ANZLIC COMMITTEE ON SURVEYING & MAPPING

Standard for the Accuracy of Spatial Cadastres in Australia and New Zealand

Version 1.0

Intergovernmental Committee on Surveying and Mapping (ICSM)

Cadastre Working Group (CWG)

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Document History

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Terms and definitions

For the purpose of this Standard, the following terms and definitions shall apply:[1]

Term/Acronym	Definition
Accuracy	The level of closeness of an estimated value – measured or computed – of a quantity to its true or accepted value[2].
ABS	Australian Bureau of Statistics
CBD	Central Business District. In this Standard, CBD includes major regional business and commercial centres. See Section 3.1
Datum	An official, fully-defined, spatial reference system or surface to which measurements and or coordinates upon the earth may be defined and related (ICSM – SP1).
ICSM	Intergovernmental Committee on Surveying and Mapping
ISO	International Organization for Standardization – a developer of voluntary International Standards (ICSM – SP1).
Marine Cadastre	The spatial extent of interests over, within or under a tidal water body that identifies a legal right, restriction and/or responsibility.
Peri-urban	Areas between urban and rural zones with large, predominately residential, blocks not primarily intended for agriculture. These areas include rural residential however, not all peri-urban areas are residential.
SA1 / SA2	Statistical Areas of geography. SA2 is a larger area comprising a number of SA1 areas. SA1 comprises a number of meshblocks (ABS).
Stats New Zealand (Stats NZ)	New Zealand Government statistics organisation.
Spatial Cadastre	The official jurisdictional spatial representation of cadastral parcels and their boundary points and lines. For further information refer to Cadastre Definitions Glossary: https://www.icsm.gov.au/sites/default/files/Cadastre%20definitions%20glossary-v1.0.pdf

[1] Note: Defined terms used in this Standard have their first letter capitalised.
[2] Note: Accuracy is qualitative and is not given a numerical quantity value

Term/Acronym	Definition
Uncertainty	In accordance with the GUM[3] meaning, uncertainty in this Standard means doubt about the validity of a measurement or result of a measurement (e.g. a coordinate). It is an indication of how wrong a value may be and is used in this Standard to quantify the level of quality of points in a spatial cadastre. Uncertainty is expressed as a standard deviation in the International System of Units (SI) expanded to the 95% confidence level (ICSM – SP1).
Uncertainty, Positional (PU)	The uncertainty of the horizontal and/or vertical coordinates of a point, parcel line or polygon in a spatial cadastre with respect to the defined datum and represents the combined uncertainty of the existing datum realisation and the spatial cadastre. A fully constrained least squares adjustment is the preferred and most rigorous way to estimate and test PU. PU is expressed in SI units at the 95% confidence level.
Uncertainty, Relative (RU)	The uncertainty between the horizontal coordinates of any two points in the spatial cadastre. Such marks may be connected by measurement directly or indirectly. The preferred and most rigorous means for deriving RU between pairs of points is by propagating the respective variances and co-variances obtained from a minimally or fully constrained least squares adjustment (i.e. from PU). RU can be expressed in SI units at the 95% confidence level, or in a proportional form such as a ratio of uncertainty per unit length or survey misclosure.

[3] GUM is the International Organization for Standardization (ISO) 'Guide to the expression of uncertainty in measurement' (ICSM – SP1)

1 About this Standard

1.1 Preface

This Standard establishes Australian and New Zealand targets and a reporting framework for the accuracy of the horizontal position of parcels within Spatial Cadastres.

The Standard also requires attributing Positional Uncertainty to points, lines and/or polygons within the Spatial Cadastre. Attribution is limited to the parcels and does not include 3D data and boundaries based on natural features such as creeks, tidal lines etc.

1.2 Introduction

The Spatial Cadastre is an important component of the Foundation Spatial Data Framework (FSDF). The FSDF represents current authoritative foundation spatial data. This Standard establishes acceptable Positional Uncertainty of the Spatial Cadastre in order to increase the confidence in, and usefulness of, the data.

The Spatial Cadastre does not provide a legal indication of the location of boundaries. The Positional Uncertainty attribution cannot be relied upon for critical decisions and does not replace the need for field survey.

1.3 Scope

The purpose of this Standard is to specify the requirements for the determination of horizontal uncertainty of parcel corners within Spatial Cadastres of Australia and New Zealand, including the Marine Cadastre. Vertical uncertainty of the Spatial Cadastre is not included at present. As Spatial Cadastres evolve to meet the requirements of the Cadastre 2034 vision (ICSM – Cadastre 2034), recommendations for vertical uncertainty will be considered.

1.4 Supporting Document

The *Supporting Document - Standard for the Accuracy of Spatial Cadastres in Australia and New Zealand* provides research material and logic used in the development of this Standard.

2 Positional Standards

2.1 Terminology

This Standard establishes Accuracy requirements for Spatial Cadastres, quantified as Positional Uncertainty.

Relative Uncertainty may also be identified by jurisdictions and be relevant for some users of spatial data. Maximum Relative Uncertainty requirements have not been included in this Standard.

2.2 Requirements

The table below identifies the required Positional Uncertainty for a Spatial Cadastre to comply with this Standard.

Zone	Standard
Central Business Districts (including regional centres)	0.05m
Urban, Peri-urban and industrial areas	0.20m
Rural areas	0.5m
Pastoral and remote areas (and Marine[4])	5m

Table 1: Recommended maximum horizontal Positional Uncertainty

3 Regional Definitions

3.1 Central Business Districts (CBD)

The Standard recommends Central Business Districts and Regional Centres be defined by ICSM Cadastral Working Group (CWG) members based on local knowledge and criteria. The areas selected may be delineated using SA1 or SA2 geographical areas.

3.2 Urban Areas

Urban Areas are defined in Australia by the ABS and in New Zealand by Stats NZ.

For the purpose of this Standard, this data may be used to determine the extent of urban areas excluding the areas of CBD defined in 3.1 above.

Urban areas are to include Peri-urban areas when data depicting these zones is available from ABS and/or Stats NZ.

[4] A spatially defined Marine Cadastre is expected to have, as a minimum, the same Positional Uncertainty as its adjacent zone. Where a Marine Cadastre has no adjacent zone, the minimum Positional Uncertainty required is that of Pastoral and Remote Areas.

3.3 Rural Areas

Rural areas are those areas outside urban areas and excluding remote areas.

3.4 Remote Areas

Remote areas may be delineated using ABS remoteness data for Australia and the Stats NZ data for New Zealand. In both cases, the Remote and Very Remote classifications may be relevant.

4 Recording Positional Uncertainty

4.1 Attributing Positional Uncertainty

With the exception of a natural feature, Positional Uncertainty is to be attributed to each point of the parcels within the Spatial Cadastre. Positional Uncertainty may also be attributed to parcel lines and polygons based on the point values.

Positional Uncertainty will be recorded as a single number expressed in metres at a 95% confidence interval. The term 'Horizontal Positional Uncertainty' shall be used to describe this value to distinguish it from Vertical Positional Uncertainty when attributed.

Relative Uncertainty may be recorded only when accompanied by Positional Uncertainty.

4.2 Natural Feature Boundaries

Positional Uncertainty of natural feature boundary points and lines is excluded from the requirements of this Standard.

4.3 Metadata

Spatial Cadastre metadata should refer to this Standard to clarify the use of Positional Uncertainty.

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