

## **Preliminary Geotechnical Investigation**

A preliminary programme of geotechnical investigation is being carried out during March and April to verify ground conditions and identify materials likely to be encountered along an assortment of possible routes for the road. Geotechnical investigation requires men and machinery to enter lands to sink boreholes, excavate trial pits and carry out probing. Personnel entering onto lands will employ appropriate bio-security measures to prevent the spread of disease and will strive to minimise damage and disturbance when carrying out the geotechnical investigation. The information collected will, in concert with the results of a wide range of other surveys and assessments, assist Roads Service to select a preferred route for the new road.

### **What is Geotechnical Investigation?**

Geotechnical investigation concerns the soils likely to be encountered during construction of the road and their properties, mainly:

- Ground moisture conditions.
- Types, strengths and quantities of materials suitable for construction.
- The extent of soft soils, acid sulphate soils and contaminated soils.
- Foundation conditions for bridges and retaining walls.

Two primary methods of ground investigation will be employed, those in which samples are retrieved from the ground for description and testing (trial pits and boreholes) and those in which the properties of the soil are described or measured in-situ (probing).

### **Methods of Exploration—Trial Pits**

Trial pits are up to 2 metres square and excavated up to a depth of 4.5 metres or so. They are normally excavated by a hydraulic back-hoe excavator (JCB or tracked digger). The use of trial pits enables the in-situ soil conditions to be examined visually, and thus the boundaries between strata and the nature of the soils to be accurately determined. Samples for laboratory tests are taken and in-situ testing may be carried out in the trial pit. Upon completion of the excavation and sampling, excavated material is returned to the trial pit, compacted in layers and the surface turf and grass replaced.

### **Methods of Exploration—Boreholes**

A light cable percussion tripod rig is normally used to sink boreholes. A typical percussion rig consists of an engine-powered winch and tripod frame which is easily collapsed for transportation. Running wheels are permanently attached so that the rig can be easily moved around behind a tractor or 4 wheel drive vehicle.

Boreholes can be up to 250mm in diameter and up to 80 metre deep. The material removed from each borehole is visually examined to determine changes in strata encountered. This allows the boundaries between strata to be accurately determined. Samples are taken from each strata encountered for laboratory testing. This allows the nature and strengths of soils to be accurately determined. Any water strikes encountered during boring are recorded.



Typical light cable percussion tripod rig

Steel standpipes may be attached to some boreholes to allow the level of the water table to be monitored. The steel standpipe normally projects about 300mm above ground level and is left in place for about 12 months. Fencing will be erected around standpipes to protect livestock and to prevent damage to farm machinery. Boreholes (except those fitted with standpipes) will be backfilled on completion.

### **Methods of Exploration—Probing**

Probing requires a small diameter steel probe to be forced into the ground to obtain an indication of the character of the underlying soils. Small scale probing can be carried out using hand operated equipment. More extensive probing is carried out using mobile equipment mounted on a proprietary tracked vehicle.