



City gateway enlivened, Melbourne-style

Melbourne Airport T2 refurbishment

Australian steelwork has brought to life a grand re-imagining of Terminal 2 at Melbourne International Airport reflecting Melbourne's lively shop-laden laneways, retail palaces and exotic dining experiences befitting the city ranked the world's most liveable for the seventh consecutive year.

Project Leader from NH Architecture, **Sina Samiee** said his practice was engaged to design and document the upgrade of the existing airside retail in Terminal 2.

"The project creates new and renovated retail spaces within the existing building shell to maximise development potential and achieve appropriate market segmentation between luxury, convenience retail and food/beverage brands, whilst ensuring minimal impact to Airport operations during the two-year project," he said.

"During initial consultation with APAM, the leadership team were quite clear in their intentions for a uniquely Melbourne concept that would also resonate around the world as a premier visitor experience. The new pedestrian precincts reflect Melbourne's distinctive urban forms."

Mr Samiee said that the luxury retail arcade takes advantage of its existing double-height space to pay homage to Melbourne's historic shopping arcades with their magnificent ceilings and decorative floors. The Laneway precinct is to be fast-paced and condensed by comparison with the buzz of Melbourne's laneways, while the food offering is intended to showcase the best of Melbourne's restaurants with a selection of strategically located bars and cafes.

"Each zone is designed to have a distinct look and feel so to provide cohesion, we have used touches of gold throughout. This is most evident in the stunning gold ceiling of the T2 Luxury Precinct," he said.

Grand gold ceiling

The T2 luxury ceiling is supported by a complex but lightweight steel frame which sits on base building steel designed by WSP Structures.

"We needed to develop details to meet Melbourne Airport's highly specific requirements, for example the complex panels need to be easy to remove to access the above-ceiling services," Mr Samiee said.

A sliding installation system with secondary chain fixing has been designed to allow the panels to be uninstalled and reinstalled when necessary.

"Due to the panels' complex geometry there are numerous junctions and edges so tolerances were very tight," Mr Samiee said.

"To meet the demanding tolerances, SBS Group redesigned the light framing for metal profiles and utilised their new machinery to deliver the design efficiently so that the structural loading still sits within the accepted range."

He said that the main issue faced is the slab in part of the terminal which contains a heated screed so the structure is already under a lot of load.

"To support the ceiling, we needed a very strong, lightweight solution and steel was the only material that could meet those specifications," he said.

"Working with Melbourne Airport, the supplier, consultants and contractor, we are very pleased with the ability of the steel frame to meet complex, high-specification requirements."

Revitalised spaces

The luxury and extended areas comprise a series of large span portal steel frames to allow maximum tenant flexibility. In the luxury zone,

there are also service platforms, new catwalks and steel outriggers to help accommodate plant requirements for services and architectural feature ceilings and finishes.

Design Engineer at WSP Australia, **Tyrone Demetriou** said that portal frames were adopted to minimise the number of columns and braced bays to erect on the busy site.

"Individual tenancies were designed as isolated portal bays which allowed for adjacent works (or occupancies) to continue as each bay was erected, allowing for easy staging and quick construction turnaround," he said.

"Member splices were also required in the steelwork design to assist in transportation and construction/staging requirements onsite.

"As the loads are not significant on the steelwork, most of the members were sized for serviceability requirements, but one of the main reasons steel was adopted was due to the existing structure's limited spare capacity so all columns were placed in strategic locations to help avoid overloading the existing structure."

He said that given the sensitivity of the project, WSP (Building Services and Structures) and the architect produced 3D models and engaged in a level of BIM that allowed for advance coordination analysis.

"This allowed for full 3D coordination of the new tenancy works and assisted all to understand critical existing interfaces," Mr Demetriou said.

All design team members participated in 3D Coordination Clash Detection Analysis and subsequent Coordination Resolution Meetings.

"A big focus for the design team is to reduce any risk of retro works onsite with the aid of BIM design software and ensure that any risk items were fully identified to the builder at tendering," he said.

"Through developed stages of the project, we utilised the 3D models with our virtual reality (VR) setup to investigate and inspect steelwork prior to fabrication. The entire process, with the aid of BIM software, requires a high level of communication and conflict resolution from all design team members."

He said that one of the benefits of adopting steelwork is that its ease of construction (compared to concrete) allows for the removal and adjustment of areas without significant demolition works required.

"Given the dynamic nature of the Airport and its tenants, we were careful to adopt as many bolted connections as possible to allow for maximum flexibility. This also helped reduce the requirement for temporary work onsite."

On-time steelwork

Operations Manager at Structural Challenge, the main steel fabricator for the project, **Nick Mavrikos** said most of the erection was undertaken at night due to site restrictions from the existing terminal operating continuously throughout the refurbishment.

"The catwalks were modularised in frames to lessen time onsite which accommodated the tedious process of working with existing conditions which were not exposed until our 'Just in Time' (JIT) deliveries," he said.

"Restrictions due to wind and air traffic are always challenging when working at the Airport, but with careful planning and coordination, the structural steelwork for the Satellite Plant Platform has been installed with minimal issues."

"The satellite platform was perhaps the highlight of the project, where we utilised a 350-tonne crane to install 22 tonnes of plant framing.

"Close coordination with Lendlease and mechanical contractor, AE Smith ensured the platform was installed in one day, allowing mechanical plant and equipment to be loaded the same afternoon."

All up, the fabricator is supplying approximately 150 tonnes of structural steel, 2700 metres of purlins and 800 metres of handrail for the project.



The fabrication was programmed to meet JIT provisions for erection of the steelwork limited to four areas on the busy operating site; the satellite plant platform, high level catwalks, luxury retail framing and walkways, and laneway steelwork.

"The satellite plant platform was delivered JIT as there was only a short window to install from the tarmac using a 350-tonne crane," he said.

"The luxury retail framing and walkways steelwork was further split so that it did not overload the existing slab or clog up the area. We basically worked from the north and supplied a third of the steel to begin, with subsequent deliveries every five days."

Working closely with the detailers and consultants, the fabricator devised a concept to fully weld the walkway modules into standardised sections, ensuring that they could be installed quickly onsite. The laneway steelwork was the last stage but was delivered in its entirety as it was not overly large.

The satellite plant platform was galvanized and all other steelwork painted black.

Where possible the steelwork was processed using CNC beam/drill lines, both in-house at the fabricator workshop and at the steel supplier to ensure accuracy of holing and overall measurement of the steelwork.

The project is expected to be completed by early 2018.

PROJECT TEAM

Client: Australia Pacific Airports (Melbourne)

Builder: Lendlease

Architect: NHArchitecture

Structural Engineer: WSP Structures

ASI Steel Fabricator: Structural Challenge

Light Steel Frame (luxury ceiling): SBS Group

Shop Detailer: Steelone Drafting

Processed Steel Supply: Metalform Structures, Rhino Grating

Erection: Sventek Steel Constructions

Hot-Dip Galvanizing: Kingfield Galvanizing

ASI Steel Distributor: Surdex Steel

ASI Steel Manufacturers: BlueScope, Liberty OneSteel