



# Aquatics

## Capability Statement

4th Edition

**Australia's leading  
aquatic engineering  
professionals**





We challenge mediocrity & strive towards Client relationships & project team associations where a collective approach is championed in recognition of enhanced outcomes.



**John Tuxworth**

Executive Director





## CONTENTS

Our Company	-01
Our People	-01
International Projects	-03
Aquatics Projects	-05
Aquatics Capability	-07
Expertise	-08
Select Project Profiles	-10

Project: **Manly Aquatic Centre, NSW**  
Contribution: **Structural | Aquatics**

# Our Company



Built Environment Collective is an award-winning Australian-based multi-national design & project management consultancy, offering enhanced client outcomes via integrated solutions & a holistic approach to project deliverables.

Built Environment Collective is a Proprietary Limited Company (Pty Ltd) registered in Australia, with subsidiaries registered in Delaware, USA, and Shenzhen, China. The company was established in 2011 by Executive Director, John Tuxworth, however, following the merger with Geoff Ninnes Fong and Partners (GNFP), Australia's leading aquatics engineering specialist, BEC offers a combined **50-years of multi-disciplinary project delivery experience**, & maintains offices in Sydney, Canberra, Perth, Brisbane, Cairns, Shenzhen & Addis Ababa.

BEC is proudly **ISO9001:2015 certified** to provide Structural, Civil, Building Services, ESD & Project Management consultancy services, in Australia & internationally.

## Our People

Key Aquatics Team Members:

John Tuxworth, Rhys Kilpatrick, Geoff Ninnes, Brad Fong, Arek Prasek

BEC is comprised of diligent & passionate professionals, who utilise their expertise to facilitate optimal client outcomes.

BEC comprises a team who are passionate about life-long learning. The organisation maintains a rigorous approach to Continuing Professional Development (CPD) - in excess of the commitment required by relevant professional institutions. CPD targets are mandated as part of each team member's employment contract.

The business is underpinned by Exec Director, John Tuxworth's 27-year international experience. John's tertiary education started at QUT's school of Civil Engineering. Following this, John spent several years abroad working for Maunsell (AECOM) in Indonesia, Waterman Partnership in London, and Michael Punch and Partners in Dublin.

John's interest in becoming a multi-discipline building professional saw him undertake architectural studies at the University of Westminster in London, & MBA studies through Latrobe University. John is a Fellow of Engineers Australia & an internationally registered Professional Engineer. John is a registered Project Manager and also a Green Star Accredited Professional.

John leads the aquatics team with support from Director's Rhys Kilpatrick & David Halpin, as well aquatics Principals Brad Fong & Geoff Ninnes.

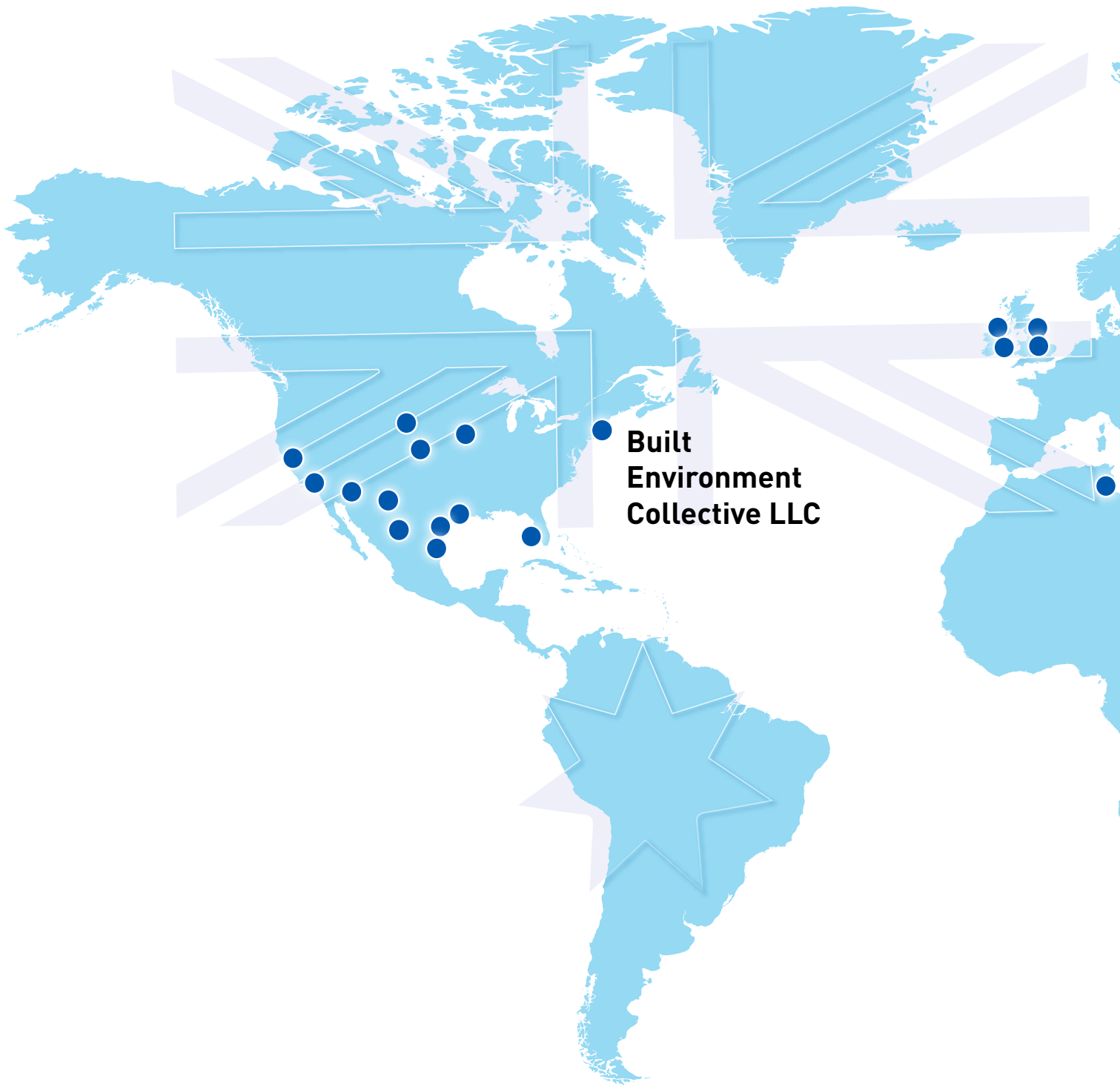


Project: **Gold Coast Aquatic Centre**  
Contribution: **Aquatics | Structural**



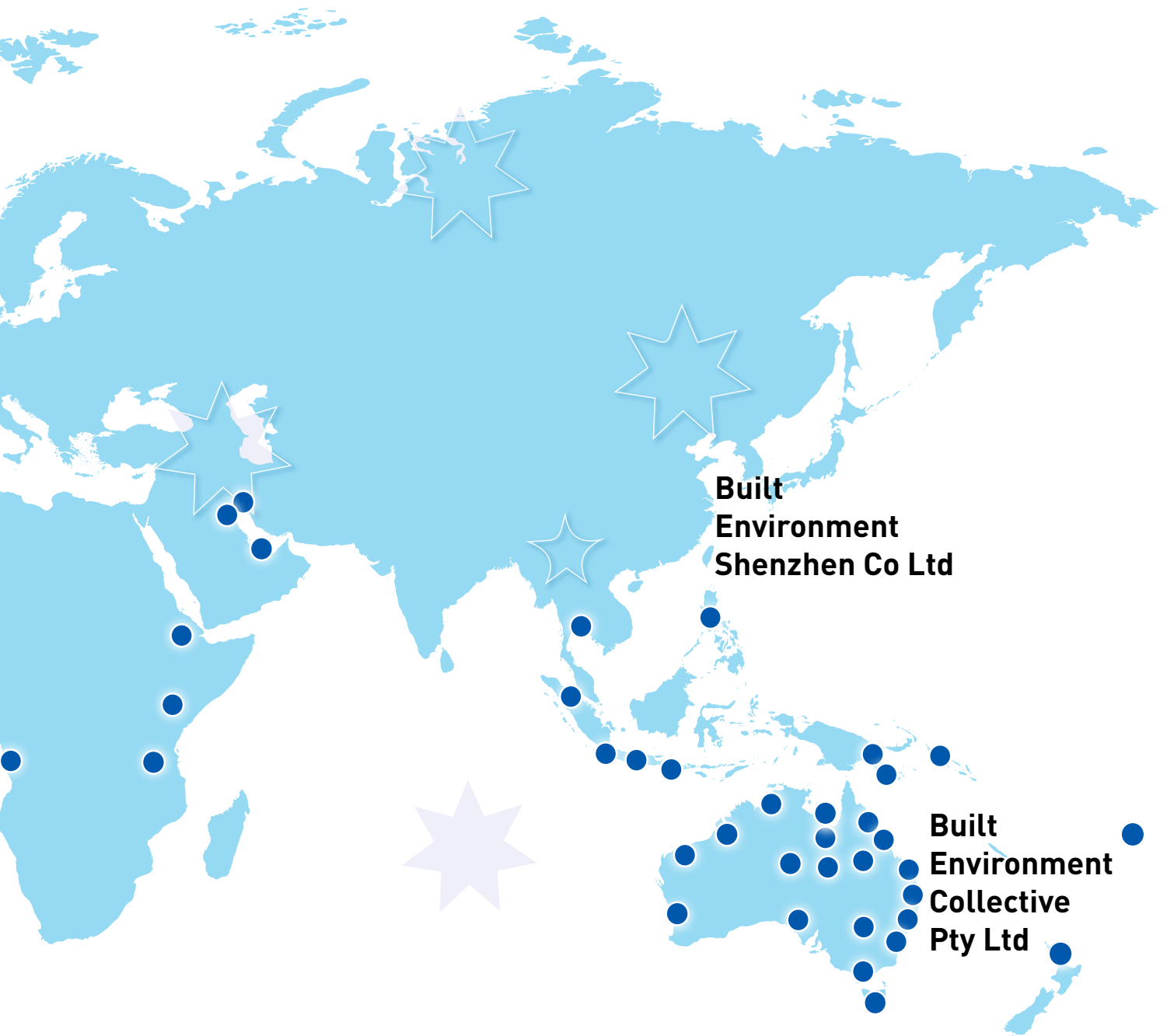
From our head office in Brisbane, BEC has delivered projects from the USA across to Angola on the west coast of Africa.

# Our Projects



**Built  
Environment  
Collective LLC**

***“We Still Call Australia Home”***



# Aquatics Major Projects

**Pymble Ladies  
College**  
– \$45 million

New indoor 50m & diving pool plus suspended hockey field & new undercover parking.

**Homebush Olympic  
Aquatic Centre  
(2000 Games)**  
– \$4.6 million

Engaged by the Olympic Coordination Authority (OCA) BEC redesigned plant systems for all pools & spas to achieve FINA standards. The new treatment system minimises backwash water loss & destroys/removes Cryptosporidium & Gardia.

**Ryde Olympic Water  
Polo & Aquatic  
Centre, Sydney  
(2000 Olympics)**  
– \$28 million

Engaged by the Olympic Coordination Authority (OCA) & Ryde Municipal Council BEC designed pool structures, finishes & water treatment systems for the whole Centre. Pools include: Olympic FINA 51.5m pool with bulkhead, 2m deep, 25m warm up pool which is part of a large wave pool, hydrotherapy pool, & spa.

**Warnbro Regional  
Aquatic Centre, WA**  
– \$16.5 million

This major aquatic centre includes an outdoor 50m FINA pool incorporating water polo, indoor FINA short course 25m pool, a very large leisure pool including play features & large river with slide, spa & hydrotherapy pool, together with a recreational centre.

**Gold Coast Aquatic  
Centre – \$41 million**

Extensive upgrade of the 2016 Commonwealth Games aquatic centre, including new indoor pool building & expansive podium post-tensioned slabs to support temporary stadium seating.

**Geoff Henke  
Olympic Winter  
Training Centre at  
Sleeman/Chandler**  
– \$16 million

New outdoor 50m x 33m x 2m-4m depth pool with 8 ski ramps for aerial skiing training and competitions. Facility features a bubble aeration system, trampoline & bungee harness system to prevent injury.

**Manly Andrew 'Boy'  
Charlton Aquatic  
Centre – \$22 million**

An extensive upgrade of the existing aquatic centre, upgrades of existing 25m diving/leisure pool with additional balance tanks, & new warm water indoor pool, leisure pool & spa.

**Aqualink Box Hill**  
– \$22 million

Upgrade of existing indoor 25m/diving & LTS pools, new indoor warm water pool & spa, new outdoor 25m pool, new plant for all pools

**Darwin Wave Pool**  
– \$20 million

The Boogie Board Wave Pool was the largest wave pool in Australia at the time of design, & one of only six wave pools in the world.

**Broken Hill Aquatic  
Centre – \$5 million**

The Broken Hill Aquatic Centre project involved a new 50m x 20m 8-lane outdoor pool, a leisure pool that includes a slide, amenities buildings, concourse, plant rooms & grandstand seating.

**AIS Canberra Elite  
Swimmers Centre  
Centre – \$16 million**

FINA standard 51.5m x 25m x 3m deep main pool with a boom, therapy pools, a warm river hydrotherapy pool & a cold plunge & walk-through pool.



<b>Frankston Recreational &amp; Aquatics Centre – \$45 million</b>	New large regional aquatic centre with indoor 50m, warm water, spa, LTS & children's pools, splash pad, large water slide.
<b>Oaks Pacific Blue Resort – \$11 million</b>	At over 475m in length, the pool at Oaks Pacific Blue Resort is the longest pool in Australia. Additionally, a separate 25m lap pool is included for a more traditional swimming experience.
<b>Riverton Leisureplex, Perth, WA – \$30 million</b>	This major aquatic centre features a 50m FINA training pool, large leisure & training pool and slide facility, large spa and full hydrotherapy pool together with an integrated sports complex.
<b>Melville Aquatic Centre, Perth, WA – \$30 million</b>	This complex comprises a FINA 50m pool with diving bowl, spas & a large leisure & training pool with integrated recreation and fitness centre.
<b>Bunbury Regional Aquatic Leisure Centre, WA – \$35 million</b>	This complex comprised a new FINA 50m pool incorporating FINA water polo, large leisure & training pool with slides and features, & a large spa, integrated with a recreation & fitness centre.
<b>Inglewood Aquatic Centre, WA – \$25 million</b>	This project included the upgrade of an outdoor 50m FINA pool, diving pool, learner's pool and toddler's pool & the construction of a new indoor FINA short course 25m pool, leisure pool & large spa.
<b>Kalgoorlie Regional Aquatic Centre, WA – \$35 million</b>	This project includes an indoor 51.5 FINA pool with bulkhead, incorporating FINA water polo, a leisure & training pool with slides and features, a large spa with integrated sports centre.
<b>Belconnen Aquatic Centre, ACT – \$20 million</b>	This major centre under construction will include the Australian Institute of Sport in Canberra, ACT. It includes a 51.5 FINA standard pool with moveable bulkhead incorporating FINA polo, a large leisure & training pool, hydrotherapy pool & spa pools together with a leisure centre.
<b>Peninsula Regional Leisure Centre, Woy Woy NSW – \$22 mill</b>	New 25m indoor, 25m leisure, spas, slides. Outdoor 50m. Medium rate sand-UV Chlorine. Deck level concrete with vinyl. Design stage.
<b>Taree Aquatic Centre – \$20 million</b>	Indoor 8 lane 25m with 400m <sup>2</sup> leisure, spa. Outdoor 8 lane FINA 50m Myrtha. Chlorine/UV, shunt backwash. DE-bromine, spas.
<b>Lane Cove Aquatic Centre – \$18 million</b>	Indoor 25m x 10 lane, large leisure pool, hydrotherapy spas, DE-chlorine-UV, separate systems. Tender.
<b>Toowoomba Aquatic Centre – \$18 million</b>	New indoor wave pool, learn to swim, spas, hydro+therapy. All ozone-chlorine, separate systems, shunt backwash, major upgrade of outdoor 50m, new balance tanks, heating, new filtration.

# Aquatic Capability

BEC is the most experienced aquatic engineering consultancy in Australia. Our team of aquatic professionals use their extensive experience & understanding of Aquatic design to identify & ideate the best results for the development of new, or upgrades to, swimming pools and waterfront projects.

Our cross-discipline approach & internal coordination absorbs administrative burden and reduces construction cost & program risks.

Aquatic engineering embodies multi-discipline design to ensure the safety & serviceability of projects for public or private use, ensuring governing standards are met and maintained. With half a decade of experience with indoor/outdoor swimming pools, resort waterfront projects, aquatic centres, etc, we support clients to ensure objectives are clearly defined & delivered.

We facilitate the delivery of aquatic structures and water treatment facilities, buildings, structures, and civil to meet a Client's detailed specifications and to eliminate unnecessary costs, whilst still achieving compliance with Australian and international building codes. A strong focus on collaboration with other design and construction team members benefits our Clients by integrating a larger pool of ideas and experience.

Our contribution responds positively to the local environment with a focus on reduced maintenance and operating costs. We offer a multi-disciplined delivery to assist with the reduction of materials and utilities requirements, and the maximisation of natural light and ventilation.

In addition, we offer experience with environmentally sustainable systems such as solar heating, rainwater harvesting and swales. Our innovative approach to buildability is based on construction techniques which lend themselves to safety and efficiency.

We work hard to ensure that Client objectives and outcomes are clearly defined from the outset. Our hands-on approach to project management assists to drive each project towards delivery, with an emphasis on quality, cost and program.

# Aquatic Expertise



BEC is the leading provider of aquatics engineering consultancy in Australia, drawing on our 50+ years of experience in Australia & abroad, across BEC's core disciplines of project management, structures, civil infrastructure,

## Why BEC aquatics?

- > Over 50-years' experience + 15,000 pools
- > Australia's leading aquatics expert
- > Architects' preferred
- > Integrated - pool structure & water treatment
- > Building structure & MEP services
- > Cost effective & appropriate solutions

## The BEC aquatic service:

- > Asset Management
- > Investigations, testing & reporting
- > Concept/sketch design
- > Site configuration
- > Cost estimation
- > Traditional delivery or Design & Construct
- > Tender design & documentation
- > Tender submission reviews
- > Detailed design, including finishes
- > Full LOD 300 construction documentation
- > Complete plant room design & setout
- > Advanced + innovative water treatment
- > Pool Heating
- > Energy minimisation
- > Chloramine control
- > Backwash water re-use

## Pools for Humans

- > World Aquatics (FINA) Competition Pools
- > Leisure Pools
- > Wave Pools
- > Rapid Rivers
- > Swirl Pools
- > Water Features
- > Kids pools
- > Interactive features
- > School pools
- > Water Slides + Slide Pools
- > Hydrotherapy pools
- > Water Polo Pools
- > Scuba Diving Pools
- > Spas
- > Lagoons
- > Indoor pools

## Pools for Animals

- > Aquariums
- > Marine Parks
- > Mammal Exhibits
- > Equine Pools

## Industry Recognition:

- WINNER** — 2018 Winner for Steel Excellence Australian Steel Institute: Buildings Small Projects (Manly Aquatic Centre)
- STATE FINALIST** — 2017 CIA Award for Excellence in Concrete: Residential Buildings Category, QLD
- STATE FINALIST** — 2016 Engineering Excellence Awards: Structures & Small Business Categories
- NOMINEE** — 2015 Structural Awards: Heritage Category & Small Practice Category
- STATE FINALIST** — 2013 Engineering Excellence Awards: Structures
- STATE FINALIST** — 2012 Engineering Excellence Awards: Structures & Environ Categories





Pymble Ladies College



# 01

**PROJECT:** Pymble Ladies College  
**SIGNIFICANCE:** Aquatics | Structural | Civil | Education

The Pymble Ladies College located near the upper North Shores of Sydney, NSW, is now home to the state-of-the-art Pymble Indoor Aquatic Centre, which offers the ladies college and general public access to a wide range of activities and services. The Indoor Aquatic Centre was designed to replace the outdated outdoor pool with a FINA compliant 50m x 8 lane pool, 2m to 3.7m deep, and a movable boom swimming facility.

The new Indoor pool includes a 1m, 3m and 5m diving platform and learner's pool which is suspended over mechanical plant rooms. The sprawling outdoor gymnasium built over the Learners Pool consists of post-tensioned beams spanning 14.5m.

An exposed 31m long tubular truss roof spans over the 50m lap pool with Y-shaped columns and a large cantilever facade. Ultra-Fine Filtration (UFF) filters are used for all of the pools. Furthermore, an on-site sodium hypochlorite generator is employed in lieu of traditional bulk delivery of sodium hypochlorite.



# 02

**PROJECT:** Emerton Leisure Centre  
**SIGNIFICANCE:** Commercial | Aquatic | Remediation

The Charles Lowles Leisure Centre located in Emerton NSW was the focus of this multi-discipline project. It features a curved wave formed roof that incorporates major tubular trusses and cable-stayed curved tubular rafters. This structure is over the indoor 25m lap pool and 25m leisure pool, including change rooms and seating.

Another feature is the curved trussed roof over a two-court sports hall. These unique facilities make Emerton Leisure Centre a very appealing destination for the community to visit for both exercise and leisure. BEC (as GNFP) designed the building structures, pool structures, water treatment and civil works required to enhance the overall quality of the facility for users.







# 03

**PROJECT:** Alice Springs Aquatic Centre  
**SIGNIFICANCE:** Structural | Aquatic | Civil

The Alice Springs Aquatic Centre was a BEC (as GNFP) multi-discipline project featuring building structures, aquatic engineering and civil engineering. The Alice Springs Aquatic Centre is a major indoor and outdoor aquatic and leisure centre which includes multiple unique features.

It includes an 8 lane 25m lap pool, which is commonly used for competitions. BEC (as GNFP) was also responsible for the unique leisure pool with zero-level beach entry, rapid river, in-pool spa, and two large water slides. The leisure pool is great for learn-to-swim classes, and other warm and shallow water activities. The centre also has abundant natural light with steel truss spanning over 36m.





# 04

**PROJECT:** Hornsby Aquatic Centre

**SIGNIFICANCE:** Aquatic Engineering | Structural | Civil

The Hornsby Aquatic and Leisure Centre in NSW, is home to a range of facilities for the local community, including a heated pool. Additionally, indoor and outdoor lap and leisure pools are used for various training programs which host aquatic classes, squad training and swimming lessons.

This indoor / outdoor aquatic centre includes a 50m lap pool and a 25m learners and leisure pool. This ambitious project is constructed over a deep embankment with the pools suspended over a carpark below. The 50m pool concourse is cantilevered 3m over the adjacent embankment. The pool structures are substantial, spanning over a 8m column grid in each direction. The indoor 25m leisure pool is enclosed by a structural steel tubular trussed roof.

In order to minimise shrinkage cracking, detailing of the concrete in the pool was very detailed, as required for the concrete pool wall sections which are over 1m thick. Detailing of complex water stops at pool joints is a feature of the waterproofing design. Extensive water testing of pool structures and pool concourses were undertaken to ensure the structure was waterproof.



**PROJECT:** Manly Aquatic Centre

**SIGNIFICANCE:** Structural | Aquatic Engineering | Civil

The Manly Aquatic Centre located on the North Manly coastline of Sydney initiated this project as a major addition to the existing outdoor aquatic centre. The Indoor Aquatic Centre encompasses a total area of some 3,300m<sup>2</sup>, including over 2,000m<sup>2</sup> of column-free space, enclosing the numerous indoor facilities.

The Manly Aquatic Centre incorporates a range of features, including an indoor 25m x 20m lap pool, indoor program pool, leisure pool with automated pool cover, under pool concourse, and a spa. The trusses support box section rafters in a sawtooth configuration allowing abundant natural light into the pool hall. Each pool is filtered using dedicated filtration and water treatment plant, designed to comply with the NSW Ministry of Health – Public Swimming Pool and Spa Pool Advisory Document.

Each pool and water treatment plant system utilises the latest technology available in the water treatment industry, comprising Atlas Ultra Fine Filtration (UFF), automatic flow control by way of flow sensors, and variable speed drives. Furthermore, the Oxidation and control of chloramine's by way of high intensity, medium pressure UV plant, helps disinfection using a sodium hypochlorite solution manufactured on-site utilising brine electrolysis via a Siemens OSEC electrolysis unit.







## 06

**PROJECT:** Broken Hill Aquatic Centre  
**SIGNIFICANCE:** Structural | Aquatic Engineering

The Broken Hill Aquatic Centre project involved a new 50m x 20m 8-lane outdoor pool, a leisure pool that includes a slide, amenities buildings, concourse, plant rooms and grandstand seating. The water slide is a 70m ride dropping from an 8m platform making it a thrilling ride.

The Centre now offers a wide range of services to support activities for overall health and fitness, such as a health club, hydrotherapy pool, indoor and outdoor pool facilities, and a water playground for children.

As part of a community partnership with YMCA NSW, this aquatic centre collaboration proved very beneficial for the community at Broken Hill, and will continue to be so for years to come. BEC (as GNFP) collaborated with Crystal Pools for design and construction of this project.



# 07

**PROJECT:** Peninsula Leisure Centre

**SIGNIFICANCE:** Structural | Aquatics Engineering | Civil

The Peninsula Leisure Centre located on the NSW coastline is home to a wide range of community sport and entertainment offerings including the aquatic centre, 24-hr fitness centre, indoor sports and children's facilities.

Our multi-discipline commission was the design of this major regional aquatic centre. The project involved a 60m span tubular trussed roof over an indoor 50m heated lap pool, and a 25m leisure and program pool with UFF filtration plant used for all pools.

With its unique layout and features, the leisure and program pools support many diverse user experiences, such as swim classes, activities for children, and everyday enjoyment. The project also included a 2-court multi-purpose gymnasium building, featuring trusses with extensive architectural steelwork.





## 08

**PROJECT:** Darwin Wave Pool

**SIGNIFICANCE:** Hydraulics | Mechanical | Aquatic | Structural

Darwin Waterfront Corporation hosts a large array of indoor and outdoor precincts, including the wave and recreation lagoons designed by BEC (as GNFP).

The Boogie Board Wave Pool is the largest wave pool in Australia, and at the time of design, was one of only six wave pools in the world. The pool is 2m in depth and covers 4,000 square meters, including a shallow water area. The waves run on a cycle, with 10 different wave patterns for all types of swimmers and boogie-board riders.

BEC (as GNFP) was responsible for the pool structure, wave plant, pool filtration, mechanical and hydraulic services. The 1.2m high boogie-board wave produced by Murphy Waves pneumatic systems.



# 09

**PROJECT:** Oaks Pacific Blue Resort  
**SIGNIFICANCE:** Structural | Aquatic Engineering

At over 475m in length, the pool at Oaks Pacific Blue Resort is the longest pool in Australia. Located in Port Stephens NSW, the pool stretches around resort buildings and includes four beach areas and two spas.

Additionally, a separate 25m lap pool is included for a more traditional swimming experience. This massive structure is supported by timber piles. BEC (as GNFP) designed all pool structures, filtration and water reticulation systems.







# 10

**PROJECT:** Frankston Recreational & Aquatics Centre

**SIGNIFICANCE:** Aquatic Engineering | Structural

The Frankston Recreational Aquatics recreation centre located in VIC is home to a diverse range of aquatic and fitness facilities, bringing together community members of all ages. The impressive facility houses a large indoor lap pool, water play for children, water top splash course and a water park.

BEC (as GNFP) was commissioned for this large regional indoor aquatic centre. It features a 50m FINA indoor lap pool with a moveable boom. The Centre also includes a warm water leisure pool and a spa. The leisure pool is a versatile multi-use space and accommodates various activities such as learners swim lessons and community classes.

The Centre also incorporates a 10m high raft slide and a splash pad, making it a great play area for children. Natural lighting enters through floor to ceiling glass facades ensuring panels on the main walls ensures that the space is well illuminated, as well as energy efficient. There is a subterranean plant room in the centre, and ultra-fine filtration filter is used for all of the pools.





Frankston Recreational & Aquatics Centre





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# Engineered Design & Management



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