

# PRECASTER

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## Unique sandstone finish for precast arch

When Goodwin Aged Care Services planned a bridge as part of their new Monash Green development, the architects looked for a solution that would provide great visual appeal and maintain the high quality finish of stage one (the village had previously won Housing Industry Association Awards for its special purpose housing).

They had originally planned to connect the first and second stages of the village with a rammed earth bridge but decided to use a precast arch structure instead, recognising that the arch was an ideal crossing solution for the waterway, providing fantastic aesthetic value with a quality architectural sandstone finish.

The original concept design included a triple cell arch structure, but after consultation, the precast manufacturer, Humes, was able to design a twin cell arch structure which still met the 100 year flood design, but reduced the overall cost of the bridge and minimised construction time. The arches were pre-fabricated which meant they could be quickly installed without being subject to weather constraints.

The spandrel and wing walls are an earth retaining system which is ideal for architectural decorative concrete finishes. The precaster's in-house engineers modified the design of the wing walls and spandrels to enable sandstone to be clad on the faces of the southern elevation. A stonemason (engaged by the developer) used random pieces of sandstone to create the finished look. A black oxide concrete finish was used on the northern facing end treatments.

**Client:** Goodwin Aged Care Services

**Head contractor:** Group One

**Precast manufacturer and arch designer:** Humes

**Engineer:** Cardno Young

## In this Issue

Pg 1 Unique Sandstone Finish

Pg 2 East Quarter Takes Off

Pg 3 Sustainable Precast

Pg 5 Scott Street Apartments

Pg 6 David Jones Melbourne

## NP News

- NP joins Australian Construction Industry Forum ([www.acif.com.au](http://www.acif.com.au))
- Discussions are being held with Safe Work Australia to review the National Code of Practice for Precast, Tilt-up and Concrete Elements in Building Construction
- The review committee for AS 3850 Tilt-up Concrete Construction, includes two NP reps
- A Walling Detailing Manual and Precast Sandwich Panel Recommended Practice are under development
- Hollowcore Walling and Flooring Manuals are currently being revised



Student edition available

**Precast Concrete Handbook Edition 2**

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## East Quarter takes off

**An ambitious project that's changing the shape of living in Sydney's inner south west has scored a sellout stage one success – with plenty more to come.**

East Quarter is a mixed use development on a 2.84-hectare site in the thriving Sydney suburb of Hurstville, the heart of the busy corridor linking the inner suburbs with the greater metropolitan regions of the south and west.

Once complete, the development will include seven buildings ranging from five to sixteen storeys, with a public square comprising mixed retail, commercial and residential.

The first stage is made up of two residential precast buildings, Aqua and Vantage. These are seven and thirteen levels respectively with in-situ basements. They comprise 168 one-, two- and three-bedroom apartments along with two-storey penthouse options, retail space, extensive common areas and landscaping, along with associated car parking.

Despite a challenging economic environment (much of the work took place in the depths of the GFC), all 168 apartments in this initial offering sold. Now, there is a real hum of excitement in this bustling centre as the remainder of the project promises to continue adding a new dimension to the already cosmopolitan environment.

The development features extensive use of precast, which was selected both for its appearance and finish and to enable speedy construction, delivering a swift return on investment and supporting the continued success of the next phases.

Two precast suppliers were selected for the job, along with specialist precast builder, Baseline Constructions, which brought significant local expertise and extensive experience in creating fast precast residential developments to the operation.

Selected for both supply and erect components was Austral Precast (formerly known as Giroto Precast), which supplied wall panels only and erected both wall panels and flooring units – which were supplied by Hanson.

Wall panels comprised load bearing external and internal panels, including stair shaft panels, with external panels of both plain and corrugated finish.

Panels were cast from flat steel moulds in three thicknesses: 150mm internal common wall panels; 180mm external wall panels, along with 550mm columns.

Particular attention was paid to the moulding and appearance to ensure clean vertical joint details, which were square edge butt joints with internal and external caulking. Horizontal joints were shiplapped for weatherproofing, with precision once again required in moulding to ensure the integrity of rebates.

Precision was also the key when it came to fixing, which was achieved via integrated load-bearing panel/slab connections.

All in all, Austral supplied 875 components, including those that made up the off-form painted façade.

Flooring – which comprised some 20,000m<sup>2</sup> – called for a combination of topped hollowcore precast planks and transfloor units.



In addition to these components, Hanson also supplied balustrades and some wetcast walls.

Swift economical floor coverage was achieved using 1200 wide, 200mm thick planks spanning 6 metres. A 70mm 32 MPa reinforced concrete topping was used to complete the flooring.

The entire development – despite its significant size – has been incorporated seamlessly into the densely populated surroundings and even called for the building of a new road... which residents were invited to name.

Use of precast has been a major factor in its success and popularity with locals, enabling that rare combination of a high quality build at lightning speed.

**Client:** Brookfield Multiplex

**Builder:** Baseline Constructions

**Architect:** Kann Finch Group

**Engineer:** Bonacci Group

**Precast manufacturers:** Austral Precast – formerly known as Giroto Precast (wall panels and columns) and Hanson Precast (flooring, balustrades)

# Sustainable development takes into consideration the environment, society and economy

Precast concrete's inherent properties make it a natural choice for achieving sustainability with today's modern buildings. Locally manufactured using local products (lower transport costs) in reusable moulds, precast produces minimal waste and most manufacturing waste is recycled. Recycled materials can be included in the concrete mix, such as slag, fly ash, aggregate, steel and water. Exact elements are delivered to site meaning fast construction, less site trades on site (OHS benefits) and less waste on site (less transportation and disposal of waste). When incorporated into passive solar design, the high thermal mass of precast concrete can provide effective use of daylight to reduce heating and cooling costs. Precast concrete's low water-cement ratio means precast is extremely durable. Its long life offers minimal maintenance and reusable, recyclable structures which contain less concrete and steel and absorb CO<sub>2</sub>. Structures are also fire resistant and perform well acoustically.

## Why Precast is Sustainable

### Energy Efficient: thermal mass benefits

- High thermal mass of precast concrete enables it to absorb, store and later radiate heat.
- Using insulated precast (such as sandwich panels) in passive solar designs allows natural heating in winter and cooling in summer, thereby reducing the need to rely on artificial heating and cooling.

### Improved internal building amenity

- Using insulated precast (such as sandwich panels) can even out internal diurnal building temperatures.
- Some precast systems (such as TermoDeck®) can improve indoor air quality, providing fresh air inside the home.

### Durable, long life, reusable, low maintenance structures

- With a long life expectancy of up to 100 years, precast structures are durable.
- Precast structures can be reused, extended and refitted internally. Structures do not need to be demolished and can simply be renovated internally conserving resources, reducing waste and landfill.
- Precast is easy to keep clean, requiring minimal maintenance.
- Precast is tough and can withstand wear and tear, requiring minimal repairs.
- Precast concrete can be moulded into almost any form and finish. Careful design of precast concrete buildings increases the likelihood of reusing the building over again.

- Precast concrete gains strength as it ages, won't shrink, distort or move and will not deteriorate with exposure to climatic change.
- Being flood resistant, precast concrete does not erode or rot therefore is suitable for river and coastal barriers to protect against high tides and storms.
- As a hardy waterproof construction method, precast concrete underground pipes transport sewerage and clean water across the country.
- Precast concrete is impact resistant and hard to cut, offering security and protection against terrorist acts.

### Locally supplied

- Materials used by precast manufacturers are usually supplied locally. This reduces haulage and fuel costs and also diverts resources from landfill.
- Precast elements are usually locally manufactured and supplied to sites meaning reduced haulage and fuel costs.
- Local highly skilled erection crews erect precast concrete elements safely on site.

### Uses less concrete, cement and steel

- Less concrete and steel are required for precast concrete because of its higher quality.
- Less concrete is used in precast flooring systems such as hollowcore, bubbledeck and Ultrafloor.
- Precast allows reduced levels of cement in the concrete mix due to higher quality manufacturing processes.
- Long spans of precast flooring mean reduced material use for supporting columns.

### Minimises waste during manufacture and on site

- Precast is manufactured in reusable moulds.
- Most waste during manufacture is recycled.
- Exact elements are delivered to site.
- Less site air pollution, noise and debris.

### Reuses waste resources and recycled materials

- Waste materials (such as slag and fly ash) which would otherwise be used in landfill can be incorporated into the precast mix design.
- Recycled aggregate can be incorporated into the precast mix design.
- Recycled steel can be used in the manufacture of precast elements.
- Grey water and stormwater runoff can be used in the precast concrete mix design, thereby reducing mains water consumption.

### Recyclable precast elements

- Precast concrete elements can be crushed and reused as aggregate for road bases or construction fill, providing economic and environmental savings.
- Some elements can be reused.

### Faster construction

- Precast concrete allows other trades to begin work more quickly, speeding the construction time and saving costs.
- Fast construction on site means less disturbance for surrounding properties.
- Precast elements can be delivered just in time for erection, reducing unnecessary handling and equipment use.

### Acoustic performance

- The high thermal mass of precast concrete assists with sound insulation to reduce noise and absorb noise impact.
- Noise walls provide an effective sound barrier between roads and urban noises, and outdoor and indoor spaces and provide more aesthetically pleasing and comfortable living environments.

### Fire resistant

- Precast concrete is non-combustible, does not melt and therefore does not require additional fire-proofing applications.
- Precast concrete does not emit toxic fumes under fire and can limit smoke spreading in buildings.

### Environmental benefits

- Precast concrete is an inert substance which does not emit or give off gases or compounds. This is a huge relief to allergy sufferers.
- Precast does not attract mould or mildew.
- Precast concrete absorbs CO<sub>2</sub>.
- Being termite proof means the unlikelihood of requiring chemical spray to reduce termites and vermin which is safer for the environment.
- As landscaping and street furniture features, planters increase biodiversity by providing a green environment for birds and a pleasant communal meeting place.

### OHS benefits

- Less trades on site means safer sites with less equipment, workers and materials.
- Reduced congestion - construction sites are cleaner and tidier, with minimal waste on site.
- Precast floors can provide a safe immediate working platform for the erection crew.

## Sustainable Design Solutions

Specific examples where sustainable designs using precast construction can make a considerable environmental impact:

| Design Strategy  | Sustainability Benefit  |
|--|---|
| Use hollowcore floor planks as ducting systems to even out internal temperatures and channel air around the building | The longitudinal ducts in the floor/ceiling increase the effectiveness of the building mass as an energy store and serve as heat exchangers between rooms and spaces having different temperatures. |
| Use prestressed concrete design for structural elements  | Prestressed precast concrete allows the designer to create longer spans, using less material which may use less concrete than conventional design.  |
| Use thermal mass in combination with appropriate insulation levels in walls  | Thermal mass with insulation provides energy benefits that exceed the benefits of mass or insulation alone in most climates.  |
| Use insulated precast sandwich panels for walls  | Durable exterior and energy benefits from insulated internal thermal mass.  |
| Use precast as sustainable design for fire resistance  | Precast concrete is non-combustible and does not require additional fire-proofing applications.   |
| Re-use of intact precast concrete elements for building function changes or relocation of building                   | Wall panels can be designed to be disassembled, saving materials and extending service life of panels.  |
| Maximise the benefit of re-use of moulds   | Steel moulds have long life spans providing thousands of re-uses and also reduces waste.  |
| Use load bearing precast   | Efficient use of materials due to combining structural, thermal and acoustic functions.   |
| Use colouring oxides, staining or polished finishes for precast elements   | Minimal ongoing maintenance of the structure's exterior.  |
| Use self-shading precast wall elements   | Reduces heat transfer to the structure's interior.  |
| Use self-compacting concrete   | Reduces need for vibration thereby minimising energy used to place concrete.  |

Source: Precast Concrete Handbook, Edition 2, 2009. The Precast Concrete Handbook is available from SAI Global, phone 131 242.



ICCX – International Concrete Conference & Exhibition  
 21 – 24 February, 2011 | The Sebel Albert Park Melbourne

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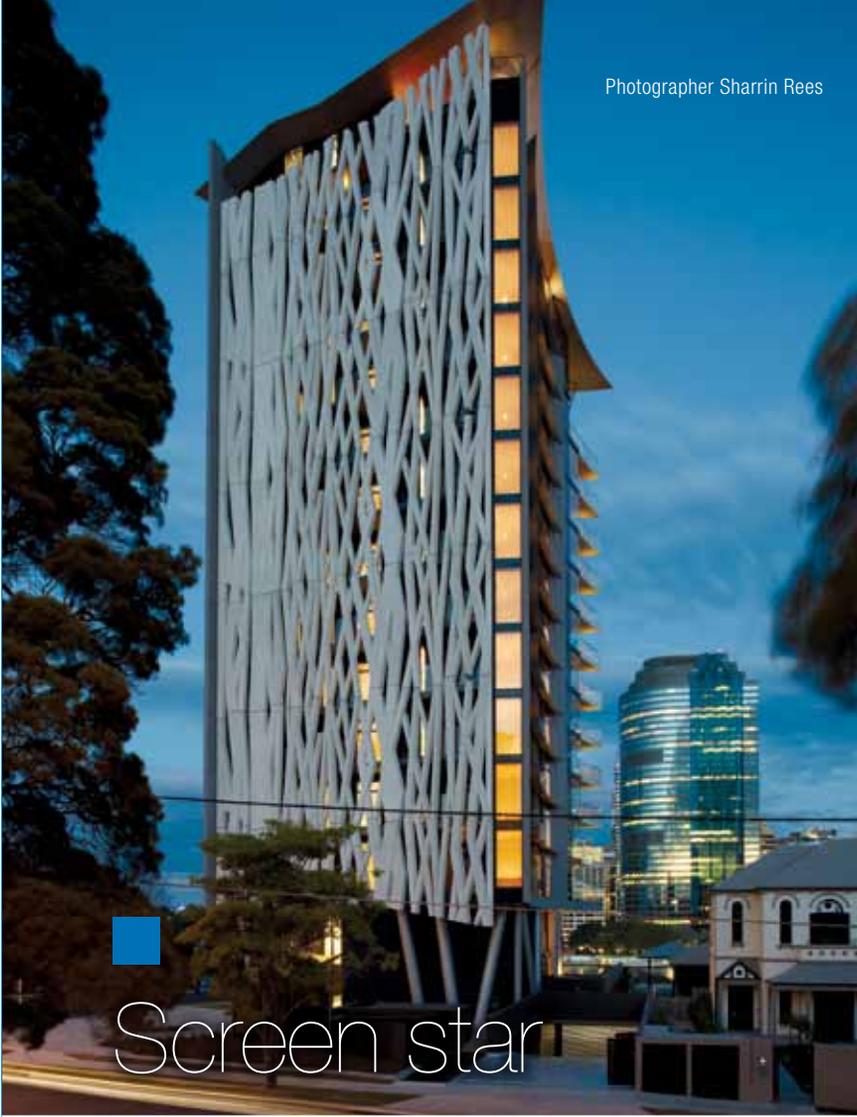
ICCX Oceania 2011, organized in The Sebel Albert Park, Melbourne, from Feb 21-24, 2011, will be the perfect opportunity for the precast industry to learn about latest developments regarding production equipment and technologies. The content of the Technical Courses, including a full day course on Precast Concrete Design – Best Practice Solutions for manufacturers and engineers, and half-day courses on Sandwich panels (production, energy efficiency, application) for precast manufacturers, engineers, architects and designers, as well as Health & Safety (Best Practice Examples from Europe), specifically for precast manufacturers and construction companies on site, will guarantee a high level educational program. Engineers attending the fib Precast Design Course will be able to record CPD hours.

With more than 80 exhibitors from all over the world, the international trade exhibition will be another highlight. Besides the leading suppliers of Australia and New Zealand, also companies from Europe and North America will be exhibiting in the exhibition area. Most of the exhibitors will present their products in special conference program sessions, where suppliers of similar products will be grouped together in one session about this kind of product. In total, 13 different sessions for different products will be organized, so every delegate can just pick the sessions of choice to get perfectly organized the information needed. A Welcome Reception, an amazing ICCX

dinner event at the Crown Entertainment Complex, Studio 3, and plant tours to NPCAA members Hollow Core and Westkon will complete the program. ICCX Oceania 2011 is organized in the same place like the Annual Meeting of NPCAA this year, so it will be a perfect opportunity for all NPCAA members to learn at ICCX Oceania 2011 about recent industry developments, before attending the Annual Meeting.

Constantly updated information is available online at [www.iccx.org](http://www.iccx.org), including several registration options. Delegates of ICCX Oceania 2011 can request for special conditions in the conference hotel using the keyword "ICCX".

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## Screen star

Brisbane's Kangaroo Point at the southern approach to the famous Storey Bridge now bears a distinctive landmark. Unmistakably individual, the super-luxury Scott St Apartments provide a real sense of 'arrival' both to visitors to the city and its fortunate occupants.

The most distinctive feature of the 12-storey apartment development overlooking the river and CBD is without doubt the elegant 'woven' screen that adorns the full length of its street front elevation.

In an extraordinary feat of engineering, design and construction, the screen is made from architectural precast concrete. It calls to mind a bamboo grove, with all its associations of soaring lightweight elegance, and forms a bespoke façade over the grey, load bearing precast external walls.

Already a challenging site, with limited access, water frontage and in the heart of a densely populated residential area, the screen concept was one that could easily have been abandoned, but for the persistence and ingenuity of the parties who worked so closely together to ensure its successful manufacture and erection – a complex operation requiring high precision craneage.

"This project creates new boundaries for the shapes that can be achieved using high quality precast concrete," says Colin Ginger, General Manager of Precast Concrete Products, which supplied the specialty precast for the screen.

Made from class 2 off-form, off-white concrete, the screen has a raw concrete finish, with no sealers or coatings.

Casting the panels in order to successfully achieve the look the architect was aiming for was just one of the challenges involved.

This was ultimately achieved by the creation of 16 highly customised moulds, intricately sculpted from a combination of steel, polyurethane, polystyrene and timber.

Fifty-six cladding panels were required to create the pattern, which repeats every four levels.

Panel thickness varied from a minimum of 180mm to a maximum of 300mm, with the heaviest panels weighing in at a hefty 8 tonnes.

Beyond casting and craneage to get the panels on site, there was also a significant challenge in fixing the panels in a manner that would ensure the integrity of the screen itself and the primary structure.

In true 'icing on the cake' fashion, the panels were finally attached to the building with steel corbels after the main structure was completed and the scaffolding was stripped.

"The highly sculptured façade presented significant structural challenges when it came to handling the panels due to the thin, slender sections in some parts," says Colin Ginger.

"Close collaboration between the precast design office and the project architect, engineer and builder was vital to get panel shapes that were structurally sound, within the capacity of the tower crane and yet achieved the overall look that the client required.

"This project serves as a real testimony to the versatility of precast concrete and the innovation and new territory that can be explored when there is close collaboration between the building designers and the precaster."

**Client:** Waterford Properties

**Head Contractor:** Hutchinson

**Architect:** Jackson Teece

**Precast manufacturer:** Precast Concrete Products

**Engineer:** Alliance Design Group



## 28 trading days to Christmas

**With Christmas around the corner, the pressure was on to ensure the major refurbishment to David Jones' Melbourne city store would be ready in time to delight eager shoppers.**

The refurbishment called for significant expansion to the iconic department store to provide a more spacious and appealing retail space. The construction called for seven suspended levels and associated staircases, a reconfiguring of existing space, extensive demolition and associated reinforcement of existing columns.

All major structural work was to take place in a super-tight time frame, minimising disruption to shoppers, lost trading for the client and ensuring maximum time for following trades to get the complex site working and fitted out in keeping with David Jones' premier status.

If that wasn't challenge enough, the site was notoriously difficult, with minimal access provided only by narrow Little Bourke Street – a through-way heavily populated by pedestrians and traffic during business hours, which meant plenty of night work and significant craneage were the order of the day.

To meet the challenge, flexibility and open minds were called for.

Project manager John Hagopian, from builder Walton Construction, recognised early that planning would be key – and that extensive use of precast elements offered a highly workable solution, including for the staircases, columns and, perhaps most significantly, in use of hollowcore planks for flooring.

So Peter Healy, from Hollow Core Concrete was called in.

"Although there was some initial concern about using hollowcore planks due to perceived craneage issues, assessment of the practicalities soon proved the opposite point," says John

Hagopian. "In reality, the hollowcore solution only required materials to be brought in, not taken out, which was a massive saving – especially given the site limitations. In fact use of precast on this job offered significant benefits all round."

Peter Healy explains further.

"Using precast and hollowcore planks completely eliminated the need for formwork and A-frames, and there was no need for back propping. Once the floor planks were in and screeded, roughing in took place within three days, instead of waiting 14 days for curing, as you do for conventional concrete," he says.

Precast again came to the rescue with heavily reinforced columns to take the loads. Once again, speedy and effective results were achieved, allowing the rest of the project to forge ahead on time.

The end result? A new shoppers' paradise open and ready for business four weeks before Christmas.

**Architect:** Parker Design  
**Builder:** Walton Construction  
**Precast manufacturer:** Hollow Core Concrete  
**Project manager:** Henant Group  
**Engineer:** Robert Bird Group



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