Australian Government

Department of Education, Employment and Workplace Relations

# NWP557 Apply surveying for civil engineering projects

**Release: 1**

# NWP557 Apply surveying for civil engineering projects

## Modification History

NWP557 Release 1: Primary release.

## Unit Descriptor

This unit of competency sets out the knowledge and skills required to design and establish survey control for engineering and construction purposes. This includes the measurement and calculation of survey data, drawing of sketch plans, collection and processing of topographical data for detail mapping and related computational skills.

## Application of the Unit

This unit applies to para-professionals working in an engineering / surveying environment where measurement and set out of engineering works is undertaken. This may include office, and fieldwork.
No licensing, legislative, regulatory or certification requirements apply to this unit at the time of publication.

## Licensing/Regulatory Information

Not applicable.

## Pre-Requisites

Not applicable.

## 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 tasks you need to be able to perform, to demonstrate that you can achieve the element. Where ***bold italicised*** text is used, further information is detailed in the range statement. Assessment of performance is to be consistent with the evidence guide. |

# Elements and Performance Criteria

| | |
|---|---|
| **1 Identify survey to be undertaken** | 1.1 Identify the survey and analysis task from documentation, work requests or discussions with ***appropriate personnel***. |
| | 1.2 Obtain ***resources and equipment*** needed for the task, in accordance with ***enterprise procedures,*** and check for correct operation and safety. |
| | 1.3 Consult appropriate personnel to ensure the work is co-ordinated effectively with others involved at the work site. |
| **2 Plan survey** | 2.1 Collect and analyse documentation relating to existing survey features. |
| | 2.2 Check ***survey equipment*** calibration and for conformity with Australian Standard. |
| | 2.3 Perform reconnaissance of construction/engineering sites in line with local standards or regulations and enterprise procedures. |
| | 2.4 Establish survey risk management procedures and discuss with appropriate personnel. |
| **3 Conduct survey and analyse results** | 3.1 Conduct survey control is in accordance with job requirements and enterprise procedures. |
| | 3.2 Operate survey equipment according to manufacturers' manuals and enterprise procedures. |
| | 3.3 Record and analyse results and apply computations according to enterprise procedures. |
| | 3.4 Select methods for dealing with unexpected situations based on discussions with appropriate personnel, job specifications and enterprise procedures. |
| **4 Document, and report results** | 4.1 Maintain and store equipment and tools in accordance with enterprise procedures. |
| | 4.2 Record, analyse and report results to appropriate personnel according to enterprise procedures. |
| | 4.3 Results are stored and archived according to enterprise procedures. |

# Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

**Required skills:**

- basic operation, testing and maintenance of theodolites
- three dimensional survey control using total stations (or theodolite and EDM)
- radiations in three dimensions using total stations and/or theodolite and EDM/data recorder
- mapping of engineering/construction sites using total stations and/or theodolite and

EDM/data recorder

- computing co-ordinates and bearings and distances as related to grids and general setout works for construction works and building site setout
- setting out for construction works using theodolite and tapes
- calculating the information necessary to setout a structure, or part thereof, using a site plan with positions fixed by a mixture of bearings and distances (radiations), offsets and co-ordinates

**Required knowledge**:

Nil

# Evidence Guide

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

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

The candidate should demonstrate the ability to:

- perform the design and establishment of survey control for engineering and construction purposes

**Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- workplace specific equipment and technology
- supervision and experienced team members to provide observations, feedback and third party reports
- enterprise operating procedures and work allocation
- relevant codes, standards, and government regulations

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

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

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

Validity and sufficiency of evidence require that:

- competency will need to be demonstrated over a period of time reflecting the scope of the role and the practical requirements of the workplace
- where the assessment is part of a structured learning experience the evidence collected must relate to a number of performances assessed at different points in time and separated by further learning and practice
- a decision of competence should only be made when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence
- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
- assessment can be through simulated project-based activity

and must include evidence relating to each of the elements in this unit

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the candidate, any cultural issues that may affect responses to the questions, and reflecting 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, if used in the performance criteria, is detailed below. 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) may also be included.

| | |
|---|---|
| ***Appropriate personnel*** may include: | • supervisor<br>• leading hand<br>• foreman<br>• manager<br>• site engineer<br>• trainer<br>• mentor<br>• teacher<br>• team member |
| ***Resources and equipment*** may include: | • specifications<br>• manuals<br>• standards<br>• catalogues<br>• stationary<br>• calculators<br>• computer work station |
| ***Enterprise procedures*** may include: | • the use of tools and equipment<br>• instructions, including job sheets, cutting lists, plans, drawings and designs<br>• reporting and communication<br>• manufacturers' specifications and operational procedures |
| ***Survey equipment*** may include: | • levels<br>• theodolite<br>• data collector and software<br>• GPS equipment<br>• lasers<br>• compass<br>• measuring wheels<br>• tripods<br>• poles<br>• construction calculator<br>• CAD/survey software<br>• field tools |

# Unit Sector(s)

Not applicable.

# Competency Field

Civil Engineering.