



**Australian Government**

**Department of Education, Employment and Workplace Relations**

# **CPPSIS5018A Conduct an engineering survey**

**Release: 1**

## **CPPSIS5018A Conduct an engineering survey**

### **Modification History**

Not Applicable

### **Unit Descriptor**

#### **Unit descriptor**

This unit of competency specifies the outcomes required to conduct an engineering survey on engineering and construction sites. It requires the ability to plan approaches to engineering contingencies and management requirements. Functions would be carried out within organisational guidelines.

### **Application of the Unit**

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This unit of competency supports the application of managing teams, sound communication, sound use of technology, designing data and implementing specifications. The skills and knowledge acquired upon completion of this unit would support the needs of employees in surveying.

Licensing, legislative, regulatory and certification requirements may impact on this unit. Incorporate these requirements according to state, territory and federal legislation.

### **Licensing/Regulatory Information**

Refer to Application of the Unit

## Pre-Requisites

**Prerequisite units** Nil

## Employability Skills Information

**Employability skills** The required outcomes described in this unit of competency contain applicable facets of employability skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged, will assist in identifying employability skills requirements.

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where ***bold italicised*** text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

### ELEMENT

### PERFORMANCE CRITERIA

#### 1 Plan the task.

- 1.1 *Objectives*, principal work activities and *constraints* are defined and documented with written survey specifications.
- 1.2 Details of instruments and basic *techniques* to be used are evaluated and determined.
- 1.3 *Design* is interpreted to identify *surveying data*.
- 1.4 Pertinent *legal and statutory standards* and requirements, and *OHS* standards are considered and adhered to.
- 1.5 Skills and knowledge are updated to accommodate changes in engineering surveys.

#### 2 Execute the task.

- 2.1 Work is scheduled to be completed within *time available*.
- 2.2 *Project management mechanisms* are implemented to measure, record and report progress of activities in relation to the agreed schedule and plans.
- 2.3 Identified survey components are measured.
- 2.4 Measured survey data is reduced to the project reference system for comparison with design.
- 2.5 Impact of *contingencies* and problems are managed.
- 2.6 *Measurements* are validated and recorded according to *specifications*.
- 2.7 Checks are completed according to *organisational guidelines*.
- 2.8 *Equipment* is checked to be in good working order.
- 2.9 *Manufacturer specifications* with regard to the use of equipment are complied with.
- 2.10 Processes are followed that comply with relevant *legislation* and *company policy*.

#### 3 Finalise the task.

- 3.1 *Relevant personnel* are informed of the results according to organisational guidelines.
- 3.2 *Required documentation* is completed according to organisational guidelines.
- 3.3 Survey data is archived according to project specifications.

#### 4 Review the task.

- 4.1 Review of achievements against objectives is undertaken.

## Required Skills and Knowledge

### REQUIRED SKILLS AND KNOWLEDGE

This section describes the essential skills and knowledge and their level, required for this unit.

#### Required skills:

- ability to relate to people from a range of social, cultural and ethnic backgrounds and with a range of physical and mental abilities
- analytical skills
- ability to translate requirements into design
- communication skills to:
  - consult effectively with clients and colleagues
  - impart knowledge and ideas through oral, written and visual means
- computer skills (high technical user level) to complete business documentation
- information management
- instrument use (high level)
- literacy skills to:
  - assess and use workplace information
  - locate and interpret legislation and other written documentation
  - prepare and manage documentation
  - read and write technical reports
  - research and evaluate
- negotiation skills
- numeracy skills to:
  - analyse errors
  - conduct image analysis
  - interpret and analyse statistics
  - perform mental calculations
  - record with accuracy and precision
  - undertake high level computations
- organisational skills to:
  - coordinate technical and human resource inputs to research activities
  - prioritise activities to meet contractual requirements
- planning
- spatial skills to:
  - display proficiency in the operation of engineering equipment
  - exercise precision and accuracy in relation to spatial and aspatial data design
  - perform spatial data archival and retrieval and train others in this task
  - perform spatial data management and manipulation and train others in this task

## REQUIRED SKILLS AND KNOWLEDGE

- perform file management and train others in this task
- solve problems relating to height, depth, breadth, dimension, direction and position in actual operational activity and virtual representation
- understand implications of height, depth, breadth, dimension and position to actual operational activity and virtual representation
- team leadership.

### Required knowledge and understanding:

- abilities of work teams
- accuracy and precision requirements
- data capture and data set out
- calibration of specialised surveying equipment
- data formats
- data management
- data reduction and manipulation techniques
- guidelines of projects
- industry standards
- legislative, statutory and industry requirements and standards
- limitations of the guidelines relating to equipment, measuring and analysis
- organisational policies and guidelines, such as OHS guidelines
- planning and control processes
- project review procedures
- safe work practices
- surveying reference systems
- surveying data capture and data set out methodologies
- understanding and application of high-level, relevant engineering-related tasks and associated computations
- use of surveying equipment for data capture and data set out.

## Evidence Guide

### EVIDENCE GUIDE

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, the range statement and the Assessment Guidelines for this Training Package.

#### Overview of assessment

This unit of competency could be assessed on its own or in combination with other units relevant to the job function, for example units CPPSIS5019A Conduct an engineering surveying project, and CPPSIS5027A Carry out a precision survey.

**Critical aspects for assessment and evidence required to demonstrate competency in this unit**

A person who demonstrates competency in this unit must be able to provide evidence of:

- matching objectives with resources to ensure project proceeds in an organised and timely manner
- ensuring that achievement of required accuracy has been attempted by:
  - accessing and interpreting design information to identify the components to be measured and monitored
  - applying solutions to a range of problems
  - performing measurements
  - planning resources
  - managing contingencies
  - documenting and reporting
- ensuring that non-conformity aspects are recorded and reported
- taking responsibility for team outputs in work and learning.

**Specific resources for assessment**

Resource implications for assessment include access to:

- assessment instruments, including personal planner and assessment record book
- assignment instructions, work plans and schedules, policy documents and duty statements
- registered training provider of assessment services
- relevant guidelines, regulations and codes of practice
- suitable venue and equipment.

Access must be provided to appropriate learning and assessment support when required.

Where applicable, physical resources should include equipment modified for people with disabilities.

**Context of assessment**

Holistic: based on the performance criteria, evidence guide, range statement, and required skills and knowledge.

**Method of assessment**

Demonstrated over a period of time and observed by the assessor (or assessment team working together to conduct the assessment).

Demonstrated competency in a range of situations, that may include customer/workplace interruptions and involvement in related activities normally experienced in the workplace.

Obtained by observing activities in the field and reviewing

induction information. If this is not practicable, observation in realistic simulated environments may be substituted.

### **Guidance information for assessment**

Assessment requires that the clients' objectives and industry expectations are met. If the clients' objectives are narrowly defined or not representative of industry needs, it may be necessary to refer to portfolio case studies of a variety of spatial information services requirements to assess competency.

Oral questioning or written assessment and hypothetical situations (scenarios) may be used to assess underpinning knowledge (in assessment situations where the candidate is offered a preference between oral questioning or written assessment, questions are to be identical).

Supplementary evidence may be obtained from relevant authenticated correspondence from existing supervisors, team leaders or specialist training staff.

All practical demonstration must adhere to the safety and environmental regulations relevant to each State or Territory.

Where assessment is for the purpose of recognition (recognition of current competencies [RCC] or recognition of prior learning [RPL]), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge.

Assessment processes will be appropriate to the language and literacy levels of the candidate and any cultural issues that may affect responses to the questions, and will reflect the requirements of the competency and the work being performed.

## **Range Statement**

### **RANGE STATEMENT**



The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. ***Bold italicised*** wording in the performance criteria is detailed below. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

- Objectives*** may include:
- agreed client requirements
  - written survey specifications.
- Constraints*** may include:
- coverage
  - datum
  - environmental factors
  - industry requirements
  - legal and statutory
  - financial
  - resource availability
  - time.
- Techniques*** may include:
- field procedures
  - office procedures.
- Design*** may include:
- digital information
  - hard copy plans
  - maps
  - written instructions.
- Surveying data*** may include:
- depth
  - dimension
  - direction
  - flow rates
  - position
  - slope.
- Legal and statutory standards*** may include:
- local government requirements
  - national standards
  - state statutes and regulations.
- OHS*** may include:
- Australian standards
  - development of site safety plan
  - identification of potential hazards
  - inspection of work sites
  - training staff in OHS requirements
  - use of personal protective clothing
  - use of safety equipment and signage.
- Time available*** may involve estimates for time duration of project, including:
- client instructions
  - consideration of contingencies
  - consideration of past project experiences
  - experience of project personnel
  - location of project

- methods to be employed
  - resources and equipment to be used.
- Project management mechanisms*** may include:
- communicating with stakeholders
  - resolving disputes
  - monitoring and adjusting key milestones.
- Contingencies*** may include:
- equipment failure
  - injury to personnel
  - personnel turnover
  - observation errors
  - obstructions to project plan
  - weather.
- Measurements*** may include use of:
- current meter
  - echo sounder
  - global positioning system (GPS)
  - level
  - remote sensing
  - tape
  - tide gauge
  - total station.
- Specifications*** may include:
- detailed technical descriptions of survey data and its requirements
  - preparation of cross-sections and plans with all information included.
- Organisational guidelines*** may include:
- appropriate timelines
  - code of ethics
  - company policy
  - final product formats
  - formal design parameters
  - legislation relevant to the work or service function
  - manuals
  - OHS policies and procedures
  - personnel practices and guidelines outlining teamwork, work roles and responsibilities
  - requirements for data processing.
- Equipment*** may include:
- GPS
  - level
  - tape
  - total station.
- Manufacturer specifications*** may include:
- equipment specifications
  - operator manuals.

- Legislation** may include:
- Australian standards
  - award and enterprise agreements
  - certification requirements
  - codes of practice
  - equal employment opportunity (EEO)
  - quality assurance requirements.
- Company policy** may include:
- internal and external communication guidelines
  - company OHS standards
  - customer service standards
  - company goals, such as mission statement
  - governance guidelines
  - guidelines on the use of equipment
  - operational manuals
  - operational plan
  - strategic plan.
- Relevant personnel** may include:
- colleagues
  - registered surveyors
  - company personnel
  - staff or employee representatives
  - supervisors or line managers
  - suppliers
  - users.
- Required documentation** may include:
- electronic or paper-based correspondence with client
  - field records
  - final report
  - records of conversation
  - survey plots
  - organisational work activity sheets.

## Unit Sector(s)

Unit sector                      Spatial information services