



Large scale land development surveys

Procedure

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Version History

Version	Date	Description/Comments
1.00	7/11/2016	Document created.
1.01	21/6/2017	Expanded explanation on procedure requirements.

Approval

Position	Name	Date
Director, Cadastral and Geodetic Services	Russell Priebbenow	21/6/2017



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1 Purpose

This procedure sets out the processes to be undertaken in using Standard 3.22 *Large scale land development surveys* of the Cadastral Survey Requirements (v7.1) for land developments that are planned and executed using an integrated survey approach based on a coordinate framework connected to the State control survey.

2 Procedure

Standard 3.22 *Large scale land development surveys* can be utilised by a surveyor for any standard format survey that meets the requirements of Standard 3.22. A surveyor can choose to use the standard where he/she considers that the use would be advantageous to the proposed land development, i.e. its use is not mandatory. A surveyor's accreditation status does not have any impact on whether the standard can be used on a proposed land development.

A standard subdivision plan usually connects to datum, subdivides the lot and records the survey marks placed on the single survey plan. A development undertaken utilising Standard 3.22 becomes a package of surveying work with the integration of the coordinate framework flowing from the initial surround survey, through the subdivision stages that assign values to each corner, through to the IS plan that records the survey marks placed at those corners. This package of survey work creates separate survey plans under Standard 3.22 that would normally be represented by the single or standard stage subdivision plan. As these normally combined actions are contained on separate survey plans, it is important that both surveyors and DNRM treat these plans as a package throughout the depositing/lodgement process.

Applying to DNRM

Application to DNRM is by way of written correspondence (letter or email to the local WFSURV email address, attention to the DNRM Senior Surveyor), requesting that a proposed land development be conducted using Standard 3.22. Where a surveying firm has a level of experience and/or confidence in meeting the datum connection requirements, a suitably connected resurvey or identification survey plan may be submitted for review with the application. The application will contain the following information:

- how the development meets the criteria of Standard 3.22.
- the location and extent of the development. This may take the form of an indicative map of the lots affected, e.g. kml file highlighting all lots to be subdivided by the overall development.
- any 'concept' plans of the development.
- how the surrounds of the entire development will be defined, i.e. by plan of resurvey or identification survey; (or, include the resurvey or identification survey plan where it has already been completed).
- how the connection to the state control survey (datum) is intended to be performed, e.g. traverse or GNSS, network design showing control stations, number of receivers, observation duration, etc.

Approval from DNRM

The DNRM Senior Surveyor will forward the application to the Manager of Geodesy and Positioning. Discussions will occur between the surveyor, the DNRM Senior Surveyor and the Manager of Geodesy and Positioning (or their representatives) to identify existing datum PSMs and/or CORS,

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suitability of connection design, suitability of new PSM placement, etc with regard to the particular development.

These discussions should address all the issues surrounding datum connection. In conjunction with the DNRM Senior Surveyor, the Manager of Geodesy and Positioning will advise the Director of Surveys when these discussions have been finalised. Formal approval of the application of Standard 3.22 for the development is given by the Chief Executive, through the Director of Surveys, in writing to the surveyor, stating any conditions which apply to the approval. A copy of the approval will be forwarded to the DNRM Senior Surveyor for inclusion in the relevant surveyor's survey auditing email folder and will be stored in the Large scale land development folder in SurvProg [\[\\SURVPROG\\Surveyors\\CHECKLISTS FORMS STANDARDS ACTS REGULATIONS\\Large Scale Land Developments \(CSR 3.22\)\\Approved developments\]](#).

Initial surround plan

One of the requirements of the application of this standard is that the surrounds of the entire development must be surveyed and coordinates determined for all corners with a survey uncertainty of <15mm for horizontal position. PSMs are integral to this outcome as the surround survey will establish and/or connect to datum PSMs (showing those datum coordinates on the surround survey plan), and they will be used for propagating coordinates on all subsequent surveys in the development. Prior to finalising the surround survey DP or IS, it may be necessary for the surveyor to submit their observation data to the Manager of Geodesy and Positioning so that the observed network can be adjusted by DNRM in order for datum coordinates to be established on PSMs that are integral to the development and connected to the surround survey. The specifics of this process will be decided during the discussions surrounding the datum connection.

The surround survey (DP or IS) that connects to datum at the required accuracies must be fully examined by the department to ensure the surround meets very high levels of cadastral and geodetic integrity.

The DP or IS is deposited via email to the local WFSURV email address, attention to the DNRM Senior Surveyor. The email is to include:

- plan (as pdf)
- reinstatement report (either on the plan or in field records)
- field records (as pdf) which includes MGA 94 coordinates determined on all corners of the surround survey
- digital file (e.g. dxf or dwg) of the surround survey with the surveyed MGA coordinates on all corners (to be used to upgrade and lockdown the surround in the DCDB)
- observation data from datum connection and Form 6's for any new or updated PSMs (if not already provided)
- if the plan is only of the surround and does not create any final lots (i.e. does not include any first stage lots), the statement on face of the plan must not bear the 3.22 annotation "In accordance with Standard 3.22 corners have not been marked ..." as the surround survey must be fully marked, but instead must bear an annotation along these lines "This survey is for the purposes of Standard 3.22".

The DNRM Senior Surveyor will undertake an examination of the deposited DP or IS utilising the basic assessment checklist in accordance with *SIG/2013/565 Survey Plan Processing & Pre-Lodgement Advice*. The Senior Surveyor will:

- refer to the approval in the Large scale land development folder in SurvProg [\[\\SURVPROG\\Surveyors\\CHECKLISTS FORMS STANDARDS ACTS REGULATIONS\\Large Scale Land Developments \(CSR 3.22\)\\Approved developments\]](#)
- note the DP or IS in CISP as a “Large scale land development survey”
- examine the plan for full reinstatement
- check the datum connection by comparing the bearing and distance at terrain height determined from the datum coordinates to the plan dimensions between the datum marks
- check that the meridian of the plan has been determined from the datum connection
- check the coordinate values provided for the corners of the surrounds

Once satisfied, the Senior Surveyor will pass the DP or IS in CISP (for IS plans, put “Passed for the purposes of Standard 3.22” in the Permanent comments field). The Senior Surveyor will then forward the digital file, any field records and any Form 6’s to the CadastralAdminDataHelp email address for action. If observation data has been submitted, this is to be forwarded to the GeodeticSupport email address.

Stage plans

As the subdivision plan for each stage of the development is completed, it is to be submitted to the department, as a DP or SP, in the normal manner, i.e. via email to the local WFSURV email address, but highlighting that the DP or SP plan is part of a specific package of survey plans under Standard 3.22. The email is to include:

- plan (as pdf)
- reinstatement report (either on the plan or in field records)
- field records (as pdf) which includes coordinates determined on all corners of the survey
- digital file (e.g. dxf or dwg) of the survey with the surveyed MGA coordinates on all corners
- any further observation data from datum connection and Form 6’s for any new or updated PSMs (if not already provided)¹
- each stage plan must contain the statement on face regarding corners not being marked with reference to the subsequent IS plan, i.e. “In accordance with Standard 3.22, corners have not been marked. For corner marks and reference marks see ...”.

The DNRM Surveyor will undertake an examination of the deposited DP or IS in accordance with *SIG/2013/565 Survey Plan Processing & Pre-Lodgement Advice* (referring to the approval and surround survey in the Large scale land development folder in SurvProg [\[\\SURVPROG\\Surveyors\\CHECKLISTS FORMS STANDARDS ACTS REGULATIONS\\Large Scale Land Developments \(CSR 3.22\)\\Approved developments\]](#)). The DNRM Surveyor will then forward the digital file, any field records and any Form 6’s to the CadastralAdminDataHelp email address for action.

Marking of stages

As the standard allows the plan of subdivision to be submitted and registered without the lot corners being marked, it is imperative that the subsequent IS plan showing the corner and reference marks placed following the registration of the subdivision plan be submitted to the department in a timely manner, so that other surveys that are conducted on the land have the information available to them.

¹ Stage plans should propagate the coordinates as shown on the original surround survey even if datum coordinates on the surround survey PSMs have changed over time in the Survey Control Register. A statement under the coordinate table is needed to show the adjustment name and date for the datum PSMs coordinates used.

Standard 3.21.1 requires the identification survey plan to be deposited within 60 business days of the registration of the plan. However, where the IS plan is for the marking of a stage under Standard 3.22, the IS plan must be deposited by the time the subdivision is 'on maintenance'.

Surveyors should ensure that reference marks are placed in locations that provide long-standing evidence of the survey (see Standard 3.23.2 and Guideline 3.23.7.4) – i.e. stable locations and a variety of mark types. The number, position and type of reference marks placed need to be in keeping with the need to propagate high quality coordinates throughout these developments. This necessitates that there be a significant density of PSMs throughout the development, nominally at a density of every 250m, which would create a typical density of two new PSMs for every 100 residential lots. (See the Qld Globe extract below for a typical PSM spacing of a large scale land development in the Capestone area). Coordinates must be determined for these stage PSMs with a survey uncertainty of <15mm for horizontal position and shown on the IS in a coordinates table².


As the marking for each stage of the development is completed, the corresponding IS plan is to be submitted to the department in the normal manner, i.e. via email to the WFSURV email address and original plan delivered or mailed to a departmental office, but highlighting that the IS plan is part of a specific package of survey plans under Standard 3.22. The email is to include:

- plan (as pdf or CIF)
- field records (as pdf or CIF) which includes evidence verifying the position of all corner marks placed on the survey and the independent connection to datum for at least two corner marks³,
- any observation data from the datum connection verification and Form 6's for any new or updated PSMs (if not already provided)

² For large scale developments, all PSMs installed (including during the marking of the stage) are required to have coordinates determined with a SU of <15mm. This is in keeping with the integrated coordinate approach to large scale land developments as it enables coordinates to be propagated from those PSMs to the lot corners with a SU of <15mm.

³ The requirement for evidence verifying the position of each corner mark placed is seeking to have information submitted that demonstrates that each peg is actually placed where the SP purports those pegs to be. The SP shows the proposed position of those pegs, the IS shows the actual position of the peg as placed in the ground. Even though coordinates are propagated onto each corner in the development, courts still consider the evidence of the corner to be the mark on the ground. Therefore we need direct evidence that the actual peg is where it was proposed to be. The requirement is not prescriptive as to what form that evidence may take. Replicating the coordinate values as submitted with the stage plan does not constitute verifying evidence. It is acceptable to describe the methodology and accuracy levels achieved in verifying the position of the marks.

Separately, the requirement to show connection to datum from at least two corner marks is to provide an independent check on the overall coordinate framework assigned on the SP. There are instances where the independent check has found processing errors that carried through to the assigned lot corner coordinates. These connections should be conducted using AUSPOS, with a minimum 4 hours observation time, to enable the detection of processing, systematic or gross errors. The actual results of the independent connection to datum for at least two corner marks must be included in the field records.

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- where surveyors elect to submit a modified version of the SP⁴ as the subsequent IS (to record placement of marks):
 - the IS must no longer bear the 3.22 annotation “In accordance with Standard 3.22, corners have not been marked ...” and instead must bear an annotation along the lines of “In accordance with Standard 3.22, this plan records the placement of additional corner and reference marks following the completion of SP#####”
 - it is acceptable for large stage plans to use a statement similar to ‘Peg placed at all new subject corners after the registration of SP##### unless shown otherwise’. This statement is in keeping with the accepted practice of on-face statements for marks at new corners (Guideline 9.15.2.2), and therefore can be considered as satisfying the form of the statement requirement under Standard 3.21.1.

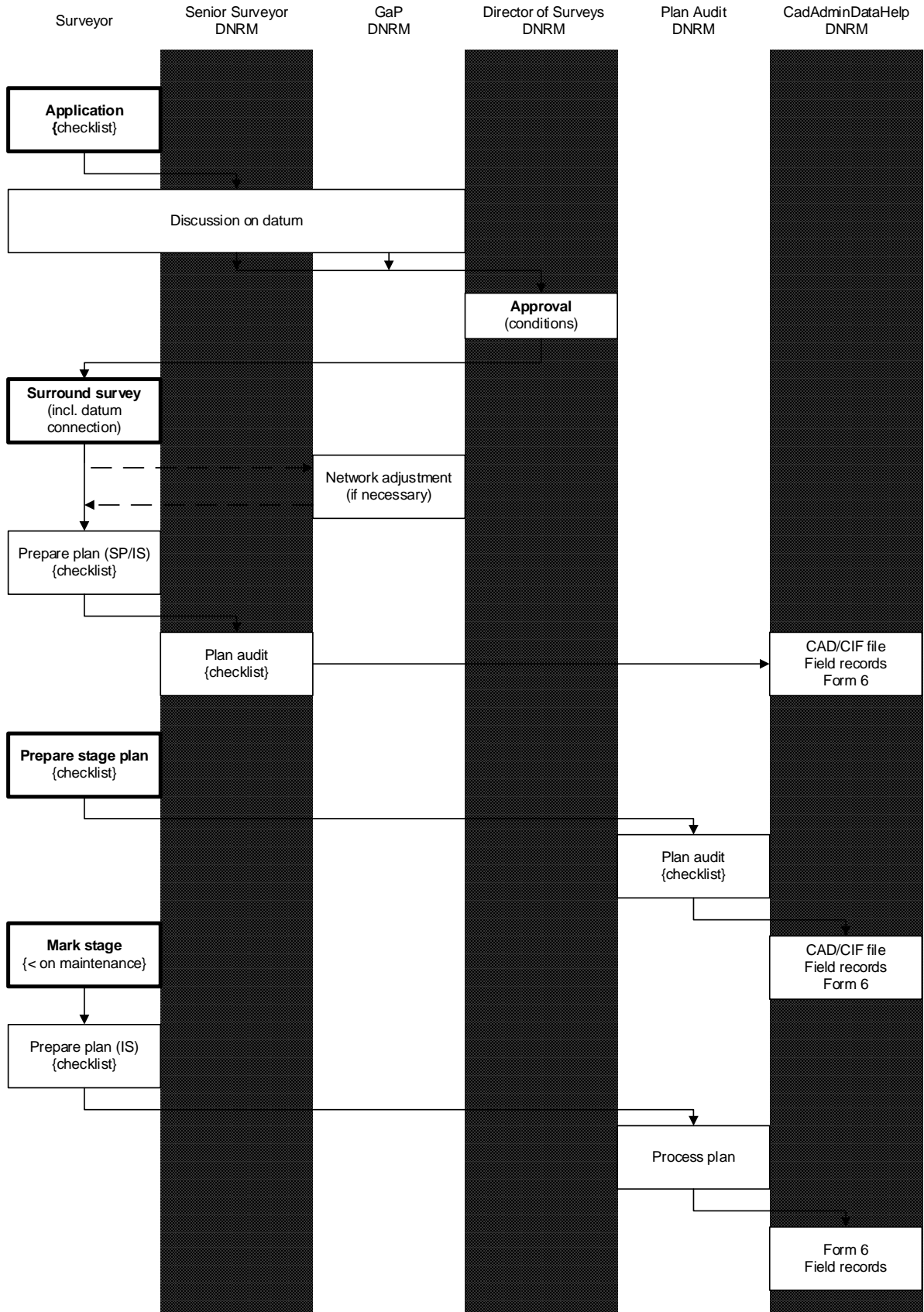
The DNRM Survey Assessors will process the deposited IS in accordance with *SIG/2013/565 Survey Plan Processing & Pre-Lodgement Advice*. The DNRM Survey Assessor will then forward any field records and any Form 6’s to the CadastralAdminDataHelp email address for action. If observation data has been submitted, this is to be forwarded to the GeodeticSupport email address.

⁴ The requirement in Standard 3.21.1 to rule through the original Form 13 and place a new Form 13 on the plan is to cater for those cases where the IS plan is an annotation of a copy (photocopy) of the original registered plan. Where surveyors are drafting a fresh plan using the original data, then the resulting IS plan is not an annotated copy, and would therefore have a new Form 13 on the IS plan.

Image 1 – Qld Globe extract



PROCESS FOR LARGE SCALE LAND DEVELOPMENT SURVEYS





3 Responsibilities

Cadastral Surveyors shall be responsible for:

- choosing which land developments to seek application to apply the standard to
- performing the surveys, including connecting to datum, and submitting the required plans and information in accordance with this procedure and the relevant standards
- marking of lots, and placement of reference marks, in accordance with the relevant standards and in a timely manner.

DNRM Senior Surveyors shall be responsible for:

- liaising with the surveyor on survey requirements
- liaising with the Manager of Geodesy and Positioning (or their representatives) on geodetic survey requirements
- examining and processing submitted plans in accordance with this procedure and the relevant standards.

Department Survey Assessors shall be responsible for:

- processing survey plans deposited/lodged with the department in accordance with *SIG/2013/565 Survey Plan Processing & Pre-Lodgement Advice*.

4 Definitions

Department - The department responsible for administering the *Survey and Mapping Infrastructure Act 2003*.

Deposited - A survey plan and/or associated records submitted to the department in accordance with *SIG/2013/565 Survey Plan Processing & Pre-Lodgement Advice*.

Director of Surveys – The director within the Land & Spatial Information Group of DNRM who holds delegations for surveying matters from the Chief Executive of the department.

Identification Survey or IS – A cadastral survey performed to identify the existing boundaries of land, with the plan deposited with the department.

Plan - A record of a cadastral survey prepared on Form 21 or Form 38 (*Land Title Regulations 1994*).

Senior Surveyor – Includes Senior Surveyors, Principal Surveyors or other senior surveying operatives of the department.

5 References

Cadastral Survey Requirements

www.business.qld.gov.au/industry/titles-property-construction/surveying/standards-forms

Registrar of Titles Directions for the Preparation of Plans

www.business.qld.gov.au/industry/titles-property-construction/titles-property/survey-plan-requirements/registrars-titles-plans



SIG/2013/565 Survey Plan Processing & Pre-Lodgement Advice
www.dnrm.qld.gov.au/?a=109113:policy_registry/survey-plan-processing.pdf

6 Legislation

Surveyors Act 2003

Surveyors Regulation 2014

Survey and Mapping Infrastructure Act 2003

Survey and Mapping Infrastructure Regulation 2014

Land Act 1994