



Australian Government

CPPSIS5049A Conduct an engineering surveying project

Release 1

CPPSIS5049A Conduct an engineering surveying project

Modification History

Unit revised and not equivalent to CPPSIS5019A Conduct an engineering surveying project
Element structure, performance criteria, and critical aspects reviewed to reflect workplace requirements

Skills and knowledge requirements and the range statement updated

Unit Descriptor

This unit of competency specifies the outcomes required for designing, computing and setting out basic engineering surveying projects. It requires the ability to plan and execute technical project activity within set deadlines. Functions would be carried out within organisational guidelines.

Application of the Unit

This unit of competency supports the application of managing teams, sound communication skills, 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/Regulatory Information

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

Pre-Requisites

Nil

Employability Skills Information

This unit contains employability skills.

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

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|---|-----------------------------|-----|---|
| 1 | Identify project. | 1.1 | Project activities are identified according to organisational requirements. |
| | | 1.2 | <i>Organisational priorities</i> are determined in line with project specifications. |
| 2 | Organise project resources. | 2.1 | Characteristics of the <i>operating environment</i> and any special <i>equipment</i> or resource requirements are identified according to <i>organisational guidelines</i> . |
| | | 2.2 | Higher authority endorsements are obtained where necessary to ensure that the use of resources and equipment is in line with <i>project objectives</i> . |
| | | 2.3 | Equipment is checked to be in good working order. |
| | | 2.4 | <i>Manufacturer specifications</i> with regard to the use of equipment are complied with. |
| | | 2.5 | Project objectives comply with relevant <i>legislation</i> and <i>company policy</i> . |
| 3 | Plan the tasks. | 3.1 | Project objectives, <i>principal work activities</i> and <i>constraints</i> are defined and documented according to <i>surveying data</i> specifications and <i>client requirements</i> . |
| | | 3.2 | Survey <i>design</i> is interpreted to identify surveying data. |
| | | 3.3 | Agreed communication processes between project members, <i>client</i> and other <i>stakeholders</i> are implemented and maintained. |

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|---|---------------------------------|-----|---|
| | | 3.4 | OHS and legislative requirements are incorporated into project risk management plan. |
| | | 3.5 | Pertinent legal and statutory standards are researched, considered and adhered to. |
| 4 | Manage and monitor the project. | 4.1 | Work is scheduled to be completed within time available . |
| | | 4.2 | Project management mechanisms are implemented to measure, record and report progress of activities in relation to the agreed schedule and plans. |
| | | 4.3 | Identified surveying components are accurately measured. |
| | | 4.4 | Measured surveying data is reduced to project surveying reference system for comparison with design. |
| | | 4.5 | Measurements are validated and recorded according to project specifications . |
| | | 4.6 | Contingencies and constraints are managed to ensure project specifications are met. |
| | | 4.7 | OHS requirements are adhered to. |
| | | 4.8 | Quality assurance processes are implemented based on the project plan. |
| 5 | Finalise the project. | 5.1 | Relevant personnel are informed of the results according to organisational guidelines. |
| | | 5.2 | Required documentation is completed according to organisational guidelines. |
| | | 5.3 | Surveying data is archived according to project specifications. |

Required Skills and Knowledge

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

Required skills

- communication skills to:
 - consult effectively with clients and colleagues
 - impart knowledge and ideas through oral, written and visual means
 - initiative and enterprise skills to translate requirements into design
- literacy skills to:
 - assess and use workplace information
 - manage information
 - read and write technical reports
 - research and evaluate
- 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
- spatial skills to:
 - display proficiency in the operation of surveying equipment
 - exercise precision and accuracy in relation to spatial and aspatial data design
 - archive and retrieve spatial data
 - manage and manipulate spatial data
 - manage files
- technology skills to:
 - use computers to complete project documentation
 - use instruments as part of engineering surveying projects

Required knowledge

- accuracy and precision requirements
- data capture and data set out

- calibration of specialised surveying equipment
- data formats
- data management
- data reduction and manipulation techniques
- engineering-related tasks and associated computations
- 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 equipment requirements for data capture and data set out
- surveying reference systems
- surveying data capture and data set out methodologies

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 CPPSIS5048A Conduct an engineering survey, CPPSIS5050A Create engineering drawings and CPPSIS5057A 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:

- accessing and interpreting design information to identify the components to be measured and monitored
- managing contingencies
- performing measurements
- reducing and manipulating spatial data
- recording and reporting non-conformity aspects
- knowledge of engineering surveying processes.

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 surveying and 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

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.

Organisational priorities may include:

- client focus
- external influence and focus
- financial priorities
- internal influence and focus
- operational plan
- strategic plan.

- Operating environment:** • any surveying project work site.
- Equipment** may include: • global navigation satellite system (GNSS)
• level
• tape
• total station.
- 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.
- Project objectives** may include: • agreed client requirements
• written survey specifications.
- Manufacturer specifications** may include: • equipment specifications
• operator manuals.
- Legislation** may include: • Australian standards
• award and enterprise agreements
• certification requirements
• codes of practice
• quality assurance requirements.
- Company policy** may include: • company OHS standards
• customer service standards
• company goals, such as mission statement
• governance guidelines
• guidelines on the use of equipment
• internal and external communication guidelines
• operational manuals
• operational plan
• strategic plan.
- Principal work activities** may include: • activity and sequence of activity determined to be essential in order to meet project objectives.
- Constraints** may include: • coverage
• datum
• environmental factors

- industry requirements
- legal and statutory
- financial
- resource availability
- time.

Surveying data may include:

- depth
- dimension
- direction
- flow rates
- position
- slope.

Client requirements refer to description of outputs and may be contained in:

- contracts
- memos
- tender briefs
- verbal instructions
- written instructions.

Design may include:

- digital information
- hard copy plans
- maps
- written instructions.

Client may include:

- customers with routine or special requests
- external to organisation
- internal to organisation
- regular and new customers, including:
 - business enterprises
 - government agencies
 - members of the public
 - suppliers.

Stakeholders may include:

- human resource personnel: internal or external
- procurement agency: internal or external management.

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.

Risk management may include:

- adhering to budget
- anticipating external influences
- contingency planning
- using guidelines for the selection of contractors
- effective communication and consultation
- effective project management
- internal and external audit processes
- milestone review and evaluation
- realistic timelines

- targeted activity.

- Legal and statutory standards** may include:
- local government requirements
 - national standards
 - state statutes and regulations.
- 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:
- communication with stakeholders
 - dispute resolution guidelines
 - monitoring and adjusting key milestones.
- Reference system** refers to:
- projection and datum parameters required for GNSS equipment and processing software.
- Measurements** may include use of:
- current meter
 - echo sounder
 - GNSS
 - level
 - remote sensing
 - tape
 - theodolite
 - 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.
- Contingencies** may include:
- equipment failure
 - injury to personnel
 - personnel turnover
 - observation errors
 - obstructions to project plan
 - weather.
- Quality assurance processes** may include:
- internal and external
 - product or service measurement against set criteria
 - standard verification
 - target monitoring.
- Relevant personnel** may include:
- colleagues
 - registered surveyors
 - company personnel

Required documentation
may include:

- staff or employee representatives
- supervisors or line managers
- suppliers
- users.
- electronic or paper-based correspondence with client
- field records
- final report
- progress reports
- records of conversation
- survey plots
- organisational work activity sheets.

Unit Sector(s)

Not applicable.

Custom Content Section

Not applicable.