



DESIGNING GLOBAL SKYLINES

OUR GLOBAL PORTFOLIO
OF HIGH-RISE PROJECTS



**PARSONS
BRINCKERHOFF**

“ENGINEERING HIGH-RISE BUILDINGS IS HALF ART, HALF SCIENCE – AN ARTFUL APPLICATION OF SCIENCE EMPOWERED BY EXPERIENCE.”

AHMAD RAHIMIAN, DIRECTOR OF BUILDING STRUCTURES, USA

CONTENTS

DESIGNING GLOBAL SKYLINES	04
OUR PROJECTS	09
THE ONLY WAY IS UP	10
NORTH AMERICA	12
EUROPE, MIDDLE EAST AND AFRICA	30
CHINA AND SOUTH EAST ASIA	50
AUSTRALIA	68
OUR SERVICES	78
ABOUT US	80
CONTACT DETAILS	82

DESIGNING GLOBAL SKYLINES

FOR MORE THAN A CENTURY WSP | PARSONS BRINCKERHOFF HAS BEEN HELPING TO SHAPE THE SKYLINE OF CITIES THROUGHOUT THE WORLD. WE'RE LEADERS IN THE DESIGN OF TALL BUILDINGS, PIONEERING THE TREND TO BUILD HIGHER AND SLIMMER TO OPTIMISE VALUABLE REAL ESTATE IN OUR DENSE URBAN ENVIRONMENTS.

Our expertise makes it possible for architects to push the boundaries of their aesthetic visions and for our clients to realise their goals. We have a long history of innovation and a reputation for meeting engineering challenges with imaginative thinking coupled with common sense solutions. Buildings engineered by WSP | Parsons Brinckerhoff stand the test of time and make a positive contribution to our cities' economies, society and the environment.

Our portfolio includes iconic global landmarks such as the Shanghai Tower, the World Trade Center, The Shard, Petronas Towers and Marina Bay Sands, while current projects range from high quality commercial and mixed-use mega-towers across Asia to some of the most desirable, super-slimmer high-rise residential developments in New York.

CREATING THE HIGHEST VALUE

We add value to our projects by listening carefully to our clients to ensure we meet their commercial requirements and the needs of building occupants in addition to delivering buildings that are safe, sustainable and cost-effective. We have pioneered engineering techniques that have reduced build times, realised additional floors and maximised space in the most awkward of footplates.

From the earliest design stages, we plan for the diverse uses of a building through its whole life cycle, focusing on efficiency and economy and the flexibility to adapt to future needs. We optimise the building structure to maximise the lettable area; and we optimise the building performance by including energy-efficient systems to reduce operational costs.

BUILDING HIGHER AND SLIMMER THAN EVER BEFORE

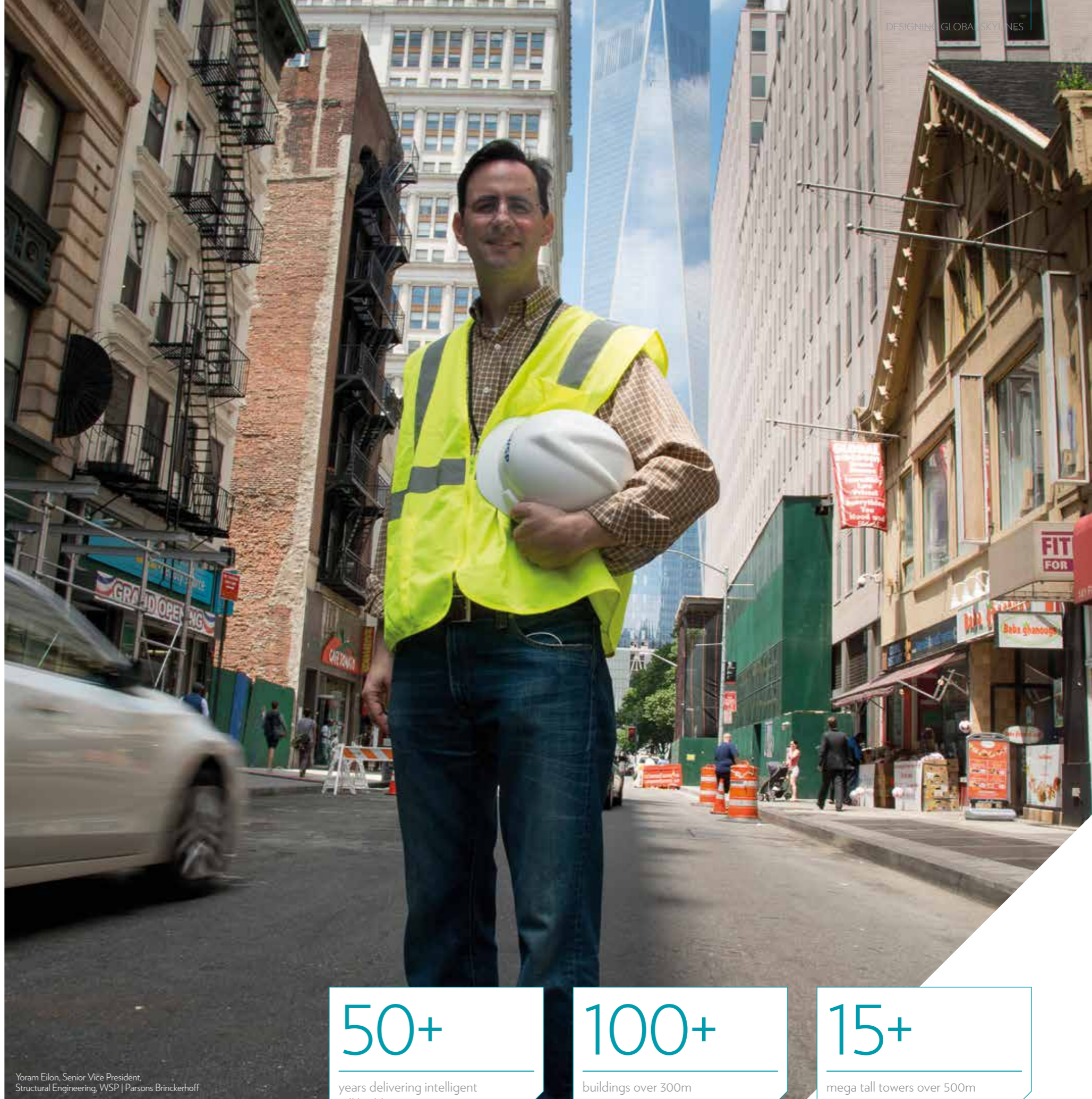
Our engineers are enabling a new generation of landmark mega-towers and super-slimmer buildings.

Through our innovative design approach and use of materials we ensure that the form and function of our mega-towers are perfectly adapted to the different needs of the people who use them.

Our designs for tall, slim towers help developers make the most of limited real estate in urban areas, and capitalise on small and constricted sites to create highly desirable residences with magnificent views and high market values.

DELIVERING TECHNICAL EXCELLENCE IN EVERY RESPECT

Our centres of excellence in the design of tall buildings offer world-class design skills which we integrate with local detailed design delivery and relationship management. Our talented and experienced engineers are equipped with the most sophisticated design tools, and constantly explore new ways to design and build using innovative materials and advanced methods of construction.



Yoram Eilon, Senior Vice President, Structural Engineering, WSP | Parsons Brinckerhoff

50+

years delivering intelligent tall buildings

100+

buildings over 300m

15+

mega tall towers over 500m



Swanston Central, Melbourne, Australia

Our expertise allows us to:

- Mitigate the impact of wind turbulence on tall buildings through the innovative use of higher strength concrete and steel, and the development of acceleration damping devices
- Ensure the stability of very tall buildings even in the most unstable of ground conditions such as earthquake zones
- Deliver robust buildings that protect against disproportionate collapse in the event of localised damage
- Deliver buildings that withstand the effects of extreme events
- Develop new construction techniques to streamline building construction and minimise costs.

SUSTAINABILITY WITH A VIEW

We're committed to minimising the burden of our projects on the environment, while maximising the benefits they offer economically and to society. We have a long heritage of

specialist green building design, always at the forefront of the development of new, sustainable technologies to reduce the environmental impact of tall buildings. We consider the overall emissions and resource consumption over the whole lifespan of a building, and prioritise strategies such as using recycled or locally sourced materials, low carbon building services design and minimising waste.

STIMULATING URBAN ECONOMIES AND REVITALISING CITY CENTRES

Our tall building projects are catalysts for urban regeneration, stimulating growth by creating places where people enjoy living, leisure and shopping as well as working. They put people back in the heart of cities.

We pay close attention to how buildings interact with people and public spaces at street level, and contribute to the creation of attractive, comfortable streetscapes through the expertise of our urban development and transportation planners and the use of advanced modelling technology.

WORLD-CLASS ENGINEERING SKILLS FROM CONCEPT TO COMPLETION

We are unique in our ability to provide the entire range of engineering, design and planning disciplines, which means we can see tall building projects all the way from the earliest planning stages through to operation. Our role ranges from lead consultant to providers of a range of specialist services, including:

- Structural design
- Civil engineering
- Geotechnical engineering
- Seismic design
- Wind engineering
- Building services design
- Façade design
- Fire engineering
- Acoustics, noise & vibration
- Vertical transportation
- Specialist lighting
- Green building design
- ICT
- Transport planning and regeneration
- Security

“WE ARE UNIQUE IN OUR ABILITY TO PROVIDE THE ENTIRE RANGE OF ENGINEERING, DESIGN AND PLANNING DISCIPLINES.”

OUR PROJECTS

WE ARE PROUD TO BE WORKING ON MANY EXCITING HIGH-RISE BUILDINGS WITH THE WORLD'S TOP DEVELOPERS AND RENOWNED ARCHITECTS.

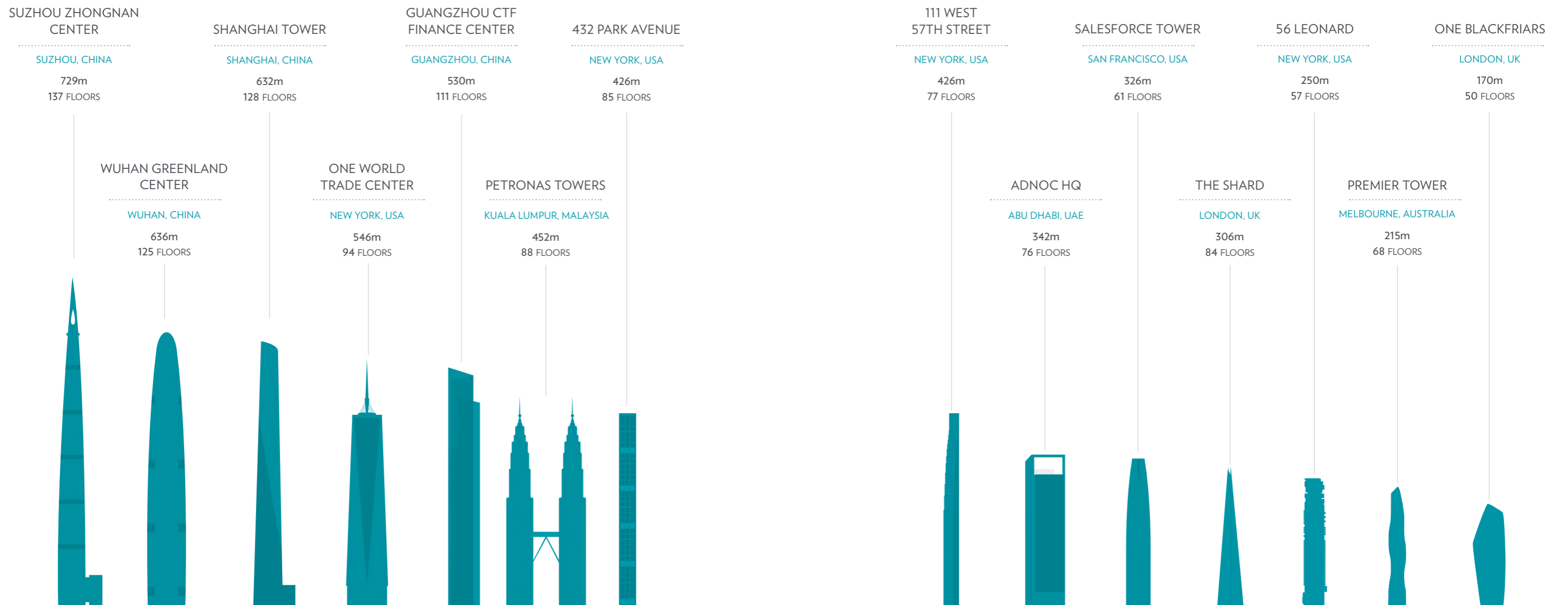
THE FOLLOWING PAGES INCLUDE OUR TALLEST, SLIMMEST AND MOST TECHNICALLY CHALLENGING PROJECTS TO DATE, AS WELL AS SOME OF THE ICONIC BUILDINGS THAT HAVE BECOME DEFINING LANDMARKS ON CITY SKYLINES AROUND THE WORLD.

THE ONLY WAY IS UP

WE ARE PROUD TO BE CHANGING THE SHAPE OF OUR SKYLINES IN CITIES ACROSS THE GLOBE. FROM THE ENGINEERING FEATS OF MEGA-TOWERS IN THE HIGH-RISE CITIES OF THE USA, CHINA AND THE MIDDLE EAST TO THE MORE MODEST BUILDINGS THAT DRAW THE EYE ON THE HISTORICALLY LOWER-RISE HORIZONS OF EUROPE, AUSTRALIA AND SOUTH AFRICA.

“IF SUCCESSFUL GLOBAL CITIES CONTINUE TO GROW, THERE IS ONLY ONE WAY TO GO. RATHER THAN SPREADING THE CITY, THE NATURAL SOLUTION IS TO GO UP.”

KAMRAN MOAZAMI, HEAD OF BUILDING STRUCTURES, UK





NORTH AMERICA

“WE ARE HELPING OUR CLIENTS TO BUILD SOME OF THE TALLEST AND MOST SLENDER BUILDINGS IN THE WORLD, SOLVING SOME OF TODAY’S BIGGEST DESIGN CHALLENGES. WE ARE IMMENSELY PROUD OF THE SCOPE AND SCALE OF OUR PORTFOLIO OF ICONIC HIGH-RISE PROJECTS.”

AHMAD RAHIMIAN, DIRECTOR OF BUILDING STRUCTURES, USA



WORLD TRADE CENTER

NEW YORK, USA

WSP | Parsons Brinckerhoff continues to be heavily involved in the reconstruction of the World Trade Center, overcoming the many complexities of this high-profile and sensitive site, and setting new standards of design and construction.

One World Trade Center, the tallest building in the western hemisphere and the third tallest building in the world, is the new icon of the New York skyline. At 1,368ft (541m), the building is the same height as the Twin Towers, and the spire reaches a symbolic 1,776ft – 1776 being the year of the American Declaration of Independence.

Two World Trade Center, at 200 Greenwich Street, will be the second tallest building in New York at 403m. The tower will contain retail, office floors, trading floors, a sky lobby and an imposing double-height ground floor lobby. The tower has a unique diamond-shaped top to respond to the Memorial Park below, and comprises four blocks arranged round the central cruciform core.

Client	Port Authority of New York and New Jersey (1 WTC) Silverstein Properties (2, 3 and 7 WTC)
Architect	Skidmore, Owings & Merrill (1 and 7 WTC) BIG (2 WTC) Rogers Stirk Harbour + Partners (3 WTC)
Services	Structural engineering

Three World Trade Center, located opposite the WTC Memorial and Cultural Center, will be 357m high. The 80-storey tower has an unusual design with an exposed steel structure. The building includes office and trading floors above five levels of retail. The three-level lobby offers tenants and visitors a picture-window view onto the WTC Memorial.

Seven World Trade Center was the first building completed in the WTC complex in 2006. Not only was it constructed quickly, but it included a host of life-safety and environmental features never before incorporated into a commercial skyscraper. The first 10 floors house an electrical substation serving the entire lower Manhattan area.





Image courtesy of © David Sundberg / Esto

NEW YORK TIMES HEADQUARTERS

NEW YORK, USA

This imposing glass skyscraper was considered to be the most significant addition to the New York City skyline in decades, symbolising the revitalisation of Midtown Manhattan's West Side. The New York Times is the anchor tenant for the high-performance green building.

WSP | Parsons Brinckerhoff provided comprehensive design services for the building's core-and-shell, followed by the interior fit-out of the New York Times Center and Corporate Headquarters. In an effort to reach aesthetic and sustainability goals for The New York Times Building, the building services design required the application of advanced technologies for some of the building's most essential components such as water, lighting and air temperature controls. Our high-performance design features included under-floor air distribution, demand-controlled ventilation, carbon dioxide sensors, daylighting controls for light fixtures and automatic shades, occupancy sensors and exterior sunshades.

One of The New York Times Building's most sustainable features is its 1.4 MW cogeneration facility, which is powered by two natural gas-fired reciprocating engines operating in parallel. Heat recovered from the engines provides hot water for the 250-ton absorption chiller in the summer and perimeter heating in the winter.

Project Status Completed in 2007

Floors 52

Height 220m

Type Commercial

Client New York Times

Architects Renzo Piano Building Workshop in association with FXFOWLE Architects; Gensler (New York Times Interiors)

Services Building services



520 PARK AVENUE

NEW YORK, USA

Located between 60th and 61st street, 520 Park Avenue is a high-end luxury condominium residential building. The building includes a health club, a meeting room, amenity spaces, support space, and three cellars.

WSP | Parsons Brinckerhoff is providing building services and fire protection services for the complete design of the finished apartments, residential lobby, health club, corridors, and back-of-house spaces including service storage, and management offices. Basic IT and security services for each residential unit are also part of the scope.

Project Status Ongoing

Floors 54

Height 238m

Type Residential

Client Zeckendorf Development

Architects Robert A.M. Stern Architects; SLCE Architects

Services Building services, fire protection, basic IT and security services



432 PARK AVENUE

NEW YORK, USA

This luxury super-tall residential, hotel and commercial tower in midtown Manhattan will be the tallest residential building in the western hemisphere. The tower is characterised by its unconventional and elegant structural system: in addition to being very tall, it is also exceptionally slim with a slenderness ratio of 1:15. The key challenge for WSP | Parsons Brinckerhoff was to prevent building sway while devising a structure to provide efficient and flexible floor plates that could be reconfigured by apartment owners. Our building services design incorporates energy efficiency and renewable technology approaches with a viable economic basis.

Project Status	Under construction
Floors	85
Height	426m
Type	Mixed-use
Slenderness Ratio	1:15
Client	CIM Group and Macklowe Properties
Architect	Rafael Vinoly Architects, SLCE Architects
Services	Structural engineering, building services

ONE 57

NEW YORK, USA

Currently Manhattan's tallest residential building and one of the most desirable addresses in New York, this elegant glass tower is one of the first slender, super-tall buildings that are transforming the city's skyline.

The building has 95 luxury residences with breathtaking views, above the flagship Park Hyatt New York hotel. Our design incorporates the many requirements of the building users, with the best possible layouts for apartments and for the hotel.

Challenges have included managing the requirements of the L-shaped site, varying floor heights to accommodate the different uses of the building, including a triple-height swimming pool above the hotel and varying thicknesses of the concrete slabs depending on the floor and span requirements. The upper storeys of the building have been set back, in keeping with Manhattan zoning laws that limit the area of buildings at higher levels.

Project Status	Completed August 2012
Floors	79
Height	306m
Type	Residential
Client	Extell Development Company
Architect	Christian de Portzamparc
Services	Structural engineering





30 PARK PLACE

NEW YORK, USA

30 Park Place will be a Four Seasons hotel, restaurant and private residences in Tribeca, Manhattan.

Our structural solution is designed to facilitate the different uses of the building, which has a slenderness ratio of 1:10.5. There are several floor set-backs at different locations up the height of the building which, along with the architectural layouts, are accommodated through the use of column transfers achieved by using a thicker slab and 'walking columns'. The typical residential floor slabs are nine inches thick, supported by exterior columns and core walls, giving architectural freedom to change the layouts without any structure interruptions.

The structure is a reinforced cast-in-place concrete construction. The building is supported on columns and shear walls formed around the elevator shafts, staircases and along a few divider partitions between the hotel and residential units. At the upper floors the shear walls are formed around the elevator shafts and staircases only.

At the mechanical floor, 24th floor, a belt wall was created engaging all the perimeter columns to the central core via outrigger walls (two in each direction, total of eight outrigger walls) to stabilise and stiffen up the building.

Project Status	Due for completion in 2016
Floors	68
Height	282m
Type	Mixed-use
Client	Silverstein Properties
Architect	Robert A.M. Stern Architects / SLCE Architects
Services	Structural engineering



56 LEONARD

NEW YORK, USA

This luxury residential tower will be the most prominent building in Manhattan's Tribeca district. Described as 'houses stacked in the sky', the unique design features a staggered series of cantilevered boxes arranged at varying angles, creating unique floor plans for each of the 145 apartments. With a slenderness ratio of 11:10.5, the tower is very slender, tapering gently as it ascends. WSP | Parsons Brinckerhoff worked closely with the architects to create a floor plate arrangement that would meet the design goals while retaining the lateral stability of the building.

Project Status	Due for completion at the end of 2015
Floors	57
Height	250m
Type	Residential
Slenderness Ratio	1:10.5
Client	Alexico Group
Architect	Herzog & de Meuron, Costas Kondylis and Partners
Services	Structural engineering



53W53

NEW YORK, USA

53W53, formerly known as the MoMA Tower (or Torre Verre), is currently under construction in Midtown Manhattan, New York City, adjacent to the present Museum of Modern Art facilities on 53rd Street, between Fifth and Sixth Avenues. The 82-storey tower will be located on a narrow, 17,000ft² site and is intended to provide an additional 50,000ft² of exhibition space for the Museum of Modern Art (MoMA), expanding the museum into the second, fourth and fifth floors of the new building. The building will also provide a super-luxury hotel and condominiums, a sunken restaurant and bar, amenity floors and an event venue at the midpoint of the tower. A bridge will connect the entrances on 58th and 54th Streets.

WSP | Parsons Brinckerhoff is providing structural and building services.

Designed by the renowned French architect Jean Nouvel, the tower is exuberantly crisscrossed with concrete framing. The glass-clad structure slopes gradually away from 53rd and 54th Streets as it rises.

As the building is essentially all glass, we have undertaken extensive CFD modelling to determine the most efficient HVAC systems. Based on this modelling, overhead heat was designed to offset downdrafts without the use of finned tube radiation. The glazing system uses three layers of high-performance glass. The residential controls are setting a standard for modern residential buildings.

Due to the building geometry and the atypical nature of all floors, the design will be completed using Revit.

Project Status In Construction

Floors	82
Height	320m
Type	Cultural
Client	Hines / Goldman Sachs / Pontiac Land
Architects	Ateliers Jean Nouvel / SLCE / Adamson / Thierry Despont
Services	Structural engineering and building services



55 HUDSON YARDS

NEW YORK, USA

55 Hudson Yards is a new 1.3 million ft², LEED® Gold tower that will be located on 11th Avenue between 33rd and 34th Streets. The building will feature a 10-storey base with floorplates of 44,000ft², with a 41-storey tower atop it with 28,000ft² floorplates. The core infrastructure design includes a single path of circulation, shallow floorplates, unobstructed perimeter views due to overhead heat/cooling, efficient core configuration (without interior columns) and on-floor independent HVAC systems. A robust infrastructure is being provided to serve the most demanding tenant requirements. A large capacity of tenant standby power and associated fuel oil storage is being provided.

The building will be constructed above the terminus for the Number 7 Subway. It will envelope and cantilever above the mechanical services building that serves the tunnel and station house. We worked with the subway engineer to coordinate utility services, MEP infrastructure and other very specific requirements that serve the subway system.

Project Status	Due for completion in 2017
Floors	51
Height	238m
Type	Commercial
Client	Oxford Properties Group Inc.; Related Companies
Architect	Kohn Pedersen Fox; Kevin Roche John Dinkeloo Associates
Services	Structural engineering, building services

111 WEST 57TH STREET

NEW YORK, USA

Slated to become the most slender skyscraper in the world, this project combines the conversion of the landmark Steinway building near Carnegie Hall with a luxury residential tower. At its base the heritage will blend with the modern, to provide shared recreation spaces, a lobby and high-end retail. Above, the 77 floors of apartments will have commanding views of Central Park. WSP | Parsons Brinckerhoff is the structural engineer for the building, whose east and west façades will be clad in terracotta, while the north side will feature a glass curtain wall. Located on a very small site, the project's width-to-height ratio is 1:24.

Project Status	Completion in 2018
Floors	77
Height	426m
Slenderness Ratio	1:24
Type	Residential
Client	JDS Development Group
Architect	SHoP Architects
Services	Structural engineering



SALESFORCE TOWER

SAN FRANCISCO

Salesforce Tower will be a beacon for San Francisco Bay, at the heart of the Transbay redevelopment area that will include commercial, housing, retail and entertainment facilities. At its base is a transit centre that will become a major transportation hub for the West Coast. The tower, the tallest in San Francisco, is designed as a landmark in sustainability and a model for modern workplaces in promoting the health and well-being of its occupants.

Our building services design includes many innovations for user comfort and low environmental impact. Sustainable design features include water/rainwater management, abundant use of natural daylight, reduced overall energy usage, application of recycled materials to cut down on construction waste and maximum indoor environmental quality. Each floor has 100% natural air, and the building is targeting LEED Platinum.

Project Status	Completion in 2017
Floors	61
Height	326m
Type	Mixed-use
Client	Boston Properties and Hines
Architects	Pelli Clarke Pelli
Service	Building services

ONE ELEVEN CHICAGO, USA

When the economy halted in 2008, so too did work on what was to be the 'Shangri-La'. The 28-storey concrete shell sat along one of the most visible stretches of the Chicago River. Following numerous failed plans to redevelop the incomplete structure, developer Related Midwest and its design team devised an economic and efficient solution for a 60-storey high-end apartment tower.

Having undertaken a peer review of the original structural design, our structural engineers understood the challenges and possibilities in reusing the existing structure, helping to bring it back to life as the 504-unit luxury apartment tower, OneEleven.

Our work involved verification of the original structure and design of the full addition. Although the original structure was to be taller, parts of the existing structure below level 30 could not support additional floors of the new tower. We devised an optimal concrete structural addition including 7.5-inch post-tensioned slabs and a column grid that is coordinated with the owner's desired apartment unit layouts. We reused the existing core below level 30 by updating it with numerous new openings and infills to accommodate the new architectural design, and designed a new optimised concrete core above.

A 60-inch deep post-tensioned slab, integrated at the amenities floor (level 30), transfers the new column grid, and core walls, of the upper levels to the original existing core and column grid below. In addition we reinforced select existing columns, originally designed to only support 30 floors, to enable them to ultimately support 60 floors.

Project Status	Completed
Floors	58
Height	186.7m
Type	Residential
Client	Related
Architect	Handel Architects (design); Epstein (record)
Our Services	Structural engineering



Image courtesy of Lucien Lagrange Architects

WALDORF ASTORIA CHICAGO, USA

The Waldorf Astoria is a luxury five-star hotel located in the Gold Coast area of Chicago. Its design emulates the grand hotels of Paris in the 1920s, complete with colonnades, spires and a motor court.

Wind and its dynamic effects governed the structural design of this 700-foot-tall building. Our structural engineers used a wind tunnel to study options for different combinations of structural stiffness and damping to develop a cost effective structural solution that incorporates a tuned liquid damper at the top of the building. This approach to controlling perceptible motion in tall, slender buildings offers low cost, low maintenance and high performance over a broad range of wind conditions.

Project Status	Completed 2009
Floors	60
Height	209 m
Type	Hotel
Client	Elysian Development Group – Chicago, LLC
Architect	Lucien Lagrange Architects
Our Services	Structural

KING WEST

TORONTO, CANADA

The Mirvish+Gehry King West development in Toronto, Canada, will create a new visual identity for the city's premier arts district. The conceptual designs, which will continue to evolve, consist of two six-storey stepped podiums housing retail and commercial spaces detailed to relate in scale and articulation to the neighbouring buildings, topped by two iconic towers which will be the tallest residential buildings in Canada. Each tower has a complementary but distinctive design, which fits with the history and texture of the surrounding neighbourhood. We are providing structural and façade engineering for this iconic landmark development. The height and slenderness require the use of a highly efficient lateral system, ingenious systems for the transfer of gravity loads to accommodate building massing and functional layout requirements, and a damping system to control tower motion.

Project Status	Ongoing
Floors	West Tower: 92 Stories, East Tower: 82 Stories
Height	West Tower: 305m, East Tower: 276m
Type	Mixed-use
Client	Mirvish Enterprises
Architects	Gehry International Inc. Architects
Our Services	Structural and façade engineering



DELOITTE TOWER

MONTREAL, CANADA

Deloitte Tower is the first privately funded commercial office tower to be built in Montreal's downtown core in over 20 years. It is also Montreal's first office building targeting LEED Platinum certification, putting it at the forefront of sustainable office design in Canada. Situated between the historic Windsor Station and the Bell Center, the energy-conscious mixed-used development includes commercial and office space, condominium towers and a courtyard, as well as a seasonal pool/skating rink.

WSP | Parsons Brinckerhoff was engaged to create a sustainability strategy for the project, provide building energy modelling, manage the LEED Platinum certification, and design the measurement and verification plan. One of the key project successes was using iterative energy modelling to reduce energy use: compared to the Model National Energy Code for Buildings (MNECB) baseline, this project is designed to reduce the cost of total energy use by 46%, which will result in lower operating expenses and lower emissions. The measures contributing to Deloitte Tower's energy-efficient design include lower lighting density, daylight harvesting and LED lighting technology; high efficiency mechanical equipment; heat recovery from exhaust air; and high thermal performance of the building

envelope. Other key design features include high water efficiency with a cistern for rainwater harvesting, premium air filtration and enhanced climate control for improved occupant comfort, ventilation and health. All major base building energy end-uses at Deloitte Tower are metered and measured to track performance and optimise the systems. Tenant sub-metering data is used to provide real-time feedback on energy use.

Project Status	Completed
Floors	28
Height	133m
Type	Commercial
Client	Cadillac Fairview
Architects	Design Architect: Kohn Pedersen Fox Associates; Executive Architect: B + H Architects
Our Services	LEED project management, building energy simulation, tenant measurement & verification plan, green education program



EUROPE, MIDDLE EAST AND AFRICA

“THE ART OF BUILDING HIGH ISN’T ONLY ABOUT DESIGN, BUT ABOUT THE EFFICIENCY OF MATERIAL, SPEED OF CONSTRUCTION, MAXIMUM ACHIEVABLE SPACE, SEAMLESS COORDINATION OF ENGINEERING AND ARCHITECTURE, THEREBY ACHIEVING OPTIMAL COST AND PERFORMANCE AS WELL AS AN ICONIC AND ELEGANT BUILDING.”

KAMRAN MOAZAMI, HEAD OF BUILDING STRUCTURES, UK





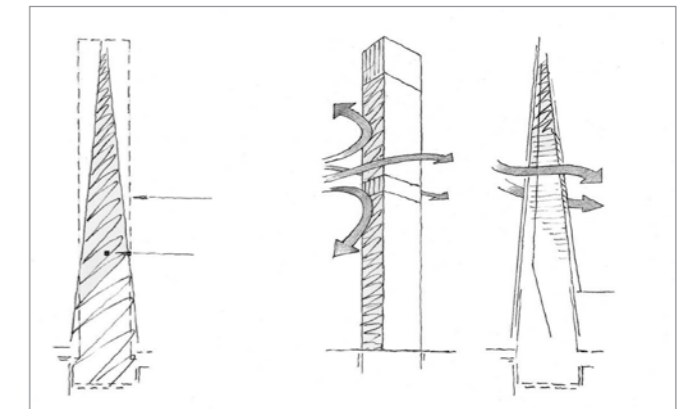
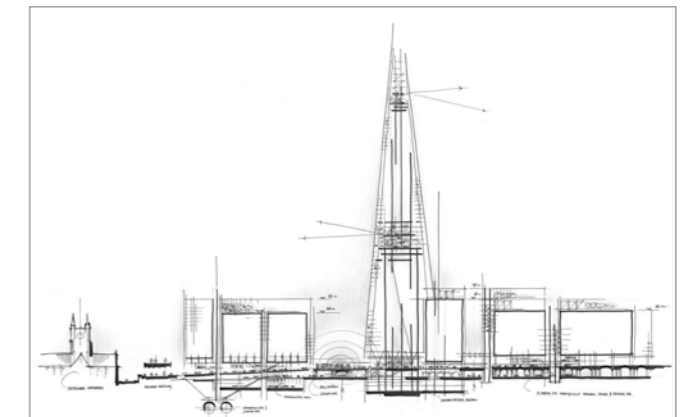
THE SHARD

LONDON, UK

The tallest building in Western Europe, the Shard has redefined the London skyline and is already an international symbol for the city. The Shard is designed as a mixed-use 'vertical city' and is the first building of its kind in Europe, incorporating office space, restaurants, a hotel, apartments and a public viewing gallery. It is crowned with a steel-framed pinnacle clad with shards of glass designed to blend into the sky. Standing next to London Bridge station, the Shard is a catalyst for the regeneration of London Bridge Quarter, an important new commercial area on the city's South Bank.

WSP | Parsons Brinckerhoff worked closely with the architect, developer and contractor to develop innovative new construction techniques that enhance the distinctive architecture and are appropriate for the different uses of the building.

Project Status	Completed
Floors	84
Height	306m
Type	Mixed-use
Client	Sellar Property
Architects	Renzo Piano Building Workshop
Our Services	Structural, fire and geotechnical engineering, acoustics, traffic and transport, drainage



THE MADISON

LONDON, UK

WSP | Parsons Brinckerhoff has helped clients Madison Developments Ltd and LBS Properties achieve planning permission for a new tower scheme. The 55-storey tower will provide 400 affordable homes. The slender form enables 70% of the site to be dedicated to public facilities, such as café access, public garden and a children's playground.

We have been involved from an early stage to develop a structural concept that complements ambitious architectural intent. Client aspirations for sustainable solutions, floor plate area maximisation and cost-effective construction were met by delivering a highly optimised concrete structure, fully integrated with the building services.

Project Status	Ongoing
Floors	55
Height	185m
Type	Residential
Client	Madison Developments Ltd, LBS Properties
Architects	Make Architects
Our Services	Structural, geotechnical and civil engineering and transportation



SOUTH QUAY PLAZA

LONDON, UK

WSP | Parsons Brinckerhoff is working with Berkeley Homes and architect Foster + Partners to produce a skyline-changing residential tower in London's docklands.

Upon completion it will be the tallest residential tower in the UK. The project will create 888 new homes, including 188 affordable units across two buildings of 68 and 36 storeys. Over 1.6 acres of new landscaped garden will be delivered. There will also be new shops, restaurants and leisure facilities, and improved pedestrian connectivity to the dockside and Canary Wharf area that will bring vibrancy to the site. In the towers there will be a 56th floor lounge and terrace area, a spa, gym and swimming pool.

As opposed to rectangle-shaped towers, South Quay Plaza residents will enjoy multiple views of London and greater access to natural light, which has been achieved by joining two diamond-shaped structures together.

Project Status	Ongoing
Floors	Two buildings of 68 and 36 storeys
Height	210m and 112m
Type	Residential
Client	Berkeley Homes
Architects	Foster + Partners
Our Services	Structural, geotechnical, MEP and façade engineering, traffic & transportation, vertical transportation, security, energy & sustainability





MILTON COURT

LONDON, UK

This 36-storey development in the City of London provides new facilities for the Guildhall School of Music and Drama. A residential tower is constructed above the School complete with duplex apartments and penthouse suites in the upper levels.

The Guildhall School of Music and Drama occupies the six-storey lower level structure, and contains a world class concert hall, a Lyric style teaching theatre together with plant rooms, rehearsal rooms and a studio theatre in the basement.

The ground floor provides separate entrance lobbies for residents, the School and the concert hall in addition to management offices and storage. The foyer for the main concert hall and the theatre is at level 1. The concert hall and theatre includes stages, galleries and fly towers as well as teaching rooms, staff rooms and school offices located in a central area between the concert hall and the theatre.

The level over the concert hall roof has a roof garden, club and bar while plant rooms, cold water storage tanks and theatre plant occupy the entire floor under the tower. The steel-framed concert hall is fully acoustically isolated 'box-in-box' construction.

Project Status	Completed
Floors	36
Height	112m
Type	Leisure, Residential
Client	Heron Land Developments
Architects	David Walker Architects, RHWL
Services	Structural, fire, geotechnical engineering, traffic and transport, façade engineering and façade access.

Image courtesy of © Morley Von Sternberg

22 BISHOPSGATE

LONDON, UK

This new landmark tower will be the second tallest in London after the Shard and will accommodate around 12,000 people working for up to 100 companies. The developer's ambition is to create London's first 'vertical village', providing a wide range of facilities throughout the building including retail, restaurants, fitness centres, an auditorium and spaces for a variety of leisure and learning activities. The basement will accommodate bicycle parking that meets latest TfL standards, and a free public viewing gallery at the top of the building will be the highest in London.

WSP | Parsons Brinckerhoff is providing a full range of consultancy services for the project, which is being built on the original foundations of the demolished core of a previous project which stalled in 2012. Our structural engineers are working with the architects to produce a simple, elegant building which utilises the majority of the existing foundations, including nearly all the columns while providing 20% more floor area.

Our building services engineers have the challenge of delivering an extremely efficient building with high targets for sustainability, comfort and occupant wellbeing. With a total floor area of about two million square feet, it will require a high volume of services and systems designed with built-in flexibility to accommodate the many as-yet undecided facilities and office layouts required by future tenants.

Project Status	Project Status: Ongoing
Floors	62
Height	278m
Type	Commercial
Client	Lipton Rogers
Architects	PLP Architecture
Services	Structural engineering, acoustics, façades, MEP, fire, geotechnical, security, vertical transportation



ONE BLACKFRIARS

LONDON, UK



Image courtesy of One Blackfriars, by St George PLC. Computer generated image and is indicative only.

One Blackfriars is a new iconic, mixed-use development situated on the south side of Blackfriars Bridge overlooking the River Thames. Its prime location has unobstructed views of St Pauls Cathedral and views along the river towards Westminster and Tower Bridge.

The centrepiece of the development is a stunning 170m tower, a geometric masterpiece which creates an elegant silhouette on London's skyline. The tower's slender shape minimises its footprint and maximises the extent of the public realm at street level where it meets a landscaped piazza. The 50-storey tower accommodates 274 homes, a private viewing lounge and a multi-level penthouse crowned within the glass rooftop structure.

The scheme also features a boutique hotel in an adjacent low-rise block incorporating retail and gym facilities. The entire development is built over a three storey basement structure housing swimming pool and spa facilities. A private cinema, wine storage and resident car parking are also provided in the basement.

A top-down construction sequence for the basement saved time on construction. The piling configuration was arranged to enable temporary and permanent works to be combined in order to increase efficiency.

All structures are reinforced concrete frame elements. The hotel and tower floors make use of thin post tensioned slabs for maximum floor-to-floor height efficiency.

The tower's stability system adopts staggered outrigger elements strategically placed to control the tower's movement with minimum impact on apartment layouts. The tower's column configuration was optimised for the complex 3D geometry ensuring the best solution for apartment layouts.

Project Status	Completion in 2018
Floors	50
Height	170m
Type	Mixed-use
Client	St George
Architect	Ian Simpson Architects
Services	Structural and geotechnical engineering, façade maintenance and access

STOCKHOLM NEW

STOCKHOLM, SWEDEN

Stockholm New is set in beautiful waterside surroundings to the south of the city of Stockholm. The tall building will be a landmark in the up-and-coming neighbourhood of Hammarby Sjöstad, an attractive location for offices close to downtown Stockholm with good public transportation.

As structural engineers our biggest challenge is the foundation design, which must take into consideration new subway tunnels. In addition there is a new subway station inside one of the buildings. Tension rods will be used to anchor the core foundation into the bedrock to avoid interference with the subway tunnels.

Project Status	Detailed design
Floor	30
Height	115m
Type	Commercial
Client	Skanska Property
Architects	Sauerbruch Hutton
Our Services	Structural engineering



Image courtesy of Skanska



Image courtesy of Foster+Partners

TORRE CAJA MADRID

MADRID, SPAIN

Torre Caja Madrid is the headquarters of Caja Madrid, the oldest of the Spanish savings banks, situated in Fuencarral-El Pardo, Madrid.

We worked closely with Foster + Partners to create an astonishing column-free base by supporting the entire weight of the building on only its two end cores. The heavily loaded cores allow the slender 820ft (250m) tower to efficiently resist wind. To achieve this unique structure, steel trusses at intermediate mechanical levels channel loads from the floors above to the cores and serve as beams in a 'mega-frame' to stiffen the tower. Special attention was given to redundancy, ensuring structural stability should components of these trusses fail due to localised damage.

Project Status	Completed 2008
Floors	49
Height	248.3m
Type	Commercial
Client	Caja Madrid Bank
Architect	Foster + Partners
Our Services	Structural engineering

BAHRIA ICON TOWER

KARACHI, PAKISTAN

Bahria Icon Tower will be the tallest building in Pakistan. The 60-storey office tower has a three-storey retail podium above five levels of basement car parking.

WSP | Parsons Brinckerhoff developed the structural design through concept and schematic design stages, working with the architects and a local structural engineer. We carried out the design development and prepared the construction documents.

The design of the tower was unique as we had to create an innovative floor framing solution, which was robust yet simple to construct, to help the local labour force which lacked experience in high-rise construction. This removed the need for complex steel-to-steel connections, allowing the beams to be simply laid in position and 'cast in' with the RC beams.

Project Status	Ongoing
Floors	60
Height	260m
Type	Commercial
Client	Bahria Town
Architects	AAA Partnership
Services	Structures design, vertical transportation



ENTISAR TOWER

DUBAI, UAE

The Entisar Tower is a mixed-use development under construction on Dubai's Sheikh Zayed Road. The 114 storey high-rise contains retail, offices, hotel, residential and amenities, with an adjacent 15-storey building containing conventional and automatic parking, and various leisure spaces such as a fitness centre, roof deck garden and pool. A significant structure sat under the annex building consisting of six basement levels.

The design of the building was considered in a segmented manner – a horizontal spread of space was converted into a vertical tower.

Coordinating the infrastructure into the core of such a high-rise building, and space constraints due to the concrete structure were some of the challenges we overcame in the design of the project.

Project Status	Ongoing
Floors	114
Height	520m
Type	Mixed-use
Client	Ae7 Architects
Architects	Ae7 Architects
Our Services	Building services, audio visual, ICT

BURJ MOHAMMED BIN RASHID TOWER

ABU DHABI, UAE

The Burj Mohammed Bin Rashid tower is part of the World Trade Center (Abu Dhabi) complex. Situated in the heart of the city, the 700,000m² mixed-use complex replaces the former Central Market (or Souk), and features this 88-storey residential tower and a 58-storey office tower. The site also includes the re-envisioned souk, up to seven levels of retail in the podium, an 11-storey business hotel, five basements, a green roof above the market, and a bridge system linking these areas together. In 2015, the Burj Mohammed Bin Rashid Tower was named Best Tall Building in the Middle East & Africa.

When, in collaboration with Foster + Partners, we were appointed based on a concept level design, the basement had already been excavated and the developer wanted to begin construction immediately. Within four months, we were able to develop preliminary design information to issue the first piles for construction, and continued to issue construction documents in advance of construction needs, as the building's design developed in parallel.

Project Status	Completed 2014
Floors	88
Height	381m
Type	Residential
Client	Aldar Properties
Architect	Foster + Partners
Our Services	Structural engineering



Image courtesy of Nigel Young of Foster and Partners



DUBAI PEARL

DUBAI, UAE

Dubai Pearl is a mixed-use development comprising hotel, residential, offices and retail, prominently located in Dubai Media City and along Sheikh Zayed Road. There are four towers each 70 stories high, which are connected at the roof level by a 'sky palace'. The towers are connected by a central podium that covers the footprint of the plot.

As Engineer of Record, WSP | Parsons Brinckerhoff ensured that the design was safe and buildable in accordance with international standards, local best practices and authority requirements.

Project Status	Ongoing
Floors	73
Height	300m
Type	Mixed-use
Client	PEARL DUBAI FZ LLC
Architects	Schweger Associated Architects
Services	Structures design



ROSEWOOD HOTEL SOWWAH ISLAND

ABU DHABI, UAE

Rosewood Abu Dhabi will be a landmark five-star high-rise hotel and residences featuring approximately 190 spacious guest rooms and suites, approximately 140 serviced residences, an array of signature restaurants, Sense, A Rosewood Spa®, superb shopping and stunning views of the surrounding water and city. WSP | Parsons Brinckerhoff provided MEP, fire and life safety consultancy services, and supervised the project.

The 34-storey hotel is a dramatic modern structure covered with reflective glass, which was chosen for its daytime shimmer and its nighttime luminescence. The curvilinear architecture of the 470-foot-tall building is designed to suggest the movement in this vibrant city, and the inspiration for the interiors of the hotel comes from the meeting of land and sea, desert and sky.

Offering 10 restaurants including Lebanese, French, Indian and all-day-dining, cigar lounge, a spa, fitness centre, outdoor pool, ballroom, junior ballroom, meeting rooms, conference centre and superb shopping and stunning views of the water; the hotel complex provides a sophisticated environment for both business and leisure.

Rosewood Abu Dhabi is directly connected to The Galleria, a luxury shopping destination, and Cleveland Clinic Abu Dhabi. It first opened its doors in May 2013, marking the first presence of the Rosewood Hotels & Resorts brand in the United Arab Emirates.

Project Status	Completed
Floors	34
Height	143m
Type	Hospitality, commercial
Client	Mubadala Development
Architects	Handel Architects LLP
Services	Building services design, fire & life safety, AV & ICT, construction supervision

ADNOC HEADQUARTERS

ABU DHABI, UAE

Located on one of Abu Dhabi's most prominent urban sites, this iconic 342m tower is the new corporate headquarters for the petroleum company, ADNOC. The tower is built over a three-level podium housing a heritage museum, employee service retail space and the main lobby and atrium.

WSP | Parsons Brinckerhoff developed the MEP design, which includes floor-by-floor air handling systems to maintain environmental control of each individual floor, supplemented by a central outside air recovery system providing outside air to the air handling system. Chilled water is generated from an off-site central chilled water plant serving air handling and fan coil systems in the tower. To reduce water consumption, all HVAC condensate and grey water is collected for re-use. We also provided security services for the development which was considered of national importance. Our security solutions created an inherently safe and secure building without detracting from the aesthetic and functional value of the project.

Project Status	Completed
Floors	76
Height	342m
Type	Commercial
Client	HOK
Architects	HOK
Our Services	Building services design, security consulting



PORTSIDE

CAPE TOWN, SOUTH AFRICA

WSP | Parsons Brinckerhoff provided the civil and structural engineering design for Cape Town's tallest building, Portside, which recently opened in Cape Town's central business district. At 139m high, this is one of the tallest buildings in South Africa and the first tall building to be constructed in Cape Town for 20 years. It is also the tallest building in South Africa to be awarded a 5 star Green Star certification (design and as-built) by the Green Building Council of South Africa. The premium office development, which serves as the regional headquarters of FirstRand Bank's three divisions as well as providing rentable office space, is a joint venture development between FirstRand Bank and Old Mutual Property.

We provided the preliminary and detailed civil and structural design for the project, all the structural and civil tender and construction documentation as well as a full time construction monitoring service. Our aim was to deliver engineering expertise of the highest calibre – while meeting the challenges associated with a project of this magnitude subjected to a very fast-paced construction programme.

Project Status	Completed
Floors	32
Height	139m
Type	Commercial
Client	FirstRand Bank and Old Mutual Property
Architects	dhk Architects Pty Ltd; Louis Karol Architects
Services	Civil and structural engineering

CHINA AND SOUTH EAST ASIA

“WE HAVE ACCUMULATED A WORLD-CLASS PORTFOLIO OF SUSTAINABLE SUPER HIGH-RISE DEVELOPMENTS THAT ARE ENERGY-EFFICIENT AND SAFE. WITH TOWERS SUCH AS THE 632 METRE SHANGHAI TOWER AND THE 2,500-SUITE MARINA BAY SANDS HOTEL IN SINGAPORE, WE ARE CONTRIBUTING TO THE SPECTACULAR SKYLINES OF CITIES THROUGHOUT THE WORLD.”

VINCENT TSE, MANAGING DIRECTOR, BUILDING MEP, CHINA





DALIAN EAST HARBOUR MIXED DEVELOPMENT

DALIAN, CHINA

The Dalian East Harbour is a residential development in the rapidly expanding city of Dalian, a popular tourist destination in north-east China. The development will stretch across six high-rise blocks and its focal point will be a slender mega-tower that will host a five-star Langham Hotel, surrounded by five other luxury apartment towers. WSP | Parsons Brinckerhoff provided multidisciplinary services for the project, responding to a fast-moving design in which the architecture was constantly refined to provide the client with the most economical, flexible configuration.

Project Status	Under construction
Floors	74
Height	300m
Type	Residential
Client	The Great Eagle Development and Project Management
Architect	Rocco Design Architects
Services	Structural, civil, geotechnical and building services engineering, traffic, BMU engineering consultancy

HANKING CENTER TOWER

SHENZHEN, CHINA

The Hanking Center in Shenzhen designed by Morphosis is a 350m tall office building with the core shifted outside of the floor plate. The challenges of the eccentric core design have been overcome by a unique structural steel solution – a ‘mega-braced’ tube structure, using composite columns linked by steel diagonal bracing organised over multi-storey modules around and through the tower. The result is a closed tube structure, efficiently engaging the entire tower depth, from the outside face of the core to the opposite face of the tower, and integrated within the architectural design. To keep the minimal floor links envisioned between the tower and offset core, light floor bracing was integrated at select levels to assure the separated floors still acted together in plane. The structure is designed using the latest performance-based seismic design approaches using non-linear time history analyses.

Project Status	Completion due in 2018
Floors	73
Height	350m
Type	Commercial
Client	Hanking Group
Architect	Morphosis (Design); Zhubo Design (Architect of Record)
Our Services	Structural engineering, building services



YANTAI SHIMAO NO.1 THE HARBOUR & HILTON HOTEL

YANTAI, CHINA

This landmark development at the Seafront Plaza in Yantai's city centre has a total gross floor area of 277,000m² and comprises of four commercial towers. The tallest of these, at 323 metres, will be the tallest building in Shandong Province.

Our work on this project includes façade, MEP and VTS design and tender documentation.

Our building services cover review of construction drawings and technical advisory during tendering and construction stages. The aim is to maximise the efficiency of the building and meet the local code requirements.

Project Status	Completion in 2016
Floors	59
Height	323m
Type	Hotel, commercial
Client	Shimao Group
Architects	Wong Tung & Partners
Our Services	Façade, MEP and VTS consultant engineer

For the façade design, we were present at all façade design and site coordination meetings. The façade systems comprise a unitised curtain wall for construction speed and reduced installation costs, stick curtain wall incorporating glass, stone and louvres, and stick ribbon metal wall. The building has a metal roof system.



Image courtesy of Wong Tung

ONE AVENUE (GANGXIA REDEVELOPMENT PROJECT)

SHENZHEN, CHINA

This 380m tower is part of the new Gangxia redevelopment, which will create a dynamic and vibrant mixed-use neighbourhood at the south-east quadrant of Shenzhen's Central District. The tower is a mixed-use commercial/residential development including various large retail outlets. An international team from WSP | Parsons Brinckerhoff is delivering the engineering design for the project.

Project Status	Under construction
Floors	72
Height	380m
Type	Mixed-use
Client	Gemdale Dahaihui Corporation (Shenzhen)
Architect	Kohn Pedersen Fox Associates
Services	Structural, geotechnical, civil and building services





Image courtesy of KPF

BEIJING CBD Z15 CITIC GROUP HEADQUARTERS BUILDING

BEIJING, CHINA

When it is completed in 2017, the Z15 Tower will be Beijing's tallest tower. At over 528m tall with 108 storeys the tower is located opposite Beijing's current tallest building, the China World Trade Center Tower 3. The Z15 tower will provide mixed-use facilities with a gross floor area of over 350,000m².

WSP | Parsons Brinckerhoff will provide full MEP consultancy services from concept design to detail design stages to include cutting-edge energy-saving MEP systems and advanced vertical transportation technologies. During subsequent construction drawing and construction stages we will also provide technical checking to ensure MEP construction drawings prepared by the local design institute and the site installation are in line with the original design intent and quality requirements.

Our value-added design features include plume-less cooling towers designed inside the building and integrated with an energy-efficient ice-storage system.

Project Status	Completion in 2017
Floors	108
Height	528m
Type	Commercial
Client	CITIC Group
Architects	KPF
Our Services	MEP & VTS consultant engineer

WUHAN GREENLAND CENTER AND RITZ CARLTON HOTEL

WUHAN, CHINA



Earmarked as the tallest building in central China, this 636-meter tower offers 119 levels and approximately 300,000m² of offices, luxury apartments, and a Ritz-Carlton Hotel. Designed to be an eco-tower, sustainable systems include water conservation and reuse, daylight responsive control, and energy recovery to capture energy from the building's exhaust systems to pre-heat or pre-cool air entering the building.

WSP | Parsons Brinckerhoff is providing peer-review of the entire VTS and MEP systems design on behalf of the owner. Major achievements include upgrading the standard and quality of both hotel and apartment design planning.

Project Status	Completion in 2017
Floors	125
Height	636m
Type	Mixed-use
Client	Greenland Group
Architects	Adrian Smith, Gordon Gill Architecture
Our Services	Owner's engineer – MEP & VTS consultant engineering

Image courtesy of Greenland Group

GUANGZHOU CTF FINANCE CENTER & ROSEWOOD HOTEL

GUANGZHOU, CHINA

Standing at 111 storeys, this 530m tower will be Guangzhou's tallest and a new landmark on the city's already distinguished skyline. Set in the city's Central Business District, it has been designed with sustainability in mind. The tower is scheduled for completion in 2016 and will provide 508,000m² of high-end mixed-use facilities including grade A offices and a hotel.

WSP | Parsons Brinckerhoff is providing MEP consultancy covering design, tender, construction administration, coordination and site supervision. This includes HVAC, high- and low-voltage electrical systems, extra-low-voltage systems for structured cabling, security, surveillance, audio visual, telephone and communications systems, fire and smoke control, plumbing and drainage, swimming pool and spa filtration, automatic refuse collection and vertical transportation systems including double- and single-deck elevators and escalators.

Our design challenges include design coordination with the architect on energy-efficient ventilated window development, city district cooling system design integration, and supporting the efficiency of the commercial areas across the entire building through the effective stacking of MEP systems and elevator design.

Project Status	Completion in 2016
Floors	111
Height	530m
Type	Mixed-use
Client	New World Development Co. Ltd.
Architects	Kohn Pedersen Fox Associates
Our Services	MEP & VTS consultant engineer





SHANGHAI TOWER AND J HOTEL

SHANGHAI, CHINA

Not only will the Shanghai Tower be the tallest building in China at 632m, it will also set a new benchmark in green building design. With its curved and spiralling façade, the Shanghai Tower will offer 128 storeys of grade A office space, retail facilities, conference centre, entertainment and cultural amenities, as well as a luxurious hotel.

WSP | Parsons Brinckerhoff is carrying out a peer review of the entire MEP, vertical transportation and LEED Commission Authority Services for the owner. We have been able to significantly add value for both the owner and the architect through initiatives including the rezoning of elevators to increase the size of the commercial areas, upgrading the VTS design standard of the office and hotel zones, and the introduction of 18 m/s elevators to serve the observation deck.

Project Status	Completed in 2015
Floors	128
Height	632m
Type	Hotel, commercial
Client	Shanghai Tower Construction & Development
Architects	Gensler
Our Services	Owner's engineer – MEP, VTS & LEED commission authority services

TIANJIN CTF BINHAI CENTER & ROSEWOOD HOTEL

TIANJIN, CHINA

Scheduled for completion in 2017, this 530m skyscraper will rank amongst the highest buildings in the northern port city of Tianjin. It will provide 350,000m² of mixed-use facilities spanning 100 storeys, including a 30,000m² shopping mall and a four-level basement.

WSP | Parsons Brinckerhoff's work includes the overall design and site supervision of the MEP and VTS systems. Innovative design features include efficient zoning of elevators, localised energy efficient chiller plant and delivering a LEED Gold sustainable designed building.

Project Status	Completion in 2017
Floors	100
Height	530m
Type	Mixed-use
Client	New World Development Co. Ltd.
Architects	SOM
Our Services	MEP & VTS consultant engineer



SUZHOU ZHONGNAN CENTER & RITZ CARLTON HOTEL

SUZHOU, CHINA

Soaring over the Central Business District of Suzhou, the 729m mega-tall Suzhou Zhongnan Center stands on the west side of the Jinji Lake. It will provide 470,000m² of mixed-use facilities spanning over 137 storeys, including grade A offices, deluxe apartments, a six-star hotel, an observation deck, and a podium with premium retail, entertainment, hotel, conference facilities, multi-functional ballrooms and a six-level basement.

WSP | Parson Brinckerhoff's services on the project include MEP and VTS consultancy services. The major challenges are stacking the MEP services and elevators for various building zones (office, hotel, apartment and club) of the very slender tower effectively in order to maximise the overall floor efficiency and also achieving the international Grade A standard for the tower.

Project Status	Construction in progress
Floors	137
Height	729m
Type	Mixed-use
Client	Zhongnan Group
Architects	Gensler
Our Services	MEP & VTS consultant engineering



Image courtesy of Gensler

VIETINBANK

HANOI, VIETNAM

A striking pair of triangular, landmark towers anchor VietinBank Business Center – a 300,000m² mixed-use development in Hanoi designed in collaboration with Foster + Partners. The 68-storey, 365m office tower will be home to VietinBank, one of Vietnam's largest banking groups. Concrete cores at the three corners of its triangular plan are linked by steel bracing wrapping the full-height central atrium and by steel perimeter transfer trusses over four-storey sky gardens, creating dramatic 50m column-free exterior vistas.

The 48-storey, 225m tower will house a five-star hotel and has a similar triangular configuration. The concrete hotel tower has a full-height atrium along one side, known as the 'green spine' – exposed space trusses span 32m horizontally to support its expansive face of windows.

The towers are linked by an eight-storey podium, with below-grade parking for over 5,000 cars and motorbikes.

Project Status	Due for completion in 2018
Floors	68
Height:	365m
Type:	Commercial
Client	VietinBank
Architect	Foster + Partners (Design); Vinaconex (Architect of Record)
Our Services	Structural engineering



LOTTE WORLD TOWER

SEOUL, SOUTH KOREA



Lotte World Tower is a 123-floor, 555m super-tall skyscraper currently under construction in Seoul, South Korea. It will provide 304,000m² of premium grade A offices, a six-star hotel, an observatory deck, extensive retail and recreational facilities. The tower is designed to achieve LEED Gold certification.

WSP | Parsons Brinckerhoff is undertaking the peer review of the entire MEP and VTS installations for the owner. Major achievements include improvements to the logistics and reliability of the elevators and enhancing the overall MEP installation.

We are also providing LEED consultancy and facilitation services, energy modelling and commissioning support.

Project Status	Completion in 2016
Floors	123
Height	555m
Type	Hotel, commercial
Client	The Lotte Group
Architects	Kohn Pedersen Fox Associates
Our Services	Owner's engineer – MEP & VTS, LEED consulting, facilitation services, and energy modelling

Image courtesy of KPE

KUALA LUMPUR CITY CENTER

KUALA LUMPUR, MALAYSIA

A landmark of Kuala Lumpur, the Petronas Towers were the tallest buildings in the world from 1998 to 2004 and remain the tallest twin towers in the world. They formed the first phase of the Kuala Lumpur City Center (KLCC) project to create an entertainment, commercial and business focal point, and a popular tourist destination at the heart of the city. Rising above a retail podium, which contains a performing arts centre, car park and an art & science museum, the towers are home to the headquarters of Petroliam Nasional Berhad, Malaysia's National Oil Company. WSP | Parsons Brinckerhoff provided the entire building services design for the Petronas Towers and podium, working closely with the architects to ensure perfect integration of the technical services into the architecture. WSP | Parsons Brinckerhoff's continuing involvement in the development of KLCC has included the design of the initial 30,000-ton on-site central plant, which has expanded to 60,000 tons to meet the cooling requirements of the entire district. We have also provided vertical transportation solutions for buildings in the development.

Project Status	Completed 1998
Floor	88
Height	452m
Type	Commercial
Client	KLCC Property Holdings Berhad
Architects	Pelli Clarke Pelli
Our Services	Building services





AUSTRALIA

“OUR STRUCTURAL TEAM CONSISTENTLY DELIVERS CREATIVE, BUILDABILITY-FOCUSSED DESIGN SOLUTIONS TO ACHIEVE HIGH QUALITY COST-EFFECTIVE PROJECT OUTCOMES FOR OUR CLIENTS. WE ARE RECOGNISED FOR SUCCESSFULLY DELIVERING VERY CHALLENGING TALL, SLENDER AND CURVACEOUS TOWERS SUCH AS PREMIER TOWER AND AURORA.”

KEVIN WINWARD, EXECUTIVE CHAIRMAN, STRUCTURES, AUSTRALIA





Image courtesy of COX/FKA Architects

350 QUEEN STREET MELBOURNE, AUSTRALIA

The development of 'Queens Place' aims to enliven and enrich the character of the Queen Victoria Market Precinct currently under development in Melbourne's CBD.

Working with the developer, the joint venture architectural design team of COX and FKA in conjunction with WSP | Parsons Brinckerhoff and the consultant team devised a master plan for the site around a pair of 79-storey towers. The design process gave rise to a concept that enriches the ground plane with new connections and an enhanced public realm within the Queen Victoria Market Precinct. In the podium, a variety of uses such as retail, childcare, and commercial suites provide animation to the critical 'first 25m'. Atop the podium, the two towers are shaped and sculpted to complement other buildings within and around the site. Stepping in form as they ascend, each tower is crowned with internal 'lanterns'. By using this shared language, the intent is to form a unique and dynamic pairing on Melbourne's continuously evolving skyline.

Project Status	Ongoing
Floors	79
Height	246m
Type	Residential
Client	3L Alliance
Architect	Cox Architecture & Fender Katsalidis Architects
Our Services	Structural and civil engineering

PREMIER TOWER MELBOURNE, AUSTRALIA

With stunning views of Port Phillip Bay, Docklands, Flagstaff Gardens and the CBD, Premier Tower will be one of Melbourne's tallest towers. The development comprises 780 one- and two-bedroom apartments, 180 hotel suites and restaurant, indoor/outdoor communal facilities including a pool, gymnasium, private dining and lounge rooms, virtual golf and theatre rooms, and game rooms as well as 147 car and 193 bicycle spaces.

Premier Tower's amorphic form responds to its island-site location. It endeavours to balance Melbourne's architectural past with its bright future through the progressive architectural design of the tower element and simple glass design of the podium section, which is sympathetic to the adjacent heritage buildings. The design reflects the personality and diverse uses of the different parts of the building, from the tough and resilient cable-structured gardens and gyms of Level 7, through the showy and glitzy entertainment spaces on Level 46, to the refined and exclusive luxury of the Library and Premier Club on Level 76. The geometry and diagonally opposed tower mass responds to first-principles demands from a structural and environmental wind perspective.

Project Status	Ongoing
Floors	68
Height	215m
Type	Hotel, Residential
Client	Fragrance Group
Architect	Elenberg Fraser
Our Services	Structural engineering



Image courtesy of Fragrance Group, Elenberg Fraser & Pointilism

SWANSTON CENTRAL

MELBOURNE, AUSTRALIA

Swanston Central is a 72-level high-rise residential building on the North of Melbourne's CBD. The development will be a defining project within Melbourne given its unique L-shape and façade which must blend with adjoining heritage buildings. The building will be over 40 levels taller than any other project on the site.

The site is bound on two sides by a bluestone heritage façade which must be retained at all times during construction. WSP | Parsons Brinckerhoff and the project team met the challenges associated with shared boundaries and retention of the existing heritage building through close collaboration with the adjacent building owners and Heritage Victoria.

The predominant structural challenge for an L-shaped building as slender and tall as Swanston Central is the complex torsional (twisting) acceleration at the top of the building under wind loading. We overcame this potential acceleration issue with our efficient design solution for the building in combination with close collaboration with the wind consultant. The result of this process was that additional tuned mass damping was not required, in turn increasing the net saleable area for the building.

Project Status	Completion in 2019
Floors	72
Height	236m
Type	Residential
Client	Hengyi Pacific
Architect	Elenberg Fraser
Our Services	Structural and civil engineering



WEST SIDE PLACE TOWER 1

MELBOURNE, AUSTRALIA

This four-tower mixed-use development contains 2500 apartments, five levels of basement car parking and 7000m² of retail space. The 79-storey signature tower will be topped with a luxurious 200-room six-star hotel, taking advantage of the spectacular views at that height. The other three towers of between 60 and 70 storeys are predominantly residential, with a 200-room hotel forming part of Tower 3. The integrated podium will include terraced apartments and the hotel and residential facilities.

We have worked closely with the consulting team to develop an efficient structural solution that utilises mega columns on the perimeter tied to a central core. Tower columns carry through the podium and basements to avoid costly transfers. Flat plate slabs have been utilised for an efficient construction cycle. Due to the depth of excavation for the basements, part of the development will be founded on pad footings and the rest will have large diameter bored pier foundations.

Project Status	Ongoing
Floors	79
Height	270m
Type	Hotel, Residential
Client	Far East Consortium
Architect	Cottee Parker Architects
Our Services	Structural and civil engineering



Image courtesy of Greenland Group

GREENLAND CENTER

SYDNEY, AUSTRALIA

Greenland Center at 115 Bathurst Street is expected to be the tallest residential building in Sydney. It consists of two distinct buildings with heritage significance; one of them a tall tower, onto which the new tower is grafted; the other a listed Art Deco style building which will be converted into a boutique hotel.

The tower will comprise 480 apartments over 67 levels and 11 levels of car park. On levels 2–6 a 'creative hub' offers facilities for performing artists, including a theatre, rehearsal, practice and office spaces as well as a television and recording studio. The car park will be designed to allow for the future provision of electric vehicle charging points. WSP | Parsons Brinckerhoff is engaged to provide full building services for the entire project, including MEP, fire, hydraulics, ICT, security, acoustics, vertical transportation and ecologically sustainable development (ESD) services.

Project Status	Completion in 2017
Floors	67
Height	235m
Type	Residential
Client	Greenland Group
Architect	BVN Donovan Hill, Woods Bagot
Our Services	Building services



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QUEEN'S WHARF BRISBANE, AUSTRALIA

Queen's Wharf Brisbane is set to transform Brisbane's CBD and will become an internationally recognised precinct with world class sustainable urban design and architecture that establishes a clear identity that is uniquely 'Brisbane' and 'Queensland'. It will connect the defining parts of Brisbane city – the Botanic Gardens, the Queen Street Mall, the Cultural Precinct, South Bank, the Parliamentary Precinct and the Brisbane River.

This 'Integrated Resort Development' is a high-quality, mixed-use destination aimed at providing tourism, leisure and entertainment facilities that appeal to as broad a demographic as possible, including the international market. It will include hotel towers, the signature 'Arc' casino resort, restaurants, cinemas and numerous new attractions. The Sky Deck sits on top of the Arc structure comprising towers 2 & 3.

Project Status	Completion in 2022
Floors	Tower 1 – 43 Levels Tower 4 – 63 levels Tower 5 – 49 Levels Tower 6 – 45 Levels Towers 2 & 3 above podium – Casino and Hotels – 26 Levels
Height	Tower 1 – 160m Tower 4 – 200m Tower 5 – 180m Tower 6 – 160m Casino and Hotels – 101m
Type	Hotel / Resort
Client	Destination Brisbane Consortium
Architects	Cottee Parker Architects Steelman Partners and Jerde in Collaboration – Architect Integrated Resort Grimshaw – Bridge Architect ML Design (Architects) – Retail and Adaptive Re-Use Architects
Our Services	Structural, civil, mechanical, electrical, hydraulic engineering, central energy planning, infrastructure services, fire and vertical transportation

OUR SERVICES

WE DELIVER LANDMARK STRUCTURES AND HIGHLY EFFICIENT SYSTEMS, AS WELL AS A BROAD RANGE OF ESSENTIAL TECHNICAL SERVICES – JUST SOME OF WHICH ARE HIGHLIGHTED ON THESE PAGES.

At WSP | Parsons Brinckerhoff, we know that high-rise projects present a range of unique challenges, and that no two are ever the same. We can draw on our global network of experts to provide a bespoke team tailored to the demands of every project, from the earliest planning stages to a successful completion and faultless operation throughout the life of the building.

So whether our clients need a fully integrated multidisciplinary service or expert consultancy in a very specialised field, we can help.



ACOUSTICS, NOISE & VIBRATION
Entisar Tower
Page 43



CIVIL ENGINEERING
Swanston Central
Page 72



DRAINAGE
The Shard
Page 32



ELECTRICAL ENGINEERING
Salesforce Tower
Page 25



ENERGY INFRASTRUCTURE AND MANAGEMENT
Deloitte Tower
Page 29



ENVIRONMENTAL CONSULTANCY
Tianjin CTF Binhai Center & Rosewood Hotel
Page 60



FAÇADE ENGINEERING & BUILDINGS MAINTENANCE
King West
Page 28



FACILITIES MANAGEMENT
Lotte World Tower
Page 65



FIRE & LIFE SAFETY
520 Park Avenue
Page 17



FIRE ENGINEERING
22 Bishopsgate
Page 37



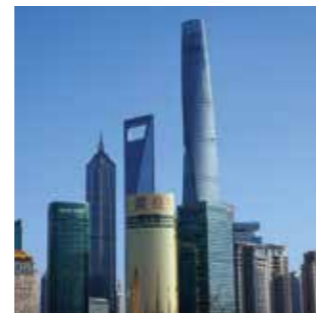
GEOTECHNICS
The Madison
Page 34



HYDRAULICS
Queen's Wharf
Page 76



IT AND COMMUNICATIONS TECHNOLOGY
Rosewood Hotel Sowwah Island
Page 46



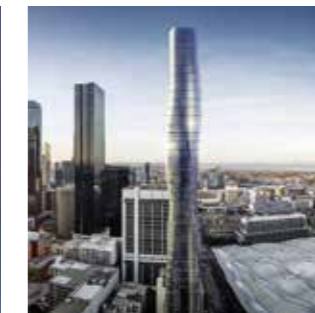
MECHANICAL ENGINEERING
Shanghai Tower and J Hotel
Page 61



POWER SYSTEMS
Guangzhou CTF Finance Center & Rosewood Hotel
Page 59



SECURITY CONSULTING
ADNOC HQ
Page 48



STRUCTURAL ENGINEERING
Premier Tower
Page 70



SUSTAINABILITY
South Quay Plaza
Page 35



TRANSPORT PLANNING AND REGENERATION
Milton Court
Page 36



VERTICAL TRANSPORTATION
Bahria Icon Tower
Page 42



WIND ENGINEERING
432 Park Ave
Page 18

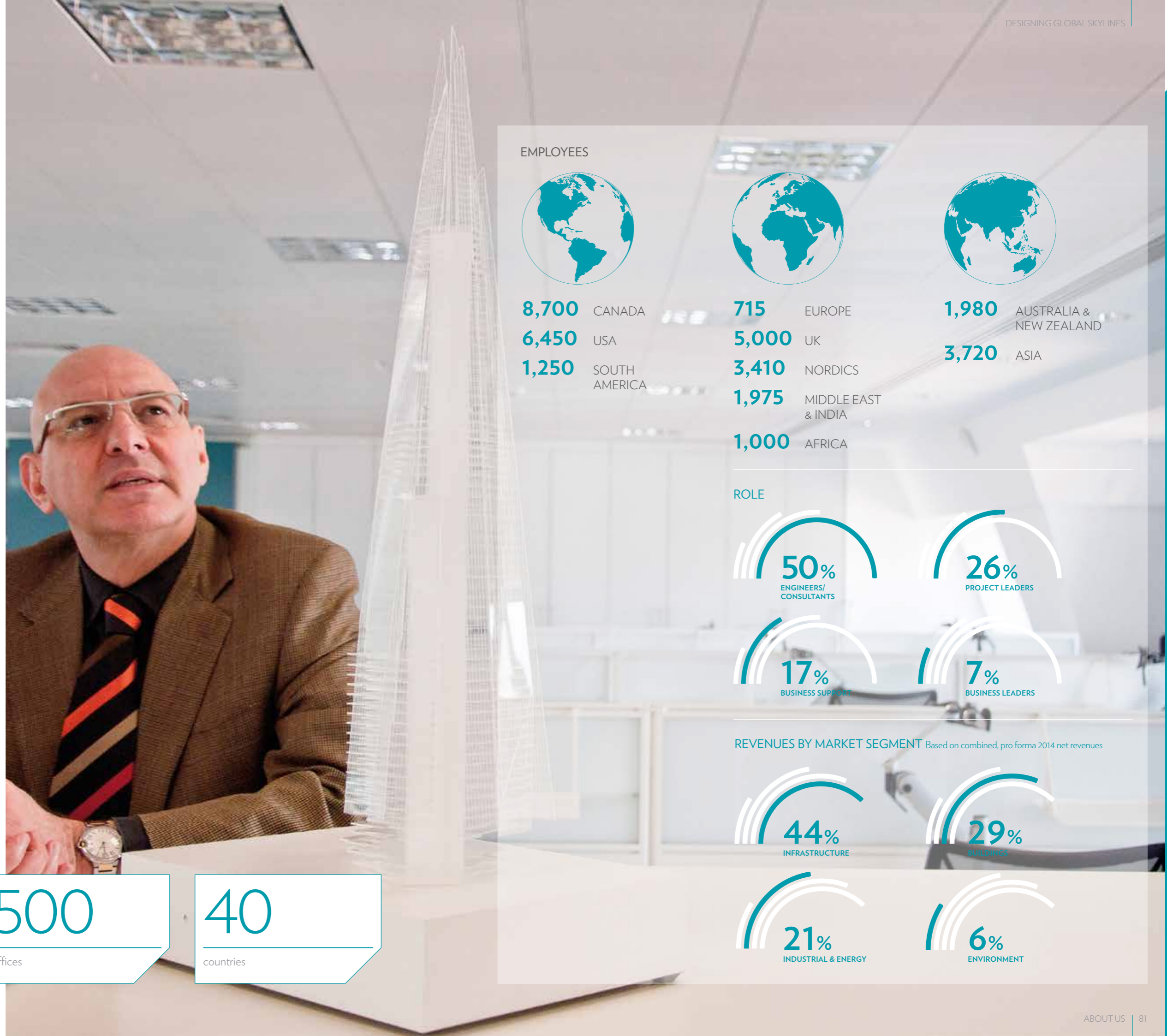
ABOUT US

WSP | PARSONS BRINCKERHOFF IS ONE OF THE WORLD'S LEADING ENGINEERING AND DESIGN CONSULTANCIES.

We provide services to transform the built environment and restore the natural environment. Our expertise ranges from environmental remediation to urban planning, from engineering iconic buildings to designing sustainable transport networks, and from developing the energy sources of the future to discovering new ways of extracting essential resources.

Our people come from a wide range of backgrounds, but we are united by the pride we take in our work and our passion for solving clients' problems.

Our unique combination of specialist and integrated skills, backed by our global reach, enables us to offer not only the latest thinking and most innovative technologies but also the most responsive client service, whatever and wherever the challenge.



EMPLOYEES



8,700 CANADA
6,450 USA
1,250 SOUTH AMERICA

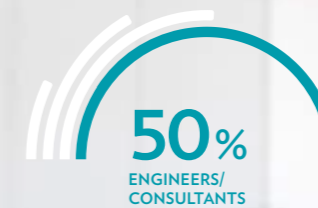


715 EUROPE
5,000 UK
3,410 NORDICS
1,975 MIDDLE EAST & INDIA
1,000 AFRICA

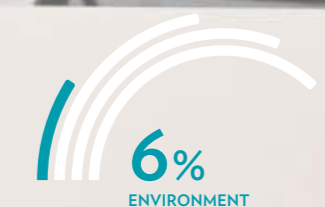
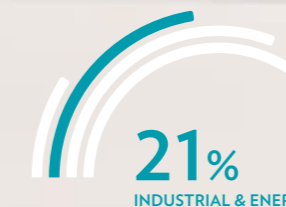


1,980 AUSTRALIA & NEW ZEALAND
3,720 ASIA

ROLE



REVENUES BY MARKET SEGMENT Based on combined, pro forma 2014 net revenues



34,000

employees

500

offices

40

countries

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ABOUT WSP | PARSONS BRINCKERHOFF

WSP | Parsons Brinckerhoff is one of the world's leading professional services firms, working with governments, businesses, architects and planners and providing integrated solutions across many disciplines. We provide services to transform the built environment and restore the natural environment, and our expertise ranges from environmental remediation to urban planning, from engineering iconic buildings to designing sustainable transport networks, and from developing the energy sources of the future to enabling new ways of extracting essential resources. We employ 34,000 engineers, technicians, scientists, architects, planners, surveyors and environmental experts, based in more than 500 offices across 40 countries.



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