

DETAILED DESCRIPTION OF PROPOSED ACTIVITY

The site is within the Residential Zone 1.

The proposed activity is an extension to an existing single level 2-bedroom dwelling. The extension comprises of a bedroom, ensuite & dining area.

DESCRIPTION OF SITE AND EXISTING ACTIVITY

The existing site is a fully fenced/ hedged 703m² sloped section. It is located in the suburb of Wakari; the surrounding properties are generally of a similar era.

There is a single level 2-bedroom dwelling with a semidetached single garage within the sideyard setback on the South-western boundary.

Currently the site breaches the following rules:

Rule 8.7.2 (i) (a) Minimum Yards

Side yards shall be 2.0m minimum

The South West side yard is currently breached by the existing garage.

The garage encroaches the sideyard by 1.85m for a length of 5.7m.

Rule 8.7.2 (ii) Height Plane Angle

63° (1 to 2 yard to height ratio)

The South West Height Plane Angle is currently breached by the existing garage. The encroachment to the plane angle is approximately 1.0m at the deepest point, for the 5.7m length of the garage.

Refer to attached drawings / photos for reference.

BREACHES OF DISTRICT PLAN RULES

The proposal will comply with all general & zone rules except:

Rule 8.7.2 (i) (a) Minimum Yards

Side yards shall be 2.0m minimum

The South West side yard is currently breached by the existing garage that is being removed.

The proposed extension will breach the yard by 1.1m for a length of 8.6m.

Rule 8.7.2 (ii) Height Plane Angle

63° (1 to 2 yard to height ratio)

The South West Height Plane Angle is currently breached by the existing garage. The proposed extension will encroach the plane angle approximately 0.6m at the deepest point.

AFFECTED PARTIES

During the initial planning stages of this project it was deemed that the neighbour at 37 Greenhill Ave could be an affected party.

At this time, the owners of 39 Greenhill Ave had a good relationship with this neighbour.

design arc Limited designed a concept for 37 Greenhill Ave. The extension was very similar to the current proposed option; however, the new extension roof pitch was 30° to match the existing roof & the roof had a gable end and the other end intersected with the existing roofs hip ridge.

In January 2017 Lance (owner of 37) went over to Ron & Alison's (owner of 39) with the concept design drawings. At this meeting the only issue that was brought up was that they were

concerned about the height of the new roof as it may cause shading & would block their view of the sky in that direction.

design arc Limited redesigned the roof so the pitch was reduced to 15° & the ends were hipped. The hipped roof ensured that the sky view blockage was kept to a minimum. Lance drew an approximation of the roof on a photo taken from Ron & Alison's living area (attached), he presented that to Ron with the amended drawings.

On 17th March 2017 Lance received a letter from Ron & Alison (attached).

This letter acknowledged that they were happy with the lowered hip roof design & said that it would now not shade their living area.

However, 2 more issues were raised:

1. Mirror reflection from the roof
2. Closed-in feeling from extension

In this letter, Ron & Alison talk about the beech tree that is on Lance & Kaye's North East boundary. This tree is on the opposite boundary to Ron's & approximately 16m from Ron & Alison's house – see drawings & photos for location.

Ron & Alison have asked Lance to remove this tree in the past, however the neighbours at 41 (neighbour next to the tree) & Lance and Kaye like the tree and do not wish to remove it.

On 22nd March Julie-Ann Ross from design arc Limited met with Ron & Alison to discuss these issues. From this meeting, Julie-Ann agreed to consider lowering the roof further & whether non-reflective materials could be used on the roof. Note the existing roof is planned to be reclad to match the new roof. Julie-Ann stated that the beech tree was not part of the proposed project & would not be removed as it was a mature tree and added to the streetscape.

An 8° pitched roof was investigated, however lowering the pitch actually lifted the eaves height due to the increased truss knee junction & made issue with connecting the existing ceiling level with the new extension. The ridge would have lowered by approximately 240mm & it was deemed that the negative effects outweighed the 240mm of sky view gained.

On 27th March Julie-Ann had another meeting with Ron. At this meeting, she outlined the issues with lowering the roof pitch & why there would be little gains from it. She also talked about roof glare & showed Ron NZ Steel brochures on reducing glare. She also showed Ron the Queenstown Lakes District Council's guide to reducing glare & reflection (attached). She suggested that this could be a good baseline for this project with Lance & Kaye agreeing that the roof cladding colour selection would have a LRV below 20% as suggested by QLDC. She also noted that any potential glare would be from the existing reclad roof that wasn't part of the resource consent but Lance & Kaye were keen to keep friendly with them & wanted a good outcome.

At the end of this meeting, Ron indicated that they would most likely be happy with this.

Julie-Ann amended the drawings to state the cladding would have a colour LRV below 20%. Lance delivered these drawings to Ron.

Lance received an email from Ron on 31st March (attached).

This letter indicated there were 3 options.

1. Build within the District plan rules
2. Remove the Beech tree & they would sign
3. Go to a notified consent with hearing

Julie-Ann met with Lance & Kaye to discuss this letter. It was concluded that no amount of redesign would please the neighbours & they saw this process as an opportunity to get the beech tree removed.

Lance & Kaye have a very young family & are currently on 1 income so they were reluctant to proceed with a notified consent as the cost could escalate beyond what they could afford.

Therefore, shading studies were produced to show that the new extension does not impact on the neighbours any more than the existing situation.

These shading plans also show the original concept plan which actually had less impact than we thought it would. We also feel Ron's comments about the closed in feeling are not justified as currently there is a garage wall on the boundary that is at a similar height to the proposed buildings eaves line. Privacy would remain the same as the living areas & courtyard are on the opposite of the extension.

We would like the Council planner to take these points in review & eliminate 37 Greenhill Ave as affected parties.

ASSESSMENT OF EFFECTS ON ENVIRONMENT (AEE)

Building within the rules

The designer has investigated the possibility of building within the District Plan rules.

To design the extension within the sideyard requirements would mean the loss of valuable amenity space in the north facing courtyard that will be formed by the existing house & extension. While there would be still plenty of amenity space in the sloped backyard, it may not be possible to achieve a 4.5m wide amenity circle within the flat courtyard space. It would also mean the kitchen would receive minimal light due to the bedroom extension being in line with the area.

With a current proposal, there would be a 1.0m service path along the South West boundary, if the extension was moved to within the sideyard it would mean the path would be 2.0m wide & pretty much no use to the occupants of the dwelling. Note currently there is no access along this boundary due to the existing garage being built directly on the boundary.

Effects on people/neighbours

The effects on 37 Greenhill Ave have been described in the affected parties section of this application.

No other neighbour could be deemed effected by the proposal in regard to shading effects, loss of outlook or privacy.

Effects on the Neighbourhood

The Streetscape impact will be less than minor. The extension is at the rear of the property & approx. 30m from the street frontage. Note the section is a sloping section falling to the street & it's very hard to see the existing garage. The impact on the street front would be the same or less than the existing garage.

Transportation effects

Currently there is off street parking & one single garage. Vehicles need to reverse out of the garage on to the road.

The existing garage is not used as the width is not suitable for the occupant's people mover & the driveway next to the house is narrow.

Currently the occupants park their 2 cars on the driveway of the property & plan to do the same for the proposed project.

Noise levels and minimisation of noise

The dwelling is able to be on the site as of right and there will be no noise other than normal domestic dwelling noise levels on site. Construction noise levels will comply with the set levels from the Dunedin City Council.

Amenity Area

The rear sloped backyard has large areas (can fit a 4.5m dia circle) that can be used for amenity areas. However, the amenity area would be enhanced by the proposal as a flat courtyard would accommodate a 4.5m wide amenity circle, this would be accessed directly from the living areas.

Built environment / Natural environment / Landscape / Cultural effects

Hazards, Services

There are no effects to the Built environment, Natural environment, Landscape, Cultural & Services from this proposal.

There are no hazards involved in the proposal.

Cumulative Effects

A dwelling is able to be on the site as of right and the effects of the breaches on the surrounding environment will be minor. As a result, any cumulative effects on amenity values or the environment will also be minor.

Legal Description:

Lot 16 BLK V DP 7195

Site Information:

Valuation No. 26950-14700
 Property No. 5017134

Total Site Area 703m²

Wind Zone: High
 Exposure Zone: C
 Climate Zone: 3
 Snow Zone: N5
 Rainfall Intensity: 40-50
 Altitude (approx): 184m
 Earthquake Zone: 1

Planning Zone:
 R1 - Residential

Existing Construction - Bungalow
 (construction date unknown)

Exterior Walls: Brick veneer
 Floors: T&G flooring
 Foundation: Timber subfloor
 Roof: Concrete tile

Legend:

----- Boundary Line

Building & Site dimensions are from
 previously drawn plans and are not
 to be taken as absolute.



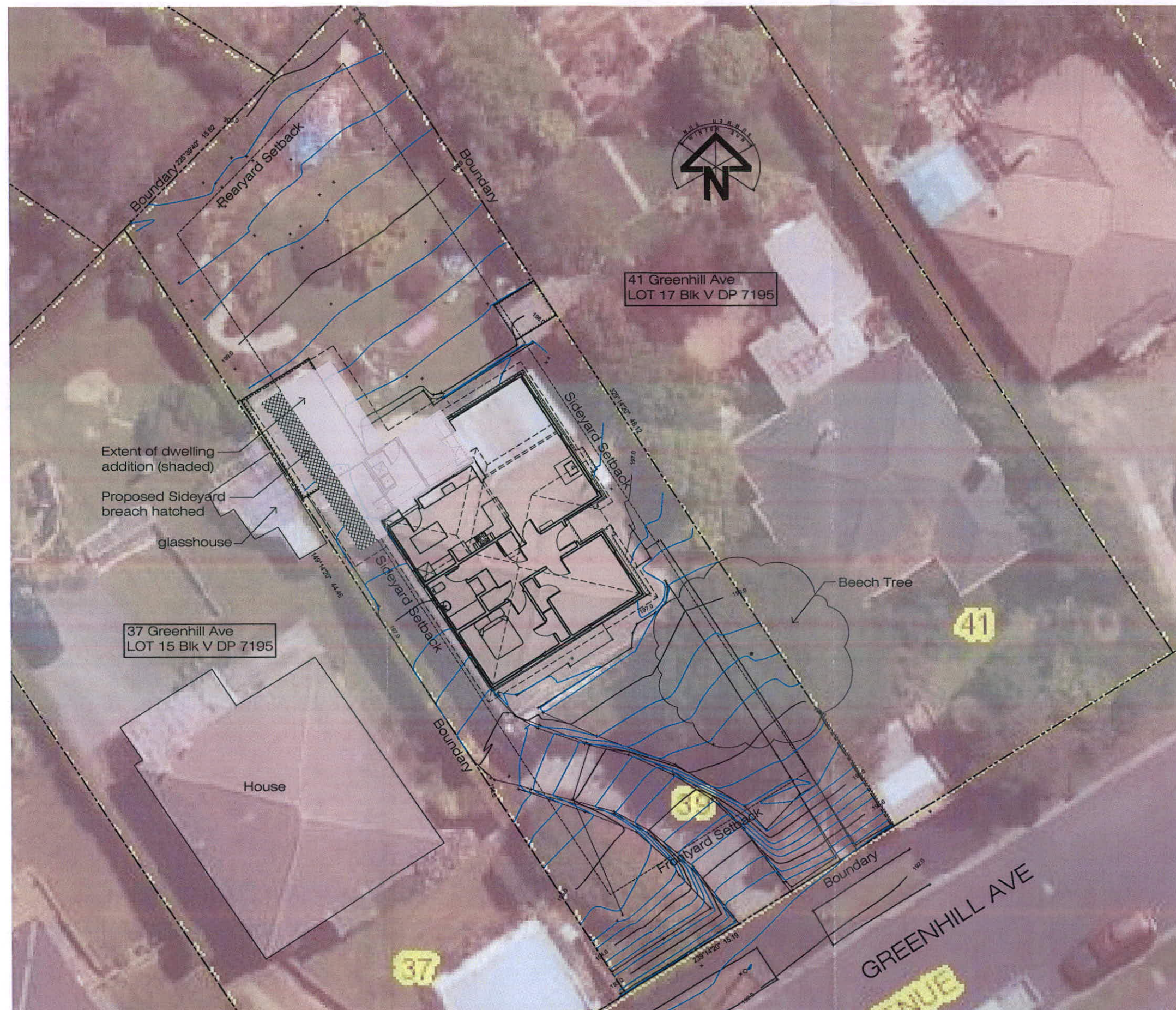
design arc Limited
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Julie-Ann Ross NZCD (Arch.)

46 Bremner Street Fairfield Dunedin 9018 New Zealand
 tel +64 3 488 3383 e-mail architecture@design-arc.co.nz

Proposed Alterations for
 K. Poulter & L. Chisman
 39 Greenhill Ave, Wakari, Dunedin

Site Plan



Existing Site Plan
 Scale 1:200

Filename: 1612 - Poulter Chisman.dwg
 Print Date: 25.05.17

The Contractor shall verify ALL Dimensions on
 site BEFORE commencing construction.
 Drawings are only to be used for the purpose
 stated, unless notified by design arc limited in
 writing.

No:	Date:	Revision:
Design:	J Ross	Date: 21.11.16
Drawn:	J Ross	Date: 21.11.16

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RMA 25.05.17

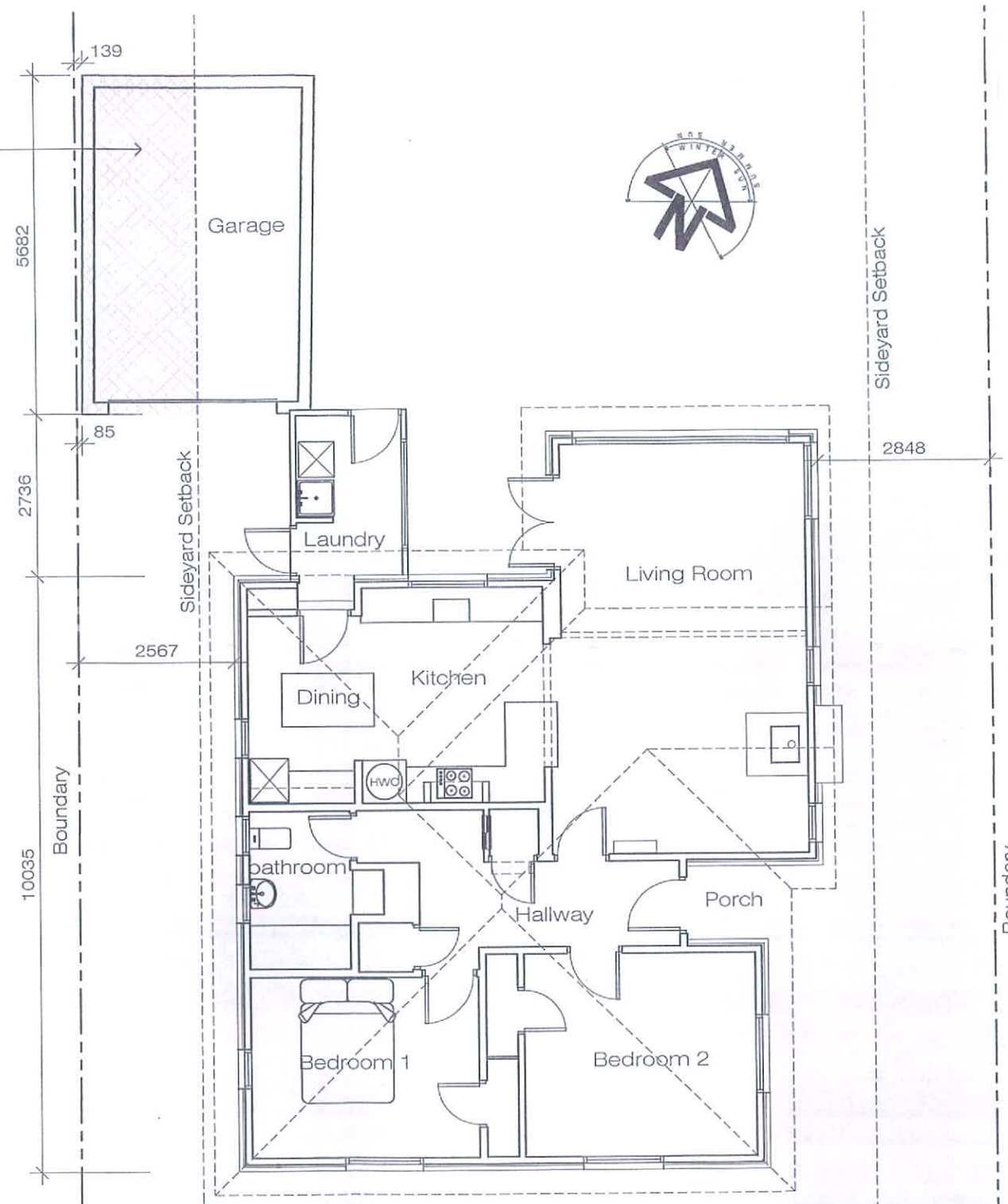
Project No.	Revision:	Sheet No:
1612		R01
		of 6 Sheets

Existing Dwelling Information:

Total Site Area 703m²
 Existing House Footprint Area 108m²
 Existing Garage Footprint Area 22m²
 Total Existing Footprint Area 130m²

Existing Site Coverage 19%

Current non-compliance
 to sideyard rules hatched



Existing Floor Plan
 Scale 1:100

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Existing Floor Plan

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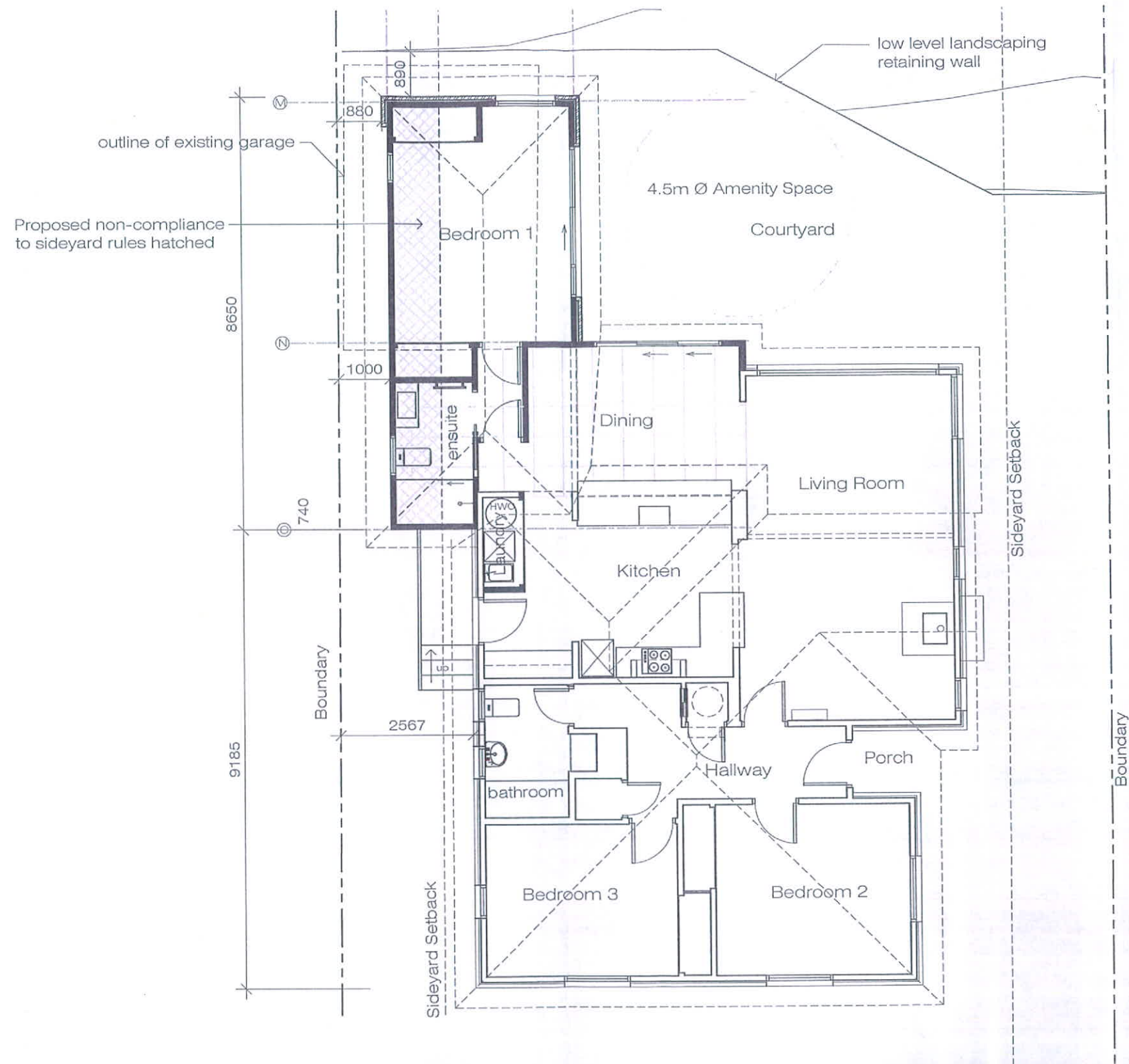
RMA 25.05.17

Project No.	Revision:	Sheet No:
1612		R02
		of 6 Sheets

ORIGINAL-10 0 10 20 30 40 50mm
 SIZE 1:1
 DO NOT SCALE OFF DRAWINGS - ASK!

Proposed Dwelling Information:

Total Site Area 703m²
 Proposed House Footprint Area 144m²
 Proposed Site Coverage 21%



Proposed Floor Plan
 Scale 1:100

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Proposed Alterations for
 K. Poulter & L. Chisman
 39 Greenhill Ave, Wakari, Dunedin

Proposed Floor Plan

Filename: 1612 - Poulter Chisman.dwg
 Print Date: 25.05.17

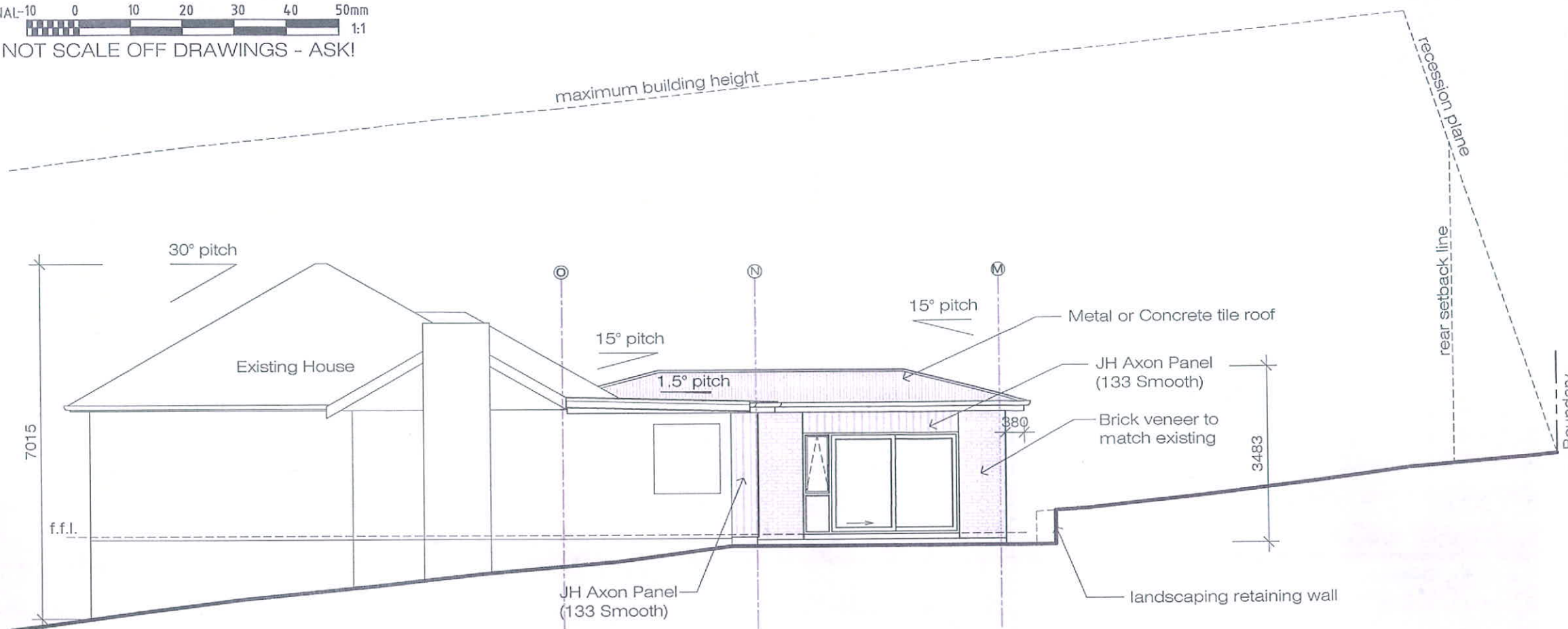
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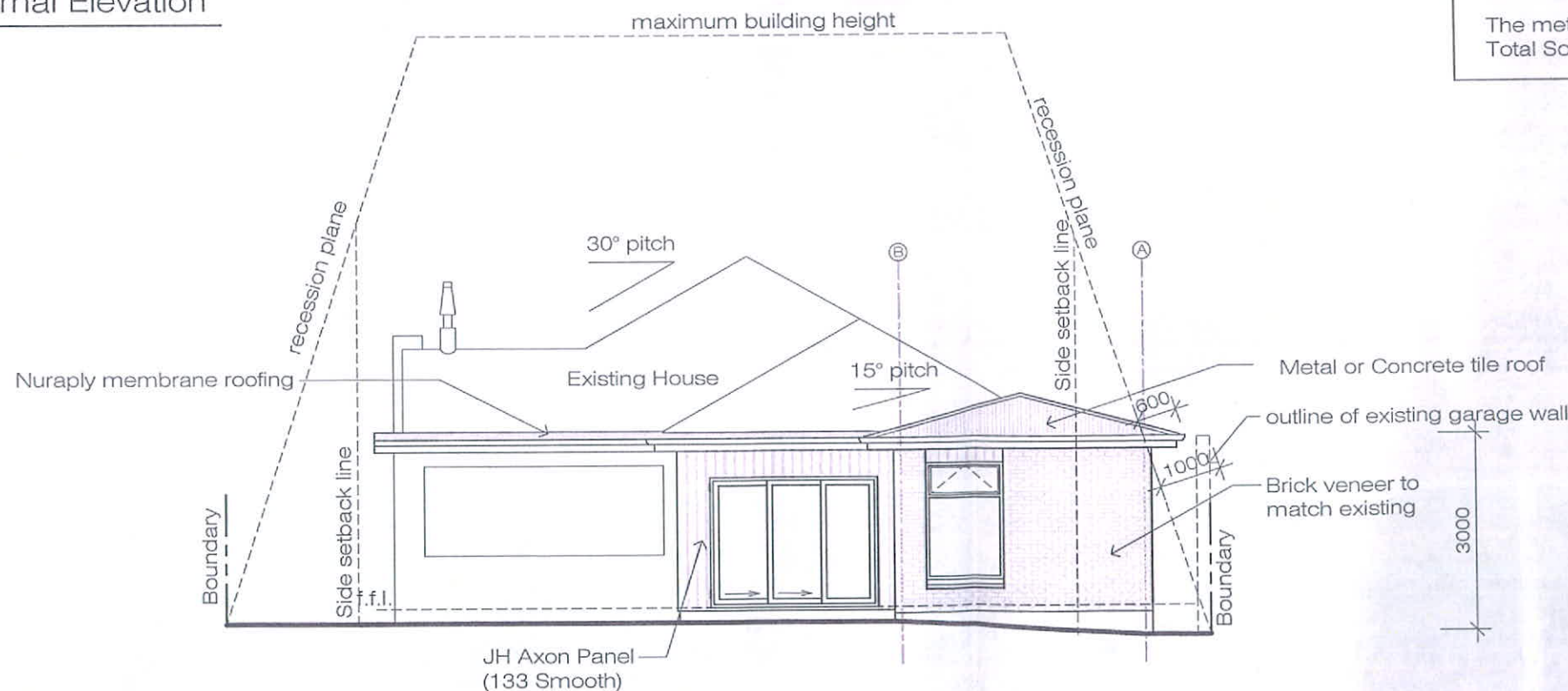
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RMA	25.05.17
Project No. 1612	Revision: Sheet No: R03 of 6 Sheets



East External Elevation
 Scale 1:100

The metal or concrete tile roofing shall have a Total Solar Reflectance of 25% or less.



North External Elevation
 Scale 1:100

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Proposed Alterations for
 K. Poulter & L. Chisman
 39 Greenhill Ave, Wakari, Dunedin

External Elevations

Filename: 1612 - Poulter Chisman.dwg
 Print Date: 25.05.17

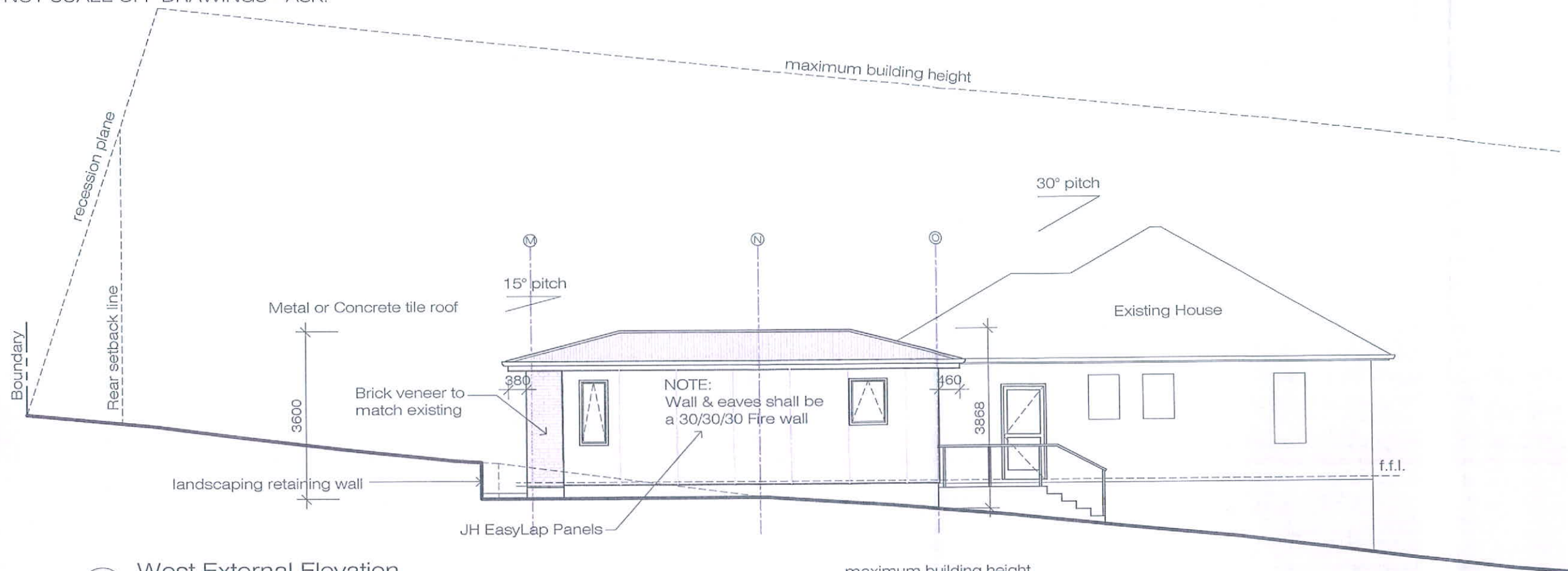
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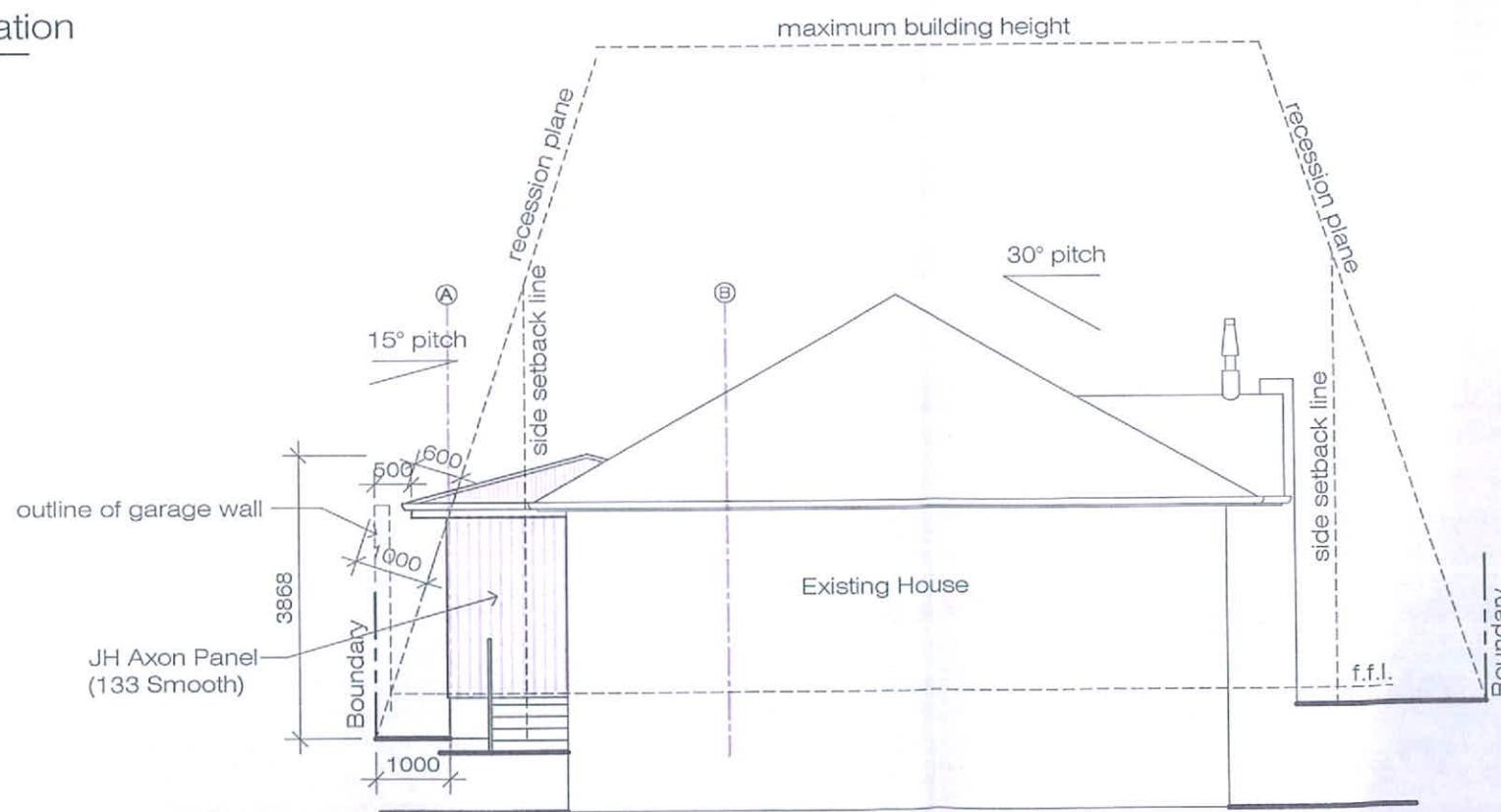
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RMA		25.05.17
Project No. 1612	Revision:	Sheet No: R04 of 6 Sheets



West External Elevation
 Scale 1:100



South External Elevation
 Scale 1:100

The metal or concrete tile roofing shall have a Total Solar Reflectance of 25% or less.

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Proposed Alterations for
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 39 Greenhill Ave, Wakari, Dunedin

External Elevations

Filename: 1612 - Poulter Chisman.dwg
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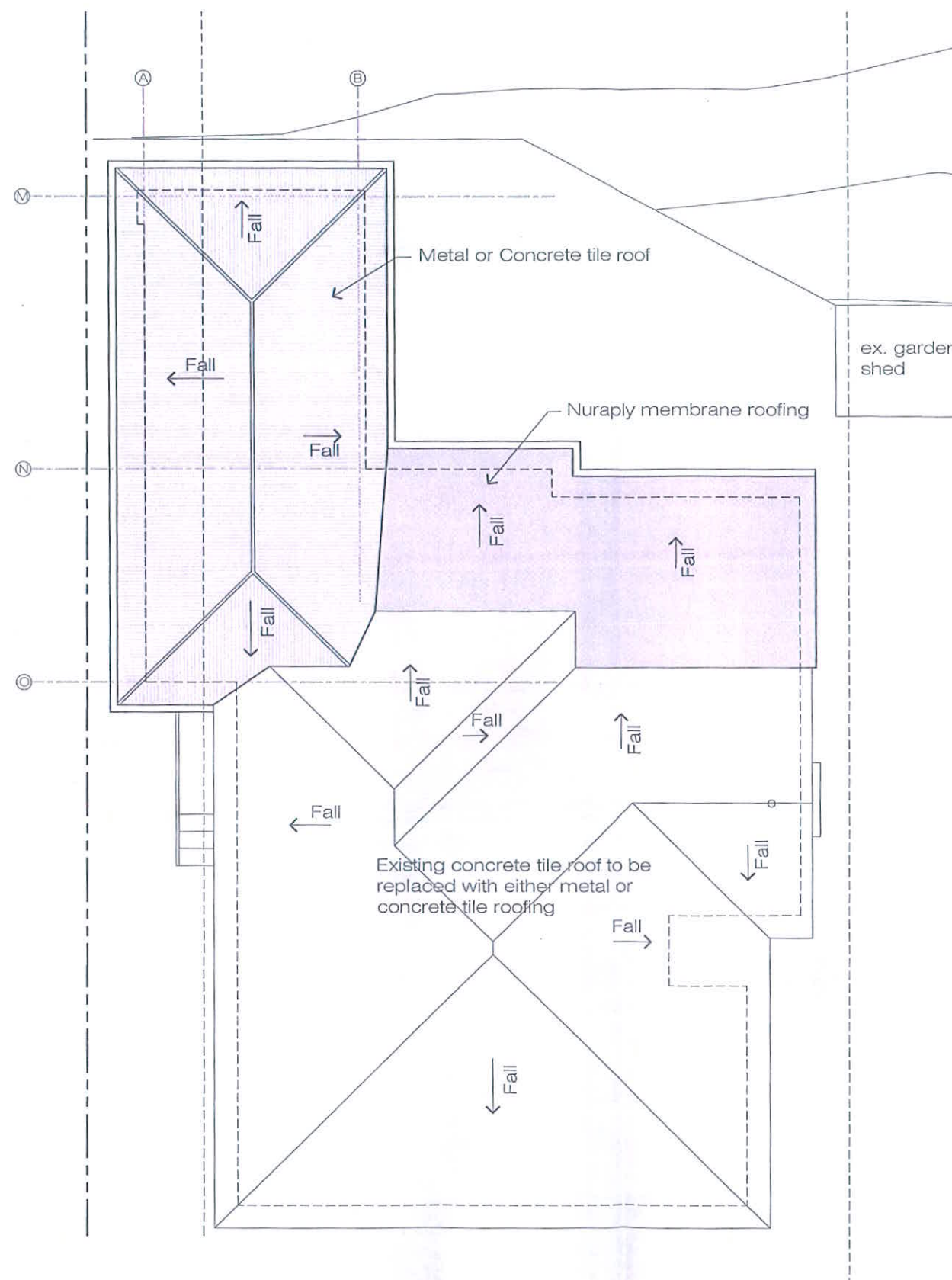
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RMA	25.05.17
Project No. 1612	Revision: R05 of 6 Sheets



The metal or concrete tile roofing shall have a Total Solar Reflectance of 25% or less.

Proposed Roof Plan
 Scale 1:100

Building & Site dimensions are from previously drawn plans and are not to be taken as absolute.



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Proposed Alterations for
 K. Poulter & L. Chisman
 39 Greenhill Ave, Wakari, Dunedin

Proposed Roof Plan

Filename: 1612 - Poulter Chisman.dwg
 Print Date: 25.05.17

The Contractor shall verify ALL Dimensions on site BEFORE commencing construction. Drawings are only to be used for the purpose stated, unless notified by design arc limited in writing.

No.	Date:	Revision:
Design:	J Ross	Date: 21.11.16
Drawn:	J Ross	Date: 21.11.16

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RMA	25.05.17
Project No. 1612	Revision: R06 of 6 Sheets

Friday 2017.03.17.
Lance Kay,

As Kay came over at lunch time to see the kinds of things that are on our mind, it is probably not necessary for us to drop across this evening at this stage, as promised.

Instead, here's some positive suggestions to discuss with the architect. We certainly don't want to hold up your plans unnecessarily. It would be nice for you to get the advantages from your project this winter. We are aware however, that unintended consequences for us are difficult to assess without considerable reflection. We spend most of our time at home so shading and view factors are important to us.

Three impacts we envisage, and some suggestions:

1. SHADING – We think the revised, lower hip roofline plan (2017.03.08) will now avoid the shading of the living area in our home. Thankyou so much for considering this.

2. MIRROR REFLECTION – Long-run iron, even corrugated, and even dark coloured, is highly reflective. This would make it difficult for us to look out our windows all morning and part of the afternoon. The current tiles are non-reflective, but even so, the quartz pebbles in them sparkle. The neighbour's iron roofing to our NW is immensely reflective – hence the high hedge.

Mitigation suggestion: We would much appreciate if you would consider a non-reflective form of roofing (I think it could still be iron but with a particulate, non-reflective surface).

3. CLOSED-IN FEELING – the revised plan still considerably minimises the amount of sky we currently view when seated in our lounge and dining area. Your existing 9m house length restricts our view anyway (we bought knowing this), but the extra 8.5m length of roofing will make a huge difference to our wellbeing.

Suggestion: Build with the minimum pitch necessary to enable long-run corrugated iron roofing to have efficient runoff, strength for snow, and space for ceiling insulation, etc. The lowest roof profile really is preferable for us.

Compromise suggestion: whatever your plans for an 8.5m extension it will unavoidably produce a closed-in feeling for us. Compensation could be that we incur a closed-in feeling to the North and we gain a less closed-in feeling to the East, as well as gaining sunlight and home-heating that has been denied us over the past 10-12 years only. As we grow older, we watch the still rapidly growing beech tree, by the year making our home colder (currently 3.5°C less warmth plus less light in the mornings for a crucial 2h in our living area from February 17th and to November).

Your current plans will potentially give you considerable gains in space and solar radiation (sunlight into your home), which we don't want you to miss out on. However, we stand to lose considerably (above). We ask that you to seriously consider our compromise suggestion, thus creating a win-win situation for us both. ... and we will be happy to sign so you can get things going. Please feel free to continue discussing these things with us.

Alison Fox

From: Ron Adams <adamsra@slingshot.co.nz>
Sent: Friday, 31 March 2017 9:36 PM
To: Lance - Julie-Ann Ross
Subject: RON & ALISON ADAMS / LANCE & KAY PLANS

Julie-Ann,

Thankyou for helping answer our questions about Lance and Kay's proposal. We thought it would be helpful if we sent a copy of the email Ron sent to Lance this afternoon. We had agreed with Lance to give him a reply by Friday (31st).

Ron and Alison Adams.

Lance,

We have been very hesitant as you know about your proposal. We'd prefer at present that you built within the rules so that we didn't feel so crowded out and have reduced lighting in our living area. We are sorry that you went to all this trouble and expense *before* we had a chance to comment. We still think that your extension idea would make a heap of difference for you with an extra bedroom and more living space.

We see three options:

1. We hope you can replan to provide the improvements you want without the structure being so 'in our face'.
2. The possibility of a trade off such that we lose lighting and a have a crowded out feeling due to your proposal, and we gain lighting and a less crowded out feeling by removal of the beech tree. The tree's growing presence *and* your proposal is asking too much of us.
3. Ignore our reasonable concerns and insist on a Council hearing.

We hope you will choose an option that is a happy meeting place for both you and us.

Heaps,
Ron

37 Greenhill Ave

Beech Tree

garage location





Beech tree

39 Greenhill Ave

41 Greenhill Ave

Driveway

Google

View from backyard

Beech tree

37 Greenhill Ave



View 2 from backyard







View from Neighbours Living Area
Estimate of Proposed roof line



Existing View

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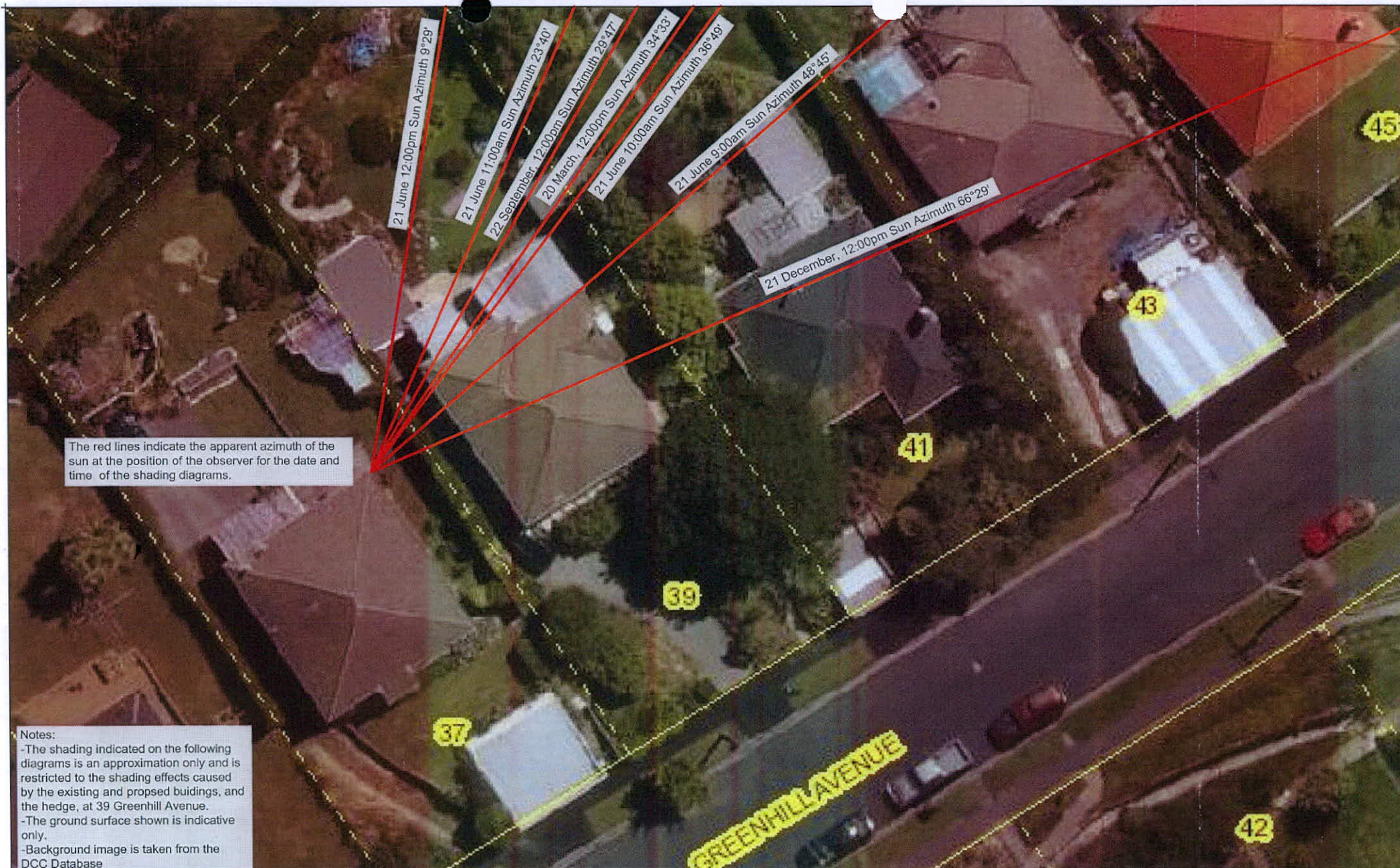
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Plan Purpose
Drawing Title

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		X	X
			Date Created:
			19/05/2016



Notes:

- The shading indicated on the following diagrams is an approximation only and is restricted to the shading effects caused by the existing and proposed buildings, and the hedge, at 39 Greenhill Avenue.
- The ground surface shown is indicative only.
- Background image is taken from the DCC Database

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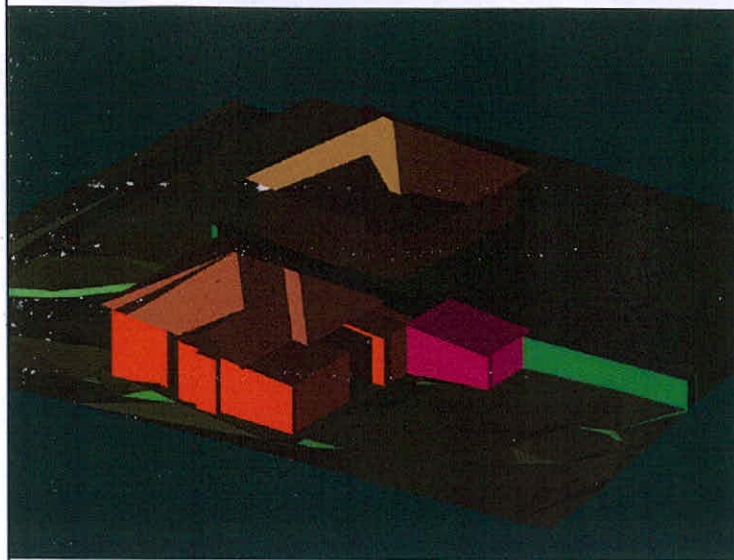
L Chisman & K Poulter
 39 Greenhill Avenue

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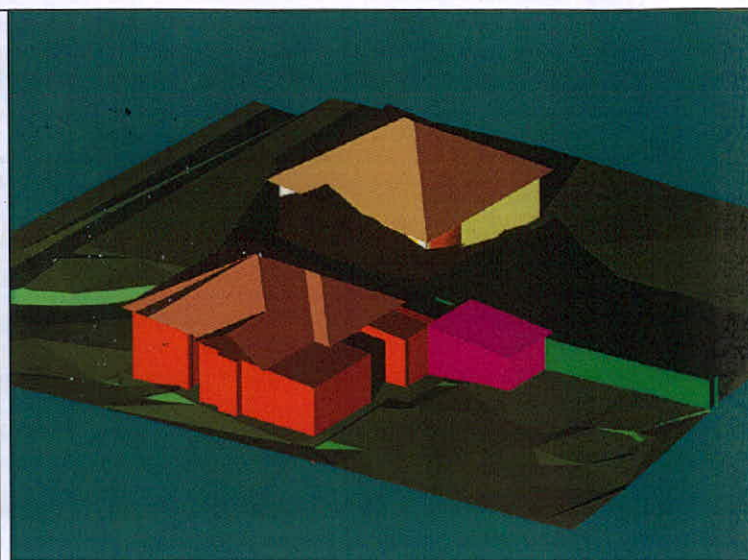
Sunlight Shading

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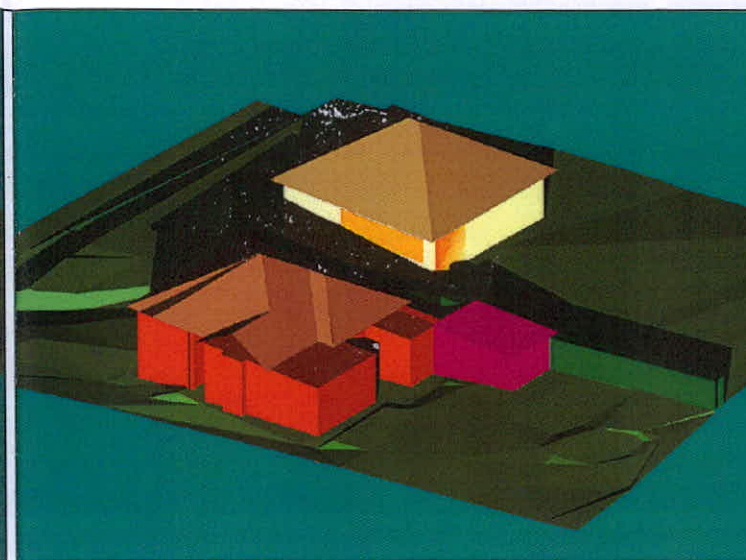
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			May 2017



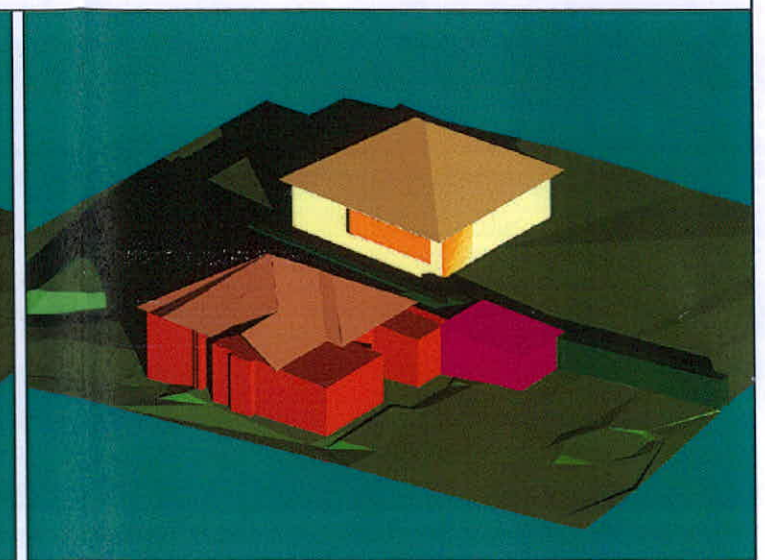
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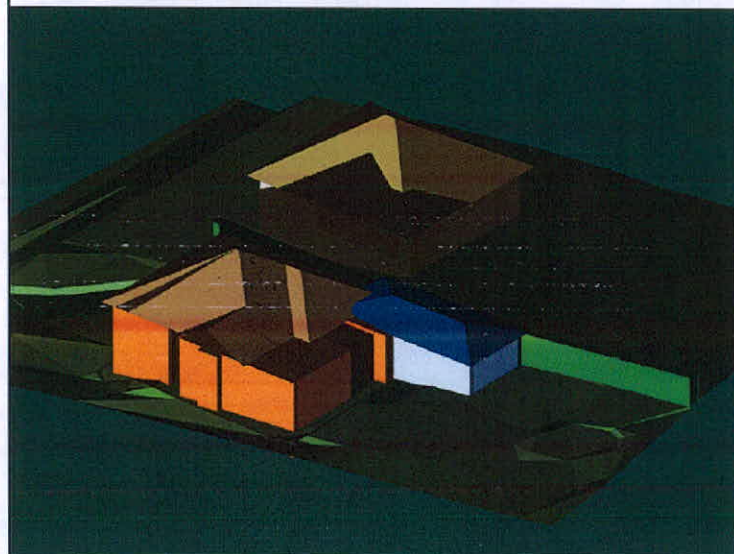
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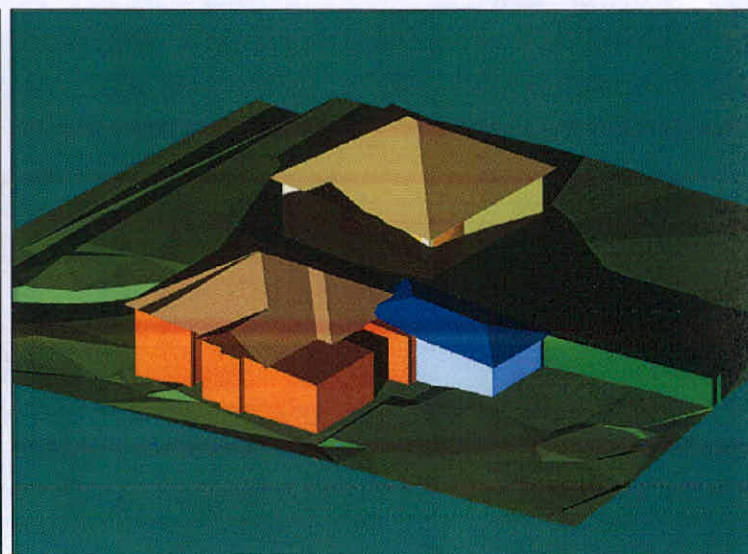
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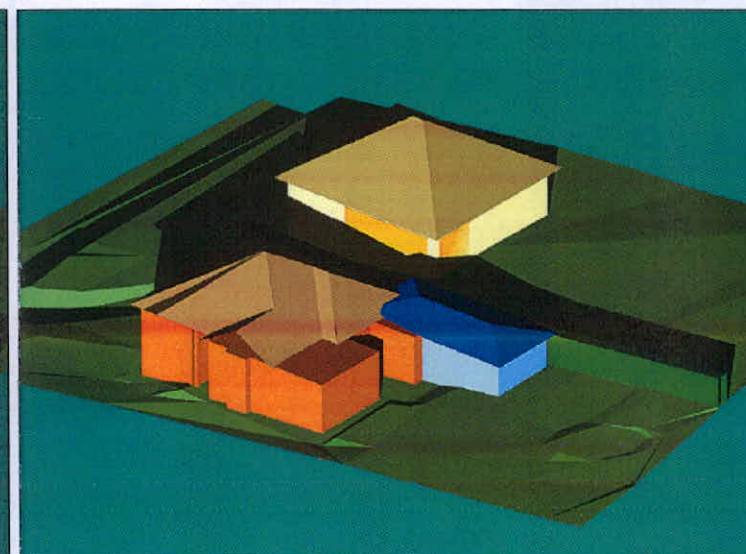
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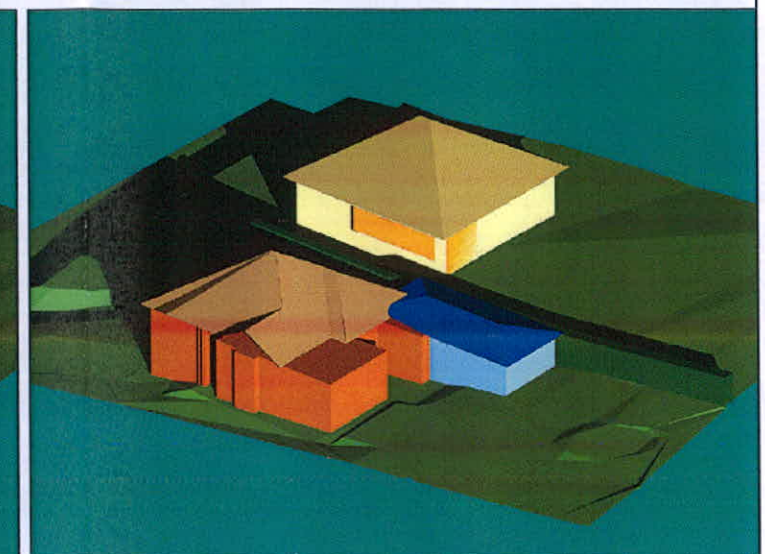
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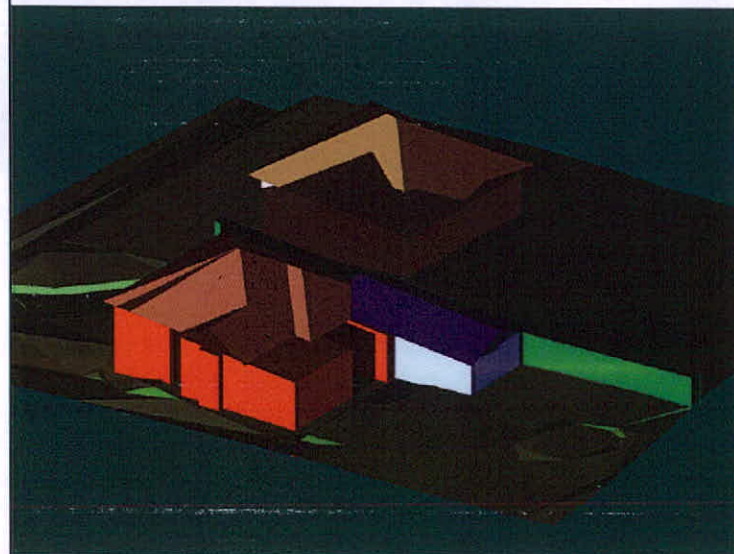
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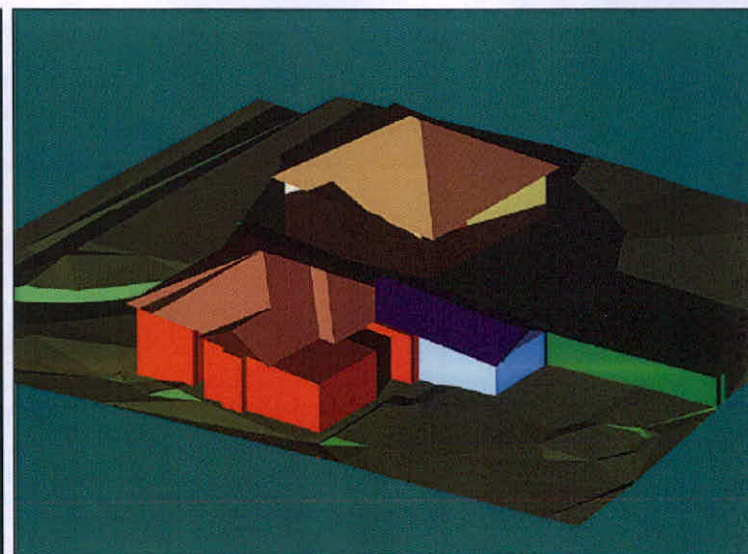
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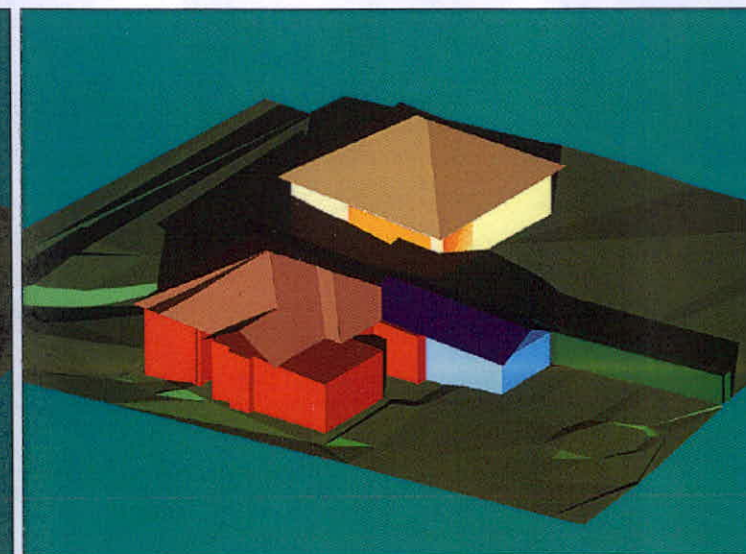
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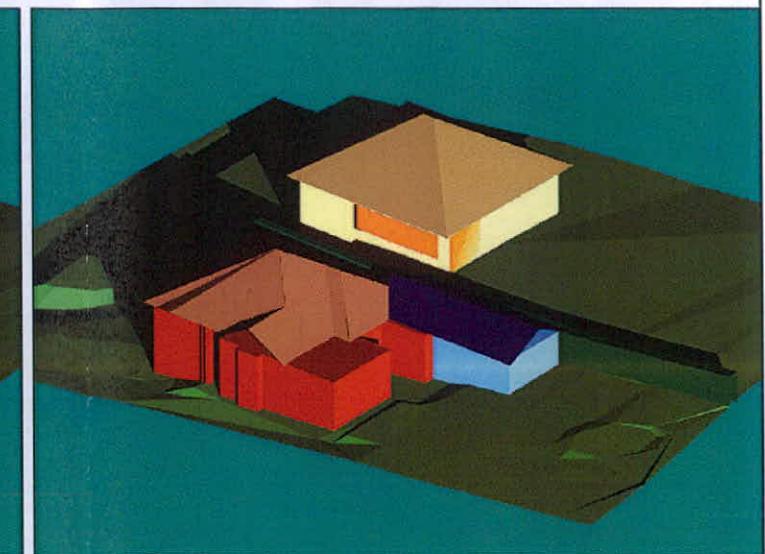
21 June 9:00am Sun Azimuth 48°45' - Initial Concept



21 June 10:00am Sun Azimuth 36°49' - Initial Concept



21 June 11:00am Sun Azimuth 23°40' - Initial Concept



21 June 11:00am Sun Azimuth 23°40' - Initial Concept

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 T 03 477 3245
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Client/Location:

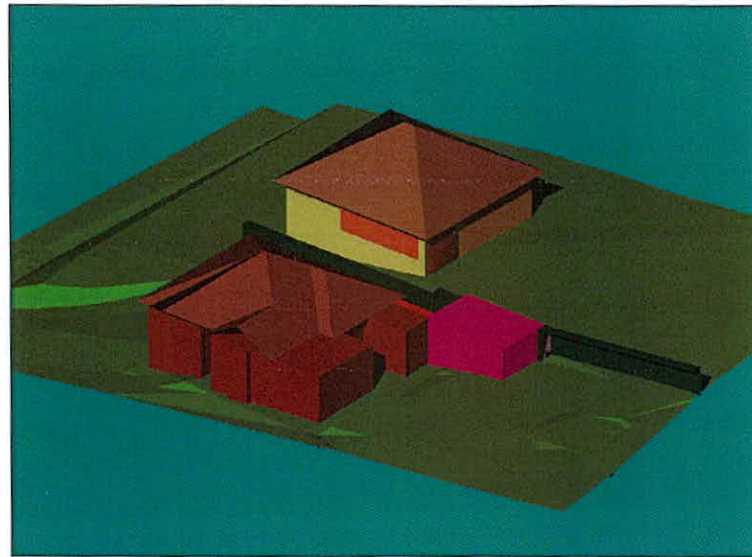
L Chisman & K Poulter
 39 Greenhill Avenue

Purpose/Drawing Title:

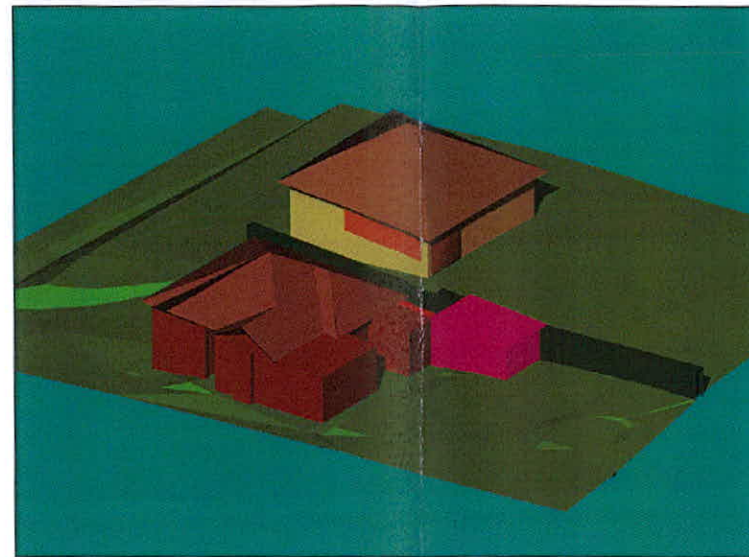
Sunlight Shading

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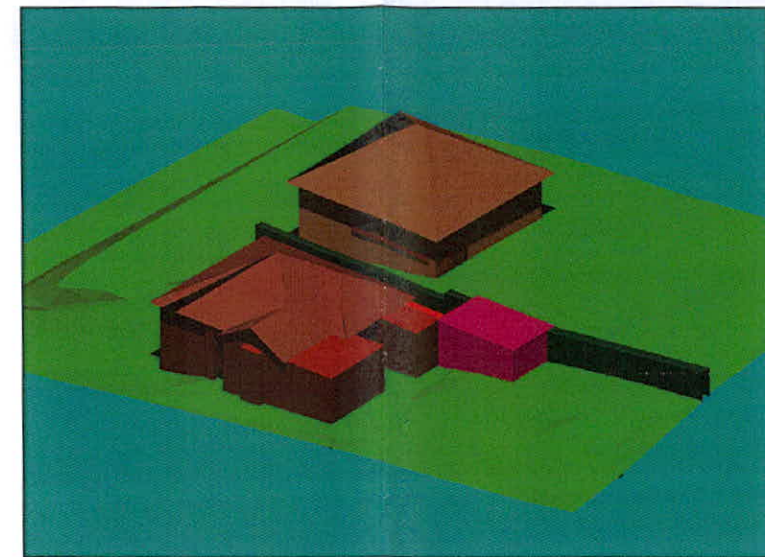
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			May 2017



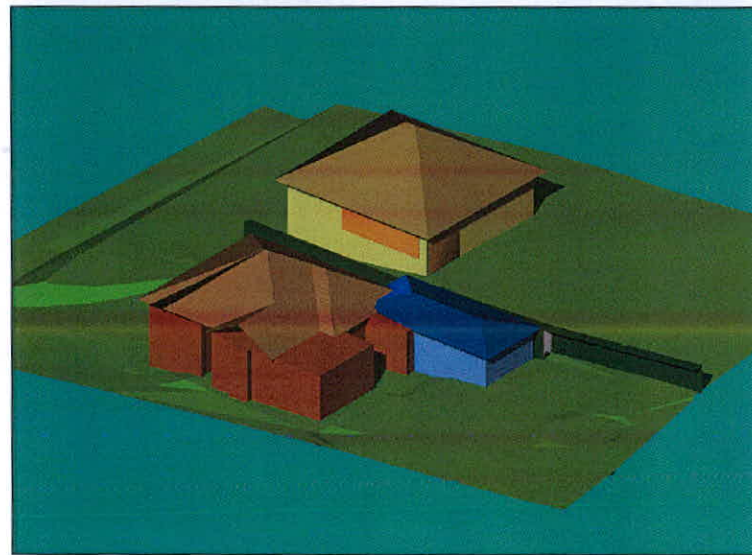
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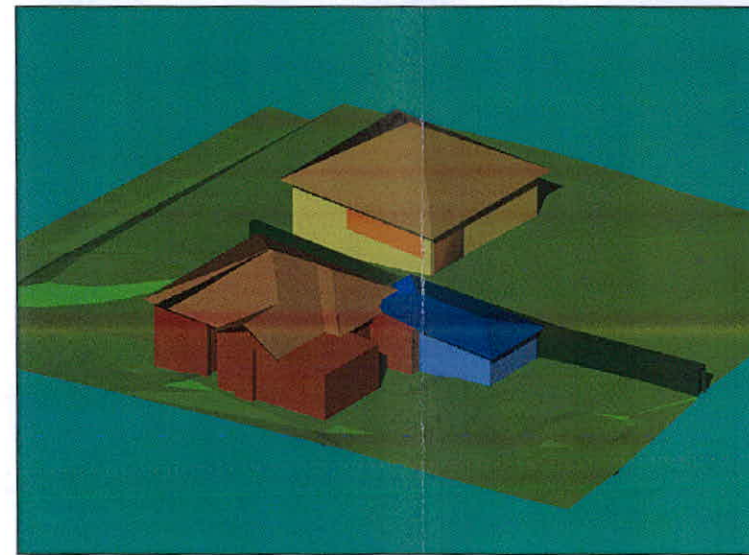
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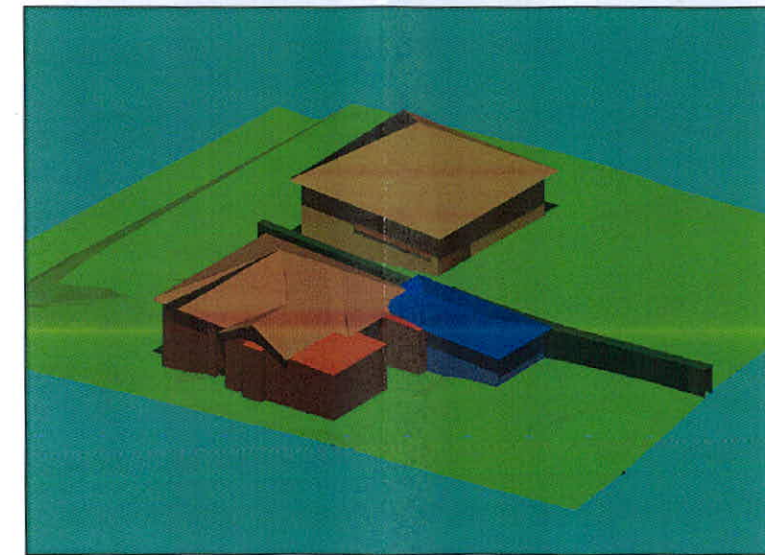
21 December, 12:00pm Sun Azimuth 66°29' - Existing



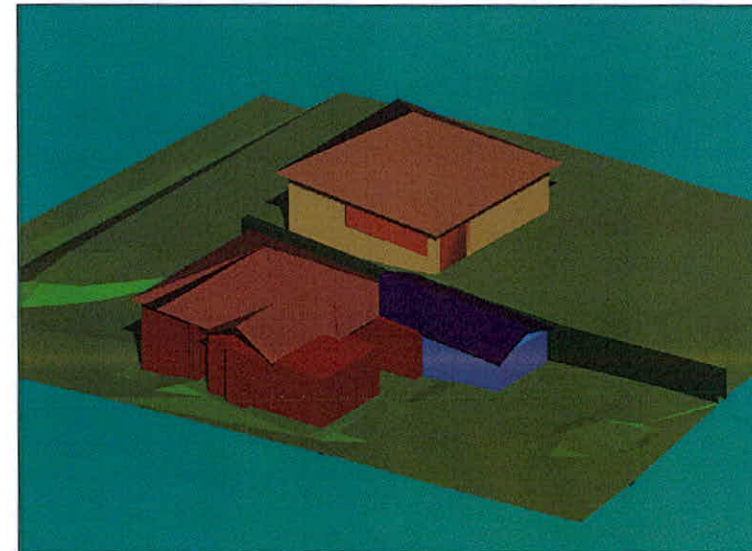
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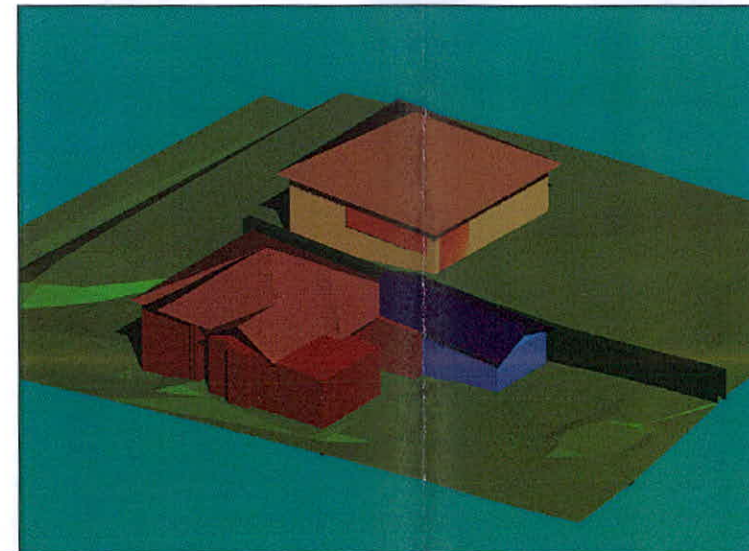
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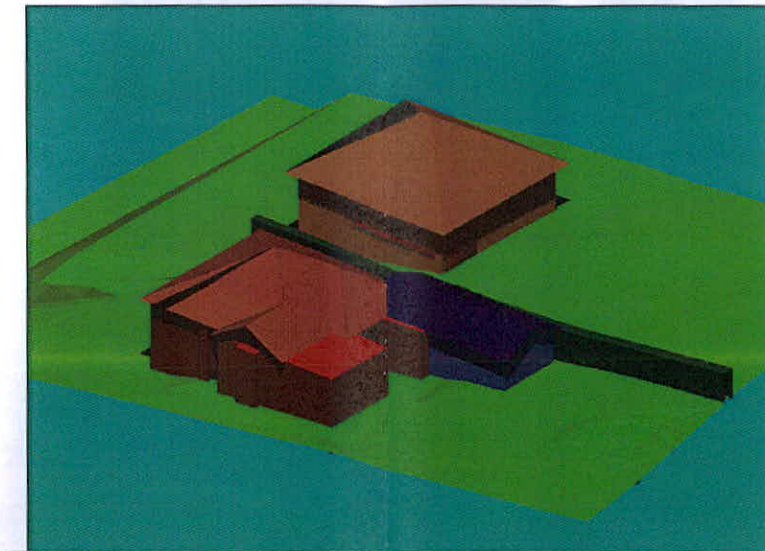
21 December, 12:00pm Sun Azimuth 66°29' - Proposed



20 March, 12:00pm Sun Azimuth 34°33' - Initial Concept



22 September, 12:00pm Sun Azimuth 29°47' - Initial Concept



21 December, 12:00pm Sun Azimuth 66°29' - Initial Concept

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Purpose/Drawing Title:

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Checked by:	XXX		
Approved by:	XXX	Sheet No:	Revision No:
Job Ref:		3 of 3	X
			Date Created: May 2017

Building materials, thermal efficiency and reflectivity

INTRODUCTION

Good building design requires some thought in the selection and use of materials. Reflective building materials benefit the occupants and the environment. However, in limited instances highly reflective materials or surfaces, if not properly used, can cause some annoyance to immediate neighbours. Therefore, the challenge is to develop an understanding of the key issues to allow a balanced assessment of material choice in the interests of the occupants, the neighbours and the environment. The purpose of this Technical Bulletin is to provide insight on some of these issues.

INEFFECTIVE POLICIES

All building materials reflect sunlight. Occasionally policies or guidelines are developed with wording such as 'all building materials must be non-reflective'. One implication of such a statement would be that nothing could be built, as all materials are reflective to some extent.

There are several inadequacies in attempting to control the use of building materials based on reflectivity alone. One problem with this approach is that it is well known that, in most Australian climate zones, materials with high solar reflectivity can offer better thermal performance than materials with lower reflectivity by way of lower energy costs and/or improved comfort. Placing limits on reflectivity therefore precludes energy efficient design, to the detriment of the occupants and the environment.

Many other problems are introduced with reflectivity limits. For example, it is inappropriate to have such limits if they are not equally applied to all materials. Materials such as glass may have difficulty in meeting any reflectivity limit if assessed for all lighting angles and not just at normal incidence. While this would mean that some materials could not be used in any building application, they may not pose a problem if they do not cause sunlight to be reflected directly back to the observer.

CASE-BY-CASE ASSESSMENT

The most effective method of determining which building materials are appropriate is to conduct a case-by-case assessment. Arbitrary approaches that do not account for site conditions will always be to the detriment of the applicants, the neighbours or the broader environment. A case-by-case assessment can be a reasonably simple process.

Important factors to be considered in appraising a building include:

1. **Orientation:** A simple sketch of the house in question, the typical position of the sun and the position of any neighbouring dwellings (see Figure 1) can be a great help in determining whether any neighbours could be affected by directly reflected sunlight.

For typical roofing pitches in the southern hemisphere, if a roof is viewed from the north, it is unlikely that it will cause glare. If viewed from the west, it is unlikely that glare would occur other than for a short period in the morning. If viewed from the east, it is unlikely that glare would occur other than for a short period in the afternoon. However, if viewed mainly from the south, roofs can result in glare for extended periods of the day. Furthermore, due to the sun's ever changing path, glare will typically only be present during particular seasons representing a minority of the year.

2. **Roof Pitch and Topography:** Issues such as roof pitch and the slope of the ground (topography) need to be considered in drawing a sketch such as that in Figure 1. Any vegetation or other screening that is present or could be used to shield the view of the roof should also be considered (see Figure 2).

Figure 1. Direction tendency of mirrored sunlight to the North and to the South.

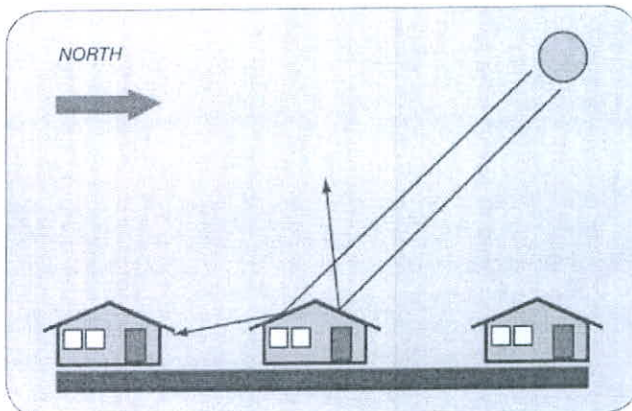
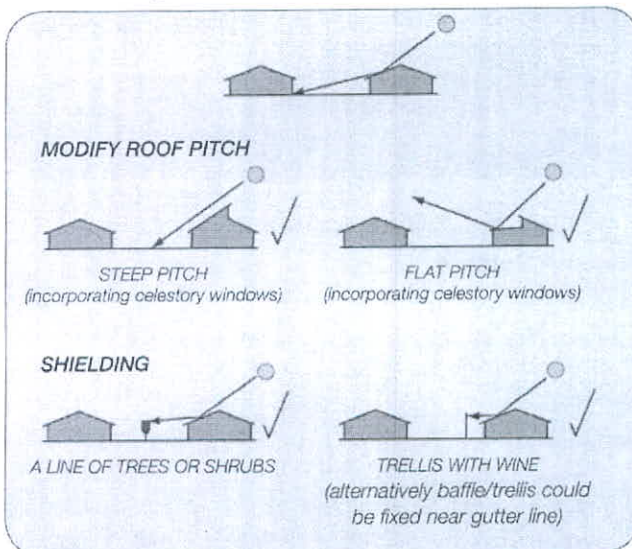


Figure 2. Modifying roof pitch or shielding to avoid directly reflected sunlight.



3. Seasons and Weathering: The effects of glare will often be worse in summer when the sun is at its most intense. New roofs built during summer that have not undergone any weathering have the potential to cause the most glare regardless of roofing colours and materials used. As the seasons change, so does the orientation of the sun in the sky and the observer may no longer receive direct reflection. Furthermore, in the case of roofing made from COLORBOND® prepainted steel, some weathering will occur over time and the amount of reflected light will be reduced. While this weathering process reduces glare, it occurs in a manner that does not substantially affect the thermal performance of the roofing system. It is important to consider the effects of weathering, since the tendency for some materials to cause glare will reduce with time (e.g. COLORBOND® steel), while others may continue to cause glare at a consistent level over time (e.g. terracotta tiles, many types of glazing and swimming pools).

4. Choice of Colour: Choosing a darker colour over a lighter colour may not have the desired effect of reducing glare. Problem glare is commonly associated with directly reflected sunlight, which is primarily affected by material gloss level. Colour has a much smaller secondary impact on direct reflection. It is typical for all colours of a standard material range (COLORBOND® steel, tiles etc.) to have similar gloss levels and to reflect similar levels of direct sunlight.

THERMAL EFFICIENCY

Many building materials are designed to be highly reflective. The main benefits being that highly reflective materials do not absorb as much heat as less reflective materials and therefore stay cooler. Generally, the use of highly reflective materials will result in a building with greater thermal efficiency (which can improve occupant comfort and improve effectiveness of cooling systems).

The most exposed element of a building is its roof. Therefore it is an extremely important element in designing an energy efficient building. During hot sunny weather, the temperature of a light coloured roof can be up to 35°C cooler than a dark coloured roof. This results in a significantly lower cooling load from the roof. In warm and temperate climates, this can translate into energy savings and improved thermal comfort for no additional cost. The benefit of light colours in warm climates has been well established through research and through monitoring of real buildings. Numerous experiments in several residential and commercial buildings in California and Florida in the USA show that white roofs can reduce air-conditioning energy use by between 10% and 50%. The energy efficiency benefits of high solar reflectance roofs are recognised in both the Building Code of Australia and BASIX (NSW), and concessions are provided where appropriate to encourage their use.

COLORBOND® steel with Thermatech® solar reflectance technology is a low maintenance and durable roofing material that can be used to improve building energy efficiency. Whilst the potential for reflective visual problems reduces with weathering, outdoor exposure testing has shown that the heat reflective properties of COLORBOND® steel are maintained.

In addition to this, on hot summer nights a roof made from COLORBOND® steel will radiate less heat into your home. This is due to steel's low thermal mass, which enables it to cool down fast once the sun has set. As with all roofing products, the use of light solar reflective colours is preferable for thermal efficiency.

ENVIRONMENTAL BENEFITS

The thermal efficiency features of a light coloured roof can offer benefits to the environment by reducing energy use and greenhouse gas emissions through improved efficiency of building air-conditioning systems. This also helps to moderate our cities' increasing problems with meeting peak electrical summer loads, due largely to the huge increase of residential air-conditioner use. Further benefits to the environment result from light coloured roofs because they are cooler helping to mitigate Urban Heat Islands (UHI). The use of dark building materials (particularly high mass materials) in built-up areas contributes to increased local temperatures causing UHI. Elevated temperature from UHI, particularly during summer, can affect a community's environment and quality of life.

According to the US Environment Protection Agency, impacts of UHI include increased energy consumption, elevated emissions of air pollutants and greenhouse gases, as well as impaired water quality. For more information on UHI and their effects visit <http://www.epa.gov/heatisland/about/index.htm>.

COMMERCIAL/INDUSTRIAL BUILDINGS

Whilst most of the preceding comments are equally applicable to commercial/industrial buildings, these types of buildings tend not to cause glare disturbance as commercial/industrial roofs are usually of very low pitch and typically elevated beyond line of sight.

COLORBOND® Coolmax® steel has been designed to achieve the maximum solar reflectance for a prepainted steel product whilst maintaining all the quality and durability of COLORBOND® steel. Higher solar reflectance may raise concern that roofing made from COLORBOND® Coolmax® steel has increased potential for creating glare. It should be noted that the mirrored reflection of the sun from COLORBOND® Coolmax® steel in the colour Whitehaven® is similar to COLORBOND® steel in the colour Surfemist®. Therefore, the performance of COLORBOND® Coolmax® steel with respect to potential glare arising from mirrored reflection of the sun is also expected to be similar to COLORBOND® steel in Surfemist®. On this basis, if it was deemed appropriate to use COLORBOND® steel in Surfemist® for roofing, as would be the case for the large majority of commercial and industrial roofs, then COLORBOND® Coolmax® steel in Whitehaven® should also be suitable.

Commercial/industrial walls do not typically cause glare problems, as direct reflection often goes straight to the ground and is not received by people around the building. The main instance where reflection from walls may cause glare issues is multi-storey buildings. In this case, if the observer can see direct reflection from a wall, glare from windows would also be a significant problem as the sun would hit the windows at a low angle and most of the light will be reflected.

CONCLUSION

Key Points to Remember:

1. All materials are reflective.
2. A case-by-case assessment is the most effective means of managing reflectivity and thermal efficiency concerns with appropriate choice of building materials.
3. Reference to reflectivity limits alone tend to restrict the opportunity to use thermally efficient light colours, which have inherent environmental benefits including reduced energy use, reduced greenhouse gas emissions, and mitigation of UHI.

Given the benefits of choosing reflective building material and the effective ways to manage glare issues, it is suggested that building owners should be encouraged, rather than discouraged, in the use of products such as COLORBOND® Coolmax® steel and standard COLORBOND® steel with Thermatech® solar reflectance technology.

REFERENCES

1. Akbari H, Konopacki S and Parker D, Updates on revision to ASHRAE Standard 90.2: Including roof reflectivity for residential buildings, Proceedings of the ACEEE summer study on energy efficiency in buildings, 2000.

If you have any questions regarding this Bulletin, please contact BlueScope Steel Direct on 1800 800 789.

To ensure you have the most current Technical Bulletin, please go to bluescopesteel.com.au.



The information and advice contained in this Technical Bulletin ("Bulletin") is of a general nature only and has not been prepared with your specific needs in mind. You should always obtain specialist advice to ensure that the materials, approach and techniques referred to in this Bulletin meet your specific requirements.



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A guide to **REDUCING GLARE AND REFLECTION** in the Queenstown Lakes District



- **Why a guideline?**
- **Why avoid glare and excessive reflectance?**
- **What causes the problem?**
- **What are the rules?**
- **What colours and materials are appropriate?**
- **When do you need a reflectivity report?**



WHY A GUIDELINE?

- To encourage the use of building materials, in particular for roofs, that complement the environment in terms of colour and texture, and do not cause glare or excessive reflectance.
- To ensure that building materials with low glare are used in the Queenstown Lakes District, particularly in Outstanding Natural Landscapes and Visual Amenity Landscapes.
- To explain the rules and intent of the District Plan.

WHY AVOID GLARE AND EXCESSIVE REFLECTANCE?

- To avoid negative impact on the visual landscape of the District.
- In consideration of immediate neighbours.

WHAT CAUSES THE PROBLEM?

Visual reflectance is caused by white light being reflected.

If large amounts of white light are reflected in a bundle this is called glare. All surfaces reflect light, but:

- Light colours reflect more white light than dark colours. This visual reflectance has a correlation to solar reflectivity. The reflectivity value listed by, for example, paint manufacturers can be used to judge how reflective a particular colour is.
- Smooth surfaces reflect white light directly whereas textured surfaces scatter the light causing it to be less bright in any one spot. This means that smooth surfaces are more likely to cause glare than textured surfaces.

WHAT ARE THE RULES?

There is now much more focus on the issues of glare and excessive reflectance in this district than ever before.

In all rural zones the exterior of buildings is assessed under the resource consent process and some restrictions might be imposed. The assessment criteria emphasise that buildings should not be prominent. Recessive colours help to protect the landscape values.

In high and low density residential zones metal cladding, roofing or fencing is required to be painted or otherwise coated with a non-reflective finish (rule 7.5.5.1 viii). As there is no such thing as a non-reflective surface (it would make it invisible), this is intended to mean a surface giving limited visual reflection.

At present, there are no other rules concerning the choice of colour or material, but it is best practice to consider neighbours.

WHAT COLOURS AND MATERIALS ARE APPROPRIATE?

The exterior colours and materials of buildings should reflect the natural character of the locality. Special attention needs to be paid to the choice of colour and material of roofs.

Colours

Emphasis should be given to colours in the natural range of browns, greens and greys to complement materials and tones found in the natural surroundings. In particular white should be avoided, as it can cause an annoying glare and stand out in the visual landscape.

Paint and roofing manufacturers are often able to provide reflectance values for their colours and products. This is the percentage of white light reflected and can be used as a guide to choosing appropriate colours:

Reflectance value	Appropriateness	Examples of colours in colour steel range
0 - 20 %	Natural colours usually appropriate	Karaka, Grey Friars, Rivergum
21 - 35 %	Natural colours often appropriate	Lichen, Kauri, Sandstone Grey
36 - 100 %	Not appropriate	Desert Sand, Titania, Gull Grey

Materials

Materials with a non-shiny, textured or matt/powder finish are preferable to glossy or shiny finishes. Emphasis should be given to low reflective materials that tend to scatter the light rather than bounce it directly back. The following materials should be avoided as outer cladding if possible:

- zincalume
- any material with a reflectance greater than 35%
- any shiny, highly reflective materials, even for small surfaces
- large expanses of glass
- large smooth surfaces

WHEN DO YOU NEED A REFLECTIVITY REPORT?

In some cases, particularly if the materials listed above as inappropriate are being used, a Reflectivity Report may be required to assess the potential visual reflectance from a proposed building. In the report, aspects such as the visibility of the surface from various public and private viewpoints, the angle and orientation of the surface to the sun and the surroundings of the building should be taken into account.



CONTACT DETAILS

Please contact CivicCorp at either Queenstown or Wanaka offices between 8.30am and 5.00pm Monday to Friday.

If you are considering lodging a resource consent application please ask for an appointment to meet with our enquiries planner.

QUEENSTOWN

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Private Bag 50077
QUEENSTOWN
Ph +64 3 442 4777
Fax +64 3 442 4778
enquiries@civiccorp.co.nz

WANAKA

Civic Corporation Limited
38 Ardmore Street
WANAKA
Ph +64 3 443 9955
Fax +64 3 443 9956
enquiries@civiccorp.co.nz

www.qldc.govt.nz Property information can be found on the Queenstown Lakes District Council website. Information like: property information maps, underground services, District Plan maps, subdivision data, water bores.

LAND USE RESOURCE CONSENT CHECK LIST

Applicant's Name: Lance ^{Chapman} & Kaye Butler

Site Address: 39 Greenhill Ave, Wakari, Dunedin

This check list has been produced to assist you in the preparation and lodgement of your resource consent application. The provision of correct and accurate information will enable the effective processing of your application and will ensure that delays are kept to a minimum.

Tick each box that is relevant as you compile the information. If it is not relevant, please write NA across the box.

Please consult our front counter staff for additional guidance if you are not sure what is relevant to your resource consent application.

Customer Use		Office Use Only
☒	Application Form: ☒ Completed, signed and dated application form; ☒ Full description of the proposal.	☐
☒	Certificate of Title: ☒ Copy of current Certificate of Title (max 3 months old) from Land Information New Zealand; ☐ Copy of any relevant restrictions on the Certificate of Title (such as consent notices, covenants, encumbrances, building line restrictions).	☐
☒	Application Fee/Deposit: ☒ Fees payable as per the Planning Fees and Charges for the current financial year. Cash, cheque or EFTPOS only; no Credit Cards accepted.	☐
☒	Assessment of Environmental Effects including (where relevant): [also see the separate guide and related District Plan provisions] ☒ Effects on people/neighbours [such as: sunlight admission/shading effects; loss of outlook; building dominance; loss of privacy; noise, vibration, odour and dust generation] ☒ Effects on the neighbourhood [such as: streetscape impacts (including visibility from public places, distance from street, building dominance, building design and appearance); locality characteristics (range and type of activities, building form and function, ambient noise levels, hours of operation)] ☒ Built environment effects [such as: impacts on heritage buildings; impacts on heritage and townscape precincts; quality of architecture] ☒ Transportation effects [such as: traffic generation; access; parking and loading; on-site manoeuvring; vehicle and pedestrian safety] N/A Natural environment effects [such as: scheduled trees; areas of significant conservation value; native flora and fauna; loss of vegetation generally; ecological effects generally] N/A Landscape effects [such as: effects on outstanding natural features and landscapes; effects on natural character; effects on visual quality; change to landform] N/A Cultural effects [such as: impacts on archaeological sites; impacts on resources of importance to iwi] N/A Hazards [such as: natural hazards (including erosion, falling debris, subsidence, slippage, or inundation); storage, use, disposal and transport of hazardous substances; operation of hazardous facilities; site contamination] N/A Servicing [such as: potable water supply; disposal of stormwater; disposal of wastewater]	☐

	☒ Cumulative effects [such as: effects from the activity that arise over time; effects from the activity in combination with other effects (both on and off-site)]	
☒	Locality Plan or Aerial Photograph: ☒ Showing the physical location of the subject site in relation to adjoining streets and sites.	☐
☒	Site Plan showing (where relevant): ☒ General » Certificate of Title boundary lines and dimensions » Address, legal description and title reference » Area of the site » North Point » Road reserve, street name and property address » Underground services (both Council-owned and private) and effluent disposal systems » Easements » Any relevant covenant and consent notice boundaries (e.g. building platforms) » Location of existing and proposed fencing, including fence type and height » Location of buildings on adjoining sites, in particular buildings on or close to boundaries ☒ Buildings » Outline of all existing and proposed buildings including decks and buildings to be demolished » Overhang of eaves i.e. roof outline as well as building footprint » Usage of new and existing buildings » Total length and width of buildings dimensions » Building coverage (proposed and existing) calculation in square metres » Minimum yards required by the District Plan » Distances to boundaries dimensioned » Areas of non-compliance highlighted » Associated amenity open space and outdoor service areas identified for dwellings ☒ Topography » Areas of proposed earthworks, areas of cut and fill (including depth and volume), new retaining walls and existing and proposed ground levels » Ground contours and selected levels at critical locations on boundary/below highest part of building N/A Hazards » Location of any water course, including catchment orientation and secondary flow paths » Known geological features, including any areas of instability » Areas of known site contamination ☒ Transportation » Vehicle crossings and driveways with widths dimensioned » Driveway gradients » Distance of vehicle crossing to intersection » Car parking areas with parking spaces dimensioned » Any loading area (e.g. for commercial or industrial activities) with loading spaces dimensioned » Tracking curve for on-site manoeuvring » Existing and proposed hard surfacing ☒ Vegetation & Habitat » Location, species and height of all existing and proposed plants » Location of protected trees (including the canopy spread) on the site or adjoining sites (refer to Schedule 25.3 of the District Plan) » Areas of Significant Conservation Value (refer to Schedule 25.4 of the District Plan) » Any significant indigenous vegetation or significant habitats of indigenous fauna N/A Archaeology & Heritage » Location of archaeological sites (refer to Schedule 25.2 of the District Plan) » Location of heritage buildings (refer to Schedules 25.1 of the District Plan)	☐
☒	Floor Plans showing (where relevant): ☒ Total length and width of buildings dimensioned; ☒ Existing and proposed uses inside each room or space for each floor within the building(s); ☒ Location of all/any kitchen and bathroom facilities and any sinks; ☒ Location of doors and windows; ☒ Calculation of floor area.	☐
☒	Elevations showing (where relevant): ☒ Existing structures and proposed new work from all four sides; ☒ Floor levels; ☒ Maximum height of structure above existing ground level; ☒ Roofing, cladding and window elements including material type and colouring/finish; ☒ Door and window location; ☒ Areas of proposed earthworks, identifying areas of cut and fill (including depth and volume), new retaining walls and existing and proposed ground levels; N/A ☒ Chimneys, aerials, satellite dishes, heat pumps, LPG cylinders;	☐

☒ N/A	☒ Certificate of Title boundary lines; ☒ Fences; ☒ Vegetation where it is used for screening; ☒ Front yard, side yard and rear yard setbacks required by the District Plan; ☒ Overhang of eaves into yard with size dimensioned; ☒ Height plane angle from the point of the existing ground level, including cross-sections at critical locations on boundary/below highest part of building; ☒ Areas of non-compliance shaded/indicated; ☒ Signage (include location, size, design, colour and illumination).	
☒ N/A	Written Approvals: ☐ "Affected Person(s) Consent Form" completed; ☐ Site plan, elevations, floor plan and any other relevant documentation signed and dated by affected person(s).	☐

This is a preliminary checklist only. It is general in nature and does not cover all possible information requirements, nor is all of the information relevant to all types of application.

Please check with a planner at the Council if you are unsure of the information requirements for your particular application.

Please also note that the detailed technical review of your application once lodged may reveal the need for you to supply further information, in which case you will be advised as soon as possible.



**COMPUTER FREEHOLD REGISTER
UNDER LAND TRANSFER ACT 1952**
Limited as to Parcels



R. W. Muir
Registrar-General
of Land

Identifier OT7B/334
Land Registration District Otago
Date Issued 07 October 1977

Prior References
OT356/56

Estate Fee Simple
Area 703 square metres more or less
Legal Description Lot 16 Block V Deposited Plan 7195

Proprietors
Lance Roderick Chisman

Interests
Fencing Provision in Transfer 486006.1 - 7.10.1977
8598450.2 Mortgage to Westpac New Zealand Limited - 24.9.2010 at 12:57 pm

