

NORTHERN TERRITORY OF AUSTRALIA
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NORTHERN TERRITORY OF AUSTRALIA

Directions under *Licensed Surveyors Act*

The Surveyor Board of the Northern Territory of Australia, in pursuance of section 47 of the *Licensed Surveyors Act*, gives the following directions with respect to the practice to be followed by licensed surveyors in making land boundary surveys within coordinated survey areas and preparing plans showing the results of those surveys.

The common seal of the Surveyors Board of the Northern Territory of Australia is affixed in pursuance of a resolution of the Board authorising the seal to be affixed passed on 2003.

Chairperson

Member

**SURVEY PRACTICE DIRECTIONS 2003 – SURVEYS WITHIN
COORDINATED SURVEY AREAS**

PART 1 – PRELIMINARY

1. Title

These Directions may be referred to as the Survey Practice Directions 2003 – Surveys Within Coordinated Survey Areas.

2. Definitions

In these Directions, unless the contrary intention appears –

"CRM" means a coordinated reference mark in a CSA, being a tertiary level geodetic mark, approved and registered by the Surveyor-General, with geographical coordinate values in the approved geodetic datum;

"CSA" means a coordinated survey area declared under the Act;

"geographical coordinate values" mean latitude and longitude in approved geodetic datum;

"GNSS" means equipment that operates in a global navigation satellite system;

"surveyor" means a surveyor licensed under the Act;

"true mid bearing" is the true bearing of a survey line at a point midway along the survey line.

3. Supervision

A surveyor who carries out a survey must ensure that he or she oversees and directs the survey work to ensure that the survey is carried out in accordance with these Directions.

PART 2 – SURVEY PRACTICE

4. Standardisation of instruments

(1) A surveyor must ensure that equipment used by the surveyor or by persons employed under the surveyor's supervision is correctly adjusted, correctly standardised and correctly calibrated before use.

(2) A surveyor must, every 12 months, verify distance-measuring equipment, including GNSS, against a standard acceptable to, and in a manner approved by, the Surveyor-General.

5. Datum marks for cadastral surveys

A surveyor must ensure that a datum between –

- (a) a minimum of 3 CRMs or 3 geodetic control marks of higher accuracy; or
- (b) 2 CRMs that have been validated by 2 recovery reference marks, or 2 geodetic control marks of higher accuracy that have been validated by 2 recovery reference marks,

is adopted on every survey and that sufficient work is carried out to confirm that the marks are in their original purported positions.

6. Datum marks for establishing new CRMs

- (1) A surveyor must ensure that a minimum of –
 - (a) 3 CRMs; or
 - (b) 3 geodetic control marks of higher accuracy,

are used as datum stations for the establishment of new CRMs.

(2) A surveyor must ensure that suitable survey techniques are used to ensure the accuracy requirements specified in clause 27 are achieved for CRM surveys.

7. Comparisons between CRMs

If a surveyor or a person employed under the surveyor's supervision determines that the geographical coordinates of existing CRMs or geodetic control marks of a higher accuracy are different from the approved and registered geographical coordinates by more than the limit set out in clause 28, the surveyor must –

- (a) ensure the measurement is confirmed; and
- (b) advise the Surveyor-General of the discrepancy and resolution in accordance with clause 38(b).

8. Isolated surveys

If there are insufficient CRMs to enable the establishment of datum and coordinates for a parcel, the datum and coordinates for the parcel may be established by an alternative method that is approved by the Surveyor-General.

PART 3 – ESTABLISHMENT OF BOUNDARIES

9. Adoption of boundary coordinates or existing marking

- (1) A surveyor must adopt for the resurvey of existing boundaries the boundaries defined by the registered geographical coordinates.
- (2) However, if an existing survey mark is found and the mark –
 - (a) is within survey tolerances – the surveyor may adopt that mark to represent the coordinates; or
 - (b) is outside survey tolerances and evidence is available to indicate that the registered geographical coordinates may be in error – the surveyor must –
 - (i) confirm the measurements;
 - (ii) record the findings; and
 - (iii) as soon as practicable advise the Surveyor-General of the discrepancy and resolution in accordance with clause 38(b).

10. Remarking

A surveyor must ensure that a boundary that is resurveyed is marked in the same manner as a new boundary but does not require survey of new CRMs.

PART 4 – BOUNDARY MARKING

Division 1 – General

11. Survey marks

- (1) A surveyor must ensure that a survey mark is constructed of concrete, steel or hardwood or another material that will resist destruction by fire, decay and termites.
- (2) A surveyor must ensure that a survey mark is in the form of –
 - (a) a peg – being a white-painted, flat-topped mark not less than 50 mm square and 350 mm in length;
 - (b) a steel peg – being a white-painted, steel star dropper not less than 600 mm in length;
 - (c) a post – being a white-painted mark (that, if it is made of wood, is pointed on top), not less than 100 mm square and 750 mm long, sunk at least 450 mm into the ground;

- (d) a witness mark – being a white-painted, steel star dropper not less than 1600 mm long, driven not less than 400 mm into the ground; or
- (e) another mark that is approved by the Board from time to time.

12. Parcel numbers on survey marks

(1) A surveyor must ensure that a peg or post is clearly and durably marked with –

- (a) the lot, portion or section number of the parcel being surveyed; and
- (b) the lot, portion or section number of the adjoining parcels.

(2) A surveyor must ensure that if a survey mark defines the boundary of a road, the letter "R" is used as a distinguishing mark.

(3) A surveyor or a person employed under the surveyor's supervision may mark –

- (a) a post – by cutting the numbers into it or by stamping the numbers onto a metal tag of not less than 1 mm thickness and attaching the tag firmly to the post; or
- (b) a peg – by stamping the numbers onto a metal tag of not less than 1 mm thickness and attaching the tag firmly to the peg.

13. Unique numbering on long line surveys

(1) A surveyor must ensure that, on long line surveys, each peg, concrete block or post is clearly and durably marked with a unique consecutive number.

(2) A surveyor must ensure that the unique number on the survey mark is marked by –

- (a) stamping the number onto the concrete block or the post; or
- (b) stamping the number onto a metal tag of not less than 1 mm thickness and attaching the tag firmly to the peg, the concrete block or the post or adjacent to the mark.

14. Finders

(1) A surveyor must ensure that, at each peg or post in an urban area, a finder that is –

- (a) a white-painted fence spacer; or

- (b) a white-painted, 25 mm by 25 mm wooden stake not less than 900 mm long,

is driven firmly into the ground.

(2) A surveyor must ensure that a witness marker is placed at each peg or post in a rural area.

15. Non-compliance with boundary marking

(1) A surveyor or a person employed under the surveyor's supervision may, during a survey, only mark boundaries otherwise than in accordance with a clause in this Part if the Surveyor-General approves the marking before the survey begins.

(2) A surveyor may apply to the Surveyor-General for approval to mark boundaries otherwise than in accordance with a clause in this Part by lodging with the Surveyor-General an application that –

- (a) describes the manner in which it is proposed to mark the boundaries; and
- (b) states why the manner in which it is proposed to mark the boundaries ought to be approved for use instead of the markings specified in a clause in this Part.

Division 2 – Marking in urban areas

16. Marking angles and bends

A surveyor must ensure that, in an urban area, each angle, bend or corner of a section, portion or lot is marked according to its area as follows:

- (a) if the area of the section, portion or lot is not more than 1 hectare – by a peg;
- (b) if the area of the section, portion or lot is not more than 10 ha – by a peg or a steel peg;
- (c) if the area of the section, portion or lot is more than 10 ha – by a post, or by a steel peg and a witness mark.

17. Intermediate marks

A surveyor must ensure that intermediate pegs or steel pegs are placed on all boundary lines so as to ensure that the distance between marks is not more than 100 m.

Division 3 – Marking in rural areas

18. Marking angles and bends

A surveyor must ensure that, in rural areas, each angle, bend or corner of a portion, section or lot is –

- (a) if the area of the portion, section or lot is not more than 10 ha – marked by a peg or a steel peg; or
- (b) if the area of the portion, section or lot is more than 10 ha – marked by a post, or by a steel peg and a witness mark.

19. Intermediate marks

(1) A surveyor must ensure that intermediate pegs or steel pegs are placed on all boundary lines at intervals of not more than 500 m.

(2) A surveyor must ensure that if the length of a single boundary line is more than 3 km, marks consisting of a post, or of a steel peg and a witness mark, are placed at or near intervals of 2 km.

20. Parallels of latitude

A surveyor must ensure that a boundary described as a parallel of latitude is marked in a series of chords not more than 10 km long.

21. Boundary indicators

If a boundary mark is not visible from the next adjoining boundary mark on a boundary line, a surveyor must ensure that a witness mark is placed on the boundary line at a distance of not less than 20 m from each bend, corner or intermediate mark.

PART 5 – COORDINATED REFERENCE MARKS

22. CRM marking

(1) A surveyor must ensure that a CRM is constructed of a material that will resist destruction by fire, decay and termites.

(2) A surveyor must ensure that a CRM is in the form of –

- (a) a brass plaque, stamped with the unique CRM number, that is –
 - (i) centrally set in situ on the surface of a concrete block that is precast or in situ and that has a reinforced concrete frustrum that consist of –

- (A) if the block is set in stable ground – a truncated pyramid or cone the minimum dimensions of which are 200 mm diameter at the top, 300 mm diameter at the base and 450 mm deep; or
 - (B) if the block is set in unstable ground – a cylindrical shape the minimum dimensions of which are 200 mm diameter and 700 mm deep; or
- (ii) securely affixed to an existing, stable, concrete structure;
- (b) an existing concrete block, post or a drill hole with wings in a substantial concrete structure that is able to be stamped or have affixed to it an identification tag marked with the unique CRM number; or
 - (c) another mark approved by the Surveyor-General from time to time.
- (3) A surveyor is to ensure that, if practical, a warning tag affixed to a witness marker or other substantial structure is placed adjacent to the CRM.

23. Unique numbering of CRMs

(1) A surveyor must ensure that each CRM is clearly and durably marked with a unique number in accordance with this clause.

- (2) The unique number is to consist of –
 - (a) a maximum of 10 uppercase alpha/numeric characters; and
 - (b) a combination of the survey number allocated by the Surveyor-General and a number for the mark being placed.

Example: S01064125 would uniquely describe a CRM placed for survey S2001/64.

- (3) A surveyor must ensure that the unique number on the survey marks is marked by –
- (a) stamping the number onto the brass plaque, concrete block or post; or
 - (b) stamping the number onto a metal tag of not less than 1 mm thickness and attaching the tag firmly to the concrete block or post or adjacent to the drill hole.

24. CRM recoveries

(1) A surveyor must ensure that measurement is made to a minimum of 2 recovery marks for each CRM.

(2) A surveyor must ensure that the recovery marks are at a distance no greater than 20 m from the CRM.

(3) A surveyor must ensure that the recovery marks are at locations where the likelihood of disturbance or destruction is kept to a minimum.

(4) A surveyor must ensure that the recovery marks consist of –

(a) a new or existing spike – being a steel or iron spike, not less than 8 mm in diameter and not less than 200 mm long, driven flush into a paved surface, where practicable, or driven not less than 150 mm below an unpaved surface;

(b) a new or existing drill hole – being a hole, not less than 5 mm in diameter and not less than 10 mm deep, drilled into a kerb or other substantial structure and having wings not less than 50 mm long cut on either side of the hole to indicate its position; or

(c) another mark approved by the Surveyor-General from time to time.

25. CRM density

(1) A surveyor must ensure that in urban areas CRMs are placed at intervals of not more than 200 m and at road intersections.

(2) A surveyor must ensure that in rural areas CRMs are placed at intervals of not more than 1 000 m and at road intersections.

(3) A surveyor must ensure that in pastoral areas CRMs are placed at a density, or at a location, prescribed by the Surveyor-General from time to time.

PART 6 – ACCURACY OF SURVEYS

26. Cadastral surveys

A surveyor must ensure that all survey marks placed relative to the nearest datum mark and to the adjoining survey marks are positioned within an error circle whose radius is determined by the following formula:

$$r = 2.45 \times 30(d + 0.2)$$

where "r" = length of maximum allowable radius in mm; and

"d" = distance in km to either the nearest datum mark or adjoining survey marks.

27. CRM surveys

A surveyor must ensure that all CRMs placed relative to both the nearest datum mark and to adjoining CRMs are positioned within an error circle whose radius is determined by the following formula:

$$r = 2.45 \times 15(d + 0.2)$$

where "r" = length of maximum allowable radius in mm; and

"d" = distance in km to either the nearest datum mark or adjoining CRMs.

PART 7 – FIELD NOTES, SURVEY DATA AND REPORTS

Division 1 – General

28. Abstract field notes

(1) A surveyor must lodge with the Surveyor-General an abstract of the original field notes for each survey.

(2) A surveyor must ensure that the abstract of the field notes –

(a) is lodged in either digital or paper form;

(b) is neat, precise and legible;

(c) summarises all survey measurements, observations and adoptions;

(d) indicates the position of –

(i) all watercourses, whether permanent or not, that cross parcel boundaries;

(ii) all ridges that cross parcel boundaries; and

(iii) all other relevant topographic features that cross parcel boundaries; and

(e) describes and shows offsets to substantial improvements or occupations within 1 m of boundaries.

Division 2 – Lodgement

35. New survey plans

A surveyor must, when submitting a survey for approval, lodge with the Surveyor-General, in the format prescribed by the Surveyor-General –

- (a) parcel boundary information that includes –
 - (i) the parcel numbers;
 - (ii) geographical coordinate values of parcel corners;
 - (iii) a sequence string defining the points forming the parcel corners;
 - (iv) the type of survey marks placed and their unique survey mark numbers (if a long line survey) in accordance with clause 13; and
 - (v) for abutting parcels – the existing parcel numbers;
- (b) a list of the parcel numbers and their title area;
- (c) the consents, given by proprietors of registered interests in the parcel, to the subdivision and to subdivision applications to the Registrar-General for new titles; and
- (d) the following certification by the surveyor that the parcels have been marked and data lodged in accordance with these Directions:

"SURVEYOR'S CERTIFICATE

I,, certify that the survey represented by the attached survey plan was carried out by me and/or under my supervision and was completed on and that this survey has been executed in accordance with the *Licensed Surveyors Act* and the Directions under the Act.

.....

.....

Licensed Surveyor

Date".

- (b) any discrepancies found that are outside accuracy limits and how they were resolved;
- (c) if the Surveyor-General requires them to be provided – additional field notes or survey data, relating to the discrepancy, for examination or investigation;
- (d) easement requirements that were investigated;
- (e) occupations that are within 1 m of the boundary or parcel corner;
- (f) how areas were obtained; and
- (g) a sketch showing the relative positioning of the parcels.

39. Non-compliance with directions

A plan of survey submitted under section 49 of the Act is not correct for the purposes of that section unless –

- (a) it is prepared, and the survey as a result of which it was prepared, was carried out in accordance with these Directions;
- (b) the Surveyor-General is satisfied that there are good and sufficient reasons for accepting it as correct although the survey as a result of which it was prepared was not carried out in accordance with these Directions; or
- (c) the surveyor has applied for and received, before the survey, permission from the Surveyor-General to perform the survey in a manner not in accordance with these Directions.
