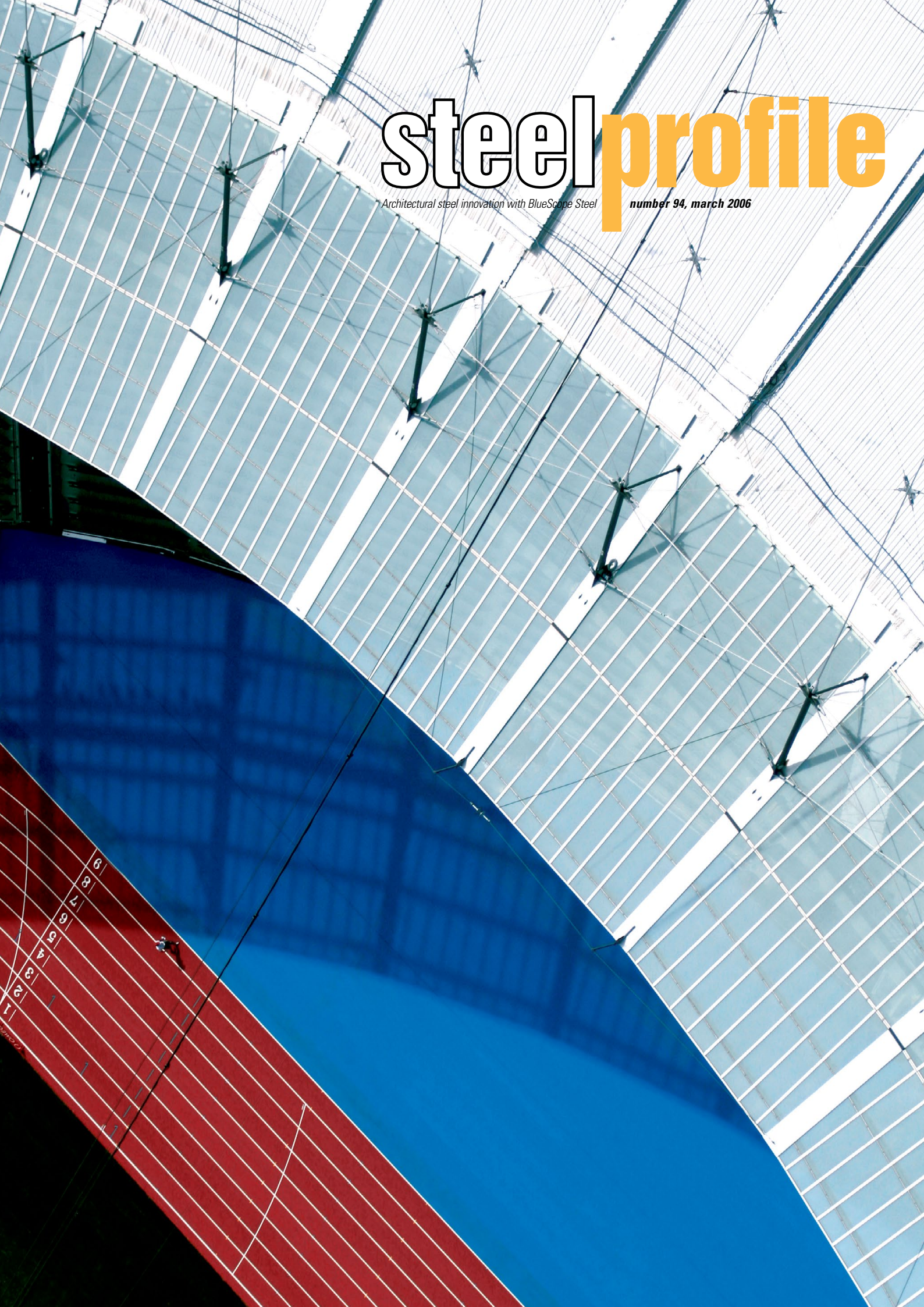
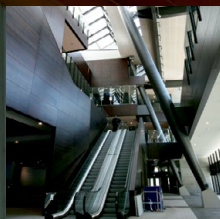


steelprofile

Architectural steel innovation with BlueScope Steel

number 94, march 2006





002

Raise The Roof

Sport defines and unifies many Australians in the same way it enthralled the ancient Greeks and Romans. The love of a real contest is timeless. Although immense, the Melbourne Cricket Ground's new Northern Stand has a lightness derived directly from steel. MCG 5 consortium architects Patrick Ness and Peter Cole offer thoughts on a shared experience.



010

Super Size Me

The Hardiman House, in Darwin, is superlative for its simplicity and filleted, climatic response. While many structures fail to take our Top End tropical "dress code" into consideration, this house is a model of uncommonly good sartorial elegance. And architect Peter Fletcher has rendered air conditioning truly optional.



016

Out Of This World

Perched on the rim of a huge natural sinkhole in rugged north-west Tasmania, the Dismal Swamp tourist facility boldly flies in the face of its surrounding, dank environment. Looking as though it has just landed from outer space, it also reflects architect Neil Wade's sense of fun and visitor involvement – down to its 110m-long slippery dip to the sinkhole floor.



024

Rainforest Refuge

Mark Buttrose knew he had to design a home to fit a difficult tropical jungle block in Cairns – one that would respond to intense downpours and cyclonic winds. The result is incredibly light on the ground – and informally liveable – and would not have been possible without steel.

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ART DIRECTOR: Natasha Krncevic **CORRESPONDENCE:** Steel Profile, PO Box 961, Crows Nest, NSW 1585 AUSTRALIA.
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(cover photograph) The new Northern Stand of the Melbourne Cricket Ground – which can best be appreciated from the air – owes much to steel, its basic structural and cladding ingredients.

(this page) Australian steel and local timbers . . . vital in producing the spectacular Dismal Swamp tourist facility in north-west Tasmania.

002

Project

MCG Northern Stand

Architect

A joint venture between Jackson Architecture, HOK Sports Architects, The Cox Group, Hassell Group and Tompkins Shaw and Evans.

It's amazing the difference little more than a decade makes with everything from hair styles to buildings. Bigger, bolder and more technically complex than the Southern Stand, the MCG's \$434 million Northern Stand will allow 55,000 spectators to raise their voices as one.

RAISE THE ROOF

Just another grandstand, or confirmation of the MCG as one of the world's pre-eminent sporting venues? Some believed the 1993 Great Southern Stand was the last word in modern stadium development. While it lacked the fluid, sculptural panache of Santiago Calatrava, it delivered the grunt of spectator capacity.

However with completion of the Northern Stand, the Southern Stand is, if not quite dwarfed, then at least tempered.

Sport defines and unifies Australians in the same way it enthralled the ancient Greeks or Romans. The love of a real contest is timeless. Here then is a modern coliseum that delivers the synthesised energy of sporting teams and spectators alike. From a design viewpoint, this new stand shares something with all champions – it makes the performance appear quite effortless – and it is this human characteristic that is most telling.

While there are more dramatic and striking stadia – Herzog and de Meuron's futuristic Allianz Arena in Munich and a raft of

dynamic work underway for the Beijing Olympics – few achieve their goal with such apparent economy of effort.

Peter Hyatt spoke with Patrick Ness of Cox Group and Peter Cole of Daryl Jackson Architects, two of the directors from the MCG 5 consortium that shared design responsibility for the new Northern Stand.

Ancient Rome could be incredibly modern. Two thousand years later we're still enjoying the contest from the best stadia that take most of their design DNA from the Romans.

Ness: "Fully encircled, the new Northern Stand means the MCG finally becomes the complete coliseum. The experience of this place has been heightened to the point that it's the ultimate stage.

Cole: "It's very similar to the coliseum in that there's so much beneath and behind the stadium. It shares the idea of colonnades, seating principles, sight lines, merchandising in the concourse, access ways and water storage. We used lightweight steel and glass as a contemporary reinterpretation of that."



Using a simple, highly appropriate material palette, the school makes a clean break from the neighbourhood vernacular of brick and tile. Evening light rakes into the building.



Ness: “Unlike soccer and rugby grounds that are really built around the rectangular pitch, this is much closer to the circle and that allows the coliseum format to take hold.”

Live competition frequently has to compete with a high level of in-home entertainment. Did this influence the MCG Trust, the architecture and engineering?

Ness: “These types of venues must deliver something not available via a replay or direct broadcast. Our starting point was spectator and player experience. The result of technology is that the virtual is the real. We have to get people out of their lounge-rooms and into this place. There is an experience of being here that needed to be such that seeing is believing.”

Cole: “Well yes it’s a one-off chance to get it right. It includes all the planning devices to make it as comfortable, as accessible as possible.”

It’s certainly no Houston Astrodome or even Melbourne Telstra Stadium. There is an authenticity to the whole experience rather than highly filtered indoor experience.

Ness: “Well it has a fantastic glass and steel roof that’s light and feels that you’re under a big sky. The fact is that cricket and football can still be played in conditions where it is open to the rain and weather conditions. However, you still have to provide shelter, and the new roof provides 80 per cent of cover for northern stand patrons.”

Is the condition of the playing field likely to be compromised?

Ness: “The turf is like our canary in the mineshaft. When that grass is green it tells us about light penetration and ground surface health. When it fails, it tells people that something is



Tradition in the making. The MCC members entrance and atrium typifies the huge voids and penetrations made possible with a refined structural program featuring cigar-shaped columns made from XLERPLATE® steel.

wrong. There has always been regular grass replacement in parts of high wear and shadow areas, but we don’t expect any major difference.”

Cole: “There’s been a lot of work on the arena surface, primarily for the Commonwealth Games. The ground has been levelled and the camber has now gone, permanently. It has new drainage and new turf has been laid. From a player’s viewpoint the arena and the surface he plays on is absolutely paramount.”

Were the Commonwealth Games the catalyst for action?

Cole: “It began just as a Northern Stand re-development that didn’t really consider the Members and Ponsford Stands but it also became clear that there were serious technical issues involving seating plats and existing staircases. This led to trying to work around the Members’ area and the old staircases. It meant we had to build over it or demolish the thing. Escape routes were cluttered. Its corridors at ground level were narrow and

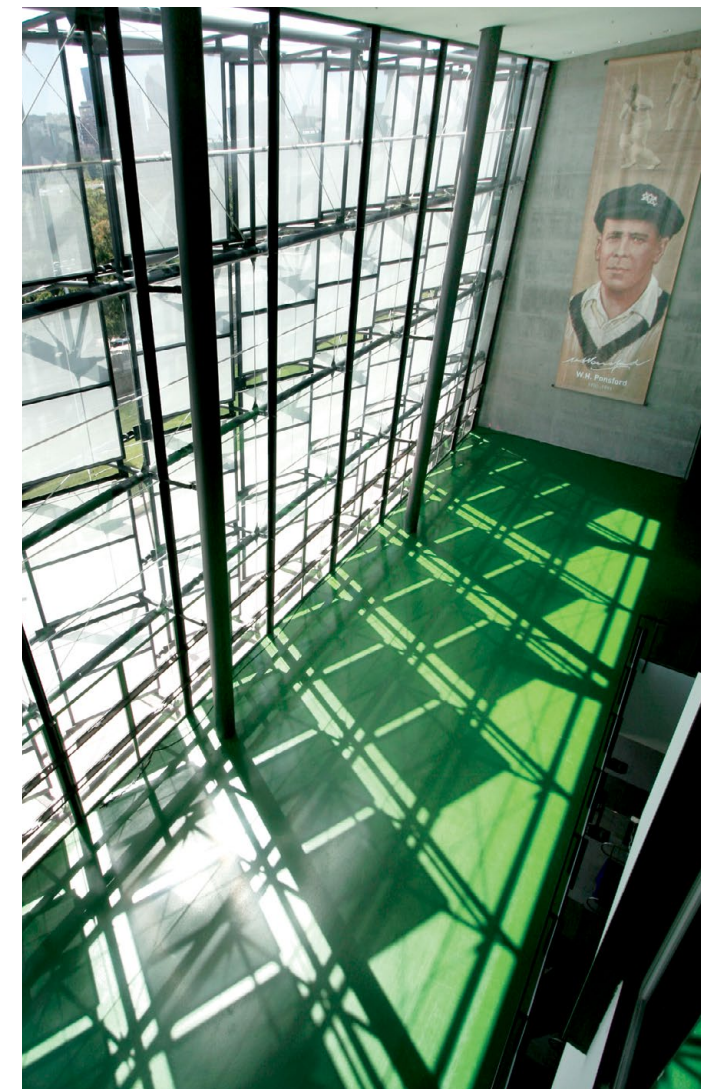
maintenance was becoming very costly. The old Ponsford Stand, for instance, sloped upwards by about 2m along its circumference. This meant the site lines changed as you moved around.”

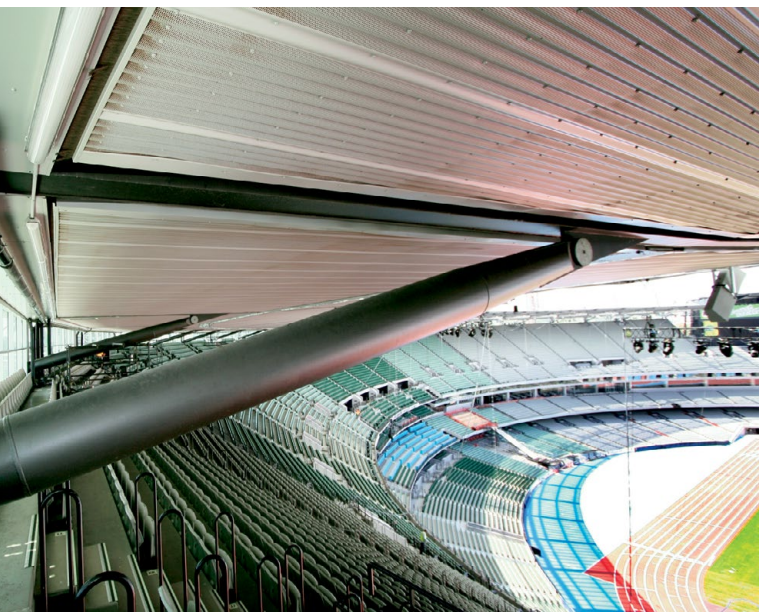
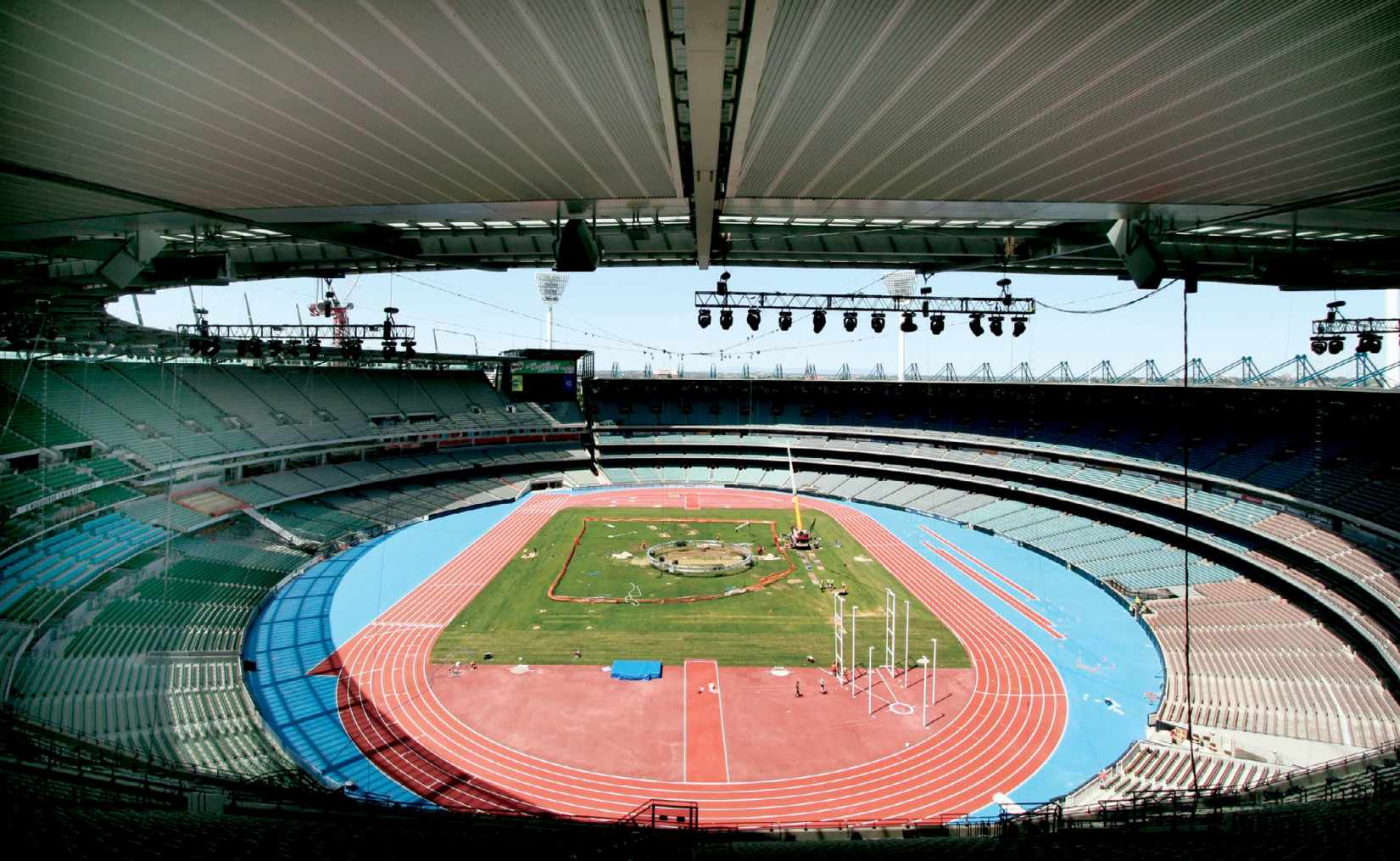
Ness: “It was partly in response to the Commonwealth Games and it was also timely to upgrade the ground.”

How complicated was it to have five firms of architects working under the banner of MCG 5? It must be like five drivers grabbing one steering wheel.

Ness: “We were very fortunate by virtue of the personnel involved. It wasn’t divided up by territory or responsibility in that sense. We managed to thread together a single team. Had we not done this it could have been a disaster. Personality-wise we were very lucky with the working team we had.”

Cole: “It takes a collaborative arrangement that involves supreme patience and tolerance.”





Unlike simplistic, traditional grandstand design, the Northern Stand incorporates a remarkable range of above and below ground services and facilities. While a predominantly deep structure, the architecture ensures a wash of screened daylight and shadow throughout to animate spaces.

It's vast and yet it's quite understated. It's not overly engineered or outrageous. Yet despite that there is still a real 'wow' factor.

Ness: "You're quite right. This is already in place. I think this will grow in its iconic status because it's beautiful to be here. The light, the spaces, and quality of dining rooms and bars create the fabric. It's not about a titanium-clad object that

becomes one of architecture's high altars. The iconography of the place is already here."

The new stand appears to be an entirely different beast from the Southern Stand.

Ness: "The reality is that the homogenous quality is dictated by the sight lines. The Southern Stand is in many ways quite heroic and robust. This new stand had the opportunity to be much more open and transparent and to respond to public parkland to the north and west."

Cole: "Nevertheless the new structure had to compliment what was already here. And remember, it was designed to be built bay-by-bay so capacity targets could be met for major events along the way. Material like LYSAGHT BONDEK® was therefore very useful in the construction because it had to be built so quickly."

And were materials a conscious choice to achieve this lightness and elegance?

Ness: "The current trend is towards more glass and less mass. The use of XLERPLATE® steel helps to provide the necessary strength to allow for a lighter, light-filled structure. The really ponderous, concrete-filled stadia are of the past. The Northern Stand is expressive internally and externally with a far greater feeling of interior space and internal volume. Structural steel and cladding work together to minimise the sense of mass in what is obviously a massive structure."

Cole: "It's carried through in all of the detailing. You're really here as a spectator to see this great green arena, not so much to be transfixed by mind-boggling structure."

There appears to be a seamless link between the architecture and engineering.

Cole: "Well, fundamentally in many ways it's an engineering driven job that's about geometry, sight lines, the angle of decks and getting 55,000 people happily seated. The geometry

to fit this led us to work on all the decks and get them to integrate with Southern Stand decks, although we've left out the secondary middle deck to give it a sense of separation and particularity. The challenge was also to hold up such a deep roof from behind, using a tensile cable net from the outside."

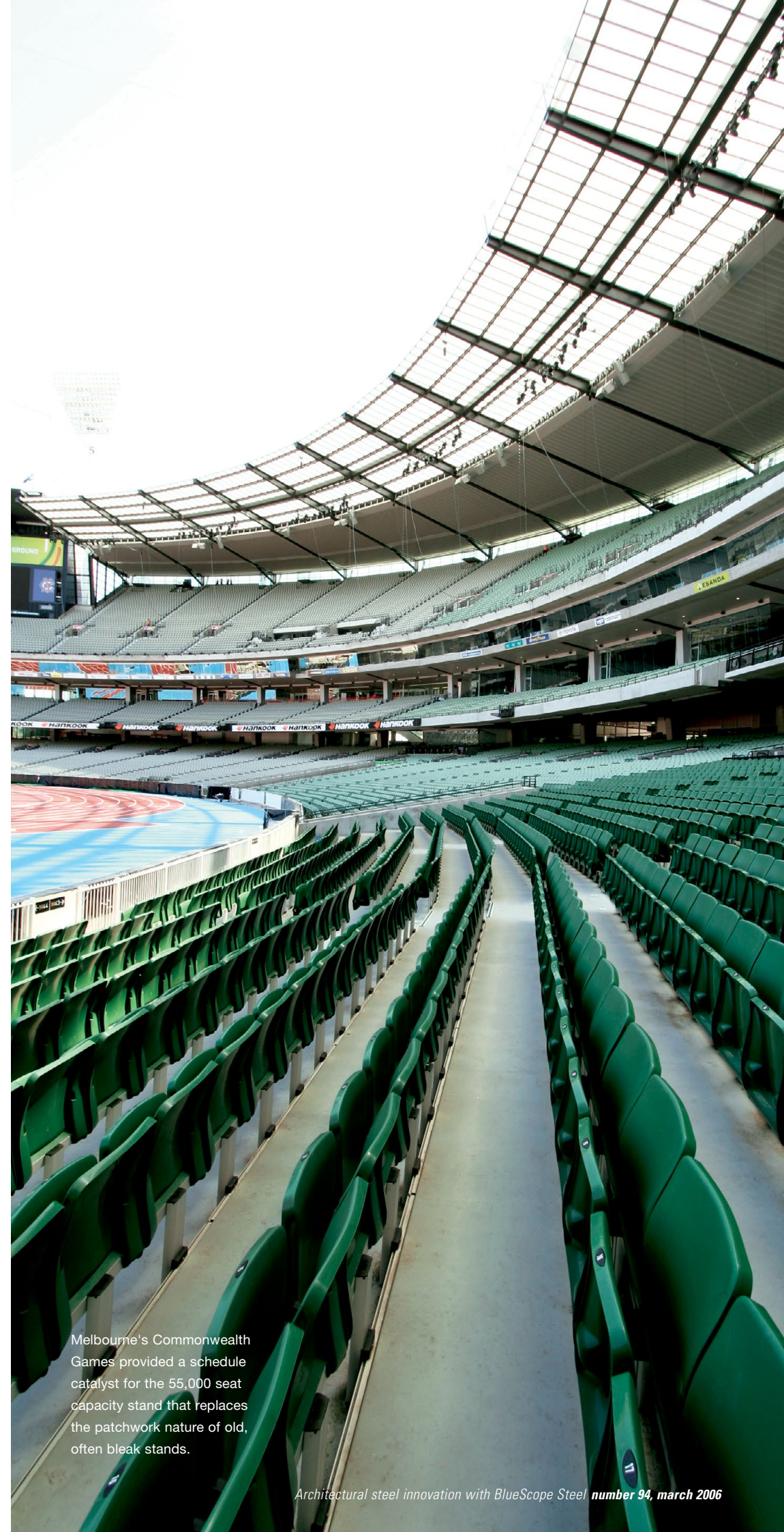
Ness: "The Southern Stand set the very criteria Peter describes – to form the bowl that flows from that. The Southern Stand is a compression cantilever but this is a much lighter tension-based cantilever, which is pushed into a certain three-dimensional web."

How important are the Green initiatives?

Cole: "Natural ventilation is used throughout where possible. Sun angles were calculated to optimise natural light and minimise thermal loadings so slatted light can penetrate well into the rear of the stands. The stands themselves are naturally light-filled and reflective due to the glass and steel sections. On the northern façade, photovoltaic cells feed into the ground's power grid while roof water collection feeds into eight mega-litre tanks used primarily for plat wash-down and parkland watering. Zone air-conditioning is programmed to specific areas rather than throughout and principal materials are low embodied energy and recyclable. Steel is very much in tune with that program, so structural grade steel such as XLERPLATE® steel and the various deck steels were used wherever possible.

The Southern Stand was viewed as having such a light, parasol-style roof when it was built, but 15 years later, it does look heavier and a little gloomier up under the rafters by comparison.

Cole: "There was a conscious requirement by the client and a decision by the architects to



Melbourne's Commonwealth Games provided a schedule catalyst for the 55,000 seat capacity stand that replaces the patchwork nature of old, often bleak stands.



Peter Cole (left)
and Patrick Ness
from MCG 5.

deliver something of its time that was lighter and more transparent. With its parkland orientation we could incorporate much more glass for views out and light in.”

Ness: “At a very basic level this has a masonry base with structural steel and lightweight roof that provides a crown of thorns cap of steel that floats above.”

Cole: “The main steel columns that rise up through the three main entries allow visitors to

touch the columns and better understand how the roof is held aloft. The other important difference with the previous conglomeration of stands is the sense of internal space.”

That decision to feather and taper provides a subtle, vital expression rather than the chunky amputated rough cast endings we are more accustomed to in sports stadia. Here you have a sense of a robust delicacy.

Cole: “That’s true. It’s all about reducing the thickness and size of structural steelwork so that every piece is lightened and refined to provide a slender muscularity rather than that over-scaled mass you see in buildings where no one has really bothered. Steel is excellent at allowing you to reduce mass and build quickly. The elements that help this structure’s sense of lightness are all steel.”

Ness: “The engineers like to be pushed as hard as possible. It was a very deliberate move to take structure to another level.”

What about players’ facilities?

Ness: “In many ways the architecture of the MCG reflects the elegance – and even brutality – of games that are often played here. It’s appropriate that the architecture reflects this refinement and elegance as well as toughness. It has facilities that recognise what being an elite athlete is all about.”

The members section has emerged well, yet what lies beneath is also impressive.

Cole: “Food and beverage facilities were inadequate in the former Members Stand. Now there are more than a dozen large function rooms, bars and cafes, most with ground views, to service the 23,000 capacity members area. The new public areas with 32,000 capacity are suitably catered for.



Underneath, the stand resembles a huge hotel complex. There’s a massive food service preparation kitchen that services 40 or so food outlets via lifts.”

Acoustically are there any improvements to a venue that really has a lot of hard surfaces?

Cole: “The roof’s underside incorporates perforated COLORBOND® steel backed with an acoustic blanket to absorb reverberated sound.”

If you consider the technology improvements of home entertainment systems you’re really competing with that improvement in the home, broadcasting and viewing quality.

Ness: “The coverage and information you now enjoy via television is impressive, but what you can’t get is the fourth dimension and that is what makes the MCG. This helps to ensure that a visit will provide a fabulous quality experience.”

Peter Hyatt

Architectural steel innovation with BlueScope Steel **number 94, march 2006**



The new stand relies on a lightweight three dimensional cantilever rather than the heavier compression cantilever. The stand’s skin is punctuated by a variety of material and surface treatments to optimise performance and heighten the parkland relationship.

010

Project Hardiman House
Client Tim and Lucy Hardiman
Architect The Architect's Studio, Darwin

SUPER SIZE ME

Many new Australian residential estates are characterised by houses that almost rival aircraft carriers in size and complexity. With style advice seemingly drawn from Versace, Gucci, Borromini and Palladio, the result is often a stew of novelty and burlesque. This love affair with status and ornament has created the cult of the trophy house. In the process, design for indigenous climate and culture has taken a beating. But commonsense does sometimes prevail.

The Hardiman House in Bayview, a rapidly expanding suburb 4kms from the heart of Darwin, is superlative for its simplicity and filleted, climatic response. While neighbours housed in the equivalent of parachute silk tracksuits require year round air-conditioning, here is a model of an uncommonly good dress code for the tropics.

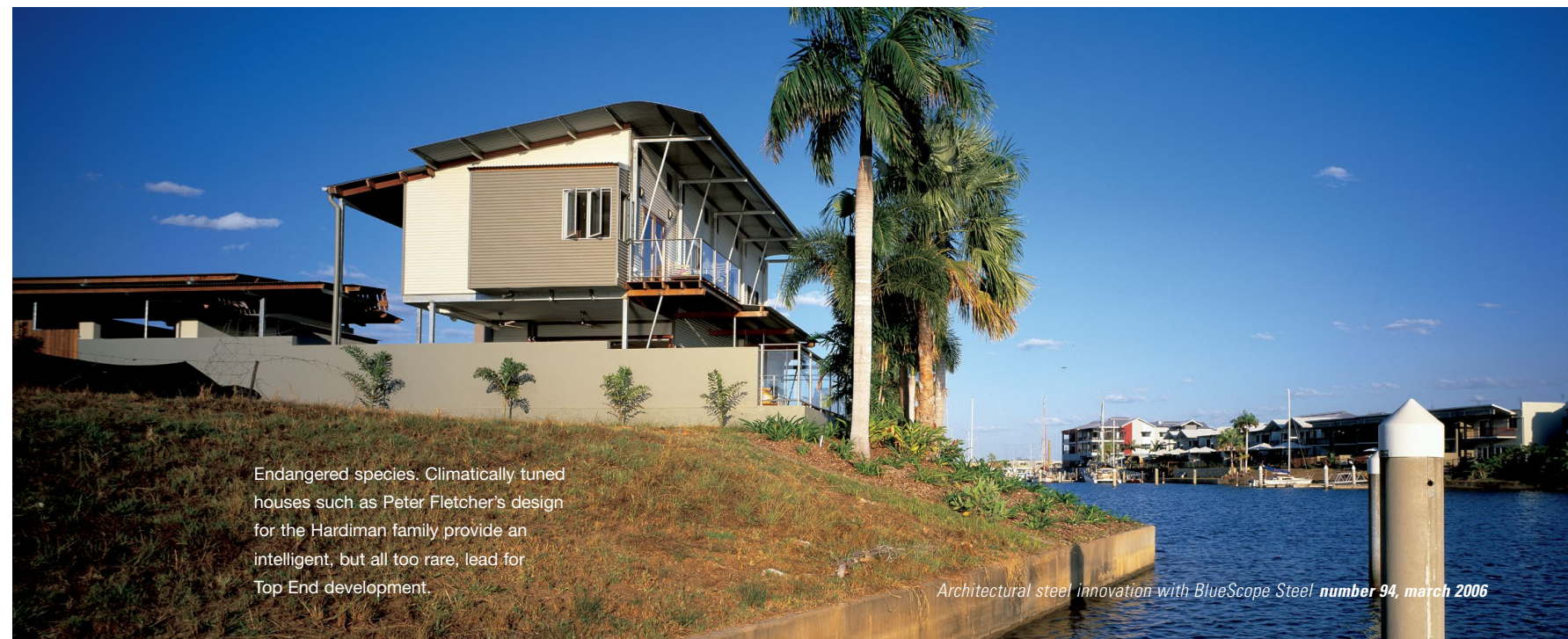
Houses are like clothes – they create a first impression of their owners. Housing is architecture at its most intimate. Commercial towers, opera houses and cathedrals might put cities on the map, but it's houses that really define who we are and how we live. Oddly, but unsurprisingly, architect designed homes rarely figure in the brave new world of super-sized brick veneers that seem to have so captivated the marketplace.

Many architects recognise that size and quality are often poles apart, but home-buyers don't always appreciate the difference. Housing growth has mirrored the stellar trajectory of convenience food outlets where bulk has been the yardstick of value. While the fast food

formula is being re-defined by new, healthier rules, the housing hamburger just keeps getting bigger. This has real consequences, far beyond aesthetics.

Bigger houses need vastly more energy to heat and cool and on a mass scale this means consumption spikes that can test any energy grid. Inefficient design requires corrective air-conditioning to allow such houses to remain habitable for much of the year.

With its demanding climate, Darwin presents architects and builders with the challenge and opportunity to generate a distinctively regional response rather than to ape blockbusters from the south. One of the few to value sensible



Endangered species. Climatically tuned houses such as Peter Fletcher's design for the Hardiman family provide an intelligent, but all too rare, lead for Top End development.

Architectural steel innovation with BlueScope Steel number 94, march 2006



A layered, textured vernacular open rather than closed to the environment is reminiscent of traditional Darwin pole houses. Lightweight coated steel skin reduces thermal mass and heat containment. An undercroft and generous roof overhangs add to the leaf canopy effect.

difference, the Hardiman House projects a restraint and energy efficiency in an estate big on the bling of Fountain Gate and Sylvania Waters.

Architect Peter Fletcher has brought out all of the heavy artillery that makes his work in the Top End such exemplars of

subtraction. A steel frame made from ZINCALUME® steel and lightweight cladding made from COLORBOND® steel helps generate a climatically sensitive result. An underplayed street elevation hints at the preference for handsome function rather than film-set facade. At Bayview, Fletcher

pays homage to a time before the 1973 cyclone when pole houses were such a central part of the Darwin identity.

As with all good architecture, the clients were vital design contributors. Lucy and Tim Hardiman were informed and decisive. Client/architect trust

and a touch of bravery is in all top shelf work. The Hardimans didn't need to look too far to identify what they didn't want and Fletcher was on a similar wavelength. They went with the idea of light scoop and breeze catcher, hedonistically attuned to the tropics where they could comfortably immerse themselves in the full experience of place.

Cyclone Tracy might have demolished some uncomfortable memories but it just as surely erased many good ones. Among them were the traditional corrugated steel pole houses that made full use of slatted light and caught available breezes. It is such houses that inform Fletcher today. The Hardiman's floor-plan borrows heavily from this history. Roofing and cladding made from COLORBOND® steel in the CUSTOM ORB® profile provide a seamless envelope and contribute homogenous expression where the material provides a feathered, slender envelope.

"Insulated steel cladding in combination with a steel frame allows the necessary large openings that become venting or gills, ensuring the house remains comfortable all year round," observes Fletcher. A covered timber walkway runs parallel to the pool on the north boundary of the property.

"Eventually the plan is to link the timber path all the way to a small jetty where we will moor not the big cruiser, but a \$1,000 dinghy," says Lucy Hardiman.

The design program is disarmingly simple and uncomplicated. With a young family in tow – a fourth child is on the way – this is a user-friendly kids' home as much adults' playhouse.

"It does have a playful quality," says Hardiman of the design that packs plenty onto a 800 sqm





Pre-fabricated, off-the-shelf components artfully assembled – and a perfect fit for clients already well convinced about the potential for green architecture to be anything but beige.

allotment without any sense of over-crowding. Nowhere in the house do you feel isolated. It's not a sprawling ranch style that needs intercoms and cameras for the family to communicate and function.

"We're not conscious about moving from the inside out or vice-versa. The house is like an outdoor room and the children revel in the climate rather than experiencing a huge temperature adjustment and being unable to cope. We're fully acclimatised," she says.

The house proper has a north-west orientation made comfortable by broad eaves, awnings, screens, louvres and stackable doors. It's a combination that makes the entire ground floor kitchen and living area such an easy place to gather. Upstairs bedrooms use ceiling fans and selective air-conditioning to comply with building codes but they remain unused, such is the thermal efficiency of the house.

A government architect until his arrival in Darwin 15 years ago, Fletcher decided to set up his own practice after falling in love with the city. It's a devotion that shows. His style shares plenty with the likes of Murcutt, Mainwaring and Troppo.

According to Fletcher, CSIRO studies from the early 1950s revealed that such lightweight steel and timber buildings were far more energy efficient than the heavy masonry variety.

To reinforce this science and practice, Lucy Hardiman says her brother-in-law, a distributor of infra-red, heat-sensitive imaging equipment – used by the police and mining industry – was employed to photograph the neighbourhood at night time. "It was quite amazing," she says. "Our house was all cool blues and greens, while the others, even with air-conditioners whirring, were red and orange with their stored heat."



The problem with the McMonster, apart from its sheer bulk and high operating costs, is that it contributes to a fortress mentality. "Not even good for a sense of community," say the Hardimans. And not even as tough as imagined in cyclonic conditions, says Fletcher, who has long regarded steel frames and cladding as the benchmark for wild as well as tame weather. "It's much easier to make stronger buildings out of steel than anything else, including block work and brickwork," he says.

"Its other advantage – and John Mainwaring is a great exponent of this – is this layering of materials, or external skins and screens, that enables you to filter light into a building in a way that minimises heat and connects with the outside world to enable views. It gives you that degree of transparency that is so important in a tropical landscape and climate," says Fletcher.

Fletcher is concerned that Darwin is rapidly losing its identity in the rush to look like everyone else. "People who arrive fresh from NSW want housing that they're used to without understanding that this doesn't automatically translate to this place.

"Despite this, a lot of good people have persevered and changed the whole understanding of steel. It's a simple material that can have an exotic twist," says Fletcher. There were no surprises using it on the Hardiman House. The obvious advantages are that it's termite proof. Secondly, because of the wind code, it's more economical than traditional timber structures. "Because of timber's cost and the need to conserve it we use steel and timber in combination," Fletcher says. "Steel is our mainstay because it allows for more dynamic looking structures to produce elegant cantilevers that you couldn't achieve with either timber or concrete.

"Our hybrid approach allows a building to be shut down or opened up, depending to conditions. Even in Darwin, passive cooling replaces the need for air conditioning for most of the time and yet the regulatory system makes it almost impossible to get this improved. This is why most people are now building sealed boxes with minimal door and window openings as specified by the code."

Peter Hyatt

Project:
Hardiman House, Bayview Darwin
Client:
Tim and Lucy Hardiman
GPO Box 2435 Darwin 0801
Architect:
The Architect's Studio, Darwin
Design team:
Peter Fletcher, Greg McNamara, Joanna Rees
Tel: 08 89418262
Structural Engineer:
Mike Hatton
Builder:
Brustolin Builders
Steel fabricator:
Richard Norris
Principal cladding:
(roof and walls)
COLORBOND® steel in
CUSTOM ORB® profile
Cost:
\$500,000
Size:
260sqm
Photography:
Peter Hyatt

016

Project Dismal Swamp
Client Forestry Tasmania
Architect Neil Wade, JAWS Architects

OUT OF THIS WORLD

Looking as though it has just landed from outer space, the new tourist attraction at Dismal Swamp, in Tasmania's North West, is perched on the rim of a natural polje, or sinkhole. It may well have been easier to procure an errant space ship than to construct this complex facility, but the team from JAWS Architects and Thompson and Brett relished the challenge.

Architect Neil Wade and engineer Shane Abel are no strangers to difficult projects in remote forest locations. Nevertheless, the tourist facility at Dismal Swamp is out of this world. It consists of a visitors' centre and restaurant perched on the rim of a giant sinkhole – a huge natural depression in the landscape, 1km wide, 5km long and 30m deep.

As if to make their task that much harder, Wade and Abel devised a 110m long steel 'slippery dip' to transport visitors from the site's highest vantage point to the forest floor below. Sliders can reach speeds of up to 47km an hour as they plummet into the heart of the ancient, undisturbed woodland, shaking up their disposition and their perception of eco-tourism as they descend.

According to Wade, the inclusion of the slide was a deliberate attempt to inject some excitement into what might have otherwise been a static and staid visitor experience. "The slide started as a silly squiggle, it was a throwaway line that we put in the competition," he says. "You have to attract a bit of attention."



Looking as though it has just landed from outer space, the main building stands tall on steel legs among local vegetation, disturbing nothing in its environment.



(above and opposite)
COLORBOND® steel and
ZINCALUME® steel in various
profiles juxtapose Dismal
Swamp's lush vegetation
while not overpowering it.

"Yes, it was a frivolous
gesture initially," Abel agrees.
"You suggest concepts you
don't think will ever be resolved
in the final outcome."

Wade adds: "To be honest, if
you work through your ideas
methodically and sensibly –
and everything was a rational
response – you probably
wouldn't end up with a slide.

"Maybe you'd end up with
a box in the tree canopy, but
the slide had to come from
left field. Shane and I felt that
perhaps there was a tad too
much pomposity about eco-
tourism, that it's governed by
an evangelical, zealous, sort
of 'holier-than-thou' green
movement that can sometimes
forget humour and entertainment.

"However, humour and
entertainment has to be an
integral part of a project like
this, allowing for entertainment
across the board, for kids
as well as adults."

Wade believes that in the past
Tasmanian tourist operators had
laboured under the misguided
impression that, "you shouldn't
even bother advertising
Tasmania as a destination
for adolescent kids, because
they all go to theme parks in
Queensland". He suggests that
Dismal Swamp goes some way
to capturing that market for the
Island State. "Maybe the purists
think we might have gone a
little bit far, but we are pushing
the boundary," he says.

In fact, Wade and Abel are no
strangers to the eco-tourism
industry, having completed their
first Forestry Tasmania project
five years ago. The Tahune
AirWalk is a steel and timber
bridge-like structure that takes
visitors into the treetops of the
Huon River forest, southwest
of Hobart. In September 2003,
the pair replicated the AirWalk's
success when they completed
and opened their own tourist
attraction, the Otway Fly, near
Apollo Bay, Victoria.

When they were approached a
second time by Forestry Tasmania
to submit a concept design for
Dismal Swamp, the pair jumped
at the chance. Together they
visited the site, which is five
hours drive or a one-hour light-
plane flight from Hobart, before
concluding their reconnaissance
mission with a debrief in a pub
near Hobart's airport.

"We found Dismal Swamp
pretty underwhelming when we
first approached it," Abel says.
"We thought, what can we do
to make it exciting for visitors?
We had a few beers and on the
back of a drink coaster we came
up with the idea of the Dismal
Swamp Maze. We then added
the elevated building.

"Then Neil came up with the
idea of a slide to connect
the two. We presented the
concept to Forestry Tasmania
who loved the design."

The project's genesis actually
derived from the floor of the





(above and opposite)
Widespread use of local
hardwood and timber veneers
brings warmth to the interior
of the Visitors' Centre, and
creates a cocoon-like effect.

(bottom opposite) The angle
of the slide alludes to the
polje's depth.

polje. "That was the key to
the project," Wade says.
"There was a lost world to
be discovered and uncovered,
and it was a confusing,
disorienting environment.
We wanted to accentuate
that rather than avoid it."

Meanwhile, up on the polje's
rim, the unique topography
inspired the form of the site's
only building. "The polje boasts
an interesting geographical
form," Wade says. "You can't
see it from anywhere, unless
you are in the air. On the ground,
you are among the trees. So to
orient people as to where they
are, and what the polje is all
about, we had to elevate them
through the tree canopy."

On approach from the carpark,
visitors step off the plateau
onto a bridge that connects
to the rear of the building,
which sits above the slope on
10m high steel stilts. The ground
continues to drop away as
you approach the front of the
building, so that by the time
you reach the far end of the
cantilevered Celery Top pine
springboard, you are suspended
high above the valley floor,
and you can see to the other
side of the polje.

Inside, the building houses a
reception desk for ticket sales,
two small offices, a restaurant,
small shop and an interpretive
gallery. A second wing contains
visitor amenities (with stunning

views from each toilet stall
over the Blackwood forest!).

In homage to location, the
entire building showcases
regional timbers. Locally
sourced Blackwood was used
in the primary beams, and
was laminated and curved to
form the rear wall, echoing the
shape of the beer barrels that
were once manufactured using
Blackwood staves. Decoratively
figured crown-cut Blackwood
veneers were used for ceiling
and floor linings, creating a
cocoon-like effect that contrasts
with the vast expanse of the
forest outside.

Wall infill panels are of
ZINCALUME® steel in MINI

ORB® profile. The outer shell is
clad in COLORBOND® steel.

The building and its slide now
look perfectly at home nestled
among the trees, and they
obviously provide visitors
with an ideal way to connect
with the mysteries of life
contained in the sinkhole.

However, Dismal Swamp posed
myriad challenges to its design
and construction team.

"The remoteness of the site was
the biggest initial constraint,
because it immediately limits the
number of building contractors
you can get interested in
tendering," Wade says.
"Then you've got the





(above) The elevated steel walkway transports visitors beyond the polje's rim.

Visitors reach speeds of 47k/hr as they slide to the polje's floor.

issues of building something that would be difficult in any location, let alone the fact that it's in a rainforest that gets more than 2m of rain a year, and it's on the side of a steep slope. Also, throw in the fact that it's a natural environment which you want to preserve as much as possible; you can't just clearfell and construct as you would in an urban centre. Here you've got to preserve the trees because that's what people expect to see.

"Having said all that, the most difficult element of the project was the construction methodology to put in the slide itself," says Wade. "We were dealing with a very steep incline, so Shane and the construction crew had to work out each crane lift methodically – and in advance – to see that they could get access. That was a reasonably complex thing to achieve."

According to Abel, the weather didn't make life any easier. "We were working in the most horrific conditions, especially because we started in July: We were pouring 1.5 metre deep foundations on a 26 degree slope at the wettest time of the year," he says. "It's the kind of site where you walk around in gumboots, and when you step, you step out of your gumboots."

"But we faced much the same challenges at Tahune and in the Otways, so to some degree we had some experience with dealing with them."

"We had some idea of how to go about it, so those previous projects were of significant benefit to us. The fact that we knew we could actually do it gave us confidence, and we also knew we could do it with minimal disturbance to the environment."

It's that point that provokes one of the most common responses from visitors. "The question many people ask when they get up there is, how did they actually build it? And that's the



The Visitors' Centre affords panoramic views out over the polje.

first question people also ask at Tahune and the Otways as well," Abel says.

For the record, the most difficult aspects of the seven-month construction program included lifting the slide into place, getting the barrel vaulting right for the timber corridor in the rear of the visitors centre, and erecting the cantilevered steel and timber springboard.

Of course, none of these elements could have been realised without the instrumental inclusion of steel. "The combination of steel and timber in the cantilever, which is cable stayed to the building, is a very interesting piece of structure," Wade says. "You need the raw materials of the timber structure, which is augmented by the steel. We were showcasing timber, given that the client was Forestry Tasmania, but without the unique characteristics of steel, which gives tensile strength to support the timber, we couldn't have made it work."

The innate flexibility of steel was another important factor in the project's success. "All of the steel construction was

broken down segmentally, the towers were a certain length, the slide sections were a certain segmented length, all from the point of view that you have to be able to get it into a forest and move it around," Abel says. "Obviously you can't have huge pieces of steel swinging around the forest, so the steel was largely prefabricated in manageable chunks offsite, and craned into place in carefully controlled operations."

However, all these elements didn't necessarily add up to an expensive design and construction exercise, Wade says.

"For the construction tendering, I suppose everyone was starting from unknowns, and the biggest uncertainty was the weather, followed by the transport and the terrain," he says. "And then you've got a complex structure on top of that, in a forest that you have to preserve, so in terms of degrees of difficulty, any one of those would be enough to escalate the overall cost."

"However, we had a fixed-price contract, so everything was anticipated upfront, and there was provision – which

we needed – for extra time for inclement weather."

The initial popularity of Dismal Swamp could lead one to believe that it actually has the pulling power of a wayward Martian spacecraft. In the first year of operation, Dismal Swamp attracted more than 30,000 visitors, many of whom – children and adults alike – tested their capacity for exhilaration on the slide. Legend has it that the oldest slider so far is a 78-year-old woman, a detail Wade is thrilled about.

"I think the most pleasing thing is that we set ourselves a challenge to produce something in a really rugged environment, to provide an exciting new visitor destination in Tasmania, and I think it's worked," he says. "Dismal Swamp is located in an area that was traditionally a dead end – people didn't go up to the North-West Coast, because it's not on a circular route – so having an icon destination in that area, to augment other natural environmental experiences, was an important goal."

Rachael Bernstone

Project: Dismal Swamp
Client: Forestry Tasmania
Architect: JAWS Architects
Design Concept: Neil Wade and Shane Abel
Project Architect: Neil Wade, JAWS Architects
Project Team: Brian Pigden, Kate Morrow
Builder: De Jong and Sons Constructions Pty Ltd
Structural/Civil Engineer: Thompson and Brett Pty Ltd
Mechanical/Services Engineer: Julian Oakes, ECOS Pty Ltd
Landscaping: Susan Small Landscape
Interpretation: Pru Cotton, JAWS2
Principal Steel Products
Structure - Visitor Centre Columns are 168X4.8CHS and Beams are 310UB40. Springboard uses Raking Column 406X6.4CHS, while the Slide uses Columns 508X12.7CHS.
Slide Cladding & Roof Cladding - COLORBOND® steel in CUSTOM ORB® profile in the colour Night Sky®. Wall Infill panels are ZINCALUME® steel in MINI ORB® profile.
Approx Cost: \$1.8 million including Visitor Centre, Springboard, Slide, Maze Walkway
Approx Size: Visitor Centre 320sqm
Photography: Paul Bradshaw

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Project Tree House
Architect Peddle Thorp Architects
Builder Reg Moore

RAINFOREST REFUGE

Thousands of tourists visit Cairns each year for its rainforests. And it was the dense vegetation that lured the owners to this site in the suburb of Edge Hill, 4km from the centre of town. Previously living in a traditional house, on a fairly suburban site nearby, they were ready for a change.

"We looked at every site bordering Whitfield Conservation Park," Tim McGrath says. "The sale sign on this one – which had been on the market for six years – was overgrown with creepers. Agents had obviously put the property in the 'too hard basket'." Tim lives in the house now with partner Kate Galloway and their three children.

Known as the 'Tree House' by locals, this steel home sits at the end of a steep court. As the 1300 sqm site narrows to 10m towards the street, the only sign of a house is an angled steel carport. The carport is separated from the house by a 16m bridge.

The creek running through the site, activated only in the Wet season, was one reason why the property proved difficult to sell. Another was the elevation of the land - almost a 30 degree slope. "But we fell in love with the vegetation," Tim says.

Fortunately, architect Mark Buttrose, Manager of Peddle Thorp's North Queensland office, shared the enthusiasm for the lush forest setting.

"Our brief to Mark was to create a platform for living – one that didn't interfere with the natural wildlife," Tim says. He cites the birds, butterflies, bandicoots, echidnas and bush turkeys roaming the property. "The premise we shared from the outset was to not interfere with the soil or lose any of the growth on the property," Buttrose says.

Unlike many new homes being built in Queensland, this steel house is relatively modest in size. Approximately 140 sqm (not including external decks), the house sits comfortably under a rich canopy of trees.

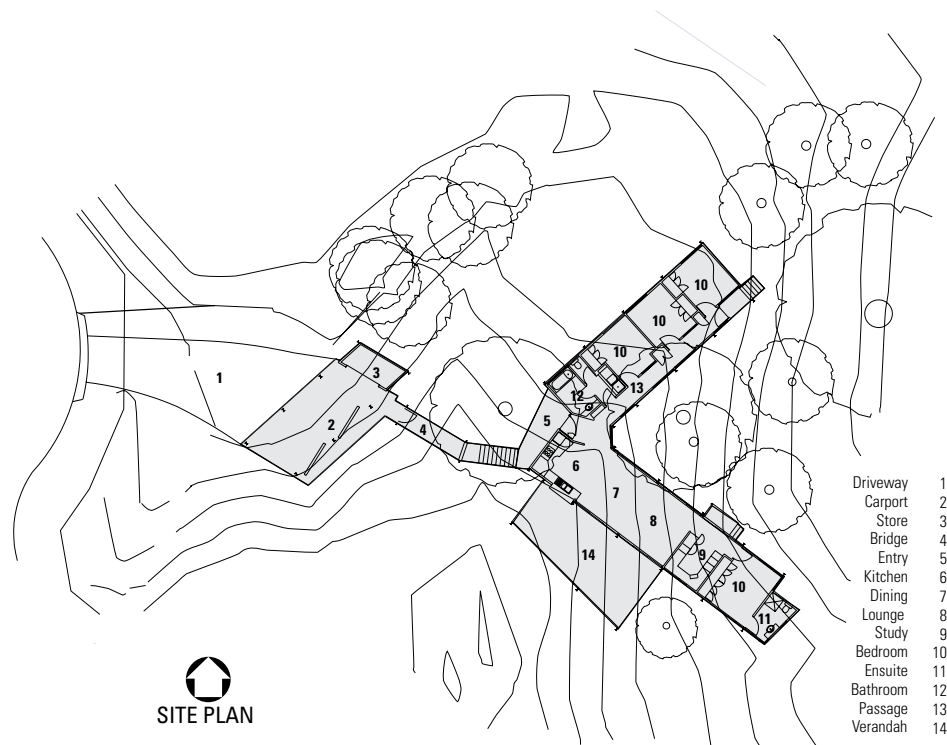
"There was no question of not using steel," Buttrose says. "We had to use a material that was robust. In a climate like this, timber would have simply rotted."

The other benefit of using steel was its lightweight nature. "We could manufacture the steel components off site and bring them in as they were needed," Buttrose says.

The home's portal steel frame columns are clearly expressed, both internally and externally.



The steep block called for linked walkways between structural elements. A view down to the carport.



"The idea was to see back to the forest," Buttrose says. "But the gap allows air to move through the spaces." The angular roofs (at 20 degrees) also allow for water runoff into the gullies below.

One of the most spectacular times of the year in this area is during the wet season. The creek rushes past the house. And water cascades from one section of the roof to another. Buttrose saw the design as an opportunity to celebrate the rain – from the movement to the sound. "We've limited the number of gutters in the design – there's only one row of gutters," he says. "Water flows freely from one roof span to the next. In this environment, gutters would quickly fill up with leaves."

Also integral to the design was the natural flow of air from one side of the house to the other. Buttrose deliberately made the house only one room wide. This allows cool, moist air to move through the house towards the external deck.

Glass louvered windows frame the entire house, appearing in bedrooms as well as in the living spaces. And to ensure wildlife is kept out of the house, floor to ceiling fly-wire appears on every aperture. On either side of the main living space, large sliding doors can be pulled back entirely. To avoid family or friends falling into the forest, steel wire doubles as balustrades on one side of the living space.

The home's entrance leads directly to an open-plan kitchen, dining and living area on one side of the house. Unlike many contemporary homes, the kitchen takes centre stage in the Tree House. "This design is fairly informal," Buttrose says. "Tim and Kate wanted a house that was robust, where the children could enjoy using the entire house, rather than be restricted to their bedrooms."

The kitchen features stainless steel bench tops and laminated



The carport, almost at street level, well below the main house.

(opposite page) Expansive decks for outdoors living, a house effectively only one room wide to allow cross ventilation, and steel throughout make the home ideal for tropical conditions.

COLORBOND® steel in CUSTOM ORB® profile was used as cladding. Finished in the colour of Cottage Green®, the external COLORBOND® steel merges with the bush setting.

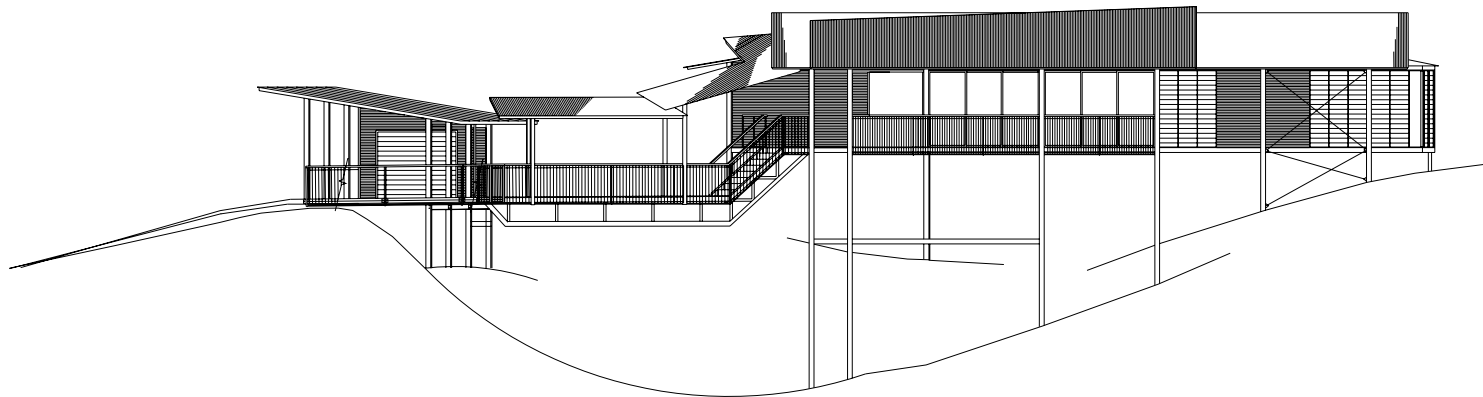
COLORBOND® steel was also used for the roof as well as for canopies covering the outdoor deck and entrance to the home. The COLORBOND® steel used externally is carried through to the internal ceilings.

"Our brief to Mark was to create a 'shed for living'. We wanted a design that would appear to float in the tree tops," Tim says. Hollow steel sections supporting

these canopies have a twig-like appearance. "These sections pick up the tree branches," Buttrose says. "They are crucial in creating resistance from the cyclonic conditions around Cairns." Also important in the home's construction was the inclusion of steel rods, cross-braced to strengthen the portal beams.

To increase ventilation, as well as create a 360-degree view of the property, Buttrose 'layered' the COLORBOND® steel roofs that cover both exterior and interior spaces. The awning covering the outdoor deck, for example, is 1m above the home's main roofline.





(opposite page) The design called for little disturbance of soil or vegetation. Rainwater runoff flows around and under the house, and wildlife scampers freely around the property at night.

cupboards. The cupboards, painted in deep reds, blues and plums, add colour to the otherwise neutral interior. A central moveable bench also allows the kitchen space to be reconfigured, depending on whether the children decide to play indoors or on the deck. While the kitchen, living and dining spaces are only one room wide, they appear considerably more spacious as a result of the large glass sliding doors on either side. The steel bench in the kitchen also services the outdoor bar/eating area.

"This deck really doubles as a second living area," Tim says, pointing to the dining setting and barbeque.

While Tim and Kate work in town, there is a small office tucked away behind the main living area. Framed with plywood joinery and louvered glass windows, the office is partially screened from the living areas by a 2.4m-high plaster wall. The office also acts as a transition space between the living areas and the main bedroom and ensuite.

One of the most dramatic aspects within the house is from the main bedroom. On one side are panoramic views of the rain forest. On the other side are the mature and gnarled roots of trees, together with the rich undercroft typical of a forest floor. Bush turkeys freely wander the property. "At night it's quite remarkable hearing the birdlife and forest animals scampering below you . . . You couldn't get closer to nature," Tim says.

The ensuite bathroom also forms a strong connection to nature. Framed by glass louvered windows, the ensuite has a translucent corrugated polycarbonate roof. The steel channels supporting the roof resemble tree branches.

A corrugated polycarbonate canopy was also installed along one side of the living area. Secured by steel channels, the canopy allows filtered light to enter the house from the dense canopy. It also prevents rain from entering the home. "In this climate, any design must be robust," Buttrose says. "The materials also had to be low maintenance, so steel was an obvious choice."

The home's second wing comprises three children's bedrooms. Relatively compact in size, these bedrooms also benefit from direct views into the bush. Buttrose included louvered aluminium shutters between the children's bedroom walls and the passage. "There's a continual flow of air, wherever you are in the house, even when bedroom doors are shut," he says.

Buttrose was also aware of his clients' request to avoid reliance on air conditioning. "We didn't want to feel trapped in a house that was controlled by air conditioning," Tim says.

There were initial concerns from friends as to where the children would play. While there isn't a back garden, the children are free to use the interior and exterior spaces in a similar way. And while there is currently a large terrace for outdoor

activities, a second deck, immediately below, is being built.

The sounds of the rainforest were important for the family in considering the use of steel. While the COLORBOND® steel roof is designed in the form of two layers (with R3 insulation between), noises are easily heard from inside the house, whether the dropping of a branch or the movement of an animal. Fruit bats regularly drop berries on the roof.

"It's about living in the rainforest and being part of the natural environment," Buttrose says, proud of the fact only one tree was removed during construction. "The steel has literally been woven between the trees," he says.

Stephen Crafti

Architects: Peddle Thorp Architects, North Queensland (07) 40512496
Project Architect: Mark Buttrose
Structural Engineer: ARUP Cairns Strucad
Structural Drafting: Wayne Wilds
Steel Fabricator: Atherton Metaland
Builder: Reg Moore
Principal steel cladding materials: COLORBOND® steel in CUSTOM ORB® profile in the colour Cottage Geen®
Roof and Walls cladding – COLORBOND® steel in CUSTOM ORB® profile in the colour Cottage Geen®
Ceilings – COLORBOND® steel in CUSTOM ORB® profile
All structural fabrication – frame, roof, primary floor framing, eaves and outriggers – done off site and erected in situ.
Cost: \$2075 per sqm
Photographer: Paul Bradshaw



steelprofile

My inspiration

"As with any job, it's a matter of finding the essence of the project. In the case of Dismal Swamp, the polje floor is like a maze: we kept being told that the foresters themselves were getting lost in there, because all the trees were of a similar dimension, they've all grown at the same pace.

There's no geographical reference within the actual sinkhole. Once you get out the middle, if you're looking around and you think, 'I'll go back uphill', it is dead flat, so if you've got no compass, you've got no idea where you are...

On top of that, you've got rainfall of more than 2m a year. It's always misty, you can't see the sun, so you've got nothing to orient yourself.

So we felt it important that we back the confusion of the forest, being lost in an alien world, rather than avoiding it. Rather than providing a fine dining experience up on the upper edge of the sinkhole, we wanted to thrust people right into the depth of the forest, with all the intrigue and mystery that's involved with that. Rather than baulk at the hard issues, actually confront them with it.

That was the key to the project: that there was this lost world to be uncovered and discovered, and that it was a confusing, disorienting environment. We wanted to accentuate that rather than avoid it."

*Neil Wade
Architect
JAWS Architect*



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