

# The Review of the Rules for Cadastral Survey

## Stage 2 – Part 1 Consultation on proposed changes

30 July 2018

### Proposals:

- Layout of the rules
- Reference marks
- Connection to a horizontal control mark
- Reduced levels and NZVD2016
- Accuracy of non-primary boundaries
- Unique identifiers for boundary points
- Date of survey

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

The Surveyor-General is seeking feedback on this initial 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](mailto:sgrulesreview@linz.govt.nz)

**Feedback is due by Tuesday 4 September 2018.**

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### Enquiries

**Email:** [sgrulesreview@linz.govt.nz](mailto: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.

Our focus has been on researching the ideas set out in that paper and the feedback received from surveyors. We have also discussed our proposals with the reference group of cadastral survey experts from the private sector as well as LINZ subject matter experts. Their views have had an influence on our thinking.

I have decided to split the Stage Two consultation with surveyors on our response to issues into two separate parts. This document reflects the first part and sets out 7 proposals for changes to the Rules based on the feedback received.

We will send out the second part of the Stage Two consultation later this year with a continuing focus on the items identified in the Issues and Opportunities paper.

Surveyors have told us the current rules are confusing and hard to read and this remains a fundamental concern of theirs. We have decided to start addressing this issue first up. We have been working with Parliamentary Counsel Office (PCO) on examining ways of reorganising the Rules with a view to making changes to both the layout and the order of rule requirements. In this document is a proposed rule layout for your consideration. Once we get your feedback we will further refine the layout and then look at the actual wording of the rules to make them more understandable and user-friendly. You will then get the opportunity to provide feedback on the proposed rules in actual draft form during the Stage Three consultation.

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

**Mark Dyer**

**Surveyor-General / Kairūri Matua**

# 1 Overview

## 1.1 What's the purpose of this document?

This document sets out a first set of proposals for changes to the Rules for Cadastral Survey 2010. The document is prepared so that you can consider these proposals and, if you wish, provide feedback.

## 1.2 Overview of the Rules review process

This document reflects the first step of Stage Two in the Rules review process. In the near future further proposals will be presented for your feedback. Figure 1 below illustrates the overall process and indicative timing.

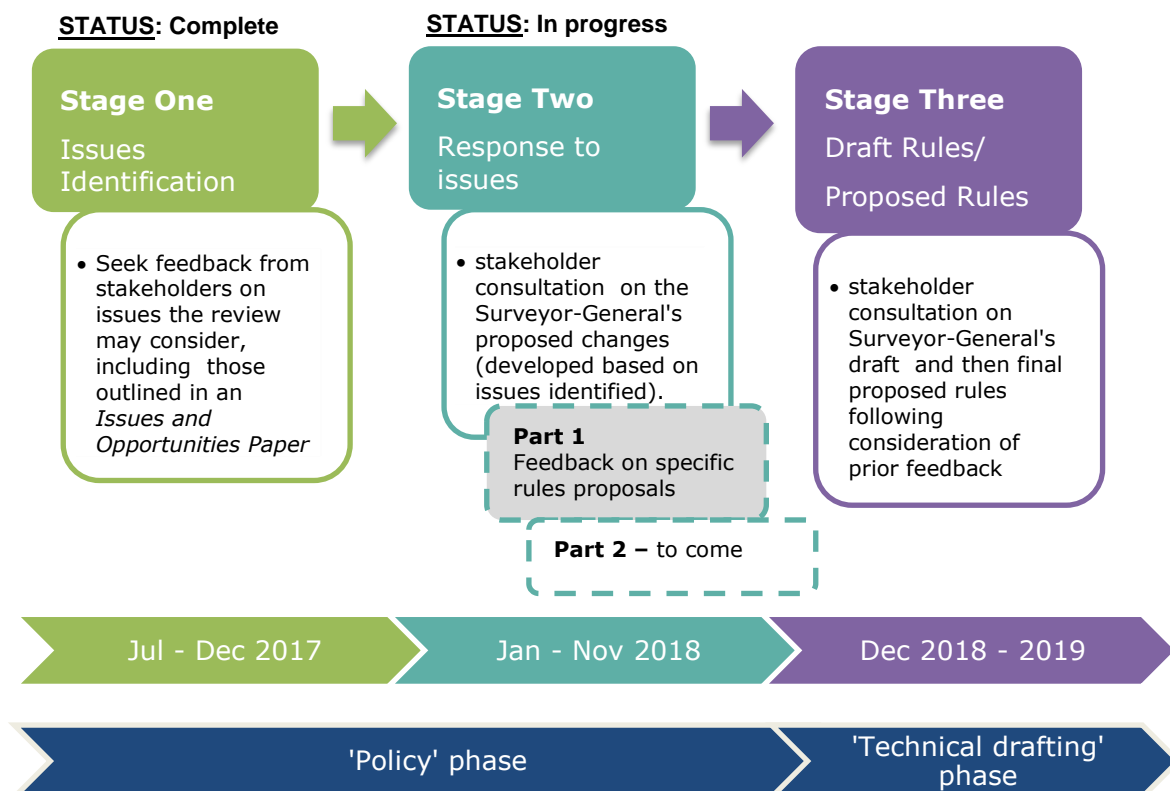


Figure 1: Review consultation process

## 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

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compliance (managing risk) and flexibility (achieving the outcomes efficiently and effectively)?

3. Is the proposal looking to the future adequately particularly when considering future technological developments and the expectations of users of cadastral information?
4. How does the proposal contribute to the cadastre and if implemented how would it 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.](#)
- [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

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## 2 Layout of the rules

### 2.1 Summary of the proposal

The proposal is to change the layout of the rules so that they are more user friendly for the survey community.

### 2.2 Background

The Surveyor-General has received ongoing feedback on the layout and order of the 2010 Rule requirements. Surveyors generally agreed that the outcomes from the rule requirements are appropriate (i.e. the requirements are appropriate) but that the way the requirements are presented makes them unclear and hard to interpret.

Specifically the feedback focused on surveyors:

- being frustrated with the cross referencing. They indicated they did not like having to search back and forward through the rules to firstly understand the meaning of the rules and secondly to identify all the relevant requirements for their survey.
- wanting requirements for a particular survey purpose to be grouped together. Examples including wanting all the requirements for non-primary parcels to be grouped together.
- wanting rules that are clear and concise with more use of simple sentence structure and plain English rather than multiple technical terms set out in long sentences.

Parliamentary Counsel Office (PCO) is required to draft and publish the cadastral rules. While it is required by legislation to ensure they look and feel like legislation they also have a mandate to make them easy to understand. We have worked with the PCO in developing an alternative layout of rules. This is shown in [Appendix A](#) and is referred in this document as the draft layout.

### 2.3 Proposal in detail

The following are initial structural proposals that will inform subsequent work on drafting the actual rules.

#### 2.3.1 Draft layout

- 1) It is proposed that the Rules be divided into 8 parts:
  - 1) Preliminary provisions
  - 2) Boundaries
  - 3) Parcels
  - 4) Field Survey
  - 5) Non-Primary Parcels
  - 6) Record of Survey

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- 7) Ground Movement
  - 8) Boundary Reinstatements
- 2) Each part is further divided into subparts to further refine the subject matter. Subpart 1 of each part includes an opening purpose statement which sets out at a high level the purpose of the rules that follow.
  - 3) To illustrate how the proposal might work the current rule headings have been cut and pasted, many without change, into the 8 Parts and Sub-parts according to subject matter. For example, in the current Rules, the requirements for non-primary parcels are scattered throughout the Rules. In the draft layout [Part 5 Non-primary parcels](#) includes all the requirements for non-primary parcels in subparts:
    1. Preliminary provisions,
    2. Parcels
    3. Form of boundaries,
    4. Datums,
    5. Accuracy standards, and
    6. Referencing
  - 4) Other examples where initial work on grouping requirements has been considered are:
    - **ground movement** - where the provisions of current rules 18 and 20 have been grouped together with subparts for surveys outside and inside greater Christchurch (see rules 119-128 in [Part 7 Ground movement](#)).
    - **redefinition surveys** - where the relevant provisions in current rules 2 (Terms and definitions), 8.5 (lodging a CSD) and 11 (monumentation CSD) have been grouped together (see rules 129-141 in [Part 8 Boundary reinstatements](#)).
    - **parcel and boundary annotations** set out in current rules 16.5, 18.1, 18.2 and 20.9 and tables 9, 10 and 11. New tables to illustrate the concept have been drafted (see [rules 101](#) and [116](#) in Part 6 Record of survey).
    - **Survey reporting** with requirements in current rules 8.2, 16, 17, 18 and 20 being grouped together. New subheadings are proposed to identify the various reporting requirements. [Rule 75 in Part 6 Record of survey](#) has been drafted to illustrate this.
  - 5) This draft layout sets out the intent but does not attempt to complete the process. Much of this work looks untidy at this stage and further work will be needed to firstly confirm if the requirements are still relevant and secondly rewriting the requirements so that they are easy to interpret. The inclusion of a current rule heading in this draft layout does not necessarily mean the current rule requirement will be retained. For example, if the proposals set out in this document on

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- 6) [Accuracy of non-primary parcel](#) boundaries are implemented they will replace rules 61 – 64 in the draft layout.

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### 2.3.2 Dictionary of terms

One key proposal is to place the terms and definitions throughout the revised rules where they are most relevant. This has been done by:

- grouping a particular definition together with other rules relating to the same subject. For example incorporating the definition of water boundary with other rules on water boundaries (see [Rule 9 Water boundaries in Part 2 Boundaries](#)),
- rewriting a definition as a rule. For example the meaning of conflict has been included in the main body of rules immediately prior to defined by survey where it is referenced (see draft [rule 12 \(Meaning of conflict\)](#) in [Part 2 Boundaries](#)).

In addition, a complete set of all the terms and definitions will be included in a separate section of the rules with links to relevant areas in the rules.

### 2.3.3 Cross referencing

Some initial work has been carried out on reducing cross referencing in the rules. To illustrate this [rule 49 \(Boundaries to be marked\)](#) in [Part 4 Field survey](#) has been drafted. Here the cross referencing to rules 6.2(a)(vi) - (x) in current rule 7.1(b) has been removed and the related requirements inserted.

Because of the complex relationship between many of the survey requirements it is not always possible to group together all the requirements relating to the same topic and remove all cross referencing. An example is permanent structure boundaries. It is proposed all the requirements for permanent structure boundaries are in Part 5 Non-primary parcels. However it seems logical to also refer to permanent structure boundaries in [rule 7](#) (Form of boundaries) within [Part 2 Boundaries](#) which sets out all the permitted forms of boundary. In this case it is proposed that a cross reference (in the form of a hyperlink) from [rule 58](#) in Part 5 to [rule 7](#) in Part 2 and visa versa will be included. Draft rules 7 and 58 illustrate this.

### 2.3.4 Rulings

It is proposed that requirements and information currently set out in related Rulings are incorporated within the revised rules. In some areas this will be in schedules located at the back of the new rules.

There are existing rulings on the [official geodetic datums and projections](#), [cadastral survey network marks](#), [official vertical datums](#) and [vertical control marks](#).

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## 3 Reference marks (witness marks and PRMs)

The following section outlines a proposed change to requirements for witness marks and permanent reference marks.

### 3.1 Summary of proposal

It is proposed that only one type of non-boundary mark will be required to reference boundary points. This is a change from the dual roles of witness marks and permanent reference marks required by the current rules.

### 3.2 Background

- 7) Reference marks play an important role in providing evidence of boundary location particularly where a boundary mark has been disturbed or removed. Reference marks also enable accurate calculations between adjacent surveys and have proved to be invaluable in determining the extent of any localised ground movement.
- 8) To enable reference marks to serve their purpose as long standing evidence of boundary location they need to be of a permanent nature, be in close proximity to the boundary points they reference and be of sufficient number so as provide confidence that if any are removed or disturbed there are others that can be relied on. The current requirement that witness marks only need to be expected to last for 10 years is not sufficient for these longer term purposes.
- 9) To enable surveyors to have confidence they can accurately re-establish a boundary in the future, a cadastral survey today should:
  - provide for at least 3 reference marks. With only 2 marks it is more difficult to tell which mark is disturbed if a new measurement does not agree with the previous survey.
  - ensure reference marks have sufficient durability to last well into the future.
  - place reference marks within reasonable proximity of the boundary points they reference. This will assist future surveyors:
    - to achieve the accuracy required for boundary reinstatement,
    - to help identify the effect of any localised earth deformation on boundary location, and
    - to efficiently re-establish a boundary point.
- 10) Under the current rules, another reason for requiring witness marks was to ensure there remained in the ground 'traverse marks' that enabled future surveyors, primarily with theodolite type technology, to derive an orientation and check the orientation of an underlying survey. This was often carried out by confirming the angle and distances between 3 traverse marks on the underlying survey. Today approximately 50% of class A boundaries and 75% of class B boundaries are defined on surveys using GNSS technology which derives orientation independent of the underlying survey. This means the need to provide for traverse marks for future surveyors to derive an origin of bearings is diminishing.

## 3.3 Proposal in detail

This section sets out in detail the proposal for reference marks.

### 3.3.1 Reference marks to be of a permanent nature

It is proposed there be only one type of reference mark. These marks must be of a permanent nature and their attributes similar to those currently specified for permanent reference marks in rule 7.4.3 (Permanent reference marks). It is proposed that these marks under the revised rules continue to be called Permanent Reference Marks.

Current rule 7.4.3 requires that a PRM be reasonably expected to survive and remain useful for 50 years. In developing the 2010 rule the 50 year criteria was considered important as it aligned with the design lifespan of major buildings on any site and would give any surveyor, in 50 years, some confidence the mark(s) would continue to remain undisturbed in the ground for them to use in locating the old boundaries. It was also important to make a distinction with witness marks that were expected to last only 10 years.

The 10 year and 50 year criteria has been successful to date and surveyors have been placing marks that will continue to be available for surveyors many decades into the future. However it is recognised that some surveyors have been concerned with the 50 year criteria<sup>1</sup> and it is proposed this same outcome can be achieved by replacing 50 years with an alternative phrase. The revised rule could say for example that a PRM must be durable, stable and accessible so that it is likely to remain useful as a reference mark for the foreseeable future.

### 3.3.2 Number of and distance to PRMs

- 11) It is proposed that the total number of PRMs in a cadastral survey will be a minimum of 3 for class A and 4 for classes B and C. This is similar to the number of witness marks currently required in current rule 7.3.2 (Number and distance of witness marks).
- 12) Similarly, the distance between a boundary point required to be referenced and its reference PRM will remain at 150 m, 500 m and 1000 m respectively. This is the same as for witness marks set out in rule 7.3.2. The proposal is summarised in the table below.

<b><i>Class of Boundary Point</i></b>	<b><i>Distance(m)</i></b>	<b><i>Minimum number of PRMs required for the cadastral survey</i></b>
<i>A</i>	<i>150</i>	<i>3</i>
<i>B</i>	<i>500</i>	<i>4</i>
<i>C</i>	<i>1000</i>	<i>4</i>
<i>D</i>	<i>not applicable</i>	<i>nil</i>

<sup>1</sup> The concern of some surveyors that they are required to place PRMs with an expected lifespan of 50 years and that they could be found to be non-compliant if the mark was disturbed or removed within that period is noted. However in practise surveyors have almost without exception applied the intent of the rule and no one has been taken to task where a PRM has been disturbed or removed by an unforeseen event.

It is not anticipated this requirement will have a significant impact on class A but there may be a small increased compliance cost for some class B surveys.

Further information on referencing non-primary boundaries is covered below.

### 3.3.3 Boundary points to be referenced

- 13) It is proposed that the boundary points that must be referenced will be generally the same as currently required by rule 7.3.1 (Boundaries to be witnessed) but with changes for stratum boundaries (see below).
- 14) Normally non-primary parcels are not required to be referenced. However an exception is where there are class D intersections with the underlying parcel boundary (see the discussion topic [6.3.2 Class D intersections where normally class B or C](#) below).

### 3.3.4 Referencing stratum boundaries

- 15) Stratum boundaries define limitations by height<sup>2</sup>. It is proposed that:
  - For new stratum boundaries for primary parcels, units and leases, 2 of the reference marks (PRMs) must have reduced levels.
  - For other types of new non-primary stratum boundaries there will not be any requirement to include PRMs with reduced levels.
  - In both cases the stratum boundary must be referenced to an existing non-boundary mark that has an official NZVD2016<sup>3</sup> reduced level (the connection and use of the official vertical datum is discussed below under the heading [Reduced levels and official vertical datums](#)).
- 16) An exception to the above is proposed for existing developments with stratum boundaries where the:
  - underlying title is going to remain in place. Here new stratum boundaries may be defined in terms of the datum used for the underlying 'title' survey. An example is a new stratum easement over a primary parcel that has a stratum boundary.
  - development is a subsequent stage. Here new stratum boundaries may be defined in the same datum as the prior stages. An example is for a subsequent stage of a unit development.

In these cases, the new stratum boundary may be referenced to an existing survey reference mark (PRM / bench mark) by adoption providing that mark still exists in its original position. If that mark is missing or disturbed, the boundary will need to be referenced to another existing mark that has an official NZVD2016 reduced level.

- 17) The above proposal is different and more comprehensive than current requirements (refer current rules 7.3.1(d), 7.3.4 and 7.4.3(d)). This is because, firstly it has been identified that the current rules do not address many of the scenarios that surveyors have to deal with today and secondly, going forward there is an increased need for the vertical aspect of cadastral surveys to be referenced to a common vertical datum.

<sup>2</sup> This does not include permanent structure boundaries. Permanent structure boundaries are referenced by a permanent structure.

<sup>3</sup> New Zealand Vertical Datum 2016.

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### 3.3.5 Referencing lease boundaries

The question as to whether lease boundaries should continue to be referenced by witness marks / PRMs has been considered. Leases give occupancy rights almost equivalent to fee simple ownership and therefore the level of survey definition and ability to accurately relocate lease boundaries should be similar to that of a primary right. The requirement to reference new lease boundary points provides the assurance that the location of the new lease boundaries are accurately known and recorded in the cadastre and that any surveyor in the future, in locating a reference mark can confidently relocate that same boundary / boundary point correctly. This same assurance cannot be provided by referencing new lease boundaries to existing primary parcel boundaries of which themselves are referenced to traverse marks / witness marks by various means and completed under different regulation requirements where the witness marks may or may not still exist undisturbed in the ground.

### 3.3.6 No provision for extensive rural boundary points

It is proposed to remove the provisions relating to extensive rural boundary points. The 2010 Rules enabled witnessing distances to be extended from 500 m to 1000 m for class B boundary points where the parcel / title was over 500 ha. In reality this enabling provision has only applied in a very limited number of situations. Seldom has it applied to private land parcels and there are many instances of surveyors confusing the 500 ha criteria with their perception of what extensive high country should mean. In reality the rule has mainly applied to Crown surveys for South Island high country tenure reviews. In the future any potential need for extending 'witnessing distances' can be managed through a dispensation under s47(5) Cadastral Survey Act 2002 as an exemption or alternative requirement.

## 4 Connection to a horizontal control mark

The following section outlines a proposed change to requirements for a survey to connect to a cadastral survey network mark (CSNM).

### 4.1 Summary of proposal

It is proposed that when defining a new primary parcel<sup>4</sup>, all class A surveys will be required to connect to a CSNM and all class B and C surveys will be required to make the connection where such a mark is within 5 km.

### 4.2 Background

- 18) Current rule 4.2 (Horizontal datum – connection) requires at least one CSNM must be connected by vectors to the survey if it is within 500 m of a new class A boundary point on a new parcel (increasing to 1000 m for Class B and 2000 m for class C). The method of connection is not specified and some surveys will use adoptions with others making direct observations.
- 19) In the 2017/18 year over 99% of applicable surveys connected to a CSNM. A detailed analysis for the 5 year period 2013 – 2018 for class A and for class B surveys is shown below. Class C survey numbers are very low.

Looking at the tables:

- The number of surveys not connecting to a CSNM year on year is reducing each year,
- Where a survey has not connected to a CSNM, the average distance and maximum distance to a CSNM has reduced markedly.

Class A surveys/CSDs					
Year	Average No. CSNM Connections	Number surveys not connected	Percentage not connected	Average distance to nearest CSNM for unconnected CSDs (m)	Maximum distance to nearest CSNM for unconnected CSDs (m)
2013/14	7.8	17	0.5	958	4457
2014/15	7.6	31	0.9	615	4586
2015/16	7.6	7	0.2	1474	4578
2016/17	7.6	5	0.1	1515	4566
2017/18	7.9	6	0.1	1174	1944

<sup>4</sup> For a full understanding of when this will apply refer to the introduction in current rule 4.2.

	Class B surveys/CSDs				
Year	Average No. CSNM Connections	Number surveys not connected	Percentage not connected	Average distance to nearest CSNM for unconnected CSDs (m)	Maximum distance to nearest CSNM for unconnected CSDs (m)
2013/14	5.4	81	4.2	2848	11195
2014/15	5.4	100	4.7	2607	15532
2015/16	5.5	75	3.5	2309	10948
2016/17	5.6	50	2.3	2377	5322
2017/18	5.5	39	1.7	2149	3865

- 20) With more and more surveys connecting to a CSNM, LINZ adding more connections to 5th order marks and generating more CSN marks, and survey technology that can efficiently and accurately measure long distances (e.g. GNSS), making a connection to a CSNM can now be considered a part of normal cadastral surveying.

The density of CSNMs throughout New Zealand and in any particular location can be viewed via the LINZ GeoMarks app available on [Android](#) and [Apple](#) mobile devices.

## 4.3 Proposal in detail

This section sets out in detail the proposal for connection to a CSNM.

### 4.3.1 Connection to CSN

- 21) It is proposed that a cadastral survey that creates a new primary parcel with a new boundary point / new or old boundary mark:
- must connect to a CSNM where the survey is class A.
  - must connect to a CSNM if there is one within 5 km where the survey is class B or C.

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## 5 Reduced levels and official vertical datums

The following section outlines a proposed change to requirements for reduced levels and vertical datums.

### 5.1 Summary of proposal

It is proposed to require virtually all reduced levels in cadastral surveys to be in terms of an official datum and the survey to be referenced to an existing mark that has a NZVD2016 level. This includes stratum boundaries for primary and non-primary rights.

### 5.2 Background

- 22) A stratum boundary must have at least one boundary point with a reduced level (rule 6.8). This requirement is not expected to change. Current Rule 4.3 (Vertical datum) requires this level to be in terms of an official vertical datum where a vertical control mark is within 200 m of a class A boundary and 500 m of a class B boundary. There are 14 official vertical datums specified in Ruling [LINZSR65301](#) and a vertical control mark is specified as 3V or better in Ruling [LINZR65303](#). These 14 datums are offset from each other.
- 23) On 27 June 2016 the LINZ Geodetic office published NZVD2016 - a single datum that covers all of New Zealand and replaced NZVD2009. They also published information that enables the ready transformation of heights between the 13 local datums and NZVD2016.

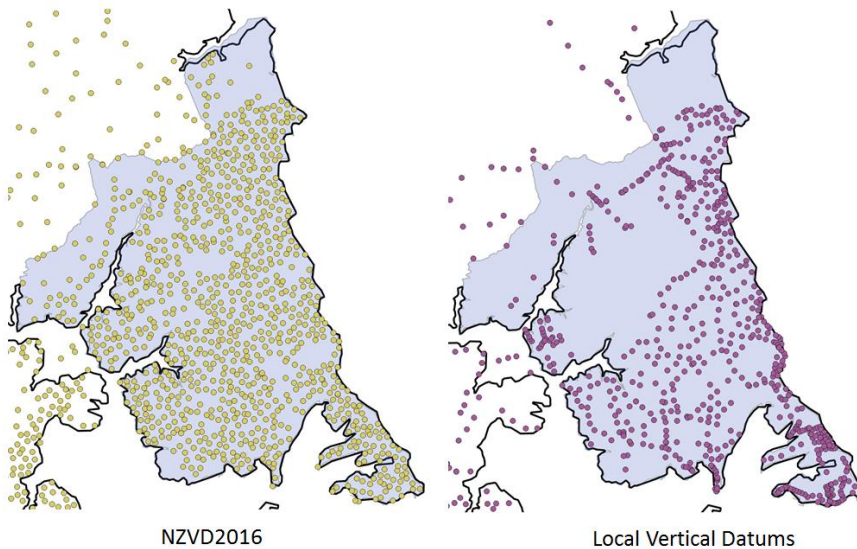
Importantly NZVD2016:

- enables GNSS derived NZGD2000 ellipsoidal heights to be consistently converted to NZVD2016.
- is consistent with NZGD2000. This means that normal-orthometric NZVD2016 heights can be transformed to ellipsoidal NZGD2000 heights and vice versa using an online conversion.
- heights and the marks that define them are actively maintained as part of the annual geodetic control programme. In general, heights in terms of the local datums have not been reviewed since their measurement in 1970s and 1980s.
- provides a greater number of 3V order and higher marks with a much better spread compared to local vertical datum marks which are focused along major roadways and urban centres. The table below shows there are already over 3000 more NZVD2016 than local vertical datum marks with a more even distribution across NZ. More NZVD2016 heighted marks are being added over time.

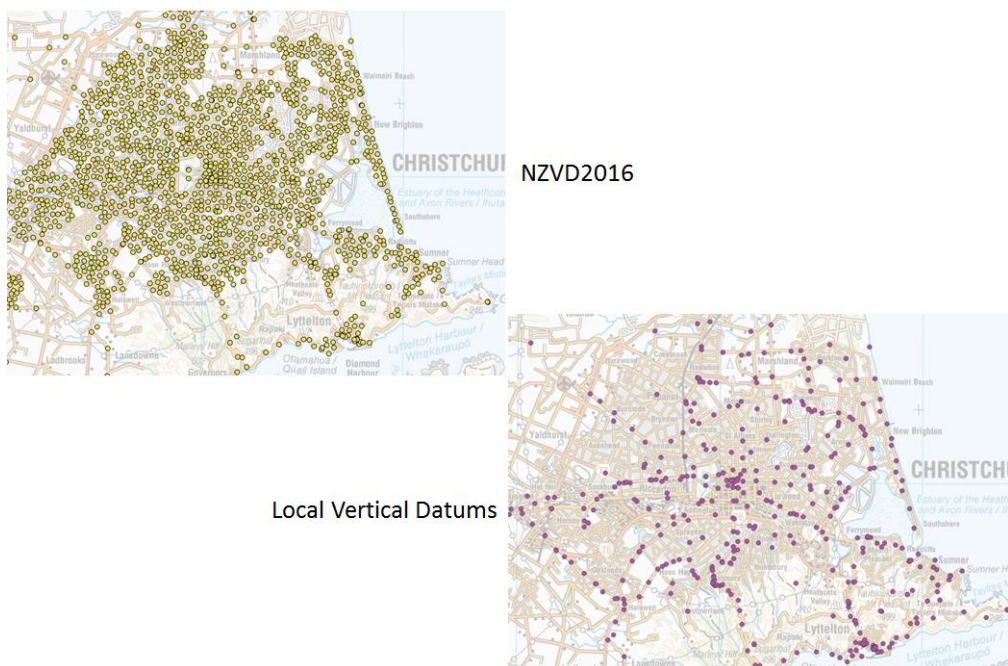
Order	NZVD2016	Local vertical datum
1V	7,707	10,562
2V	4,535	4,042
3V	26,931	21,417
<b>Total</b>	<b>39,173</b>	<b>36,022</b>

In the built up areas where stratum boundaries are more likely to occur the distribution of NZVD2016 marks is also denser. The maps below show a comparison of vertical marks in Auckland City and Christchurch.

**Orders 1V, 2V & 3V Mark Distribution  
North Shore - Auckland**



**Orders 1V, 2V & 3V Mark Distribution  
Christchurch**



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NZVD2016 coverage over all of New Zealand can be viewed via the LINZ GeoMarks app (tap the icon 'H/O' at the bottom of the opening screen to 'V/O' to see NZVD2016 marks).

- 24) Since the introduction of New Zealand Geodetic Datum 1949, surveyors have been required to connect surveys to a national horizontal framework. This has enabled significant efficiencies when integrating dissimilar or spatially separated information, particularly with the advent of digital systems for receiving, holding, maintaining, and disseminating cadastral survey information. In this regard, Landonline has emphasised that data in terms of a national framework is a significant resource for the surveying and spatial community, and for New Zealand as a whole.

There is now a need to utilise a common vertical datum. The implementation of a 3D digital cadastre, as is proposed for ASaTS, will require surveys that provide information about the vertical extent of parcels to be related to a single datum for the management of a seamless and integrated national system. In this regard, NZVD2016 suitably supports the survey-accurate determination of elevations over the whole of New Zealand. A requirement to connect surveys to this datum (or to a datum that can be transformed to this datum) will ensure that the benefits are shared in 3D. In doing so, the horizontal and vertical spatial extents of property rights will be readily available in a digitally consumable format for an ever-increasing user base.

## 5.3 Proposal in detail

This section sets out in detail the proposal for the use of official datums.

### 5.3.1 Official datums must be used in most cases

- 25) It is proposed that:
- there be 14 official vertical datums. This will include the current 13 local datums specified in Ruling [LINZSR65301](#) plus the New Zealand wide NZVD2016,
- 26) It is proposed where a new primary or non-primary stratum boundary is being defined:
- reduced levels in the CSD must be expressed in terms of an official datum (the applicable local official datum or NZVD2016).
  - no new stratum boundary may be in terms of an alternative or assumed vertical datum (as currently allowed by rule 4.3(b)).
  - the survey must be referenced (in a vertical sense) to an existing non-boundary mark that has an official<sup>5</sup> NZVD2016 reduced level if it is within 5 km of the boundary. In a traditional sense this mark will likely act as the origin of heights in the field. Where a mark is not within 5 km, any official mark with a NZVD2016 reduced level must be used. It is likely surveyors will use heightened marks in close proximity to the land under survey particularly in urban areas,

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<sup>5</sup> Any mark in the cadastre or the survey control system with a NZVD2016 reduced level.

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- LINZ will generate NZVD2016 heights for all boundary and non-boundary positions in the integrated cadastre.

Note: In some instances the survey will also need to provide to 2 reference marks with reduced levels (see [Referencing stratum boundaries](#)).

- 27) An exception will be provided for existing developments with stratum boundaries where there is a stage development or there is not going to be any change to the underlying title (see [Referencing stratum boundaries](#)).

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## 6 Accuracy of non-primary parcel boundaries

The following section outlines a proposed change to requirements for how non-primary parcels can be defined when the underlying parcel is not also being defined on the survey e.g. an easement-only survey.

### 6.1 Summary of proposal

It is proposed that such new non-primary boundaries need not be accurately defined in terms of the underlying parcel boundaries. This change will allow new non-primary boundaries to be connected to reference marks (PRMs) rather than be accurately calculated to be in terms of the underlying primary parcel boundaries.

### 6.2 Background

- 28) Generally when a new non-primary parcel boundary is defined there is a requirement that it fits mathematically with the boundaries of the underlying parcel. For example, in a rural area a new intersection of an easement boundary with the underlying boundary is normally required to be calculated to class B accuracy standards. By relating the easement boundary accurately to the underlying primary parcel boundary, the primary parcel boundary references the easement. This means that in the future the easement boundary can be relocated by first relocating the primary parcel boundary.

However:

- to relate an easement boundary accurately to the primary parcel boundary requires the primary parcel boundary to be located in the first instance. This can be a particularly difficult, time consuming or costly task especially where the underlying survey has not been connected to by later surveys or where the easement is crossing over multiple parcels.
- there are occasions where the location of the underlying parcel boundaries is not accurately known, particularly in some rural area where the underlying surveys are very old. In these cases it is unreasonable to require the underlying parcel boundaries to be redefined to modern standards in order to reference the new easement boundaries.

It is proposed to include provisions similar to those set out in current rule 17 (Alternative requirements for non-primary parcels) that allow such non-primary boundaries to instead be referenced to witness marks.

## 6.3 Proposal in detail

This section sets out in detail the proposal for referencing non-primary parcels to PRMs.

### 6.3.1 Class D intersections where normally class B or C

- 29) The following proposal will apply where the purpose of the survey is to define a new non-primary parcel and the underlying parcel is not part of the survey. An example is an easement-only survey.

It is proposed that in rural areas (where classes B or C would normally apply) the relationship between the horizontal boundaries of a new non-primary parcel and the horizontal boundaries of its underlying parcel need not be accurately determined.

In this case Class D accuracies may be used for the non-primary boundaries where they coincide or intersect underlying parcel boundaries. Because of this and because these non-primary parcel boundaries must be able to be relocated in the future it is proposed that they are connected to reference marks and be in terms of the geodetic datum. In essence the non-primary parcel boundaries will be 'floating' independently of the underlying parcel boundaries.

- 30) In detail:

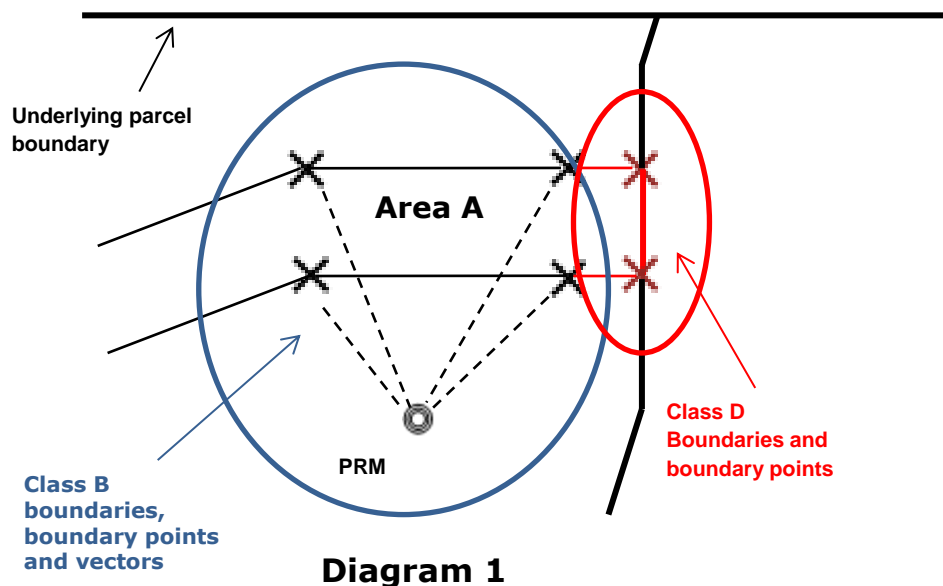
- The non-primary boundaries need not be accurately defined in terms of the underlying parcel boundaries (i.e. may be class D) but their location in relation to these underlying boundaries must be materially correct,
- The survey will need to be oriented in terms of the official datum and a connection made to a cadastral survey network mark but the bearings of the underlying primary parcels may be accepted,
- The new non-primary boundary points will need to be connected to reference marks in the same manner as other cadastral surveys (see [Number of and distance to PRMs](#) above) i.e.

<b><i>Class of Boundary Point</i></b>	<b><i>Distance(m)</i></b>	<b><i>Minimum number of reference marks required for the cadastral survey</i></b>
<i>A</i>	<i>not applicable</i>	<i>not applicable</i>
<i>B</i>	<i>500</i>	<i>4</i>
<i>C</i>	<i>1000</i>	<i>4</i>
<i>D</i>	<i>not applicable</i>	<i>nil</i>

- 31) Diagram 1 below illustrates this concept. The survey is an easement only survey and a new easement Area A is shown as intersecting the eastern boundary of the underlying parcel. The new boundary points of Area A internal to the underlying parcel (shown with black crosses) will be class B and these are shown as being connected to the PRM<sup>6</sup>. This enables these points to be relocated at any time in the future. Where Area A coincides with the underlying parcel boundaries, it may be

<sup>6</sup> In Diagram 1 the multiple connections from the class B boundary points to the PRM are for illustrative purposes only. Firstly, in practise far less connections will be required as the boundary vectors between the boundary points can be used to ascertain and verify the relationship between the boundary points and the PRM. Secondly, the symbology will be that of a calculated vector rather than a measured vector.

class D and this means the coincident boundary points and the boundaries of Area A that connect to these points (shown red) will also be class D.



Under this proposal:

- The diagrams in the CSD will need to show the new non-primary parcel in the 'right area' of the underlying parcel i.e. it must be clear from the diagrams Area A is in the northeast of the underlying parcel (refer to current rule 9.6.3(f)),
- there cannot be an ambiguity as to which boundary of the underlying parcel is being coincident with the new non-primary boundary i.e. it must be clear the boundaries of Area A coincide with the second to last boundary before the northeast corner (refer to current rule 3.3.2), and
- there cannot be any ambiguity as to whether the new non-primary boundary points are within or outside of the underlying parcel i.e. there cannot be any doubt that the boundary points of Area A (the black crosses) are to the west of the underlying parcel boundary (refer to rules 16.3 (b) and 17.1(c)).
- Class D boundary vectors are required for the boundaries indicated in red.
- in the future, if the underlying primary parcel is subdivided and its boundaries are class B, a connection will need to be made to one of the 'easement PRMs' to enable class B intersections to be calculated and the easement to be accurately located in terms of the new subdivision parcel.

- 32) Where the accuracy of the intersected / coincident underlying parcel boundaries meet the normal class B accuracy tolerances, it is anticipated that using the above Class D scenario set out above will be an option available to surveyors. Alternatively surveyors could define the new non-primary parcel boundaries accurately in terms of the underlying parcel and not have to connect to PRMs (as is the current practise).

Where the accuracy of the intersected / coincident underlying parcel boundaries do not meet the normal class B accuracy standards, surveyors will be obliged to

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use the Class D scenario or alternatively update the underlying parcel to current accuracy standards (calling for a new title<sup>7</sup>) and define the new non-primary parcel to B standards.

### 6.3.2 Class D intersections where normally class A

For class A boundaries (urban), where the accuracy of the intersected / coincident underlying parcel boundaries cannot meet class A accuracy tolerances because the underlying boundaries are themselves poorly defined and do not meet class A accuracies, surveyors will be obliged to define the new non-primary boundaries using reference marks and Class D intersections as set out above or alternatively update the underlying parcel to current accuracy standards (calling for a new title<sup>8</sup>) and define the new non-primary parcel to class A standards.

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<sup>7</sup> There will be an exception for surveys in greater Christchurch. In this region the revised rules will include enabling provisions similar to current rule 20.6(d) where surveyors will be able to record a change in the underlying 'title' boundary in the same CSD that records the new non-primary parcel rather than having to define the underlying parcel for a new title. The Registrar-General of Land has confirmed that the provisions in rule 20.6(d) are not to extend to surveys outside greater Christchurch.

<sup>8</sup>ditto.

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## 7 Unique identifiers for boundary points

The following section outlines a proposed change to requirements for how boundary points are to be identified.

### 7.1 Summary of proposal

It is proposed that all new boundary points and new boundary marks on existing boundary points are to be identified by a unique mark name.

### 7.2 Background

- 33) A unique name for a survey mark enables the mark to be readily identified should there be a query about it, either when viewing the CSD that first recorded the mark or by future surveys when referencing the mark.
- 34) The current rules do not require new boundary points to have a unique name and as a result surveyors and LINZ staff have found it frustrating and inefficient when trying to:
- link pre-validation warnings with the actual marks that are causing the validation failures,
  - spatially search for a specific boundary point.

It is also noted that Landonline functionality adds to the frustration as its capture field is the same for boundary marks which do not require names with other survey marks (e.g witness marks and PRMs) that do require them.

Many surveyors are already giving boundary points a unique mark name.

### 7.3 Proposal in detail

It is proposed that all new boundary points (whether marked or not) and new marks at existing boundary points are to be identified by a unique survey mark name.

The identifiers will not be required to be displayed on the CSD survey diagrams.

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## 8 Date of survey

The following section outlines a proposed change requiring the date of survey to be included in a CSD.

### 8.1 Summary of proposal

It is proposed to require that the date of survey is recorded in a CSD where the survey involves a field measurement.

### 8.2 Background

For future surveyors, the date when field work was completed becomes critical evidential information where an underlying survey was carried out about the time the area was subject to an earthquake or ground movement. Without its inclusion in a CSD the only way to determine the date of fieldwork is for a future surveyor to request the information from the originating surveyor which becomes more problematic with older surveys.

The current rules do not require the date of survey to be recorded in a CSD. Landonline has a mandatory 'Survey finish date' field that surveyors currently populate prior to CSD lodgement and the Landonline help file advises that it should be populated with the date the survey was performed. However this finish date is not defined and it cannot be relied on.

### 8.3 Proposal in detail

It is proposed that a CSD must record the date of survey where that survey involves a field measurement. Date of survey will be defined as the last day fieldwork is completed. This will include surveys where field work is carried out over an extended period of time but not include any later date where a mark is moved or placed as a result of a LINZ requisition.

Landonline functionality already requires the survey finish date to be captured and it is not expected this requirement will increase the costs of compliance.

# Appendix A: Draft layout of revised rules

## Cadastral Survey Rules 20XX

Pursuant to section 49 of the Cadastral Survey Act 2002, the Surveyor-General makes the following rules.

### Rules

#### 1 Title

These rules are the Cadastral Survey Rules 20XX.

#### 2 Commencement

These rules come into force on X.

### Part 1

#### Preliminary provisions

- 3 Purpose of these rules
- 4 Duty of surveyor
- 5 Classes of survey (A, B, C, D)

### Part 2

#### Boundaries

##### Subpart 1—Preliminary provision

#### 6 Purpose of this Part

The purpose of this Part is to specify the types of boundaries to be used to limit the extent of land parcels and the evidence to be taken into account when defining these boundaries.

##### Subpart 2—Form of boundary

#### 7 Form of boundary

- (1) A parcel boundary must be defined in its horizontal extent by—
  - (a) a right-line boundary; or
  - (b) an arc boundary; or
  - (c) a water boundary; or
  - (d) an irregular boundary; or
  - (e) a permanent structure boundary.
- (2) The vertical extent of a parcel, where the vertical extent is limited, must be defined by—
  - (a) a stratum boundary; or

- (b) a permanent structure boundary (see [rule 58](#)).

Compare: SR 2010/492 r 6.5

## **8 Irregular boundary**

## **9 Water boundary**

- (1) In this subpart, a water boundary—
- (a) is a boundary set at the landward margin of—
    - (i) a river bed or a stream bed; or
    - (ii) a lake bed; or
    - (iii) the common marine and coastal area or other tidal area; and
  - (b) is a natural boundary where this term is used in enactments to refer to a boundary at a water margin.

10 Water body centreline boundaries

11 Stratum boundaries

## **Subpart 3—Quality of boundary definition**

## **12 Meaning of conflict**

A conflict exists if a difference exceeds the applicable accuracy standards—

- (a) between the estate boundary and the boundary recorded in a CSD integrated into the cadastre; or
- (b) between the same boundary as recorded in different CSDs integrated into the cadastre; or
- (c) between the same boundary as recorded in a CSD integrated into the cadastre and other evidence including field evidence; or
- (d) has not been resolved by 1 or more CSDs already integrated into the cadastre.

Compare: SR 2010/492 r 2

13 Boundary defined by survey

14 Boundary intersection to be defined

15 Boundary defined by adoption

16 Acceptance of boundary

## **Part 3 Parcels**

### **Subpart 1—Preliminary provision**

#### **17 Purpose of this Part**

The purpose of this Part is to specify the types of land parcels to be used for different types of land rights, how these parcels are to be described in the cadastre, and the requirements where a new parcel is to replace an existing parcel.

### **Subpart 2—Parcel extents**

- 18 Balance parcels
- 19 Primary parcels
- 20 Residue parcel
- 21 Accounting for parcels
- 22 Width of parcels
- 23 Parcel areas

### **Subpart 3—Parcel appellation**

- 24 General land appellation
- 25 Parcel-type components
- 26 Māori land appellation
- 27 Unique parcel identifier

## **Part 4 Field survey**

### **Subpart 1—Preliminary provision**

#### **28 Purpose of this Part**

The purpose of this Part is to ensure that the boundaries of the land under survey are sufficiently accurate, and able to be relocated at the time the survey is completed and in the future.

### **Subpart 2—Datum**

- 29 Horizontal datum—orientation
- 30 Horizontal datum—connection
- 31 Vertical datum

### **Subpart 3—Accuracy standards**

- 32 Accuracy of non-boundary marks
- 37 Boundary points
- 38 Accuracy of boundary points
- 39 Accuracy of water and irregular boundaries
- 40 Accuracy of boundary witnessing
- 41 Vector accuracy

## Subpart 4—Reference marks

- 42 Boundaries to be witnessed
- 43 Number and distance of witness marks
- 44 Types of witness marks
- 45 Witnessing stratum boundary points
- 46 Number of permanent reference marks
- 47 Distances between permanent reference marks and a boundary point
- 48 Permanent reference marks

## Subpart 5—Boundary marking

### 49 Boundaries to be marked

The following boundary points must be marked, where practicable:

- (a) each new boundary point on a new primary parcel, unless—
  - (i) it is a boundary point that is only between new parcels that are all intended to remain in the same Crown ownership; or
  - (ii) it is on a survey under the jurisdiction of the Māori Land Court; or
  - (iii) it is a boundary point that is only between parcels that are required to be, or as a result of the survey will be required to be, held in common ownership; or
  - (iv) it is on a boundary where the parcels on each side of that boundary are required to be, or as a result of the survey will be required to be, subject to reciprocal rights of way; or
  - (v) it is unlikely that it will need to be physically located in the foreseeable future because of the terrain, ground cover, or protected vegetation; or
  - (vi) the boundary point is readily identifiable by occupation along the boundary:
- (b) each boundary point on an existing boundary of a new primary parcel, that is required to be defined by survey by [rules 6.2(a)(vi) to (x)] [now 13], where—
  - (i) there is a conflict; or
  - (ii) the extent and location cannot be accurately determined; or
  - (iii) the limited as to parcels or the interim nature of a Hawke's Bay interim title is being removed; or
  - (iv) it is subject to a claim for adverse possession:
- (c) each primary parcel boundary point that results from an existing irregular class A boundary that is being converted to one or more right-line boundaries.

Compare: SR 2010/492 r 7.1

- 50 New boundary marks
- 51 Removing boundary marks

## Subpart 6—Disturbed and reinstated marks

- 52 Disturbed marks
- 53 Reinstated marks

## **Part 5** **Non-primary parcels**

### **Subpart 1—Preliminary provision**

#### **54 Purpose of this Part**

The purpose of this Part is to bring together most requirements relating to non-primary parcels, including units and leases.

### **Subpart 2—Parcels**

- 55 Non-primary parcels
- 56 Overlap of non-primary parcels
- 57 Surrendering of part of easement or covenant

### **Subpart 3—Form of boundaries**

- 58 Permanent structure boundary (see [rule 7](#))

### **Subpart 4—Datums**

- 59 Survey requirements where inaccurate relationship between covenant and underlying parcels
- 60 Survey requirements where alternative requirements for non-primary parcels apply

### **Subpart 5—Accuracy standards**

- 61 Class C for covenant boundaries
- 62 Accuracy between covenant and underlying parcels
- 63 Accuracy between non-primary and underlying parcels where alternative requirements for non-primary parcels apply
- 64 Existing unit and lease boundaries may be accepted

### **Subpart 6—Referencing**

- 65 Boundaries to be witnessed
- 66 Boundary witnessing for covenant boundaries
- 67 Witnessing requirements where alternative requirements for non-primary parcels apply
- 68 Accuracy of permanent structure witnessing

## **Part 6** **Record of survey**

### **Subpart 1—Preliminary provision**

## 69 Purpose of this Part

The purpose of this Part is to specify requirements for the recording of cadastral surveys in the cadastre and enable land tenure managers to assign rights to the land under survey.

### Subpart 2—Miscellaneous requirements

70 Statement of certification

71 Certification

72 Units of measure for CSDs

73 Adopted information to match source

74 CSD to include survey report

## 75 Information to be included in survey report

A survey report must contain the following information:

### General information

- (a) the purpose for which the survey was conducted

### Bearings

- (b) the basis for determining the orientation of bearings:
- (c) the basis for any bearing adjustment applied to an adopted bearing or scale adjustment applied to an existing distance:

### Definition information

- (d) details of any conflict and how this was resolved:
- (e) reasons for not relying on an old survey mark:
- (f) information about old survey marks not located or reasons why they were not searched for
- (g) an assessment of the adequacy of the number and location of old survey marks used to define boundaries:
- (h) reasons for, and details of decisions made regarding each existing boundary defined by survey, and the information considered in order to reach those decisions:
- (i) details to support acceptance of a boundary in terms of [rule 6.3] [now 16]:
- (j) where a movable marginal strip is included in a CSD, a description of the method used to determine its existence:
- (k) the accuracy class of each water and irregular boundary and information about the accuracy of the determination of any water boundary or irregular boundary and the factors taken into account, as specified in [rule 3.4] [now 39]:

### Ground marking

- (l) reasons why it was impracticable to mark any boundary point in terms of [rule 7.1] [now 49] or impracticable to use a vertical control mark as a witness mark in terms of [rule 7.3.4(b)] [now 45]:

- (m) details to support an exemption from marking a boundary point under the provisions in [rules 7.1(a)(i) to (vi)] [now 49]:

#### Correspondence

- (n) reference to any prior correspondence with LINZ on issues relevant to the application of these Rules to the CSD:
- (o) notification from the Māori Land Court of a non-standard appellation used under [rule 5.5.3(b)] [now 26].

#### Accuracy

- (p) a description of the type of equipment and methods used to ensure compliance with the accuracy standards specified in these Rules:
- (q) details to support acceptance of a boundary in terms of [rule 6.3] [now 16]:
- (r) the accuracy class of each water and irregular boundary and information about the accuracy of the determination of any water boundary or irregular boundary and the factors taken into account, as specified in [rule 3.4] [now 39]:
- (s) the survey report must note where class C has been used in terms of [rule 16.1] [now 61] or where class D has been used in terms of [rule 16.3] [now 62]:
- (t) note where class D has been used in terms of [rule 17.1] [now 63]

#### Ground movement

- (u) must include the information considered, reasons for, and details of decisions made regarding each existing boundary or boundary point affected by ground movement:
- (v) must provide the basis for determining the change in reduced level for unaffected stratum boundaries.

Compare: SR 2010/492 rr 8.2, 16.5(a), 17.2(a), 18.4, 20.1

## 76 Retention of field information

### Subpart 3—Cadastral survey datasets

- 77 Content of CSD
- 78 Information for unit and lease parcels that have been accepted
- 79 Symbol and text depiction
- 80 Symbols
- 81 Line styles
- 82 Font size for text

### Subpart 4—CSD plan

- 83 CSD plan must include
- 84 Datum information
- 85 Vector information
- 86 Boundary information
- 87 Information about occupation and physical features
- 88 How to state information on a Diagram of Survey

- 89 Unique survey mark name
- 90 Disturbed mark to be treated as new
- 91 Survey mark and point information
- 92 Parcel information
- 93 Parcel information for a unit title development
- 94 Parcel information for a cross lease development
- 95 Parcel information for a movable marginal strip
- 96 Water boundaries
- 97 Irregular boundaries
- 98 Permanent structure boundaries
- 99 Stratum boundaries
- 100 Parcel annotations

## 101 Boundary annotations

A Diagram of Survey must depict the annotations set out in Table 13 [old table 10], clearly related to the relevant boundaries.

**Table 13: Boundary annotations for Diagrams of Survey**

Boundary	Annotation
boundary accepted in terms of [rule 6.3(a)(iii)] [now 16] and no dimension is available	‘bearing unknown’ or ‘distance unknown’ as applicable
boundary accepted in terms of [rule 6.3(a)(iv)] [now 16] and only magnetic bearing available	‘magnetic bearing’
boundary accepted in terms of [rule 6.3(c)] [now 16]	‘boundary accepted from existing survey’
where a boundary is Class D in terms of [rule 16.5b] [now 62]	‘class D’
water body centreline boundary	‘boundary follows centreline’
new boundary angles created in terms of [rule 18.1] [now 121]	‘boundary includes new angles due to deep-seated movement’
boundary accepted in terms of [rule 18.2(b)] [now 122]	‘boundary not surveyed since ground movement’
boundary accepted in terms of [rule 20.9(c)] [now 10]	‘boundary not surveyed since the Canterbury earthquakes’

Compare: SR 2010/492 r 9.6.12

## 102 Vectors

## 103 Boundary dimensions

## Subpart 5—Title plan

- 104 Title plan to include diagram of parcels
- 105 Interpretation of information on a Diagram of Parcels
- 106 Title plan information
  - 107 New easement information
- 108 Existing easement information
- 109 Covenant information
- 111 Parcel information for unit title development
- 112 Parcel information for a movable marginal strip
- 113 Water boundaries
- 114 Irregular boundaries
- 115 Permanent structure boundaries

### 116 Parcel annotations

- (1) A Diagram of Parcels must depict the annotations set out in Table 14 clearly related to the relevant boundaries or parcels.

**Table 14: Annotations for Diagrams of Parcels**

Parcel	Annotation
existing centreline easement of unknown width	‘width unknown’
parcel area derived from class D boundaries	‘area not determined by survey’
land in a parcel intended to remain in a title limited as to parcels	‘Limited as to parcels’
land in a parcel intended to remain in a Hawke’s Bay interim title	‘Hawke’s Bay interim title’
land in a parcel intended for disposal by the Crown, or land already subject to Part 4A of the Conservation Act 1987	‘Subject to Part 4A Conservation Act 1987’
accepted boundary under [rule 6.3(c)] [now 16]	‘boundary accepted from existing survey’
Where boundary is class D in terms of [rule 16.5] [now 62]	‘boundary not defined by survey’
Water body centreline boundary	‘boundary follows centreline’
New boundary angles created in terms of [rule 18.1] [now 121]	‘boundary includes new angles due to deep-seated movement’
Boundary accepted in terms of [rule 18.2(b)] [now 122]	‘boundary not surveyed since ground movement’
Boundary accepted in terms of [rule 20.9(c)] [now 10]	‘boundary not surveyed since the Canterbury earthquakes’

- 117 Boundary dimensions
- 118 Parcel information

## Part 7 Ground movement

### Subpart 1—Preliminary provisions

#### 119 Purpose of this Part

The purpose of this Part is to ensure land under survey where there has been ground movement has a known extent and a known relationship with the adjoining land without any inappropriate overlaps or gaps.

- 120 Dictionary

### Subpart 2—Ground movement for areas outside of greater Christchurch

- 121 Re-establishing boundaries affected by deep-seated movement
- 122 Acceptance of boundaries affected by ground movement

### Subpart 3—Ground movement for greater Christchurch

- 123 Defining by survey or acceptance of affected boundaries
- 124 Defining and referencing affected boundaries
- 125 Occupation and physical features in diagram
- 126 Defining non-primary parcel boundaries and underlying boundaries
- 127 Boundaries to be marked
- 128 Reduced level for unaffected stratum boundaries

## Part 8 Boundary reinstatements

### Subpart 1—Preliminary provisions

#### 129 Purpose of this Part

The purpose of this Part is to bring together all of the requirements relating to the reinstatement of an existing boundary or boundary point where a new estate record is not being created.

- 130 Dictionary

### Subpart 2—Field work

- 131 Horizontal datum—orientation
- 132 Witnessing

### Subpart 3—General requirements

- 133 Boundary reinstatement CSD to be lodged for boundary marking
- 134 Monumentation CSD usage
- 135 Monumentation CSD exempt from certain rules

### Subpart 4—Record of boundary reinstatement

- 136 CSD to be lodged for boundary marking

- 
- 137 Boundary reinstatement CSD plan
  - 138 Monumentation CSD Plan
  - 139 Information on Diagram of Survey
  - 140 Survey mark information
  - 141 Interpretation of information on Diagram of Survey

## **Schedule 1** **Transitional, savings, and related provisions**

### **Part 1** **Provisions relating to Cadastral Survey Rules 2018**

Appellations under Rules for Cadastral Survey 2010...

## **Schedule 2** **Dictionary**

In these rules .....

## **Schedule 3** **Official geodetic datum and projections**

The official geodetic datum is.....

## **Schedule 4** **Cadastral survey network marks**

A survey mark is suitable for use as a cadastral survey network mark.....

## **Schedule 5** **Official vertical datums**

The official vertical datum is.....

## **Schedule 6** **Vertical control marks**

A survey control mark.....