



Surveying Graduate

Competency Frameworks

Surveyors Act 2003 s 39

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Document References

Ref	Title	Document ID	Version	Owner
[1]	Surveyors Act 2003			State of Qld
[2]	Competency Frameworks (Overview)	SBQ-CF-0100	V1.00	SBQ
[3]	Competency Frameworks (Surveying Associate)	SBQ-CF-0101	V3.00	SBQ
[4]	Competency Frameworks (Surveyor)	SBQ-CF-0103	V3.00	SBQ
[5]	Competency Frameworks (Consulting Endorsement)	SBQ-CF-0104	V1.00	SBQ
[6]	Competency Frameworks (Engineering Endorsement)	SBQ-CF-0105	V3.00	SBQ
[7]	Competency Frameworks (Cadastral Endorsement)	SBQ-CF-0106	V3.00	SBQ
[8]	Competency Frameworks (Hydrographic Endorsement)	SBQ-CF-0107	V1.00	SBQ
[9]	Competency Frameworks (Mining Endorsement)	SBQ-CF-0108	V3.00	SBQ
[10]	National Competency Standards for Professional Surveyors		1996	ISA

Introduction

This document describes the Competency Framework for registration as a Surveying Graduate as prescribed under section 39 of the Surveyors Act 2003.

The competency framework describes the competency Units, Elements and Descriptors that are required to be met for registration as a Surveying Graduate. The competency framework describes the performance that the applicant is required to display. Competency is developed through the appropriate combination of qualifications, skills, knowledge, and experience.

Definitions

Unit of Competency (Unit): A major segment of the overall competency of a profession, typically representing a major function, role or field of activity.

Element of Competency (Element): A subdivision of a unit of competency into an observable function or activity.

Performance Criteria (Descriptors): An indicative list of the aspects of professional performance that would be regarded as evidence of competent professional performance in the work place in an element of competency.

With Guidance: The performance of the descriptor is achieved by the applicant under the direction of a competent supervisor. The applicant need not be able to perform the activity without requesting help in planning and execution.

Under Supervision: The performance of the descriptor is achieved by the applicant without direct supervision of each step; however the result of the activity cannot be used unless it has been checked by a competent supervisor.

Interpretation of the Framework

The competencies for surveying graduates will be typically demonstrated by professional surveyors practising in any sector of the market under the direct guidance of senior professional surveyors.

Surveying Graduates, as employees in the public, private or tertiary sectors, will normally be participating in professional work under the supervision of experienced professional colleagues and demonstrating expertise and professionalism within one or more areas of surveying.

They will have developed sound technical skills during their years of education, training and work experience, and will demonstrate increasing ability to apply these technical skills in the work place.

Surveying graduates will share professional responsibilities with more experienced professionals and must undertake structured training and development programs to progressively develop their competencies.

Competency Requirements for Surveying Graduate

An Applicant will need to demonstrate competency in the following Units:

- Unit 1: Professional Practice
- Unit 2: Collection of Data and Information
- Unit 3: Management of Data and Information
- Unit 4: Presentation of Information
- Unit 5: Business Management and Supporting Quality Assurance Programs
- Unit 6: Communications
- Unit 7: Spatial Reference Systems and Core Data Bases
- Unit 8: Land Administration and Property Development
- Unit 9: Controlling the Location of Developments

Competency Table for Surveying Graduate

Unit 1: Professional Practice

Surveying graduates will have developed a commitment to professionalism during their years of education, training and work experience. Under the guidance of experienced professional surveyors, they will demonstrate increasing levels of professionalism in all aspects of professional practice and a sound understanding of the relevant policy on ethics and professional practice.

Element	Descriptors
1.1 Undertake a program of tertiary education	<p>Applicants will need to demonstrate that they :</p> <ul style="list-style-type: none"> i. Have completed a course of at least three years fulltime duration acceptable to the Surveyors Board of Queensland or have been previously registered as a Surveying Graduate by the Surveyors Board of Queensland
1.2 Advance the science of surveying and the image of surveyors	<p>Applicants will need to demonstrate that they :</p> <ul style="list-style-type: none"> i. Conduct themselves in a manner that enhances the profession. ii. Can explain the role of technology in improving service. iii. Seek appropriate reward through merit and quality of performance. <p>Applicants will need to demonstrate that they are able to :</p> <ul style="list-style-type: none"> iv. Contribute to promoting surveyors and surveying.
1.3 Fulfil community service obligations	<p>Applicants will need to demonstrate that they :</p> <ul style="list-style-type: none"> i. Can explain why surveyors have professional responsibilities to government and the community. ii. Can explain the need for impartiality and objectivity in decision making. iii. Can explain the need to pursue fair and equitable solutions that rank community interests appropriately with client and personal interests. iv. Can explain why the welfare and safety of the community is above sectional interests. v. Understand and can explain the Surveyors Board of Queensland's <i>Code of Practice for Surveyors</i> <p>Applicants will need to demonstrate that they are able to :</p> <ul style="list-style-type: none"> vi. Demonstrate knowledge about community affairs that relate to land and property development.
1.4 Follow an accepted code of professional conduct and ethics	<p>Applicants will need to demonstrate that they :</p> <ul style="list-style-type: none"> i. Can explain the meaning of the profession's code of ethics. ii. Can explain the legal requirements and obligations of surveyors. iii. Can explain a surveyor's professional responsibilities.

<p>1.5 Undertake a program for personal professional development and continuing education</p>	<p>Applicants will need to demonstrate that they :</p> <ul style="list-style-type: none"> i. Attend professional development events. ii. Can explain the need for continuing improvement in performance. iii. Seek out and read literature relevant to surveying practice.
<p>1.6 Understand and apply sustainable development and environmental principles</p>	<p>Applicants will need to demonstrate that they :</p> <ul style="list-style-type: none"> i. Can explain the profession's stated environmental policy. ii. Can explain the profession's role in environmental matters. iii. Can explain how developments impact on the life styles, cultures and heritage of all sections of the community. iv. Can explain how environmental harm can be minimised during development v. Can explain the benefits of sustainable development. <p>Applicants will need to demonstrate that they are able to :</p> <ul style="list-style-type: none"> vi. Seek advice from senior colleagues on environmental issues encountered in regular practice. vii. Demonstrate an understanding of land degradation issues and conservation practices
<p>1.7 Accept responsibility for professional activities</p>	<p>Applicants will need to demonstrate that they :</p> <ul style="list-style-type: none"> i. Can identify potential risks and liabilities. ii. Can identify the likely impacts of proposed work. iii. Do not attempt work beyond the limits of personal skills and expertise <p>Applicants will need to demonstrate that they are able to :</p> <ul style="list-style-type: none"> i. Practises correct occupational health and safety procedures.

Unit 2: Collection of Data

Surveying graduates will be competent to participate in collecting information and data under the guidance of experienced professional surveyors. They will be responsible for accurately reporting outcomes of all work personally carried out to senior colleagues.

Element	Descriptors
2.1 Collect data by measurement	<p>Applicants will need to demonstrate that they :</p> <ul style="list-style-type: none"> i. Can use the typical measurement techniques available. ii. Can collect data by indirect methods. iii. Can explain the need to clarify client needs and expectations. iv. Can explain the need for legal traceability. <p>Applicants will need to demonstrate that they are able to :</p> <ul style="list-style-type: none"> v. Assess the various methods and procedures available for data collection and measurement under supervision. vi. Review the effectiveness of methods used under supervision.
2.2 Search and acquire existing data	<p>Applicants will need to demonstrate that they :</p> <ul style="list-style-type: none"> i. Can extract required information from geographic and land information records, survey data bases, and general information depositories. ii. Can explain the integrity, value and possible uses of stored data and information. iii. Can explain the importance of historical records. <p>Applicants will need to demonstrate that they are able to :</p> <ul style="list-style-type: none"> iv. Transfer data from existing data bases under supervision. v. Acquire information in an orderly and systematic manner.
2.3 Use modern surveying technologies to collect data	<p>Applicants will need to demonstrate that they are able to :</p> <ul style="list-style-type: none"> i. Define coordinates systems likely to be encountered by GNSS users and calculate GNSS coordinates ii. Discuss the principles of GNSS observations iii. Make observations using a GNSS receiver iv. Explain GNSS observations techniques, and calculate and evaluate levels of accuracy associated with GPS observations v. Identify error sources in GNSS observations, and explain the uses and critical factors of differential GNSS techniques vi. Output GNSS observations in existing local co-ordinate systems including ground based systems vii. Output terrestrial laser scanner observations in existing local co-ordinate systems

Unit 3: Management of Data and Information

Surveying graduates will be competent to participate in managing data and information under the guidance of experienced professional surveyors. They will be responsible for accurately reporting outcomes of all work personally carried out to senior colleagues.

Element	Descriptors
3.1 Process data to accepted standards and for specific requirements	<p>Applicants will need to demonstrate that they are able to :</p> <ul style="list-style-type: none"> i. Verify the integrity of the base data under supervision. ii. Store data in appropriate data bases. iii. Verify the integrity of the processed data under supervision.
3.2 Convert data from one system or medium to another	<p>Applicants will need to demonstrate that they :</p> <ul style="list-style-type: none"> i. List the various data bases holding spatial and textual data. <p>Applicants will need to demonstrate that they are able to :</p> <ul style="list-style-type: none"> ii. Convert and transfer data between systems and formats with guidance.
3.3 Administer electronic and physical data bases	<p>Applicants will need to demonstrate that they are able to :</p> <ul style="list-style-type: none"> i. Determine procedures for recording, retrieving and updating information with guidance. ii. Establish security systems to ensure data protection under supervision. iii. Develop and implement appropriate maintenance systems under supervision.
3.4 Analyse, evaluate and interpret data	<p>Applicants will need to demonstrate that they are able to :</p> <ul style="list-style-type: none"> i. Assess the accuracy and reliability of data under supervision. ii. Interpret data and its relevance with guidance. iii. Collate data logically.
3.5 Process data to create information	<p>Applicants will need to demonstrate that they are able to :</p> <ul style="list-style-type: none"> i. Solve complex problems using appropriate maths processes such as trigonometry and calculus ii. Apply mathematical models to physical processes iii. Apply basic statistics to analyse measurements and examine the variation that occurs in properties iv. Analyse, evaluate and use statistical data

Unit 4: Presentation of Information

Surveying graduates will be competent to participate in presenting information and data under the guidance of experienced professional surveyors. They will be responsible for accurately reporting outcomes of all work personally carried out to senior colleagues.

Element	Descriptors
4.1 Assemble data into specific data or information sets	<p>Applicants will need to demonstrate that they are able to :</p> <ul style="list-style-type: none"> i. Clarifying client needs with guidance. ii. Identify the potential benefits of creating specific information from various data bases with guidance. iii. Assemble data into useful information under supervision.
4.2 Compile and produce maps, plan, charts and photographs	<p>Applicants will need to demonstrate that they :</p> <ul style="list-style-type: none"> i. Can explain the uses and limitations of base data. <p>Applicants will need to demonstrate that they are able to :</p> <ul style="list-style-type: none"> ii. Apply techniques available for graphical and photographic presentation under supervision. iii. Apply cartographic principles under supervision. iv. Use a computer aided drafting package. v. Use the best methodology to meet client needs.
4.3 Provide digital spatial information	<p>Applicants will need to demonstrate that they :</p> <ul style="list-style-type: none"> i. Can correctly evaluate the accuracy and reliability of data. <p>Applicants will need to demonstrate that they are able to :</p> <ul style="list-style-type: none"> ii. Transfer spatial data files between formats under supervision. iii. Integrate spatial data with other information under supervision. iv. Format data to meet customer needs under supervision.
4.4 Produce models	<p>Applicants will need to demonstrate that they are able to :</p> <ul style="list-style-type: none"> i. Create digital models of physical surfaces. ii. Attach attribute information to a digital model. iii. Participate in transferring model files between various formats.
4.5 Formally present information orally to clients, government agencies and public forums	<p>Applicants will need to demonstrate that they are able to :</p> <ul style="list-style-type: none"> i. Use communication and display techniques to present information in a usable manner. ii. Address special interest groups under supervision. iii. Conduct seminars and public meetings under supervision. iv. Contribute to discussion groups.

4.6 Prepare reports	<p>Applicants will need to demonstrate that they are able to :</p> <ul style="list-style-type: none"> i. Prepare parts of detailed technical reports under supervision. ii. Prepare information brochures or reports under supervision. iii. Prepare parts of business reports on surveying matters under supervision.
4.7 Certify data	<p>Applicants will need to demonstrate that they :</p> <ul style="list-style-type: none"> i. Can explain the need for certified data to be reliable and meet accuracy standards. ii. Can explain the responsibilities of data certification. <p>Applicants will need to demonstrate that they are able to :</p> <ul style="list-style-type: none"> iii. Supply accurate data for certification by another iv. Effectively identify and manage risk associated with certification under supervision
4.8 Provide advisory services	<p>Applicants will need to demonstrate that they are able to :</p> <ul style="list-style-type: none"> i. Discuss information with potential users under supervision. ii. Interpret information and relate it to specific issues under supervision. iii. Collate information and format it into relevant advice under supervision. iv. Provide advice to clients on surveying and land management matters under supervision.

Unit 5: Business, Management and Supporting Quality Assurance Programs

Surveying graduates will be competent to participate in applying business and management skills under the guidance of experienced professional surveyors. They will be responsible for accurately reporting outcomes of all work personally carried out to senior colleagues.

Element	Descriptors
5.1 Plan, organise, direct and control tasks, people and other resources	<p>Applicants will need to demonstrate that they are able to :</p> <ul style="list-style-type: none"> i. Set work objectives and prioritise activities with guidance. ii. Determine work methods and procedures with guidance. iii. Estimate times, costs and resources with guidance. iv. Compile work schedules and allocate resources with guidance. v. Organise small work teams under supervision.

5.2 Apply project management principles	<p>Applicants will need to demonstrate that they can :</p> <ul style="list-style-type: none"> i. Explain the principles of project management. <p>Applicants will need to demonstrate that they are able to :</p> <ul style="list-style-type: none"> ii. Use project management techniques in work activities. iii. Plan, control and monitor projects under supervision.
5.3 Apply self management principles	<p>Applicants will need to demonstrate that they :</p> <ul style="list-style-type: none"> i. Can explain the need for effective time management. <p>Applicants will need to demonstrate that they are able to :</p> <ul style="list-style-type: none"> ii. Use management skills with guidance. iii. Identify and undertake appropriate continuing professional development activities
5.4 Apply quality assurance principles	<p>Applicants will need to demonstrate that they are able to :</p> <ul style="list-style-type: none"> i. Implement quality assurance programs under supervision. ii. Comply with an accepted quality assurance program. iii. Perform internal auditing procedures under supervision. iv. Rectify non compliance with quality standards. v. Suggest improvements to quality assurance processes.
5.5 Implement projects	<p>Applicants will need to demonstrate that they are able to :</p> <ul style="list-style-type: none"> i. Manage and programme development projects under supervision.

Unit 6: Communications

Surveying graduates will be competent in applying communications skills under the guidance of experienced professional surveyors. They will be responsible for accurately reporting significant communication difficulties to senior colleagues.

Element	Descriptors
6.1 Communicate effectively	<p>Applicants will need to demonstrate that they are able to :</p> <ul style="list-style-type: none"> i. Communicate effectively, orally and in writing. ii. Compile, interpret and present information under supervision. iii. Interpret briefs and instructions with guidance. iv. Issue clear, accurate instructions to subordinates. v. Successfully use electronic communications technologies.

<p>6.2 Present, promote, report on and advocate ideas on surveying and allied areas of practice</p>	<p>Applicants will need to demonstrate that they are able to :</p> <ul style="list-style-type: none"> i. Prepare and present technical reports under supervision. ii. Conduct seminars and public meetings under supervision.
<p>6.3 Prepare and comprehend surveying documents</p>	<p>Applicants will need to demonstrate that they are able to :</p> <ul style="list-style-type: none"> i. Prepare and interpret surveying reports with guidance. ii. Prepare specifications and standards with guidance. iii. Prepare submissions and cost estimates with guidance. iv. Prepare documents defining work procedures and processes with guidance. v. Prepare documents on measurement technology, data acquisition with guidance.
<p>6.4 Comprehend, report on and discuss relevant legal matters</p>	<p>Applicants will need to demonstrate that they are able to :</p> <ul style="list-style-type: none"> i. Operate in accordance with government Acts, Regulations or instructions. ii. Contribute to discussions on legal matters pertaining to land and land information with clients, colleagues and other professionals. iii. Prepare advice for clients on legal requirements relating to land development under supervision. iv. Prepare advice for clients on land rights, land tenure disputes, and rights of entry and occupation under supervision. v. Prepare advice for clients on legislation pertaining to planning, development and environment issues under supervision. vi. Advise clients on responsibilities and liabilities pertaining to spatial information under supervision.
<p>6.5 Collaborate with colleagues and other interested parties</p>	<p>Applicants will need to demonstrate that they are able to :</p> <ul style="list-style-type: none"> i. Discuss development projects with other stakeholders under supervision. ii. Represent the concerns of clients and/or special interest groups to governments, authorities and other stakeholders under supervision. iii. Negotiate solutions to common problems with other parties under supervision. iv. Prepare advice and information on surveying, geomatics and land developments under supervision.
<p>6.6 Use professional expertise to contribute to the processes that shape society</p>	<p>Applicants will need to demonstrate that they are able to :</p> <ul style="list-style-type: none"> i. Explain the need for orderly management and administration of land resources. <p>Applicants will need to demonstrate that they are able to :</p> <ul style="list-style-type: none"> i. Identify opportunities to utilise surveying for the benefit of society.

Unit 7: Spatial References Systems and Core Data Bases

Surveying graduates will be competent to participate in designing, establishing and maintaining spatial reference systems and core data bases, and determining the spatial relationships within land and geographic information systems under the guidance of experienced professional surveyors. They will be responsible for accurately reporting the outcomes of all work personally carried out to senior colleagues.

Element	Descriptors
7.1 Use geodetic reference systems	<p>Applicants will need to demonstrate that they are able to :</p> <ol style="list-style-type: none"> i. Describe the geodetic relationships and elements of geometry of the size and shape of the earth ii. Illustrate the relationships between ellipsoids, geoids, gravity and vertical datums iii. Explain the construction properties and uses of the UTM map projection and identify its fundamental elements
7.2 Establish subsidiary networks	<p>Applicants will need to demonstrate that they are able to :</p> <ol style="list-style-type: none"> i. Establish subsidiary network control datums. ii. Determine the locations of reference marks with guidance. iii. Place appropriate reference marks in suitable locations. iv. Analyse spatial data pertaining to the geodetic network under supervision. v. Evaluate and adjust the spatial data created under supervision. vi. Record network information in appropriate data files under supervision. vii. Mathematically adjust survey networks by the method of least squares, using both manual methods and computer software packages with guidance viii. Analyse and critically evaluate the adjustment with guidance
7.3 Integrate spatial reference systems with fundamental physical and cultural data, and manage core databases	<p>Applicants will need to demonstrate that they are able to :</p> <ol style="list-style-type: none"> i. Demonstrate an understanding of the logical structure of data bases. ii. Collate, update and maintain core data bases. iii. Create new asset bases and integrating them with core data bases under supervision. iv. Verify the integrity of data in data bases under supervision.
7.4 Accredite spatial data standards	<p>Applicants will need to demonstrate that they are able to :</p> <ol style="list-style-type: none"> i. Develop standard procedures for acquiring and storing spatial data with guidance. ii. Develop procedures for testing and validating the integrity of spatial data under supervision.

<p>7.5 Perform geodetic calculations</p>	<p>Applicants will need to demonstrate that they are able to :</p> <ol style="list-style-type: none"> i. Define the elements of geometry of the ellipsoid and the geoid that are relevant to geodetic surveying ii. Reduce measured angles and distances, manually and with appropriate software, to a form suitable for use in geodetic calculations under supervision iii. Perform geodetic calculations of traverses and intersections using geographic coordinates under supervision iv. Perform geodetic calculations of traverses and intersections using UTM grid coordinates under supervision
<p>7.6 Transform co-ordinates</p>	<p>Applicants will need to demonstrate that they are able to:</p> <ol style="list-style-type: none"> i. Explain the coordinate transformation process ii. Transform three dimensional coordinates between systems and between datums, with the aid of suitable software, to the required level of accuracy under supervision
<p>7.7 Make precise observations</p>	<p>Applicants will need to demonstrate that they are able to :</p> <ol style="list-style-type: none"> i. Demonstrate a knowledge of the sources of errors in precise angle observations and the techniques used to minimise their effects ii. Demonstrate a knowledge of the effects of curvature and refraction on levelling and apply this knowledge to trigonometrical levelling iii. Demonstrate a knowledge of the equipment and methods used in precise levelling and of the sources of error and the techniques to minimise their effects iv. Use statistics to analyse geodetic observations, values and positional results under supervision

Unit 8: Land Administration and Property Development

Surveying graduates will be competent to participate in the routine aspects of land administration and property development, and will assist senior colleagues in providing advice to developers. They will be responsible for accurately reporting the outcomes of all work personally carried out to senior colleagues.

<p>Element</p>	<p>Descriptors</p>
<p>8.1 Advise on land tenure and existing land tenure systems.</p>	<p>Applicants will need to:</p> <ol style="list-style-type: none"> i. Demonstrate knowledge of land registration and land tenure. ii. Demonstrate knowledge of laws in relation to land tenure and land development.

<p>8.2 Contribute information and advice to facilitate the administration, control and development of land resources</p>	<p>Applicants will need to demonstrate that they :</p> <ul style="list-style-type: none"> i. Can explain the significance of planning laws, environmental constraints and land management policies. ii. Explain the functions and roles of other disciplines in property development <p>Applicants will need to demonstrate that they are able to :</p> <ul style="list-style-type: none"> i. Access available land information resources with guidance.
<p>8.3 Support sustainable land development</p>	<p>Applicants will need to demonstrate that they are able to :</p> <ul style="list-style-type: none"> i. Apply local knowledge on topography, land tenure and land use to assist with development under supervision. ii. Assist in feasibility studies and impact assessments. iii. Describe the inter-relationships between geology, geomorphology, water, soils, vegetation and fauna resources with guidance iv. Apply the techniques commonly used to describe and assess the physical land resources with guidance v. Describe the processes involved in undertaking land resource surveys and land evaluation practices with guidance
<p>8.4 Provide advice on financial implications of land development</p>	<p>Applicants will need to demonstrate that they are able to :</p> <ul style="list-style-type: none"> i. Compare land use options under supervision. ii. Prepare cost/benefit analyses for development projects under supervision. iii. Investigate the potential of land for further development under supervision. iv. Prepare advice to clients on opportunities to enhance land value and use under supervision.
<p>8.5 Provide design services to optimise land development and encourage sustainable land use.</p>	<p>Applicants will need to demonstrate that they are able to :</p> <ul style="list-style-type: none"> i. Plan and design land boundary patterns under supervision ii. Plan and design infrastructure for land divisions and land developments under supervision. iii. Identifying options for sustainable land development under supervision. iv. Apply basic design parameters and relevant geometric principles to the preliminary design of urban and rural roads under supervision v. Explain and apply process of horizontal and vertical road alignment for rural and urban road design vi. Apply basic design parameters to design sewerage services under supervision vii. Apply basic design parameters to design of storm water services under supervision

<p>8.6 Undertake cadastral surveys</p>	<p>Applicants will need to demonstrate that they :</p> <ul style="list-style-type: none"> i. Can explain the law and principles regarding the reinstatement of cadastral boundaries <p>Applicants will need to demonstrate that they are able to:</p> <ul style="list-style-type: none"> ii. Assess all relevant evidence and draw appropriate conclusions about the location of boundaries under supervision iii. Understand and apply relevant legislation and standards for the conduct of cadastral surveys and the preparation of plans under supervision. iv. Ensure that plans are fit for purpose and if necessary capable of achieving the desired actions regarding the creation of land titles and the integrity of the land boundary system under supervision.
<p>8.7 Prepare and manage planning applications</p>	<p>Applicants will need to demonstrate that they are able to :</p> <ul style="list-style-type: none"> i. Describe the planning processes that are used in Queensland at State, regional and local government levels to control land use and development with guidance ii. Discuss the purpose of, and the significant elements of, the Queensland's current planning legislation with guidance iii. Outline the principles of performance based design with guidance

Unit 9 : Controlling the Location of Developments

Surveying graduates, under the guidance of experienced professional surveyors, will be competent to participate in the surveying required to control the location and quality of engineering developments including the measurement of earthworks; the installation of machines, structures or equipment; and the extraction of materials at mining sites. They will be responsible for accurately reporting the outcomes of all work personally carried out to senior colleagues.

Element	Descriptors
<p>9.1 Control and locate engineering works, development projects, and the building or installation of structures and machines.</p>	<p>Applicants will need to demonstrate that they :</p> <ul style="list-style-type: none"> i. Can explain the roles of other professionals, technicians and trades persons. <p>Applicants will need to demonstrate that they are able to :</p> <ul style="list-style-type: none"> ii. Read and use detailed design and construction plans. iii. Establish appropriate reference systems under supervision. iv. Select and use appropriate technology for site operations under supervision. v. Set out of works under supervision. vi. Communicate results to client, construction staff and other consultants under supervision vii. Use adequate redundant measurements to validate results under supervision.

<p>9.2 Control and measure the extraction of minerals and other materials.</p>	<p>Applicants will need to demonstrate that they :</p> <ul style="list-style-type: none"> i. Can explain a variety of mining and excavation processes. ii. Can explain the measuring and monitoring techniques needed for the safe, cost effective extraction of materials. <p>Applicants will need to demonstrate that they are able to :</p> <ul style="list-style-type: none"> iii. Establish appropriate reference systems under supervision. iv. Select and use appropriate technology under supervision. v. Establish effective reporting systems under supervision.
<p>9.3 Monitor the position, shape and size of structures, land forms and sea beds.</p>	<p>Applicants will need to demonstrate that they :</p> <ul style="list-style-type: none"> i. Can explain the roles of other professionals, technicians & trades persons. ii. Can explain the basic principles, theory and accuracy of various aerial and terrestrial photogrammetric, and remote sensing methods <p>Applicants will need to demonstrate that they are able to :</p> <ul style="list-style-type: none"> iii. Read design and detail plans, and participate in determining required tolerances. iv. Establish appropriate reference systems under supervision. v. Use appropriate technology. vi. Implement effective reporting systems under supervision. vii. Establish procedures to validate results under supervision. viii. Judge the applicability of photogrammetric and remote sensing methods to mapping and engineering projects with guidance

Unit 10: Not Applicable

Unit 11: Not Applicable