mpa Precast

Edition 1 – May 2025

Case Study Compendium

Case studies highlighting innovation, applications and modern methods of construction (MMC)

Mineral Products Association

Contents

Introduction

Precast concrete is one of the most versatile and robust construction materials available today, used across a huge range of applications, from domestic driveways to major national infrastructure projects. Whether delivering repeatable elements for platform-based construction approaches or enabling bespoke, architecturally stunning designs, precast concrete plays a crucial role in modern construction.

A clear example of the efficiencies offered by precast concrete is the prison building programme featured in this publication, where repetition of products across multiple builds has resulted in significant time and cost savings. Yet precast is not limited to repetition; it also supports the creation of unique structures, realising creative architectural visions and solving complex engineering challenges.

This compendium captures a selection of projects from across the precast concrete product range. It showcases the flexibility and innovation of the sector, although it is by no means exhaustive - hundreds more applications exist. For the latest project updates and further inspiration, we encourage you to visit the MPA Precast website: www.mpaprecast.org

Across the case studies presented here, six common benefits of precast concrete emerge:

Modern Methods of Construction (MMC)
Precast concrete is at the forefront of MMC, incorporating new technologies through innovative offsite manufacturing and advanced onsite installation techniques. As a mature stable construction products sector, concrete today offers solutions that align with multiple MMC categories.

Programme Efficiency
Precast concrete enables significant time savings. Smart casting sequences, just-in-time deliveries, reduced reliance on associated trades and rapid installation methods mean faster, more predictable construction programmes.

High-Quality and Robustness
Factory-controlled environments ensure consistent, high-quality products that are often superior to those produced using lightweight, traditional methods - especially when weather conditions or labour shortages could impact quality onsite.

Enhanced Safety
Precast construction reduces risks during both manufacturing and installation, particularly by limiting work at height and in confined spaces. Offsite production and smaller onsite teams reduce noise, dust and general disruption, while the material's A1 fire rating provides long-term safety benefits post-construction.

Predictability and Reliability
Modern digital construction techniques, coupled with a mature UK concrete supply chain, ensure precast products are predictable, traceable and resilient - offering reliability throughout their lifecycle and even enhancing insurability.

Sustainability and Circular Economy Benefits
Precast concrete assets are long-lasting, adaptable and can be designed with disassembly and reuse in mind, supporting sustainable construction practices. Precast concretes thermal mass, fire performance and acoustic benefits also contribute to comfortable, resilient and efficient buildings.

The projects featured here are from the membership of MPA Precast, the trade association representing the UK precast concrete sector. MPA Precast's mission is to promote the use of precast concrete in construction, disseminate industry guidance, and provide added value to members through knowledge-sharing and advocacy. With over 50 precast manufacturers and more than 100 supply chain associate members, MPA Precast stands as a hub of expertise, innovation, and best practice in precast concrete.

FP McCann Ltd

Dunfermline Learning Campus

The recently opened £120m Dunfermline Learning Campus which replaces two schools, Woodmill High School and St. Columba's RC High School, has surpassed minimum compliance levels within current Building Regulations and school design standards, and adopted Passivhaus principles.

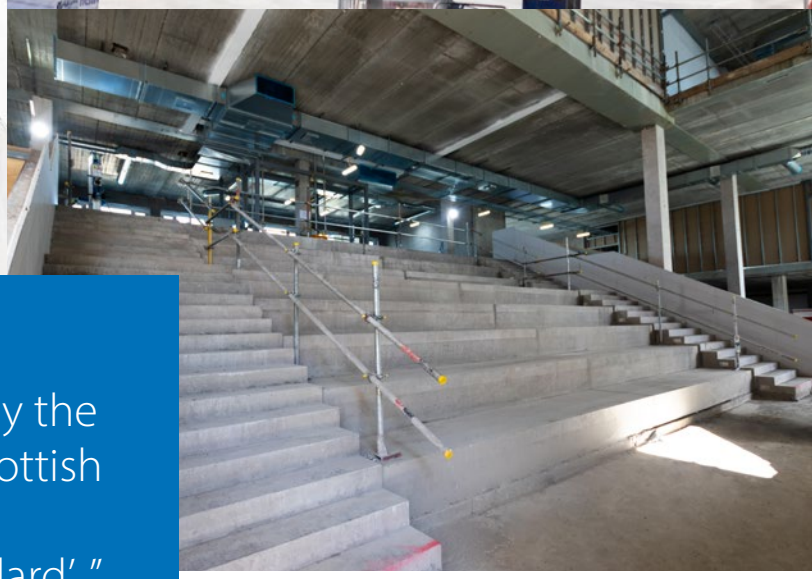
Fife Council had ambitious goals to create a state-of-the-art facility with a number of high-quality facilities that enable progressive teaching and the cross-fertilisation of ideas in a building designed to push the boundaries for collaborative working.

With energy reduction and sustainability high on the priority list, Fife Council stipulated that the design should achieve Passivhaus Classic Certification, whilst also setting a lower embodied carbon value for the project, as per RIBA 2025 targets. In addition, this was one of the first construction projects to apply the Scottish Government and Scottish Futures Trust's new 'Net Zero Public Sector Buildings Standard', a voluntary standard designed to support public bodies to define objectives for their construction project in pursuit of a credible path to net zero operational energy.

This is one of a growing number of certified Passivhaus projects in the UK, including schools. In 2012, the UK's first zero carbon school built to the Passivhaus standard, Montgomery Primary School, also utilised a precast concrete structure, as did the first house in England to receive Passivhaus accreditation: Underhill House.

The Passivhaus approach was first developed in Germany in the 1990s. It relies on ultra-low levels of air permeability, which means that all schemes require mechanical ventilation with heat recovery. Other key elements of Passivhaus construction include very high levels of insulation, low or "no" thermal bridging and high-performance windows. This strategy keeps heat loss so low that little or no additional heating is needed, beyond passive sources such as the building occupants. Concrete's inherent solidity provides a simple and robust air barrier, with high performance demonstrated in numerous Passivhaus projects.

AHR Architects were tasked with designing the new building to accommodate Woodmill High School and St. Columba's RC High School. Its Glasgow team worked closely with Fife Council's architect John Peden to bring the vision to fruition with main contractor BAM Construction. AHR recognised the importance of embracing key Passivhaus principles from the outset, firstly in respect of the building form. In Passivhaus projects, the 'form factor' must be considered to ensure the ratio of the external envelope to the floor area is minimised, thus lowering the potential



> " ...this was one of the first construction projects to apply the Scottish Government and Scottish Futures Trust's new 'Net Zero Public Sector Buildings Standard'. "

for heat loss. This resulted in a design with the accommodation arranged over three floors and a relatively compact form which avoided complexities such as external soffits and multiple steps in the massing.

Simplification of the build process was also significantly important for a building of this scale. In particular, how to ensure the building's main frame could be built efficiently whilst also achieving super-high levels of airtightness. An analysis of the frame options was undertaken early in the design at RIBA Stage 1-2 to assess which approach would achieve the airtightness level of 0.6 air changes per hour (ACH), expressed as ≤ 0.6 h-1 @ 50 Pa. From this, the decision was made to use precast concrete for the main building frame.

Choosing precast concrete for the main building frame maximised delivery of an airtight envelope and simplification of detailing. This is because concrete is inherently airtight, which makes it easier to track the airtightness line through the building, and it does not rely on membranes and tapes to achieve performance throughout the building's operational life. In addition, because the joints between the precast panels could be pressure grouted, this further assists in maintaining an airtightness. In contrast to other forms of construction, the airtightness barrier is not hidden within the wall build up, but inherent in the concrete structure and visible internally, allowing for ease of tracking and resolution of any issues throughout the build.

BAM Construction and precast supplier FP McCann Ltd expertly translated these inherent advantages into the structure as built today. With such tight standards to meet, quality manufacture is vital, something synonymous with offsite concrete. FP McCann's package included the manufacture and delivery of approximately 1,500 units including precast walls, stairs, lift shafts, floor planks and columns.

The precast concrete frame was built over a 27-week period between October 2022 and May 2023, with a large crane lifting the panels into position on arrival to site. Some of these precast panels were particularly large, with seven measuring 12m in length for the construction of the three-storey high dining hall.

The BAM team in Scotland recognised that the key difference between this project and non-Passivhaus building projects was intense scrutiny on quality and detailing, and the initial advice provided by their colleagues in Germany, with extensive Passivhaus experience, was simply put 'build it with concrete'.

The result of this attention to detail and continuous quality focus delivered an airtightness level that surpassed the target. In the precast concrete framed building, airtightness of 0.4 h-1 @ 50 Pa was recorded. A very high level of airtightness was not the only benefit of using precast concrete, however. Superior acoustic performance could be achieved more easily due to the floor-to-floor spans of the precast units, and they also reduced the need for linings in the stairwells, which is a vulnerable area.

Forterra Building Products Ltd

HMP Millsike

Forterra Building Products Ltd has played a key role in delivering the UK's first fully electric prison, HMP Millsike, through its supply of precast concrete components to Kier, the project's main contractor.

Situated on a 53-acre site near York and due to open in 2025, HMP Millsike is an excellent example of the Government Construction Playbook in action. As part of a £400 million government investment into new prison places, this facility is a flagship for the Ministry of Justice's push towards modern and sustainable infrastructure.

The new prison will provide c.1,500 Category C resettlement places for adult male prisoners, providing a rehabilitative environment and preparing them for release. It will run solely on electricity, making it the first of its kind in the UK. Solar panels, heat pump technology and more efficient lighting systems mean it will use 68% less energy than even the most recently built prison, HMP Fosse Way.

Forterra supplied a wide range of precast concrete components, including wall panels, floor slabs, stairs and ground beams. These were manufactured offsite to tight tolerances and delivered just-in-time, in line with the project's platform-based design and installation methodology. This standardised approach enabled rapid construction of the prison's seven houseblocks, with over 16,500 precast elements used in total. Up to 220 tonnes of precast concrete was installed each day, illustrating the scale and efficiency of this DfMA (Design for Manufacture and Assembly)-led approach.

The project is part of the MoJ's Net Zero by 2050 strategy and aimed to achieve lower embodied carbon and operational emissions than previous builds. Forterra's precast concrete supported this ambition by enabling the use of efficient construction processes and reducing on-site waste. The project achieved 24% embodied carbon savings, aided by the offsite production and repeatable quality of Forterra's precast elements.

Offsite manufacturing also brought safety benefits. Forterra's high-quality precast components helped reduce high-risk activities on site, such as hot works and work at height, contributing to a 200,000-hour, RIDDOR-free construction record.

In addition to environmental and safety benefits, the project delivered meaningful social value. More than 765 jobs were created, along with 88 apprenticeships and training opportunities. Employment was also offered to prison leavers and individuals on temporary licence—reflecting a broader commitment to social impact across the supply chain, including from Forterra.

As the third in a series of four new prisons delivered using a standardised, MMC-first model, HMP Millsike achieved 84.2% Pre-Manufactured Value (PMV). Thanks to early and sustained collaboration with suppliers such as Forterra, the project also saw improved build efficiency and consistency compared to earlier programmes.

O'Reilly Precast Ltd

Sherriff's Gate, Worcester

The ambitious £150 million Sherriff's Gate development in Worcester is a prime example of how precast concrete and Modern Methods of Construction (MMC) combine to deliver efficient, high-quality outcomes on complex projects.

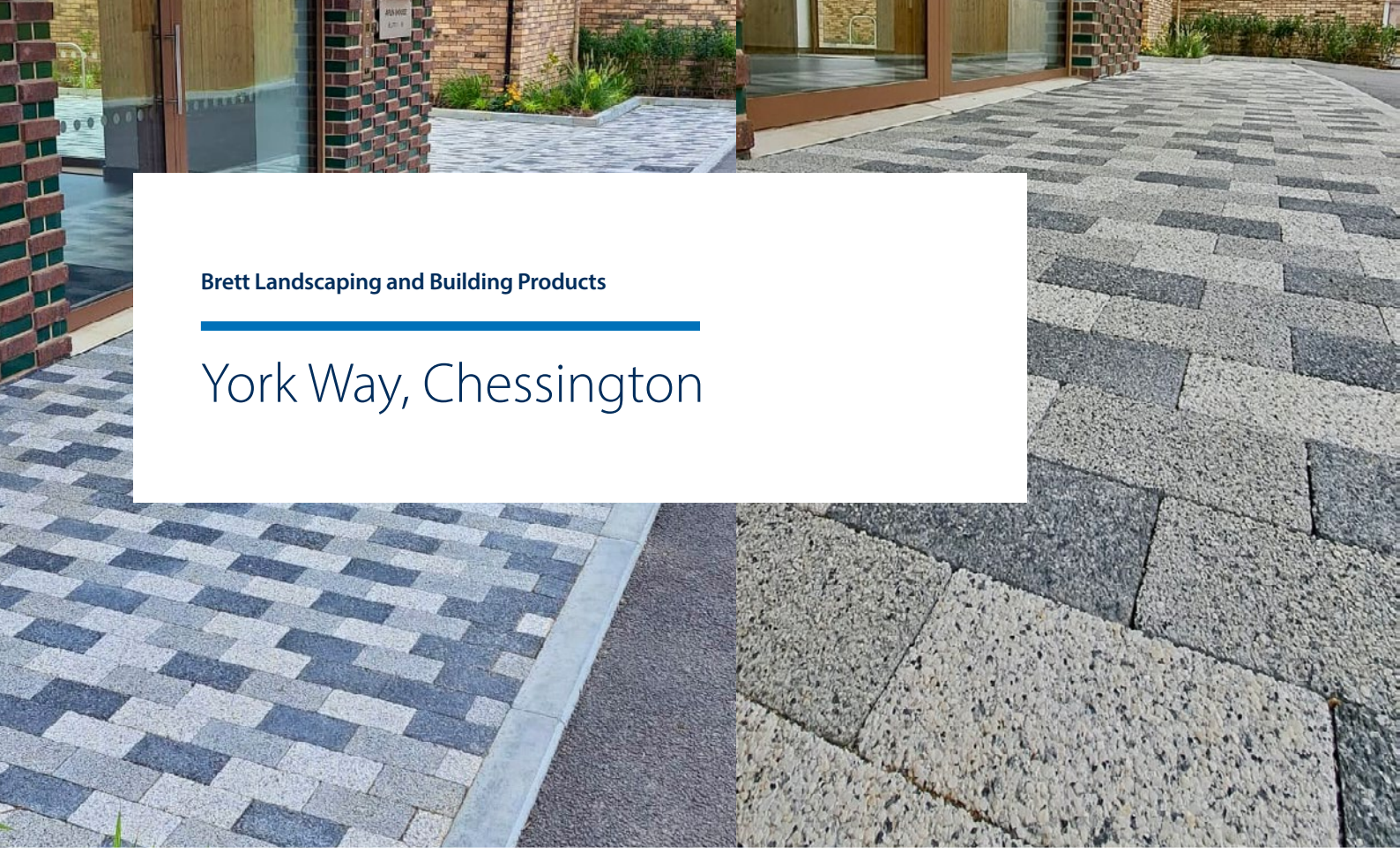
The scheme aimed to transform 900,000 square feet of former industrial land into a vibrant, mixed-use development, with phase one showcasing the speed, safety and precision achievable through precast solutions.

O'Reilly Precast Ltd, working in partnership with the Elliott Group, began work on the first phase of the development in July 2022. The initial stage delivered two residential blocks, John Gregory Court (105 units) and Wilson Roberts Court (108 units), in just over 100 days. This rapid delivery was made possible by O'Reilly's full-frame precast concrete system, supported by detailed upfront planning and tight on-site coordination.

In total, precast elements supplied included 8,800m^2 of 200mm hollowcore floors, 750m^2 of 250mm hollowcore, 9,400m^2 of solid walls and 30 flights of precast stairs. With deliveries arriving from both Ireland and O'Reilly's factory in Barry, Wales, the logistics demanded a rigorous and fail-safe plan. Up to 14 articulated truck deliveries per day were scheduled, with wall panels installed in the morning and floors fitted above them that same afternoon, leaving no room for error or delay.

The city-centre location presented significant logistical challenges. Safe Systems of Work were implemented to manage crane positions, lifting plans, vehicle access, and material flow on a constrained site. Effective collaboration between O'Reilly Precast, Elliott Group and the wider supply chain, including screeding contractor NAB Flooring Ltd, ensured that structural installation progressed without disruption, regardless of adverse weather conditions that might otherwise impact lightweight systems.

The success of the precast approach at Sherriff's Gate lies not only in the on-site efficiency but in the six months of detailed preparation that preceded it. Working closely with Elliott's design team, O'Reilly helped shape the scheme's structural solutions from an early stage. BIM coordination ensured full alignment between design intent and buildability.



Brett Landscaping and Building Products

York Way, Chessington

The use of Invicta block paving at York Way in Chessington has helped deliver a robust, attractive and sustainable surface solution for one of Kingston Council's most significant housing developments in recent years.

Developed by Vistry Homes as part of the Council's 'first in a generation' programme to build new council homes, the scheme comprises 19 modern residences alongside a communal outdoor space and new play area.

The development required a hard-wearing and visually appealing paving solution that could withstand regular foot and vehicle traffic while complementing the surrounding residential setting. Invicta, the premium block paving range from Brett Landscaping and Building Products, was selected for pathways, parking areas and public realm spaces across the site.

Manufactured at Brett's Cliffe site in Kent, the Invicta range combines long-term performance with enhanced visual impact. Each paving block features a specially formulated surface layer incorporating selected aggregates to create a vibrant, shimmering finish. For the York Way project, this ensured not only durability and ease of maintenance but also a high-quality look that matched the modern, low-rise housing design.

The blocks used on the development were part of the 60mm range, designed for domestic-scale applications. Thanks to its modular design, Invicta could be laid in flexible patterns across different zones of the site, creating visual continuity while meeting practical requirements for pedestrian and vehicular access.

In line with the Council's sustainability targets, the environmental credentials of Invicta were also a key factor. Using aggregates dredged directly from the Thames estuary has significantly reduced the carbon footprint of the manufacturing process, making Invicta a carbon friendly option in the block paving category. The paving is also 100% recyclable and manufactured in compliance with a range of quality and sustainability standards, including BES 6001 for responsible sourcing and ISO 14001 for environmental management.

The success of the York Way development has contributed to growing interest in Invicta among local authorities and social housing developers across the UK. Its combination of performance, aesthetics and low environmental impact has also led to its use on the exterior car parks and pathways around the new training centre for Crystal Palace Football Club, as well as more than forty new food outlets at ASDA supermarkets and Leon restaurants.

> "The paving is also 100% recyclable and manufactured in compliance with a range of quality and sustainability standards..."

Banagher Precast Concrete Ltd

Silvertown Tunnel, London

The Silvertown Tunnel is set to be the largest diameter tunnel ever undertaken in the UK. Stretching beneath the River Thames to connect Silvertown and the Greenwich Peninsula, the £1 billion project aims to ease congestion through the Blackwall Tunnel while improving public transport links across East London.

Opening in 2025, it also reflects a wider shift toward more sustainable and efficient infrastructure delivery, much of which has been made possible through the use of precast concrete.

Precast was chosen for its quality, reliability and ability to reduce environmental impact. Supplied by Banagher Precast Concrete Ltd, more than 10,000 tunnel segments were manufactured offsite and transported to site for installation. Factory production offered significant advantages, including rigorous quality control, consistent strength and minimal disruption on site.

Working closely with the Riverlinx JV (Ferrovial, BAM Nuttall and SK Ecoplant) and consulting engineers, Banagher delivered a UK first with the development of intricate cross-passage segments that removed the need for temporary propping. This bespoke engineering solution enabled a faster and safer build, showcasing the flexibility and adaptability of precast in complex underground works.

Sustainability was embedded throughout the project. The concrete mix included 39% ground granulated blast furnace slag (GGBS), a lower-carbon cement alternative and the use of steel-fibre reinforcement further reduced reliance on traditional steel bar. Together, these innovations saved approximately 1,480 tonnes of CO_2. As part of its wider commitments, Banagher also planted 1,000 trees and maintained its ISO 17025 accreditation for materials testing.

The Silvertown Tunnel project not only highlights the many advantages of precast concrete, precision, performance and carbon savings but also points to an increasingly circular and low-carbon future for infrastructure in the UK.

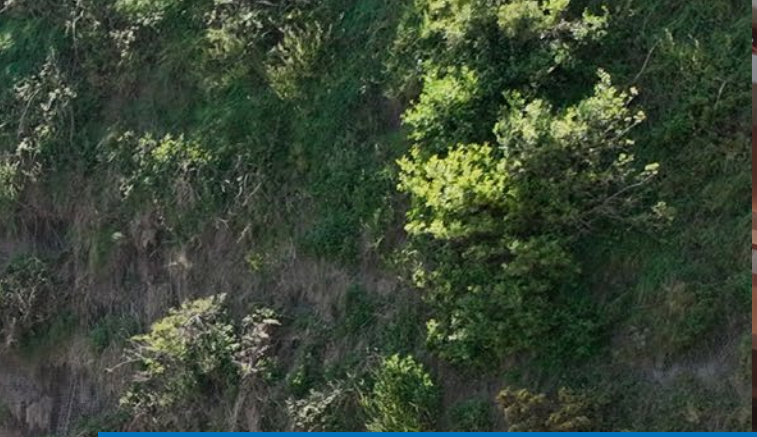
Cornish Concrete Products Ltd

South Devon Railway Resilience Programme

The completion of the 109m-long rockfall shelter at Parsons Tunnel, near Holcombe, marks a major milestone in Network Rail's Southwest Rail Resilience Programme.

This programme was designed with the aim of protecting the coastal railways, running between Exeter and Newton Abbot, from extreme weather. On this route there was a particular focus on protecting the railway line from any potential rockfalls as steep cliffs cover that line.

This £48 million rockfall shelter is part of the wider Southwest Rail Resilience programme which was initiated following the 2014 storms that caused disruptions and cut of services to the peninsula for eight weeks. The programme has seen a total investment of £165 million, which includes the construction of a new sea wall at Dawlish and ongoing work to install additional protective measures between Dawlish and Holcombe. To ensure that there were minimal disruptions to the train services and to maintain the safety of the workers and passengers, most of the construction work took place during the night.



> " The roof shelter was covered with 4,100 tonnes of red sand and 5,132m³ of foam concrete which was used to backfill between the shelter and the cliff edge. "

Images – © Network Rail

Cornish Concrete Products Ltd played a central role in the project, manufacturing a total of 185 precast concrete units. Each unit was specifically designed and coloured red to match the local sandstone, ensuring that the structure blended seamlessly with the natural surroundings whilst providing the necessary durability to withstand the extreme weather conditions. The structure itself is open on the seaward side, so that passengers are still able to continue to enjoy the coastal views. All of the precast concrete units were then transported to site and installed to create a protective shelter.

To build the shelter, a gantry crane running along the rails was used to move the precast units into place. Due to the space constraints between the cliffs and the sea, the gantry crane proved to be invaluable to meet the unique challenges of working in such a confined space. The roof shelter was covered with 4,100 tonnes of red sand and 5,132m^3 of foam concrete which was used to backfill between the shelter and the cliff edge. Stainless steel netting measuring 7000m^2 and secured with 1,400 soil nails was installed above the structure to add an additional layer of protection, to the bridge, against potential rockfall.

The completion of the Parsons Tunnel rockfall shelter is a vital step in ensuring the resilience of this crucial rail link, blending innovative engineering with thoughtful design. It not only enhances passenger safety but also preserves the natural beauty of the surrounding Cornish coastal landscape.

ABM Precast Solutions Ltd

Burton Green Tunnel South Portal

As part of the high-speed 2 rail infrastructure, the Burton Green Tunnel South Portal required a specialist engineering response to a unique challenge: the dispersal of air pressure caused by high-speed trains entering and exiting tunnels.

The solution to this was designed by BBV and delivered in collaboration with ABM Precast Solutions Ltd, involved the construction of a fixed-height porous portal structure with pressure relief vents of varying size.

The scope included the delivery of 178 precast concrete roof units, each integral to managing aerodynamic pressure while forming part of a visually cohesive and structurally robust portal. What made this especially complex was the high level of variation, 96 unique dimensional combinations across the panel units, many of which featured vent chimneys of varying sizes.

To meet these challenges, ABM devised a flexible mechanical formwork solution, allowing a set of standard moulds to be rapidly adjusted and reconfigured throughout the production cycle. This enabled high-speed, high-accuracy manufacture without compromising on tolerances, a critical requirement given the structural demands of the portal units, which each weighed between 17 and 28 tonnes.

The inclusion of chimneys added another layer of complexity. While casting the units monolithically could have been an option, the presence of rebar projecting from the upper surface would have necessitated costly couplers and created issues in demoulding and turnover. Instead, ABM implemented a two-stage casting method. The main panels were cast first, with the chimneys added later using custom internal and external formwork. This approach ensured consistency, control and efficiency.

ABM also challenged the conventional method for creating construction joints at the interface between precast roof units and in-situ portal walls. Rather than rely on post-casting surface preparation, which adds time and labour, ABM proposed a cast, indented joint detail that complied with BS EN 1992-1-1, Clause 6.2.5. This alternative detail was accepted, eliminating the need for secondary preparation and streamlining the production process further.

Through technical innovation and a commitment to manufacturing efficiency, ABM successfully delivered all 178 portal units to exacting standards. The project demonstrates how complex pre-designed elements can be manufactured at scale and on time, when smart production engineering is applied to structural challenges.

Charcon Hard Landscaping - Part of Holcim UK

Regeneration of Farnham Town Centre

Charcon Hard Landscaping - part of Holcim UK, has supplied a full suite of hard landscaping products to transform the public realm at Brightwells Yard, a major regeneration project in the heart of Farnham, Surrey. Led by developer Crest Nicholson, the scheme has revitalised a previously underused area with new homes, retail, leisure and green space. All centred around a vibrant new town square.

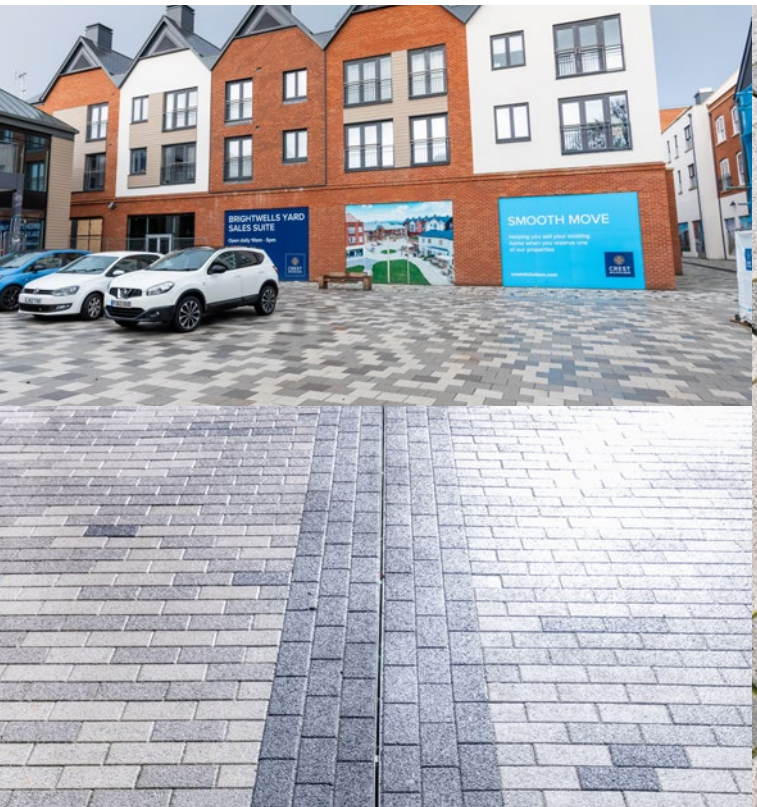
Working in collaboration with landscape architects Murdoch Wickham and contractor De-Ath Bros, Charcon provided paving solution to support the creation of a welcoming and contemporary public space. A total of 1,179.86m^2 of paving was laid, with 217 tonnes of material used. Charcon's Stonefleck block paving, Stonefleck Infilta permeable paving and UrbanPave block paving were chosen to echo the blend of modern and traditional architecture found across the development.

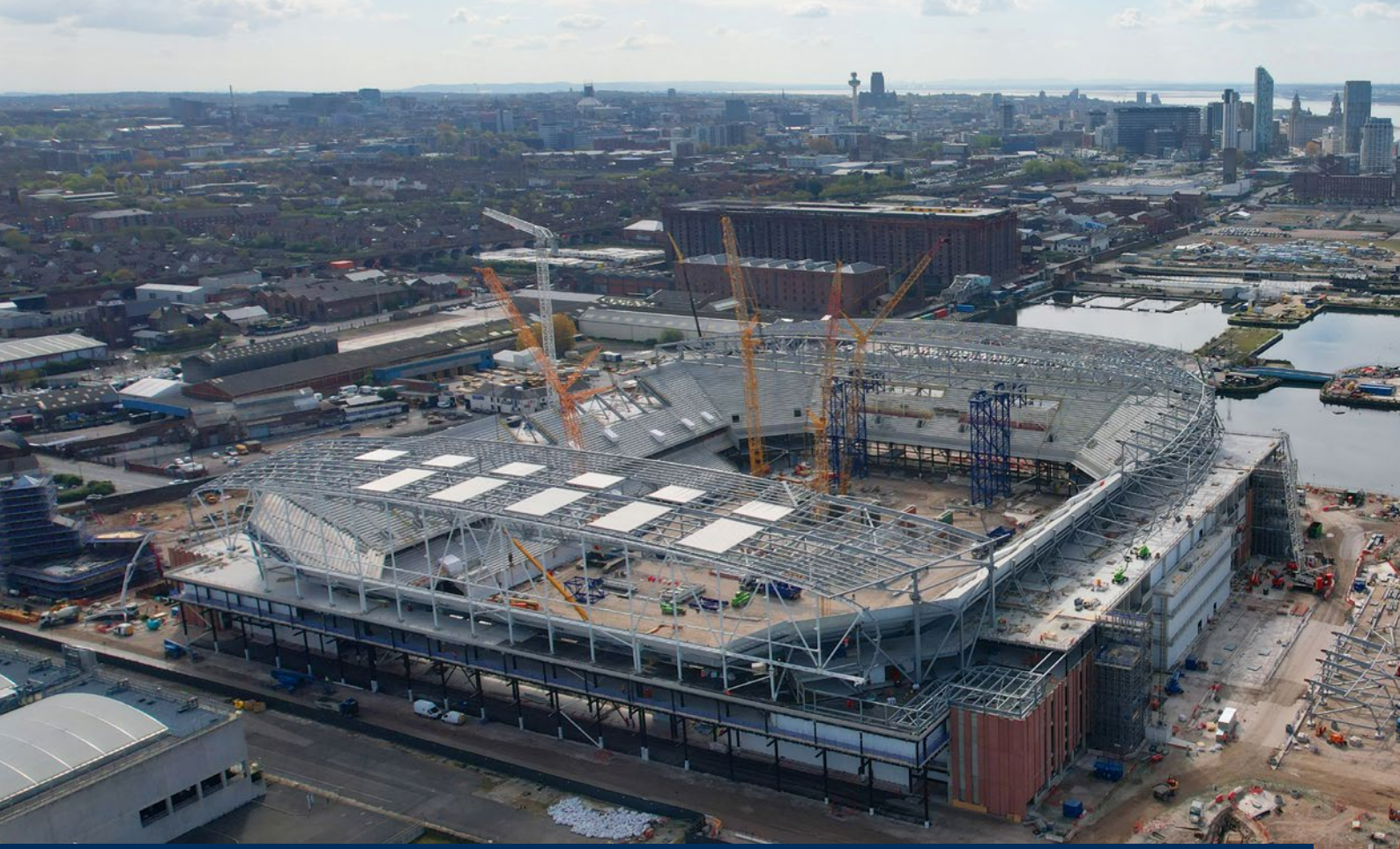
To meet the project's sustainability and surface water drainage requirements, Charcon recommended its Stonefleck Infilta permeable paving, which features a dropped nib design to maintain clear, visible joints for water infiltration. This ensures compliance with Sustainable Drainage Systems (SuDS) and helps reduce flood risk by managing runoff at the surface level. Infilta paving also simplifies construction and maintenance, while supporting wider pollution control and water management goals.

The main square combines both Stonefleck and UrbanPave ranges, selected in a palette of grey tones to deliver a clean, modern aesthetic. These paving systems were designed not only for visual impact but for long-term durability in high-footfall areas such as walkways and commercial zones.

Charcon's Aqua-etching technology, used to finish UrbanPave, offers a sustainable alternative to traditional shot-blasting methods. The process produces less waste, recycles water on-site and reuses the minimal dust created as a by-product, contributing to the project's 40% cement replacement rate and reinforcing the circular approach to resource use.

With a fixed completion deadline to align with the official opening, the Charcon team worked closely with De-Ath Bros and Crest Nicholson to ensure on-time delivery and project readiness. Through consistent communication and logistical support, Holcim UK helped ensure that the new public square opened on schedule, making a positive, lasting impact on the local community.





Banagher Precast Concrete Ltd and Explore Manufacturing Ltd - part of Laing O'Rourke

Everton Football Stadium

Everton Football Club's new 52,888 seater stadium, set along the historic banks of the River Mersey, Liverpool, has officially opened its doors for the 2025/2026 football season.

This world-class stadium is a testament to modern engineering, utilising cutting-edge construction techniques and the expertise from industry-leading companies including, Laing O'Rourke, Banagher Precast Concrete Ltd and Explore Manufacturing Ltd. Each company played a crucial role in delivering this iconic project, which blends sustainable practices, digital precision and innovative building methods.

As the main contractor, Laing O'Rourke has overseen the entire stadium construction since being appointed by Everton Football Club in February 2020. With a £555 million project budget, Laing O'Rourke has leveraged its extensive experience in delivering complex sports infrastructure. The company's expertise in managing large-scale, intricate builds has been essential in maintaining both the ambitious timeline and budget.

From the early stages of development, the team worked closely with Everton Football Club to refine the stadium's design, navigating complex planning processes and coordinating with local authorities. Their integrated approach, supported by an in-house supply chain, allowed them to efficiently respond to the challenges posed by the stadium's unique dockside location. Laing O'Rourke's contribution is evident in the detailed preservation of historical features, including the Grade II listed dock wall and the stabilisation of the site's hydraulic tower, demonstrating their commitment to heritage alongside modern development.

Banagher Precast Concrete, a leader in precast concrete manufacturing, supplied critical structural elements for the Everton Stadium. They provided bespoke double-step terracing units and other key precast components. The company's advanced manufacturing capabilities ensured that the components were produced to exacting specifications and delivered on time.

The terracing units, produced offsite in Banagher's Irish facilities, were shipped directly to Liverpool, minimising on-site construction time and labour. These double-step units were engineered specifically for Everton's stadium to create the perfect balance between durability, safety and spectator experience. By manufacturing the components offsite, Banagher Precast significantly reduced construction waste and improved quality control, key aspects of the project's sustainability efforts. Their partnership with Laing O'Rourke exemplifies how offsite construction methods can drive both efficiency and sustainability in large-scale developments.

> " With a £555 million project budget, Laing O'Rourke has leveraged its extensive experience in delivering complex sports infrastructure. "

Explore Manufacturing, another vital player in the project, brought its specialised capabilities in offsite manufacturing to the Everton Stadium build. As part of Laing O'Rourke's in-house supply chain, Explore Manufacturing was responsible for producing a wide range of precast elements, including structural beams, columns and cladding systems, which formed the stadium's structural backbone.

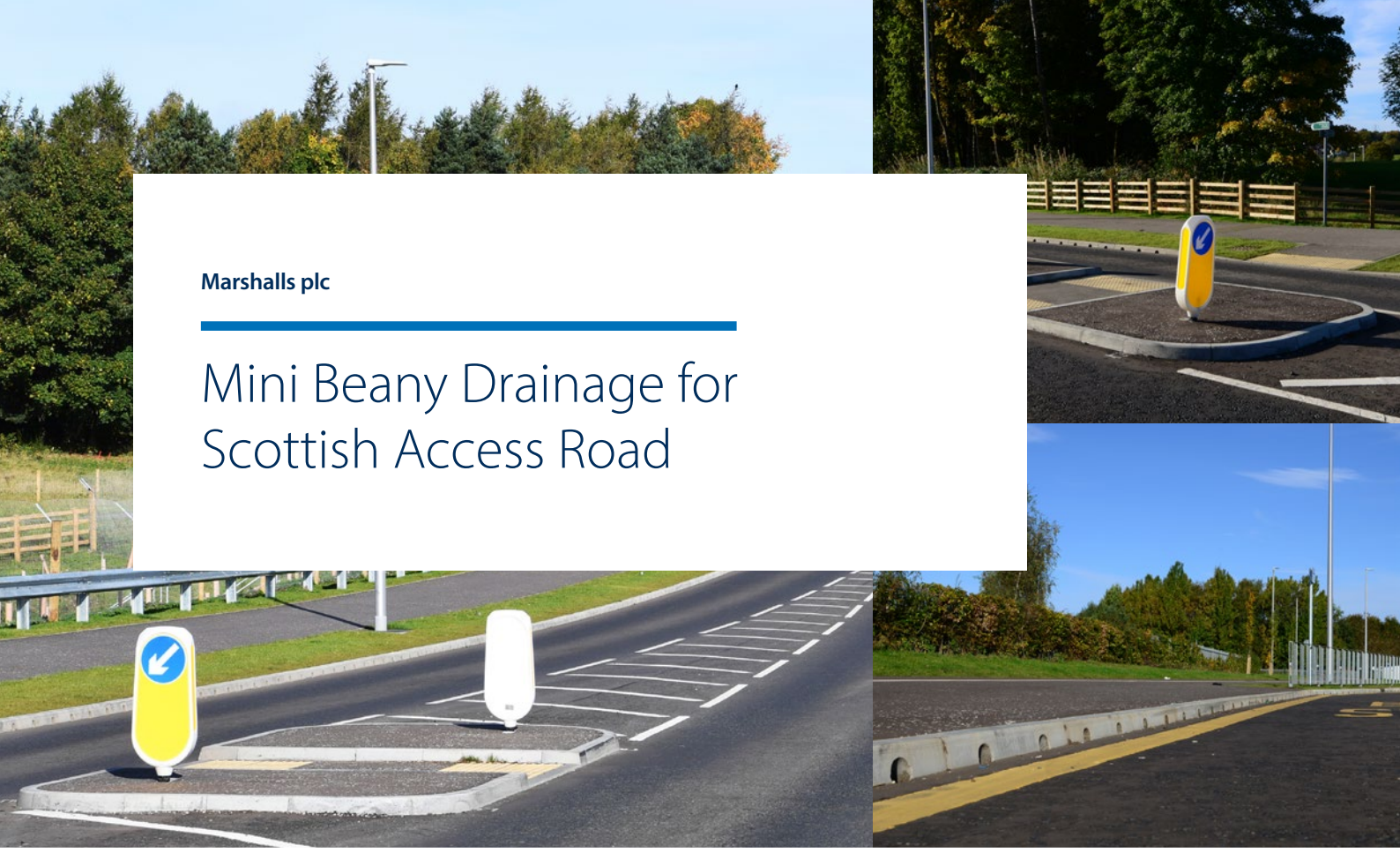
Explore Manufacturing's precision-driven approach leveraged cutting-edge technologies and Design for Manufacturing and Assembly (DfMA) principles. By producing components offsite and ensuring meticulous quality control, Explore Manufacturing helped streamline the construction process, reducing on-site complexities and minimising disruption to the surrounding area. Their contributions were integral to achieving the project's ambitious timelines while maintaining the highest standards of safety and durability.

The collaboration between Laing O'Rourke, Banagher Precast Concrete and Explore Manufacturing is a prime example of how modern methods of construction (MMC) and digital innovations like Building Information Modelling (BIM) can enhance both the efficiency and sustainability of large projects. BIM was crucial in the planning and execution of the Everton Stadium, enabling digital visualisation of every stage of construction. This minimised risks, improved project management, and provided a digital blueprint for future maintenance or upgrades.

By employing DfMA principles, all three companies ensured that large components could be fabricated offsite to precise specifications and assembled with minimal waste and maximum efficiency. This approach was critical in meeting the stadium's tight deadlines, particularly in the context of a complex, dockside construction environment.

Beyond its impressive structural design, Everton Football Stadium stands as a model of sustainable construction and community engagement. Its location, just a short distance from Liverpool's city centre, allows fans to walk or take public transport to matches, reducing the carbon footprint of game-day travel. Laing O'Rourke, Banagher Precast Concrete, and Explore Manufacturing all worked with local organisations to create jobs, provide skills training and engage with the local community throughout the construction process.

The site's transformation from a historic dock to a world-class stadium has been carefully managed with sustainability in mind. Initial groundwork, including the infilling of the dock with 450,000 cubic meters of sand dredged from the Irish Sea, was conducted with a minimal environmental impact. Marine life was carefully relocated and heritage structures were preserved, ensuring that the project respected both the natural environment and the historical significance of the site.



Marshalls plc

Mini Beany Drainage for Scottish Access Road

In early 2024, work began on a transformative infrastructure project in Denny, a town in the Falkirk area of Scotland, where long-standing traffic congestion and safety concerns had plagued residents for years.

The construction of the 1.3km Denny Eastern Access Road aimed to alleviate pressure on the town's two main routes, Glasgow Road and Broad Street, by diverting HGVs and unnecessary through-traffic away from the town centre. The project, commissioned by Falkirk Council, was not only a response to transport issues but also a forward-thinking investment in environmental and community wellbeing.

A key priority for the Council was to ensure the road supported sustainable and climate-resilient infrastructure. This included improving air quality, encouraging active travel, enhancing biodiversity and, crucially, managing flood risk through a sustainable drainage system (SuDS). To meet these goals, Marshalls plc, delivered a bespoke drainage design. The solution needed to be engineered with a hydraulic combined kerb and drainage system, achieving a minimum wall thickness of 60mm and installed to a specific kerb upstand.

Having worked successfully with Marshalls on previous schemes, contractor RJ McLeod enlisted the manufacturer's technical team to co-develop the drainage solution. Using site data and technical drawings, Marshalls carried out hydraulic calculations and collaborated on a value-engineered proposal that would meet both performance and dimensional requirements. While Marshalls' Beany system was initially considered, the more compact Mini Beany was selected as the most suitable solution. Approved by National Highways for E600 load classification, Mini Beany is a low to medium-capacity combined kerb and drainage system made up of a durable, two-piece concrete construction. Its ease of installation and low maintenance profile made it ideal for the access road, particularly given the spatial constraints and requirement for integration with outfall spaces and swale features.

Once the design was approved, Marshalls produced a tailored schedule of components, with deliveries planned according to the project phases to optimise efficiency on site. Installation was supported by Marshalls' comprehensive 'Tool Box Talks' to ensure accuracy, and the team remained closely involved throughout, conducting regular site visits and offering hands-on support to RJ McLeod and Falkirk Council. The value of the Mini Beany drainage system supplied to the project totalled £120,000.

The completed Denny Eastern Access Road has significantly enhanced the local transport network, improving safety and accessibility for drivers and pedestrians alike. Pedestrian refuge islands have been strategically placed at public rights of way and core path locations to support active travel, while new bus lay-bys along the route strengthen public transport infrastructure. The road also features a culvert with an otter pass to safeguard local wildlife, alongside a landscaped buffer zone that forms a green corridor connecting neighbouring woodland areas.

Thanks to the inclusion of Mini Beany, the road benefits from a robust drainage solution that protects users from the dangers of surface water and flooding, particularly during periods of heavy rainfall, being described as "a game-changer for Denny," highlighting its role in reducing congestion and promoting sustainable travel.

> "The value of the Mini Beany drainage system supplied to the project totalled £120,000."

Explore Manufacturing Ltd

Google's KGX1 Headquarters

As visitors arrive at King's Cross or St Pancras stations, they are greeted by the striking presence of Google's new UK headquarters, known as KGX1.

Designed by renowned architecture firms BIG and Heatherwick Studio, this impressive building is situated in the heart of one of London's most vibrant, redeveloped neighbourhoods. At 330 meters (1,082 feet) long, this "landscraper" is a horizontal marvel that surpasses the height of iconic structures like the Eiffel Tower and The Shard.

In a time when hybrid and home working have become the norm, KGX1 offers a compelling reason for employees to return to the office. The building encompasses approximately 80,000 square meters (861,100 square feet) of office space, featuring amenities such as extensive landscaped roof terraces, a running track, and even a swimming pool. Upon completion, Google's King's Cross campus will accommodate around 7,000 employees, significantly bolstering the local economy and contributing to the Knowledge Quarter's status as a world-class research hub.

KGX1's architectural design is nothing short of revolutionary, marked by its four eye-catching rings of precast concrete facade. These rings tie together other design elements, including sleek glazing and timber mullions. The facade, crafted by Explore Manufacturing Ltd, a Laing O'Rourke company, is not just aesthetically pleasing but also an engineering triumph. The non-rain screen concrete facade, with its complex geometries and dramatic tapers, posed significant engineering challenges. Each heavy-blasted concrete panel took up to eight hours to complete, demonstrating the meticulous attention to detail in the building's construction.

Google's commitment to innovation extends beyond its technological endeavors; it is also evident in the construction of KGX1. The use of precast concrete panels and digital construction models allowed for prefabrication and offsite construction, optimising the build process. By moving labour offsite to controlled environments, the project minimised risks and ensured high-quality finishes. The building's structure comprises five structural cores with steel trusses supporting the steel framework, showcasing the potential of hybrid construction methods.

KGX1 is not only a marvel of architecture and engineering but also a beacon of sustainability. The inclusion of cross-laminated timber (CLT) alongside concrete not only maximises natural light and creates flexible workspaces but also aligns with the growing emphasis on sustainable building practices. The UK concrete and cement industry, including the precast sector, is making strides towards decarbonisation. With the introduction of carbon-efficient mixes and the adoption of Carbon Capture, Use, or Storage (CCUS) technology, the industry aims to reach net zero emissions, further reducing its environmental footprint

KGX1 is more than just a building; it represents the future of urban construction. By leveraging the power of digital offsite construction and sustainable practices, Explore Manufacturing Ltd has delivered a flagship project that dominates the King's Cross landscape. Google's new UK headquarters is not only a testament to what can be achieved through innovation and collaboration but also a model for future developments in urban settings.

Shay Murtagh Precast Ltd

London Southbank

The redevelopment of a historic Grade II listed building on London's Southbank has demonstrated how innovative precast concrete solutions can breathe new life into iconic architecture while aligning with modern sustainability goals.

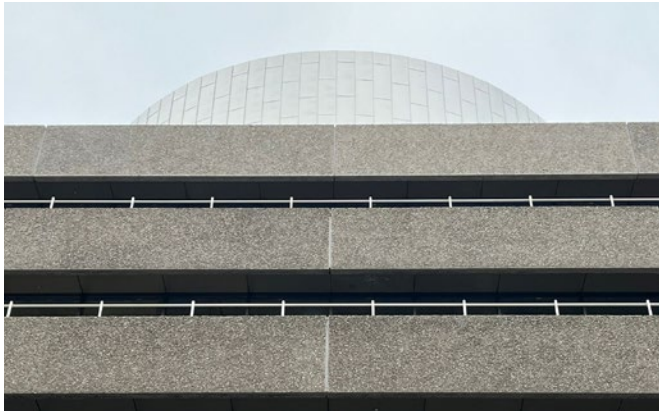
Situated in one of London's most culturally significant quarters, the project required a sensitive balance between heritage conservation and contemporary performance standards.

Shay Murtagh Precast Ltd was appointed to deliver bespoke concrete elements that would replicate and support the original structure, while also helping the development team meet their ambitious sustainability targets. Working alongside architect Alfred Hall Monaghan Morris (AHMM), principal contractor Multiplex Europe Ltd, and façade contractor Szerelmey Ltd, Shay Murtagh supplied over 160 precision-engineered precast panels for the project.

The precast elements were manufactured with tight tolerances to ensure an exact match with the original façade. In total, 270m^3 of concrete, 35 tonnes of reinforcement and 200 tonnes of coarse Cornish granite were used. The exposed aggregate finish, featuring 40mm Cornish granite, provided a textured and natural appearance that mirrored the building's original design, preserving the aesthetic character of the historic structure.

One of the most innovative aspects of the project was the integration of 80% of the original façade with new precast concrete panels. This approach significantly reduced demolition waste and embodied carbon, forming a key part of the development's Net Zero Carbon construction strategy. The panels were delivered to site in just 47 efficient deliveries, minimising disruption and supporting sustainability objectives.

The outcome is a visually seamless and structurally enhanced building that not only maintains the architectural integrity of the original structure but also serves as a benchmark for future urban redevelopment schemes. By combining precision engineering with a deep respect for the site's heritage, the project illustrates how high-quality precast concrete can contribute to a more sustainable built environment, without compromising on design or durability.



Plean Precast Ltd

Aberdeen's Union Terrace Gardens Redevelopment

As part of Aberdeen City Council's £28 million Union Terrace Gardens redevelopment, a centrepiece of the City Centre Masterplan, Plean Precast Ltd was appointed to deliver architectural precast concrete elements for all three new pavilions.

The project, led by architects Stallan-Brand, sought to blend modern design with Aberdeen's historic granite character, creating a unified civic space in the heart of the city.

Plean Precast was responsible for the design, manufacture, and delivery of a wide range of precast components, including cladding panels, beams, pilasters, cills, and copes. These were used to form the outer skin of the pavilions and capture the architectural vision of a distinctive "tram" form, a symbolic and sculptural expression at the centre of the development.

The use of precast concrete provided both design flexibility and construction efficiency. Elements were cast with a high level of dimensional precision, allowing for seamless assembly on site with tight joints aligned to architectural specifications. Structurally, the panels were designed as a self-supporting system from foundation level, removing the need for intermediate vertical supports and preserving the clean, uninterrupted visual lines of the cladding.

Designing for such a complex architectural brief required attention to fine detail, particularly at the curved leading edges and slender upper-level components. Every element, from reinforcement to cast-in fixings, was developed and coordinated to BIM Level of Detail 400. This ensured a precision fit across all stages of manufacture and installation.

Durability and refinement were key to the success of the project. Small section sizes in upper mullions and transoms were achieved through carefully specified reinforcement cover and tolerance control, while hidden lifting and restraint systems demanded the development of bespoke brackets and cast-in plates. These engineering challenges required close collaboration across design, manufacturing, and site teams.

In addition to aesthetic and structural goals, precast concrete played a crucial role in delivery. It allowed the main contractor to minimise site labour requirements while achieving a consistently high-quality finish, with reduced risk of damage during handling and installation.

The Union Terrace Gardens project is a striking example of how architectural precast concrete can meet complex design requirements while supporting efficient, sustainable urban redevelopment. Plean Precast's contribution showcases the possibilities of precision manufacturing and intelligent detailing in delivering modern civic architecture with deep historical resonance.

Decomo UK Ltd

The Fitzrovia

The Fitzrovia, Tottenham Court Road, London, sits at a juncture between more modern development and the old Victorian and Edwardian building stock of the area.

The design marries the need for rejuvenated retail and office space with an elegant historic feel. The new building replaces an unsalvable 1960s building with a six-storey mixed-use development which will provide 65,000 sq. ft. of Grade A office space and 11,000 sq. ft. of retail space. The striking façade of the building is clad in three different facing materials, the most notable being the celadon-glazed terracotta which adorns the scalloped bays on the Tottenham Court Road and Bayley Street elevations. As you move round to the Morwell Street elevation the frontage transitions from the terracotta bays to brick clad premium residential units, with a distinctive grey basalt base to the façade tying the elevations together.

Before settling on the design, multiple façade design options were considered for the project including unitised curtain wall, SFS with rainscreen and precast concrete. Ultimately, it was precast concrete which was chosen to best accommodate the scalloped profile and curved nature of the design. Precast concrete also offers limited penetrations to the weather line compared to the likes of a rainscreen system which have a significant amount of bracketry leading to thermal bridging. Thinner facing material is also possible with a faced precast solution than on a typical rainscreen solution.

Precasters Decomo were given the task, by contractors Kier and PCE, of bringing to life the distinctive design created by award-winning architects Stiff + Trevillion. The complex textured terracotta cladding panels are donut shaped and faced with extruded terracotta tiles. The precast backing provides a very robust substrate for the various facing materials, resulting in good impact performance. This meant that there was no need for a sub-frame to support the ceramic reducing the materials used.

Fire performance should always be a key consideration, especially in a residential development. The inherent non combustibility of concrete sets it apart from other construction materials, reducing risk. Concrete façade build-ups like the ones on the Fitzrovia also benefit from fire stops and cavity barriers being simpler to achieve than with a rainscreen type construction methodology where there are lots of cavities inherent in the build-up.

The Fitzrovia is designed to the highest environmental standards, achieving BREEAM Outstanding with a strong focus on health and wellbeing, as well as being awarded a 5 Star Design for Performance NABERS rating. Using Ground Granulated Blast-Furnace Slag (GBBS) in the concrete mix saved 25,000 kg of CO_2 across the project and the use of Basalt fibre reinforcement (BFR) instead of steel mesh saved over an additional 30,000 kg of CO_2.

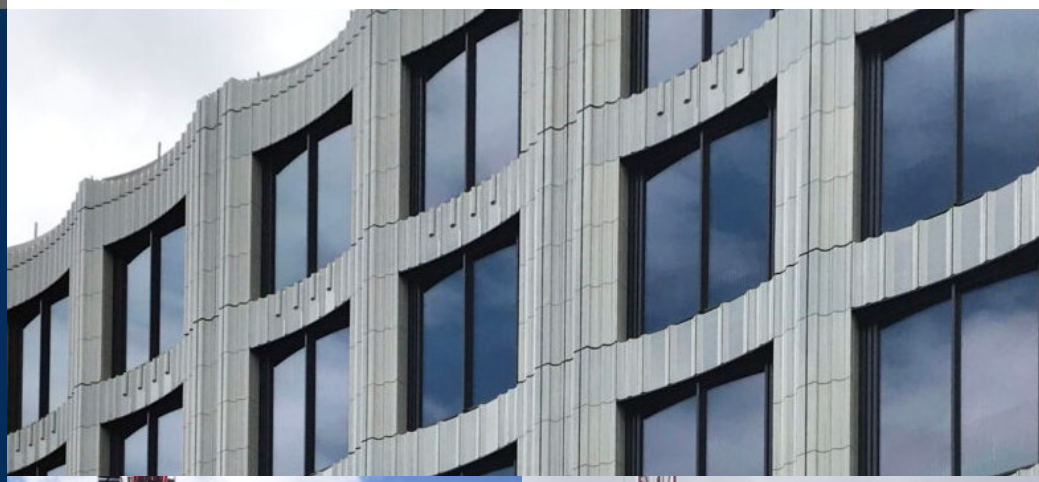
The social impact of the project was a key consideration for contractors PCE. In dense urban environments like London, construction traffic, noise, and activity can cause significant disruption. By utilising offsite Design for Manufacture and Assembly (DfMA) concrete solutions, Kier, PCE, and Decomo effectively minimised these disturbances.

Offsite manufacture not only reduces site activity and improves quality but also boosts health and safety with less working at height and manual handling. The offsite approach also reduces required deliveries by up to 80%, waste by up to 90%, with a significant reduction in noise and dust.

Speed of precast installation is also a big reason to go down the concrete MMC route and without the requirement for material storage on site, the programme can be designed around just-in-time delivery. For the Fitzrovia, completion was achieved in 26 weeks from starting on site with only 25 or less operatives onsite at any one time. The large nature of the panels and with up to 6 being installed per day meant that significant areas of the façade could be made fully weather tight quickly.

Over 2,100 units were manufactured and installed for The Fitzrovia from 6 different offsite specialists across the UK and Europe, testament to the strength and depth of the precast concrete supply chain. This included brick-faced sandwich panels, stairs, landings, upstands, twin and solid walls. Additionally, 5,000m^2 of concrete in-situ flooring and over 1,000 hollowcore slabs helped reduce material usage.

> " Ultimately, it was precast concrete which was chosen to best accommodate the scalloped profile and curved nature of the design. "



Pacadar UK

Northolt Tunnel West HS2

Delivering Precision and Sustainability for HS2's Northolt Tunnel West. Pacadar UK has been a key partner in supporting the delivery of High Speed 2 (HS2), the UK's largest infrastructure project, by providing nearly 60,000 precast concrete tunnel ring segments for the Northolt Tunnel West.

As one of the longest and most complex tunnels of the HS2 project, the Northolt Tunnel West required the highest standards of precision, efficiency, and safety—requirements that Pacadar UK met through its advanced production capabilities and robust logistical planning.

The production of the tunnel segments began in April 2022 at Pacadar's state-of-the-art factory in Kent, where a dedicated team set to work on manufacturing 59,129 segments, which formed 8,447 complete tunnel rings. Each tunnel ring consists of seven segments, and each segment weighs approximately seven tonnes. To meet the demanding project schedule, the factory maintained a consistent production rate of 130 segments per day. This was a remarkable feat, particularly when considering the complexity of the Northolt Tunnel West, which stretches beneath London's busy urban landscape.

The precast tunnel segments serve a critical function as they form both the inner and outer linings of the tunnel. Once the tunnel boring machine (TBM) completes its excavation, the segments are fed through the back of the TBM and placed by an automatic segment erector. This advanced automated system improves safety significantly by minimising the need for engineers to work in confined underground spaces during the installation process. The accuracy and efficiency of this automated approach ensure the structural integrity of the tunnel, meeting the high standards required for a project of this scale.

Sustainability was at the forefront of Pacadar UK's operations on the HS2 project, not only in the production of high-quality precast concrete but also in the logistics of delivering the tunnel segments to the construction site. The company made a concerted effort to reduce the environmental impact of transportation by utilising rail freight to deliver the tunnel segments from the factory in Kent to the site in West Ruislip. This innovative solution meant that each freight train replaced 56 lorries, significantly reducing road congestion, fuel consumption, and carbon emissions. This approach aligned perfectly with HS2's commitment to reducing its environmental impact and supporting sustainable transport practices.

The successful production of the tunnel segments was a major milestone, culminating in June 2024 when husband-and-wife team Saad and Loubna cast the final tunnel segment. This marked a moment of pride for the factory's 180-strong workforce, who had worked tirelessly to deliver this critical component of the HS2 project. Beyond the Northolt Tunnel West, Pacadar UK continues to play a vital role in the overall success of HS2 by manufacturing precast concrete segments for other essential structures, including the Thame Valley Viaduct in Buckinghamshire and the Edgcote Viaduct in Northamptonshire.

Ibstock Concrete

Alexandra Hospital Redditch

Ibstock Concrete's precast division played an important role in the ongoing development of the Alexandra Hospital in Redditch, where main contractor Interclass PLC is delivering a new clinical facility to support the growing demands on the Worcestershire Acute Hospitals NHS Trust.

The project involves the construction of two new operating theatres, recovery areas, staff offices and welfare changing rooms. Construction began in February 2024 and is scheduled for completion by November 2025. Located on a live hospital site, the programme is being delivered at pace and with minimal disruption to surrounding healthcare services.

As part of the new extension, two precast concrete lift shafts were manufactured and supplied by Longley, part of Ibstock's flooring and precast business. These lift shafts will provide essential vertical circulation between the new operating theatres and adjacent recovery spaces. Due to the complexity of the site layout, limited access and the need to maintain hospital operations throughout construction, a precast solution was selected to reduce installation time and limit site disruption.

Longley provided a full-service solution covering the design, manufacture and installation of the precast lift shafts. Typically produced in five sections, the units were instead delivered in nine self-supporting precast box sections per shaft to accommodate the irregular dimensions specified by the client and to facilitate safe transport and craning into position. Each section weighed up to 6.2 tonnes and was produced with a wall thickness of 200mm, an increase from the standard 140mm, which required bespoke adaptation of the moulds at Ibstock's precast production facility.

The two lift shafts were installed in a single day, demonstrating the efficiency and accuracy achievable with a modular, factory-built approach. The use of precast also brought significant benefits in terms of health and safety, eliminating the need for high-risk formwork, scaffolding and wet trades in a confined working environment.

In addition to the lift shafts, Ibstock also supplied precast stair units to the site. These were successfully installed by the steelwork subcontractor, Ballard Engineering Ltd, further streamlining the build process and reducing onsite construction time.

By manufacturing the key structural elements offsite, Ibstock was able to provide a flexible and responsive solution aligned to the tight programme constraints. The project highlights how precast concrete can offer a reliable, high-quality alternative to in-situ construction, particularly in healthcare environments where speed, safety and precision are paramount.

Thorp Precast Ltd

Great Charles Street, Birmingham

Located in Birmingham's Jewellery Quarter, the Great Charles Street project is a landmark Build to Rent development delivered by Moda Living.

The scheme transforms a brownfield site, undeveloped for over 70 years, into a thriving residential community. The completed project will deliver 772 high-quality rental apartments and a hotel, forming Moda's second neighbourhood in the city. Designed by Ryder Architecture, with Weedon Architects acting as Executive Architect, the façade design pays homage to the area's rich architectural heritage while adopting modern construction methods. Precast concrete played a central role in delivering this architectural ambition.

Thorp Precast was appointed to design, manufacture, and install over 1,060 precast units across multiple blocks, supporting a complex façade solution that combines traditional aesthetic with modern performance. The façade strategy was developed in close collaboration with the architect and design team to deliver multiple architectural masonry profiles. These included full storey-height panels incorporating punched window openings, vertical emphasis brick-faced piers, spandrel panels, and reconstituted stone coping units. The approach ensured variety in expression while maintaining a cohesive visual language across the development.

> " Thorp Precast was appointed to design, manufacture, and install over 1,060 precast units across multiple blocks... "

Each block adopted a tailored solution, Block C1: Vertical emphasis brick-faced piers and spandrel panels featuring decorative Staffordshire brindled tiles and reconstituted stone copings. Block C2: Mullions and spandrels up to Level 2, above which large spanning full-height panels with punched window openings were used. Blocks C3 & B3: Mullion and spandrel arrangement up to Level 1, with punched window panels continuing above. Block C4: A solution largely comprising double storey-height mullion and spandrel units.

This variation allowed the architectural design intent to be realised while taking full advantage of precast construction benefits. Joint widths between panels were carefully controlled at 10–12mm and concealed to replicate the appearance of traditional handset brickwork.

Panels were installed using two main contractor tower cranes, operated by two dedicated Thorp Fixing Gangs. The use of offsite precast meant that no external scaffolding or wet trades were required, significantly reducing programme risk and improving on-site efficiency. The cladding package was delivered ahead of schedule.

The majority of the lower block panels were designed as ground-bearing units. These transferred all vertical loads directly to pile-capped foundations, relying only on the primary structural frame for lateral restraint. In addition, panel fixings were engineered to mitigate the risk of disproportionate collapse in the event of impact at ground level.

Material selection was a critical aspect of the project. Birmingham City Council took an active role in the specification process, emphasising the importance of high-quality brick and stone finishes in reinforcing the architectural narrative of the Jewellery Quarter.

Thorp Precast conducted a detailed material review exercise, including site visits with planners to compare proposed brick samples with local façades. Full-scale mock-up panels were cast featuring a variety of brick types, mortar colours, and joint profiles to support final selection.

All brick types used were sourced from UK manufacturers and selected to meet rigorous standards for precast use, frost resistance, durability, and compatibility with casting processes. The brick-faced precast units were fully factory finished and pointed prior to delivery. In this case, window installation was carried out on-site into the precast panels.

Techrete Ltd

Rock Wing – Mater Misericordiae University Hospital Dublin

John Sisk & Son engaged Techcrete to provide 348 precast concrete panels for the Rock Wing at Mater Misericordiae University Hospital in Dublin.

Designed by Scott Tallon Walker Architects, the brief was to create a modern wing which would provide the hospital with occupancy for an additional 5,000 patients annually.

Techrete's punch window panels incorporate a terracotta veneer, with an acid etched finish to the concrete elements and glazing which was installed at their facility in Dublin. The flat wall panels to the stair core feature concrete fins, echoing the solar shading provided by the window fins on the main elevations.

Dummy joints to the top of the stair core provide an additional design feature. The hospital emblem was cast into the large wall panel to the main building entrance using a bespoke rubber mould.

DfMA (Design for Manufacturing & Assembly) and MMC (Modern Methods of Construction) techniques were essential to meeting the programme for the project. All the building interiors were laid out on a module consistent with the main hospital, allowing for seamless adaption and future flexibility. By engaging with the supply chain early and utilising Building Information Modelling (BIM) across the project, construction waste was minimised and savings estimated at €40 million were delivered for the taxpayer.

The Rock Wing won both 'Building of the Year (Medical and Health)' at the Building and Architect Awards 2024 and the 'Public Buildings and Infrastructure' award at the RIAI Awards the same year, as well as 'Healthcare Project of the Year' at the 2025 Irish Building and Design Awards this spring in Dublin.

Steven McGee, Chief Operating Officer, Sisk Ireland & UK said: "This is an amazing example of a value for money approach to speedily developing a healthcare asset in super quick time during the pandemic."

> " The flat wall panels to the stair core feature concrete fins, echoing the solar shading provided by the window fins on the main elevations. "

MPA Precast represents the UK precast concrete manufacturers and members of the supply chain. We develop and disseminate best practice guidance to promote precast concrete in construction.

Web www.mpaprecast.org

LinkedIn @mpaprecast

MPA Precast is a product group of the Mineral Products Association, the trade association for the aggregates, asphalt, cement, concrete, dimension stone, lime, mortar and industrial sand industries.
www.mineralproducts.org

Mineral Products Association