A PERMANENT TENT
A retrospective and reconsideration of the A-Frame Chalet in New Zealand.

A thesis submitted to the Victoria University of Wellington in fulfilment of the requirements for the degree of Master of Interior Architecture

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It’s customary for an author to thank all the people who helped them with their book. But as this is a thesis, I’d like to thank some of the people who helped me with my journey through the School of Architecture.

Peter Anderson for his support and belief in me over the past five years. None of this would have been possible without you, thank you.

Christina Mackay, thank you for your wisdom and being a constant sounding board. You were the reason I chose to pursue Interior Architecture.

To the greats here and the other place, you continue to be a constant source of inspiration. In particular, the late great Sir Ian Athfield and the positively timeless Roger Walker. Your seminal work ignited my imagination from a very young age. I am eternally in awe of your contribution to architecture.

I’d also like to acknowledge Gordon Duff, Sam Sherriff and Scott Kersley who took time and patience to invest in the formative years of my architectural interest.
“The tent, moreover, was not something that replaces the ground on which it sits. It either decayed (or grew) after we stopped using it, or it became something we took with us when we moved on to the next campsite. Architecture here is no more and no less than an extension of our clothes, our furniture, and our tools into a form that can, if only for a night, enclose us. It is at the same time no more and no less than a conventionalisation of the nature we still find around us.”

**BETSKY, Furnishing the Primitive Hut**

“Alteration is more like a duet than a solo. It is about the art of response as much as it is the art of individual genius; it sets out to make a concord between the new and existing, or even a discord. Either way, it is a proposal concerning how the designer may form a response in their new work to the host building”

**FRED SCOTT, On Altering Architecture**
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1. Abstract

The mid twentieth century A-Frame chalet holds a special place in the memories of generations of New Zealanders. Reminiscent of summer and winter getaways, it is perhaps the most poignant architectural representation of leisure and relaxation.

The novelty of unconventional sleeping arrangements, intimate spatial dynamics and the somewhat ephemeral nature of the typology combined to imbue the A-Frame with a strong emotional association. This research intends to harness the nostalgic connotations and use this, along with contemporary interior architectural theory, to reinterpret the A-Frame as a relevant form of accommodation suitable for twenty-first century vacationers and permanent inhabitants alike.

Early New Zealand A-Frames were supplied as kit sets to be erected by owners with rudimentary knowledge of construction techniques. This ‘low-end’ means of arrival, understandable given the purpose of the dwelling, resulted in a typology that was regarded as a lesser relative to the primary (and more conventional) home. Awkward interior spaces were regarded as novel and tolerable for the duration of the vacation.

There is limited academic publication on the A-Frame Chalet and its place in New Zealand architectural history. The aim of this research is to identify the key proponents of the style and use this as a base for a modern reinterpretation encompassing spatial and material issues.

The modern tendency toward compact housing and preservation of architecturally distinctive buildings favours a new appreciation of the A-Frame. A reevaluation will address limitations of the original and re-interpret the A-Frame from nostalgic novelty to spatially responsive contemporary architecture.

1.1 Research Question

How can an existing A-Frame chalet be redesigned to reflect the history of the typology and address spatial desires of modern antipodean user groups? With the application of interior architectural theory, can the A-Frame form be elevated from nostalgic novelty to spatially responsive contemporary architecture?
1.2 Introduction

The triangle’s innate structural integrity has been employed for centuries as an efficient and robust means of shelter. Examples of the form can be identified in most primitive cultures as permanent dwellings or temporary refuge. The traditional tent form is an archetypal representation of man’s intrepid nature, the manipulation of environment through architectural response.

This research regards the A-Frame as an evolution of the traditional tent form, the most elemental of forms merged with the permanence of a conventional built dwelling - the permanent tent. The strength and longevity of conventional building materials integrated with the tradition of the form and combined to become the A-Frame Chalet.

Material availability and economy has determined the purpose and life span of the form. Primordial examples employed animal hide as a means of weather protection, tethered to a rudimentary timber frame (Randl 12). Progressively technology has improved the usability and longevity of the shelter, indeed the form itself has morphed into an inhabitable version of the most basic of built forms.

Evocative of its European roots, the form became synonymous with Alpine recreation. The evolution of the form was not limited to sub-zero locales however, as the form has been successfully applied in coastal and temperate climates. A tent for all seasons.
And in New Zealand? The nation is steeped in ‘do it yourself’ tradition, an enduring pioneering spirit that has permeated our culture since colonisation.

Prefabricated dwellings then, should by their nature, appeal to the kiwi consciousness. The ability for the purchaser to take a ‘hands on’ approach to their build should have been an easy selling point for the brazen entrepreneur.

DIY perhaps, but New Zealander’s aesthetic aspirations are more inherent than one would like to admit. Individuality and prefabrication is a curious dichotomy that the antipodean psyche finds difficult to process. Indeed, this dilemma has been pertinent since the early Railway Houses; identical in form in detail, unique in personal décor expression. What can’t be inherently altered can be superficially gilded as an expression of the owners taste.

The ‘Prefab’ concept was at its commercial peak in the early 1970’s with the McRae-way ‘A-Frame’ Chalet. Though adaptable in detail and available in three different variations, the McRae-way was the harbinger of the acceptance of kitset homes. It is of note that at this time society had a much more relaxed approach to architecture. Sir Ian Athfield and Roger Walker, the \textit{enfants terribles} of New Zealand architecture had already unleashed their fanciful confections to an unsuspecting nation, inciting a dramatic wave of architectural expression.

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{Roger_Walker's_Johnson_House_1970.png}
\caption{Roger Walker’s Johnson House 1970. Note steep roof pitch and skylights.}
\end{figure}
High pitched roofs were favoured over their lower slung counterparts, windows were placed at unconventional heights, orthodox layouts abandoned in a knee jerk reaction to the traditions of yore. Walker’s early Wellington Club project 1968-1972 (dem. 1985) (Figure 4) represented a perfect embrace of the ‘shift’. The staid peerage of the Club embracing the radical proposal was perhaps the ultimate triumph, Walker himself said of the building:

“When I was designing the Wellington Club, I felt intuitively that some time in the future such a valuable site could be threatened by the demolition contractor and replaced with a twenty storey tower... so I deliberately over-structured the building - it’s massively strong - in the hope that the resultant heavy cost of demolition might dissuade future entrepreneurs from destroying it’ (Melling, 1)

In 1972, Lower Hutt’s Dowse Museum curated an exhibition of the work of Walker, Athfield and Scott et al. entitled ‘The New Romantics’ (Architecture Now). Also included in the exhibition was the work of Claud Megson, who, according to Peter Beaven (architect and author of the cited article) “had a remarkable talent for astonishing manipulation of small spaces into great spatial experiences”(Beaven). On one hand you have outlandish built forms, in the other, tangible evidence that small spaces can be appreciated far beyond the sum of their parts. Small spaces and strong forms. A pattern was starting to emerge.

Gone were the staid conventions of previous decades, the 1970’s were a time of great architectural awakening. New Zealand was listening and primed for a change. One might even attribute Walker and Athfield with paving the road of acceptance for the A-Frame Chalet in New Zealand.

The story, of course, does not start and end there. It is in fact a case of déjà vu, heralded by post-war America and an architect by the name of Andrew Geller.
1.3 Methodology

The methodology for this research began with an overall historical look at modern A-Frames in America and New Zealand. Physical models were built as research, an interview and archival review was also conducted.

This lead to an intuitive design response which upon reflection, needed philosophical stance on which to develop iterations further. Case studies were investigated which informed further design process.

Developed design constantly referred to literature, research and theory when appropriate.
Design response

- Literature Review: Formation of ‘stance’
- Case Studies (International)

Informed Design Process

- Re-evaluation of design
- Development of design
- Detail design
- Critical Reflection

Development of design

Critical Reflection

Detail design

Re-evaluation of design
2. Historical Background

2.1 The A-Frame in America

It is generally considered that architect Rudolph Schindler was the first to introduce the A-Frame to America. In 1936, Schindler designed, for Gisela Benatti, an open plan gable ended holiday home; a simple structure that predated the A-Frame’s period of popularity by some twenty years. In order to circumvent the planning regulations of the exclusive resort, Schindler rebranded the dwelling as ‘Norman Style’ (Old House Journal). Whilst not adhering to a conventional style, the A-Frame was tolerated under a guise. That it took another twenty years for the form to be considered an architectural style of merit beyond mere rudimentary shelter and storage speaks volumes.

The first iteration of an A-Frame to capture the imagination of the public was designed by John Campbell and entitled the ‘Leisure House’ (Toolan). Campbell exhibited his building at the 1951 San Francisco Arts festival and experienced enough interest to begin selling the plans and kit sets. It was not the novelty of the form that necessarily endeared the style to the public. It was in fact the network of suppliers throughout the west coast that, combined with artistic impressionism, marketed that A-Frame as a desirable must have for the aspiring middle-class.

Public interest in the A-Frame acted as the catalyst by which architects began experimenting with the form in earnest. The success of Campbell’s ‘Leisure house’ inspired clients to seek a more personalised iteration of the typology.
American architect Andrew Geller (1924-2011) took Campbell’s cue one step further by removing the kitset aspect and introducing bespoke opportunity. Geller’s beach houses were just that - Beach Houses; thus, the Alpine vernacular so imbued in the style was seemingly at odds with its adopted environment. Geller addressed this shift in application by utilising modern (at the time) materials with limited thermal considerations as appropriate to the temperate environment. The key driver for the application of the form was the innate strength of the triangular form and its ability to resist high wind loads in coastal areas. It should be noted that Gellers later iterations of the form steered away from the purity of the ‘A’ shape, though fundamentally remained true to the nature of unconventional provocative architecture.

The first of Geller’s A-Frame’s was the Elizabeth (Betty) Reese House in Long Island, New York. This gained exposure after being featured in the New York Times in May 1957 (Gordon 22). Reese provided a carte blanche brief; the only prerequisite being “intimate contact with the sea and sand, instant release from her busy schedule in the city” (Gordon 24).

Sadly short lived, the Reese House was destroyed by a hurricane after only months in existence. The client was undeterred. Geller was promptly commissioned to design a second Reese house, this time on an inland wooded site. The architecture responded to the setting in as dynamic a way as the original did, though not adhering to the A-Frame style.
What makes the first Reese house unique is the A-Frame structure coupled with adaptable interior spatial forms. This resulted in a building that invited casual occupation, its playful spatial dynamic countered with its coastal location captured the imagination of the American public and heralded the start of Geller’s illustrious ‘Vacation House’ period.

The interior of the house was pared back; simple timber finishes and no insulation suggested only seasonal inhabitation. Geller did, however, consider the solar gains of the interior by designing a *brise soliel* that provided space for private sunbathing whilst protecting the ground floor living area from the sun (Gordon 104). A settee was built into the living room that doubled as extra bedding should the need arise. Here we see spatial efficiencies being considered from the outset.

Reese’s own bedroom was located on the first floor of the structure and accessed by means of a moveable ladder. Spatial division was achieved by fabric sails, denoting the ephemeral nature of the interior and transient nature of inhabitation.

Geller’s early career was built upon the beach house ‘movement’ in Montauk, Long Island. He went on to design numerous iterations of the form, each with its own personality particular to the whim of the client and the architect’s interpretation of the brief. Geller’s popularity, though not initially appreciated in architectural circles, laid in his ability to blend whimsical folly with practical and spatially aware architecture. This particular combination of facets could be applied to the early work of Walker and Athfield in New Zealand, be it some twenty years later.

1. *Brise soliel*, a fixed or movable device designed to block the direct entrance of sun rays into a building (Harris 74)
2.2 ‘Leisurama’

The success and potential financial reward of Geller’s beach houses did not go unnoticed by developer Herbert Sadkin. Commercial success, though tasted by Geller, had the hallmarks of a highly lucrative proposition. Geller’s initial designs continued through iterations in his private commissions. Economy of scale however, dictated that a more conventional approach be taken and the design be reined in to fit a more conventional method of construction. Sadkin commissioned noted industrial designer Raymond Loewy to create a housing project of beach houses. Loewy assigned the task to Geller, at the time the vice-president of his Housing and Home division (Sahre 170). To better understand the project we should consider that at the time Loewy was focusing on automotive design. This mind-set of production line manufacture coupled with Gellers’ innovative back catalogue should, all things considered, have been a resounding success.

Leisurama was introduced to the public in 1964, courtesy of the seventh floor of the Macy’s department store in Manhattan (Sahre 26). A full sized ‘showhome’ was erected, and a catalogue of additional extras was available to personalise the homes. The full ‘turn-key’ package included furniture, linen and the choice of varieties of cutlery. Here we see the interior architecture extending beyond the building envelope and operating on a much more intimate scale.

If Leisurama is the mid-sixties acme of architectural ‘off the shelf’ customisation, its automotive counterpart the Ford Mustang can be considered the parallel accessory. What better then, for the customers that opted for the ‘Carport’ option, but to have the motorised manifestation of the Leisurama ethos nestled next to their own slice of pre-packaged paradise. Released in 1964, Ford’s Chief Executive Lee Iacocca commissioned a car for the people; an off the shelf creation with extras only limited by the customer’s imagination and budget. This mode of purchasing reflected the buoyant post-war economic climate and the idea of the product being as close to bespoke as an ‘off the shelf’ consumable could be.
The base model was the medium upon which a catalogue of variations and accoutrements could be added according to the taste and budget of the customer. As with Leisurama, the economy of the Mustang was achieved by deriving parts from existing models negating the extra tooling costs for bespoke components. One could surmise the process to be as close to pre-cut framing as an automobile could be. Initial sales were stronger than the 100,000 units anticipated, and within 18 months of its release the Mustang had exceeded one million units. (Iacocca 79)

Iacocca’s vision was to produce a vehicle that appealed to all markets, from the entry level purchaser to the high end customer. Alvin Toffler’s Future Shock addresses consumerism and mass production, succinctly noting that “the customer wanted custom-like cars that would give them the illusion of having one-of-a-kind” (Toffler 244). This is the same ethos that applied to the Leisurama customer.

Where the parallels end, though, is the financial reward endowed on the subject companies. Beleaguered by unanticipated fiscal setbacks, Leisurama failed to deliver on its promise. Production was paused before the completion of 200 units, 800 short of the original forecast, due to unforeseen cost increases (Sahre 22). Land value had soared, and reticulation services into the barren reaches of Long Island proved to be a financial hindrance that absorbed profit as voraciously as the Ford V-8 guzzled the seemingly inexhaustible supply of gasoline.

The post-war affluence and availability of coastal land, once the catalyst for the style, became its downfall. With land prices exponentially increasing a new type of clientele was paying attention to the shores of Montauk. No longer was it acceptable for one’s second home to be the playful folly of leisure. The holiday home was now seen as an extension of the primary residence and representative of all of the material aspirations of its owner.

If Leisurama is seen as the evolution of the ‘off the shelf’ ethos of the original A-Frame concept we can identify parallels on a domestic level. Cheap housing, though not a new concept in New Zealand, was not truly embraced until the 1970’s. While previous ‘kitset’ houses were available (1920’s New Zealand Railway Houses for example) they lacked the ability to be customised beyond superficial decoration.

The earliest example of kitset housing stemmed from one man’s vision to combine cheap construction techniques, self-buildability and customisation. Somewhat unsurprisingly, the A-Frame proved to be the perfect form for the vision to be realised.
2.3 New Zealand
McRae-way Homes, Timaru
Interview with Neil McRae conducted May 2015.

To gain a greater understanding of the early history of the A-Frame in New Zealand, I conducted an interview with Neil McRae, son of the late Ian McRae. The purpose of the interview was to explore archival documentation held at the office and glean an appreciation for the social and economic climate of the time that gave rise to the success of the McRae-way A-Frame. The McRae-way A-Frame is regarded as the first mass produced example of the typology in New Zealand.

Ian McRae was a self-taught builder, his early work involved erection of garages for a local developer. This experience prompted McRae to investigate low-cost build techniques, and resulted in the first commercially available pre-cut A-Frame in New Zealand.

Timaru based McRae-way Homes started the pre-cut A-Frame’s in 1972 under the name of ‘Precut Chalets’ offering three variations of the design A1, A2 and A3; one, two and three bedrooms respectively. The company was renamed McRae-way Homes in 1974. At this time the company exported a kitset chalet to Japan to test the international market, this met with limited success however.

The concept became synonymous with McRae-way Homes and featured in their contemporary advertising. Match boxes illustrated with an image of the A-Frame (Figure 9) are still in existence and provide a curious glimpse of 1970’s advertising.

Figure 9: McRae-way Homes matchbox advertising c. 1974
The premise for the design was efficient use of materials and ease of building. It was the house that you could build yourself. This economical and ‘hands-on’ approach appealed to the New Zealand psyche, traditionally steeped in the DIY tradition. Alterations to the standard form were achieved by extending the longitudinal dimension, keeping the ‘A’ form unchanged.

The original A-Frame was superseded in 1978 by a more conventional 8ft high perimeter wall with a 45 degree pitch named ‘Colonial’ and ‘Pioneer’ series. The ethos of material efficiency remained; Neil McRae pointed out that the 45 degree cut meant a reduction in wastage of plasterboard linings. The same applied to the 45 degree cut of rafters, where the cut again eliminated wastage and improved time efficiency. While widely regarded as creating the ‘McRae’ look, the cottages owe a lot of their construction technique to the design of the original A-Frame. The evolution of this progression of iteration was similar to that of Geller’s ‘Leisurama’ foray some twenty years prior.
If the A-Frame acted as a test bed for efficient building techniques, the ‘Pioneer series’ built on this success but in a more socially palatable form. Again, we could attribute this with the evolution of esteemed New Zealand architects, in particular Athfield and Walker’s ‘Neo-Colonial’ examples that became popular at this time also.

When comparing the Pioneer series with the A-frame a number of similarities can be identified, in particular the shifting from unconventional form to the conventional. Spatial limitations of the sloped wall/roof were addressed by means of conventional 8ft stud height on the ground floor. Dormer windows became standard fitment enabling the first floor to accommodate full sized occupants.

Insulated zones addressed the thermal and noise issues of the original design. McRae recalls being told to turn down the television in the families Queenstown A-frame (Figure 11) as the sound reverberated throughout the non-insulated interior. Here we see a critical fault in the design, though not necessarily a fault of the form per se. It should be remembered that acoustic and thermal insulation was not a priority in what was essentially a cheap means of holiday accommodation. Indeed, thermal insulation was not compulsory in New Zealand until April 1978 (Isaacs).

The records on hand at the company date back to 1985, thus missed the period of the final A-Frame build by seven years. McRae acquired original cutting schedules for the A2 chalet from the factory as it was being decommissioned (Figure 13). It is assumed the remaining archives and plans are no longer in existence.
The McRaeway A-frame enjoyed its heyday from 1974 until its eventual demise in 1978 at which point some 2000 of the structures had found owners throughout New Zealand and the greater pacific region (Southcombe 61). This short period of popularity introduced the concept of efficient cost effective building to New Zealanders, and gave rise to the evolution of the pre-cut cottage offered by the company from 1978 until the mid-1990’s. The format of ‘catalogue building’ has since been widely adopted as the modus operandi of building companies throughout New Zealand.

It is not a surprise then that the form was adopted by the developers of the Ruapehu Alpine Villages in the early 1980’s. Here we witness environmentally appropriate application of the A-Frame, or a return to the alpine vernacular so embedded in the history of the typology.
2.4 Sunset Magazine

The American lifestyle magazine ‘Sunset’ was produced in 1898 to dispel the ‘wild west’ myth of California that perpetuated throughout America.

The magazine was relaunched in 1932 as a lifestyle review, often specialising in a specific style or topic for each issue.

“Sunset will cover the whole range of home-life and family interests... gardening, building, home decorating and furnishing... and a host of other subjects of equal interest to men and women” (Jaehn)

Of particular interest is the Cabins and Vacation Houses issue of April 1973. The magazine contains fifty examples of holiday homes, ranging from self-build, kitset and prefab. Curiously, it includes David Hellyers Cabin #4 from 1953, investigated in Part 3.2 of this thesis.

The issue addresses the change in opinion regarding holiday homes ‘if the romantic notion has had to fade just a bit, the practical considerations are much easier to face’ (Sunset 5), indicating that the ‘dream’ of owing a retreat had become a more realistic proposition than in previous decades. This is where we see a much greater consideration for the interior, the spatial dynamics evolved to provide a much higher standard of inhabitation.

The ‘Practical Planning’ section discusses the A-Frame at length, describing the difficulty of insulating the form as a disadvantage ‘without ruining the appearance of the interior’ (Sunset 109). This is of concern to this research, as the interior needs to meet current thermal standards and reflect the history of the typology.

Spatial issues are also discussed, in particular the lack of storage and perceived ‘wasted space’ due to the triangular form. Headroom and construction details are illustrated is the addition of dormers to add to the floor space of the A-Frame, albeit in a conventional form (Figure 14)

![Figure 14: ‘Practical Planning’ - The A-Frame, Sunset 1973.](image)

Given that the spatial issues were still a fault of the form some twenty years after the rise in popularity of the A-Frame, it indicates either a limit in technological advances or a lack of evolution of the interior dynamic. While efficient furniture solutions are discussed for more conventional interiors, the A-Frame is treated as a rudimentary form of holiday accommodation with little consideration for interior configuration possibilities.
It is somewhat ironic then, that 1973 was one year before the Ian McRae started selling his version of the A-Frame. Furthermore, the A-Frame was, by most counts, well received in New Zealand.

Here we see the peculiar phenomenon of cross-continental influence. Whilst out of fashion with American taste (generally the A-Frame lost popularity in the late 1960’s) the form was looked upon afresh by antipodean readers and clearly found a niche in the aspirational mind-set of the early 1970’s.

Figure 15: Sunset ‘Cabins and Vacation Houses’ cover. April 1973.
Figure 16: Authors iterative illustration of A-Frame ‘in the sunset style’
3. The Site
3.1 Ruapehu, Central Plateau, New Zealand

The volcanic ski resorts of Ruapehu and Tongariro have represented winter leisure and recreation for generations of New Zealanders. Consisting of the ski fields Whakapapa and Turoa, Ruapehu is the largest alpine recreational area in New Zealand comprising of 1800 hectares of lift accessed terrain (New Zealand Tourism).

Mount Ruapehu was gifted to the people of New Zealand by the Chief of the Ngati Tuwharetoa tribe, Horonuku Te Heu Heu Tikino. This magnanimous gesture was to ensure the ongoing protection and enjoyment of the area for all time, for all people (Potton 9).

This research is primarily concerned with the Turoa ski field and the township of Ohakune. Lying at the foot of Mount Ruapehu, Ohakune is the quintessential New Zealand ski town. The town has a permanent population of 1080 (Statistics New Zealand) as at June 2015. It has a large range of visitor accommodation ranging from Backpackers lodgings to luxury motels. While the majority of the town's visitors arrive during the winter months, the proximity to Tongariro National Park offers a range of recreational activities throughout the year.

The 'Mountain Road association', formed by locals in 1952 saw the town connected to the south western slopes of the mountain. The road reached Turoa ski fields in 1963 and was declared a legal road in 1973 (Ohakune Mountain Road). The recreational skier now had access to the alpine playground, and the resultant surge in population necessitated residential growth.
However, the most significant development occurred in 1978 with the opening of motorised ski lifts on the field (Ohakune Mountain Road), allowing the less hardy of winter recreation seekers full access to the slopes. With the popularity of the area came increased demand for vacationer accommodation, and the burgeoning of ‘Alpine Villages’. Ohakune’s central plateau location proved attractive to out of town buyers being a short three hour drive from Auckland or Wellington.

It should be noted that at this time the township was primarily considered a winter destination. The popularity of mountain biking is, by comparison to skiing, a modern pastime. It is here that we see the innate thermal issues of the A-Frame come to the fore. Loft bedrooms that capture latent heat in the winter become uncomfortably overheated in the summer. The single glazing and poor solar screening render the interior of the dwelling diabolically thermally unyielding.

The A-frame was not a new concept for the New Zealand palette. As previously mentioned, the form was being investigated by Ian McRae, a visionary builder who saw a need for affordable housing solutions. The notions of cost-efficiency, ease of transportability and construction made for an attractive proposition. What was different with Ohakune however, was the Alpine setting and need for high volume accommodation. As with Leisurama in America some twenty years prior, desirability and availability resulted in an architectural expression that came to represent the socially optimistic mood of the time.

![Figure 18: Ski fields of Mount Ruapehu and surrounding area](image_url)
3.2 Subject A-Frames

The subject development is a cluster of ten A-Frame Chalets designed by Fairhead, Sang and Carnachan in 1983. The 2023 square metre site is located on the corner of Miro and Shannon Streets in Ohakune, Central Plateau region.

Contact with Simon Carnachan and Ron Sang indicates that construction drawings for the A-Frames have been destroyed. The plans contained herein are the only remaining records held by the Ruapehu District Council, therefore construction techniques have been assumed based on similar A-Frame construction in the area.

The Chalets are orientated to face North East, effectively true north. Neighbouring dwellings are predominantly conventional 1960’s structures. The site has a large deciduous tree to the north-east, and relatively low density vegetation elsewhere. No partitions exist between the chalets, vehicle access is permitted by means of an east west driveway with access from Shannon and Miro Street.

Interior layout of the development employs classic A-Frame design with two sleeping areas, living, single bathroom and kitchen/dining (refer image 33). The inclusion of a small drying room is an unusual, yet essential addition to the Chalets. This detail alludes to the intended purpose of the A-Frames; winter recreational accommodation. Access to the loft sleeping area is gained through a rung style ladder from the living area beneath.

All Chalets employ an exposed rafter system with nominal insulation cavity under corrugated iron roof. Cladding is a fibre-cement board with battens at 600mm centres. Single glazed aluminium joinery is used throughout with single glazed skylight units installed in the eastern roof section.

The development appears to have been largely unchanged throughout its history and is generally in sound order with no obvious remedial work necessary. The majority of the chalets have been painted in period colours and appear to be maintained to a high standard.

Figure 19: Satellite view of subject A-Frames
<table>
<thead>
<tr>
<th>CT ISSUED</th>
<th>UNIT DESCRIPTION</th>
<th>APPROX AREA</th>
<th>UNIT ENTITLEMENT</th>
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<td>113 m²</td>
<td>61.1</td>
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<td></td>
<td>A14</td>
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Figure 20: Site Plan of subject dwellings.
Figure 21: Chalet showing later dormer addition.

Figure 22: Rear elevation of Chalets 8 & 9. Note finials at each end of the structure.
Figure 23: Chalets 2 & 4; Rear view facing Shannon Street.

Figure 24: View of driveway access from Miro Street.
Figure 25: Elevation of Chalet 5. Note (obscured in image) skylight on eastern side of Chalet and deciduous tree in North-East corner of site.

Figure 26: Front elevation of Chalets 8, 9 & 10. Note skylight on eastern side of Chalet 10. Note adherence to 1970's colour palette.
Figure 27: Chalet 5 corrugated iron roof with Chalet 8 at rear.

Figure 28: Chalet 9 elevation. Note period Conifer and A-Frame colour scheme.
Figure 29: Dining and Kitchen. Painted kitchen joinery and stainless steel benchtop.

Figure 30: Lounge and ladder (right). Note original 'Visor' fireplace.
Figure 31: First Floor Bedroom. Note window’s off centre location to align with front door below.

Figure 32: Ground Floor Bedroom. Conventional vertical wall to allow different configuration of space.
Figure 33: Original Plans of Subject A-Frames
4. Case Studies

4.1 ‘Trigon’, Switzerland

The demise of the American A-Frame, due to proliferation of ‘McMansions’ and the realisation of the limits of the form, necessitated the need for further in-situ redevelopment. The most dramatic example of this is the A-Frame designed for Heidi and Peter Wenger in Switzerland, appropriately named ‘Trigon’. Built in 1955, Trigon is an alpine example of the type, typical in its construction. However, Trigon is able to be enclosed during uninhabited months through a suspended triangular gable end that, with the aid of a pulley and rope system, endow the structure with a deck.

The intervening twenty years saw the Wenger’s use of the chalet decline. Unlike the vast majority of owners however, the Wengers’ opted to sympathetically alter their A-Frame to adapt to their lifestyle whilst keeping the essence of the form intact. From an interior architectural perspective, this involved the removal of partition walls creating a uniform spatial experience. A basement was also created, and acts as an anchor by which the A-Frame settles into its environment, where previously the connection with the ground was somewhat tenuous. The couple took the notion of bespoke to another plane by custom designing furniture and fittings to align the interior with their lifestyle. Of particular note is the circular kitchen unit that delineates the main living area and introduces a contrast to the traditionally angular interior.

Understanding the form and its potential, the Wenger’s replaced the standard rectangular joinery with triangular centrally pivoting units, embracing the A-Frame’s potential. It should be noted that the Wengers were architects, so the ability to visualise the evolution of their house was perhaps more easily realised than most. The opposite side of bespoke, though, is kitset.

And what was to become of that?
4.2 David Hellyers Cabin #4

Hellyers Cabin represents the acme of collaborative marketing. The ‘Douglas Fir Plywood Association’ became aware of the project in 1957 (Randl), and offered Hellyer a contra deal of building materials for exclusive use of his plans. It is of importance that the same year, Andrew Geller designed Betty Reese’s House, so one can assume this was ‘the’ year of the American A-Frame.

While Geller went on to experience professional success, the Douglas Fir Plywood Association had orders for some 12000 sets of working drawings within a few months of the publication of the project. (Randl, Old House Journal). This is a similar phenomenon to the success of John Campbell’s ‘Leisure House’ some 6 years earlier.

As a means of understanding the construction technique and spatial complexities of the early Cabin, a 1:50 model was constructed. The purpose of this was to appreciate the interior spatial dynamic, indeed, a physical representation of the structure allowed this beyond the limits of digital modelling.

The physical model highlighted the limitations of the interior, in particular the inefficiencies of space. As access to the upper level sleeping area is permitted through an external ladder, we interpret this gesture as a nod to the cabins intended warm climate locale. How this translated to an alpine setting is questionable.

Of interest is the design of the roof system. Full size sheets of marine ply act as oversized roof shingles, an efficient means of speedily enclosing the structure and providing a clever (if rudimentary) solution to weather tightness. Longevity of the system and appropriateness to the Alpine setting is unknown, though it is assumed that owners superseded the plywood system to suit their specific environments.
Figure 37: 1:50 model of Hellyer's Cabin #4
FIRST FLOOR plan. Note single-door side entry from the narrow deck along left side of cabin.

SECOND FLOOR plan. Deck has ¾-inch plywood panels; a weatherproofing agent was applied.

"WALK-AROUND" space is mostly in the downstairs area, because of the cabin roof's 60° pitch.
Figure 39: Front Elevation of model showing decks and rafter structure.

Figure 40: Side Elevation showing first story window.
Figure 41: Rear elevation of model. Note plywood ‘shingles’.

Figure 42: Side Elevation showing door to side deck access.
Figure 43: Detailing of first floor deck hand railing.

Figure 44: Front door with view through model.
Figure 45: Ground floor of interior with view toward front door.

Figure 46: Close up of plywood roof shingles.
The purpose of building a model of this early example of the A-Frame was to understand the construction technique and spatial complexities of the dwelling. The open-plan nature of the interior, though obvious in the plans, is realised in greater detail by physical construction.

The relative simplicity of the structure is evident; again, by physically representing this the commercial appeal of the cabin becomes apparent. Interior partitions were omitted for clarity, thus the model focuses on the holistic interior experience. It is expected that owners were able to adapt the internal layout of spaces, therefore the interior of the model was treated as such.

This exercise was of value from a conventional and interior architectural point of view, in that one needs to understand how a structure is built before one can set about altering it. Rafters were designed to fit a conventional (of the time) 8 ft by 4 ft plywood sheet, we see economical considerations beyond the inherent efficiencies of the kitset A-Frame.

Where possible, the model was built as per the plans in Randl’s A-Frame, though assumptions were made where detail was not provided.
5. Philosophical Strategy
5.1 Fred Scott, On Altering Architecture.

Now the existing typology is understood, a philosophical stance has to be established as a means of asserting a personal position by which to revisit the A-Frame’s interior.

Fred Scott’s *On Altering Architecture* deals in depth with the issue of authenticity and alteration. Scott argues that ‘restoration nearly always involves modernisation of servicing’ (Scott 92), thus the intent of authenticity is inherently flawed. Spatially, he argues that the building is ‘broken’ (Scott 95) by the alteration process. Relocation of spaces and rearticulated circulation renders the architecture beyond repair.

Scott’s theory of ‘stripping back’ the host building to inform alteration is of significance to this research. It is defined as a ‘process by which the designer acquires an understanding of the host building with which he or she is engaged’ (Scott 108). Further to this, Scott discusses the role of drawings in analysis as primary evidence, though does not consider them definitive; likening them to ‘how a piece of music is set down on paper prior to a performance’ (Scott 113).

Authenticity then, extends beyond the physical fabric of architecture. the expression of self being the first response to the interior. In the ‘Leisurama’ example, this notion is given further impetus by the inclusion of household items in the style of the architecture; authenticity on varying scales. The human scale associates with the intermediate, the intermediate again with the architectural envelope. One could iterate this notion ad infinitum; the landscape and choice of shrubbery, often selected to fashion’s whim, adds a further layer of authenticity to the intervention.

It is at this point that one must take a holistic view if the intent and evaluate the interior subjectively. Technological advances dictate the interior. Obsolete materials are replaced by modern examples ‘in the style of’.. This lack of truth again raises the issue of the stance. The desire for authenticity risks appearing nostalgic, however, it is often this that adulterates the design to the point of parody.

What then of the A-Frame and modern reinterpretation? Scale comes to the fore here. A set of period cutlery, for example, has a minor effect on the response to architecture. However, a vehicle (parked in the driveway) of the same vintage of the house somehow elevates its architectural authenticity. There is almost a parallel between inhabiting the interior of the house and car respectively, the car represents the means by which arrives at the interior and pre-empts the experience. This level of kitsch reverence appeal to a nostalgic few; the ones willing to truly indulge in ‘time warp’ architecture and lifestyle.

However peculiar the notion, there is a certain appeal in revisiting a simpler time. Interior architecture can extend backwards as well as forwards. A completely genuine recreation of the past can be credible, however fundamentally unrealistic it may be.
Scott succinctly highlights this point when discussing the patina of the aged versus the apparent newness of the restored. He analogises using the example of an elderly couple with an equally elderly vehicle, both protagonists showing the signs of their age. The pitted chrome and worn leather of the vehicle represented the true intent of the designer; apparently evoking a more genuine response than the faux newness of a restored vehicle (Scott 177). This highlights the absence of truth in restoration. I would argue that it is the contradiction of modern and patina that reveals the authenticity of the interior.

The notion of reinterpretation must be considered through the human scale. The interior, therefore, should respond in the outset at a minor scale; and build to encompass the greater building envelope. Scott’s philosophy, though valid, fails to address the requirements of modern users. One must ‘break’ the building to make it suitable for modern inhabitation. In the case of the A-Frame and its inherent spatial and thermal issues, there is little scope to improve the design without major spatial reconfiguration and mechanical ventilation apparatus. With this in mind, the redesign will be sympathetic to traditional materials to an aesthetic extent; but will introduce contemporary materials and fittings to address the limitations of the originals.
5.2 Chad Randl, A-Frame.

Architectural Historian Chad Randl’s ‘A-Frame’ examines the prehistoric Japanese ‘triangle houses’, rise and decline in popularity of the American A-Frame holiday house and the typology’s influence on modern architecture. He identifies the typology as a dwelling with a ‘low slung, steeply pitched roof’ with ‘no intervening interior walls’ (Randl 5).

The scope for reinterpretation of the style is addressed early in the text, stemming from the early Swedish vedskjul and aforementioned Japanese versions, culminating in the post-war American A-Frame that came to be the widely adopted version of the style.

Post war affluence is identified as the driver of the rise in popularity of the A-Frame; though it is also noted that the reclamation of ‘tens of thousands of miles’ of coastal land also contributed to the popularity of the holiday house per se. The persistence and evolving design by young architects keen on provocative design shifted the marginalized concept into the mainstream, and with the added benefit of national media exposure, catapulted the style into the imagination of middle-class Americans.

Northern California is widely accepted as the locale for the heralding of the style. Its alpine extremes provided the setting for the application of a versatile and iconic design typology. The triangular form was lauded for its excellent structural integrity and resistance to snow and wind loads. It should also be noted that California is also the birthplace of the popular ‘Sunset’ magazine, a lifestyle editorial that was among the first to feature the A-Frame as the object of desire for the aspirational middle-class, the ‘apres-ski’ lifestyle aspects of the style being depicted as the utmost in good taste.

Randl, though generally extolling the virtues of the style, briefly identifies the flaws in the design. A lack of natural light, limited and wasted space, and difficulty heating and cooling the space are seen as the major drawbacks. This is of relevance to this thesis as these fundamental issues are of significant importance considering the aim of the project is to re-interpret the chalet from an interior architecture perspective.
The evolution of the A-Frame from holiday home to commercial premises is largely generalised. Randl observes the somewhat practical application of the style amongst American ecclesial groups as the form of their churches. The most curious application though is the adoption of the format by hospitality venues offering Scandinavian style fare to the weary traveler. Quite rightly, we see connections to the alpine aesthetic, however contrived this notion may be.

Randl summarises the demise of the A-Frame alluding to a public furor that dwindled in the realisation that the limitations of the design often resulted in less than adequate interior conditions.

On a domestic level, New Zealand has a long standing fascination with the concept of prefabrication. Mark Southcombe and Pamela Bell’s Kiwi Pre-fab - Cottage to cutting edge identifies the previously mentioned McRaeway A-Frame as being amongst the earliest of kitset housing, though the definition of prefab in this case is in fact a kitset where the owner erects the house from a series of pieces (in this case pre-cut timber lengths) as opposed to components. Indeed, the ‘self-build’ kitset stands apart from the prefab as a separate entity, requiring a higher degree of construction skill and knowledge.
5.3 The ICOMOS Charter

The ICOMOS charter was established as a document by which to address any alteration, preservation or conservation of historically significant buildings. The Charter’s intent is to provide a means of understanding cultural heritage values, thus underpinning any modification that may be detrimental to the historical importance of a building or site.

In the case of the A-Frame redesign, I have opted to address the ‘reconstruction’ and ‘alteration’ sections of the charter. Reconstruction addresses the material aspects of the building, stipulating that replacement of material that is no longer available or viable.

With this in mind, I have chosen to reuse the existing rafters where possible and replicate the profile, finish and species in the realised outcome. Materials not original to the subject A-Frame are selected based on the availability and profile available in the early 1980’s, as a means of imbuing original character into the interior. It should be noted that the promotion of the social ‘standing’ of the interior aligns to the material choice i.e rudimentary plasterboard ceilings replaced with native timber tongue and groove appropriate to higher level architectural finishes of the era.

Alteration of the A-Frame when aligned to the ethos of the charter raises the issue of the degree of intervention and its effect on the historical significance of the altered form. It states that:

‘Any alterations or additions should be compatible with the original form and fabric of the place, and should avoid inappropriate or incompatible contrasts of form, scale, mass, colour and material. Adaptation should not dominate or substantially obscure the original form and fabric, and should not adversely affect the setting of a place of cultural heritage value. New work should complement the original form and fabric.’ (ICOMOS)

Consideration of the degree of intervention is crucial. Though the introduction of a non-original material is a potentially unfavourable gesture, in this case I believe it to complement the original materials and set a hierarchy that reads as a textural palette. This act allows the materials to speak on a direct level, as was proposed by Brooker in ‘Re-readings’ that ‘for a successful dialogue to be established, the two components must be speaking equally loudly, albeit in different languages’ (Brooker 102).

Here we see the composition of the materials working in a holistic manner, the scale and ratio of use dictating the degree by which they are understood. Placement also comes to the fore here, where concrete is used a means of grounding the structure. The longitudinal placement of the form suggests a structural intent, indeed as does the inherent character of the material.
6. Strategy
6.1 ‘Insertion’ - Re-readings

The basis for the remodeling of the A-Frame relies upon ‘insertion’. The relationship between the intervention and the original building should be a counter-balance, ‘the two components speaking equally loudly, albeit in different languages’. (Brooker 102)

This counter is achieved through contrasting material selection, the innate strength of concrete acting as the spine by which the A-Frame is supported. The transverse location of the concrete speaks of balance, equally underpinning both sides of the structure. A similar relationship can be seen in John Scott’s Futuna Chapel in Karori. The somewhat temporary (by comparison) nature of timber given impetus by the permanence of concrete, in Scott’s case a custom coloured ‘Firth’ breeze block and pebble-dashed surface treatment. A game of opposites sets the tone for an engaging and provocative interior, as in Futuna Chapel, colour and light is perceived differently depending on the surface on which it casts itself. Indeed, the lofty interior form lends itself to an almost ethereal atmosphere, exploited in both of the intimate bathroom spaces in the A-Frame by considered light permeation through acrylic apertures. Scott’s dramatic treatment of colour and light has influenced aspects of the redesigned A-Frame’s interior.

The treatment of timber in the interior of the chapel, a relationship mimicked by Walker and Athfield (to name but a few) some decades later, suggests a dynamic interface. Structural components are stained black, supporting the naturally finished tongue and groove ceiling. Again, the notion of scale and hierarchy becomes apparent; concrete being the protagonist, black timber the secondary player and natural timber acting as the darling of the interior ‘stage’.

Scott’s early sketches draw parallels between the ‘tent’ (European architecture) and Maori Whare. Alternating floor levels again reinforce ‘insertion’. Delineation of surfaces creates a spatial dialogue that identifies the purpose of the space. The lower concrete floor surfaces integrate seamlessly with the vertical elements again acting as a means of integrating the insertion into the greater whole.

Figure 47: Early sketch of John Scott’s Futuan Chapel. Note triangular roof forms and glazed facades.
7. Preliminary Design

7.1 Initial conceptual response

The initial studies responded to the lack of useable space of the triangular form. The shifting of pitch to provide a traditional vertical wall resulted in an iteration that evoked the original, yet provided a more conventional (for the most part) interior experience. It should be noted that the original concept was intended to be a thoroughly new interpretation of the A-Frame, not a redesign of an existing structure. This intuitive response was undertaken prior to establishing a philosophical stance.

Vertical window screens can be tilted to a horizontal position to provide shade to the space beneath. This concept borrows from the precedent set by Andrew Geller and his a *brise soliel*, though in this case acts in a semi-permanent manner allowing the structure to be rid of superfluous appendages when not in use.

Although this iteration was an intuitive response to sunlight and spatial limitations, it aligned more closely with a conventional architectural project. As a means of aligning the research with interior architecture, I opted to redesign the interior of an *existing* chalet following the philosophy of Fred Scott’s ‘On Altering Architecture’ and Graeme Brooker and Sally Stone’s ‘Re-readings’.

![Figure 48: Illustration of intuitive design.](image1)

![Figure 49: Developmental drawings.](image2)
The spatial limitations are clearly noticeable in the first floor areas, with the uppermost space being suitable only for storage. The acute angle of the roof plane has, however, allowed a sense of spatial ‘loftiness’ that the original form lacks. Interconnectivity between the floors furthers this notion allowing a holistic experience of all spaces throughout the interior.

This initial response highlighted the need for consideration of solar control and the dynamic between vertical and inclined planes.

Figure 50: 1:50 model of initial design response.
Figure 51: Shades in closed position.

Figure 52: Shades in open position.
Figure 53: Shades partially open (alternative location)

Figure 54: Shades closed in alternative position.
7.2 Prefabication

The basis for investigating prefabrication (hereafter ‘pre-fab’) was the kitset style offered by Mcraeway homes in their A-Frame houses.

The concept was based around a rafter ‘rib cage’ into which pre-insulated and lined panels would be inserted. A flat pack system of delivery would ensure an efficient and cost effective means of construction.

Original sketches investigate a collapsible rafter system, though after development this proved to be logistically inefficient, involving pin joints that would compromise the integrity of the structure. It was supplanted by a kitset system (again similar to McRaes’ original) that could be erected by a person of limited building experience.

Standardisation of the panel size (i.e: 2400 x 600 mm) would allow efficient use of material. Further to this, the option to used recycled timber pallets as the structural member of the panel introduced a sustainable means of cost and material reduction.
Figure 58: Detail Sketches of design.
Critical Assessment of Iteration

Although the design has potential as far as mass production and low-cost accommodation, the design steers away from the intent of the research “elevated from nostalgic novelty to spatially responsive contemporary architecture”.

The adaptability of the from is appealing and consistent with the purpose of the structure, however, it fails to address the greater question of elevating the form. This requires an additional level of consideration; the issues of spatial dynamics and detail are of importance, but in this case these are somewhat overshadowed by what could be considered ‘conventional’ architectural concerns. Needless to say, the structural feasibility and integrity are paramount in any project, though in this case the detailing of this aspect cannot be ‘assumed’, and therefore falls outside of what is primarily interior architecture research.

What I did gain from this iteration was the benefit of re-using an existing piece of material, be it a repurpose in the case of the pallet, or the retaining of existing materials in a structure. The philosophy of the ICOMOS Charter becomes important here, and will be the baseline for further iterations of the A-Frame.
7.3 The Shroud

This iteration deals with the adaptability of the form and its ability to regulate the amount of daylight permitted into the interior. The shroud system encapsulates the original form and moves on a rail and wheel system. Fold-out decks at either end allow the structure to be closed up when not in use, a similar mechanism to that employed by Trigon Chalet.

Further to this concept, the sliding shroud system mimics the traditional form of the A-Frame, yet adds a layer of aesthetic interest (and solar protection). Sheltered alfresco areas are created at either end of the structure with the shroud system engaged, responding to the need for such areas in the summer months.

Figure 59: Render of ‘Shroud’ extended.
Figure 60: Render of ‘Shroud’ in Winter mode (top) and Summer mode (bottom).
Figure 61: Sketch detail of shroud system.

Figure 62: Sketch detail of shroud system.
Figure 63: Schematic of interior and fixed deck.

Figure 64: Interior showing loft and bathroom enclosure.
Figure 65: Physical model of A-Frame with shroud in ‘Winter’ position.

Figure 66: Shroud extended to ‘Summer’ position.
Figure 67: Rear view of model demonstrating original form with shroud facing North.

Figure 68: Experiment with light through extended shroud.
Critical Assessment of Iteration

While the consideration of solar gain is crucial, the scope of the project is primarily interior based. The ‘shroud’ system could be further investigated as a building science proposition, and be quantified by thermal analysis.

With this in mind, I have opted to retain the shroud on the west side of the dwelling to negate solar gain from afternoon summer sun. This remains a rudimentary proposition that with further testing and development could be refined to add a further layer of solar control to the re-design of the A-Frame.

Figure 69: North Elevation with glazing inspired by Trigon Chalet.
At this point of the project, it became evident that a brief needed to be established. Limitations of the project also had to be considered.

**Project Brief:**

Redesign the interior of the subject A-Frames to provide:

- Accommodation for 2-6 inhabitants
- Consideration of thermal limitations
- A palette of materials that align to a ‘high-end’ fit out
- The ability to spatially reconfigure the interior to suit the level of occupancy
- Durability and sustainability of materials

Limitations in scope:

The project will consider, but not resolve:

- Buildability based on structure outside the scope of NZS3604
- Final build cost/budget
- Measured thermal performance
- The outcome will be largely conceptual

The ground floor of the A-Frame is comprised of kitchen/dining, drying room, bathroom and combined living/bedroom spaces. The adaptability of these spaces enables the interior to be suitably adapted to suit the number of occupants. The rationale behind this was to allow the architecture to respond to the occupants instead of compromising the experience of the inhabitants.

The drying room has been retained, but split to include external access storage space. The advantage of this is to provide a small area in which to store necessary implements for maintenance that is accessible without entering the dwelling.

Delineation of the floor plane allows spatial intimacy and a means of accommodating integrated furniture items. The contrast of materials between the two ground floor living/bedroom areas again alters the dynamic of the spaces, providing two different interior experiences. The timber flooring of the western living area suggests a more intimate atmosphere compared to its more austere concrete counter-part.

The shroud system investigated earlier in the design process has been developed into a full height screen mounted on the west facade of the A-Frame. As previously, the screen is able to be moved to adjust to the season and the amount of sunlight required to enter the interior.
Figure 70: Early developmental sketch of layout.

Figure 71: Longitudinal exploration of spaces.
Figure 72: Initial Floor Plan of new A-Frame.
8.1 Materials and Technology

The original materials of the subject A-Frame are as one would expect in a relatively low budget dwelling. Gib board is primarily used as the ceiling and wall treatment, an obvious choice given its cost efficiency and availability. The original kitchen joinery is painted composite with a stainless steel bench top.

Material selection is a crucial consideration for the re-design of the subject A-Frame. The intent is to “elevate the form from nostalgic novelty to spatially responsive contemporary architecture”. With this in mind, one has to avoid cliché application. Nostalgic hints must be realised through form and material, though it presents a formidable challenge to deftly apply this. For this reason, I have selected design cues present in the late 1970’s that were often applied to higher end architectural projects.

Furthermore, while the era was consuming the seemingly inexhaustible supplies of native timbers (indeed, previous decades had also been as inconsiderate) I have opted for a sustainably grown representation of the original. Macrocarpa, an exotic softwood of the cypress species, is prevalently grown in New Zealand. Tongue and groove clears are to be laid horizontally throughout the interior as a ceiling treatment, floor and cabinetry facings. All existing rafters are to be retained and re-purposed where possible. All additional interior structural members are to be rough sawn to match, and stained black.

The issue of insulation is critical here. Clause H1 of the New Zealand Building Code requires that the ceiling cavities of dwellings in the central plateau area have an insulation value of R 3.5 (New Zealand Standards).

Standard fiberglass insulation requires a cavity of 100mm in which to optimally perform. With this in mind, and considering the 200mm rafter into which the void will impinge, I have opted for a 75mm PIR (polyisocyanurate) insulation panel supplied by Christchurch based Conquerer PIR Panel. These panels have a R 3.6 rating, and will permit a 105mm rebate of the existing rafter to be visible once the 20 mm Macrocarpa sarking is installed.

The kitchen drawer and cupboard fascia’s are again Macrocarpa, where necessary these are to be biscuit jointed and grain matched to provide a high level of finish to panels greater than 150mm width. Stainless Steel 25 x 25 mm square extrusion is to be used as the legs and frame of the units, in conjunction with Blum ‘Movento’ drawer runner systems.

Tiled surfaces of the bathrooms and kitchen are 1970’s inspired ‘Moss’ 150 x 73 mm supplied by Middle Earth Tiles and laid in traditional ‘brick’ pattern.
Figure 74: Materials (clockwise from left), black stained Macrocarpa, polished Concrete, 25 x 25 mm Stainless Steel extrusion, 6 mm Decor Satin Acrylic, Tongue & Groove Macrocarpa.
The introduction of concrete into the interior of the A-Frame acts metaphorically as an anchor, a similar notion to the schist basement of the Trigon Chalet case study. The intent is to imbue the interior with a sense of permanence; yet integrate existing timber structure.

As in John Scotts’ Futuna Chapel, the dialogue between the materials should be interpreted as a conversation, a complimentary relationship that underpins the understanding of the interior. The innate strength of the material has enabled the mezzanine bathroom to be suspended off the vertical member, thus creating spatial intimacies in the living/bedroom below and an unbridled view to Mount Ruapehu from the first floor bedroom.

Consistency of form is achieved through a uniform surface treatment, in this vertical members will be poured within rough sawn form work, floors will be polished. Vertical members will either be cast on site, or constructed off-site and erected in a ‘tilt-slab’ manner. Interiors of the bathroom spaces will be waterproofed and tiled.

Figure 75: Core shown with exposed building envelope.
8.3 Kitchen & Furniture

In accordance with the ethos adopted for the redesign of the A-Frame, the kitchen utilises an ‘honest’ material and system selection. The ‘Good Bones’ kitchen cabinetry system was chosen primarily for its adaptability and integrity of design. The absence of manufactured timber products (eg: particle board) allows the configuration of the kitchen to be altered should the need arise. In addition, cabinet facings can be easily replaced.

The ‘Good Bones’ system was developed by Christina Mackay as a reaction to the unsustainability of traditional ‘carcass’ MDF cabinet construction (Good Bones). The inherent durability and ecological conscience of the system is of relevance to this project, as the intended purpose of the interior indicates a high level of use by varied occupancies.

The system is based upon a metal frame that replaces the traditional carcass. It is able to be kitset assembled and offers a high level of customisation. The aforementioned steel members allow infinite options of configuration, again appealing to the unconventional interior form of the A-Frame.
Shelving units throughout the interior employ a similar construction technique to the kitchen. Again, durability is the key driver for the design. The unit’s fit within the roof pitch resulting in a stepped edge that provides additional open shelving. Cupboard fronts hinge in a vertical concertina form allowing unimpinged access to the contents.

Again, the same material philosophy applies, where the inherent qualities are celebrated. Handles are a simple circular hole that negates the need for further material incorporation.

The acrylic backing allows a degree of visual screening, though still allows light to travel between the spaces. The unit could successfully be used also as a room divider in the upper floor area should the need arise.

Figure 84: Shelve units in position within interior.
The furniture designed for the Bedroom/Living spaces responds in the same way as the architecture - adaptable depending upon use. Constructed of 25 x 25 mm Stainless Steel extrusion, the piece acts as a sofa with storage under, when unfolded becomes a conventional Queen sized mattress.

Of note is the angled rear of the armrest that allows the top half to pivot within the 60 degree slope of the interior without the need to move the unit to provide clearance. The units can be positioned throughout the interior, and will function whether against the sloping wall, or the vertical concrete wall.

Figure 85: Sofa (Top), folded out to bed (bottom).
Bathrooms and Showers

The bathroom areas of the interior are designed beyond their utilitarian purpose and elevated to spaces of ceremonial refuge. The ground floor shower takes advantage of the elevated ceiling space, effectively becoming a light well. The use of satin acrylic diffuses the light throughout the shaft countering with the handmade ‘Middle Earth’ tiles in the shower.

By dropping the shower cubicles below the floor levels the occupant is given the sense of separation from the planar levels. This ‘shift’ again emphasises the sense of refuge.

Figure 86: Developmental model of lower Bathroom.

Figure 87: Developmental model of Upper Bathroom.
Figure 88: Core system showing upper level bathroom recess abutting vertical member.

Figure 89: Lower bathroom recess with drying room in foreground.
Figure 90: Longitudinal exploded view of interior

Exposed west side of the A-Frame, showing ground level bathroom, sun shade and storage locker. Of note is the connection of the concrete transverse member to the aforementioned bathroom and its integration of the interior components.
Figure 91: South view of Interior

Note pull out bed beneath kitchen at left of image. This was later superseded by a free-standing alternative to allow spatial re-configuration to suit the type of occupation. Informal dining bench is visible above.
Figure 92: North view towards Mount Ruapehu

Developed concept of lower living areas. Ladder to loft is visible left of centre. Note ‘Pyroclassic’ Woodburner has subsequently been replaced by integrated concrete unit within core.
Figure 93: Light shaft - Lower Bathroom

View from lower bathroom shower through to first floor of interior. Note skylight permits light into shaft, and again into interior through satin acrylic panels.
Figure 94: Illustration of redesigned A-Frame, North Elevation.
Figure 95: Redesigned A-Frame in context.
9. Project Documentation

- 6 mm Decor Satin Acrylic Sheet.
- Glazing, double glazed Aluminium frame supplied by Nu-Look
- 140 x 75mm Middle Earth Tile in ‘Moss’
- 75mm Tongue and Groove dressed Macrocarpa (Applicable on ceilings) On decks, 75 x 25 mm Macrocarpa with 5mm gap.
- Concrete.
- Rough sawn interior timber, black stain.
- 10 mm plywood veneer.
- Lacquered enamel paint finish.
- Rough sawn interior timber, black stain.
1. Drying Room (potential location of HVAC system).
2. Storage (dotted lines indicate position of access from exterior).
4. Shower.
5. Living / Bedroom.
6. Deck.
7. Deck.
8. Living / Bedroom.
First Floor Plan

1. Storage.
2. Bathroom.
4. Shower.
1. 6.0 mm PSP Decor Satin Orange Perspex.
2. 150 x 73 ‘Middle Earth’ tile.
3. Concrete firebox with bespoke 5.0 mm mild steel liner and S/S flue.
Interior Elevation South

1. Kitchen (Units omitted for clarity)
2. Front Door.
3. Drying Room.
4. Storage.
1. Upper Bathroom (Obscured).
2. Sliding doors to lower service areas.
3. Sliding doors.
1. Concrete porch.
2. Upper Shower.
3. Centre hinged 'Velux' Roof Windows (applicable throughout).
Ground Floor Bathroom Plan
Ground Floor Bathroom East
1. ‘Brighton’ DV 203L S/S Single Sink welded flush to benchtop.

2. Refrigerator.

3. 900 mm Freestanding Stove.

Kitchen Elevation South
& Runner Detail

1. ‘Brighton’ Stainless Steel Sink.
2. Refrigerator.
3. 6mm Decor Satin acrylic screen.

Typical drawer runner detail based on Blum ‘Movento’ system.
Kitchen Elevation West
Kitchen Elevation North

1. 900mm extractor ducted through roof.
2. 900mm freestanding stove.
10. Design

Conclusion

The intent of this research was to redesign an existing A-Frame to ‘elevate the form from nostalgic novelty to spatially responsive contemporary architecture’. By applying the philosophy of Fred Scott and fundamentals of the ICOMOS Charter, the design outcome of the research succeeds on a number of levels.

The refinement and reapplication of existing materials, coupled with the introduction of complimentary materials, has imbued the interior of the A-Frame with a level of sophistication not apparent in the original. Consideration of thermal and spatial concerns, a major issue in the original, has been negated through the incorporation of efficient furniture systems, modern insulation technology and adaptable spaces based on the type and volume of occupancy.

Inherent nostalgic aesthetic has been maintained however, by retaining the original form and utilising new materials in the ‘style’ of the original. Where possible, material selection has been considered from a sustainable perspective. The palette and detail draws from a late 1970’s aesthetic, though avoids appearing sentimental by means of utilising the materials with a contemporary bent; the fine balance of durability and elegance.

Spatially, the re-designed A-Frame responds to the brief by being adaptive and responsive. Its varied zones provide for different types of occupation; be it a weekend getaway for a couple or an extended stay by a larger group.

The inclusion of concrete as a secondary material effectively underpins the interior experience by introducing hierarchy and order. The placement of the element is fundamental to its success. The longitudinal central axis implies a structural purpose, though it is only by acting as a means of suspending the upper level shower that this is the case. By delineating the interior into two halves it automatically allows the spaces to be as separate or integrated as is required. The concrete also acts as a primary source of thermal mass, addressing the needs of seasonal inhabitation.

Again, the shift in levels of floor according to material adds to the notion of hierarchy and spatial interest. The lower concrete lounge / bedroom implies a shift; one could surmise the weight of the concrete has pulled away from the wooden floor level finding its own equilibrium as true ground level. Connection with the ground in this area furthers the sense of intimacy; the concrete extending beyond the interior and reaching towards Mount Ruapehu.
10.1 Critical Review

As set out in the brief, the outcome can comfortably accommodate up to six occupants. The design stays true to the playful nature of the original. Room adjacencies are challenged, resulting in a dynamic and unexpected interior experience. The adaptability of spaces allows each sleeping area to be isolated in the event of full inhabitation, conversely, the spaces can revert to their alternative use when required.

Thermal concerns are addressed by utilising modern insulation materials, a concrete core thermal mass, solar screen and modern glazing units. There is provision for a HVAC system to be installed in the ceiling cavity of the drying room that could be ducted throughout the structure.

Materials are kept to a refined palette of timber, concrete, tile and acrylic screen. These loosely adhere to a 1970's inspired colour scheme. The realisation that the A-Frame could be rented for a percentage of the year informed the choice for durable materials.

The limitations of the scope allowed for carte blanche in relation to budget. This allowed the design to evolve without restraint. Again, engineering of the concrete member was not considered as part of this research.

The research successfully *elevates the form from nostalgic novelty to spatially responsive contemporary architecture.*
10.2 Thesis Conclusion

When one is gauging the success of a piece of research they must consider the impact on the subject, what has gone before their research and what potential benefit there is in their work. With this in mind, I hope that this research acts not as a design guide for the renovation of an A-Frame, but as a means of undertaking any sort of design project that deals with altering any existing structure.

The historical review of the typology in New Zealand is of value to future researchers, particularly as a contribution to understanding the relationship between societal changes and architecture.

While the project goes beyond mere ‘renovation’, the philosophies threaded are perhaps as pertinent now more than ever. To me, truth in material is paramount. Letting the material express it’s natural qualities automatically elevates an interior. Dialogues become relationships.

As far as process, it was a somewhat optimistic expectation to fully resolve every detail of the interior and building envelope. Where applicable, assumptions have been made based on rudimentary known solutions. At times such considerations extended beyond the scope of the research, which is primarily interior architecture.

I was drawn to the research because of the limited resource information available. A number of A-Frame plans were collected and analysed, the scope of variations and quality was unexpected. While most were basic in their design, many, including the subjects, attempted to push the limits of the envelope and offer a more considered interior experience.

Though the research hasn’t set out to categorise every example of the A-Frame in New Zealand, it has at least started the conversation and opened the door for future researchers. At the very least, the research demonstrates the beauty in sympathetic renovation using the A-Frame as merely one example of the many architectural curiosities in New Zealand.

Callan Svendsen, April 2016.
11. References


11.1 Image Sources.

1: Svendsen, Callan. "Early Sketch of A-Frame." 2015. JPEG.


16: Svendsen, Callan. "Sunset Style A-Frame" 2015. JPEG.

17: Svendsen, Callan. "Mount Ruapehu at Dusk" 2015. JPEG.


