ISSUE 19

SCOPE

MRM

Below is a brief introduction to the 2008 executive of The NZ Metal Roofing Manufacturers Inc.
It is intended that Scope be representative of the industry and therefore material of interest is welcomed from all sectors of the building industry be it design, research, manufacture or construction.

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www.metalroofing.org.nz

SCOPE

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NZ METAL ROOFING MANUFACTURERS INC.

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FINDING SOLUTIONS

Solutions is an appropriate name for the architectural practice, lead by architectural designer Mark Brown, who created this multi functional home designed to accommodate the needs of an extended family and provide generous, but separate, entertaining facilities on a grand scale.

Mark Brown has worked with the family on several projects over the years and has built a rapport and empathy with their needs and aspirations.
This connection has proved invaluable, as the project has spanned some five years from initial concepts to completion. A process that has included 18 months of negotiation and resource consent hearings involving the local Iwi, Council, Archaeologists and the historic places trust.

The site covers 6500 square meters and is situated on a prominent knoll. This position is highly visible and exposed but offers commanding, unobstructed 360 degree views of the surrounding countryside

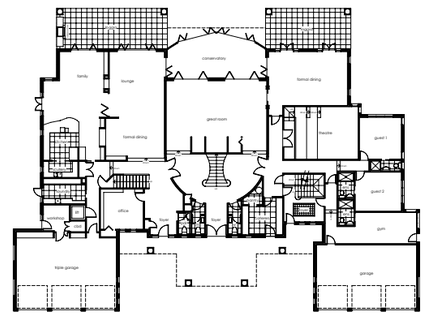
The clients provided an extensive “wish list” to be incorporated into what are effectively two homes and a dedicated executive entertainment facility. Two homes because the parents and their son are co-owners of the property and part of the design spec was to provide two independent, self contained, living areas within the same structure. The family business is widespread and involves considerable entertaining and high-end corporate functions. The brief was to incorporate, and yet keep separate, this facility that is completely self contained providing accommodation and catering facilities on a large scale.

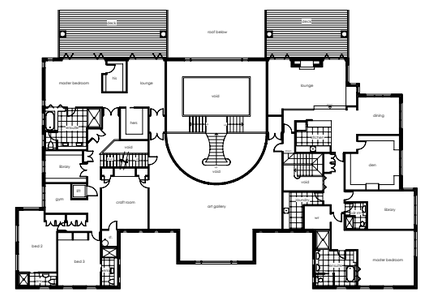
The building is designed to give complete autonomy and privacy to each of the three functions.

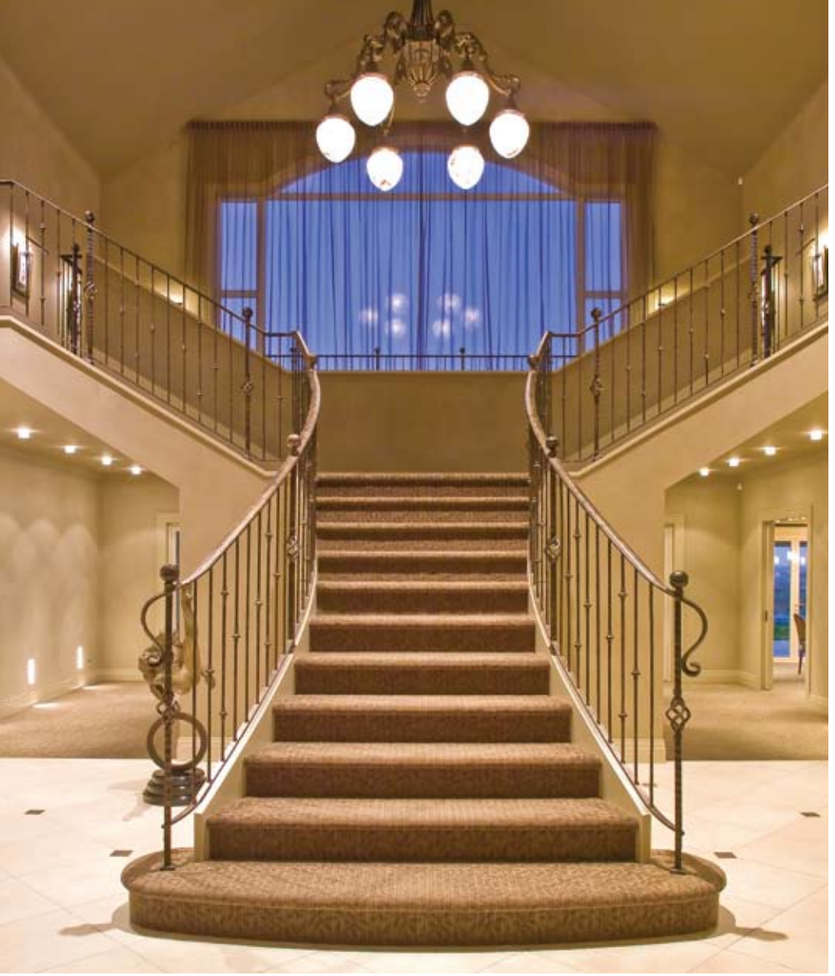
The overall character of the home is intended to have a timeless quality that would not date. The country aspect of the site, in accord with client brief, precluded a contemporary design in favour of one with more classical values. The brief extended beyond the building to include the landscaping and inclusion of an infinity pool and tennis court.

The shear volume of the project at 1500 square meters required particular consideration for heating and energy conservation. “Sustainable design was a key driver,” says Brown, “Water heating is provided by solar panels which are so efficient they also heat the pool. Careful consideration has been given with the use of products such as Plasta Brick to the majority of the exterior with some Rockcote EPS 40 on the upper levels and insulation that exceeds the requirements of the building code throughout”.

To accomplish the objectives of the owners and achieve the separation of the areas Mark Brown, together with his clients, settled on a formal symmetrical approach that divided logically into two wings to accommodate the separate living areas that connect to a central hall leading through to the conservatory. The circular driveway leading to the main entrance is impressive complimenting the formal approach and directing guests to the entertainment areas which flow through to the northern side of the home and open onto the pool and outdoor entertainment areas.







Both family living areas have separate entrances with internal access to the formal areas.

Each of the private living areas on the second floor has distinctly different requirements and features. The parents living area, serviced by a lift, has two guest rooms both with ensuites used for the grandchildren during visits.
A master bedroom with ensuite, his and hers wardrobes, a lounge, a craft room, a library, a study, a kitchen, a laundry and fully glazed loggia which opens to the pool area.

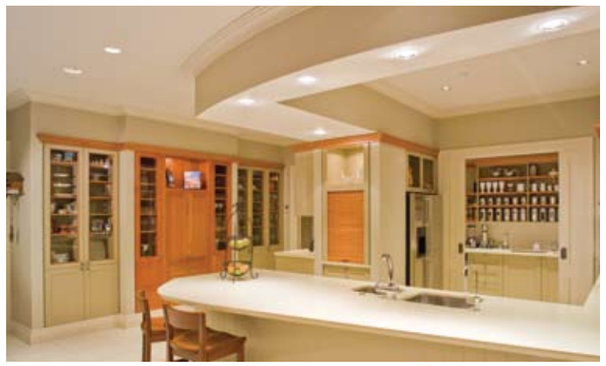
On the opposite side of the house their son's home includes Master bedroom and ensuite, guest room and ensuite, a lounge, a dinning room, a laundry and study.

Both living areas have 3 garages below including a workshop and both have separate decks that overlook the pool and tennis court.

The entertaining area includes a reception area, with full bar facilities, which opens to the conservatory and pool area, a home theatre, a formal dinning room which seats 22, a caterers kitchen, access to the art gallery of 250 square meters and a wine cellar. Guests and residents share a fully equipped gymnasium.

Included on the ground floor are two self-contained guest suites that are fully equipped with office facilities.

The shear scale of this project is a daunting one from all aspects and required detailed planning from the ground up. The earthworks and construction of the extensive retaining walls alone took 3 months to complete before any building could begin. The land was contoured to provide the building platform and to allow for easy access to all areas of the sloping site.



The exposed site and wind loading required very specific detailing because of the size (in some cases 3,5 meter glass panels) and shear weight The timber framing was up-scaled to 150 x 50 to withstand the strong winds. Mark Brown says" Wok Stehr, of Stehr Brothers Ltd the main contractor, has done an exceptional job offering considerable input and expertise behind the scenes. Many of the features such as curved walls, large glazed spans, concealed fixings, extra high skirting details and decks all contributed to the complexity of the project. One of the major considerations was the roofing because of high wind zone and shear size of the structure."

" The roof forms a significant part of the overall aesthetic appeal and character of the home and careful consideration was given to the final choice. Weather tightness was one priority but the look and style was equally important. With more than 900m2 of roofing, it was essential that the tiles complement the multi-gabled architecture, which is a significant visual feature. The Gerard Senator shingles in Charcoal have a textural finish that works well with the design, the Plasta Brick and Rockcote plastered exterior and the country setting.

The lightweight of Gerard Senator Shingles made it a cost-effective choice as additional structural work was not required which was critical given the design and spans in some areas. We worked in close consultation with the designers in Gerard Roof's technical department who provided a solution where the roof pitch, above the conservatory, was less than the recommended 15-degree pitch. This enabled the conservatory roof to maintain the same profile and texture as the main roof structure.

The basement wine cellar, which can be seen through a glass floor.

From the initial concept to completion this project is huge by any standard. Mark Brown is the first to acknowledge that the skills of all the trades involved have been of the highest possible standard, all of which has contributed to what must be one of New Zealand's most luxurious homes.

Solutions Architecture Ltd.

Solutions Architecture Ltd pride themselves on imaginative architectural design that is unique to the site characteristics and the lifestyle or working environment of their clients.

The principal, Mark Brown has been in the design field for 23 years, with a rebranding and launch of Solutions Architecture in 2006. Involvement with ADNZ (Architectural Designers of NZ Inc) at both branch and national level has given Mark the tools to respond in a professional manner to clients needs. The senior staff of Solutions Architecture each has over 20 years experience and the company is committed to continued professional development on Industry standards, trends and regular seminar attendance. "We consider staying abreast with the latest developments, products, trends and good practice is vital to the success of our practice. Our clients expect nothing less," says Mark Brown.

The practice has been commissioned on a wide variety of National and international projects but consider they have a special affinity for unique residential design with special attention to the client's individual needs and the relationship of the building to the site. To this end Solutions Architecture offer their clients a wide range of design skills and complimentary expertise ranging from subdivision to interior decorating.

"We consider our success can be attributed to our innovative approach to projects from the smallest alteration to multi million dollar homes and commercial projects. The attention to detail, costing, observation and documentation is of the highest standard ensuring our projects run smoothly", says Mark." This is vital to out business and our clients."

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Roofing Manufacturer:
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Telephone: 0800 244 766.
website: www.gerardroofs.co.nz.
Profile: Gerard Senator Shingles
Colour: Charcoal

Roofing Contractor:
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Harvey Roofing Center, Auckland
Telephone: 09 978 9010

Glazing/exterior joinery:
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Nebulite ,Auckland,
Telephone: (09) 271 2980.

Wrought-iron balustrades
Classic Iron (Tauranga),
Telephone: 07 578 5613.

Kitchen joinery:
Project Kitchens,Tauranga
Telephone: 07 578 0404,

Bathrooms: Mico Bathrooms
Telephone:0800 448 844.

Pool and surround:
Advanced Pools & Spa, Auckland,
Telephone: 09 534 3572,

Interior Design Wendy Campbell
Tauranga.

THE DART

WINEGROWERS OF ARA MARLBOROUGH

By Graham Hepburn

When Winegrowers of Ara commissioned an operations centre for its vineyard, they wanted to make a statement.
As well as making a visual statement with the building, they wanted to make a statement of intent about their commitment to making high quality, boutique wines on a large scale on their 1600ha vineyard in Marlborough's Waihopai Valley.

The Dart, so-called because it resembles a paper plane from the air, is the first of a family of four planned buildings for the site, a river terrace at the confluence of the Wairau and Waihopai rivers that used to be the Bankhouse sheep station.

From its very first days, Winegrowers of Ara has taken care to invest in a master-planning process for the vineyard as a whole: a long-term, collaborative process involving representatives of Winegrowers of Ara in conjunction with lead architects Warren and Mahoney, Hillery Priest Architecture, landscape architects Boffa Miskell and brand identity and design consultants Designworks Enterprise IG.

The Dart, which was opened in March, is the first built expression of this massive undertaking, as well as the company's philosophy to create a sustainable yet functional vineyard. The building is designed to be one of the finest vineyard staff environments in the world, fit for a community of wine people whose shared goal is to produce wines that express the site's unique characteristics and set a New World standard in wine.

Winegrowers of Ara general manager Damian Martin says the building may look dramatic but it is also extremely practical as you would expect of an operations centre that houses vehicles and machinery, workshops, offices, meeting rooms, a lunchroom, and workers' showers and changing rooms.

"It's a mixture of form and function - even the architectural features do have a function," Damian says. "At the western end of the building the roof folds down over a stone embankment and one of the reasons it does that is the roof deflects the wind up and over the forecourt."
The way the ZINCALUME® roof folds down creates an arrowhead pointing west that nestles into stones mounded high around it. Apart from protecting the building and workers from the elements, this form was part of a design concept to make the building look part of the land.

The Dart's distinctive shape also serves another purpose, as Damian points out. "One thing we were keen to do is make it look like a graphic from the air because this so site is so massive we think that a lot of people will only see the building aerially."

John Coop, of architects Warren and Mahoney, came up with the design when he began folding bits of paper while he was sitting on a flight from Los Angeles to Auckland. From there, the building began to take shape and it has gone on to win a local award for commercial architecture this year from the Zealand Institute of Architects - and it is among the finalists for a national award.

The structure is 9m high, 80m long and 45m wide, with 100m of garaging frontage within. A large, fully enclosed forecourt allows space for vineyard machinery to be stored, maintained and repaired, The full-height entry and exit gates on either side of the building are also a striking design feature. These steel gates, which weigh 2 tonnes each, sit opposite each other on the north and south sides of The Dart so when they are rolled back they create a 10m-wide gap so you can see through the building to the vines on the other side. When closed, the gates provide the security needed when you are garaging expensive equipment in an isolated rural setting.

Just like the ZINCALUME® roofing, the other building materials are ones with low maintenance finishes and sustainability in mind. The exterior cladding is exposed aggregate concrete panels that have been made on site, while the decking and flooring is red beech sourced from a sustainably grown forest in South Westland. There is also extensive use of plywood linings internally.
At the eastern end of the building is the lunchroom, which is 30m x 8m and boasts an open fire. The large wooden tables and benches can seat about 100 people. The lunchroom opens to a deck with more seating that overlooks a landscaped garden and pond designed to create a restful setting.

"The lunchroom and garden is an oasis from what can be very hot or cold conditions out in the vineyard," says Damian. "One of the reasons we built it was our approach in the vineyard is quite labour intensive so we have a lot of staff. We want to make sure we can get workers and keep them and that they're happy in their work. Both our permanent staff and our casuals are very happy to be in the building."

Creating a gathering point for all staff was also part of the thinking so that knowledge and ideas could be shared among the wider group, encouraging a communal approach to managing the vineyard.
Upstairs there is office space and presentation rooms with views out over the vines.

Damian says The Dart is the first of a planned three operation buildings on the site, which measures 9km long by 2-3km wide. It is servicing the 400ha of vines they already have planted and as the remaining 1200ha is planted, predominantly with pinot noir and sauvignon blanc, the other buildings will go up so there are three buildings serving as operations hubs. A winery with tasting rooms is also in the pipeline. He says the scale of the vineyard demands having these hubs spread throughout to maintain efficiency. The other two operations centres will be similar to the Dart with some adjustments for their sites.
While they've taken a modern approach to their architecture, Winegrowers of Ara are using some old-fashioned values to craft their wines. They have narrower rows much like the older European vineyards and a labour-intensive approach to grape growing. Because they aim for lower crop yields in the pursuit of higher quality grapes, their vines are lighter and can be supported by steel stakes rather than wooden posts. The stakes have several advantages: they last longer than wood and are easier to recycle, and they allow the wires to be closer together on the rows. Overhead sprinklers, which mimic the effect of light rain, are used to fight frost and they are also encourage deeper root growth than drip irrigation.

Winegrowers of Ara have so far produced two brands of sauvignon blanc and pinot noir wines: the premium level Composite, which is made with grapes from blocks throughout the vineyard, and the super-premium Resolute, which comes from a single block at the heart of the site. The former is designed to be consistent in style and flavour year on year, while the latter, which is an elegant wine of great complexity and finesse will be more subject to vintage variation. For more information on Winegrowers of Ara and its wines, please visit: www.winegrowersofara.co.nz.

While it might seem a daunting project that Winegrowers of Ara have taken on, they can take some comfort from the fact that, like The Dart, the wines are gaining early praise.

Warren and Mahoney

Established in 1958 as a partnership, Warren and Mahoney has grown over the years to become one of New Zealand's leading architectural practices. In that time the company has won many awards for its new buildings as well as refurbishments for large commercial and government organisations. Last year, Warren and Mahoney became New Zealand's first accredited CarboNZero architects and has developed a plan that involves monitoring carbon emissions, lowering them where possible and encouraging staff to think about ways to reduce the company's carbon footprint. The firm is a founding member of the New Zealand Green Building Council (NZGBC) and has, over the last 10 years, become increasingly focused on environmentally sustainable design, developing protocols that cover materials, waste management and energy efficiency. Two recent projects involving Warren and Mahoney – the Meridian Energy building in Wellington, and the Deloitte building in Auckland - became the first buildings in New Zealand to be awarded a 5 Star Green Star rating by the NZGBC.

Architectural Design:
Warren and Mahoney in conjunction with Hillery Priest Architecture and landscape architects Boffa Miskell.
Warren and Mahoney
(9) 916 5057
www.warrenandmahoney.com

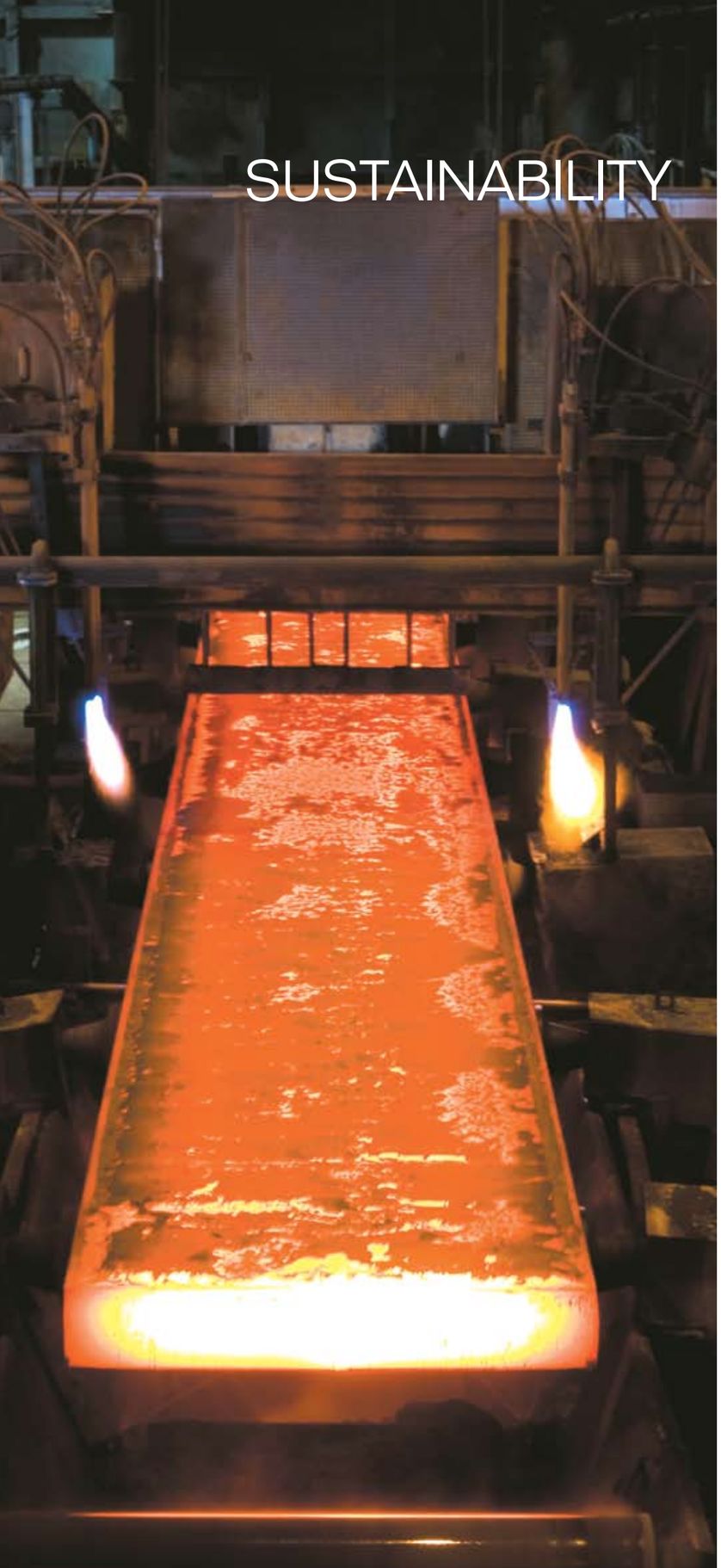
Contractor: TH Barnes,
Telephone: 03 578 9329

Roofing Manufacturer:
Dimond

Roofing profile: ZINCALUME®
Dimondek 630
Cladding: ZINCALUME® LT7

Roofing installer:
Nelson Marlborough Roofing Ltd.
Telephone: 0800 101 155

Photography:
Jean-Marc La-Roque
Patrick Reynolds



SUSTAINABILITY

New Zealand Steel has been working on it for years.

Article by Jenny Bain, Rooflink Magazine.

Climate change and rising energy costs have seen sustainability and environmental management gain momentum all around the world. In New Zealand the Government has outlined some initiatives as part of a broader programme to improve energy efficiency and sustainability and the building environment will be a focus for much of this activity, with sustainable building materials being a significant part of that process.

In changes outlined in the review of the New Zealand Building Code, building designers will be required to demonstrate the "intended life" for a building and demonstrate that "sustainable" factors have been given full consideration in material selection.

The plant is now extremely efficient at getting the white-hot iron from a to b minimising the heat loss and reducing the need to reheat it. Everywhere you turn ways are being found to cut energy costs.

As one of the country's major companies, New Zealand Steel began its journey with sustainable business practices 40 years ago, though much of what it has embraced is little known or recognised. New Zealand Steel has long been striving to minimise waste and reduce the environmental impact of its mining and manufacturing operation while still delivering innovative sustainable steel products and co-products. It is actively involved in the sustainable building movement and is a shareholder in BEACON, which is running the NOW homes project, a research programme creating affordable homes that are warmer, healthier, cheaper to run and reducing the impact on the environment.

New Zealand Steel advocates the use of Life Cycle Assessment (LCA) as a measurement tool for quantifying the impact on the environment of a product or service throughout its lifespan. This is seen as the fairest way of assessing potential environmental impact and extends from the extraction and processing of raw materials through to the manufacturing process, distribution, end-use and then waste management and/or recycling including all the intervening transportation steps. Of significance is the fact that embodied energy in building materials is significantly less than the energy consumed by the occupants of the building. In the UK a study by the Steel Construction Institute showed that the energy embodied in the structural system is about 2% of the total energy consumption of the building over an expected life of 60 years. Research by the Steel Construction Institute found that for an air-conditioned office building over a 60 year design life, the ratio of embodied to operational energy is around 1:10.

Unique local resource

New Zealand Steel is unique in the world of steel making. This is because it uses its own iron sands resource as a key ingredient in the production of high quality steel and is the only company in the world making steel in this way.

In recent times technology and product development have been at the heart of changes in the steel industry, with increasing importance placed on product lifecycle and a manufacturing process that delivers sustainable products.

New Zealand Steel is the single largest employment site in the country and is the country's largest steel producer (620,000 tonnes of steel per year). New Zealand Steel contributes 1% of New Zealand's GDP and over $2 billion into the economy. One half of all steel produced is exported.

New Zealand Steel was one of the first companies in New Zealand to set up a laboratory to measure the environmental impact of its manufacturing site with air and water quality being constantly monitored and information presented to the Auckland Regional Council and a local environment committee.

The company's objectives of managing its environment and minimising harmful affects from its Glenbrook site was recognised by achievement of ISO 140001, one of only a few major New Zealand companies to achieve this internationally recognised standard. The company had already developed its Environmental Management Systems prior to the establishment of the ISO standard in 1997 and by far the biggest percentage of capital investment in environmental control has been in the improvement of the quality of emissions into the atmosphere.

It is the increasing importance of product lifecycle and a manufacturing process supporting sustainable products that is shaping the future for New Zealand Steel and its primary manufacturers. It is no longer merely a steel business but one that is producing a number of innovative co-products from what previously were 'waste streams'. For example a co-product from the smelting process is used for road surfacing, soil conditioning, sports field drainage and filtering in waste water treatment by both Auckland City and Franklin District Councils.

The use of electric conveyors, directly from the mine face, and the pipeline to the Glenbrook Plant reduces energy costs and the impact on the environment.

Extraction of iron sand

The iron sand extraction process at New Zealand Steel's Waikato North Head mine site and concentration plant is itself an exercise in improved environmental efficiency. When the iron sand is concentrated using double drum magnetic separators and further cleaned before stock piling, the iron sand is transported in the form of slurry through an underground pipeline over a distance of 18k to the Glenbrook mill. No trucks required. Strenuous efforts have been made to reduce the levels of clay in the slurry and as part of a study into utilising this "waste" material the company is awaiting resource consent to develop a worm farm from the clay material carried in the slurry pipe. The sand that is left over from the extraction process - called "tailings" - is returned to the site where the iron sand was removed and these areas are being progressively planted with Marram grass and pine trees. It is almost impossible in parts of the sand dunes to tell that the area was once mined.

Recycling

The steel industry in New Zealand has a good record of recycling. Scrap steel comes from a variety of sources including the scrap generated in steel plants and the off-cuts generated by manufacturers. There is also steel that has been used to manufacture items that have become obsolete. Steel can be endlessly recycled and does not suffer any product degradation, which makes its life cycle potentially continuous. Steel scrap is a necessary and integral part of the steel manufacturing process and the average recycled content of steel produced by New Zealand Steel is approximately 12%. The recovery rate of steel from buildings is 85% and a recent report on commercial construction waste found that more than 90% of steel was recycled.

The Attritioner unit's successful operation has meant a significant reduction in waste clay at the steel mill.

- Steel is the most recycled material in the world and does not suffer any degradation through repeated recycling.
- Steel requires minimum maintenance and has a long life.
- Steel is non-combustible
- Steel has a high strength-weight ratio which means buildings can be extended without the need to alter foundations.

Slag recycled to roading aggregate

Other waste reduction initiatives include.-

- Nearly 82% of the total waste from New Zealand Steel's sand to steel process is recycled, reused or resold and the company continues to actively pursue new ways to reduce waste.
- Hot gases are recycled to generate 70% of its electricity needs; the waste stream going into the onsite landfill has been reduced 60% in the past three years owing to targeted recycling and reduction programmes.
- 15 tonnes of plastic and 25 cubic metres of polystyrene have been diverted from landfill in the last year; all old machinery and scrap metal on the site has been recycled through the steel making process and the use of chemicals has been reduced.
- One million tonnes of water is circulated through the steel making and finishing operations daily with 2% of the total added each day to replenish discharge water. Maximum conservation is achieved by water being cleaned, cooled and re-circulated many times. A large volume of storm water is collected on site but New Zealand Steel also takes water from the Waikato River, with an innovative system in place to ensure that fish stocks and recreational users of the river are not affected.

Capital investment

The greatest amount of capital investment at the 190 acre Glenbrook site has been directed into issues concerning the environment, specifically improving the quality of emissions into the atmosphere. New Zealand Steel is a member of the World Steel Association (formerly the International Iron and Steel Institute IISI) which in its first sustainability report for the world steel industry commits to seven key actions including.-

- Expanding the use of efficient technology
- Research into new low carbon steelmaking methods
- Maximising the recycling of steel and by-products
- Developing new generation steels that improve energy efficiency of the products in which they are used.

Extensive planting of Marram grass and Pine forests returns the environment to its pre-mining state. The green purist could argue that the best thing for the environment is to leave it alone, however if you are going to disturb it then leaving it in arguably a better state is not a bad compromise.

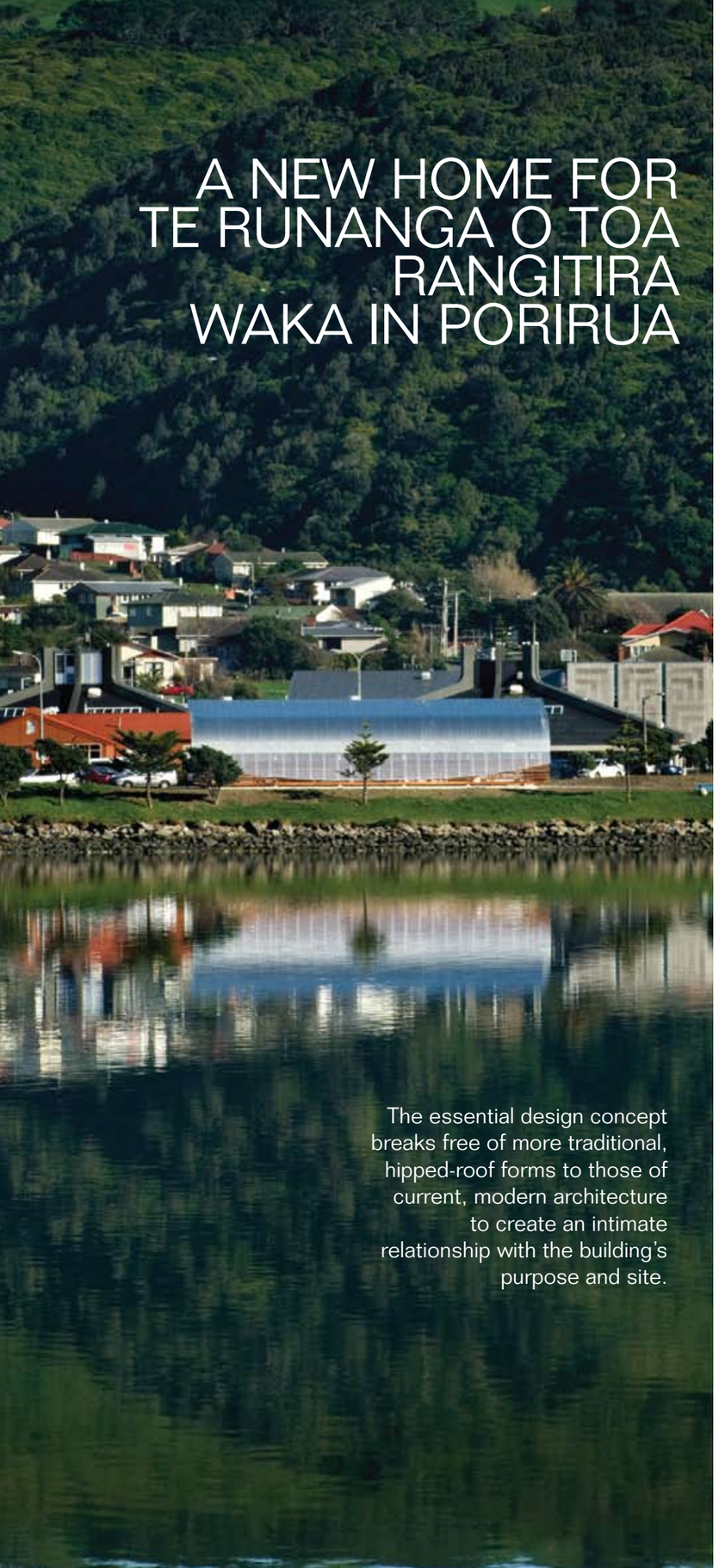
Steel cannot be produced without the production and emission of carbon dioxide. However NZS has committed to reduce CO2 emissions to the minimum and has consistently met government targets for reducing these emissions. It is currently involved in a joint venture with a Japanese steel company researching new technology for reducing coal use in the steel making process.

A big factor in consideration of steel for sustainable building is the distance required to transport it through the supply chain and the level of recycling that is possible at the end of its life. As our environmental consciousness is being constantly aroused, the 80% of RANZ primary members involved in metal roofing plus associates in the manufacturing and supply sector should note the following advantages of steel for today's building applications.-

- Steel can be engineered to precise specifications which means minimum waste on site
- It is non-toxic and is available coated to give greater corrosion resistance and durability
- Steel products can be used to reduce the cooling and heating of buildings, leading to reduced energy use
- Steel products are light and easily transported
- Steel products have been in use in New Zealand for over 100 years for the catchment and storage of drinking water

New Zealand Steel's journey for sustainability is a challenging one but has led to exciting product improvements, new products and the development of many co-products from waste such as materials for pigments, material for magnets and even waste material that can be used to manufacture house bricks.
Going forward the company is supporting the development of a standard New Zealand methodology for LCA and is actively participating in this work with a group of organisations with a vested interest in resolving the issues.
Sustainability has become a hot topic of debate and many companies and organisations may just be starting to consider it. New Zealand Steel had the foresight to predict the impact of its steel making operation on the environment and has been actively managing sustainability since the 1970s. It's almost as if the rest of New Zealand has just caught up.

A NEW HOME FOR TE RUNANGA O TOA RANGITIRA WAKA IN PORIRUA



The essential design concept breaks free of more traditional, hipped-roof forms to those of current, modern architecture to create an intimate relationship with the building's purpose and site.

The overall design concept reflects the "meeting of land and sea". The land is represented through the building's soft green cladding laid at an angle representative of the tilted plates of the earth and fault lines that traverse the area. The sea is represented by the wave form of the roof (formed of materials echoing the nature of the sea: reflective corrugated aluminium and translucent

fiberglass sheeting), washing over the land. Both are tied together through a finely detailed structure, reminiscent of the rope bindings on the waka itself, overlaid with timber shaped to reflect the waka's basic form.

At night the building is lit with soft blue light which carefully designed to create the feeling of being a part of the ocean.

Colours are soft and natural with much of the shelter left in its raw state to show its materiality and weather gracefully over time.

Above all, this is a working building in a marine environment. The waka, stored inside the building, is intended for regular use by a dedicated team and is able to be easily manoeuvred in and out through its large doors at either end, and cleaned down whilst inside the shelter.

The building includes a lower mesh screen portion that allows the waka

to be clearly displayed to the nearby street whilst affording good security. All materials are chosen to suit the marine environment and also to weather naturally amongst it.

Architect: Dennis Chippindale.
Stephenson&Turner Architects
Wellington
Telephone: 04 472 7899
www.stephensonturner.com

Roofing Manufacturer:
Dimond
Profile: Aluminium Corrugate

Photographer: Paul McCredie

SCOPE NEWS AND VIEWS

Use your copy of Version 2 of the COP to ensure we all talk the same language. Best Practice.

When the NZMRM first published their Code of Practice five years ago it was regarded as a living document, and because of this, in 2007, a review was undertaken to:

- better explain some areas
- make amendments in the light of changes to standards and other legislation
- clarify the Industry position compared with E2/AS1 (which is only one non-mandatory means of compliance with the NZBC)
- learn from the past, listen to the present and look to the future

The result

V2 of the NZMRM Code of Practice. The new version clearly defines "best Practices" for designers and roofing and cladding installers keeping everyone abreast of changes that have been made, the reasons why, and how it can benefit them.

What can it do for you?

The COP enables designers to confidently produce designs using Lightweight metal roof and wall cladding in a more efficient way. The saving in costs is significant with less structure, less materials and less labour.
While compliance costs keep rising, we believe unjustifiably, this is an easy way to reduce costs. The direct benefit to roofing and cladding installers is a common point of reference on Best Practice. The intended outcome is to encourage designers to work alongside those who actually manufacture and install metal claddings and to avoid the pitfalls that can arise.

By reading the new version 2 a designer can get a step ahead of the opposition by to producing exciting new designs using up to date performance information with the knowledge that this information is produced conservatively by an Industry organization that prides itself on service to the Industry.
It can be a challenge to designers to think laterally about a lightweight material that has been around for a long time, but with sustainability upon us, it is almost an obligation to think outside of the square.

For further information about the COP V2 please contact Julie Brough
julie.brough@ema.co.nz
Telephone 09 367 0913
Fax 09 367 0914
or visit our website to download a copy www.metalroofing.org.nz

Gerard introduce two new profiles to their range.

Gerard Milano® Tile

The latest product development from Gerard Roofs brings a mediterranean influence to their range giving greater choice for homeowners, builders and designers to source a profile and colour scheme to enhance the style and design of their homes.
Gerard Milano® Tile provides an ideal solution for those who want to capture the traditional elegance of a solid tile profile without compromising on the benefits of a lightweight interlocking steel roofing system.

Gerard Milano® Tile is suited to both traditional "brick and tile" designs with the ten standard textured colours available from the Gerard Pacific Colour Range. To achieve a more Mediterranean style some colours can be combined to create a random "patch" in the base colours. Call Gerard Roofs for details and a colour chart.

Gerard Rockport® Shingle

A distinguished new shingle profile designed to capture the third dimension of the profile which changes the mood and appearance in various light conditions. This attractive shingle is designed as a cost effective roofing solution to virtually any contemporary style home.
Gerard Rockport Shingles are only available in textured finishes which offer 4 basic over layed (patched) natural stone colour options or in charcoal with no patch.

As with all Gerard Roofs profiles the benefits of lightweight safety, design flexibility, and safe potage water collection all apply. The textured surface of both tiles and shingles are covered by the recently extended Gerard Roofs 20 year pro-rata warranty on the surface coating.

For those wishing to download technical information please visit our website. All technical drawings are available in a variety of formats.

Freephone: 0800 104 868
Email: info@gerardroofs.co.nz
Website: www.gerardroofs.co.nz

Metalcraft Open a new Branch in Hastings

Metalcraft Roofing has expanded its base of operations into the Hawkes Bay region by opening a new Metalcraft Roofing branch at 1454A Omahu Road, Hastings. The site is also occupied by sister company Wireplus. Branch Manager Brian Johnson is no stranger to the New Zealand roofing industry and the opening was a great opportunity for Metalcraft Roofing to welcome Brian on board.

The factory has the capability to rollform both Corrugate and T-Rib profiles as will as manufacturing flashings up to 8m in length and roll top ridging in either the 150mm or 200mm cover width.

September 11th was the official opening of the Hastings branch which was celebrated by 120 members of the local roofing and building community and staff at a breakfast proudly sponsored by Metalcraft Roofing and radio station The Rock.

Metalcraft Roofing would like to thank the attendees who took time out of their busy schedules to help celebrate the opening of their new branch. Brian and the team are looking forward to the challenges ahead and Metalcraft Roofing is proud to have expanded its service and product promise into the Hawkes Bay region.

To contact your local Metalcraft Roofing branch dial 0800 ROOFNZ or visit the website at www.metalcraftroofing.co.nz.

Metalcraft's new user friendly website.

Metalcraft Industries has, over the past couple of months, made significant advances in the way that its technical information is available in the marketplace. The Metalcraft Roofing website has been designed to be easy to use and informative.

The Metalcraft Roofing website has a number of key features. There are dedicated sections to Warranties and Maintenance as well as information on sustainability. These sections all have downloadable information that is easily accessed.

The products section is where the real advances have been made. Products are classified based on application, profiles can appear in more than one section, and on each profile page there is a one page technical brochure covering all the data for that particular profile. Span charts are presented in formats as recommended by the Code of Practice, taking into account fixing patterns. Similar information is available for Rainwater Systems, the technical data deals with capacities and which gutters are suitable given various building characteristics.

Flashing details have been presented in a unique way with a 3D interface used to show flashing locations on the roof. Full sets of flashing details can be downloaded in applicable 2D formats for residential and commercial roofing and wall cladding scenarios. Metal Tiles have a section dedicated specifically to the relevant flashing details, again presented in the same format.

In order to access the CAD details you must register first. Once registered proceed to the profile you require and select "View CAD Details" from the right hand side of the screen.

Metalcraft Roofing has an ongoing commitment to the roofing industry of New Zealand and aims to elevate the profile of metal roofing through the provision of quality goods and services backed up by solid warranties and technical information.

1: To enter the download section you must register.

2: Go to products. Select the product catagory

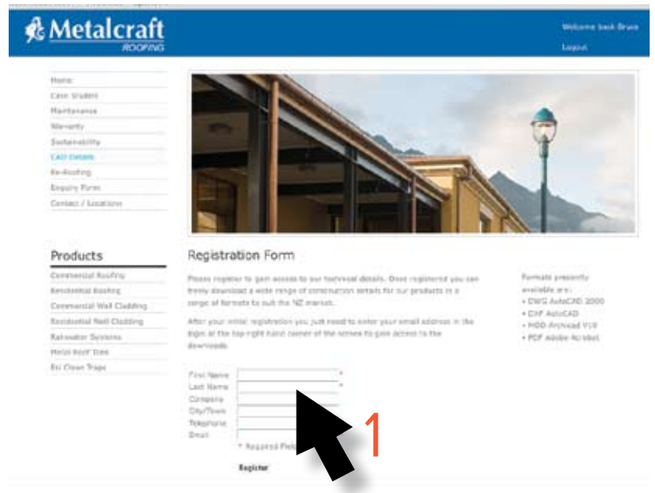
3: Choose the profile you require.

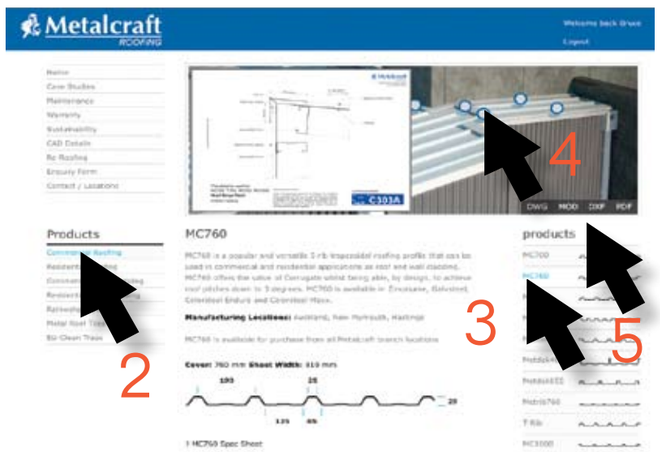
4: Moving the mouse over the dots will bring up a preview screen of the relevant CAD detail.

5: Choose the format you want by selecting one of the options. Once the details have downloaded they can be pasted directly into your plan or specification.

A pop-up widow will show you the detail which you can then download and paste directly into your plan or specification.

For further information on the range of Metalcraft Roofing Longrun, Metal Tile and Rainwater System products please visit www.metalcraftroofing.co.nz or contact your local Metalcraft branch on 0800 ROOFNZ.





Pacific Coilcoaters Technical research bulletins

To keep specifiers informed on all matters related to various cladding products PCC produce an ongoing series of technical bulletins which will focus on product enhancements, roof system installation recommendations and the results of testing that has been carried out.

The first of these three bulletins provides recommendations for the underside protection of ColorCote® ARX™ and AR8™ Roofing in Very Severe Marine Environments.

The second is the reassuring test results on potable water compliance. These tests were done by the Australian Water Quality Centre which is the only authority recognised in Australasia to carry out tests on the collection of drinking water.

The third is the results of fire rated compliance tests paramount to the safety of building users. Testing was done by CSIRO, New South Wales, to measure its ignitability, flame propagation, heat release and smoke release.

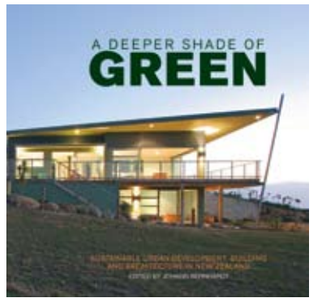
Each bulletin is a useful tool providing both reassurance and recommendations on usage. It is the intention of PCC to continue to keep specifiers informed as and when topics or testing results become available.

For copies of all bulletins or further information please contact Pacific Coilcoaters on 0800 ARXZRX, or 09-5799199, or by email on PCCWebSales@fcsp.co.nz, or visit www.colorcote.co.nz.

A deeper shade of Green

Sustainable urban development, building and architecture in New Zealand edited by Johann Bernhardt.

This is a comprehensive book on Sustainable Urban Development, Building and Architecture in New Zealand offering an introduction into



the new realm of sustainable thinking, concepts and solutions. The book gives a wide overview on sustainable topics, covering the world of building-related activities, from questions of urban development to neighbourhood concepts, to housing options, to the design of public and commercial buildings, identifying alternatives for sustainable energy-, water- and material-use along the way.
It initiates reflection on how sustainable concepts influence the built environment and architecture and what the future of sustainable architecture might look like.
The book addresses a multitude of stakeholder groups whose contributions are all vital for a successful shift in practice. They include central and local governments, professional groups, manufacturing and construction industries, investors, non-government organisations and the general public.
The book offers a glimpse of what we have achieved to date in New Zealand with a selection of sustainable projects featured in a series of case studies across the spectrum of urban development, housing and public and commercial buildings.
To cover all these topics at the most advanced level, editor Johann Bernhardt has compiled essays from 50 experts in their fields.
The book has been produced to the highest possible standards with 350 colour photographs, plans, graphs and many relevant webpages for further exploration.

A Deeper shade of green is available in all good bookshops or directly from the publisher ($69.95): Balasoglou Books: j.balasoglou@xtra.co.nz or John on 09 - 529 2211

The new DP955 roofing profile is the latest innovation from Dimond.

It is designed not only to be stronger than traditional profiles, but also cost effective and faster to install.

The challenge was to provide a high strength rib shape whilst allowing a generous wide style pan to allow for safe foot placement, resulting in less damage and fewer call backs to repair damage.

To meet the challenge, Dimond researched using the inherent strength of a trefold arch shape for the ribs of the profile. The resulting shape is technologically advanced from a roll-forming point of view – a first in roofing resulting in patents for the rib shape.

From a practical aspect, the wider cover width of DP955 (955mm) means fewer sheets are required to be installed. The four rib profile requires only three fasteners per sheet into each purlin and three straight cut notches reducing the risk of error and increasing installation speeds. These features add up to savings in time and money.

With 40 years experience in roofing Dimond offers innovative products without compromising on quality. This fully patented technology will help your next commercial project rise above the others with unique style and greater benefits.

DP 955 is manufactured in Auckland and is available now in a choice of ZINCALUME® and colour finishes.
For more information contact Dimond today on 0800 DIMOND or visit our website: www.dimond.co.nz

Dimond's Recently Launched Affinity Cladding System makes its Presence Felt in the Building Market

The new system has been demonstrated to architects and contractors and has proven to be the first choice with professionals, with 10 buildings already completed on both commercial and residential jobs.

The System is comprised of horizontally laid Dimond Corrugate or the stylish Sahara or Pacific profiles, and a complete set of innovative flashing components for all standard openings.

This makes the installation of metal wall cladding faster and simpler than ever before by significantly reducing the amount of on site cutting and measuring, and it doesn't require sealant to ensure a weather- tight fit at corners or around windows.

The ease of installation is allows contractors to look forward to their next cladding job, while architects appreciate the clean appearance, reliability and consistent quality. Both agree that Affinity provides the cladding solution that they have been looking for.

Dimond and BRANZ have worked together to test this product rigorously so you can have peace of mind in its ability to keep moisture out

Dimond produces NZ's longest Roof Sheet

When ProArch Architects of Palmerston North designed this new warehouse and they looked to Dimond and Dimondek 630 roofing profile for the solution

Dimond's Palmerston North branch was able to produce 88.25m single length sheets by utilizing the Dimondek 630 onsite roll forming machine, over 20m longer than the previous New Zealand record of 65m for Dimondek 630

Shane Lewer of ProArch Architects Ltd Palmerston North says,"Without this on site roll forming capability the building roof design wouldn't have been possible in its current form."

The ability to run full length sheets without overlaps or stepping has provided better assurance of weather tightness and cost effectiveness for Foodstuffs. Combined with the Dimond's patented Continuous Plastic clip system this has seen up to 2290lm laid per day.

The continuous plastic clip systems interlocking feature avoids issues with sheet creeping and allows thermal expansion and contraction of the roof sheets without creating unnecessary wear from the clip surface.

Shane Lewer comments "The project has benefited right from the start with the knowledge that the product was available and the design team could move forward with confidence".

URBAN ECO

By Graham Hepburn

Raymond Q's Takapuna home is testament to how sustainable building is becoming more mainstream in New Zealand.
And that change in mind-set has been helped in no small part by the home's designer, Johann Bernhardt, who has recently released a comprehensive book on sustainable building, A Deeper Shade of Green, after years of designing energy efficient and environmentally friendly homes.
Not only has Johann, a Berlin-trained architect, been designing eco-friendly homes, he has also been running the Auckland office of the Building Biology and Ecology Institute, which researches, compiles and disseminates information on healthy and environmentally friendly building and living. The institute has a comprehensive directory of building solutions and services.

While Johann is a friend of Raymond's, that didn't mean he was an automatic choice to design a home for Raymond and his partner, who had become tired of their traditional bungalow.
Raymond found their existing home cold and damp, causing him problems with allergies. His partner, originally from Germany, wasn't used to homes without central heating. "He literally sat on the heater during winter," says Raymond.
Raymond admits he was "a bit sceptical" about the idea of building an eco home, which conjured up images of "a mud brick house or growing grass on the roof".
"I wanted something smart and contemporary that would suit my interest in art and design."
When Johann reassured him he could have that and a home that would be healthy and energy efficient, the partnership began on the house that was finished about two years ago.

Because Raymond, a flight attendant, and his partner travel a lot, he also wanted a home that was low maintenance. Budget was an issue, too, and so was maximising the harbour views.

To create that contemporary look and to resist sea spray, COLORSTEEL® cladding was a natural choice. As well as being cost-effective and low-maintenance, it gives the home a modern look in combination with Titan board.
"That was my choice right from the beginning in my first hand-drawn sketch," says Johann. "I like the contrast in textures between the 3-D of the COLORSTEEL® and the flat surface of the Titan board."

A major constraint on Johann's design was the tight site – Raymond subdivided land around his existing bungalow to build on. And the tight budget meant that desirable eco features such as a solar panel and dealing with storm water on site were postponed, with the initial focus on less costly factors such as good passive solar design.

With the help of computer modeling, Johann showed Raymond how the sun would come into the various rooms in the house through the day and the seasons.
"I think the way Johann designed the windows works really well with the way the sun moves around the house," says Raymond.
Hand-painted concrete floors soak up heat from the sun pouring through the windows and release it at night. To ensure that heat is not lost, polyester insulation above building code requirements was fitted as well as double glazing on the south, west and east faces of the house. The double glazing allows Raymond to have large windows on the western side of the house so that he can enjoy the harbour views, city skyline and sunsets over the Waitakeres from his first floor lounge. A unique feature is the bridge from this lounge to a set of full-height sliding windows, which creates a void in this part of the house that allows warmth from the underfloor heating at ground level to circulate throughout the house.
Bamboo flooring on the first floor is another sustainable feature as is the NZ plantation grown hardwood used in the deck on the northern side of the house that connects the home to the self-contained studio.
Because of Raymond's allergies, low or non-toxic building materials and paints have been used where possible.
Neither Johann nor Raymond is a fan of hallways so the home has been designed to incorporate passageways through the living spaces. This optimises space and makes the home easier to heat and light.

Photographer: Daniela Incoronato

"I can create a really nice atmosphere in the whole house by using just four energy saving lightbulbs," says Raymond.
And the power bill in his new home during winter is about $150 a month compared to the $500 a month he used to spend on electricity and gas in his old home.
One indulgence Raymond did allow himself was a rooftop terrace for outdoor dining and admiring the view - although it again allows him to create more living space on a limited site. And with Johann elevating the southern wing, windows have been added up here to allow sun into rooms on the south side of the house. The stairwell on the opposite side of the house is also elevated to allow light into it and it is partially clad in Titan board to create a striking vertical element. A pair of porthole windows heightens the effect.
While Raymond might have been doubtful about the benefits of an eco home, he's now a convert and something of an advocate for sustainable design.
In fact, one of the reasons he wanted a modern and dramatic-looking home – apart from his personal taste – was so that it would stir up interest in the community.
"I wanted a striking home to spread the message," Raymond says. "My concept for this house is to create an apartment in the suburbs with a lot of eco features. It's a good example to the younger generation that you can have an eco home but don't have to compromise your lifestyle."
And that's exactly the message that Johann would like to get out.

"The general idea about sustainable housing four or five years ago was that it had to be an earth house in the country but that's starting to change now because a lot of attractive houses have been developed."
He's also had a lot of positive feedback about his book, which he hopes will point law-makers, councils, manufacturers, architects and builders down the right path at a time when global warming and soaring energy prices are becoming huge concerns.
"A lot of people have said to me that it is the right book at the right time."
While the advantages of building a sustainable home are obvious, Johann says the concept has taken a long time to get traction with the public, who often take a short-term view about their homes.
"A sustainable home beats a conventional home hands-down in terms of costs during the life cycle of the home," he says. "Unfortunately, the problem for New Zealand is that people here sell very often and move very often so they tend not to plan for the long term."
Maybe that attitude will change with people like Raymond showing that a sustainable home can be practical, stylish, healthy - and good for the planet.

Johann Bernhardt

The director of Bernhardt Architecture, Johann Bernhardt is passionate about creating healthy, warm homes that are energy efficient and environmentally friendly. He took a year off his design practice to edit his book, A Deeper Shade of Green, which was published this year and looks at every facet of sustainable building. He says, "Hopefully, with this book people will have more information and be able to make better decisions."
His firm has been designing eco homes for many years, and he has also been running the Auckland office of the Building Biology and Ecology Institute, which researches, compiles and disseminates information on healthy and environmentally friendly building and living. Johann has an architect's degree from Technical University Berlin, a PhD in urban development from Paris University VIII, and a lifelong interest in sustainability.

Architectural Design:
Johann Bernhardt,
Bernhardt Architecture,
Telephone: 09 376 6767

Drawings: Eddie van Uden,
Equinox Design,
Telephone: 09 815 3838

Builder: Inger Builders,
Telephone: 09 424 8833.

Roofing: COLORSTEEL® ENDURA™
Cladding: COLORSTEEL® ENDURA™
New Denim Blue

Roofing and cladding installer:
Slater Roofing & Spouting,
Telephone: 09 424 1591.

Photographer:
Peter Lawrence

PUTTING IT TO THE TEST

Whilst most home owners have "blind faith" in their roofs staying put during storms there is considerable research and testing done by NZ manufacturers to ensure their products comply with local and off shore conditions. The MRM has invested in building a test rig which is made available to NZ manufactures to ensure their products comply with and exceed these standards. The durability and aesthetic values of roofs is often taken as a given but in reality painstaking research goes into each process.

Wind.

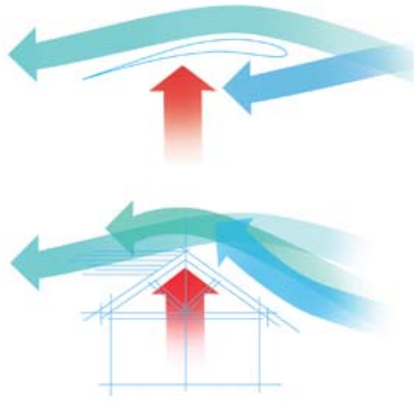
Recently the Australian Building Authorities issued an ultimatum to all roofing companies to provide test results on their new "Low High Low Pressure Sequence". This is a legal requirement which allows companies to market their products in cyclone prone areas. An independent, registered engineer was appointed by AHI, as a requirement of the Australian regulations, and each test using the MRM Test rig and the results were viewed and verified. AHI has performed many such tests over the years and now took the opportunity to test not only the tile fixing procedure but also the effects on the batten to rafter junctions. As the "inventors" of the Pressed Metal Tiles AHI distributes their product to approximately 80 countries worldwide. Meeting the compliance codes in some very inhospitable climatic extremes is testimony to their confidence in their product which was confirmed in the recent tests.

The overall calculations used in specifying a roof in a given area depends on many variables. Altitude, terrain, climate and wind load zones.

These tests were limited to the effects of wind uplift resistance of Metal tiles. In previous tests on longrun roofing and fasteners, done by MRM, the tests measured the strength of the material and the "pull-out" resistance of the cladding fasteners. The way the rig was configured did not test the purlin from rafter uplift which is a potential cause of failure. The objective of these tests, done for the Australian authorities, was to measure both the tile fixing to the batten and the batten fixing to the rafter.

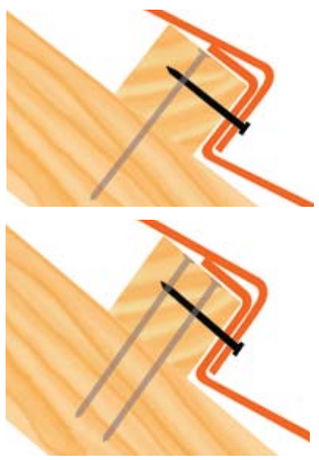
When roofs are lost due to high winds it is not accurate to say the roof is blown off... in reality it is a combination of the imbalance of high pressure created by the wind moving over the roof and the low pressure in the roof cavity. This creates uplift that has been compared to the same principle which creates high and low pressure on an aircraft wing giving the plane lift.

Battens can be fixed to the rafters



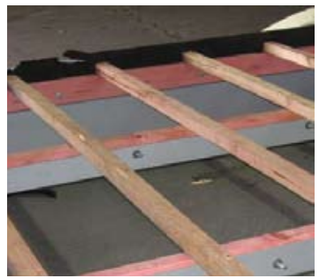
using 3 different methods; single nail, double nails and in some instances screwing. In these tests both single and double nailing of the batten to the rafter was tested. In the Australian tests 75mm annular groove nails were used as standard in Australian. In New Zealand 90 mm smooth nails were used.

Tile to batten fixing is the same in NZ and Australia - 4 nails per tile (one in every second pan or 320 mm) for most conditions and 7 nails per tile (one in each pan) for extreme wind conditions. Both configurations were tested using the test rig.



The Test Rig.

The rig is effectively a large sealed unit which allows air to be pumped in and released in measurable cycles. This simulates the pressure created by wind uplift. Static tests are used to measure a continuous pressure and Cyclic tests are achieved by pressurising the unit to a given load and then releasing the pressure. This pulse rate of 2 seconds is repeated up to 4500 times applying and releasing pressure to the batten/rafter and tile /batten junctions.



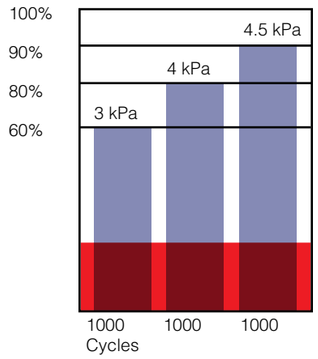
Because the wind zoning for New Zealand is very different to the cyclone areas of Australia tests were done to meet the standards required for both environments and then pushed to the highest levels of the capability of the test rig. The accepted international standard unit of kPa (kilo Pascals) is used to measure the pressure created. The NZ Standard in NZS3604 for very high wind zones is 1.5 kPa. The Australian cyclone testing was done at 4.5 kPa and 6.3 kPa

Tests for New Zealand

The first tests were done using one nail batten to rafter fixing. A static load was applied until one of the nails failed. This occurred at 2.9 kPa which is almost twice the 1.5 kPa pressure specified for very high wind zones.
The tile to batten fixing showed no sign of stress or failure. The test was repeated using two nails to fix the batten to the rafter and the static pressure reached 5.1 kPa before the batten began to part from the rafter. Again the tile to batten fixing showed no sign of failure. In all NZ tests the standard tile to batten configuration was 4 nails at an average of 320mm centres.

Having established the upper limits of static testing the roof was then subjected to cyclic testing with pulses of pressure every 2 seconds. The tests started with 1000 cycles at 60% of the static load and then increased to 1000 cycles each at 80% and 90%.. The single nail batten/rafter tests were at 2.9 kPa and the normal two nails batten to rafter tests were at 5.0 kPa, well above the New Zealand standard configuration to fixing.
In both instances of cyclic testing failure at the batten junction occurred when the pressure reached 90%. This figure, 4.5 kPa, established the acceptable design load. (Graph below). The standard 4 nail tile to batten fixing showed no sign of failure.

Cyclic testing at 5.0 kPa with 2 nails batten/rafter fixing and 4 nails per tile section



Tests for Australia

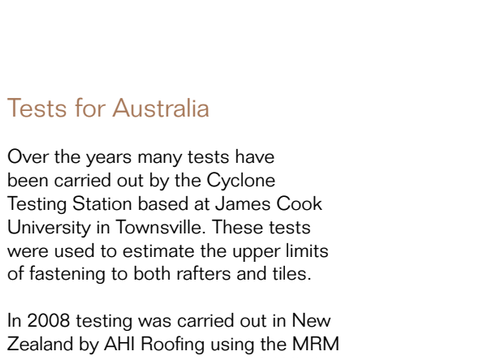
Over the years many tests have been carried out by the Cyclone Testing Station based at James Cook University in Townsville. These tests were used to estimate the upper limits of fastening to both rafters and tiles.

In 2008 testing was carried out in New Zealand by AHI Roofing using the MRM test rig to prove compliance of AHI tiles and fixing to the new Australian test standard (Low High Low)."

Hardwood battens, rafters and fasteners were imported from Australia for these tests.

Cyclic tests were carried out at two different levels. 4.5 kPa where 4 nails were used to secure the tile to the batten and 6.3 kPa where 7 nails were used. These loads were considered conservative as the requirement was to measure the result on each rafter, batten and tile.

Cyclic testing schedule at 6.3 kPa using Australian batten/rafter fixing and 7 nails per tile section



The cyclic test done at these levels showed no sign of failure to either the batten/ rafter or the batten/tile fixing. Once the cyclic test were complete the two different configurations were tested at their static maximums. The 4 nail tile to batten system reached 6.1 kPa before it failed. By adding 1 more nail to a shake or 3 to a tile (total of 7 per tile section) the roof held with no adverse effects. The roof was then static tested to the maximum of the rigs limit at 7.5 kPa without failure.

Coating Durability

Whilst testing the fixing effectiveness of a roof in extreme conditions is a vital aspect of any roofing products success there are numerous other factors which come into play. Weather tightness, profiles, substrates used, colours and texture all play a role in contributing to the viability of a product in a competitive market place.

The vast majority of metal based products in New Zealand utilise the same ZINCALUME® coated steel. Effectively ZINCALUME® has replaced the traditional galvanised corragated iron and offers many benefits.

Earlier roofing products made from galvanised iron suffered from micro cracking where the base material was bent, pressed or folded. In turn this allowed exposed, albeit microscopic, areas prone to deterioration from rust. In these instances the protection to the substrate relied on the coating applied after forming. These issues are virtually non existent with the use of ZINCALUME® which has minimised or removed the occurrence of microcracking.

In New Zealand there are primarily two systems used to coat the substrate.

COLORSTEEL® and ColorCote® roller coat high temperature curing solvent and water-based paints onto ZINCALUME® coated coil steel at high speeds and dry them at high temperatures. This provides a relatively thin but durable finish onto coil which is then roll-formed into various profiles to make longrun roofing products or rainwater goods. Some metal tiles are also made by pressing pre-painted steel into the tile shape.

In the second process, used by AHI Roofing, metal tiles are made in an entirely different way. The ZINCALUME® steel, coated only with a thin styrene-acrylic coating is pressed into tile blanks before any other coating is applied.

The pressed blanks are then spray coated with either acrylic waterbased paint to make the Satin product range or a high-build acrylic adhesive, crushed rock (chip) and clear overglaze for the Textured product range.

Both of these coating systems, because they are applied after pressing minimise the opportunity for corrosion at the bends, and the paint is an even thickness and not stretched thin during the forming process. The paint system is thicker than the coil coated paint, dried at about 100^{o} C and is therefore "softer" than coil coat paints. The Textured finish uses a very high build acrylic paint, effectively as an adhesive, and this is coated, while

still wet, with natural rock crushed and blown into the paint to ensure good long lasting adhesion. This is then coated with a thin layer of acrylic lacquer (overglaze) to lock in the chip and provide a deeper colour and slightly glossy finish. This is also dried though an air oven with a very carefully controlled temperature gradient to provide good adhesion and flexibility. This base material also contains biocides to provide protection against organic growth.

These coatings go through extensive durability exposure testing at extreme and moderate marine and geothermal sites to establish that they do offer very good long-term protection for the steel and appearance.

While much of the research and development which is undertaken by specific manufacturers remains commercially sensitive we asked Neville Parker, AHI's Development Chemist, to provide some insight into the testing procedure. Development in coatings is undertaken for a variety of end purposes. This may be for improved durability/extended service life, to evaluate alternative raw materials, to evaluate manufacturing or processing benefits and alternative markets to be targeted. Depending on the development project, these may be undertaken entirely within AHI Roofing or as collaborative projects with suppliers. Where facilities or expertise are not available inhouse, independent laboratories are retained to assist.

The procedure for coatings would typically consist of selecting a range of potentially suitable candidates, be it a resin or colour pigment and then checking the physical attributes such as flexibility, adhesion etc,. After preliminary testing eliminates some candidates the remainder are subjected to accelerated testing in the laboratory These tests depend on the characteristics being considered but will typically encompass properties such as weathering resistance under UV/Moisture cycles, or if a corrosion project, Prohesion testing (a cyclic testing regime) and Salt Fog testing.

Once this screening has removed any further candidates that have failed to achieve the desired result, samples are evaluated under extreme real life conditions at sites such as Muriwai for corrosion evaluations, or exposed to the sun and weather at a 45°C angle with a with a north facing aspect .

Exposure sites.

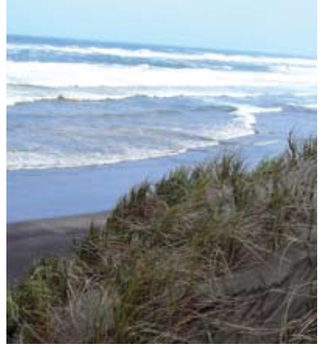
A number of exposure sites have been used in the development process over the years to evaluate various properties, the currently active sites being described below.

New Plymouth.

Very active lichen growth area. Used primarily to compare different biocides actives for effectiveness against lichen, but also longer term, the ability of the coatings to resist damage through lichen growth.

Muriwai.

Severe marine exposure site used primarily for corrosion resistance testing of substrates, effect of coatings, fasteners, interaction between components etc. The site is monitored monthly for salt deposition rate and is approximately 6 x more severe than Rings Beach and 13 x times more corrosive than the Glen Innes site based on salt deposition rates.



Rings Beach.(Coromandel)

Moderate corrosion resistance test site primarily for evaluating long term tile substrate (ZINCALUME®) corrosion resistance (currently 25 years + exposure). The site is calibrated against other corrosion test sites for salt deposition rates, but not monitored for salt deposition in the same manner as other test sites due to the sites remoteness. Testing by an independent research laboratory on sample tiles from this site have shown a less than 7% loss of the protective ZINCALUME® coating after 25 years exposure.

Glen Innes.

A combination of mild corrosion conditions for substrate, fastener evaluations etc and weathering of coatings for painted and chipped products. Monitored monthly for salt deposition rate.

The Auckland site is located at the factory, which also contains the development laboratory. This provides facilities for Salt Fog and Prohesion testing for accelerated corrosion resistance evaluations, and accelerated weathering testing under both UVA and UVB conditions. For accelerated corrosion testing, Prohesion testing is becoming the preferred test method due to its cyclic wet fog and drying regime, in combination with lower electrolyte levels, which provides a better correlation to real life than does Salt Fog.

The ongoing development and testing of coatings is an extremely complex and time consuming process. Neville

indicates that as little as 5-10% of the research leads to product advances and change however the information collected during the process of elimination proves invaluable.

Once satisfied that the durability requirements of a coating will be met the research focus changes to manufacturing trials. For example a coating must be able to be satisfactorily manufactured in the paint shop as well as being appropriate for the end users. A coating destined for the tile coating line must be able to be applied in a satisfactory manner in the manufacturing process.

Final trialling before a new development is accepted requires field trialling to ensure their are no adverse design effects. These trials would usually be undertaken on material manufactured during the manufacturing/processing trial to ensure that product characteristics are accurate, rather than on laboratory manufactured examples or similar.

HOKITKA TOWN ENTRANCE BROUGHT TO LIFE

The recently constructed Westland Farm Centre, located at the entrance to Hokitika township, is a great example of the use of standard cladding as a design feature for this prominent site. Here you can see how its creative use for the façade forms part of the architectural design footprint. The building also incorporates enclosed eaves – two concepts that are a positive for metal roof manufacturers' design standard.

In 2006, Babbage Consultants was contracted by the Westland Co-Operative Dairy Company Limited to design and build a complex comprising 830 m^2 warehouse block, 400 m^2 farm retail centre and 170 m^2 BP service station. The brief was to design the three components as a unified complex that while fulfilling its functional requirements, provided a signature site at a major intersection that fits the local context.

The complex is a high profile project for Hokitika, creating a new gateway at the Northern portal to the town centre. The design proposal had to meet the user expectations, align with BP's brand guidelines and be of such quality as to play its part in the town urban fabric.

Babbage Consultants designed and implemented the project, providing the architecture, project management, structural, civil and building engineering services. Their design solution maximises the site with the Centre positioned for excellent visibility, access and functionality. The larger element of the complex, the warehouse, is located at the town entrance to reinforce the portal, with the plan tapering off and anchored by the service station canopy to balance the warehouse scale.

The structure of the warehouse is steel, and located on the building exterior in such a manner to reinforce height. The retail centre and BP service station are of similar design language to the warehouse, but on a smaller scale – single storey. Steel portal frames have been used on the exterior, allowing for greater usable floor space within. To assist with aesthetic appeal, tapered cantilever beams and careful design of the diagonal bracing have been employed. Enclosed eaves will counter possible roof lift from strong winds in the area and are a plastic composite Duraclad to prevent rust forming, an important factor when in close proximity to the sea.

Self-supporting cladding has been used for the façade throughout the complex, with three vertical panels per structural bay in contrasting colour. These alternate with translucent cladding at varying heights, providing an overall design feature while the translucent panels allow daylight transmission and energy reduction. All three cladding materials have a horizontal profile to give the building a streamlined look while blending seamlessly with the flashings and roofing.

Key personnel involved in this project were Registered Architect, Frank Cleary ANZIA and Structural Engineer, Dr Victor Lam BE, ME, PhD, CPEng, IntPEng, MIPENZ. Mr Cleary has extensive architectural knowledge in a variety of building structures including recreational complexes, industrial developments, residential and learning centres.

Dr Lam has a wide range of experience in steel and reinforced concrete structures, gained from New Zealand, the Pacific and North America.

Babbage Consultants is a multi-disciplinary design and engineering consultancy. They provide architectural, engineering, planning, geotechnical, environmental, project management and surveying advice across a range of industry sectors, throughout Australasia. Their client base includes manufacturing, dairy, health and commercial and industrial organisations.

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Installers: Evan Jones and
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Soffit Manufacturer:
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Profile: Duraclad BB900

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