



**Board of Surveying  
& Spatial Information**

# **Determination – Board Examinations**

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346 Panorama Avenue  
Bathurst NSW 2795

T: (02) 6332 8238

[www.bossi.nsw.gov.au](http://www.bossi.nsw.gov.au)

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In accordance with the *Surveying and Spatial Information Regulation 2017*, (the Regulation) Part 3, Division 2, Clause 77(1)(a), the Board of Surveying and Spatial Information (BOSSI, the Board) makes the following determination for the purposes of the definition of board examination in Clause 5(1).

Variations or exemption applications may be considered on application in writing to the Board.

## Board Examinations Determination

The following is applicable to both land surveying candidates and mining surveying candidates, unless otherwise stated.

### 1. Enrolment as a candidate

A person can make an application to be enrolled as a candidate if they are:

- a) Enrolled in a course of studies leading towards a recognised qualification; or
- b) Hold a recognised qualification.

Applications, along with required documentation and payment of the applicable fee, must be made via the [BOSSI portal](#) on the Service NSW website.

Enrolment as a candidate is subject to payment of the annual fee as prescribed by the Regulation. A candidate is only considered financial if they have paid the annual fee.

The Board may refuse an application to be enrolled as a candidate if the above criteria is not met and/or the Board is not satisfied that the applicant is a fit and proper person to be a candidate. In determining whether an applicant is a fit and proper person the Board is to consider, amongst other things, whether the applicant is of good repute, having regard to character, honesty and integrity.

If an application to enrol as a candidate is refused, the Registrar will provide the applicant written notification of the Board's decision and reasons for the decision. The applicable fees will be refunded.

### 2. Recognised practical experience for candidates

Recognised practical experience for the purposes of Board examination eligibility is practical experience in surveying obtained under the supervision of a NSW (or ACT) registered surveyor in specific areas that have been accepted as counting towards the Board examination process.

The specific areas of practical experience are;

- Land boundary surveys in rural areas
- Land boundary surveys in urban areas
- Mining surveys
- Other surveys (including engineering and control surveys)

At the time of application to become a candidate, a candidate can supply evidence of practical experience for the preceding 12-month period. Beyond this, practical experience will only be recognised by BOSSI for a period in which the candidate is financial.

A candidate must submit a completed [notice of practical experience obtained form](#) when they complete their annual renewal via the [BOSSI portal](#) on the Service NSW website.

The Registrar will review all submitted notices and refer any forms that need further investigation to the BOSSI Training Committee. The Registrar will provide candidates with a notification (via email) of the acceptance/rejection of any period of recognised practical experience.

BOSSI recognises that there may be individual or extenuating circumstances that impact on practical experience, including moving interstate for work. Applications for special consideration must be submitted to BOSSI in writing via [BOSSI@customerservice.nsw.gov.au](mailto:BOSSI@customerservice.nsw.gov.au) for Board consideration. BOSSI may at its absolute discretion accept or reject a submission, and apply conditions to any acceptance.

### **3. Application to sit Board examinations**

Financial candidates will be advised by the Board of upcoming examinations and will be invited to make an application to attend. All applications, including payment of the applicable fees, must be made via the [BOSSI portal](#) on the Service NSW website before the specified closing date.

A person can apply to sit a Board Examination if they;

- a) Are a financial candidate, and
- b) Have obtained at least 26 weeks of recognised practical experience together with the specific requirements of the examination(s) they wish to undertake

If a candidate's application to sit a Board examination is approved, the Registrar will provide the candidate written notification (via email) of the date, time and location of the Board examinations.

The Board may refuse an application to sit a Board examination if the above criteria is not met and/or the Board is not satisfied that the applicant is a fit and proper person to undertake the examination. In determining whether an applicant is a fit and proper person the Board is to consider, amongst other things, whether the applicant is of good repute, having regard to character, honesty and integrity.

If a candidate's application to sit a Board examination is refused, the Registrar will provide the candidate written notification of the decision and reasons for the decision. The applicable fees will be refunded.

### **4. Conduct of examinations**

The Board may conduct Board examinations in any such manner as it deems fit.

The Land Surveying Board examinations are conducted as viva voce examinations.

The Mining Surveying Board examinations are conducted as a combination of viva voce and a written examination.

Candidates presenting themselves at the examinations are expected to dress in professional business attire. Candidates who, in the opinion of the Registrar or the examiners, do not dress appropriately will not be permitted to sit the examination as they have not met the requirements for examination.

For the viva voce examinations candidates will be required to present their projects in front of a panel of assessors. Candidates will present, in addition to their projects; a completed Project Certification form, field notes, search, calculation sheets and any other documentation used in the preparation of their project.

The candidate will then be asked to give a brief description of their project and how they prepared their project. More detailed questions will be then asked of the project or on hypothetical examples to ensure the candidate has demonstrated sufficient competence for that particular examination topic.

The examination enables the candidate to demonstrate a mature and professional attitude to questions and comments by the Board's assessors. Matters relevant to the examination may include the candidate's understanding, responsibilities and obligations in respect of:

- the cadastre, client and community
- the Board of Surveying and Spatial Information (BOSSI)
- BOSSI Determinations, policies and procedures
- BOSSI Ethics and Code of Professional Conduct
- employer and employee responsibilities
- candidate surveyors
- registered surveyors
- contribution to the surveying profession and/or membership of professional bodies
- presentation of surveys and related documentation
- Continuing Professional Development (CPD)
- knowledge of relevant technology and instruments
- legislation - current and proposed
- technical and professional journals
- confidential information
- tendering of legal evidence - professional responsibility, potential liability
- professional practice

## 5. Assessment of Competency

Competence is judged against the competencies detailed in this determination. Based on the project and examination, the candidate will be allocated a grading of:

- Competent
- Conditional
- Not yet Competent

A conditional result is given at the discretion of the assessors and only when the candidate;

- Needs to rectify a minor error or address a minor omission in their project, or
- Needs to demonstrate a more detailed understanding of a particular aspect of the topic

Candidates will be advised of the outcome at the end of the examination.

In the instance of a 'Conditional' result, candidates will be informed in writing (via email) of the items that will need to be satisfactorily addressed before they will be graded as 'Competent'. The corrected project, or the information requested by the assessors, must be submitted to the Registrar by the due date specified, otherwise grading for that particular examination will result in a 'Not yet Competent'. Unless exceptional circumstances can be demonstrated, candidates will be afforded only one opportunity to address a conditional result in an examination.

Failure to satisfy the requirements of a conditional result will result in a 'Not yet Competent' grade and the candidate will have to repeat the examination at a future set of the Board's examinations.

If a candidate does not have the appropriate level of experience and/or professional attitude to satisfy the required competencies they will be allocated a 'Not Yet Competent' grade in that examination. The candidate will be required to retake the entire examination at a future set of examinations. Candidates will be advised in which criteria they are lacking and on the next attempt will be specifically examined in these criteria, in addition to the other listed competencies for the project.

## 6. Certificate of competency

A person will be granted a certificate of competency if they;

- a) Hold a recognised qualification, and
- b) Are a financial candidate, and
- c) Have passed all of the required Board examinations and/or completed a recognised Professional Training Agreement (PTA).

Note: PTA's are expected to be removed from the Regulation as part of the next review (September 2022)

## 7. Board examinations for land surveying

The Board examinations for a land surveying candidate are;

- a) Completion of the approved projects for land surveying, wherein the work displayed must comply with current legislation, and
- b) A viva voce examination to demonstrate competency in each of the approved projects specified

The approved projects must comply with the requirements of this determination and must have been undertaken by the candidate in the 2 years immediately preceding the date of the exam. If the project is outside the prescribed time frame, the candidate may apply to BOSSI to have this requirement waived. BOSSI may at its absolute discretion accept or reject such an application and apply conditions to any acceptance.

## 8. Approved projects for land surveying

The approved projects consist of;

- Town Planning
- Engineering Design
- Urban Cadastral
- Rural Cadastral
- Strata and Community Titles

Projects can be attempted in one session or at separate sessions and must comply with current appropriate legislation.

Candidates must ensure that the project presented to the Board meets the guidelines set for that project before attempting the examination. If a candidate is unsure about their project they should seek advice from their supervising surveyor. The Board can provide advice on the suitability of projects by contacting the Registrar. Candidates must have any project that does not strictly meet the guidelines contained in this document, pre-approved by the Board.

As part of the examinations, candidates will need to demonstrate their knowledge in all competencies for that particular examination. It is therefore recommended that candidates undertake projects that include elements that demonstrate compliance with as many competencies as possible. This may involve submitting a portfolio of surveys instead of one single survey.

All plans and reports must be prepared in a professional manner and comply with current legislation, standards and the requirements of authorities such as NSW LRS and councils.

Unless specified otherwise below, one electronic copy of the project documentation must be submitted to the examiners for the Board's use. This will include reports and plans. Candidates should note that the Board may use submitted projects for educational and instructional purposes with future candidates. Project Certification forms should also be submitted separately to the examiners.

Electronic submissions are to meet the following requirements:

- All individual files are merged into one file and in similar layout as per the hard copy which was submitted for the assessment.
- This file is to be in PDF format.
- Submission is to be via USB memory stick. Please Note: that the USB submitted will be retained by BOSSI and should therefore only contain files relevant to your project.
- The file is to be named using the convention:

ID\_Name\_Assessment\_Month\_Year.pdf

E.g.: CA009243\_John Smith\_Town Planning\_March\_2020.pdf

The projects are used by the Board to assess the competency of a candidate. Therefore, it is critical that the projects are subjected to a high level of scrutiny. Projects will be thoroughly examined in all aspects, from field work and computations through to the drafting of the final documents.

## **8.1 Town Planning Project**

The assessment process involves the presentation of a Town Planning project at the viva voce exam. The project allows the candidate to demonstrate competence in town planning, land development, subdivision design and the relevant legislation that is encountered when undertaking these activities. Candidates must also demonstrate that the proposal complies with the relevant planning controls and appropriately addresses the natural and man-made attributes of the site and reflects current commercial and social expectations for such a proposal.

### **Guidelines for the size and scope of suitable projects**

The project will involve preparing a proposal for a significantly large development in an urban, rural or industrial area which meets the provisions of the relevant planning instruments and other planning requirements. Ideally the project will be one on which the candidate has had some professional involvement whilst undertaking their practical experience. A project of suitable complexity will generally assist the candidate to demonstrate competence, thus avoiding the need for assessors to also rely on questions of a more general nature.

As a guide the following subdivisions sizes are considered suitable:

- Conventional residential subdivision 20 hectares or 50 lots
- Rural subdivision 50 hectares or 20 lots
- Industrial subdivision 20 hectares or 20 lots

A 'hypothetical' project may be prepared, but candidates must visit the site and document their investigations with photos and notes. Candidates should discuss this project with their supervising surveyor and other professionals, and also note these discussions, along with any comments. Candidates should seek relevant data from councils and government agencies for their project.

## Project design work

For each type of subdivision, the candidate must:

- undertake and document a site inspection with photos and notes
- obtain relevant planning requirements from the consent authority
- obtain copies of relevant planning instruments
- obtain copies of relevant topographic and planning constraints mapping
- obtain specialist reports
- undertake a site analysis, road and lot layout design
- prepare relevant plans as required by the consent authority
- prepare concept cut/fill, drainage, service & landscaping plans
- complete a development application form
- prepare a statement of environmental effects
- undertake a detailed cost analysis and report on the economic feasibility

## Competencies

Candidates must demonstrate competence in the following topics, amongst other things:

- legal framework and hierarchy of planning instruments
- development application and approval process
- consent authority standards
- principles of subdivision design
- environmental considerations
- appreciation of site features, opportunities and constraints
- design and document preparation
- cost estimate and economic feasibility
- preparation of a planning report
- working with specialist consultants
- communication with stakeholders and authorities
- development application
- project management
- *Work Health and Safety Act 2011*
- ethics and professional conduct
- spatial information competencies (Appendix B) as may be related to town planning including
  - Point of truth
  - Fitness for purpose
  - Flow of data through a project
  - Metadata
  - NSW Spatial Information Management framework
  - Digital cadastres

## Deliverables

For each type of Town Planning Project, the candidate must bring the following documents to the exam:

- Copy of the titles for the relevant parcels of land
- two A3 size copies of the development proposal plans
- one copy of the applicable Local Environmental Plan together with one copy of any applicable Development Control Plans
- list of the current State Environmental Planning policies that apply to the development site
- copy of any other relevant reference documentation, such as external consultant studies undertaken over the site
- evidence of site visit
- two copies of the Statement of Environmental Effects meeting the requirements of the Environmental Planning and Assessment Act 1979
- two copies of the completed Development Application form
- two copies of the detailed cost analysis to establish the projects feasibility
- two copies of a letter/report to the client detailing the economic feasibility
- metadata statements for at least 5 sourced data sets (see Appendix A for a metadata statement template)
- working drawings to demonstrate the process resulting in the adopted lot and road layout
- one electronic copy of the submitted project as per the requirements outlined in Section 8

The project should be presented as if it would be lodged at the consent authority for development consent. Plans should be at an appropriate size and scale to be legible.

## 8.2 Engineering Design Project

The assessment process involves the presentation of an Engineering project at the viva voce exam. The project allows the candidate to demonstrate competence in Engineering design, storm water drainage design, tender preparation and construction management.

### Guidelines for the size and scope of suitable projects

The prepared plans and documentation will normally consist of a road, or other major structure that includes storm water design, together with documents for tender and construction. Ideally the project will be one on which the candidate has had some professional involvement whilst undertaking their practical experience. A project of suitable complexity will generally assist the candidate to demonstrate competence, thus avoiding the need for assessors to also rely on questions of a more general nature.

As a guide the following minimum sized engineering projects are considered suitable:

- Residential subdivision of 20 lots and 250 m of road incorporating the design of:
  - a) two roads incorporating six vertical curves
  - b) connection to an existing road
  - c) any battle axe driveways that are part of the project
  - d) one intersection
  - e) three kerb returns

- f) hydrology and hydraulics for storm water drainage of three pipe lines, 10 pits, upstream catchment and downstream discharge minor and major storm events
- Rural Subdivision of 500 m of new road incorporating the design of:
  - a) connection to existing road
  - b) two horizontal curves with super-elevation
  - c) three vertical curves
  - d) design speed compliance
  - e) any battle axe driveways that are part of the project
  - f) hydrology and hydraulics for three storm water pipe lines and culverts for two catchments for the minor and major storm events
- Industrial subdivision of 500 m of new road incorporating the design of:
  - a) two roads incorporating six vertical curves
  - b) connection to existing road
  - c) any battle axe driveways that are part of the project
  - d) one intersection
  - e) three kerb returns
  - f) hydrology and hydraulics for storm water drainage of three pipe lines, 10 pits, upstream catchment and downstream discharge minor and major storm events

A 'hypothetical' project may be prepared, but candidates must visit the site and document their investigations with photos and notes. Candidates should discuss this project with their supervising surveyor and other professionals, and also note these discussions, along with any comments. Candidates should seek relevant data from councils and government agencies for their project.

### **Project design work**

For each type of engineering project, the candidate must:

- undertake and document a site inspection with photos and notes
- obtain relevant design requirements from the consent authority
- obtain copies of relevant design and construction specifications
- obtain specialist reports
- undertake engineering and storm water design and prepare relevant plans as required by the consent authority
- prepare a bill of quantities
- obtain applicable construction costs for each item in the bill of quantities and prepare a priced bill of quantities
- prepare a tender document, including invitation to tender, construction specification, general conditions of contract and relevant schedules, annexures and attachments and tender form

## Competencies

Candidates must demonstrate competency in the following topics amongst other things:

- legislative and consent authority requirements
- principles of road/rail/other structure design together with storm water drainage design
- safe and practical design
- appreciation of site features, opportunities and constraints
- design and document preparation
- construction certificates and compliance certificates
- cost considerations in design
- construction methods
- erosion and sediment control
- geotechnical considerations
- Work Health and Safety Act 2011
- communication with stakeholders and authorities
- project management, contracts, tenders and supervision
- ethics and professional conduct
- spatial information competencies (Appendix B) as may be related to engineering design

## Deliverables

For each type of engineering project, the candidate must bring the following documents to the exam:

- one full size set of plans at scale and one A3 size set of plans
- two copies of the Tender Documents that include:
  - Invitation to Tender
  - Bill of Quantities
  - General Conditions of Contract and any Special Conditions of Contract that will apply to the project
  - Tender Form
- two copies of the priced Bill of Quantities for cost estimate purposes
- one copy of the local council or authority design specification
- metadata statements for all sourced information (a metadata statement template is included in Appendix A)
- one electronic copy of the submitted project as per the requirements outlined in Section 8

The project should be presented as if it would be given to an authority for approval and for a contractor who is tendering on the project. Plans should be at an appropriate size and scale to be legible.

### 8.3 Urban Cadastral Project

A specific requirement is that a candidate for the urban cadastral project must have obtained at least 52 weeks of cadastral experience at the time of applying for the examination.

The project must demonstrate a candidate's competence to undertake urban cadastral surveys that exhibit a significant degree of difficulty.

A very large component of the practice of surveying is related to cadastral surveying and in particular those aspects involved with the definition of land boundaries. It is essential that professional surveyors, registered to undertake boundary survey work, have a thorough understanding and knowledge of the requirements.

The candidate may submit a portfolio of work, rather than a single plan, to demonstrate an acceptable level of competence. The plans must be suitable for lodgement at NSW LRS. At least one plan presented must show a boundary obstructed by buildings/walls or other obstruction so that it is not possible to define or redefine the boundary by direct measurement. If the survey involves a party wall, the candidate must survey the relationship of both sides of the party wall to the surveyed boundary. The measurements relied upon are to confirm the direction and width of that wall throughout its length.

At least one boundary shown in the Urban Cadastral Project must be based on two or more deposited plans. The candidate must also present an identification survey.

#### Competencies

Candidates must demonstrate competence in the following topics amongst other things:

- Land ownership
  - Old System and Torrens Title
  - use and interpretation of cadastral information tools and data sources (e.g. SIX, CRE, DCDB, charting maps), title search and current title rights and interests in land (including creation and types)
  - notations on title and their meaning
  - plan search and other survey records on public record
- Boundary definition
  - roads – their alignment and widths
  - principles of boundary definition
  - hierarchy
  - field notes
  - identification survey
- Legislation
  - consents – railway, council, maritime, etc
  - Acts and Regulations – marking requirements, survey orientation (SCIMS) and street addressing
  - lease plans
  - party walls and their creation
  - adverse possession
  - possessory title
  - *Encroachment of Buildings Act 1922*
  - instrument calibration including analysis
  - *Work Health and Safety Act 2011*

- Spatial information competencies as may be related to urban cadastral
  - spatial information on the plan
  - ePlan (Tiff)
  - EPlan (LandXML)
    - upon application to sit the urban cadastral exam candidates will be provided with a basic subdivision/consolidation DP. They must create a compliant LandXML file from the information provided that passes validation and produces a rendered image
    - for candidates that do not have access to LandXML software the Board has made arrangements with software providers for access to education/evaluation licences
    - access can be arranged by the Board for candidates who do not have access to NSW LRS validation tool when they make application to the Board to undertake this assessment

Note: Candidates who prepare their urban cadastral project using LandXML do not need to complete the BOSSI supplied LXML project. But must provide the required deliverables based on their project.

## Deliverables

For the Urban Cadastral examination candidates must present:

- one full, correct scale copy of final urban cadastral plan
- two A3 size copies of final urban cadastral plan
- original field notes signed and dated
- calculation sheet
- one complete set of searches including relevant CRE, titles, deeds, dealings, plans, etc. properly organised (note that the examiners may want to keep some or all of this information for their records)
- completed Surveyor General's DP Checklist and NSW LRS DP Checklist
- proof of equipment calibration, including measurements and reductions
- identification report and sketch for either the property surveyed as part of urban cadastral project or some other property, including relevant title, base plans and field notes
- evidence of compliance with the *Work Health and Safety Act 2011* for the survey work undertaken (for example, a Safe Work Method Statement)
- photographs and aerial imagery of the site if possible
- print out of the created LandXML file, validation report and rendered image
- one electronic copy of the submitted project as per the requirements outlined in Section 9

Survey plans presented must be suitable for lodgement at NSW LRS for registration. All survey work must comply with the current Surveying and Spatial Information Regulation.

## 8.4 Rural Cadastral Project

A specific requirement is that a candidate for the rural cadastral projects must have obtained at least 52 weeks of cadastral experience at the time of applying for the examination.

The project must demonstrate a candidate's competence to undertake rural cadastral surveys that exhibit a significant degree of difficulty.

A very large component of the practice of surveying is related to cadastral surveying and in particular those aspects involved with the definition of land boundaries. It is essential that professional surveyors, registered to undertake boundary survey work, have a thorough understanding and knowledge of the requirements.

The survey presented in the project shall:

- Be located in a rural environment on land that is zoned RU1 or RU2 under the relevant LEP
- Be a minimum area of 20 hectares unless a variation is approved in writing by the Board.
- Be bound in part by an irregular road, railway or other irregular strip of land having at least three substantial changes in bearing, or an irregular watercourse or other similar natural feature which forms an existing boundary or have formed a previous boundary that is now consolidated. The survey methodology adopted to re-establish this boundary must include appropriate independent checks.
- Be based on a pre-1975 plan of survey (pre EDM) and in an area where there are few or no recent registered surveys, except where the survey demonstrates conflicting alignments/adoptions between the registered surveys and/or with the project survey, resulting in a Rural Cadastral Project of increased difficulty.
- Must have at least one right line boundary re-defined by the investigation of more than one Plan of Survey

### Competencies

Candidates must demonstrate competence in the following topics amongst other things:

- Land ownership
  - Old System and Torrens Title
  - use and interpretation of cadastral information tools and data sources (e.g. SIX, CRE, DCDB, charting maps)
  - title search, current title and crown grants
  - rights and interests in land
  - notations on title and their meaning
  - plan search and other survey records on public record
- Boundary definition
  - principles of boundary definition
  - hierarchy
  - historical methods and techniques
  - field notes
  - road alignments – Act IV William IV No. 11 1883, crown roads, reserved road, opening and closing of roads
  - tidal boundaries – Mean High Water Mark, accretion and erosion, Coastal Protection Act 1979, natural features sourced by SI methods
  - non tidal boundaries – banks, ad medium filum aqua or viae, natural features sourced by SI methods
  - application of Global Navigation Satellite System (GNSS) for rural surveys

- Legislation
  - consents – railway, council, Crown Lands, etc
  - Acts and Regulations – marking requirements, survey orientation (SCIMS) and street addressing
  - Easements – creation and types
  - instrument calibration including analysis
  - Work Health and Safety Act 2011
- Spatial information competencies as may be related to rural cadastral
  - Use and recording of imagery as an evidentiary tool

## Deliverables

For the Rural Cadastral examination candidates must present:

- one full, correct scale copy of final cadastral plan
- two A3 size copies of final rural cadastral plan
- original field notes signed and dated
- calculation sheet
- complete set of search including relevant Parish map, titles, deeds, dealings, plans, etc.
- Surveyor General's DP Checklist and NSW LRS DP Checklist
- proof of equipment calibration, including measurements and reductions
- evidence of compliance with the *Work Health and Safety Act 2011* for the survey work undertaken (for example, a Safe Work Method Statement)
- photographs and aerial imagery of the site if possible
- one electronic copy of the submitted project as per the requirements outlined in Section 9

Survey plans presented must be suitable for lodgement at NSW LRS for registration. All survey work must comply with the current Surveying and Spatial Information Regulation.

## 8.5 Strata and Community Title Project

A specific requirement is that a candidate for the strata/community title project must have obtained at least 52 weeks of cadastral experience at the time of applying for the examination.

The project must demonstrate a candidate's competence to undertake strata and community title surveys with a significant degree of difficulty.

As there is an increase to the density of urban living the provision of developments containing multiple titles and joint ownership of shared facilities is becoming more common. The subdivision of these developments can be either through the Strata or Community Title legislation. It is essential that professional surveyors, registered to undertake boundary survey work, have a thorough understanding and knowledge of the requirements.

The survey plan presented shall:

- include the creation of a minimum of 2 strata lots and common property
- the strata lots must include external courtyards as part of the lot

## Competencies

Candidates must demonstrate competence in the following topics amongst other things:

- Strata Schemes
  - Base title and plan requirements
  - Structures and buildings that can be strata subdivided
  - Types of strata plans
  - Unit entitlement, initial period
  - By laws
  - Common property
  - Utility lots
- Legislation
  - Acts/Regulations
  - Consents for subdivision
  - Signatures on plan
  - Encroachments
  - Easements – existing and new
  - Pre-1974 boundaries
  - Termination of strata schemes
- Strata Plan Boundaries
  - Preparation of location plan and floor plan
  - Structural boundaries
  - Line boundaries
  - Stratum statements
- Staged Strata Scheme
  - Plan preparation
  - Strata development contract
- Part Strata Development
  - Stratum plan
  - Management Statements
  - Easements
- Community Schemes
  - Types of Community plans
  - Components of the plan
  - Plan preparation
  - Approved forms – Management Statements, Development Contract
- Spatial information competencies as may be related to Strata and Community Titles
  - Use and recording of imagery as an evidentiary tool

## Deliverables

For the Strata and Community Title examination candidates must present:

- two full, correct scale copies of final strata or community title plan
- title search, together with any associated instruments
- original field notes signed and dated
- copy of base plan defining the parcel boundaries
- copy of the base strata plan if subdividing lots and/or common property in an existing strata

- NSW LRS strata plan lodgement checklist
- copy of council's letter of determination if available and/or applicable
- copy of architectural plans if available
- photographs of the site and the building if possible
- one electronic copy of the submitted project as per the requirements outlined in Section 9

Survey plans will be presented as if they were to be lodged with NSW LRS for registration. All field work must comply with the current Surveying and Spatial Information Regulation.

## 9. Board examinations for mining surveying

The Board examinations for a mining surveying candidate are;

- a) Completion of the approved projects for mining surveying, wherein the work displayed must comply with current legislation
- b) A written examination (2 hours) wherein the candidate will be required to demonstrate a knowledge and understanding of the relevant legislation as it applies to the mining surveyor
- c) An oral examination to demonstrate competency in mining surveying. This examination can only be attempted once a candidate has been deemed competent in all other examinations.

In the case where a currently registered mining surveyor has a restriction on their registration, either limiting activity to open cut, underground coal, underground metalliferous or any combination of the areas, an oral assessment will be required to be successfully completed to have the area of restriction removed from their registration.

## 10. Approved projects for mining surveying

The approved projects consist of:

- Mining surveys, formal mine survey plans and archival research project, and
- Design and survey of engineering works project, and
- Mine planning and mining approvals project

Projects can be attempted in one session or at separate sessions and must comply with current appropriate legislation at the time of assessment.

### 10.1 Mining surveys, formal mine survey plans and archival research project

A specific requirement is that a candidate for the mining surveys, formal mine survey plans and archival research project must have obtained at least 104 weeks of recognised practical experience in mining at the time of applying for the examination.

The project submission shall comprise of;

- a) A work portfolio which demonstrates knowledge and competency in mining surveying. The work portfolio must comprise the candidate's own work and all work must comply with current legislation requirements. If necessary for the purpose of survey definition, surveys by other surveyors may be shown but must be clearly identified and endorsed.

The portfolio must contain the following:

- a mine workings plan shall be produced by the candidate derived from surveys and calculations undertaken by the candidate and
  - for mine workings depicted for any surface mine or underground coal mine shall have an area greater than 7.5 hectares and
  - for mine workings depicted for any metalliferous underground mine an area less than 7.5 hectares may be approved by the Board upon application
- b) Mine workings spatial information and metadata statement shall be produced by the candidate derived from surveys, research and calculations undertaken by the candidate.
- c) A primary control traverse required for the preparation of the mine workings plan component of the project must include the survey of a minimum of six survey stations. This primary control traverse must demonstrate primary control traversing skills that are common to both surface and underground traversing techniques and requirements.
- d) A comprehensive written report detailing and describing all field results, calculations, mine workings plan preparation and Mine Workings Spatial Information data preparation. Electronic field notes and observations must be supported with documentation describing the underlying electronic process and procedures used in the verification of the field observations. Documentation and reduction calculations of the instrument accuracy testing of all survey instruments used in the preparation of the mine survey and formal Mine Plan Project must be included.
- e) A comprehensive written report detailing an archival research undertaken by the candidate. This archival research shall be completed in relation to any abandoned or suspected abandoned mining areas.

## **10.2 Design and survey of engineering work project**

The project submission shall comprise of a portfolio of the candidate's work. This portfolio will include all surveys, calculations, Safe Work Method Statements and preparation of survey plan data and engineering drawings associated with two of the following;

- Major water management structure or water reticulation scheme
- Major surface infrastructure
- Realignment and re-grading of an existing conveyor belt installation (minimum 500m)
- Major loop take up installation
- Shaft or drift installation
- Haul road design including associated water management
- Major surface rehabilitation

The candidate will be required through the documentation for the project and the oral examination to demonstrate an understanding of design techniques, safety work principles (including a safe work method statement), preparation of survey and engineering plans/data and general principles that relate to the design and survey of engineering works.

### **10.3 Planning and mining approval project**

The project submission shall comprise a portfolio addressing the following and should have a working mine as a case study;

- a) A comprehensive report analysing the interaction between valid development consents and mining leases. The report should include a detailed reference to the granting and maintenance of development consents and mining leases, and
- b) A comprehensive report analysing the Mine Operations Plan (MOP) process and development, and
- c) A comprehensive report using one of the following mine approval processes;
  - application and approval for an emplacement area or
  - application and approval to mine by method other than board and pillar or
  - extraction Plan/ Subsidence Management Plan application and approval, or
  - Annual Review, previously an Annual Environmental Management Report (AEMR)

## Appendix A – Metadata statement template

<b>Metadata Statement</b>		
<b>Category</b>	<b>Element</b>	<b>Definition</b>
Data	Data name (user input)	data file name. (user input)
Data representation	Data Type	(user input) e.g. Vector (points, lines, polygons) Raster (images or photographs) Table (text)
Reference	Reference Number	(user input)
Custodian	Name and Address	The name and address of the Company and point of contact details. (user input)
Description	Abstract	Brief summary description of the content of the data. (user input)
Data Currency	Date of First Version	When the data was first created. (user input)
	Date of this Version	Date of this version of the data. (user input)
Data Status	Progress	The status of the process of data creation. (user input) e.g. Completed Historical/Archive Obsolete Ongoing Planned Required Under development

<b>Metadata Statement</b>		
<b>Category</b>	<b>Element</b>	<b>Definition</b>
	Maintenance and update frequency	Frequency of changes or additions made to the data. (user input) e.g. continual daily weekly monthly as needed irregular not planned unknown
Access	Stored data format	The format in which the data is stored by the Surveyor. (user input) e.g. AutoCAD Drawing Exchange Format (DXF) AutoCAD Drawing File (DWG) Shapefile (SHP) ArcInfo Coverage
	Available format type	The format in which the data is available. (user input)
	Access constraints	Restrictions or legal prerequisites that may apply to the access and use of the data including licensing, liability, and copyright. (user input)

<b>Metadata Statement</b>		
<b>Category</b>	<b>Element</b>	<b>Definition</b>
Data Quality	Lineage	A brief history of the source or production the data. (user input)
	Positional Accuracy	A brief assessment of the closeness of the location of objects in the data in relation to their true position on the Earth.
	Attribute Accuracy	Should contain a brief assessment of the attribute accuracy of the data i.e. how reliable the attribute values of the data are compared to what they represent in the real world.
	Logical Consistency	A brief description of the degree of adherence of logical rules of data structure, attribution, and relationships. (user input)
	Completeness	An assessment of the extent and range in regard to completeness of coverage, attributions and verification. (user input)
Miscellaneous	Source Pathname:	Data location. This not required for submission but may support internal data management.
Projection:	Name:	Map Grid Australia (MGA 94)
	Zone: Units: Datum: Ellipsoid:	MGA [zone] (user input) Metres Geocentric Datum of Australia 1994 (GDA94) Geocentric Datum of Australia 2020 (GDA2020) GRS80
Metadata date	Metadata date	Date on which the metadata record was created or modified. (user input)

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## Appendix B – Spatial Information Competencies

The following Spatial Information (SI) competencies have been developed to ensure that surveying candidates have a basic understanding of some of the principals and issues in SI.

### **SI competency 1: Demonstrated ability to identify and source spatial information from point of truth sources for inclusion in survey information output**

It is expected that a candidate would have a good understanding of:

- whether specific data is needed for the project and the most appropriate organisation from which it might be sourced from, with a particular focus on obtaining data from relevant local government, state agencies, etc. with an understanding of issues relating to ‘free’ data versus data which may be ‘commercial’
- how useful metadata can be to identify why a particular spatial information dataset is the most appropriate for their project, as well as to have an understanding of the various metadata standards in use by the SI industry
- the ‘point-of-truth’ of the data source, particularly in cases where the same dataset may be available from multiple sources at varying levels of quality, completeness, etc.
- how spatial information can be collected and provided by professionals who may be from non-surveying disciplines
- the difference between primary and secondary data sources and how data may have been manipulated by intermediate organisations before it was used by the candidate
- issues that a user should be aware of when requesting spatial information from an organisation, particularly relating to digital data formats
- issues relating to licensing and copyright for spatial information sourced from another organisation and how that may restrict or enhance the usage of the data

### **SI competency 2: Demonstrated understanding of the ‘fitness-for-purpose’ of datasets incorporated into submitted projects**

It is expected that a candidate would be able to demonstrate their evaluation of whether a spatial dataset is fit for the purpose to which it is intended to be used on their project. This should include providing documentation of relevant metadata, licensing and terms-of-use conditions, as well as:

- where the data was created
- whether there are any copyright or licensing issues relating to the use of this data
- how the data was created and how positionally accurate the data may be
- how the data relates to the project objectives regarding such issues as scale, data model, format, projection, etc.
- the currency of the data and whether it is still maintained
- the geographic extent of the data as it may relate to the project

### **SI competency 3: Demonstrated understanding of the spatial data flow through a project / survey plan lifecycle**

This competency relates to the acquisition of the data, the synthesis and modelling of that data into your project, the analysis and management of that data in relation with other project data and the publication of that data to the intended user. This also includes the preservation of topology and attribution during these processes as well as an understanding of the error propagation from the previous translation and transformation activities.

The candidate should have a good understanding of:

- the adequacy of the data and how it was sourced for the project
- the agencies and organisations that were contacted when the data was acquired and whether there were any limitations advised with the use of the data
- the use of the various data sources in the project and whether they are all spatial (and overlaid graphically) or whether data is being interpreted from written reports which describe location-based objects and data
- the interpretation of any subjective data, such as aboriginal cultural heritage items, and the impact of this interpretation on the project
- the use of data which may be derived from analytical models, such as hydraulic modelling of flood extents, and the issues which need to be investigated to determine if the outcomes are realistic for your project
- whether the data has been ground-truthed and if so, by whom and which method
- the methodology required to combine data sets from various sources at various scales, currency, accuracy, etc. and the impact that this may have on your project
- acknowledgement of the data sets used, their source and limitations and the impact of the final presentation in outcomes such as the Statement of Environmental Effects report

### **SI competency 4: Ability to interpret controlled vocabularies across spatial information systems relevant to survey information output**

This competency particularly relates to cross-discipline issues which may occur with professionals in industries such as environment, heritage, planning, transportation, emergency management, etc.

The candidate should have a good understanding of:

- some of the issues relating to the effective communication of SI issues with clients and other professionals who are not surveyors, particularly to ensure that there is a commonality of understanding on issues relating to the data and use of that data
- the effective interpretation of metadata from spatial information layers prepared by other professionals and the relevance of an included spatial dataset in a project, with reference to the source data's metadata record
- the operation of the various ePlan, EPlan and ePlanning frameworks in operations in New South Wales (NSW) such that a candidate can understand the difference between a plan, a LandXML file and a spatial information dataset and
- the reason why key spatial information layers, themes, objects, symbology were included or excluded in the project using appropriate terminology

### **SI competency 5: Demonstrated understanding of the NSW Spatial Information Management Framework as would be relevant to a NSW Registered Surveyor**

The NSW Information Management Framework is based on national initiatives such as those undertaken by ANZLIC and ICSM whose initiatives include the Australian Standard for Spatial Data Accuracy, Standards and Practices for Control Surveys, Cadastre 2034, the GDA2020 Technical Manual and other documents.

The candidate should have a good understanding of:

- the current NSW Information Management Framework as it applies to spatial information and may be relevant to NSW land and mining survey practices
- the appropriate principles, policies and guidelines contained within that framework and as may apply to metadata, custodianship, intellectual property, access and licensing, data standards, copyright, governance, etc.
- metadata discovery tools, such as the ANZLIC metadata tool
- understanding of the 10 themes of the foundation spatial data and the relevance of that to survey related projects and activities
- the NSW Spatial Data Directory and how that may be used to source data
- other online sources of data using custodians licensing and intellectual property terms and conditions

### **SI competency 6: Demonstrated understanding of the issues associated with changes to various digital cadastral databases on lodgement of deposited plans (DPs)**

There are a number of digital cadastral databases (DCDB's) in use in NSW, some of which are based on survey data while others are based upon varying cadastral data which may have originally been digitised from cadastral maps or acquired by other means.

While many of these DCDB's are used for administrative purposes, over the past several decades a number of DCDB's have been progressively used to manage a range of planning, environmental and asset data for a wide variety of business applications, typically requiring integration of spatial data with data from other systems (e.g. asset data, planning instruments, etc.). Often this requires a correlation of the data models and methodologies between the DCDB data environments and those from other related systems.

Nevertheless, the issues associated with the various digital cadastral databases in NSW are complex and difficult, often associated with substantial business process issues within each host department, utility or council.

It is expected that the candidate will have a working knowledge of how the cadastral data produced from an urban or rural survey may be used and managed in a digital cadastre, particularly when it may be in conflict with other digital cadastral data. This will require that the candidate have a good understanding of:

- some of the processes (and constraints) that could be used to 'blend' different digital cadastral databases and how they may be managed
- some of the issues associated with the collection and update of an agency's digital cadastre
- the use of metadata to ensure that data integrity is maintained, or at least not degraded
- why the business processes of council's and utilities are important for maintaining their own digital cadastral databases
- how LandXML EPlan works and how it will impact on and / or improve the quality of various digital cadastral datasets in use in NSW

- ideally the lodgement by the candidate of a DP through the SIX ePlan lodgement portal with attendant documentation
- how EPlan will impact on the management of various digital cadastres and provide a higher level of coordination between different users of the DCDB
- how different other digital cadastres could affect this project