

# Subsurface Utility Engineering Standards Development



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*In 1991 the RTA formed a Utility Locations Unit in the Surveying Section to address the risk to the Authority in not knowing the precise location of underground public utilities. From that date, underground utilities have been surveyed during the design phase of a road project and again when road construction is about to commence. This enables the Authority to plan and cost the relocation of underground utilities, and also to provide assurance that underground utilities will not be struck during construction. The financial and OHS/WHs risks in this area of operation are very high.*

*In September 1999, the RTA won a NSW Excellence Award for its underground utility work, which was outlined in a submission called “Surveying Down Under”.*

*Acknowledgement both nationally and internationally of the importance of such work has led to a move for the development of an Australian Standard in this area.*

*Mark’s presentation today is on the development of an Australian Standard for the location and mapping of underground utilities, now called SUE – Subsurface Utility Engineering.*

## The Development of an Australian Standard in Subsurface Utility Engineering (SUE)

On 23 March 1977, the Institution of Surveyors NSW held a seminar on “The need for common standards in the recording and charting of underground services”. Its key recommendations recognised the need for:

- a central repository of work-as-executed plans,
- all mapping to be on coordinated grid system’
- common symbology
- standardised computer codes.

34 years later, we are about to commence work on these recommendations.

Admittedly, more vigorous action has been taken since a “wake-up call” on September 11, 2001. Asset owners now talk more about infrastructure protection, their vulnerabilities & risk and the value in accurate mapping and recording of their assets.

In 2006, the Surveying & Mapping Industry Council of New South Wales (SMIC) released an issues paper on ‘Underground Services Detection & Data’ (see [www.smicnsw.org.au](http://www.smicnsw.org.au)), recommending common accuracy standards for data capture of new or replaced underground utilities and as-built drawings to be lodged for new or replaced services. Also in 2006, RailCorp NSW supported its 2000 Australian Standard AS4799 *Installation of Underground Utility Services and Pipelines within Railway Boundaries* by publishing a Specification for the Collection of Services Data, specifying survey accurate 3D location for underground utilities.

In the following year, a GITA Workshop in Brisbane concluded that “*a national standard for recording the location of underground services is urgently required*” and “*critical infrastructure protection is a prime driver for recording the location of underground services*”.

In 2009, Main Roads Western Australia published Underground Utility Standard 67-08-121, based on the USA Standard ASCE 38-02. In the same year, the NSW Board of Surveying & Spatial Information (BOSSI) investigated current standards for recording underground services and made key recommendations concerning accuracy, absolute positioning, data capture methods, data quality, symbology and a common data exchange format.

At 9.30 pm on 15 September 2009, a contractor in the Sydney CBD accidentally cut through 10 Telstra fibre optic and copper cables. The final cost of the repair was \$800 million and resulted in an important change in State legislation. The cost of not knowing “where” was significant, and was a catalyst for the current work towards the development of an Australian Standard in the mapping and location of underground utility services.

SUE (Subsurface Utility Engineering) is an engineering process that combines surveying, civil engineering, geophysics and CADD/GIS. It provides more confidence in the reliability of data that defines the positional accuracy of underground public utility services. The SUE process has been incorporated in a USA Standard (known as ASCE 38-02) and a draft Standard in Canada. In the USA, a study sponsored by the US Federal Highway Administration (FHWA) found that approximately \$4.62 was saved in overall project costs for every \$1 spent on SUE.

Internationally, four quality levels have been adopted for the location and mapping of underground services:

- Level D: Document Search (eg Dial Before You Dig)
- Level C: Document Search *plus* investigation of surface features
- Level B: Document search, investigation of surfaces features *plus* using pipe and cable locators
- Level A: Document search, investigation of surfaces features, using pipe and cable locators *plus* confirmation by non-destructive digging (“pot-holing”).

An initial industry meeting was convened by Standards Australia on 10 May 2010, after representations from BOSSI, RTA and the private company Cardno. Some of the current encumbrances that need to be addressed by the proposed Standard are:

- Records of underground assets are incomplete and inconsistent.
- Current information from utility owners is of varying quality and accuracy.
- The position and significance of underground assets vary over time (“asset lifecycle”).
- Utility owners do not take responsibility for the accuracy of the information they provide.
- Not everyone can be accessed through DBYD.
- Lack of Interagency cooperation for infrastructure planning (placement, repair, renewal) – street openings.
- There is no standard approach to records sharing.
- Current locating technologies are not 100% effective.
- Significant variations in practices, approaches, attitudes and emphases.
- Ageing workforce and contracting out means “those who know” are no longer there.
- Some locators only mark services in the field and do not produce drawings.
- Lack of training and no education standards.

Commitments from various parties totalling \$70,000 to fund the development of the Standard have been raised. A Development Committee, comprised of national stakeholders, has been formed and includes representatives from Austroads, ALGA, ANZLIC, Australasian Railway Association, Roads Australia, Dial Before You Dig, Energy Networks Association, WSAA, IPWEA, NULCA, Australian Services Union, GITA, Streets Opening Conference, SSSI, University of New South Wales and the Heads of Workplace Safety Authorities. The committee first met on 21 March 2011, with Mark Gordon as Chair.

The work should take about 18 months to complete. Depending on the level of consensus within the Committee, the process should result in either a Guideline (at the very least) or an Australian Standard. The financial and OHS/WH&S benefits of such a Standard are immeasurable.