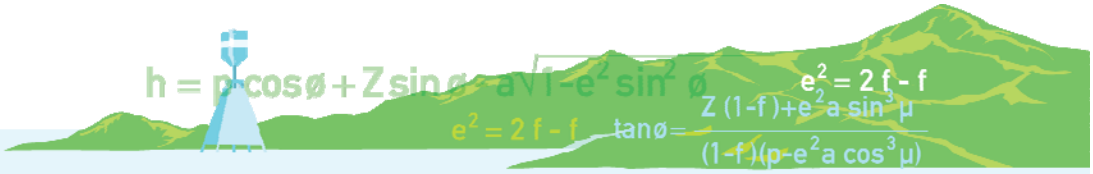
Land Information New Zealand
Toitū te whenua



Specification for Geodetic Physical Maintenance Services

Version 1.0
National Geodetic Office

Date 11 July 2012

New Zealand Government

Table of Contents

Terms and Definitions

For the purposes of this specification, the following terms and definitions apply.

Term / abbreviation	Definition
benchmark	a mark, often with an orthometric height, embedded in a substantial concrete block (approximately: 0.35m x 0.35m x 0.50m)
cadastral mark	a survey mark from a CSD that has already been integrated into the cadastre
CORS	Continuously Operating Reference Station (includes PositioNZ stations)
CSD	Cadastral Survey Dataset: as defined in s 4 of the Cadastral Survey Act 2002
survey control mark	a geodetic mark which belongs to at least one survey control network. For practical purposes this is an Order 0-5 or Order 1V geodetic mark
geodetic mark	a mark which has an official 4-character geodetic code assigned
GNSS	Global Navigation Satellite System. GPS, GLONASS, Galileo and Compass are all examples of GNSS
health and safety risk	a behaviour or condition that influences the chance or probability of susceptibility to a specific health issue. This includes but is not limited to trip hazards, sharp edges, protruding materials, and proximity to traffic
high order control mark	a control mark with a higher order than the order of the survey. For example, for an Order 5 survey a High Order control mark is an Order 0-4 geodetic mark
high order survey	an Order 0-4 geodetic survey
IGS	International GNSS Service, an organisation providing global GNSS products and services, such as precise orbits and antenna phase centre models
ITRF	International Terrestrial Reference Frame
large diameter tube	a tube with a diameter greater than 25mm
live traffic lane/roadway	the portion of the road used or reasonably usable for the time being for vehicular traffic in general
improved mark	a tube greater than 25mm in diameter containing a stainless steel pin inserted to provide a more defined reference point
LINZ	Land Information New Zealand
local high order mark	an Order 0-4 geodetic mark within the selected area
long occupation	a static occupation of at least 4 hours
NGO	National Geodetic Office: a group within Land Information New Zealand which provides centralised data collection, management,

Term / abbreviation	Definition
	maintenance and distribution functions for LINZ geodetic services
nearby non-boundary mark	a mark located within half the specified mark density distance, which is not on a boundary point
new mark	a mark installed by the Supplier which has a CSD submitted
NRTK	Network Real-Time Kinematic, a survey positioning method
NZGD1949 Trig	a geodetic mark which was Order 1-3 in NZGD1949. These trigs are typically Order 8 or 9 NZGD2000, unless they have been resurveyed.
modified mark	a mark where the original position of that mark is altered either horizontally or vertically by more than the tolerances specified in Section **6.1.1**
PPP	Precise Point Positioning, a survey positioning method
PRM	Permanent Reference Mark, in accordance with rule 7.4 Rules for Cadastral Survey 2010
SO plan	a Survey Office CSD used to tie new marks into the cadastre
supplier	a party supplying a service to LINZ
upgrade mark	a mark proposed to be upgraded to a higher order
WGS84	World Geodetic System 1984, the reference frame used by GPS

1 Foreword

1.1 Purpose of Specification

Section 7(1)(b) of the Cadastral Survey Act 2002 makes it a function and duty of the Surveyor-General "to maintain a national survey control system". This function has been delegated to the Chief Geodesist of the National Geodetic Office (NGO) in Land Information New Zealand (LINZ).

This specification was developed by the NGO for use by contracting organisations when providing geodetic maintenance services to LINZ.

1.2 Related Rules, Standards and Specifications

The following Standards, Guidelines and Rules are related to this document:

- Standard for tiers, classes and orders of LINZ data – LINZS25006 (21 September 2009)
- Standard for the New Zealand survey control system – LINZS25003 (21 September 2009)
- Guideline for the provision and maintenance of the New Zealand survey control system – LINZG25704 (21 September 2009)
- Rules for Cadastral Survey 2010 (24 May 2010).

> **INFORMATION – Related Documents**
>
> The above standards can be obtained from:
>
> http://www.linz.govt.nz/geodetic/standards-publications/standards
>
> http://www.linz.govt.nz/survey-titles/cadastral-surveying/publications/sg-rules

1.3 Contact Information

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2 Introduction

2.1 Scope of this Specification

This specification defines the requirements for the provision of geodetic services to the NGO by contracting organisations (Suppliers).

2.2 Variations from this Specification

(a) Compliance with all aspects of this specification is expected.

(b) It is recognised that on occasions a better outcome for the survey control system may be obtained through an alternative approach. If a Supplier believes this to be the case, a variation to these specifications must be sought.

(c) All variations must be agreed to by LINZ prior to any work being carried out.

2.3 Precedence of Contract Documents

In all situations any contract document (including notes on map images), and/or agreed instruction from LINZ takes precedence over this specification. LINZ recommends that this specification be read together with any Contract/Works Orders and/or supplementary agreements as these may specify items in addition to, or in direct conflict with this specification.

GUIDELINE – Hierarchy of Precedence

If there is a conflict among any of the contract documents, the precedence is:

1. Variations or supplementary agreements
2. Contract/Works Order
3. Bid/Proposal (Request for Proposal)
4. This Specification
5. Other referenced Specifications and Standards

3 General Requirements

3.1 Site Access

(a) The Supplier must obtain permission to enter private land from the landowner/occupier prior to accessing any privately owned site.

(b) However, if after reasonable attempts, the landowner/occupier is unable to be contacted prior to private land being accessed, the Supplier must leave their contact details at the property concerned, so that the landowner/occupier is aware that the site has been accessed.

(c) The Supplier must obtain permission from the landowner and occupier to install and/or maintain marks, the site and/or protection structures, before any work commences.

(d) The Supplier must comply with any requests from the landowner/occupier regarding the site, access and health and safety.

(e) In the case that the landowner/occupier denies access or imposes unreasonable access restrictions the Supplier should advise the NGO as soon as possible.

(f) When Suppliers are required to enter sites of cultural significance this shall be done in consultation with LINZ, the landowner and other parties with an interest in the site.

INFORMATION – Site Access

Suppliers are given access to private property for the purpose of these contracts at the grace of the landowner/occupier. The landowner/occupier is entitled to place restrictions on this access, such as: preventing access or limiting access at certain times (for example, during lambing or after severe wet weather), defining the route/method of access, prohibiting scrub clearance and/or requesting gates to be closed.

Details of the landowner/occupier may be available from the LINZ Geodetic Database (see http://www.linz.govt.nz/gdb).

3.2 Health and Safety

(a) Suppliers must be fully aware of, and at all times exercise their responsibilities and obligations under, the Health and Safety in Employment Act 1992.

(b) Sites, marks, beacons and other protection structures must be left in a respectable and safe state.

3.3 Traffic Management

(a) Suppliers must abide by the relevant road controlling agency's Temporary Traffic Management requirements when working on or near roads.

(b) Suppliers must supply copies of all approved traffic management plans with the deliverables, in accordance with Section **11.6**.

INFORMATION – Traffic Management

In the absence of any other code, New Zealand Transport Agency's *Code of practice for temporary traffic management* (NZTA COPTTM) shall apply.

Where only generic plans have been approved, copies shall be included with the deliverables.

Where the Supplier has delegation to approve their own plans, copies of the approved plans and notice of delegation shall be included with the deliverables.

Where no plans are required to be supplied to the road controlling agency, a statement outlining this should be provided in the deliverables, including the road controlling agency and relevant code.

4 Geodetic Marks

4.1 Geodetic Codes

(a) Each mark shall be assigned a unique four-character geodetic code.

(b) Geodetic codes shall be requested from the NGO by the Supplier.

(c) A mark shall retain its existing geodetic code unless:

(i) the mark has been modified (Section **6.1.1**), or

(ii) the height of the mark has been modified (Section **6.1.2**).

4.2 Mark Names

4.2.1 Names for Existing Marks

(a) The existing name for a mark with a geodetic code shall be retained, except that:

(i) all letters of the name shall be shown in upper case, however,

(ii) where a Survey District forms part of the name, the Survey District name shall be enclosed in brackets, shown in sentence case, and followed by "SD".

(b) A single space character shall be inserted between each element of a name.

EXAMPLE - Existing Mark Names

An existing mark referred to as "Dingle Peak" should be changed to "DINGLE PEAK".

An existing mark referred to as "B MAROTIRI SD" should be changed to "B (Marotiri SD)".

An existing mark shown as "OIT IV DP 2532" on a CSD plan should be changed to "IT IV DP 2532".

An existing mark originally referred to as "IT III DP 2398" but renamed to "SS 23 SO 2865" should continue to use the later name.

4.2.2 Names for Modified Marks

(a) Where a mark has been modified in accordance with Section **6.1.1** the modified mark shall be assigned a new name.

(b) A modified mark name shall have "NO 2" appended to the original name for the mark.

(c) Where a "NO 2" mark has been modified, "NO 3" shall replace "NO 2" in the mark name, and so on for subsequent replacements.

(d) Where an original mark name is prefixed by a number or letter, the number or letter is to be removed in the modified mark name.

EXAMPLE - Modified Mark Names

Where “B (Marotiri SD)” has been modified, the new mark shall be named “B (Marotiri SD) NO 2”.

Where “IT IV SO 1254 NO 2” has been lowered, the new mark shall be named “IT IV SO 1254 NO 3”.

Where “MT JOHN” has been modified the new mark shall be named “MT JOHN NO 2”.

Where “2 HILL RD” has been modified, the new mark shall be named “HILL RD 3”.

5 Field Requirements

5.1 Maintenance Required

(a) This specification identifies typical maintenance activities for each of:

(i) Mark Maintenance, Section **6**,

(ii) Protection Structure Maintenance, Section **7**, and

(iii) Site Maintenance, Section **8**.

(b) Contract documentation will specify which maintenance items shall be completed.

(c) Maintenance items not required by the contract shall not be completed.

(d) Where the utility of a mark could be improved by non-contract maintenance, the Supplier shall recommend this maintenance in the Contract Report, Section **11.5**.

GUIDELINE – Maintenance Required

Unless instructed as part of the contract, maintenance shall only be completed to avert an immediate health and safety risk.

Common health and safety risks include, but are not limited to: sharp edges, protruding objects, loose parts, uncovered holes and trip hazards.

5.2 Incomplete Maintenance

(a) In some situations full maintenance of a Mark, Protection Structure and/or Site may not be completed. This may be due to the required maintenance being:

(i) outside the scope of the contract,

(ii) rejected by the landowner/occupier, Section **3.1**,

(iii) rejected or not required by the NGO, or

(iv) unsafe to complete.

(b) the Mark, Protection Structure and Site shall be left in a tidy state, so that it does not pose a health and safety risk, in accordance with Section **3.2**,

(c) the reason for not completing this work shall be clearly stated in the Contract Report Section **11.5**, and

(d) any recommended future maintenance shall be included in the Mark Details File Section **11.4** fields:

(i) mark maintenance required (MDMK), and/or

(ii) beacon maintenance required (MDBE), and/or

(iii) protection structure maintenance required (MDPR).

5.3 Not Found or Destroyed Marks

5.3.1 Not Found Marks

If after a reasonable period of time, no evidence of the mark can be found, the Supplier shall:

(a) update the Mark Physical State in the Mark Details File (Section **11.4**) to NFND (Not Found),

(b) update the Mark Details File (Section **11.4**), to reflect any protection structures that were found,

> **EXAMPLE – Retained Information**
>
> If a Marker Post was found, but the mark was not located, the Marker Post details shall be retained in the Mark Details File.
>
> However, if there is no evidence of a Marker Post at the site of the Not Found mark, the Mark Details File shall reflect that there is no Marker Post.

(c) provide details of the search undertaken to locate the mark in the Contract Report, Section **11.5**.

> **GUIDELINE – Not Found Marks**
>
> Generally a "reasonable period of time" of no more than 15 minutes should be spent at each site searching for evidence of an individual mark and/or its protection structure. Lower order marks (Orders 10-12), may be 10s – 100s of metres out of position and may be impossible to locate without a survey.
>
> The "reasonable period of time" may be extended if a protection structure such as a Marker Post is located. This indicates the site of the mark has been correctly identified.
>
> The "reasonable period of time" may be reduced if evidence is found that indicates this mark has been Destroyed or is indefinitely inaccessible.
>
> Describing a mark as Not Found indicates that with additional evidence (or time) a future user may be able to locate the mark.

5.3.2 Destroyed Marks

If while searching for a mark, the evidence indicates the mark no longer exists, is indefinitely inaccessible or has physically moved in relation to its surrounding (Section **6.1**) the Supplier shall:

(a) update the Mark Physical State in the Mark Details File (Section **11.4**) to DEST (Destroyed),

(b) update the Mark Details File (Section **11.4**), to reflect that this mark no longer has any protection structures, and

(c) provide details of the evidence found in the Contract Report, Section **11.5**.

GUIDELINE – Destroyed Marks

Evidence that supports mark destruction could include:

(a) a significantly damaged mark and/or protection structure,

(b) road realignments or extensive earthworks,

(c) buildings and structures over the site, and/or

(d) landslides and flooding covering the site.

Describing a mark as Destroyed indicates that even with additional information (or time), it is highly unlikely a future user will be able to locate the mark.

A mark, such as those at the bottom of Lake Dunstan, may be considered Destroyed as they are indefinitely inaccessible. While it is likely that these marks still exist the chances of them been accessed by a surveyor in the future are negligible.

5.4 Activities to be Completed On-Site

The Supplier shall assess and verify the following for every geodetic mark visited, surveyed or maintained. This list is informational only. If it conflicts with other sections of this specification, the other sections take precedence.

(a) Before photo, Section **9.4.1**,

(b) Maintenance:

  (i) Mark Maintenance, Section **6**,

  (ii) Protection Structure Maintenance, Section **7**,

  (iii) Site Maintenance, Section **8**,

(c) The following site details shall be recorded or checked for correctness, for the Mark Details File, Section **11.4**:

  (i) Mark type (MRKT),

  (ii) Mark physical state (MPSC),

  (iii) Protection structures (MRKR, MRKR2),

  (iv) Beacon type recorded (MRKE),

  (v) Ground Level Relationship (GLREL), Section **5.5**,

  (vi) Beacon and pillar height measurements (BCNHGT, BCNHGT2, BCNHGT3, BCNHGT4, BCNHGT5, BCNHGT6) in accordance with Sections **5.6** or **5.7**,

  (vii) Beacon installation date for new beacons (BDAT),

  (viii) Beacon Eccentricity (BECC), Section **5.6.3**,

  (ix) Mark details/description (MRKD), Section **10.3**,

  (x) Mark location/access note (MLOC), Section **10.2**,

(xi) Identification Plaque, Identification Plate and Information Plate are attached correctly (PLQEXIST, PLTEXIST, INFOEXIST), Sections **6.2**, **7.2** and **7.3**,

(xii) Description of mark and protection structure maintenance completed (MPSM, MPSB, MPSP), Sections **6** and **7**,

(xiii) Description of mark, protection structure and site maintenance recommended/required (MDMK, MDBE, MDPR), Sections **6, 7** and **8**,

(xiv) Landowner/occupier name, physical address and phone number (OWNR, PHNO, PADD), Section **10.5**,

(xv) Access restrictions (ARES), Section **3.1**,

(xvi) GNSS suitability (GNSSU), Section **10.6**, and

(xvii) Cell phone coverage (CELL), Section **10.7**,

(d) Access/finder diagrams, Section **10.1**,

(e) Non-Standard Beacon diagram, Section **10.8**,

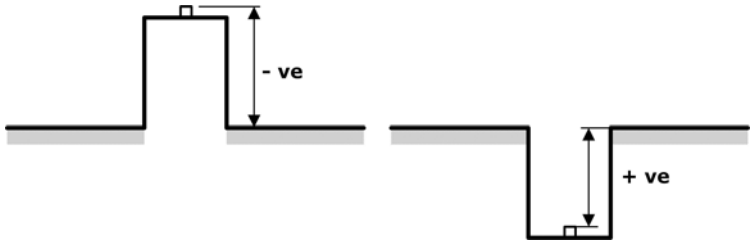
(f) Approximate Coordinates, Section **10.9,**

(g) After Maintenance Photos, Section **9.4.2**,

(h) Mark, Site and Extended Site photos, Section **9.1**.

5.5 Ground Level Relationship

(a) All Geodetic Marks shall have the relationship from the top of the mark to the ground measured.



(b) Ground Level Relationship shall be measured and recorded as accurately as possible, preferably to the nearest 0.01m.

(c) Where the ground level is uneven an average height shall be recorded.

INFORMATION – Ground Level Relationship

This information is collected for multiple purposes, including:

- an indication of how far to dig, and
- the relationship to ground for LiDAR and photogrammetric control.

5.6 Beacon Measurements

5.6.1 Two and Four Metre Beacons

(a) Two and Four Metre Beacons shall have the following vertical relationships measured, from the top of the mark to the:

(i) Top of Mast,

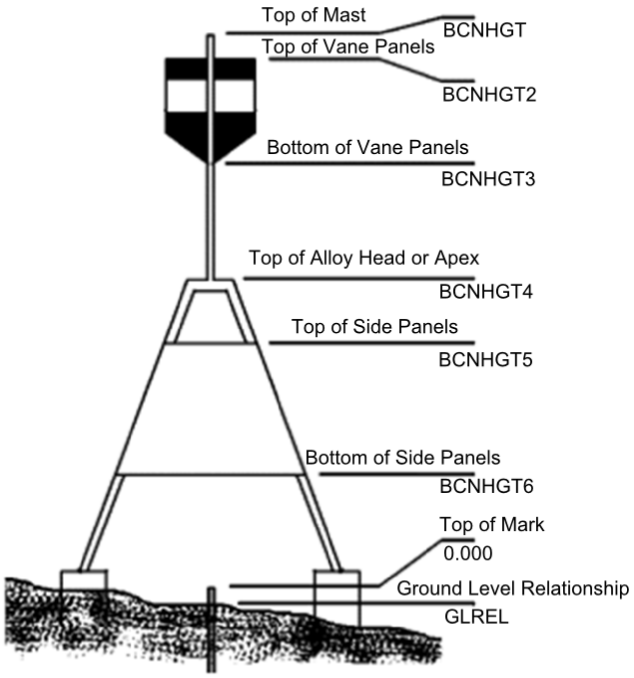
(ii) Top of Vane Panels (target boards),

(iii) Bottom of Vane Panels,

(iv) Top of Alloy Head or Apex,

(v) Top of Side Panels (sight boards), and to the

(vi) Bottom of Side Panels.



(b) All measurements shall be to the nearest 0.01m and recorded in the Mark Details File, Section **11.4**.

(c) The beacon measurement method shall be recorded in the Contract Report, Section **11.5**.

5.6.2 Non-Standard Beacons

(a) A Non-Standard Beacon shall be measured, as far as possible, in accordance with Section **5.6.1**.

(b) Where Section **5.6.1** does not apply, measurements shall be taken from the mark to the observable features on the beacon, and

(c) measurements shall be to the nearest 0.01m and displayed on a Non-Standard Beacon Diagram in accordance with Section **10.8**.

(d) The beacon measurement method shall be recorded in the Contract Report, Section **11.5**.

5.6.3 Beacon Eccentricity

(a) Prior to survey or maintenance, a beacon shall be checked for eccentricity in relation to the mark.

(b) In the case that any eccentricity of a Two Metre Beacon is greater than 0.01m:

(i) the direction (degrees) and distance from the mark to the centre of the beacon shall be recorded in the Mark Details File (Section **11.4**), and

(ii) the beacon shall be centred over the mark.

(c) In the case that any eccentricity of a Four Metre Beacon is greater than 0.01m:

(i) the direction (degrees) and distance from the mark to the centre of the beacon shall be recorded in the Mark Details File (Section **11.4**), and

(ii) if the eccentricity is greater than 0.1m the beacon shall be centred over the mark.

(d) In the case that any eccentricity of a Non-Standard Beacon is greater than 0.01m:

(i) the direction (degrees) and distance from the mark to the centre of the beacon shall be recorded in the Mark Details File (Section **11.4**), and

(ii) the beacon shall be centred over the mark where practical.

GUIDELINE – Beacon Eccentricity

Any beacon eccentricity should be corrected when a beacon is being maintained. It is important to record any existing eccentricity so that observations made to the beacon before it was maintained can be correctly reduced by surveyors.

On completion of maintenance at the site, the Supplier should confirm that the beacon is still central over the mark.

5.7 Pillar Measurements

Heights shall be measured and recorded from the top of the mark to each of the following:

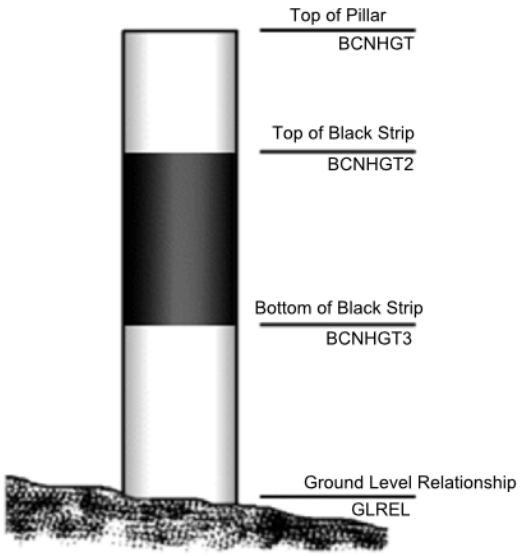
(a) Top of Pillar,

(b) Top of Black Strip, and

(c) Bottom of Black Strip.

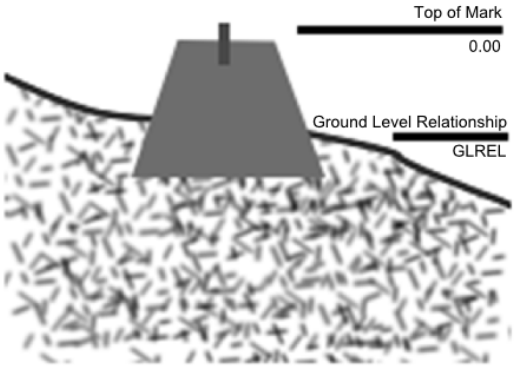
GUIDELINE – Pillar Height Measurements

Pillars are regarded as beacons in the contract deliverables. As such, 'beacon height' measurements will generally be negative because the mark is generally above the top of the pillar.



5.8 Benchmark Block Measurements

Heights shall be measured and recorded from the top of the mark to ground level.



6 Mark Maintenance

The purpose of this section is to define Mark Maintenance activities and specialist equipment.

(a) Contract documentation will specify which maintenance items shall be completed.

(b) Maintenance items not required by the contract shall not be completed.

> **GUIDELINE – Mark Maintenance**
>
> Whenever Mark Maintenance work is carried out, care shall be taken to ensure that the existing mark does not have its position altered either horizontally or vertically.
>
> If a mark is damaged, Destroyed or moved it shall become classified as a modified mark, Section **6.1**.

6.1 Modifications to Existing Marks

6.1.1 Mark Modifications

If, during the course of maintenance, the original position of the mark will be altered either horizontally by 3mm or vertically by more than the amount stated in Section **6.1.2**:

(a) the physical change between the original and modified mark shall be recorded,

(b) the modified mark shall be named in accordance with Section **4.2.2**,

(c) a new geodetic code shall be assigned for the modified mark in accordance with Section **4.1**,

(d) details of both the original mark and the modified mark are to be included in the Mark Details File (Section **11.4**), and

(e) the Mark Physical State for the original mark shall be recorded as DEST (destroyed) in the Mark Details File (Section **11.4**).

6.1.2 Modify Height of an Existing Mark

(a) Where the mark has a published Order 1V or 2V normal-orthometric height or is a High Order Mark (Orders 0-4) and the height has been altered by more than 3mm, it shall be regarded as a modified mark, or

(b) where the mark is an Order 5 mark, and the height has been altered by more than 10mm, it shall be regarded as a modified mark, and

(c) the Supplier shall carry out all work described in Section **6.1.1**.

(d) For all geodetic marks (irrespective of order) where the height of the mark has been altered, the change in height shall be recorded in the Mark Description field of the Mark Details File (Section **11.4**).

> **GUIDELINE – Mark Height Modification**
>
> The height of a mark may need to be changed to mitigate a health and safety risk

or to protect an at-risk mark.

6.1.3 Improve an Existing Mark

(a) Where an existing or proposed geodetic mark comprises a large diameter (greater than 25mm) tube that is in good condition, the Supplier shall:

(i) insert a stainless steel pin inside the tube,

(ii) secure the pin in place using cement or a suitable epoxy resin, and

(iii) report any difference between the height of the tube and reference point of the pin in the Mark Details File (Section **11.4**).

(b) For other large diameter marks such as: spikes, pins or dogs, a permanent reference point shall be punched or inscribed.

GUIDELINE - Upgrading an Existing Ground Mark

The top of the pin should ideally be at the same level as the top of the tube. In this case the rim is the vertical reference point and a precise horizontal reference point is required. Where it is not possible to install a pin perfectly flush with the rim of the tube, it is preferable to have the pin protruding slightly (by no more than 3mm) above the rim.

If a 3D coordinate already exists for the mark and the pin is not flush with the top of the tube, it shall become classified as a modified mark and Sections **6.1.1** and **6.1.2** shall apply.

6.1.4 Stabilise an Existing Mark

If an existing mark is at risk of destruction because it can be moved horizontally or vertically by more than 1mm (under normal conditions), then the Supplier shall stabilise the mark by:

(a) removing any nearby vegetation threatening the mark,

(b) compacting or replacing the ground around the mark with a more stable material, and

(c) installing a concrete collar around the mark.

GUIDELINE – When Not to Stabilise a Mark

In some situations the site may be too unstable, due to localised deformation or draining etc. In these cases, where the mark is able to move more than 3mm horizontally or vertically, any identification plates/plaques should be removed and the mark recorded as Destroyed.

6.1.5 Preserve a Mark

When the top of a corroded iron pipe or tube is protruding above the ground and its height is not posing a health and safety risk, the Supplier shall preserve the tube by:

(a) placing a PVC pipe around the corroded tube to a sufficient depth below ground level to ensure mark stability, and

(b) securing the corroded tube within the PVC pipe with concrete.

GUIDELINE – When Not to Preserve a Mark

Some marks may be too corroded or pose a Health and Safety Risk by protruding above the ground. These marks should have their height reduced in accordance with Section **6.1.2**.

6.2 Identification Plaques

An Identification Plaque shall:

(a) be in the form of and contain the wording specified by LINZ,

EXAMPLE – Identification Plaque

The Identification Plaque approved by LINZ at the time of writing these specifications has the following form and wording:

LAND INFORMATION NEW ZEALAND

TOITŪ TE WHENUA

GEODETIC SURVEY MARK

HE TOHU KAIRŪRI

GEODETIC CODE **:**

(b) have an outside base dimension of 112mm by 63mm, and

(c) be engraved or stamped to clearly show the geodetic code.

6.2.1 Install an Identification Plaque

(a) An Identification Plaque shall be installed at all High Order (Order 0-4), Order 1V marks and on a mark that has just had its beacon permanently removed.

(b) An Identification Plaque shall be firmly secured (rendering it difficult to remove) to a:

(i) concrete collar around the mark, or

(ii) stable rock, or

(iii) permanent structure in close proximity (i.e. within 0.5m) of the mark.

(c) Identification Plaques shall not be installed:

(i) for lower order marks (Order 6-12) unless they are also Order 1V, except where a beacon has just been permanently removed,

(ii) for marks that are flush in seal in urban areas and which have no protection structure (e.g. marks not protected by a cast iron or plastic cover), or

(iii) on removable features, such as attached to a Cast Iron Cover.

6.2.2 Non-Conforming Identification Plaques

(a) Where an existing Identification Plaque does not conform with Section **6.2**, the non-conforming plaque shall only be removed if:

(i) information on the plaque is incorrect or misleading, and

(ii) the removal will not damage or disturb the mark.

EXAMPLE – Non-Conforming Identification Plaques to Remain

Where an existing Non-Conforming Plaque shows the Mark Name, rather the Mark Code the plaque shall not be removed.

Where the plaque has been installed by an agency (such as a local council) other than LINZ or its predecessors, the plaque shall not be removed.

7 Protection Structure Maintenance

The purpose of this section is to define Protection Structure activities and specialist equipment.

(a) Contract documentation will specify which maintenance items shall be completed.

(b) Maintenance items not required by the contract shall not be completed.

7.1 Repairs for Safety

(a) This section applies when Protection Structures require maintenance for health and safety reasons.

(b) Repairs shall be completed to a level that ensures that the Protection Structure no longer poses an immediate health and safety hazard.

(c) The Supplier shall remove, replace or secure any dangerous components including any or all of the following: rails, rafters, side panels, vane panels, hinges, and holding down devices.

7.2 Identification Plates

An Identification Plate shall:

(a) be made of aluminium or similar non-oxidising, weather resistant material,

(b) be in the form of and contain the wording specified by LINZ,

EXAMPLE – Identification Plate

The Identification Plaque approved by LINZ at the time of writing these specifications has the following form and wording:

(c) have outside dimensions of 100mm by 125mm, and

(d) be engraved or stamped to show:

(i) the geodetic code,

(ii) the distance to the mark (to one decimal place of a metre).

7.2.1 Install an Identification Plate

(a) Identification Plates shall be affixed to one of the following features at any site:

(i) Beacon,

(ii) Wooden Marker Post,

(iii) Post and Rail Enclosure, or

(iv) Pillar.

GUIDELINE – Identification Plate Location

Identification plates are only to be secured to LINZ property. They are not to be secured to nearby fences, walls, fence posts or power poles, etc.

In the situation were there is more than one protection structure at a site, for example at a site with a Two Metre Beacon, a Marker Post and a Post and Rail Enclosure, only one Identification Plate needs to be installed.

(b) Where possible the Identification Plate shall be secured to:

(i) the flat side of a Wooden Marker Post, or

(ii) the Beacon or the Post and Rail Enclosure on the side facing the most common point of access.

7.2.2 Non-Conforming Identification Plate

(a) Where an existing Identification Plaque does not conform with Section **7.2**, the non-conforming plaque shall only be removed if:

(i) the information on the plate is incorrect and misleading, or

(ii) the Identification Plate is damaged or deteriorating.

> **EXAMPLE – Non-Conforming Identification Plate**
>
> Where an existing Non-Conforming Identification Plate shows the Mark Name, rather the Mark Code the plaque shall not be removed.
>
> Where the Identification Plate has been installed by an agency (such as a local council) other than LINZ or its predecessors, the plaque shall not be removed.

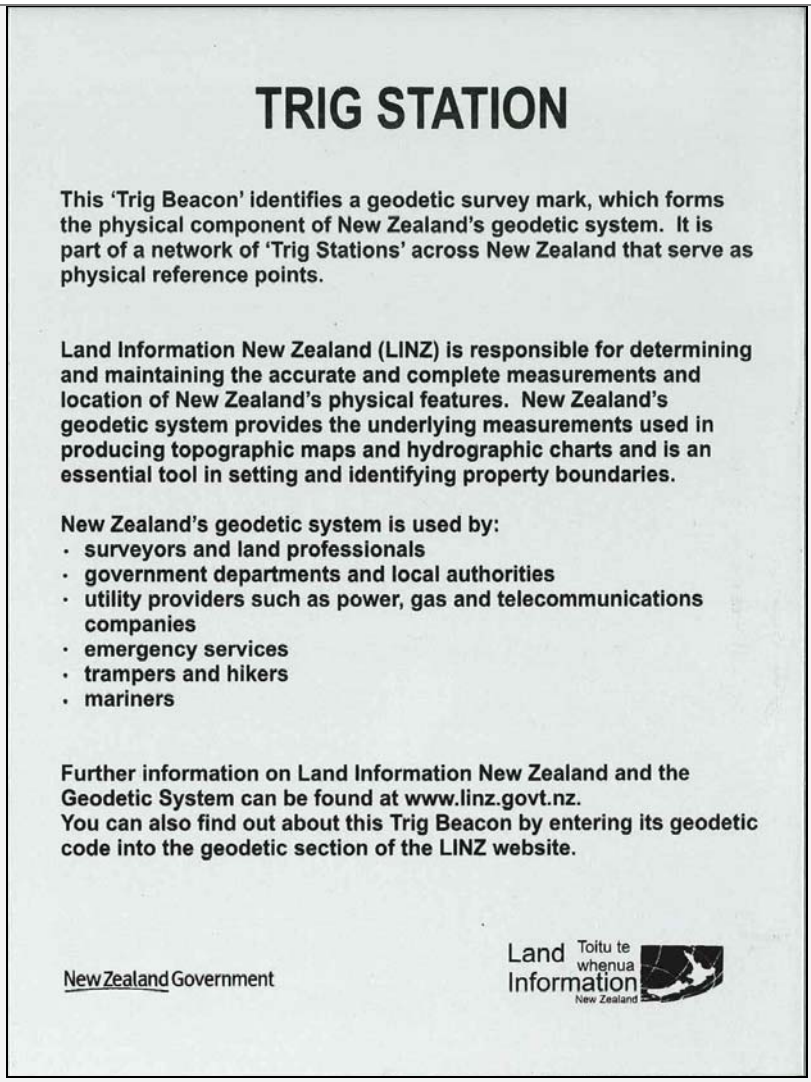
7.3 Information Plates

An Information Plate shall:

(a) be made of aluminium or similar non-oxidising, weather resistant material,

(b) be in the form of and contain the wording specified by LINZ:

> **Example – Information Plate**
>
> The Information Plate approved by LINZ at the time of writing these specifications has the following form and wording:



TRIG STATION

This 'Trig Beacon' identifies a geodetic survey mark, which forms the physical component of New Zealand's geodetic system. It is part of a network of 'Trig Stations' across New Zealand that serve as physical reference points.

Land Information New Zealand (LINZ) is responsible for determining and maintaining the accurate and complete measurements and location of New Zealand's physical features. New Zealand's geodetic system provides the underlying measurements used in producing topographic maps and hydrographic charts and is an essential tool in setting and identifying property boundaries.

New Zealand's geodetic system is used by:

- surveyors and land professionals
- government departments and local authorities
- utility providers such as power, gas and telecommunications companies
- emergency services
- trampers and hikers
- mariners

Further information on Land Information New Zealand and the Geodetic System can be found at www.linz.govt.nz.
You can also find out about this Trig Beacon by entering its geodetic code into the geodetic section of the LINZ website.

New Zealand Government

Land Information New Zealand Toitu te whenua

(c) have outside dimensions of 150mm by 200mm.

7.3.1 Install an Information Plate

An Information Plate shall be affixed to a side panel of Two and Four Metre Beacons located at sites readily and frequently accessed by the general public.

GUIDELINE – Readily and Frequently Accessed Beacons

A Beacon should have an Information Plate attached if it is located in an area where the public usually walk or park, such as on walking tracks, reserves, parks and lay-bys.

For example:

- an extremely accessible beacon at the side of the State Highway, may not be considered for an Information Plate, if there is no evidence that people frequent the site, while
- beacons on the tops of remote hills with limited access, may be considered for an Information Plate, if the site is at the summit of a popular walking track.

(a) Where possible the Identification Plate shall be secured to the side panel facing the most common point of access.

(b) If an Information Plate installed in accordance with Section **7.3.1** (a) would not be easily readable, then no information plate shall be installed.

(c) Information Plates are only to be secured to LINZ beacons and not to nearby fences, walls, fence posts, power poles or other protection structures.

7.3.2 Non-Conforming Information Plate

Where an existing Information Plate does not conform with Section **7.2**, the non-conforming plaque shall only be removed if:

(a) the information on the plate is incorrect and misleading, or

(b) the Identification Plate is damaged or deteriorating.

7.4 Two Metre Beacons

(a) Two Metre Beacons shall be constructed using the following materials:

(i) all nuts, bolts, screws, washers, 'U' bolts, mast locking pins etc to be stainless steel,

(ii) side panels, vane panels and vane braces to be 22 gauge galvanised iron sheet metal or stainless steel,

(iii) mast braces to be 12 gauge galvanised iron sheet metal,

(iv) mast and rafters to be 20mm diameter galvanised iron pipes, and

(v) alloy head to be cast aluminium with 28mm internal diameter steel tubing insert.

(b) A locking pin, 'U' bolt or other securing bracket shall be fixed through the mast immediately above the head to prevent the mast rotating and to hold the mast clear of the ground mark.

GUIDELINE – Mast Locking Pins

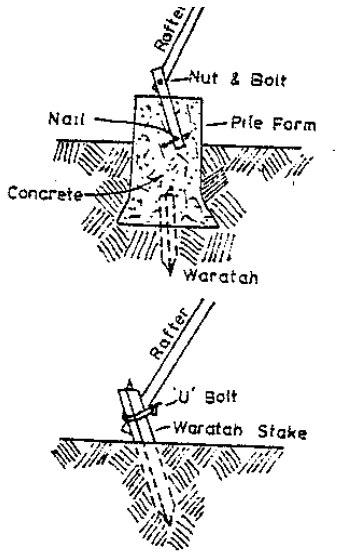
Locking pins are used to ensure that the beacon mast can be replaced to a consistent height above the ground mark, thereby maintaining the accuracy of the beacon height measurements.

The pins also protect the ground mark by ensuring that the mast does not rest directly on it, and prevent the mast from spinning and incurring damage to the beacon.

(c) The bottom of the mast shall sit at least 20mm clear of the top of the ground mark to prevent damage to the ground mark.

(d) The beacon shall be anchored by clamping the rafters to waratahs using a nut and bolt, or a 'U' bolt.

(e) Waratahs are driven firmly into the ground, and if necessary, secured by a concrete collar. Concrete must not be placed around rafters (see Figure below).



(f) The centre of the mast shall be located vertically over the centre of the mark.

> **GUIDELINE – Two Metre Beacons**
>
> This is usually a metal beacon (but can be wooden) where a survey instrument is set up over the beacon structure. This includes Gisborne, Nelson and Clarke type beacons.

7.4.1 Paint a Two Metre Beacon

(a) Two Metre Beacons shall be painted in the following scheme:

(i) side panels and vane braces painted white, and

(ii) vane panels painted black.

(b) The Supplier shall:

(i) clean all surfaces, by brushing down or scraping prior to painting, to remove all loose paint, moss, lichen etc,

(ii) use non toxic paint, and

(iii) undercoat all bare metal structures with galvanised iron primer or a suitable self priming paint.

7.4.2 Install a Two Metre Beacon

(a) Two Metre Beacons shall be installed:

(i) to the standard outlined in Section **7.4**, and

(ii) to replace a damaged existing beacon, or

(iii) over a non-beaconed mark only with written permission from the NGO.

(b) New beacons shall be installed so that that the top of the alloy head is 1.2m – 1.4m above ground level.

7.4.3 Repair a Two Metre Beacon

(a) A Two Metre Beacon shall be restored to its state outlined in Section **7.4** including replacing or securing any damaged components of the beacon including damaged, corroded, rotted or missing rails, rafters, side panels, vane panels, hinges, and holding down devices.

(b) When a Two Metre Beacon is beyond repair, a new Two Metre Beacon shall be installed, Section **7.4**, unless otherwise advised in advance by the NGO.

7.5 Four Metre Beacons

(a) Four Metre Beacons are historic infrastructure constructed using various timbers, and occasionally metal and other materials.

(b) Four Metre Beacons range in height between approximately 3m - 5m, from the top of the mark to the top of the mast.

> **GUIDELINE – Four Metre Beacons**
>
> This is usually a wooden beacon (but can be metal) where a survey instrument is set up underneath the beacon.
>
> Where the beacon height is in shorter than 3 metres, e.g. a 3m wooden “Allison” beacon, then the Mark Protection Type Code used should be 2MBE (2m Beacon). Where the height is between 3 and 4 metres use 4MBE (4m Beacon).

7.5.1 Paint a Four Metre Beacon

(a) Four Metre Beacons shall be painted in the following scheme:

(i) rafters, rails, mast, mast braces and top and bottom third of vane panels painted black, and

(ii) side panels and centre third of the vane panels painted white.

(b) The Supplier shall:

(i) clean all surfaces, by brushing down or scraping prior to painting, to remove all loose paint, moss, lichen etc,

(ii) use non toxic paint, and

(iii) undercoat all bare metal structures with galvanised iron primer or a suitable self priming paint.

7.5.2 Repair a Four Metre Beacon

(a) A Four Metre Beacon shall be restored by replacing or securing any damaged components of the beacon including damaged, corroded, rotted or missing rails, rafters, side panels, vane panels, hinges, and holding down devices.

(b) When a Four Metre Beacon is beyond repair, a new Two Metre Beacon shall be installed, Section **7.4**, unless otherwise advised in advance by the NGO.

7.5.3 Modify a Wooden Four Metre Beacon

(a) Wooden Four Metre Beacons shall be modified so that they can be easily removed and accurately re-established over the ground mark by installing brackets at the base of the rafters.

(b) Brackets and securing bolts or screws shall be made of galvanised steel or brass.

GUIDELINE – Modifying Four Metre Beacons

Four metre beacons were designed to enable terrestrial surveying measurements to be made from under the erect beacon. To collect GNSS observations at marks protected by four metre beacons, it is necessary to first remove the beacon.

Metal brackets should be attached to each rafter to facilitate the efficient removal and replacement of wooden four metre beacons. An example of a modified rafter is shown in the picture below.

7.6 Non-Standard Beacons

(a) Non-Standard Beacons are historic infrastructure constructed using various materials, to various standards.

(b) Non-Standard Beacons range in height and dimensions.

(c) Non-Standard Beacons should be treated the same as a standard Two or Four Metre Beacon, Sections **7.4** and **7.5**, wherever possible.

(d) Beacons which are not LINZ property shall not be maintained.

7.6.1 Paint a Non-Standard Beacon

(a) Cone Beacons shall be painted in the following scheme:

(i) top and bottom third of cone painted black, and

(ii) middle third of cone painted white.

(b) Other Non-Standard Beacons, shall be painted as far as possible, in accordance with Sections **7.4.1** or **7.5.1**.

(c) All other beacons, which are LINZ property, shall be painted black.

(d) The Supplier shall:

(i) clean all surfaces, by brushing down or scraping prior to painting, to remove all loose paint, moss, lichen etc,

(ii) use non toxic paint, and

(iii) undercoat all metal structures with galvanised iron primer or a suitable self priming paint.

7.6.2 Repair a Non-Standard Beacon

(a) A Non-Standard Beacon shall be repaired by replacing or securing any damaged components of the beacon including damaged, corroded, rotted or missing rails, rafters, side panels, vane panels, hinges, and holding down devices.

(b) When a Non-Standard Beacon is beyond repair, a new Two Metre Beacon shall be installed, Section **7.4.2**, unless otherwise advised in advance by the NGO.

7.7 Permanently Remove Beacon

Where the NGO or a landowner has requested that a beacon be removed the Supplier shall:

(a) remove the beacon and dispose of unwanted materials in accordance with Section **8.2**,

(b) protect the mark from situations where it may be at risk from future disturbance or destruction especially where the mark is protruding out of the ground,

(c) justify/explain the level of protection within the contract report Section **11.5**, and

(d) leave the site in a condition such that the NGO will not be required to ever return for maintenance or health and safety purposes

7.8 Marker Posts

(a) Marker Posts may be either Plastic or Wooden, as defined in Sections **7.8.1** and **7.8.4**.

(b) Wooden Parker Posts shall be used in all cases where the purposes of the Marker Post include physical mark protection and to avert a health and safety hazard.

(c) When the purpose of the Marker Post is identification only, a Plastic Marker Post may be installed.

7.8.1 Plastic Marker Posts

A Plastic Marker Post shall:

(a) be in the form of and contain the wording specified by LINZ:

EXAMPLE – Plastic Marker Post

The Plastic Marker Post approved by LINZ at the time of writing these specifications has the following form and wording:

(b) s
ist of a white, 1.4m length PVC road edge marker post,

(c) have black text (on at least seven year exterior grade vinyl, if self adhesive),

(d) have the four-character geodetic code applied onto the post using 3M black on white, non-reflective lettering. These shall be placed:

(i) vertically,

(ii) below the “Geodetic Survey Mark” text.

(e) The distance to ground mark may be recorded on the adhesive sticker. This information shall be:

(i) recorded below the text “Nearby”,

(ii) shown to the nearest 0.10m,

(iii) written neatly, using a black, UV resistant marker.

7.8.2 Install a Plastic Marker Post

A Plastic Marker Post shall:

(a) be placed no further than:

(i) 5.0m from the ground mark in urban areas, or

(ii) 10m from the ground mark in rural areas,

(b) have 0.30m of the post’s length buried,

(c) have the flat side of the post facing the mark,

(d) be installed immediately against the fence line or as close as possible to it, where a mark is situated close to a fence.

> **GUIDELINE – Plastic Marker Post**
>
> The purpose of some Marker Posts is to aid identification of a mark (especially for buried marks or marks in rural areas), other posts are to help protect the mark (e.g. trig pipes in paddocks), and/or avert a health and safety risk.
>
> Plastic Marker Posts should only be used in situations where a Marker Post is required to aid identification only. In all other situations, a Wooden Marker Post shall be installed in accordance with Section **7.8.4**.

7.8.3 Non-Conforming Plastic Marker Posts

(a) Where an existing Plastic Marker Post does not conform with Section **7.8.1**, the non-conforming Plastic Marker Post shall only be removed and replaced if:

(i) the information on the Marker Post is incorrect and misleading, or

(ii) a Wooden Marker Post is required to provide mark protection or avert a health and safety risk.

7.8.4 Wooden Marker Posts

A Wooden Marker Post shall:

(a) be constructed from a tanalised half round fence post with a minimum diameter of 125mm and between 1.4 - 1.8m long,

(b) not be an existing fence or other post unless they were explicitly placed for mark identification, e.g. existing concrete benchmark posts,

(c) have an Identification Plate that complies with Section **7.2** located:

(i) on the flat side of the post facing the ground mark, and

(ii) on the area painted black.

7.8.5 Install a Wooden Marker Post

A Wooden Marker Post shall:

(a) be placed no further than:

(i) 5.0m from the ground mark in urban areas or

(ii) 10m from the ground mark in rural areas,

(b) be set in concrete to ensure stability, if in soft or sandy soil,

(c) have the flat side of the post facing the mark,

(d) be installed immediately against the fence line or as close as possible to it, where a mark is situated close to a fence.

7.8.6 Paint a Wooden Marker Post

(a) A Wooden Marker Post shall be painted in the following scheme:

(i) the top 0.2m of exposed post painted black, and

(ii) the remaining exposed post painted white.

(b) The Supplier shall:

(i) clean all surfaces, by brushing down or scraping prior to painting, to remove all loose paint, moss, lichen etc,

(ii) use non toxic paint, and

(iii) undercoat all bare surfaces with a suitable self priming paint.

7.8.7 Non-Conforming Wooden Marker Posts

(a) Where an existing Wooden Marker Post is non-compliant, the Supplier shall only replace it if the existing Wooden Marker Post:

(i) is not identifiable as a post, or

(ii) does not aid in the identification and location of the mark, or

(iii) does not aid in the required protection of the mark, or

(iv) does not mitigate any health and safety concern caused by the mark.

(b) Where an existing Marker Post has been replaced the Supplier shall justify the reasons for replacing the Marker Post in the Contract Report Section **11.5**.

GUIDELINE – Existing Marker Post

In most cases the existing non-compliant Marker Post provides sufficient protection and/or identification of a survey mark. It is not intended that these posts be replaced unless they meet the criteria of Section **7.8.7**.

The purpose of some Marker Posts is to aid identification of a mark (especially for buried marks or marks in rural areas), other posts are to help protect the mark (e.g. trig pipes in paddocks), and/or avert a health and safety risk. The purpose of an existing Marker Post shall be taken into consideration when contemplating replacement.

7.9 Post and Rail Enclosures

Where a mark or beacon is threatened by cattle or when required by the local authority, a Post and Rail Enclosure may be installed with approval from the NGO.

7.9.1 Post and Rail Enclosures

A Post and Rail Enclosure shall:

(a) be constructed from the following materials:

(i) three or four wooden tanalised fence posts (e.g. half rounds) approximately 1.8m long (post),

(ii) tanalised half-round fence posts or lengths of tanalised 100mm x 50mm timber (rails),

(b) have posts installed equidistant from the ground mark, where this distance shall be between 1.8m and 2.2m,

(c) have top rails which are generally level.

7.9.2 Install a Post and Rail Enclosure

A Post and Rail Enclosure shall have:

(a) at least one third of the post's length buried, leaving approximately 1.2m of post exposed above ground level,

(b) posts in soft sandy soil set in concrete to ensure stability,

(c) the rails secured to the top of the posts using screwed in metal straps or galvanized bolts.

7.9.3 Paint a Post and Rail Enclosure

(a) A Post and Rail Enclosure shall be painted in the following scheme:

(i) rails and tops of posts at rail level are to be painted white, and

(ii) the remainder of the posts exposed above ground level are to be painted black.

(b) The Supplier shall:

(i) clean all surfaces, by brushing down or scraping prior to painting, to remove all loose paint, moss, lichen etc.

(ii) use non toxic paint, and

(iii) undercoat all bare surfaces a suitable self priming paint.

7.9.4 Non-Conforming Post and Rail Enclosures

(a) Where an existing Post and Rail Enclosure is non-compliant, the Supplier shall only replace it if the existing Post and Rail Enclosure does not:

(i) aid in the required protection of the mark, or

(ii) mitigate any health and safety concern caused by the mark

(b) Where a Post and Rail Enclosure has been replaced the Supplier shall justify the reasons for replacing the Post and Rail Enclosure in the Contract Report Section **11.5**.

> **GUIDELINE – Existing non-complaint Post and Rail Enclosure**
>
> In most cases the existing non-compliant Post and Rail Enclosure provides sufficient protection and/or identification of a survey mark. It is not the intention that these enclosures be replaced unless they meet the criteria of Section **7.9.4**.
>
> The purpose of a Post and Rail Enclosure is to help protect the mark (e.g. beaconed marks subject to disturbance by stock or benchmark blocks near roads) and/or avert a health and safety risk. If the non-compliant Post and Rail Enclosure does not meet these criteria, it should be replaced.

7.9.5 Repair an Existing Post and Rail Enclosure

The Supplier shall:

(a) restore an existing Post and Rail Enclosure to original state in accordance with Section **7.9.1**, and

(b) supply and replace any damaged or missing parts, taking care to ensure that the identification plate remains undamaged.

7.10 Boxes and Covers

7.10.1 Plastic Boxes and Covers

Plastic Boxes and Covers shall:

(a) consist of a Universal Small Box, measurements:

(i) Top: 230mm x 265mm,

(ii) Bottom: 300mm x 400mm,

(iii) Height: 150mm, and

(b) have a black lid with the words “SURVEY MARK”.

> **GUIDELINE – Plastic Box and Cover**
>
> Products such as the DRA50/27U are compliant with this specification.

7.10.2 Install a Plastic Box and Cover

A Plastic Box and Cover shall:

(a) be placed in a way so that they are safe, stable and durable,

(b) be placed so the lid is flush with the surrounding surface,

(c) have original disturbed surface reinstated, and waste disposed of, and

(d) be installed in areas not subject to heavy loading (e.g. pedestrian areas, low volume driveways or grassed areas).

7.10.3 Cast Iron Boxes and Covers

A Cast Iron Box and Cover shall:

(a) be an NGO-approved standard box and cover,

(i) Top: 277mm x 277mm

(ii) Bottom: 360mm x 360mm

(iii) Height: 103mm.

(b) be suitable for use in vehicular trafficked areas

> **GUIDELINE – Cast Iron Box and Covers**
>
> While this Mark Protection Structure is referred to as being "Cast Iron", many covers are made of "Ductile Steel" or other suitable materials.

7.10.4 Install a Cast Iron Box and Cover

Cast Iron Boxes and Covers shall:

(a) be placed in a way so that they are safe, stable and durable,

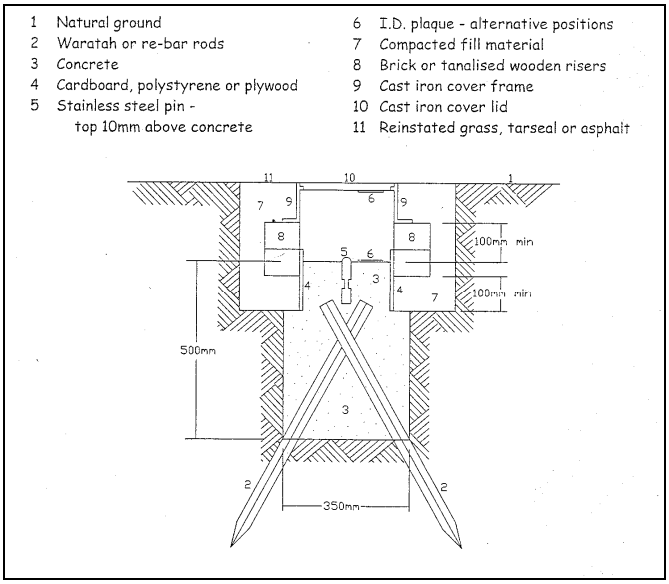
(b) be placed so that the lid is flush with the surrounding surface,

(c) have original surface that was disturbed reinstated, and waste disposed of,

(d) be installed in areas subject to heavy loading (e.g. roadways)

(e) have the base of the box isolated from the concrete base by a material such as plywood, polystyrene spacers or PVC pipe, and

(f) be installed in accordance with the diagram below, as much as possible:



7.10.5 Raise or Lower a Box and Cover

Where an existing Box and Cover is no longer level with the surrounding surface, the Supplier shall:

(a) raise or lower the existing Box and Cover in accordance with Section **7.10.2** or **7.10.4**, and any brick, wood or polystyrene raisers shall be replaced or adjusted to achieve the required height,

(b) restore the surface surrounding the Box and Cover to a standard at least equivalent to the state before installation, and

(c) dispose of all waste from the site.

7.10.6 Replace a Box and Cover

Where an existing Box and Cover is broken or a new lid cannot be obtained to fit an existing box, the Supplier shall:

(a) remove and dispose of the existing Box and Cover,

(b) supply and install a Box and Cover, Section **7.10.2** or **7.10.4**.

7.10.7 Replace a Cover

Where a Cover is missing or broken, the Supplier shall:

(a) remove and dispose of the broken cover, and

(b) supply and install a replacement cover for the existing box in accordance with Section **7.10.2** or **7.10.4**.

> **GUIDELINE – Non-Standard Covers and Lids**
>
> Covers and lids may vary from area to area and may not always fit the LINZ standard Box and Cover. If a Non-Standard Cover cannot be obtained, then both the Box and Cover may need to be replaced.

7.11 Pillars

(a) Pillars are considered to be structures over 1m high that can be observed to.

(b) A Pillar shall have an identification plate that complies with Section **7.2** located:

(i) within the area painted black, and

(ii) on the side of the pillar facing the usual direction of access.

7.11.1 Paint a Pillar

(a) A Pillar shall be painted in the following scheme:

(i) the top and bottom third of a pillar is to be painted white, and

(ii) the central third is to be painted black, and

(b) the Supplier shall:

(i) clean all surfaces, by brushing down or scraping prior to painting, to remove all loose paint, moss, lichen etc,

(ii) use non toxic paint, and

(iii) undercoat bare surfaces, except stainless steel items (e.g. a vertical reference plate), with a suitable self priming paint.

7.12 Benchmarks

(a) Benchmarks are considered to be a mark within a substantial concrete block, with

(b) approximate dimensions 0.35m x 0.35m x 0.5m.

7.12.1 Paint a Benchmark

(a) Benchmarks shall only be painted if they are protruding more than 0.10m above ground (Benchmarks more than 1.0m above the ground shall be regarded as a pillar).

(b) A Benchmark shall be painted white.

(c) The Supplier shall:

(i) clean all surfaces, by brushing down or scraping prior to painting, to remove all loose paint, moss, lichen etc.

(ii) use non toxic paint, and

(iii) paint the entire exposed section of the Benchmark.

8 Site Maintenance

The purpose of this section is to define Site Maintenance activities and specialist equipment.

(a) Contract documentation will specify which maintenance items shall be completed.

(b) Maintenance items not required by the contract shall not be completed.

8.1 Clear Vegetation

8.1.1 Landowner Permission

Permission from the landowner/occupier must be obtained prior to any clearance of vegetation.

> **GUIDELINE – Landowner Permission**
>
> Permission to clear vegetation may be gained at the same time as permission is sought to access the site (Section **3.1**).

8.1.2 Clear Tall Plants

Tall plants, including trees, shall be cleared from the site so that it is clear of all obstructions that may restrict visibility both to and from the site.

> **GUIDELINE – Tall Plants**
>
> Any vegetation over 1.5m tall can be considered as “Tall Plants”, vegetation under 1.5m will be either “Scrub” or “Grass”.

8.1.3 Clear Scrub

(a) All scrub-like vegetation which impedes usability of an existing site shall be cleared from within a two metre radius of the mark and its protection structure.

(b) Grass is not considered to be scrub unless it exceeds 1.0m in height before clearance.

> **GUIDELINE – Clear Scrub**
>
> The purpose of clearing scrub such as blackberry and gorse is to improve access to the mark and to enable observations to be made from it in the medium term.
>
> In general, trimming grass does not provide improved access or mark usability after a month. However, grass may need to be trimmed to enable other maintenance to occur (e.g. painting posts, beacons or marks).

8.2 Disposal of Unwanted Materials

(a) Any beacon, protection structure, or parts thereof that have been replaced shall be removed from the site and disposed of in an environmentally friendly manner.

(b) Debris such as cleared plants, vegetation and excavated material that cannot be left on or near site in a safe and tidy manner (e.g. in urban areas) shall be removed and disposed of in an environmentally friendly manner.

GUIDELINE – Disposal of Material

All unwanted materials shall be removed from the site, or if instructed by the landowner, left in a tidy state. Any green waste should be composted or disposed of in accordance with local by-laws.

9 Photographs

9.1 Photographs Required

(a) The following photographs must be provided for each mark:

(i) Mark Photograph that clearly shows the mark, including the mark type,

(ii) Site Photograph that clearly shows the mark in relation to its immediate surroundings, including any protection structures *in situ*, and

(iii) Extended Site Photograph that shows a wider view of the site, its surroundings, and other features which may help to locate the mark in the future.

(b) Photographs must be taken after all maintenance has been completed at the site.

GUIDELINE – Photographs

The mark type should be obvious in the Mark Photograph and any beacon must be upright and over the mark in the Site and Extended Site Photos.

If the mark has a cast iron, plastic, or non-standard cover, this should be visible in at least one of the photos.

The Extended Site Photograph should:

(i) be taken more than 20m from the mark,

(ii) contain enough information to convey the suitability of the mark for terrestrial or GNSS observations, and

(iii) have an item (such as a road cone) placed over the mark to identify its location where it is not obvious.

This information will be used for locating the mark in the future. Therefore photographs following any maintenance are required.

9.2 Photograph Characteristics

All photographs must:

(a) not include members of the public, or anything else that could compromise an individual's privacy, bearing in mind that these photographs will be made available over the internet in a public database,

(b) be vertically aligned for ease of viewing (i.e. ground at the bottom of the photograph, sky at the top), and

(c) not be digitally altered, except to:

(i) overcome privacy issues, or

(ii) identify the location of the mark if it is not obvious in the photo.

9.3 Mark and Site Image

(a) The photographs required by Section **9.1** must be provided as a single Mark and Site image that shows the:

(i) geodetic code,

(ii) mark name,

(iii) mark photograph,

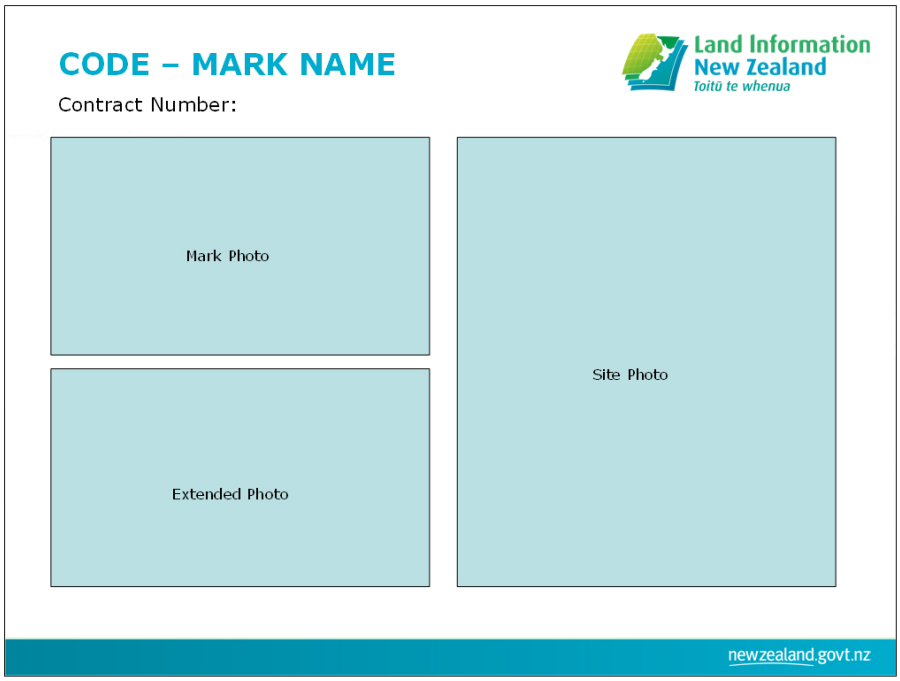
(iv) site photograph,

(v) extended site photograph, and

(vi) contract identifier.

(b) The Mark and Site image shall be provided in the format specified in Section **11.8.13**.

(c) The Mark and Site image shall follow the general template:



GUIDELINE – Mark and Site Image

The three photos, mark, site and extended site, must be shown on the Mark and Site image. However, it is up to the Supplier how they wish to orient each photo (landscape or portrait).

Suppliers may include their own logo on the image in addition to the LINZ logo if they wish.

9.4 Maintenance Photographs

(a) The following photographs must be supplied if physical maintenance is carried out at a mark, protection structure or site:

(i) before photographs, and

(ii) after photographs.

(b) Sufficient 'before' and 'after' mark and site photographs shall be supplied to provide evidence of maintenance work completed.

(a) Maintenance photographs shall be provided in accordance with Section **11.8.13**.

(c) Separate 'after' photographs are not required if the Mark and Site image required in Section **9.3** clearly shows all maintenance completed.

9.4.1 Before Photos

Before photographs must:

(a) be taken prior to commencement of any maintenance work, and

(b) clearly show the nature of the maintenance work required.

9.4.2 After Photos

After photographs must:

(a) be taken upon completion of all maintenance work, and

(b) clearly show the maintenance work carried out and/or any additional maintenance required.

> **GUIDELINE – Maintenance Photographs**
>
> 'Before' and 'after' photos are used to verify the need for maintenance to be undertaken and to show that it has been satisfactorily completed.
>
> It is important for the supplied images to contain sufficient detail to enable this assessment to be completed.

10 Mark and Site Information

10.1 Access and Finder Diagrams

(a) An access or finder diagram must be provided for every non-CORS mark found and included in the Mark Details File Section **11.4**, irrespective of whether it was maintained or not.

(b) An access or finder diagram is not required for CORS sites, Destroyed and Not Found marks, see Section **5.3**.

(c) The following types of diagram shall be provided:

(i) access diagrams shall be provided for all trigs and marks with complex access instructions, or

(ii) finder diagrams shall be provided in all other cases.

(d) An existing mark diagram may be used as an access or finder diagram if:

(i) the content is still applicable and correct, and

(ii) it complies with the requirements of this section and is supplied in accordance with Section **11.8.13**.

(e) Access diagrams shall provide enough information to ensure that anyone locating the mark will travel via the safest, most direct route or the route preferred by the landowner/occupier.

(f) Finder diagrams shall include street names and ties to at least three nearby physical objects (if they exist) to allow the mark to be located in a timely manner.

(g) All diagrams must:

(i) be drawn at a scale appropriate to show features useful in accessing the mark (access and finder diagrams will be recorded as “Not to Scale” on the Mark and Site details form),

(ii) have a north arrow and be aligned so that the north arrow points up the page,

(iii) show all topographical features and names useful in accessing the mark, including the geodetic code of the mark,

(iv) show the measured relationship of physical features with respect to the ground mark, which would allow the mark to be located in a timely manner, and

(v) show the relationship of any Marker Post with respect to the ground mark.

(h) Diagrams must be square in shape and contain detail that is clearly visible when the image is displayed at 8cm x 8cm.

10.2 Access Description

A text description of the information provided on the Access/Finder Diagram shall be included in the MLOC field in the Mark Details File (Section **11.4**). As a minimum, the description shall include:

(a) location of the mark, with respect to:

(i) topographical, or

(ii) nearby permanent features, and

(b) directions to the mark, from the most direct road.

10.3 Mark Description

A text description of the ground mark, as found, shall be included in the MRKD field in the Mark Details File (Section **11.4**).

GUIDELINE – Mark Description

There is no need to include information in this section which is detailed elsewhere in the Mark Details File, except that where a mark has been Destroyed, this should be reported in the MRKD field.

For a wooden beacon, state if it can or cannot be easily removed.

For existing geodetic marks the mark description from the geodetic database (including the information on scanned mark diagrams) shall be used and edited/updated with new information if required. The original information should not be lost/deleted unless it is incorrect.

10.4 Plan References

Wherever possible, at least one survey plan relevant to the mark shall be listed in the PLRF field in the Mark Details File (Section **11.4**).

GUIDELINE – Plan Reference

For existing marks the plan references from the geodetic database (including those listed on scanned mark diagrams) shall be used.

It is not necessary to research all plans that have used the mark.

In the case there are no relevant survey plans, this field shall be left blank.

10.5 Owner Occupier Information

(a) After gaining permission to access a site (Section **3.1**), permission to include contact details in the Geodetic Database (public website) shall be sought, and

(b) the following information shall be recorded in the Mark Details File (Section **11.4**):

(i) the name of the contact person (OWNR),

(ii) their phone number (PHNO), and

(iii) their physical address (ARES).

(c) Where the contact person has specified that they do not wish their contact details to be published:

(i) the OWNR and PHNO fields of the Mark Details File (Section **11.4**) shall populated with "Not on Public Record – Contact LINZ", and

(ii) the OWNR and PHNO details shall be supplied to the NGO in the Contract Report.

GUIDELINE – Owner/Occupier Information

As a minimum, the name of the contact person authorised to give access and permission to occupy the mark (OWNR) must be supplied.

If the mark is in the road reserve, state: 'Road Reserve'.

10.6 GNSS Suitability

Each site shall be assessed for its suitability for making observations using GNSS techniques. This information shall be recorded in the GNSSU field in the Mark Details File (Section **11.4**). The site shall be assessed as being good, poor or unsuitable.

(a) A 'Good' site shall:

(i) have at least 70% clear sky visibility above 15 degrees from the horizon in all directions,

(ii) be at least 5 metres clear of obstacles such as fences and buildings that may cause multipath, and

(iii) be at least 20 metres clear of sources of radio interference such as radio transmitters, cell-phone transmitters and high-tension power lines.

(b) A 'Poor' site shall:

(i) have less than 70% clear sky visibility above 15 degrees from the horizon in all directions, or

(ii) be less than 5 metres clear of obstacles such as fences and buildings that may cause multipath, or

(iii) be between 20 - 10 metres clear of sources of radio interference such as radio transmitters, cell-phone transmitters and high-tension power lines.

(c) An 'Unsuitable' site shall:

(i) have less than 40% clear sky visibility above 15 degrees from the horizon in all directions, or

(ii) be less than 10 metres clear of sources of radio interference such as radio transmitters, cell-phone transmitters and high-tension power lines.

10.7 Cell Phone Coverage

Each site shall be assessed for its cell phone coverage, for at least one provider. This information shall be recorded in the CELL field in the Mark Details File (Section **11.4**). The site shall be assessed in accordance with the table in Section **11.8.12**.

10.8 Non-Standard Beacon Diagrams

(a) A Non-Standard Beacon Diagram shall be provided for every mark included in the Mark Details File that has a beacon type (MRKE) that is not 4M, 2M, PL, or NB.

(b) An existing Non-Standard beacon diagram may be used if:

(i) the content is still applicable and correct, and

(ii) it complies with the requirements of this section and is supplied in accordance with Section **11.8.13**.

(c) Non-Standard Beacon Diagrams must:

(i) clearly depict the appearance and prominent parts of the beacon,

(ii) show the height, in decimal metres, of each prominent beacon part above (+ve) or below (-ve) the top of the mark, and

(iii) show the height of the ground (in decimal metres) above (+ve) or below (-ve) the top of the mark.

(d) Diagrams must be square in shape and contain detail that is clearly visible when the image is displayed at 8cm x 8cm.

10.9 Approximate Coordinates

(a) When an Order 10 - 12 site is being visited for the purposes of Geodetic Inventory or Maintenance and the mark is not going to be upgraded by Geodetic Survey, the Supplier shall provide an Approximate Coordinate.

(b) An Approximate Coordinate can be collected:

(i) using a handheld GPS receiver, or

(ii) using another method approved in advance by the NGO.

(c) Coordinates shall be NZGD2000/WGS84.

(d) Coordinates shall meet at least Order 9 accuracy standards.

GUIDELINE – Accuracy Standard

Accuracy standards are defined in LINZS25006 Standard for tiers, classes and orders of LINZ data.

The main Order 9 accuracy requirements are summarised below:

Horizontal tier	Vertical tier	Horizontal Class	Vertical Class

5 m	-	1 m + $3x10^{-3}$ m/m	-

At this level accuracy, there is no significant difference between NZGD2000 and WGS84.

(e) Coordinates shall be supplied as an Approximate Coordinate File, Section **11.3**.

(f) The method used by the Supplier to collect coordinate information shall be detailed in the Contract Report, Section **11.5**.

11 Contract Deliverables

11.1 General

(a) All information relating to geodetic contracts shall be provided to the NGO in digital form only.

(b) Information shall be provided:

(i) physically on a CD, DVD or flash drive, or

(ii) by the NGO downloading directly from the Supplier's FTP site, or

(iii) by the Supplier uploading to the LINZ FTP site.

(c) Individual files that are being resubmitted may be delivered by email.

11.2 Invoices

(a) A hard copy invoice for full or progress payment of work completed shall be provided to the NGO.

(b) Digital copies of all provided invoices shall be supplied in accordance with Section **11.8.13**.

(c) For Maintenance contracts, a Maintenance Summary Report shall be provided for every invoice submitted.

(d) A Maintenance Summary Report template will be provided by the NGO and shall be submitted in the format specified in Section **11.8.13**.

> **INFORMATION – Maintenance Summary Report**
>
> The purpose of the Maintenance Summary Report is to provide a record of maintenance completed at each site. The Maintenance Summary Report is then checked against the Contract Report and before and after photos for consistency.

11.3 Approximate Coordinate File

(a) An Approximate Coordinate File shall be supplied that contains a list of marks with an approximate coordinate in accordance with Section **10.9**.

(b) The following fields shall be provided for each mark included in the Approximate Coordinate File:

Field Name	Contents	Format
CODE	Geodetic Code	Four-character geodetic code
MRKS	Mark Status	See Section **11.8.1**
MRKT	Mark Type	See Section **11.8.3**
EXMK	Existing Mark	See Section **11.8.2**
DISTRICT	Land District	See Section **11.8.4**
CROD	Coordinate Order	See Section **11.8.5**

ORDV1	NZGD2000 Latitude	Decimal degrees to 8 decimal places (+ve North, -ve South)
ORDV2	NZGD2000 Longitude	Decimal degrees to 8 decimal places (+ve East, -ve West)
ORDV3	NZGD2000 Ellipsoidal Height (if available)	Metres to three decimal places, blank if unknown
NAME	Mark Name	See Section **4.2**
ALTN	Alternative Mark Name	See Section **4.2**
COMM	Optional Comments	Text, for information only.

(c) The Approximate Coordinate File shall:

(i) be supplied in comma delimited format (CSV),

(ii) contain the following header line:

CODE,MRKS,MRKT,EXMK,DISTRICT,CROD,ORDV1,ORDV2,ORDV3,NAME, ALTN,COMM

(iii) contain information about one mark per line, and

(iv) be named in accordance with Section **11.8.13**.

GUIDELINE – Approximate Coordinate File

The Approximate Coordinate file is used to update low order coordinates in Landonline for those marks without vector data.

An example Approximate Coordinate File (listing one mark) is:

CODE,MRKS,MRKT,EXMK,DISTRICT,CROD,ORDV1,ORDV2,ORDV3,NAME,ALTN,COMM
AG1F,COMM,PIN,Y,DN,2k6,-45.89797972,170.37251667,0.000,W 8/180,MOWD 96, Autonomous Coordinate

11.4 Mark Details File

(a) A report shall be supplied that provides updated information about all geodetic marks visited, maintained and searched for by the Supplier.

(b) CORS stations (including PositioNZ stations) are not required to be included in the Mark Details File.

(c) The following fields shall be provided for each geodetic mark:

Field Name	Contents	Format
CODE	Geodetic Code	Four-character geodetic code
NAME	Mark Name	See Section **4.2**
EXMK	Existing Mark	See Section **11.8.2**
MRKT	Mark Type	See Section **11.8.3**
MPSC	Mark Physical State	See Section **11.8.6**
PLRF	Plan references	See Section **10.4**, blank if none found

EDAT	Date mark originally established	YYYY.MM.DD
MRKR	Most prominent mark protection	See Section **11.8.7**
MRKR2	Secondary mark protection	See Section **11.8.7,** blank if none present
MRKE	Beacon type	See Section **11.8.8**, blank if none present
GLREL	Ground level relationship	Metres to two decimal places, see Section **5.5**, blank if not required to be measured
BCNHGT	Height measurement for beacons and pillars	See Section **5.6** and **5.7**, blank if not required
BCNHGT2	Height measurement for beacons and pillars	See Section **5.6** and **5.7**, blank if not required
BCNHGT3	Height measurement for beacons and pillars	See Section **5.6** and **5.7**, blank if not required
BCNHGT4	Height measurement for beacons and pillars	See Section **5.6** and **5.7**, blank if not required
BCNHGT5	Height measurement for beacons and pillars	See Section **5.6** and **5.7**, blank if not required
BCNHGT6	Height measurement for beacons and pillars	See Section **5.6** and **5.7**, blank if not required
BDAT	Date Beacon Erected	YYYY.MM.DD, blank if not known
BECC	Beacon Eccentricity	See Section **5.6.3** and **11.8.10**, blank if not beaconed
MRKD	Description of ground mark	Text, see Section **10.3**
MLOC	Description of site and location	Text, see Section **10.2**
PLQEXIST	ID plaque existence	See Section **11.8.9**
PLTEXIST	ID plate existence	See Section **11.8.9**
INFOEXIST	Information plate existence	See Section **11.8.9**
MDAT	Date of most recent maintenance or site inspection	YYYY.MM.DD
MPSM	Description of mark maintenance completed	Text, state “None” if no work completed
MPSB	Description of beacon maintenance completed	Text, state “None” if no work completed
MPSP	Description of protection maintenance completed	Text, state “None” if no work

		completed
MDMK	Description of mark maintenance required	Text, state “None” if no work required, see Section **6**
MDBE	Description of beacon maintenance required	Text, state “None” if no work required, see Section **7**
MDPR	Description of protection maintenance required	Text, state “None” if no work required, see Section **7**
OWNR	Name of contact person to permit access to and occupation of mark	Text, state “Road Reserve” if in road reserve and “Not for Public Record – Contact LINZ” if the contact person does not wish their details to appear on the Public Record, see Section **10.5**
PHNO	Phone number of OWNR	(0X) XXX XXXX, blank if OWNR is road reserve, see Section **10.5**
PADD	Physical address of OWNR, where they can be contacted	Text, blank if OWNR is road reserve, see Section **10.5**
ARES	Restrictions to accessing mark	Text, state if no access restrictions, see Section **3.1**
GNSSU	GNSS Suitability	See Sections **10.6** and **11.8.11**
CELL	Cell phone network coverage of at least one provider	See Section **10.7** and **11.8.12**
ADAT	Date that owner/occupier information and access data was verified	YYYY.MM.DD
COMM	Optional comments	Text, for information only. These comments will not be loaded in to the Geodetic Database or Landonline

(d) The Mark Details File shall:

(i) be supplied in comma delimited format (CSV),

(ii) contain the following header line:

CODE,NAME,EXMK,MRKT,MPSC,PLRF,EDAT,MRKR,MRKR2,MRKE,GLREL,
BCNHGT,BCNHGT2,BCNHGT3,BCNHGT4,BCNHGT5,BCNHGT6,BDAT,BECC,
MRKD,LOC,PLQEXIST,PLTEXIST,MDAT,MPSM,MPSB,MPSP,MDMK,MDBE,
MDPR,OWNR,PHNO,PADD,ARES,GNSSU,CELL,ADAT,COMM

(iii) contain information about one mark per line, and

(iv) be named in accordance with Section **11.8.13**.

GUIDELINE – Mark Details File

The Mark Details File contains mark information that a Supplier has collected or

verified. It is used to update Landonline and the geodetic database with the latest information about geodetic marks.

It is important to ensure data formats are maintained in CSV files, particularly the specified number of characters (eg Year.Month.Day: YYYY.MM.DD).

Information regarding PositioNZ or CORS sites not visited by the Supplier should not be included in the Mark Details File.

11.5 Contract Report

The Contract Report shall be arranged in the following order and contain details and/or discussion on each of the listed points:

11.5.1 Heading

(a) Contract Name

(b) Schedule Number

(c) Schedule Name

11.5.2 Personnel

A list of the staff involved and their role in this contract.

11.5.3 Summary, Issues, Problems and Variations

(a) Specified Requirements

A summary of the contract requirements, including total number of marks maintained.

(b) Variations

Where any variations/dispensations have been agreed to by LINZ, either by correspondence or a formal variation to the contract, these should be stated, (for example, where it was not possible to complete a compliant activity).

(c) Certification of Compliance with Specifications

The following declaration, signed by the Supplier, shall be included in the Contract Report:

All work undertaken as part of this Contract is fully compliant with the Specification for Geodetic Physical Maintenance Services.

Signed:

_____

Name:

_____

Supplier

Any variations/dispensations agreed with LINZ, should be stated in Section **11.5.3** (b) above.

(d) Issues

Describe any difficulties experienced and how these were managed. Include any inconsistencies found with or recommendations for the specification.

11.5.4 Traffic Management Requirements

(a) Traffic management plans used, Section **3.3**.

(b) Details of areas where traffic management plans were not required, Section **3.3**.

11.5.5 Maintenance

(a) Maintenance Completed

Details of each mark, including reasons why any non-conforming structures were replaced (e.g. Section **7.8.7**).

(b) Maintenance Recommendations

Where the utility of the mark could be improved by additional or more frequent maintenance this should be reported, Section **5.1**

(c) Incomplete Maintenance

Where maintenance has been left incomplete this should be reported, Section **5.2**.

(d) Marks Looked For but Not Found or Found Destroyed

List all marks looked for and not found: Geodetic Code and Mark Name and any evidence to support this, Section **5.3**.

(e) Beacon Height and Eccentricity Measurement Methodology

(f) Resources Used

List at a high level the equipment and recourses used including type and brands of paints and primers

11.6 Approved Traffic Management Plans

(a) All Traffic Management Plans should be approved by the relevant local authority or their delegate.

(b) Where the Supplier has authority to approve their own traffic Management Plans evidence of this authorisation shall be provided.

(c) Approved copies of these plans should be supplied in the form specified in Section **11.8.13**.

11.7 Mark and Site Image

(a) A Mark and Site Image shall be provided for each mark, in accordance with Section **9.3**.

(b) The image shall be colour JPEG, in accordance with Section **11.8.13**.

INFORMATION - PowerPoint

Help for changing the output resolution of a PowerPoint slide (the template for the Mark and Site Image) can be found at:

http://support.microsoft.com/kb/827745

11.8 Field Codes

11.8.1 Mark Status

The following MRKS codes shall be used to indicate the status of a mark:

MRKS Code	Description
PEND	Mark is not currently in the geodetic database
COMM	Mark exists in the geodetic database

11.8.2 Existing Mark

The following EXMK codes shall be used to indicate the status of a mark:

EXMK Code	Description
N	Mark is not currently in the geodetic database
Y	Mark exists in the geodetic database

11.8.3 Mark Type

The following MRKT codes shall be used to indicate the type of a mark:

MRKT Code	Description
IS	Iron Spike Iron Rod or similar
IT	Iron Tube Iron Pipe or similar
LP	Lead Plug
NAIL	Nail
PIN	Stainless Steel Pin
BP	Bronze Plaque
OTHR	Any other mark type, including forced centring
UNMK	Unmarked
UNKN	Not Specified

11.8.4 Land District

The following DISTRICT codes shall be used to indicate the land district in which a mark is located:

DISTRICT Code	Description
AA	Antarctica
CH	Canterbury
CI	Chatham Islands

GS	Gisborne
NA	Hawkes Bay
BM	Marlborough
NN	Nelson
AK	North Auckland
OI	Offshore Islands
DN	Otago
HN	South Auckland
IN	Southland
NP	Taranaki
WN	Wellington
HK	Westland

11.8.5 Coordinate Order

The following CROD codes shall be used to indicate the existing order of a mark:

CROD Code	Description
2k0	Order 0
2K1	Order 1
2k2	Order 2
2K3	Order 3
2k4	Order 4
2k5	Order 5
2k6	Order 6 or lower

11.8.6 Mark Physical State

The following MPSC codes shall be used to indicate the physical state of a mark:

MPSC Code	Description
DEST	Destroyed
DMGD	Damaged
NFND	Not Found
RELB	Reliable / Found
THRT	Threatened

11.8.7 Mark Protection Type

The following MRKR and MRKR2 codes shall be used to indicate the mark protection structure:

MRKR / MRKR2 Code	Description
2MBE	2m Beacon
4MBE	3m or 4m Beacon

CICV	Cast Iron Cover
COVR	Concrete or Non-Standard Cover
MKPT	Wooden or Non-Standard Marker Post
PLPT	Plastic Marker Post
PLCV	Plastic Cover
PREN	Post and Rail Enclosure
NOPR	No Protection
NSTD	Non-Standard Beacon

11.8.8 Beacon Type

The following MRKE codes shall be used to indicate the beacon type:

MRKE Code	Description
AA	Cairn
CN	Chimney
LH	Lighthouse
MR	Marine Beacon
MS	Mast
NB	Not Beaconed
ND	Unknown
PL	Pillar
TO	Tower
TT	Transmission Tower
2M	2m Beacon
4M	3m or 4m Beacon
NS	Non-Standard Beacon

11.8.9 ID Plate, Plaque and Information Plate

(a) The following PLQEXIST, PLTEXIST and INFOEXIST codes shall be used to indicate the presence of ID Plaques, ID Plates and Information Plates:

PLQEXIST, PLTEXIST, INFOEXIST Code	Description
E	ID Plaque, ID Plate or Information Plate exists
Y	ID Plaque, ID Plate or Information Plate installed
N	ID Plaque, ID Plate or Information Plate non-existent and not installed

(b) Where an ID Plaque or ID Plate does not exist and is not installed, despite being required by these specifications, this shall be explained in the COMM field of the Mark Details File (Section **11.4**).

11.8.10 Beacon Eccentricity

(a) The following eccentricity status indicators shall be used:

Status	Description
Not Central	Beacon not central (by more than 0.01m) on arrival and departure from site
Now Central	Not central on arrival on site but central on departure from site
Central	Central on arrival and departure from site

(b) The beacon eccentricity shall be reported in the following format:

Eccentricity: status

GUIDELINE – Beacon Eccentricity

The purpose of this field is to report the eccentricity of a beacon for surveys that may have observed to it prior to it being centred.

Example - Now Central:

90 deg 0.04m: Now Central

Example - Central:

Central

11.8.11 GNSS Suitability

The following GNSSU codes shall be used to indicate the GNSS suitability of a mark:

GNSSU Code	Description
GD	Good
PR	Poor
US	Unsuitable

11.8.12 Cell Phone Coverage

(a) The CELL field shall be used to indicate cell phone coverage for at least one provider at a mark.

(b) The following coverage status indicators shall be used:

Status	Description
Good	Strong signal
Poor	Weak but reliable signal
No Coverage	No signal or unreliable signal
Not Tested	Network signal not tested

(c) The cell phone coverage shall be reported in the following format:

Provider: status, Provider: status, Provider: status

GUIDELINE – Cell Phone Coverage

Cell phone coverage is a text field. The format above is to create consistency between Suppliers. 027 and 022 are not to be used, as numbers can now be transferred between providers.

Example:

Telecom: Good, Vodafone: Good, 2Degrees: Not Tested

11.8.13 File Names

(a) Contract deliverable files shall use the following naming conventions:

File Type	File Name Format	File Format
Before Photo	CODEYYpbV.jpg	JPG
After Photo	CODEYYpV.jpg	JPG
Mark and Site Image	CODEYYpV.jpg	JPG
Access Diagram	CODEYYad.png	PNG
Finder Diagram	CODEYYad.png	PNG
Non-Standard Beacon Diagram	CODEYYbd.png	PNG
Approximate Coordinate File	BBEEEEEm.csv	CSV
Mark Details File	YYNNNNmV.csv	CSV
Maintenance Summary Report	YYNNNNmV.xls	XLS
Contract Report	YYNNNNs.doc YYNNNNs.pdf	DOC PDF
Progress Payment Invoice	BBNNNNiV.pdf	PDF
Final Invoice	BBINVOICE.pdf	PDF
Approved Traffic Management Plans	BBEEEEEE.pdf	PDF

(b) Files shall be provided in the following formats:

Format	Document Type	Details
JPG	JPEG Image	Resolution: 200 dpi Colour: True Colour
TIF	TIFF Image	Resolution: 200 dpi Colour: Black and white Compression: CCITT Group 4 (2d)
PNG	PNG Image	Resolution: 200 dpi Colour: Black and white
DOC	Microsoft Word Document	
XLS	Microsoft Excel Spreadsheet	
CSV	Comma delimited text file	
PDF	PDF Document	Searchable text is not compulsory
PDFS	PDF Document	Text within document is searchable
SNAP	SNAP adjustment files	Meet SNAP data format specifications

11.9 Abbreviations

(a) Upper case characters in file names and in record formats represent:

Abbreviation	Description	Example
CODE	Geodetic Code	HNPC
YY	Year of information (last two digits)	11
HH.MM	24 hour time of information	13.25
YYYY.MM.DD	Date of information	2011.04.15
V	Sequential file number	1
NNNNNNN	Schedule code	2006102
NNNNNNNNN	Cell code (where no Cell, use 01)	200610201
NNNN	Last four digits of cell code	0201
FFF	Sequential file number, assigned by Supplier	001
BB	Supplier ID (assigned to Supplier by the NGO, see (b) below)	LI
EEEEE	Unique number within deliverables, assigned by Supplier	1234
EEEEEE	Unique number within deliverables, assigned by Supplier	12345
S	Session number reflecting the consecutive sequence of separate occupations of the same mark on a particular Julian Day. Must begin 0 or 1.	0

(b) Where a Supplier has not been assigned an ID, the abbreviation 'XX' shall be used in deliverable file names.

11.10 Summary of Required Files (Information Only)

The following table summarises the files that are to be provided with the contract deliverables. The table is informational only; if it conflicts with other sections of this specification, the other sections take precedence.

It is the responsibility of the Supplier to ensure that all necessary files are correctly provided to fulfil their contractual obligations to LINZ.

Deliverable	Format	Reference	Comment
Approximate Coordinate File	CSV	Section 11.3	Lists all marks referenced in vector or height data files
Mark Details File	CSV	Section 11.4	Lists all marks visited or maintained in a contract
Contract Report	DOC PDFS	Section 11.5	Report
Maintenance Summary Report	XLS	Section 11.2	Record of maintenance completed
Final Invoice	PDF	Section 11.2	Final digital invoice
Progress Payment Invoice	PDF	Section 11.2	Digital progress payment invoice(s)
Before Photo	JPG	Section 9.4	Photo of Mark, Site and Protection Structure before maintenance
Mark and Site Image	JPG	Section 11.7	As per template showing Mark, Site and Extended Site photos
Access Diagram	PNG	Section 10.1	Diagram conveying mark location
Non-Standard Beacon diagram	PNG	Section 10.8	Image of a Non-Standard beacon and its heights
Approved traffic management plans	PDF	Section 11.6	Final approved traffic management plans