
SECTOR CASE STUDY

Hotels

Elizabeth Quay, Lots 2 & 3 — Perth, WA, Australia.



**BG
&E**
Part of SYSTRA

Jumeirah Beach Residences

STRUCTURAL

DUBAI, UNITED ARAB EMIRATES

CLIENT: DUBAI TECHNOLOGY, ELECTRONIC COMMERCE & MEDIA FREE
ZONE AUTHORITY

BG&E provided structural engineering services for Jumeirah Beach Residences — the foundation of a thriving waterfront community on Dubai’s coastline that comprises 35 residential towers and four hotels on shared podium sprawled across a 230,000 square metre site.

The tower buildings and hotels range from 10 to 46 levels, above a four to five level podium that covers most of the site.

BG&E provided the Theme Architect with master planning and schematic design, while detailed designs for four of the tallest buildings were delivered for the Dubai Technology, Electronic Commerce and Media Free Zone Authority.

The elongated site, about 1.7 kilometres long and width varying between 70 metres and 200 metres, lies between the Dubai Marina and the coast adjacent to the Hilton Dubai Jumeirah, Sheraton Jumeirah Beach, Ritz Carlton, Oasis Beach, Metropolitan Resort, and Le Royal Meridian hotels — all meccas for the thousands of visitors to one of the most popular Middle Eastern destinations.





JW Marriott Marquis Hotel

STRUCTURAL

DUBAI, UNITED ARAB EMIRATES
CLIENT: EMIRATES GROUP

Upon completion in 2012, this awe-inspiring development was the world's second tallest hotel, with twin-tower skyscrapers standing 355 metres high in Dubai's skyline.

BG&E provided structural engineering services for the high-rises that include the following key features:

- Twin concrete-frame towers on piled raft foundations.
- Glazed guest lifts in the 80 storey towers.
- Expansive podium areas with tall, unrestrained tower columns.
- Stability via the use of a concrete core and outrigger walls.
- Transfer structures at first hotel floors above the podium.
- Post-tensioned flat plate slabs.

This timeless luxury hotel features 1,364 guest rooms, 240 suites, four Presidential Suites, a banquet hall, an auditorium, 18 specialty retail stores, 19 restaurants, and a day spa, all surrounded by perfectly manicured landscaping.

Grosvenor House

STRUCTURAL

DUBAI, UNITED ARAB EMIRATES

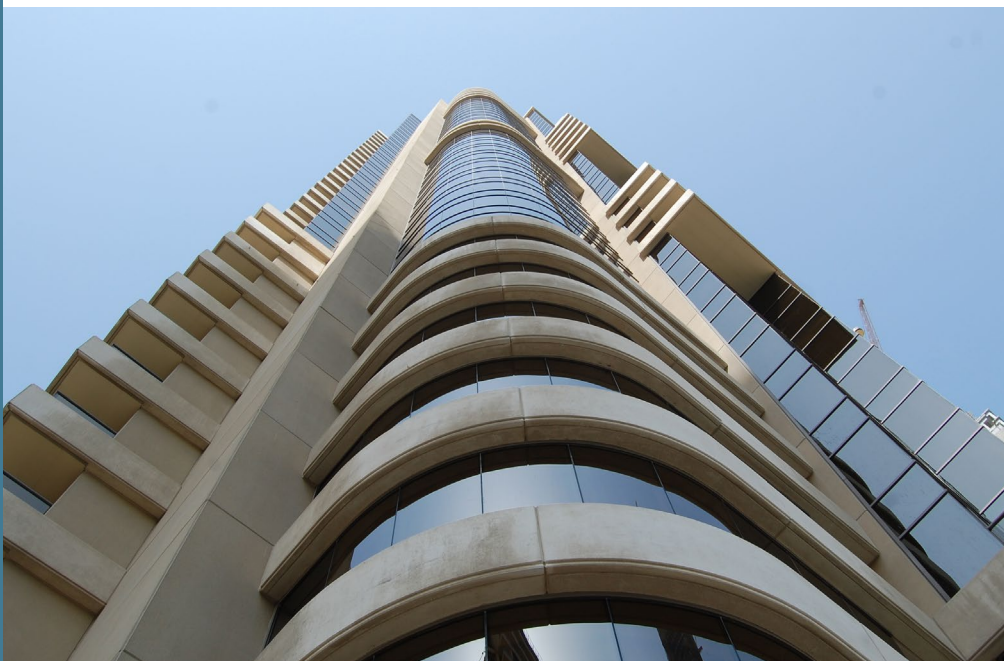
CLIENT: SHEIKH AHMED BIN SAEED AL MAKTOUM

BG&E provided structural design engineering services for Grosvenor House — Tower 1, the first hotel to open in the iconic Dubai Marina.

Standing at 210 metres or 48 storeys, the high-rise structure comprises a five star hotel and serviced apartments, as well as luxurious conference, banquet, and food and beverage facilities.

Occupying an 8,000 square metre plot at the northern mouth of the Dubai Marina, the three storey basement construction made use of proprietary precast planks alongside precast band beams and a composite structural concrete topping. This process enabled the efficient construction of the three below ground floor levels and early commencement of the superstructure.

The vertical elements — columns, cores, and shear walls — were constructed using high-strength concrete, drawing on experience gained by BG&E's Buildings team from the construction of the Emirates Tower project. This approach reduced reinforcement requirements and bar diameters, facilitating off-site prefabrication of column wall and reinforcement cages.





Castle Residences

STRUCTURAL | CIVIL

SYDNEY, NSW, AUSTRALIA

CLIENT: UNITED DEVELOPMENTS SYDNEY

BG&E provided structural engineering services for Castle Residences and The Porter House Hotel, a mixed-use development in the heart of Sydney with a unique design — a 37 storey tower cantilevering over the heritage-listed Porter House building, originally built in 1876.

The slender composite tower comprises both hotel and residential levels, supported by an eight storey basement. At level 11, the tower cantilevers 10 metres over the historic Porter House, with three concealed four storey steel trusses supporting the 27 storeys above.

Located on the corner of Castlereagh and Bathurst Street, the site required a soldier pile retention wall along its full perimeter, designed to accommodate the adjacent heritage structure and Roads and Maritime Services interface.

The foundation system was developed above the Cross City Tunnel (CCT) that runs approximately 20 metres below the bulk excavation level. During construction, a Sydney Metro tunnel was also excavated parallel to the site, five metres from the eastern rock face.

The project was designed in accordance with RMS Technical Direction for Deep Excavations (GTD2012/001), with excavation depths reaching up to 25 metres.

Shell Cove Harbour Hotel

STRUCTURAL

SHELL HARBOUR, NSW, AUSTRALIA
CLIENT: OSCARS



Located in the heart of Shell Cove's town centre and harbour precinct, the proposed Shell Cove Harbour Hotel is an 11 storey mixed use development comprising a four level basement adjacent to sea level, 191 hotel rooms and residential apartments, a day spa, three pools, bars and dining rooms, and conference and ballroom facilities.

BG&E is providing structural engineering services for development, including the design of the superstructure and four level basement. The structure incorporates hydrostatic slabs and walls, with extensive use of precast load-bearing wall panels to assist constructability.

A key design consideration was the hydrostatic pressure on basement elements, with the building classified as Importance Level 3 due to the inclusion of public assembly spaces such as the ballroom and function rooms.



Oxford Street Hotel

STRUCTURAL | CONSTRUCTION ENGINEERING | FAÇADE DESIGN

SYDNEY, NSW, AUSTRALIA

CLIENT: BOSTON GLOBAL

In 2019, BG&E was engaged for a \$200 million revitalisation project for Sydney's Oxford Street. West's Olympia Theatre at 1 Oxford Street in Paddington is one of three heritage blocks approved for transformation from a heritage cinema into a boutique hotel.

Oxford Street Hotel required flexibility in design to accommodate latent and changing site conditions. The project comprised top-down construction, including plunge columns, slabs confined within retained heritage walls, and a construction platform. Temporary works challenges were exacerbated by restricted site access.

BG&E provided structural engineering for both permanent and temporary works design from concept through to construction. BG&E has also provided a structural engineering assessment report for the building plan approval, alongside structural and façade design services to retain the heritage façade.

The successful retention of the heritage façade required significant strengthening, demolition, and temporary works, while navigating the complexity of Busby's Bore — a heritage Sydney Water asset that passed through the centre of the site with an unknown location.

To overcome this challenge, extensive on-site modifications and coordination of shoring piles and temporary propping were required to accommodate varying ground conditions and to mitigate any potential impact on Busby's Bore while working around existing structures and neighboring properties.



Holiday Inn Darling Harbour

STRUCTURAL

SYDNEY, NSW, AUSTRALIA

CLIENT: GOLDEN SWAN INVESTMENTS

Originally construction in 1890, this heritage building in Darling Harbour precinct had previously gone through refurbishment with a mix of construction materials and framing systems completed in different periods. BG&E took on the challenge to significantly transform the technically challenging existing structure into the largest Holiday Inn in Australia, at the time of refurbishment.

The original brick masonry building from 1890 was expanded in 1989 with a separate reinforced concrete framed structure. This introduced design complexity in the refurbishment scope to further extend three additional storeys above the existing nine storeys, whilst the building remained fully operational during construction.

The proposed additional loads required a full review of the existing building structure, including pile foundations, columns and transfer beams.

Various structural options were considered for the new extension and a lightweight mix of timber and steelwork construction resulted to be the most cost-effective solution. The design had minimal strengthening of selected transfer beams and columns, with no impact on the existing hotel layout. The additional three storeys provided a significant increase of the seismic loads to the building that had been constructed prior to the requirement for seismic loading. This required strengthening for full compliance to the current earthquake code.

West Side Place

FAÇADE

MELBOURNE, VIC, AUSTRALIA
CLIENT: FAR EAST CONSORTIUM



Located in central Melbourne at 250 Spencer Street, West Side Place is a \$2.5 billion development representing the largest bluestone façade installation in Australia to date, delivered by BG&E Façade Consultants.

BG&E Façade Consultants drove the visionary design of the West Side Place towers, from early architectural concept development through to the design development and construction phases of the project.

This project involves the delivery of complex and innovative façade typology, including tensile cable structures façades, different façades materiality, and modular façade systems.



The façade itself is characterised by its tessellated articulation and consists of a complex unitised curtain wall with sloped and folded panel types. The podium façades, spanning over 11,000 square metres, feature bluestone panels meticulously installed as a curtain wall system. Representing the largest bluestone façades installed in Australia to date, this achievement is the result of rigorous testing and innovative methodology to ensure the installation meets stringent structural and safety design requirements.

This groundbreaking mixed-use development boasts four luxury towers, ranging in height from 63 to 85 storeys, offering a total of 2,853 luxe apartments.

Connecting these four towers is a 10 storey podium that houses a ground floor lobby, 3,000 square metres of retail space, and basement car park facilities for visitors and residents alike.

Among these towers, Tower 1 stands as a pinnacle, soaring at a height of 270 metres and earning its place as Melbourne's second tallest building. The upper 15 levels of the tower house the flagship location of the Ritz-Carlton Hotel — complete with a majestic sky lobby. Below, the remainder of the tower will consist of high-end residential apartments.

*West Side Place —
Melbourne, VIC, Australia.*

Ramada by Wyndham VetroBlue Apartment Hotel

STRUCTURAL

SCARBOROUGH, WA, AUSTRALIA
CLIENT: RAMADA

The VetroBlu Apartment Hotel development, located in the heart of Scarborough and designed by Hartree + Associates Architects, comprises a mix of ground level commercial tenancies and 52 hotel and short-stay accommodation units and apartments.

BG&E provided structural engineering services for the ten storey development that comprises:

- Two levels of car parking at the basement level and the upper ground suspended level.
- Commercial and retail tenancies at the lower ground suspended level (current ground level).
- Short stay accommodation at level one.
- Residential apartments from level two to eight with a roof terrace area and two storey penthouse apartments.

Part of a larger redevelopment plan to activate the Scarborough region, the VetroBlu Apartment Hotel stands as an iconic building that responds to the coastal context on a prominent corner site.



Elizabeth Quay, Lots 2 & 3

STRUCTURAL | CIVIL

PERTH, WA, AUSTRALIA
CLIENT: CA CORPORATION

The \$300 million development of Lots 2 and 3 Elizabeth Quay (EQ West), represents a key component in realising the vision for one of Perth's premier inner-city precincts.

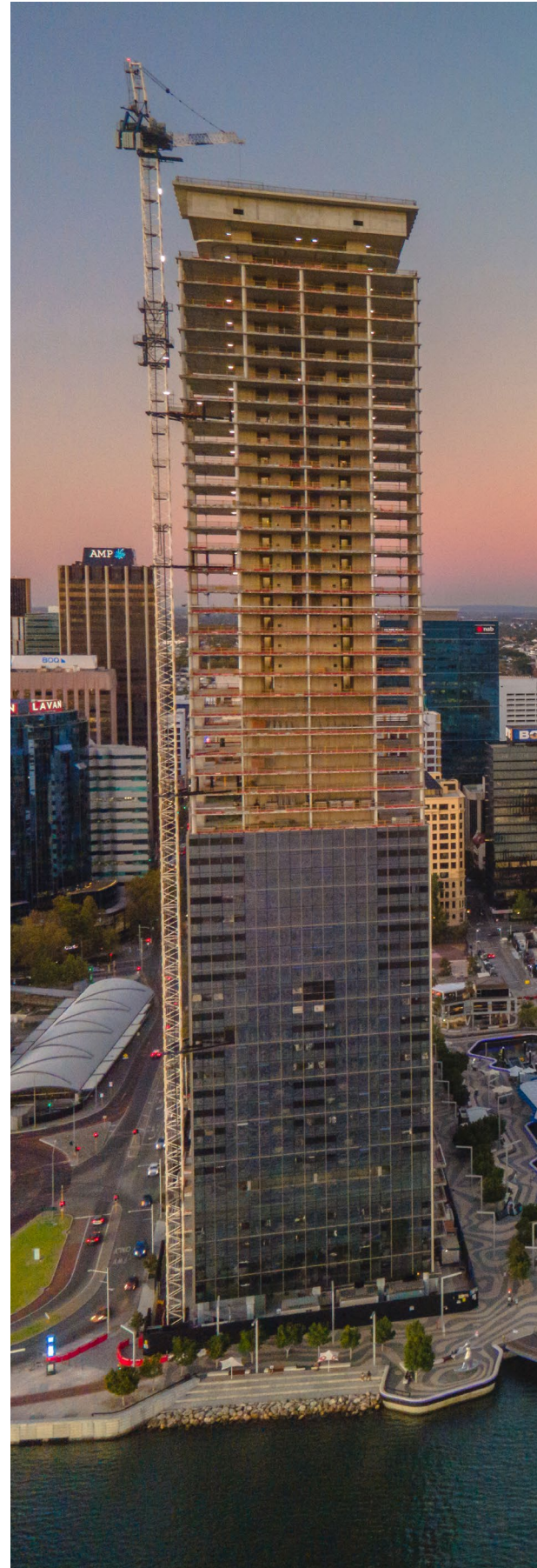
BG&E provided the structural and civil engineering services for the design savvy, integrated mixed-use development.

EQ West includes:

- 180 metre, 52 storey tower.
- 100 metre, 25 storey tower.
- Four basement levels.

Together, they comprise 493 residential apartments, a 190 room hotel, contemporary commercial space, end of trip facilities, an art gallery and viewing deck, back of house facilities and car parking.

The tower floors have been designed with post-tensioned concrete slabs and the buildings' lateral stability is provided by the lift and stairwell cores, plus the supplementary shear walls. Wind studies were undertaken by specialist wind consultants to optimise wind loading on the residential tower, as well as to assess the lateral drifts and horizontal accelerations under service winds.



RUAH Community Services

STRUCTURAL

NORTHBRIDGE, WA, AUSTRALIA
CLIENT: RUAH



Designed by Architectus for Western Australia's Ruah Community Services, this \$27 million, seven storey multi-functional facility occupies a 694 square metre site in Perth.

BG&E provided structural engineering services for the development that offers comprehensive support for women and children, including those escaping family violence.

The building features a concrete frame with post-tensioned concrete floors. The internal layout includes:

- Three levels for women's health and family empowerment services.
- Two levels for support services.
- Two levels for short-term accommodation.



Melbourne Hotel

STRUCTURAL

PERTH, WA, AUSTRALIA
CLIENT: OAKSFIELD

BG&E provided structural engineering services for the redevelopment of the iconic, heritage-listed Melbourne Hotel in Perth's CBD, transforming it into a seven storey, 4.5 star hotel.

The project involved the refurbishment of the original heritage building, demolition of an existing extension, and construction of a new structure to accommodate function rooms.

The redeveloped Melbourne Hotel now features 73 new or refurbished hotel rooms, new dining and fitness amenities, cocktail and public bars located on the ground floor, private function rooms located on level one, and a rooftop bar located on level six.

Features:

- CFA piling system along the perimeter wall adjacent to existing building foundations.
- 750 millimetre diameter bore piles to support internal columns and 1300 millimetre thick raft on piles under the lift and stairs core walls to provide lateral stability and for future provision of an office tower.
- Post-tensioned flat slab floor systems provide both a thinner structure and speed up construction by reducing forming and maximising lettable space.
- Façade in glazing and aluminum panels.

Sydney Charles Quarter

STRUCTURAL

LEEDERVILLE, WA, AUSTRALIA
CLIENT: APPL GROUP

BG&E is delivering full structural engineering services for Sydney Charles Quarter (SCQ) — a landmark mixed-use development transforming a prominent 1.95 hectare site in West Perth. Set across four buildings — housing residential, commercial, retail, and hotel uses — the precinct is unified by “The Commons,” a 5,600 square metre public open space designed to create a vibrant urban village.

SCQ responds to significant topographic challenges, with a seven metre site fall from Newcastle Street to Old Aberdeen Place, driving complex basement design and retaining solutions. A concrete frame solution underpins the residential towers and hotel, supported by raft and pad footings, while steel framing is used for the distinctive sawtooth roofs and architectural features. The structural systems were developed to minimise transfer structures, accommodate irregular grids, and optimise buildability across podium, tower, and heritage interfaces.

A key feature is the adaptive reuse of the 1960s Pickle Factory. BG&E is undertaking detailed structural analysis and upgrade works to meet seismic standards and extend the building’s life. The structural solution integrates heritage preservation with contemporary performance, ensuring the revitalised factory becomes a vibrant hospitality offering within the precinct.





Lots 9 & 10, Elizabeth Quay, Ritz-Carlton Hotel

FAÇADE

PERTH, WA, AUSTRALIA

CLIENT: FAR EAST CONSORTIUM

Elizabeth Quay's waterfront precinct has seen the transformation of Lots 9 and 10 into two striking towers, housing the prestigious 6-star Ritz-Carlton Hotel and luxury residential apartments and their accompanying amenities.

The façade for the towers is a high-performing unitised curtain wall system with high-performance glass and an integrated operable window system connected to the build monitoring system. These Lift Tilt Operable Windows (LTOWs) are the largest of their type in the world.

BG&E Façade Consultants provided services during the construction stage to assist the owner, Far East Consortium.

We were initially engaged during schematic design, and during the design development phase for the LTOWs, following which we provided extensive services during the construction phase to completion.

The development was completed and handed over in 2021.

Hyde Park Hotel

STRUCTURAL | FAÇADE

PERTH, WA, AUSTRALIA
CLIENT: KYKO GROUP



In 2023, the prime location of 37 Pier Street, situated in the vibrant heart of Perth CBD, was acquired for a sum exceeding \$20 million. Under new ownership, the hotel is undergoing a significant transformation into a lifestyle hotel with modern amenities that will attract both travellers and the local Perth community.

BG&E was engaged by Total Project Management alongside architects Hames Sharley to refurbish the existing hotel façade, implementing a contemporary glazing and cladding scheme.

The façade's revitalisation will breathe new life into the hotel's exterior – aligning it with the upgraded interior and enhancing its capabilities in both aesthetics and performance – specifically, in acoustic and structural specifications.

BG&E Façade Consultants provided the following services:

- Advice on façade design and interfaces.
- Wind assessment and base façade requirements.
- Review of contractor documentation and installation.
- Specialist advice on the façade system, enabling an FP1.4 performance solution pathway.

BG&E also provided structural design and engineering services, encompassing:

- Floor usage changes and loading assessments.
- Strengthening works, including provisions for load bearing wall removal, additional feature stairs, mechanical and plant upgrades, and additional event spaces.
- Seismic assessment of the existing and modified structure.
- Construction engineering advice and temporary works design.

As of mid-2024, this redevelopment is currently under construction.

*Hyde Park Hotel —
Perth, WA, Australia.*



Hotel Grand Chancellor

CONSTRUCTION ENGINEERING

AUCKLAND, NEW ZEALAND
CLIENT: NZ STRONG



Grand Chancellor has boosted its network within New Zealand by delivering Grand Chancellor Hotel Auckland in the heart of the city's CBD — a four-star 12 storey newbuild hotel situated between two buildings on Wellesley Street West.

BG&E provided construction engineering services for the 191 room hotel that boasts a ground floor café and first floor restaurant.

The internal design of the new hotel includes a nine storey mural etched into the precast panels at the southern end. The mural will reflect a forest setting and will be complemented by an array of native plants scattered around the hotel.

Hotel Indigo

CONSTRUCTION ENGINEERING

AUCKLAND, NEW ZEALAND

CLIENT: MARIN CONSTRUCTION (JACKING SYSTEMS)

Hotel Indigo Auckland is a mixed use 41 storey development comprised of a boutique hotel, residential apartments, and multiple food and beverage outlets.

Located on the lower 28 floors of Hotel Indigo is a four-star hotel that boasts 225 rooms, an all-day restaurant and bar, fitness centre and flexible working and conference areas. The upper levels 29 to 41 of the build comprise residential accommodations that offer stunning views of Auckland's harbor.

The building's original 1912 façade will be retained and incorporated into the hotel to highlight the heritage of the area and lend charm to the development.

BG&E contributed construction engineering and independent verification of jumpform and CPB to the mixed-use build.

One of the tallest towers in the Auckland skyline, Hotel Indigo is a world-class destination for travelers looking for a local experience paired with the security and amenity of a global brand.

Hotel Indigo debuted in late 2022.



Laheq Island

STRUCTURAL | TIMBER DESIGN

KINGDOM OF SAUDI ARABIA

CLIENT: CHAPMAN BDSP & RED SEA GLOBAL



This ambitious luxury resort island project for the Kingdom of Saudi Arabia (KSA) aims to reshape the region into a premier international tourist destination.

Designed by Foster and Partners architects, the project aims to turn the existing island into a luxurious resort destination that features an 800 metre diameter ring hotel with a central lagoon, over 550 luxury villas, and various amenity buildings, including beach clubs, restaurants, entertainment destinations, an 18-hole golf course, and associated amenities.

BG&E's role on the SAR 12 billion valued project involved:

- Design of 43 luxury villas, ranging from three to eight bedrooms, each with a unique architectural style and character.
- Design of nine different common amenity buildings, with two set to be constructed over the shallow waters just off the coast of the island.

Preserving the project's architectural vision, BG&E collaborated with Timber Design Studios to incorporate extensive use of structural timber throughout. This included internal and external elements like pergolas, canopies, and roof structures. Notably, the use of exposed glulam timber beams and CLT panels in the Golf Clubhouse entrance achieved seven metre cantilevers, creating a memorable arrival experience for guests. The timber theme was seamlessly extended to each villa community to ensure the barefoot luxury feel of the island. BG&E and TDS worked closely with Fosters to ensure distinct architectural expressions for the four communities through specific framing methods and species selection.

Our Designer's had to overcome several challenges to deliver the project, including:

- Ensuring durability of the structures in an extremely aggressive environment, including marine structures and timber elements.
- The projects very remote location and difficulty involved in transportation of labour and materials meant maximising the use of off-site manufacturing.

*Laheq Island —
Kingdom of Saudi Arabia.*





Renaissance Hotel

STRUCTURAL | MATERIALS & DURABILITY SERVICES

MANCHESTER, UNITED KINGDOM
CLIENT: PROPERTY ALLIANCE GROUP

The four-star Renaissance Hotel in Manchester has been closed since July 2020, in anticipation of an ambitious redevelopment by Property Alliance Group. Instead of taking the traditional demolish and rebuild route, the original hotel tower will be retained, undergoing restoration and upcycling.

The revamped 216 bedroom hotel, part of SH Hotels & Resorts, will operate under the 'Treehouse' brand. This project is a key component of the £181.6 million redevelopment plan for the Deansgate site, marking the second Treehouse Hotel in the United Kingdom, after the first in London.

BG&E is providing structural engineering and materials technology services for the refurbishment project. Our innovative technical solutions will significantly cut the development's embodied carbon emissions, facilitating owners and operators in achieving BREEAM Certification. The forecasted environmental benefits are substantial, projecting a remarkable 40% reduction in CO₂ compared to constructing a new hotel of the same size.

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 800 highly skilled people, in offices across Australia, New Zealand, Singapore, 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.

