



Art Storage Facility DANGROVE

Working in conjunction with renowned Sydney-based architects Tzannes, and builder Infinity Constructions, structural and façade engineers Taylor Thomson Whitting created a dramatic and beautiful structure to house the private art collection of a prominent Sydney-based philanthropist. Located in Alexandria, the warehouse provides 10,000m² of storage space, split over two levels.

The building delivers a state-of-the-art facility with a 100-year design life, designed to provide an exceptional opportunity for both staff and visitors to view and interact with the artworks. In a departure from traditional warehouses, the storage rooms in the facility have been designed not only to display artwork but to also host private events.

Overall Design Merit

Above the base structure are the standout features of the building. The Great Hall is a 90m long, 20m wide space, which soars in height from 8m at the lower end to 30m at the upper end. This spectacular steel-framed space is used for displaying, evaluating and curating artwork. The Great Hall utilises a mixture of steel portal frames, welded steel beams, universal column and beam sections, PFCs and hollow sections.

The use of structural steel is integral to the design philosophy and key to the success and aesthetics of the building. Around the perimeter of the Great Hall and throughout the building, steel is featured heavily, chosen for its aesthetics and beauty. Large steel reveals frame the 4m high entry doors, while 600mm high feature steel channels run around the full perimeter of the Great Hall, with large circular openings providing fresh air into the space.

To the east and west are steel framed and clad plant rooms while to the north of the site is the second standout feature of the building – a beautifully designed and crafted steel bowstring truss bridge linking both sides of the Great Hall. Internally, steel is a major feature for carpentry and cladding in the form of steel kitchen units, steel window and door reveals, and bespoke steel window mullions. The facility is designed to be energy efficient and has a low carbon footprint, with the intention that the building can be adaptively reused should it ever cease to function as a warehouse.

Design Innovation

The steel framing of the Great Hall is innovative in its aesthetics, lack of crossbracing and its ability to intelligently resolve many of the issues faced by art storage facilities, namely: water ingress,

temperature control, service distribution and the requirement for natural light while restricting the ingress of UV radiation.

The use of a steel-framed truss satisfies all these requirements. It does so by cladding each leg of the truss with a polycarbonate skin, utilising the natural depth of the truss to provide a primary and backup rain screen with thermal and noise separation. Additionally, the use of polycarbonate allows natural light to penetrate the space, while blocking out 99% of the sun's harmful UV rays that could otherwise damage the artwork being displayed.

Environmental Sustainability

From an environmental perspective, the use of steel was an important project requirement for Taylor Thomson Whitting. While concrete has a high embodied energy content, Australian steel has a much lower environmental footprint. Steel is also the most recycled material in the world. It can be melted down an unlimited number of times without resulting in degradation of the material, and approximately 90% of Australian steel is made up of recycled content.

Buildability

The position of the bolted splices was considered early in the design, with splices to the Great Hall portal frame trusses located at third points. To reduce fabrication costs, non-visible trusses were replaced with standard welded beam sections. Additionally, where possible, much of the fabrication was limited to the trusses to allow for incoming members to have simple connections and standard bolt arrangements.

PROJECT TEAM

Architect: Tzannes

Structural Engineer: Taylor Thomson Whitting

Head Building Contractor: Infinity Constructions Group

Steel Distributor / Manufacturer: Liberty

Steel Fabricator: DJD Fabrication

Steel Detailer: Van der Meer Consulting