

SECTOR CASE STUDY

Education

OPPORTUNITIES
THROUGH
EXCELLENCE
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BG
&E



Northland College

KAIKOHE, NORTHLAND, NEW ZEALAND

CLIENT: NORTHLAND COLLEGE BOARD OF TRUSTEES

BG&E provided structural engineering services for the renovation of Northland College - a private, liberal arts college with a progressive focus on the environment and sustainability.

BG&E undertook structural design for the suspended ceilings and fit out of the college. The main challenge for this project was ensuring the complex ceiling and wall geometry could be seismically restrained in a cost efficient manner.

We worked closely with project architects, AP Design, to ensure the project could proceed, and relied heavily on site inspections to confirm assumptions during construction.

Lynfield College

AUCKLAND, NEW ZEALAND
CLIENT: MINISTRY OF EDUCATION



BG&E provided façade design services for a new three storey building, in line with the college’s extension masterplan.

Since 2022, Lynfield College has been undergoing a significant transformation, involving the refurbishment of the administration building and the replacement of a block that had fallen into disrepair with a new structure that houses 30 general education classrooms.

This addition features a dynamic façade with standard slab-to-slab joinery and curtainwalls spanning multiple levels.

The exterior envelope showcases an engaging design, incorporating a one storey brick veneer, followed by two levels of vertical profile metal cladding with various junctions between cladding typologies. The below grade involved predominantly DPM below slab with a tanked lift pit and long run metal roofing.

BG&E provided PS1 design services and PS4 construction monitoring services on this project.



ACG Sunderland

AUCKLAND, NEW ZEALAND
CLIENT: ACG

ACG Sunderland, recognised as one of Auckland's premier private schools, expanded its campus by adding a new three storey building to accommodate a new school for ACG.

BG&E provided façade engineer design services to the project, undertaking PS1 and PS4 services. The project is due to run from 2023 to 2025.

The design of the new structure is straightforward - incorporating materials such as a block base, solid aluminium panels cladding, precast concrete, and a curtainwall façade.

In considering the educational aspects of façade design, emphasis is placed on the robustness of materials, particularly as the end-users can be highly destructive. Additionally, careful attention was given to addressing gaps in material joints to ensure the safety and suitability of the facility for small children.

ACG Parnell

AUCKLAND, NEW ZEALAND
CLIENT: ACG



ACG Parnell, recognised for its excellence in early learning education within a vibrant urban setting, has expanded its facilities to better serve its students.

In response to the growing needs of the student body, a new five storey building was added to the Parnell premises, designated as an educational block for ACG.

Pacific Environment Architects enlisted BG&E to provide façade engineering design services, encompassing both PS1 and PS4 aspects.

The design of the new building maintains a simplistic aesthetic to align with the existing school's look. Materials include precast concrete and five storeys of brick veneer, featuring horizontal joints to accommodate floor movement. Additionally, aluminium joinery has been carefully designed to ensure building code compliance while not compromising functionality.

SJI International Preschool

SINGAPORE, SINGAPORE

CLIENT: SJI INTERNATIONAL PRESCHOOL

BG&E provided civil and structural engineering services for SJI International Preschool, a new early education facility near the vibrant Dempsey and Holland Village areas in Singapore.

The project involved:

- Phase 1: refurbishment and extension of the Shalom House building, a 90 year old, two storey monastery that had fallen into disrepair. We provided civil and structural engineering services for the addition and alteration works to conserve this heritage structure and add a new two storey wing.
- Phase 2: rebuild of the existing one storey preschool building to a new three storey structure with a basement. We provided a full scope of civil and structural engineering services, including temporary works and façade. The estimated completion date is June 2026.

Based on the characteristics of the old building and the future needs of the school, BG&E proposed using various materials and technologies such as steel structure, concrete, timber, and 'micro piles' for renovation.

Since opening its doors in August 2024, SJI International Preschool has established itself as a nurturing and enriching learning environment for local and expatriate children alike.





Australian National Academy of Music, South Melbourne Town Hall

MELBOURNE, VIC, AUSTRALIA

CLIENT: AUSTRALIAN NATIONAL ACADEMY OF MUSIC

BG&E provided structural and civil engineering services for the bold \$60 million transformation of South Melbourne Town Hall into a leading performing arts venue for the Australian National Academy of Music (ANAM).

Originally built in the late 1800s and declared unsafe in 2020, South Melbourne Town Hall is now undergoing renovations, refits, and strengthening exercises to allow the ANAM to move back in and take ownership of the space.

As of 2024, this project is early in the design stage. Once completed, the redevelopment will deliver a world-class performing arts venue, while also providing practice spaces for the students of ANAM.

Structural works included:

- Demolition and reconstruction of the north west annex.
- A new student common lounge.
- Numerous strengthening areas to allow for the installation of heavy acoustic treatments and performance equipment.
- Upgraded main hall performance spaces.

Ruyton Girls School Performing Arts Refurbishment

MELBOURNE, VIC, AUSTRALIA
CLIENT: RUYTON GIRLS SCHOOL



BG&E delivered civil, structural, and façade engineering services for the major refurbishment of the auditorium, performing arts centre, and library facilities at Ruyton Girls School in the heart of Kew - seven kilometres east of Melbourne's CBD.

Designed by Sally Draper Architects, the new performing arts centre features a 650 seat auditorium, a basement drama space, and renovation of the existing library building. The project also tied into a historic late 1800s house that forms the music school, requiring the new basement to extend below the existing building to introduce a new lift shaft.

As of October 2024, the refurbishment is complete, offering an enhanced library building, and a high quality performing arts centre that will serve whole school assemblies, performances and public functions alike.



University of Melbourne, New Student Precinct

MELBOURNE, VIC, AUSTRALIA
CLIENT: UNIVERSITY OF MELBOURNE

The University of Melbourne is a prominent global institution renowned for its excellence in both teaching and research.

The newly developed student precinct aims to significantly enhance the on-campus experience at Parkville by creating a top-tier student hub for the entire campus community.

BG&E collaborated with Kane Constructions on this project, providing:

- Expertise in the design and detailing of façade elements and improving the performance of the existing façade.
- Preparation of a performance solution report to facilitate the building permit process.

Caulfield Grammar School

MELBOURNE, VIC, AUSTRALIA

CLIENT: CAULFIELD GRAMMAR SCHOOL

Established in 1881, Caulfield Grammar School is a leading independent co-educational school in Melbourne.

Located within the Caulfield Campus in St Kilda East, the new TL01 Teaching and Learning Building is the first major project within the Caulfield Master Plan recommendation to be delivered.

Completed in mid-2024, this building has set a benchmark for the actualisation of the rest of the Caulfield Grammar School expansion masterplan. TL01 is Australia's first education building to attain 6 Star Green Star and WELL Gold certification.

BG&E provided full façade consulting services from schematic design through to the construction phase of the project, including:

- A reflected glare assessment to assess and manage the potential impacts of the building's reflectivity on the surrounding environment.
- FP1.4 Weatherproofing consulting services.





Curtin University, B316 Sciences Building

PERTH WA, AUSTRALIA
CLIENT: CURTIN UNIVERSITY

Set for completion in 2027, the Curtin University B316 Sciences Building will house research and teaching laboratory facilities for science oriented faculties and the Western Australian School of Mines on the Bentley Campus.

The building is designed across five levels: one basement, a suspended ground floor, and three additional suspended levels with a roof above.

As a unique facility, Building B316 will include specialist research and teaching laboratories that require stringent structural performance, particularly regarding vibration control, to support the highly sensitive equipment housed within these spaces.

As of 2024, the B316 Sciences Building project has progressed to the early contractor involvement phase, with Lendlease engaged as the contractor. BG&E is providing structural and civil engineering services for this development.

Spanning approximately 20,000 square metres, the Sciences Building will be key in supporting Curtin University's goal to expand its STEMM (Science, Technology, Engineering, Mathematics, and Medicine) research and education programs.

Bob Hawke College

PERTH, WA, AUSTRALIA

CLIENT: WA STATE GOVERNMENT



Named after a former Australian Prime Minister, Bob Hawke, this \$68 million secondary school is a state-of-the-art learning institution with a 150 seat lecture theatre, modern library, and huge multipurpose indoor sports hall.

BG&E provided civil and structural engineering for Stage 1 of the development, in cooperation with the Bateman and T&Z Architects JV and other consultants.

The scope of Stage 1 comprised four three storey buildings that are interconnected with a covered link. The buildings are surrounded by a large, landscaped podium that is suspended over an underground carpark and classrooms.

The design was created with the option to alter some of the spaces in the future. The concrete frame has widely spaced concrete columns, a supporting post-tensioned flat plate slab, spans up to 11 metres long, and cantilevers up to four metres long. Concrete lift cores and strategically placed concrete shear walls provide lateral stability.

The design also includes a 115 metre by 50 metre post-tensioned and landscaped flat plate podium slab that interconnects two buildings. Jointing of this element with temporary movement joints was critical to control shrinkage.

BG&E played a crucial role in assisting the design team in negotiations with Water Corp, which enabled them to deliver a compliant piled structural solution that allows for the school to be built over an easement.

By 2025, this institution of academic excellence will accommodate up to 2,500 students.



*Bob Hawke College –
Perth, WA, Australia.*



Piara Waters Senior High School

PERTH, WA, AUSTRALIA
CLIENT: WA STATE GOVERNMENT

The Piara Waters Senior High School project in WA involved constructing a state-of-the-art educational facility to accommodate the growing population in the area. This project, completed at a cost of \$130 million, features an array of modern amenities designed to support a comprehensive educational experience.

BG&E was engaged to provide civil and structural engineering services for the project. The school embodies a forward-thinking architectural approach within a burgeoning suburban setting. Its architectural design, guided by clear planning principles, ensures both functionality and adaptability for future growth.

Stage 1 of the project, completed in early 2023, includes facilities for students from Years 7 to 10.

These facilities comprise an integrated education support centre, student wellbeing services, and specialised learning areas such as science laboratories, food science laboratories,

commercial kitchens, and workshops for metal and woodwork. The school also features extensive sports facilities, including AFL and cricket ovals, soccer and hockey fields, and courts for basketball, netball, and tennis.

BG&E contributed significantly to the creation of a modern, safe, and functional educational environment at Piara Waters Senior High School. This project is expected to alleviate the pressure on nearby schools, such as Harrisdale Senior High School, and provide local students with access to high-quality education and facilities.

Carine Senior High School

PERTH, WA, AUSTRALIA

CLIENT: WA STATE GOVERNMENT



The Carine Senior High School redevelopment project exemplifies the excellence of steel in modern construction. By leveraging the unique properties of steel, the project delivers a versatile, durable, and sustainable facility that enhances the educational experience.

The Carine Senior High School redevelopment project, backed by a \$32 million investment from the WA State Government, exemplifies a modern approach to educational infrastructure.

This ambitious project features a four storey building - integrating a ground floor gymnasium and a two storey teaching block above - underscoring the excellence of steel in its construction.

At the heart of this redevelopment is the state-of-the-art gymnasium, located on the ground floor. This expansive sports hall spans 24 metres in width without internal support columns, a feat made possible by the remarkable strength and versatility of steel. The column free design provides an unobstructed space for various physical activities and events.

The new facility seamlessly integrates into the existing campus, composed of multiple buildings at different levels, with interconnecting paths and stairs. Addressing these accessibility challenges was a key focus of the redevelopment. The building is strategically embedded into an embankment, supported by a seven metre deep piled retaining wall. Steel piles were selected for their exceptional load bearing capacity and durability, crucial for stabilising the embankment and supporting the new structure.

Aesthetically, the use of exposed steel elements adds a modern and sleek appearance to the building. The clean lines and contemporary design elements seamlessly blend with the existing campus architecture while signalling a forward looking approach to educational facility design.

This redevelopment not only addresses the current needs of the school community but also positions Carine Senior High School as a beacon of innovative and inclusive education for the future.



*Carine Senior High School –
Perth, WA, Australia.*

Alkimos College

PERTH, WA, AUSTRALIA

CLIENT: DEPARTMENT OF FINANCE



BG&E played a crucial role as civil and structural engineers for Stage 2 of Alkimos College's expansion. Our expertise ensured that the new buildings were not only modern and functional but also safe and resilient, meeting the high standards required for educational infrastructure.

The Alkimos College: Stage 2 project in the coastal suburb of Alkimos, around 40 kilometres north of Perth, expanded the existing educational facilities to accommodate the increasing student population in the Alkimos and Eglinton areas.

The \$52 million project, completed in time for the 2024 school year, added several new facilities to the college, significantly enhancing its capacity and educational offerings.

Stage 2 included:

- A student services area.
- Performing arts centre.
- Dance and visual arts studios.
- Dedicated music and specialist classrooms.
- STEM classrooms.
- Additional general learning classrooms.

These new facilities supported an extra 700 students, bringing the total student capacity to 1,450.



Roleystone Community College

PERTH, WA, AUSTRALIA

CLIENT: WA STATE GOVERNMENT

The Roleystone Community College upgrade project is a landmark initiative aimed at enhancing the educational infrastructure and sustainability of the school. This \$9.66 million project marks the first mass timber construction for a public school in decades.

The project comprised the delivery of:

- A new multipurpose building with a sports hall and change rooms.
- A drama centre with a performance space and two green rooms.
- Two new early childhood classrooms.
- College refurbishments, including:
 - Upgrading the science and information technology block to create a STEM laboratory.
 - Improving the existing science labs for both schools.

BG&E provided crucial civil and structural engineering services, ensuring the successful implementation of these upgrades. The project not only enhances the educational environment but also sets a new benchmark for sustainability and innovation in school construction.

Design documentation indicates a 49% reduction in upfront carbon emissions compared to a GBCA reference building, meeting the criteria for Exceptional Performance for Credit 21 – Upfront Carbon Emissions.

Heavy duty timber detailing was guided by the BG&E Timber team as the Australian standard AS1720 for timber structures was deemed inadequate for this project's scale - hence, EC5 1995 was used for the majority of main connections. The project also features the use of European Glulam instead of Australian supply, due to cost efficiencies. The Australian Glulam design was approximately 30-40% more expensive, largely due to supply costs in WA.

Brabham East Primary School

PERTH, WA, AUSTRALIA

CLIENT: WA STATE GOVERNMENT



BG&E was engaged by Bateman Architects to carry out civil and structural engineering design services for the new Brabham East Primary School.

This project has been selected by the WA Department of Finance to test and identify alternative approaches to the established primary school brief standard pattern primary school.

The project involved structural works for six new buildings, including two double storey teaching blocks, a single storey early education teaching block, a library, a covered assembly, and an administration building.



Rossmoyne Senior High School

PERTH, WA, AUSTRALIA
CLIENT: WA STATE GOVERNMENT

The Rossmoyne Senior High School redevelopment is a \$39.1 million project designed to expand and modernise the campus facilities.

BG&E provided structural and civil engineering services to support the staged redevelopment, which included:

- New facilities: construction of new science labs, a library resource centre, and updated sports facilities to enhance learning spaces and amenities.
- Demolition and refurbishment: removal of older classroom wings and facilities, and conversion of existing spaces for STEM labs and staff areas.
- Landscaping and access: upgraded landscaping with expanded playing fields and a new car park for improved accessibility.

Special attention was given to managing hazardous materials during demolition, due to the school's age.

This project is set to revitalise the campus, providing flexible, future-ready facilities to support student growth and modern educational standards, with completion expected by late 2025.

Chisholm Catholic College, Northern Development

PERTH, WA, AUSTRALIA

CLIENT: CATHOLIC EDUCATION OFFICE



Stages 17 and 18 of Chisholm Catholic College’s master plan included constructing a new two storey teaching block with associated site works and parking for nine new teaching and learning spaces that also serve as an extended examination centre.

The standalone building features a two way post-tensioned concrete first floor slab with in-situ concrete columns and walls. Additionally, a link bridge connects the new teaching block to the main school network.

BG&E was engaged in providing both civil and structural engineering design services for this project.



Scarborough Primary School Redevelopment

SCARBOROUGH, WA, AUSTRALIA
CLIENT: WA STATE GOVERNMENT

BG&E was engaged to provide structural and civil engineering services for the comprehensive redevelopment of Scarborough Primary School - a \$10.6 million investment designed to expand and modernise facilities and increase capacity from 300 to 366 students.

The redevelopment included:

- A new two storey teaching block, accommodating three kindergarten and pre-primary classrooms, five general learning area classrooms, toilets, storerooms, and staff areas.
- Existing building upgrades, including installing a new roof over existing school buildings.
- Additional on-site parking.

The Scarborough Primary School redevelopment aligns with the WA State Government's objectives to create adaptable, future-ready learning spaces. BG&E's engineering solutions ensured the structural integrity and functionality of the new facilities while minimising disruptions to the existing campus environment.

Pymble Ladies College

UPPER NORTH SHORE, NSW, AUSTRALIA
CLIENT: PYMBLE LADIES COLLEGE



The Secondary Innovation Precinct (SIP) represents the final phase of Pymble Ladies College Master Plan 2020, which guides development across Pymble Ladies College’s main campus.

BG&E’s scope included:

- Structural and facade engineering peer review of the SIP Architectural Design Competition.
- Civil engineering services for the detailed design and construction phase.

Targeted for completion by 2029, the SIP is designed to fulfil the College’s strategic vision for additional, state-of-the-art learning spaces for Year 11 and 12 students, offering a collaborative and technology enhanced educational environment.

The SIP proposal involved:

- Demolition of internal buildings.
- Construction of a terraced five storey building, presenting as three storeys from certain orientations due to the land slope.
- A central open atrium.
- A robotics lab.
- A multipurpose dining hall.
- A large lecture hall.
- Study and learning rooms.
- A campus green that includes an amphitheatre and outdoor event spaces.



School of Performing Arts, University of Western Sydney

SYDNEY, NSW, AUSTRALIA

CLIENT: UNIVERSITY OF WESTERN SYDNEY

The School of Performing Arts is nestled in Sydney's growing west and is an integral part of the University of Western Sydney's Kingswood Campus.

BG&E provided structural engineering for the progressive facility, which comprises areas for academic learning and practical experiences – including nine interconnecting dance studios, learning spaces, and an administration centre.

Key features of the project included:

- The three large dance studios comprised a steel framed structure, a precast facade, and steel roof sheeting. Careful consideration was made to the fire rating requirements of the steelwork to eliminate any fire protection requirements.
- All nine dance studios required specific details to limit acoustic and vibration breakout between the studios via the structural elements. A combination of cast on ground concrete and precast floors was used on the undulating site.
- The poor ground conditions required the installation of small piled foundations that could accommodate a future basement level.
- The external steelwork comprised a high performance protective paint coating for aesthetic reasons rather than hot dip-galvanising.

Randwick High School

SYDNEY, NSW, AUSTRALIA

CLIENT: RANDWICK HIGH SCHOOL

BG&E provided structural and civil engineering services from concept through to schematic design for major upgrades to Randwick High School, addressing future teaching and learning needs.

The primary project objective is to upgrade Randwick Boys High School and Randwick Girls High School to a co-educational facility, with lead-in works by Day 1 - Term 2, 2025, followed by the balance of refurbishment scope.

The proposed masterplan for an upgrade to co-education of Year Seven to 12 across both existing schools includes refurbishment and new build components.

The scope related to the refurbishment works undertaken by BG&E included:

- Upgrading amenities to provide men's and women's bathrooms.
- Refurbishment for Building I to provide a new and refurbished GLS, staff study, and lounge.
- Multiple internal refurbishments throughout both schools.





Wilton Junction Public School

WOLLONDILLY SHIRE, NSW, AUSTRALIA
CLIENT: NSW DEPARTMENT OF EDUCATION

BG&E provided structural and civil engineering services from the master planning phase through to the schematic design phase for the new Wilton Junction Public School, located in the Wilton Growth Area within Wollondilly Shire in southwest Sydney.

This upgrade was funded by the NSW Government's 2024-25 Budget, which included a \$3.6 billion investment in new and upgraded schools across Western Sydney.

The two stage development included 44 teaching spaces and an integrated uninterruptible power supply component.

Additional infrastructure that was also provided included:

- A hall and covered outdoor learning area.
- An integrated preschool building and carpark.
- Outdoor play areas, including sports courts and a playing field, with the potential for shared community use.
- Amenities.
- Landscaping, including landscaped outdoor learning areas.
- A carpark.
- A kiss and drop area.
- Road and service infrastructure, including new footpaths, and substation.

NextSense Centre for Innovation

MAQUARIE PARK, NSW, AUSTRALIA

CLIENT: NEXTSENSE



BG&E was engaged by NextSense to create a new Centre for Innovation across two interconnected pavilions within the Macquarie University campus.

The \$65 million development included:

- Zone 1: the main administration building, accommodating approximately 260 staff, custom designed as an allied health facility for people with hearing and vision loss. Up to three storeys, including the basement level.
- Zone 2: a preschool and primary school, accommodating up to 80 preschool children and up to 120 school children. In a single storey pavilion addressing Culloden Road.

Our team delivered structural and civil engineering services from the SSDA stage through to the 90% tender stage, for the design and construct tender.

Early contractor input was also provided during the design development stage to assist the design team with developing an economical and buildable design.

BG&E was subsequently novated to the successful design and construct contractor to complete the structural engineering services, including finalising documentation for construction and construction phase services. This involved onsite supervision and collaborating closely with the builder to ensure successful project delivery.

With regards to civil engineering, BG&E undertook the earthworks and pavement scope for this project, and as the hydraulic engineer, we undertook the grading and stormwater design scope.

Key design features included:

- Complex post-tensioned and reinforced floors, including curved set-downs and folds.
- Complex boardform wall finish elements in the concrete structure that wrap around the school boundaries.
- Large structural steel roofs with substantial cantilevers and spans.

Through close collaboration with ADCO Constructions, we successfully delivered a state-of-the-art facility. The new Centre for Innovation comprises two 5 Star Green Star buildings covering 14,000 square metres - with 5,300 square metres for educational purposes and 8,700 square metres for health and administration.

*NextSense Centre for Innovation -
Maquarie Park, NSW, Australia.*







Arthur Phillip High School

SYDNEY, NSW, AUSTRALIA

CLIENT: DELTA PRECAST

Arthur Phillip High School, one of the first high-rise public secondary schools in the State, stands at 18 storeys in the heart of Parramatta.

The building incorporates flexible technology-enhanced learning spaces with adaptable furniture and room configurations to support collaborative and personalised learning for up to 2,000 students.

BG&E provided structural engineering services - including tender bid design for the precast hollow-core floor slabs, engineering

coordination, concrete floor plank and topping designs, design layout drawings, slab topping plan drawings, temporary works, details sheets and specifications.

This multi-storey education facility is a prime example of refurbishment and adaptive reuse of a heritage building.

Hunter School of Performing Arts

NEWCASTLE, NSW, AUSTRALIA

CLIENT: RICHARD CROOKES CONSTRUCTION



BG&E was engaged to provide structural, civil, and value engineering, and Issued for Construction (IFC) services to support the redevelopment of the Hunter School of the Performing Arts (HSPA) in Broadmeadow - a selective, co-educational school specialising in the performing arts.

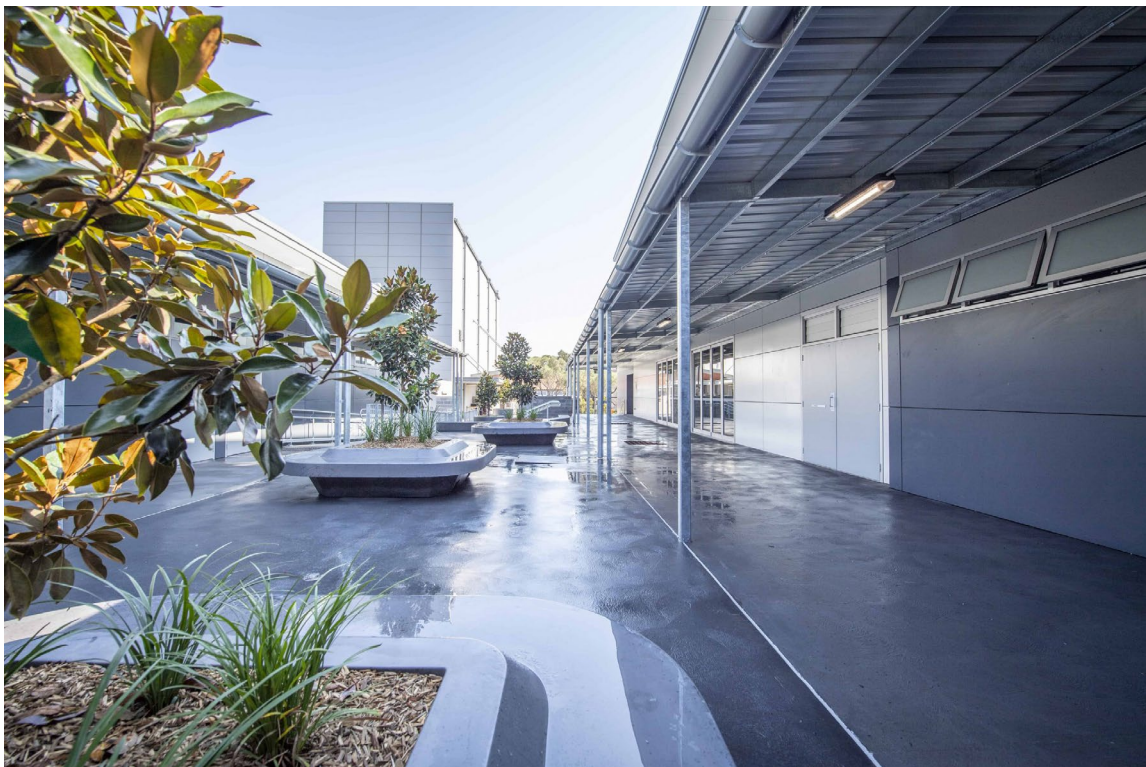
The site, designated as a flood refuge, required special structural and civil engineering to ensure that new structures and landscaping could withstand floodwaters and debris impacts.

The project included:

- A new multipurpose facility, which involved:
 - Demolition of the existing bini-dome.
 - Construction of a new facility, including a basketball court, a gymnasium, operable walls, a mezzanine level with tiered seating area, six modular learning spaces with storage rooms and amenities, and courtyards with planter boxes - all built on a suspended steel skid to allow floodwater passage underneath.
- Associated landscaping of the site of the old bini-dome and new outdoor games courts.

The foundations were custom designed, using steel screw piles connected to concrete posts with built-in tolerance for precise steel beam placement. This supported a Hebel Powerfloor AAC precast plank floor with a long-span steel framed roof and walls.

This system enabled an accelerated construction schedule: BG&E was engaged in July, issued the first design drawings in August, and reached substantial structural completion by November.



*Hunter School of Performing Arts -
Newcastle, NSW, Australia.*



Medowie Christian School

HUNTER REGION, NSW, AUSTRALIA
CLIENT: EPM PROJECT MANAGEMENT

BG&E was engaged by EPM Project Management on behalf of Medowie Christian School to provide structural and civil design services from concept through to the construction phase and final certification.

The project included:

- A new two storey administration building with a height of 7.8 metres, comprising meeting rooms, amenities, reception, executive offices, sick bay, and a staff common room.
- Ancillary site works, including demolition of the existing demountable buildings, excavation, removal of 32 trees, landscaping (including new pedestrian pathways and replacement planting of local endemic species), and 10 additional parking spaces.
- A stormwater management strategy, including stormwater pits and pipes to collect and convey stormwater flow from the new parking areas and building, upgrade of the existing OSD basin, and construction of water quality treatment measures.

The structure consisted of a steel frame, two storey, split level configuration with composite steel beams and Bondek concrete slabs for economic benefit and accelerated construction.

A large, reinforced block internal retaining wall divides the split levels, which required temporary state propping design before the level one slab was poured. High groundwater in clay soils created challenging construction and waterproofing conditions.

BG&E was later novated to Patterson Build for the construction phase. Earthworks and footings began in September, with the steel frame erected, slabs poured, and the building clad by February the following year. The rapidity of this construction was a testament to the thoughtful design and strong cooperation onsite.

St Nicholas Early Education Lochinvar

HUNTER REGION, NSW, AUSTRALIA
CLIENT: CATHOLIC DIOCESE OF MAITLAND

BG&E was engaged by the Catholic Diocese of Maitland to provide structural and civil engineering services from concept design through to construction phase support and signoff for contractor, Reitsma, for St Nicholas Early Education Lochinvar.

St Nicholas is a 144 place early education and care centre co-located with St Patrick's Primary School, with an award-winning play environment.

The new early education facility was constructed in response to the growing needs of local families for quality early education and care in the Hunter Region.

The project comprised:

- Three stand-alone buildings with waffle raft slabs, high long-span steel framed cathedral ceilings, and mezzanine service spaces.
- Outdoor structures, including tensioned shade awnings, play structures, and landscaping.
- Civil services, including a carpark, interface with council road, and stormwater drainage.



Nihon University Campus

NEWCASTLE, NSW, AUSTRALIA

CLIENT: BUILT



BG&E was engaged by Built to provide construction engineering services for the new Nihon University Campus at the former Newcastle Court House on Church Street. The project involved refurbishing the heritage listed, state significant courthouse and constructing new buildings.

In partnership with the University of Newcastle, Japan's Nihon University established an international campus in Newcastle, to attract both local and international students and expand its offerings.

BG&E's scope included:

- Scaffolding design, including the design of long-span elements over construction vehicle access zones.
- Assessment of existing structural elements for supports of scaffold posts and restraint of lateral ties.

- Peer review and inspection of scaffold, hoarding, and site fencing.
- Construction site support.
- Pre- and post-construction dilapidation reporting of the adjacent hospital, police and brick terrace building structures.

Opened in late 2024, the Nihon University Campus showcases a thoughtfully restored heritage building, flanked by a premier accommodation wing and teaching wing on either side.

TAFE NSW Kurri Kurri Campus

HUNTER REGION, NSW, AUSTRALIA

CLIENT: RICHARD CROOKES CONSTRUCTION

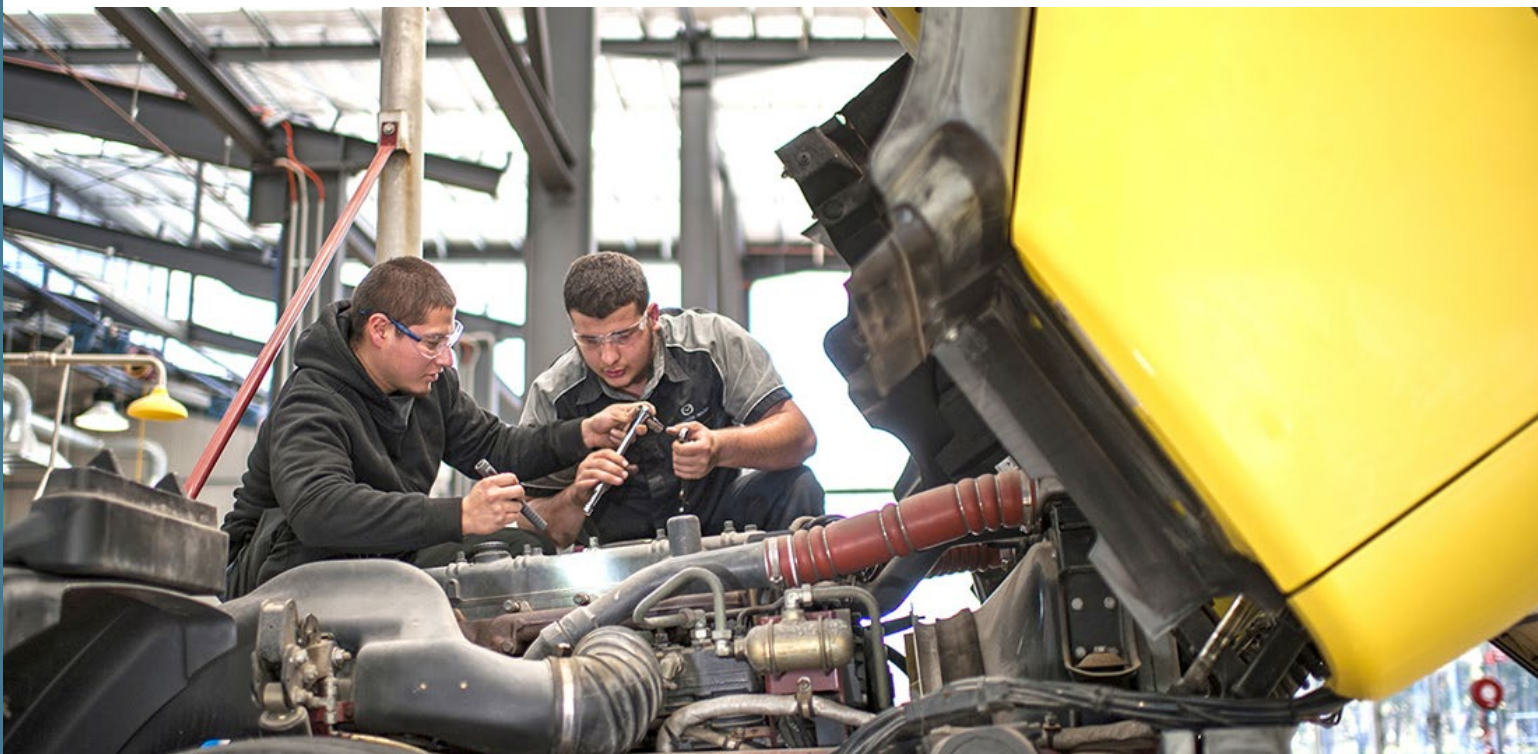
BG&E was engaged by Richard Crookes Construction to deliver the structural and civil design for a new plant and heavy vehicle training centre, along with major upgrades across the TAFE NSW Kurri Kurri Campus.

BG&E's scope included:

- A new plant and heavy vehicle training centre, including a new two storey, 1500 square metre brick and metal clad building.
- Major refurbishment, alterations, and extensions to several other existing buildings.
- New covered walkways and outdoor areas.
- Modification of the existing car park and partial reconstruction of the access road.

- Construction of extensive gabion retaining walls, new paving, landscaping, and associated site works and services.

The TAFE NSW Kurri Kurri Campus now provides students with the opportunity to learn new skills and gain practical experience in training environments that reflect real workplaces equipped with industry-standard equipment.





QASMT – Queensland Academy of Science, Mathematics & Technology

BRISBANE, QLD, AUSTRALIA
CLIENT: FKG GROUP

BG&E provided structural and civil engineering services for the \$30 million upgrade of the Toowong campus of the Queensland Academy of Science, Mathematics and Technology (QASMT) - a selective entry high school in the riverside suburb of Toowong in Brisbane.

The upgrade included a new four storey STEM building and a three storey general learning area building with link walkways and a middle school terrace between them.

The works also included internal upgrades to several other buildings around the campus with additional link walkways added to service student movements. The project was delivered under a ministerial designation instead of a traditional development application.

BG&E aided the contractor during their tender stage with significant value adding design inputs, which included:

- Changes to the structural scheme to aid in constructability and remove the need for two tower cranes.
- Removal of several column grids to make the structure significantly more economical.
- Reduction of all prestressed and reinforced concrete rates.

West End State School Expansion

BRISBANE, QLD, AUSTRALIA
CLIENT: HUTCHINSON BUILDERS

BG&E provided structural and civil engineering services for the \$34 million, Stage 2 expansion of West End State School.

The project featured:

- A four storey concrete framed building, including 18 classrooms, a resource centre, administration rooms, and a link building.
- A performance arts centre, including two music rooms, and a 500 seat auditorium.
- Essential amenities, including a car park, a commercial grade canteen suitable for events, and a tuckshop.

BG&E provided structural and civil engineering services for the whole project, including the design of the post-tensioned slab, structural steel structures including the roof and walkway, and structural steel framing supporting precast façade units.

The expansion has enhanced the school's facilities with new greenspace, including a playground area with tiered seating, shady trees, and a second grassed oval on Vulture Street.

This project, designed by Cox Architecture, represents a significant milestone for the local West End community, which has experienced considerable growth due to ongoing urban development efforts. The expansion has increased the school's enrolment capacity by accommodating over 2,000 additional students.





Murwillumbah High School Upgrade

MURWILLUMBAH, NSW, AUSTRALIA
CLIENT: HUTCHINSON BUILDERS

BG&E provided structural and civil engineering services for the upgrade of Murwillumbah High School, including its heritage listed main building, located in the Northern Rivers region of NSW.

As the primary structure of the Murwillumbah High School is heritage listed, BG&E was engaged by Hutchinson Builders to provide advice on its refurbishment, which included:

- Assessment of the structural condition of the building by conducting materials testing.
- Utilising the materials assessment as a foundation to develop a scope of works for the structural interventions on the building.
- Providing a remediation strategy to extend the design life of the building for an additional 25 years.

Funded under the 2023-24 NSW Budget, the upgrade of Murwillumbah High School provided significantly improved classrooms and specialist learning spaces with new paint, floor coverings, energy efficient LED lighting, air conditioning, furniture, fittings, and equipment.



Cleveland State High School

BRISBANE, QLD, AUSTRALIA
CLIENT: FKG GROUP

Cleveland State High School offers premium education to the local community, as a member of the Council of International Schools and an International Baccalaureate (IB) World School offering the IB Diploma Program.

BG&E were the structural engineers for the \$10 million general learning area building, a three storey structure that comprises part of Cleveland State High School. The project included the building and all link walkways between the adjacent buildings.

The new general learning area building will enable the Cleveland State High School to meet the educational requirements of the growing local population, remaining a pillar of the community.

Fortitude Valley State Secondary College – Stages 1 & 2

BRISBANE, QLD, AUSTRALIA

CLIENT: QLD DEPARTMENT OF EDUCATION



Fortitude Valley State Secondary College is the first school to open in inner-city Brisbane in over 50 years. This innovative educational facility embraces its urban surroundings and utilises the subtropical climate, fostering a vibrant learning environment that engages with the local community.

Designed by Cox Architecture, with Thomson Adsett delivering the final architectural design, the project won the Australian Institute of Architects Queensland Educational Architecture Award in 2021.

Stage 2 of the project consisted of a sports centre. BG&E provided construction engineering services, including managing the structural design for a 23 metre concrete floor that spans twin basketball courts. The proximity to a rail line required careful

consideration of rail impact loads and partial collapse criteria, with the entire structure built using precast elements.

BG&E's scope also covered the erection sequencing of precast components to assess their strength at various stages and the design of all temporary works to ensure stability. The team produced 4D-rendered animations, aiding communication of the construction sequence to on-site trades.



*Fortitude Valley State Secondary College –
Brisbane, QLD, Australia.*

Baringa State Secondary College (Caloundra South)

SUNSHINE COAST, QLD, AUSTRALIA

CLIENT: FKG GROUP



As part of the Queensland New Schools Program, the new Baringa State Secondary College Campus was completed and opened for the school year in January 2021.

Valued at \$47.5 million, BG&E was engaged by FKG Group on behalf of the QLD Department of Education to undertake the development of the new state high school in Caloundra South.

BG&E worked closely with FKG Group during the tender stage of the project to present value engineering options which allowed the project to be completed on time and under budget.

The work included the design and construct of:

- Six single, two, and three storey buildings.
- A sports hall and two fully enclosed basketball courts.
- A new car park, oval, and link roads.

Corymbia State School

PARK RIDGE, QLD, AUSTRALIA

CLIENT: QLD DEPARTMENT OF EDUCATION



BG&E was engaged from concept to detailed design, and the construction phase of the development of Corymbia State School, a new primary school constructed for the growing area of Park Ridge that will open for prep to year six students in term one, 2025.

The new school includes an administration, FamilyLinQ hub, early childhood education opportunities, state of the art classrooms, information and resource centre, canteen, multipurpose hall, outdoor multipurpose courts, sports oval, playgrounds, car parking, and under cover areas.

BG&E was engaged to complete the design and documentation of six new buildings, walkways, link bridges, and retaining walls for the new school.



Ripley Central State School

IPSWICH, QLD, AUSTRALIA
CLIENT: HUTCHINSONS BUILDERS

BG&E was the structural engineer for Ripley Central State School, a new educational facility located on a greenfield site in Brisbane's fastest growing region - the City of Ipswich.

The project involved:

- Building A: a three storey building that includes 25 learning areas and associated spaces, administration and staff areas, and a lower level student resource centre.
- Building H: a two storey building that includes a basement level carpark and storage spaces, and a ground level multipurpose hall featuring a sports floor, stage, and music learning spaces.
- Associated external works that include play areas, sports courts, an oval, hardscape areas and walkways, fencing, and carparks and roadways.

BG&E served as the structural engineers, collaborating closely with Hutchinson Builders - the design and construct contractor, and Hayball - the architect, to deliver the \$45 million project.

Ripley Valley Secondary College

IPSWICH, QLD, AUSTRALIA
CLIENT: FKG GROUP

BG&E provided civil and structural engineering design and construction services for Stage 2B of the development of Ripley Valley Secondary College, a new secondary school in the greater Ipswich region that opened in 2020 and caters to year seven to 12 students.

BG&E worked alongside FKG Group, who was engaged by the Queensland Department of Education, to deliver Stage 2B of the development, which included:

- A new performing art centre.
- Conversion of an existing block into new learning areas.

Notably, the structural design involved utilising tilt up concrete wall construction with structural steel trusses to span the performance studio.





Augustine Heights State School

IPSWICH, QLD, AUSTRALIA
CLIENT: FKG GROUP

To support the rapid growth in Queensland's fastest growing areas, the Premier of QLD announced a \$330 million investment to open four new schools in 2023.

Among them is Augustine Heights State School, an \$85 million primary school in Ipswich designed to accommodate 1,000 students.

BG&E provided structural and civil engineering services for the project, which included:

- An administration building.
- An information and resource centre.
- A multipurpose hall.
- A canteen.
- General learning areas.
- A sporting oval.
- Multipurpose courts and amenities.

Rosewood State High School & Walloon State School

IPSWICH, QLD, AUSTRALIA

CLIENT: QLD DEPARTMENT OF EDUCATION

BG&E was engaged by the QLD Department of Education to provide structural and civil engineering services, designing new learning centres for the expanding Rosewood State High School and Walloon State School, both located in the City of Ipswich and carried out under one contract.



The Rosewood learning centre, valued at \$16 million, includes six learning spaces, a staff room, staff and student amenities, storage areas, and an undercroft with capacity for future infill. In addition, the existing bus bay was upgraded, and a new car parking area was delivered as a part of the project.

The Walloon learning centre, valued at \$10 million, includes four learning spaces, a large undercroft, a lift, and associated facilities. A new outdoor multipurpose court was also constructed.

Beenleigh State High School Multipurpose Hall

BEENLEIGH, QLD, AUSTRALIA
CLIENT: HUTCHINSON BUILDERS

BG&E provided civil and structural value engineering, detailed design, and construction services for the new multipurpose hall at Beenleigh State High School.

Built by Hutchison Builders for the QLD Department of Education, the double court sports hall also features a raised performance stage, change facilities, amenities, a student gym, a theory classroom, staff offices, a kitchen, and a kiosk.





Griffith University Health Sciences Building

GOLD COAST, QLD, AUSTRALIA
CLIENT: GRIFFITH UNIVERSITY

BG&E was engaged by Griffith University to provide structural engineering services for the complete internal fit-out of the Health Sciences Building at its Gold Coast campus.

The project involved:

- Structural assessment of the existing building.
- Strengthening design to allow for modification of the structure.
- Demolition of the existing load-bearing walls.
- Modifications to the roof framing.
- Provision of an open internal layout.

As the largest of Griffith University's campuses, the Gold Coast location serves over 21,000 students and specialises in medicine, dentistry, and health.



Buranda State School Redevelopment

BURANDA, QLD, AUSTRALIA
CLIENT: ARKLAB ARCHITECTURE

BG&E was engaged to complete the design and documentation for Stage 1 of the Buranda State School Masterplan which aimed to redevelop the three original sites to integrate them into a consolidated school site, maximising the ability of the school to respond to forecasted future growth in the corridor.

BG&E were engaged to support Stage 1 of the Masterplan, which included:

- Providing additional temporary classrooms within Block A.
- Demolishing Block C.
- Providing a new administration building, resource centre, five general classrooms, and two specialist classrooms.
- Providing a new external stairwell and lift to connect the adjacent Martin Street and Cowley Street sites.
- Refurbishing the library and Block D into prep classrooms.
- Upgrading the lift and ramp access to the prep precinct.
- Refurbishing Block A to convert the existing administration centre to classrooms.
- Constructing a town square to improve play area amenities.
- Providing additional car parking.

This scope of work involved completing the detailed design of the suspended slabs, columns, walls, and steel roof structure. The building design also had the added challenge of being on the side of a 10 metre high cliff face, with different storeys founded at different levels.

At BG&E, we are united by a common purpose – we believe that truly great engineering takes curiosity, bravery and trust, and is the key to creating extraordinary built environments.

Our team of more than 700 highly skilled people, in 15 offices across Australia, New Zealand, South East Asia, the United Kingdom and Middle East, design and deliver engineering solutions for clients in the Property, Transport, Ports and Marine, Water, Defence, Energy and Resources sectors.

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