

Geotechnical investigations

What is required?

Geotechnical investigations are conducted during reference and detailed design phases by specialist subcontractors and consultants contracted to Inland Rail.

Boreholes and test pit excavations are required for investigating the ground conditions of existing rail corridors and new areas where an alignment for rail needs to be identified. Samples are collected and sent to laboratories for testing.

Depending on the location and extent of drilling required, permits from government agencies may be required before any drilling can start. These may be needed for vegetation clearing, potential disturbance to animals and their habitat and also for the potential disturbance and management of cultural heritage artefacts. Inland Rail obtains all necessary permits prior to beginning geotechnical investigations.

How we work with you

Working with landowners is a critical part of our planning and consultation. To undertake an investigation on your land we work with you to prepare a Land Access Agreement.

As part of these negotiations, we discuss your expectations and requirements of our field teams when they are doing geotechnical investigations on your land.

We also advise you of the type of investigation we'll conduct on your property and agree how we access the survey site.

Timing of the work

Our investigations usually occur during daylight hours. If we need to complete works outside of this period, agreements will be made between you, Inland Rail and the contracted parties, in accordance with the Land Access Agreement.

Multiple vehicles and machinery operate on-site during daylight hours. Occasionally in remote or hard to reach areas, vehicles and equipment remain on-site overnight or on weekends with security present.

Need to know



Geotechnical investigations help us understand the type and strength of ground conditions so we can ensure Inland Rail is safely designed and constructed.



We develop Land Access Agreements with landowners prior to doing any geotechnical investigations to ensure we understand your expectations for working on your property.



Geotechnical investigations range from visual surveying of land to collecting soil samples by digging test pits or drilling boreholes.



Inland Rail is a 1,600km fast freight rail line between Brisbane and Melbourne that is connecting businesses, manufacturers and producers to national and global markets and generating opportunities for industries and regions during construction and beyond.



Delivering Inland Rail will help shift more goods onto rail and take tens of thousands of large trucks off our roads. This means faster, more reliable freight; safer, less congested roads; and fewer emissions.

Boreholes: what is involved?

- A truck with a drilling rig and a support vehicle, which is typically a 4WD ute with a 1,500-2,000L water tank.
- The work area for drilling a borehole is usually 20m x 20m, but this varies depending on the investigation type and surrounding geography.
- The hole bored is 100mm in diameter and the depth drilled varies. An investigation hole for a bridge foundation pile may be up to 50m deep depending on ground conditions and the anticipated load on structure foundations.
- The time taken to drill the hole varies with depths of 20-25m able to be drilled in a day.
- Wastewater is managed appropriately to suit each site.

Work is done by a lead driller, an engineering geologist (who logs the drilling activity and earth samples) and, where appropriate, a cultural heritage representative.

An Inland Rail supervisor may be present on site.

Test pits: what is involved?

Test pit excavations require an excavator, backhoe or similar and a support vehicle.

The work area for a test pit is generally smaller than 15m x 10m. Some earthworks and vegetation clearing might be required to prepare the site.

Investigations for shallow embankment and formation works may require a 2-3m deep trench excavation.

Work is done by an excavator or backhoe operator, an engineering geologist and, where appropriate a cultural heritage representative. An Inland Rail supervisor may be present on site.

Site rehabilitation

When a borehole is completed, it is backfilled with the soil removed during drilling, capped with a cement grout mixture and left with a slightly raised or mounded surface, which may compact over time.

Test pit sites are backfilled and left with a slightly raised or mounded surface as the soil will compact over time.

Ongoing site monitoring

In some boreholes, we install a measuring device called a piezometer to monitor groundwater levels within the borehole. Once installed, the borehole is backfilled with sand and cement grout and covered with a small locking cover that is level with the ground surface.



An engineer obtains data and maintains the data loggers on site. This usually occurs at two and six-week intervals and then annually. The piezometer is left in the location for at least 12 months, so we can understand seasonal groundwater changes.

At the end of the monitoring program, the piezometer is removed and the borehole is rehabilitated.

Ensuring site safety

All vehicles accessing private property, outside of road and rail corridors, use a weed and seed wash-down facility to prevent the introduction of noxious weeds. Weed and seed procedures are established relevant to specific areas of investigation.

The drill rig and support vehicles are equipped with spill kits appropriate to the fuels, oils and chemicals used in the drilling process. Any spills are promptly cleaned up and contaminated materials hauled to the appropriate disposal site in a manner consistent with regulatory requirements. Bins are provided at work sites for all waste types.

Sites are maintained daily. All waste produced is collected and recycled where practical or disposed of at an approved disposal facility.

Water used during drilling is contained in a purpose-built tank and recirculated until the hole is completed. This ensures drilling fluids do not enter any surrounding waterways.

The work areas are backfilled with excavated material as soon as practicable after work is finished in each location. No sediment laden run-off is discharged directly or indirectly into drains or waterways.