Section E4 Tender and Building Consent Alpine Details

4.1. Contents

Section E4 contains guidance on the issues and details that need to be taken into account when the hut is located in an alpine environment. An Alpine environment is where design is dictated by extremes of cold, wind and snow loading. Generally these huts are sited at altitudes above 1,200m and/or are subject to snow loads of 2kPa or more. Snowfall may remain on or around the hut for extended periods of time. Occasionally it would be extended to include huts below 1,200m where similar conditions are experienced.

These details may be selected or amended as required, added to the Developed Design Drawings, the selected sheets from Sections E1, E2, E3, F1 and F2 and any specific sheets derived from section E5 to form the Tender and Building Consent drawings.

Information and requirements arising from these details can then be incorporated in the specifications.

There are no generic Tender and Building Consent Alpine Details as details are likely to be non-standard designs specific to the at the hut site. However, included in Appendix E4 are typical details that have been used in alpine huts and may be suitable for the hut under consideration.

Hut users' needs and local environmental factors should be discussed with Area staff. Based on these discussions and consideration of the specific environmental factors these details may be incorporated into the project, amended as necessary or not used. There may also be additional details that are considered necessary due to site-specific considerations.

4.2. Considerations

4.2.1: Access and egress

i) Entry lobby:

The provision of an entry lobby is permitted for huts in alpine environments. The entry lobby serves as an insulating space between the interior of the hut and the exterior environment, minimising the loss of warm air. It provides a sheltered area where hut users can remove their gear (parkas, ropes, crampons, ice axes etc) prior to entering the hut. It also provides a protected area to store alpine gear outside of the hut interior. Considerations for the entry lobby include:

- Orientation of door relative to prevailing winds to provide a sheltered entry and to minimise likelihood of snow drifting against door

- Likely size of parties using the hut
- Width, length and construction of any fixed seating to accommodate hut users putting on or removing alpine gear
- provision of hook rails or other fixtures for the storage of specific equipment
- the door between the entry lobby and the hut interior may open in to the hut space (refer Part D – Fire Safety, Section D3: Examples of Complying Huts)

ii) Doors:

All exterior doors of huts in an alpine environment are to open inwards. This is to allow for the opening of the door even when there is snow drift piled against the outside face of the door. Considerations for doors include:

- exterior door construction, which may be specifically designed using material such as an aluminium insulated sandwich panel, an aluminium suite incorporating thermal breaks, or PVC rather than a standard aluminium joinery suite to deal with issues of heat loss, cold transfer and condensation on interior surfaces.
- exterior doors hardware, which may need to be designed in such a way that they can be opened by using additional force in the event that the door panel is stuck to the frame by frozen spin-drift. 'D' handles fitted to the both the inside and outside faces of the door which can be used, rather than the latch furniture, to apply additional force to open the door may be required. Heavy duty commercial latch furniture is inadequate to cope with extreme wind pressures and suction, so that the door latch system may need to be a mechanical system that penetrates through the face of the door and latches to the door jamb both inside and outside. As a result the door jambs and door frame may need to be stronger than standard aluminium joinery suites.

iii) Means of escape:

- Where an entry lobby is provided a means of escape directly to the exterior from the hut must still be provided. Therefore the lobby results in a requirement for two means of escape, and the one from the main hut may be via a side hung window (refer Part D – Fire Safety, Section D3: 'Examples of Complying Huts for requirements and for an example of an alpine hut').

4.2.2: Flooring and stairs

The floors in huts in an alpine environment are subject to harsher 'wear and tear' than standard huts and ply may not always be sufficient. Hut users are likely to enter the hut wearing crampons and there is likely to be more moisture from snow and rain off both clothing and alpine gear. Considerations for the flooring include:

- flooring to entry lobby to be hard wearing such as aluminium checker plate to allow for the use of crampons on entry and prior to departure from the hut.
- flooring to main hut to be made from solid timber ex 100 x 40mm macrocarpa TG & V or similar.
- Drainage and snowmelt control with the lobby flooring laid to falls to a snow tray located just inside the exterior door. The snow tray should have web-forge grating over to allow for snow and ice to be knocked off the bottom of boots / crampons. There should be draining pipes in the base of the snow tray that discharge snow melt to the ground below the hut. The ends of the draining pipes should be cut at 45 degrees and orientated away from the prevailing wind. If base boards are not being used around the hut then the draining pipes should also be shrouded to prevent spin-drift from being blown back up inside the hut.

4.2.3: Exterior wall cladding and finishing

Huts in an alpine environment are subject to extreme winds and 'spin-drift' – small particles of frozen water which get blown or sucked into small spaces by pressure differentials. Once pressure differentials drop, the spin-drift can settle and accumulate in enclosed spaces (ceiling voids, wall cavities etc) and pose problems either while frozen due to increased loadings on horizontal elements or when thawing through moisture. Based on the site specific conditions, the cladding may need to be detailed to either prevent the ingress of spin-drift or enable ready drainage upon melting. Considerations for the cladding detailing include:

- the base metal thickness for the exterior cladding being 0.55 BMT.
- the building paper behind the cladding to be continuous to the highest wall framing members and to the base of the floor framing, taped to the framing along the edges and at all laps to prevent spindrift entering the wall cavity and settling in the insulation. Dwangs should be installed as necessary to create a continuous surface on to which the building paper should be taped.
- the cladding of trapezoidal profile to make the on-site cutting of flashings easier. All flashings should be cut on site to suit locations of cladding crests.
- the lengths of back flashings increased to cover the maximum distance between the crests of the selected wall cladding.
- Compriband or similar compressible seals installed between cladding and the flashing.

4.2.4: Roofing

The roofing is also subject to extreme winds and spindrift, but with the additional factor of snow load and drift. Based on the site specific conditions, the roofing may need to be designed to cope with heavy snow loads, and detailed to either prevent the ingress of spin-drift or enable ready drainage upon melting. Considerations for the cladding detailing include:

- If a deck with a veranda is to be incorporated into the design of an alpine hut, one continuous roof plane extending from the roof to cover the veranda may be required to avoid the increased snow load due to snowdrift accumulating at the change in angle of the roofing as per the standard hut design incorporating a deck and a veranda.
- the base metal thickness for the exterior cladding being 0.55 BMT.
- the building paper under the roofing to be continuous and lapped over the wall building paper, taped to the roof framing or wall building paper along the edges and at all laps to prevent spindrift entering the roof cavity and settling in the insulation. Dwangs should be installed as necessary to create a continuous surface on to which the building paper should be taped.
- the cladding of trapezoidal profile to make the on-site cutting of flashings easier. All flashings should be cut on site to suit locations of cladding crests.
- gable eaves may not be included to reduce the number of junctions in the cladding and enabling the gable flashing to flash directly from the roof over the edge and be cut on site to suit the cladding profile
- the roofing sheets may be one piece continuous from one side of the hut to the other, with the ridge being roll formed to the minimum radius as recommended by the roofing manufacturer. By using continuous roofing, ridge flashings are eliminated preventing the ingress of spin-drift at this point.

4.2.5: Interior lining and finishing

Huts in an alpine environment are subject to greater humidity differentials between the exterior and interior environment. The alpine environment typically has lower humidity than sub-alpine environments. During hut occupancy, the interior temperature and humidity levels will increase. The variation between the exterior and interior humidity levels combined with exterior and interior temperatures differentials can result in relatively moist air moving from the interior into the roof and wall cavity where the dew point may occur within the insulation. Condensation can form and then freeze, Insulation value and performance is lost, surface temperatures fall, interior condensation occurs. In addition to poor interior thermal comfort, durability of the building structure and fabric is adversely affected through deterioration of the wall framing, insulation, linings and other material. Considerations for the interior lining detailing include:

- installing a vapour barrier directly behind the ply wall linings and ply ceiling lining to prevent the moist air migrating far enough nto the cavity to reach the dew point. The vapour barrier should be continuous between wall and ceiling, with all joints lapped 150mm min. and taped. The vapour barrier should be taped at all edges to the framing.

4.2.6: Joinery

Joinery in an alpine environment may need to be detailed to prevent the ingress of spin-drift, as well as coping with the specific wind pressures at alpine sites. Considerations for the joinery detailing include:

- joinery to be selected from a suite that is designed to cope with the site wind speed.
- joinery to be double glazed and the joinery suite may have thermal breaks to raise internal surface temperatures and reduce surface condensation.
- avoid integrated ventilation openings that could allow the ingress of spin-drift
- avoid integrated condensation channels that could allow the ingress of spin-drift. Instead, provide an aluminium condensation catchment trough to the reveal at the base of the window to allow for condensation to evaporate from catchment
- all opening windows to be fitted with restrictor stays to limit the opening to 200mm, except any window which is designated as a fire escape window
- openings for joinery for windows which are designated as fire escape windows to be side hung and of minimum dimensions as required by Part D – Fire Safety, Section D2.2 'Means of escape'. The window should be fitted with heavy-duty door hinges and be glazed with laminated safety glass

4.2.7: Guttering

Huts in an alpine environment are subject to snow and ice on and around the hut for extended periods of time. Snow that has accumulated on the roof may pull the guttering off its brackets and destroy it when the snow starts to melt and slips off the roof. Considerations for the plumbing and drainage include:

- Colorsteel spouting with external brackets. Space the spouting brackets as necessary to allow for the increased weight of snow drift on the spouting
- snow straps should be rivet fixed to spouting spaced at 300mm centres (corrugate profile roofing) or every crest (trapezoidal profile roofing)

4.2.8: Ventilation

Huts in an alpine environment are required to be ventilated via a passive ventilation system that does not rely on openings in the joinery for fresh air intake and does not use the ceiling cavity for air inlet or exhaust because of the issues of spin-drift. When all windows, doors and mechanically operated vents are closed, alpine huts should still residual ventilation. Considerations for the ventilation include:

- providing inlet/s at floor level, with the fresh air taken from below the floor of the hut, that have a means of controlling the rate of natural ventilation. The ends of the air inlet pipes located below the floor level should be cut at 45 degrees and orientated away from the prevailing wind. If base boards are not being used around the hut then the inlet pipes should also be shrouded to prevent spin-drift from being blown back up inside the hut
- providing the outlet for the ventilation through a ceiling mounted ventilation grille connected directly to a rigid ducted system to exhaust via a vertical vent with incorporated cowl designed to prevent spin-drift entering the hut. The outlet/s should have a means of controlling the rate of natural ventilation (e.g. a chain operated damper or similar).

- Providing the junction between the ventilation cowl / rigid ducting and the hut cladding with an integrated flashing to the wall cladding so that there is a continuous seal at the junction where the ventilation cowl enters the building
- Placing the inlet/s and outlets at opposite ends of the hut to allow for cross-flow ventilation
- Not installing base boards to the perimeter of the hut will prevent snow drift accumulating against and under the hut as the increased wind speed under the hut clears snow from under the hut. Against this benefit is the need to consider managing spindrift with any ventilation inlet.

Appendix E4 Alpine Huts

This appendix contains:

- Current Detail Register
- Amendment Register
- Detail Drawings

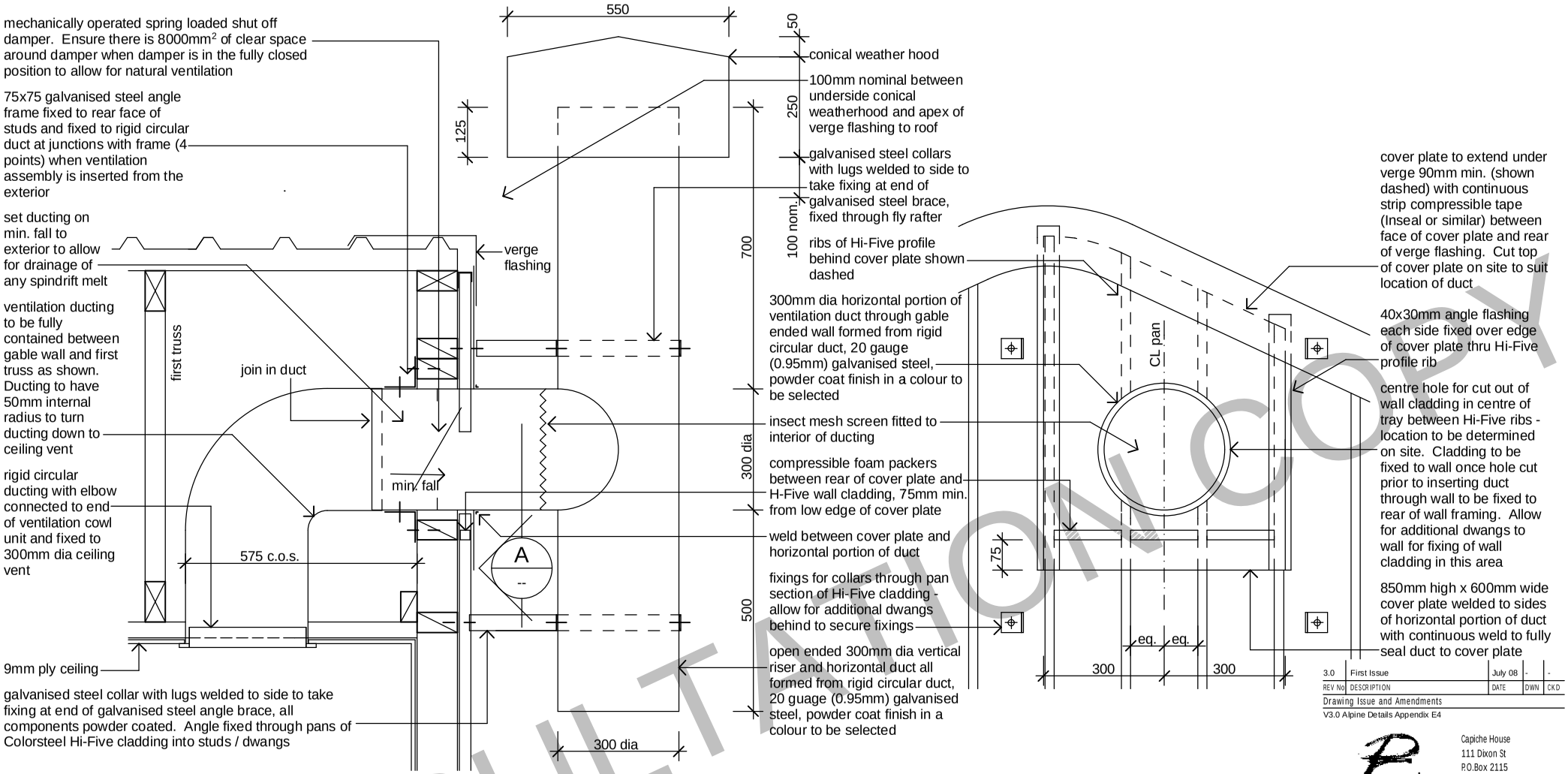
ALL DRAWINGS ARE A4 REDUCTIONS OF A3 ORIGINALS AND THEREFORE ARE NOT TO SCALE. DO NOT MEASURE OFF THESE DRAWINGS OR USE FOR CONSTRUCTION.

CURRENT DRAWING REGISTER

Detail	Title	Version	Date issued
E4.1	hut ventilation – wall outlet	3.0	July 2008
E4.2	hut ventilation – floor inlet box	3.0	July 2008
E4.3	roof details	3.0	July 2008
E4.4	floor details	3.0	July 2008
E4.5	external corner & door sill	3.0	July 2008
E4.6	bench seat and cooking bench details	3.0	July 2008

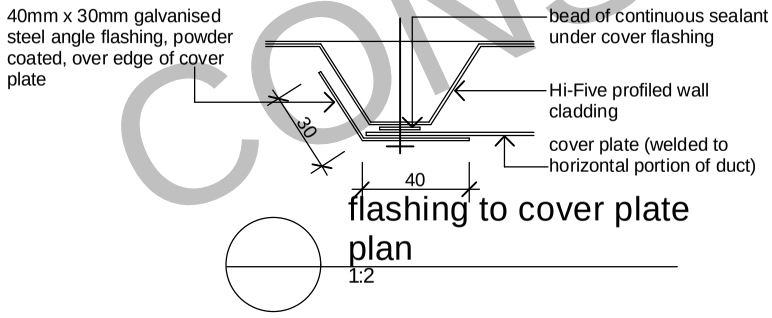
AMENDMENT REGISTER

Amendment date	Amendment details (section, page number, block)	Version	Signature of copyholder and date



1 side elevation
1:10

A Section
1:10



flashing to cover plate plan
1:2

REV No	DESCRIPTION	DATE	DWN	CKD
3.0	First Issue	July 08	-	-

Drawing Issue and Amendments
V3.0 Alpine Details Appendix E4

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PROJECT
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ALPINE DETAILS

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SHEET CONTENTS
hut ventilation - wall outlet

SCALES
1:10, 1:2
@ A3 SHEET SIZE

DESIGN	DRAWN	CHECKED	PROJECT No.	SHT No.	REV No.
RP	GR	RP	0819	E4.1	

DATE
July 2008

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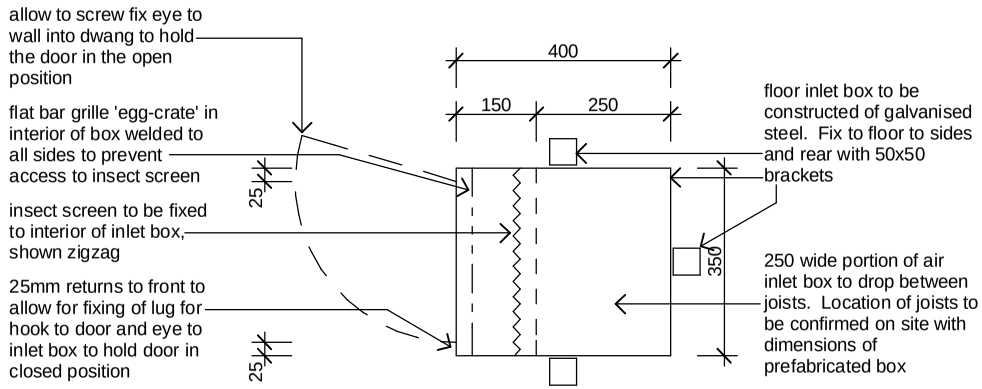
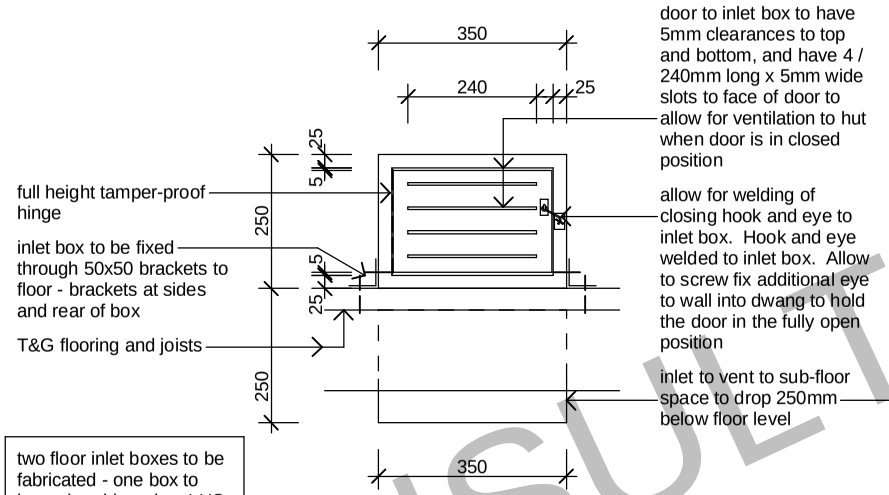
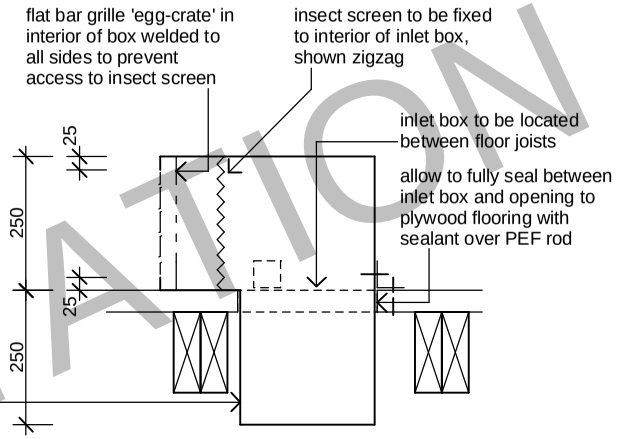


FLOOR INLET BOX
Plan
Scale 1:10



two floor inlet boxes to be fabricated - one box to have door hinged on LHS, one to have door hinged on RHS

FLOOR INLET BOX
Front Elevation
Scale 1:10



FLOOR INLET BOX
Side Elevation
Scale 1:10

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hut ventilation - floor inlet box

SCALES
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@ A3 SHEET SIZE

DESIGN	DRAWN	CHECKED	PROJECT No.	SHT No.	REV No.
RP	GR	RP	0819	E4.2	

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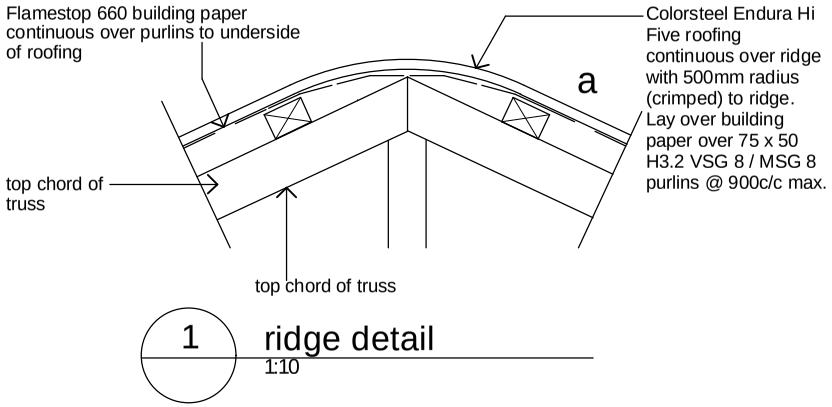

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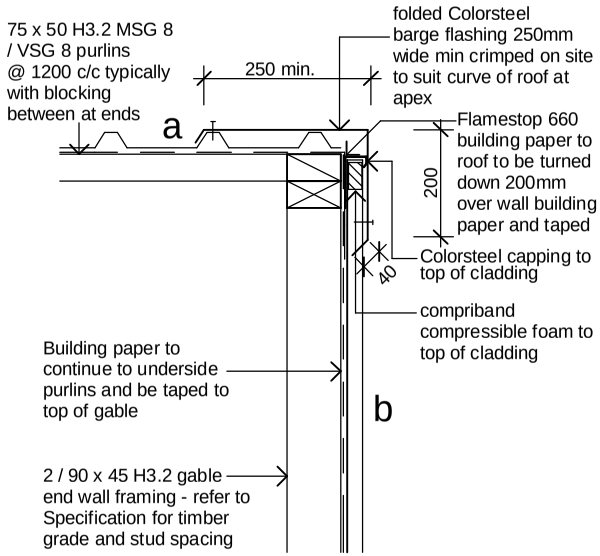
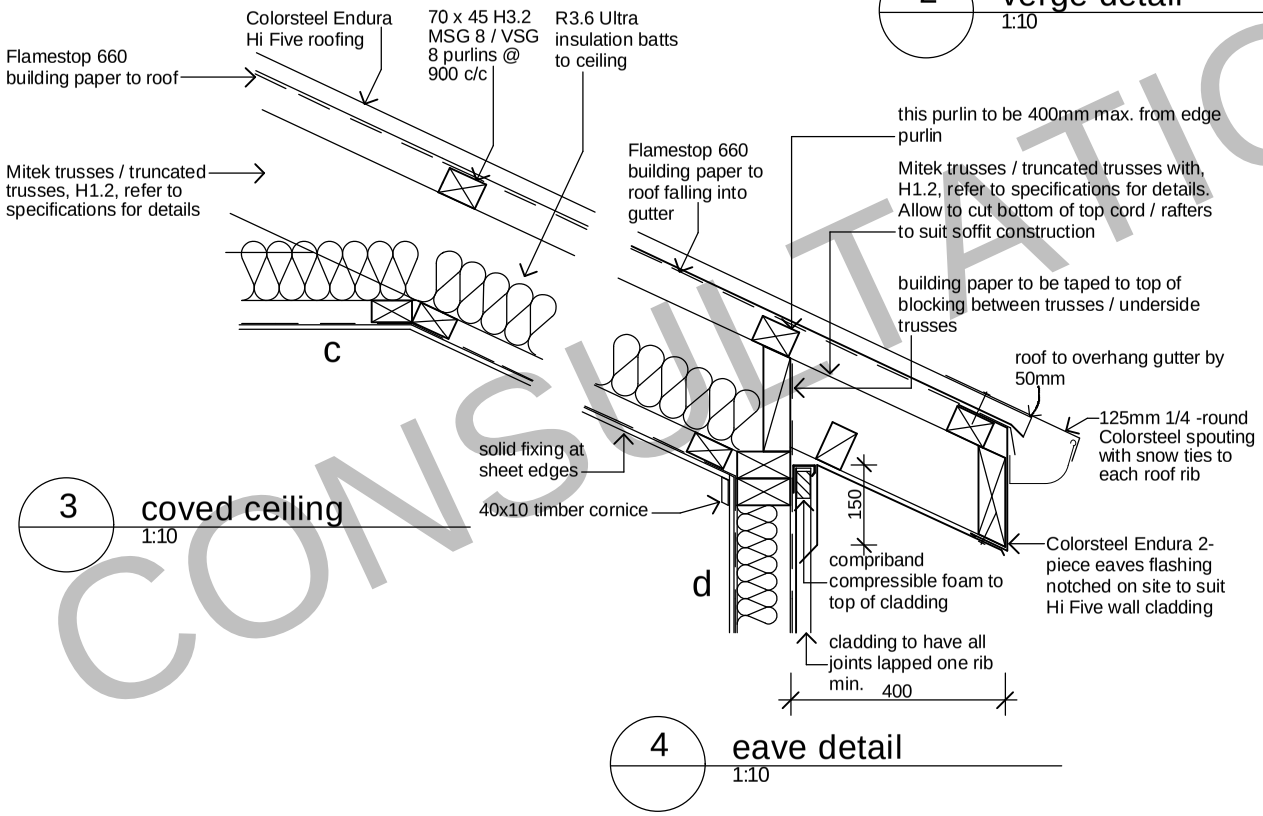


2 verge detail
1:10



3 coved ceiling
1:10

4 eave detail
1:10

Material Note:

a COLORSTEEL ENDURA 0.55BMT HI FIVE PROFILE roofing over TASMAN INSULATION FLAMESTOP 660 building paper over 70 x 45 H3.2 purlins @ 900c/c max.

b COLORSTEEL ENDURA 0.55BMT HI FIVE PROFILE cladding over TASMAN INSULATION BITUMAC 860 building paper over timber framing. Refer to floor plan for framing sizes & c/c.

c CHH 9mm ECOPLY CD grade untreated ceiling lining over polythene membrane over 70 x 35 H1.2 battens @ 600c/c max. Polythene to be continuous behind ceiling / coved ceiling and wall

d CHH 9mm ECOPLY CD grade untreated wall lining (10mm gap to flooring) over polythene membrane. Polythene to be continuous behind wall lining and taped to bottom plate.

e ex100x40 PG T&G MACROCARPA flooring over timber joists. Refer to foundation plan for sub floor framing sizes & c/c.

f 90 x 35 H3.2 grip tread decking, grip side up, even nail spacing. 10mm gap between first piece of decking and wall cladding. Refer to foundation plan for sub floor framing sizes & c/c.

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Drawing Issue and Amendments
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SHEET CONTENTS
roof details

SCALES
1:10,
1:50
@ A3 SHEET SIZE

DESIGN	DRAWN	CHECKED	PROJECT No.	SHT No.	REV No.
RP	GR	RP	0819	E4.3	

DATE
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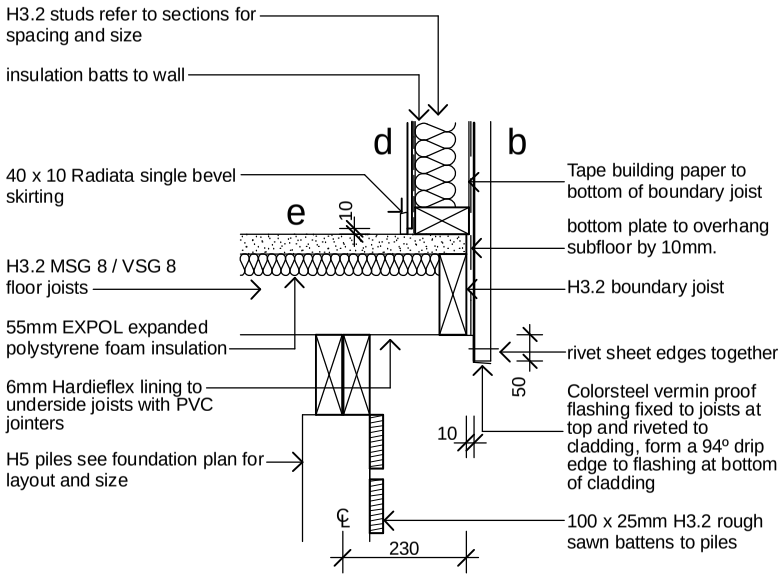

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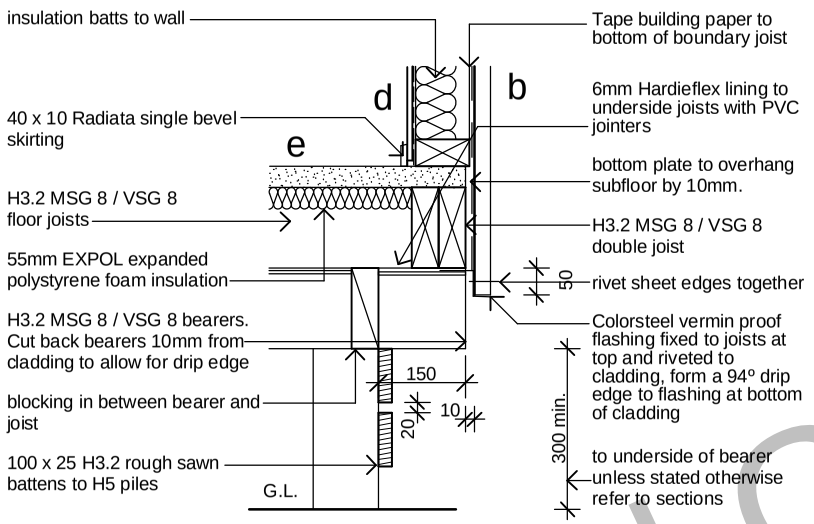

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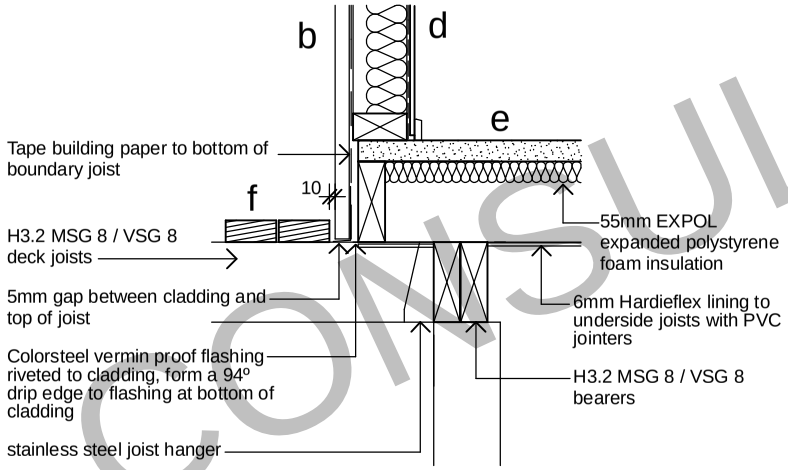

3 floor to deck connection
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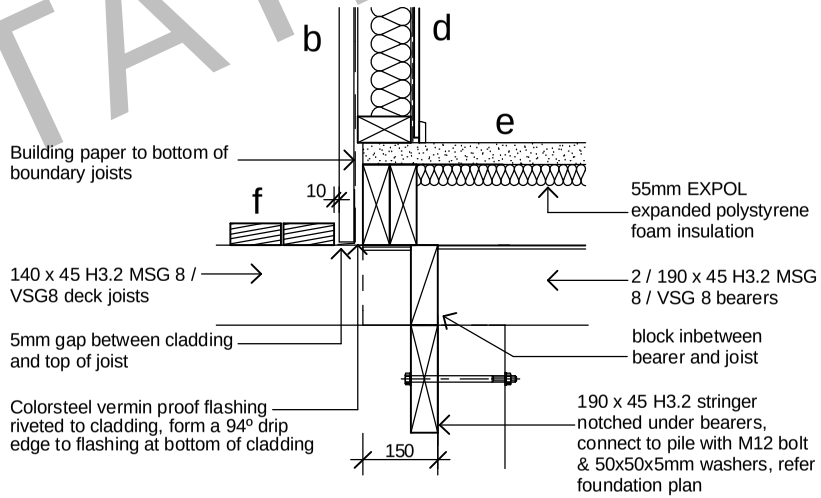

4 floor to deck connection
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Material Note:

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SHEET CONTENTS
floor details

SCALES
1:10,
1:50
@ A3 SHEET SIZE

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RP	GR	RP	0819	E4.4	

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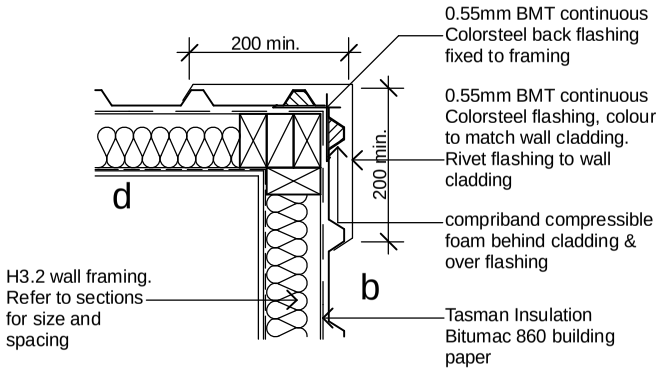

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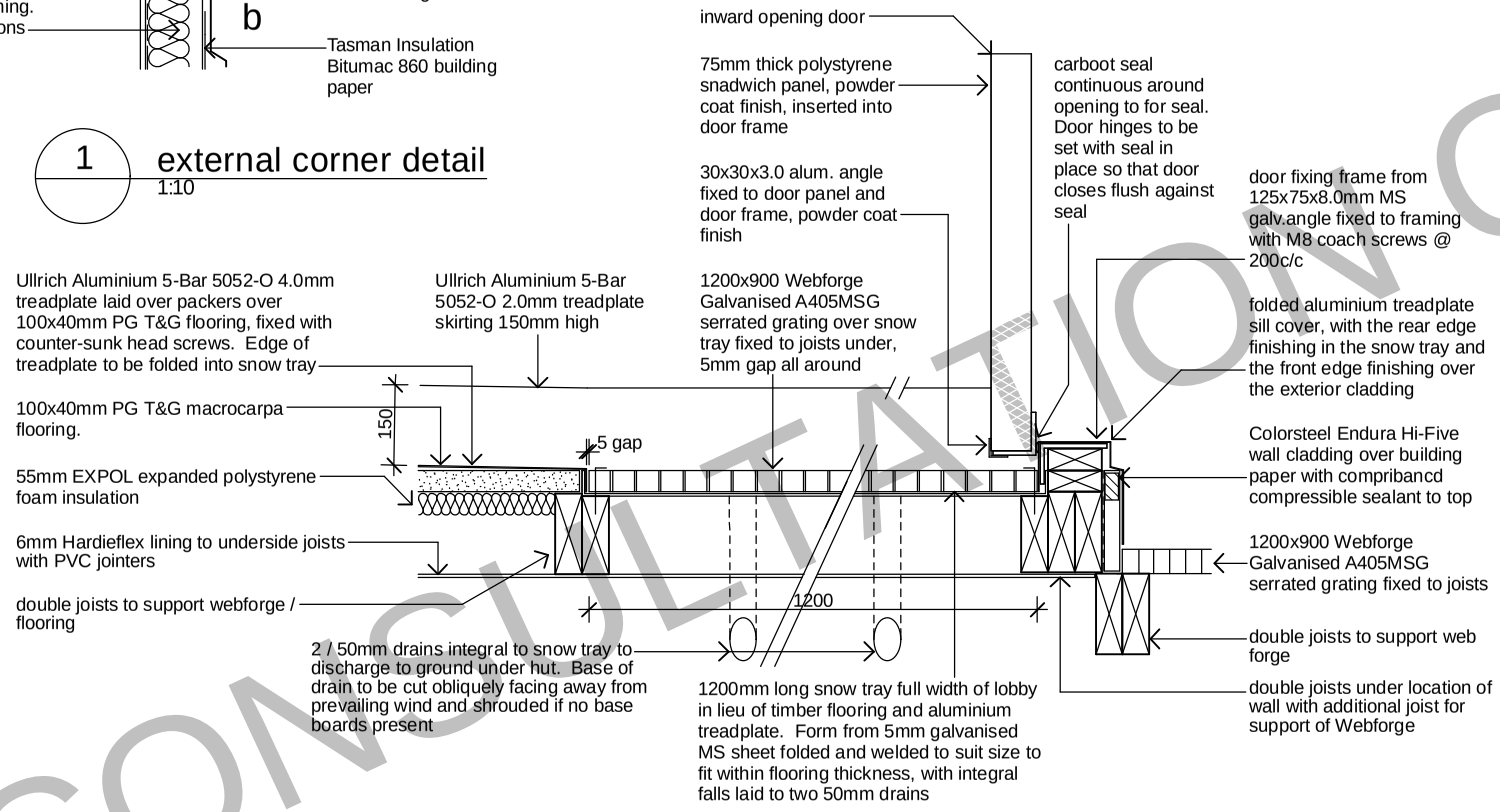

3 door sill
1:10

Material Note:

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SHEET CONTENTS
external corner & door sill

SCALES
1:10,
1:50
@ A3 SHEET SIZE

DESIGN	DRAWN	CHECKED	PROJECT No.	SHT No.	REV No.
RP	GR	RP	0819	E4.5	

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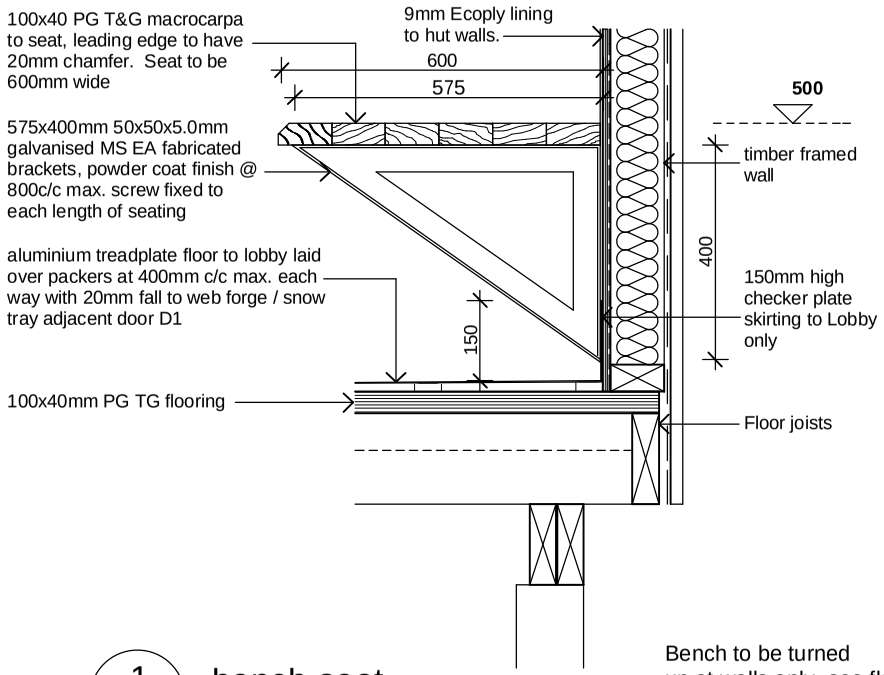
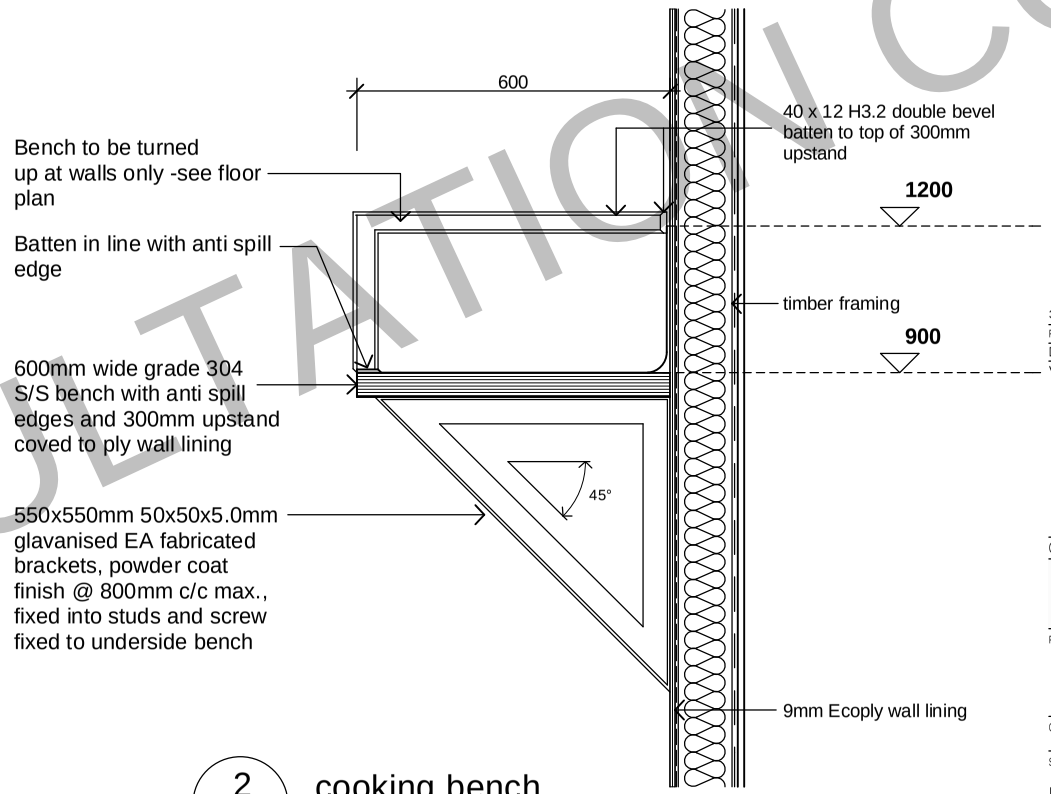


1 bench seat
1:10



2 cooking bench
1:10

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3.0	First Issue	July 08	-	-

Drawing Issue and Amendments
V3.0 Alpine Details Appendix E4

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SHEET CONTENTS
bench seat & cooking bench

SCALES
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@ A3 SHEET SIZE

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Section E5 Harsh Environment Details

5.1. Contents

Section E5 contains guidance on the issues that need to be taken into account when the hut is located in a harsh environment. A Harsh environment is where design is dictated by a higher risk of corrosion and will either be coastal or geothermal. Generally these huts are sited within 500m of the coast, within 100 metres from tidal estuaries and sheltered inlets or within 50 metres from a geothermal hot spot within the Central volcanic plateau of the North Island. Figure 4.1 of NZS 3604 identifies these areas as the sea spray zone and zone 4 respectively.

There are no generic Tender and Building Consent Harsh Environment Details as these details will be one-off and may be non-standard designs specific to the environmental factors at the hut site. In most cases, the construction details will be the same as per the details contained in Appendix E1 but with different material specification to suit the harsh environment.

The relevant details need to be amended as required, added to the Developed Design Drawings, the selected sheets from Sections E1, E2, E3, F1 and F2 and any specific sheets derived from section E4 to form the Tender and Building Consent drawings

Information and requirements arising from these details can then be incorporated in the specifications.

Hut users' needs and local environmental factors should be discussed with Area staff. Based on these discussions and consideration of the specific environmental factors decisions regarding the solutions, if any, can be made and incorporated.

5.2. Considerations

5.2.1: Material and fixing selection

All cladding and the structural and non-structural fixings building materials for huts located in a harsh environment need to be selected based on the nature of the harsh environment. Considerations for material selection includes:

- the base metal of the cladding and roofing should be selected to suit the environment, including the grade of base metal and the type of coating
- flashing materials should be compatible with the cladding and roofing materials, the building paper and any other component that it comes into contact with (e.g. CCA timber treatment)
- the spouting materials should be selected to suit the environment and be compatible with receiving water run-off from the roofing material

- refer to NZS 3604:1999 Table 4.1 ‘Protection required for steel fixings and fastenings excluding nails’ and Table 4.3 ‘Steel items such as nails and screws for framing and cladding’ for fixing material specification

5.2.2: Water supply

In a geothermal region there is a risk of eruption and ash fall accumulating on roofs. Consideration should be given to providing a means of disconnecting the roof supply in the event of an eruption to avoid contamination of the water supply held in the tanks.