

# Unlocking space within new build on old Gaol site

## Queensland Ecosciences Precinct, Brisbane

Steel was used extensively for a wide variety of structures which link together and enhance the primary buildings to unlock clear spaces within the new Ecosciences Precinct (ESP) on the site of Brisbane's old Boggo Road Gaol.

Through the use of steel generally within this development, spans for support of roofs, stairs and walkways have been maximised, creating much greater flexibility of space generally throughout the facility.

The \$270 million ESP is intended as an innovative analytical, research and education facility, designed to bring some of Queensland's and Australia's leading scientists all under one roof. Spanning 50,000sqm, it is part of the new Boggo Road Urban Village, a unique, mixed-use development, including residential, retail, commercial, environmental research and recreational facilities.

The development was designed and built to cater for over 1000 scientists and researchers from three government agencies and several different scientific disciplines in a single, collaborative research environment.

Between each of the buildings is a significant courtyard space which resulted in steel being used as the primary element for a cable stayed courtyard canopy, link bridges, architectural stairs, as well as the primary courtyard glass wall and façade screen supports.

Steel was also used for the other building components, such as external duct risers, roof flue supports, shade houses, entry canopies and bicycle stores.

All building materials used were chosen in order to develop a facility that would meet both the strict environmental controls, typical of a building of this nature, as well as provide a robust low maintenance facility designed to last more than 50 years.

"The choice of steel for the bespoke courtyard, roof, bridge, stair and facade elements of the building was natural given the intent to harness and experience the natural environs in these spaces," said the Project Manager at Arup responsible for leading the core team of designers, **Josh Neil**.





“Being hot dip galvanised generally or three-coat painted where required for architectural intent and maintainability, steel provides a durable lightweight solution for these spaces.”

The courtyard stairs and bridges were designed to be uniquely connected with the surrounding buildings. The stairs are designed to be supported via twin columns and braced horizontally back to adjacent buildings via composite steel and bridge slabs using steel decking which work as a deep beam.

Those elements were modelled to determine both their sensitive dynamic performance utilising footfall simulation, as well as reactions on the adjacent surrounding structure.

The courtyard roofs were designed to span up to approximately 20 metres between each building as a lightweight structural form. The efficiency and cost-effectiveness of this was enhanced via the use of cable stayed RHS primary structural beams supported under predominant uplift loading via feature cables integrated into the landscape within the courtyard space.

Project engineer, Arup embraced the project’s collaborative approach, encouraged by the client to guide the contractor and design team to achieve a 4-star Green Star equivalent rating for the precinct.

That involved the development of a project-specific rating tool against which to assess the Environmental Sustainable Design (ESD) performance of the project, conducting sustainability workshops, providing sustainability design advice to the project team at design meetings and through a sustainability action plan, and assisting with capital and life-cycle costing of ESD components. Arup also undertook construction audits during the construction phase of the project.

Arup was able to significantly enhance the environmental credentials of the project through the optimisation of material and resources use throughout the development.

Throughout the project, Arup was generally responsible for maximising the use of prefabricated building elements which minimised onsite waste and increased construction speed and quality.

“Perhaps the best example of this was the courtyards where the architect’s vision was to use a perforated screen around and over spaces between the three tower blocks,” Mr Neil said.

“We instigated successful prototype testing and daylight and glare modelling of innovative perforated screen elements which, when combined with delicate rod-stayed lightweight roof and glazed walls, addressed all of the cost and performance risk concerns that have in the past prevented such solutions from being adopted.

“The result is a series of shaded outdoor courtyard spaces that are performing exactly as intended and proving immensely popular with building users and visitors alike.

“The use of steel was essential to the enhancement of the environmental performance of these spaces which provide ample shade and weather protection to the building users.”

The project was recently awarded a High Commendation in the 2011 Queensland Engineering Excellence Awards in the category of Buildings and Structures.

#### Project team

**Client:** Queensland Government, Department of Public Works – Project Services

**Project Owner:** Queensland Government, Department of Public Works

**Managing Contractor:** WATPAC

**Architect:** HASSELL

**Engineer:** Arup

**Environmental Sustainable Design:** Arup

**Building Services:** AECOM, SKM, S2F

**Steel Fabricator:** Beenleigh Steel Fabrications

**Steel Detailer:** Pryde Drafting

**ASI Steel Distributor:** OneSteel Steel and Tube, BlueScope Distribution

**ASI Steel Manufacturer:** OneSteel, BlueScope Steel

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