



Competency Frameworks

(Hydrographic Endorsement)

*Section 39
Surveyors Act 2003*

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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-0101	V1.00	SBQ
[3]	Competency Frameworks (Surveying Associate)	SBQ-CF-0101	V1.00	SBQ
[4]	Competency Frameworks (Surveying Graduate)	SBQ-CF-0102	V1.00	SBQ
[5]	Competency Frameworks (Surveyor)	SBQ-CF-0103	V1.00	SBQ
[6]	Competency Frameworks (Consulting Endorsement)	SBQ-CF-0104	V1.00	SBQ
[7]	Competency Frameworks (Engineering Endorsement)	SBQ-CF-0105	V1.00	SBQ
[8]	Competency Frameworks (Cadastral Endorsement)	SBQ-CF-0106	V1.00	SBQ
[9]	Competency Frameworks (Mining Endorsement)	SBQ-CF-0108	V1.00	SBQ
[10]	National Competency Standards for Professional Surveyors		1996	ISA

Introduction

This document describes the Competency Framework for the hydrographic endorsement of a registered surveyor 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 a hydrographic endorsement. 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

Application

Applicants should note that many hydrographic surveying activities are international in nature and that recognition of hydrographic surveyors is under the auspices of the International Hydrographic Organisation.

This endorsement is intended to apply only to hydrographic surveying activities within the coastal waters of the State of Queensland, that is, those waters that are within the meaning of the Coastal Waters (State Powers) Act (Cth) and the inland waters of the State.

Surveyors seeking to undertake hydrographic surveying work in ports servicing commercial or international shipping or in areas to seaward of the coastal waters of the State of Queensland should seek national recognition of their qualifications and expertise

Definitions

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

Element of Surveying Competency (Element): A subdivision of a Unit of Surveying 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 surveying competency.

Interpretation of this Framework

Applicants should address the relevant Elements of Surveying Competency for each Unit of Surveying Competency relating to the grade of registration applied for. Applicants are expected to show that they have met the Performance Criteria to the level set for each endorsement or grade of registration sought.

The Units of Surveying Competency and Elements of Competency enunciated in this framework are necessarily generic in nature. Applicants for registration and endorsement are required to interpret the Units and Elements in a way that demonstrates his/her competency in the context of the registration or specialisation sought. This is particularly important when a registered surveyor seeks endorsement of his/her registration in the various fields of specialisation.

The competencies for a registered surveyor seeking a hydrographic endorsement will be typically demonstrated by experienced registered surveyors who hold a hydrographic endorsement and practise in any sector of the market.

Registered surveyors holding a hydrographic endorsement, as employees in the public, private or tertiary sectors, will be practising as competent professionals demonstrating expertise and professionalism.

They will have demonstrated sound technical competence and management skills during their years of professional experience. They will work autonomously and accept responsibility for all professional work undertaken within their areas of expertise. However, they must recognise complex or unusual situations where additional professional guidance is required.

Competency Requirements for a Hydrographic Endorsement

An applicant seeking a hydrographic endorsement will need to demonstrate competency in the following Units in the context of hydrography:

- Collection of Data and Information
- Management of Data and Information;
- Presentation of Information
- Communications
- Spatial Referencing systems and Core Data Bases
- Land Administration and Property Development
- Controlling, Measuring and Locating Developments

Professional surveyors will be expected to progressively develop their levels of competency and accept a commensurate increase in professional responsibility

More Information

- Australian Hydrographic Surveyors Certification Panel, **Guidelines for Specialism Certification in Hydrography**, Spatial Sciences Institute – New Zealand Institute of Surveyors, March 2005
- FIG/IHO International Advisory Board on Standards of Competence for Hydrographic Surveyors, **Standards of Competence for Hydrographic Surveyors**, M-5 Ninth Edition 2001, International Hydrographic Bureau, Monaco, 2001
- International Hydrographic Organisation (IHO), **Manual on Hydrography M-13** First Edition May 2005, International Hydrographic Bureau, Monaco, 2005
- International Hydrographic Organisation (IHO), **IHO Standards for Hydrographic Surveys**, 4th Edition April 1998 Special Publication No. 44, International Hydrographic Bureau, Monaco, 1998
- International Hydrographic Organisation (IHO), Home Page, <http://www.iho.shom.fr>, International Hydrographic Organisation, Monaco.
- Maritime Safety Queensland, **Waterways - Hydrographic Standards**, http://www.msq.qld.gov.au/qt/msq.nsf/index/hydro_surveys, Maritime Safety Queensland, Brisbane, 2005

Competency Table for Hydrographic Endorsement

Unit: Collection of Data and Information

Surveyors with a hydrographic endorsement will be competent in collecting data and information that are relevant to hydrographic surveying and will be accountable for the outcomes of work personally carried out or carried out under their direct supervision.

Element	Descriptors
Search and acquire existing data	<p>Applicants will need to demonstrate that they :</p> <ul style="list-style-type: none"> • Understand the importance of historical records <p>Applicants will need to demonstrate that they are able to :</p> <ul style="list-style-type: none"> • Access relevant geographic and land information records, survey data bases, and general information depositories • Qualify the integrity and value of stored data and information and identify possible uses • Transfer data from existing data bases • Acquire information in an orderly manner • Determine if acquired information is relevant to client needs
Collect data by measurement	<p>Applicants will need to demonstrate that they are able to :</p> <ul style="list-style-type: none"> • Recognise and assess the measuring technology available • Recognise and assess technology available to collect data by indirect methods • Clarify client needs and expectations • Participate in evaluating the various methods and procedures available • Use measuring technology to meet client needs • Review the effectiveness of the methodology used • Participate in the preparation of specifications and contracts • Participate in supervising contracts • Ensure processes are followed to achieve legal traceability
Apply quality assurance principles	<p>Applicants will need to demonstrate that they are able to :</p> <ul style="list-style-type: none"> • Participate in implementing quality assurance programs • Comply with an accepted quality assurance program • Participate in internal auditing programs • Recognise when to rectify non-compliance with quality standards • Participate in programs for continuous improvement
Collect and process tidal information.	<p>Applicants will need to demonstrate that they are able to :</p> <ul style="list-style-type: none"> • Understand and apply the concept of chart datum • Understand and apply the concept of co-tidal zones in the reduction of soundings to chart datum • Record tidal height by terrestrial and or satellite means. • Establish or transfer chart datum and relate it to the national geodetic network • Analyse tidal height data for the preparation of tidal height predictions and the estimation of the statistical tidal planes

	<ul style="list-style-type: none"> • Determine the locations of reference marks • Record tidal stream and current flow • Analyse tidal stream and current data for the preparation of tidal stream predictions • Validate the tidal data (height or streams) recorded • Record all relevant metadata
Accept responsibility for professional activities	<p>Applicants will need to demonstrate that they are able to :</p> <ul style="list-style-type: none"> • Recognise and understand potential risks and liabilities • Practice and enforce correct occupational health and safety • Understand the likely impacts of work undertaken • Work within the limits of personal skills and expertise and seek professional advice and support for more complex work

Unit: Management of Data and Information

Surveyors with a hydrographic endorsement will be competent in managing all information and data that are relevant to hydrographic surveying and will be accountable for the outcomes of work personally carried out or carried out under their direct supervision.

Element	Descriptors
Design and develop system standards	<p>Applicants will need to demonstrate that they are able to :</p> <ul style="list-style-type: none"> • Identify the outcomes needed from a system • Identify the various elements of a system • Develop standards across the total system • Develop system standards and integrate them into data management quality programs
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"> • Verify the integrity of the base data • Process data to achieve specific outcomes • Store data in appropriate data bases for future access and use • Verify the integrity of the processed data
Convert data from one system or medium to another	<p>Applicants will need to demonstrate that they :</p> <ul style="list-style-type: none"> • Understand the various bases holding spatial and textual data <p>Applicants will need to demonstrate that they are able to :</p> <ul style="list-style-type: none"> • Identify and collate appropriate data in one system for transfer and integration into other systems • Use appropriate technology and procedures to convert and transfer data between systems and media
Administer electronic and physical data bases	<p>Applicants will need to demonstrate that they are able to :</p> <ul style="list-style-type: none"> • Apply effective procedures for recording, retrieving and updating information • Establish security systems to ensure data integrity • Implement appropriate maintenance systems
Analyse, evaluate and interpret data	<p>Applicants will need to demonstrate that they are able to :</p> <ul style="list-style-type: none"> • Apply systems to analyse data

- Determine the required accuracy and reliability of data
- Interpret data and ensure its relevance to client needs
- Enhance or add value to data where applicable
- Collate and relate data to specific areas of interest

Unit: Presentation of Information

Surveyors will be competent in presenting all information that is relevant to hydrographic surveying and will be accountable for the outcomes of work personally carried out or carried out under their direct supervision.

Element	Descriptors
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"> • Recognise market trends • Clarify and determine customer needs • Identify the potential benefits of creating specific information from various data bases • Use technology to assemble data into useful information
Compile and produce maps, plans, charts and photographs	<p>Applicants will need to demonstrate that they are able to :</p> <ul style="list-style-type: none"> • Use the technology available for graphical and photographic presentation • Determine the uses and limitations of data bases • Apply appropriate cartographic principles • Apply computer aided drafting techniques • Identify and use the best methodology to meet client needs
Provide digital spatial information	<p>Applicants will need to demonstrate that they :</p> <ul style="list-style-type: none"> • Recognise the accuracy, reliability and potential uses of data <p>Applicants will need to demonstrate that they are able to :</p> <ul style="list-style-type: none"> • Transfer spatial data files between various media • Integrate spatial data with other information • Format data to meet customer needs
Produce models	<p>Applicants will need to demonstrate that they are able to :</p> <ul style="list-style-type: none"> • Create digital models of natural or cultural entities and phenomenon • Create model files and integrates model files with other information • Transfer model files between various media
Formally present information 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"> • Identify and use appropriate communication and display techniques to present information in a usable manner • Address special interest groups • Conduct seminars and public meetings • Lead and/or participate in discussion groups
Prepare reports	<ul style="list-style-type: none"> • Prepare detailed technical reports • Prepare information brochures and reports <p>Prepare business reports on surveying matters</p>

<p>Certify data</p>	<p>Applicants will need to demonstrate that they :</p> <ul style="list-style-type: none"> • Understand the accuracy and reliability of data to be certified • Understand the responsibilities of data certification <p>Applicants will need to demonstrate that they are able to :</p> <ul style="list-style-type: none"> • Apply effective validation procedures • Apply effective risk management techniques
<p>Provide advisory services</p>	<p>Applicants will need to demonstrate that they are able to :</p> <ul style="list-style-type: none"> • Discuss information with potential users • Decipher information and relate it to specific issues • Collate information and format it into relevant advice • Provide advice on opportunities to add value to existing information • Provide sound advice to clients on surveying and land management matters

Unit: Communications

Surveyors with a hydrographic endorsement will be effective communicators who successfully communicate to colleagues, subordinates and customers on all matters relating to their surveying activities in a professional manner. They will be responsible for any personal communications that reflect on the responsibilities and integrity of the business enterprise.

<p>Communicate effectively</p>	<p>Applicants will need to demonstrate that they are able to :</p> <ul style="list-style-type: none"> • Communicate effectively, orally and in writing, at a professional level • Use the full range of media options available to expedite communications • Compile, interpret and present information • Interpret briefs and instructions • Issue clear, accurate instructions and meaningful advice to colleagues and subordinates • Exchange data and information through electronic communications • Take into account the comments and concerns of others
<p>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"> • Prepare and present technical reports and papers to professional forums • Prepare position and discussion papers on surveying and allied topics for publication • Present papers to seminars and public meetings • Use appropriate media to promote technical and professional matters
<p>Prepare and comprehend surveying documents</p>	<p>Applicants will need to demonstrate that they are able to :</p> <ul style="list-style-type: none"> • Prepare and interpret professional surveying reports • Prepare specifications and standards • Prepare submissions and quotations • Prepare documents defining work procedures and processes • Prepare documents on measurement technology, data acquisition and spatial relationships
<p>Collaborate with colleagues and</p>	<p>Applicants will need to demonstrate that they are able to :</p> <ul style="list-style-type: none"> • Contribute to discussions with stakeholders on development projects

other interested parties	<ul style="list-style-type: none"> • Represent the concerns of clients and/or special interest groups to government, regulators and other stakeholders • Negotiate solutions to common problems with other parties • Contribute to the integration of surveying activities with the activities of other professionals • Provide advice and information on surveying, geomatics, spatial relationships, and developments
Use professional expertise to contribute to the processes that shape society	<p>Applicants will need to demonstrate that they are able to :</p> <ul style="list-style-type: none"> • Contribute to discussions on the sustainable development of national resources and the conservation of national heritage • Promote opportunities to utilise surveying for the benefit of society • Advocate the orderly management and administration of land resources.

Unit: Spatial References Systems and Core Data Bases

Surveyors with a hydrographic endorsement will be competent to contribute to designing, establishing and maintaining spatial reference systems; maintaining core data bases; and determining spatial relationships within land and geographic information systems. They will be accountable for the outcomes of work personally carried out or carried out under their direct supervision

Design reference systems	<p>Applicants will need to demonstrate that they are able to :</p> <ul style="list-style-type: none"> • Evaluate system requirements • Design appropriate reference systems • Monitor the effectiveness of existing systems • Ensure that equipment is calibrated
Establish primary geodetic control datums.	<p>Applicants will need to demonstrate that they are able to :</p> <ul style="list-style-type: none"> • Establish primary geodetic control datums. • Determine the locations of reference marks • Analyse spatial data pertaining to the geodetic network • Evaluate and adjust data created • Record all relevant information
Establish subsidiary networks	<p>Applicants will need to demonstrate that they are able to :</p> <ul style="list-style-type: none"> • Establish subsidiary network control datums • Determine the locations of reference marks • Supervise the placement of appropriate reference marks in suitable locations • Analyse spatial data pertaining to the geodetic network • Evaluate and adjust created spatial data • Record network information in appropriate data files
Develop and implement network maintenance programs	<p>Applicants will need to demonstrate that they are able to :</p> <ul style="list-style-type: none"> • Develop network maintenance systems • Carry out or supervise network maintenance programs
Integrate spatial reference systems with fundamental physical and	<p>Applicants will need to demonstrate that they :</p> <ul style="list-style-type: none"> • Understand the logical structure of data bases <p>Applicants will need to demonstrate that they are able to :</p>

<p>cultural data, and manage core databases</p>	<ul style="list-style-type: none"> • Interface spatial systems with physical data bases and cultural data • Integrate data into homogenous data environments • Collate, update and maintain core data bases pertinent to topographic data, administrative boundaries, transport corridors, infrastructure and geographic information • Create new asset bases and integrate them with core data bases • Verify the integrity of data in data bases
<p>Accredit spatial data standards</p>	<p>Applicants will need to demonstrate that they are able to :</p> <ul style="list-style-type: none"> • Contribute to the standards required for data created for specific purposes • Contribute to developing standard procedures for acquiring and storing spatial data • Contribute to developing procedures for testing and validating the integrity of spatial data
<p>Maintain and manage core data bases</p>	<p>Applicants will need to demonstrate that they are able to :</p> <ul style="list-style-type: none"> • Review and maintain existing data bases • Edit new data for inclusion in core data bases • Interpret data for potential users • Upgrade core data bases to meet community needs • Contribute to the administration of core data bases

Unit: Land Administration and Property Development

Surveyors with a hydrographic endorsement will be competent in carrying out land administration and property development and will participate in advising property developers or managing property development projects. They will be accountable for the outcomes of work personally undertaken and advice provided, and for work carried out under their direct supervision.

<p>Advise on appropriate land tenure and land tenure systems.</p>	<p>Applicants will need to demonstrate that they have :</p> <ul style="list-style-type: none"> • A sound knowledge and understanding of the principles of land registration and land tenure. <p>Applicants will need to demonstrate that they :</p> <ul style="list-style-type: none"> • Understand the relationships between land and various ethnic groups and cultures within jurisdictions of practice. <p>Applicants will need to demonstrate that they are able to :</p> <ul style="list-style-type: none"> • Comply with laws in relation to land and land development • Participate in the rationalisation and operation of native title programs
<p>Contribute information and advice to facilitate the administration, control and development of land resources</p>	<p>Applicants will need to demonstrate that they have :</p> <ul style="list-style-type: none"> • An understanding of planning laws and procedures. <p>Applicants will need to demonstrate that they :</p> <ul style="list-style-type: none"> • Understand 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"> • Advise on environmental constraints and management policies applicable in various jurisdictions. • Access available land information resources.

<p>Promote opportunities to expedite sustainable land development</p>	<p>Applicants will need to demonstrate that they are able to :</p> <ul style="list-style-type: none"> • Apply local knowledge of topography, land tenure, statutory controls and development policies to assist development. • Participate with other professionals to optimise outcomes. • Contribute to feasibility studies and impact assessments.
<p>Unit: Controlling, Measuring and Locating Developments</p>	
<p>Surveyors will be competent 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 at industrial sites; or the extraction of materials at mining sites. They will be accountable for the outcomes of work personally carried out or carried out under their supervision and control.</p>	
<p>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"> • Understand 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"> • Read, interpret and understand detailed design and construction plans. • Establish appropriate reference systems. • Select and use the appropriate technology for site operations. • Set out works. • Establish effective reporting systems. • Validate data.
<p>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"> • Recognise mining and extraction of minerals and other materials. • Know and understand the measuring and monitoring outcomes needed for the safe, cost effective extraction of materials. • Recognise 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"> • Establish appropriate reference systems. • Selects and uses the appropriate technology for site operations. • Establishes effective reporting systems.
<p>Establish quality control systems.</p>	<p>Applicants will need to demonstrate that they are able to :</p> <ul style="list-style-type: none"> • Determine client needs and required tolerances. • Apply appropriate technology. • Detail methods and procedures. • Implement measuring and monitoring programs. • Implement effective reporting procedures.
<p>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"> • Understand 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"> • Read and understand design and detail plans, and apply the required tolerances. • Establish appropriate reference systems.

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| | <ul style="list-style-type: none">• Apply appropriate technology.• Implement effective reporting systems.• Establish procedures to validate results. |
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