



ARCHITECTURAL MERIT

Regattas has been part of the Adelaide Convention Centre since 2000, but was housed within the main exhibition hall building. The project moved Regattas out of the existing facility into its own feature stand-alone two level building. The brief was to design a facility which:

- Had a view to the Torrens Riverbank and Parklands
- Interacted with the Promenade
- Offered more flexibility in the service offering, being a coffee shop, bar, bistro and function centre
- Be designed for indoor-outdoor flexibility and interaction
- Included a new premium event space

Without the steel-framed approach, it would have been necessary to structurally upgrade the existing structures or even demolish and rebuild them.

The response was a lightweight steel structure, with an over-arching roof form that glides over the main spaces and glass facades allowing a strong visual connection to the surrounding site. Sails extending from the main building act as sun controls as well as evoking the fleet of ships suggested by the Bistro's name, also inspiring the curves in the roof and the timber detail

to the soffits.

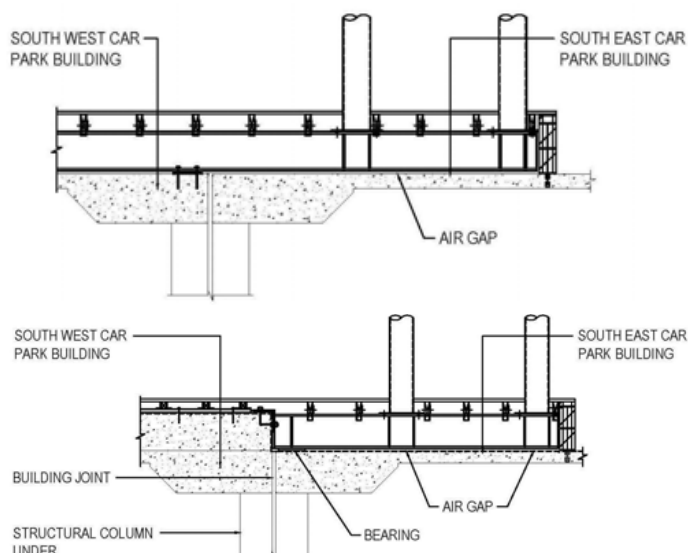
To the north the Regattas building extends over the Promenade building and to the south over two adjacent carpark structures. Steel construction was utilised to minimise the building weight and providing the flexibility to solve a number of challenging structural load paths. Due to the complex nature of the site, the building was required to sit within the existing load capacities of the existing buildings. Without the steel-framed approach, it would have been necessary to structurally upgrade the existing structures or even demolish and rebuild them.

INNOVATION IN THE USE OF STEEL

During the concept phase of the project it quickly became apparent that steel was the only material that could satisfy all of the flexibility to solve a number of challenging structural load paths, with long spans and cantilevers. It allowed the architect to achieve an exciting shape and form, and minimized time and personnel on site through its prefabricated nature, solving many of the site constraints.

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Regattas is a two level steel framed structure:

- The roof is composed of low aspect ratio fabricated trusses which follow the roof and ceiling profiles. Roof purlins and ceiling purlins are cold formed steel C100s.
- The Level 1 floor consists of Structaflor fixed to cold formed steel joists supported on steel beams.
- The Level 0 floor consists of Structaflor fixed to timber joists. To the south the timber joists are fixed to the existing concrete slab. To the north the timber joists are supported on steel beams.
- The Level 0 steel beams to the north span on to the structural grid of the existing car park below, which means they extend outside the building envelope to the west.

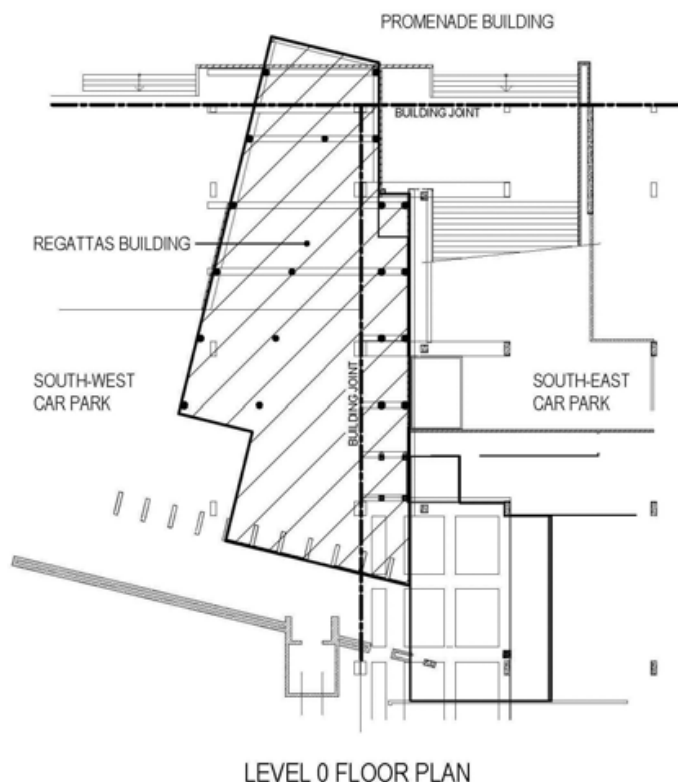
- Stability in the east-west direction is achieved on every structural grid with a portalised structure comprising a twin column arrangement on the east side with partial bracing, which has moment connections to the roof trusses and floor beams. The connection to the west columns is a pin joint.
- Stability in the north-south direction is achieved through two planes of bracing on the east side on each side of a service corridor, with torsion resolved by the east-west portals.
- Stability is supplemented with a connection to the existing Convention Centre building at Level 1, which assists with torsion and lateral vibration.
- The north-south bracing are also trusses which transfer the loads from Regattas back to the car park grid beneath.
- The building is anchored to the south west carpark building. It cantilevers over the Promenade building and slides over the south east carpark building through the use of structural bearings.
- The building has been fire engineered to avoid any applied fire rated products. The lower level steel columns are concrete filled to assist with this.

Being constructed over three existing buildings, Regattas is centred over two building joints, with all loads required to remain within the existing load limits.

- The paint system is Dulux Durepond P14 overcoated with Dulux Duremax GPE (both shop applied) followed by two coats of Dulux Weathermax HBR (site applied).

The new building is constructed on top of three existing structures. To the north the Regattas building extends over the Promenade building, which provides a pedestrian deck over Festival Drive. To the south the Regattas structure extends over two adjacent carpark structures. This presented a number of structural challenges:





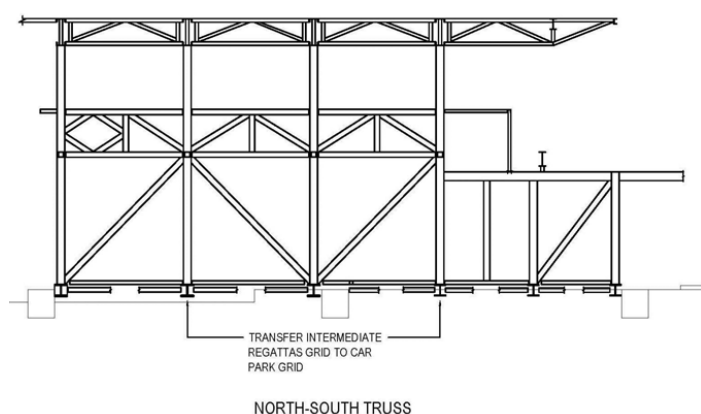
1. Being constructed over three existing buildings, Regattas is centred over two building joints, one running east-west between the Promenade building and the carpark buildings, and one running north-south between the two adjacent carparks.

2. The Promenade building was not designed for the provision of any future vertical expansion, with any load applied to it by the new Regattas development having to be within the previous load regimes.

The new structure was required to pass through the facade of the existing building, without structurally connecting to it due to its load limitations.

3. Whilst the carpark structures were designed for some future vertical expansion, this only provides reserve capacity in the columns and foundations, but not to the floor structure itself.

4. The carpark slabs were only designed for carpark loads. The loads of a new two level building designed for retail loads exceeds the original design loads.

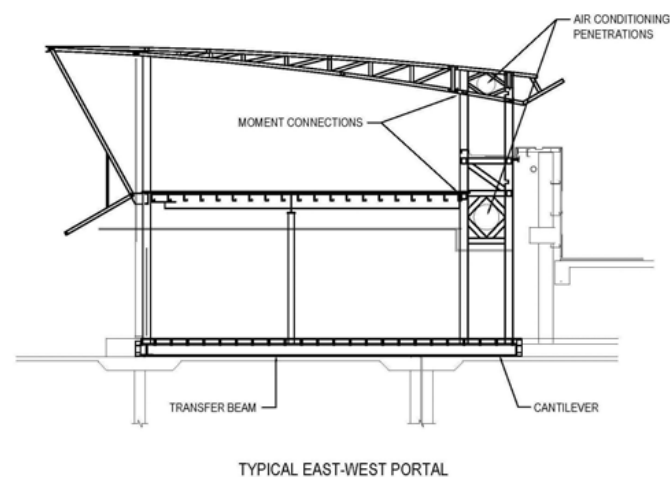


5. Compounding the problem of applying additional loads to an existing building, the carpark structures had already been modified in 2000, when the Adelaide Convention Centre Exhibition Halls were constructed. This involved putting a new transfer slab over the existing carpark slabs for approximately half of the floor area of Regattas. It also involved the construction of the external stair leading from the Convention Centre down to the Promenade. This previous work already utilised some or all of the reserve capacity of the existing structure, making it even more difficult to add more load in the form of a new building.

6. The lateral capacity of the existing building for earthquake and wind loads was in question, as additional load was being applied to the building and the building was designed to earlier less stringent earthquake and wind load requirements.

In addition to the challenges associated with adding extra load to existing buildings and the presence of existing building joints, the design of the building and its functional requirements presented additional challenges:

- The new structure was required to pass through the façade





of the existing building, without structurally connecting on to it due to its load limitations.

- The new Regattas is a multifunction facility, with an upstairs private function room and a downstairs public bar and bistro. A requirement of the upper level floor is to isolate lively activities occurring upstairs (acoustics and floor vibrations) from the bar and bistro use downstairs.
- The construction site is land locked. Deliveries of construction materials were difficult.
- The construction site is located within a fully operational convention centre and public precinct, so interruptions to the public were required to be limited.

It was undesirable to express the building joints between the three existing buildings through the new Regattas building. This would have meant joints in the floor and façade finishes, adding cost and serviceability complications. The steel solution anchors the new building to the south west car park building, making it possible to partially cantilever over the south east car park building.

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The stability system in a north-south direction is achieved by a pair of parallel braced frames on the east side of the building.

These frames are also trusses, transferring load from the Regattas building grid back to the grid of the car park columns underneath it. The magnitude of all new loads applied to the existing columns and footings was minimized by selecting steel framed construction and lightweight steel framed floors. Due to the use of Level 1 as a private function room, Aurecon's specialist Building Sciences Group designed a floor composition which was lightweight to accommodate the structural requirements whilst achieving a high degree of acoustic separation and having a balance of stiffness with structural damping to prevent the transmission of perceptible floor vibration to the ground level space.

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EFFICIENT USE OF STEEL

In order to address the site difficulties identified above it was clear that prefabrication and minimization of personnel on site would be key to achieving a constructible and economical build. The choice of steel framed construction naturally lent itself to these requirements, assisting to achieve the project outcomes within its tight budget. Consideration was given to weights and sizes of deliveries that would be possible on the site, with Aurecon consulting a builder prior to finalizing the design.

Being a prefabricated building component, the use of steel shortened the project programme allowing parallel off site



fabrication to occur with the early construction activities. With planned scheduling the steel was in many cases lifted straight from the transport into position. The site was very tight and existed in a functioning public space. Rapid and safe erection without double handling was a key advantage of steel construction. The style of floor construction chosen eliminated wet trades, simplifying site works and streamlining deliveries, and minimizing interruptions to the Convention Centre and surrounding public spaces.

Being a prefabricated building component, the use of steel shortened the project programme allowing parallel off site fabrication to occur with the early construction activities.

As the steel fabrications were lightweight, erection was possible using a 50 tonne crane positioned in the parklands adjacent to Festival Drive. Columns and building frames were erected in double height lifts, allowing the two level structure to be erected in one sequence, working on all levels at once, with a single mobilization of the steel trade. The two coat primer system was shop applied to the steel, with the exposed steelwork topcoated on site.

ENVIRONMENTAL PERFORMANCE

Two primary environmental concerns regarding the project were:

- wind tunnel testing to optimise the wind loads and reduce the amount of structural steel

- fire engineering of the structural steel to eliminate much of the fire protective coatings otherwise required to satisfy the Building Code of Australia.

Regattas is a highly sustainable outcome because it allowed the reuse of an existing building. If, through the use of steel, it had not been possible to put the new Regattas building on top of the existing car park building, it would have been necessary to substantially structurally upgrade the existing building, or possibly locally demolish and rebuild it. The new Regattas building has transformed a previously underutilized space, allowing significant value and public benefit to be extracted by enhancement of an existing asset. This was only possible through steel construction.

A feature of the design is the combination of the large overhang on the roof with the sunshade devices to the west elevation. The combination of these elements, when overlaid with the properties of the Viridian Super Green double glazed units, allowed a fully glazed western façade to comply with Section J of the BCA.

Steel construction eliminated wet trades on site, simplifying site works and streamlining deliveries, and minimizing interruptions to the surrounding public spaces.

The Level 1 space is also designed as an indoor/outdoor space, with a large operable wall in the west face and a operable window in the east face. This allows the venue to operate without air-conditioning when the climatic conditions allow it, relying



only on a combination of natural and forced ventilation. With the focus on operations within a constrained site, it was important to minimize waste, and the prefabricated nature of steel allowed this.

BUILDABILITY

The documentation produced for the project was documented to 100% construction status for tender, which drove a straight-forward tender process with few tender queries. Rigour by the design team in coordination and checking minimized RFI's and any corresponding delays or additional costs during construction. Boulderstone was employed early to give constructibility advice, to ensure the construction systems in the final tender documents would not have to be revised.

Due to the complexity of the site, it was identified as being advantageous to avoid wet trades as much as possible.

Boulderstone's advice centred around the issues of deliveries and erection on the constrained site, and identified the advantage of avoiding wet trades as much as possible. Although concrete was not really viable on the basis of the load capacity, Boulderstone advised that there would be a cost penalty for using concrete over steel due to the difficulty of the site.

The 3D geometry of the building, particularly the roof, was a challenge for all involved. The resolution of the steel shop drawings was identified as a key issue to be resolved early in the contract. With the structural model resolved the shop drawings were then produced and approved and the mechanical services integrated to fully coordinate these trades. This identified a

number of clashes which would have caused delays if they had not been picked up until installation of the mechanical services on site. The ease and speed with which the steel was assembled on site is evidence of the benefit of producing a highly resolved 3D structural model in shop drawing preparation.

During construction the contract was managed using BPIMS, the South Australian Government's Building Project Information Management System. Regattas is one of the first projects to adopt this internet based system for administering projects. This streamlined the contract management and approvals.

Part of the design involved fire engineering the structure to avoid the requirement for applied fire protection products, and part of this solution required the lower level columns to be filled with concrete. To avoid potential delays caused by wet trades on site, SA Structural built a temporary scaffold tower in their yard to allow the columns to be filled with concrete off site, prior to delivery.

PROJECT TEAM	
Architect:	Woods Bagot
Structural Engineer:	Aurecon
Head Building Contractor:	Mossop Construction + Interiors
ASI Manufacturers:	Bluescope Steel, OneSteel
Fabricator:	SA Structural
Steel Detailer:	SA Structural
Coatings Supplier:	Dulux
Coatings Contractors:	Adelaide Blast + Spray

