



A CRH COMPANY

Capital Metro Light Rail (Stage 1) - Case Study

STAKKAbox™ ULTIMA Hybrid

Industry Experts

STAKKAbox™ ULTIMA Hybrid: an innovative and sustainable access pit solution

The Canberra Light Rail Project, Capital Metro, marks the exciting transformation of the public transport system connecting Australia's Capital Territory (ACT). The overall project, including all future zones, will span over 20 years and be the largest infrastructure spend in the history of the ACT, estimated to reach \$939 million in total construction value.

Stage One (1) of the project is well underway, estimated to take two-years and includes the design and construction of a 12km light rail route spanning between the fast-growing northern corridor of Gungahlin to the City Centre. The first Light Rail Vehicle arrived in March 2018, with a total of 14 Light Rail Vehicles (LRV) each commuting 207 people across the 13-stop route. The light rail system is earmarked to drive growth within the region, increase tourism, alleviate road congestion, all whilst invigorating local businesses and the greater community.

To ensure the roll-out of the 21st Century service is completed as intended, Cubis were approached by Canberra Metro Construction to provide an innovative and sustainable solution for associated underground network access infrastructure. As the global leader of highly-engineered composite access pit and cover systems, Cubis' in-house design team developed the STAKKAbox™ ULTIMA Hybrid to meet the specific needs of the project.

A highly accelerated project schedule was required to ensure successful completion of works in preparation for Stage Two. The 12km construction site was divided into three zones, Northern, Southern and Depot, each overseen by a dedicated project management team. The site comprised of both inner city and suburban locations, resulting in a diverse range of installation environments and associated construction requirements.

Dimensional constraints varied between project stages due to the Light Rail design. Access pits accommodated multiple electrical (LV & HV) and communications cables vital to the successful delivery of the Light Rail network. Due to the high security and load capacities demanded by the project, guaranteeing complete safety, during and after installation, as well as ongoing asset protection was of utmost importance.

Traditional pit options could not meet all project requirements and therefore Cubis were approached due to their long proven history of providing high quality and specialised network access solutions.

Connecting Australia. 
through innovation, design & development.



CUBIS SYSTEMS SOLUTION

Product: STAKKAbox™ ULTIMA Hybrid
Load Rating: Class D
Internal Dimensions (mm): Cubis provided three standardised pit sizes;

(1) 3000L x 1500W x 1500D
(2) 5000L x 1500L x 1500D
(3) 3000L x 1500W x 2000D
Multiple additional custom Hybrid solutions were provided for the Depot site.

Access Cover: Modular three (3) and five (5) part precast concrete encasements

**In addition to the ULTIMA Hybrid, a number of Cubis precast concrete Scec pit and cover assemblies, including the C5, C2, 911 and 1500, were installed to protect the Light Rail communications network.*

Cubis' in-house project management and engineering departments worked closely with Canberra Metro Construction providing technical advice to overcome the extensive project HV service footprint constraints. With a highly accelerated schedule and facing dimensional restrictions, particularly between the track slabs, Cubis utilised the inherent benefits of the ULTIMA Connect system and custom engineered the STAKKAbox™ ULTIMA Hybrid.


The entire ULTIMA Hybrid assembly acted as an exoskeleton, consisting of an in-situ concrete base, the ULTIMA Connect pit system, ULTIMA beams and a three-part pre-cast concrete encasement replicating the modular structure of Cubis' STAKKAbox™ range.

The innovative design of the ULTIMA beams were engineered to deliver amplified lateral strength capabilities particularly for large access pits measuring two (2) meters and above. All ULTIMA Hybrid components were flat packed for delivery, therefore reducing freight and unloading costs. The lightweight

ULTIMA sections were rapidly installed onsite, enabling two (2) or more large custom pits to be fully assembled including all connections and backfill within one day by a small work crew. Modifications to the pits which accommodated the HV electrical conduits were easily completed using standard battery powered tools.

Some of the major project outcomes included simplicity and ease of installation, custom access pit systems with Class D load capabilities, secure asset protection, minimal traffic management and no specialist builders, backfills or heavy lifting machinery required. This resulted in a minimal labour intensive build, significantly reduced costs and the highest standard of health and safety compliance.

Undeniably, the STAKKAbox™ ULTIMA Hybrid pit system has set a new standard for the ultimate high strength underground network access solution industry-wide.



"It is one of the best innovative products which we have seen and I think we will be using more of this in Australia... Cubis STAKKAbox™ is the ultimate solution".

Kesh Prabhu, Project Engineer for Canberra Metro Construction

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Driven by Innovation

Cubis Systems is Australia's leading manufacturer and supplier of network access pits and cable protection solutions used in the construction of infrastructure networks for Rail, Telecoms, Water, Defence, Construction and Power markets.

Cubis has developed an innovative approach in an old-fashioned industry. This has been achieved by developing quality products which replace traditional construction materials, like bricks and concrete, with lightweight plastics incorporating intelligent design features. These can then be installed faster and ultimately save our customers both time and money.

Cubis manufactures its preformed network access pit systems STAKKAbox™, cable protection system RAILduct™, MULTIduct™ multiple duct system and various AX-S™ access covers at its manufacturing sites throughout the UK and Ireland these products are exported to more than 25 countries throughout the World. With additional manufacturing facilities located throughout Australia, Cubis provides customised, highly engineered underground access solutions including their robust precast concrete and MONObox™ access pits systems, developed in partnership with leading Authorities and Asset Owners.

At Cubis we pride ourselves on delivering technical customer support, new innovation, product quality and the highest levels of customer satisfaction.