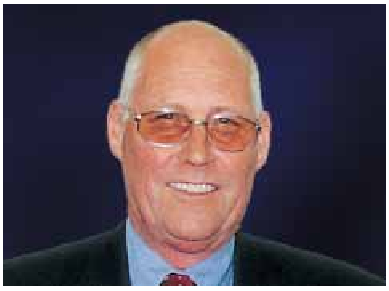
ISSUE 10

# SCOPE

NZ METAL ROOFING MANUFACTURERS INC.



Below is a brief introduction to the 2005 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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NZ Metal Roofing Manufacturers Inc.
Managing Director of the Steelform Group of Companies.

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Philip Meyers: Marketing Manager of Roofing Industries Limited.

Warren Oliver: Managing Director of Franklin Long Roofing.

Gregg Somerville: Marketing Manager for Dimond.

Mark Winnard: General Manager for Steel & Tube Roofing Products.

If you would like to submit material please contact any member of the executive or the publisher.

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# SCOPE

## CONTENT ISSUE 10



The new "MRM logo" was introduced in June 2005 in order to provide the New Zealand Metal Roofing Manufacturers Inc with a readily identifiable and communicable "badge" and acronym (MRM) that could be used to improve internal and external communications.

MRM
NZ METAL ROOFING MANUFACTURERS INC.


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# BIG IDEAS SMALL SITE

This speculative project presented all the challenges a developer can give an architect. The site, an "infill" in a suburban street, was tight and constricted (400 m2) and overlooked on three sides. The brief demanded maximum floor area, well integrated exterior space and a well considered design with market appeal. Spatial requirements were conventional, but the project required considerable exploration in order to accommodate a new residence of 260 m2, without compromising the quality of interior, exterior space or contravening the Upper Hutt District Plan. Pilbrow Design Group enjoyed the challenge.

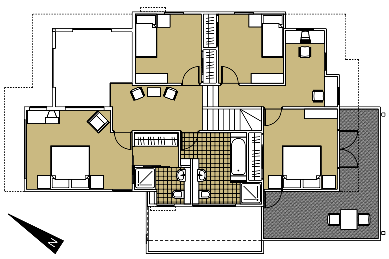
To create interesting architectural composition and to prevent the two-storey volume from appearing dominating on a small site, the building is "broken" down into elements each expressed with a different material. The materials chosen reflect the surrounding buildings within this mixed era and densely occupied suburb.

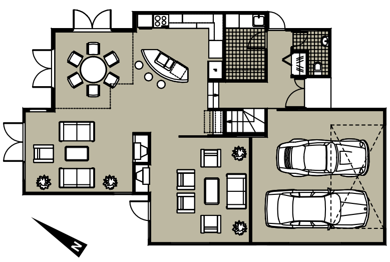
Set down around 1.5 m from the street, the garage does not overshadow the elevation, rather, the composition of form and materials combined with the overhanging eaves, create a pleasant street façade, not dissimilar in scale to its neighbours.

The Entry, which could be lost in this level change, is instead emphasised with terraced landscaping and the overhang of an upper storey element. Similarly, the butterfly roof emphasises elevation height at the front and rear creating a dynamic form and maximising sunlight penetration. It is the inter-relationships between both the interior volumes and the exterior spaces that create the most successful sense of space and light on this small site.

The living spaces, positioned to rear of the site, maximize privacy and sun, are double height and surrounded by perimeter glazing creating a sense of space and integrate both interior and exterior, upstairs and downstairs. These connections are emphasised by an interior balcony, which overlooks the dinning space. Positioned within an occupiable landing at the top of stairs, this balcony integrates a private seating area with the main living area below. In addition the void space between provides circulation and light. Such openness enables the heart of the interior to be connected to both the private

areas of the exterior, and the town of Silverstream beyond. These volumes, carefully composed to complement the street, open to provide interior and exterior connections which create light and spacious architecture within a tight and constricting site, without compromising the demands of brief or budget.





## Pilbrow Design Group Architects.

The Pilbrow Group was established this year as a collective which brings together 'in' studio talents of architects, interior designers, CAD design and project management. Whilst members of the group collaborate on many projects they each retain a degree of flexibility which enables them to work independently of the group structure.

The Pilbrow Design Group Architects, comprising of 7 members, draws upon International Architectural education and experience with many awards to their credit. Based in Wellington, the group's experience offers innovative design to residential, commercial, industrial and public buildings. As a multi cultural group the endeavour is to deliver fresh, innovative, functional and aesthetically pleasing design to their clients. Pilbrow Design Group utilises a variety of tools from hand made models to the latest computer technology to assist clients to visualise the end result.

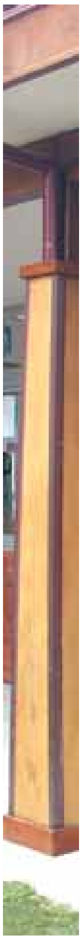
*Client: Straightline Construction Ltd.*

*Architect: Davor Mikulcic. Dipl. Arch. (Sarajevo) ANZIA.*
*Pilbrow Design Group*
*Wellington*
*Telephone: 04 238 9467*

*Main contractor:*
*Contact: Tom Hunter*
*Straightline Construction Ltd.*
*Upper Hutt*
*Mobile: 021 507 977*

*Roofing and Cladding Manufacturer:*
*Silbery Longrun Ltd.*
*Upper Hut*
*Telephone: 04 526 9343*
*Corrugated Colorsteel®.40mm*
*Colour: Karaka*

*Roofing Contractor:*
*Straightline Construction Ltd.*

*A unique, functional and cost effective solution to providing a glazed area which opens to provide fresh air in summer and is completely out of the way of small fingers. Kiwi innovation with modified garage door mechanics.*

# A TEAM EFFORT

Sometimes the "next project" comes from the most unexpected circumstances. Kids at playcentre. This was the case for designer, Michael Manning, who became involved in the development due to his children being members of the playcentre group at the time. "The project was a very enjoyable team effort" says Michael which resulted in a further project with playcentre builder, Grant Richards.

The Red Beach Playcentre, at Whangaparaoa, is a unique organisation in that the families run the centre, on behalf of the North Shore Playcentre association. Therefore the association and the parents where all my clients during the design and building process. Design by committee is not usually the most enviable situation however in this instance it proved to be enjoyable and constructive.

There was originally an old villa on the property, which was donated and relocated onto the site in the 1970's. As Red Beach became more popular and the population grew so did the number of families wanting to attend the playcentre. Eventually it was obvious that the existing building was inadequate and a larger purpose built centre was required.

The site had a gentle north slope and an almost true north aspect. The site was contoured to enable the positioning of the building on the south of the site to take maximum advantage of the sunlight for both the indoor and outdoor play areas.

The size of the new building and its various spaces both internally and externally were governed by both M.O.E and playcentre regulations based on the number of children and parents expected to use the centre during a session.

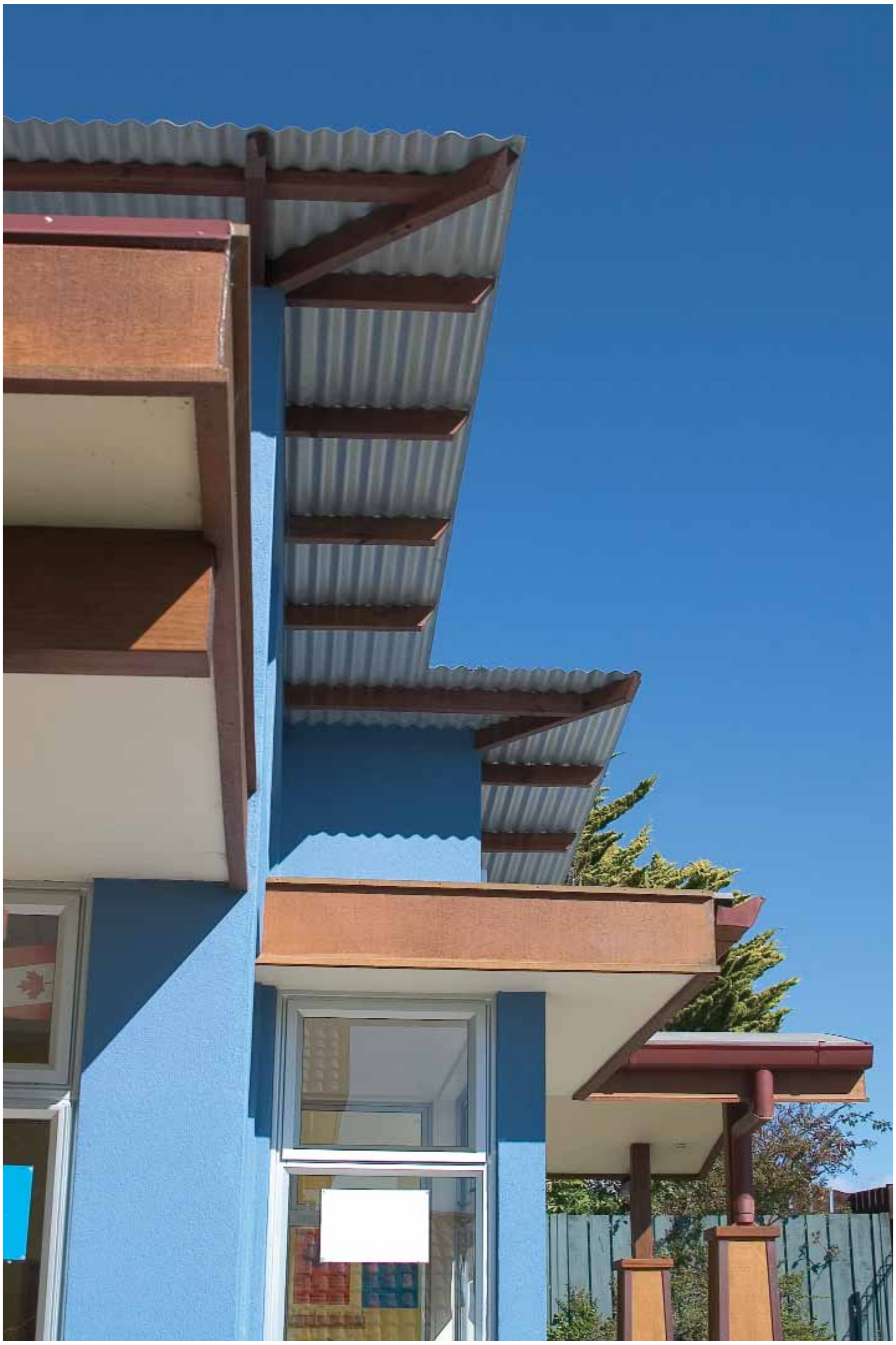
Two concepts were presented to the playcentre with two very different styles of building based on the same floor plan. One quite traditional and the other more modern which reflected the beach environment and had a sense of fun. The collective clients chose the latter.

Internally the office, cloakroom, toilets, resource room were placed along the southern length of the building. This enabled the higher use areas such as the indoor play area and kitchen to enjoy the northerly aspect. The high stud combined with generously glazed areas provides excellent indoor light and allows vital visual supervision of the outdoor areas from all aspects of the community area.

Every detail of the building is designed with young children in mind. Interesting innovations such as washable brick surfaces, modified overhead opening doors and concealed drainage provide a very functional benefit and yet enhance the aesthetic values of the building.

In consultation with NZ Steel and Tube the roofing material chosen was corrugated zincalume® which was draped over longitudinal purlins which were fixed to the curved posi-struts. This construction was cost effective and proved to be easy to apply. The ceiling curves with the roof line and has acoustic tiles and insulation to absorb any noise created by heavy rain.

*Storm water pipes cleverly hidden from inquiring little minds and incorporated into the aesthetics of the design.*



*Editors note: Where metal products are used in unwashed areas they should be washed regularly every 6 months.*

Likewise the window joinery, at each end of the building, has been specifically manufactured to follow the curve of the roofline enhancing the overall feeling of the building.

Manning Architectural Design provided a full service for the new playcentre including concept design, resource consent application, car parking and zoning issues, comprehensive construction drawings and documentation, liaison with various consultants on civil, acoustic and fire issues, tendering, assessing the tenders with the client, awarding the contract and project managing the construction.

Michael Manning says,"It was an enjoyable project to be involved with architecturally particularly as all who were involved, from the playcentre to the contractors were very enthusiastic. The project was very much a team effort. It is also satisfying to have been part of providing an enjoyable facility for the families that use the playcentre now and in the future."

*Client: North Shore Playcentre Association*

*Architectural Designer and Project Manager: Michael Manning, Manning Architectural Design Red Beach, Whangaparaoa Telephone: 09 426 2255 Mobile: 027 280 8689*

*Main Contractor: Grant Richards GDR Builders Telephone: 09 428 1010 Mobile: 027 496 9730*

*Roofing Manufacturer: NZ Steel and Tube Auckland Telephone: 09 274 4056 Roofing Profile: Custom Orb*

*Roofing Contractor: Rodney Roofing Scott Riach Telephone: 07 424 2393*

# NEW BUILDING REGULATIONS:

## Acceptable Solution E2/AS1 External Moisture

Improvements in building products, designs and processes over a number of years have contributed to better built environments. The 2004 Building Act was intended to regulate for the continuation and enhancement of this improvement process.

The publication on 1 July 2005 of the new Acceptable Solution E2/AS1 by the Department of Building and Housing (DBH) aims to re-emphasise the provision of quality practices in building design and construction.

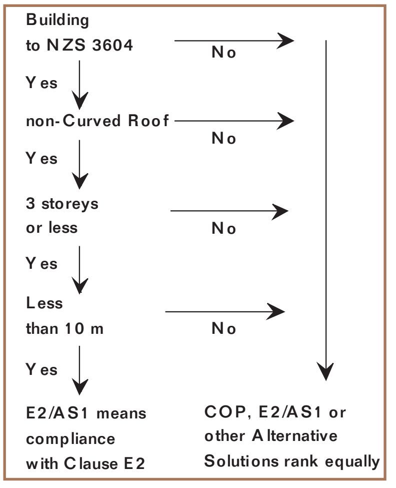
Changes to the provisions in the new E2/AS1 have a number of important implications for designers, building practitioners, and users of metal clad buildings in New Zealand.

Clause E2 is one of 35 clauses of the New Zealand Building Code and deals specifically with External Moisture. It says that buildings must "provide adequate resistance to penetration by, or accumulation of, water from the outside".

The updating of E2/AS1 was part of the recommendation of The Report of the Overview Group on the Weathertightness of Buildings in August 2002.

Spanning the period of revision of E2/AS1, the NZ Metal Roofing Manufacturers (MRM) produced the far more comprehensive Code of Practice for Metal Roof and Wall Cladding which was intended as the definitive document for the industry. MRM also contributed comprehensively to the formulation of the new E2/AS1 over two and a half years, and E2/AS1 does refer users to the NZ Metal Roof and Wall Cladding Code of Practice (COP) for additional guidance in a number of places where more detail is required, although this is in the form of non-mandatory comment only.

The scope of E2/AS1 is only for buildings constructed according NZS 3604:1999 "Timber Framed Buildings", it is limited to 3-storey buildings less than 10 m high and it does not include curved roofs. The COP covers all buildings with metal roof or wall cladding and so has a




much wider scope than E2/AS1. While the Building Code itself is "performance" based, Acceptable Solutions such as E2/AS1 are provided as one "prescriptive" method of meeting the Building Code.

An "Alternative Solution" may be used instead provided it can be shown to meet the performance based requirements of the Building Code, but this may need to be demonstrated for every installation. Acceptable Solutions like E2/AS1 are not mandatory and Building Control Authorities (BCAs) are required to consider Alternative Solutions if they can be satisfied of compliance with the Building Code on 'Reasonable Grounds'. In practice however, the Acceptable Solution is generally preferred because of the effort required to show that Alternative Solutions do meet the performance requirements of the Building Code, and also because the DBH assumes liability for details in E2/AS1. The MRM and the DBH have worked hard to produce documentation containing good trade practice for metal roof and wall cladding, but changes will continue to be made to Building Codes and Standards over the next few years.

NZ Metal Roofing Manufacturers will continue to play a very active part in ensuring that good trade practice in metal roof and wall cladding is implemented for quality building under New Zealand conditions.

For various reasons there are some differences between E2/AS1 and the MRM specification for good trade practice as per the COP, and these fall into four classes:-

1. Areas where E2/AS1 is more conservative than the COP

It is desirable for the Building Consent to specify the use of the NZ Metal Roof and Wall Cladding Code of Practice. Where the Building Consent (a legal contract) specifies use of the COP, then the COP applies in place of E2/AS1. Otherwise, for buildings where E2/AS1 applies as shown in the table, the provisions of E2/AS1 may need to be followed

2. Areas where the COP is more conservative than E2/AS1.

Use of more conservative practices than shown in E2/AS1 still comply with E2, and in these instances the COP should continue to be applied as it provides the appropriate specification for good trade practice which may not be in E2/AS1 at this point.

3. Areas where E2/AS1 does not provide sufficient information to cover more than limited situations and may refer to the COP. Here the COP will need to be used.

4. There are some limited provisions in E2/AS1 which are not practical and here the COP should be followed to avoid damage or loss of durability.

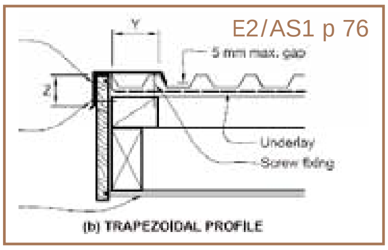
It is important for designers and practitioners to have and use both the COP and E2/AS1 for the provision of good quality metal roof and wall cladding.

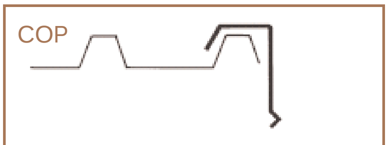
| Group | Action - 3604 | Action - non-3604 or 3604 & COP in consent | Action all |
|---|---|---|---|
| 1 | E2/AS1 | COP | |
| 2 | COP | COP | COP |
| 3 | COP unless E2/AS1 does cover | COP | |
| 4 | E2/AS1 except where wrong | COP | COP where shown |

Some specific instances of the above cases follow. This is not an exhaustive list.

## E2/AS1 more conservative Flashing Cover

E2/AS1 stipulates that barge flashings (Table 7, Fig 47 and 48) must give 2 ribs cover for buildings built to NZS 3604.
For buildings not built to NZS 3604 the Code of Practice allows one rib cover, with the exception of two rib cover for rib heights under 20mm and design wind load > 1.5 kPa. (Very High).



Drawing 5.2.C. Barge (Category A)

## Aprons

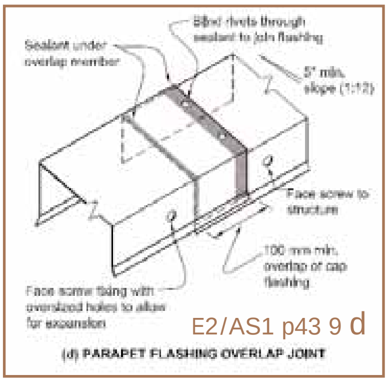
E2/AS1 stipulates minimum clearance below cladding of 35 mm (Table 7, p39) for buildings to NZS 3604.
The Code of Practice stipulates minimum clearance of 25 mm, and this continues to be the recommendation for buildings other than those built to NZS 3604.
Clearly 35 mm does comply with a 25 mm minimum.

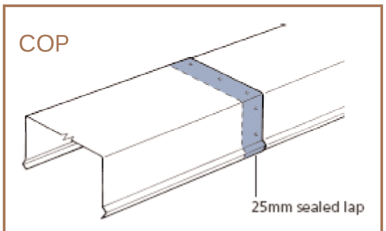
## Barge Size

Down face (overlap) is now 70mm minimum in very high wind zones (E2/AS1 Table 7).
Down face (overlap) is 50mm minimum in low, medium and high wind zones in both the Code of Practice and E2/AS1 (Table 7). The COP however qualifies this vertical face distance according to the type of wall cladding it covers.

## Sealed Laps

E2/AS1 stipulates that sealed laps must be 100mm (Fig 9 p 43) for buildings to NZS 3604.
The MRM and the DBH still disagree on the rationale behind this, and the Code of Practice specifies that sealed laps of 25 mm and unsealed laps of 100mm should apply to all buildings.



Drawing 5.2.1.C. Parapet

## Roof Pitch

E2/AS1 S 8.4.5 provides criteria for roofs up to 18 m in length and then refers readers to manufacturer's requirements for larger roofs. The COP (S 4.8.2) gives explanations and instructions for assessing roof pitch for various conditions depending on rainfall and size of roofs. COP allows up to 40 m before making changes.

## COP more conservative - Flashing Hems

Hooks and Hems are used on flashings to increase resistance to water penetration and to make the flashing edge safe and rigid.
The Code of Practice makes it clear that Hooks and Hems must be used unless the flashing height is increased by 25mm (COP Table 5.2).
Although the new E2/AS1 indicates that these are optional (S 4.5.1, Fig 5), the MRM position is that the Code of Practice still stipulates the minimum requirement and hooks and hems must continue to be used for profiled metal roof cladding flashings unless the height is increased.

## Fixing requirements

The COP (S 5.4.1) requires that screw fixings must penetrate timber purlins by 35mm minimum not 25mm as shown in E2/AS1 S 8.4.8.1.

## Fixing patterns

The comment in E2/AS1 S 8.4.8.1 refers users to the COP (S 7.9) for additional instructions and explanations on fixing patterns. The COP determines purlin spacing according to the design load on the building, and also makes allowance for the use of load spreading washers.
E2/AS1 provides a simplified or summarised explanation of fixing patterns (Tables 14 and 15). It is recommended that the fixing details in the COP (S7.9) be followed to avoid the possibility of transverse expansion.

## Fixing Cladding

Primary fixings must be used for fastening flashings to the structure as per the COP S 5.4.1. Rivets must not be used as primary fixings which is implied in E2/AS1 S 9.6.8 (Figures 92 and 94).
Note that over-flashings are incorrectly referred to as under-flashings in E2/AS1 S9.6.7 (d).

## Ambiguous or limited details - Compatibilities of materials

Users should note that determining the compatibility of materials is not a straightforward exercise and depends on the intended use of the materials. There are limitations to what can be summarised in tabular form such as Tables 21 and 22 in E2/AS1.
For metal roof and wall cladding reference should be made to the COP Table 2.7.2.
Clarification of compatibilities of materials is beyond the scope of this article and is intended to be the subject of future work which the MRM will advance.

## Durability - corrosion categories

Corrosion requirements for all buildings are dependent on the specific conditions existing in each particular case, even though a number of documents provide guidance or suggestions for assessing corrosion classes for different categorised regions.
The Code of Practice contains more comprehensive and industry agreed corrosion statements.
Note also that the terminology used by different standards and guidance documents is also different and is not interchangeable in: NZS 3604, AS/NZS 2728, E2/AS1 and the Code of Practice.
Although E2/AS1 does make comments about durability, the MRM interpretation and understanding of these comments is that durability continues to be as defined by B2/AS1.

## Valley Gutters

E2/AS1 specifies a set of design requirements for a valley gutter of roof pitch greater than 12.5 degrees (S8.1.6.2, Table 8 pp. 56,57), and for catchments up to 25m$^2$.
The comment is made that gutters for lower roof pitches or other catchment areas should be specifically designed and that additional information is available in the NZ Metal Roof and Wall Cladding Code of Practice. The COP does contain this information in S 8.4.5, and shows minimum pitch of 8° and maximum catchment of 35m$^2$.

## Purlin Spacings

E2/AS1 specifies spacings only for limited access roofs (Table 12 p.70A).
E2/AS1 does not specify spacings for restricted access or unlimited access roofs.
These are specified in the Code of Practice (3.9).

## Penetrations

If the single penetration detail shown in E2/AS1 (Fig 55) is used, it requires care to be taken because as shown it may not achieve even distribution of water flow or ease of over-flashing.
E2/AS1 S8.4.17 refers the user in the comment to the COP for guidance on design for penetrations. (Chapter 6 of the COP is on Penetrations and there are 12 details on flashing methods.)
The table in E2/AS1 limits allowance for catchment above roof penetrations (Table 17) and more detailed explanation and instruction on allowable catchment is contained in the COP S6.1.4.

## Inconsistent or impractical details - Boot Flashings EPDM

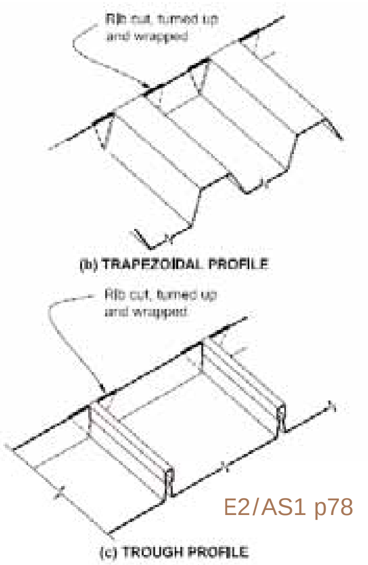
E2/AS1 contains an internal inconsistency with regard to compatibility where it allows EPDM Boot Flashings in Fig 53 but excludes EPDM in Table 22. The MRM interpretation is that E2/AS1 does allow Boot Flashings with unpainted galvanised and Zincalume® and MRM recommends this.

## Allowance for expansion

E2/AS1 shows for flashings and cappings (4.5.2, 6.4) that allowance is needed for light coloured or stainless steel over 12 m and for dark coloured steel, copper, and aluminium over 8 m. Table 16 for metal roofing merely says steel (any) 8-18 m requires sliding washers and aluminium requires oversize holes at any length and sliding washers from 8-12 m. Over these limits Specific Design is required. Table 4.1.6 in the COP provides a more detailed matrix in line with E2/AS1 4.5.2.

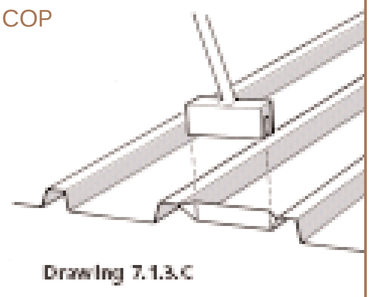
## Stopends

E2/AS1 S 8.4.13 requires the use of dog-eared type (or folded) stopends in all materials. This can only be achieved safely for low tensile steel or aluminium, and only the pull-up type stopend should be used for high tensile steel otherwise the material will tear.



E2/AS1 p78

COP




The compilation of industry documents such as E2/AS1 and the COP represent years of consultation across the industry by organisations such as the MRM.

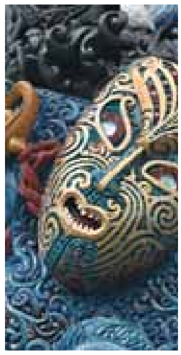
NZ Metal Roofing Manufacturers will continue to play a very active part in ensuring good trade practice in metal roof and wall cladding for quality building in New Zealand conditions.

## Further assistance can also be obtained by contacting your local member of the NZ Metal Roofing Manufacturers Inc.

# THE HEART OF MANUKAU

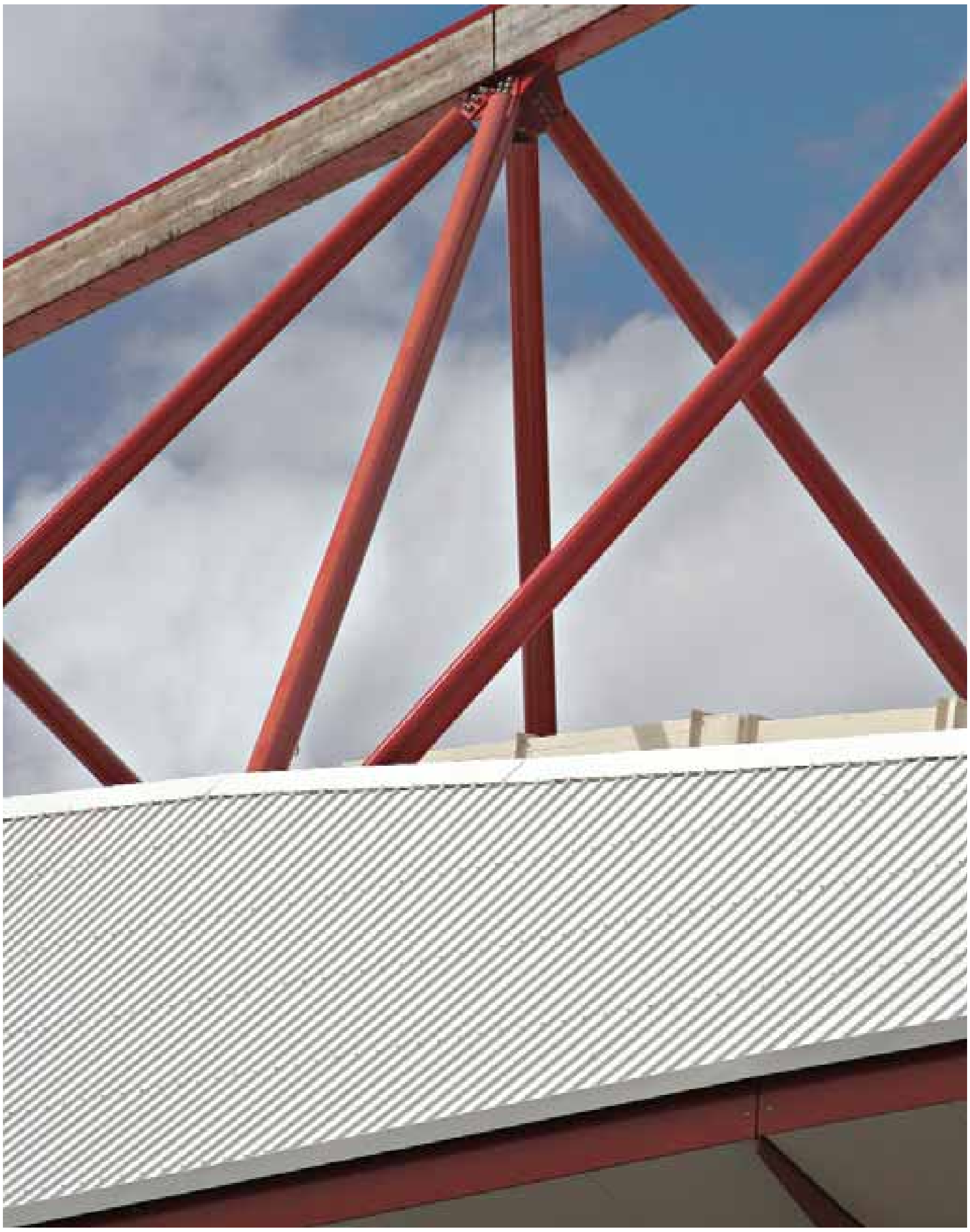
Situated adjacent to Auckland's Southern Motorway in the heart of Manukau City, the new Telstra Clear Pacific Events Centre is an eye-catching facility designed to embrace the cultural diversity of its surrounding community. The architectural form was inspired by both Maori and Polynesian building and craft traditions and expresses these in a temporary manner. In order to achieve this vision, Creative Spaces and Cox Richardson formed a joint venture for the project with a talented team from both architectural practices working together on what is seen as Stage 1 in the development of the 26 hectare site.

The centre caters to the cultural, entertainment, sporting and business needs of Manukau City with the 2,500 seat Sir Woolf Fisher indoor sports arena and the 700 seat fully functional Genisis Energy theatre combining to create a highly distinctive venue. Harry Street of Creative Spaces comments "The business plan for the development required the ability to use the two venues simultaneously meaning the concept design had to resolve a number of potential conflicts whilst maximising the benefits arising from the use of shared facilities. The arena had to be able to be easily and quickly transformed from a concert/sports venue to a flat floor venue for exhibitions or banquets." Similarly, the theatre can be reconfigured from a traditional 700 seat theatre to a number of different formats including 'catwalk' and 'theatre-in-the round'.



The eye-catching curves of the new Telstra Clear Pacific Events Centre meant special consideration was given to roofing materials. The complex roof required considerable flexibility and consequently Dimond Styleline™ was chosen as the profile best suited to fulfil the requirements. The use of Dimond Styleline™ allowed for design freedom while still remaining cost effective.

Street explains "The most difficult challenge in regards to the roof was resolving the roof geometry to avoid detailing problems. The roof segments are based on a toroidal surface, the extent of which is defined by its intersection with other curved or conical surfaces. So the roof surface does in fact curve in two directions, however due to the generally large radii involved the toroidal geometry has been successfully approximated with straight or slightly warped elements." Clarke Roofing was the roofing contractor responsible for the project and they developed special techniques to ensure the installation of the curved roof went as planned.



Adding further to the complexity of the construction was the 165 tonne steel truss running the length of the Pacific Events Centre which was designed to resemble a Maori waka. This huge steel structure was the result of months of careful engineering and fabrication by Grayson Engineering both at their workshop and on-site, culminating in the assembled truss being lifted into place by 3 cranes. This is thought to be New Zealand's biggest single span lift with one of the cranes a 200 tonne American crawler crane brought in specially for the project.

The end result of all the careful planning, inspired design and dedicated construction is a unique community-focused facility that aptly reflects the rich cultural tapestry of Manukau City.

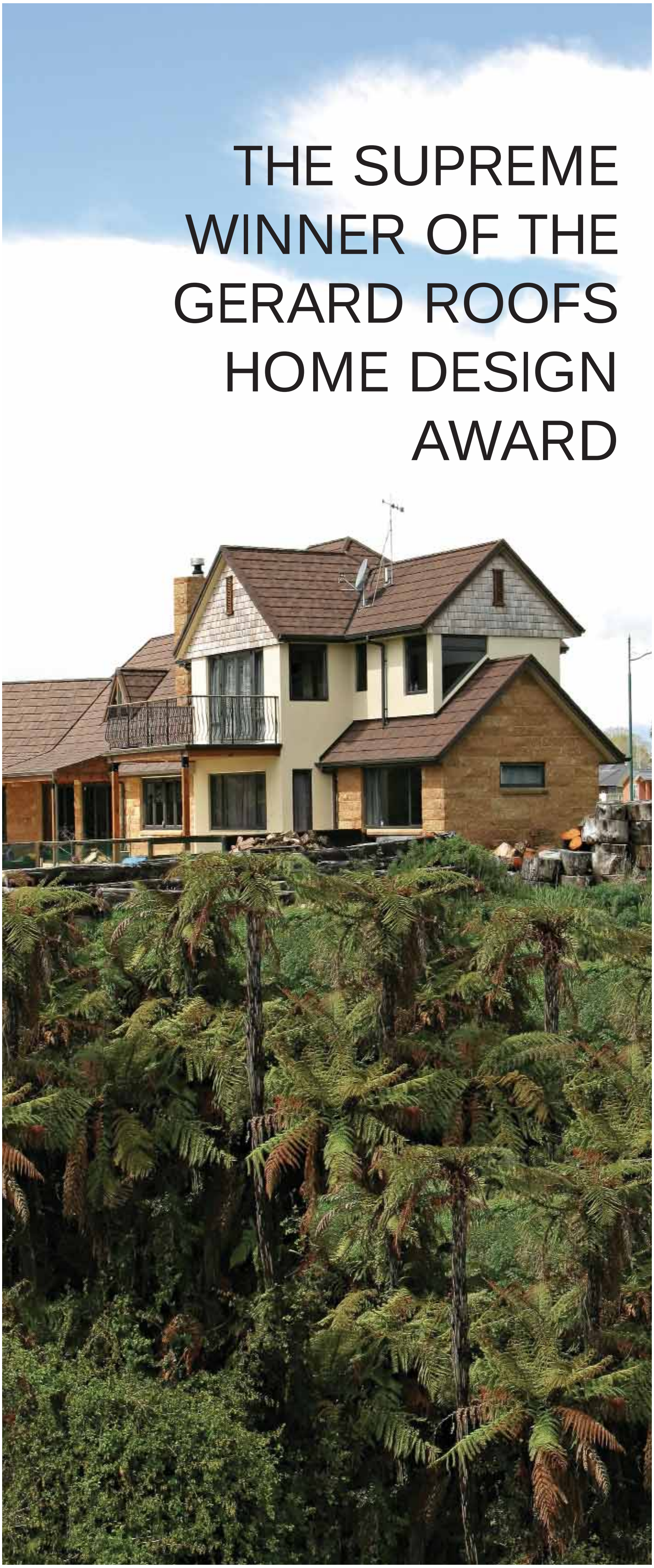
*Client: Counties Manukau Pacific Trust*

*Architect: Cox Creative Spaces*
*Contact: Harry Street*
*Telephone: 09 358 3777*
*Email: harry@creativespaces.co.nz*

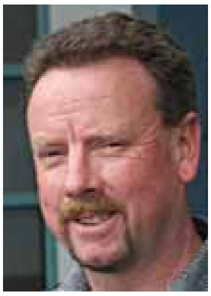
*Contractor: Mainzeal Construction*
*Telephone: 09 375 2100*
*Email: info@mainzeal.co.nz*

*Roof Manufacturer: Dimond*
*Telephone: 0800 Dimond*
*(0800 346 663)*
*Roof Profile: Dimond Styleline in Colorcote ZRX®*
*Colour: Habitats Off White*
*Website: www.dimond.co.nz*

*Roofing Contractor:*
*Clarke Roofing Ltd*
*Contact: John Matheson*
*Telephone: 09 579 9483*



# THE SUPREME WINNER OF THE GERARD ROOFS HOME DESIGN AWARD



*Ross McMillan, of McMillan Design, Hamilton,*

Michelle and Pat Peoples had a vision to create a family home that they could enjoy for many years. A home they, and their young family, could grow with and into. They chose a very unique site which, although within the city, is bordered by a large gully to the north-west which offers a semi rural aspect and privacy to the property. Their brief was not for a house but rather a large, spacious family home which would meet the long term objectives of their lifestyle and growing family.

The brief was given to Ross McMillan, of McMillan Design, Hamilton, who set about designing a homestead which ultimately was voted the Gerard Roofs Supreme Award Winner for 2005.

The site sits on the North-West side of the road, and has the gully outlook to the rear of the site. The building platform allowed enough space for the house and provided the perfect scenario to create the North facing courtyard area off the main living areas and lounge.

The brief required four bedrooms plus study, a separate formal lounge with the main living, dining and kitchen areas to be open plan.
A double garage plus a third garage and workshop were required with an attic to provide an extra storage space.

## Design response.

To make the most of the site the home sits to the front and the multiple layers and roof plans provide a sense of grandure to the entry which opens to a large lobby with the family room beyond. The 6 metre stud and natural timber is designed to give an immediate feeling of space and warmth.

Convenient access from garage to kitchen was created by positioning the main garage wing perpendicular to the main body of the house next to the kitchen and breakfast area. This effectively pushed the main living areas of the house away from the road creating a buffer to reduce traffic noise inside the house.
A small, sheltered morning courtyard has been created between the garage and lounge wing.

The living area, entry, stairs, and lounge have timber raking ceilings, large exposed rafters and beams with timber sarking providing an impressive sense of space an natural ambience. ]Three alpine style dormer skylights provide an interior feature and successfully combine with the exterior appearance to create the style of home Michelle and Pat were looking for. The use of lightweight roofing material meant very large internal ceiling spans could be achieved with native timber beams without the need for steel support.

Consideration was given to the indoor / outdoor flow from the living areas to the rear courtyard that was to be established between the house and gully. This took full advantage of the private, northerly aspect which enjoys the sun for the majority of the day.

The centrally positioned kitchen is easily accessible from all parts of the house, and enables Michelle and Pat to keep a close watch on the children playing outside.

The master bedroom,ensuite, wardrobe, and study are situated in the upper level, which, while reducing the size of the footprint on the available building platform, also helps create the overall presence of the structure that a single storey house lacks. A balcony opens off the master bedroom to the north providing sunshine and views over the gully and courtyard below.

The architecture had to be along strong, bold, with traditional lines, harmony, high aesthetic values and appeal. To enhance the appearance of the house, Gerard Oberon Shingles and glazed Hinuera Stone were used giving the home solidarity and presence. Cedar timber shingles have been used on the gable ends of the main roof structures. Considerable thought has gone into the selection of materials which complement each other in texture, style, colour and durability.

Overall, the use of strong architectural design and high quality, aesthetically pleasing materials has resulted in a very successful, comfortable and beautiful home with very happy owners.

## McMillan Design

McMillan Design is a small Waikato based Architectural Design company who specialize in mid to high spec housing and small to medium scale commercial and industrial work.

Director Ross McMillan has a strong belief in modern architectural styles, with many of his projects around the Waikato being testament to this.

"I had a stint working in Queenstown for Architect John Blair, who, in my opinion, produced some of the best Architecture in the country. This experience together with 2 years based in London has given me an appreciation of what good design is all about".

'I'm happy to say," says Ross,"that with incredibly small budgets, compared to other countries, we produce a very high standard of architecture in New Zealand".

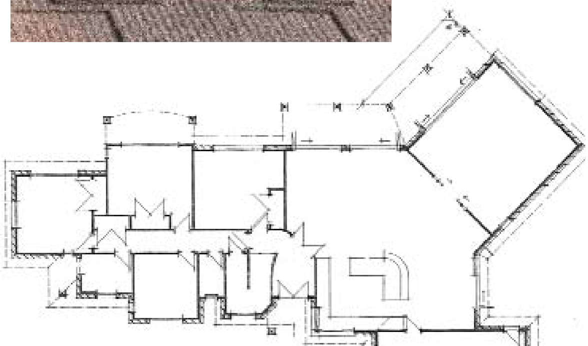
Ross prides himself in listening to the clients requirements and delivering a design that matches or exceeds that brief.

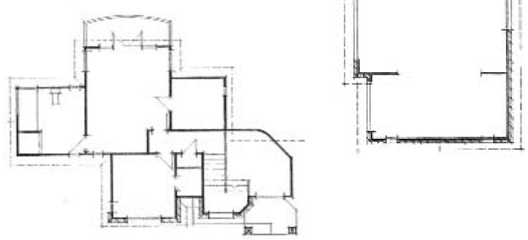
Client: Pat and Michelle Peoples.

Architectural Designer:
McMillan Design,
Ross McMillan,
Telephone: 07 825 2244

Roofing Manufacturer:
Gerard Roofs
Telephone: 0800 104 868
Profile: Gerard Senator Shingle
Colour: Bark

Roofing Contractor:
Harvey Roofing Centre
Telephone: 0800 104 868





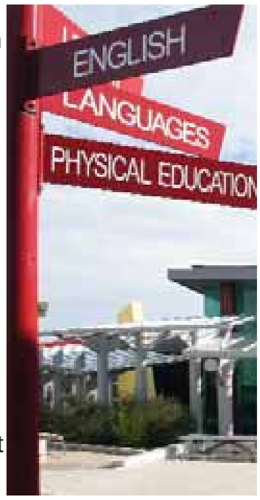
# JAMES HARGEST COLLEGE LIBRARY DEVELOPMENT

This Library development was the latest project for The James Hargest College who have had a long association with Architects Sinclair Knight Merz. Recent projects at the college had been the administration building and 'E' block, both of which where quite exuberant in their architectural character.

## Design brief

As with many schools of this vintage there were a number of architectural styles present on the campus, the most recent of which are quite radical in appearance when compared to the older buildings.

Of this work the iconic administration building had been regarded favourably. Those representing the school felt the library should display some importance on campus. A contemporary library is the schools information centre and invokes the notion of 'the heart of study'. It was thought appropriate the library should be perceived to sit collectively with a group of student centred buildings. The project was thus to provide a physical link in students' collective minds of the sports, cafe, library, information and student service areas, as all being part of "student territory". This notion was to be reinforced by the student services unit being taken out of the admin/staff area and incorporated in the new complex.




The original library was housed in a standard "Nelson" block, and had a number of deficiencies including space, inability to adapt to IT requirements and a variety of environmental problems. To assist in keeping costs down the brief was to retain as much of the old Nelson block as practical. The old library somewhat blocked the route from the main school entrance to those student areas often used by the public after hours. The site was also strategically located on the western side of the main school quad.

*The exisiting administration building, shown here, was regarded as the icon of the school image.*

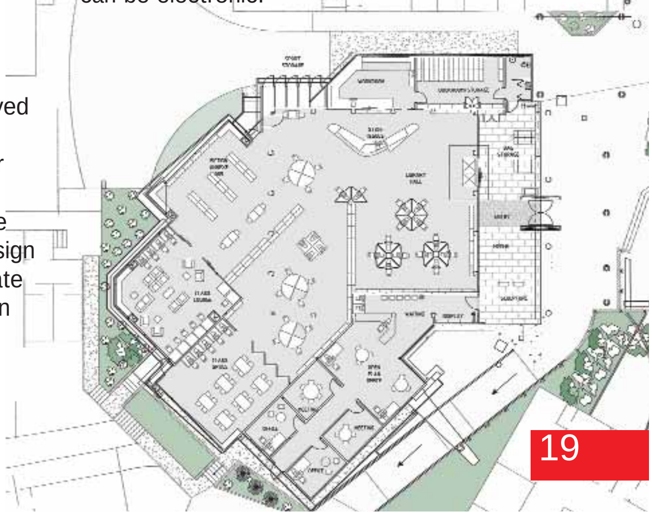
## Design statement

The design intention is to “knit” the externally associated visual elements (colour, materials and forms) of the existing school buildings to a new library building creating a student heart that clearly belongs to the wider school complex but retains its own status reflecting the central importance of the library, the contemporary information centre, to student life.

To aid “wayfinding”, a formal entrance gateway was created leading from the schools main entrance carpark. The gateway composition takes reference from the design of the nearby landmark administration building in form and colour. A pathway then curves around the library sheltered by a glass canopy that is intended to eventually lead to and bind the Hargest Centre, E block and library to create a unified, accessible and covered student centred heart to the school alongside the main quad.

The library frontage was conceived as a bold double height curtain glazed foyer composed together with four columns created to address the western edge of the main school quad. A cultural design solution seemed more appropriate for this college library rather than the recently over used abstracted minimalist design approach. The built response is a composition imbued with a touch of monumentality raising the status of the library among the collection of buildings bordering the quad. The four columns have been given evocative South Pacific treatment to their capitals bringing a regional connotation of “standing tall” to this place of study.

Following this lead, the foyer becomes opportunity for art installation. To date the foyer has included two installations, a mural by resident art teacher Al Pannet and one by local artist John Wishart representing the jaws of a Taniwha (featured in the legends of Foveaux Strait). The latter is positioned to greet those arriving along the pathway from the main entrance. The foyer is wired so that future installations or displays can be electronic.



The core library building has been kept intact but re-clad in Quartz zinc cladding. This permanent, but soft textured, cladding will weather well and adds contemporary prestige to the library along with  the green curtain glass frontage to the quad. The low glare and matt patina that zinc gives the building adds a potent and durable appearance when contrasted with the lightness and transparency of glass.

The eaves have been extended on the library roof to reduce glare through clear-lights and the original skylights were removed. Glare and temperature fluctuations from these sources had been of environmental annoyance to the staff and students as well as a source of leaks.

A low roof pitch resulted from a juggle between maintaining sufficient ceiling height, in the rooms below, while keeping the existing upper windows clear of obstruction.  This has lead to choice and care in the detailing of tray roofing to avoid damming and the risk of water ingress.

The existing mezzanine has been removed from the library interior because it had been a source of numerous problems for library staff and was difficult to service. There is extensive use of internal glazing to enhance sightlines and passive surveillance. The configuration is designed to be flexible, to keep direct UV light away from books, and maintain good surveillance sightlines from the issues desk.

## Architects Sinclair Knight Merz.

Architect Rob Ansell lead the design team for The James Hargest College working closely with Project Manager Ian Sutherland. Sinclair Knight Merz is a multi disciplinary consultant group represented with branches throughout New Zealand.  Rob heads SKM's New Zealand architectural design group which operates from Sinclair Knight Merz Wellington Office while Ian undertakes project management from the SKM office in Invercargill. Building services, lighting, fire and structural design for the project were all undertaken by SKM personnel.

*Client:*
*The James Hargest College.*

*Architect: Rob Ansell*
*Sinclair Knight Merz.*
*Telephone: 04 914 8429*

*Project Manager: Ian Sutherland.*
*Sinclair Knight Merz*
*Telephone: 03 218 7102*

*Main Contractor:*
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*Telephone: 03 214 1669*

*Roofing & Cladding Manufacturer:*
*Calder Stewart Roofing*
*Telephone: 0800 115 232*
*Profile: VM Quartz Zinc*

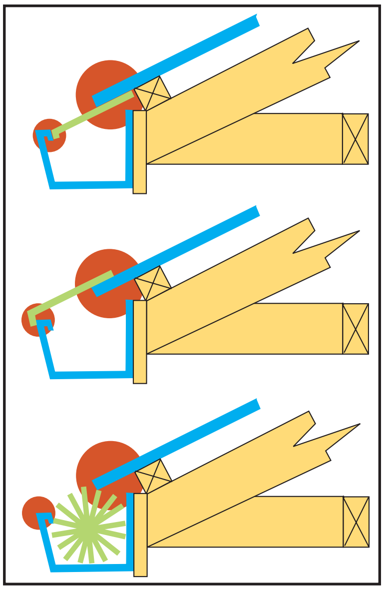
# GUTTER LEAF PROTECTION SYSTEMS

## A solution or a problem?

In recent years there have been a number of products launched onto the market which claim to prevent the blocking of gutter or spouting by leaves. There are two types - one which fits into the gutter, for example like a brush, and those which are attached to the bottom edge of the roof. This latter type is typically made of some sort of mesh or grid of plastic or metal, and there is even one made of slit and expanded Zincalume steel.
These are attached under or on top of the bottom of the roof and over the gutter, and the claim is that leaves will be trapped on the mesh while the water flows through into the gutter. The leaves may or may not get washed over the front of the gutter.

There are some concerns over their effectiveness under New Zealand conditions, for example, what happens when the mesh is covered in broad-leaves? Do leaves actually wash off or not? The maintenance said to be required is no less than you should do with your gutter anyway.

The significant concern of the NZMRM as manufacturers of steel based roofing and guttering is the potential corrosion effect of the product on the roof cladding or gutter. All these products are fixed to the underside or topside of the lower edge of the roof in some manner, often by screws penetrating the roofing, but also by clips.



*Irrespective of the material used a leaf protection system can create permanently "wet' areas wherever it touches or covers the roofing material*

### This gives rise to several concerns -

❏ The fastener if made of incompatible material will damage the roof metal.
❏ However fixed, the attachment results in permanently wet areas of greater or lesser size where the product touches or covers the roofing material.
❏ The in-gutter products similarly can result in permanently wet areas on the bottom of the gutter.
❏ All of these products inhibit the ability to clean out the bottom of the gutter by preventing access, and possibly impeding free flow of water.

This means that such installations contravene warranties from materials suppliers NZ Steel and Pacific Coil Coaters, and manufacturers NZMRM, and AHI Roofing.

For a metal tile roof, damage to the bottom of the roof may only involve replacing the bottom course of tiles, but for long run roofing it means replacing the entire roof, so this warranty statement is serious and means any damage caused could be extremely expensive, and would all be borne by the homeowner.

Damage to the gutter will be caused if this is kept wet either by the device or by ponding or wet sediment - refer NZMRM COP sections 2.6.5 "Corrosion caused by Ponding" and 8.4.3 "Eaves Gutters" … "permanent leaf guards do not provide the protection claimed ………. they allow finer particles to collect on the sole of the guttering ………. will lead to early corrosion.." This will result in the need to replace the gutter.

Neither of the material supply companies will support warranty claims for damage caused to roof or gutter by gutter protection type products, and have asked us to make this clear to our customers and installers.

Therefore we must strongly recommend to designers, installers, roofing installers and particularly to homeowners, that they do not install or have installed any of these products in conjunction with steel roof cladding or guttering.

** For a copy of the MRM Code of Practice please contact:*
*Robynne Craig,*
*NZ Metal Roofing Manufacturers Inc.*
*Private Bag 92066, Auckland.*

# ZINC IS GOOD

Zinc and roofing go hand in hand and have done so since the 1800's. Roofing products incorporating zinc have been used to roof the historic buildings of Paris to the garden shed in your back yard and for very good reason. Zinc is truly an amazing material. Zinc has the ability to protect less noble materials from rusting, such as the steel base on "galvanised steel" or where it's used in a pure zinc sheet application it protects itself.

Zinc sheet used in roofing in its purest form, allows a patina (zinc hydroxycarbonate) to form which is insoluble in rainwater, and thus significantly reduces the corrosion rate. The durability of Zinc can be affected by some acid pollutants, the main one being sulphur dioxide (S02). During the 1970's Europe acknowledged S02 pollution of the atmosphere as a major environmental problem and have taken the required steps to significantly reduce it. The reduction in the corrosion rate of Zinc roofing has been staggering….up to one third. Fortunately in New Zealand, with the exception of geothermal areas, S02 is not a significant pollutant.

Pure zinc roofs in Europe currently have a life expectancy of up to hundred years with little or no maintenance.

Not only does zinc make sense to use in roofing it is also an essential element for all living organisms. Humans are unable to synthesise their requirement of zinc and need to consume zinc - up to 15mg per day for men to meet the World Health Organisation recommendations. Unfortunately in many developing countries there is a deficiency of zinc in the diet. As a result the World Health Organisation ranks this as the 5th health risk factor for developing countries and attributes 800,000 deaths worldwide to zinc deficiency.

Recently there has been information issued by the ARC over concerns of zinc build up in Auckland harbours. The ARC is concerned that the level of zinc, at selected sites within the Manukau and Waitemata, is higher than natural background conditions and is increasing. For every organism there is a range of optimum zinc concentrations. The ARC stated in the July 05 Storm publication "we don't yet know the concentration of zinc at which cockles, for example, will start to disappear………" The ARC also acknowledge that the two common methods for measuring these effects suffer from large uncertainties and are working with NIWA to develop an Ecosystem Health Model to better understand the link between sediment contamination and the effects on animals.

In 2003 the ARC commissioned Kingett Mitchell to look at zinc run-off from roofing. Kingett Mitchell determined that the main source of zinc run-off, from roofing, was coming from unpainted galvanised roofs. In 2004, the MRM commissioned Tonkin and Taylor to conduct a similar study to understand the amount of zinc run-off from various types of metal based roofing. Both studies concluded, not surprisingly, that the highest level of zinc run-off comes from unpainted galvanised roofs (100% zinc over a steel base often referred to as galvanised iron). At the other end of the scale, also no surprise, was painted zinc/ aluminium coated steel. The big difference in the results was with unpainted zinc/ aluminium coated steel (43.5% zinc and 55% aluminium) where the Tonkin & Taylor result was significantly lower (ZINCALUME® is the most common brand of this material in New Zealand). The MRM study used controlled test rigs with over 500 samples taken over a period of 8 months. All the run-off samples were tested in an internationally accredited New Zealand laboratory.

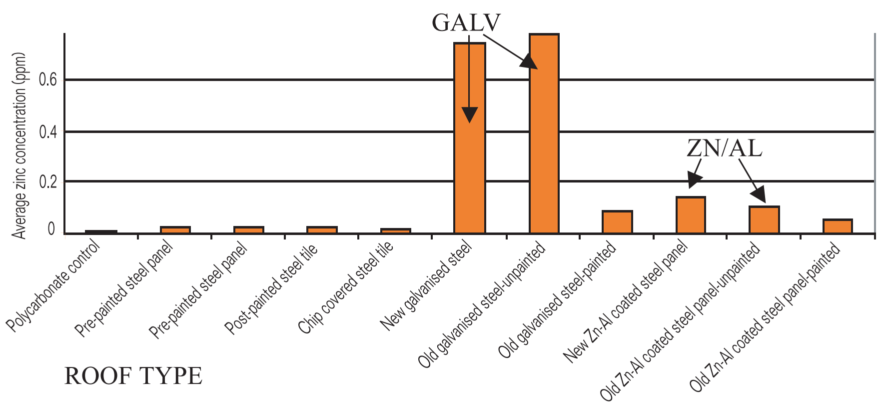
*Test Rigs used by MRM to collect over 500 samples over 8 months.*

In contrast, the ARC report involved only 5 samples. Even so the difference was surprising and on investigation it was discovered that one of the ARC samples was taken from a contaminated roof. The roof had cement spilt on it, which due to its high alkaline content reacts with the aluminium and accelerates zinc run-off. However, on the basis of these results the ARC issued a draft policy on roof run-off, without

any public consultation and without following any of the formal processes required by the Resource Management Act. They concluded that painted roofs, due to their low zinc run-off, didn't require any water treatment, but that galvanised iron (their term) and unpainted ZINCALUME® did. The reason given for including ZINCALUME® with galvanised iron was due to the wide range of results - influenced by a contaminated roof!
The below results from the MRM test data clearly show that unpainted zinc/aluminium is more in line with results from painted roofs rather than unpainted galvanised roofing.

ZINCALUME® has been on the market in New Zealand since 1994. The aluminium content of 55% gives it up to twice the life of galvanised products in severe environments. As a result of its improved performance it is now used in nearly all new pre-painted roof systems and over 70% of unpainted applications. Not only does this mean good news for all building owners, it has and will increasingly have a dramatic impact on the amount of zinc run-off from roofs. Remember it is not known at what level zinc in waterways goes from being a positive to a negative and in ARC's TP217 it indicates the biggest issue for Auckland harbours is actually sedimentation build up - “Sediment run-off from land to sea is an increasing threat to the Auckland Region, not only to inter-tidal flats, but to the sub-tidal coastal realm as well.” There is also the question of whether the zinc is bio available or not. All run-off from roofing is bio available, but this allows it to quickly form non-bio available zn-complexes with soils/sediments and is also diluted by large volumes of harbour water. Zinc from other sources is significant, such as car tyres that generate zinc oxide, which may directly accumulate as sediment in harbours/estuaries.

*Fig 1: Zinc run-off concentrations for various roofing materials"*

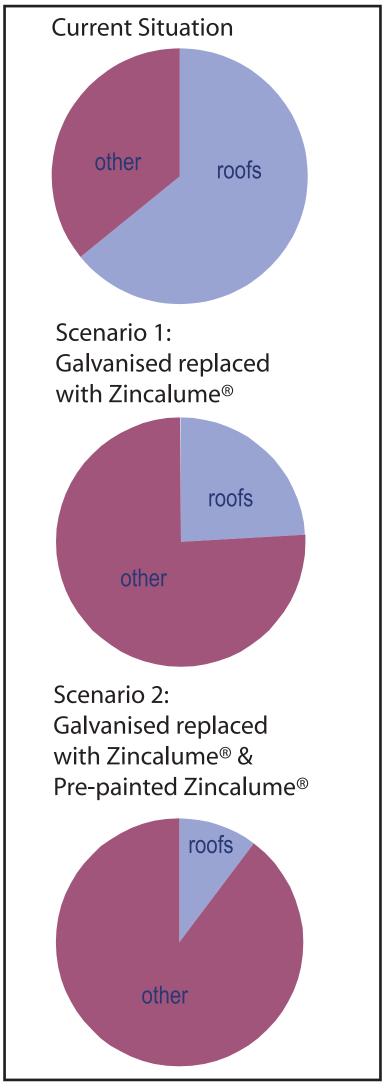



Zinc run-off from roofing is just one component in a broader urbanisation problem and with the positive environmental changes made over the last decade in metal roofing, it should be supported by the ARC not targeted, as the below graphs indicate. Based on ARC data, Auckland City stormwater catchment carries about 12800kg/year of zinc of which galvanised based roofs contribute 8200kg/year. In Figure 2, Scenario 1 shows the reduction in zinc from roofs if they were all replaced with ZINCALUME®. Scenario 2 shows a more realistic result where the galvanised roofs are replaced using a ratio of 2:1 for pre-painted ZINCALUME® to unpainted ZINCALUME® being the replacement material. This ratio reflects the portions sold in each product group in the current market. With no change in current practices zinc in the water ways, over time, can be reduced by 20 times - now that's GOOD.

The MRM is actively working with other parties and have offered to form a working party with the ARC so we can all work towards protecting the environment. We believe this must be done on the basis of correct analysis, well understood and researched scientific information.
We hope the current confusion will soon be clarified as we are very confident that the metal roofing industry is doing more than it's share to improve the environmental sustainability of our products and that they can be specified, not only on this basis, but for their durability, function and form.

ZINCALUME® is a registered trademark of BlueScope Steel Ltd.

*"Fig 2 Reduction in zinc run-off from all roofing by replacing galvanised roofs*



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