffistic breccia containing 10 to 20 % xenolithic material and angular Paleozoic limestone clasts up to 2 - 3 cm. Traces of ilmenite and 4 to 5 mm serpentinized olivine megacrysts have also been found. Other nodules such as ultramafic nodules of granulites, glimmerites, peridotites, and rare eclogites as well as deformed pelletal lapillites from 1 to 10 cm are abundant (Brummer et al., 1992b).

Bedrock geology of the B30 kimberlite and location of sampled drill hole. Geology from Jensen (1972; 1982) (modified from McClenaghan et al., 1996).

**Location:** in Clifford Township, at UTM coordinate (NAD27) 0588751 E and 5348074 N in UTM Zone 17.

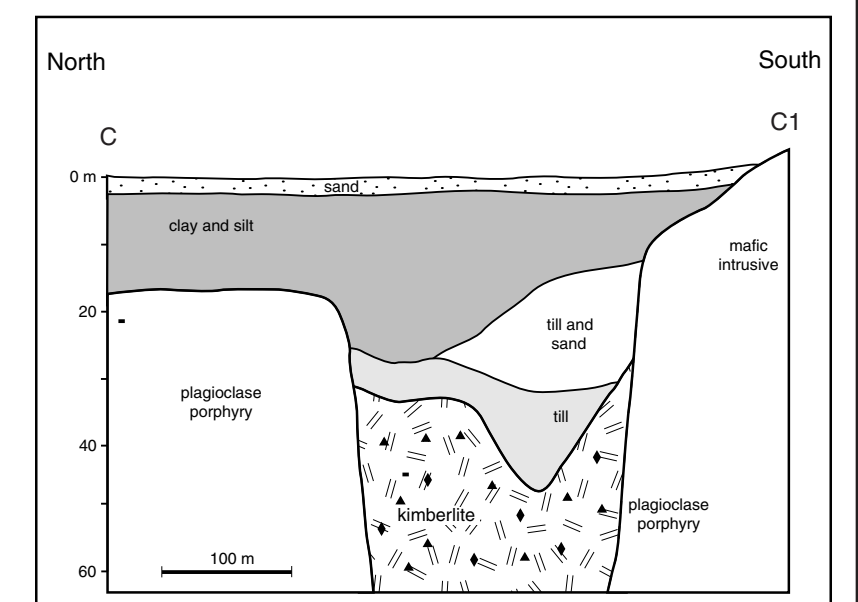
**Age:** 157 Ma

**Geology:** C14 appears to be at a transition zone between diatreme and hypabyssal facies (Sage, 1996) and the pipe contains several different phases: tuffaceous kimberlite breccia, coarse tuffaceous breccia, hypabyssal kimberlite and tuffaceous kimberlite (Brummer et al., 1992b). All phases of the kimberlite contain clasts of Paleozoic rock. The groundmass contains serpentine, phlogopite, chlorite and calcite (McClenaghan et al., 1999a). The matrix is composed of a fine-grained mixture of carbonate, chlorite and serpentine (Sage 1996).



Surficial geology of the C14 kimberlite area and locations of sampled drill holes (geology from Baker et al., 1982) (modified from McClenaghan et al., 1999a)

## Kimberlite C14



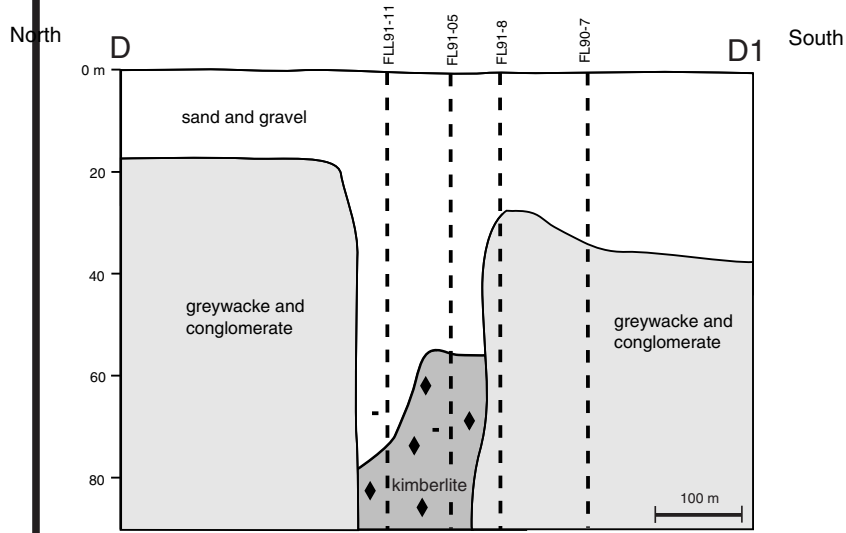
A north-south cross-section over the C14 kimberlite showing glacial stratigraphy and sediment thickness (modified from McClenaghan et al., 1999a).

## Diamond Lake

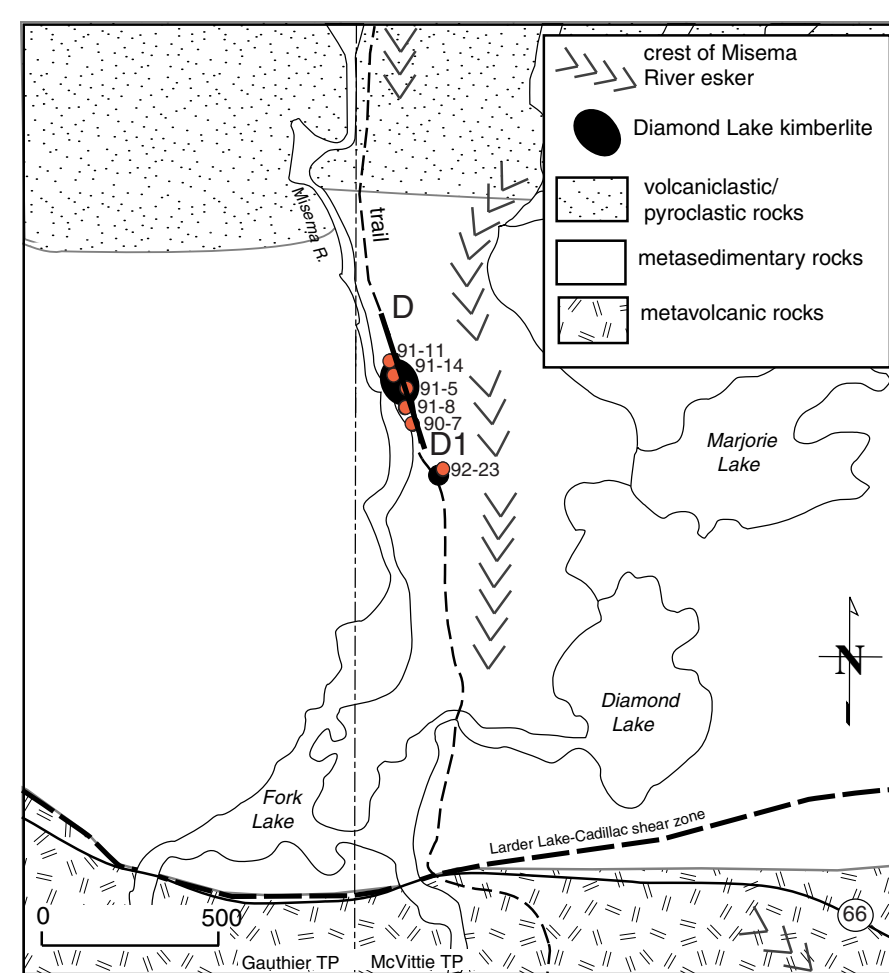
**Location:** on the west flank of the Misema River esker in McVittie Township. The UTM coordinates at the southern most point of the pipe are 0592450 E and 5329933 N (NAD27) in Zone 17.

**Age:** Between 150 and 157 Ma.

**Geology:** The kimberlite groundmass is similar in composition to other kimberlites in the Kirkland Lake region. Serpentine, phlogopite, chlorite and calcite are the major minerals (McClenaghan et al., 1998). The diatreme facies contain 15 to 25 % xenoliths and is a pelletal textured kimberlite matrix. Below the diatreme zone, in the hypabyssal zone, the rock is a fine to medium grained and is estimated to contain 50 to 75 % olivine and smaller amounts of opaques and minor garnet and phlogopite (Sage, 1996).



A north-south cross-section over the Diamond Lake kimberlite pipe #1 showing glacial sediment thickness and sampled drill holes (modified from McClenaghan et al., 1998).

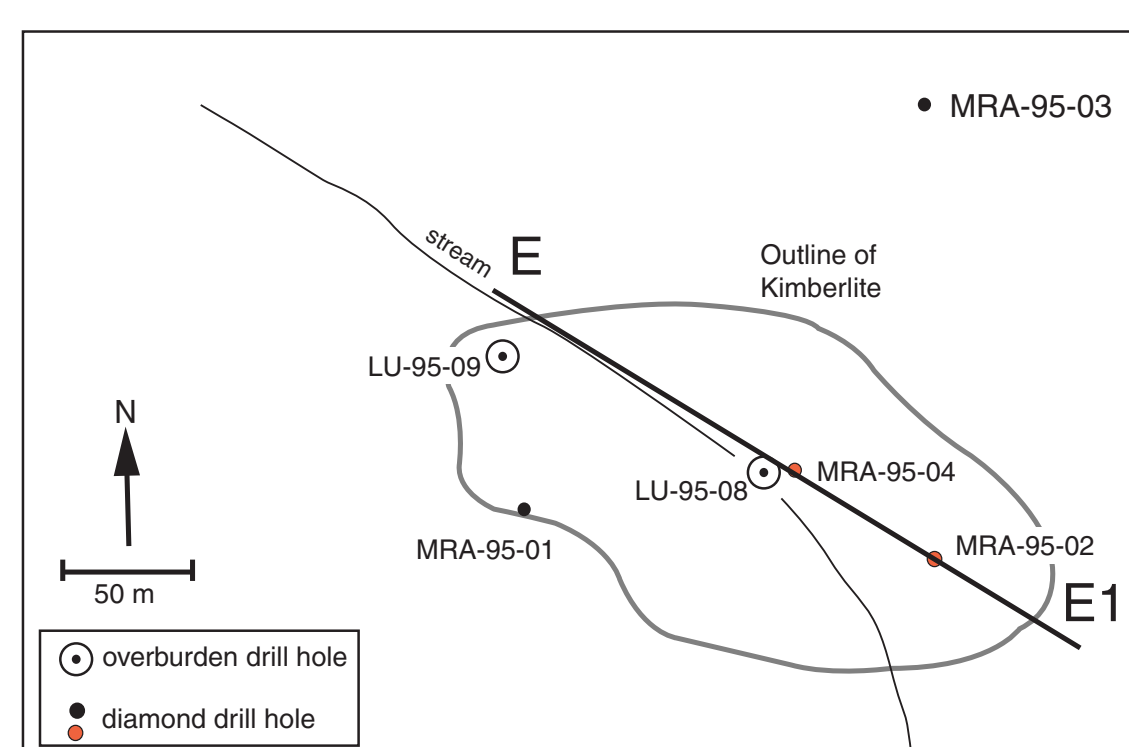


Bedrock geology of the Diamond Lake area and locations of drill holes sampled (geology from Jackson, 1995) (modified from McClenaghan et al., 1998).

**Location:** 0583334 E and 5263598 N in UTM Zone 17 (NAD27) in Lundy Township and is approximately 12 km west of to the town of New Liskeard.

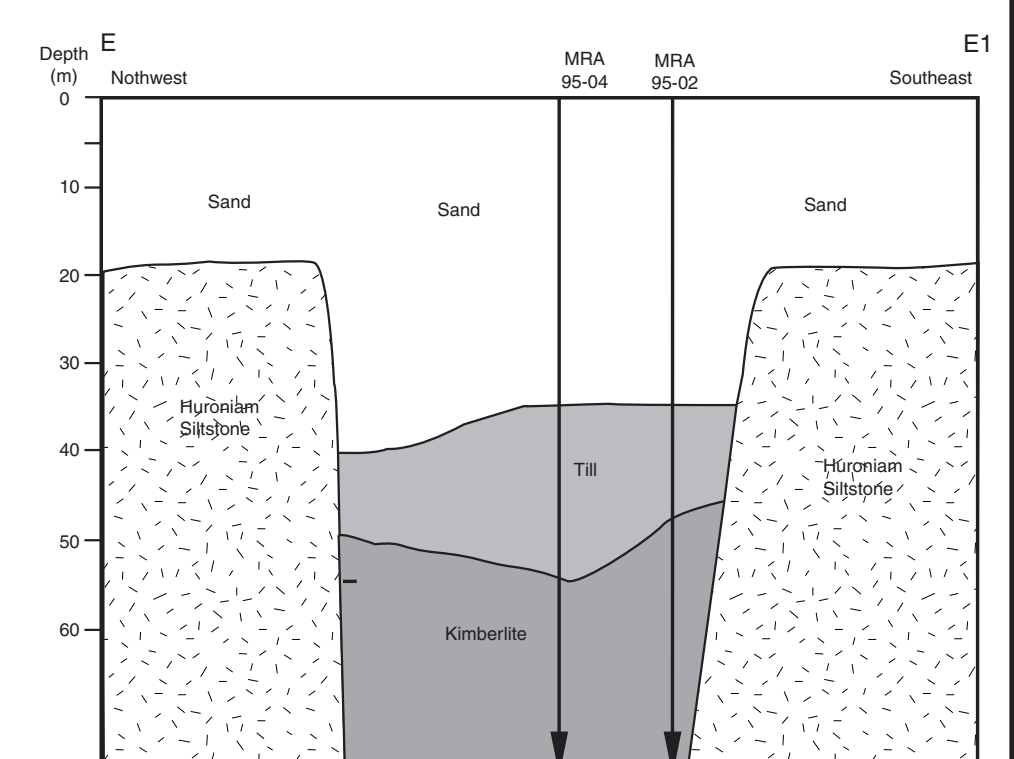
**Age:** Estimated to be between 134 to 154 Ma.

**Geology:** The groundmass is composed of serpentine, talc, pelletal mantle fragments and various amounts of country rock (Huronian siltstone, gneissic and mantle fragments). With greater depth, the kimberlite is composed of up to 30% olivine. Throughout the kimberlite various garnets are present, ilmenite, Cr-diopside and phlogopite.



92-2 kimberlite pipe and location of sampled drill holes (modified from McClenaghan 2002 - unpublished data).

## Kimberlite 95-2



Cross-section of 95-2 kimberlite and sampled holes (modified from McClenaghan, 2002 - unpublished data).