112
AUGUST 2012
ARCHITECTURAL
STEEL INNOVATION
WITH BLUESCOPE STEEL

STEEL PROFILE

BARK DESIGN
MARCUS BEACH HOUSE

HASSELL AND COX ARCHITECTS
ADELAIDE OVAL
WESTERN GRANDSTAND

IN PROFILE:
CHENCHOW LITTLE

EDITORIAL

Welcome to *Steel Profile* #112.

As always, we are proud to bring you this collection of inspired and innovative steel architecture, and some insights into the creative minds behind it.

While steel has long been an iconic marker of the Australian rural landscape, advances in product development combined with appropriate specification have also made it eminently suitable for coastal sites, as evidenced by three of the residences in this issue that harness its materiality.

We trust you will enjoy the issue. Please feel free to share your thoughts via info@steelprofile.com.au

Kristin Camery
BlueScope Steel editor

EDITORIAL ADVISORY PANEL

Steel Profile has established an editorial advisory panel to ensure that only projects of the highest calibre are selected for publication. The panellists are:

ADAM HADDOW

Adam is a director of SJB Architects NSW. He was awarded the 40th Anniversary Churchill Fellowship in 2006 to study alternatives to conventional models of urban design. SJB Architects recently won two Australian Institute of Architects NSW Awards for Multiple Housing.

More than anything, he loves to design buildings

FRANK STANISIC

Stanisic Associates founder Frank Stanisic is a Sydney-based architect and urbanist.

His work is fuelled by an evolving interest in the diagram and frame as a basis for architectural invention, and the aesthetics of permeability.

Frank's projects have won numerous awards including Australian Institute of Architects' Special Jury, Wilkinson, Aaron Bolot and Frederick Romberg

SAM BRESNEHAN

Sam Bresnehan is a graduate architect with Melbourne-based architectural and urban design practice, McGauran Giannini Soon Architects (MGS).

Graduating from the University of Tasmania with a Master of Architecture (First Class Honours) in 2010, Sam was awarded the 2011 BlueScope Steel Glenn Murcutt Student Prize

CONTENTS **ISSUE 112**

Principal Corporate Partner

Australian Institute of Architects

COVER PROJECT
Marcus Beach House

PHOTOGRAPHER
Christopher Frederick Jones

NUMBER 112, AUGUST 2012

BLUESCOPE STEEL EDITOR Kristin Camery **MANAGING EDITOR** Rob Gillam **ASSOCIATE EDITOR** Trisha Croaker

CONTRIBUTING WRITERS Rachael Bernstone, Trisha Croaker, Rob Gillam, Peter Hyatt, Christine Phillips, Micky Pinkerton

CONTRIBUTING PHOTOGRAPHERS Peter Bennetts, Brett Boardman, Paul Bradshaw, Katrina Hawley, Peter Hyatt, Christopher Frederick Jones, Patrick Reynolds

ART DIRECTOR Natasha Krncevic **CORRESPONDENCE** *Steel Profile*, PO Box 961, Crows Nest, NSW 1585, AUSTRALIA

EMAIL rob.gillam@steelprofile.com.au; trish.croaker@steelprofile.com.au

SUBSCRIPTIONS For all subscription enquiries please contact us via the *Steel Profile* website at www.steelprofile.com.au

ARCHITECT Bark Design Architects
PROJECT Marcus Beach House
LOCATION Marcus Beach, Queensland

SECOND COMING

A change in the owners of this house gave Bark Design Architects an opportunity to revisit its earlier work, redesigning the space for new needs while continuing the flawless balance of steel and timber elements throughout.

Words **Micky Pinkerton** Photography **Christopher Frederick Jones**

"Shadows interplay between the organic outline of the tree and the more angular silhouette of the building"

Coastal homes are typically all about the view. Architects are expected to work miracles to maximise what clients can see of surf and sand, but not the neighbour's clothes hoist or the ugly block of flats down the road. The blessing of location can become a curse for form and function, seeing a home contort in uncomfortable ways to accommodate ways of seeing, rather than ways of living.

Having worked for Gabriel Poole and also Kerry and Lindsay Clare before founding Bark Design in 1997, it is not surprising that Lindy Atkin and Stephen Guthrie prefer to take their cues from the landscape, and this project was no exception. Although only one street back from Marcus Beach, the residence owes its unique tone to a different view – that of the majestic Moreton Bay Ash which stands at the heart of the site.

"It sounds clichéd," says Guthrie, "but we literally stood on the block with the clients back in 2001, picked up a stick and drew two pavilions in the sand around the tree. They got it straight away."

The result was a home which provided those clients with a calm retreat from their busy professional lives. Seven years later, when the original owners sold the home and moved overseas, it was snapped-up by the current owners, who had long admired it.

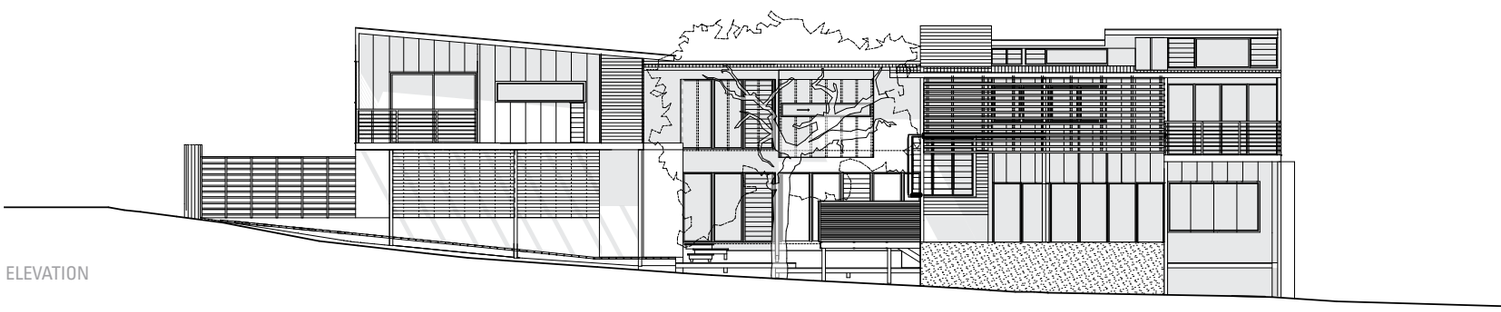
Working in the creative industries themselves, the current clients were keen to respect the architecture, but they required some updating and modest additions. Bark Design was re-invited to oversee the works.

"It was great to see that the flexibility and overall framework of the design allowed the house to continue its life to suit the needs of a new client," says Atkin.

Steel was chosen in both the original build and the recent additions for various reasons. For both clients, a swift pace of construction was paramount – the first owners had the birth of their second child looming at the time, while the new owners were living onsite during the works.

"Speed was one of the main reasons for using steel, as well as its cost-effectiveness," explains Atkin. "With steel you can have everything prefabricated; you can check all the drawings before you actually start fabrication. We had considered timber, but with timber you basically get it delivered and then they build it and sometimes it's too late to change anything."

LEFT AND BELOW: The house celebrates a sculptural Moreton Bay Ash, with two contemporary pavilions sited to embrace the tree and create a calm courtyard landscape

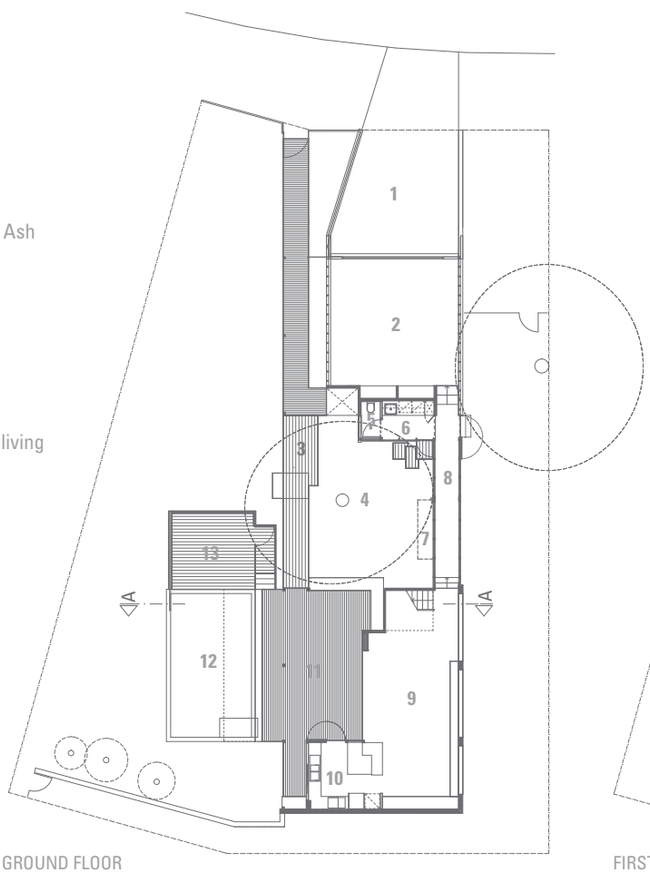


ELEVATION

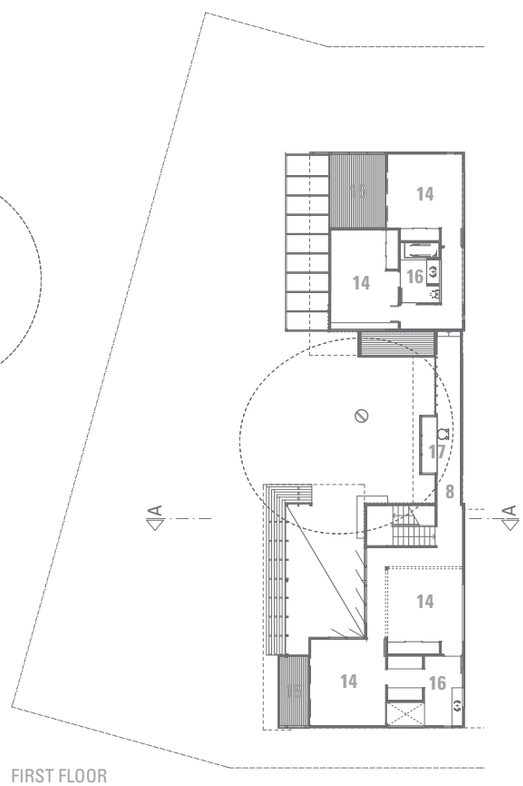
ABOVE AND RIGHT: The main pavilion accommodates the living spaces and is focused around a double height north-east deck made from ZINCALUME® steel. Layers of screening filter light and breezes

LEGEND

1. Driveway
2. Garage
3. Entry platforms & seat
4. Courtyard/Moreton Bay Ash
5. WC
6. Laundry
7. Study pop-out above
8. Bridge link
9. Living/dining
10. Kitchen
11. Double height outdoor living
12. Pool deck
13. Swimming pool
14. Bedrooms
15. Deck
16. Bathrooms
17. Study/desk



GROUND FLOOR



FIRST FLOOR

Steel's structural capabilities also informed the choice of construction materials. "We wanted an indoor-outdoor spatial arrangement, and to do that you need a wide span so that you don't have columns in the way," says Atkin. "In addition to that, the strength of the steel and its dimensions are perfect – it's not too deep, compared with timber."

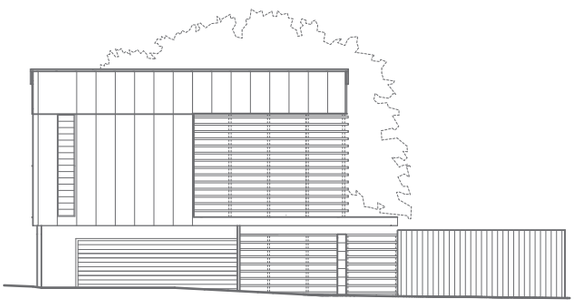
The frame used hot-dipped galvanised RHS and SHS structural members and allows the pavilions to sit lightly on the site. The main pavilion accommodates the open living spaces and is focused around the double-height covered deck made from ZINCALUME® steel which overlooks a treed courtyard and lap pool. The guest bedrooms located above are accessed via a polycarbonate-clad stair which glows lantern-like at night.

Where previously the pavilions were linked by a ground-level boardwalk, the new owners wanted to formalise this connecting space. As a result Bark Design added a high-level glazed bridge to allow enclosed access to the master bedroom in the eastern pavilion. This addition afforded an opportunity to subtly create a 'pop out' study on the upper level, as well as accommodate a new laundry and powder room below.

The contemporary update was then completed with a paint refresh and new timber flooring to replace the raw aesthetic of the previous clients' choice of polished chipboard. The original steel elements had held up well. These included horizontal flashings around the windows and doors made from ZINCALUME® steel, LYSAGHT CUSTOM ORB® profile cladding made from COLORBOND® steel in the colour Surfmist® and the LYSAGHT® quad profile gutters made from ZINCALUME® steel.

"Being near the ocean we needed to make sure that the materials would withstand the elements and require minimal maintenance. We sought the durability that COLORBOND® steel is renowned for," says Guthrie.

ABOVE AND RIGHT: Being located 250m from Marcus Beach, the architects specified ZINCALUME® and COLORBOND® steel for its durability and low maintenance record. When engaged seven years later for the recent alterations and additions, Bark Design was impressed with how it had withstood the elements



EAST ELEVATION

SECTION

"When the original owners moved overseas, it was snapped up by the current owners who had long admired it… Bark Design was re-invited to oversee the new works"

With its double-height living space and grid-patterned wall of exposed structural steel, the Marcus Beach House recalls the landmark Case Study House No. 8 (1949) of Ray and Charles Eames, the Californian coastal residence also set amidst an impressive copse of eucalypts. And like the Eames, the new owners – a graphic designer and an arts consultant – have used their new abode to curate an evolving display, regularly rearranging paintings and artefacts.

"It was one of those places where you kept discovering things," says Atkin. "Whenever we went there, there would be interesting new things on the walls, interesting collections of works and photographs that they had found in their travels."

The main permanent piece in the collection is, of course, the Moreton Bay Ash.

Where others would have pulled it down in the quest to look out, Bark chose to respect the tree and draw the view around it. The reward is a truly integrated building and landscape with a wonderful sense of place.

"Without that tree, the project wouldn't be as successful," says Guthrie. "In a way the house frames the tree and makes it even more special."

Working around the Ash's widespread branches and broad crown of leaves was the main challenge of both builds, and Atkin and Guthrie praised the local contractor for his care in seeing that the tree remained unscathed.

When pressed to remember any other construction issues, the architects struggle to think of any. "The relationship with the builder was collaborative, the new owners were supportive custodians of the architecture and the original client used to show up every few weeks during the build and say 'I love it'," says Atkins.

"The best attribute is probably the way it feels as soon as you walk in," says Guthrie. "We take quite a few clients and students there and everybody loves the overall spirit of the house, and it immediately just connects you to the site of the place and the climate."

Almost all the rooms in the dwelling enjoy a connection to the courtyard and get to enjoy the shifting light as the Ash moderates the intense Queensland sun. Shadows interplay between the organic outline of the tree and the more angular silhouette of the building, bringing the landscape inside the house and vice-versa, in a perfect balance of landscape and architecture.

"There's a lot of slatted elements which mark the changing of the light throughout the day so you're really aware of the seasons, whether in the winter's softer light coming onto that big double-height space, or on the shady deck in summer," adds Guthrie.

This house has taken its inspiration from the tree and, in return, a sympathetic frame of timber and steel has gently unfolded around it to personify contemporary sustainable living. SP

PANEL SAYS

This is a very strong, yet complex project and a complete joy – radiating elegance, lightness and refinement. Revisiting a beach house they completed for another client in 2001, the architects' new work appears as a seamless addition. Transitional spaces, such as decks and overhangs, are used to create harmonious inside/outside spaces, while sun screens and natural ventilation are thoughtfully applied to negate air conditioning. We especially like the use of a double-height living room and enclosed linking passage to create spatial emphasis and variation, and the filtering of light throughout. The use of steel as structure, cladding and roofing contributes to the free-flowing, airy, Queenslander feel typical of Bark Design projects.

PROJECT Marcus Beach House **CLIENT** Owen and Beryl Davis **ARCHITECT** Bark Design Architects **PROJECT TEAM** Steven Guthrie, Lindy Atkin, Tim Juckes, Phil Tillotson, Sam Gleeson and Christoph Kleine **STRUCTURAL AND CIVIL ENGINEER** TOD Noosa, SCG Consulting Engineers **BUILDER** Mick Devlin, Murray Wall (alterations and additions) **PRINCIPAL STEEL COMPONENTS** Cladding: LYSAGHT CUSTOM ORB® made from COLORBOND® steel in the colour Surfmist®; Roofing: flat ZINCALUME® sheet cladding; Gutters: LYSAGHT® quad profile made from ZINCALUME® steel; Structural: hot-dipped galvanised RHS (200x100) & SHS (89x89) members **PROJECT TIMEFRAME** Original house completed 2003 (seven months construction time), alterations and additions completed 2009 **AWARDS** 2010 Commendation, Australian Institute of Architects Sunshine Coast Regional Award **BUILDING** Size 250m² **TOTAL PROJECT COST** $400,000

CHENCHOW LITTLE

Sydney architects and couple Tony Chenchow and Stephanie Little see the pursuit of architecture "not just as the production of a building or formal object, but rather as an intellectual endeavour", an approach that defines their string of award-winning projects. Words **Rachael Bernstone**
Photography **Bob Seary (portrait); John Gollings**

When Tony Chenchow and Stephanie Little met in their final year of university they established a personal relationship before taking on their first project together in 1994. "We never deliberately set out to start a company together, it was more of an organic process," Chenchow says. "We were both working for separate companies and a family friend contacted us to design a small house, and then we secured a second project for a small office by referral. Those two clients referred us to friends and we did more private commissions, and over time we realised we needed to formalise the partnership."

They established Chenchow Little in 2004, and in the eight years since have won numerous architecture awards for their striking homes – several of which feature innovative steel construction techniques – and garnered much interest from local and international media, including being named one of 10 international Design Vanguard firms in 2010 by *Architectural Record* magazine in the United States.

Eschewing the predominant trend for post-modernism that was popular as they graduated, the pair instead identified with traditional modernism as espoused by Mies Van Der Rohe with a touch of contemporary philosophy thrown in for good measure.

"We saw architecture not as an autonomous practice or subject at university," Chenchow says. "Towards the end of our studies we became interested in the philosophy behind Deconstruction, and felt that it was important to see architecture as part of a wider cultural endeavour, linked to sociology, philosophy and the visual arts: we saw something in that that we could grab hold of and identify with."

The intellectual rigour that they bring to their practice makes for a lengthy and carefully considered design process, where both architects explore two main competing streams of thought, Chenchow says. "Our design process is striated," he explains. "Potentially reductive layers such as the clients' brief, budget, the physical site and council regulations are explored creatively within a conceptual framework. There is a constant push and pull between trying to arrive at a singular expression and at the same time, negotiating those many layers.

"We don't see this tussle as a negative aspect; rather, the tension and disjuncture opens up new possibilities during the design process. It's actually something to look forward to," he adds. "We are always trying to refine the expression of an architectural idea down to its essence while dealing with the other issues, so our design process involves seeing those things come together holistically."

One of the firm's recent projects, the Pitched Roof House (2009), conforms to council requirements for new homes and additions to feature pitched roofs, but exploits complex geometry – made possible thanks to steel framing – to capitalise on a harbour setting and maximise interior natural light. "We use council codes as a generative process; we don't need to resist or struggle against codes, rather we use them as a creative point of departure," Chenchow says.

"In the case of this home the council wanted a pitched roof, but instead of a traditional roof that pitches upwards we decided to try a triangular roof that pitches up and down, to develop a faceted roof plan," he explains. "We put the living rooms on the top floor so the faceting is expressed on the living space ceiling, and we opened up the facets on the northern side for a courtyard. The facets became a system for organising the space and allowing sunlight into the building."

Building this distinctive structure required an innovative approach, and steel was essential to its realisation, Chenchow says. "The structure of the Pitched Roof house is triangular – it's not a simple horizontal and vertical grid building – which means that the lateral and vertical loads are blurred by triangulation. Steel allowed us to create myriad shapes using different sections and sizes where each has a specific structural or load capability, because the triangles form different angles."

The architects devised a structural steel model that allowed them to specify each steel section for its particular circumstance, Chenchow says. "This was our first project where steel was represented rather than expressed: we were trying to work out the most economical steel solution," he explains. "[Looking at the model], you can see the most efficient member for beam 10 was a UB, whereas for 9 it was an SHS."

The architects carried the roof's faceted facade down into the walls to produce the singular aesthetic they strive for in all their work, in this case with some unexpected results. "During our explorations of that triangular geometry, a series of study models revealed that it warped the perspective within the space and looking out," he says. "The triangular members elongate the visual effect when you are walking along the internal facade, but since the apex is at a corner, it flattens out and becomes like an elevation. The vertical planes shift to horizontal and because of the triangulation, the traditional perspective of imagining the space is redefined."

Chenchow says that this project provided them with more opportunity than usual to extend their architectural thinking, thanks to the client's willingness to experiment. "Clients like that are rare, so we haven't designed another project exploring the same geometry," he says. "In the Semi-Detached House (2007), for example, the steel sections are expressed. We consistently used 300 parallel flange channels for visual continuity, but in some cases a 200 PFC would have done the job."

For that project, which involved adding a second storey to a rendered brick house with sandstone foundations, steel was again the most cost-effective material to deliver the architects' vision. "We superimposed a new top floor on the old house – including living, dining and kitchen spaces with a series of courtyards and decks – and we decided very early on to use steel because it could support a lightweight addition that cantilevers three to four metres beyond the base of the existing building," Chenchow says.

PFCs were chosen both for structural and aesthetic reasons. "In designing the steelwork, we opted to express the horizontal elements and recess

LEFT AND ABOVE: Semi-Detached House (2007)

OPPOSITE LEFT: Pitched Roof House (2009)

RIGHT AND BELOW: Ang House (2009)

the vertical," Chenchow explains. "By prioritising the flanges of the steel members, they read with the edges of the louvre blades to generate a textural approach for the whole facade.

"We don't explore structure on its own: it's the way the elements are combined to produce the effect which interests us, so we never look at individual elements such as structural systems or sun-shading as separate entities."

with a 4.5m cantilever," Chenchow says. "The trusses – PFCs for the top and bottom cord, and CHS for the diagonals – became the major expressive element of the building. Because the budget was tight, the steel junctions were not overly finessed, resulting in quite industrial and robust connections. For example, the CHS was crimped to form a connecting plate."

The LYSAGHT MINI ORB® profile ceiling, made from COLORBOND® steel in the colour Surfmist®,

directions. "Whenever possible, we try to express steel members that are not normally expressed in domestic projects, for example using Z-purlins as a repetitive structural element to generate visual effects within a space."

Running their practice has not always been a straightforward task, he adds. "Overall, we are trying to achieve a financially sustainable office while delivering rigorous architecture:

"Whenever possible, we try to express steel members that are not normally expressed in domestic projects... using Z-purlins as a repetitive structural element to generate visual effects within a space"

That desire to create a singular aesthetic is exemplified in the award-winning Ang House, which collected an Australian Institute of Architects National Architecture Award for Small Project Architecture in 2009. The steel-framed addition to the rear of a semi-detached sandstone house was cantilevered to maximise space in the garden below, and is hidden from the heritage streetscape at the front.

"The clients wanted new open living spaces to the north with a deck over the garden, but they didn't want a series of columns down to the garden, so we devised a simple truss system and inserted it into the building,

was chosen for its cost-effectiveness and speed of erection, and also contributes to the ambience of the new space. "Everything was painted in the COLORBOND® steel colour Surfmist® to match the ceiling – the steelwork, the polyurethane joinery, the floors – and there is a lovely mix of light and shadow resulting from the ripples of the LYSAGHT MINI ORB® profile and the shadows generated from the louvres that generate a play of textures in the room."

Chenchow says that the firm's experiments with steel have led the architects in new and different

to do this sort of architecture takes a lot of time, and we don't necessarily get paid for that sort of time," he explains.

For that reason, establishing partnerships with the right kind of clients is crucial to their ongoing success, Chenchow asserts. "The initial interview process with prospective clients is very important," he says. "You can determine early on whether a prospective client just wants your name on their building, or whether they are passionate about architecture: the sort we prefer are passionate about architecture and the work we do." **SP**

FULL SPEED AHEAD

ARCHITECT Phillips/Pilkington Architects and H2o Architects
PROJECT University of Adelaide Plant Accelerator
LOCATION Urrbrae, South Australia

Packed with technology behind its gossamer strength of steel and plexiglas, Australia's most advanced greenhouse delivers exacting performance and a striking presence.

Words **Peter Hyatt** Photography **Peter Hyatt**

17

Adelaide's Botanic Gardens Bi-Centennial Conservatory is one of the grand environmental statements of the past few decades. Ahead of its time in so many ways, Guy Maron's design created serious form using a butterfly touch with steel and glass. Recognition included accolades in *Steel Profile*'s 'Architecture of the Decade' awards.

The Conservatory is so good that it appears every bit as impressive today as at its official opening in 1989 – a feat rivalled by very few buildings. Fast-forward to the present and a high-science greenhouse called The Plant Accelerator.

Set amid an arcadian landscape, the Plant Accelerator is located in suburban Urrbrae, on the uppermost flank of the University of Adelaide's Waite Campus.

With Australian farmers facing continuing pressures from international competition, soil degradation and climate change, the Plant Accelerator is a timely response for emerging science.

It's the latest facility in Adelaide for the research and development of plants, especially drought-resistant crops, and a far cry from the lush, tropical environment created by the Bi-Centennial Conservatory.

The Plant Accelerator enables academic and commercial plant scientists to better understand the factors controlling performance of particular crops, including the genetic make-up of plants, soil conditions, chemical and nutrient treatments and environmental stresses.

The Plant Accelerator's phenomics – or measurement of phenomes – is the study of the physical and biochemical traits of organisms as they change in response to genetic mutation and environmental influences. Test plants at the facility are exposed to various stresses and evaluated in a controlled environment. This facilitates the generation of crops that are more productive, disease-tolerant and viable in marginal conditions.

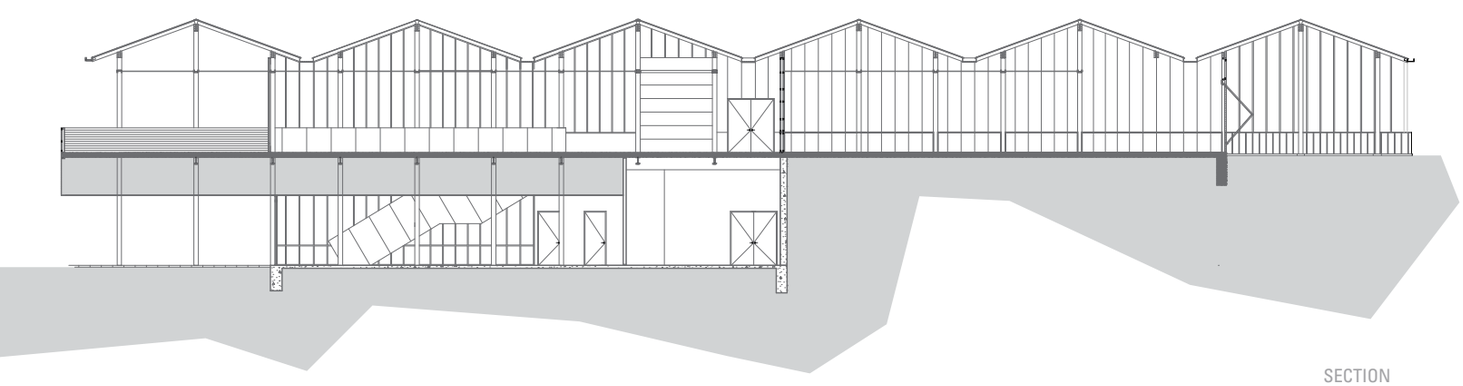
The Plant Accelerator is designed as two halves to meet different operating requirements. In plan, the facility effectively creates an offset figure-of-eight. Half of it provides moderate containment for normal plants and the other half strict quarantine to manage genetically modified plants and imported stock.

Michael Pilkington points out that the building's function ultimately drove design. "There was little desire, or scope, for design whimsy. It's more of a process-driven design because the accelerator operates like a laboratory. At the same time, you can't afford to deliver a sterile or barren design."

Both Phillips Pilkington and H2o Architects focused on housing the Plant Accelerator's demanding technical requirements in a meaningful, credible way. "We also needed a convincing expression for the facility," Pilkington says.

A two-day workshop with international specialists in greenhouse operation helped to clarify the key architectural performance issues. "We were very interested in the relationship between the steel cladding and plexiglas. That understanding of technology gave us rapid construction with minimal time on site."

LYSAGHT LONGLINE 305® profile cladding made from COLORBOND® steel in the colour Surfmist® provides a strong vertical thrust to the gabled roofline. Pilkington says the project's very strong gable roof form defers to Utzon's church at



SECTION

ABOVE LEFT: The Plant Accelerator's industrial vocabulary has a strong textural ribbed finish that echoes the highly modular build rhythm

BELOW: LYSAGHT LONGLINE 305® profile cladding made from COLORBOND® steel in the colour Surfmist® provides a strong vertical thrust to the gabled roofline. The lightweight composition rises lightly from this highly stable platform

Baegsverd, Cophenhagen, with its varied height gable sections that allow the ceiling to float. "But the expression is convincingly Australian," says Pilkington, who attributes much of this to the ribbed steel base and lightweight form.

"It's beautifully clad in COLORBOND® steel. Plexiglas sheet rises out of LONGLINE® rib profile from a waistline of about 6.5 metres and then the plexiglas takes over. You could tell immediately just how steel and the translucent cladding complemented each other."

Pilkington says the collaboration with H2o was highly productive. "Mark O'Dwyer and H2o brought an analytical methodology that produced a cool, rational building. The academic/research nature of this project and German technology perfectly suited H2o's practice."

He draws the parallel with materials used on the project. "One works off the other, playing to its strengths yet also contrasting to build a better result."

Pilkington extols the virtues of a systems approach. "The structure's modular form and precise prefabrication meant there were no nasty surprises. Windows were basically punched into the steel cladding where needed.

"The cladding process is so rapid and this profile has such a nice rib. It's strong, rugged-looking and gives the building a scale and finesse. It even catches light beautifully. The colour scheme of white, silver and translucent produced something wonderfully crystalline. I think it helped to overcome the constraints of such a formal, functional arrangement," he says.

The steel cladding profile has such a nice rib. It's strong, rugged-looking and gives the building a scale and finesse, and then the plexiglas takes over. One works off the other, playing to its strengths yet also contrasting to build a better result

"The deck went in and that allowed us to finish the upper and lower levels simultaneously. Steel was critical in that delivery. We couldn't have got there any other way. It's economical and strong and does all of the right things.

"The precision and speed of coverage possible with steel was amazing. I remember the clients' reaction. It was 'oh wow!'.

"Steel plays a very important role," he continues. "Apart from the feature cladding there are back-of-house and RHS sections that are quite perfunctory. These carry all of the air-conditioning and mechanical services that sit on a lightweight concrete slab formed with LYSAGHT BONDEK® made from DECKFORM® steel."

The architects investigated greenhouses in Europe and New Zealand before settling on a system ultimately sourced from Sydney. "It shone above all others," says Pilkington. "It's part of the overall system that made the task so much easier. This allowed the building team to throw themselves into it and within a few days it was pretty well all up."

As much as traditionalists might have liked a fully glazed envelope, this was ruled out because of occupational health and safety considerations and risks from hail damage; and so plexiglas, a clear cladding which transmits the entire UV light spectrum, was chosen.

The facility also has the potential for large water and power requirements, tempered by sustainable initiatives including large roof water catchments and mechanical plant water recycling.

Materials, including timber elements in the central entry foyer, have been selected to accent natural qualities. The architecture humanises the greenhouse so that it more closely creates the ambience of a glasshouse instead of laboratory. Red-toned colours have been chosen to enliven internal spaces, as red dissolves the after-image of the green plants.

"Colour can certainly contribute to a more residential feel. We chose a bright red floor that contrasts with the usual plant spectrum," Pilkington says.

Break-out spaces offer a more intimate scale. "It's a massive research greenhouse but it does break down into manageable modules. The main technology is confined to the middle of the building.

"When you're one-on-one in the greenhouse they're quite private spaces. They're uplifting and quite lofty, with plenty of daylight."

Ultimately, Pilkington is proud his and H2o's architectural practices have applied their skills to house to such a vital initiative. "It's such an important science and one with the potential to add huge dollars to boost Australia's farming and export capacity. As an architect you can play a part in streamlining that. Every time the Plant Accelerator delivers its science, we as architects will have contributed." **SP**

PANEL SAYS

This greenhouse research facility by H2o is a stand-out, designed using a similar economy of means displayed by French architects Lucaton and Vassall. While being a very functional building, it demonstrates ingenious and thoughtful steel detailing. We particularly like the treatment of the building's structural steel posts, which are light and thin – meeting sustainability objectives of reduced material weight and embodied energy of building fabric. Materials are both juxtaposed and compatible – steel cladding, permanent steel concrete formwork, timber and aluminium framed glazing. While timber is used at human level, the steel structure helps to frame the light-filled space and staircase in a simple and straightforward manner.

ABOVE AND OPPOSITE: Minimal material treatment delivers maximum operational performance and visual integrity. A LYSAGHT LONGLINE 305® profile cladding made from COLORBOND® steel in the colour Surfmist® combines with a plexiglas roof to create a thermal shell for the study and development of drought-resistant crops

PROJECT University of Adelaide Plant Accelerator or Plant Accelerator, Waite Campus University of Adelaide **CLIENT** University of Adelaide **CLIENT REPRESENTATIVE** Synergy **ARCHITECT** Phillips/Pilkington Architects (Adelaide) and H2o Architects (Melbourne) **STRUCTURAL & CIVIL ENGINEER** Wallbridge & Gilbert **BUILDER** Built Environs **BUILDING SERVICES ENGINEER** Lucid Consulting Engineers **STEEL FABRICATOR** RC & ML Johnson **GREENHOUSE FABRICATOR** Croudace **SHOP DRAWING CONTRACTOR** Kloek Drafting Services **CLADDING CONTRACTOR** S & LJ Roofing Contractors **LANDSCAPE ARCHITECTS** Taylor, Cullity, Lethlean **PRINCIPAL STEEL COMPONENTS** Cladding: LYSAGHT LONGLINE 305® profile cladding made from COLORBOND® steel in the colour Surfmist®; Formwork: LYSAGHT BONDEK® made from DECKFORM® steel; Structural: SHS, RHS, UC, UB **PROJECT TIMEFRAME** 2007–09 **AWARDS** Australian Institute of Architects South Australia 2010 Keith Neighbour Award for Commercial Architecture; Sustainable Architecture Award (commendation); Australian Steel Institute South Australia 2010 Steel Design Award, Steel Clad Structures **BUILDING SIZE** 4500m² **TOTAL PROJECT COST** $25 million

ARCHITECT WSH Architects
PROJECT Motorhome
LOCATION Port Fairy, Victoria

HOME & AWAY

For WSH Architects the Winnebago provided both a formal basis and a clever siting and planning solution for this coastal home. Words **Christine Phillips**

Photography **Paul Bradshaw; Christine Francis**

"The architects have have created a hybrid that draws on the everyday holiday language of the Winnebago"

A steep skillion roof made from COLORBOND® steel in the colour Ironstone® creates a bold form facing the street

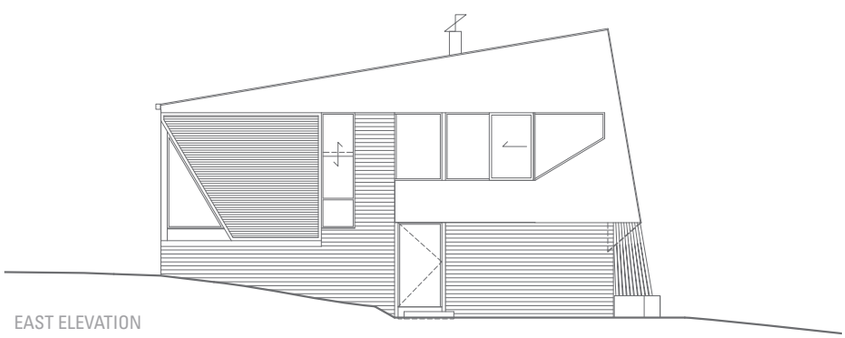
Winding down the windows to smell the sea along the Great Ocean Road is something most Victorians have experienced. For many, the road trip is undertaken in a vehicle such as a Winnebago – which was the source of inspiration for WSH Architects' Motorhome house in Port Fairy, a four-hour drive from Melbourne along the Great Ocean Road.

The former WSH (now HATZ Architects) comprised directors Owen West, Steve Hatzellis and Andrew Simpson. Simpson and West designed the house for West's parents. The brief called for a combination of a permanent 'home away from home' as the couple moved into retirement and a holiday home for the family. This dual brief inspired WSH to reference a recreational vehicle.

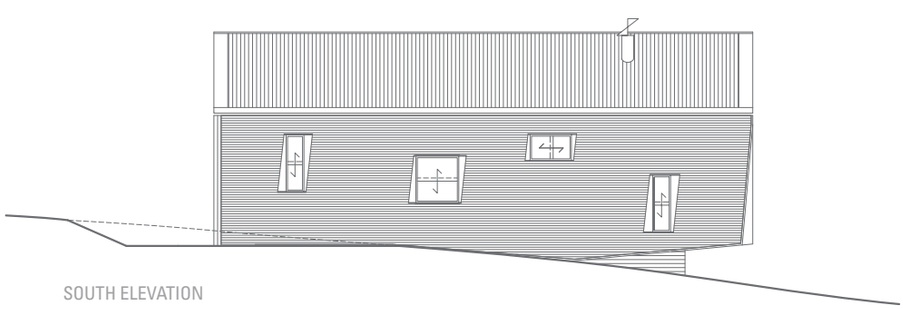
Both motor vehicle and holiday accommodation, motor homes serve as iconic reminders of road trips past. As WSH intended, Owen West says its building "expresses a character of simultaneous stability and impermanence".

Located on a small block on the highway end of the coastal road, the site has a suburban feel to it. WSH's design is, appropriately, not the heroic coastal pavilion but a smart solution that addresses both the requirements of the brief and site conditions. A simple yet bold form, the rectangular house is split across two levels: the grounded 'sleeping' zone versus the elevated 'living' zone. Elevating the house at one end also uses the natural slope to provide a practical solution for car parking on a relatively small site.

The angled house has a steep skillion roof made from COLORBOND® steel in the colour Ironstone®. The elevated end is propped up by a series of steel posts, a bit like the pull-out awnings found on the side of a Winnebago, while invoking the lightweight structural expressionist houses of the 1950s that share a similar formal approach, such as Peter McIntyre's Stargazer House (1951).



EAST ELEVATION



SOUTH ELEVATION

ABOVE LEFT: Referencing a caravan, the house's southern end is clad in LYSAGHT® PANELRIB® profile in the colour Shale Grey™

ABOVE: Black-framed windows follow the house's form, creating bold punctures

To the northern facade, a double layer of translucent polycarbonate sheets commonly used as a roofing material is employed for external wall cladding. This polycarbonate sandwich is intended to trap an insulating pocket of air while also creating a diffused lighting effect inside. WSH describes this as “a twisted, taut membrane that obscures the adjacent property while capturing daylight from the north”.

Referencing a caravan, the house’s southern end is grounded to the earth and its walls are clad in COLORBOND® steel in the colour Shale Grey™ and the profile LYSAGHT® PANELRIB®.

Black aluminum-framed windows follow the house’s form, creating bold punctures that display the surrounding coastal suburban setting.

Entry is via the semi-enclosed staircase that bisects the house. Not quite inside and not quite outside, the staircase reinforces the home’s sense of informality while also providing ventilation.

WSH chose slender steel columns for the structural frame, combined with prefabricated timber roof trusses. The elevated living annex is thus formed, connecting the grounded sleeping box, or caravan.

“The combination of steel and timber yielded a lightweight and cost-effective structural approach which was important for the expression of the house,” West explains.

“The close spacing of roof trusses (1.1m) allowed the use of a relatively small steel hollow section column. The stiffness and strength of steel was well suited to varying the structural profile of the building in combination with timber for spatial and material effect.”

The planning of the Motorhome is simple, yet considered. And like a recreational vehicle, it reinforces the hybrid theme of stability and impermanence. This is achieved through the use of a corridor and entry stair that divides the ‘grounded’ spaces from the ‘elevated’ spaces. The private bedroom areas and amenities are housed in the grounded end – “the hermetic, metal-clad box” – while the more public living area and deck is contained within the raised section of the house, creating an annex to the caravan end.

These ideas are expressed internally through the use of colour, form and materials. Within the elevated living area, rich polished hardwood timber floors ground the space and provide a warm contrast to the crisp, bright and glossy wall and ceiling finishes.

WEST ELEVATION

"The stiffness and strength of steel was well suited to varying the structural profile of the building in combination with timber for spatial and material effect"

PB

LEFT: The rear entry stair clearly separates the metal clad sleeping box from the elevated living and kitchen areas

BELOW: Notions of inside and out are toyed with through the roofline and blue structural ribs that extend beyond the line of the house to provide shelter to the deck

PB

PB

This is reinforced through the subtle but complex formal play where “the ceiling and wall twist in counterpoint to each other, creating the illusion of a membrane construction that conveys a sense of weightlessness and provisional shelter,” West says.

The skillion roof is expressed internally in the light-filled living and kitchen areas that open out to a large deck facing the back yard. Timber roof trusses are exposed and painted a sky blue colour, generating a bright rib-like appearance.

The use of digital technologies enabled the efficient construction of each roof truss in a different size to create a dynamic effect. Notions of inside and out are toyed with through the roofline and blue structural ribs that extend beyond the line of the house to provide shelter to the deck. These blue ribs are also echoed in the finely detailed kitchen island bench that incorporates projecting blue fins as door dividers around the hearth-like centrepiece.

But the RV feel is most prominent in the bedroom component, through the further use of COLORBOND® steel in the colour Shale Grey™, this time as interior cladding. This marks a clear formal distinction between the house’s halves and helps imbue a caravan sensibility. The bedrooms are modest in size, but – also with blue ceiling fins – feel light and airy.

WSH has successfully avoided the clichéd timber pavilion approach that is ubiquitous to many coastal sites, but this is not a suburban home transplanted to a coastal setting. Instead, the architects have created a hybrid that draws on the everyday holiday language of a Winnebago.

The Winnebago idea brought with it the danger of becoming a ‘one-liner’ response, but WSH’s thoughtful planning, elegant detailing and playful structural expression make this house a great addition to Victoria’s architect-designed coastal homes. This success was reinforced by the clients and those who have visited the house, which West says “has elicited a diverse range of responses – comfortable, unusual, striking, crisp, compact, light, provisional, fresh, busy and intricate. It is a place people love to return to.” **SP**


CF


PB

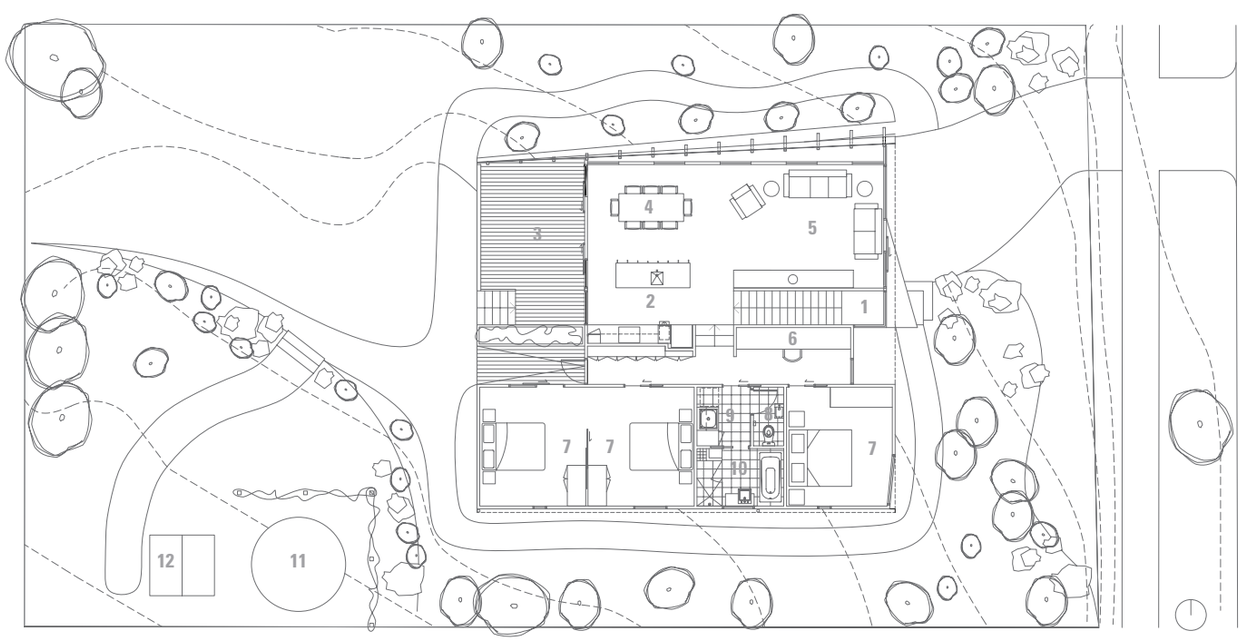
COLORBOND® steel in the colour Shale Grey™ is also used as interior cladding. Internal timber roof trusses are exposed and painted a sky blue colour, generating a bright rib-like appearance

PANEL SAYS

This project has a lovely, strong tectonic and clear architectural idea, representing domestic stability and mobility simultaneously. ‘Motorhome’ aptly describes the architects’ fusion of carport and house, combined in a single strikingly sculptural object. We particularly like the spatial development of the interiors: on one side, a grounded, hermetic, metal clad box containing the bedrooms and bathroom; on the other, an elevated open plan kitchen, living and dining area. The use of ribbed wall cladding, juxtaposed against polycarbonate, effectively expresses the multi-faceted character of the house. Overall, a dramatic and original development of a compact, standard house form.

www.steelprofile.com.au

ABOVE: The blue ceiling ribs are echoed in the kitchen island bench that incorporates projecting blue fins as door dividers around the hearth-like centrepiece



LEGEND
1. Entry
2. Kitchen
3. Deck
4. Dining
5. Living
6. Study
7. Bedroom
8. WC
9. Laundry
10. Bathroom
11. Tank
12. Solar collectors

PROJECT Motorhome **CLIENT** Ken & Sheryl West **ARCHITECT** WSH Architects **PROJECT TEAM** Owen West, Andrew Simpson **STRUCTURAL & CIVIL ENGINEER** TGM Group **BUILDER** MM Hearn **STEEL FABRICATOR AND SHOP DRAWING CONTRACTOR** RA Steel Fabricators **CLADDING CONTRACTOR** Gary McLuod Plumber **PRINCIPAL STEEL COMPONENTS** Roofing made from COLORBOND® steel in the colour Ironstone®; Wall cladding made from COLORBOND® steel in the colour Shale Grey™ and profile LYSAGHT® PANELRIB®; Structural: 75mm SHS hot-dipped galvanised columns **PROJECT TIMEFRAME** March 2009 – January 2011 **BUILDING SIZE** 190m² including external deck **TOTAL PROJECT COST** $530,000

ARCHITECT Hassell and Cox Architects
PROJECT Adelaide Oval
Western Grandstand Redevelopment
LOCATION North Adelaide, South Australia

PRIDE OF PLACE

Australia's reputation as a sporting nation can to some degree be attributed to the calibre of its venues. At a glance, Adelaide Oval's new Western Grandstand appears straightforward, perhaps even obvious. But like an iceberg, the visible 'tip' conceals a vast and complex underside. Words **Peter Hyatt** Photography **Peter Hyatt**

TYPICAL TRUSS ELEVATION - SIDE

PANEL SAYS

The redevelopment of Adelaide Oval's Western Grandstand offers seating for 14,000 spectators, and spectacular views – not just of the oval, but to the city and distant hills. It draws immediate comparisons with AAMI stadium in Melbourne, but is distinctly different, quite beautiful and refined in expression.
Its scalloped form demonstrates the potential of steel framing to produce a welcoming, sheltering grandstand. Using five diagrid roof shells and trusses, the architects have effectively created a lightweight, simple and elegant steel canopy that floats over and protects spectators.
We particularly enjoy the billowing, segmented sweep of roof elements around the edge of the field, and the easy coupling of the new roof with the existing heritage brick walls. This project is delightfully contemporary, and clearly demonstrates the suitability of light steel as a complementary material to enhance heritage fabric.

A grand stadium never exists in isolation. It requires context, and in this regard Adelaide Oval is blessed. Sited in postcard-perfect parkland overseen by the visionary Colonel Light in bronze, the ground enjoys a real head-start against its interstate equivalents. Perhaps only the Melbourne Cricket Ground might claim bigger bragging rights. Even so, the challenge to re-develop Adelaide Oval's $30 million Western Grandstand was bound to be a tough act given the architects' challenge to make modernity out of history.

While the process rarely becomes public spectacle, off-field design competitions can be just as intense and bruising as a game of football or cricket. Ambitions should aim to soar. A stadium has to stand scrutiny not just for a few days or seasons, but usually decades. In such venues tradition either helps or hinders the result.

Principal of Hassell Adelaide and the stadium's key designer, Chris Watkins, was mindful of heritage in designing the new stadium and admits: "There was plenty to live up to. We were acutely aware of the task."

Hassell and Cox Architects collaborated to produce a grandstand of refinement and elegance: no mean feat given the complexity of heritage elements needing to be absorbed. Good design exhibits appropriateness, and so it is in this case with a stand that appears to spring organically and elegantly from its place. This quality of fitting form and finish – all made to appear effortless – is one of the stadium's standout qualities.

The Western Grandstand accommodates 14,000 spectators over four levels. New members' facilities include a 650-seat dining room, a 45 metre-long bar with views to the oval and an elevated, covered outdoor terrace with views across Oval No.2 to the western parklands. Two additional bars and kiosks are provided at ground level to service the 'out the back' crowd – a great tradition at major events at the Adelaide Oval.

Adelaide Oval will be further developed with the construction of two new grandstands, lifting capacity to around 50,000, and will become the home of AFL in Adelaide in 2014 with the Crows and Port Power moving from AAMI Stadium once work is complete.

The new Western Grandstand is covered by five diagrid roof shells. Each highly engineered steel structure spans 30 by 30 metres and is supported at a mere six points.

If architecture is a series of problems requiring solutions then a grandstand – or five connected bays in this case – had to overcome plenty to achieve a result that is athletic, slender, elegant and lyrical.

Considered alongside a typical high-rise tower tipped on its side, the stadium's intricacy begins to better reveal itself. "From the ground side you see all of those seats and you would imagine it's a very simple structure, but the reverse side reveals other detail. If this was a $100 million high-rise office building we would have around a third of the drawings required for this project. That gives you some idea of the lack of repetition involved here," says Watkins.

"Because we had to deal with a complex set of heritage buildings there was little scope for repetition in the actual fabric. Of the five diagrid shell structures, three are different while the two end bays are a mirror image."

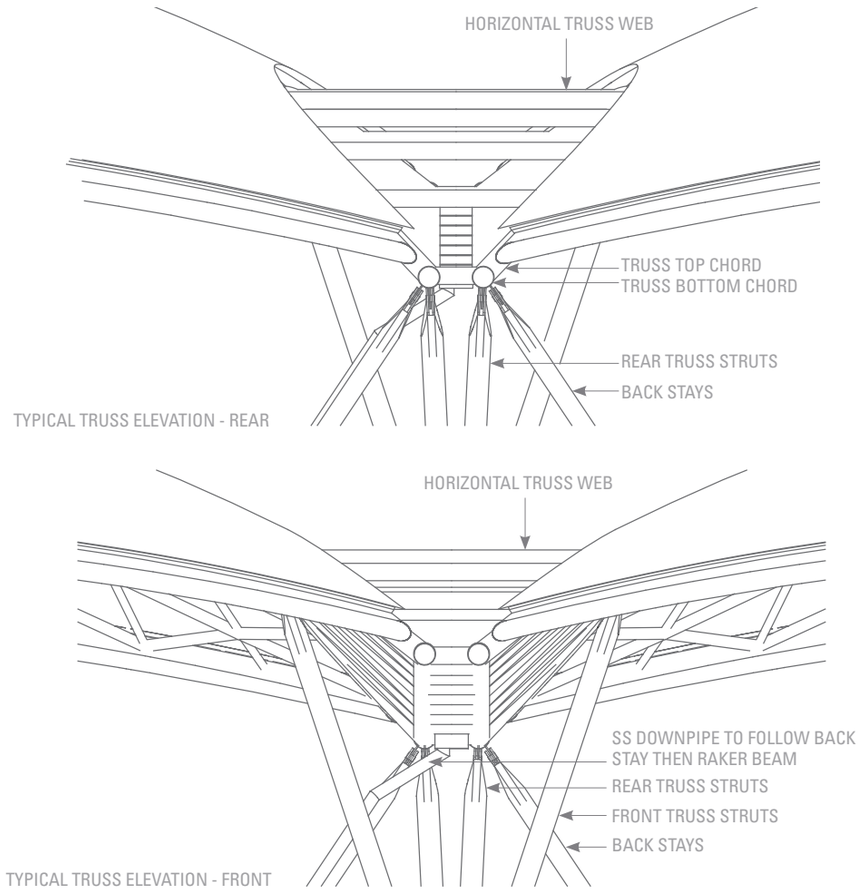
From the rear, the stadium partially resembles an archaeological dig. The brief demanded acknowledgment of the pre-existing George Giffen, Sir Edwin Smith and Mostyn Evans stands. The remnants of these western stands required a complex, interlaced steel structure to span and strengthen century-old masonry.

"We could have quite easily followed and replicated those accumulated footprints consolidated over 100 years, but would have been left with the legacy of an almost straight western boundary. This meant we had to 're-ovalise' the ground and correct the straight, western side and very deep pockets. We managed to lengthen the western boundary by five metres and be truer to the oval shape by international cricket standards." Watkins says that change brings spectators up to 15 metres closer to the centre of the ground and improves amenity. For him such big-picture master-planning is just as important to the ground's success.

Watkins says the stand's structural 'hierarchy' – a quilt of integrated parts rather than a singular, heroic expression – is far preferable to a single, utilitarian concrete extrusion. "There was a definite investment in breaking down and feathering the project's scale."

ABOVE LEFT: Five parasol-light roof bays overcome the singular extruded 'slab' stadium

LEFT: A three-quarter rear view exposes slender haunches that spring from foundations of heritage stands



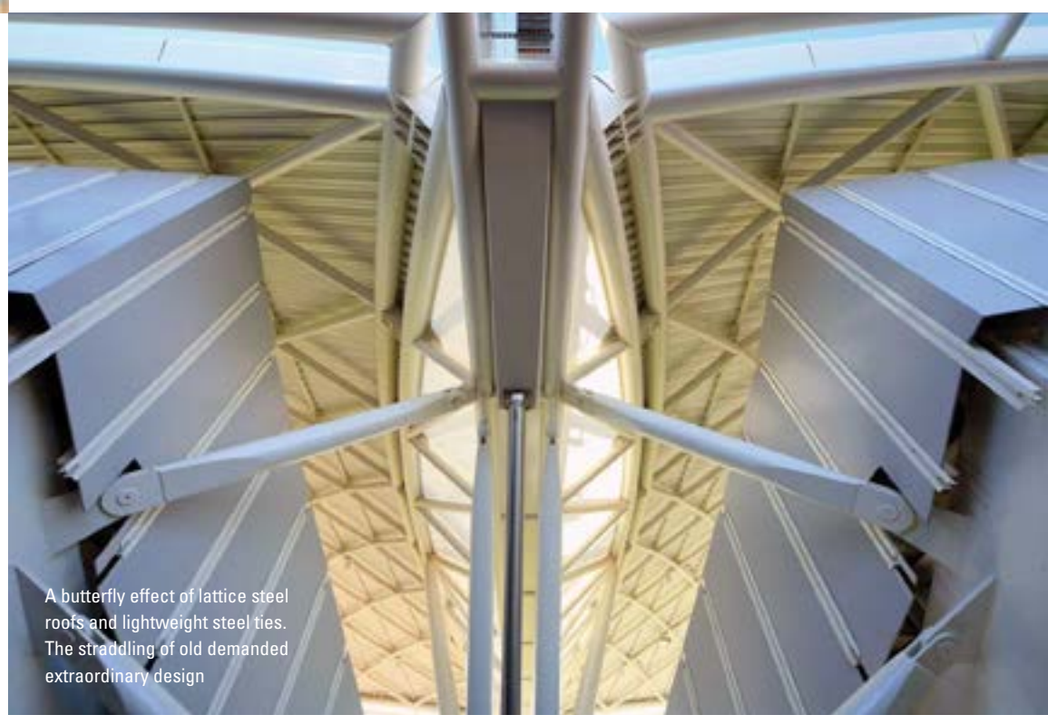
In elevation the stand rises from its solid haunches to a leaf-like rhythm. Watkins and his team had to ensure a complex range of services and facilities could be crammed into the building, without it appearing like an over-stuffed Christmas stocking.

"Computer technology allows these kinds of structures to occur in a very refined, structurally efficient way. Steel members are working to their full capacity because there is no redundancy. The structure appears to conquer the laws of gravity."

The project's floating roof quality is essentially a practical response, says Watkins, because of the need to express those five shells. "There was a structural response to achieve those clear spans and cantilevers. Each shell was fabricated and welded together off-site because it was so difficult to calculate live deflection and construction tolerances. Fully assembled as a whole piece, each shell was cut up into sections with connection points welded on and then transported to site and bolted together.

"There is a logic to the material usage," he points out. "Concrete provides the base that works well in compression, while steel is brilliant in tension. The beauty of steel in such an expressive structure is that it's so easy to fabricate. Steel members can be very light and it's such an efficient material with long spans on such a shell-like series.

"Steel coating technology is amazing. The roof structure is steel and most of the soffits above the walkways are clad in steel," Watkins says.

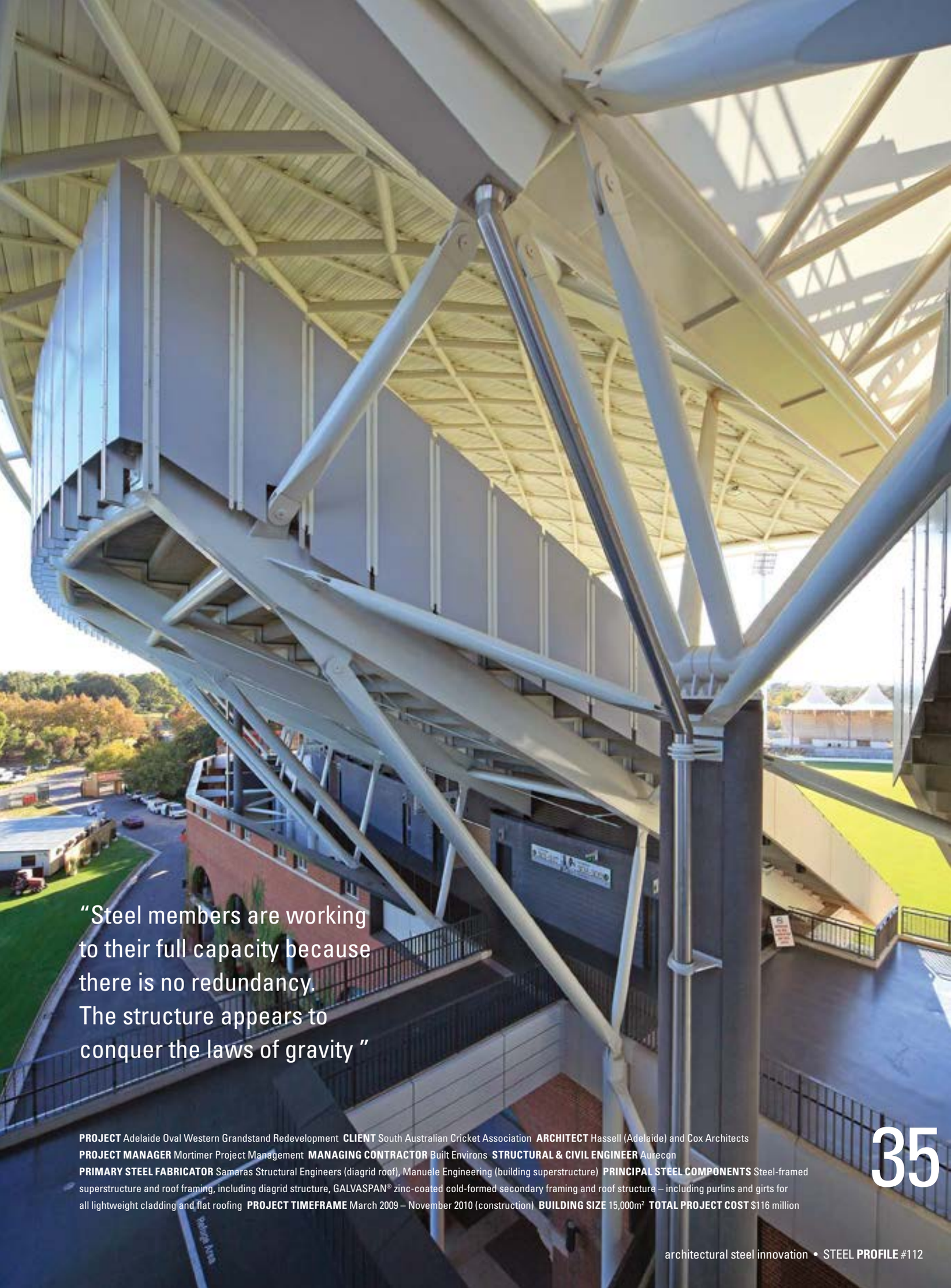


A butterfly effect of lattice steel roofs and lightweight steel ties. The straddling of old demanded extraordinary design

"It's my first stadium and, to be honest, one of the most challenging jobs of my life," he continues. "Everything here was complex – the budget program, time constraints, adapting a new stadium across an old one – there was nothing easy about this project. I'm serious. If you can think of a problem, this had it.

"Being the lead design consultant we were often front-and-centre in negotiations. It can be testing," he muses. "It often demanded a tough position from us. We had to fight those battles and perhaps we burnt a few bridges along the way to achieve the necessary results."

While he may bemoan the larger-than-life issues that leapt up to thwart his best efforts, heavy lifting and perseverance by the design and construction teams has paid off. With its new grandstand now fully operational and the oval undergoing further expansion, Adelaide will soon have something new to really applaud. SP



"Steel members are working to their full capacity because there is no redundancy. The structure appears to conquer the laws of gravity "

PROJECT Adelaide Oval Western Grandstand Redevelopment **CLIENT** South Australian Cricket Association **ARCHITECT** Hassell (Adelaide) and Cox Architects **PROJECT MANAGER** Mortimer Project Management **MANAGING CONTRACTOR** Built Environs **STRUCTURAL & CIVIL ENGINEER** Aurecon **PRIMARY STEEL FABRICATOR** Samaras Structural Engineers (diagrid roof), Manuele Engineering (building superstructure) **PRINCIPAL STEEL COMPONENTS** Steel-framed superstructure and roof framing, including diagrid structure, GALVASPAN® zinc-coated cold-formed secondary framing and roof structure – including purlins and girts for all lightweight cladding and flat roofing **PROJECT TIMEFRAME** March 2009 – November 2010 (construction) **BUILDING SIZE** 15,000m^2 **TOTAL PROJECT COST** $116 million

ARCHITECT Architect Prineas
PROJECT Avoca Beach House
LOCATION Avoca Beach, New South Wales

TREETOP LIVING

A coastal steel-framed house by Architect Prineas stays true to the Australian beach shack tradition and creates a magical treehouse feeling. Words **Trisha Croaker** Photography **Brett Boardman**

The New South Wales Central Coast, like most of Australia's populated coastline, was once the domain of the unobtrusive, modest fibro beach shack sitting quietly on site so that nature could speak.

Given the area's natural beauty and proximity to Sydney and Newcastle, the Central Coast was always destined for development. But need so much of the new residential work be so, well, large and unresponsive to its location? Architect Prineas understands how contemporary weekenders can meet contemporary needs in a more restrained way.

For more than 25 years, Sydney-based architect Eva-Marie Prineas visited the Central Coast, staying with family and friends in an unassuming two-bedroom fibro cement beach shack at glorious Avoca Beach. Surrounded by bush and towering eucalypts, the house sat five minutes from the beach and was the source of cherished holiday memories.

As the owners' family expanded with grandchildren, they decided to rebuild. Knowing the site intimately, Prineas was the obvious choice as architect.

"The brief was simple," she says. "Our clients loved the trees on site and wanted to feel like they were living in a really light 'treehouse'. Importantly, while the existing shack's surrounds were now significantly developed, they wanted to retain the spirit of holidays spent in the original structure." The area had become increasingly dotted with "monoliths". The neighbouring houses were clearly in one of two camps – either of the Australian beach vernacular and appropriate for their location, or not so. Prineas says it was crucial to all involved that the new house was appropriate. Her client's house needed to be relaxed, not excessively sized and very much connected to the landscape. The brief was for it to be highly adaptable and responsive – cosy for two occupants but flexible and generous enough to accommodate multiple families visiting together.

"The detailing of exposed steel is key to the language of the architecture... the intent is a sense of camping on an edge amongst the trees and this is achieved through fine steel detailing that seemingly allows the roofs to float"

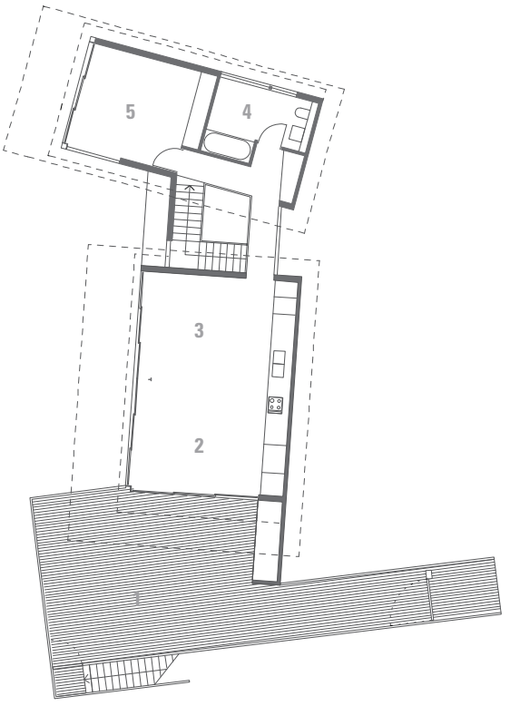
Prineas' solution was to position the house along the site's top southern edge, where it 'camps' over the original shack footprint, minimising disruption to the land and allowing much of the block to be regenerated by bushland. She then built upwards with a compact two-storey high, one-room wide design that gently turns away from the street to the south, to open completely to the treed block and the north. Living and sleeping areas face the block, with services, bathrooms, laundry, storage and kitchen positioned against the southern service wall.

Materials and their treatment are deliberately simple and speak to the tradition of low maintenance, relaxed beach shacks. Externally, darkly painted fibre cement sheeting has been used to ensure a low profile from the street, and to acknowledge the original fibro structure. Being in a bushfire-prone area, the cladding also needed to be non-combustible. Contrasting internal white walls feature throughout, ensuring a light and open spaciousness.

While the house's spirit is firmly in the trees, this is made possible by relying on steel which is used extensively throughout – from its custom-made letterbox at the arrival point, to its roofing, balustrades and structure. "Steel became the main structural material, and everything else fell into line with that," Prineas says.

Her 'treehouse' idea was for a slim, elegant structure and exposed steel was used to realise it. Working very closely with structural engineers, she used steel to produce a structure that was "incredibly thin" – a result not achievable with other building materials. "The detailing of exposed steel is key to the language of the architecture. The intent is a sense of camping on an edge amongst the trees and this is achieved through fine steel detailing that seemingly allows the roofs to float, detached from structure." LYSAGHT CUSTOM ORB® made from COLORBOND® steel in the colour Woodland Grey® was used for the steel roofing because of its light weight, durability and profile, ensuring the structure blended discreetly among the eucalypts.

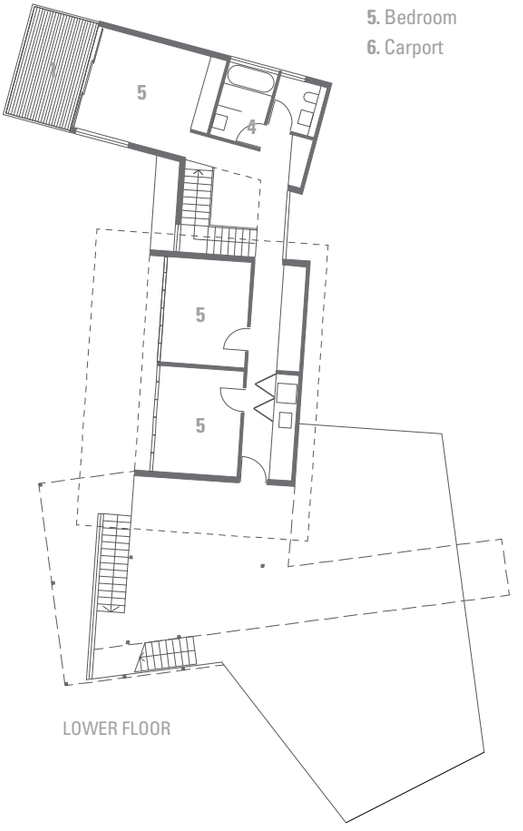
To enhance this sense of floating through tree tops, Prineas used fully retractable floor-to-ceiling glazed doors on all north-facing rooms upstairs, which transforms those spaces into 'balconies' which connect immediately to the outside. To achieve this, a finely detailed steel balustrade wraps around



GROUND FLOOR

LEGEND

1. Deck
2. Dining/Kitchen
3. Living
4. Bathroom
5. Bedroom
6. Carport



LOWER FLOOR

TOP: A light steel bridge connects house and street, with darkly painted fibre cement sheeting used to maintain a low profile

LEFT: By exposing tapered rafters externally and lining the underside of roof purlins, the roofs appear to float lightly into the treetops

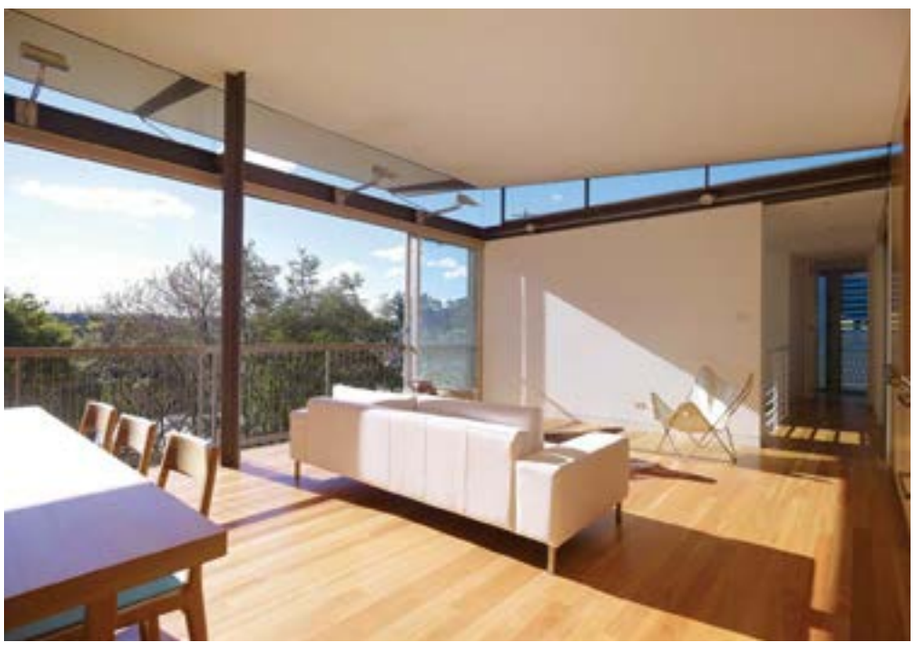
LEFT A finely detailed steel balustrade allows all living spaces to be opened fully to the outdoors

BELOW LEFT: Living and bedroom spaces face east, with fully retractable windows and doors heightening the sensation of treetop living

BELOW RIGHT: Stainless steel wire run vertically in a zigzag pattern is used for the balusters, creating the impression of strength, security and gossamer fineness

PANEL SAYS

This beach house is a fine piece of work. We found it simple, straightforward, and elegant – the detailing of exposed steel is key to the architectural language. Steel is used effectively in the entry bridge, structural posts and roof sheeting, with fine steel members seemingly allowing roofs to float detached from structure. Sympathetic attention to detail includes steel balustrades, stainless steel balusters and micaceous iron oxide coating, used to blur the threshold between internal spaces and the landscape beyond. This project demonstrates a delightful spatially light feel, the kind only achievable through the large spans that steel allows.



Internally, warm white walls and blackbutt feature throughout, ensuring a light and open spaciousness

"Attached to the main living area, this deck simply and directly extends a sense of space and is capable of accommodating large gatherings while the house retains its intimacy"

all full-height windows on the top storey, allowing those windows to fully open behind the permeable safety barrier the balustrade provides. Balusters are made of stainless steel wire and run vertically in a zigzag configuration. The effect is ethereal – as if deft, light hands have cast a fine web to protect those inside. Despite having a roof overhead, the resulting feeling is of being outside among the trees, truly that of being in a tree house.

To best provide a clear, open span to the northern glazing, and allow doors to open unencumbered, Prineas placed the main steel column supporting the living area roof within the living room, away from the glass line. It also enables the highlight windows to the north to be clear of any structural posts. Exposing the depth of the tapered rafters externally beyond the glass line and lining the underside of the roof purlins creates a thin roof edge, which is finished off with a welded steel angle. Steel angles used as posts and beams provide recesses and shadows in the facade, adding to the lightness of the building.

A large deck and bridge to the street cantilever off the living area and heighten the sensation of being outdoors. "Attached to the main living area, this deck simply and directly extends a sense of space and is capable of accommodating large gatherings while the house retains its intimacy," she says.

Mindful of the house's environmental responsibilities, two 5000-litre water tanks occupy the undercroft and retain water for toilets, washing machine and garden irrigation. Its siting maximises a northern solar exposure moderated by extended roof overhangs. The deep roof overhangs and cross-flow ventilation through operable louvres and doors allow the house to be cooled naturally while heat from glazing to the north can be retained.

The landscape design was a collaboration with Rolf Den Besten and has a sense of informality that complements the house. Cleverly, the landscape is capable of sustaining itself while the occupants are absent for long periods.

This is a thoughtful, relaxed Australian weekender that floats among the eucalypts in a gentle, unobtrusive way. It sends all the right messages about beach living, without saying a word. SP

PROJECT Avoca Beach House **ARCHITECT** Architect Prineas **PROJECT TEAM** Eva-Marie Prineas, David Parsons, Laura Antiohos, Sophie Solomon, Helen Stumbaum **STRUCTURAL & CIVIL ENGINEER** James Prineas & Stephen Giblett of Robert Bird Associates **BUILDER AND CLADDING CONTRACTOR** Cochran Constructions **STEEL FABRICATOR AND SHOP DRAWING CONTRACTOR** Bob Edmonds **LANDSCAPE ARCHITECTS** Rolf Den Besten **PRINCIPAL STEEL COMPONENTS** Roofing: LYSAGHT CUSTOM ORB® profile made from COLORBOND® steel in the colour Woodland Grey®; Structural: columns, expressed steel angles, I-beams and tapered rafters **PROJECT TIMEFRAME** Documentation: 12 months; Construction: 12 months **BUILDING SIZE** Floor area: 160m^2; Site area: 930m^2 **TOTAL PROJECT COST** $1.2 million

MINDFUL METAL

New Zealand's Architectural Ecology has cleverly shared structural loads with an external skeleton that delivers design finesse, practicality and comfort for the University of Otago's Psychology Department and its students.

Words **Rob Gillam** Photography **Patrick Reynolds**

This latest stage (III), the William James Building, echoes two previous buildings also designed by Architectural Ecology. The practice's principal, Tim Heath, is an advocate of flexible building arrangements. When first called to campus 20 years ago, he questioned why most of the university's buildings were constructed of concrete. "I wondered why so much precast concrete was being used," he says. "I wanted to know if we could reduce the building mass and reduce seismic loads.

"With the Stage I building we set up an external circulation system that also provides external access to other buildings and other levels on the Psychology campus. The succeeding stages were similarly connected."

All the Psychology Department buildings have since been framed and clad in lightweight steel, a proud tradition continued with the latest stage.

"We argued that material selection should be innovative," continues Heath. "The idea of modular design – how we could use regular planning components repetitively – was prominent in our minds early on. Steel lent itself to extend that thinking into a building form. It was a logical choice in terms of precision and the speed of construction."

A feature of Stage III is the structural system. The building core is adjacent to and shares structure with an earlier building stage. "Seismic design is a big deal in New Zealand," he says. "What we tried to avoid were deep beams connecting lateral loads from the core to the exterior of the building. Therefore we worked with the structural engineer to locate diagonal bracing at the outer edge of the floor plates."

The William James Building research laboratories needed to be flexible in layout and typically required longer uninterrupted spans of 10 metres. The office spaces had a much tighter module. "We modelled the building uses to locate the offices on the perimeter, for access to natural lighting and ventilation. The longer-span laboratory spaces were internalised with assisted ventilation and lighting."

The architects started off with a simple 3-D model when developing the client brief. The same model was then transferred to engineers who quantified energy and daylight modelling for the whole structure. This gave the designers confidence when arranging the various elements of the building skin. "With the long face being exposed to western sun, we had the potential for overheating. So we came up with a three-dimensional skin, which manages solar gains, natural lighting, sky glare, visual privacy and heat losses. It also allows occupants to open windows for natural ventilation – you can open up and breathe fresh air."

The primary components of the 3-D skin are the insulated panels and an integrated system of glazing, Webforge access walkways, sliding timber sunscreens and the internal perforated steel light-trays.

The sliding timber shutters can also be used to manage solar gains, provide visual security and modulate the daylight quality in office, and laboratory spaces. They can work in conjunction with internally-located perforated metal light-trays designed to bounce daylight off raking ceilings, deep into office spaces.

"We were looking for fine, lightweight elements. Using the tensile strength of steel meant that we could achieve that objective"

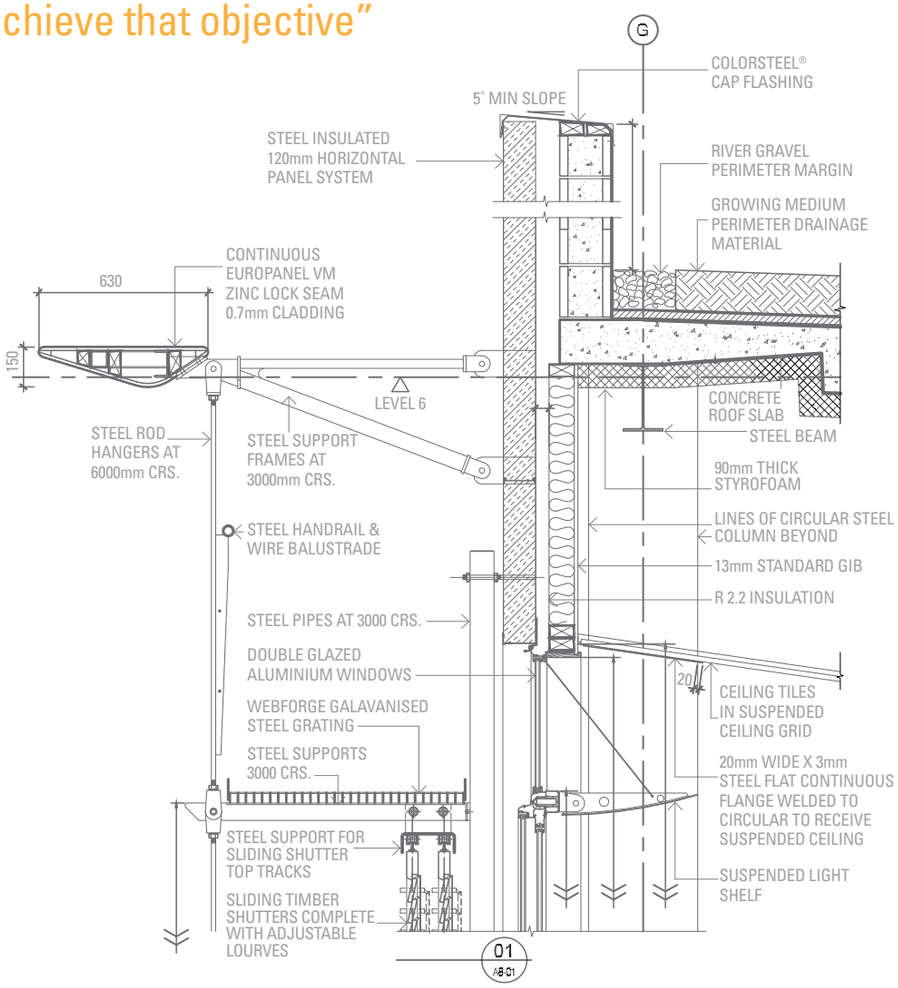
The 120mm insulated panels are made with pre-painted steel skins. "This material provides excellent insulation. We know that exterior access is required to maximise the cladding life. Suspended Webforge gratings have proven excellent in taking live loads, as well as providing optimal sun-shading for these latitudes."

The 3-D skin required a supplementary steel structure, including pin-jointed galvanised and high-tensile steel components. "We were looking for fine, lightweight elements. Using the tensile strength of steel meant that we could achieve that objective."

Topping off this steel structure is an aerofoil, "Something akin to a cornice, or visual stop," Heath says.

The combination of structure, material and technology fairly reflect the contributions of the many people whose skills were required to bring this complex project to fruition. Notably, this building is the first to receive a New Zealand Green Building Council Sustainability Category 5 (Educational) Rating and is the first large public building in the New Zealand South Island to have a green roof.

Both client and architect are extremely satisfied with the final result. Heath says his client "wanted something that they could call home and that is seen as their front door." SP



PROJECT William James Building **CLIENT** University of Otago **ARCHITECT** Architectural Ecology **PROJECT TEAM** Tim Heath, John Baker, Hannah Sharp, Noel Seal, Bill Cadzow **STRUCTURAL & FIRE ENGINEER** Hanlon & Partners **BUILDER** Naylor Love Construction **STEEL FABRICATOR** Action Engineering **SHOP DRAWING CONTRACTOR** W J Cadzow and Associates **CLADDING CONTRACTOR** Southern Insulation Dunedin **LANDSCAPE ARCHITECTS** Architectural Ecology **PRINCIPAL STEEL COMPONENTS** Structural steel: columns, beams, perimeter diagonal bracing; Roofing: COLORSTEEL® in the colour Titania to plant room; Cladding: 120mm insulated pre-painted steel skins; Webforge walkways, perforated metal light trays, aerofoils and support structures **PROJECT TIMEFRAME** 2008–2010 **AWARDS** 2010 NZIA Southern Architecture Awards Sustainable Architecture; 2012 New Zealand Green Building Council Sustainability Category 5, Education **BUILDING SIZE** 5000m²

BLUESCOPE STEEL

STEEL **PROFILE** #112

9 320075 070335

www.steelprofile.com.au