



Regulatory Impact Statement

Surveying and Spatial Information Regulation 2017

A Regulation under the
Surveying and Spatial Information Act 2002



Spatial
Services

Submissions accepted until: **Friday 21st July 2017**

Forward all submissions to:

E-Mail: SS-CMU@finance.nsw.gov.au

Mail: Surveying and Spatial Information Regulation 2017
Office of the Surveyor-General
DFSI Spatial Services
PO Box 143
Bathurst, NSW, 2795

Online questionnaire: go to: www.surveymonkey.com/r/SSIR2017

Title: Regulatory Impact Statement -Surveying and Spatial Information Regulation 2017

Published by

Spatial Services
A Unit of the Department of Finance, Services and Innovation
PO Box 143
BATHURST NSW 2795
Tel: (02) 6332 8410

www.spatialservices.finance.nsw.gov.au/

Disclaimer

This publication avoids the use of legal language, with information about the law summarised or expressed in general statements. The information in this document should not be relied upon as a substitute for professional legal advice.

For access to legislation in force in NSW go to the official NSW Government website for online publication of legislation at www.legislation.nsw.gov.au.

Copyright 

© Crown in right of New South Wales through DFSI Spatial Services, 2017.

This copyright work is licensed under a Creative Commons Australia Attribution 4.0 licence,

<http://creativecommons.org/licenses/by-nd/4.0/au/>

Any enquiries relating to the policy may be addressed to DFSI Spatial Services

E: SS-CMU@finance.nsw.gov.au

Author: DFSI Spatial Services

Important: For full details, see Department of Finance, Services and Innovation's copyright policy at www.finance.nsw.gov.au/copyright or

email: publications@finance.nsw.gov.au

Spatial Services (B) P17/10/012

Contents

1. Introduction	1
1.1 Title and proponents of the proposed Regulation	1
1.2 Why is the proposed Regulation being made?	1
1.3 Status of the proposed Regulation.....	1
2. Legislative background	1
2.1 <i>Surveying and Spatial Information Act 2002</i>	1
3. Objectives of the proposed Regulation	2
4. Assessment of options to achieve objectives.....	2
4.1 Remake the current Regulation	2
4.2 Code of Practice.....	4
4.3 Allow the Regulation to lapse.....	4
5. Summary of main differences between the current and proposed Regulations	5
6. Impact assessment of the proposed Regulation.....	21
6.1 Part 1 Preliminary	21
6.1.1 Objective of Part.....	21
6.1.2 Overview of provisions.....	21
6.1.3 Proposed amendments.....	21
6.1.4 Assessment of costs and benefits of proposed amendments	21
6.2 Part 2 Survey Practice.....	22
6.2.1 Division 1 General duties of surveyor.....	22
6.2.2 Division 2 Adoption of datum lines and bench marks.....	22
6.2.3 Division 3 Measurement and calculations	25
6.2.4 Division 4 Use of survey marks and monuments	27
6.2.5 Division 5 Boundaries formed by tidal & non-tidal waters and other natural features.....	29
6.2.6 Division 6 Field notes.....	29
6.2.7 Division 7 Survey plans	30
6.2.8 Division 8 Public surveys.....	37

6.3	Part 3 Administration	38
6.3.1	Division 1 Constitution of Board	38
6.4	Part 4 Miscellaneous	38
6.4.1	Objective of Part	38
6.4.2	Overview of provisions	39
6.4.3	Proposed amendments	39
6.4.4	Assessment of costs and benefits of proposed amendments	42
7.	Consultation.....	43
7.1	Presentations.....	43
7.2	Questionnaire.....	43
7.3	Circulation of the public consultation draft Regulation and RIS	43
7.4	Making a submission.....	44
8.	Appendices	45
8.1	Appendix A - Approved GNSS validation schedule	46
8.2	Appendix B - Approved height difference schedule.....	46
8.3	Appendix C - Approved MGA coordinate schedule	47
8.4	Appendix D - Approved height schedule.....	48

1. Introduction

1.1 Title and proponents of the proposed Regulation

The *Surveying and Spatial Information Regulation 2017* ('the proposed Regulation'), a Regulation under the *Surveying and Spatial Information Act 2002* ('the Act'), has been developed by the Office of the Surveyor-General within DFSI Spatial Services and the Office of the Registrar-General, both being units of the Department of Finance, Services and Innovation. The Act and the *Surveying and Spatial Information Regulation 2012* ('the current Regulation') are administered by the Minister for Finance, Services and Property, except those parts so far as they relate to the registration of surveyors which the Minister for Innovation and Better Regulation is responsible for. The Minister for Finance, Services and Property, the Hon. Victor Dominello, MP and the Minister for Innovation and Better Regulation, the Hon. Matt Kean MP are proposing the remake of the current Regulation.

1.2 Why is the proposed Regulation being made?

As part of the state government's commitment to review regulations every 5 years to ensure they remain relevant, the proposed Regulation will replace the current Regulation on 1st September 2017. The current Regulation has been closely monitored since the last remake was made and extensive industry consultation has been undertaken to ensure that the proposed Regulation remains relevant and its objectives achievable.

1.3 Status of the proposed Regulation

The attached proposed Regulation is a draft. It has been released with this Regulatory Impact Statement so that interested parties can review and provide comment and suggestions. Submissions received will be considered and may result in amendments to the proposed Regulation. The proposed Regulation will be finalised and published on the NSW Legislation website to enable it to commence on 1st September 2017.

2. Legislative background

2.1 *Surveying and Spatial Information Act 2002*

The *Surveying and Spatial Information Act 2002* incorporates all aspects of the regulation and oversight of land and mining surveys in NSW. The major objectives of the Act are to:

- ensure competent surveyors provide the public professional survey services; and
- ensure the maintenance and on-going development of the State control survey and State cadastre, which provide a reliable and accurate spatial referencing system underpinning surveying, spatial information and mapping systems in NSW.

To achieve these objectives the Act requires that surveyors must be registered and must comply with minimum standards of education. The Act establishes the Board of Surveying and Spatial Information ('the Board') to oversee the competency and registration of surveyors, set professional education requirements and conduct disciplinary investigations to ensure consistency and quality in the delivery of survey services.

In addition, the Act enables the Surveyor-General to establish permanent survey marks throughout the state. To foster effective State control survey co-ordination, all surveys made by or on behalf of a public authority are to be carried out to a high standard and are to be made by reference to state legislated datums.

The current Regulation sets the standards for surveying of the cadastral boundaries that comprise the State cadastre. The standards relate to the accuracy of measurements, the calibration of equipment, connection to state legislated datums (the Geocentric Datum of Australia 1994 (GDA94) and/or the Australian Height Datum 1971 (AHD71)), the marking of surveys and preparation of the plan of survey. Maintaining the standards assures the competency of surveyors and allows cadastral boundaries to be traceable and reliable.

3. Objectives of the proposed Regulation

The objectives of the proposed *Surveying and Spatial Information Regulation 2017* are to:

- Facilitate the implementation, maintenance and management of cadastral survey standards under the Act.
- Ensure the accuracy and integrity of the State cadastre and State control survey to assure public confidence in the land title and mapping systems in New South Wales.
- Enable the public to readily and confidently identify the location and extent of all rights, restrictions and responsibilities related to land and real property.
- Enablement of digital government, digital business, the Property Development Pipeline and E-Plan automation by centralising information on plans of survey.
- Greater enablement and integration of positioning with GDA94 and AHD71.
- Cater for evolving technologies, such as Global Navigation Satellite Systems (GNSS) and Continuously Operating Reference Stations (CORS).
- Enhance the standards of survey accuracy required for greater protection of the public and facilitation of database integration.
- Ensure uniform outcomes for the marking of surveys.
- Encourage standardised forms and styles for all survey marks to facilitate electronic lodgement and examination of surveys.

4. Assessment of options to achieve objectives

4.1 Remake the current Regulation

The proposed Regulation offers the best solution to guarantee a rigorous land titles and tenure system based upon reliable surveys. It ensures sound surveying practices are used while enabling flexibility to adopt and adapt new technologies to achieve the same or better results.

Central to the integrity of survey information in New South Wales are the State cadastre and State control survey, networks that spatially identify the parcels within the Torrens land title system as well as numerous other spatial information systems. There is a recognised need for an accepted set of technical standards and specifications for horizontal and vertical control surveys to ensure the spatial integrity of the State cadastre and State control survey.

Adherence to a reliable set of standards for the State cadastre and State control survey provides significant savings, both at the local level and, more broadly, for the community. Each time that a cadastral survey is undertaken the surveyor must investigate the existing boundaries and relate them to adjoining boundaries, monuments and the State control survey.

All survey information required before undertaking a cadastral survey is held on public record, generally at Land and Property Information. The Regulation supports the process where new survey information is added to existing information on land parcels and stored on public record available for future use. This system ensures the verification of property boundaries when original survey marks are lost or destroyed and ensures that surveyors take due regard for the property rights of adjoining owners, as evidenced in previous plans of survey.

The State control survey provides a high degree of spatial accuracy and integrity for all surveys and can be used to check results. The State control survey is a network of permanent survey marks of standard form being points of known horizontal position and/or height throughout the

state. This network is essential if information held in government and private spatial information systems is to be compatible. It provides the foundation for the integration of all spatial information. The horizontal positions and heights of marks comprising the State control survey, along with their respective metadata attributes (mark type, accuracy etc.) are stored and delivered to the industry and public by the Survey Control Information Management System (SCIMS), rigorously maintained to known standards by the Surveyor-General.

This enables surveyors to use the State control survey confidently, knowing that the information held has been captured using proven survey techniques, adjusted and classified according to the accuracy of results. Where the State control survey has been extended to a locality, the surveyor will be able to use that information and build onto the network. The provision of height control is very important for engineering works in all developments, particularly for water, sewerage and drainage design and other public infrastructure.

Avoiding duplication of surveys has a direct economic advantage. The State control survey has approximately 250,000 survey marks forming a network that covers the entire state. This network provides a foundation layer for all spatial information systems. It ensures that all measurements and dimensions are compatible and there is a spatial relationship for all boundary information. The proposed Regulation emphasises the use of the network and ensures that additional information regarding growth of the network is recorded on the public record. This is designed to eliminate the duplication of effort for placing permanent marks. Subsequent surveys using the network should be cheaper.

By using a land tenure system that is based upon survey for all parcels, high levels of consumer confidence are attained and greater efficiencies from using new technologies can be achieved. A system of land parcel boundaries, the State cadastre, based upon a State control survey provides a significant cost saving through the minimisation of fieldwork necessary for boundary reinstatement.

In the absence of the proposed Regulation, it could be expected that disputes would arise from poorly or incorrectly marked boundaries. Even if the level of disputes rose to twice or three times that of the present number, this would unjustifiably add substantial costs to the community.

Without the proposed Regulation, a surveyor and many other users of survey information may have great difficulty relying on work performed by other surveyors. This would result in the duplication of effort because poor survey standards would not enable new surveys to build upon previous surveys. Additional time would be spent both in the field measuring and marking surveys, and in the office computing and comparing that data, adding significant cost to the client.

In light of the above, the proposed Regulation offers the best option. It ensures that recognised standards are maintained and enforced, which is crucial to the integrity of the Torrens title system and to maintain stakeholder and community confidence. The proposed Regulation makes certain that sound surveying practices are used while retaining sufficient flexibility to adapt to new technologies as they are introduced.

It is clear from the respondents to the questionnaire regarding the proposed Regulation that the industry supports a Regulation governing surveying and spatial information. Comments in this questionnaire from the industry are emphatic in their support of the Regulation, with one respondent's comment being: *"The framework of surveying could otherwise be reduced to the quality of other non-regulated professions."*

As at 19th May 2017, in the questionnaire regarding the proposed Regulation, of 182 industry respondents to the question "Should there be a Regulation governing Surveying and Spatial Information?", 96% answered "Yes".

4.2 Code of Practice

An alternative to statutory regulation would be an industry Code of Practice administered by either the existing Board or an existing industry group, such as the Institution of Surveyors NSW Inc. A Code of Practice would incorporate matters dealt with in the proposed Regulation. However, it would be a voluntary code with no compulsion to adopt and would therefore be difficult to enforce. Unless all surveyors agreed to adopt a voluntary Code of Practice there would be a decline in the integrity of the land tenure system and an increase in problems, litigation and loss of confidence in the Torrens title system, which is guaranteed by the state government.

The standards for the knowledge base and professionalism would still be set by a body, presumably the Board, before the granting of Certificates of Competency and registration as a surveyor. The Board would rely on the Surveyor-General's Directions, the Registrar-General's Directions and a Code of Practice to provide a guide for acceptable survey practice.

To give a Code of Practice the power of enforcement by the Board, amendments to the Act would be necessary. Some criteria for determining the accuracy of surveys would need to be set before the Board could determine a survey as "failing to comply". In effect, standards equating to those imposed by the proposed Regulation would need to be developed and maintained.

The difficulty of enforcing a voluntary code would lead to a gradual decline in standards, eventually eroding the integrity that has been built up in the State cadastre and State control survey over many years.

Adopting a Code of Practice would rely on the ability of the administering body to place the protection and benefit of the public and public interests ahead of the interests of individual surveyors, individual businesses or the relevant administering body.

Rather than providing savings and efficiencies, reliance on a Code of Practice would prove to be more costly both to the state government and the public. Survey costs would rise, as less reliance could be placed on surveys prepared

under a Code of Practice. More significantly, the public would bear substantial and unreasonable costs due to the gradual decay of the State cadastre and the State control survey that underpin the Torrens title system.

This option is not considered viable.

4.3 Allow the Regulation to lapse

Generally speaking, in a deregulated industry, all outcomes from survey activities would be prearranged between the surveyor and their client, based on cost and the level of service required. The success of this model relies on the consumer knowing what services to expect and demanding that the surveyor provide them. Often, consumers of survey services do not fully appreciate the various levels of services available or appreciate those services that are required to provide fully functioning property, development and spatial information industries.

In a deregulated environment, penalties for non-compliance would not exist as there would be no minimum standards for compliance. The Torrens title system of land tenure in New South Wales relies on every title being based upon an accurate plan of survey. Having confidence and security in the land tenure system is a fundamental prerequisite to economic development. If standards for cadastral survey services are not set, the future economic development of New South Wales may be impeded or jeopardised.

In a deregulated environment, surveys could be prepared for individuals without consideration of the community good. There would be no incentive to place survey marks, tie surveys into the State control survey, or uphold the integrity of the State cadastre, leading to their rapid decline. Boundary disputes would proliferate as surveys would be prepared without due regard to the interests of adjoining property owners, in turn giving rise to increased legal actions, placing the judicial system under increased load and delaying infrastructure development.

This option is not considered to be viable.

5. Summary of main differences between the current and proposed Regulations

The proposed Regulation remakes the current Regulation with a number of changes aimed at meeting the objectives outlined in Section 3 above. In some cases the format of the current Regulation has been changed to provide a more logical sequence and grouping of clauses. A summary of the proposed changes is set out below.

Current Regulation	Proposed Regulation	Reason for Change
4 Mining surveys	References to legislation updated to correspond with current legislation	Updated to include references to current orders issued by the Surveyor-General and to remove references to repealed orders.
5 Definitions		
<i>Accurate AHD value</i>	Amended to be an AHD value in SCIMS equal to or better than Class "B" or Class "LD".	Amended for clarity; the addition of the "in SCIMS" qualifier has been added so that there is only one single source of truth for accurate height values within NSW.
<i>Accurate MGA orientation</i>	New definition to define an orientation adopted from the Map Grid of Australia (MGA) co-ordinates of either: (a) 2 established survey marks, or (b) 2 permanent survey marks or reference marks, determined using an approved Global Navigation Satellite System (GNSS) method to an accuracy of Class "D" or better.	Definition included to simplify Clause 70. Because the proposed Regulation makes reference to 'accurate MGA orientation' a definition of it is required.
<i>Established survey mark</i>	Amended to Class "D".	To enable more Deposited Plans to be placed on MGA while retaining the integrity required for easy integration within the Foundation Spatial Data Framework; it is an enabler for digital government and network propagation.
<i>Reference station</i>	Amended to Class "D".	To correspond with the relaxing of the class of established survey marks.
<i>Positional uncertainty</i>	New definition to mean the uncertainty of the co-ordinates or height of a point at the 95% confidence level, with respect to the defined reference frame, as described in <i>Standards and Practices for Control Surveys (SP1)</i> .	A new definition to express part of the positioning outcomes required as part of the reforms.
<i>Road</i>	Definition expanded to include private roads within community schemes.	All appropriate marking requirements are met for land effectively used as a road.
<i>Spline</i>	New definition to mean a continuous curve constructed so as to pass through a given set of points and have continuous first and second derivatives. Note that the use of a spline refers to the graphical representation of the natural feature only (i.e. the plan drafting of the natural feature), not its legal definition. The definition of the natural feature boundary remains the feature itself, subject to the doctrine of accretion and erosion.	Commonly known as 'smooth wiggly lines' that surveyors use to graphically represent natural features on a plan. Advice from the spatial information industry indicates that a spline is considered the geometric entity best suited for the graphical representation of a natural feature boundary.
<i>Standard Instrument</i>	References the <i>Standard Instrument (Local Environmental Plans) Order 2006</i>	Used in the definition for 'urban survey', therefore must be defined.

Current Regulation	Proposed Regulation	Reason for Change
<p><i>Standards and Practices for Control Surveys</i></p> <p><i>Urban survey</i></p>	<p>New definition to reference the document entitled <i>Standards and Practices for Control Surveys</i> (SP1) Version 1.7, published by the Intergovernmental Committee on Surveying and Mapping.</p> <p>Amended definition by deleting the current definition and replacing it with zones listed in the Land Use Table in the Standard Instrument – Principal Local Environmental Plan.</p>	<p>The full description of the precise version of the document is referenced multiple times within the proposed Regulation; adding a definition and referencing the definition, rather than the full description, means that any future re-referencing of the document version requires a change in only one location (clause 5) within the proposed Regulation.</p> <p>It is not always clear if a survey has taken place in an urban area according to the current definition. The updated definition will make it easier to determine whether a surveyor is conducting an urban survey.</p>
<p>6 General principles of survey</p> <p>Clause stipulating fundamental outcomes of a survey</p>	<p>Subclause 6(d) amended to include reference marks and to change “permanent marks” to “permanent survey marks”</p>	<p>Changes to Clause 12 (Datum line) require the addition of reference marks as part of the fundamental MGA coordinate accuracy outcomes.</p> <p>The term “permanent survey marks” is the correct term for the wide ranging category of form and style of mark under Clause 27.</p>
<p>12 Datum line</p> <p>Prescribes the position of survey marks defining the datum line when a surveyor carries out a survey.</p>	<p>Clause 12 has been restructured and changes made regarding the adoption of datum lines.</p> <p>Subclause 12(2) has been changed to prescribe the adoption of a datum line for urban surveys for the following situations:</p> <ul style="list-style-type: none"> • Where the land surveyed is within 300m of two established survey marks; • Where the land surveyed is not within 300m of two established survey marks and an approved GNSS method is used; • Where the land surveyed is not within 300m of two established survey marks and an approved GNSS method is not used. <p>A new subclause 12(3) has been inserted to prescribe the adoption of a datum line for rural surveys for the following situations:</p> <ul style="list-style-type: none"> • Where the land surveyed is within 1,000 m of two established marks; • Where the land surveyed is not within 1,000 m of two established marks. <p>The rejection tolerance specified in subclause 12(6) for the verifying line has been loosened to 40 mm + 175 ppm.</p> <p>All references to astronomical observations are deleted.</p>	<p>To place as many plans as possible on an MGA orientation with MGA position. All rural surveys will be on an MGA orientation with MGA position whether via established marks or approved GNSS methods. The placing of as many surveys as possible on an MGA orientation with MGA position is an enabler of digital government and integration of position into the Foundation Spatial Data Framework. The initial desired outcome was for all plans to be placed on an MGA orientation with MGA position. Industry feedback indicated that this proposal was problematic in urban areas, where there exist significant gaps in the “established” network and GNSS usage is less prevalent.</p> <p>In the absence of established survey marks within the prescribed distances, it is reasonable to expect a survey utilising an approved GNSS method to be able to place the survey onto an MGA orientation and give the survey an accurate MGA position. A larger rejection tolerance for SCIMS established mark comparisons is required due to the relaxing of the established survey mark definition from Class “C” to Class “D”.</p> <p>The use of astronomical observations is considered obsolete and is superseded by GNSS techniques. Astronomical observations can derive orientation only. Positioning of surveys via astronomical observations does not achieve the accuracy required.</p>

Current Regulation	Proposed Regulation	Reason for Change
<p>13 Bench marks</p> <p>Imposes standards for the adoption and use of bench marks and datums.</p>	<p>References to “external” bench marks have been removed.</p> <p>Clause 13(5)(b) has been clarified.</p> <p>Clause 13(6) regarding the determination of the position of each bench mark has been moved to clause 70.</p>	<p>The stipulation of “external” bench marks is not considered necessary for the vast majority of surveys and removal improves interpretation of the clause.</p> <p>Co-ordinate, height difference and height schedules have been consolidated into one area of the proposed Regulation for ease of interpretation and clarity of purpose.</p>
<p>14 Equipment for measurement of surveys</p> <p>Clause regulating the accuracy and calibration of survey equipment.</p>	<p>Clause 14(2)(c) regarding the determination of accuracy of GNSS equipment has been altered; reference to established survey marks has been removed and replaced with reference to survey marks described in SCIMS as having horizontal positions of Class “B” or better and accurate AHD values.</p>	<p>The definition of an established survey mark has been relaxed to Class “D”. Class “D” marks are not appropriate marks for determination of accuracy of GNSS equipment, therefore the appropriate accuracy class (Class “B”) as described in SCIMS has been referenced instead of established survey marks. Marks having accurate AHD values are also required to determine the accuracy of GNSS equipment.</p>
<p>18 Surveys for affecting interests</p> <p>Sets out the requirements for surveys defining an affecting interest such as an easement or covenant.</p>	<p>Minor amendments to subclauses 18(6) and 18(7) to correct an error.</p>	<p>A drafting error at the beginning of subclause (6) as it refers to itself; it should be referring to subclause (5). This error also appears in subclause (7)</p>
<p>22 Surveys using GNSS equipment</p> <p>When making a survey using GNSS equipment a surveyor must use an approved GNSS method.</p>	<p>Added a specific reference to the Surveyor-General’s Directions.</p>	<p>Specific reference to the Surveyor-General’s Directions to ensure that surveyors are made aware of where the descriptions of approved GNSS methods are.</p>

Current Regulation	Proposed Regulation	Reason for Change
<p>23 Surveyor to check angular work and 24 Accuracy of angular measurement</p> <p>Sets out the requirements for the accuracy and checking of angular work in a survey</p>	<p>Clauses 23 (Surveyor to check angular work) and 24 (Accuracy of angular measurements) have been combined to form a new clause 23 and the restriction of the old Clause 23 as applying to surveys in which the total length of surveyed boundaries exceeds 10,000 metres has been removed.</p> <p>An accuracy of included angles has been inserted as subclause 23(5) to state that if two surveyed lines shown on the survey plan have a common vertex and those lines have bearings shown, the accuracy of the included angle must be within the tolerance of the stipulated formula. The accuracy specification is based on the existing accuracy specification of an individual length of 10mm + 50 parts per million.</p>	<p>Combining the same subject matter for clarity. The 10,000 metre restriction applying to the checking of angular work has been removed as all surveys that utilise angular measurement should be subject to checking standards.</p> <p>There is currently no minimum standard of accuracy regulating an individual angle or bearing shown on a plan. The angular misclose and parcel misclose regulations do not regulate the accuracy of individual bearings or angles shown on a plan. Individual bearings and angles shown on the plan should be accurate to a minimum standard in the same way that individual lengths need to be.</p>
<p>25 Accuracy of length measurements</p>	<p>Renumbered to Clause 24</p>	
<p>Insertion of new clause</p>	<p>New clause 25 Accuracy of relative position</p> <p>Accuracy of relative position has been inserted as Clause 25 to require that a surveyor must ensure the accuracy of the relative positions between any two surveyed points is within the tolerance of the stipulated formula. The accuracy specification is based on the existing accuracy specification of an individual length of 10mm + 50 parts per million and the proposed accuracy specification of an individual angle of 10mm + 50 parts per million.</p>	<p>Currently, the accuracy of the relative position of any two surveyed points on a plan is not regulated. The accuracy of relative positions of surveyed points on a plan is critical to the integrity of the survey as a whole (how good the integrity of the "shape" of the survey is); integration of surveys into spatial information systems at a standard expected and demanded by industry users and the public requires a specified integrity of shape as well as a position.</p>
<p>26 Checking accuracy of measurements and calculations</p> <p>26(3) & (4) currently regulate the closure of any compiled or partially compiled parcel of land.</p>	<p>Subclauses 26(3) & (4) are amended to remove references to compiled plans.</p>	<p>This requirement has no application to compiled plans. Requirements for compiled plans are matters dealt with separately by the Registrar-General as those plans don't have to be prepared by a surveyor.</p>
<p>28 Boundary marks</p> <p>Insertion of new subclause (b) in clause 28(3).</p> <p>Clause 28(3) regulates the non-marking of boundary corners.</p>	<p>Inserted as new subclause 28(3)(b) to state that if the corner that cannot be marked is within a structure, the corner does not require a reference mark to be placed and must be shown by the appropriate symbol depicted in Schedule 5 (solid circle). The old clause 28(3) remains as the new subclause 28(3)(a).</p>	<p>There are occasions where it is physically impossible to place a survey mark, such as where the boundary corner lies within the material of a structure that does not have an accessible surface. An acceptable solution is for the surveyor to depict the boundary corner on the plan of survey by a prescribed symbol to be prescribed in Schedule 5.</p>

Current Regulation	Proposed Regulation	Reason for Change
28(5)(d) – For a rural survey, unless environmental considerations dictate otherwise the boundary must be reasonably cleared, and trees must be blazed.	Amended subclause 28(5)(d) to add “unless it is unlawful to do so” as a consideration whether to clear and blaze.	To accommodate situations where it would be illegal to clear and blaze (e.g. boundary of a national park, etc). A surveyor who does not clear and blaze as required must annotate the relevant boundaries to that effect (see cl. 63(1)(h) in the proposed Regulation).
<p>29 Marking of urban surveys</p> <p>29(1) currently requires reference marks to be placed where an urban survey abuts a road.</p>	<p>Added the words “including the junction or intersection of roads” in subclause 29(1)(a).</p> <p>Minor rewording of subclause 29(1)(b) to make it clearer without changing the intent of the clause.</p>	<p>There was doubt whether the junction or intersection of a road in an urban survey is included as an extremity of the land surveyed. The amendment removes this doubt.</p>
<p>30 Marking of rural surveys</p> <p>Placement of reference marks for rural surveys.</p>	<p>Subclause 30(6) amended to clarify that reference marks are to be placed “so as to refer to the corner” they are referencing, not “at” the corner they are referencing.</p>	<p>Corrects an error in the current Regulation that requires reference marks to be placed “at” a specific boundary corner (if it were it would cease to be a reference mark and become a boundary mark).</p>
<p>31 Roads to be marked with reference marks</p> <p>Placement of reference marks for roads created, redefined or widened.</p>	<p>Amended clause 31 to clarify that reference marks are to be placed “so as to refer to the corner” they are referencing, not “at” the corner they are referencing.</p>	<p>Corrects an error in the current Regulation that requires reference marks to be placed “at” a specific boundary corner (if it were it would cease to be a reference mark and become a boundary mark).</p>
<p>35 Surveyor to note nature and position of survey marks etc.</p> <p>35(1)(b) & 35(1)(e) – Regulations stipulating the requirement for showing MGA co-ordinates and AHD heights on the survey plan</p> <p>35(4) – the state of a monument important for the definition of land</p>	<p>Subclauses 35(1)(b) & 35(1)(e) have been clarified and moved to Clauses 70 & 71.</p> <p>Subclause 35(4) altered to refer to the “state” of a monument.</p>	<p>This clause should be within “Division 7 – Survey plans”. Co-ordinate, height difference and height schedules have been consolidated into one area of the proposed Regulation for ease of interpretation and clarity of purpose.</p> <p>The “state” of the mark gives scope to automated Eplan testing algorithms. The term “state” is the term used by the Eplan NSW_LandXML Recipie</p>
<p>42 Connection to permanent survey marks</p> <p>New subclause 42(4)</p>	<p>Inserted new subclause 42(4) to require that permanent survey marks used to comply exclusively with Clause 13 (as a bench mark for verification of AHD or as a bench mark to be related to the survey) do not need to comply with subclause 42(3) (connections to the land proved by closed survey).</p>	<p>A permanent mark can also be used as a bench mark (see Schedule 1). Bench marks are required to comply with clause 13; however it is unreasonable to expect permanent survey marks that are exclusively used as bench marks to have closed horizontal connections.</p>

Current Regulation	Proposed Regulation	Reason for Change
<p>43 New permanent survey marks</p> <p>43(2) - Where two permanent survey marks connected to have accurate AHD values, all permanent survey marks placed must be given accurate AHD values as well.</p>	<p>Amended subclause 43(2) to specify that an AHD value must be determined for the placed permanent survey mark to an accuracy equal to or better than Class "B" or Class "LD".</p> <p>Deleted clause 43(3)(c).</p>	<p>To take into account the updated definition of 'accurate AHD value' it is necessary to make reference to the "AHD value" (not 'accurate AHD value') of a placed Permanent Survey Mark and have that value verified by closed height difference; surveyors cannot determine an 'accurate AHD value' as part of the definition requires the value to be in SCIMS. Only the Surveyor-General can enter values into SCIMS.</p> <p>As heights and height differences are now required to be shown on deposited plans, it is unreasonable to expect surveyors to place the height on the sketch plan as well.</p>
<p>48 Changes in boundaries formed by tidal waters</p> <p>48(3) - If the change to the Mean High-Water Mark (MHWM) was not natural, gradual or imperceptible the previous MHWM position is to be adopted.</p>	<p>Clause 48(3) amended to clarify that, if the change to MHWM was not natural, gradual or imperceptible, a surveyor must refer to a previous survey plan on public record to adopt the position of the MHWM before the change.</p>	<p>A surveyor is unlikely to know what the position of the MHWM was immediately "before the change" occurred, the surveyor was most probably not physically there to observe the change.</p> <p>The clause is clarified so that the surveyor is required to refer to a survey plan on public record prepared prior to the change in position of MHWM.</p>
<p>55 Surveyor to record astronomical observations</p> <p>Clause regulating the recording of astronomical observations in the surveyor's field notes.</p>	<p>Clause 55 deleted.</p>	<p>The practice of recording astronomical observations is considered obsolete and is superseded by the use of GNSS methods.</p>
<p>Clauses 56 - 59</p>	<p>Renumbered as clauses 55, 56, 57 & 58</p>	
<p>Insertion of new clause</p>	<p>New Clause 59 Method of showing bearings and distances</p> <p>Inserted new Clause 59 to require that:</p> <ul style="list-style-type: none"> • All angles and bearings must be shown on the survey plan in degrees, minutes and seconds, and all bearings must be reckoned and expressed clockwise from zero to 360 degrees. • All distances shown on the survey plan must be horizontal plane distances at ground level expressed in metres unless otherwise approved. 	<p>Nowhere in the Act or the current Regulation specifies that distances to be shown on the survey plan have to be horizontal ground distances (as opposed to slope distances, map grid distances, ellipsoidal distances etc.), nor that bearings have to be shown on the survey plan as degrees, minutes and seconds (note that clause 58 of the current Regulation specifies degrees minutes and seconds for field notes, not a survey plan).</p> <p>To remove any doubt as to what distances must be shown on the survey plan (and how to show bearings on the plan), it is appropriate to add a clause under "Division 7 - Survey Plans" to this effect.</p>

Current Regulation	Proposed Regulation	Reason for Change
<p>60 Survey plan to indicate name of locality, street address and type of survey</p> <p>60(e) - Where the plan includes a compiled or partially compiled lot the plan must indicate whether the terrain is level/undulating or steep/mountainous.</p>	<p>Clause 60(e) amended to delete reference to compiled plans.</p>	<p>Terrain type is not required for compiled plans.</p>
<p>61 Method of recording datum line</p> <p>Clause stipulating the requirements for showing the datum line of orientation on the survey plan.</p>	<p>Deleted subclauses: 61(2) (MGA coordinate table - now dealt with in Clause 70) and 61(3) (astronomical observations).</p> <p>Subclauses added to prescribe what is required to be shown on the survey plan, with respect to the datum line of orientation and any verifying line, for each of the following methods used to orient the survey:-</p> <ul style="list-style-type: none"> • Adopted from established survey marks • Adopted from an approved GNSS method • Adopted from a plan filed or recorded by a public authority 	<p>Co-ordinate, height difference and height schedules have been consolidated into one area of the proposed Regulation for ease of interpretation and clarity of purpose. References to astronomical observations deleted as the practice of recording astronomical observations is considered obsolete and is superseded by the use of GNSS methods.</p> <p>Consolidation and clarification of all matters regarding showing the datum line and verifying lines on the survey plan.</p> <p>It is expected that in the usual course of undertaking a survey, the surveyor would verify their work by showing comparisons on the datum line and any verifying lines. There is no explicit requirement to this effect in the current Regulation. This amendment puts it beyond doubt that comparisons are needed as an affirmation of the datum line validity.</p>
<p>62 Method of recording bench marks</p> <p>Clause stipulating the requirements for showing bench marks on the survey plan.</p>	<p>The stipulations within clause 62 have been consolidated and clarified within Clauses 70 & 71; clause 62 has been removed.</p>	<p>Coordinate, height difference and height schedules have been consolidated into one area of the proposed Regulation for ease of interpretation and clarity of purpose.</p>
<p>63 Use of reference marks</p>	<p>Renumbered as clause 62</p>	

Current Regulation	Proposed Regulation	Reason for Change
<p>64 Method of showing boundaries generally</p> <p>64(1)(g) - regulates dimensions to be shown on the survey plan for partially compiled lots.</p> <p>Insertion of new subclause (h)</p>	<p>Renumbered as clause 63.</p> <p>Deleted references to compiled plans.</p> <p>Added subclause (h) being a requirement to record if the clearing and blazing of boundaries has not been undertaken in accordance with clause 28(5)(d)</p>	<p>The clause has no application to a compiled plan - it can only be used in situations where the dimensions are taken from a partial survey of the land.</p> <p>There is currently no stipulation to record on the survey plan whether clearing and blazing of a boundary has not occurred. A future user of the survey plan needs to know what boundary marking was placed so that the boundary can be readily investigated and identified.</p>
<p>65 Method of showing natural feature boundaries</p> <p>65(b) - Natural feature boundaries must be indicated by a line generally following the line of the boundary.</p> <p>65(c) - table of bearings and distances describing the natural feature boundary</p> <p>65(d) - Showing connections between terminals.</p>	<p>Renumbered as clause 64.</p> <p>Subclause (b) amended to require natural feature boundaries to be indicated by a "spline curve" and not an "irregular line".</p> <p>Subclause (c) amended to require the tabulated bearings and distances describing the natural feature boundary to be sequential.</p> <p>Amended subclause (d) to remove the words "in cases where more than 10 straight lines have been used to define the boundary created by the natural feature" and replaced with "for each lot".</p>	<p>Advice from the spatial information industry indicates that a spline is considered the geometric entity best suited for the graphical representation of a natural feature boundary. See '<i>spline</i>' definition above.</p> <p>If the bearings and distances are not sequential, the following undesirable situations occur:</p> <ol style="list-style-type: none"> 1. If the bearings and distances are not numbered or indexed and out of sequence, the table does not correctly and completely describe the boundary and computed areas will be erroneous or, 2. If the bearings and distances are numbered or indexed and out of sequence, the table is extremely difficult to interpret, giving increased scope to errors in interpretation. <p>To facilitate ease of checking of natural feature boundary closes, especially where a lot boundary intersects the natural feature boundary. Clearly defines the point at which the side boundary of a lot cuts the natural feature boundary.</p>

Current Regulation	Proposed Regulation	Reason for Change
<p>66 Surveys of land adjoining tidal waters</p> <p>For a survey of land adjoining tidal waters, stipulations regarding the showing on the survey plan of the description and relationship of any sea wall and reclaimed land adjacent to the MHWM.</p>	<p>Renumbered as Clause 65.</p> <p>Minor alteration to require the descriptions and relationship to be shown on “the survey plan” instead of “a survey plan”.</p>	<p>The requirement is for the descriptions and relationship to be shown on the survey plan which is the subject of the clause; not on a separate survey plan.</p>
<p>67 GNSS-derived lines to be indicated</p> <p>A survey plan that includes lines derived from GNSS observations must indicate which of those lines have been so derived.</p>	<p>Renumbered as Clause 66 and re-headed as “Survey plan to show GNSS validation”.</p> <p>The current wording of the clause has been deleted and replaced to stipulate that if an approved GNSS method is used in the survey, then details of the GNSS validation must be shown on the plan of survey.</p> <p>A further requirement added for surveys adopting an MGA orientation from MGA co-ordinates obtained by an approved GNSS method. In this case, the GNSS validation required above must be performed and shown for the datum line of orientation.</p>	<p>All GNSSs are operated by international parties. Most GNSS augmentation systems (e.g. CORSnet-NSW, GPSnet) are operated by government or commercial third parties and are not under the surveyor’s direct control. As such, any GNSS equipment and methods used must be confirmed (“validated”) against an independent external source of known accuracy.</p> <p>GNSS equipment is not a tool which can be “calibrated” in the strict sense of the word and therefore the proper use of the equipment in accordance to the Surveyor-General’s Directions is important.</p> <p>The extra stipulation of validating the datum line for the cases described is required so that the MGA orientation taken solely from MGA co-ordinates determined by the surveyor using an approved GNSS method is affirmed. This can be considered analogous to showing comparisons on the datum line with established MGA co-ordinates or with prior plans filed or recorded by a public authority.</p>
<p>Clauses 68 & 69</p>	<p>Clauses 68 and 69 renumbered as 67 and 68.</p>	

Current Regulation	Proposed Regulation	Reason for Change
<p style="text-align: center;">Insertion of new clause</p>	<p>New clause 69 Survey plan to show height difference schedule</p> <p>A new requirement to show height differences in an approved schedule on the survey plan between: permanent survey marks and bench marks used in surveys limited in height or depth as referred to in Clause 13 and new urban permanent survey marks placed as referred to in Clause 43(2)</p> <p>The permanent survey marks and bench marks to which this clause applies are those under Clause 13 or Clause 43(2) or both.</p> <p>Addition of a requirement for the height difference schedule to be of the form specified by the Surveyor-General.</p>	<p>The height datum needs to be propagated for infrastructure management and development; survey control is essential public infrastructure, in just the same way as sewer, stormwater drainage, electricity, telephone and data services. Height is an important component of survey control.</p> <p>The group best placed to propagate the height datum is the surveying industry; the industry has the requisite professional skills, technical equipment and local knowledge to effectively propagate height.</p> <p>The plan of survey is being used as the delivery mechanism for height and height differences from the surveying industry for several reasons:</p> <ul style="list-style-type: none"> • The previous information delivery mechanism was through Locality Sketch Plans; Spatial Services have received less than 65% of Locality Sketch Plans for marks issued in 2016, so this delivery mechanism has demonstrably failed. • The information is in one location, facilitating e-Plan validation and Spatial Services' collation and ingestion of the information. • In specifying height differences and height values to be shown, the survey plan becomes self-describing and self-checking. <p>The requirement for the coordinate, height and height difference schedule to be of the form specified by the Surveyor-General has been introduced for several reasons:</p> <ul style="list-style-type: none"> • Data in a standardised form means that the information is always given in a specific format, thus enabling LandXML digital lodgment automated checking procedures and ingestion; this is an enabler for the digital government Property Development Pipeline. • Surveyors should be the subject of fewer requisitions regarding the form of the schedule required if a standardised form is specified and adhered to.

Current Regulation	Proposed Regulation	Reason for Change
<p style="text-align: center;">Insertion of new clause</p>	<p>New clause 70 Survey plan to show coordinate schedule</p> <p>The requirements for showing of MGA co-ordinates on the survey plan in an approved schedule for:</p> <ul style="list-style-type: none"> • any survey mark used to define an <i>'accurate MGA orientation'</i> or • any permanent survey mark or • any bench mark <p>either found or placed, have been consolidated into one clause.</p> <p>Requirements have been altered so that if a survey adopts an <i>'accurate MGA orientation'</i>, then the MGA co-ordinates need to be shown to Class "D" or better for unestablished marks. The only exception to the above requirement is where the mark is connected to the survey by height only, in which case the MGA co-ordinates need only be determined to a positional uncertainty of 3 metres.</p> <p>This clause also requires that the surveyor show on their plan of survey that the MGA co-ordinates are within the same MGA zone and are derived from the same datum.</p> <p>Addition of a requirement for the coordinate schedule to be of the form specified by the Surveyor-General.</p>	<p>Consolidation of MGA coordinate schedule requirements into one clause facilitates clarity and ease of understanding.</p> <p>If the surveyor has connected horizontally to any of the stipulated marks and the survey has an <i>'accurate MGA orientation'</i>, then it is not unreasonable to ask the surveyor to provide Class "D" MGA co-ordinates for the unestablished marks instead of hand-held GNSS co-ordinates. This enables better initial positioning of the mark.</p> <p>This will prevent surveyors from using co-ordinates from different co-ordinate systems (different datums and map projection zones) on the same plan e.g. GDA94 and GDA2020.</p> <p>The requirement for the coordinate, height and height difference schedule to be of the form specified by the Surveyor-General has been introduced for several reasons:</p> <ul style="list-style-type: none"> • Data in a standardised form means that the information is always given in a specific format, thus enabling LandXML digital lodgment automated checking procedures and ingestion; this is an enabler for the digital government Property Development Pipeline. • Surveyors should be the subject of fewer requisitions regarding the form of the schedule required if a standardised form is specified and adhered to.

Current Regulation	Proposed Regulation	Reason for Change
<p style="text-align: center;">Insertion of new clause</p>	<p>New clause 71 Survey plan to show height schedule</p> <p>The requirements for showing of AHD heights on the survey plan in an approved schedule for: any permanent survey mark or any bench mark either found or placed, that is referred to in either clause 13 or 43(2) or both, have been consolidated into one clause.</p> <p>A new classification in the height schedule for marks with accurate AHD values (those in SCIMS of Class “B” or “LD” or better) of “height datum validation” has been added. The classifications can be either:</p> <ul style="list-style-type: none"> • “SCIMS adopted” or • “from SCIMS – datum validation” <p>where the classification “SCIMS adopted” can only be used once within a schedule</p> <p>Addition of a requirement for the height schedule to be of the form specified by the Surveyor-General.</p>	<p>Consolidation of AHD height schedule requirements into one clause facilitates clarity and ease of understanding. See comments regarding propagation of the height datum in proposed clause 69 above.</p> <p>The height datum validation – the SCIMS AHD value adopted to derive the AHD values for marks not having an ‘<i>accurate AHD value</i>’ – and the marks used to validate the ‘<i>accurate AHD value</i>’ of the single mark adopted – is critical information describing what the height values determined by the surveyor are based on and what was used to check that basis.</p> <p>The survey technique used to derive the AHD value is not needed as it will be a derivative of the method shown in the height difference table. Use of a schedule approved by the Surveyor-General has been introduced for reasons stated above in new clause 70.</p> <p>The requirement for the coordinate, height and height difference schedule to be of the form specified by the Surveyor-General has been introduced for several reasons:</p> <ul style="list-style-type: none"> • Data in a standardised form means that the information is always given in a specific format, thus enabling LandXML digital lodgment automated checking procedures and ingestion; this is an enabler for the digital government Property Development Pipeline. • Surveyors should be the subject of fewer requisitions regarding the form of the schedule required if a standardised form is specified and adhered to.
<p>Clause 70</p>	<p>Renumbered as clause 72.</p>	
<p>71 Standards for public surveys under sections 4 and 5 of the Act</p>	<p>Renumbered as Clause 73.</p> <p>Subclause 73(1) altered to refer to the term “Standards and practices for Control Surveys” as defined in clause 5 (Definitions) instead of the full description of the precise version of the appropriate document.</p>	<p>The full description of the precise version of the appropriate document has been defined in clause 5 (Definitions), as the full description has many occurrences; changing to reference the term in clause 5 (Definitions) means that any future re-referencing of the document version requires a change in only one location (clause 5) within the proposed Regulation.</p>
<p>Clauses 72 - 76</p>	<p>Renumbered as clauses 74 - 78.</p>	

Current Regulation	Proposed Regulation	Reason for Change
<p>77 Qualifications for registration</p> <p>Stipulates eligibility requirements for registration as a surveyor</p>	<p>Renumbered to clause 79.</p> <p>Subclause (d) altered to stipulate that an eligibility requirement is that a person “is, in the opinion of the Board, of good character”</p>	<p>Simply specifying “of good character” does not define who is to adjudicate a person to be “of good character”. The proposed amendment clarifies the intent of the subclause.</p>
<p>Clause 78</p>	<p>Renumbered as clause 80.</p>	
<p>79 Provision of further information and supporting evidence</p> <p>Sets out requirements of the Board regarding applicants for registration as a surveyor.</p>	<p>Renumbered as clause 81.</p> <p>An amendment to subclause (e) to clarify the standard of passport photo to meet the specification of the Australian Passport Office.</p>	<p>Standardisation of the photograph specification.</p>
<p>Clause 80</p>	<p>Renumbered as clause 82.</p>	
<p>81 – Conditions of registration as a mining surveyor</p>	<p>Renumbered as clause 83.</p> <p>Amended clause to also apply to underground metalliferous mines</p>	<p>Underground metalliferous mines are considered to be subject to the same conditions as an open cut mine. The <i>Survey and Drafting Directions for Mine Surveyors 2015 (NSW-Mines)</i> applies to mining surveys in relation to underground metalliferous mines.</p>
<p>Clauses 82 - 87</p>	<p>Renumbered as clauses 84 - 89</p>	
<p>88 Applications to remove survey marks under section 24 of the Act</p>	<p>Renumbered as clause 90.</p> <p>Subclause (2) has been altered to include bench marks.</p>	<p>Bench marks are important survey infrastructure and must be protected.</p>
<p>89 Exemption by the Surveyor-General</p> <p>The Surveyor-General may in writing exempt the surveyor conducting the survey from complying with the requirement of the Regulation.</p>	<p>Renumbered as clause 91.</p> <p>New subclause (2): Any survey subject to an exemption must comply with all conditions contained within the exemption otherwise the exemption is ineffective.</p> <p>New subclause (4): If a survey plan to which an exemption applies is lodged with a public authority, then that public authority must be furnished with a copy of the exemption.</p>	<p>Exemptions are often issued referring to only part of the survey and subject to one or more conditions. When the survey plan is lodged with the Registrar-General or a public authority, it is considered critical for the examination process that a requirement exists for the surveyor to also lodge a copy of the exemption so that a plan examiner can:</p> <ul style="list-style-type: none"> • Be aware of which part or parts of the survey plan the exemption applies to, and • Determine whether the conditions which apply to the exemption have been met.
<p>Clause 90</p>	<p>Renumbered to clause 92</p>	
<p>Schedule 1 Bench marks</p> <p>Defines the form and style of bench marks.</p> <p>New mark added</p>	<p>Added a new style of bench mark to the schedule called “Bench Mark” token. The form or style of the mark is a non-corrodible token at least 32mm in diameter and 1.5mm thick with “Bench Mark” permanently stamped, engraved or etched on the upper surface.</p>	<p>The bench mark token is of similar form and style to the State Survey Mark type 15 (SSM15) which is a durable and easy to use mark that has been adopted by the industry for other purposes. The manufacturer of the marks makes variations of the SSM15 for other applications, such as boundary marks and reference marks (each with appropriate wording on the tokens).</p>

Current Regulation	Proposed Regulation	Reason for Change
<p>Schedule 2 Boundary marks</p> <p>Defines the form and style of boundary marks.</p> <p>New mark added</p> <p>“Boundary mark token”</p>	<p>“Fixed steel fence post” added as a new mark. The form of this mark is an uncapped steel fence post. The requirements for the mark are to describe the steel post at the corner. The corner does not need to be centrally located within the post.</p> <p>Clarified the use of the “Boundary Mark” token. Amended the section to put it beyond doubt that the boundary mark token can be placed on any stable structure, irrespective of the material it is made from.</p>	<p>When a boundary fence post is uncapped (i.e. hollow) it is physically very difficult to place a boundary mark. As a solution, “Fixed steel fence post” mark is to be used, which is to simply describe the mark on the plan (e.g. “centre of 100mm diameter steel fence post at corner”).</p> <p>Removes any doubt that the boundary mark token can be placed on any stable structure.</p>
<p>Schedule 3 Reference marks</p> <p>Defines form and style of reference marks.</p> <p>New mark added</p> <p>“Drill Hole and Wing”</p> <p>“Metal spike or galvanised iron pipe”</p>	<p>Added a new reference mark to the schedule called “Reference Mark” token. The form or style of the mark is a non-corrodible token of at least 32mm in diameter and 1.5mm thick with “Reference Mark” permanently stamped, engraved or etched on the upper surface.</p> <p>Amended diameter of drill hole from 6mm to 5mm.</p> <p>Amended the form or style so that if using a galvanised iron pipe, the rim wall thickness has been changed from 3mm to 2.6mm.</p>	<p>The reference mark token is of similar form and style to the State Survey Mark type 15 (SSM15) which is a durable and easy to use mark that has been adopted by the industry for other purposes. The manufacturer of the marks makes variations of SSM15 for other applications, such as boundary marks and reference marks (each with appropriate wording on the tokens).</p> <p>Surveyors have reported the difficulty in drilling a hole of 6mm into hard surfaces such as rock or concrete. As such the diameter has been reduced to 5mm to make it easier.</p> <p>The rim wall thickness of a galvanised pipe is reduced from 3mm to 2.6mm to take into account commercial availability.</p>
<p>Schedule 3 - Reference marks - continued over page</p>		

Current Regulation	Proposed Regulation	Reason for Change
<p>“Specific point”</p> <p>“Non-corrodible nail (concrete)”</p> <p>“PVC Pipe”</p>	<p>When referencing a specific point on a structure to a corner that abuts a road, an additional reference mark must be placed within the road corridor.</p> <p>Non-corrodible nail (concrete) (20 mm long) has been deleted.</p> <p>PVC Pipe has been deleted</p>	<p>Removes the issue where the corner of a building used to reference a corner abutting a road is, for surveyors required to measure the specific point, either inaccessible or access is problematic.</p> <p>Stability and longevity of the mark has proven to be not satisfactory.</p> <p>PVC pipe is no longer deemed suitable as a reference mark, due to their lack of stability and reliability.</p>
<p>Schedule 4 Permanent survey marks</p> <p>Defines the form and styles for permanent survey marks</p>	<p>A new form and style of permanent survey mark has been added to schedule 4 as Type 16 (State Survey Mark).</p>	<p>There are several reasons for the addition of the Type 16 SSM:</p> <ul style="list-style-type: none"> • Decrease susceptibility to topping or scalping by machinery • Minimises trip or slip hazard • Improve the functionality for levelling measurements • Enables future reduction in mark types used • Combines the best features of the current Type 1 & Type 2 SSM's
<p>Schedule 5 Conventional signs and symbols</p> <p>Defines the form and style of signs and symbols to be used on survey plans.</p>	<p>Nine symbols have been removed:</p> <ul style="list-style-type: none"> • Territorial Division • State Forest • State Recreational Area • National park, nature reserve or regional park • State Coal Mine • Public road • Surveyed Reserved Road • Railway • Track <p>A new symbol has been added called “Obstructed boundary”. This is represented as a solid circle and is used only for surveys where proposed clause 28(3)(b) applies; that is where a mark can't be physically placed as per proposed clause 28(3)(b)</p>	<p>To retain currency and consistency with standard usages and reforms. Some signs to be removed as they are no longer required.</p> <p>A new symbol for marking of obstructed boundaries is required by clause 28(3)(b).</p>

Current Regulation	Proposed Regulation	Reason for Change
<p>Schedule 6 Forms</p> <p>Form 1 – Survey certificate</p> <p>Form 2 – Certificate as to surveys not requiring strict accuracy</p> <p>Form 3 – Notice of entry</p>	<p>The following have been added to the Survey Certificate:</p> <ul style="list-style-type: none"> • Single asterisks indicating “Strike through if inapplicable” added to the paragraph indices of paragraphs (a), (b) & (c). • Double asterisks indicating “Specify the land actually surveyed or specify any land shown in the plan that is not the subject of the survey” added to paragraph (b) • Paragraph for noting the Datum line • Paragraph adding the type of survey (urban or rural) • Paragraph noting the type of terrain upon which the survey was carried out (Level-Undulating or Steep-Mountainous) <p>A paragraph for the date has been added to the Certificate as to survey not requiring strict accuracy.</p> <p>The paragraph for the surveyor’s signature and date has been standardised with Forms 1 & 2.</p>	<p>Changes to Form 1 required by the Surveyor-General to include critical information used in assessing the survey plan for compliance – information which needs to be explicitly provided by the signatory – and to maintain consistency with the approved Form 6 Deposited Plan Administration Sheet of the Registrar-General.</p> <p>Surveys not requiring strict accuracy should have a date of survey. This maintains consistency with other forms, each of which require a date.</p> <p>To maintain consistent form protocols.</p>
<p>Schedule 7 – Fees</p>	<p>Updated fees</p>	<p>Standard update of fees. The fees in the schedule are only indicative at this stage and may be subject to change.</p>

6. Impact assessment of the proposed Regulation

This section of the Regulatory Impact Statement (RIS);

- Discusses the provisions of the proposed Regulation;
- Weighs up the costs and benefits of the proposed changes to the current Regulation on the surveying industry, land owners, government and the general community.

The current Regulation is broken up into Parts and Schedules. Each of the Parts and Schedules will be analysed separately below.

6.1 Part 1 Preliminary

6.1.1 Objective of Part

Includes machinery provisions and enables the Surveyor-General, by order, to make directions relating to the conduct of mining surveys.

6.1.2 Overview of provisions

Clause 4 enables the Surveyor-General, by order, to make directions relating to the conduct of mining surveys.

Clause 5 defines a number of terms used throughout the current Regulation.

6.1.3 Proposed amendments

Clause 4 updated to refer to the Surveyor-General's current directions for mining surveyors.

The proposed Regulation includes a number of changes to the definitions in clause 5 including:

Accurate AHD value - refined to clarify that the value is only be taken from SCIMS and not from other databases. This allows for better integration into other mapping systems of the government and ensures accuracy.

Accurate MGA orientation - The proposed Regulation makes reference to 'accurate MGA orientation' (see proposed clause 70 (2)), necessitating a definition.

Established survey mark - to enable more Deposited Plans to be placed on MGA the definition needs amending to relax the level of accuracy from Class "C" to Class "D".

Positional uncertainty - The proposed Regulation makes reference to positional uncertainty (see proposed clause 70(2)), necessitating a definition.

Reference station - Due to the relaxing of the class of an established mark, the class referred to within this definition has been changed to Class "D".

Road - definition clarified to remove any doubt that accessways within community schemes are covered by the definition.

Spline - new definition to describe the graphical representation of a natural feature boundary on a survey plan, as recommended by the spatial information industry.

Standard Instrument - new definition referencing the *Standard Instrument (Local Environmental Plans) Order 2006*.

Standards and Practices for Control Surveys - new definition to reference the document entitled *Standards and Practices for Control Surveys (SP1) Version 1.7*, published by the Intergovernmental Committee on Surveying and Mapping.

Urban survey - definition updated to correspond with current planning zones under the *Environmental Planning and Assessment Act 1979*.

6.1.4 Assessment of costs and benefits of proposed amendments

The amendments to the definitions have been made for clarity and to reflect existing terminology (e.g. definition for spline). The amendments do not give rise to any costs.

6.2 Part 2 Survey Practice

6.2.1 Division 1 General duties of surveyor

6.2.1.1 Objective of Division

To ensure:

- that all surveys are carried out to a consistent and reliable standard appropriate for the nature of the survey being undertaken;
- that boundaries are not only located on the ground but are connected to the State control survey; and
- that all information is obtained to locate boundaries and surveys comply with requisitions from the Surveyor-General and the Registrar-General.

6.2.1.2 Overview of provisions

A key objective of the Act, as stated in section 2A(c) of the Act is to provide for the maintenance of the State cadastre and to ensure its integrity. To achieve this, clause 6 of the current Regulation sets out the general principles of a survey. When undertaking a survey a surveyor must not only locate boundaries on the ground but must connect those boundaries to the State control survey (clause 7). The boundaries that are determined must be checked for accuracy and the details recorded on the ground in the form of survey marks, in field notes and, where necessary, on a survey plan. This allows the survey to be re-established in the future.

The current Regulation allows a lesser standard for certain classes of survey not requiring the same degree of accuracy (clause 9).

6.2.1.3 Proposed amendments

Clause 6

Subclause 6(d) amended to include reference marks and to change “permanent marks” to “permanent survey marks”.

6.2.1.4 Assessment of costs and benefits of proposed amendments

Clause 6

Changes to Clause 12 (Datum line) require the addition of reference marks as part of

the fundamental MGA coordinate accuracy outcomes.

The term “Permanent survey marks” is the correct term for the wide ranging category of form and style of mark under Clause 27.

The amendments to Clause 6 have been made for clarity and consistency and to reflect the correct terminology. The amendments do not give rise to any costs.

6.2.2 Division 2 Adoption of datum lines and bench marks

6.2.2.1 Objective of Division

To ensure that the datum line and bench marks on which a survey is based are reliable, traceable and have been connected to the State control survey to determine, or facilitate determination of horizontal and vertical position within the State.

6.2.2.2 Overview of provisions

Establishing a datum is paramount to the reliability, traceability and spatial enablement of the survey. To maintain a reliable State control survey and State cadastre, boundaries must not only be accurately measured but must be related to survey marks and the existing State control survey network. To achieve this, the datum line and survey marks must be based on the most reliable, traceable and up-to-date information available.

Clauses 12 and 13 set minimum standards for locating and recording the datum line and bench marks adopted for a survey. The clauses deal with each of the requirements for establishing the datum line for an urban survey and a rural survey.

6.2.2.3 Proposed amendments

Clause 12

Clause 12 has been restructured and changes made regarding the adoption of datum lines.

The summary outcome of the proposed amendments is as follows:

- All rural surveys will be required to adopt an MGA orientation and MGA position.

- The majority of urban surveys will be required to adopt an MGA orientation and MGA position, with the exceptions (adoption of an orientation from a plan filed or recorded by a public authority) expected to comprise less than 10% of surveys, based upon data from 2016.
- All surveys in which an approved GNSS method has been used will be required to adopt an MGA orientation and MGA position.

The initial proposal was for all survey plans to adopt MGA orientation and MGA position.

At a consultation meeting with industry representatives on 13th April 2016, the Office of the Surveyor-General and the Office of the Registrar-General were advised by industry representatives that this may cause problems in urban areas due to:

- the existence of substantial gaps in the urban sections of the State control survey where there are no established survey marks, and
- many urban surveyors not having access to GNSS equipment, as it is not suitable to use GNSS equipment for many surveys in urban areas due to the nature of the surveys.

The advice given by industry representatives was duly considered and, in light of their concerns, the proposal for all survey plans to adopt MGA orientation and MGA position was changed so that, in circumstances where:

- an urban survey was not within 300 metres of established survey marks, and
- an approved GNSS method was not used,

the orientation of the datum line could be adopted from a plan filed or recorded by a public authority.

Subclause 12(2) has been changed to prescribe the adoption of a datum line for urban surveys for the following situations:

1. Where the land surveyed is within 300m of two established survey marks;
2. Where the land surveyed is not within 300m of two established survey marks and an approved GNSS method is used;
3. Where the land surveyed is not within 300m of two established survey marks and an approved GNSS method is not used

A new subclause 12(3) has been inserted to prescribe the adoption of a datum line for rural surveys for the following situations:

1. Where the land surveyed is within 1,000 m of two established marks;
2. Where the land surveyed is not within 1,000 m of two established marks.

The current clause 12(3) has been renumbered to clause 12(4) and the table therein amended to reflect the actual codes as they exist in SCIMS.

The current clause 12(4) has been renumbered as clause 12(6) and clarified so that verification of the datum line can be to another established mark, without a limitation of class.

Clause 12(5)(b) has been inserted to specify the accuracy and currency of MGA co-ordinates required for datum line orientation by an approved GNSS method.

The current clause 12(6) has been renumbered as clause 12(7) and the rejection tolerance specified in the current subclause 12(6) for the verifying line has been loosened to 40 mm + 175 ppm.

The current subclause 12(7) has been deleted as its provisions are either addressed in the new subclauses 12(2) & (3) or refer to astronomical observations, which have been removed from the proposed Regulation.

Clause 13

References to “external” bench marks have been removed.

Clause 13(5)(a) has been amended to remove the words “if it is impracticable to use an existing permanent survey mark” as it is considered to be redundant; placing a new permanent survey mark as a bench mark would be necessary in any case where an existing permanent survey mark is not within 300 metres of the land surveyed.

Clause 13(6) regarding the determination of the position of each bench mark has been transferred to Clause 70.

6.2.2.4 Assessment of costs and benefits of proposed amendments

Without regulations for adoption of a datum line and bench marks, the reliability, traceability and spatial enablement of a survey would have no minimum standard; this would impact the State control survey, the State cadastre and the spatial information systems that rely on both.

Clause 12

The substantial amendments in clauses 12(2) and 12(3) ensure the reliability, traceability and spatial enablement of a survey has a minimum standard upon which all stakeholders can rely.

It is expected that some costs to a small minority of rural surveyors may occur to procure access to GNSS equipment in order to adopt MGA orientation and MGA position for rural surveys.

The abovementioned cost is considered reasonable and necessary for the following reasons:

- GNSS is a mature technology, thus the cost has reduced significantly and the functionality has increased when compared with 20 years ago
- GNSS equipment has been readily available for at least the last 15 years, giving rise to a significant second hand GNSS equipment market and abundant GNSS training resources.
- The spatial enablement of survey plans has substantial benefits to both the community and industry:

- o facilitates propagation of the State control survey,
- o facilitates spatial enablement of the State cadastre,
- o improves the accuracy and availability of spatial information systems (e.g. the Digital Cadastral Database - DCDB) on which community and industry stakeholders rely,
- o enhances the accuracy of the industry’s preparation or pre-calculation of projects prior to field work
- o facilitates the state government’s Property Development Pipeline initiative and Open Data policy

It is worth noting that as at 19th May 2017, in the questionnaire regarding the proposed Regulation, of 201 industry respondents to the question “Do you have access to GNSS equipment?”, 82% answered “Yes”.

Approximate costs (new) of various GNSS equipment configurations are:

1. Single GNSS receiver with ability to log data for AUSPOS processing:
\$10,000 - \$20,000
2. Single GNSS receiver with CORS capability:
\$20,000 - \$30,000
3. Single base RTK configuration (a GNSS base station and GNSS rover with radio link): \$30,000 - \$50,000

Option No.1 is considered the minimum necessary to comply with the proposed Regulation regarding the datum line for rural surveys.

The above costs are for new equipment. It is expected that the second hand costs of appropriate GNSS equipment would be significantly cheaper than the cost of new equipment.

All references to astronomical observations have been removed as very few surveyors utilise astronomical observations in daily practice and

have been superseded by GNSS methods. The proposed Regulation must reflect the changing practices of the surveying profession to remain relevant.

Also, astronomical observations can derive orientation only. Positioning of surveys via astronomical observations does not achieve the accuracy required.

As at 19th May 2017, in the questionnaire regarding the proposed Regulation, of 197 industry respondents to the question “Have you used astro observations for survey plan datum line orientation in the last 5 years?”, 98% answered “No”.

This amendment is considered cost neutral.

Clause 13

The proposed amendments to Clause 13 are for clarification and consolidation and are considered cost neutral.

6.2.3 Division 3 Measurement and calculations

6.2.3.1 Object of Division

To ensure that surveys can be compared by requiring that:

- equipment used to measure and calculate boundaries is appropriate for the purpose and accurate;
- measurements are made in a standardised manner; and
- measurements and calculations made are checked for accuracy according to standard minimum requirements.

6.2.3.2 Overview of provisions

Division 3 specifies a minimum outcome that is required for all surveys. The current Regulation does not tell a surveyor how to execute a survey; instead it specifies a minimum outcome that is to be obtained. A surveyor can perform a survey using a variety of methods and equipment. Clause 14 requires that whatever equipment is used it must be appropriate and its accuracy must have been determined according to specified standards. Clause 22 allows GNSS equipment to be used but when it is, the surveyor must use

an approved method described in the Surveyor-General's Directions. Clauses 23-26 require a surveyor to measure a survey to specified minimum standards and check the accuracy of measurements to minimum standards.

6.2.3.3 Proposed amendments

Clause 14

Clause 14(2)(c) requires that the GNSS equipment making the survey is accurate and that accuracy is determined by reference to at least 3 survey marks with horizontal accuracies of a specified class in SCIMS and accurate AHD values. This is an important requirement that will not be changing in the proposed Regulation. However, due to the relaxing of the requirement of established survey marks (reduced from Class “C” to Class “D”) the class of the horizontal accuracies of the three survey marks needs to be explicitly specified as Class “B”. This is a tighter tolerance than is specified by the current Regulation (the current Regulation calls for horizontal accuracies of Class “C” as pertained to established survey marks within the current Regulation); the tolerance has been tightened as Class “C” was considered inadequate for purposes of determining the accuracy of GNSS equipment.

Clauses 23 and 24

Previous clauses 23 and 24 have been amalgamated and re-grouped to logically place related provisions together. Reference to astronomical observations is removed as this practice is considered obsolete and is superseded by the use of GNSS methods.

All other references to astronomical observations in the proposed Regulation have also been removed.

Clause 23 has been amended to include, as subclause 23(5), an accuracy of included angles that states that if two surveyed lines shown on the survey plan have a common vertex and those lines have bearings shown, the accuracy of the included angle must be within the tolerance of the stipulated formula.

The angular accuracy specification is based on the angular displacement of a line using the existing accuracy specification of an individual length of 10mm + 50 parts per million.

Clause 25 (insertion of new clause)

A new clause 25 has been inserted to require that a surveyor must ensure the accuracy of the relative positions between any two surveyed points is within the tolerance of the stipulated formula. The accuracy specification is based on the existing accuracy specification of an individual length of 10mm + 50 parts per million and the proposed accuracy specification of an individual angle of 10mm + 50 parts per million.

Clause 26

Clause 26(3) has been amended to remove compiled plans from the requirements of this clause. The checking of accuracy of measurements and calculations do not apply to a compiled plan - it can only be used where the dimensions are taken from a partial survey of the land. Requirements for compiled plans are matters that are dealt with separately by the Registrar-General as compiled plans do not have to be prepared by a surveyor.

6.2.3.4 Assessment of costs and benefits of proposed amendments

The proposed new accuracy specifications in clauses 23 and 25 reflect current technologies that are readily available. The proposed accuracy specifications are to ensure reliable surveys of a minimum standard that benefit all stakeholders and ameliorate the cost of investigating and amending substandard surveys by future surveyors.

The new accuracy standards are easily achievable using available equipment coupled with a satisfactory standard of field practice. This conclusion is based on testing and data analysis of audit surveys carried out by the Surveyor-General.

Clause 23

There is currently no minimum standard of accuracy regulating an individual angle or bearing shown on a plan. The angular misclose and parcel misclose regulations do not regulate the accuracy of individual bearings or angles shown on a plan. Individual bearings and angles shown on the plan should be accurate to a minimum standard in the same way that individual lengths need to be.

As at 19th May 2017, in the questionnaire regarding the proposed Regulation, of 194 industry respondents to the question “Should bearings shown on a survey plan have a minimum accuracy?”, 93% answered “Yes”.

The reforms to accuracy specifications should not impact the survey practice of surveyors who utilize current technologies and employ a satisfactory standard of field technique; the cost of the proposed accuracy standards can therefore be considered cost neutral.

Clause 25 (insertion of new clause)

Currently, the accuracy of the relative position of any two surveyed points on a plan is not regulated. The accuracy of relative positions of surveyed points on a plan is critical to the integrity of the survey as a whole (how good the integrity of the “shape” of the survey is); integration of surveys into spatial information systems at a standard expected and demanded by industry users and the public requires a specified integrity of shape as well as a position.

As at 19th May 2017, in the questionnaire regarding the proposed Regulation, of 191 industry respondents to the question “Should the relative position of survey marks have a minimum accuracy?”, 94% answered “Yes”.

The reforms to accuracy specifications should not impact the survey practice of surveyors who utilize current technologies and employ a satisfactory standard of field technique; the cost of the proposed accuracy standards can therefore be considered cost neutral.

Clause 26

Removing the requirement to checking accuracy of measurements and calculations from compiled parcels removes an unnecessary burden which can be more cheaply and readily policed by the Registrar-General, thereby ensuring that the cost of compliance is kept to a minimum.

6.2.4 Division 4 Use of survey marks and monuments

6.2.4.1 Subdivision 1 Surveys generally

6.2.4.1.1 Objective of Subdivision

To provide consistent forms, styles and methods of marking surveys so there is:

- uniform understanding of how to recognize various types of marks;
- consistent, stable and durable marking;
- a reliable way of relocating boundaries;
- confidence for land owners in being able to identify their boundaries.

6.2.4.1.2 Overview of provisions

Subdivision 1 of Division 4 prescribes a standard form and style for survey marks. Standardisation is important as it enables a surveyor to locate marks placed by other surveyors, maybe many years earlier, and to identify the nature of the marks placed.

As well as prescribing forms and styles of marks the current Regulation prescribes where and how boundaries are to be marked. This is fundamental to the land development process and enables developers to construct buildings and infrastructure with confidence that works placed are within the boundaries of the land.

6.2.4.1.3 Proposed amendments

Clause 28

An amendment has been made to clause 28(3) by adding an additional subclause to allow for the situation where it is not possible to place a boundary mark on a corner and the corner that cannot be marked lies within the material of a structure that does not have an accessible surface (e.g. a boundary corner within a “party wall”). The added subclause provides that in circumstances such as this, the surveyor is to depict the boundary corner on the plan of survey by the new prescribed symbol in Schedule 5.

Clause 29

Clause 29(1) has been amended to remove confusion as to where the extremity of the land being surveyed is where it abuts a road. The clause has also been amended to clarify that where land abuts a road, reference marks must be placed at intervals of not more than 100 metres along the road frontage that has intervening side boundaries.

Clauses 30 and 31

Clause 30(6) and 31 have been amended to clarify that a reference mark is not physically placed “at” the terminal of a road (if it were it would cease to be a reference mark and instead be a boundary mark); instead the reference mark is to be placed elsewhere so as to refer to the terminals of a road.

Clause 35

To make it easier for a surveyor who is seeking guidance on the requirements of the MGA coordinate schedule and AHD height schedule, all parts of the current Regulation that deal with how co-ordinates and heights are to be shown on plans are consolidated into a clause each (see clauses 70 and 71). In this regard, clause 35(1)(b) and 35(1)(e) have been removed and re-grouped together with other clauses to form new clauses 70 and 71.

6.2.4.1.4 Assessment of costs and benefits of proposed amendments

The proposed amendments in this Division are directed towards clearing up issues with a common sense approach. For example dealing with obstructed corners is proposed to be as simple as marking the plan with the prescribed symbol and noting the relationship of the structure to the corner/boundary. This will provide a small cost saving to the profession and clients.

The other amendments to the Division clear up some confusion with the wording in clauses 29(1), 30(6) and 31, without making any additional changes to the requirements already there. The amendments do not give rise to any costs.

6.2.4.2 Subdivision 2 Surveys to be lodged with Registrar-General or public authorities

6.2.4.2.1 Objective of Subdivision

To ensure permanent survey marks are placed within new subdivisions of land so that:-

- new surveys are linked to the State control survey; and
- survey plans are spatially enabled, or facilitate spatial enablement
- the State control survey is maintained and developed as land use intensifies.

6.2.4.2.2 Overview of provisions

Where a survey plan is to be put on public record and lodged with a public authority clause 41, 42 and 43 require the placement of a minimum number of permanent survey marks, depending on the number of parcels re-defined or created by the plan. The clauses detail how the permanent survey marks are to be connected to the survey and impose certain requirements as to where permanent survey marks must be placed. Permanent survey marks are uniquely numbered and managed through SCIMS under direction from the Surveyor-General. This coordinated reference system provides a valuable asset that forms the basis for all spatially related information.

6.2.4.2.3 Proposed amendments

Clause 42

Schedule 1 of the current Regulation allows for a permanent survey mark to be used as a bench mark. Bench marks are required to comply with clause 13; however it is unreasonable to expect permanent survey marks that are exclusively used as bench marks to have closed horizontal connections. Therefore new subclause 42(4) has been inserted to specify that permanent marks used for the purpose of complying exclusively with clause 13 need not comply with clause 42(3).

Clause 43

Clause 43(2) has been amended as a result of the updated definition to 'accurate AHD value'. To take into account the updated definition of 'accurate AHD value', it is necessary to make

reference to the "AHD value" (not 'accurate AHD value') of a permanent survey mark placed for the purposes of an urban survey subject to 43(2).

This requires a change to the requirements of clause 43(2) whereby the "AHD value" of a permanent survey mark placed under this clause must be determined:

1. to an accuracy equal to or better than Class "B" or Class "LD" and
2. have that "AHD value" verified by closed height difference between two marks having an 'accurate AHD value'

Surveyors cannot determine an 'accurate AHD value' as part of the definition of 'accurate AHD value' requires the value to be in SCIMS. Only the Surveyor-General can enter values into SCIMS.

Clause 43(2) also clarifies the condition by which a permanent mark placed will be subject to the clause; specifically, the clarification that the permanent survey marks having an 'accurate AHD value' as a condition also includes those under 12(2) (Datum Line - urban survey). This was not clear in the current Regulation.

Clause 43(3)(c) is deleted.

6.2.4.2.4 Assessment of costs and benefits of proposed amendments

The amendments made to the Part save rather than impose additional costs.

Clause 42

The addition of clause 42(4) prevents a surveyor from having to engage in the expense of measuring a permanent survey mark in a mandatory closed horizontal traverse where the mark is connected to the survey by a vertical (height only) connection and a horizontal connection is not required by any other part of the proposed Regulation. This is considered a cost benefit.

Clause 43

The amendment to clause 43(2) is to take into account the changed definition of 'accurate AHD value' and to clarify the intent of the clause. The outcome of the clause has not changed.

As the outcome has not changed, the amendments are considered cost neutral.

The deletion of clause 43(3)(c) is aimed at avoiding duplication and therefore should result in a cost saving. As heights and height differences are proposed to be shown on Deposited Plans, the amendment does not require surveyors to place the height on the Locality Sketch Plan for the permanent survey mark as well. This amendment is considered a cost benefit.

6.2.5 Division 5 Boundaries formed by tidal & non-tidal waters and other natural features

6.2.5.1 Objective of Division

To address the need for accurate and reliable boundary definition for water boundaries and boundaries formed by other natural features, given that these boundaries are:-

- an interface between private and public (Crown) land;
- continually changing;
- intensively and actively used; and
- have multiple uses and different users.

6.2.5.2 Overview of provisions

Generally, the bed of a tidal stream and land below the Mean High-Water Mark (MHW) is Crown Land.

Boundaries formed by tidal & non-tidal waters and other natural features are affected by natural events such as flood and erosion. Whether or not a parcel boundary is changed by a natural event will depend upon the common doctrine of accretion and erosion and statutory requirements such as s.55N of the Coastal Protection Act 1979 that has modified the common law doctrine.

As the bed of a tidal stream and land below the MHW is generally Crown land there is a community need for accuracy with regard to these boundaries. This Division imposes specific requirements for marking natural boundaries to ensure that they can be re-established over time despite the physical changes that may have occurred. Changes in tidal boundaries are required to be approved by the Minister administering the Crown Lands Act 1989.

6.2.5.3 Proposed amendments

Clause 48

Clause 48(3) currently states that if the change in the position of the mean high-water mark arose otherwise than from natural, gradual and imperceptible accretion or erosion, the position of the mean high-water mark as it was *before the change* is to be adopted (emphasis added).

A surveyor is unlikely to know what the position of the MHW was immediately “before the change” occurred, as the surveyor was most probably not physically on-site to observe when the change occurred and to have measured the MHW immediately “before the change” occurred. It is therefore unlikely that a surveyor can re-establish the position of MHW immediately “before the change” occurred.

To clarify and provide certainty in the definition of MHW in the case where the change in the position of the MHW arose otherwise than from natural, gradual and imperceptible accretion or erosion, clause 48(3) has been amended by altering “as it was before the change” to “as defined by a survey plan filed or recorded by the Registrar-General or a public authority before the change”.

6.2.5.4 Assessment of costs and benefits of proposed amendments

Clause 48

The proposed amendment to Division 5 does not require any additional survey work to be carried out during the survey. The amendment does not impose any obligation to obtain approvals not already required and therefore no costs arise as a result.

6.2.6 Division 6 Field notes

6.2.6.1 Objective of Division

To ensure that the surveyor keeps and maintains field notes so that:-

- an accurate record of the survey is retained; and
- boundaries are traceable.

6.2.6.2 Overview of provisions

A survey plan is only a representation of the cadastral survey work undertaken. Field notes show how the survey work was done and are the true record of the survey. The Division ensures that field notes are made and retained in accordance with minimum standards.

6.2.6.3 Proposed amendments

Clause 55

Clause 55, which dealt with astronomical observations, has been removed entirely as this practice is considered obsolete and is superseded by the use of GNSS methods.

All references to astronomical observations in other clauses within the proposed Regulation have been removed.

6.2.6.4 Assessment of costs and benefits of proposed amendments

Clause 55

The proposed amendments to Division 6 do not give rise to any costs. The amendment removes practices that have been rendered obsolete by current technology.

As at 19th May 2017, in the questionnaire regarding the proposed Regulation, of 197 industry respondents to the question "Have you used astro observations for survey plan datum line orientation in the last 5 years?", 98% answered "No".

Any surveyor requiring use of astronomical observations can apply to the Surveyor-General and, if the case warrants, be issued with an exemption containing conditions.

6.2.7 Division 7 Survey plans

6.2.7.1 Objective of Division

Prescribes key elements that must be included on a survey plan and provides a standardised method of recording the information so that the plan:-

- provides an appropriate summary of observations made in the field
- can be readily and easily interpreted by subsequent users,
- can be examined against set standards prior to registration.

6.2.7.2 Overview of provisions

Division 7 prescribes minimum standards for the preparation of survey plans and identifies key elements that must be contained in the plan. A survey plan must be produced in a structured way so that it can be read and understood by a variety of users, not just the surveyor who prepared it. A survey plan contains a large amount of information, which needs to be presented in a concise, uncluttered manner. To ensure this outcome can be achieved, the current Regulation prescribes standardised methods for showing boundaries and identifies conventional signs and symbols that are to be used when preparing a survey plan.

6.2.7.3 Proposed amendments

Clause 59 (insertion of new clause)

A new clause has been inserted and numbered as clause 59 in the proposed Regulation to require that:

- All angles and bearings must be shown on the survey plan in degrees, minutes and seconds, and all bearings must be reckoned and expressed clockwise from zero to 360 degrees. The method of showing bearings specified here for survey plans is the same as specified for survey field notes under clause 58 of the current Regulation (clause 57 in the proposed Regulation).
- All distances shown on the survey plan be horizontal plane distances at ground level expressed in metres unless otherwise approved.

Clause 60

Clause 60(e) has a minor amendment to remove references to compiled plans. Terrain type (i.e. whether the terrain is level/undulating or steep/mountainous) is not required for compiled plans. Requirements for compiled plans are matters that are dealt with separately by the Registrar-General as compiled plans do not have to be prepared by a surveyor.

Clause 61

Clause 61 has been amended by removing subclauses:

- 61(2) (MGA coordinate table – now dealt with in the proposed clause 70) and
- 61(3) (astronomical observations)

Co-ordinate, height difference and height schedules have been consolidated into one area of the proposed Regulation for ease of interpretation and clarity of purpose.

References to astronomical observations deleted as the practice of recording astronomical observations is considered obsolete and is superseded by the use of GNSS methods.

Proposed subclauses 61(2) – (6) added to prescribe what is required to be shown on the survey plan, with respect to the datum line of orientation and any verifying line, for each of the following methods used to orient the survey:-

- Adopted from established survey marks
- Adopted from an approved GNSS method
- Adopted from a plan filed or recorded by a public authority

and also to specify the survey plan must state the horizontal datum adopted.

Clause 62

Clause 62, method of recording bench marks, has been removed; the stipulations within clause 62 have been consolidated and clarified within proposed clauses 70 & 71. Coordinate, height difference and height schedules have been consolidated into one area of the proposed Regulation for ease of interpretation and clarity of purpose.

Clause 64

Subclause (g) (renumbered as 63(1)(g) in the proposed Regulation) has been amended by removing “compiled plans”. Requirements for compiled plans are matters that are dealt with separately by the Registrar-General as compiled plans do not have to be prepared by a surveyor.

Subclause (h) (renumbered as 63(1)(h) in the proposed Regulation) has been added specifying

a requirement to record if the clearing and blazing of boundaries has not been undertaken in accordance with clause 28(5)(d).

Clause 65

Clause 65 (renumbered as clause 64 in the proposed Regulation) deals with the method of showing natural feature boundaries.

Clause 65(b) has been amended to remove the words “an irregular line” and replaced with the phrase “spline curve”.

Clause 65(c) amended to require the tabulated bearings and distances describing the natural feature boundary to be sequential.

Clause 65(d) has been simplified by removing the words “in cases where more than 10 straight lines have been used to define the boundary created by the natural feature” and replaced with “for each lot”.

Clause 66

Clause 66 (renumbered as clause 65 in the proposed Regulation) has a minor amendment to require the descriptions and relationship of any sea wall and reclaimed land adjacent to the MHWL to be shown on “the survey plan” instead of “a survey plan”.

The requirement is for the descriptions and relationship to be shown on the survey plan which is the subject of the clause; not on a totally separate survey plan.

Clause 67

Clause 67 (renumbered as clause 66 in the proposed Regulation) has been renamed from “GNSS-derived lines to be indicated” to “Survey plan to show GNSS validation” to emphasise the proper use of GNSS equipment and stipulate requirements for showing the validation of GNSS equipment on each survey plan.

GNSS validation must be performed for each survey on which an approved GNSS method has been used and involves checking against an independent external source. It is a check to ensure that the approved GNSS method has been executed and calculated correctly for that particular survey (i.e. there are no scale errors, gross systematic errors etc.)

GNSS verification as per clause 14(2)(c) is an annual affirmation of the accuracy of the GNSS equipment.

Both GNSS validation and GNSS verification are explained in detail in Surveyor-General's Direction No. 9.

Clause 67 (clause 66 in the proposed Regulation) has been amended to now require that if an approved GNSS method is used, a surveyor is required to show on the plan, in an approved schedule, the details of the GNSS validation in accordance with the Surveyor-General's Directions.

An additional stipulation is added for surveys adopting an MGA orientation from MGA co-ordinates obtained by an approved GNSS method. In this case, the GNSS validation required above must be performed and shown for the datum line of orientation.

See appendix A for an example of an approved GNSS validation schedule.

Clause 69 (insertion of new clause)

A new clause has been inserted and numbered as clause 69 in the proposed Regulation to require that:

- where a survey is carried out that is limited in height or depth under clause 13, or
- where a new permanent survey mark is placed for urban surveys and is subject to clause 43(2), then

a surveyor is required to:

- Show all differences in height relative to the same datum and show that datum in an approved schedule on the plan,
- Show, in an approved schedule, the height differences in a closed sequence between the bench marks and/or permanent survey marks,
- Show, in an approved schedule, the survey method used to determine the height differences and
- determine all height differences to an accuracy equal to or better than Class "B" or Class "LD"

See appendix B for an example of an approved height difference schedule.

Clause 70 (insertion of new clause)

A new clause has been inserted and numbered as clause 70 in the proposed Regulation specifying requirements for showing of MGA co-ordinates on the survey plan in an approved schedule for:

- any survey mark used to define an '*accurate MGA orientation*' or
- any permanent survey mark or
- any bench mark

The survey marks above can be either found or placed.

See appendix C for an example of an approved MGA coordinate schedule.

The proposed clause 70 consolidates into one clause requirements to be found in clauses 13(6), 35(1)(b), 61(2) and 62(a) of the current Regulation.

Those requirements have been altered so that if a survey adopts an '*accurate MGA orientation*', then the MGA co-ordinates need to be shown to Class "D" or better for unestablished marks.

The only exception to the above requirement is where the mark is connected to the survey by height only, in which case the MGA co-ordinates need only be determined to a positional uncertainty of 3 metres.

Additional to previous requirements, the proposed clause 70 also requires that All MGA co-ordinates shown on the survey plan must:

- relate to the same MGA zone and that zone must be shown in an approved schedule on the survey plan, and
- be derived from the same datum and the datum adopted must be shown in an approved schedule on the survey plan and,
- show, in an approved schedule, the state of the mark to be described as either "found", "placed" or "disturbed".

The term “state” as used above is that used by the Eplan NSW_LandXML Recipie and describes whether the mark is found, placed or disturbed and gives scope to automated Eplan testing algorithms.

Clause 71 (insertion of new clause)

A new clause has been inserted and numbered as clause 71 in the proposed Regulation specifying requirements for showing AHD heights on the survey plan in an approved schedule for:

- any permanent survey marks or
- any bench marks

that are either found or placed and are subject to either clause 13 or 43(2) or both.

See appendix D for an example of an approved height schedule.

The proposed clause 71 consolidates into one clause requirements to be found in clauses 35(1)(e), 43(3)(c) and 62 of the current Regulation.

A new classification in the height schedule for marks with ‘*accurate AHD values*’ (those in SCIMS of class “B” or “LD” or better) of “height datum validation” has been added. The classifications can be either:

- “SCIMS adopted” or
- “from SCIMS – datum validation”,

where the classification “SCIMS adopted” can only be used once within a schedule.

Also additional to previous requirements, the state of the mark is to be described as either “found”, “placed” or “disturbed”. The term “state” as used above is that used by the Eplan NSW_LandXML Recipie and describes whether the mark is found, placed or disturbed and gives scope to automated Eplan testing algorithms.

6.2.7.4 Assessment of costs and benefits of proposed amendments

Most of the significant amendments in the proposed Regulation fall within this Division.

Clause 59 (insertion of new clause)

Currently, the Act or the current Regulation do not explicitly require that distances to be shown on the survey plan have to be horizontal ground distances (as opposed to slope distances, map grid distances, ellipsoidal distances etc.), nor that bearings have to be shown on the survey plan as degrees, minutes and seconds (note that clause 58 of the current Regulation specifies degrees minutes and seconds for field notes, not a survey plan).

To remove any doubt as to how to show bearings on the survey plan and what distances must be shown on the survey plan, it is appropriate to add a clause to this effect.

As at 19th May 2017, in the questionnaire regarding the proposed Regulation, of 184 industry respondents to the question “Should distances shown on the survey plan be map grid distances (as opposed to ground distances)?”, 94% answered “No”, with many comments also indicating that same preference for maintaining the currently accepted practice of showing horizontal ground distances.

As the new clause is essentially a formalizing of accepted practices, it is considered cost neutral.

Clause 60

The amendment to clause 60 is a very minor amendment that has no anticipated cost impact.

Clause 61

The amendments to clause 61 consolidate and clarify all matters regarding showing the datum line and verifying lines on the survey plan.

It is expected that in the usual course of undertaking a survey, the surveyor would verify their work by showing comparisons on the datum line and any verifying lines. There is no explicit requirement to this effect in the current Regulation. The amendments to clause 61 put it beyond doubt that comparisons are required as an affirmation of the datum line validity.

The amendments are essentially a formalizing of accepted good practices. The calculation and showing of comparisons on a plan, especially considering data from SCIMS is provided free, takes very little resources and is considered cost neutral or of negligible cost.

Clause 64

There is currently no stipulation to record on the survey plan whether clearing and blazing of a boundary has not occurred. A future user of the survey plan needs to know what boundary marking was placed so that the boundary can be readily investigated and identified.

The resources required to notate the survey plan as required are minimal and thus it is considered cost neutral or of negligible cost.

The removal of references to compiled plans is minor and is considered cost neutral.

Clause 65

Consultation with the geospatial industry indicates that the term “spline” is considered the geometric entity best suited for the graphical representation of a natural feature boundary. An acknowledged usage of the word is “spline curve”.

Note that the use of a spline refers to the graphical representation of the natural feature only (i.e. the plan drafting of the natural feature), not its legal definition. The definition of the natural feature boundary has not changed and remains the feature itself, subject to the doctrine of accretion and erosion.

Advice from the Office of the Registrar-General indicates the representation of natural feature boundaries as a “smooth wiggly line” comes from natural feature boundaries being confused with right-line boundaries in the case when natural feature boundaries were depicted as straight line chords.

As many popular CAD packages have a “spline” function and the use of a “smooth wiggly line” to depict a natural feature is standard practice, this amendment is considered cost neutral.

Clause 65(c) (renumbered as clause 64(c) in the proposed Regulation) is amended to require the tabulated bearings and distances describing the natural feature boundary to be sequential. If the bearings and distances are not sequential, the following undesirable situations occur:

- If the bearings and distances are not numbered or indexed and out of sequence, the table does not correctly and completely

describe the boundary and computed areas will be erroneous or,

- If the bearings and distances are numbered or indexed and out of sequence, the table is extremely difficult to interpret, giving increased scope to errors in interpretation.

As tabulating the bearings and distances as sequential is considered good practice for the majority of surveyors, making this good practice a requirement will affect only the minority of surveyors. For the majority of surveyors and all other stakeholders, there should be a minor cost saving through not having to interpret an out-of-sequence table.

Clause 65(d) has been simplified by removing the words “in cases where more than 10 straight lines have been used to define the boundary created by the natural feature” and replaced with “for each lot”.

The amendment facilitates ease of checking of natural feature boundary closes, especially where a lot boundary intersects the natural feature boundary and clearly defines the point at which the side boundary of a lot cuts the natural feature boundary.

The minor resources required to calculate and show this information on the plan of survey is outweighed by the cost benefit in time saved to all future surveyors and stakeholders when checking or calculating from the survey plan.

Clause 66

The amendment to clause 66 is minor and considered cost neutral.

Clause 67

All GNSS are operated by international parties. Most GNSS augmentation systems (e.g. CORSnet-NSW, GPSnet) are operated by Government or commercial third parties and are not under the surveyor’s direct control. As such, any GNSS equipment and methods used must be confirmed (“validated”) against an independent external source of known accuracy.

GNSS equipment is not a tool which can be “calibrated” in the strict sense of the word and therefore the proper use of the equipment in accordance to the Surveyor-General’s Directions is important.

As GNSS validation is a current requirement of the Surveyor-General's Direction No. 9, for the surveyors who currently follow best practice as stipulated by Surveyor-General's Direction No. 9 and show GNSS validation on the survey plan, there should be no cost incurred by the inclusion of a requirement for GNSS validation in the proposed Regulation.

The extra stipulation of validating the datum line for the case described is required so that the MGA orientation taken solely from MGA co-ordinates determined by the surveyor, using an approved GNSS method, is affirmed.

This can be considered analogous to showing comparisons on the datum line with established MGA co-ordinates or with prior plans filed or recorded by a public authority.

As surveyors using an approved GNSS method are currently required to show GNSS validation on the survey plan, the above requirement should not incur any extra cost and can be considered cost neutral.

The GNSS validation table also provides a flag to facilitate the automated E-Plan checking of clause 12 (Datum Line).

Clause 69 & 71 (insertion of new clauses)

The height datum needs to be propagated for infrastructure management and development; survey control is essential public infrastructure, in just the same way as sewer, stormwater drainage, electricity, telephone and data services. Height is an important component of survey control.

As government resources are not available to propagate the height datum in all areas of NSW, the group best placed to propagate the height datum is the surveying industry. The industry has the requisite professional skills, technical equipment and local knowledge to effectively propagate height in their local area.

The plan of survey is being used as the delivery mechanism for height from the surveying industry for several reasons:

- Previous information delivery mechanism for height was through Locality Sketch Plans. The Surveyor-General has received less than 65% of Locality Sketch Plans

for marks issued in 2016, so this delivery mechanism has demonstrably failed.

- All necessary survey information is contained in one location, allowing for the easier integration with E-Plan validation and the Surveyor-General's collation and ingestion of the information.
- In specifying both height differences and height values to be shown, the survey plan becomes self-describing and self-checking. This can be considered analogous to showing MGA co-ordinates and horizontal bearings and distances. One can be used to check the other.
- Avoids duplication of effort by different surveyors having to propagate height from a remote origin for differing stages of the same development, resulting in a net benefit to industry and community.

Surveyors who have been complying with the current Regulation by:

- Determining an AHD height for permanent survey marks as per clause 43(2)
- Providing the determined AHD height on a Locality Sketch Plan as per clause 43(3)(c)
- Lodging the Locality Sketch Plan as per clause 43(4)

will incur a minor cost in providing the height information on the plan of survey in the approved schedules. The minor cost occurs due to the extra need to calculate and show the height difference schedule. It is considered that this minor cost is significantly outweighed by the benefits listed above.

Costs incurred by surveyors who have not been complying with the current Regulation with respect to the above matters cannot be considered valid costs.

It is emphasised that the requirement to determine AHD heights has not changed; it is the delivery mechanism of the height information that changes.

The further standardisation of height information on the survey plan will enable plans to be lodged

electronically and to be examined automatically. This is a cost saving to the government and the community as the amendments will allow for greater automation and accessibility of survey information.

For the AHD height schedule, the survey technique used to derive the AHD value is not needed as it will be a derivative of the method shown in the height difference schedule.

The height datum validation comprises:

- the SCIMS AHD value adopted to derive the AHD values for marks not having an 'accurate AHD value' and
- the marks used to validate the 'accurate AHD value' of the single mark adopted

This is critical information describing what the height values determined by the surveyor are based on and what was used to check that basis and is considered cost neutral.

Clause 70 (insertion of new clause)

Consolidation of MGA coordinate schedule requirements into one clause facilitates clarity and ease of understanding.

The requirement to show an MGA coordinate schedule is considered necessary and beneficial for the following reasons:

- The MGA coordinate schedule spatially enables the survey plan without reference to any external databases, spatial information systems or plans. This enables the end user of the plan to determine the position of the survey without recourse to any of the aforementioned resources.
- In the case where an 'accurate MGA orientation' has been adopted, the MGA coordinate schedule will describe the fundamental information that forms the basis of the horizontal datum adopted. This is a fundamental outcome of a survey plan and will be increasingly important in future when horizontal coordinate datums are updated and many such former datums will exist. Should the MGA coordinate schedule not be placed on the survey plan, the end user

will have to make assumptions as to what fundamental information was used. As a survey plan is a condensed statement of observed and compiled facts, the end user of the plan should not be required to make assumptions.

- The above two points emphasise that the survey plan is self-describing and self-checking. This is an important attribute as it requires access to far fewer, if any, external information sources to use the plan.

The showing of the MGA coordinate schedule can be considered analogous to showing the reference bearing and distance for reference marks in addition to the origin Deposited Plan and type of reference mark on the plan.

Not showing the MGA coordinate table is therefore analogous to not showing the reference bearing and distance for a reference mark. The end user then has to go to another plan, to which they may not have access, in order to find the bearing and distance information and assume that information is correct.

Regarding the requirements additional to the current Regulation, if the surveyor has connected horizontally to any of the stipulated marks and the survey has an accurate MGA orientation, then it is not unreasonable to ask the surveyor to provide Class "D" MGA co-ordinates for the unestablished marks instead of hand-held GNSS co-ordinates. This enables better initial positioning of the mark.

As the unestablished marks connected horizontally will mostly have been connected so to comply with other requirements in the proposed Regulation, the additional work required to calculate the MGA co-ordinates to class "D" specification is considered minimal and the additional cost can therefore be considered negligible or neutral and is outweighed by the benefit of a better initial positioning of the mark.

Adding the requirement that the surveyor show on their plan of survey that the MGA co-ordinates are within the same MGA zone and are derived from the same datum will prevent surveyors from using co-ordinates from different co-ordinate systems (different datums and map

projection zones) on the same plan (e.g. GDA94 and GDA2020) which may result in incorrect spatial positioning and incorrect datum line orientation.

This amendment is considered to have a small cost benefit, as it prevents incorrect spatial positioning and incorrect datum line orientation, errors which may incur costs on future users of the plan.

As at 19th May 2017, in the questionnaire regarding the proposed Regulation, of 195 industry respondents to the question “Does the MGA position of a survey benefit your survey practice?”, 83% answered “Yes”.

Taken as a whole, clause 70 is considered to be cost beneficial, due to the benefits detailed above.

Use of approved schedules

The requirement for the height difference, coordinate and height schedules as per clauses 69, 70 & 71 to be “approved schedules” (i.e. of the form specified by the Surveyor-General) has been introduced for several reasons:

- Data in a standardised form means that the information is always given in a specific format, thus enabling LandXML digital lodgment automated checking procedures and ingestion; this is an enabler for the digital government Property Development Pipeline.
- Surveyors should be the subject of fewer requisitions regarding the form of the schedule required if a standardised form is specified and adhered to.
- Reduces clutter on the plan and specifies a particular place where certain information is contained, thus making manual examination and interpretation easier.

Considering the savings to be made in automation and collation of the relevant data, the use of approved schedules is considered to have a cost benefit.

6.2.8 Division 8 Public surveys

6.2.8.1 Objective of Division

To ensure that all plans prepared by government agencies are carried out in accordance with a high level of accuracy to enhance the quality of the State control survey and State cadastre.

6.2.8.2 Overview of provisions

Surveys are regularly prepared by government agencies during the course of development of railways, roads and other public infrastructure. The *Surveying and Spatial Information Act 2002* requires all public surveys to be carried out by reference to the same datum, being the Geocentric Datum of Australia. The current Regulations impose a high standard for public surveys to ensure that the survey work involved in public works also provides an ongoing benefit to the community.

6.2.8.3 Proposed amendments

Clause 71

Clause 71 (renumbered as clause 73 in the proposed Regulation) deals with Standards for public surveys under sections 4 and 5 of the Act.

Subclause (1) has been altered to refer to the term ‘*Standards and practices for Control Surveys*’ as defined in clause 5 (Definitions) instead of the full description of the precise version of the appropriate document.

6.2.8.4 Assessment of costs and benefits of proposed amendments

Clause 71

The full description of the precise version of the appropriate document has been defined in clause 5 (Definitions), as the full description has many occurrences; referencing a term in clause 5 (Definitions) means that any future re-referencing of the document version requires a change in only one location (clause 5) within the proposed Regulation. This amendment is considered to be cost neutral.

6.3 Part 3 Administration

6.3.1 Division 1 Constitution of Board

6.3.1.1 Objective of Division

To prescribe the procedural matters needed to support the Board of Surveying and Spatial Information in the exercise of its functions to ensure:

- efficient operation of Committees;
- appropriate qualifications for surveyors;
- ongoing professional development of surveyors; and
- appropriate procedures for dealing with complaints against surveyors.

6.3.1.2 Proposed amendments

Clause 77

Clause 77 (renumbered as clause 79 in the proposed Regulation) deals with qualifications for registration.

Subclause 77(d) (renumbered as 79(d) in the proposed Regulation) has been amended to stipulate that an eligibility requirement is that a person “is, in the opinion of the Board, of good character”

Clause 79

Clause 79 (renumbered as clause 81 in the proposed Regulation) deals with provision of further information and supporting evidence.

The Board issues registered surveyors with an identification card for the purpose of exercising their right under Part 4 of the Act to enter onto land to conduct a survey. To ensure all photographs on identification cards appear consistent, an amendment has been made to clause 79(e) (renumbered as clause 81(e) in the proposed Regulation) by requiring that all photographs for the identification cards issued to registered surveyors are the same standard as that required for an Australian passport photograph.

Clause 81

Clause 81 (renumbered as clause 83 in the proposed Regulation) has been amended to add underground metalliferous mines, as these

mines are considered to be subject to the same conditions as an open cut mine. The *Survey and Drafting Directions for Mine Surveyors 2015 (NSW -Mines)* (see clause 4) applies to mining surveys in relation to underground metalliferous mines.

6.3.1.3 Assessment of costs and benefits of proposed amendments

Clause 77

Simply specifying “of good character” does not define who is to adjudicate a person to be “of good character”. The proposed amendment clarifies the intent of the subclause and is considered cost neutral.

Clause 79

Bringing the identification requirement into line with other government requirements for passport sized photographs imposes no additional costs on surveyors and provides assurance to the community that a surveyor’s face can be clearly seen on their official photographic identification used under this Division. This amendment is considered cost neutral.

Clause 81

The amendment is to standardise NSW with the Australian States regarding the scope of what is considered to be a mine for the purposes of registration as a mining surveyor.

The Board of Surveying and Spatial Information would incur a minor to negligible administration cost due to this amendment.

6.4 Part 4 Miscellaneous

6.4.1 Objective of Part

Prescribes the following other matters necessary for the continued operation of the Regulation:

- fees and deposits payable;
- requirements when entering into land under s.19 of the Act;
- form and manner of certificates of authority under s.26 of the Act;
- applications to remove survey marks;
- exemptions by the Surveyor-General;

- the forms and styles of marks referred to in Clause 27 (together with how they are to be placed) as described in schedules 1-4;
- the conventional signs and symbols to be used on a survey plan as per clause 68 (renumbered as clause 67 in the proposed Regulation) as described in Schedule 5;
- the forms and certificates to be used on:
 - o a survey plan, or
 - o a notice of entry, or
 - o for a certificate of authority

as prescribed in Schedule 6

6.4.2 Overview of provisions

Part 4 deals with how a surveyor can exercise their right to enter onto land to conduct a survey. Requirements about the form of the notice, and the manner of service of the notice to the landowner are also set out.

Exemptions by the Surveyor-General are an important administrative tool that allows a surveyor to seek approval to not comply with a requirement of the current Regulation. The Surveyor-General will grant an exemption if the reasons for it are justified. The exemptions (and any conditions attached to that exemption) must be furnished to the authority which the plan is lodged with. Part 4 sets out the requirements when a surveyor applies for and receives an exemption from the Surveyor-General.

The schedules prescribe the form and style (the physical attributes) of survey marks referred to in the current Regulation, the approved signs and symbols to be used on the survey plan, the forms and certificates to be used and the fees and deposits payable under the current Regulation.

6.4.3 Proposed amendments

6.4.3.1 Clauses

Clause 88

Clause 88 (renumbered as clause 90 in the proposed Regulation) deals with applications to remove survey marks under section 24 of the Act.

Subclause (2) has been altered to include bench marks.

Clause 89

Clause 89 (renumbered as clause 91 in the proposed Regulation) deals with exemptions by the Surveyor-General.

This clause is an important provision that allows a surveyor to apply to the Surveyor-General to seek an exemption from the requirements of the Regulation.

If the Surveyor-General is of the opinion it is not practicable or necessary to comply with a requirement of the Regulation, an exemption in writing will be provided, applying only to the conduct of the relevant survey.

A new subclause (2) has been inserted to require that any survey subject to an exemption must comply with all conditions contained within the exemption, otherwise the exemption is considered ineffectual.

A new subclause (4) has been inserted to require, in the case where a survey plan to which an exemption applies is lodged with a public authority, that the public authority must be furnished with a copy of the exemption.

6.4.3.2 Schedule 1 – Bench marks

“Bench Mark” token - A new mark called a *“Bench Mark”* token has been included in the schedule. The form or style of the mark is a non-corrodible token at least 32mm in diameter and 1.5mm thick with *“Bench Mark”* permanently stamped, engraved or etched on the upper surface.

The bench mark token is of similar form and style to the State Survey Mark type 15 (SSM15) which is a durable and easy to use mark that has been adopted by the industry for other purposes. The manufacturer of the marks makes variations of the SSM15 for other applications, such as boundary marks and reference marks (each with appropriate wording on the tokens). The requirements for its use and placement are by securing it using a non corrodible nail, spike, rivet or screw.

6.4.3.3 Schedule 2 – Boundary marks

Fixed steel fence post - added as a new mark. The form of this mark is an uncapped steel fence post. The requirements for the mark are to describe the steel post at the corner. The corner does not need to be centrally located within the post.

When a boundary fence post is uncapped (i.e. hollow) it is physically very difficult to place a boundary mark. To deal with such fence posts, “Fixed Steel Fence Post” mark is to be used, which is to simply describe the mark on the plan (e.g. “centre of 100mm diameter steel fence post at corner”).

“Boundary mark” token - This has been amended to put it beyond doubt that the token can be placed on any stable structure, irrespective of the material it is made from.

6.4.3.4 Schedule 3 – Reference marks

“Reference Mark” token - Added a new reference mark to the schedule called “Reference Mark” token. The form or style of the mark is a non-corrodible token of least 32mm in diameter and 1.5mm thick with “Reference Mark” permanently stamped, engraved or etched on the upper surface.

The reference mark token is of similar form and style to the State Survey Mark type 15 (SSM15) which is a durable and easy to use mark that has been adopted by the industry for other purposes. The manufacturer of the marks makes variations of SSM15 for other applications, such as boundary marks and reference marks (each with appropriate wording on the tokens).

Drill hole and wing - The diameter of the mark has been reduced from 6mm to 5mm. Surveyors have reported the difficulty in drilling a hole of 6mm into hard surfaces such as rock or concrete. As such the diameter has been reduced to 5mm to make drilling easier.

Metal spike or galvanised iron pipe - Amended the form or style so that if using a galvanised iron pipe, the rim wall thickness has been changed from 3mm to 2.6mm to take into account commercial availability.

Specific point - A new requirement has been added to state that when referencing a specific point on a structure to a corner that abuts a road, an additional reference mark must be placed within the road corridor.

This removes the issue where the corner of a building used to reference a corner abutting a road is, for surveyors required to measure the specific point, either inaccessible or access is problematic.

The “*non-corrodible nail*” and “*PVC pipe*” marks have been removed from Schedule 3. A non-corrodible nail and PVC pipe are no longer deemed suitable as a reference mark, due to their lack of stability and reliability.

6.4.3.5 Schedule 4 – Permanent survey marks

State Survey Mark Type 16 (SSM Type 16) - A new form and style of permanent survey mark has been added to schedule 4 as Type 16 (State Survey Mark).

There are several reasons for the addition of the Type 16 SSM:

- Decrease susceptibility to topping or scalping by machinery
- Minimises trip or slip hazard
- Improve the functionality for levelling measurements
- Enables future reduction in mark types used
- Combines the best features of the current Type 1 & Type 2 SSM’s

The Type 1 and Type 2 SSM’s are remaining in the proposed Regulation, however, the future intention is to phase out production runs of the Type 1 and Type 2 SSM’s thus consolidating the permanent mark types used.

6.4.3.6 Schedule 5 – Conventional signs and symbols

A review of the signs and symbols in Schedule 5 has determined that the following signs for boundaries are no longer required and have been removed in this proposed Regulation:

- Territorial Division
- State Forest
- State Recreational Area
- National park, nature reserve or regional park
- State Coal Mine
- Public road
- Surveyed Reserved Road
- Railway
- Track

Obstructed boundary - A new symbol has been added called “Obstructed boundary”. This is represented as a solid circle and is used only for surveys where clause 28(3)(b) applies; that is, where a mark can’t be physically placed as per clause 28(3)(b).

6.4.3.7 Schedule 6 – Forms

Schedule 6 sets out the various forms and certificates required under the current Regulation.

- Form 1 is the certificate to be used for any survey plans, compiled plans and partially compiled plans.
- Form 2 is the certificate used for surveys not requiring strict accuracy (as per clause 9).
- Form 3 is the notice required under clause 86 (renumbered as clause 88 in the proposed Regulation) that must be given in writing to the landowner before a surveyor can enter onto land to conduct a land or mining survey.
- Form 4 is the certificate referred to in clause 87 (renumbered as clause 89 in the proposed Regulation) that is issued by the Surveyor-General to registered surveyors.

Form 1

The following have been added to the Survey Certificate:

- Single asterisks indicating “Strike through if inapplicable” added to the paragraph indices of paragraphs (a), (b) & (c).
- Double asterisks indicating “Specify the land actually surveyed or specify any land shown in the plan that is not the subject of the survey” added to paragraph (b)
- Paragraph for noting the datum line
- Paragraph adding the type of survey (urban or rural)
- Paragraph noting the type of terrain upon which the survey was carried out (Level-Undulating or Steep-Mountainous)

Changes to Form 1 required by the Surveyor-General include critical information used in assessing the survey plan for compliance – information which needs to be explicitly provided by the signatory – and to maintain consistency with the approved Form 6 Deposited Plan Administration Sheet of the Registrar-General.

Form 2

A paragraph for the date has been added to the Certificate as to survey not requiring strict accuracy and an oversight has been corrected.

Surveys not requiring strict accuracy should have a date of survey. This maintains consistency with other forms, each of which require a date.

Form 3

The paragraph for the surveyor’s signature and date has been standardised with Forms 1 and 2 to maintain consistent form protocols.

6.4.3.8 Schedule 7 – Fees and Deposits

Fees have been updated – the fees set out in the exposure draft of the proposed Regulation are indicative only, so that comment may be made if required, and may be subject to change for the approved 2017 Regulation.

6.4.4 Assessment of costs and benefits of proposed amendments

6.4.4.1 Clauses

Clause 88

Bench marks are an important survey infrastructure and should be protected together with other survey marks in the clause. The protection of bench marks ensures appropriate availability of height control where needed and prevents the wanton destruction of bench marks.

The amendment is considered a cost benefit, as the cost of replacing bench marks to the industry and community can be substantial.

Clause 89

Exemptions are often issued referring to only part of the survey and subject to one or more conditions. When the survey plan is lodged with the Registrar-General or a public authority, it is considered critical for the examination process that a requirement exists for the surveyor to also lodge a copy of the exemption so that a plan examiner can:

- Be aware of which part or parts of the survey plan the exemption applies to, and
- Determine whether the conditions which apply to the exemption have been met.

Furnishing and complying with a Surveyor-General's exemption merely codifies what is already expected of surveyors when lodging plans with the Registrar-General, and any other public authority. The current Regulation does not stipulate the furnishing of an exemption letter as being a requirement.

Requiring, as part of the proposed Regulation, that a surveyor is to furnish the exemption at the time of lodgment prevents the Registrar-General or any other relevant public authority from having to request, in writing, a copy of the exemption from the surveyor or, failing that, from the Surveyor-General. This saves the client and the surveyor time and expense. This amendment can therefore be considered a cost benefit.

6.4.4.2 Schedules

Introduction of new marks improves both the available options and user experience of surveyors inserting marks into surfaces, but also allows easier use and identification of the marks to consumers and government agencies when conducting surveys. The stability, reliability and commercial availability of the marks is also an important consideration, and as such several marks have been amended or retired.

The amendments to the Forms of schedule 6 are required for clarity, consistency and provision of critical information and are considered cost neutral.

The amendments to Schedule 7 are standard fee increases and are expected costs.

The amendments to the other schedules do not give rise to any costs.

7. Consultation

7.1 Presentations

During 2016 - 2017 presentations were made to various surveying industry groups within New South Wales to determine if practicing surveyors had issues or problems with the current Regulation. The presentations also gave an overview of new reforms proposed in this Regulation and to assess the feedback to those reforms. The presentations were made to the following groups and conferences:

- ISNSW Australia Day Seminar
- Association of Public Authority Surveyors (APAS),
- Country Surveyors Association,
- Cumberland Group of ISNSW,
- St George Group of ISNSW
- Hunter Manning Group of ISNSW,
- Association of Consulting Surveyors NSW (ACS NSW) webinar
- North Coast Group of ISNSW,
- North Sydney Group of ISNSW
- Survey Mapping & Managers Forum (SMMF)
- Roads & Maritime Service (GLADS conference)

It is also intended to present at:

- Southern Group ISNSW 23rd June 2017
- Murray Group 9th September 2017

7.2 Questionnaire

During the consultation process and presentations to the various surveyor groups a questionnaire was made available to determine the issues and/or problems encountered by practicing surveyors. The same questionnaire was used for each group to get a consistent summary of issues and problems from each group. To date (19th May 2017) two hundred and twenty eight (228) industry respondents have

completed the questionnaire. It is anticipated that more respondents will complete the questionnaire before submission of the proposed Regulation for approval.

To complete the online questionnaire, if you have not already done so, go to:

<https://www.surveymonkey.com/r/SSIR2017>

The questionnaire will be open until 11:45pm on Friday 21st July 2017.

7.3 Circulation of the public consultation draft Regulation and RIS

The public consultation draft of the proposed Regulation prepared by the Parliamentary Counsel's Office along with this Regulatory Impact Statement will be circulated to industry groups and government agencies/sectors. The following organisations will be referenced for comment.

- Association of Consulting Surveyors New South Wales Incorporated. (ACS NSW)
- Australian Institute of Mine Surveyors Limited (AIMS)
- Association of Public Authority Surveyors (APAS)
- Board of Surveying and Spatial Information (BOSSI)
- Department of Lands, Industry and Forestry - Crown Lands
- Director Cadastral and Geodetic Services, Queensland
- Institution of Surveyors New South Wales Incorporated (ISNSW)
- Inter-Governmental Committee on Surveying and Mapping (ICSM)
- Land and Property Information
- Mapping Sciences Institute Australia (MISA)
- Spatial Information Business Association (SIBA)

- Surveying and Mapping Industry Council (SMIC)
- Survey and Mapping Managers Forum (SMMF)
- Surveying and Spatial Sciences Institute (SSSI)
- Surveyor General of the ACT
- Surveyor General of the Northern Territory
- Surveyor General of South Australia
- Surveyor General of Tasmania
- Surveyor General of Victoria
- Surveyor General of Western Australia
- Roads and Maritime Services (RMS)
- University of Newcastle
- University of NSW

It is anticipated that the Board of Surveying and Spatial Information will forward the public consultation draft of the proposed Regulation and this Regulatory Impact Statement to all contactable Registered Surveyors.

7.4 Making a submission

Interested organisations and individuals are invited to provide a submission on any matter relevant to the proposed Regulation.

Matters covered by the principal Act – the *Surveying and Spatial Information Act 2002* – are not the subject of the consultation process.

We would prefer to receive submissions by email and request that any documents provided to us are produced in an ‘accessible’ format. Accessibility is about making documents more easily available to those members of the public who have some form of impairment (visual, physical, cognitive). Further information on how you can make your submission accessible is contained at <http://webaim.org/techniques/word/>.

We invite you to read this paper and provide comments. Additional copies of the RIS and the proposed Regulation can be downloaded from www.spatialservices.finance.nsw.gov.au/

Printed copies can be requested from DFSI Spatial Services by phone on (02) 6332 8410.

You can make submissions by:

- email to: SS-CMU@finance.nsw.gov.au, or
- post submissions to the following address:

Surveying and Spatial Information Regulation 2017
Office of the Surveyor-General
DFSI Spatial Services
PO Box 143
Bathurst, NSW, 2795

Submissions will be taken until close of business Friday 21st July 2017.

8. Appendices

8.1 Appendix A - Approved GNSS validation schedule

GNSS VALIDATION SCHEDULE				
FROM	TO	GRID BEARING	DISTANCE	METHOD
SSM 66367	SSM 19764	289°09'34"	1092.340	EDM TRAVERSE
		289°09'34"	1092.332	CORS NRTK
SSM 172630	SSM 19087	12°44'44"	453.283	EDM TRAVERSE
		12°44'44"	453.290	CORS STATIC
PM 169843	PM 169844	161°01'05"	1783.171	AUSPOS
		161°01'05"	1783.182	GNSS STATIC

8.2 Appendix B - Approved height difference schedule

HEIGHT DIFFERENCE SCHEDULE			
FROM	TO	HEIGHT DIFFERENCE	METHOD
PM 622	PM 623	+0.905	DIFFERENTIAL LEVELLING
PM 623	PM 632	-0.834	DIFFERENTIAL LEVELLING
PM 632	PM 791	+0.920	DIFFERENTIAL LEVELLING
PM 791	PM 50520	+39.098	STATIC GNSS
PM 50520	SS 67065	-43.039	TRIGONOMETRIC HEIGHTING
SS 67065	SS 61260	+1.070	DIFFERENTIAL LEVELLING
SS 61260	SS 95190	+17.333	TRIGONOMETRIC HEIGHTING
SS 95190	BM 1	-15.311	TRIGONOMETRIC HEIGHTING
BM 1	BM 2	+0.145	DIFFERENTIAL LEVELLING
BM 2	PM 622	-0.287	DIFFERENTIAL LEVELLING

HEIGHT DATUM: AHD71

Clause 69
(2)(b)

Clause 69
(2)(a)

Clause 69
(1)

Clause 69
(2)(c)

8.3 Appendix C - Approved MGA coordinate schedule

COORDINATE SCHEDULE						
MARK	MGA COORDINATES		CLASS	ORDER	METHOD	STATE
	EASTING	NORTHING				
PM 622	341 418.711	6 259 416.278	B	2	FROM SCIMS	FOUND
PM 623	341 417.817	6 259 711.967	C	3	FROM SCIMS	FOUND
PM 632	341 362.507	6 259 428.731	B	2	FROM SCIMS	FOUND
PM 791	341 232.567	6 259 432.971	C	N/A	CADASTRAL TRAVERSE	DISTURBED
PM 50520	340 415.400	6 259 009.385	C	N/A	CADASTRAL TRAVERSE	FOUND
SS 51647	341 227	6 259 043	U	N/A	HAND HELD GNSS	PLACED
SS 67065	341 471.490	6 258 704.067	C	N/A	RTK GNSS	PLACED
SS 61260	341 287.160	6 258 707.785	C	N/A	CADASTRAL TRAVERSE	PLACED
SS 95190	340 828.656	6 258 970.832	D	N/A	CADASTRAL TRAVERSE	FOUND
GI PIPE A	340 701.748	6 259 150.568	D	N/A	AUSPOS	PLACED
DH&W B	341 220.823	6 259 054.046	D	N/A	AUSPOS	PLACED
STAR PICKET C	341 176.185	6 259 075.004	D	N/A	CORS NRTK GNSS	PLACED
DH&W D	341 077.010	6 259 184.774	D	N/A	CORS STATIC GNSS	FOUND
BM 1	341408.803	6259489.927	D	N/A	CADASTRAL TRAVERSE	PLACED
BM 2	341 374	6 259 492	U	N/A	HAND HELD GNSS	PLACED
DATE OF SCIMS COORDINATES: 22-9-2016		MGA ZONE: 56		MGA DATUM: GDA94		
COMBINED SCALE FACTOR: 0.999906						

Clause 70 (2)(a)

Clause 70 (2)(b)&(c)

Clause 70 (2)(d)

Clause 70 (2)(e)

Clause 70 (2)(g)

Clause 70 (2)(h)

Clause 70 (1)(a)

Clause 70 (1)(b)

Clause 70 (2)(f)

8.4 Appendix D - Approved height schedule

The diagram features four callouts at the top pointing to the first four columns of the table: 'Clause 71 (2)(a)' points to MARK, 'Clause 71 (2)(b)' points to AHD VALUE, 'Clause 71 (2)(c)' points to ORDER, and 'Clause 71 (2)(d)' points to HEIGHT DATUM VALIDATION. At the bottom, three callouts point to summary information: 'Clause 71 (2)(f)' points to the date of SCIMS coordinates, 'Clause 71 (1)' points to the height datum, and 'Clause 71 (2)(e)' points to the STATE column.

HEIGHT SCHEDULE					
MARK	AHD VALUE	CLASS	ORDER	HEIGHT DATUM VALIDATION	STATE
PM 622	4.578	LB	L2	SCIMS ADOPTED	FOUND
PM 623	5.480	LB	L2	FROM SCIMS - DATUM VALIDATION	FOUND
PM 632	4.647	LB	L2	FROM SCIMS - DATUM VALIDATION	FOUND
PM 791	5.569	LC	N/A		DISTURBED
PM 50520	44.672	LB	L2	FROM SCIMS - DATUM VALIDATION	FOUND
SS 67065	1.628	LC	N/A		PLACED
SS 61260	2.698	LD	N/A		PLACED
SS 95190	20.023	LC	L3	FROM SCIMS - DATUM VALIDATION	FOUND
BM 1	4.720	B	N/A		PLACED
BM 2	4.865	LD	N/A		PLACED
DATE OF SCIMS COORDINATES: 22-9-2016			HEIGHT DATUM: AHD71		

