



Australian Government

MSL974002 Conduct geotechnical site investigations

Release: 1

MSL974002 Conduct geotechnical site investigations

Modification History

Release 1. Supersedes and is equivalent to MSL974002A Conduct geotechnical site investigations

Application

This unit of competency covers the ability to prepare for and conduct and conclude site activities, such as excavations, sampling and testing as part of a geotechnical investigation team. Personnel are expected to solve common site problems and seek advice to deal with situations beyond their own technical competence.

This competency is typically performed by laboratory technicians working under the guidance of a geotechnical paraprofessional or engineer.

This unit of competency is applicable to laboratory technicians working in the construction, mining and drilling industry sectors.

While no specific licensing or certification requirements apply to this unit at the time of publication, laboratory operations are governed by relevant legislation, regulations and/or external accreditation requirements. Local requirements should be checked.

Pre-requisite Unit

Nil

Competency Field

Testing

Unit Sector

Elements and Performance Criteria

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

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|---|---------------------------------------|-----|--|
| 1 | Prepare for on-site operations | 1.1 | Identify the job, location, work instructions, appropriate sampling and test procedures and safety requirements |
| | | 1.2 | Identify site hazards and identify appropriate personal protective equipment (PPE) and safety procedures that are specified for the job and materials used |
| | | 1.3 | Record description of the job to be undertaken, compare |

- with specification and report any variations
- 1.4 Arrange for the collection, checking, stowing and transport of all tools, equipment and materials required at the site
 - 1.5 Ensure site access requirements, such as entry permits and safety inductions, have been organised
- 2 **Arrange excavation of boreholes, test pits and/or trenches**
- 2.1 Identify the sampling/testing location
 - 2.2 Excavate or oversee excavation to the sampling and testing depth, minimising disturbance and potential contamination of the site
 - 2.3 Identify materials and record changes of strata, test results and other relevant information
 - 2.4 Ensure materials from different strata are kept separate
 - 2.5 Terminate the excavation at the appropriate depth and record the reason for termination
- 3 **Conduct site sampling**
- 3.1 Prepare and check sampling equipment and materials
 - 3.2 Take disturbed and undisturbed samples in accordance with workplace methods and procedures
 - 3.3 Label and record samples in accordance with workplace methods and procedures
 - 3.4 Recognise and record details of site conditions that may impact on sample integrity or site interpretation
- 4 **Conduct testing**
- 4.1 Prepare and conduct pre-use checks of test equipment
 - 4.2 Perform, or assist with performing, tests in accordance with test methods or workplace procedures
 - 4.3 Record test data in accordance with test methods or workplace procedures
 - 4.4 Recognise obvious errors or atypical data and take appropriate corrective actions

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|---|---|--|
| 5 | Finalise site operations | <ul style="list-style-type: none">5.1 Backfill or seal any excavation and ensure that it is left in a safe and uncontaminated condition5.2 Reinstate surfaces disturbed by sampling or testing5.3 Clean all equipment (and vehicle, as necessary) avoiding environmental damage, stormwater contamination or spread of pests5.4 Check all equipment and materials prior to re-stowing them for safe transport5.5 Handle and transport samples in accordance with established practices5.6 Notify appropriate site personnel on completion of investigations and prior to leaving site5.7 Check serviceability of test equipment before storage on return to base |
| 6 | Maintain records | <ul style="list-style-type: none">6.1 Maintain equipment records in accordance with established practices6.2 Complete site safety plans, equipment logs and test reports in accordance with workplace procedures6.3 Maintain confidentiality of workplace information |
| 7 | Maintain a safe work environment | <ul style="list-style-type: none">7.1 Use safe work procedures and PPE to ensure personal safety and that of others7.2 Minimise environmental impacts of testing/sampling and generation of waste7.3 Collect and/or dispose of all waste in accordance with workplace procedures |

Foundation Skills

This section describes those language, literacy, numeracy and employment skills that are essential to performance.

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

Range of Conditions

This field allows for different work environments and conditions that may affect performance. Essential operating conditions that may be present (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) are included.

Standards, codes, procedures and/or workplace requirements

Standards, codes, procedures and/or workplace requirements include the latest version of one or more of:

- Australian and international standards covering the requirements for the competence of testing and calibration laboratories, laboratory safety, quality management and environmental management
- national work health and safety (WHS) standards and codes of practice, national measurement regulations and guidelines, and environmental legislation and regulations
- standard methods for sampling and testing construction materials, such as soils, aggregates, concrete and asphalt
- specific codes, guidelines, procedures and methods, such as:
 - AustRoads test methods, and State/Territory Road Authority test methods
 - National Association of Testing Authorities (NATA) documents regarding construction materials testing (Field application document)
- workplace documents, such as standard operating procedures (SOPs); quality and equipment manuals; calibration and maintenance schedules; material safety data sheets (MSDS) and safety procedures; material, production and product specifications; production and laboratory schedules; workplace recording and reporting procedures; waste minimisation and safe disposal procedures; and maps and site plans
- sampling and testing procedures for specific sites, clients and samples

Common site problems

Common site problems include, but are not limited to, one or more of:

- caving in of excavation walls
- drilling difficulties

- not knowing the requirements of the design engineer
- not understanding the nature of the item being designed (e.g. retaining wall, piled structure and earthworks)
- sample loss during retrieval
- knowing when to stop a hole, or what and when to test and sample
- misidentification of samples and sampling locations
- equipment breakdown and breakage
- environmental problems and issues, including site access, inclement weather, traffic, wildlife, vegetation and construction activities

Site hazards

Site hazards include, but are not limited to, one or more of:

- solar radiation, dust and noise
- manual handling of heavy materials and equipment
- working in/on trenches, confined spaces, wet and uneven surfaces, heights and slopes
- vehicular and pedestrian traffic
- underground services, such as gas and electricity
- working close to earth moving equipment, trucks and overhead loads

Safe work procedures Safe work procedures include, but are not limited to, one or more of:

- locating site services before investigations commence
- use of signage, barriers, flashing lights and traffic control
- use of PPE, such as hard hats, hearing protection, gloves, goggles, coveralls and safety boots
- use of MSDS
- use of machinery guards
- recognising and observing hazard warnings and safety signs/barriers
- handling and storing hazardous material and equipment in accordance with labels, MSDS, manufacturer instructions, and workplace procedures and regulations
- labelling of samples, reagents and hazardous materials
- regularly cleaning equipment and vehicles
- following established manual handling procedures

WHS and environmental

WHS and environmental management requirements:

- complying with WHS and environmental management

**management
requirements**

requirements at all times, which may be imposed through state/territory or federal legislation. These requirements must not be compromised at any time

- applying standard precautions relating to the potentially hazardous nature of samples

Unit Mapping Information

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Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=5c63a03b-4a6b-4ae5-9560-1e3c5f462baa>

Assessment Requirements for MSL974002 Conduct geotechnical site investigations

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Performance Evidence

Evidence of competence in this unit must satisfy all of the requirements of the elements and performance criteria, and include demonstration of:

- preparing for, safely conducting and concluding at least two (2) geotechnical site investigations
- interpreting maps, site plans and drawings accurately
- identifying and locating site services at sampling and testing sites
- accurately identifying, interpreting and reporting site features and geotechnical conditions; soil, rock and fill materials
- collecting representative samples and handling and transporting them in accordance with workplace procedures
- performing basic in situ tests and site measurements (e.g. location and depth)
- minimising environmental impacts and generation of waste while conducting site investigations
- identifying and solving common site problems
- seeking timely advice to deal with situations beyond own technical competence
- providing accurate sampling and testing data, site information and work results within the expected timeframe
- preparing test reports and maintaining accurate and complete records
- efficiently setting up, checking, using and cleaning/maintaining tools and equipment
- collecting, storing and disposing of waste in accordance with workplace procedures.

Knowledge Evidence

Must provide evidence that demonstrates knowledge of:

- concepts, purposes and principles of geotechnical site investigations conducted as part of job role
- site safety and management rules, including safety induction, risk assessments, controlled entry/exit to site and required personal protective equipment (PPE)
- common site problems and recommended corrective actions
- identification and classification of soil, rock and fill materials
- uses and engineering properties of soil and rock materials
- principles of representative sampling and testing
- in situ testing methods used in job role

- relevant hazards, work health and safety (WHS) and environment requirements.

Assessment Conditions

- Judgment of competence must be based on holistic assessment of the evidence. Assessment methods must confirm consistency of performance over time, rather than a single assessment event.
- This unit of competency is to be assessed in the workplace or a simulated workplace environment. A simulated workplace environment must reflect realistic operational workplace conditions that cover all aspects of workplace performance, including the environment, task skills, task management skills, contingency management skills and job role environment skills.
- Foundation skills are integral to competent performance of the unit and should not be assessed separately.
- Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.
- Knowledge evidence may be collected concurrently with performance evidence or through an independent process, such as workbooks, written assessments or interviews (provided a record is kept in each case).
- This unit of competency may be assessed with:
 - MSL952002 Handle and transport samples or equipment
 - MSL954001 Obtain representative samples in accordance with sampling plan
 - MSL973001 Perform basic tests
- Holistic assessment methods include:
 - review of the candidate's work outputs, such as plans and reports of investigations conducted; site sampling and test data
 - feedback from peers and supervisors about the candidate's conduct of geotechnical investigations safely, efficiently and in accordance with work instructions
 - examples of workplace documentation completed by the candidate, such as site plans, equipment logs and site investigation reports
 - observation of the candidate performing geotechnical sampling, testing and site reinstatement tasks
 - oral or written questioning about safety procedures, sampling and testing procedures, dealing with common site problems and interpretation of site data.
- Access is required to instruments, equipment, materials, workplace documentation, procedures and specifications associated with this unit, including, but not limited to:
 - access to geotechnical sites and relevant site documentation
 - workplace procedures, sampling plans, test methods and equipment manuals
 - consumables; hand tools; field sampling and test equipment, such as dynamic cone penetration (DCP) testing, standard penetration testing (SPT), shear vane, pocket penetrometer and water level indicator
 - excavation equipment, such as hand and power augers, powered excavators, generators and jack hammers
 - safety clothing and equipment, including helmets, boots, gloves, earmuffs and glasses.

- Assessors must satisfy the assessor competency requirements that are in place at the time of the assessment as set by the VET regulator.
- The assessor must demonstrate both technical competence and currency.
- Technical competence can be demonstrated through:
 - relevant VET or other qualification/Statement of Attainment AND/OR
 - relevant workplace experience.
- Currency can be demonstrated through:
 - performing the competency being assessed as part of current employment OR
 - having consulted with a laboratory about performing the competency being assessed within the last twelve months.

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