



# NATIONAL COMPETENCY STANDARDS FOR PROFESSIONAL SURVEYORS

**FIRST EDITION**

**July 1996**

**The Summary Document (May 1996) includes an executive summary of this edition**

**Glossary of Terms:** A number of words and phrases have been given precise and specific meaning for the purpose of these Competency Standards. Their first occurrence in a section is indicated by the use of italics and a formal definition has been included in the Glossary which follows. Please refer to these definitions when applying the Standards.

**Abbreviations:** The following abbreviations and acronyms are used in these Competency Standards:

ACSA	The Association of Consulting Surveyors Australia
AFMEU	Amalgamated Food Metals and Engineering Union
DEET	Department of Employment, Education and Training (now DEETYA: Department of Employment, Education, Training and Youth Affairs )
FIG	Federation Internationale des Geometres (International Federation of Surveyors)
IEMSA	Institution of Engineering and Mining Surveyors Australia Incorporated
ISA	The Institution of Surveyors, Australia Incorporated (also referred to as "the Institution")
NTB	National Training Board
NOOSR	National Office for Overseas Skills Recognition
TAFE	Technical and Further Education

National Competency Standards for Professional Surveyors  
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27-29 Napier Close, Deakin ACT 2600  
Telephone (06) 282 2282 Facsimile (06) 282 2576

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# 1. FOREWORD

The Institution of Surveyors, Australia Incorporated (ISA) has accepted the responsibility of developing competency-based standards on behalf of the surveying profession.

The Institution recognises the significance of having available a comprehensive set of competency standards that can be used to assess the performance of professional surveyors. These standards will determine the balance of knowledge, technical skills and professional judgements needed by practising surveyors. This will ensure that Australian surveyors continue to provide their clients and society with high quality professional services at affordable costs.

While it is acknowledged that the development and use of competency standards for the professions has received criticism from some quarters, the Institution believes that well constructed standards, properly used and administered by the profession, will benefit both the profession and the community it serves.

A feature of these competency standards is a proposal that graduates from approved university courses, on application to the Institution of Surveyors Australia, will receive immediate recognition as professional surveyors. They will still remain as Graduate Members of the Institution until they have the appropriate experience and competencies to attain corporate membership.

Currently the surveying profession is being impacted by many changes including:

- changes in the administrative hierarchy of surveying
- new membership grades for the Institution of Surveyors
- new roles for the public and private sectors
- technology advances
- revisions to the education of surveyors (including the introduction of courses in geomatics, geomatic engineering and geoinformatics)
- new market opportunities

The profession is also mindful of the increasing need for all surveyors to pay greater attention to such matters as financial and business obligations, human resource management, equal opportunity and anti-discrimination principles, health and safety requirements, trade practices, and customer service.

Given this environment of change the profession needs to re-assess its position in today's society. The development of competency standards will provide the profession with an appropriate vehicle to help review its role, its activities, its image and its contributions to the community. The Institution also recognises that competency standards must be dynamic, reflecting ongoing advances in knowledge and technology and the changing needs of our community.

The Institution is therefore committed to regularly reviewing the standards to ensure that the profession maintains a culture for continuous improvement and is in the forefront in meeting tomorrow's challenges.

These competency standards must be owned and controlled by the profession and applied by experienced assessors. The Institution, on behalf of the profession, will ensure that the standards are used to advance the competence and status of the total profession and enhance its service to society.

While these standards should provide valuable guidance to educational institutions, it is not intended that the standards should impose directly on curriculum development for surveying courses. The Institution acknowledges that the profession already has considerable opportunity to provide input to course content through the cooperative processes that already exist between various sectors of the profession and the tertiary institutions. However, to facilitate opportunities for surveying graduates to obtain immediate recognition as professional surveyors, the profession may seek to liaise with the various tertiary institutions to establish arrangements for course accreditation or recognition.

The Institution would like to thank its fellow professional associations and the many interested stakeholders for their continual support and regular contributions to the project. The Institution would also like to thank the National Office for Overseas Skills Recognition (NOOSR) for its support in developing competency standards.

The surveying profession acknowledges the assistance of the Institution of Engineers, Australia for allowing the project team to make use of material from that Institution's own competency standards project.

J B Medbury, Steering Group Chairman  
Immediate Past President, The Institution of Surveyors, Australia Incorporated



## 2. INTRODUCTION

National competency standards have been an important feature of the surveying profession in Australia for over one hundred years. Traditionally, cadastral surveyors have been registered by the various Surveyors Boards around the country. These State and Territory Boards joined with the Surveyors Board of New Zealand to form the Reciprocating Surveyors Boards of Australia and New Zealand. Under the auspices of these reciprocating boards, all licensed or registered surveyors achieved a common level of competency in cadastral surveying that ensured reciprocity throughout Australia and New Zealand.

Current trends suggest that less than 30% of university graduates with surveying qualifications are seeking registration with a Surveyors Board. Many of these graduates are working in non-traditional surveying *roles* that do not require registration. Nevertheless, they are valuable members of the profession whose activities should be included in a set of competency standards that will encompass surveying in the broadest sense and recognise the many new directions being pursued by the profession.

### **The Institution of Surveyors, Australia**

The Institution of Surveyors, Australia Incorporated (ISA), through its association with NOOSR and its involvement in the assessment of overseas surveyors seeking recognition in Australia, became interested in the development of national *competency standards* in 1991.

ISA recognised that the Surveyors Boards, through their registration and reciprocity programs, are maintaining a national standard for cadastral surveyors; however, the majority of surveying graduates are not seeking registration as cadastral surveyors.

With significant advances in technology and opportunities to provide new, exciting and diverse services, many surveyors are taking on wide ranging careers that reflect these changes.

This trend is being accelerated by the tertiary institutions where surveying courses are under constant review to incorporate new technology and meet the increasing demands of society, particularly in regards to geographic information systems and the management of spatial data.

Recent changes to ISA's membership structure gave further impetus to the need to review the assessment criteria for determining membership grades.

Consequently the Institution saw the value in establishing national competency standards that cover the broadest possible range of surveying practice. These standards could be used as a basis for accrediting all professional surveyors.

## The Reciprocating Surveyors Boards

At the centenary meeting held in Ballarat, Victoria, in 1992, the Reciprocating Surveyors Boards discussed a wide range of items that have the potential to improve the efficiency and effectiveness of the profession. Registered surveyors have enjoyed reciprocity in Australia and New Zealand for many years; however, with the introduction of legislation for *mutual recognition* throughout Australia, the Reciprocating Boards agreed that the profession — and its clients — could benefit from a review of the presently accepted competencies and the development of a new set of National Competency Standards.

At the Ballarat Meeting it was resolved that:

The Institution of Surveyors, Australia, jointly with the Reciprocating Surveyors Boards of Australia and New Zealand avail themselves of the funding, advice and other assistance offered by the National Office of Overseas Skills Recognition to set up a Steering Committee to determine the parameters of a research project which will:

1. Develop a model of competency based standards.
2. Develop the means of assessing the competency based statements to arrive at competency standards for entry level to the profession.
3. Describe any *articulation* appropriate between technical, para-professional, and professional activities.

## Competency Standards – Concerns and Benefits

During the discussions that preceded the decision to approach NOOSR for assistance in funding the development of competency standards, the Institution became well aware of the vigorous debate on the relevance of competency standards for the professions that was proceeding within some professions and the tertiary institutions.

### Concerns:

The following list generally sums up the major concerns being voiced by critics of competency standards proposals:

1. Competency standards are more concerned with skills rather than knowledge and attitudes and therefore are more applicable in the trades and technician arenas.
2. Competency standards cannot capture the rich, complex nature of professional work with its creative thinking, problem solving and professional judgement.
3. Competency standards cannot encapsulate the underlying knowledge and capabilities that underwrite the technical skills of a professional. There is also uncertainty as to the extent that the generic *attributes* of professionals can be measured.
4. Competency standards may entrench a profession's status and lock it into past practices whereas higher education is vitally concerned with the future, identifying new opportunities, exploiting advances in technology, and encouraging research.

5. Competency standards could reflect back into higher learning and inhibit the introduction of new course material. This could undermine both institutional and individual academic autonomy.
6. Competency standards may inhibit the pursuit of quality and excellence and reduce professionals to a common level of mediocrity.

### **Benefits:**

To counter balance these concerns, the following list sets out the main benefits that should accrue from a set of national competency standards:

1. The surveying profession will have redefined its purpose and its functions and included them in an explicit public statement that can be used as a strategic marketing tool.
2. Surveyors will better understand their potential roles within society and students entering universities will appreciate the opportunities available from undertaking courses in surveying.
3. Educators will better understand the profession's expectations of graduates.
4. Competency standards will assist the Institution and Reciprocating Surveyors Boards in accrediting education programs.
5. Competency standards will provide an improved basis for assessing overseas qualifications.
6. Competency standards will provide direction for the development of continuing professional education programs.
7. The Reciprocating Surveyors Boards will have a national set of competency standards that will assist in registering surveyors.
8. The registration process and the subsequent status of registered surveyors will be strengthened by the availability of a national set of standards for the Reciprocating Surveyors Boards.
9. Competency standards will assist in accrediting surveyors at a national level and can be integrated into the certification process for quality assurance programs.
10. There will be a uniform assessment strategy available for assessing all surveyors.
11. Improved reciprocity could be available to registered surveying graduates during their training period.
12. Well defined national competency standards can be used to enhance the status of Australian surveyors practising overseas. This should create increased export opportunities for the profession.
13. Competency standards provide a useful tool for determining career advancement.
14. Opportunities will exist for better articulation between professionals and para-professionals in related areas.
15. Competency standards can be used to determine membership levels of ISA or other professional associations.

16. The process of developing competency standards will present opportunities for the profession to redefine its role within society and recognise truly national Australian surveyors who can apply their specialist expertise to practise surveying in the broadest possible context.
17. All surveyors, including those who have moved away from traditional surveying roles to practise in diverse areas but where they still utilise expertise which has its roots in the surveying sciences, can be recognised as important members of the profession.

### **Conclusion:**

While the veracity of the above concerns may be open to question it must be acknowledged that they do exist. In fact, consideration and debate of these concerns should contribute to the overall balance and practicality of the proposed competency standards and the associated assessment strategy.

Despite the concerns being expressed, the Institution is convinced that the development of well constructed national competency standards, and their prudent use by the profession, will bring significant benefits throughout the surveying, mapping and land information industry and also to the many clients who use surveying services in one form or the other.

After due consideration of the various concerns and benefits, the Steering Group is convinced that the overall benefits that can be derived from development of competency standards for surveyors will outweigh any possible concerns.

### **Agreement with NOOSR**

With the declared support of the Reciprocating Surveyors Boards, the Council of the Institution of Surveyors, Australia, at its meeting in Canberra in November 1992, resolved to participate jointly with the Reciprocating Surveyors Boards in developing competency-based standards.

On 24 March 1994, ISA (on behalf of the surveying profession) and NOOSR (on behalf of the Commonwealth of Australia) signed a joint agreement for "The Development of National Competency Standards and a Competency-based Assessment Strategy for the Surveying Profession".

The aim of the project is to develop competency standards and competency assessment procedures for the profession.

## The Steering Group

In keeping with the requirements set down by NOOSR, ISA established a composite Steering Group to oversee the development of competency standards. This Steering Group consists of appropriate representatives from all major stakeholders who have a direct interest in the surveying industry.

### Steering Group Members:

Mr John Medbury, President of the Institution of Surveyors, Australia Incorporated and Chairman of the Steering Group. (Mr Medbury completed his term of office during the course of the project and now holds the office of Immediate Past President.)

Mr Graham Marion, representing Mr Henry Houghton, Chairman of the Recess Committee of the Reciprocating Surveyors Boards of Australia and New Zealand.

Mr Jeff Sanderson, representing the Association of Consulting Surveyors Australia.

Mr Noel Oliver, Head of the Department of Land Information, Canberra Institute of Technology representing Technical and Further Education (TAFE) and the Institution of Engineering and Mining Surveyors Australia Incorporated.

Professor John Fryer representing the Australian Surveying and Mapping Lecturers Association.

Mr Tony Quinn representing the Australian Council of Trade Unions through the National Technical and Supervisory Division of AFMEU.

Professor Ian Williamson, representing the Australian Vice-Chancellors' Committee.

Ms Jane Thomson, Project Officer, National Office of Overseas Skills Recognition. (Alternative member, Ms Denise McKinnon.)

Mr Norm Mann, alternative member, representing the Institution of Engineering and Mining Surveyors Australia Incorporated.

ISA, as manager of the project, established a project team to work under the direction of the Steering Group.

## Assessment Strategy

A major part of the project is the development of assessment processes that can be used in conjunction with the National Competency Standards. With an increasing number of surveyors not seeking registration through the Reciprocating Surveyors Boards, the profession needs an accreditation process whereby all professional surveyors can have the opportunity to receive some formal recognition.

Appendix B contains some basic procedures and guidelines to assist any of the stakeholders to assess the *competence* of professional surveyors.

## Sunset Clause

Competency standards for the professions must be dynamic and they must reflect the current trends in professional practice. It is now normal practice for government regulations to include sunset clauses and it essential that the competency standards should also include an appropriate sunset clause.

If these competency standards are not revised within a period of no greater than five years after their initial acceptance by the Council of ISA, they must be considered invalid.

Therefore it is the strong recommendation of the Steering Group that the Institution establish a suitable standing committee to act in a watch-dog role and be responsible to the profession to ensure that the competency standards are updated at least every five years or whenever there are any significant changes to the discipline of surveying.

### 3. OBJECTIVES OF THE PROJECT

One of the first actions of the Steering Group was to establish a set of objectives that could be achieved from the project.

#### 1. Professional Surveyors

To identify and enunciate the full scope of the professional activities and *roles* of Australia's professional surveyors and ensure that these activities are recognised by the Institution of Surveyors, Australia Incorporated and other allied professions.

#### 2. Practice Standards

To determine, as far as possible, the competency standards normally expected of all professional surveyors practising surveying and its associated professional disciplines and to produce a public document that clearly sets out these standards.

#### 3. Professional Standing

To provide a basis for assessing the eligibility of candidates seeking membership of the Institution of Surveyors, Australia Incorporated or other similar professional associations.

#### 4. Registration of Surveyors

To provide the national standards that will assist registering authorities when assessing the knowledge, skills and competencies required by professional surveyors seeking registration as licensed or registered surveyors.

#### 5. Recognition of Overseas Skills and Qualifications

To provide the national standards that can be used by authorities assessing the knowledge, skills and competencies of overseas persons seeking recognition and employment in Australia as surveyors.

#### 6. Surveying Courses

To provide persons involved with the design and implementation of undergraduate and post graduate education programs in surveying with current information on the scope, breadth and complexity of the profession's activities.

#### 7. Training and Continual Professional Development

To provide standards of expected *competency* that can give direction to post-graduate training programs and continuing professional development.

#### 8. Articulation

To facilitate the *articulation* of competency standards required of technician and professional surveyors.

#### 9. Assessment

To establish a strategy for assessing professional surveyors against the national competency standards.

#### 10. Public Communication

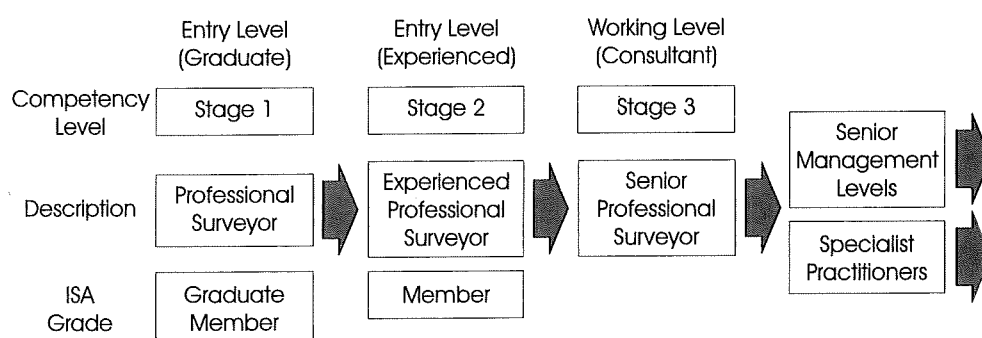
To provide the public with accurate information as to the range, scope and standards of service that can be expected from professional surveyors.

## 4. COMPETENCY LEVELS

Funding provided by NOOSR for the development of competency standards must be targeted towards entry level into the profession.

In determining this entry level the Steering Group considered what would normally be the first two stages of a surveyor's career structure.

While the current project is focused on developing competency standards for the entry levels into the profession (Stages 1 and 2), it is envisaged that the standards will be eventually expanded to cover the full range of professional activities up to senior management levels.



The competency standards can also be used as a benchmark for determining standards at the para-professional levels and providing a sound basis for *articulation* between all levels within the industry.

The competencies for the senior professional surveyor (Stage 3) were developed to provide the appropriate benchmark for determining competencies at other levels. The *competence* of surveyors must be on a continuum with continuing professional development being a significant feature of their careers. Surveyors who achieve entry into the profession will be expected to develop the competencies required for the Stage 2 level and then progress through to the senior professional surveyor level.

### Stage 1: Professional Surveyor – Entry Level

The competency standards for Stage 1 are equivalent to those required for attaining the grade of Graduate Member of the Institution of Surveyors, Australia. A candidate for this grade of membership would normally require an approved Bachelor Degree Award or equivalent and must be *competent* to carry out a wide range of surveying activities under the guidance of experienced professional surveyors.



## Stage 2: Experienced Professional Surveyor

The competency standards for Stage 2 are equivalent to those required for the grade of Member of the Institution of Surveyors, Australia. A candidate for this grade of membership would normally require an approved Bachelor Degree Award or equivalent and a minimum of three years professional experience under the direction of an experienced professional surveyor. A surveyor at this level must be competent to practise autonomously in at least one substantial branch of surveying.

A surveyor seeking initial registration with a Surveyors Board also needs an approved Bachelor Degree Award plus two years of suitable post-graduate training and experience. It should be noted that the overwhelming majority of surveying graduates have well in excess of three years' professional experience before seeking registration.

While most Surveyors Boards within Australia only register or licence cadastral surveyors, three of the boards now have the facility for general registration in any of the key areas of surveying.

The competencies required for a Stage 2 Professional Surveyor are consistent with those required for registration by a surveyors board. On achieving Stage 2, a professional surveyor could be awarded a specific title (eg, "Certified Professional Surveyor") by the Institution of Surveyors, Australia.

## Stage 3: Senior Professional Surveyor

Stage 3 is the working level for an experienced senior surveyor.

While it is intended that the project should focus on the entry level of the profession, the Steering Group agreed that it was preferable to initially develop competency standards for the working level of a senior professional surveyor.

This would normally be a professional surveyor who has had extensive professional development and experience since achieving the Stage 2 level of *competency* and who is considered to be a highly competent practitioner in a majority of the core *units of competency*.

## 5. GENERIC STANDARDS

The purpose of this project was to determine the generic competency standards required for a surveyor at entry levels into the profession.

Before developing competency standards for the entry levels, it was considered important to produce a set of general competency standards for a senior professional surveyor, with extensive experience, practising autonomously in the market place. These competency standards then provided the benchmark for developing competency standards for entry levels.

All of the competency standards developed for this project are generic in nature. With these generic standards as a basic model, it is possible to develop a framework of competency standards across the profession that complement each other, facilitate *articulation* between the various levels, and provide a road map for career progression.

These generic standards can also be used by appropriate experts to derive specific competency standards covering particular functional areas. Experts in specific fields such as engineering surveying, cadastral surveying, the design and construction of property developments, geodesy, hydrographic surveying, photogrammetry, et cetera, will be responsible for deriving relevant competency standards.

Appendix A (page 84), indicating a derived set of competency standards for a geo-spatial information consultant, is provided as an example of derived competencies for a specific functional area.

## 6. ASSESSMENT STRATEGY

A major part of the project is to develop *assessment* processes that can be used to appraise the *performance* of surveyors against the competency standards. Assessments will be required for surveyors entering the profession as Stage 1 Professional Surveyors and also for professional surveyors seeking accreditation at the Stage 2 level.

Currently the Reciprocating Surveyors Boards of Australia and New Zealand have in place assessment processes but these generally focus on the assessment of cadastral surveyors seeking registration under the various statutes that regulate surveyors in Australia and New Zealand.

With an increasing number of surveyors choosing not to seek registration through the Reciprocating Surveyors Boards, the profession needs an accreditation process whereby all professional surveyors can be assessed and formally recognised. This will enable the public to readily identify competent professional surveyors.

The Surveyors Boards currently use a diverse array of assessment procedures and it is expected that any assessment strategy would encompass many of these procedures.

Assessments will require a high degree of judgement by senior professionals with wide experience in the relevant discipline area and demonstrated *competency* in the assessment process.

To encourage acceptable consistency in the assessment procedures used by the various stakeholders, a set of guidelines has been included as Appendix B (page89).

## 7. COMPETENCY STANDARDS; WHAT ARE THEY?

The development of national competency standards has been an important part of the strategy for the micro-economic reform of Australian industry. Government involvement in national standards took place through two organisations, the National Training Board (NTB) and the Commonwealth Department of Employment, Education and Training (DEET). In particular, the National Office for Overseas Skills Recognition (NOOSR), which is responsible to the Minister of Employment Education and Training, was given the role of encouraging professions in developing competency standards.

The National Training Board was a public company, limited by guarantee and owned by the Commonwealth, State and Territory Ministers responsible for vocational education and training. The NTB was primarily responsible for the development of the Australian Standards Framework and Format. The Australian Standards Framework sets out eight *competency* levels which provide a general framework or benchmark for determining competency standards across the Australian workforce.

The National Training Board has been disbanded and its functions transferred to the Australian National Training Authority.

### NOOSR's Role

(Based on extracts from Research Paper No 7 supplied by NOOSR.)

NOOSR was established in July 1990 as part of the National Agenda for a Multicultural Australia. Its responsibilities include improving the skills recognition process for overseas trained professionals by encouraging professions to develop and then use competency standards rather than qualifications as a basis for *assessment*. The work developed by the professions for this purpose, however, also meets the broader objectives of the Training Reform Agenda because it is relevant to professionals trained in Australia.

The July 1991 Special Premiers' Conference gave further impetus to the work of the professions when it decided that all regulated occupations should have competency standards in place for the implementation of *mutual recognition*.

NOOSR's role in competency development is to encourage the professions to develop national competency standards by:

- coordinating agreements between interested parties to foster the establishment of national based standards
- lending expertise and resources to such projects, including funding
- ensuring standards developed relate to the Australian Standards Framework and Format of the National Training Board and articulate with career paths in other related industries

## The Concept of Competence

The NTB describes competency as “the ability to perform the activities within an occupation or function to the standard expected in employment”.

Critics of the competency standards movement in Australia would claim that the above definition does not capture the rich complexity and diverse nature of professional work nor can it take into account those hallmarks of professional practice such as ethics, innovation, personal judgement and community service.

The concept of *competence*, as it applies to the professions, is explained in Research Paper No 7: *A Guide to Development of Competency Standards by Professions* (by L Heywood, A Gonczi, and P Hager; published by the Australian Government Publishing Service, April 1992).

Competence is an intangible construct; ie it cannot be observed directly. The construct of competence attempts to capture the myriad of personal characteristics or *attributes* that underlie and enable *competent performance* in an occupation. Some of the personal attributes that underlie professional competence may be readily recognisable (eg a particular knowledge base, certain skills, attitudes, etc) while others may be ill-defined, poorly understood or even unrecognised.

Because competence cannot be observed directly, it is necessary to obtain some form of indirect evidence from which underlying competence might be inferred. The nature of the evidence to be obtained, and the validity of the inferences drawn from it, are the major issues surrounding recognition of competence.

## The Integrated Approach

Because many of the competencies required for professional practice cannot be observed directly, it is necessary to infer competence from indirect evidence. An integrated or holistic approach has been developed to determine competency standards for professionals.

The integrated approach combines an attribute-based approach for inferring competence with a performance-based approach.

- An **attribute-based approach** to inferring competencies relies on testing personal *attributes* such as skills, knowledge and attitudes.
- A **performance-based approach** is used to infer competence by observing the *performance* of individuals in the actual *work place*.

The integrated approach endeavours to integrate personal attributes, such as knowledge, skills and attitudes, analytical capacity, decision making, and the exercise of professional judgement, with the behaviourist (task based) approach of determining competency by observing performance or outcomes in professional practice.

## Competence for Surveyors

The following statements describe how competency standards can apply to surveyors:

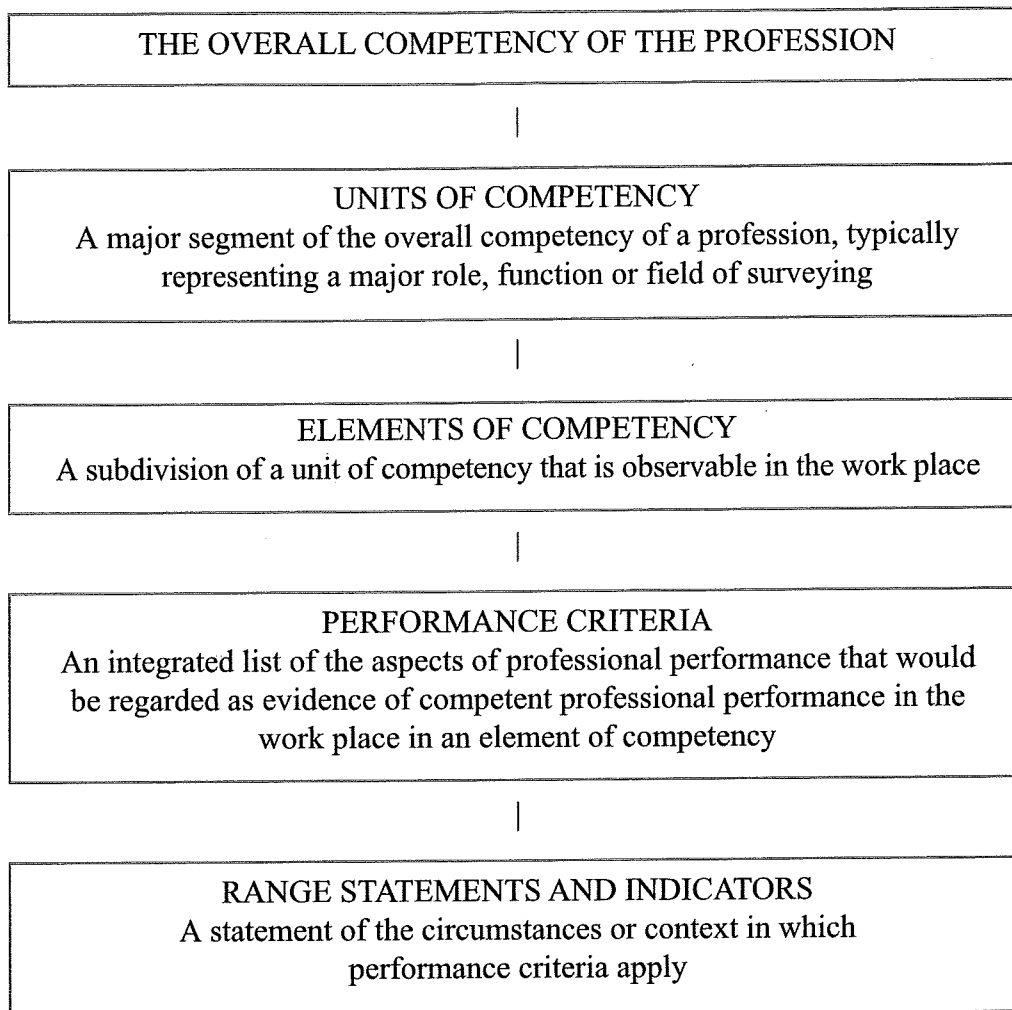
- Competency standards indicate the attributes required by a surveyor to meet the performance levels normally expected of a professional surveyor practising in the work place. These attributes are a combination of knowledge, skills, attitudes and experience.
- Competency standards indicate what a professional surveyor needs to know, and do, to practise successfully in the market place.

Competency standards will vary with the professional development of a surveyor. For example, the competency standards for an experienced surveyor in a supervisory or management position would be more demanding than those for a graduate entering the profession.

While the intention of this project is to develop competency standards for the entry levels into the profession, it was considered preferable, in the initial stages, to establish generic competency standards commensurate with the working level of a senior professional surveyor. These generic standards, which provide a benchmark for developing competency standards at all other levels, were then modified for the entry levels.

## The Structure of Competency Standards

The general format, approved by NOOSR, for the presentation of competency standards for professions is as follows:



Competency standards will define the normal functions carried out by surveyors, identify the outcomes or performance expected when carrying out these functions, and specify the context in which the outcomes can be expected.

## 8. USING NATIONAL COMPETENCY STANDARDS

As indicated in the list of benefits, there are many potential uses for competency standards. When the competency standards are expanded to include all levels of *competence* within the profession and appropriate *assessment* procedures are in place, the uses will include:

- determining the appropriate membership levels for surveyors within professional associations
- assisting registering authorities in assessing professional surveyors who are seeking registration
- accrediting *competent* persons as the preferred suppliers of surveying services
- assessing the *competency* of overseas persons seeking to practise as professional surveyors in Australia
- assisting educators in designing undergraduate and post graduate courses in surveying
- assisting educators and professional associations in developing programs for continuing professional development
- facilitating reciprocity arrangements with overseas surveying organisations

Care must be taken to ensure that the competency standards are interpreted correctly and applied in the appropriate circumstances. Acceptable competency levels may not necessarily require compliance with all *performance criteria* in an element or elements. A high degree of informed professional judgement by suitably qualified, experienced persons is required.

Assessors using these standards will need to be experienced professional surveyors who have a sound understanding of the competency standards and the assessment process. Some suitably experienced experts from fields other than surveying may also be required as assessors in some specialist areas.

Invariably final assessments will require a high degree of professional judgement by experienced professionals with wide experience in the relevant discipline area and demonstrated competency in the assessment process.



## The Commonwealth of Australia

While the profession owns the competency standards and can use the standards for its own purposes, the Commonwealth of Australia (the Commonwealth), under the joint agreement signed by NOOSR and ISA, also has the right to use the standards, as set out in Clause 7 of the Agreement.

### Clause 7: Contract Material and Intellectual Property

The Contract Material Owner and the Intellectual Property Owner under this Agreement is the Organisation.

- (a) Upon the expiration or earlier termination of this Agreement the Organisation shall deliver to the Department a copy of the Contract Material in good condition.
- (b) The Organisation grants to the Commonwealth a permanent, irrevocable royalty-free, non-exclusive licence (including a right of sub-licence) to use, reproduce and exploit the Contract Material anywhere in the world. Notwithstanding Part VII of Copyright Act 1968, publication of the Contract Material in accordance with this licence shall not effect such ownership.
- (c) The Commonwealth agrees to confer with the Organisation before using the Contract Material. The Organisation agrees to notify the Commonwealth of any changes to the Contract Material and to provide the Commonwealth with any changes to the Contract Material and to provide the Commonwealth with one copy of the revised Material.

## 9. THE SURVEYING PROFESSION

The surveying profession is now going through a period of continuous change with many of its traditional *roles* and activities being questioned and challenged. Surveyors, fellow professionals, governments, and sections of the general community are questioning the role of the profession in the nineties and beyond.

The Competency Standards Project has provided an opportunity for the profession to review its functions and responsibilities and restate its role in society.

The surveying profession has played a major role in the development of Australia since European settlement in 1788.

Many of our early surveyor-explorers were responsible for opening up much of Australia to European settlement. Surveyors have left a large imprint on Australian society as a result of their significant inputs into the site selection of early settlements and their initial layouts of many of our towns and cities. The locations of our early road patterns were influenced by the decisions of surveyors and, in many instances, the rate and extent of private land ownership depended on the ability of surveyors to survey the land.

The surveying profession has been a major contributor to one of Australia's most outstanding achievements in effective land management, the Torrens Titling System. This cost effective, efficient land tenure system, which has been adopted throughout Australia, depends, to a very large extent, on the accurate survey of land parcels. The orderly alienation of crown lands and our reliable land tenure system, substantially free from litigation, are tributes to the competency of many Australian surveyors.

Surveyors and cartographers have provided the country with a comprehensive, high quality mapping system. Many of the country's substantial public works programs have been based on accurate, reliable surveys and surveyors have played a continuing role in all major rural and urban developments.

Essential to the orderly development of effective surveying and mapping systems is a sound geodetic framework. Surveyors have provided Australia with a geodetic network that forms the basis of a fundamental data set that is available to all land professionals and other scientists.

In more recent times surveyors have been active in establishing spatial reference systems and providing base data for geographical information systems. The new breed of surveyors, with their skills in computing science, land management and information management, are now playing leading roles in establishing and managing geographic information data bases and are using their wide ranging surveying skills to provide innovative solutions to many land and environmental management problems.

New degree courses in geomatics and geoinformatics are supplementing existing degree courses in surveying and applied science.

Generally the surveying profession has managed to provide the Australian community with balanced services that have been drawn from their knowledge of the science of measurement as well as a profound understanding and appreciation of the importance of planned land development and orderly land management to our society.

### **The Definition of a Surveyor**

In 1992, the Institution of Surveyors, Australia adopted the *definition of a surveyor* previously developed by the International Federation of Surveyors (FIG). While this is an excellent definition, applicable to the wider family of land professions that have bonded together within this international organisation, it may not be appropriate to meet the requirements of the Australian surveying profession as it moves towards the 21st Century.

After consultation with many stakeholders around Australia and an assessment of material from various search conferences, ISA Divisions, and Surveyors Boards, a modified version of the FIG definition was compiled for the competency standards project:

#### **The Definition of a Surveyor**

A surveyor is a professional person with the academic qualifications and technical expertise to practise the science of measurement; to assemble and assess land and geographic related information; to use that information for the purpose of planning and implementing the efficient administration of the land, the sea and structures thereon; and to instigate the advancement and development of such practices.

A professional surveyor will practise surveying for the benefit of society. The practice of surveying in Australia may involve, but is not limited to, one or more of the following activities which may occur either on, above or below the surface of the land or the sea and may be carried out in association with other professionals.

1. Acquiring, interpreting and manipulating geodetic data to determine the shape and size of the earth and its surface.
2. Designing, establishing and managing the spatial infrastructure and fundamental data sets needed to support economic development and environmental management at a local, regional, state or national level.
3. Maintaining a spatial infrastructure, as required, to support an effective cadastre and efficient land tenure systems that meet real estate market requirements in Australia.
4. Determining, locating and defining the boundaries of public and private land (including national boundaries), interpreting anomalies in the cadastre, and arbitrating on disputes over boundary location.

5. Designing, establishing and managing spatial reference systems to provide a homogeneous framework for geographic and land information systems.
6. Collecting, analysing and managing geographic data and designing, establishing and administering land and geographic information systems.
7. Measuring, controlling and monitoring the shape, size and location of physical features, structures, machines and engineering works and determining their spatial relationships.
8. Measuring and mapping seabeds, lakes and waterways; measuring tidal movements and current flows; providing information for navigation and maritime developments.
9. Providing information and advice, pertinent to property and its environment, to assist in determining the best sustainable land use and development.
10. Assessing the potential benefits or disadvantages that could accrue from property development and advising clients and government accordingly.
11. Contributing to the development and management of urban and rural properties by planning, advising, negotiating, and implementing procedures.
12. Planning, estimating, designing, measuring, and implementing projects such as construction works, mineral exploration, and mining; and applying prudent financial control and sound project management principles.
13. Producing for clients, plans, maps, files, data bases, models, charts and reports.
14. Advancing the science of measurement; the management and administration of land and land information; the effectiveness of surveying; and the assessment, management, and introduction of new concepts such as geomatics and geoinformatics.

In application of the foregoing activities, surveyors take into account the relevant ethical, legal, financial, environmental and social aspects affecting each project.

The above definition highlights the wide and varied nature of the work carried out by surveyors. All of the surveying activities identified are relevant to Australia's continuing prosperity. Some of the roles outlined above are shared with fellow professionals. However, surveyors will continue to contribute to Australia's national development and its international standing because of their strong affinity with the land and its management and development; their skills in the science of measurement; and the qualities and characteristics developed through their education and post graduate training programs.

## Distinguishing Qualities and Characteristics

After canvassing a broad cross section of the profession, the following list of distinguishing qualities and characteristics of professional surveyors was compiled:

1. A sound knowledge and understanding of basic scientific principles and the ability to apply this scientific knowledge to exploit new technology and advance the science of surveying.
2. A profound knowledge and understanding of the operations of the surveying and land and geographic information industry, the acquisition and management of spatial data, and the diverse market available for surveying and land information products.
3. A sound knowledge and understanding of associated disciplines and the ability to communicate, liaise and work with allied professions to jointly achieve outcomes that lead to improved planning, sustainable development and enhanced quality of life.
4. The knowledge and skills in science, mathematics, and computing to analyse and solve theoretical and practical problems; and the confidence to identify and resolve future problems with innovative solutions.
5. The total communication skills needed to develop and foster customer confidence; to influence decision makers and negotiate viable outcomes; to enhance the image of surveyors; and to contribute to the advancement of society.
6. An unqualified commitment to the profession's code of ethics including:
  - dignity, impartiality and integrity in all professional and business activities
  - promoting the profession and working to ensure its continuing development
  - continuous learning and personal professional development
  - community service
7. An awareness of the current economic, political and social environment and an appreciation of the likely impact of their professional judgements and decisions within that environment.
8. A high level of computer literacy and the ability to exploit computing technology for data management and the provision of surveying and measuring services.
9. Detailed knowledge of the law, as it relates to land; a sound understanding of the processes required for land development; and an appreciation of the affinity that individuals and various groups within society have with the land.
10. A profound knowledge and understanding of all the basic surveying disciplines used for measuring and collecting topographic data; and the ability to apply that knowledge in providing clients with land information and survey control.

11. A clear understanding and appreciation of modern management principles and sound business practices including customer service, project management, quality assurance and financial accountability.
12. The interpersonal skills needed to work effectively within the *work place*, to assist colleagues to advance their career opportunities, and to promote and enhance their own value to the community as professional surveyors.
13. An international focus that includes:
  - a clear focus on the need for Australia to export professional services, including surveying
  - an understanding of the opportunities that are available overseas to use their unique skills
  - an appreciation of the personal and professional benefits that will accrue from international experience
14. The broad education, specialised knowledge and professional attitudes needed to meet the requirements of professional institutions and registration boards.
15. An understanding of, and a commitment to, the profession's stated policy on environmental issues and sustainable development.
16. An understanding of the importance of core spatial data sets and a commitment to their maintenance within state and regional jurisdictions.
17. The ability to work under adverse conditions or in extreme circumstances and continue to provide a high level of service, make difficult decisions and maintain professional integrity.
18. The ability to apply scientific knowledge, technical skills and management expertise to initiate and implement innovative designs.

## 10. COMPETENCY STANDARDS

### Developing the Standards

In developing the competency standards, the Steering Group agreed that, initially, a broad set of competency units, elements and *performance criteria* was required that would be generally applicable to professional surveyors. This broad set of standards could then be refocused onto the entry level for the profession by a considered approach to the performance criteria and the attendant *range indicators*.

The competency standards are generic in nature and should be applicable across the full range of surveying functions.

These generic standards are not intended to set out in detail the competencies required for every surveying function undertaken by professional surveyors. They are intended to provide a sound framework from which various subsets can be derived that will define, in more specific terms, the standards required for specialised surveying functions.

These derived units of *competency* will need to be compiled by experienced professional surveyors who have both specialist expertise in the functional areas being considered and a sound understanding of the generic competency standards.

### Definitions

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

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

**Performance Criteria:** An integrated 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*.

**General Range Statement:** A general statement of the circumstances or context in which a person practises in the *work place*.

**Range Indicator:** A statement of the circumstances or context in which *performance criteria* apply.

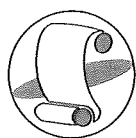
## Core Units of Competency

The following core units of competency have been identified for surveyors. They are intended to cover the Stage 1 and Stage 2 entry levels into the profession as well as the senior professional surveyor level (Stage 3).

1. Professional Practice
2. The Collection of Data and Information
3. The Management of Data and Information
4. The Presentation of Information
5. Business, Management, and Supporting Quality Assurance Programs
6. Communications
7. Spatial Reference Systems and Core Data Bases
8. Land Administration and Property Development
9. Controlling, Measuring, and Locating Developments
10. Research, Development, and Commercialisation
11. Education and Training

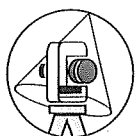
## Core Elements of Competency

A unit of competency describes a broad area of performance which is generally too large for practical *assessment*. However, these units can be further subdivided in more manageable elements of competency. These elements are the building blocks for each unit of competency and they describe in more detail what is done in the work place. An element of competency should be an observable activity which can be assessed.



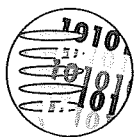
### 1. PROFESSIONAL PRACTICE

- 1.1 Advance the science of surveying and the image of surveyors
- 1.2 Fulfil community service obligations
- 1.3 Follow an accepted code of professional conduct and ethics
- 1.4 Undertake a program for personal professional development and continuing education
- 1.5 Promote sustainable development and apply environmental principles
- 1.6 Accept responsibility for professional activities



### 2. THE COLLECTION OF DATA AND INFORMATION

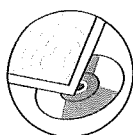
- 2.1 Collect data by measurement
- 2.2 Search and acquire existing data



### 3. THE MANAGEMENT OF DATA AND INFORMATION

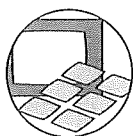
- 3.1 Design and develop system standards
- 3.2 Process data to accepted standards and for specific requirements
- 3.3 Convert data from one system or medium to another
- 3.4 Administer electronic and physical data bases
- 3.5 Analyse, evaluate and interpret data





#### **4. THE PRESENTATION OF INFORMATION**

- 4.1 Assemble data into specific data or information sets**
- 4.2 Compile and produce maps, plans, charts and photographs**
- 4.3 Provide digital spatial information**
- 4.4 Produce models**
- 4.5 Formally present information to clients, government agencies and public forums**
- 4.6 Prepare reports**
- 4.7 Certify data**
- 4.8 Provide advisory services**



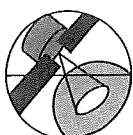
#### **5. BUSINESS, MANAGEMENT AND SUPPORTING QUALITY ASSURANCE PROGRAMS**

- 5.1 Plan, organise, direct and control tasks and people and other resources**
- 5.2 Adopt sound business practices including economic planning, financial management and compliance with legal requirements**
- 5.3 Manage human resources**
- 5.4 Train and develop subordinates in the work place**
- 5.5 Apply project management principles**
- 5.6 Apply self management principles**
- 5.7 Apply quality assurance principles**
- 5.8 Implement projects**



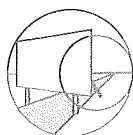
#### **6. COMMUNICATIONS**

- 6.1 Communicate effectively**
- 6.2 Present, promote, report on, and advocate ideas on surveying, land development and allied areas of practice**
- 6.3 Prepare and comprehend surveying documents**
- 6.4 Comprehend, report on and discuss relevant legal matters**
- 6.5 Collaborate with colleagues and other interested parties**
- 6.6 Use professional expertise to contribute to the processes that shape society**



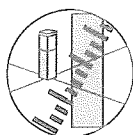
#### **7. SPATIAL REFERENCE SYSTEMS AND CORE DATA BASES**

- 7.1 Design reference systems**
- 7.2 Establish primary geodetic control datums**
- 7.3 Establish subsidiary networks**
- 7.4 Develop and implement network maintenance programs**
- 7.5 Integrate spatial reference systems with fundamental physical and cultural data, and manage core data bases**
- 7.6 Accredited spatial data standards**
- 7.7 Maintain and manage core data bases**



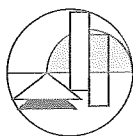
## **8. LAND ADMINISTRATION AND PROPERTY DEVELOPMENT**

- 8.1 Advise on appropriate land tenure and land tenure systems**
- 8.2 Contribute information and advice to facilitate the administration, control and development of land resources**
- 8.3 Promote opportunities to expedite sustainable land development**
- 8.4 Provide advice on financial implications of land development**
- 8.5 Provide design services to optimise land development and encourage sustainable land use**
- 8.6 Manage properties and property development**



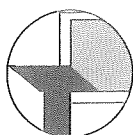
## **9. CONTROLLING, MEASURING AND LOCATING DEVELOPMENTS**

- 9.1 Control and locate engineering works, development projects, and the building or installation of structures and machines**
- 9.2 Control and measure the extraction of minerals and other materials**
- 9.3 Establish quality control systems**
- 9.4 Monitor the position, shape and size of structures, land forms and sea beds**



## **10. RESEARCH, DEVELOPMENT, AND COMMERCIALISATION**

- 10.1 Perform research**
- 10.2 Formulate concepts for development**
- 10.3 Identify and seek resources to further research and development**
- 10.4 Carry out market research**
- 10.5 Commercialise research outcomes**



## **11. EDUCATION AND TRAINING**

- 11.1 Contribute to the development of surveying education**
- 11.2 Assist in conducting surveying education**
- 11.3 Develop and conduct training programs**

## Competency Requirements for Surveyors

### Stage 1: Professional Surveyor – Entry Level

Entry level as a Professional Surveyor and entitled to Graduate Membership of the Institution of Surveyors, Australia.

Professional surveyors at Stage 1 will be expected to demonstrate competency acquired through education, training and experience in units 1, 2, 3, 4 and 6, and in at least one of units 7 to 10.

At Stage 1, professional surveyors must have developed an understanding of the importance of unit 5 and a commitment to developing competency in this area. Under the guidance of experienced professional surveyors, they must perform professional surveying activities in units 1 to 6 and in at least one of units 7 to 10.

Surveyors at this level will share professional responsibilities with more experienced professionals and must undertake structured training and development programs to progressively develop their competencies. Professional surveyors will normally progress from Stage 1 to Stage 2 competency level in about three years.

### Stage 2: Experienced Professional Surveyor

A professional surveyor eligible for Corporate Membership of Institution of Surveyors, Australia.

Professional surveyors at Stage 2 will be expected to demonstrate competency acquired through education, training and experience in no less than seven of the basic units of competency. Under the direction of experienced senior professional surveyors, they must perform professional surveying activities in units 1 to 6 and in at least one of units 7 to 11.

Surveyors at this level will accept responsibility for all professional work undertaken within their areas of expertise. However, they must recognise complex or critical situations where professional guidance is required.

Stage 2 Professional Surveyors will be expected to progressively develop their levels of competency and accept a commensurate increase in professional responsibility. Normally, practising surveyors, through experience and continuing professional development, can progress from Stage 2 level to the Stage 3 level in about four years.

### Stage 3: Senior Professional Surveyor

Senior professional surveyors must have fulfilled the competency standards expected at the Stage 1 and Stage 2 levels and will have acquired a high level of proficiency in at least seven core units of competency. Any senior professional surveyor taking on the role of supervising surveying graduates who are seeking accreditation at the Stage 2 level must demonstrate proficiency in those elements of competency pertaining to the training of the graduates.

## Performance Criteria

The performance criteria included with these competencies are not exhaustive and they should be treated as general guides. They are really cues that should be looked for during the assessment process. The assessment process will require a high level of informed, professional judgement to be exercised by trained assessors who will have the knowledge and experience to adapt or amend the performance criteria to meet specific circumstances.

## General Range Statements

A *general range statement* is provided for each level. These are supported by *range indicators* for each core unit of competency.

### The General Range Statement for Stage 1

The competencies for Stage 1 will be typically demonstrated by professional surveyors practising in any sector of the market under the direct guidance of senior professional surveyors.

As professional surveyors, they will normally require an *approved degree* or equivalent.

The benchmark for an *approved degree* will be a four year degree at an Australian University, approved or accredited by ISA.

Stage 1 surveyors, 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 of the functional areas set out under the “Definition of a Surveyor” and adopted by ISA.

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.

Surveyors at this level will share professional responsibilities with experienced professionals and must undertake structured training and development programs to progressively develop their competencies.

### The General Range Statement for Stage 2

The competencies for Stage 2 will be typically demonstrated by experienced professional surveyors practising in any sector of the market, normally under the general direction of senior professional surveyors.

Experienced professional surveyors will normally have had at least three years satisfactory post graduate experience as Stage 1 Professional Surveyors.

The benchmark for post graduate experience will be a professional development program set or approved by the ISA. This professional development program will be consistent with the training and development programs adopted by the Reciprocating Surveyors Board of Australia and New Zealand as a prerequisite for registered or licensed surveyors.

Stage 2 Professional Surveyors, as employees in the public, private or tertiary sectors, will be practising as competent professionals demonstrating expertise and professionalism within one or more of the functional areas set out under the “Definition of a Surveyor” and adopted by ISA.

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 professional guidance is required.

### **The General Range Statement for Stage 3**

The competencies for Stage 3 will be typically demonstrated by senior professional surveyors practising in any sector of the market place.

Practitioners will normally have had substantial experience and professional development (nominally four years) as practising surveyors since achieving the Stage 2 level.

Professional surveyors at this level will have demonstrated high levels of technical competence, leadership qualities and effective management skills over a number of years. As employees holding responsible positions in the public, private or tertiary sectors, or acting as private consultants, they will be competent, autonomous, practising professionals, demonstrating expertise within one or more of the fields of surveying set out under the “Definition of a Professional Surveyor” and adopted by ISA. They will regularly carry out complex or critical survey work and resolve unusual problems.

As private consultants, Stage 3 surveyors must have demonstrated competencies in business management and communications at levels normally expected for professional consultants in private industry.

Senior professional surveyors taking on the role of supervising surveying graduates who are seeking accreditation at the Stage 2 level must demonstrate proficiency in those elements of competency pertaining to the training of graduates.

# COMPETENCY STANDARDS FOR SURVEYORS, STAGES 1, 2 & 3

## Competency Standards

Competency standards follow this general format:

First Number — Stage Level

Second Number — Unit of Competency

Unit of Competency Title

### **General Range Statement for Stage 1**

The competencies for Stage 1 ...

### **1.1. PROFESSIONAL PRACTICE**

#### **1.1.1 Advance the science of surveying and the image of surveyors**

- Conducts oneself in a manner that enhances the profession.
- Participates in promoting surveyors and surveying

### **Range Indicator 1.1**

(See also the general range statement for Stage 1)  
Stage 1 surveyors ...

Elements of Competency for  
the Unit

Performance Criteria for the  
Element

# COMPETENCY STANDARDS, STAGE 1

## **The General Range Statement for Stage 1**

The competencies for Stage 1 will be typically demonstrated by professional surveyors practising in any sector of the market under the direct guidance of senior professional surveyors.

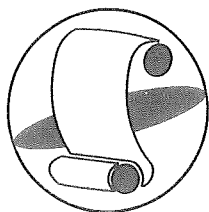
As professional surveyors, they will normally require an approved degree or equivalent.

The benchmark for an approved degree will be a four year degree at an Australian University, approved or accredited by ISA.

Stage 1 surveyors, 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 of the functional areas set out under the "Definition of a Surveyor" and adopted by ISA.

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 workplace.

Surveyors at this level will share professional responsibilities with experienced professionals and must undertake structured training and development programs to progressively develop their competencies.



## **1.1. PROFESSIONAL PRACTICE**

### **1.1.1 Advance the science of surveying and the image of surveyors.**

- Conducts oneself in a manner that enhances the profession.
- Participates in promoting surveyors and surveying.
- Recognises the role of technology in improving service.
- Seeks reward through merit and quality of performance.

### **1.1.2 Fulfil community service obligations.**

- Recognises that surveyors have professional responsibilities to government and the community.
- Recognises the need for impartiality and objectivity in decision making.
- Recognises the need to pursue fair and equitable solutions that rank community interests before client and personal interests.
- Recognises responsibilities for the welfare and safety of the community above sectional interests.
- Participates in learning about community affairs.

### **1.1.3 Follow an accepted code of professional conduct and ethics.**

- Recognises the role of the profession's code of ethics.
- Participates in professional activities in an ethical way.
- Recognises the legal requirements and obligations of surveyors.
- Recognises a surveyor's professional responsibilities.
- Applies a high code of personal conduct.

### **1.1.4 Undertake a program for personal professional development and continuing education.**

- Recognises the role of continuing professional development.
- Recognises the need for continuing improvement in performance.

### **1.1.5 Promote sustainable development and apply environmental principles.**

- Recognises the profession's stated environmental policy.
- Recognises the profession's role in environmental matters.
- Seeks advice from senior colleagues on environmental issues encountered in regular practice.
- Recognises that developments impact on the life styles, cultures and heritage of all sections of the community.
- Recognises procedures for resolving environmental issues.
- Recognises the benefits of sustainable development.

### **1.1.6 Accept responsibility for professional activities.**

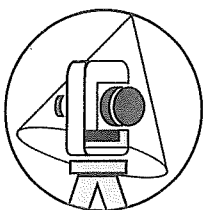
- Recognises potential risks and liabilities.
- Practises correct occupational health and safety procedures.
- Recognises the likely impacts of work undertaken.
- Recognises the limits of personal skills and expertise.

#### **Range Indicator 1.1:**

(See also the general range statement for Stage 1)

Stage 1 surveyors 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 Institution's policy on ethics and professional practice.





## 1.2 THE COLLECTION OF DATA AND INFORMATION

### 1.2.1 Collect data by measurement.

- Recognises the various measuring techniques available.
- Recognises the technology available to collect data by indirect methods.
- Recognises the need to clarify client needs and expectations.
- Participates in evaluating the various methods and procedures available.
- Uses measuring technology to achieve defined outcomes.
- Participates in reviewing the effectiveness of methods used.
- Understands the need for legal traceability.

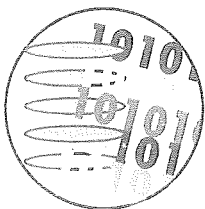
### 1.2.2 Search and acquire existing data.

- Understands geographic and land information records, survey data bases, and general information depositories.
- Recognises the integrity, value and possible uses of stored data and information.
- Recognises the importance of historical records.
- Participates in transferring data from existing data bases.
- Acquires information in an orderly manner.

#### Range Indicator 1.2:

(See also the general range statement for Stage 1)

Stage 1 surveyors 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.



### 1.3 THE MANAGEMENT OF DATA AND INFORMATION

#### 1.3.1 Design and develop system standards.

- Participates in identifying the outcomes needed from a system.
- Recognises the various elements of systems.
- Participates in the development of standards across the total system.
- Participates in defining system standards and integrating them into data management quality programs.

#### 1.3.2 Process data to accepted standards and for specific requirements.

- Participates in verifying the integrity of the base data.
- Participates in processing the data to achieve specific outcomes.
- Participates in storing data in appropriate data bases for future access and use.
- Participates in verifying the integrity of the processed data.

#### 1.3.3 Convert data from one system or medium to another.

- Recognises the various data bases holding spatial and textual data.
- Participates in identifying and collating appropriate data in one system for transfer and integration into other systems.
- Participates in using appropriate technology and procedures to convert and transfer data between systems and media.

#### 1.3.4 Administer electronic and physical data bases.

- Participates in determining procedures for recording, retrieving and updating information.
- Participates in establishing security systems to ensure data integrity.
- Participates in developing and implementing appropriate maintenance systems.

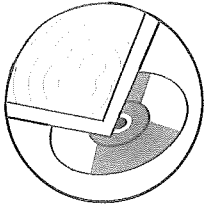
#### 1.3.5 Analyse, evaluate and interpret data.

- Participates in analysing data.
- Participates in assessing the accuracy and reliability of data.
- Participates in interpreting data and its relevance.
- Participates in collating data relating to specific areas of interest.

#### **Range Indicator 1.3:**

(See also the general range statement for Stage 1)

Stage 1 surveyors 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.



## 1.4 THE PRESENTATION OF INFORMATION

### 1.4.1 Assemble data into specific data or information sets.

- Participates in identifying market trends.
- Participates in clarifying customer needs.
- Participates in identifying the potential benefits of creating specific information from various data bases.
- Participates in assembling data into useful information.

### 1.4.2 Compile and produce maps, plans, charts and photographs.

- Participates with techniques available for graphical and photographic presentation.
- Recognises the uses and limitations of base data.
- Participates in applying cartographic principles.
- Uses computer aided drafting techniques.
- Uses appropriate methodology to meet client needs.

### 1.4.3 Provide digital spatial information.

- Recognises the accuracy and reliability of data.
- Participates in transferring spatial data files between media.
- Participates in integrating spatial data with other information.
- Participates in formatting data to meet customer needs.

### 1.4.4 Produce models.

- Participates in creating digital models of natural or cultural entities and phenomena.
- Participates in creating model files and integrating model files with other information.
- Participates in transferring model files between various media.

### 1.4.5 Formally present information to clients, government agencies and public forums.

- Uses communication and display techniques to present information in a usable manner.
- Participates in addresses to special interest groups.
- Participates in seminars and public meetings.
- Participates in discussion groups.

### 1.4.6 Prepare reports.

- Participates in preparing detailed technical reports.
- Participates in preparing information brochures and reports.
- Participates in preparing business reports on surveying matters.

### 1.4.7 Certify data.

- Recognises the need for certified data to be reliable and meet accuracy standards.
- Recognises the responsibilities of data certification.
- Participates in applying effective validation procedures.
- Participates in effective risk management techniques.

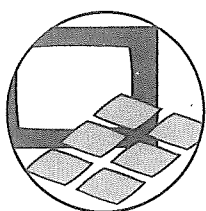
#### **1.4.8 Provide advisory services.**

- Participates in discussing information with potential users.
- Participates in deciphering information and relating it to specific issues.
- Participates in collating information and formatting it into relevant advice.
- Participates in providing advice to clients on surveying and land management matters.

#### **Range Indicator 1.4:**

(See also the general range statement for Stage 1)

Stage 1 surveyors 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.



## 1.5 BUSINESS, MANAGEMENT, AND SUPPORTING QUALITY ASSURANCE PROGRAMS

### 1.5.1 Plan, organise, direct and control tasks and people and other resources.

- Participates in setting work objectives and prioritising activities.
- Participates in determining work methods and procedures.
- Participates in estimating times, costs and resources.
- Participates in compiling work schedules and allocating resources.
- Participates in organising small work teams.

### 1.5.2 Adopt sound business practices including economic planning, financial management and compliance with legal requirements.

- Participates in estimating job costs.
- Participates in monitoring running expenses against estimates.
- Recognises the need to meet legal requirements.
- Participates in assessing markets and developing marketing plans.
- Participates in risk management programs.
- Participates in preparing business plans.
- Contributes to improving customer service.

### 1.5.3 Manage human resources.

- Participates in sustaining an effective work culture.
- Participates in applying an effective staff relations program.
- Complies with occupational health and safety requirements.
- Complies with equal opportunity, equity and anti-discrimination principles.

### 1.5.4 Train and develop subordinates in the work place.

- Participates in the application of training programs.

### 1.5.5 Apply project management principles.

- Demonstrates awareness of the principles of project management.
- Uses project management techniques in work activities.
- Participates in project planning and monitoring.

### 1.5.6 Apply self management principles.

- Participates in developing management skills.
- Sets goals for personal and professional achievements.
- Recognises the need for effective time management.
- Undertakes personal development in teamwork.
- Undertakes personal development in lateral, analytical and creative thinking.

### 1.5.7 Apply quality assurance principles.

- Participates in implementing quality assurance programs.
- Complies with an accepted quality assurance program.
- Participates in internal auditing programs.
- Recognises when to rectify noncompliance with quality standards.
- Participates in programs for continuous improvement.

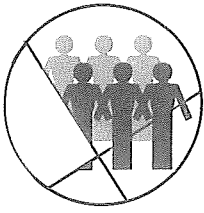
#### **1.5.8 Implement projects.**

- Participates in the preparation of specifications and contracts.
- Participates in the assessment of tenders and the letting of contracts.
- Participates in supervising contracts.
- Participates in the management and programming of development projects.
- Participates in commissioning completed projects.

#### **Range Indicator 1.5:**

(See also the general range statement for Stage 1)

Stage 1 surveyors 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.



## 1.6 COMMUNICATIONS

### 1.6.1 Communicate effectively.

- Communicates effectively, orally and in writing.
- Participates in compiling, interpreting and presenting information.
- Participates in interpreting briefs and instructions.
- Issues clear, accurate instructions to subordinates.
- Participates in exchanging data and information through electronic communications.

### 1.6.2 Present, promote, report on and advocate ideas on surveying and allied areas of practice.

- Participates in preparing and presenting technical reports.
- Participates in preparing position and discussion papers on surveying and allied topics for publication.
- Participates in presenting papers at seminars and public meetings.
- Participates in using appropriate media to promote technical and professional matters.

### 1.6.3 Prepare and comprehend surveying documents.

- Participates in preparing and interpreting surveying reports.
- Participates in preparing specifications and standards.
- Participates in preparing submissions and quotations.
- Participates in preparing documents defining work procedures and processes.
- Participates in preparing documents on measurement technology, data acquisition and spatial relationships.

### 1.6.4 Comprehend, report on and discuss relevant legal matters.

- Operates in accordance with government acts, regulations or instructions.
- Participates in discussions on legal matters pertaining to land and land information with clients, colleagues and other professionals.
- Participates in preparing advice for clients on legal requirements relating to land development.
- Participates in preparing advice for clients on land rights, land tenure disputes, and rights of entry and occupation.
- Participates in preparing advice for clients on legislation pertaining to planning, development and environment issues.
- Participates in advising clients on responsibilities and liabilities pertaining to spatial information and spatial relationships.

### 1.6.5 Collaborate with colleagues and other interested parties.

- Participates in discussions with other stakeholders on development projects.
- Participates in representing the concerns of clients and/or special interest groups to governments, authorities and other stakeholders.
- Participates in negotiating solutions to common problems with other parties.
- Participates in preparing advice and information on surveying, geomatics, spatial relationships and land developments.

**1.6.6 Use professional expertise to contribute to the processes that shape society.**

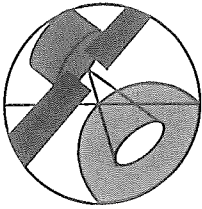
- Participates in discussions on the sustainable development of national resources and the conservation of national heritage.
- Identifies opportunities to utilise surveying for the benefit of society.
- Understands the need for orderly management and administration of land resources.

**Range Indicator 1.6:**

(See also the general range statement for Stage 1)

Stage 1 surveyors 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.





## 1.7 SPATIAL REFERENCE SYSTEMS AND CORE DATA BASES

### 1.7.1 Design reference systems.

- Participates in evaluating system requirements.
- Participates in designing appropriate reference systems.
- Participates in monitoring the effectiveness of existing systems.
- Participates in the calibration of equipment.

### 1.7.2 Establish primary geodetic control datums.

- Participates in establishing primary geodetic control datums.
- Participates in determining the locations of reference marks.
- Participates in placing appropriate reference marks in suitable locations.
- Participates in analysing spatial data pertaining to the geodetic network.
- Participates in evaluating and adjusting spatial data created.
- Participates in recording relevant information.

### 1.7.3 Establish subsidiary networks.

- Establishes subsidiary network control datums.
- Participates in determining the locations of reference marks.
- Places appropriate reference marks in suitable locations.
- Participates in analysing spatial data pertaining to the geodetic network.
- Participates in evaluating and adjusting spatial data created.
- Participates in recording network information in appropriate data files.

### 1.7.4 Develop and implement network maintenance programs.

- Participates in developing network maintenance systems.
- Participates in network maintenance programs.

### 1.7.5 Integrate spatial reference systems with fundamental physical and cultural data, and manage core data bases.

- Demonstrates an understanding of the logical structure of data bases.
- Participates in interfacing spatial systems with physical data bases and cultural data.
- Participates in integrating data sets into homogeneous data environments.
- Participates in collating, updating and maintaining core data bases pertinent to topographic data, administrative boundaries, transport corridors, infrastructure and geographic information.
- Participates in creating new asset bases and integrating them with core data bases.
- Participates in verifying the integrity of data in data bases.

### 1.7.6 Accredited spatial data standards.

- Participates in developing standard procedures for acquiring and storing spatial data.
- Participates in developing procedures for testing and validating the integrity of spatial data.

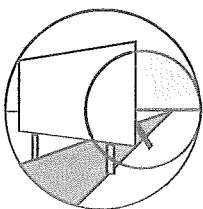
#### **1.7.7 Maintain and manage core data bases.**

- Participates in reviewing and maintaining existing data.
- Participates in editing new data for inclusion in core data bases.
- Participates in interpreting data for potential users.
- Participates in upgrading core data bases to meet community needs.
- Participates in the administration of core data bases.

#### **Range Indicator 1.7:**

(See also the general range statement for Stage 1)

Stage 1 surveyors 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.



## 1.8 LAND ADMINISTRATION AND PROPERTY DEVELOPMENT

### 1.8.1 Advise on appropriate land tenure and land tenure systems.

- Demonstrates an understanding of land registration and land tenure.
- Demonstrates an understanding of laws in relation to land tenure and land development.
- Participates in land registration and tenure projects.

### 1.8.2 Contribute information and advice to facilitate the administration, control and development of land resources.

- Recognises the significance of planning laws, environmental constraints and land management policies.
- Participates with other disciplines in property development.
- Participates in accessing available land information resources.

### 1.8.3 Promote opportunities to expedite sustainable land development.

- Participates with local knowledge on topography, land tenure and land use to assist with development.
- Assists in feasibility studies and impact assessments.

### 1.8.4 Provide advice on financial implications of land development.

- Participates in comparing land use options.
- Participates in cost/benefit analyses for development projects.
- Participates in investigating the potential of land for further development.
- Participates in preparing advice to clients on opportunities to enhance land value and use.

### 1.8.5 Provide design services to optimise land development and encourage sustainable land use.

- Participates in planning and designing land boundary patterns
- Participates in planning and designing infrastructure for land divisions and land developments.
- Participates in identifying options for sustainable land development.

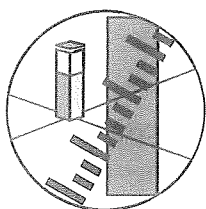
### 1.8.6 Manage properties and property development.

- Participates in applying project management techniques to property development.
- Supports professional colleagues in managing, administering and maintaining property occupation schemes.

#### Range Indicator 1.8:

(See also the general range statement for Stage 1)

Stage 1 surveyors 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.



## 1.9 CONTROLLING THE LOCATION OF DEVELOPMENTS

### 1.9.1 Control and locate engineering works, development projects, and the building or installation of structures and machines.

- Reads and uses detailed design and construction plans.
- Recognises the roles of other professionals, technicians and trades persons.
- Participates in establishing appropriate reference systems.
- Participates in selecting and using appropriate technology for site operations.
- Participates in the setting out of works
- Participates in establishing effective reporting systems.
- Participates in establishing procedures to validate results.

### 1.9.2 Control and measure the extraction of minerals and other materials.

- Recognises a variety of mining and excavation processes.
- Recognises the measuring and monitoring techniques needed for the safe, cost effective extraction of materials.
- Participates in establishing appropriate reference systems.
- Participates in selecting and using appropriate technology.
- Participates in establishing effective reporting systems.

### 1.9.3 Establish quality control systems.

- Participates in determining client needs and required tolerances.
- Applies appropriate technology.
- Participates in detailing methods and procedures.
- Participates in implementing measuring and monitoring programs.
- Participates in implementing effective reporting procedures.

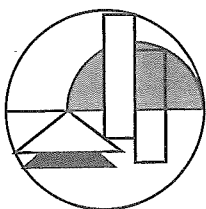
### 1.9.4 Monitor the position, shape and size of structures, land forms and sea beds.

- Reads design and detail plans, and participates in determining required tolerances.
- Recognises the roles of other professionals, technicians and trades persons.
- Participates in establishing appropriate reference systems.
- Uses appropriate technology.
- Participates in implementing effective reporting systems.
- Participates in establishing procedures to validate results.

#### Range Indicator 1.9:

(See also the general range statement for Stage 1)

Stage 1 surveyors, 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.



## 1.10 RESEARCH, DEVELOPMENT AND COMMERCIALISATION

### 1.10.1 Perform research.

- Participates in identifying potential research areas.
- Participates in literature and information searches.
- Participates in fundamental or applied research.
- Develops knowledge base.
- Participates in communicating research outcomes.

### 1.10.2 Formulate concepts for development.

- Participates in identifying development opportunities.
- Participates in the process of conceptualising thoughts and ideas.
- Participates in assessing and appraising concepts.
- Suggests concepts worthy of further development.

### 1.10.3 Identify and seek resources to further research and development.

- Participates in defining probable outcomes.
- Participates in cost/benefit analysis and estimating resources needed to proceed with development.
- Participates in identifying potential resource suppliers.
- Participates in preparing proposals and submissions setting out development plans and seeking resources.

### 1.10.4 Carry out market research.

- Participates in determining desirable product properties.
- Participates in determining potential product demand.
- Participates in developing prototypes and pilot schemes.
- Participates in identifying likely barriers to new products or services.

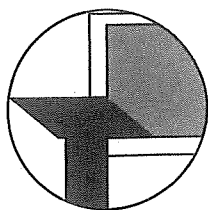
### 1.10.5 Commercialise research outcomes.

- Participates in the economic evaluation of research outcomes.
- Participates in developing promotion and marketing strategies for new products or services.
- Participates in the presentation of final products.

#### Range Indicator 1.10:

(See also the general range statement for Stage 1)

Stage 1 surveyors will be competent to participate in research and development 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.



## 1.11 EDUCATION AND TRAINING

Surveyors at the Stage 1 level are unlikely to have developed any specific competencies in this core unit. Stage 1 surveyors who may be providing assistance to experienced professional surveyors working in Education and Training will rely on the overall competencies developed for other core competency units.

# COMPETENCY STANDARDS, STAGE 2

## **The General Range Statement for Stage 2**

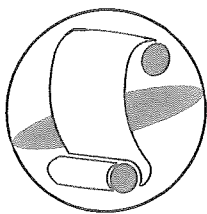
The competencies for Stage 2 will be typically demonstrated by experienced professional surveyors practising in any sector of the market, normally under the general direction of senior professional surveyors.

Experienced professional surveyors will normally have had at least three years satisfactory post graduate experience as Stage 1 surveyors.

The benchmark for post graduate experience will be a professional development program set or approved by ISA. This professional development program will be consistent with the training and development programs adopted by the Reciprocating Surveyors Board of Australia and New Zealand as a prerequisite for registered or licensed surveyors.

Stage 2 Professional Surveyors, as employees in the public, private or tertiary sectors, will be practising as competent professionals demonstrating expertise and professionalism within one or more of the functional areas set out under the “Definition of a Professional Surveyor” and adopted by ISA.

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 professional guidance is required.



## 2.1 PROFESSIONAL PRACTICE

### 2.1.1 Advance the science of surveying and the image of surveyors.

- Conducts oneself in a manner that enhances the profession.
- Contributes to promoting surveyors and surveying.
- Participates in adopting advanced technology to improve service.
- Seeks reward through merit and quality of performance.
- Assists in contributing to professional renewal

### 2.1.2 Fulfil community service obligations.

- Recognises professional responsibilities to government and the community.
- Practises impartiality and objectivity in decision making.
- Participates in pursuing fair and equitable solutions that rank community interests before client and personal interests.
- Places responsibilities for the welfare and safety of the community above sectional interests.
- Participates in community affairs.
- Provides specialist expertise to identify unqualified information that could mislead the community.

### 2.1.3 Follow an accepted code of professional conduct and ethics.

- Understands the profession's code of ethics.
- Carries out professional activities in accordance with the code of ethics.
- Complies with legal requirements and obligations.
- Complies with professional responsibilities.
- Applies a high code of personal conduct.

### 2.1.4 Undertake a program for personal professional development and continuing education.

- Participates in the profession's continuing professional development programs.
- Pursues continuous improvement in performance.

### 2.1.5 Promote sustainable development and apply environmental principles.

- Applies the profession's policy on environmental matters.
- Recognises complex environmental issues encountered in regular practice and seeks guidance.
- Recognises the likely impact of developments on the life styles, cultures and heritage of all sections of the community.
- Participates in resolving environmental issues.
- Participates with colleagues in seeking to protect the environment and promote sustainable development.

#### **2.1.6 Accept responsibility for professional activities.**

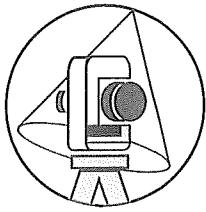
- Recognises and understands potential risks and liabilities.
- Practises and enforces correct occupational health and safety.
- Understands the likely impacts of work undertaken.
- Works within the limits of personal skills and expertise and seeks professional advice and support for more complex work.

#### **Range Indicator 2.1:**

(See also the general range statement for Stage 2)

Stage 2 surveyors will have demonstrated high levels of professionalism during their years of professional experience. They will demonstrate increasing levels of professionalism in all aspects of professional practice and a sound understanding of the Institution's policy on ethics and professional practice.





## 2.2 THE COLLECTION OF DATA AND INFORMATION

### 2.2.1 Collect data by measurement.

- Recognises and assesses the measuring technology available.
- Recognises and assesses technology available to collect data by indirect methods.
- Clarifies client needs and expectations.
- Participates in evaluating the various methods and procedures available.
- Uses measuring technology to meet client needs.
- Reviews the effectiveness of the methodology used.
- Ensures processes followed to achieve legal traceability.

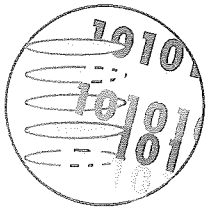
### 2.2.2 Search and acquire existing data.

- Accesses relevant geographic and land information records, survey data bases, and general information depositories.
- Qualifies the integrity and value of stored data and information, and identifies possible uses.
- Understands the importance of historical records.
- Transfers data from existing data bases.
- Acquires information in an orderly manner.
- Determines if acquired information is relevant to client needs.

#### Range Indicator 2.2:

(See also the general range statement for Stage 2)

Stage 2 surveyors will be competent in collecting data and information that are relevant to their fields of surveying and will be accountable for the outcomes of work personally carried out or carried out under their direct supervision.



## **2.3 THE MANAGEMENT OF DATA AND INFORMATION**

### **2.3.1 Design and develop system standards.**

- Identifies the outcomes needed from a system.
- Identifies the various elements of a system.
- Develops standards across the total system.
- Defines system standards and integrates them into data management quality programs.

### **2.3.2 Process data to accepted standards and for specific requirements.**

- Verifies the integrity of the base data.
- Processes data to achieve specific outcomes.
- Stores data in appropriate data bases for future access and use.
- Verifies the integrity of the processed data.

### **2.3.3 Convert data from one system or medium to another.**

- Understands the various bases holding spatial and textual data.
- Identifies and collates appropriate data in one system for transfer and integration into other systems.
- Uses appropriate technology and procedures to convert and transfer data between systems and media.

### **2.3.4 Administer electronic and physical data bases.**

- Applies effective procedures for recording, retrieving and updating information.
- Establishes security systems to ensure data integrity.
- Implements appropriate maintenance systems.

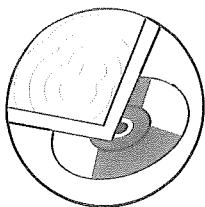
### **2.3.5 Analyse, evaluate and interpret data.**

- Applies systems to analyse data.
- Determines the required accuracy and reliability of data.
- Interprets data and ensures its relevance to client needs.
- Enhances or adds value to data where applicable.
- Collates and relates data to specific areas of interest.

#### **Range Indicator 2.3:**

(See also the general range statement for Stage 2)

Stage 2 surveyors will be competent in managing all information and data that are relevant to their fields of surveying and will be accountable for the outcomes of work personally carried out or carried out under their direct supervision.



## 2.4 THE PRESENTATION OF INFORMATION

### 2.4.1 Assemble data into specific data or information sets.

- Recognises market trends.
- Clarifies and determines customer needs.
- Identifies the potential benefits of creating specific information from various data bases.
- Uses technology to assemble data into useful information.

### 2.4.2 Compile and produce maps, plans, charts and photographs.

- Uses the techniques available for graphical and photographic presentation.
- Determines the uses and limitations of base data.
- Applies appropriate cartographic principles.
- Applies computer aided drafting techniques.
- Identifies and uses the best methodology to meet client needs.

### 2.4.3 Provide digital spatial information.

- Recognises the accuracy, reliability and potential uses of data.
- Transfers spatial data files between various media.
- Integrates spatial data with other information.
- Formats data to meet customer needs.

### 2.4.4 Produce models.

- Creates digital models of natural or cultural entities and phenomenon.
- Creates model files and integrates model files with other information.
- Transfers model files between various media.

### 2.4.5 Formally present information to clients, government agencies and public forums.

- Identifies and uses appropriate communication and display techniques to present information in a usable manner.
- Addresses special interest groups.
- Conducts seminars and public meetings.
- Leads and/or participates in discussion groups.

### 2.4.6 Prepare reports.

- Prepares detailed technical reports.
- Prepares information brochures and reports.
- Prepares business reports on surveying matters.

### 2.4.7 Certify data.

- Understands the accuracy and reliability of data to be certified.
- Understands the responsibilities of data certification.
- Applies effective validation procedures
- Applies effective risk management techniques.

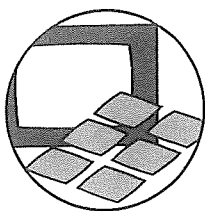
#### **2.4.8 Provide advisory services.**

- Discusses information with potential users.
- Deciphers information and relates it to specific issues.
- Collates information and formats it into relevant advice.
- Provides advice on opportunities to add value to existing information.
- Provides sound advice to clients on surveying and land management matters.

#### **Range Indicator 2.4:**

(See also the general range statement for Stage 2)

Stage 2 surveyors will be competent in presenting all information that is relevant to their fields of surveying and will be accountable for the outcomes of work personally carried out or carried out under their direct supervision.



## **2.5 BUSINESS, MANAGEMENT AND SUPPORTING QUALITY ASSURANCE PROGRAMS**

### **2.5.1 Plan, organise, direct and control tasks and people and other resources.**

- Sets work objectives and prioritises activities.
- Determines work methods and procedures.
- Estimates times, costs and resources.
- Establishes work schedules and allocates resources.
- Organises small work teams.
- Advises and supervises subordinate staff.
- Monitors performance and reports progress to stakeholders.

### **2.5.2 Adopt sound business practices including economic planning, financial management and compliance with legal requirements.**

- Prepares budgets.
- Estimates job costs and evaluates financial returns.
- Monitors running expenses against estimates or budgets.
- Demonstrates an understanding of the legal requirements for business operations.
- Assesses market needs and implements marketing plans.
- Participates in risk management programs.
- Demonstrates an understanding of the enterprise's business needs.
- Operates in accordance with business plans.
- Provides and promotes excellence in customer service.

### **2.5.3 Manage human resources.**

- Promotes and sustains an effective work culture for the enterprise.
- Applies an effective staff relations program.
- Promotes and monitors compliance with occupational health and safety requirements.
- Contributes to performance appraisal programs.
- Promotes and complies with equal opportunity, equity and anti-discrimination principles.
- Participates in developing and maintaining an effective industrial relations program.

### **2.5.4 Train and develop subordinates in the work place.**

- Identifies training needs and implements training programs.
- Trains subordinates and shares new knowledge and technology with colleagues.
- Monitors training programs.

### **2.5.5 Apply project management principles.**

- Demonstrates a sound knowledge of project management.
- Applies project management principles to work activities.
- Contributes to project planning and monitoring.

#### **2.5.6 Apply self management principles.**

- Undertakes professional development in management skills.
- Sets goals for personal, professional and business achievements.
- Practises effective time management..
- Undertakes personal development in leadership and teamwork.
- Undertakes personal development in lateral, analytical and creative thinking.

#### **2.5.7 Apply quality assurance principles.**

- Implements and maintains quality assurance programs.
- Complies with the requirements of an accepted quality assurance program.
- Contributes to internal auditing programs.
- Takes action to rectify non-compliance with agreed standards.
- Continually strives to improve performance.

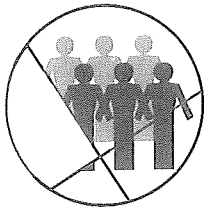
#### **2.5.8 Implement projects.**

- Prepares specifications and contracts.
- Assesses tenders and lets contracts.
- Supervises contracts.
- Manages and programs development projects.
- Commissions completed projects.

#### **Range Indicator 2.5:**

(See also the general range statement for Stage 2)

Stage 2 surveyors must demonstrate sound management skills and be competent in those aspects of business and resource management that are relevant to their work activities within a general surveying environment. They will be accountable for management decisions taken in relation to work personally carried out or carried out under their direct supervision and for the prudent management of resources under their control. They will be responsible to senior colleagues for management decisions that could seriously impact upon the integrity or viability of the business enterprise.



## 2.6 COMMUNICATIONS

### 2.6.1 Communicate effectively.

- Communicates effectively, orally and in writing, at a professional level.
- Uses the full range of media options available to expedite communications.
- Compiles, interprets and presents information.
- Interprets briefs and instructions.
- Issues clear, accurate instructions and meaningful advice to colleagues and subordinates.
- Exchanges data and information through electronic communications.
- Takes into account the comments and concerns of others.

### 2.6.2 Present, promote, report on and advocate ideas on surveying and allied areas of practice.

- Prepares and presents technical reports and papers to professional forums.
- Prepares position and discussion papers on surveying and allied topics for publication.
- Presents papers to seminars and public meetings.
- Uses appropriate media to promote technical and professional matters.

### 2.6.3 Prepare and comprehend surveying documents.

- Prepares and interprets professional surveying reports.
- Prepares specifications and standards.
- Prepares submissions and quotations.
- Prepares documents defining work procedures and processes.
- Prepares documents on measurement technology, data acquisition and spatial relationships.

### 2.6.4 Comprehend, report on and discuss relevant legal matters.

- Operates in accordance with government acts, regulations or instructions.
- Discusses legal matters pertaining to land and land information with clients, colleagues and other professionals.
- Advises clients on legal requirements relating to land development.
- Advises clients on land rights, land tenure disputes, and rights of entry and occupation.
- Contributes to advising clients on legislation pertaining to planning, development and environment issues.
- Advises clients on responsibilities and liabilities pertaining to spatial information and spatial relationships.

#### **2.6.5 Collaborate with colleagues and other interested parties.**

- Contributes to discussions with stakeholders on development projects.
- Represents the concerns of clients and/or special interest groups to government, regulators and other stakeholders.
- Negotiates solutions to common problems with other parties.
- Contributes to the integration of surveying activities with the activities of other professionals.
- Provides advice and information on surveying, geomatics, spatial relationships, and developments.

#### **2.6.6 Use professional expertise to contribute to the processes that shape society.**

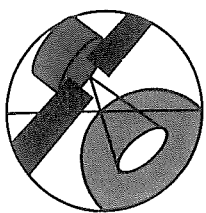
- Contributes to discussions on the sustainable development of national resources and the conservation of national heritage.
- Promotes opportunities to utilise surveying for the benefit of society.
- Advocates the orderly management and administration of land resources.

#### **Range Indicator 2.6:**

(See also the general range statement for Stage 2)

Stage 2 surveyors 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.





## **2.7 SPATIAL REFERENCE SYSTEMS AND CORE DATA BASES**

### **2.7.1 Design reference systems.**

- Evaluates system requirements.
- Designs appropriate reference systems.
- Monitors the effectiveness of existing systems.
- Ensures that equipment is calibrated.

### **2.7.2 Establish primary geodetic control datums.**

- Undertakes work required in establishing primary geodetic control datums.
- Determines the locations of reference marks.
- Places appropriate reference marks in suitable locations.
- Analyses spatial data pertaining to the geodetic network.
- Evaluates and adjusts data created.
- Records all relevant information.

### **2.7.3 Establish subsidiary networks.**

- Carries out or supervises the work required in establishing subsidiary network control datums.
- Determines the locations of reference marks.
- Supervises the placement of appropriate reference marks in suitable locations.
- Analyses spatial data pertaining to the geodetic network.
- Undertakes evaluation and adjustment of created spatial data.
- Records network information in appropriate data files.

### **2.7.4 Develop and implement network maintenance programs.**

- Develops network maintenance systems.
- Carries out or supervises network maintenance programs.

### **2.7.5 Integrate spatial reference systems with fundamental physical and cultural data, and manage core data bases.**

- Understands the logical structure of data bases.
- Interfaces spatial systems with physical data bases and cultural data.
- Integrates data into homogeneous data environments.
- Collates, updates and maintains core data bases pertinent to topographic data, administrative boundaries, transport corridors, infrastructure and geographic information.
- Creates new asset bases and integrates them with core data bases.
- Verifies the integrity of data in data bases.

### **2.7.6 Accredited spatial data standards.**

- Contributes to the standards required for data created for specific purposes.
- Contributes to developing standard procedures for acquiring and storing spatial data.
- Contributes to developing procedures for testing and validating the integrity of spatial data.

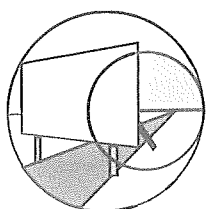
### **2.7.7 Maintain and manage core data bases.**

- Reviews and maintains existing data.
- Edits new data for inclusion in core data bases.
- Interprets data for potential users.
- Upgrades core data bases to meet community needs.
- Contributes to the administration of core data bases.

#### **Range Indicator 2.7:**

(See also the general range statement for Stage 2)

Stage 2 surveyors 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.



## 2.8 LAND ADMINISTRATION AND PROPERTY DEVELOPMENT

### 2.8.1 Advise on appropriate land tenure and land tenure systems.

- Demonstrates a sound knowledge and understanding of the principles of land registration and land tenure.
- Complies with laws in relation to land and land development.
- Understands the advantages and disadvantages of various land titling systems.
- Understands the relationships between land and various ethnic groups and cultures within jurisdictions of practice.
- Participates in the rationalisation and operation of native title programs.
- Participates in the financial analysis of establishing and maintaining land administration systems.

### 2.8.2 Contribute information and advice to facilitate the administration, control and development of land resources.

- Demonstrates an understanding of planning laws and procedures.
- Advises on environmental constraints and management policies applicable in various jurisdictions.
- Understands the functions and roles of other disciplines in property development.
- Accesses available land information resources.

### 2.8.3 Promote opportunities to expedite sustainable land development.

- Applies local knowledge of topography, land tenure, statutory controls and development policies to assist development.
- Participates with other professionals to optimise outcomes.
- Contributes to feasibility studies and impact assessments.

### 2.8.4 Provide advice on financial implications of land development.

- Participates in applying principles of land valuation.
- Evaluates and compares various land use options.
- Participates in cost/benefit analyses for land development projects.
- Investigates potential of land for further development.
- Advises clients on opportunities to enhance land value and use.

### 2.8.5 Provide design services to optimise land development and encourage sustainable land use.

- Plans and designs land boundary patterns.
- Participates in planning and designing infrastructure for land divisions and land developments.
- Identifies options for sustainable land development

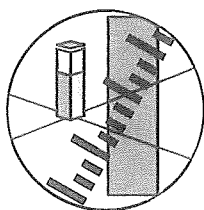
### 2.8.6 Manage properties and property development.

- Applies project management techniques to property development.
- Participates in managing, administering and maintaining property occupation schemes.

#### Range Indicator 2.8:

(See also the general range statement for Stage 2)

Stage 2 surveyors 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.



## **2.9 CONTROLLING THE LOCATION OF DEVELOPMENTS**

### **2.9.1 Control and locate engineering works, development projects, and the building or installation of structures and machines.**

- Reads, interprets and understands detailed design and construction plans.
- Understands the roles of other professionals, technicians and trades persons.
- Establishes appropriate reference systems.
- Selects and uses the appropriate technology for site operations.
- Sets out works.
- Establishes effective reporting systems.
- Validates results.

### **2.9.2 Control and measure the extraction of minerals and other materials.**

- Recognises mining and excavation processes and applies appropriate surveying technology.
- Knows and understands the measuring and monitoring outcomes needed for the safe, cost effective extraction of materials.
- Recognises the roles of other professionals, technicians and trades persons.
- Establishes appropriate reference systems.
- Selects and uses appropriate technology.
- Establishes effective reporting systems.

### **2.9.3 Establish quality control systems.**

- Determines client needs and required tolerances.
- Applies appropriate technology.
- Details methods and procedures.
- Implements measuring and monitoring programs.
- Implements effective reporting procedures.

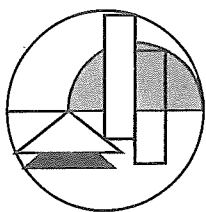
### **2.9.4 Monitor the position, shape and size of structures, land forms and sea beds.**

- Reads and understands design and detail plans, and applies the required tolerances.
- Understands the roles of other professionals, technicians and trades persons.
- Establishes appropriate reference systems.
- Applies appropriate technology.
- Implements effective reporting systems.
- Establishes procedures to validate results.

#### **Range Indicator 2.9:**

(See also the general range statement for Stage 2)

Stage 2 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.



## **2.10 RESEARCH, DEVELOPMENT AND COMMERCIALISATION**

### **2.10.1 Perform research.**

- Contributes to identifying potential research areas.
- Undertakes literature and information searches.
- Undertakes fundamental or applied research.
- Broadens existing knowledge base and seeks new knowledge.
- Identifies and communicates research outcomes.

### **2.10.2 Formulate concepts for development.**

- Contributes to identifying development opportunities.
- Conceptualizes thoughts and ideas.
- Assesses and appraises concepts.
- Nominates concepts worthy of further development.

### **2.10.3 Identify and seek resources to further research and development.**

- Defines and enunciates probable outcomes.
- Undertakes cost/benefit analysis and estimates of resource requirements for development programs.
- Identifies potential resource suppliers.
- Prepares proposals and submissions setting out development plans and seeking resources.

### **2.10.4 Carry out market research.**

- Contributes to determining desirable product properties.
- Contributes to determining potential product demand.
- Contributes to developing prototypes and pilot schemes.
- Contributes to identifying likely barriers to new products or services.

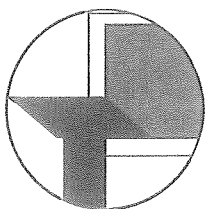
### **2.10.5 Commercialise research outcomes.**

- Contributes to economic evaluation of research outcomes.
- Contributes to developing promotion and marketing strategies for new products or services.
- Contributes to the presentation of final products.

### **Range Indicator 2.10:**

(See also the general range statement for Stage 2)

Stage 2 surveyors will be competent in undertaking research in various fields of surveying and participating in the development and establishment of new services and products that are relevant to the surveying profession. They will be accountable for any research and development work personally undertaken or carried out under their direct supervision.



## **2.11 EDUCATION AND TRAINING**

### **2.11.1 Contribute to the development of surveying education.**

- Participates in determining the education needs of surveying personnel.
- Participates in determining education plans and programs for tertiary education.
- Participates in developing curriculum, syllabi or exercises in surveying.

### **2.11.2 Assist in conducting surveying education.**

- Participates in developing courses and teaching material for education.
- Participates in effective teaching, development and learning activities.
- Uses appropriate technology to assist in supporting education.

### **2.11.3 Develop and conduct training programs.**

- Participates in determining the training needs of surveying personnel.
- Participates in developing training material for training programs.
- Participates in developing practical experience programs.
- Participates in developing suitable training programs for surveying graduates seeking registration.
- Participates in implementing suitable training programs.
- Supervises the training of surveying graduates.

#### **Range Indicator 2.11:**

(See also the general range statement for Stage 2)

The competencies in this unit will be typically demonstrated by experienced professional surveyors working in the tertiary sector or providing assistance to professional educators and trainers on surveying matters. Stage 2 surveyors may be providing training for subordinates or assisting with continuing professional development programs. They will contribute to education and training at a level commensurate with their competence in a recognised field of surveying and their general knowledge of the surveying industry.

# COMPETENCY STANDARDS, STAGE 3

## **The General Range Statement for Stage 3**

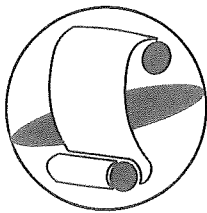
The competencies for Stage 3 will be typically demonstrated by senior professional surveyors practising in any sector of the market place.

Practitioners will normally have had substantial experience and professional development (nominally four years) as practising surveyors since achieving the Stage 2 level.

Professional surveyors at this level will have demonstrated high levels of technical competence, leadership qualities and effective management skills over a number of years. As employees holding responsible positions in the public, private or tertiary sectors, or acting as private consultants, they will be competent, autonomous, practising professionals, demonstrating expertise within one or more of the fields of surveying set out under the "Definition of a Professional Surveyor" and adopted by ISA. They will regularly carry out complex or critical survey work and resolve unusual problems.

As private consultants, Stage 3 surveyors must have demonstrated competencies in business management and communications at levels normally expected for professional consultants in private industry.

Senior professional surveyors taking on the role of supervising surveying graduates who are seeking accreditation at the Stage 2 level must demonstrate proficiency in those elements of competency pertaining to the training of graduates.



### **3.1 PROFESSIONAL PRACTICE**

#### **3.1.1 Advance the science of surveying and the image of surveyors.**

- Conducts oneself in a manner that enhances the profession.
- Promotes surveyors and surveying.
- Utilises advances in technology to improve service.
- Seeks reward through merit and quality of performance.
- Contributes to professional renewal.
- Fulfils a leadership role within the profession.

#### **3.1.2 Fulfil community service obligations.**

- Understands and accepts professional responsibilities to government and the community.
- Applies impartiality and objectivity in decision making.
- Pursues fair and equitable solutions that rank community interests before client and personal interests.
- Encourages and promotes responsibilities for the welfare and safety of the community above sectional interests.
- Plays a leading role in community affairs.
- Uses expertise to identify and challenge unqualified or misleading information that could impact adversely on the community.

#### **3.1.3 Follow an accepted code of professional conduct and ethics.**

- Demonstrates a sound knowledge and understanding of the profession's code of ethics.
- Conducts business and professional activities in accordance with the code of ethics.
- Defines and interprets legal requirements and obligations.
- Defines and promotes professional responsibilities.
- Applies and promotes a high code of personal conduct.

#### **3.1.4 Undertake a program for personal professional development and continuing education.**

- Participates in, and contributes to, the profession's continuing professional development and education programs.
- Demonstrates continuous improvement in performance and client services.

#### **3.1.5 Promote sustainable development and apply environmental principles.**

- Demonstrates a sound knowledge and understanding of the profession's policy on environmental matters.
- Applies sound environmental policies in regular practice.
- Understands the likely impact of developments on the life styles, cultures and heritage of all sections of the community.
- Incorporates the principles of sustainable development in urban and rural property developments.
- Contributes to resolving environmental issues.
- Collaborates with fellow professionals in protecting the environment and promoting sustainable development.



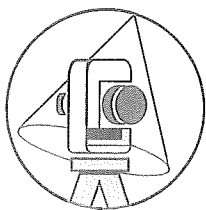
### **3.1.6 Accept responsibility for professional activities.**

- Anticipates and controls potential risks and liabilities.
- Contributes to improving occupational health and safety.
- Anticipates likely impacts of work undertaken.
- Provides services commensurate with personal skills and expertise and seeks professional advice and support when appropriate.

#### **Range Indicator 3.1:**

(See also the general range statement for Stage 3)

Stage 3 surveyors will have demonstrated an exemplary commitment to professionalism throughout their careers as professional surveyors. They will provide leadership in promoting the Institution's policy on ethics and professional practice and assist the profession in formulating new standards in professional practice to meet changes in technology and community expectations.



## 3.2 THE COLLECTION OF DATA AND INFORMATION

### 3.2.1 Collect data by measurement.

- Identifies measuring technology and develops innovative systems.
- Applies technology to collect data by indirect methods.
- Clarifies and confirms client needs and expectations.
- Evaluates various systems, methods and procedures.
- Applies best measuring techniques to meet client needs.
- Reviews the effectiveness of systems and methodology.
- Develops processes and systems to ensure legal traceability.

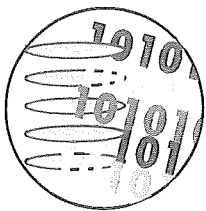
### 3.2.2 Search and acquire existing data.

- Develops relevant geographic and land information records, survey data bases, and general information depositories.
- Analyses the integrity and value of stored data and information and determines new uses.
- Analyses and qualifies the importance of historical records.
- Collects, collates and adds value to data from existing bases.
- Acquires and collates information in an orderly manner.
- Evaluates the relevance of information collected and optimises its uses.

#### **Range Indicator 3.2:**

(See also the general range statement for Stage 3)

Stage 3 surveyors will be competent in all aspects of data and information collection that are relevant to their fields of surveying and will be accountable for the outcomes of all work personally carried out or carried out under their direction.



### 3.3 THE MANAGEMENT OF DATA AND INFORMATION

#### 3.3.1 Design and develop system standards.

- Sets parameters for developing new system standards.
- Validates the integrity of existing and new standards.
- Demonstrates a profound knowledge and understanding of systems and their elements.
- Coordinates the development of standards across several systems.

#### 3.3.2 Process data to accepted standards and for specific requirements.

- Determines procedures for verifying base data.
- Determines the processing required to achieve specific outcomes.
- Applies the most appropriate technology required to process data.
- Develops procedures for storing data in appropriate data bases for future access and use.
- Establishes systems to verify the integrity of data.

#### 3.3.3 Convert data from one system or medium to another.

- Optimises the use of data bases holding spatial and textual data.
- Establishes procedures to identify and collate data in one system for transfer and integration into other systems.
- Determines appropriate technology and procedures to convert and transfer data between systems and media.

#### 3.3.4 Administer electronic and physical data bases.

- Determines procedures for recording, retrieving and updating information.
- Develops and establishes security systems to ensure data integrity.
- Develops and implements appropriate maintenance systems.

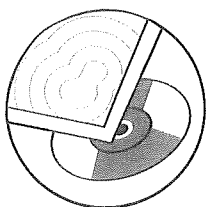
#### 3.3.5 Analyse, evaluate and interpret data.

- Designs and develops systems to analyse data.
- Develops procedures for determining the accuracy and reliability of data.
- Assesses client needs and develops systems for data interpretation and evaluation.
- Identifies opportunities for data enhancement.
- Determines procedures for collating data and relating it to specific areas of interest.

#### Range Indicator 3.3:

(See also the general range statement for Stage 3)

Stage 3 surveyors will be competent in all aspects of information and data management that are relevant to their fields of surveying and will be accountable for the outcomes of all work personally carried out or carried out under their direction.



### **3.4 THE PRESENTATION OF INFORMATION**

#### **3.4.1 Assemble data into specific data or information sets.**

- Understands market needs and anticipates new trends.
- Understands and influences customer needs.
- Identifies and enhances the potential benefits of creating specific information from various data bases.
- Applies innovative methodology to expedite the transformation of data into useful information.

#### **3.4.2 Compile and produce maps, plans, charts and photographs.**

- Develops effective procedures for graphical and photographic presentation.
- Determines the limitations of base data and optimises potential uses.
- Understands cartographic principles and applies them in innovative solutions.
- Develops computer aided drafting techniques.
- Develops new methods and procedures to meet client needs.

#### **3.4.3 Provide digital spatial information.**

- Understands the accuracy and reliability of data and determines best uses.
- Determines procedures for transferring spatial data files between various media.
- Controls and coordinates the integration of spatial data into information bases.
- Determines best data formats to meet customer needs.

#### **3.4.4 Produce models.**

- Determines parameters and procedures for creating digital models of natural or cultural entities and phenomena.
- Develops procedures for integrating model files within existing information frameworks.
- Determines procedures for transferring model files between media.

#### **3.4.5 Formally present information to clients, government agencies and public forums.**

- Develops and implements appropriate communication and display techniques to present information in a usable manner.
- Organises and addresses special interest groups.
- Organises and presides over seminars and public meetings.
- Organises, leads and participates in discussion groups.

#### **3.4.6 Prepare reports.**

- Compiles and edits detailed technical reports on complex issues.
- Designs and develops information brochures and reports.
- Compiles and edits complex reports on surveying matters.

#### **3.4.7 Certify data.**

- Determines the accuracy and reliability of data to be certified.
- Defines the responsibilities associated with data certification.
- Develops effective validation procedures.
- Develops appropriate risk management programs.

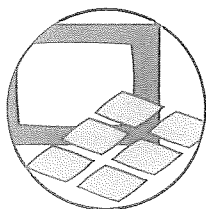
#### **3.4.8 Provide advisory services.**

- Edits and qualifies information for discussion with likely users.
- Deciphers confusing or conflicting information and relates it to specific issues.
- Interprets complex information for collation and formatting into meaningful advice.
- Provides strategies for adding value to existing information.
- Provides sound advice to clients on complex surveying and land management matters.

#### **Range Indicator 3.4:**

(See also the general range statement for Stage 3)

Stage 3 surveyors will be competent in all aspects of the presentation of information that is relevant to their fields of surveying and will be accountable for the outcomes of all work personally carried out or carried out under their direction.



### **3.5 BUSINESS, MANAGEMENT AND SUPPORTING QUALITY ASSURANCE PROGRAMS**

#### **3.5.1 Plan, organise, direct and control tasks and people and other resources.**

- Sets long term goals and develops work objectives.
- Determines work strategies and sets guidelines for methods and procedures.
- Establishes procedures for estimating and reviewing times, costs and resources.
- Develops work schedules and policies for resource allocation.
- Sets operational parameters for work teams.
- Advises and supervises professional staff.
- Develops performance standards and reporting procedures.

#### **3.5.2 Adopt sound business practices including economic planning, financial management and compliance with legal requirements.**

- Prepares and reviews budgets.
- Estimates costs for large and/or complex projects and evaluates financial returns.
- Monitors and controls costs against estimates or budgets.
- Demonstrates a profound knowledge of legal requirements for business operations.
- Assesses market needs and develops marketing strategies.
- Develops risk management programs.
- Demonstrates a profound knowledge of the business needs of the enterprise.
- Prepares business plans.
- Develops programs for excellence in customer service.

#### **3.5.3 Manage human resources.**

- Develops a sustainable, effective work culture within the enterprise.
- Develops and monitors an effective staff relations program.
- Develops effective occupational health and safety programs.
- Conducts performance appraisal programs.
- Promotes and enforces equal opportunity, equity and anti-discrimination principles.
- Develops an effective industrial relations environment.

#### **3.5.4 Train and develop subordinates in the work place.**

- Determines training needs and develops training strategies.
- Develops programs for continuing professional development.
- Reviews and evaluates training programs.

#### **3.5.5 Apply project management principles.**

- Demonstrates a profound knowledge of the principles of project management.
- Promotes project management principles for all work activities.
- Undertakes project planning and monitoring.

### **3.5.6 Apply self management principles.**

- Promotes continuous development of management skills.
- Sets goals for personal, professional and business achievements.
- Promotes effective time management.
- Develops programs for personal development in leadership and teamwork.
- Promotes and undertakes personal development in lateral, analytical and creative thinking.

### **3.5.7 Apply quality assurance principles.**

- Develops and implements quality assurance programs.
- Monitors compliance with the requirements of an accepted quality assurance program.
- Develops and implements internal auditing programs.
- Develops procedures to rectify noncompliance with agreed standards.
- Develops programs to improve performance.

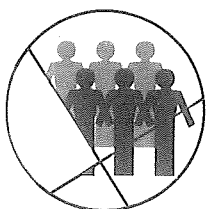
### **3.5.8 Implement projects.**

- Oversees the preparation of specifications and contracts.
- Monitors the assessment of tenders and the letting of contracts.
- Monitors contracts.
- Directs the management and programming of development projects.
- Directs the commissioning of completed projects.

### **Range Indicator 3.5:**

(See also the general range statement for Stage 3)

Stage 3 surveyors must have demonstrated sound management skills and be competent in all aspects of business and resource management within a general surveying environment. They will have specialist business skills that are relevant to their particular business environment. They will be personally accountable for their management decisions and will be responsible for the prudent management of resources under their control.



## **3.6 COMMUNICATIONS**

### **3.6.1 Communicate effectively.**

- Communicates fluently and effectively at a professional level.
- Determines standards for interpreting and presenting information.
- Interprets complex briefs and instructions.
- Provides clear, timely advice and direction to colleagues.
- Develops opportunities to utilise a full range of media options.
- Understands and comprehends the comments and concerns of others and responds effectively.

### **3.6.2 Present, promote, report on and advocate ideas on surveying and allied areas of practice.**

- Prepares and presents complex technical reports and papers to professional forums.
- Prepares position and discussion papers on complex technical and professional matters for publication.
- Conducts seminars and public meetings.
- Advises colleagues on the use of appropriate media to promote technical and professional matters.

### **3.6.3 Prepare and comprehend surveying documents.**

- Prepares and interprets complex professional surveying reports.
- Prepares specifications and standards for large or complex projects.
- Develops standards for submissions and quotations.
- Establishes guidelines for defining work procedures and processes.
- Initiates, prepares and edits documents on complex measurement technology, data acquisition and spatial relationships.

### **3.6.4 Comprehend, report on and discuss relevant legal matters.**

- Develops procedures for operating in accordance with government acts, regulations or instructions.
- Discusses complex legal matters pertaining to land and land information with clients, colleagues and other professionals.
- Advises clients and directs colleagues on legal requirements relating to land development.
- Advises clients and directs colleagues on land rights, land tenure disputes, and rights of entry and occupation.
- Advises clients and directs colleagues on legislation pertaining to planning, development and environment issues.
- Advises on changes to legislation.
- Advises clients and directs colleagues on responsibilities and liabilities pertaining to spatial information and spatial relationships.



### **3.6.5 Collaborate with colleagues and other interested parties.**

- Convenes and leads discussions with other stakeholders on development projects.
- Coordinates the presentation of concerns and issues for clients and special interest groups to all other major stakeholders.
- Negotiates solutions to complex problems with other parties.
- Directs the integration of surveying activities with the activities of other professionals.
- Provides expert advice and direction on surveying, geomatics, spatial relationships and developments.

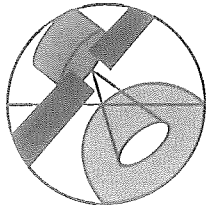
### **3.6.6 Use professional expertise to contribute to the processes that shape society.**

- Initiates and conducts discussions on the sustainable development of national resources and the conservation of national heritage.
- Identifies and initiates opportunities to utilise surveying for the benefit of society.
- Advocates and directs the orderly management and administration of land resources.

#### **Range Indicator 3.6:**

(See also the general range statement for Stage 3)

Stage 3 surveyors will be experienced communicators who can enhance communications between colleagues, subordinates, customers and other interested persons on all technical, professional and business issues relevant to their surveying practice and surveying in general. They will be personally accountable for their communications on surveying matters and for communications issued by personnel under their direction.



### 3.7 SPATIAL REFERENCE SYSTEMS AND CORE DATA BASES

#### 3.7.1 Design reference systems.

- Determines system requirements.
- Determines design standards for reference systems.
- Analyses the effectiveness of existing systems.
- Determines calibration requirements.

#### 3.7.2 Establish primary geodetic control datums.

- Determines procedures for establishing geodetic control datums.
- Sets guidelines for the locations of reference marks.
- Monitors and reviews marking procedures.
- Sets guidelines for analysing data pertaining to networks.
- Sets guidelines for evaluating and adjusting spatial data.
- Reviews recording procedures.

#### 3.7.3 Establish subsidiary networks.

- Sets procedures and guidelines for establishing subsidiary networks.
- Establishes systems for monitoring the integrity of subsidiary networks.

#### 3.7.4 Develop and implement network maintenance programs.

- Develops procedures and guidelines for network maintenance systems.
- Monitors the effectiveness of maintenance programs.

#### 3.7.5 Integrate spatial reference systems with fundamental physical and cultural data, and manage core data bases.

- Develops the logical structure of data bases.
- Determines procedures for interfacing spatial systems with physical data bases and cultural data.
- Manages and directs the collation and maintenance of core data bases pertinent to topographic data, administrative boundaries, transport corridors, infrastructure and geographic information.
- Initiates new asset bases and manages the integration of new and existing data bases.

#### 3.7.6 Accredited spatial data standards.

- Determines the standards required for data created for specific purposes.
- Develops effective procedures for acquiring and storing spatial data.
- Develops procedures for testing and validating the integrity of spatial data.

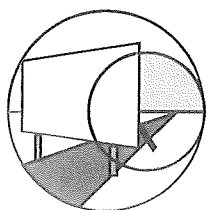
### **3.7.7 Maintain and manage core data bases.**

- Determines procedures for reviewing and maintaining existing data.
- Determines procedures for editing new data for inclusion in core data bases.
- Identifies and implements uses for core data bases.
- Determines procedures for upgrading core data bases to meet community needs.
- Determines parameters for the administration of core data bases.
- Advises key stakeholders on the management and benefits of core data bases.

#### **Range Indicator 3.7:**

(See also the general range statement for Stage 3)

Stage 3 surveyors will be competent in designing, establishing and maintaining spatial reference systems that are used in determining the spatial relationships within land and geographic information systems. They will be competent designers and managers of core data bases and will provide advice on the benefits and uses that can accrue from these bases. They will be accountable for the outcomes of all work personally carried out or carried out under their direction.



### **3.8 LAND ADMINISTRATION AND PROPERTY DEVELOPMENT**

#### **3.8.1 Advise on appropriate land tenure and land tenure systems.**

- Demonstrates a profound knowledge and understanding of the principles of land registration and land tenure.
- Assesses the impact of laws on land and land development.
- Counsels stakeholders on the advantages and disadvantages of various land titling systems.
- Provides advice on the relationships between land and various ethnic groups and cultures within jurisdictions of practice.
- Contributes to the rationalisation and operation of native title programs.
- Contributes to the financial analysis of establishing and maintaining land administration systems.

#### **3.8.2 Contribute information and advice to facilitate the administration, control and development of land resources.**

- Demonstrates a profound knowledge of planning laws and procedures.
- Contributes to the environmental and management policies applicable in various jurisdictions.
- Coordinates multi-discipline activities in property development.
- Contributes to the management of land information resources.

#### **3.8.3 Promote opportunities to expedite sustainable land development.**

- Applies expert local and regional knowledge to expedite development.
- Coordinates a multi-disciplinary approach to optimise outcomes.
- Initiates and coordinates feasibility studies and impact assessments.

#### **3.8.4 Provide advice on financial implications of land development.**

- Understands and applies principles of land valuation.
- Identifies and assesses new land use options.
- Undertakes cost/benefit analyses for land development projects.
- Assesses the potential of land for further development.
- Develops opportunities to optimise land value and sustainable use.

#### **3.8.5 Provide design services to optimise land development and encourage sustainable land use.**

- Develops innovative land boundary patterns.
- Plans and designs infrastructure for land divisions and land developments.
- Develops proposals for sustainable land development

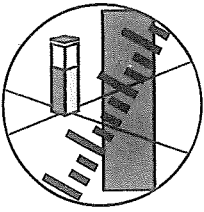
#### **3.8.6 Manage properties and property development.**

- Applies project management principles to property development.
- Manages, administers and maintains property occupation schemes.

#### **Range Indicator 3.8:**

(See also the general range statement for Stage 3)

Stage 3 surveyors will be competent in all aspects of land administration and property development and will be actively involved 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 all work carried out under their direct supervision.



### 3.9 CONTROLLING, MEASURING AND LOCATING DEVELOPMENTS

#### 3.9.1 Control engineering works, development projects, and the building or installation of structures and machines.

- Reads, interprets and understands complex design and construction plans.
- Develops procedures for the setting out of works.
- Coordinates and manages the activities of multi-discipline teams.
- Develops appropriate reference systems.
- Identifies and assesses new technology for site operations.
- Develops effective reporting systems.
- Develops procedures to validate results.

#### 3.9.2 Control and measure the extraction of minerals and other materials.

- Understands mining and excavation processes and identifies and develops appropriate surveying technology.
- Develops measuring and monitoring outcomes appropriate for the safe, cost effective extraction of materials.
- Understands the roles of other professionals, technicians and trades persons.
- Develops appropriate reference systems.
- Identifies and develops appropriate technology.
- Develops effective reporting systems.

#### 3.9.3 Establish quality control systems.

- Counsels clients on needs and required tolerances.
- Identifies and develops appropriate technology.
- Develops methods and procedures.
- Develops measuring and monitoring programs.
- Develops effective reporting procedures.

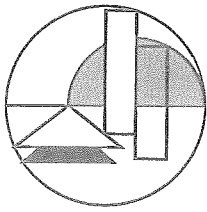
#### 3.9.4 Monitor the position, shape and size of structures, land forms and sea beds.

- Interprets complex design and detail plans and determines the appropriate tolerances.
- Coordinates multi-discipline operations.
- Develops appropriate reference systems.
- Identifies and develops appropriate technology.
- Develops effective reporting systems.
- Develops procedures to validate results.

#### Range Indicator 3.9:

(See also the general range statement for Stage 3)

Stage 3 surveyors will be competent in all aspects of 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 have specialist expertise in carrying out one or more surveying functions at construction, industrial or mining sites and will coordinate and manage complex surveying programs at major sites. They will be accountable for the outcomes of all survey work personally undertaken and for all work carried out under their direction.



### **3.10 RESEARCH, DEVELOPMENT AND COMMERCIALISATION**

#### **3.10.1 Perform research.**

- Coordinates the identification of potential research areas.
- Coordinates literature and information searches.
- Initiates fundamental or applied research.
- Initiates and develops research programs.
- Coordinates the communication of research outcomes.

#### **3.10.2 Formulate concepts for development.**

- Identifies and initiates development opportunities.
- Rationalises concepts and promotes further development.
- Rationalises development programs.

#### **3.10.3 Identify and seek resources to further research and development.**

- Appraises and promotes probable outcomes.
- Coordinates cost/benefit analysis and estimates of resource requirements for development programs.
- Coordinates programs to attract resource suppliers.
- Coordinates and develops submissions presenting development programs and funding proposals.

#### **3.10.4 Carry out market research.**

- Develops strategies for identifying desirable product properties.
- Determines potential product demand.
- Develops prototypes and pilot schemes.
- Identifies likely barriers to new products or services and develops strategies to overcome these barriers.

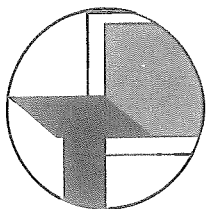
#### **3.10.5 Commercialise research outcomes.**

- Develops procedures for the economic evaluation of research outcomes.
- Develops promotion and marketing strategies.
- Develops strategies for the presentation of final products.

#### **Range Indicator 3.10:**

(See also the general range statement for Stage 3)

Stage 3 surveyors will be competent, experienced researchers, developing and establishing new services and products that are relevant to the surveying profession. They will be accountable for all research and development work personally undertaken and for all research and development carried out under their direction.



### 3.11 EDUCATION AND TRAINING

#### 3.11.1 Contribute to the development of surveying education.

- Collaborates with educators in determining the education needs of surveying personnel.
- Contributes to education plans and programs for tertiary education.
- Contributes to developing curriculum, syllabi or exercises in surveying.

#### 3.11.2 Assist in conducting surveying education.

- Contributes to the development of courses and teaching material for education.
- Collaborates in the management of programs to provide theoretical and practical experience.
- Contributes to conducting effective teaching, development and learning activities.
- Contributes to developing the content of education and training programs through research, study, practice or other techniques.
- Contributes to the assessment of students.
- Collaborates in assessing the effectiveness of education and training programs.
- Contributes to reviewing surveying education.

#### 3.11.3 Develop and conduct training programs.

- Contributes to determining the training needs of surveying personnel.
- Contributes to the development of training material for training programs.
- Contributes to developing practical experience programs.
- Participates in assessing the effectiveness of training programs.
- Understands the training requirements of surveying graduates seeking registration.
- Develops suitable training programs for surveying graduates seeking registration.
- Implements suitable training programs.
- Supervises the training of surveying graduates.

#### Range Indicator 3.11:

(See also the general range statement for Stage 3)

The competencies in this unit will be typically demonstrated by Stage 3 surveyors working in the tertiary sector or providing advice to professional educators or trainers on surveying matters. They may be contributing to continuing professional development programs or supervising the training of Stage 1 surveyors who are seeking registration or accreditation at the Stage 2 level. They will contribute to education and training at a level commensurate with their competence in a recognised field of surveying and their general knowledge of the surveying industry.

# A. EXAMPLE OF DERIVED COMPETENCIES FOR A FUNCTIONAL AREA

The following competency profile indicates how competency standards for specific functional areas can be derived from the generic competency standards. This particular profile focuses on the competency standards that could be appropriate for a professional surveyor at the Stage 2 level practising as a geo-spatial consultant.

## Competency Standards

Competency standards follow this general format:

First Number    2.    — Stage Level

Second Number   2.2   — Unit of Competency

Unit of Competency Title

**General Range Statement for Stage 2**  
The competencies for Stage 2 ...

### 2.2. COLLECTION OF DATA AND INFORMATION

#### 2.2.1 Collect data by direct measurement.

- Recognises the various natural ...
- Recognises and assesses the measuring technology available.
- Determines procedures for collecting data.

#### Range Indicator 2.2

(See also the general range statement for Stage 2)  
Stage 2 surveyors ...

Elements of Competency for  
the Unit

Performance Criteria for the  
Element



## **COMPETENCY PROFILE:**

### **GEO-SPATIAL INFORMATION CONSULTANT, STAGE 2**

#### **1. PROFESSIONAL PRACTICE**

As per the generic competencies.

#### **2. THE COLLECTION OF DATA AND INFORMATION**

##### **2.1 Collects data by direct measurement.**

- Recognises the various natural and constructed features about which data are required for analysis, interaction and the subsequent information bases.
- Recognises and assesses the measuring technology available.
- Determines procedures for collecting data.
- Ensures processes followed to achieve legal traceability.
- Identifies the custodianship of data collected.

##### **2.2 Search and acquire data from existing data files, data bases, historic records and literature.**

- Identifies potential data sources.
- Accesses relevant geo-spatial records, survey data bases and spatial data clearing houses.
- Interrogates meta-data to determine integrity and worth, and to identify possible uses.
- Transfers and integrates data from existing data bases into new data bases.
- Determines the relevance of the information gathered, to meet client needs.

#### **3. THE MANAGEMENT OF DATA AND INFORMATION**

##### **3.1 Design and develop system standards.**

- Identifies the outcomes needed from a system.
- Identifies the various elements of a system.
- Develops standards across the total systems.
- Defines system standards and integrates them into data management quality programs.
- Understands the inter-operability standards for interacting between systems.

##### **3.2 Process data to accepted standards and for specific requirements.**

- Verifies the integrity of the base data.
- Processes data to achieve specific outcomes.
- Stores data in appropriate data bases for future use.
- Verifies the integrity of the processed data.

##### **3.3 Convert data from one system or medium to another.**

- Understands the various data bases holding spatial and textual data.
- Understands appropriate data transfer standards.
- Identifies and collates appropriate data in one system for transfer and integration into other systems.
- Uses appropriate technology and procedures to convert and transfer data between systems and media.

### **3.4 Administration of electronic and physical data bases.**

- Applies effective procedures for recording, retrieving and updating information.
- Establishes security systems to ensure data integrity.
- Implements appropriate maintenance systems.

### **3.5 Analyse, evaluate and interpret data.**

- Applies systems to analyse data.
- Determines the required accuracy and reliability of data.
- Interprets data and ensures its relevance to client needs.
- Enhances or value adds to data where applicable.
- Collates and relates data to specific areas of interest.

## **4. THE PRESENTATION OF INFORMATION**

### **4.1 Assemble data into specific data sets to meet customer needs.**

- Recognises market trends.
- Clarifies and determines customer needs.
- Identifies the potential benefits of creating specific information from various data bases.
- Uses technology to assemble data into useful information.

### **4.2 Compile and produce maps, plans and charts.**

- Uses the techniques available for graphical and diagrammatic presentation.
- Determines the uses and limitations of base data.
- Understands appropriate cartographic principles.
- Applies computer aided drafting techniques.
- Identifies and uses the best methodology to meet client needs.

### **4.3 Provide digital spatial information.**

- Recognises the accuracy, reliability, validity and potential uses of subject data.
- Ensures adequate description integrity within the meta-data.
- Transfers spatial data files between various media.
- Integrates spatial data with other information.
- Formats data to meet specific customer needs.

### **4.4 Formally present information to clients, government agencies and public forums.**

- Identifies and uses appropriate communication and display techniques to present information in a usable manner.
- Addresses special interest groups.
- Conducts seminars and public meetings.
- Leads and/or participates in discussion groups.

### **4.5 Prepare reports.**

- Prepares detailed technical reports.
- Prepares information brochures and reports.
- Prepares business reports on spatial information technology.

### **4.6 Provide advisory services.**

- Discusses information with potential users.
- Deciphers information and relates it to specific issues.
- Collates information and formats it into relevant advice.
- Provides advice on opportunities to value add to existing information.

## 5. BUSINESS, MANAGEMENT AND SUPPORTING QUALITY ASSURANCE PROGRAMS

As per the generic competency standards.

## 6. COMMUNICATIONS

As per the generic competency standards.

## 7. SPATIAL REFERENCE SYSTEMS AND CORE DATA BASES

### 7.1 Design Reference Systems.

- Understands the basic reference systems used in local jurisdictions.
- Evaluates system constraints.
- Designs appropriate local reference systems to meet requirements.
- Monitors the effectiveness of existing systems.

### 7.2 Integrate spatial reference systems with fundamental physical and cultural data and manage core data bases.

- Understands the logical structure of data bases.
- Interfaces spatial systems, with physical data bases and cultural data.
- Integrates all data into a homogeneous data environment.
- Collates, updates and maintains core data bases pertinent to topographic data, administrative boundaries and infrastructure.
- Verifies the integrity of data in data bases.

### 7.3 Accredited Spatial Data Standards.

- Contributes to the standards required for data created for specific purposes.
- Contributes to developing standard procedures for acquiring and storing spatial data.
- Contributes to developing procedures for testing and validating the integrity of spatial data.

## 8. LAND ADMINISTRATION AND PROPERTY DEVELOPMENT

### 8.1 Advise on land tenure and land tenure systems.

- Demonstrates a sound understanding of land registration and land tenure.
- Understands the social and economical impact of land ownership and administrative boundaries.

### 8.2 Contribute information and advice to facilitate the administration, control and development of land resources.

- Provides spatial information to expedite effective and sustainable land development.
- Provides data to identify environmental impacts.
- Accesses the available land information resources.

## 9. CONTROLLING THE LOCATION OF DEVELOPMENTS

Not required for this competency profile.

## 10. RESEARCH, DEVELOPMENT AND COMMERCIALISATION

### 10.1 Perform research.

- Contributes to identifying potential uses for geo-spatial information.
- Undertakes literature and information searches.
- Contributes to identifying business and administrative activities that can utilise spatial information concepts.
- Identifies and communicates research outcomes.

### 10.2 Formulate concepts for development.

- Contributes to identifying new methods of portraying spatial information.
- Conceptualises ideas for producing new information products.

### 10.3 Market research.

- Identifies potential markets for spatial information products.

## 11. EDUCATION AND TRAINING

Not required for this competency profile.

### **Range Indicator: Geo-Spatial Information Consultant**

(See also the general range statement for Stage 2)

Stage 2 professional surveyors, working as a geo-spatial information consultants, will be competent in the collection, management and distribution of geo-spatial information, will make significant contributions in expanding the use and markets for spatial data, and will regularly provide advice on information technology. They will be accountable for the outcomes of work personally carried out or carried out under their direct supervision.

## **B. GUIDELINES FOR ASSESSMENT PROCEDURES**

The following principles and guidelines are provided to assist the surveying profession in assessing the performance of professional surveyors relative to the National Competency Standards for Professional Surveyors, 1996.

### **General Principles**

An effective assessment process must be consistent, fair, valid and transparent.

### **Assessment Principles**

There are some important principles that should be inherent in any sound assessment process. The following principles are considered pertinent in the development of assessment procedures for competency standards for professional practitioners.

#### **Scope of the Assessment**

It is not viable to carry out a detailed assessment of competency in every area of a candidate's professional practice. The profession must therefore identify a realistic number of areas where candidates must demonstrate a minimum level of competence.

#### **Levels of Competence**

Having determined the areas of practice that must be assessed it is then important to clearly define and describe the required levels of competence in these areas. Examples of three levels of competence are required eg; below standard, acceptable competence, and well above standard.

#### **Inferred Competence**

Given the complexity of professional practice it is generally not possible to assess professional competence directly. Instead, competence is inferred by observing and measuring successful performance. For the professions, assessment is the process of inferring underlying competence.

#### **Sampling Performance**

It is not practicable or desirable to attempt to assess, in detail, every attribute required in an area of practice. Having defined the areas of practice where a practitioner must meet minimum levels of competence, the assessment must then rely on reasonable samples of performance.

#### **Validity**

Valid assessments will require assessment procedures that are appropriate for the units or elements of competency being assessed, eg a written examination would not be appropriate for the assessment of practical procedures involving a degree of psychomotor skill.

#### **Consistency or Reliability**

Consistency or reliability depends on developing procedures that will lead to similar conclusions, even if the circumstances surrounding the assessment are changed.

**Fairness**

The procedures must be fair. There should be no bias towards or against particular individuals or groups. Unsuccessful candidates should receive timely feedback as to why they were unsuccessful. Where possible, advice should be provided on the actions required to achieve the required levels of competence.

**Transparency**

Any assessment process must be transparent to the extent that all participants and stakeholders should know and understand the process and its likely outcomes. All participants in the process should be fully aware of their responsibilities and obligations and all stakeholders must have confidence in the process.

**Professional Judgement**

The complex nature of professional practice negates the practicality of developing check lists against which to assess performance. The assessment of professional competence will always rely on the judgement of experienced professionals.

**Assessors**

Assessors must be experienced practitioners who have a sound understanding of the national competency standards, have extensive knowledge and experience in the relevant functional areas, and are conversant with the assessment process. In uncertain situations it is preferable to use an assessment panel of two or more experienced assessors.

**Appeals**

A well defined appeal system should be in place so that complaints can be dealt with fairly and expeditiously. Appeals should be dealt with by an independent assessor or assessors not involved in the original assessment.

**Management Structure**

An effective management structure is required to control the process, maintain the competency standards, and ensure that there are competent assessors available to respond to the needs of the profession.

**Costs**

The assessment process must be affordable. An elaborate scheme that offers the highest quality assessments will be ineffective if the costs are beyond the resources of the profession and candidates seeking assessment.

**Assessment Methods**

There are many methods for assessing competency and these can be generally classified under five basic headings:

**1. Questioning techniques:**

Pencil and paper tests including multi-choice questions

Written examinations or assignments

Case studies

Oral questions and professional interviews

**2. Simulations:**

- Simulated work situations
- Interviews with simulated clients
- Mock projects

**3. Skills Tests:**

- Demonstrating the use of equipment or specific techniques
- Practical examinations

**4. Direct Observation:**

- Supervisor evaluations
- Supervised work experience
- Internships or articles

**5. Evidence of Prior learning:**

- Portfolios or log books
- Referee reports
- Work diaries

## **Assessing Professional Practice**

Given the complex nature of professional work there is no one particular method that can consistently provide fair and valid results. All of the basic methodologies have some inherent weaknesses and strengths and the best assessment processes will combine several methods in a holistic approach.

To some extent there will always be a degree of conflict between consistency and validity.

While a rigid, structured approach may provide consistency this could be at the expense of validity. Assessments that effectively measure knowledge may not provide a suitable measure of psychomotor skills. A different approach will also be needed for the assessment of “soft skills” such as inter-personal communications, negotiation skills and management. Attitude, that most elusive of attributes, generally can only be assessed by long term, direct observation in the work place.

To overcome the many anomalies associated with the assessment of professional practice, the assessment process should be flexible and holistic and will rely, to a large extent, on the professional judgement of experienced professional surveyors.

Currently within the surveying profession, the various surveyors boards use a variety of methods to determine competence including work place observations, field testing, special project work, professional interviews, presentations and written reports. This same broad approach should be incorporated in any assessment strategy.

The competency standards provide a strong framework to apply as a sophisticated measure of competency but they are not a checklist to be used **rigidly** by assessors.

## Assessment Factors

It is normally accepted that assessors should take into account six major factors when assessing candidates in any of the core competencies:

- Knowledge
- Understanding
- Problem solving
- Occupational practice skills
- Attitudes
- Ethics

### 1. Knowledge:

Acquiring the enabling competencies from academic studies and applying specific knowledge gained through learning and experiences in functional areas of surveying.

### 2. Understanding:

Applying surveying knowledge and skills to new situations or adapting techniques from a familiar work environment to new applications.

Analysing data and information, hypothesizing on likely outcomes, drawing correct inferences and making sound decisions.

### 3. Problem Solving:

Demonstrating the ability to apply knowledge and skills to resolve problems and provide innovative solutions.

Developing and applying new surveying principles to meet unusual and complex situations.

### 4. Occupational Practice Skills:

Applying surveying practice skills and surveying principles within the work environment.

Demonstrating technical skills in various functional areas and ensuring that accepted quality standards are maintained.

### 5. Attitudes:

Adopting a positive approach towards achieving quality and cost effective outcomes, and accepting professional responsibilities.

Demonstrating enthusiasm, leadership and sound management while giving due consideration to risks and the impact of professional activities on others.

Striving for continuous improvement, excellence in performance, and professional development.

### 6. Ethics:

Applying the core competencies in surveying in accordance with the profession's code of ethics.

Demonstrating a commitment to the advancement of the profession in terms of community service, sustainable development and consideration for the environment.

These six factors can be used by assessors, or individuals engaged in self assessment, against any of the core units or elements of competency. However, as ethics is inherent in the unit of competency for Professional Practice, the re-application of the "ethics factor" is not appropriate.



## Assessment Models

Assessment processes are required for two levels of competency:

- Stage 1     Entry level into the profession
- Stage 2     The level where professional surveyors are expected to exercise independence and autonomy in a major functional area of professional practice.

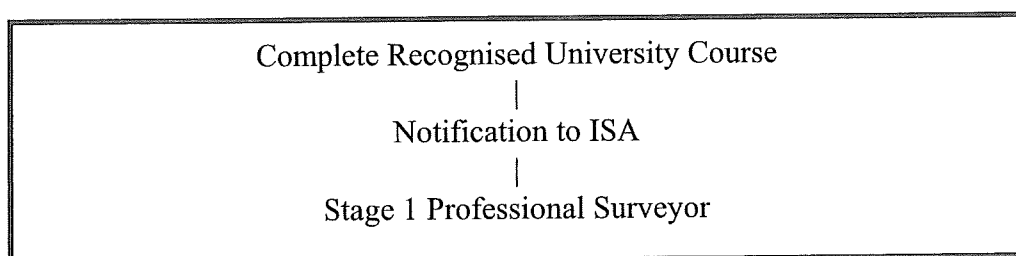
### Stage 1 Professional Surveyors

All surveyors who achieve the Stage 1 level competencies are eligible to use the title Professional Surveyor. Surveyors at this level will also be eligible to be Graduate Members of ISA.

The basic assessment and accreditation model would accommodate four entry streams into the profession as Stage 1 Professional Surveyors:

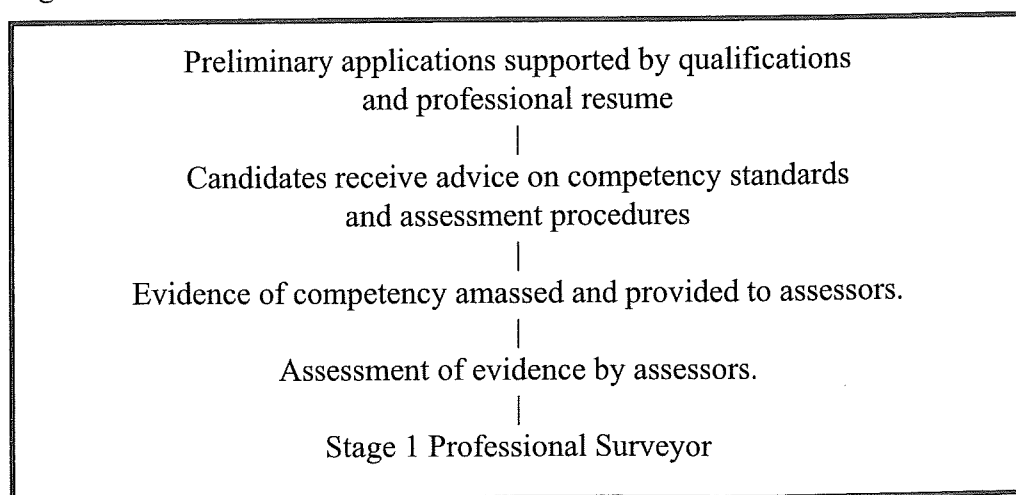
- Stream 1:** Normal entry stream for graduates with approved 4 year university degrees into the profession.
- Stream 2:** For surveyors with 4 year Australian degrees in surveying or allied disciplines not recognised by ISA plus a nominal 2 years experience.
- Stream 3:** For applicants with a degree in surveying from an overseas university recognised in the country of origin but not recognised by ISA.
- Stream 4:** For applicants seeking professional surveyor status without formal academic qualifications but with a nominal 10 years professional experience.

### Model for Stream 1



### Model for Streams 2, 3 and 4

For surveyors seeking entry into the profession without an approved university degree.



The majority of surveyors should enter the profession via Stream 1. However, if professional recognition is to be available to surveyors through Streams 2, 3 and 4, effective assessment processes must be in place. Given the high levels of achievement required by graduates in successfully completing approved courses and the importance of ensuring that all professional surveyors achieve the levels of competency as specified in the National Competency Standards, the assessment of surveyors entering through streams 2, 3 or 4 must be rigorous and should not be compromised for expediency or cost.

### **Stage 2 Professional Surveyors**

Stage 1 Professional Surveyors with appropriate experience and professional development should advance to the Stage 2 level. Professional surveying organisations may deem that practising surveyors who have achieved the Stage 2 level of competency could be eligible to use a specific title (eg, Certified Professional Surveyor, Registered Surveyor). Specific titles could identify those surveyors who have been judged by the profession as competent professional surveyors who can practice in specific fields of surveying.

The use of specific titles should be conditional upon the surveyor meeting various requirements, for example:

- Successful assessment at the Stage 2 level.
- Practising in a branch of surveying as defined under the “Definition of a Professional Surveyor”.
- Compliance with an agreed Code of Ethics.
- Participation in an approved continuing professional development program.

Progress from Stage 1 to Stage 2 would be via 3 routes:

**Route 1:** A Structured Professional Development Program.

**Route 2:** A less structured route relying on a supervised program of professional experience based on normal line supervision.

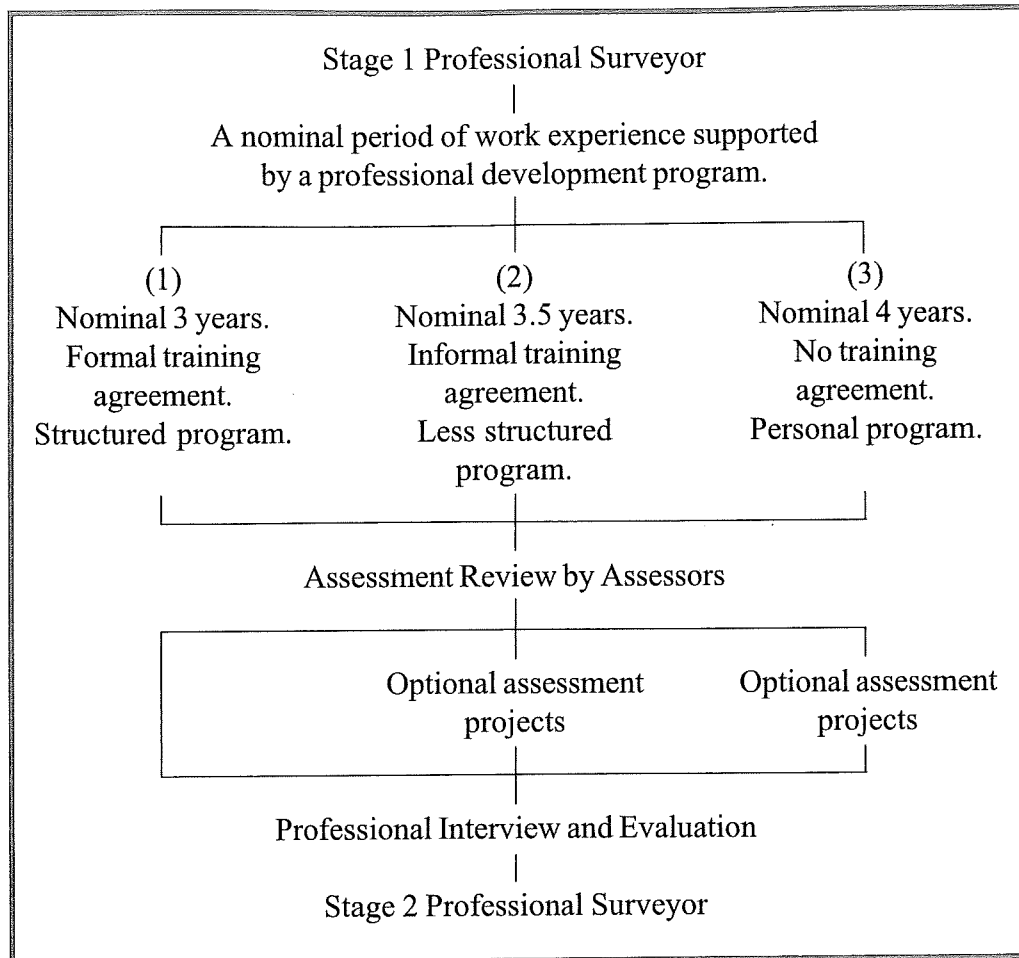
**Route 3:** Acquired professional experience, for persons working in surveying or allied fields at a professional level but without the benefit of a specific development program.

If substantial recognition is to be given to surveyors who progress from Stage 1 to Stage 2, a meaningful assessment process should be in place. Professional surveyors advancing through Route 1 should require a minimum of external assessment. The extent of external assessment required for surveyors progressing through Routes 2 and 3 should depend on the quality and diversity of professional experience available to them in the workplace.

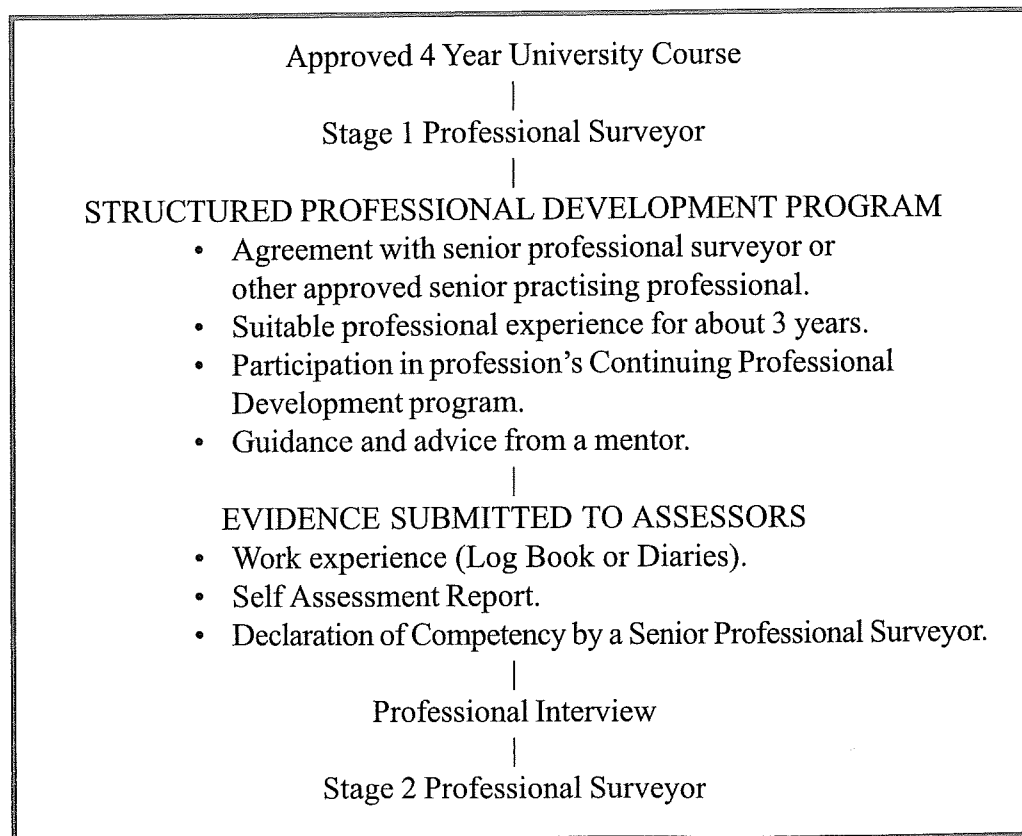
### **Preferred Route to Stage 2 Professional Surveyor**

The vast majority of surveyors will enter the profession with an approved university course and participate in an effective professional development program, hence minimising the need for external assessment.

### Model for Routes 1, 2 and 3 to the Stage 2 Level



### Model for the Preferred Route to the Stage 2 Level



## C: GLOSSARY OF TERMS

Term	Definition	Appears
Approved Degree	A four year university course in surveying or geomatics that has been accredited by the Institution of Surveyors, Australia. Typically these courses will lead to Bachelor Degree Awards in Surveying, Applied Science, Geomatics, Geoinformatics, Geomatic Engineering, or Land Information.	34
Articulation	The formal linkage between different fields or levels.	8, 13, 14, 16
Assessment	Assessment of performance against competency standards.	17, 18, 22, 30
Attributes	The knowledge, skills and attitudes that underwrite competent professional performance.	19
Competence	A construct referring to all of the personal characteristics that together enable competent performance.	11, 14, 19, 22, 35
Competency	A combination of units of competency, elements of competency, performance criteria and (optional) range indicators.	13, 15, 17, 18, 22, 29
Competency Standards	A combination of units of competency, elements of competency, performance criteria, general range statements, and optional range indicators.	7
Competent	Possessing the attributes necessary to perform a job to appropriate standards	14, 19, 22, 29
Definition of a Surveyor	Sets out the roles, functions, and areas of expertise for professional surveyors in Australia.	25
Element of Competency	A subdivision of a unit of competency that is observable in the work place.	29
General Range Statement	A general statement of the circumstances or context in which a person practises in the work place.	29
Mutual Recognition	Mutual Recognition legislation is being enacted Australia-wide to enable people registered in one jurisdiction to carry out an equivalent occupation in other jurisdictions.	8
Performance	What professional surveyors do in the workplace.	17, 19, 29
Performance Criteria	An integrated list of the aspects of professional performance that would be regarded as evidence of competent professional performance in the workplace in an element of competency.	22, 29
Range Indicator	A statement of the circumstances or context in which performance criteria apply.	29
Role(s)	A distinct area of practice within a profession.	7, 13, 24, 29
Unit of Competency	A major segment of the overall competency of a profession, typically representing a major role, function or field of surveying.	29
Work place	The actual environment(s) in which professionals work; may be simulated for purposes of assessment.	19, 28, 29