



# Safer construction: Working with underground utilities

## Background

Construction companies Abigroup and Leighton Joint Venture (ALJV) designed and constructed the Westlink M7 motorway (M7) in Sydney. This case study focuses on an integrated safety approach, featuring a combination of training and safety initiatives to work safely with underground utilities, particularly electrical and gas services. Construction commenced in 2003 and the M7 was open to traffic at the end of 2006.

ALJV conducted an extensive risk assessment before starting on the M7 project. Survey drawings, obtained from Dial Before You Dig, provided details on where utilities may be located. Pot-holing was subsequently used to ensure accurate location and identification of underground utilities. The location of utilities found was progressively recorded by ALJV on a map. Pot-holing involved thousands of work hours hand digging and water blasting holes to help prevent underground utilities being struck during construction.

## Safety approach

ALJV consulted service stakeholders such as Integral Energy (electricity), Agility (gas and electricity), and Duke Energy (gas) as well as their own engineers and safety personnel, to develop safety procedures for work with underground utilities. Collaboration between stakeholders and implementation of safety initiatives were key factors in delivering the project safely.

## Underground utilities safety initiative

**Training.** ALJV and Integral Energy combined their expertise to create a comprehensive underground electrical services training program for personnel onsite. Training used graphic real-life examples to emphasise the reality of the dangers of working with electricity.

Aspects of training included:

- an Electrical Safety for Construction Site Workers course;
- site inductions; and
- ALJV personnel, at Integral's invitation, attended the Integral safety course, traditionally only available to electrical contractors accredited to work on Integral utilities.

At ALJV's request, Integral also made supervisors available onsite to liaise with construction teams.

In addition to training and liaison, several specific safety initiatives were introduced to ensure worker safety, such as:

**De-energising.** High-risk electrical services were de-energised, where possible, during work on sites using methods including rerouting of the power supply to remove the risk of exposure while surrounding areas could receive power supply.

**Electronic detection of utilities.** Global Positioning System backpacks were developed enabling the latest survey data to be used onsite. This technology was coupled with electronic wands and pot-holing to locate underground utilities. Accurate location of utilities lowered the risk of accidentally striking underground utility services during excavation.

**Service identification.** Colour coded conduits were used to identify the type of service, location and depth to ensure hazard awareness. This highlighted services in key areas to reduce the risk of striking utilities.

**Permit to excavate.** These permits were developed by engineers and safety personnel. Each work crew was required to be in possession of a current permit before undertaking any excavation. The permits not only covered location but detailed who was responsible for managing the works.

Onsite training took place with personnel to ensure the work crew understood the details of the permit to excavate before excavation took place.

Safety coordinators ensured that all excavation work complied with the conditions of the permit to excavate and that permits were clearly understood by work crews. Safety coordinators were authorised to stop work if any aspect of the permit to excavate was not adhered to. Coordinators highlighted the importance of communicating safety messages between crews.

**Non-destructive digging.** Surface pegs detailing depth, type of service and position were used to identify the location of services to avoid digging in those areas. Spray paint was also used to mark the service location. Water blasting, hand digging and toothless buckets were used during excavation to prevent damage to underground utilities.

**Safety awareness reinforcement.** Banners, posters, stickers and signage were used extensively to reinforce procedures and identify hazards involved with underground utilities. For example, banners were hung at bridges near sites, showing messages such as 'Must have a permit to excavate' or the warning 'Power live'. Variable message boards, intended for users of the completed road, were utilised onsite to convey reminders of potential hazards. Each worker completed an ALJV electrical course and received a pocket-sized safety list about working with underground utilities. These safety messages reinforced the inherent risks to safety when working with underground utilities.

ALJV's safety approach, with its combination of collaboration, training and onsite safety initiatives, helped to create and sustain a safety culture during the construction of 40km of dual carriageway through urban Sydney.

Through extensive training, personnel had a raised awareness of the hazards and safety requirements when working with underground utilities. Most importantly, no fatalities or injuries from exposure to underground electrical utilities were sustained while undertaking this large and complicated project.

### About these case studies

The Australian Government is committed to improving the WHS standards for all workers on building and construction projects.

These case studies have been developed to share practical ideas that can be adopted by industry to assist in their own management of WHS issues.

The Federal Safety Commissioner consults widely with industry, WHS authorities and other relevant agencies to promote a cooperative approach to improving WHS performance.

The vision of the Federal Safety Commissioner is a building and construction industry where no one is harmed.

### For further information you can:

- visit the FSC website at [fsc.gov.au](http://fsc.gov.au)
- contact the FSC Assist Line on **1800 652 500**
- contact the OFSC via email at [ofsc@employment.gov.au](mailto:ofsc@employment.gov.au)

The Office of the Federal Safety Commissioner has prepared this case study to promote workplace health and safety (WHS) in the industry. When developing OHS initiatives, businesses and individuals should consider the circumstances and requirements particular to them and seek professional advice where required.

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