

The Review of the Rules for Cadastral Survey

Stage 2 – Part 2 Consultation on proposed changes

24 January 2019

Topics include:

- Connection to a horizontal or vertical control mark (revised)
- Defining by survey and adopting
- Accuracy standards
- Water and irregular boundaries
- The wet cadastre
- Repackaging CSD Plan information
- Recording surrendered easements/marks not found
- Appellations for strata parcels and units
- Reinstatement surveys
- Defining source of adoptions
- Good survey practice
- Hierarchy of evidence

Have your say on the Review of the Rules for Cadastral Survey

The Surveyor-General is seeking feedback on this second set of proposed changes to the Rules for Cadastral Survey 2010.

Your feedback

1. Feedback can be provided by:
 - (a) Submitting an individual or collective written submission.
 - (b) Contributing to a submission from an organisation or professional body.
2. It would be helpful if feedback:
 - (c) refers to the section number in this document where possible.
 - (d) includes the reason behind your comments, possibly through citing an example.
3. Email written feedback to: sgrulesreview@linz.govt.nz

Feedback is due by Thursday 7 March 2019.

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Enquiries

Email: sgrulesreview@linz.govt.nz

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Foreword

We have continued our work on reviewing the Rules for Cadastral Survey 2010 following feedback on the [Issues and Opportunities paper](#) (published in August 2017) and our first round of consultation on topics set out in the document [Stage 2-Part 1 Consultation on proposed changes](#) (published on 30 July 2018).

Our focus has been on continuing considering the ideas set out in the Issues and Opportunities paper as well as reviewing the feedback resulting from the first round of consultation.

We have also continued our discussions with the reference group of cadastral survey experts from the private sector as well as LINZ subject matter experts.

There are three types of topics set out in this document:

- those relating to the technical aspects of surveying. Examples include connection to horizontal and vertical control marks, defining by survey and accuracy tolerances.
- how information could be repackaged in a CSD and how this information is recorded. Examples include repackaging CSD Plan information and recording easements.
- those relating to the duty of a surveyor. These include good survey practice and the hierarchy of evidence.

We have also continued liaising with Parliamentary Counsel Office (PCO) on the layout and the order of rules. You will get the opportunity to provide feedback on the proposed rules in actual draft form during the Stage Three consultation mid-year.

We look forward to receiving your feedback on the proposals and questions set out in this document.

Anselm Haanen
Acting Surveyor-General / Kairūri Matua

1 Overview

1.1 The purpose of this document

This document sets out in detail a second set of proposed changes to the Rules for Cadastral Survey.

1.2 Overview of the Rules review process

Diagram 1 below illustrates the overall process and indicative timing. After considering feedback received on the proposals set out in this document, we will move to Stage Three and draft proposed rules.

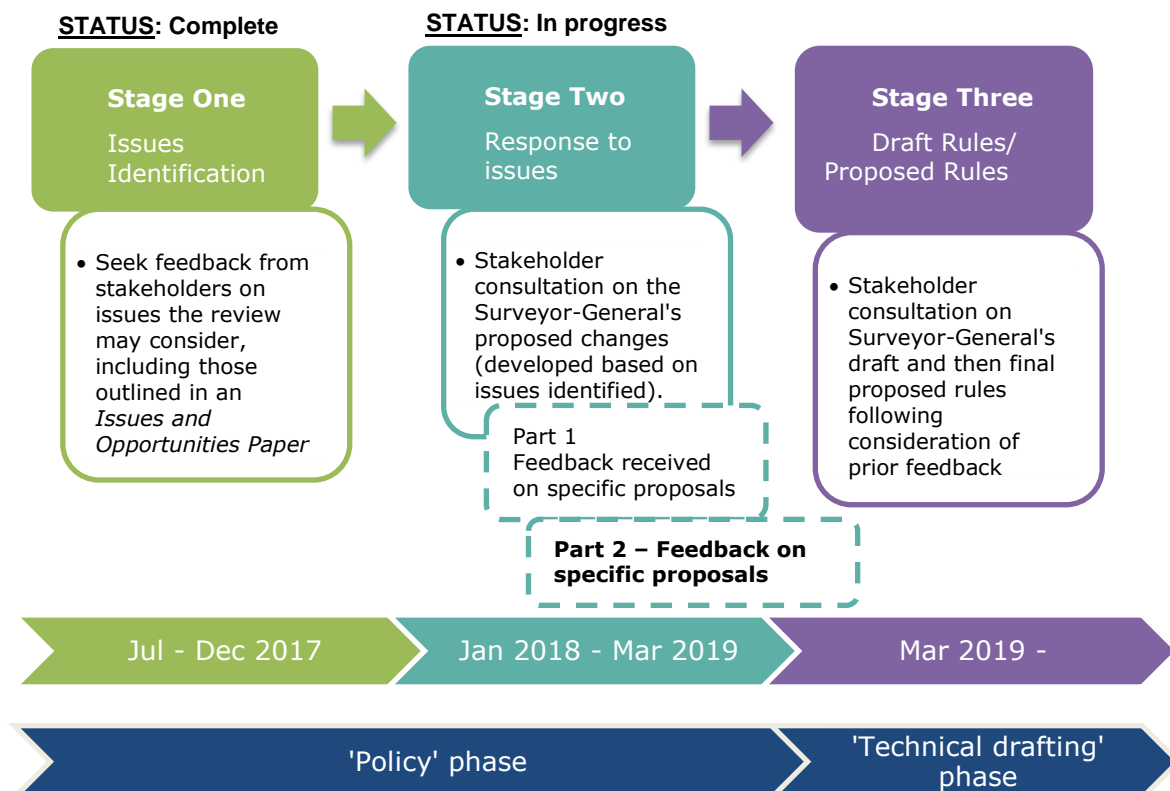


Diagram 1: Review consultation process

1.3 Matters to consider

You may wish to consider the following questions when thinking about each of the topics:

- Does the proposal simplify existing requirements and therefore make their understanding and meaning easier to implement?
- What are the compliance costs in implementing the proposal and will they be reasonable? In other words, will the proposal achieve the right balance between compliance (managing risk) and flexibility (achieving the outcomes efficiently and effectively)?
- Is the proposal looking to the future adequately particularly when considering future technological developments and the expectations of users of cadastral information?
- How does the proposal contribute to the cadastre and if implemented how it would benefit surveyors using the cadastre or others who have an interest in the cadastre?

1.4 Useful links

Further information can be found using the following links:

- [Review of the Rules for Cadastral Survey – Issues and Opportunities paper.](#)
- [Review of the Rules for Cadastral Survey – Consultation on proposed changes Stage 2 – Part 1.](#)
- [Rules for Cadastral Survey 2010.](#)
- [Rules, Standards and Guidelines](#) for the conduct and processing of cadastral surveys, and for the integration and provision of cadastral survey data.

2 Connection to a horizontal control mark or vertical control mark (revised)

These following proposals differ and replace what was presented to surveyors in Section 4 (Connection to a horizontal control mark) and Section 5 (Reduced levels and official vertical datums) in the document [Stage 2 – part 1 Consultation on proposed changes 30 July 2018](#).

2.1 Summary of proposal

2.1.1 Horizontal connection to a CSNM

- 1) It is proposed where a survey defines a new primary parcel it must connect to an existing cadastral survey network mark (CSNM)¹ if it is within 1000m. If there are no CSNMs within that distance, a connection must be made to a CSNM at any distance.

This is different to the proposal presented to surveyors on 30 July 2018 which set out that:

- all class A surveys would be required to connect to a CSNM, and
- all class B and C surveys would be required to make the connection where such a mark is within 5km.

2.1.2 Referencing in terms of an official vertical datum

- 2) It is proposed where a new stratum boundary is being defined its height must be in terms of an existing vertical control mark (VCM)² if one exists within 1000m of the new stratum boundary. If such a mark does not exist within that distance, the height must be in terms of any VCM at any distance.

This is different to the earlier proposal which set out that the boundary must be in terms of an existing non-boundary mark with a NZVD2016 height if it was within 5km of the new stratum boundary and if there is no such mark within that distance, any mark with a NZVD2016 reduced level at any distance.

¹ Landonline order 6 or higher - refer to LINZR 65302.

² Landonline order 3V or higher - refer to LINZR 65303.

2.2 Background

- 3) Feedback received on the initial proposals put to surveyors in July 2018 regarding the connection to a CSNM or referencing in terms of a heightened mark within 5km expressed the view that this requirement would be unreasonable where access to close-by CSNMs/ heightened marks was difficult or GNSS could not be used. It was also mentioned that there was no benefit to the subdividing owner of requiring these connections.
- 4) Increasingly surveyors rely directly or indirectly on a survey accurate cadastre to undertake their survey more efficiently. They rely on numerous office applications (using LINZ cadastral data as base material) to prepare survey estimates, map overlays, resource management applications, and undertake planning and topographical mapping. In the field they no longer just turn up on site with a finder diagram and a cloth tape looking for a survey mark from which they calculate and search for other marks. Today there are significant efficiencies gained by first downloading survey accurate coordinates from the integrated cadastre directly to a GNSS receiver or total station, or use the LINZ geodetic mark app for [Android](#) and [Apple](#) devices to navigate to any existing non-boundary mark.

The demand from users other than surveyors for a more accurate integrated cadastre is also increasing. Today private companies, infrastructure agencies, local authorities and LINZ are committing considerable amounts of time and money upgrading the spatial cadastre for their own uses. Solicitors also use the cadastral data in [eMap](#) office software when researching and discussing property boundaries with clients.

The success of these methods relies on surveyed boundaries being accurately interconnected and integrated into a survey-accurate network. It is appropriate that cadastral surveys, being the base ingredient of the cadastre, contribute³ where appropriate⁴ to a survey-accurate integrated cadastre.

- 5) On reconsideration of the implications and compliance costs to a small minority of cadastral surveys balanced against the benefits of maintaining a survey accurate 3D cadastre and ensuring on-going future confidence in the cadastre (including for cadastral purposes and purposes other than cadastral surveying) the original proposals have been amended to:
 - allow greater flexibility in terms of how the connection/referencing can be made, and
 - require all new surveys to be coordinated/referenced in terms of the controlling horizontal and vertical networks.

GNSS technology can be used to accurately connect a survey to a convenient CSNM, including a continuously operating reference station that may be hundreds of kilometres away and using the PositionNZ service.⁵ The costs associated with

³ Section 7(2)(d) of the Cadastral Survey Act 2002 requires the Surveyor-General to exercise his functions having regard to the use of cadastral survey data for purposes other than cadastral surveys.

⁴ Section 49(3) of the Cadastral Survey Act 2002 sets out the conditions of exercising this function.

⁵ GNSS technology and the LINZ [PositionNZ Post Processing Service](#) enables accurate and efficient connections to be made to a CSNM without the need to physically visit it. PositionNZ-PP is a free automated service that processes GNSS data to obtain local circuit NZGD2000 coordinates and NZVD2016 heights. No prior experience in post processing is required to use it. To use this service, static observations must be recorded at 30 second epochs for a minimum of one hour from a PRM on the subject survey. This can be achieved by simultaneously logging data at a base station while undertaking RTK (*continued next page*)

making such a connection could be significantly less than making a connection to a mark in the vicinity of the survey that may be difficult to access.

2.3 Proposal in detail

2.3.1 Horizontal connection to a CSNM

- 6) For a survey that defines a new primary parcel⁶ it is proposed that:
- if one or more CSNMs exist within 1000m of a new or old boundary point then at least one of those marks must be connected to.
 - If there is no CSNM within 1000m the survey must be connected to any CSNM regardless of distance.

2.3.2 Connection to a vertical datum

- 7) Where a new primary or non-primary stratum boundary is being defined it is proposed:
- heights shown in the CSD must be expressed in terms of an official vertical datum (the applicable local official datum or NZVD2016) (this is unchanged from the proposal presented to surveyors on 30 July 2018).
 - no new stratum boundary may be in terms of an alternative or assumed vertical datum (unchanged).
 - heights must be referenced to an existing VCM if it exists within 1000m of the boundary. Where such a mark is not within this distance, the heights must be referenced to any VCM regardless of distance (changed).
- 8) These proposals simplify the requirements by having a standard distance of 1000m for both the horizontal and vertical connections regardless of class of boundary as well as providing flexibility to connect to any CSNM outside this distance. Providing flexibility allows connections to be made to remote CSNMs without having to physically visit closer marks that could be difficult and time consuming to access.
- 9) In many cases an existing mark will serve as both a CSNM and VCM, particularly where it is a control mark.

2.3.3 Accuracy of connection to a CSNM or referencing in terms of a VCM

- 10) It is proposed that the maximum accuracy tolerance for the horizontal connection to a CSNM or heights in terms of a VCM will be 0.20m – refer to [section 4 Accuracy Standards](#) below.

(continued) measurements. Alternatively, a separate receiver can be set up to record the static observations. The static observations must be downloaded as Rinex 2.11 for processing. Following the prompts on the [website](#) the Rinex files are uploaded on the PositioNZ-PP service where they are processed and results returned within 10 minutes. The results include NZGD2000 coordinates in different coordinate systems, NZVD2016 heights, and a KML file showing the marks and baselines used in the processing. Using the PositioNZ-PP derived local circuit coordinate, a join (noting it must be an ellipsoidal distance) can be calculated from the PRM to one of 3 zero order stations. The join (as a vector) can then be 'captured' into the CSD. LINZ has prepared SO 428474 to illustrate the process noting it shows separate joins to each of the zero order stations used in the solution even though only one connection is required by the rules. Click [results](#) for the PositioNZ-PP summary.

⁶ For a full understanding of when this will apply refer to the introduction in current rule 4.2.

3 Defining by survey and adopting

The following section outlines a proposed change to 'defining by survey' and 'defining by adoption'.

3.1 Summary of proposal

- 11) It is proposed to simplify the requirements for 'defining by survey' and 'defining by adoption'. In addition changes to Landonline to simplify their application, and SG guidance to explain how they apply, will be made.

3.2 Background

- 12) Feedback on the terms 'define by survey' and 'defining by adoption' included:

- There is a lack of clarity as to the application of 'defined by survey', 'defined by adoption' and 'accepted'.
- There is confusion between these terms in the rules and Landonline requiring a surveyor to record a mark purpose as defined by survey/adopted or accepted.
- Defining by survey should mean 'old mark confirmed' or 'new mark placed' or 'full definition'.
- Rule 6.2(a)(iv) relating to parcels less than 0.4 ha is confusing.
- While the terminology initially caused difficulties, it is felt most users were now familiar with it. Any changes should be minor so surveyors and LINZ staff did not have to learn new terms and their application. Improved data validation in Landonline is seen as one way to improve compliance.

- 13) Landonline functionality requires the mark purpose for boundary marks to be recorded as defined by survey, adopted or accepted so it can test for compliance of rules 3 (Accuracies), 6.2 (Boundaries to be defined by survey), 6.3 (Acceptance of a boundary), 6.4 (Boundaries defined by adoption), 7.3 (Witnessing), and 7.4 (PRMs). The relationship between mark purpose and mark state is confusing. They are separate items of information but the word 'adoption' or 'adopted' is available for both items and has different but related meanings in each context. The following table shows the potential relationships between Mark Purpose and Mark State and the potential for confusion.

Table D Mark state and purpose

Mark state	Mark purpose where defined by survey	Mark purpose where defined by adoption	Mark purpose where accepted
New	✓	n/a	n/a
Old	✓	n/a	n/a
Adopted	✓	✓	✓

The Table highlights an element of particular confusion: a mark that is required to be defined by survey may nevertheless be adopted. Adding to the confusion Landonline functionality also provides for others mark purposes (including Non-boundary, Not defined, PRM, PRM/Boundary and Witness), mark conditions and

mark types. Many of the mark conditions appear to be not particularly relevant to the survey and could be rationalised.

3.3 Proposal in detail

This section sets out in detail the proposed changes to:

- rule requirements,
- Landonline functionality, and
- SG guidance.

3.3.1 Changes to rule requirements

- 14) From a survey principle perspective, an existing boundary that meets the relevant accuracy standards should be allowed to be re-used (adopted). Where it does not meet the accuracy standards it should be defined by survey, or in certain circumstances be permitted to be accepted.
- 15) It is proposed that changes are made to the three current categories that reflect the quality of boundary definition:
- defined by survey – the highest quality of definition.

It is proposed that the criteria where a boundary is required to be defined by survey is changed by removing the requirements in current rule 6.2(a)(iv) and related 6.2(c). This means for class A there will not be a requirement to define by survey existing boundaries and boundary points where the parcel is less than 0.4 ha.⁷ Diagrams 2 and 3 below illustrate two cases where the changes might impact on a subdivision of a primary parcel.

Where a new boundary intersects an existing boundary, rule 6.1 (duty of surveyor when defining a boundary by survey) will still apply and typically require adjacent existing boundary points to be located to ensure the intersection is correctly determined.

- adopted.

The term 'defined by adoption' will not be used in the rules. This will remove the requirement to capture adopted boundary points as 'defined by adoption', but still allows surveyors to adopt boundary and boundary points that meet the accuracy standards.

- accepted – the lowest quality of definition.

This will remain unchanged. This applies to existing boundaries and boundary points where the surveyor is permitted to 'copy without change' a boundary or boundary point from an existing survey that may not or does not meet the normal standards.

⁷ There will still be a requirement to define by survey where there is a survey or title anomaly, e.g. survey conflict or limited as to parcels title.

- 16) Diagram 2 illustrates a primary parcel being subdivided into two new primary parcels with the new 'defined by survey' boundaries and boundary points shown in red. The existing boundaries and boundary points that can be adopted are indicated by purple arrows.

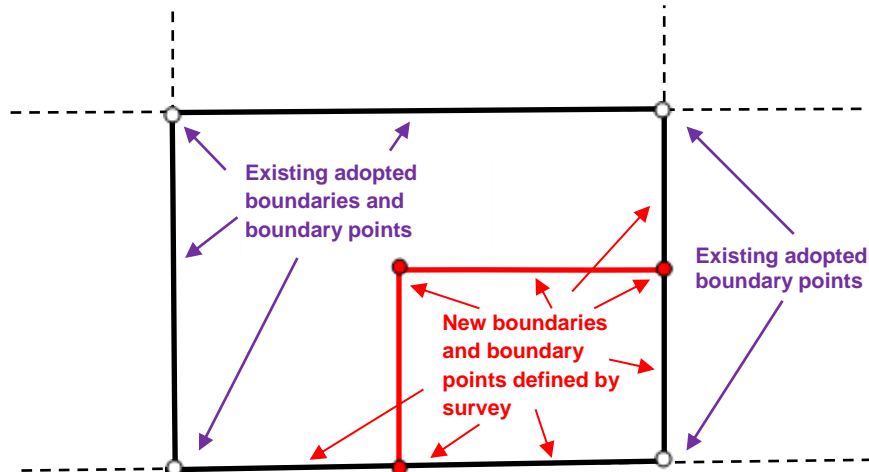


Diagram 2

- 17) Diagram 3 illustrates a primary parcel being subdivided into two new primary parcels by the calculation of a new boundary between existing primary parcel boundary points. For this to occur the adopted boundaries and the new calculated boundary must meet the appropriate accuracy standards. No field survey would be required.

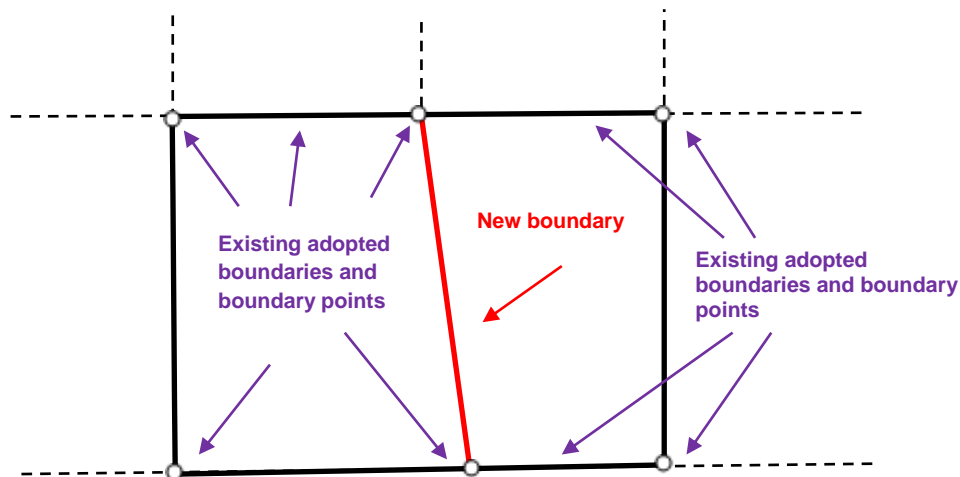


Diagram 3

3.3.2 Changes to Landonline

- 18) Removing 'defining by adoption' from the rules will enable the mark state and purpose information to be simplified.
- 19) At the same time changes are made to the rules it will be recommended that changes are made to simplify the type of mark information required and how it is captured into Landonline. This includes improved data validation so only correctly captured information can be submitted.

3.3.3 Changes to SG guidance

- 20) It is proposed that Surveyor-General guidance is rewritten with a focus on providing a better understanding and application of the 3 levels of definition.

4 Accuracy standards

4.1 Summary of proposal

- 21) It is proposed to change the accuracy standards by:
- having one standard rather than separate 95% and 100% confidence level standards for non-boundary marks and boundary points.
 - tightening the maximum accuracy tolerance for connection to old and new non-boundary marks including any measured connection to an existing cadastral survey network mark (CSNM) or vertical control mark (i.e. 3v or higher).
 - including a comprehensive package of appropriate vertical accuracy standards.

4.2 Background

4.2.1 Feedback

- 22) Surveyors have provided feedback on accuracy standards.

The feedback is summarised as follows:

- The 2 tiers of accuracy standards (one standard for new marks and another for new and adopted marks) are confusing and not well understood.
- The 'least squares' method of specification is not well understood, and it would be preferable to return to representative fractions or ratios as set out in prior rules.
- There are mixed views on the adequacy of the accuracy standards in urban areas.

4.2.2 Accuracy framework

- 23) The current accuracy standards are based on requiring the accuracy of boundary positions to be aligned with the:
- landowners need to have confidence in the location of their boundaries for their ownership needs and derive economic benefit from the land.
 - increasing need for all surveys (boundary point and non-boundary marks) to be accurately interconnected.
 - need to be able to confidently re-establish the boundaries in the future, and
 - increasing need for a survey accurate integrated cadastre.
- 24) The tolerances set out in rule 3.1 (accuracy of non-boundary survey marks), 3.2 (accuracy class of boundaries), 3.3 (accuracy of right-line boundaries and arc boundaries) and 3.6 (accuracy of boundary witnessing) work together to create a cohesive accuracy framework both at the micro level (e.g. between adjacent boundary points) and macro level (e.g. between boundary points and survey marks kilometres apart). It is based on three types of known relationships:
- Boundary point to boundary point.
 - Boundary point to witness mark (non-boundary mark).
 - Non-boundary mark to non-boundary (including connection to a CSNM).

This proposal retains this framework, but changes some of tolerance values to recognise the way that they interact with each other.

4.2.3 Reviewing the standards

- 25) **Having separate 95% and 100% confidence level standards.** Having separate 95% and 100% confidence level standards for non-boundary marks and boundary points, while theoretically necessary for least squares analysis and adjustment, adds confusion when a surveyor is attempting to determine whether their survey complies with the standards or not. From a practical perspective, where a surveyor applies sound methodology and uses the appropriate equipment, they can expect to achieve the 100% standard. It is proposed to have one standard rather than separate 95% and 100% confidence level standards for non-boundary marks and boundaries.

For boundaries of a new parcel, it is proposed that this one standard of accuracy apply to all the boundaries, regardless of whether they are surveyed or adopted. The current standards for new work are tighter than for adopted work (for class A these start at 0.04m compared with 0.06m for adoptions).

The proposal sets the standard for boundary to boundary at the 'adopted' level, but tightens the witnessing accuracy for class A boundaries to ensure that new boundaries meet the same overall level of accuracy expected under the current rules.

- 26) **Tightening the maximum horizontal accuracy tolerance for connection to old and new non-boundary marks.** Users need a more accurate integrated cadastre (the 0.50m tolerance is not sufficiently adequate for the accuracies required for the survey mark infrastructure) and modern technology enables increasingly accurate and cost-effective measurement between survey marks. It is therefore proposed that:

- the accuracy tolerance cap for horizontal connection to old and new non-boundary marks and to a cadastral survey network mark (CSNM) is tightened from the current 0.50m (refer rule 3.1(c)) to 0.20m. GNSS technology is readily able to achieve accuracies better than 0.20m over very long distances so the compliance cost resulting from this tightening is expected to be small.⁸ This proposal is set out in [Section 4.3.1 Accuracy of non-boundary marks](#) below.

In conjunction with this, it is proposed that all cadastral surveys that define a new primary parcel must connect to a CSNM. This is set out above in [Section 2.3.1 Horizontal connection to a CSNM](#) above.

- 27) **Having a comprehensive package of appropriate vertical accuracy standards.** Vertical accuracy standards need to cover the relationship between reference marks (including the mark used for the origin of heights), between reference marks and boundary points (witnessing) and between boundary points. While this in principle is the same for horizontal accuracy requirements, there are

⁸ Using the more stringent test of 0.20m LINZ tested all CSDs lodged between 1 Jan – 1 July 2018. All but 8 passed. All the 8 failures had unusual configurations such as bearing only 'trig shots' or poorly connected islands of new survey work. In principle, the trig observation can be removed from the accuracy tests but where there are poorly connected islands of new survey work the surveyor would have to make better connections.

important differences related to what vertical accuracies can reasonably be achieved.

Surveyors applying appropriate survey practise and using GNSS can be expected to achieve vertical accuracies of 30mm over a kilometre.⁹ It is not reasonable or practical to set accuracy tolerances near this level. For the relationship between:

- heightened reference marks (including the origin of heights), it is proposed that the accuracy tolerance has a constant of 0.04m (to allow for short lines) and have a distance dependant multiplier of 0.0001 per m where the distance is the slope distance between the marks. This is looser than current rule 3.1 which requires the distance to be the vertical distance which may not have always been achievable. The proposal is set out below in [Section 4.3.1 Accuracy of non-boundary marks](#).
- heightened boundary points, the proposed accuracy standards are the same as the horizontal witnessing standard. They are set out below in [Section 4.3.2 Accuracy of right-line and arc boundaries](#).
- heightened reference marks and heightened boundary points (witnessing), the proposed accuracy standards are similar to the horizontal witnessing standard except in the case of class A where they are not as tight. They are set out below in [Section 4.3.3 Accuracy of boundary witnessing](#).

- 28) Accuracy tolerances are a minimum standard. Surveyors may, if they wish and particularly in high value urban scenarios, carry out cadastral surveys to a higher accuracy level. While changes to individual tolerances are proposed, the overall regime proposed does not fundamentally change the horizontal accuracy tolerances for class A.

4.3 Proposal in detail

4.3.1 Accuracy of non-boundary marks

- 29) The proposed accuracy tolerances for non-boundary marks are as follows:

Table A Accuracy requirements for non-boundary marks on a survey

The horizontal and vertical accuracy between...	Horizontal must not exceed ^a ...	Vertical must not exceed ^b ...
(a) any two non-boundary marks, whether new or old, or adopted cadastral survey network marks.	$0.025\text{m} + (\text{dist} \times 0.0001\text{m})$	$0.04\text{m} + (\text{dist} \times 0.0001\text{m})$
(b) any two new or old non-boundary marks.	0.20m	0.20m
^a Where <i>dist</i> is the horizontal distance between the marks in metres. ^b Where <i>dist</i> is the slope distance between the marks in metres.		

⁹ GNSS RTK vertical accuracies are stated as 15mm + 1ppm. For a line of 1000m surveyors can ignore the 1ppm so the vertical RMS (or standard deviation) is 15mm. At a 95% confidence interval (a practical substitute for a 100% standard), this is multiplied by 2 to get 30mm. However cadastral surveys should always be occupying a GNSS point at least twice, separated by at least 30 minutes as part of mitigation against multipath and other local errors. If occupied twice, then the vector to the base station is more accurate by a factor of $\sqrt{2}$. This means the 30mm reduces to 21mm. However, because the accuracy tolerance relates to the vector between any two heightened points (which is the difference between the vector from each point to the base station), the root-sum-square for each point ($\sqrt{(21^2 + 21^2)}$) is used and the accuracy ends up back at 30mm.

30) Under this proposal the:

- specification of the mark types described in (a) and (b) above is the same as currently set out in current Rule 3.1 Table 1 (b) and (c).
- accuracy requirements of non-boundary marks are simplified by having a single tolerance (at the 100% confidence level).

31) The maximum horizontal and vertical tolerance between new and old marks is set at 0.20m (current rule 3.1(c) allows 0.50m).

The horizontal (b) tolerance of 0.20m in effect caps the proposed (a) tolerance between old or new non-boundary marks that are more than 1750m apart (see Diagram 4 below).

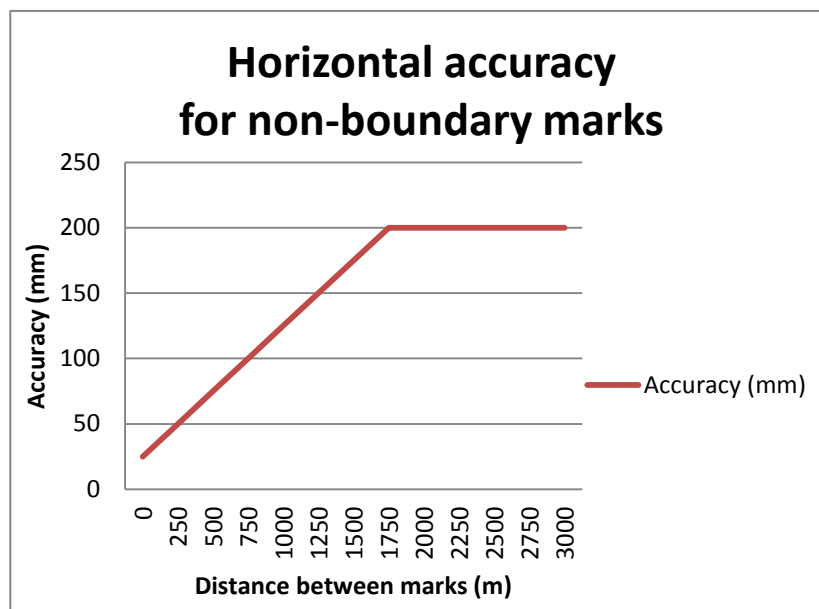


Diagram 4

Modern survey equipment and measurement techniques mean vectors can be measured accurately over many kilometres:

- RTK GNSS can achieve horizontal accuracies of 8mm + 1mm per km¹⁰ for vectors less than 30km. For static GNSS accuracies of 3mm + 0.5ppm per km is achievable.
- RTK vertical accuracies are stated as 15mm + 1mm per km.

32) The proposed (b) tolerance applies only to old and new marks and adopted CSNMs but not other adopted marks (unchanged from the current rules).

In the case of horizontal marks this means the accuracy tolerances do not apply to adopted 'traverses' which could fail the accuracy tolerances, but which are used as best evidence of a boundary location (e.g. a chain of old traverse adoptions down a

¹⁰ Trimble R10 [Datasheet](#)

road centreline to the parcel being surveyed) or as an adopted connection to a CSNM in terms of rule 4.2 (Horizontal datum- connection).

33) To illustrate how these tolerances could work in practice, in Diagram 6 below a primary parcel is subdivided into 4 new 3D primary parcels with upper and lower stratum boundaries.

- The horizontal accuracy tolerance of $0.025\text{m} + (\text{dist} \times 0.0001\text{m})$ applies to the horizontal distances between OITX and PRMs 1 to 3 and between each of the PRMs.
- The vertical accuracy tolerance of $0.040\text{m} + (\text{dist} \times 0.0001\text{m})$ applies to the slope distance between OITX and PRMs 1 to 3 and between each of the PRMs.

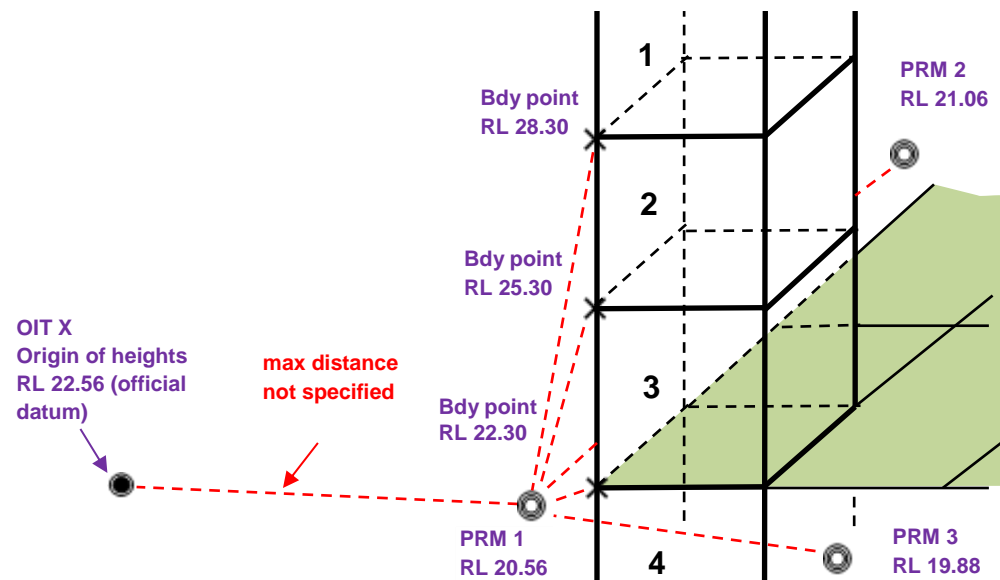


Diagram 6

Note:

- The accuracy tolerance between the PRMs and the boundary points with RLs is set out below in [Section 4.3.3 Accuracy of boundary witnessing](#).
- The maximum distance between a PRM and a referenced (witnessed) boundary point is proposed to be 150m for class A and 500m for class B.¹¹
- There is no maximum distance specified between PRMs with RLs and the mark used for the origin of heights (OITX).¹² Where OITX does not meet the criteria for a reference mark it does not have to meet the accuracy standard for boundary witnessing (although it will still have to meet the standard for accuracy between non-boundary marks).

¹¹ Refer to Stage 2 – Part 1 Consultation on proposed changes, 30 July 2018, Section 3.

¹² Refer to Stage 2 – Part 1 Consultation on proposed changes, 30 July 2018, Section 5.

4.3.2 Accuracy of right-line and arc boundaries

34) The proposed accuracy tolerances for right-line and arc boundaries are as follows:

Table B Accuracy requirements for boundary points on a parcel being surveyed

Boundary class	The accuracy between...	Horizontal must not exceed ^a ...	Vertical must not exceed ^b ...
A	Any boundary point and any other boundary point, including new, old and adopted points irrespective of these points being marked or not ...	0.06m + (<i>dist</i> × 0.00015m)	
B		0.30m + (<i>dist</i> × 0.0006m)	
C		1.00m + (<i>dist</i> × 0.003m)	
D	not specified		
^a Where <i>dist</i> is the horizontal distance between the points in metres.			
^b Where <i>dist</i> is the slope distance between the points in metres.			

35) Under this proposal the:

- specification of the boundary point types (new, old, adopted) are the same as currently set out in Rule 3.3.1 Table 1 (a)(ii), (iv), (vi) and (vii).
- accuracy requirements for boundary points are simplified by retaining the 100% tolerance specifications for class A, B and C (including the numerical values) currently in rule 3.3.1 but not the tighter statistical tolerances for the 95% confidence level.
- horizontal and vertical accuracy tolerances for the respective classes are the same.

36) It is also proposed that:

- the tolerances apply to the relationship between all boundary points on an individual parcel being surveyed, but not necessarily to the relationship to boundary points on other parcels on the same survey even if they adjoin. This is different to the current rules which require the relationship to boundary points on all parcels being surveyed to meet the tolerance.
- accuracy tolerances do not apply to adopted boundary vectors which are not on the parcel being defined but, which are used as best evidence of a boundary location and which could fail modern accuracy tolerances (e.g. a chain of old boundary adoptions down a road side to the parcel being surveyed).

4.3.3 Accuracy of boundary witnessing

- 37) The proposed horizontal tolerance for boundary-to-boundary accuracy is set at the current level for adoptions (i.e. starting at 0.06m for class A, rather than 0.04m) – see [Section 4.3.2 Accuracy of right-line and arc boundaries](#) above.

To ensure that new boundaries meet the same overall level of horizontal accuracy expected under the current rules it is proposed to tighten the witnessing accuracy for class A boundaries from 0.04m to 0.03m.¹³

The horizontal and vertical accuracies between a boundary point required to be witnessed and its witness mark are proposed as follows:

Table C Tolerances for boundary witnessing

Class of boundary point	Horizontal Tolerance	Vertical Tolerance
A	0.03m	0.04m
B	0.20m	0.20m
C	0.60m	0.60m
D	not applicable	Not applicable

- 38) Under this proposal:

- the class A boundary-to-boundary accuracy implicit in a witnessing accuracy of 0.03m is 0.042m¹⁴
- the vertical accuracy tolerances for stratum boundary points remain the same as the current requirements (refer rule 3.6).

¹³ This lesser value is the same as used for class I surveys in rule 26(2)(b)(ii) Surveyor-General's Rules for Cadastral Survey 2002/2.

¹⁴ Being the root sum square of the 0.03m applied to both points.

4.3.4 Accuracy of water and irregular boundaries

- 39) It is proposed that an accuracy class of boundary (A, B, C or D) will not be required for water boundaries or irregular boundaries. Accuracy classes of boundaries are defined to enable the application of the accuracy tolerances currently specified rule 3). However, the tolerances are numerical and specifically relate only to right line, arc and stratum boundaries. The accuracy requirements for water and irregular boundaries, currently rule 3.4, are not numerical.

Without an accuracy class, for a new primary parcel bounded by an existing water or irregular boundary:

- and the new parcel is 100ha or less, the existing boundary will need to be assessed to determine if its documented shape and location reflects its current physical location (using the factors in rule 3.4). If the documented boundary is sufficiently accurate (determined by the factors set out in rule 3.4), it may be adopted. If it is not sufficiently accurate, the boundary will need to be defined by survey (re-surveyed), taking into account any legal principles that may apply (e.g. accretion, erosion, better fix).
- and the new parcel is over 100ha, the shape and location of an existing water boundary or irregular boundary may be copied without change from the relevant approved CSD (no assessment in terms of rule 3.4 is required) in which case it would become an accepted boundary.

These are the same requirements as under the current rules (refer rules 3.3.2, 3.4, 6.2, 6.3 and 6.4).

- 40) It is proposed that no changes are made to the accuracy requirements for water boundaries and irregular boundaries.

This means the factors set out in current rule 3.4 would be retained.

4.3.5 Accuracy of intersection of water and irregular boundaries

- 41) It is proposed for a right-line boundary that intersects a water or irregular boundary:
- the bearing must be sufficiently accurate to enable the boundary to meet class A, B and C accuracies (as appropriate)
 - the distance accuracy must reflect the accuracy of the water and irregular boundary as determined by rule 3.4.
- 42) Diagram 7 below illustrates the application of the proposal in the case of a new class A primary parcel with a new non-primary parcel over it.
- The new water boundary is accurate in terms of the criteria of current rule 3.4 and does not have a class.
 - The **distance** for the intersecting boundary 6-1 (and 4-2 and 5-3) must meet the same accuracy standard as the water boundary. No class will apply. The distance can be calculated from the known relationship between the water boundary at point 1 and known point 6 or measured between these points. Note the distance need only be recorded to significant figures to reflect this accuracy.
 - The **bearing** of the new primary parcel boundary between new Lots 1 and 2 intersecting the water boundary (points 6-1) and the new non-primary boundaries (4-2 and 5-3) must meet the class A accuracy standard.¹⁵

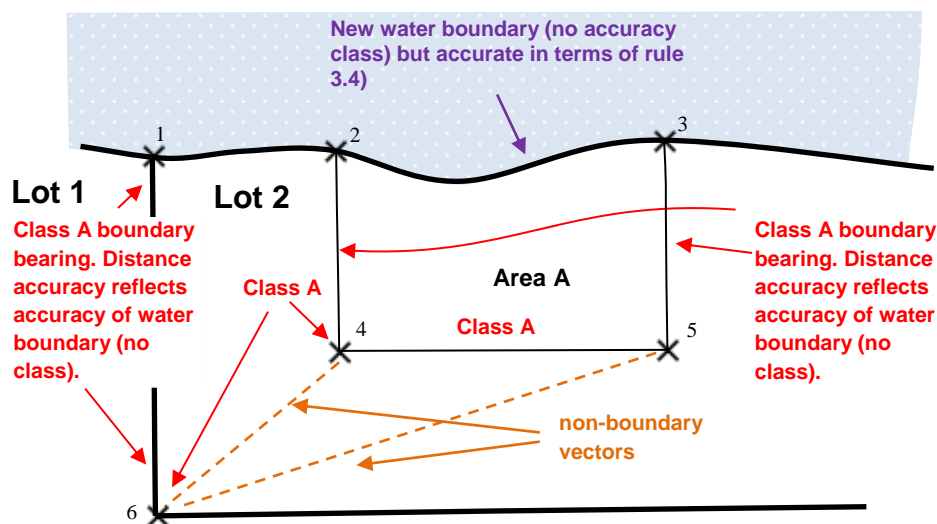


Diagram 7

¹⁵ A statically rigorous approach would be to use the root-sum-square formula to work out the maximum error in the distance and bearing components for this vector but it is difficult to reliably determine how much error is in each of these components. A simplified approach is suggested where, in every case, the assumption is made there is no error in the distance and therefore the error in the bearing component is used to test compliance with the accuracy tolerance. This means for class A the entire $0.06 \text{ m} + (\text{dist} \times 0.00015\text{m})$ 'error budget' is available for any bearing error. For example, the bearing for a class A boundary vector 20m long will need to be accurate to $\pm 0^\circ 10'$.

Note:

- While the illustration does not show it, all boundary points will be required to have two vectors to them.¹⁶
- To enable the non-primary parcel boundaries to be relocated in the future they must be connected by a minimum of 2 vectors to an underlying primary parcel boundary point or to a reference mark (one method is illustrated).

43) Diagram 8 illustrates the application of the proposals for a survey of a new class A non-primary parcel only.¹⁷

- The new non-primary boundary coincides with the existing underlying water boundary. Here the shape and location of that existing boundary must be copied without change from the relevant approved CSD regardless of where the current physical boundary is located and used to bound the new non-primary parcel. The new non-primary water boundary will not have an accuracy class.
- The bearing of the new non-primary parcel boundaries (3-1 and 4-2) must be class A. The distances for these boundaries can be calculated from the relative positions of the documented position of the water boundary and points 3 and 4. No class will apply.

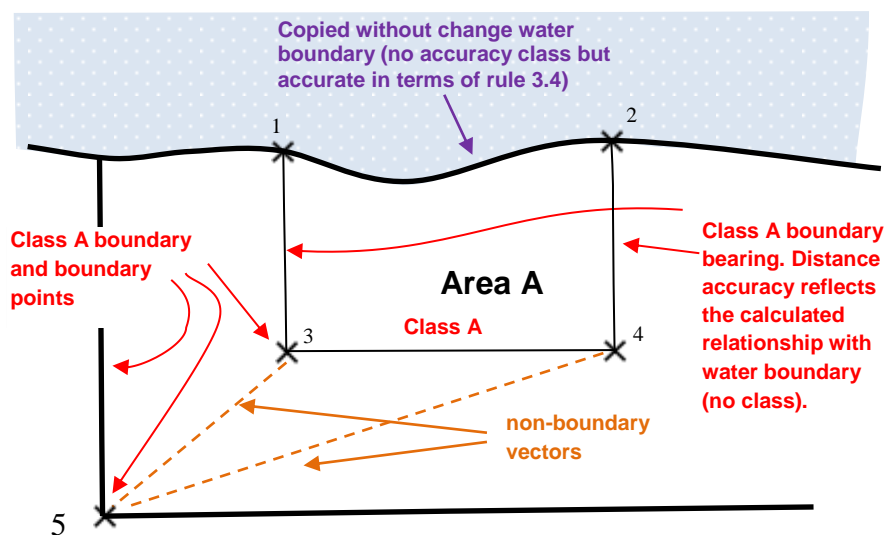


Diagram 8

Note: as outlined above for Diagram 7, all non-primary boundary points will be required to have two vectors to them and be connected to the underlying primary parcel boundaries or reference mark.

¹⁶ For illustrative purposes the non-boundary vector symbology in the diagram is for a measured line. In a CSD lodged by a surveyor the symbology will be for a calculated vector.

¹⁷ For example, an easement-only survey.

5 Water and irregular boundaries

5.1 Summary of proposal

- 44) It is proposed that the main body of existing rule 6.7 remain in place, albeit with some changes and reorganisation of the text, but be supported in its application by focused guidance material.

5.2 Background

5.2.1 Feedback

- 45) Surveyors provided a considerable amount of feedback on water boundaries. The majority of comments related to:
- wanting more clarity around the requirements in rule 6.7.
 - wanting improved guidance including linkages from the Rules.
 - wanting to accept all rural water boundaries regardless of parcel size.
 - questioning the right lining of a previous water boundary.
 - questioning the assigning of an accuracy class to a water boundary.
 - noting that due to the distortion in Landonline the only way to accurately and confidently reproduce a water boundary is to require field note fixes of the river bank.

5.2.2 Considerations

- 46) Dealing with water boundaries is one of most complex technical cadastral matters for surveyors. This is because the boundaries of the water bodies are ambulatory in nature and the law is complex. Adding to this complexity since the drafting of the 2010 rules is new legislation such as the Marine and Coastal Area (Takutai Moana) Act 2011 and a continuing public focus on legal and physical access strips along the margins of waterways.
- 47) Care must be taken to ensure a cadastral rule, being secondary (subservient) legislation, does not:
- inadvertently establish a principle of law (new law), or
 - direct surveyors on how to interpret existing principles of law, or
 - result in possible diminishment of landowners' rights when acted on.

Existing rule 6.7 (water boundary) was crafted with considerable care with these principles in mind but in hindsight it has been found:

- to be difficult to interpret and apply
- the requirement in (a)(i) to convert a previous water boundary to right lines in some circumstances has the potential to mislead and potentially result in the diminishment of landowners' common law rights.

48) Historically, surveyors have reproduced the position of an existing water boundary using original field fixes recorded on the plan face or from field notes. Where neither of these is available they revert to digitisation from the CSD diagram. All diagrams in a CSD are required to be drawn to a scale (rules 10.4.2(d) and 10.4.5) and digitisation remains an accepted method of confidently reproducing the position of the water boundary.

5.3 Proposal in detail

5.3.1 Changes to rule 6.7

49) It is proposed that the main body of existing rule 6.7 remain in place with changes to:

- the way it is set out so that its application is more in line with the way a surveyor might consider an existing water boundary. For example, placing existing rule 6.7(b) before 6.7(a).
- the text by expanding it so that the intent of the requirements are more obvious.
- the requirements relating to the right lining of a water boundary.

5.3.2 Changes to guidance supporting new rules on water boundaries

50) It is proposed that comprehensive guidance is provided to support rule requirements on water boundaries. The material would be set out in a manner that enables the surveyor to apply the rule according to the particular circumstances.

6 The 'wet' cadastre

6.1 Summary of proposal

- 51) It is proposed to have requirements that are specific to the survey of parcels within the common marine and coastal area (CMCA)¹⁸ and over the beds of streams¹⁹ and lakes.

6.2 Background

- 52) There is an increasing demand for non-primary land rights to be defined outside the historical 'dry land' based cadastre. Examples are customary marine titles, and marine reserves.²⁰
- 53) The current rules do not adequately cater for the unique circumstances associated with these rights.

6.3 Proposal in detail

At a high level the proposal will enable new non-primary parcels to be defined to class C/D accuracies with boundaries referenced to adopted CSNMs.

The following sections set out the proposal in detail.

6.3.1 Boundary detail

- 54) It is proposed that:
- a new right-line or arc parcel boundary and its associated boundary points where in the CMCA may be class C as of right, and either class A, B or C (as appropriate) where over the bed of a stream or lake.
 - an existing primary parcel water boundary that is in common with or is intersected by a non-primary parcel boundary may be copied without change (accepted) from the relevant approved CSD irrespective of its accuracy or relationship to the current physical position of the water boundary.
 - with regard to the CMCA, a new water boundary (e.g. MHWS, MLWM) that is being defined in relation to an accepted existing primary parcel water boundary (e.g. MHWM) may be 'offset' from that accepted water boundary without field survey and not have a boundary class.
 - where a new right line or arc boundary intersects an accepted water boundary, a bearing (with an accuracy class) and a distance (but without accuracy class) is required.

¹⁸ The land between MHWS and the outer limits of the territorial sea but with specific exclusions. Refer to definitions in section 9 of the Marine and Coastal Area (Takutai Moana) Act 2011.

¹⁹ Including rivers.

²⁰ Resulting from Marine and Coastal Area (Takutai Moana) Act 2011, changes to the Resource Management Act 1991, and the Marine Reserves Act 1971

- where a new right line or arc boundary intersects an 'offset' water boundary, a bearing (with an accuracy class) is required but a distance is not required.

6.3.2 Connection to the official geodetic datum

- 55) For new non-primary parcels within the CMCA it is proposed that no connection to old or new reference marks will be required, but at least two of any new class C boundary points must be connected to a cadastral survey network mark (CSNM) by non-boundary vectors:
- the CSNM may be adopted.
 - the maximum distance between the CSNM and the boundary points will not be specified and the connection may be calculated but will need to meet the class C accuracy of boundary witnessing (0.60m²¹).
- 56) Similar provisions will apply for a non-primary parcel over the bed of a stream or lake where the non-primary parcel boundaries cannot be directly or accurately connected to parcel boundaries of the existing primary parcel to which the right relates to.

²¹ Refer current rule 3.6.

6.3.3 Applying the proposal for a new marine reserve

57) Diagram 9 below illustrates how the proposal might be applied for the creation of a new marine reserve.

- The new marine parcel (Area A) is shown as intersecting the existing (copied) MHWM boundary.
- The seaward boundary (points 1 & 2) is class C and 'referenced,' i.e. connected to a cadastral survey network mark via calculated non-boundary vectors.²²
- The western and eastern boundaries (vectors) intersecting the copied MHWM boundary are class C for bearing. The distances are calculated from the known relationship between the copied MHWM and points 1 or 2 and will not have a class (see [Section 4.3.5 Accuracy of intersection of water and irregular boundaries](#) above).
- All boundary points must have at least two vectors to each of them.

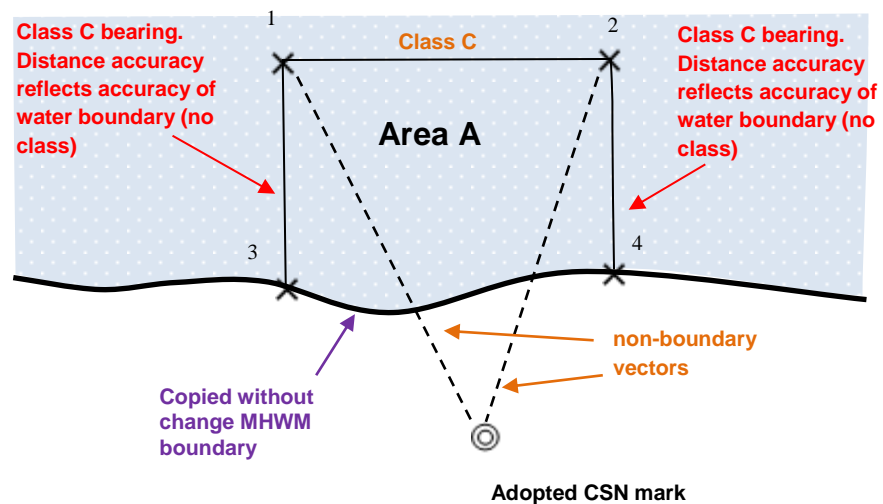


Diagram 9

²² For illustrative purposes the vector symbology in the diagram is for a measured line. In a CSD lodged by a surveyor the symbology will be for a calculated vector.

6.3.4 Applying the proposal for a new customary marine title

58) Diagram 10 below illustrates how the proposal might be applied for the creation of a new customary marine title where the land in the new title is to be over common marine and coastal area, but which is currently defined in the cadastre as partly over 'dry' land defined to MHW²³ and partly over the 'sea' below MHW.

- The new customary marine title will consist of two parcels (Areas A and B).
- The existing MHW is copied without change and the new movable MLWS and MLWS boundaries are offset from it (they will not have any accuracy class).
- The right line boundaries define the western and eastern extent of the parcels and are fixed in their east/ west location but may extend or contract in the north/south direction according to the location of MLWS and MHW on a daily basis. For relocation purposes in the future their location is fixed by boundary points 1 and 2 being connected to the cadastral survey network mark via calculated non-boundary vectors.²⁴ The bearing of the western and eastern right line boundaries will be required but the distances will not be required.

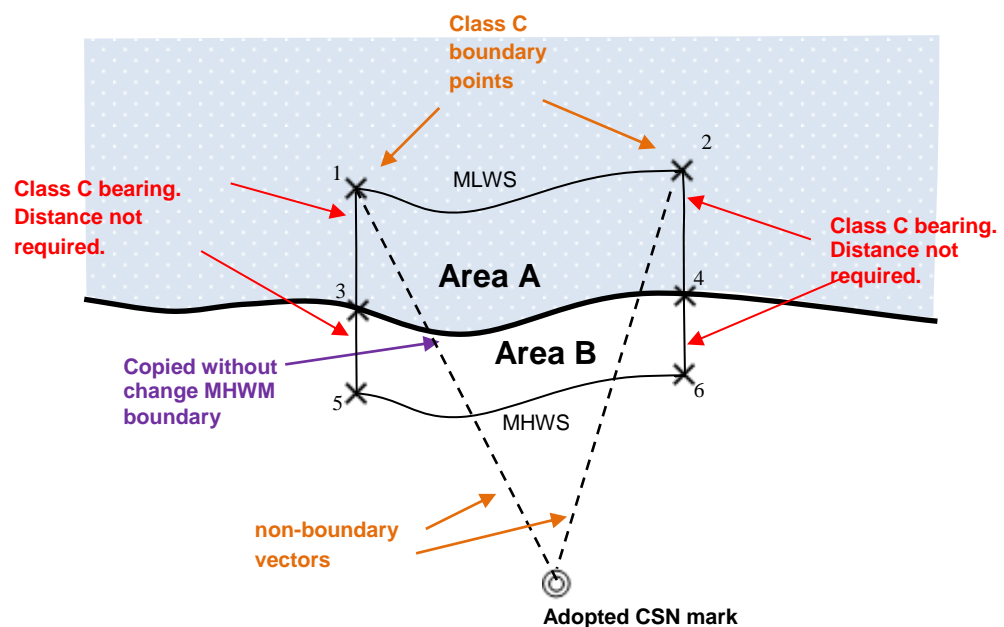


Diagram 10

²³ Only where the land is owned by the Crown or local authority.

²⁴ For illustrative purposes the vector symbology in the diagram is for a measured line. In a CSD lodged by a surveyor the symbology will be for a calculated vector. The vectors can be to any points on the right-line boundaries including any theoretical points between points 1-5 or 2-6.

7 Repackaging CSD Plan information

7.1 Summary of proposal

- 59) It is proposed that all the survey information in the current CSD plan including the Diagram of Survey is replaced with a digital **Record of Survey**. Visualisation software would then use this information to produce a 3D view of the survey.

7.2 Background

7.2.1 Feedback

- 60) Surveyors have provided feedback on the complexity of requirements relating to information in the CSD, CSD Plan, Diagram of Survey and Title Plan.

Specifically, the feedback commented:

- many requirements in rule 9 (CSD Plan) are duplicated in rule 10 (Title Plan).
- a diagram of survey is expensive to produce. It is recommended that the rules allow for flexibility for the presentation of these diagrams. This could include the removal of the requirement for survey diagrams and improving the viewing tools in Landonline.
- there is a need for more than just digital data when going in the field.
- the Diagram of Survey should not be replaced until replacement visualisation tools have been proven.
- the use of colour would make plans more user friendly.

7.2.2 Current rules and Landonline

- 61) The current Rules prescribe an extensive set of requirements for a CSD Plan running to some ten pages (rules 9, 11.4, and 12). The majority relate to information in the Diagram of Survey. Outside of the diagram, rule 8 specifies other information requirements.
- 62) The purposes of the information required by rules 8 (in part) and 9 are for the cadastre and surveyors. The Title Plan information required by rule 10 is intended for other parties but primarily for land tenure managers. The idea behind that approach was that later surveyors when resurveying the subject land need only view the issued title and the underlying CSD Plan. They would not need to view the Title Plan as it would not contain any extra information.
- 63) Because the 'spatial' information required in the Diagram of Parcels (parcel shape, location, area, appellations, boundary lengths, etc.) is a subset of the same data required in the Diagram of Survey, Landonline shows in the Diagram of Survey this Diagram of Parcels subset information as 'T' sheets. The Landonline method of packaging rule data and the rules duplicating requirements is confusing.
- 64) The current CSD Plan produced by Landonline includes elements not currently required by the rules, e.g. comprised in field and mark & vector reports.

7.2.3 Visualising a survey

- 65) The ability to 'visualise' the information in a CSD remains a core requirement for surveyors. Putting aside the context information such as the dates, surveyor name, and supporting documents, surveyors want to:
- understand the survey and definition methodology used, primarily by visualising the spatial relationship between old marks used and the adoptions from them into existing boundaries.
 - visually identify, select and obtain details of marks and vectors, particularly for use in a new survey (via adoption or by comparison with new measurements).
 - visually interpret the relationship between all parcels and boundaries.
 - see the descriptive and warning information about parcels and boundaries (e.g. area, legal description of a water boundary and other annotations).
- 66) The traditional method has been to depict this information in the form of a diagram on a survey plan (under the current rules a Diagram of Survey within the CSD Plan). One of the main challenges using traditional diagrams is being able to view the information at both the macro and at detail level. Survey diagrams typically need to include additional large-scale diagrams to zoom in on the detail and this often results in the CSD Plan including multiple sheets of diagrams.
- 67) Preliminary analysis by the ASaTS project indicates that there are digital tools currently available that can provide very good graphical visualisation of a CSD, including a parcel of land and how it is defined or bounded and the ability to interactively zoom in to see the detail.

7.2.4 Looking to the very near future

- 68) Modern technology provides possible alternative tools through which CSD information could be visualised, and printed e.g:
- an enhanced version of the Landonline Survey View in Landonline.
 - third party products whether in survey software, GIS, web browsers, or mobile devices that would consume the data in the CSD.
- 69) These digital tools potentially provide much better functionality to enable the user to better access the specific information required, whether at a macro or detail level (e.g. by simply switching on/off vector information at different scales or zooming in to enlarge detail).
- 70) The language in the current rules reflects the premise that the CSD Plan must include diagrams, e.g. rule 9.6.3(a) states "*A Diagram of Survey must depict the extent of all parcels...*". This language constrains the implementation of alternative digital visualisation tools.

- 71) At this point in time, land tenure managers still expect a Title Plan to include its current diagram format. The visualisation of the extent of land rights and their relationship to other rights is an important output of a survey for land tenure managers, lawyers, territorial authorities, landowners and to a lesser degree other parties. It is anticipated landowners and lawyers will continue to want to print out titles and title diagrams and therefore the continuance of the Title Plan as we know it will need to continue (at least in the medium term). The data provided by the surveyor will still need to be able to be presented in the form of a Title Plan as we currently know it.

7.3 Proposal in detail

- 72) The majority of information requirements in rules 8, 9 and 10 are still relevant, but it is proposed that the way the requirements are described is changed to a more enabling form to allow for future alternative methods of visualising CSD information. It is proposed that a CSD consist of:

- a **Record of Survey** being mainly the information requirements set out in current rule 8 (8.1 (c), (d), (e) & (f) and rule 9 (CSD Plan). There will not be a Diagram of Survey as a subset of requirements within The Record of Survey. The information would be in a digital format that enables the surveyed land to be visualised in 3 dimensions with associated parcel and survey information.
- a **Title Plan** being mainly the data requirements set out in current rule 10 including the retention of the Diagram of Parcels.
- **Other information** including framework rules (eg 8.3 & 8.4), the survey report and surveyor's certification.

- 73) Diagram 11 below illustrates the contents of a CSD from the proposed rules perspective.

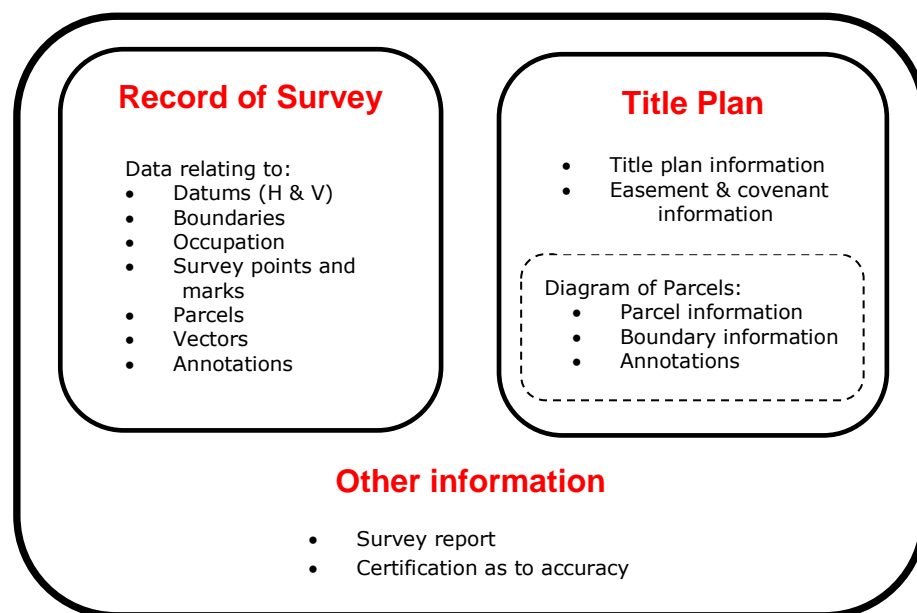


Diagram 11

A CSD for purposes other than for land tenure purposes (e.g. a reinstatement CSD) would not require a Title Plan and consist of:

- a Record of Survey, and
- other information.

74) Under this proposal:

- rules would refer to a Record of Survey rather than a CSD Plan or Diagram of Survey.
- rules would include a generic statement similar to '*A Record of Survey must include...*' rather than current phrases like '*A Diagram of Survey must depict...*'.
- symbol and text requirements are still needed for the Diagram of Parcels in the Title Plan.
- To ensure the standardisation of visualisation within the Record of Survey the Surveyor-General would publish a separate specification for visualisation of the Record of Survey that would include mark symbols, line styles, text and colour. This specification would not be part of the Rules.

75) In addition, information about easements and covenants (refer [Section 8 Recording easements/ covenants to be surrendered](#)) and survey marks (refer [Section 9 Recording survey marks not found](#)) will also be included in the Record of Survey.

76) No related changes to the requirements are proposed for the Title Plan and Diagram of Parcels (currently rule 10).

7.3.1 Transitional arrangements

77) Implementation of alternative tools for data visualisation requires significant changes to Landonline and changes to the related processes for creating, validating and managing data and datasets, including the use of survey software.²⁵ This will also require significant changes to the current way Unit Title, Cross Lease and 3D surveys are presented.

78) The new requirements will not be implemented until these changes have occurred. As an interim measure it is anticipated the rules will be written to provide for the transitioning from the presentation of CSD information in the current diagrammatic form to the new Record of Survey form. This may mean retaining the current requirements which would be revoked when the alternative systems are in place.

²⁵ This will occur through the Survey and Title Enhancement programme (STEP) (previously referred to as ASaTS). This programme is now underway - see [Information on LINZ website](#).

8 Recording existing easements/ covenants to be surrendered

The following section outlines a proposed change to the information required about easements and covenants to be surrendered.

8.1 Summary of proposal

- 79) It is proposed that the Record of Survey (refer [Section 7 Repackaging CSD Plan information](#)) include information about existing easements and covenants that are to be surrendered.

8.2 Background

- 80) Rule 42(2) of the Surveyor-General's Rules for Cadastral Survey 2002/2 required reporting on any rights of way, easements or covenants that were to be surrendered or relinquished. This reporting requirement was not retained in the 2010 Rules and this has and is continuing to cause inefficiencies and difficulties for both surveyors and LINZ.

- Where a CSD does not include detail about or depict an existing easement, the LINZ validator is unsure whether the easement/covenant is to be surrendered or, alternatively, that it has been inadvertently missed off the CSD by the surveyor. Also knowing the likelihood that an easement schedule could be incorrect (one of the more frequent requisition items), the validator's confidence the CSD is correct is further eroded.
- Errors in easement schedules are the single largest source (60%) of post approval amendments required to be made before a CSD can deposit.

LINZ should be able to approve a CSD in the state it was lodged but the consequences for the surveyor, solicitor and landowner should the CSD be approved with an inadvertently missing easement is significant. In an attempt to address this, LINZ validation has included in the survey report template a reporting item on whether existing easements and covenants are to be retained or not but there is no rule to support this information being supplied.

- 81) One of the desirable outcomes of the spatial view (live layer) in the integrated cadastre is for it to be current and that it displays only live rights and restrictions. Being current makes it more relevant to users. Including information in a CSD regarding existing rights to be surrendered will enable LINZ to update the live layer on CSD deposit.

8.3 Proposal in detail

This section sets out in detail the proposal for requiring data on the surrender of existing non-primary rights as part of the Record of Survey.

8.3.1 Types of surrendered rights to be recorded

- 82) It is proposed that the CSD include data about the surrender of existing non-primary rights that are recorded on the related titles.

This data about existing subject non-primary rights would apply to:

- easements being surrendered.
- covenants being surrendered.

8.3.2 Inclusion in the Record of Survey

- 83) It is anticipated the information on the surrender of existing easements/covenants will be required to be in the Record of Survey in a form of smart data that enables the efficient updating of the cadastre. This information would also be available to the tenure manager to act on prior to issuing any new land right.
- 84) There will not be any requirement to define or spatially depict the surrendered rights in the CSD nor make reference to them in the Survey Report.

9 Recording survey marks not found

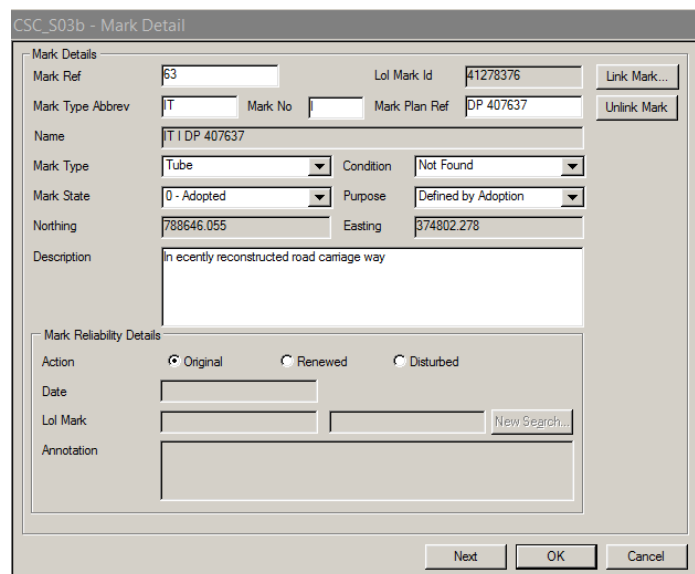
The following section outlines a proposed change to requirements for reporting on old marks searched for but not found or destroyed.

9.1 Summary of proposal

- 85) It is proposed that information about *old marks searched not found or destroyed* is included as smart data in the Record of Survey (refer [Section 7 Repackaging CSD Plan information](#)).

9.2 Background

- 86) Current rule 8.2(a)(vii) requires the survey report to include information about old survey marks not located or reasons why they were not searched for.
- 87) Current rule 9.6.2(g) requires the identification of renewed and disturbed survey marks on the Diagram of Survey. Many surveyors do this through the Landonline mark detail screen (see example below) which provides facilities to record mark reliability as renewed or disturbed. The mark condition field also has the facility to record the condition of a mark as 'not found' although this is not a current rule requirement.



- 88) One of the desirable outcomes of the cadastre is for it to be relevant to surveyors. In the case of the digital cadastre, enabling surveyors to apply a filter so that it displays in the 'live layer' all the survey marks that physically exist in the ground (and not the ones reported as searched for and not found or destroyed) is one way of improving the cadastre's relevance. It is proposed that the information about an old mark searched for but not found does not remain isolated in the reporting CSD but is used to update the digital cadastre.

9.3 Proposal in detail

This section sets out in detail the proposal for updating the cadastre to record old marks not found.

9.3.1 Information on marks not found to be in the Record of Survey

- 89) It is proposed that information on old marks searched for not found or destroyed will be required to be included in the Record of Survey in the form of smart data. This will enable LINZ to update the digital cadastre to record this information and enable surveyors to apply filters to display relevant survey marks, including within the Landonline spatial view.
- 90) There will not be any requirement to record information on old marks not located in the Survey Report including reasons why they were not searched for (current rule 8.2(a)(vii)).

10 Appellations for strata parcels

The following section outlines a proposed change to appellations for parcels that are restricted in height.

10.1 Summary of proposal

- 91) It is proposed that where a parcel (other than units) is constrained in height that it has a standard appellation that includes the prefix 'strata' or an alternative word reflecting this intent.

10.2 Background

- 92) Appellations serve a wide range of administrative purposes, particularly for the allocation of parcel-based rights. They are used by lay-persons as well as property professionals. Confusion can easily lead to incorrect identification of parcels, incorrect allocation and administration of rights and interests, and possible loss. They also provide the key access mechanism that enable linking of data across central and local government agencies, especially in a digital environment.
- 93) Experience with problematic historical appellations, and the introduction of "simple" appellations for Lots and Sections have shown that there is great benefit in standardisation that improves discovery and searching of parcels and facilitates automation and processing.
- 94) Currently land transfer fee simple parcels with a height component are either captured in Landonline with parcel intent of 'strata' or depicted on a plan graphic. The resulting computer freehold register is noted with the height restriction (see example below).



**COMPUTER FREEHOLD REGISTER
UNDER LAND TRANSFER ACT 1952**



Identifier **356145**
Land Registration District **Wellington**
Date Issued 07 March 2008

Prior References
202161 202162 258140
320487

Estate Fee Simple
Legal Description Lot 1 Deposited Plan 389044

Proprietors
Wellington City Council

Notes: in Council exempting Willis Street from Section 117 of The Public Works Act 1908 - 15.8.1913 (affects parts formerly Lot 2 DP 363521 and lots 1 - 2 DP 26068)
589178 Order in Council exempting the north-eastern side of Chews Lane from the Provisions of Section 128 of the Public Works Act 1928 - 14.4.1964 at 2.50 pm (affects part formerly Lots 1 - 4 DP 26068)
Subject to a right (in gross) to pedestrian right of way over part marked B, C and F on DP 363521 in favour of Wellington City Council created by Easement Instrument 6856094.10 - 8.5.2006 at 2:22 pm
The easements created by Easement Instrument 6856094.10 are subject to Section 243 (a) Resource Management Act 1991

Subject to a stormwater & sewage drainage right, right to convey telecommunications, electricity & gas and water supply right marked C and F and a pedestrian right of way over part marked B, C and F on DP 363521 created by Easement Instrument 6856094.14 - 8.5.2006 at 2:22 pm (Limited as to Duration)
Appurtenant to the part formerly Lot 2 DP 363521 is a pedestrian right of way created by Easement Instrument 6856094.14 - 8.5.2006 at 2:22 pm (Limited as to Duration)
The easements created by Easement Instrument 6856094.14 are subject to Section 243 (a) Resource Management Act 1991

7743583.15 Surrender of the easements specified in Easement Instrument 6856094.14 over the part marked F on DP 363521 appurtenant to Certificates of Title 258140 and 285775 - 7.3.2008 at 1:07 pm
FOR AREA AND REDUCED LEVELS SEE DP 389044
Subject to a right to drain sewage and water over parts marked E1, E2, E3, E4 and E47 on DP 389044 created by Easement Instrument 7743583.22 - 7.3.2008 at 1:07 pm

- 95) There is concern that with an increasing number of parcels with a vertical component it is not immediately obvious that these parcels (and the related rights) are constrained in height, i.e. is a strata parcel/ land right.

10.3 Proposal in detail

- 96) It is proposed to require parcels that are restricted in height²⁶ (other than for units) to have a Parcel Type component prefixed with 'Strata' – e.g. 'Strata Lot', 'Strata Section' and 'Strata Area'.²⁷ The following table illustrates the different types of 'parcel type components' for general land that would result from this requirement. They would also apply to Māori and Crown Land.

Type of parcel	Parcel type component
primary parcel restricted in height in a Land Transfer CSD	Strata Lot
primary parcel restricted in height in a Survey Office CSD	Strata Section
any other non-primary parcel restricted in height other than a unit	Strata Area

²⁶ Defined by stratum boundaries or permanent structure boundaries.

²⁷ Or an alternative word reflecting the same intent.

The Unit Titles Act 2010 is specific that a principal unit or accessory unit is restricted in height and it is not appropriate for the rules to require a 'strata' prefix to the appellations of these land rights.

11 Alternative appellation for units

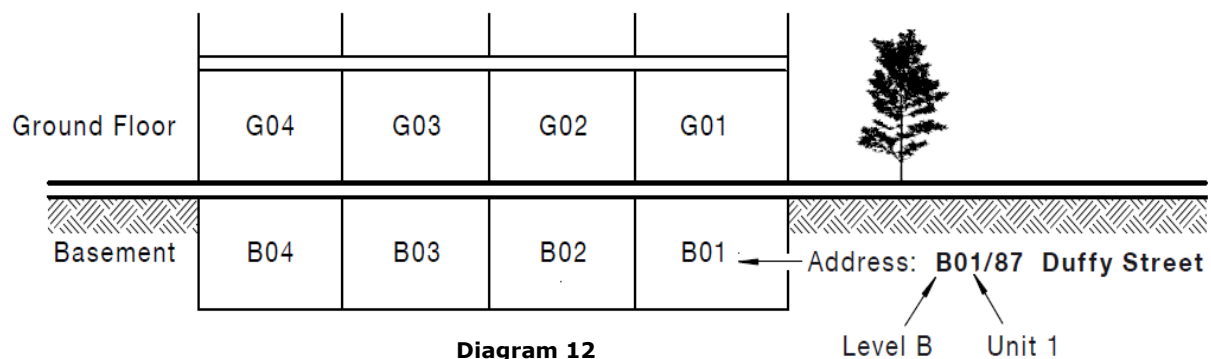
The following section outlines a proposed change to the requirements for unit appellations.

11.1 Summary of proposal

- 97) It is proposed that unique parcel identifier formats for a unit provides for unit appellations to be consistent with unit addresses.

11.2 Background

- 98) The unique parcel identifier format for a unit is currently required to be a number which may only be followed by a letter (refer Table 6 in rule 5.5.4). This format works well from a survey and title perspective but in some circumstances is at odds with the Rural and Urban addressing standard (AS/NZS 4819-2011).²⁸ In the case of a high rise development the addressing standard specifies the address to first refer to the floor level followed by the unit number (e.g. at a development at 87 Duffy Street a ground floor address could be G01/87 Duffy Street. The G representing the ground floor and 01 the unit number on that level. At upper levels the address aligns with the floor level, i.e. 1204/87 Duffy Street - the 12 representing the floor level and 04 the unit number). This methodology is illustrated in Diagram 12 below (shown as Figure 5.25 in the addressing standard).



- 99) Some architects are designing and identifying units based on the addressing standard and units are sometimes also pre-sold on the same basis. The current restrictions on parcel identifiers do not allow surveyors to create unit appellations that match the design plans, Council allocated address and sale and purchase agreements.

²⁸ The Rural and Urban addressing standard (AS NZS 4819-2011) is used by territorial authorities in New Zealand and Australia to assign addresses, name roads, signage and record mapping information.

11.3 Proposal in detail

11.3.1 Appellation option

100) It is proposed that parcel identifiers for units may be either:

- a number which **may** be followed by a letter, or
- a letter which **must** be followed by a number.

12 Reinstatement surveys

The following section outlines a proposed change to the requirements for reinstatement surveys.

12.1 Summary of proposal

101) It is proposed to simplify the requirements for reinstatement surveys by having a reduced single set of requirements where there is no survey or title anomaly.²⁹

12.2 Background

12.2.1 Feedback

102) Surveyors have provided considerable feedback relating to reinstatement surveys.

Specifically, the feedback indicated surveyors:

- agree it was important that surveys that place new pegs on existing boundaries should be recorded in the cadastre.
- find the current rules confusing with the current three different types of reinstatement CSDs with differing levels of requirements (Monumentation CSD, Reinstatement CSD and Full CSD (conflict)).
- have the view that the current requirements and compliance cost of recording reinstatement surveys (including monumentation CSDs) are unreasonable.
- have the view that requirements for reinstatement surveys should not be reduced to the point where these surveys do not, in the opinion of future surveyors, properly define the boundaries.

A small number of surveyors have the view that where there is conflict³⁰ the reinstatement must be recorded in a survey that enables the update of the title to the land (e.g. where the land is held under the Land Transfer Act, a land transfer CSD of the land is prepared to enable the issue of a new title).

12.2.2 Considerations

103) There are circumstances where a landowner wants to know where their existing boundaries are located. In many cases it is when they want to construct something close to or on the boundary – perhaps a new house or extension or a garage. Often the new building is to be built at a specified distance off a boundary. In these cases, a surveyor is required to initially set out the proposed new building platform. This usually involves the surveyor firstly determining where the property boundaries are located then offsetting the structure from the boundary at a specified offset. Once the building has been constructed the surveyor then provides

²⁹ Where there is no boundary conflict (refer to definition in rule 2), the boundary is not an affected boundary (refer to definition in rule 20.1), the title is not defined by a diagram on transfer or limited as to parcels or a Hawkes Bay interim title.

³⁰ Where there is a difference that exceeds the applicable accuracy standards – refer to the definition of conflict in rule 2.

the local authority with a building location certificate (BLC). Often as part of these processes new boundary marks are placed in which case current rule 8.5 requires the surveyor to lodge a CSD for recording the boundary marking survey (the reinstatement survey) in the cadastre.

- 104) It is important that the cadastre records the placement of all boundary marks. In doing this the cadastre remains authoritative and relevant, and surveyors and in turn the public can have confidence in it.
- 105) The approval as to survey of a reinstatement CSD provides the surveyor with further confidence they have correctly located the boundary and this in turn translates to confidence in signing the BLCs.
- 106) Under the current rules the landowner has the option of instructing the surveyor to prepare a:
- 'SO boundary marking CSD'. On approval as to survey by LINZ this CSD records the resurvey in the cadastre but not in any land tenure system. This means its existence is not recognised by tenure managers and any title for the land is not updated in terms of the resurvey, or
 - LT CSD. On approval this CSD also records the resurvey in the cadastre but does not update the title. It stays in this state until a lawyer (employed by the landowner) submits documentation that enables the CSD to deposit at which stage a new title is issued in terms of the resurvey.³¹
- 107) Cadastral rules could specify that where there is conflict the reinstatement must be recorded in LT CSD, however the consequences of this would be:
- the LT CSD would need to not only deal with the boundary being redefined but also all the other boundaries of the related parcel including any existing flaws in those boundaries and any existing easements.³² The cost of fully surveying the land and preparing a LT CSD would be far greater than a simple SO CSD recording the survey of the boundary in question. This heightens the risk of surveyor's clients rejecting these costs, reinstatement surveys going 'underground' and not be recorded in the cadastre, and a proliferation of 'old pegs no record'. This in turn would have an impact on the authoritativeness of and confidence in the cadastre.
 - The cadastral rules cannot require the LT CSD to deposit. Noting the landowner would have already had their needs satisfied by the placement of boundary markers there is little motivation for them to further employ a lawyer and incur legal fees to enable the CSD to deposit.

The compliance cost of requiring a surveyor to provide a LT CSD is not considered to be proportionate to the benefits expected from such a regulation. On the contrary, it creates risk to the cadastre that the survey is not officially recorded.

- 108) The current rules on reinstatement surveys have been successful in incentivising surveyors to record authoritative reinstatement surveys in the cadastre. In 2006 (prior to the current rules) 290 reinstatement surveys were lodged of which only 30

³¹ The reference to LT CSD is used because the vast majority of land is held under the LT Act 2017. The same considerations apply to Māori Land held under the Te Ture Whenua Māori Act 1993 and land of the Crown held under various other enactments.

³² The Registrar-General of Lands has reaffirmed that presenting a LT CSD for the purpose of updating some but not all boundaries of a parcel of land for the purpose of 'updating title' is not appropriate.

were approved as to survey with the remainder approved for record purposes only. Since the implementation of the 2010 rules a yearly average of 740 such surveys have been approved as to survey. Despite this there remains a tension between the current requirements and the cost of complying with them.

12.3 Proposal in detail

This section sets out in detail the proposal for reinstatement surveys and their associated CSDs.

12.3.1 Simplified requirements where there is no survey or title anomaly

109) It is proposed that the survey and CSD requirements for a reinstatement survey are simplified where there is no survey or title anomaly.

The proposal is to have one set of requirements to replace the current requirements spread throughout rules 7.3.2(d) (witnessing), 7.4.1(b) (PRMs), 8.2 (Reporting), 8.5 (prepare CSD), 9 (CSD Plan) and 11 (Monumentation CSD).

110) For the field survey of a reinstatement survey the key rule that will apply will be the equivalent to current rule 6.1 (Duty of a surveyor). This means the surveyor will need to gather, interpret and use all relevant evidence in determining the location of the boundary point being marked. However, in applying this there will not be any requirement to connect to:

- or place a reference mark, or
- an old mark that was recorded in the same CSD as the old boundary point.

This means there will not be any explicit requirements similar to current rules 7.3.2(d)(witness marks) and 11.1(a)(ii)-(iv)(Monumentation CSD usage).

111) For the CSD:

- there will be no requirement for a CSD Plan and Diagram of Survey. Instead the proposal is to repackage the CSD Plan information in a Record of Survey which will replace the CSD Plan and Diagram of Survey.³³
- the Record of Survey will need to include information about the boundary mark placed along with how the point was defined (e.g. old marks connected to, vectors to these marks and the boundary mark, occupation).
- a simplified survey report will be required with a focus on information on reasons for and decisions made on survey definition including any adjustments made to existing survey data (similar in intent to current rules 8.2(a)(iii) and (ix)).
- certification will be required.³⁴
- LINZ will assess it for compliance with the rules and it will be integrated into the cadastre when approved as to survey.

³³ Refer to Section 7 (Repackaging CSD Plan information) above.

³⁴ Refer current rule 13.

12.3.2 Where there is a survey anomaly

- 112) Where there is conflict or an affected boundary³⁵ it is proposed that the survey will need to connect to reference marks,³⁶ and a fuller Record of Survey prepared.³⁷ A simplified report focussing on survey definition will be required (identical to reinstatements CSDs where there is no anomaly – see [section 12.3.1](#) above).

12.3.3 Where a boundary reinstatement survey will not be permitted

- 113) It is proposed a boundary reinstatement survey will not be permitted where the boundary is a water boundary or an irregular boundary, or the title is limited as to parcels, a Hawkes Bay interim title, or defined by a diagram on transfer. In these situations the survey will only be permitted to be recorded on a CSD that enables an updated title (e.g. normally a full Land Transfer survey).

Where there is an anomaly in a title it is not appropriate for the cadastre to record a boundary where the land tenure manager has not had the opportunity to take into account legal matters (e.g. serving notice to other affected parties).

³⁵ For boundary conflict refer to definition in rule 2 or where the boundary is an affected boundary refer to definition in rule 20.1.

³⁶ Refer to Stage 2 – Part 1 Consultation on proposed changes. 30 July 2018. Section 3.

³⁷ The same requirements as a full Land Transfer or Crown subdivision dataset, but without a Diagram of Parcels.

13 Defining 'Source of adoptions'

13.1 Summary of proposal

- 114) It is proposed to not include a rule defining what is a source CSD where information has been adopted.

13.2 Background

- 115) Some users of the rules have sought clarification as to what is the correct source CSD where information has been already adopted from an existing CSD. A significant number of requisitions have been issued for incorrect references to the source CSD.
- 116) Rule 8.4 requires adopted information to be copied without change except for the conversion of units of measure or the application of a bearing adjustment. Rule 9.3 requires the source CSD for adopted dimensions to be included in the CSD Plan.

13.2.1 Considerations

- 117) Referencing back to the source of a survey is important as it provides transparency and enables future users to assess the adequacy of the adoptions they are using to construct their definition.
- 118) Some surveyors argue they should be able to rely on the latest CSD and therefore should be able to adopt from that CSD even where that information was in turn adopted from an earlier CSD. Others argue it is important that the survey (CSD) that creates the information is the primary 'source' for an adoption. In the latter view, surveyors may be concerned about adopted water boundaries whose shape has been copied and thence copied again from the earlier copy - the shape may or may not be a true reflection of the originating survey.
- 119) However, irrespective of whether the adoption source is the originating survey or a later adopted source, any later surveyor is still able to track back to the original survey. To specify which source CSD must be used in such cases would create a significant compliance cost on surveyors which is disproportionate to the actual risk or problem posed.

13.3 Proposal in detail

- 120) It is proposed to not include a rule clarifying what is a source CSD means. Surveyors will need to be mindful of the risks of adopting information from a later CSD that is not the originating source of the information. It is anticipated LINZ validation processes, like the requirement in the Rules, will focus on the primary risks relating to the accuracy of the information itself.

14 Good survey practice

14.1 Summary of proposal

121) It is proposed that a reference to good survey practice is not included in the rules.

14.2 Background

14.2.1 Feedback

122) Feedback from surveyors included the following.

Good survey practice:

- was in the Survey Regulations 1972, Survey Regulations 1998 and the Surveyors General's Rules for Cadastral Survey 2002 and should be in the new rules.
- is a competency requirement set by the Cadastral Surveyors Licensing Board.
- is important and therefore should be reflected in the rules going forward.
- will ensure there is a level playing field for surveyors to work to.
- would encourage surveyors to go the extra mile through adding user added text and lodging extra supporting information such as field notes.

123) Further background on good survey practice is set out in [Appendix A](#) below.

14.2.2 Response to feedback

124) Accepted good survey practice was in prior 1972, 1998 and 2002 regulations although the term was not defined. This meant its enforcement was discretionary and opinion based. Compliance, or rather non-compliance, at time of CSD lodgement, could not always be predicted.

125) Good survey practice is not in the competency requirement set by the Cadastral Surveyors Licensing Board. As noted in Appendix A, licensing bodies of other professions do have good practice requirements.

126) There is no doubt as to the importance of good survey practice. Its applicability has been confirmed through New Zealand case law decisions³⁸ and this is reflected in current rule 6.1(b) where surveyors are required to interpret evidence in accordance with all relevant enactments and **rules of law** when defining a boundary. In applying rule 6.1 a surveyor will need to apply good survey practice to be confident the outcome of their survey will be accurate and correct.

127) Good survey practice is part of the educational program at Otago University and is the subject of some of the educational programs provided by NZIS and ICS.

128) Following good survey practice will not necessarily ensure there is a level playing field for surveyors to work to. It is not a rote process that all must follow in order to achieve an

³⁸ For example, *hierarchy of evidence*.

appropriate outcome and should not be seen as a constraint to the use of alternative or innovative practices. The Cadastral Survey Act 2002 is very clear that it is not the duty of the Surveyor-General to regulate surveyors' behaviour (refer to s7 (functions and duties of Surveyor-General), schedule 2 (Professional Misconduct) and s35 (complaints of professional misconduct)). One example is Schedule 2(1)(c) where a surveyor is guilty of professional misconduct if they certified to the accuracy of any cadastral survey or cadastral survey dataset without having carried out sufficient checks to ensure the accuracy of the entries in any field book and the accuracy of all calculations. Most if not all surveyors would consider carrying out sufficient checks as good survey practice. It is the role of the Cadastral Surveyors Licensing Board to consider these issues.

- 129) There is no direct link between good survey practice and surveyors going the extra mile. Good survey practice is about using a generally accepted method of carrying out a function or activity to achieve an appropriate outcome rather than placing additional expectations on surveyors beyond what is normally required by regulation.

14.2.3 Rule principles

- 130) In principle a new cadastral rule should:

- only be created where there is an unsustainable level of risk of an inappropriate outcome occurring and other non-regulatory mechanisms are not sufficiently effective in diminishing this risk. At present no unsustainable level of risk has been identified.
- be capable of being applied without ambiguity to support compliance. This means compliance can be predictable, minimizing the risk of a requisition due to subjective judgment. Good survey practice, whilst conceptually is well understood by surveyors, has not been defined nor agreed to by surveyors. Its application remains subjective. It is not the role of the Surveyor-General to write the manual informing surveyors what is good survey practice.
- be outcome focused. Rule 6.1 is such a rule. It sets out the duty of a surveyor when defining a boundary by survey. In applying this rule, the expected outcome is the correct position of a boundary. Nothing less will be adequate and a failure to do this correctly places the surveyor at risk of having to correct the survey and face the possibility of disciplinary action by the licensing board.

14.3 Proposal in detail

- 131) It is proposed that a reference to good survey practice is not included in the rules but good survey practice as it relates to boundary definition will be included in the Surveyor-General's guidelines.

15 Hierarchy of evidence

15.1 Summary of proposal

132) It is proposed that a reference to the hierarchy of evidence is not included in the rules.

15.2 Background

15.2.1 Feedback

133) Feedback from surveyors included the following:

- Would like the hierarchy of evidence codified into the Rules.
- Would like to see aspects of common law such as the hierarchy of evidence, limited titles, adverse possession and water boundaries codified into the Rules.
- NZ is tectonically active and ground movement is common and a single consistent set of rules is achievable in line with good survey practice and the hierarchy of evidence. The hierarchy of evidence should be included in the Rules to avoid future doubt of its importance.

134) Further background on the hierarchy of evidence is set out in [Appendix B](#) below.

15.2.2 Response to feedback

135) When a surveyor is locating an existing boundary, there is no doubt as to the importance of the need to assess all relevant evidence and determine its value as an indicator of boundary location. This principle is well established in common law. The rules in turn recognise the hierarchy through rule 6.1(b) (duty of a surveyor) which refers to rules of law.

136) The hierarchy itself, as noted by the Court of Appeal, is a guide.³⁹ It is also described in various respected survey publications and surveyors are well aware of its importance and its application.

137) The particular legal principles relating to the uplifting of limitations and claiming land under adverse possession came from the Land Transfer Act 1952 and the 1963 amendment and it is not appropriate for Cadastral Rules to codify them.

³⁹ Para 111 and 112 Court of Appeal CE LINZ v Te Whanau O Rangiwhakaahu Hapu Charitable Trust and Friends of Matapouri Inc CA67/2011[2013] NZCA 33

15.2.3 Rule principles

138) After the Canterbury sequence of earthquakes, surveyors had the difficult task of redefining boundaries. It was difficult because of the large extent of differential ground movement both deep-seated and shallow. Surveyors' views on what should be at the top of the hierarchy of evidence differed and this resulted in a mixed approach to boundary definition. The Government recognised that existing rules of law were not adequate in this case and created new survey law for greater Christchurch to provide clarity around boundary definition.

Where there is an absence of rules of law or the law is not clear, it is not appropriate for cadastral rules, as secondary (subserving) legislation, to establish law. It is also not appropriate to use cadastral rules to direct surveyors on how to apply the hierarchy of evidence where surveyors disagree on its application.

15.3 Proposal in detail

139) It is proposed that a reference to the hierarchy of evidence is not included in the rules but information on the hierarchy will be included in the Surveyor-General's guidelines.

16 Other matters

In addition to the proposals outlined in the [Stage 2-Part 1 Consultation on proposed changes](#) and those set out above the following matters were raised during the initial [Issues and Opportunities](#) consultation phase.

16.1 3D CSDs

16.1.1 Background

- 140) The issues and Opportunities paper identified 3D CSDs as an issue just around the corner. One of the innovation ideas under consideration for ASaTS was to remove the requirement for the CSD Plan and rely instead on the data and suitable tools for displaying that data in forms tailored for the particular use.

16.1.2 Proposal

- 141) A 3D CSD remains a concept under consideration as part of the Survey and Title Enhancement programme (STEP) but it is too early to build rules to support it.

16.2 Arc Boundaries

16.2.1 Background

- 142) The Issues and Opportunities paper noted that the review would consider whether new arc boundaries should be permitted. A significant majority of submissions were in favour of retaining them.

16.2.2 Proposal

- 143) It is proposed that new arc boundaries remain as a permitted form of boundary.

16.3 Right-lining irregular boundaries

16.3.1 Background

- 144) 'Fixed in location' irregular boundaries are not an appropriate form of boundary.⁴⁰ Current rule 6.6 restricts the creation of new irregular boundaries and requires existing ones in class A and B circumstances to be right-lined with rule 7.1(c) requiring those in class A to be marked. New irregular boundaries have not been permitted since the 1972 regulations came into effect and since the 2002 regulations there has been a requirement to right line existing irregular boundaries on subdivision.

⁴⁰ Irregular boundaries that can move are appropriate. Examples are the landward margins of movable marginal strips and esplanade strips.

- 145) Feedback has indicated there are some circumstances where the requirement to right-line an existing irregular boundary is not necessary or reasonable, i.e. some cases where parcels are being amalgamated or for some legalisation type surveys.

16.3.2 Proposal

- 146) With the exception of water body centreline boundaries ([see section 16.5 below](#)) it is proposed to keep the status quo.
Rather than create a complex set of rule requirement scenarios that attempt to cover reasonably rare events, it is more appropriate to have simple rules and manage exceptional cases through the dispensation process under s47(5) of the Cadastral Survey Act 2002.

16.4 Occupation

16.4.1 Background

- 147) Occupation requirements were identified in the Issues and Opportunities paper as an area for further consideration. During consultation, mixed views were received on when occupation information should be included in the CSD. Some suggested the current requirements in rule 9.5 should be extended to cover all boundary points being marked. Alternative views included occupation should provide for all primary parcel boundary points that have been defined by survey or only be required when uplifting limitations as to parcels.
A review of CSDs being lodged indicates many surveyors were showing occupation for primary parcel boundary points that have been marked.

- 148) Feedback from LINZ CSD validation staff noted that where a CSD does not include detail about or depict occupation information for points marked on existing boundaries, they are unsure whether occupation does not exist or the surveyor has inadvertently failed to include the information.

16.4.2 Proposal

- 149) It is proposed that the requirements in current rule 9.5 be retained but in addition, where no occupation exists, this is to be recorded in the CSD.

16.5 Boundaries of large parcels

16.5.1 Background

- 150) The Issues and Opportunities paper noted that Rule 6.3(c), which allows existing boundaries to be accepted on large rural parcels without their dimensions recorded in the digital cadastre, is counter to the objectives of the cadastre. Rule 6.3(a), which allows existing anomalies to remain, is also counter to these objectives.

While it is desirable that all the boundaries of a newly surveyed parcel of rural land should meet class B accuracy standards, the cost of re-surveying existing boundaries that have anomalies cannot be justified where the land use is extensively rural and will remain so after the survey and there is a high likelihood occupation such as fence lines will remain unchanged.

Current rules 9.6.14 and 10.4.9 require the inclusion of boundary dimensions in a CSD but provide an exception where the boundary has been accepted in terms of rule 6.3(c) (parcel over 100 ha). This exception was inserted as an amendment to the rules on 1 November 2012 in recognition of the time and cost associated with the capture of existing boundary information into a new CSD.

16.5.2 Proposal

151) It is proposed to retain the current provisions in rule:

- 6.3(a) that permits anomalies to remain in existing boundaries where the parcel is over 20ha⁴¹
- 6.3(c) that permits existing boundaries to be accepted where the parcel is over 100ha.

It is also proposed to retain the current provision in 6.3(b) that permits existing boundaries to be accepted for a balance or residue parcel.

16.6 Water body centreline boundaries

16.6.1 Background

152) The Issues and Opportunities paper noted that there is no direction in law as to whether water body centreline boundaries are fixed or ambulatory boundaries. Existing Rule 20.9 partially addresses the issue by allowing the retention of water body centreline boundaries in Greater Christchurch.

16.6.2 Proposal

153) It is proposed that the revised rules will permit the retention of an existing, and the creation of a new, irregular boundary that follows the centre-line of a water body.

16.7 Marginal strips

16.7.1 Background

154) There remains some dissatisfaction with how the Rules deal with marginal strips particularly around their definition. Their separate ownership by the Crown suggests they should be separate primary parcels.

⁴¹ Refer to 6.3(a)(1) – (vi) for detail.

The rule requirements are primarily an outcome of s24D(6) Conservation Act 1987 which, in summary, states a title includes all the land in the title except that portion which is reserved as a marginal strip. This means the land for a marginal strip cannot be subdivided out of the land in the title.

16.7.2 Proposal

- 155) It is proposed to retain the current requirements relating to marginal strips. These requirements focus on how a marginal strip is to be recorded in a CSD including that it must be a non-primary parcel.

16.8 Surveyor's certification

16.8.1 Background

- 156) A small number of surveyors are of view the current certification holds them responsible for all documents bundled into a CSD by Landonline.

For the purposes of the rules and the Cadastral Survey Act 2002,⁴² surveyors are only responsible for the CSD and its related cadastral survey.⁴³ They are not responsible for the accuracy and correctness of other material that are not normally considered part of a cadastral survey (e.g. TA certifications and other documents certified by other parties) that is bundled by Landonline within a CSD.

16.8.2 Proposal

- 157) It is proposed to retain the words in current rule 13 relating to a surveyor's certification as to the accuracy and correctness of a CSD and its related survey.

⁴² See schedule 2 (Professional misconduct) Cadastral Survey Act 2002.

⁴³ **Cadastral survey** means the determination and description of the spatial extent (including boundaries) of interests under a tenure system and **cadastral survey dataset** means the set of cadastral survey data necessary to integrate a cadastral survey into the cadastre (see section 4 Cadastral Survey Act 2002).

Appendix A: Good Survey practice

Good practice and best practice

Good practice and best practice are terms used frequently in New Zealand documentation, but are generally not defined. This may be because good practice and best practice vary depending on the context in which they are used.

Good practice and best practice can be generally defined as follows.

Good practice

Exercising good practice involves carrying out a function or activity using approved or recommended methods. Good practice is a 'proper', usual, or generally accepted way or ways of carrying out a function or activity within an industry or profession. Good practice is not necessary the best method of carrying out a function or activity, but it is proven methods to obtain satisfactory results.

What constitutes good survey practice to one surveyor may not constitute good survey practise to another although each surveyor can rightly argue the same satisfactory results can be achieved using their methods.

Best practice

Best practice is a method of carrying out a function or activity that produces results superior to those achieved with other means. Best practice is not necessarily utilised throughout an industry or profession; it can be developed by one organisation as a result of learning, analysis and experience, and can provide an organisation with a competitive advantage.

Over time, if best practice becomes widely recognised it can become good practice.

Past New Zealand regulation

- 1) Regulation 5 Survey Regulations 1972, regulation 9 Survey Regulations 1998 and rule 9 Rules for Cadastral Survey 2002 all had a requirement to comply with *accepted good survey practice*.
- 2) These regulations and rules did not define what good survey practice was and it was left to other LINZ publications to clarify how the regulation/rule might apply. For example, the Chief Surveyor's Practice Notes for the Wellington Land District (1990) states:

"Chief Surveyors have discretionary power to refuse to accept survey plans which in their opinion do not conform to good survey practice, or which have not been sufficiently checked to ensure the accuracy of the survey. Such refusals may not be based on specific breaches of the Regulations, but on bad practices and methods that are not in accord with the accepted standards of work for title surveys."

The Guidelines to the Rules for Cadastral Survey 2002 states, "good survey practice relates to the use of sound methodology in the conduct of surveys, and includes, but is not limited to:

- *Use of proven and calibrated equipment*
- *Connection to existing monuments, and use of a sufficient number of existing monuments to prove definition*
- *Locating witness marks and PRMs in suitable positions*
- *Confirming the origin of the survey*
- *Working from the whole to the part*
- *Providing proof of survey by redundant (independent) methods*
- *Using dependable marking, measuring, recording and processing methods*
- *Analysing acceptable error limits for each component of the survey*
- *Dealing with conflicts in existing records appropriately*
- *Carrying out checks to ensure consistency between field notes, traverse sheets and plans."*

Cadastral Surveyors Licensing Board

- 3) The Cadastral Surveyors Licensing Board publishes a standard for licensing which sets out in detail the competencies required to become a licensed cadastral surveyor. The Standard for Licensing requires applicants for cadastral survey licenses to uphold "professional practice standards" in order to satisfy the board that they meet the required standard. Professional practice is defined in section 3.1.3 as:
 - 3.1.3.1 act to maintain the accuracy and integrity of the cadastre and efficiency of the survey and cadastral systems,
 - 3.1.3.2 uphold the rights and responsibilities of the Crown,
 - 3.1.3.3 act to maintain public confidence in the cadastral survey and land tenure systems,
 - 3.1.3.4 take into account the lawful interests of current and future land owners, the adjoining land owners, and other affected parties, and
 - 3.1.3.4 be responsible for work undertaken on his or her behalf by any other person.
- 4) Section 2.3 of the Standard for Licensing specifies 13 competencies required for land boundary definition, and section 3.1.2 specifies a further seven competencies for cadastral surveying. Although some of the competencies are related to good survey practice, they do not require that candidates for licensing be able to apply good survey practice. Overall, the Standard for Licensing makes no reference to good survey practice.

S+SNZ (NZIS) and ICS

- 5) In 2016 the New Zealand Institute of Surveyors and the Institute of Cadastral Surveyors co-published *Practice Guidelines for Cadastral Surveying in Areas Affected by Ground Movement Caused by Earthquakes in Canterbury*. Focused on surveying in earthquake affected areas of greater Christchurch, Chapter 3 relates to good survey practice and includes tips and hints, areas of risk, survey tools and methodology to reduce risk, and recommendations.
- 6) The NZIS has also over the years published articles on good survey practice. For example, the Survey Quarterly of September 2005 (Issue 43) has as its main banner 'Good survey practice'.
- 7) The institutes also promote good survey practice through educational activities that involves the sharing of knowledge, skills, techniques and resources. For example, the NZIS held a seminar in Wellington in 2000 titled 'GSP in cadastral Surveying' and in Auckland in 2018 titled 'Good Survey Practice'.

Australian regulation

- 8) The six Australian States, the Northern Territory, and the Australian Capital Territory (ACT) each have separate survey regulations. The survey regulations or rules and relevant guidance material differ considerably between the states and territories.
 - Only Tasmania has a requirement for surveyors to exercise good survey practice. Direction 2.1.1 of the Tasmania Survey Directions 2014 states, "*where no express provision is made in these Directions, [surveyors must] comply with nationally recognised survey practice standards.*"
 - The Surveyor-General of ACT publishes 12 guidelines covering a number of topics. The guidelines specify additional requirements to those in the Surveyors (Surveyor-General) Practice Directions 2013 and recommend good or best practice techniques to surveyors.
 - The Surveyor-General of Victoria publishes guidance in the form of the Victoria Practice Directives 2014. The Practice Directives state "*These practice directives are to be viewed and adopted in conjunction with the relevant legislation, best practice guidelines (as available) and general good practice principles and procedures.*"
 - Survey regulations for Queensland, South Australia and Western Australia explicitly refer to accepted practice or good practice in particular circumstances, but do not include general provisions requiring surveyors to conduct surveys in accordance with good survey practice.
- 9) Notably, Australian survey regulations are generally more prescriptive than the Rules for Cadastral Survey 2010, and some of the regulations could be considered good survey practice although they are not described as such. For example, the New South Wales Surveying and Spatial Information Regulation 2017 require surveyors to use appropriate

equipment in making a survey, and to locate reference marks in positions such that they are unlikely to be disturbed.

Examples of other professions and Government Departments

- 10) **Chartered Professional Engineers of New Zealand Rules (No 2) 2002** require that engineers must be able to demonstrate knowledge and application of good practice in engineering as part of their registration requirements rather than as part of processes to assess or approve their work.

The interpretation section of the rules (clause 3) does not define what good practice in the context of the engineering profession is.

- 11) **Registered Architects Rules 2006** require that architect must be able to demonstrate knowledge and application of good practice in architecture as part of their registration requirements rather than as part of processes to assess or approve their work.

The interpretation section of the rules does not define what good practice is.

- 12) **WorkSafe New Zealand** is the regulator of the workplace health and safety system, in accordance with the Health and Safety at Work Act 2015.

WorkSafe publishes or directs associated organisations to publish a number of good practice guidelines on work practices for different industries. Examples include the safe use of machinery, safe practices in mines, safe practices in forestry, and working safely with chemicals and fuel on farms. The guidelines are not legislative instruments.

Compliance and enforcement under the Health and Safety at Work Act 2015 is undertaken by WorkSafe inspectors. Inspectors may undertake enforcement actions if they believe that the Act or regulations are not being complied with, or if there is an immediate risk to health and safety.

The good practice guidelines published by WorkSafe are not enforceable, except to the extent that failure to follow good practice may result in a situation where there is immediate risk to health and safety.

Appendix B: Hierarchy of evidence

The hierarchy is a survey principle

"The hierarchy of evidence is a principle that accords varying preference to different types of evidence when determining disputed land boundaries. The generally accepted order places greater significance on evidence of natural boundaries than on monumented lines, such as original pegs:

Historically, the hierarchy of evidence has been accepted as being:

- 1) Natural boundaries*
- 2) Monumented lines (such as original peg)*
- 3) Undisputed occupations*
- 4) Abuttals*
- 5) Calculations based on stated figures, deeds, grants and titles*

*The hierarchy of evidence is a guide rather than a straightjacket. The hierarchy places the greatest weight on the points on which the parties were least likely to be mistaken at the time. If the circumstances make it clear that a piece of evidence further down the hierarchy is more reliable indication of the parties intention then it may take precedence."*⁴⁴

New Zealand regulation

The hierarchy of evidence is not directly referenced in New Zealand legislation or in past survey regulation.

Cadastral Surveyors Licensing Board

Cadastral Surveyors Licensing Board requires that applicants for cadastral survey licenses understand the hierarchy of evidence.

The objective statement in section 2.3 of the Standard for Licensing notes that, "accurate land boundary location and correct definition is fundamental to cadastral surveying and requires a sound knowledge of, and ability to apply correctly, the hierarchy of evidence applicable to the definition of cadastral boundaries."

Section 2.3.5 requires "An ability to interpret and apply all Acts, Regulations, Rules," and section 2.3.6 requires "An ability to locate old boundaries, interests, property rights, covenants and limitations on public, private and Māori land, including by the application of sound judgement and application of survey and legal principles to the assessment of relevant physical, historical and legal evidence."

⁴⁴ Para 111 and 112 Court of Appeal CE LINZ v Te Whanau O Rangiwhakaahu Hapu Charitable Trust and Friends of Matapouri Inc CA67/2011[2013] NZCA 33

As such, it is expected that licensed cadastral surveyors understand the hierarchy of evidence and are able to apply it appropriately within the circumstances of any cadastral surveys that they undertake.

NZIS and ICS

NZIS publications, including *The Surveyor and the Law* (chapter 5), *Law for Surveyors* no. 5, and *Land Title Surveys in New Zealand* (chapter 1) refer to the hierarchy of evidence, or types of evidence in the hierarchy. In addition, multiple articles in the old series of the *New Zealand Surveyor* and the current *Surveying+Spatial* journals include material relating to survey definition and factors that are important in determining the location of old boundaries.

Australian regulation

Survey regulations for Queensland and Tasmania both contain provisions relating to the hierarchy of evidence.

Queensland

The Queensland Cadastral Survey Requirements 2016 contain a combination of standards and guidelines:

- Requirement 3.33.1 sets out various tasks surveyors must undertake when reinstating existing cadastral boundaries, such as obtaining a full search, gathering sufficient physical evidence, recording relevant occupation, etc.
- Guideline 3.33.3 states:

"In making a survey to re-establish the boundaries of land, the first and over-riding aim is to arrive at the intention of the parties as expressed in the original documents establishing those boundaries.

The evidence of the parties themselves, when available, will sometimes, although not always, be accepted. If the intention by the actual parties is not available, or not admissible, their intentions must be arrived at by the study of documents to which they were party.

A plan may be such a document, or may be incorporated by reference into such a document.

If the plan is a statement of measurements actually marked on the ground then the markings become monuments, and evidence as to their nature and position is admissible.

However, the intention of the parties to the creation of the boundary is of paramount importance, and the courts have laid down rules establishing the relative importance of the, sometimes conflicting, documentary and physical evidence on which the surveyor must base their survey, in order to arrive at what the intention was.

This set of rules and priorities is often referred to as the hierarchy of evidence. It is a list of best evidence for establishing the intention of the parties at the time the boundaries were created. It becomes a hierarchy where two or more pieces of evidence for determining a corner or a boundary exist and the evidence is in conflict. A modern expression of the hierarchy of boundary evidence, taking into account recent case law and using terminology relevant to surveying in Queensland can be ranked as:

1. *"The greatest weight must always be given to lines and corners marked on the ground and corroborated by other physical evidence.*
2. *Natural monuments shown on the plan.*
3. *Adjoiners – "a well-established line of an adjacent survey" in existence before the original grant.*
4. *Adjoiners created after the original grant.*
5. *Artificial monuments corroborated by documentary evidence.*
6. *Occupation evidence that is contemporaneous and consistent with the documentary evidence.*
7. *Bearings and distances. Bearings and distances of short lines will over-ride bearings and distances of longer lines. Neither bearing nor distance is given overall preference.*
8. *Artificial monuments uncorroborated by documentary or physical evidence.*
9. *Area will in general be the least valued evidence, but may in some cases be the key to the problem.*
10. *Finally, but most important of all, any one of these rules may be of more (or less) weight in one case than another. The rules set out are for cases of conflict, they are general rules, to be used as a guide but not as a straightjacket."*

Tasmania

In the Tasmania Survey Directions 2014, Direction 3.2.2 relates to the reinstatement of boundaries:

- Direction 3.2.2.1 states:

"A land surveyor must ascertain and report unambiguously on the origin, nature, position, and age (where not evident from the attributed origin) of survey marks, buildings, fences, and other features that are evidence of previously established boundaries being resurveyed. Such features include all evidence of occupation and other interests in the vicinity of surveyed boundaries."

- In relation to direction 3.2.2.1, direction 3.2.2.4 states:

"In reinstating boundaries, the intention expressed in the instruments providing for their creation must be determined from the best evidence that the nature of the case admits. A guiding principle is that most effect is to be given to that evidence about which there is least likelihood of a mistake having originally been, or now being made. Where there is conflicting evidence, the order of priority generally assigned to such evidence by the courts is:

1. *Natural boundaries*
2. *Monuments creating the boundary*
3. *Long undisputed occupation*
4. *Abuttals*
5. *Measurement*

Note that survey marks placed in the process of reinstating a boundary form secondary evidence of the original surveyed boundary. Where a land surveyor's boundary reinstatement decisions deviate from this hierarchy, the facts and reasoning must be clearly reported in the survey notes."

- The Tasmania Survey Directions 2014 require surveyors to including reasoning for departures from the hierarchy in their survey reports.