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SPECS 16479

Engineering Soils Investigation Report for Proposed Garage 560 Stanley Road Whakatane

CLIENT: Dave Barraclough & Anne Bennett

File ref. 574.2
30 October 2007

Contents **page**

1.0 Report Limitations and Scope..... 1

2.0 Background..... 2

3.0 Site Notes..... 2

4.0 Building Foundations..... 2

1.0 Report Limitations and Scope

This report reviews the foundation soils at the location of the proposed garage and has been prepared at the specific instruction of Dave Barraclough and Anne Bennett and supports a building consent application to the Whakatane District Council, and should not be used for any other purpose, or by any other party. As factual evidence has been obtained from visual inspections, five scala penetrometer, shear vane and borelog test sites, which by their nature only provide information about a relatively small volume of subsoil, there may be special conditions pertaining to the building site which have not been disclosed and which have not been taken into account in the report.

This review has been limited to the area identified on the attached site notes plan.

This report does not preclude the need for normal foundation inspections (by the District Council) in regard to verification of required footing geometry and reinforcement at the time of construction.

Restrictions to building arising from the proximity of property boundaries, archaeological issues, and the like, have not been investigated

Manktelow Consulting Engineers Limited (MCE) geotechnical report dated 14/5/2004 outlines development options for this building site including minimum building setbacks from the top of slopes. A reference copy of this is included herein. The proposed garage is within the designated permitted building area as defined in the report. The report concludes that soils softer than permitted in NZS 3604:1999 exist on the building platform. MCE have previously completed specific foundation soils investigation and foundation design for the dwelling that is nearing completion.

Our specific design is limited to a review of the applied soil bearing pressures from the proposed construction and is based on information obtained from information provided by the client regarding the proposed garage. All other areas of this project, including weatherproofing, proprietary systems and elements within the scope of the non-specific design codes NZS 3604 and NZS 4229 are specifically excluded from our review. The performance of the various specified proprietary systems are not covered by these calculations. Guarantees should be sought from the manufacturer if required.

Refer to the attached specific design specification notes; these outline some of the design assumptions. It is assumed that the Territorial Authority, being the building control authority, will undertake the necessary inspections to confirm the design assumptions and that the elements designed herein are installed in accordance with the intentions of the details shown. Any variation should be reported to the designer for a design review and alternative detailing.

2.0 Background

Specific engineering soil investigation has been requested at the site of the proposed garage.
It is proposed to construct a 7.2m x 9.0 m light timber framed Ideal garage. Colorsteel claddings are proposed with a 3m high exterior light timber framed walls. The garage is shown founded on a conventional ground bearing concrete slab.

3.0 Site Notes

We have visited the site and completed five hand penetrometer and shear vane test sites and augured borelogs. Scala penetrometer testing has generally been undertaken per the procedure as outlined in NZS 4402 Test 6.5.2 with results expressed as penetration mm/blow and a 50 mm diameter hand auger has been used to reveal soil types.

The ground is relatively level across the site with the nearly completed residence located 4m toward the north. It is proposed to locate the garage 3m back from the house wall adjacent to the slopes. The attached location plan shows the proposed garage position in relation to the dwelling.

Borelogs reveal that silt and clayey sand ash deposits underlay this site down to the investigation depth of 2.5 m.

Poor scala penetrometer results were recorded for the near surface. Serviceability allowable bearing pressures as low as 36 kPa was recorded at one of the test sites. Better relative densities were recorded at the other site sites and at depth.

The attached site notes plan and soil results sheets refer.

4.0 Building Foundations

Soil investigation results confirm that soils softer than permitted by NZS 3604:1999 (Timber Framed Buildings) exist at this site.

We have reviewed the proposed exterior footing systems for the measured reduced bearing pressures at a depth of 0.45 m below ground level and slab and 150mm slab sub-base fill on grade.

Because there is some variance in penetrometer resistance, some differential settlement of building foundations can be expected. The design procedure outlined in "Determination of allowable bearing pressure under small structures" MJ Stockwell 06/1977, suggests that differential settlement might be in the order of 20mm if applied pressures are less than measured values. This paper concludes, "These deflections are regarded as the acceptable limits a modern building can withstand without distress".

A review using this procedure shows the applied pressures from 200 mm wide footing bearing at 450 mm and 100mm slab on 150mm fill are indeed less than measured theoretical values.

This suggests that the underlying soil is suitable to support the modified shallow bearing foundation system as shown herein, and the risk of differential settlement greater than mentioned above is low. Our calculations and sketch details are attached.

The garage downpipes should be connected into the property stormwater disposal system that discharges at the base of the slope. No stormwater should be permitted to discharge onto the building platform of slopes below the building platform.

Manktelow Consulting Engineers Limited

Craig Manktelow BE (Hons) MIPENZ

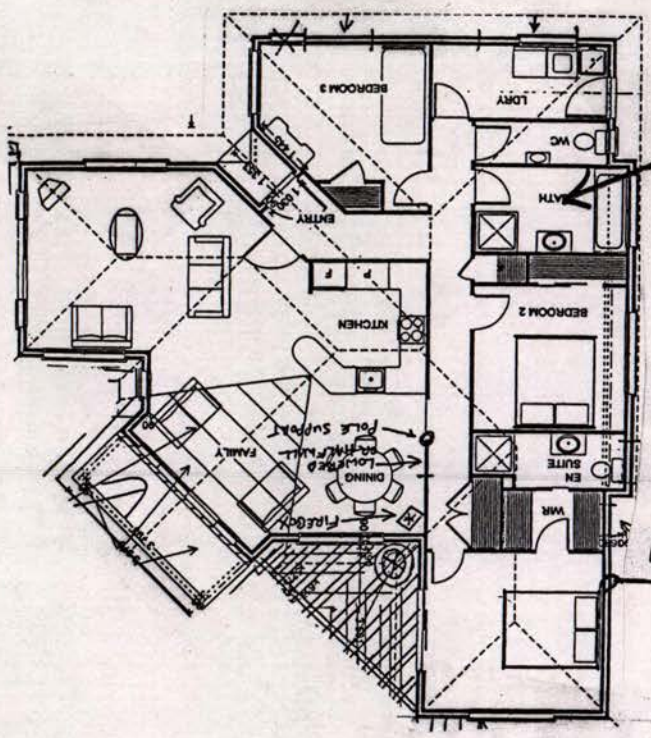
Enclosed: 5 sheets of sketch details and specific design specification notes
Site notes plan
Ideal Garages summary sheet
4 sheets of structural calculations
5 sheets of soil test results sheet
Copy of MCE geotechnical report 14/5/2004

Manktelow Consulting Engineers Limited

Project Barraclough & Bennett
Garage at 580 Stanley Rd, Whakatane

file 514.20
date 30/10/07
page Sketch—01

Stanley Road.



Existing dwelling

garage square with dwelling

4m.

Proposed 9m x 7.2M garage.

3m

top of bank

LOCATION PLAN NTS

Note: Connect garage roof downpipes into the designated piped stormwater disposal system.

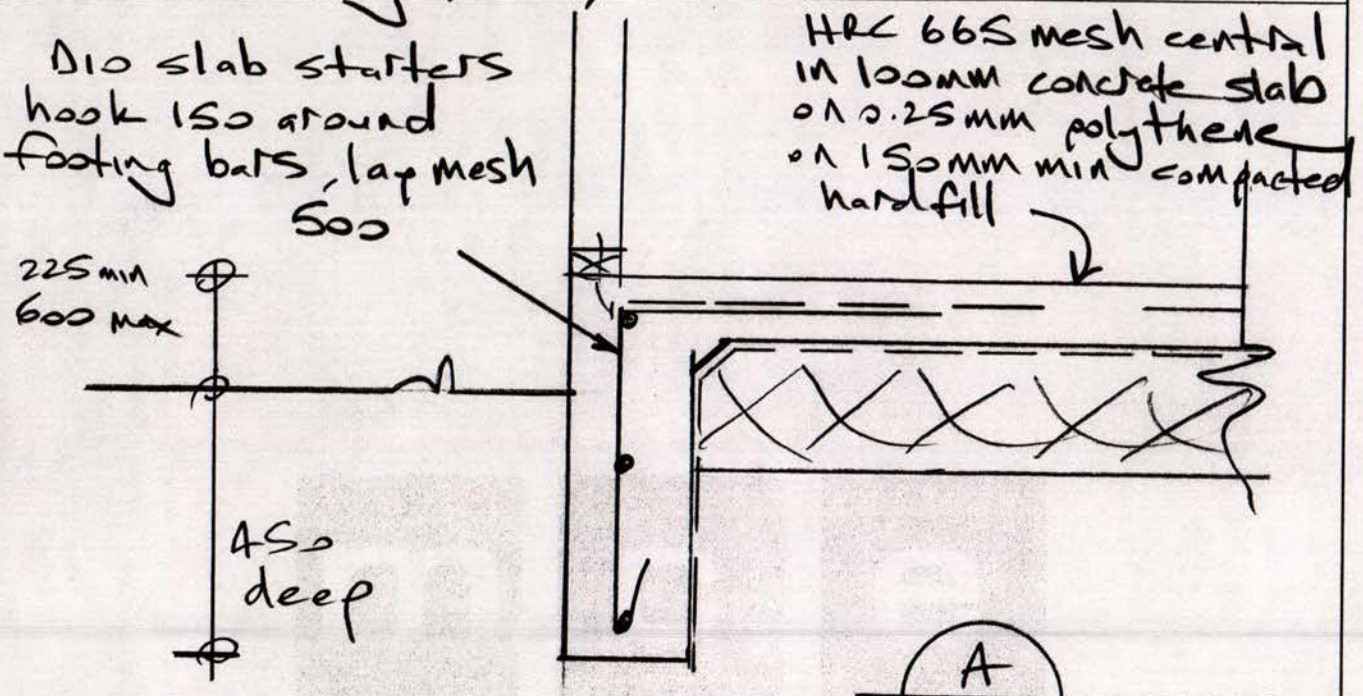
Manktelow Consulting Engineers Limited

Project Barraclough & Bennett
Proposed Garage
560 Stanley Road, Whakatane

file 574.20
date 30/10/07
page Sketch-02

D10 slab starters hook 150 around footing bars, lap mesh 500

HRC 665 mesh central in 100mm concrete slab on 0.25mm polythene on 150mm min compacted hardfill

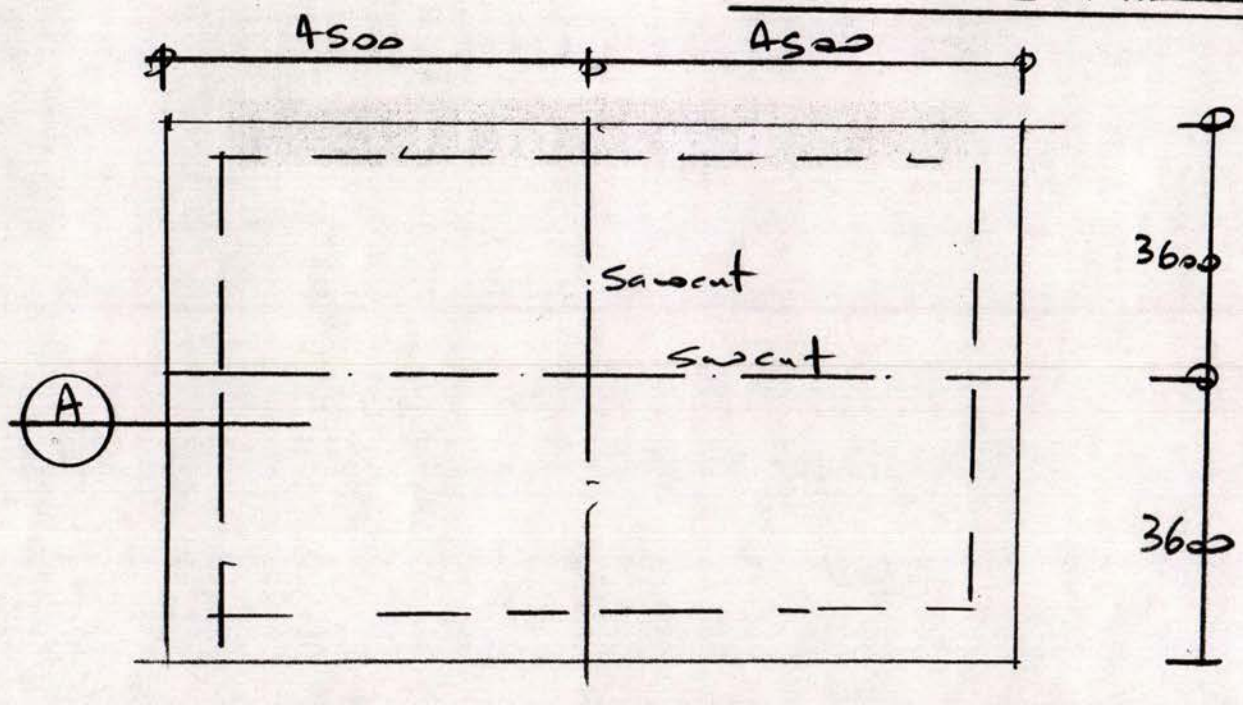


3 D12 footing bars central in footing and 85 bottom cover.

200

A

TYPICAL EXTERIOR FOOTINGS DETAIL



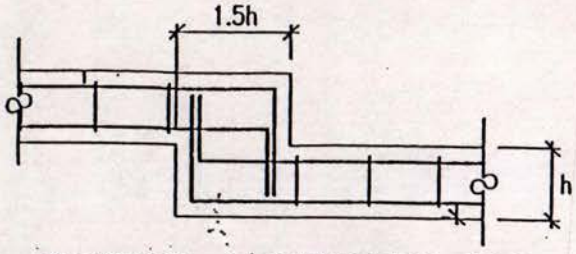
SLAB PLAN NTS

Refer attached construction notes

Structural and Geotechnical Consulting Engineers
Phone/fax 07 307 2002

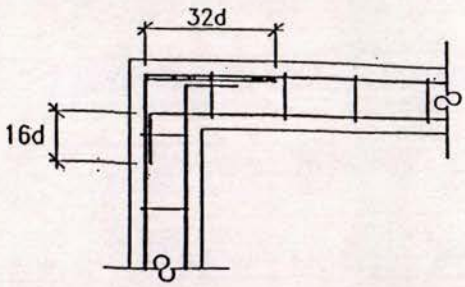
Manktelow Consulting Engineers Limited

Project	file
Barraclough & Bennett Garage at 560 Stanley Road Whakatane	SA.2
	date 30/10/07
	page Sketch-02



ELEVATION – FOUNDATION STEP

d = bar diameter



PLAN – FOUNDATION CORNER

FOUNDATION DETAILS

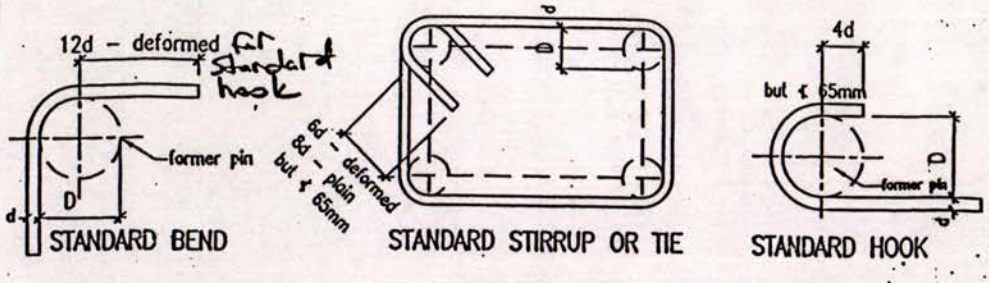
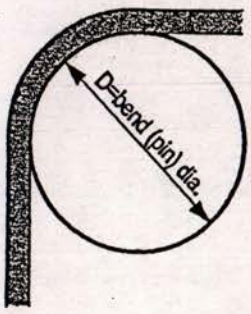


FIG. 1. STANDARD BEND, HOOK & STIRRUP d = bar diameter

MINIMUM RECOMMENDED BEND (PIN) DIAMETER = D



REBAR TYPE	bar diameter = b					
	6	10	12	16	20	25
plain bars	30	50	60	80	100	150
deformed bars	30	50	60	80	100	150
plain bars (stirrups & ties)	20	20	30	40	40	80
deformed bars (stirrups & ties)	30	40	50	70	80	150

ALL REINFORCEMENT SHALL BE COLD BENT ONLY

Structural and Geotechnical Consulting Engineers
Phone/fax 07 307 2002

SPECIFIC DESIGN CONSTRUCTION SPECIFICATION

1.0 General

1.1 Check all the dimensions and levels on site before fabrication. Locate and protect any existing services before commencement of any excavation.

1.2 Proprietary systems and products shall be installed strictly in accordance with manufacturers' recommendations. Garage superstructure shall be constructed in accordance with building consented plans and specifications. Slab and footing construction is to be in accordance with attached sketch detailing (sketch 01-03).

1.3 The attached sketch detailing is diagrammatic and intended only to convey specific engineering design conclusions. Read in conjunction with the building consented architectural drawings and specifications. It is assumed that the Territorial Authority, being the building control authority, will undertake the necessary inspections to confirm that the elements are constructed in accordance with the attached detailing and elements not covered by our review are installed in accordance with NZS 4229 and NZS 3604:1999 and building consented drawings. Any variation should be reported to the designer for a design review and alternative detailing.

1.4 Light timber framed construction shall be in accordance with the latest amendment of NZS 3604:1999 unless specified otherwise in the engineering design.

1.5 Corrosion protection for steel components shall be as required by the proprietary system manufacturer and NZS 3604:1999 for the appropriate corrosion zone.

1.6 Bolts shall be fitted with washers on all timber faces. For M12 use 50 square x 3 mm; M16 use 65 square x 5 mm.

2.0 Concrete

2.1 Prior to concrete pour footing trenches shall be clear of any loose debris and ground water.

2.2 Concrete construction shall be in accordance with NZS 3109 and NZS 3101. Concrete shall be Ordinary Grade unless mentioned otherwise. Concrete strength at 28 days shall be 20MPa. Concrete slump shall be the lowest possible to allow thorough compaction of the concrete. The slump however shall not exceed 75 mm.
Slump and compression tests shall be regularly conducted in accordance with procedure outlined in NZS 3112: 1986 Methods of Test for Concrete parts 1, 2 and 4. Test results shall be forwarded to the Territorial Authority.

2.3 The contractor shall protect the floor slabs against early plastic and thermal cracking. The slab shall be cured by water ponding for at least 5 days starting immediately after the slab has been finished. The attached sketch details show the location and depth of the slab shrinkage control joints. Sawcuts shall be 6mm wide x 33mm deep. The timing of sawcutting is critical; cutting too early should be avoided to reduce the risk of spalling the joint edge; however cutting shall take place no later than 8 to 24 hrs, depending on the ambient conditions, after the slab has been finished. Cutting with a 'wet-type' saw immediately after slab finishing is recommended. Whilst care has been taken in the location of these joints no guarantees are provided that uncontrolled cracking will not occur.

2.4 Reinforcement specified as HD shall be Pacific Steel Seismic Grade 500E®E MA; D or R shall be Grade 300. Reinforcement shall comply with AS/NZS 4671 and NZS 3402:1989, with construction, including bar fabrication, in accordance with NZS 3109:1997. Reinforcement shall be 'cold-bent' with minimum former pin diameters as shown on the attached standard details. Welding of reinforcement is not allowed. The construction reviewers shall satisfy themselves that reinforcement does comply with these standards.

2.5 Minimum lap lengths for reinforcement shall be; 600mm for D12, unless shown otherwise on the drawings. Lap and tie mesh 305 mm minimum.

2.6 NO IMPORTED REINFORCING STEEL IS TO BE USED IN THIS PROJECT.

2.7 Refer to the attached standard details sheet for construction of footing junctions and any steeping of the footing.

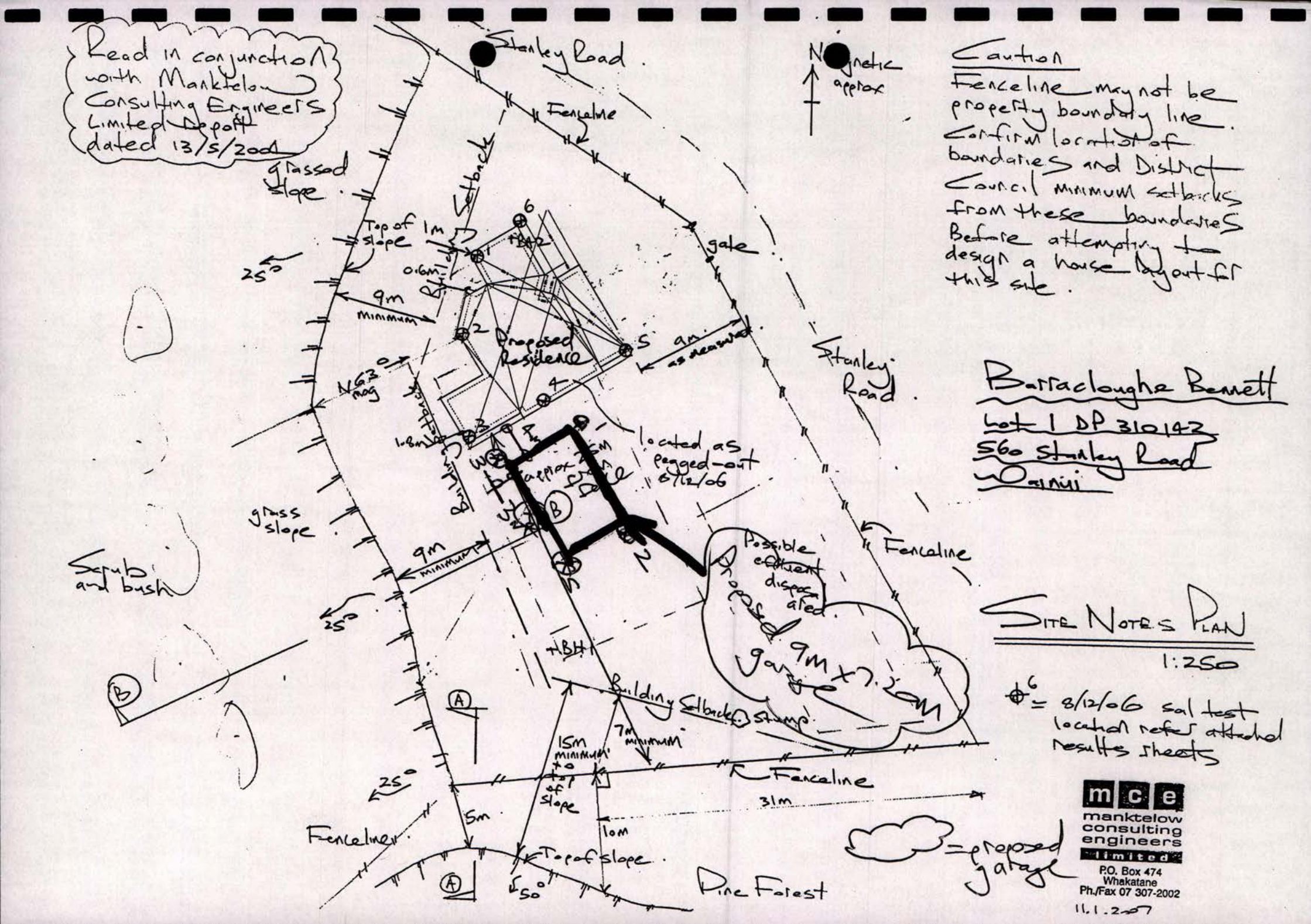
2.8 Surface finishes shall be per the building consented specification or as directed by the client.

3.0 Slab Sub-Base Filling

3.1 The existing soil shall be removed to achieve at least a 150mm and maximum of 600mm depth of compacted hardfill below slab. The area to be filled shall be benched so that fill is placed on a level surface. This shall be undertaken during the time of the year when the watertable is well below the excavated depth.

3.2 Backfill shall be placed in layers not exceeding 150mm loose depth and shall be compacted in place prior to the placement of successive layers with a heavy ride-on vibrating roller to achieve either 96% relative standard compaction to NZS 4402 test 6.5.2, or no more than 25 mm/blow with a scala penetrometer and undrained shear vane strength of at least 240kPa. Depending on fill type, it is likely that at least 6 slow passes of the roller per layer will be required to achieve this compaction. Care will be required close to the slab edge, such that damage or overstressing of the wall does not occur.

3.3 Backfill material shall be a well-graded pumice material or an approved equivalent (up to 100mm maximum particle size). The finished surface shall be blinded and levelled with fine sands that will not damage the d.p.c.


Read in conjunction with Manktelow Consulting Engineers Limited Report dated 13/5/2004
Stanley Road
Magnetic approx
Caution
Fenceline may not be property boundary line. Confirm location of boundaries and District Council minimum setbacks from these boundaries Before attempting to design a house layout for this site.
Fenceline
grassed slope
Top of slope
1m
Setback
25°
9m minimum
0.6m
Proposed Residence
gate
9m as measured
Stanley Road
Barraclough Bennett
Lot 1 DP 310142
560 Stanley Road
Opotiki
NG3 mag
1.8m
Building Setback
located as pegged-out 8/12/06
grass slope
Scrub and bush
9m minimum
Fenceline
Possible effluent disposal area
Proposed 9m x 7.2m garage
Site Notes Plan
1:250
6 = 8/12/06 soil test located refer attached results sheets
Building Setback Stamp
15m minimum
7m minimum
Top of slope
Fenceline
31m
5m
10m
Fenceline
Top of slope
50°
Pine Forest
= proposed garage
mce manktelow consulting engineers limited
P.O. Box 474
Whakatane
Ph./Fax 07 307-2002
11.1.2007

IDEAL Garages / Beulah Logistics
38 Melville Rd, RD3, Whakatane
Ph: (07) 3048111 / Donna: (07) 304 9468
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IDEAL Garages Eastern Bay of Plenty

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27 September 2007

Dave Barraclough
996A SH/Way 30
R D
WHAKATANE

Hi Dave

Price for a 9 x 7.2 Ideal Classic garage with a 3 mtr' stud and coloursteel cladding with a lined room 7.2 x 3.....Total $25,720.00 incl (garage has to be ordered in Oct). After 5 November price will be $26,970.00 incl. Add on an extra $354.00 each for a 3 mtr' high door.

- **Includes two roller doors 2.2 x 2.4, one access door and 12 fixed windows, one aluminium ranchslider 1793 x 2106, one aluminium opening window 1193 x 853.**
- **100% NZ Coloursteel, kilne dried MSG timber (machine stressed guaged) to conform to NZIS standards.**
- **Studs at 600 centres with two rows of nogs and trusses at 1800 centres garage and 1200 centres room. Studs, nogs, top and bottom plate for internal wall.**
- **Building of garage with building paper under roof and room and to line room, includes batts in room area, perimeter walls and ceiling, including 7.2 mtr' partition wall, gib board lining – gib stopped to paint finish, skirting and scotia.**
- **Concrete floor for a flat site only, there may be more if site is uneven or if site requires a non-standard foundation.**

Permits, drainage and electrical are all extra.

Thanks and I look forward to hearing back from you.

Kind regards
Donna Walker
Manager & Sales

Dealers Nationwide - Over 35 years experience - 5 and 10 year Guarantees

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Putting Quality First

Project Barraclough & Barnett Garage 560 Stanley Road Dainni	file 570-20. date 30.10.07 page 1.

1.0 Site investigation

Five Scala penetrometer and borelog test sites have been completed at the site of the proposed garage.

MCE have previously completed a geotechnical report for this building site and specific Soil investigation and design for the house foundation.

A copy of this report is attached.

It is noted that the proposed garage is well within the permitted building area (slope stability based) as is likely beyond slope instability issues provided the restrictions and stormwater control systems are installed per report

Testing reveals soils softer than permitted by NZS 3604:1999.

Review for reduced theoretical bearing pressures

Project	file 574.2o. date page 2.

2.0 Bearing Pressure Review

- assumed loads.

Roof · colorsteel e15°, LHF trusses G=400 Pa
No access Qb=250 Pa

Ext wall LHF, colorsteel cladding G=300 Pa

2.1 External strip footing

Consider unit length of footing

(Gable) w = 3.60 x (0.40 + 0.25) roof
+ 3.0 x (0.30) ext wall
+ 3.60 footing DL
= 5.94 (6) + 0.90 (2) = 6.84 kN/m

q_{max} = 100 kPa (blue)

⇒ q_a = 36 kPa

200 wide footing x 450 deep concrete fo

Sand modification ÷2.0 ← saved $\frac{H}{B} \geq 1$

$q_{an} = q_a \left(1 + \frac{H}{B}\right) \times \frac{2}{3}$ ← knife edge effect ignored due to slab confinement

$= \frac{4}{3} q_a$ = 48 kPa.

Silt modification

Project

file 574.20
date
page 3

$q_M = q_a\left(1 + \frac{H}{4B}\right) \neq 1.5 q_a = 1.5 q_a$

H = 450
B = 200

Sand modifications critical

$q_M = 48 kPa$

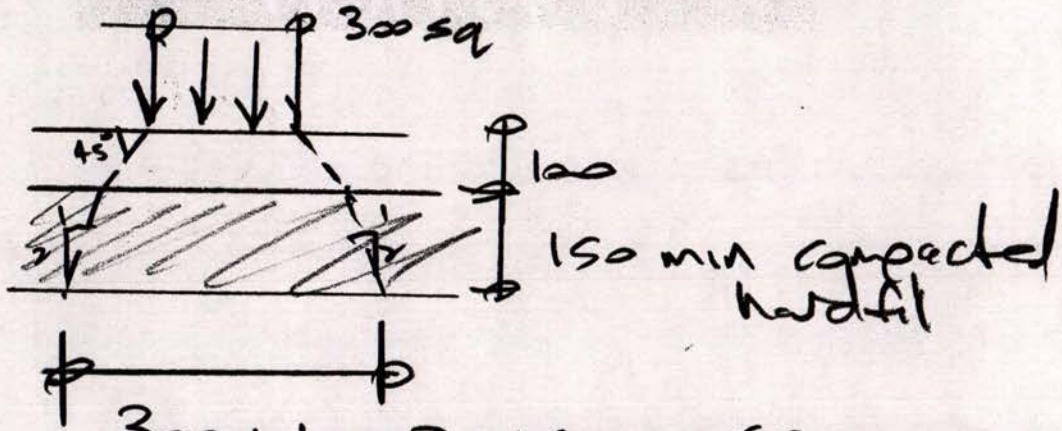
$q_a = \frac{0.84}{0.20} = 34 kPa$ ∴ OK

Provide a minimum of 200 wide

× 450 deep concrete footing

2.20 Slab + fill

check 9.0 kN point load



300 + 100 × 2 + 150 = 650 sq

(6 m²) $P = 9.0 + 0.65^2 \times 0.10 \times 24$ slab
$+ 0.15 \times 0.65^2 \times 18$ fill
$= 11.15 kN$

Project	file 514.20 date page 4

$p_a = 11.1 S / 0.6S^2 = 26 kPa$

$< 36 kPa$

Provide a minimum of HRC 665 mesh central in 100mm slab on 0.25mm polythene on 150 mm compacted hardfill

Shrinkage control joints (saw cut) per NZS 3604:1999.

SOIL TEST RESULTS SHEET

Client: Dave Barraclough & Anne Bennett

Project Location: Proposed garage
560 Stanley Road, Lot 1 DP 310143, Wainui

Test Site 1 of 5

Ref: 574.2

Date: 2/10/2007

Comments	Soil Sensitivity	Shear vane Cu (kPa)	Scala (mm/blow)	Depth (m)	Soil, Engineering Description
					silty SAND (fg), yellow-brown
			52		
			46	0.5	SILT, grey-brown, slight clay,moist
			33		
			25	1.0	
			20		
				1.5	clayey SAND, fine to medium grained, slight plastic, moist
			30		
					at 1.7m- wet
			50		
			28	2.0	
			25	2.5	end of drilling at 2.4
			35		
			eot	3.0	
				3.5	
				4.0	
				4.5	
				5.0	
				5.5	
				6.0	

mce manktelow consulting engineers limited

Structural and Geotechnical Engineers
(07) 307 2002

Auger dia: 50mm
Depth measured from existing ground level
Logged: CM

SOIL TEST RESULTS SHEET

Client: Dave Barraclough & Anne Bennett

Project Location: Proposed garage
560 Stanley Road, Lot 1 DP 310143, Wainui

Test Site 2 of 5

Ref: 574.2

Date: 2/10/2007

Comments	Soil Sensitivity	Shear vane Cu (kPa)	Scala (mm/blow)	Depth (m)	Soil, Engineering Description
				0.0	
			60	0.5	
			50		
			22		
			30	1.0	
			27	1.5	
			28		
			50	2.0	
			17		
			18		
			27	2.5	
			26	3.0	
			eot		
				3.5	
				4.0	
				4.5	
				5.0	
				5.5	
				6.0	

mce manktelow consulting engineers limited

Structural and Geotechnical Engineers
(07) 307 2002

Auger dia: 50mm
Depth measured from existing ground level
Logged: CM

SOIL TEST RESULTS SHEET

Client:	Dave Barraclough & Anne Bennett	**Test Site**	**3** of 5
		Ref:	574.2
Project Location:	Proposed garage 560 Stanley Road, Lot 1 DP 310143, Wainui	Date:	2/10/2007

Comments	Soil Sensitivity	Shear vane Cu (kPa)	Scala (mm/blow)	Depth (m)	Soil, Engineering Description
					silty SAND (fg), yellow-brown
			60		
				0.5	SILT, grey-brown, slight clay,moist
			58		
			30	1.0	
					clayey SAND, fine to medium grained, slight plastic, moist
			71	1.5	
			65		
				2.0	
			42		
			28	2.5	end of drilling at 2.4m depth
			35		
				3.0	
			eot		
				3.5	
				4.0	
				4.5	
				5.0	
				5.5	
				6.0	

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(07) 307 2002

Auger dia: 50mm
Depth measured from existing ground level
Logged: CM

SOIL TEST RESULTS SHEET

Client:	Dave Barraclough & Anne Bennett	**Test Site**	**4** of 5
		Ref:	574.2
Project Location:	Proposed garage 560 Stanley Road, Lot 1 DP 310143, Wainui	Date:	2/10/2007

Comments	Soil Sensitivity	Shear vane Cu (kPa)	Scala (mm/blow)	Depth (m)	Soil, Engineering Description
				0.0	
			60	0.5	
			46		
				1.0	
			25	1.5	
			17	2.0	
			eot		
				2.5	
				3.0	
				3.5	
				4.0	
				4.5	
				5.0	
				5.5	
				6.0	

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Structural and Geotechnical Engineers
(07) 307 2002

Auger dia: 50mm
Depth measured from existing ground level
Logged: CM

SOIL TEST RESULTS SHEET

Client: Dave Barraclough & Anne Bennett

Project Location: Proposed garage
560 Stanley Road, Lot 1 DP 310143, Wainui

Test Site 5 of 5

Ref: 574.2

Date: 2/10/2007

Comments	Soil Sensitivity	Shear vane Cu (kPa)	Scala (mm/blow)	Depth (m)	Soil, Engineering Description
					silty SAND (fg), yellow-brown
	3.1	130	100	0.5	SILT, grey-brown, slight clay,moist
	2.6	136	50		
			33	1.0	
			29	1.5	
			30		clayey SAND, fine to medium grained, slight plastic, moist
			20	2.0	
			21	2.5	
			31		end of drilling at 2.5m depth
			eot	3.0	
				3.5	
				4.0	
				4.5	
				5.0	
				5.5	
				6.0	

mce manktelow consulting engineers limited

Structural and Geotechnical Engineers
(07) 307 2002

Auger dia: 50mm
Depth measured from existing ground level
Logged: CM

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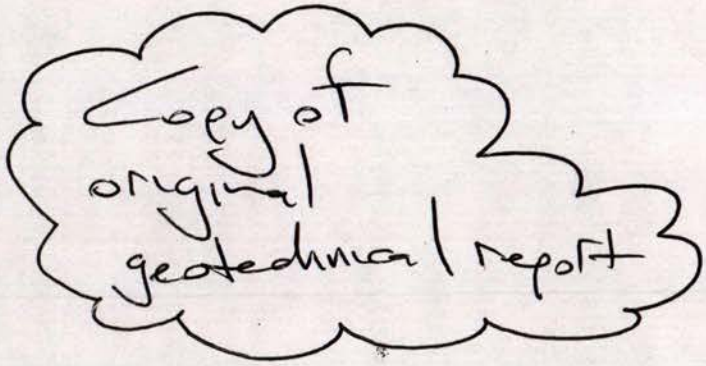
Email mankshouse@xtra.co.nz



BUILDING SITE FEASIBILITY REPORT
FOR
LOT 1 OF PROPOSED SUBDIVISION OF LOT 2 DP 310143
560 STANLEY ROAD
WHAKATANE

CLIENT: J. AND N. COWPER

Ref. 103.1
14/5/2004

Contents page

1.0 Background....3

2.0 Site notes....3

3.0 Site geology....3

4.0 Theoretical building setbacks....4

5.0 House foundations....4

6.0 Stormwater controls and erosion protection....4

7.0 Effluent disposal....4

8.0 Conclusions....5

Photographs....6

Survey Plan....8

Site notes plan....9

Critical slope profiles....10

Soil test data sheets....11

Limitations

This report has been prepared at the specific instructions of J. and N. Cowper and supports a subdivision consent application, and should not be relied upon for any other purpose, or by any other party, and is based on data from preliminary scala penetrometer and borelog testing. The nature and continuity of subsoil conditions away from the test sites is inferred and it must be appreciated that actual conditions could vary considerably from the assumed model.

This review has been limited to the area identified on the attached site notes plan and is based on information collected from a site visit and engineering judgment. This report should not be construed as a guarantee for continued slope stability.

This report does not preclude the need for normal foundation inspections at the time of construction of any building on the site.

Restrictions to building arising from the proximity of property boundaries, archaeological issues, and the like, have not been investigated

1.0 Background

This property is located on an elevated portion of ground adjacent to Stanley Road. The attached survey plan by Ross J. Overington dated March 2004, outlines the subdivision proposal. To support a subdivision resource consent application this geotechnical engineering feasibility report has been commissioned. Theoretical minimum building setbacks from slopes, possible house foundation requirements, effluent disposal system siting and stormwater controls are issues reviewed in this report. Restrictions to building arising from the proximity of property boundaries, archaeological issues, and the like, have not been investigated.

2.0 Site Notes

We visited the site on 29th April 2004. Fieldwork undertaken comprised; a walkover inspection, measurement of platform dimensions, plots of critical slopes using a measuring tape and clinometer. Two augured borelog and scala penetrometer test sites were also carried out at the locations identified on the attached site notes plan. A copy of the test data and slope cross-sections are included also.

Access was gained to the building site directly from Stanley Road. The ground surface over the potential house site is relatively level, however there is some undulation with a few tree stumps evident.

To the west beyond this the ground slopes down to the valley floor some 40 metres below. Slopes of between 25 to 43 degrees to the horizontal were recorded. Groundwater was seen exiting in a few locations. Relic slip and erosion features were also seen down this slope. These shallow features were particularly evident in areas of ground water seepage or natural surface water run-off. Visual evidence suggests that there have been no deep-seated failures; ground movements appear to be isolated to groundwater induced shallow slides and regressive erosion of the weaker upper soils. I understand that stock have extensively grazed this property for a number of years, and despite the large number of mature trees and scrub the ground surface does not have a good covering of grass or ground cover. It is evident that the strongly interbedded volcanic soils contain perched "ribbon" aquifers.

Beyond the southern boundary fence the ground slopes away steeply down to a drainage valley which traverses around to the base of the western slope. Slopes of up to 50 degrees to the horizontal were recorded down to the valley floor approximately 15 metres below. At the time of our visit a small stream flowed at the base, with the valley head adjacent to Stanley Road.

Borelogs reveal that the building site is underlain with a combination of interbedded volcanic pumice, pumice sand and weathered ash deposits down to a depth of at least 3m. Similar volcanic lapilli and tuff deposits were seen exposed on the Stanley Road cuttings; some of which stand near vertical at 4 to 5m high. Scala penetrometer testing suggests that the near surface soil is loose, with allowable bearing pressures as low as 45 kPa (135 kPa ultimate) being recorded. Soil densities improve with depth.

A recent slip has occurred to the south of this property on the edge of Stanley Road. A portion of the road has slumped into the previously mentioned valley. I understand this failure occurred during a period of intense rainfall. It was raining during our visit and surface water flows from the sealed Stanley Road, given the road profile, were directed to the slip zone. At least a 150m length of roadway would have contributed to the catchment area for this surfacewater flow.

3.0 Site Geology

Soil maps describe the geology of this area as Whakatane Hill soils comprising Tarawera and Kaharoa Ash and Taupo Pumice, on Whakatane Ash to 41cm, on volcanic ash, lapilli, and weathered ash (clay) to 15m, on sandstone and on greywacke.

4.0 Theoretical Building Setbacks

Observations indicate that the slopes below the site are at a lower degree of stability than is acceptable to permit buildings to be erected on or at the crest of the slopes. Further movement of the upper soil layers should be expected. I understand that the bush clad slopes will be retired from stock grazing. Re-growth of vegetation groundcover should be encouraged to reduce erosion potential.

As a general rule of thumb for weathered and pumice ash deposits a building set-back margin based on a 2:1 (horizontal to vertical) 26° plane applied to the slope profile has been established as a practical and prudent tool for preliminary assessment of hillside slopes. Applying this approach to the existing contours suggests that a building line set at 9m from the top edge is appropriate for the western slopes.

A similar process was undertaken for the southern slope profile beyond the boundary fence with a 15m setback resulting.

The attached Site Notes Plan showing the potential building area with the above mentioned setback distances and the slope profiles refer.

5.0 House Foundations

Preliminary scala penetrometer probing indicates that the pumice ash deposits within the defined building area have allowable bearing pressures less than 100 kPa (300 kPa ultimate) as required for buildings designed within the scope of NZS 3604:1999. Specific soil testing and design of foundations for any building on this site will be required.

6.0 Stormwater Controls and Erosion Protection

Evidence suggests that the loose upper layers of the pumice ash deposits that underlie the site are prone to erosion if left exposed. The overall stability of the site will be subject to prudent practices in terms of vegetation and surface water control.

It is important that building developments do not result in discharge of stormwater onto the adjacent slopes (this includes during construction) and that the appropriate slope vegetation is planted and maintained. Stormwater from the house roof, driveway, paths and any other hard surfaces needs to be collected and conveyed in sealed pipes away from the slopes. The final location of any dwelling, auxiliary buildings, effluent disposal system and driveways will influence the placing of any disposal system on this site. An appropriate stormwater disposal system might include a series of soakholes along the Stanley Road boundary with an overflow into the roadside watertable. If it is proposed to collect the water from the house roof the overflow pipe from the collection tank should be connected into this disposal system.

7.0 Effluent Disposal

The Environment Bay of Plenty Regional Plan for On-site Disposal of Effluent specifies for soil type encountered at the test sites (soil category 3 with good drainage) the disposal area required for a conventional septic tank with standard seepage trenches is 590 square metres, this includes a reserve area.

As with the stormwater disposal system the layout of this system will require particular attention to ensure that the trenches are of adequate length and spacing, minimal longitudinal fall, and are not too close to slope surfaces. A designated area should be assigned to the seepage trenches where vehicle and stock movements over the disposal area can be avoided.

The exact nature of any house and driveway proposal at this stage is unknown. Given the large area that would be needed for soakage the extent of the building proposal will have a bearing on whether a conventional septic tank and seepage trench system could be accommodated on this site. Site information

would suggest that a suitable area exists in the south-eastern corner of the site.

Alternatively, a proprietary package plant treatment system (some of the suppliers include: Hynds Environmental, Septech NZ, Biocycle, Enviroflow....) with low dose drip lines could be considered. This type of system allows more freedom in location of the seepage area, which could be split into different zones and be on slopes away from the residence with suitable planting. The manufacturer and supplier should visit the site and will need to provide a report that details the appropriate system for this site. This information will need to be included in the documentation for a Building Consent application to the District Council.

8.0 Conclusions

8.1 As with any elevated hillside property there is a risk of slope instability. Our investigations suggest that it is prudent to observe minimum setback distances from the top edges of the slopes at this site. Observations suggest there is a low risk that instability will extend back into the building area at these setback distances. Specialist geotechnical review and investigation will be required before consideration can be given to locate any buildings closer to the tops of the slopes than specified on the attached site notes plan.

8.2 The overall stability of the site is subject to prudent practices in terms of vegetation and surface water control. It is important that building developments do not result in discharge of stormwater to the adjacent slopes, and that the appropriate bank vegetation is planted and maintained. A suitable plan detailing the stormwater control systems from roofs, driveways and paths, should form part of the documentation in a Building Consent application to the District Council for any residential development on this site. Ground soakage systems shall not be placed in between any building and the steep slopes below the building site.

8.3 Preliminary soils investigations suggest that specific engineering design of any building foundation system on this lot is required.

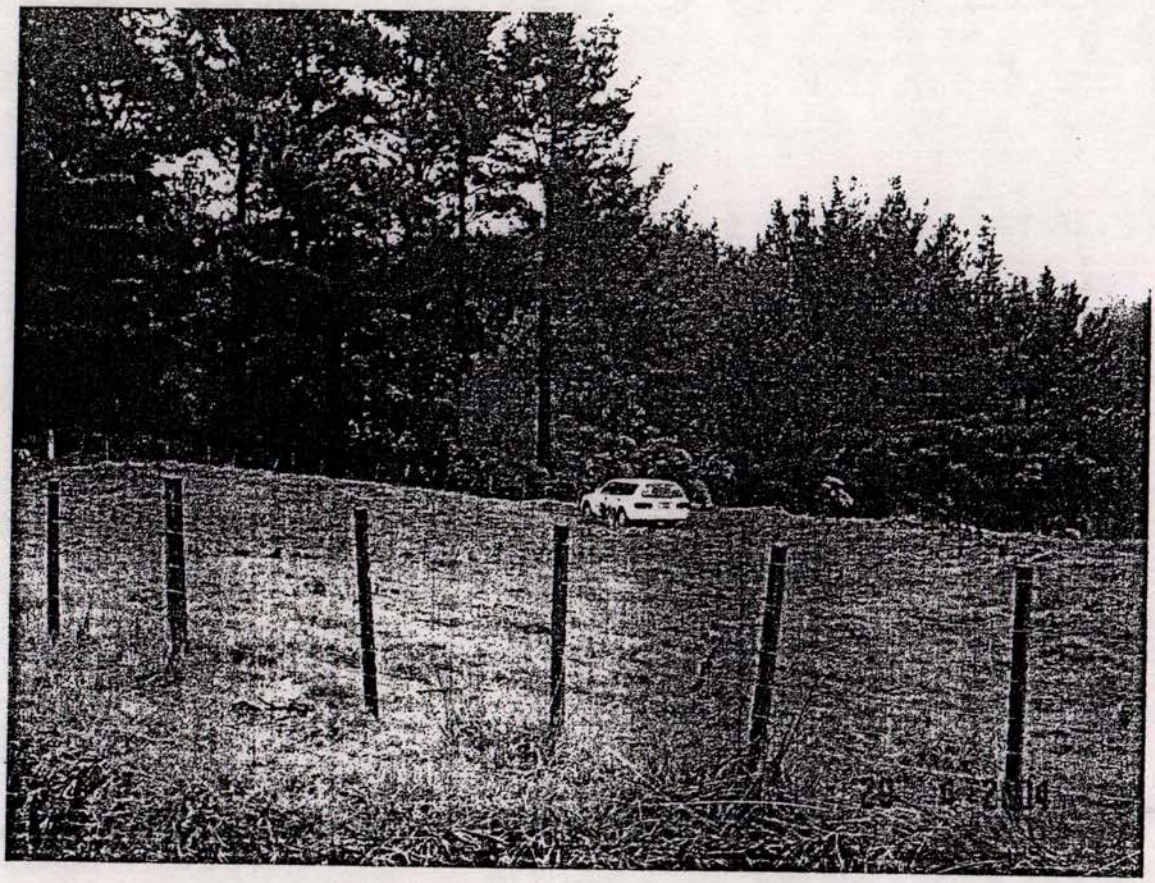
8.4 Effluent disposal from a proposed dwelling should be undertaken in accordance with the Environment Bay of Plenty Regional Plan for On-Site Disposal of Effluent, District Council requirements and comply with AS/NZS1547:2000. A conventional septic tank and seepage trench system shall not be placed between any buildings and the steep slopes around this building site. A proprietary package plant treatment system with low dose drip lines is an alternative if a conventional septic tank system cannot be accommodated given the extent of the building proposal. The manufacturer and supplier should visit the site and provide a report that details the appropriate system for this site. This information should form part of the documentation in a Building Consent application to the Distinct Council.

8.5 No filling should take place on the sloping ground around the building site. No filling in excess of 0.6 m deep should be undertaken within the building area unless endorsed by a Professional Engineer experienced in geomechanics who is familiar with our report.

8.6 Regardless, construction of a house and effluent disposal system on the proposed lot 2 is believed feasible given the site constraints subject to final boundary location.

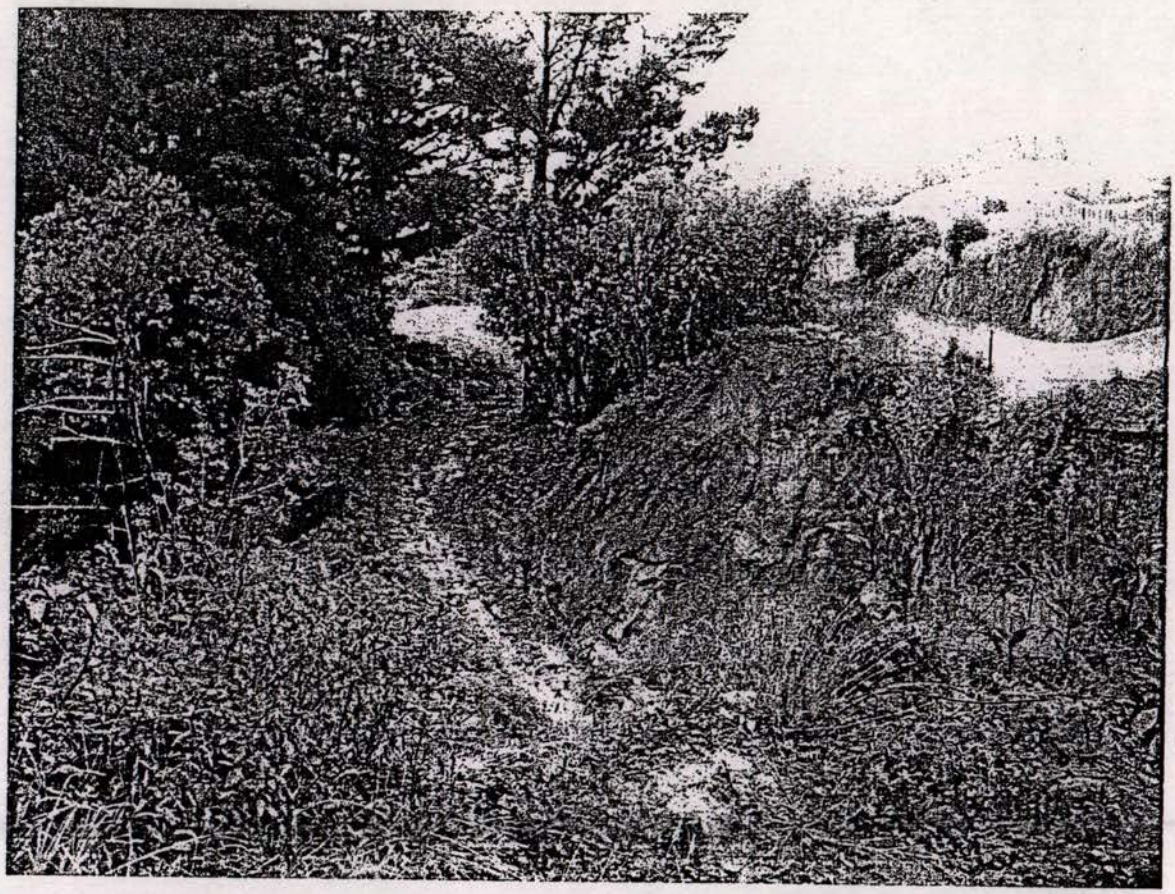
MANKTELOW CONSULTING ENGINEERS LIMITED

Craig Manktelow BE (Hons) MIPENZ

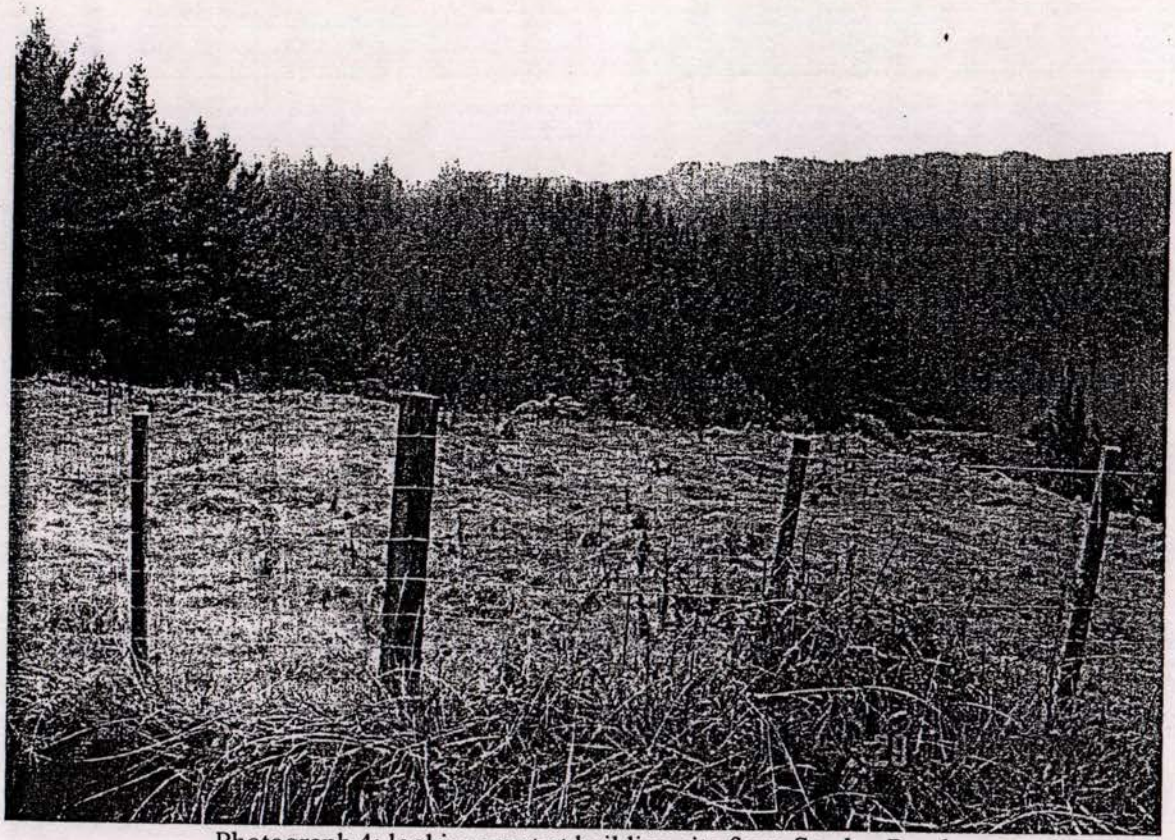


Photograph 1: view looking from Stanley Road south-west to site

Photograph 2: view looking south at western slopes below building site



Photograph 3: view looking north building site through trees, Stanley Road slip at right



Photograph 4: looking west at building site from Stanley Road

Manktelow Consulting Engineers Limited

Project Site Notes
Cowper: 560 Stanley Rd
BH1

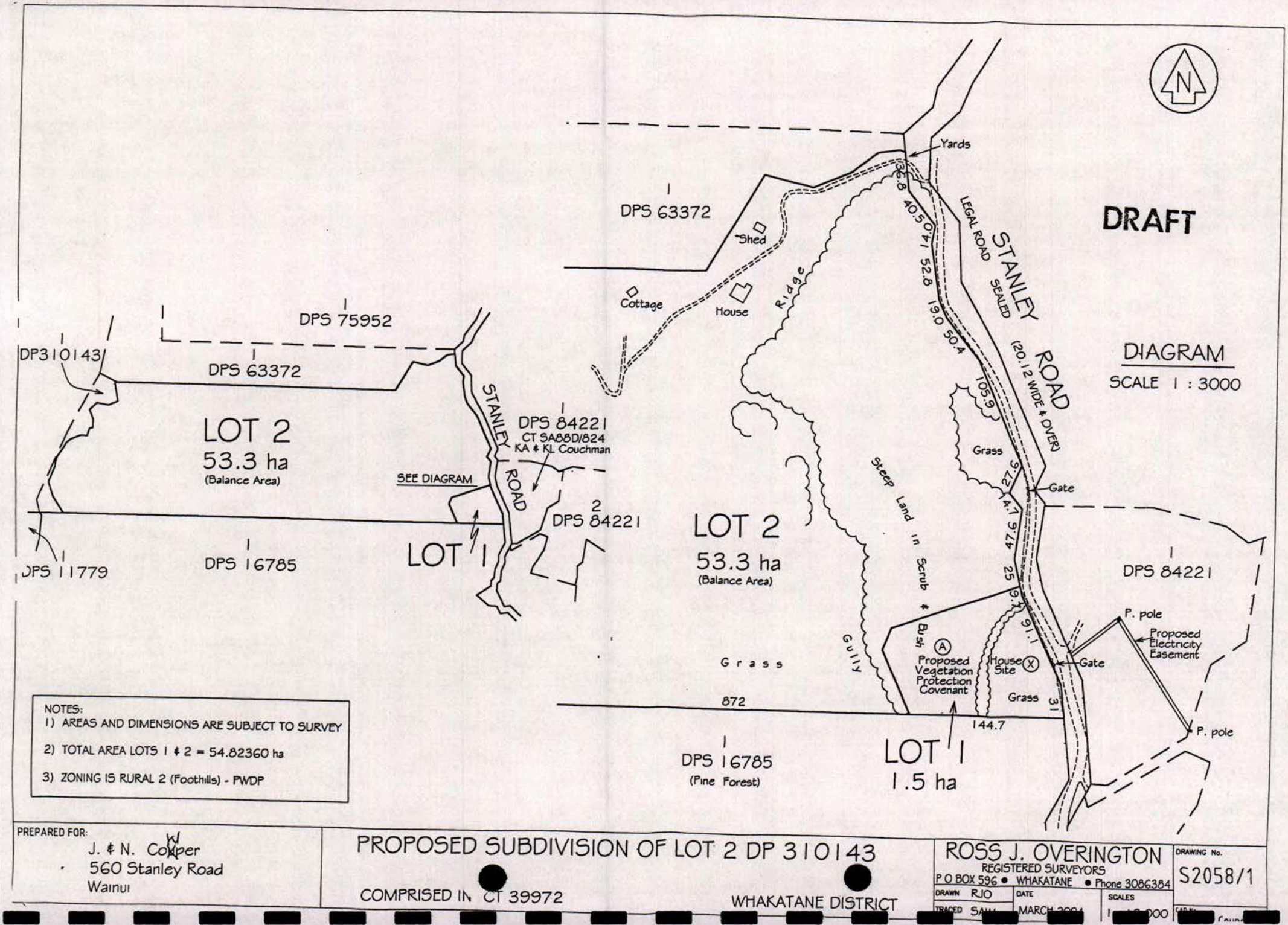
file 103.1
date 29/4/04
page 1 of 2

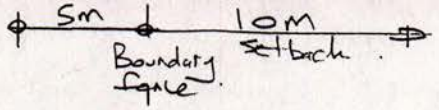
Soil Description	Depth m	Scala mm/blow	Water table	Remarks
Topsoil	0			50ϕ auger hand Scala penetrometer readings = mm/blow.
	-0.2			
Yellow Pumice Sand/Silt loose in upper ash layers density increasing with depth	-0.4	80		
	-	40		
	-			
	1.0	25		
	-1.2			
Silty Pumice	-			
Weathered Pumice Sand	-	35		Despite soils moist @ around 1.80m. No watertable encountered down to 3.0m depth.
	-			
Moist	2.0	25		
	-2.2			
Clay content evident	-2.4			
	-2.6	33		
	-2.8			
	3.0			
E.o.B	-	29		Scala results soft below topsoil.
	-			
	-	24.		
	-			
	4.0			
		EOT.		logged by CM.
	5.0			

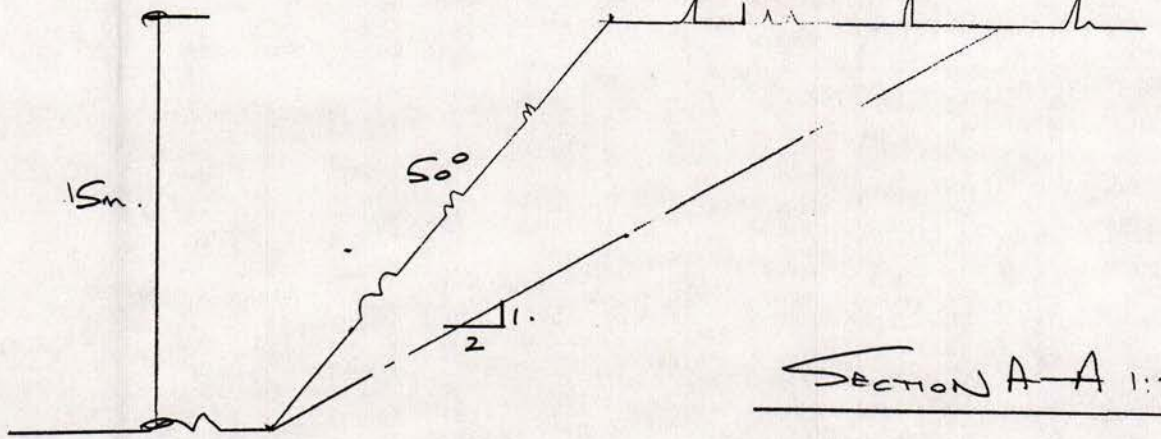
Project Soil test results
Comped: 560 Stanley Road

file 103.1
date 29/4/04
page 2 of 2

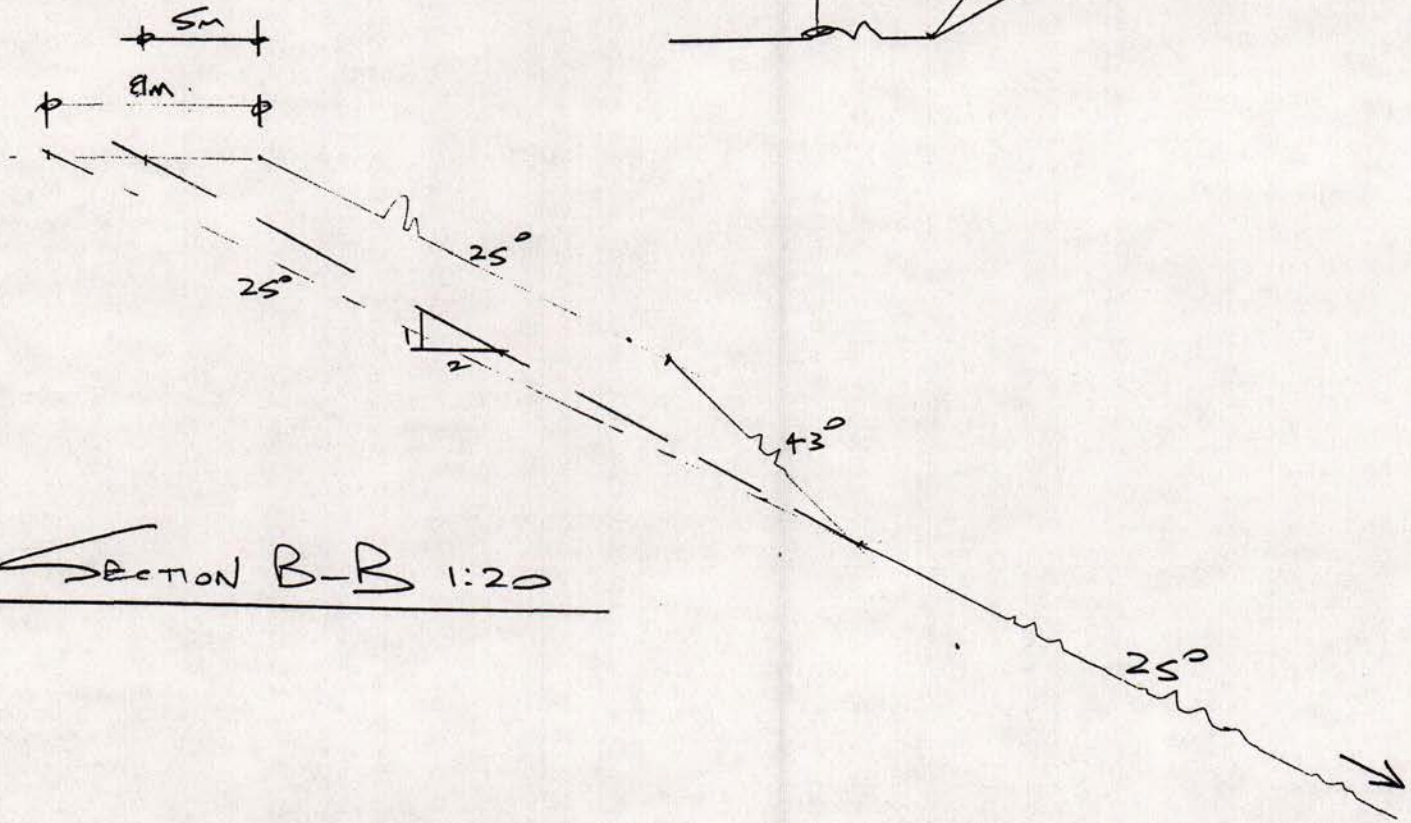
Soil Description	Depth m	Scala mm/blow	Remarks
Topsoil			BH2
Yellow Pumice Silt ash. loose		75	
		38	
	1.0	29	
Silty Pumice		40	
Weathered ash. Clayey Silt Sand flecks		32	
	2.0	29	
		25	
		EoT	
	3.0		
EoT			
	4.0		


DRAFT
DIAGRAM
SCALE 1 : 3000
N
DPS 63372
Shed
Cottage
House
Ridge
Yards
STANLEY ROAD
LEGAL ROAD SEALED (20.12 WIDE & OVER)
36.8
40.5
141
52.8
19.0
50.4
105.9
Grass
27.2
4.7
9.4
25
9.3
91.1
Gate
DPS 84221
Steep Land in Scrub & Bush
Gully
Grass
872
144.7
31
Proposed Vegetation Protection Covenant
A
House Site
X
Gate
P. pole
Proposed Electricity Easement
P. pole
LOT 2
53.3 ha
(Balance Area)
LOT 1
1.5 ha
DPS 16785
(Pine Forest)
DPS 75952
DP310143
DPS 63372
LOT 2
53.3 ha
(Balance Area)
SEE DIAGRAM
STANLEY ROAD
DPS 84221
CT 5A88D/824
KA & KL Couchman
2
DPS 84221
LOT 1
DPS 16785
DPS 11779
NOTES:
1) AREAS AND DIMENSIONS ARE SUBJECT TO SURVEY
2) TOTAL AREA LOTS 1 & 2 = 54.82360 ha
3) ZONING IS RURAL 2 (Foothills) - PWDP
PREPARED FOR:
J. & N. Cowper
560 Stanley Road
Wainui
PROPOSED SUBDIVISION OF LOT 2 DP 310143
COMPRISED IN CT 39972
WHAKATANE DISTRICT
ROSS J. OVERINGTON
REGISTERED SURVEYORS
P O BOX 596 • WHAKATANE • Phone 3086384
DRAWN RJO
DATE MARCH 2004
SCALES 1:3000
DRAWING No.
S2058/1





SECTION A–A 1:20



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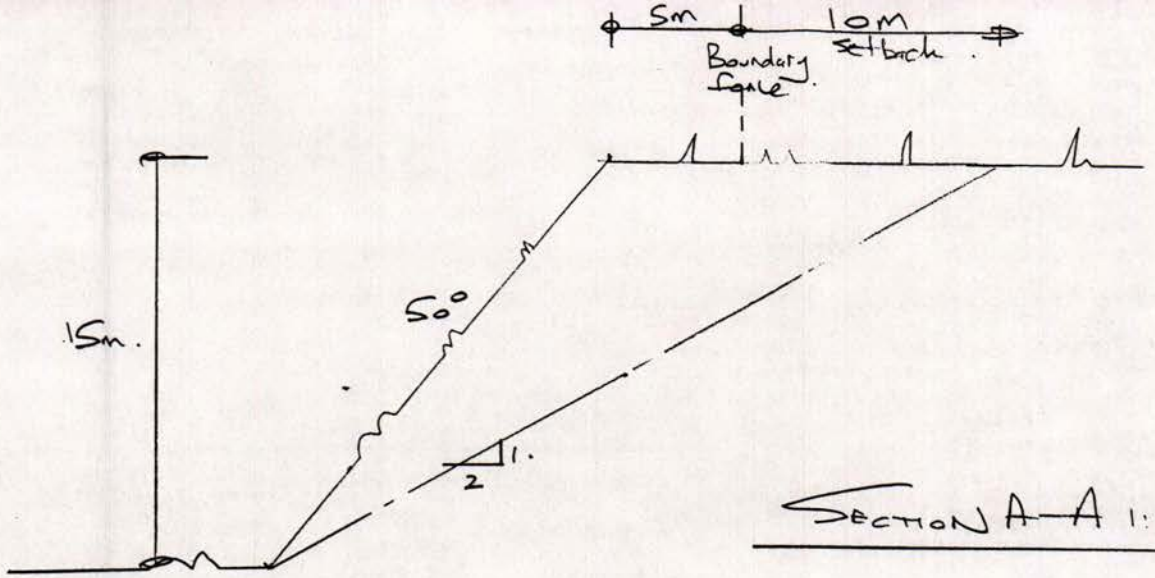

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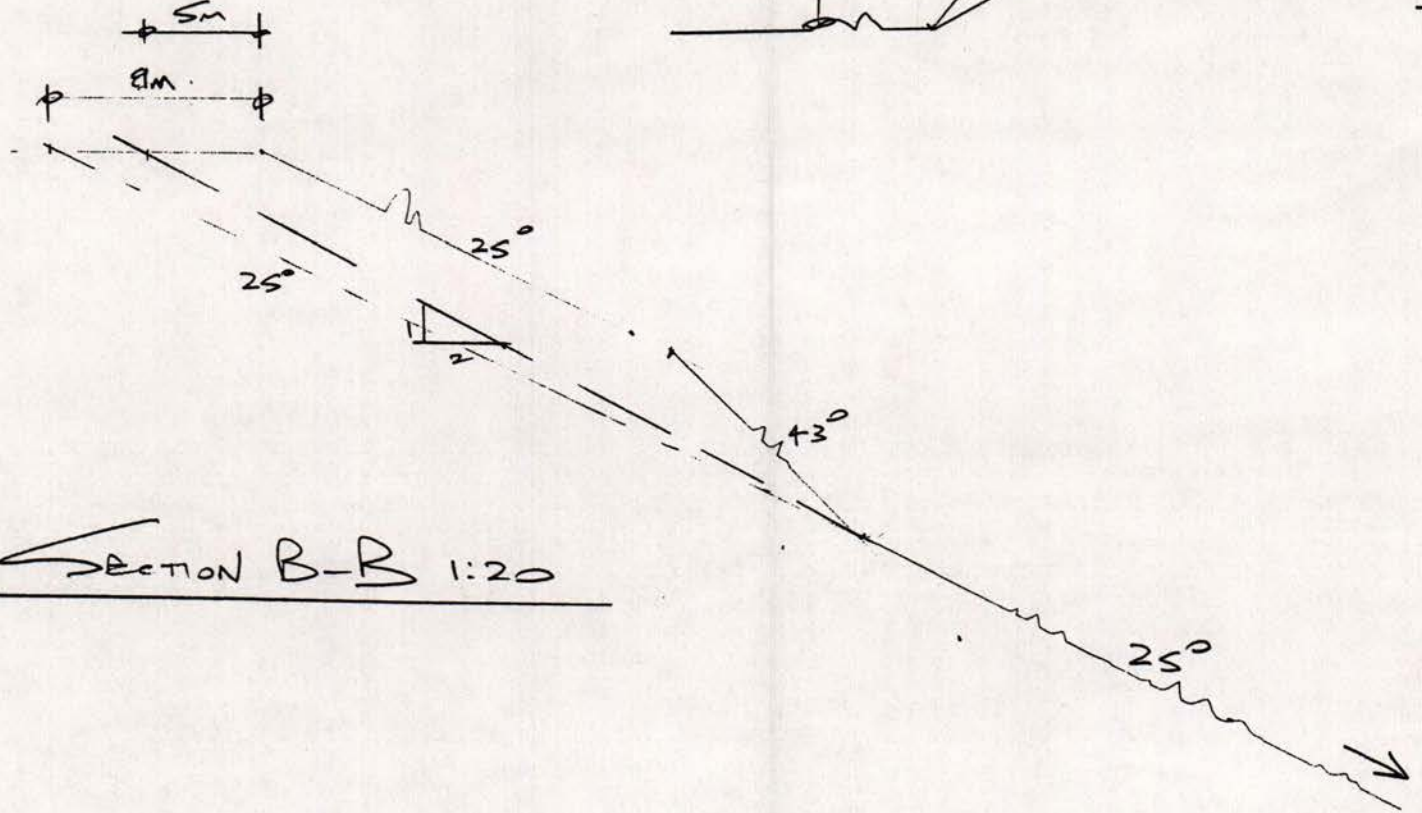

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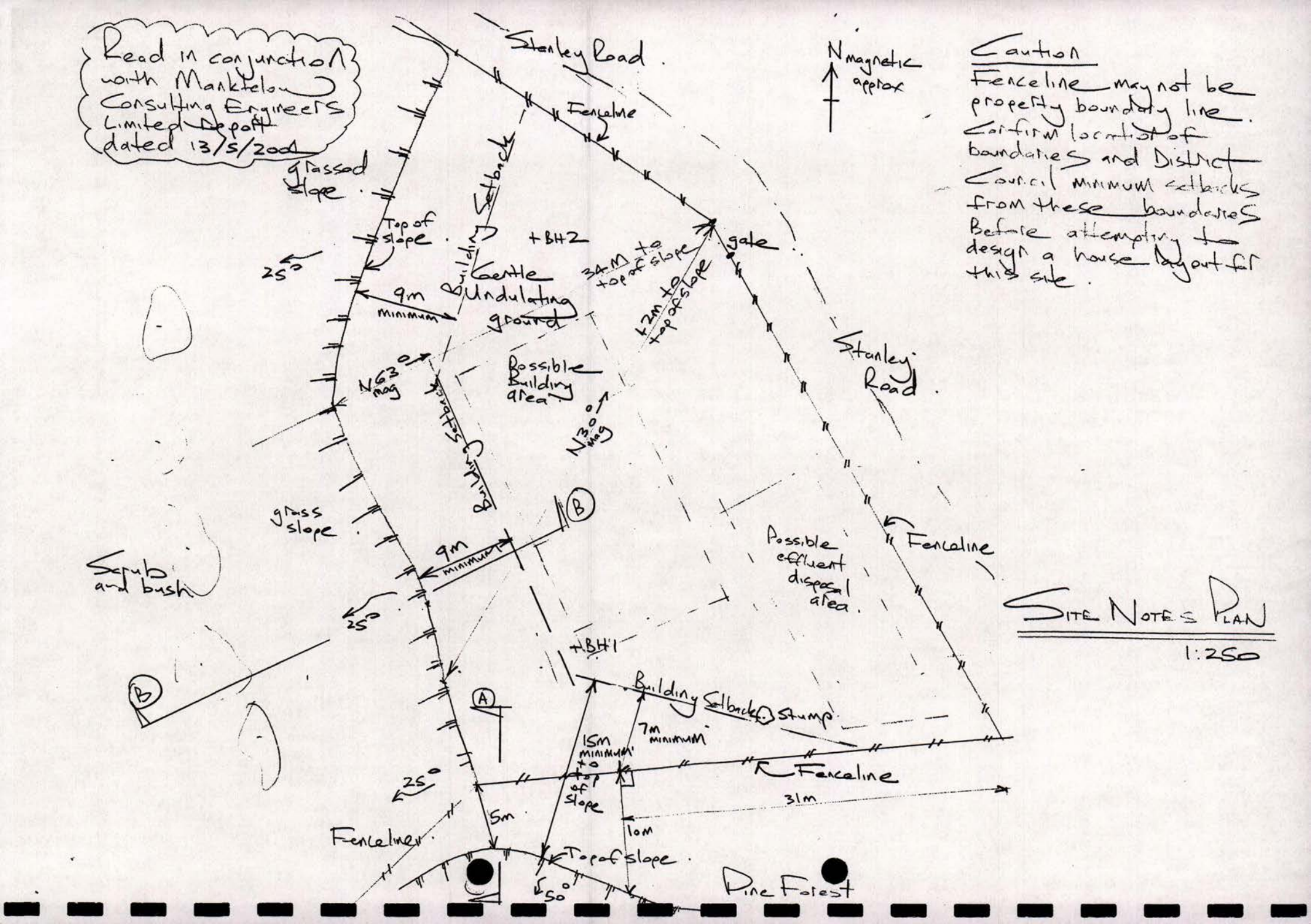
Read in conjunction with Marktelow Consulting Engineers Limited report dated 13/5/2004
Stanley Road
N magnetic approx
Caution
Fenceline may not be property boundary line. Confirm location of boundaries and District Council minimum setbacks from these boundaries Before attempting to design a house layout for this site.
Fenceline
grassed slope
Top of slope
Building Setback
+BH2
25°
9m minimum
Gentle Undulating ground
34m to top of slope
gate
12m to top of slope
Stanley Road
Possible Building area
N63° mag
N30° mag
Building Setback
grass slope
Scrub and bush
9m minimum
B
B
25°
Possible effluent disposal area
Fenceline
+BH1
A
Building Setback
Stump
15m minimum to top of slope
7m minimum
Fenceline
25°
31m
5m
10m
Fenceline
Top of slope
50°
Pine Forest
SITE NOTES PLAN
1:250

manktelow consulting engineers limited

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Whakatane
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m. 027 6125548
mankshouse@xtra.co.nz

Engineering Soils Investigation Report for Proposed Garage 560 Stanley Road Whakatane

CLIENT: Dave Barraclough & Anne Bennett

File ref. 574.2
30 October 2007

Contents **page**

1.0 Report Limitations and Scope..... 1

2.0 Background..... 2

3.0 Site Notes..... 2

4.0 Building Foundations..... 2

1.0 Report Limitations and Scope

This report reviews the foundation soils at the location of the proposed garage and has been prepared at the specific instruction of Dave Barraclough and Anne Bennett and supports a building consent application to the Whakatane District Council, and should not be used for any other purpose, or by any other party. As factual evidence has been obtained from visual inspections, five scala penetrometer, shear vane and borelog test sites, which by their nature only provide information about a relatively small volume of subsoil, there may be special conditions pertaining to the building site which have not been disclosed and which have not been taken into account in the report.

This review has been limited to the area identified on the attached site notes plan.

This report does not preclude the need for normal foundation inspections (by the District Council) in regard to verification of required footing geometry and reinforcement at the time of construction.

Restrictions to building arising from the proximity of property boundaries, archaeological issues, and the like, have not been investigated

Manktelow Consulting Engineers Limited (MCE) geotechnical report dated 14/5/2004 outlines development options for this building site including minimum building setbacks from the top of slopes. A reference copy of this is included herein. The proposed garage is within the designated permitted building area as defined in the report. The report concludes that soils softer than permitted in NZS 3604:1999 exist on the building platform. MCE have previously completed specific foundation soils investigation and foundation design for the dwelling that is nearing completion.

Our specific design is limited to a review of the applied soil bearing pressures from the proposed construction and is based on information obtained from information provided by the client regarding the proposed garage. All other areas of this project, including weatherproofing, proprietary systems and elements within the scope of the non-specific design codes NZS 3604 and NZS 4229 are specifically excluded from our review. The performance of the various specified proprietary systems are not covered by these calculations. Guarantees should be sought from the manufacturer if required.

Refer to the attached specific design specification notes; these outline some of the design assumptions. It is assumed that the Territorial Authority, being the building control authority, will undertake the necessary inspections to confirm the design assumptions and that the elements designed herein are installed in accordance with the intentions of the details shown. Any variation should be reported to the designer for a design review and alternative detailing.

2.0 Background

Specific engineering soil investigation has been requested at the site of the proposed garage.
It is proposed to construct a 7.2m x 9.0 m light timber framed Ideal garage. Colorsteel claddings are proposed with a 3m high exterior light timber framed walls. The garage is shown founded on a conventional ground bearing concrete slab.

3.0 Site Notes

We have visited the site and completed five hand penetrometer and shear vane test sites and augured borelogs. Scala penetrometer testing has generally been undertaken per the procedure as outlined in NZS 4402 Test 6.5.2 with results expressed as penetration mm/blow and a 50 mm diameter hand auger has been used to reveal soil types.

The ground is relatively level across the site with the nearly completed residence located 4m toward the north. It is proposed to locate the garage 3m back from the house wall adjacent to the slopes. The attached location plan shows the proposed garage position in relation to the dwelling.

Borelogs reveal that silt and clayey sand ash deposits underlay this site down to the investigation depth of 2.5 m.

Poor scala penetrometer results were recorded for the near surface. Serviceability allowable bearing pressures as low as 36 kPa was recorded at one of the test sites. Better relative densities were recorded at the other site sites and at depth.

The attached site notes plan and soil results sheets refer.

4.0 Building Foundations

Soil investigation results confirm that soils softer than permitted by NZS 3604:1999 (Timber Framed Buildings) exist at this site.

We have reviewed the proposed exterior footing systems for the measured reduced bearing pressures at a depth of 0.45 m below ground level and slab and 150mm slab sub-base fill on grade.

Because there is some variance in penetrometer resistance, some differential settlement of building foundations can be expected. The design procedure outlined in "Determination of allowable bearing pressure under small structures" MJ Stockwell 06/1977, suggests that differential settlement might be in the order of 20mm if applied pressures are less than measured values. This paper concludes, "These deflections are regarded as the acceptable limits a modern building can withstand without distress".

A review using this procedure shows the applied pressures from 200 mm wide footing bearing at 450 mm and 100mm slab on 150mm fill are indeed less than measured theoretical values.

This suggests that the underlying soil is suitable to support the modified shallow bearing foundation system as shown herein, and the risk of differential settlement greater than mentioned above is low. Our calculations and sketch details are attached.

The garage downpipes should be connected into the property stormwater disposal system that discharges at the base of the slope. No stormwater should be permitted to discharge onto the building platform of slopes below the building platform.

Manktelow Consulting Engineers Limited

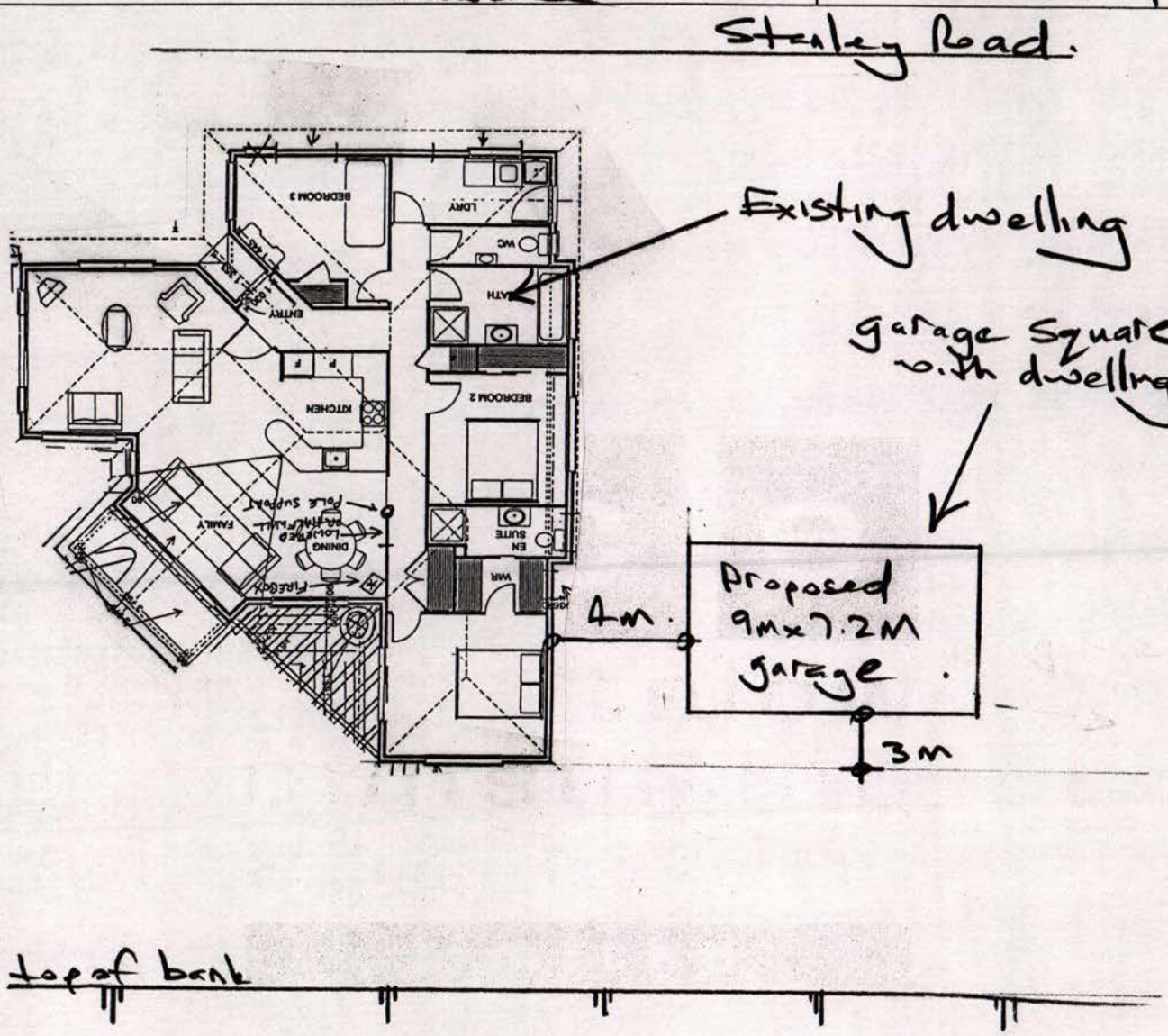
Craig Manktelow BE (Hons) MIPENZ

Enclosed: 5 sheets of sketch details and specific design specification notes
Site notes plan
Ideal Garages summary sheet
4 sheets of structural calculations
5 sheets of soil test results sheet
Copy of MCE geotechnical report 14/5/2004

Manktelow Consulting Engineers Limited

Project Barraclough & Bennett Garage at 580 Stanley Rd, Whakatane

file 5/14.20
date 30/10/07
page Sketch—01



LOCATION PLAN NTS

Note: Connect garage roof downpipes into the designated piped stormwater disposal system.

Structural and Geotechnical Consulting Engineers
Phone/fax 07 307 2002

Manktelow Consulting Engineers Limited

Project Barraclough & Bennett
Proposed Garage
560 Stanley Road, Whakatane

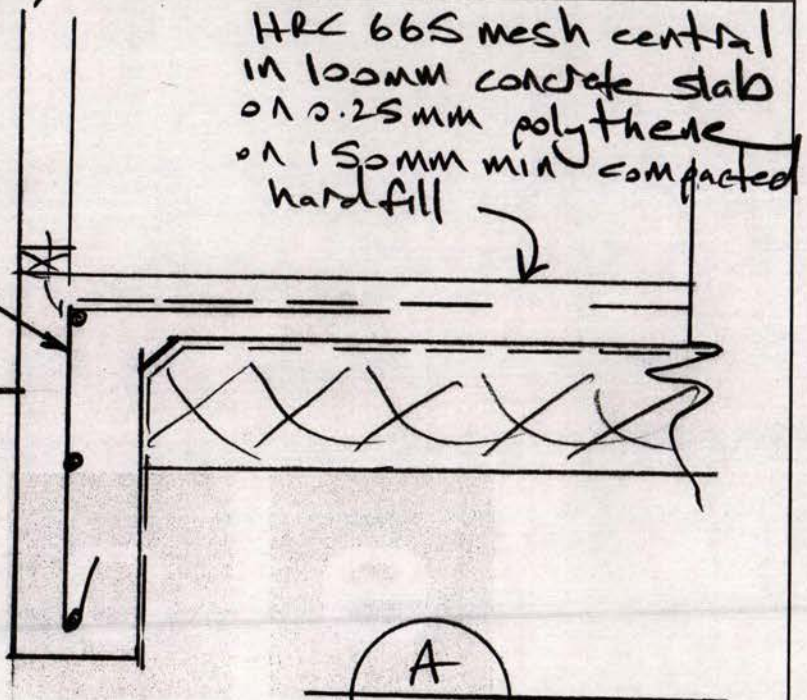
file 574.20
date 30/10/07
page Sketch-02

D10 slab starters hook 150 around footing bars, lap mesh 500

HRC 665 mesh central in 100mm concrete slab on 0.25mm polythene on 150mm min compacted hardfill

225 min
600 max

450 deep

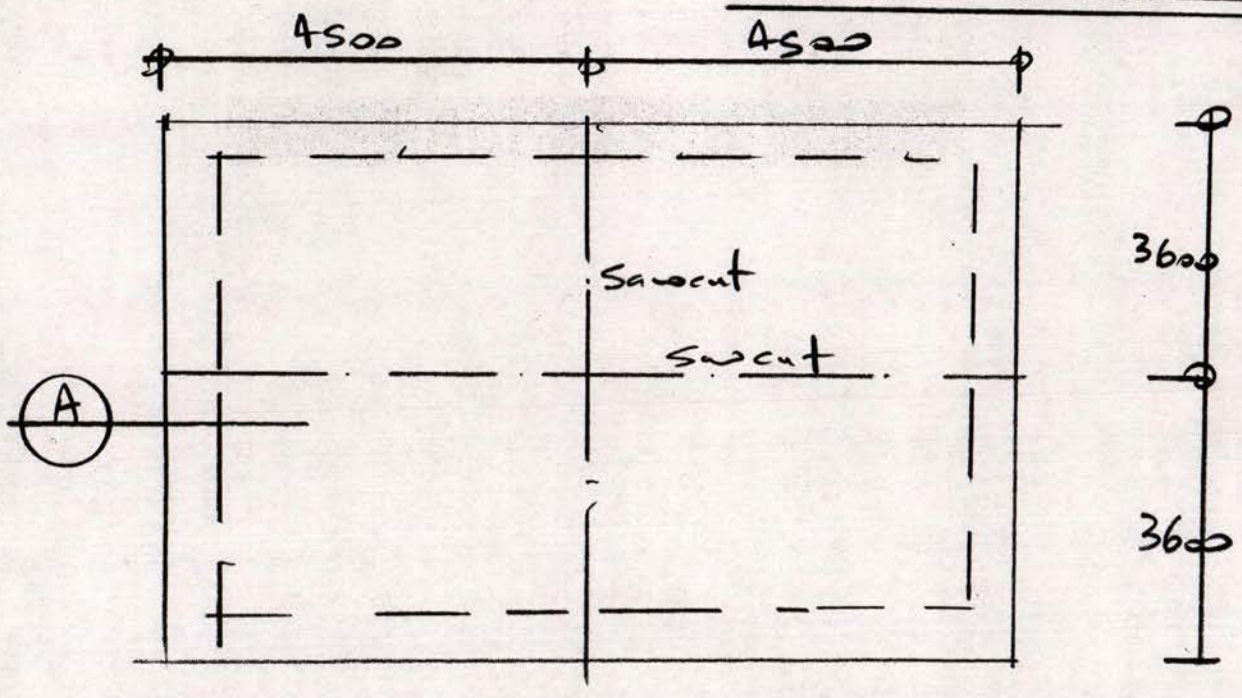


3 D12 footing bars central in footing and 85 bottom cover.

200

A

TYPICAL EXTERIOR FOOTINGS DETAIL



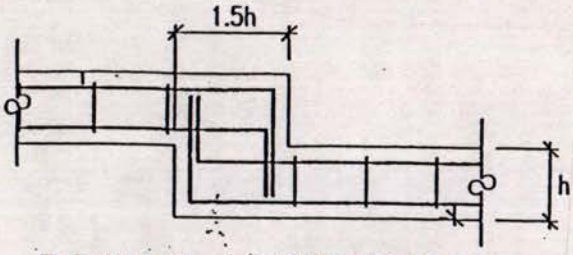
SLAB PLAN NTS

Refer attached construction notes

Structural and Geotechnical Consulting Engineers
Phone/fax 07 307 2002

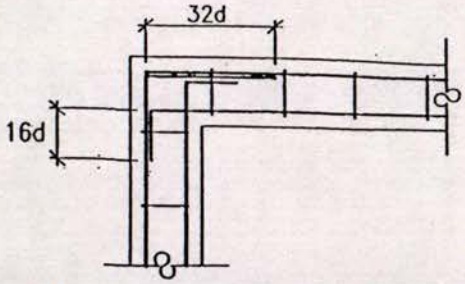
Project Barraclough & Bennett Garage at 560 Stanley Road Whakatane

file SA.2
date 30/10/07
page Sketch-03



ELEVATION – FOUNDATION STEP

d = bar diameter



PLAN – FOUNDATION CORNER

FOUNDATION DETAILS

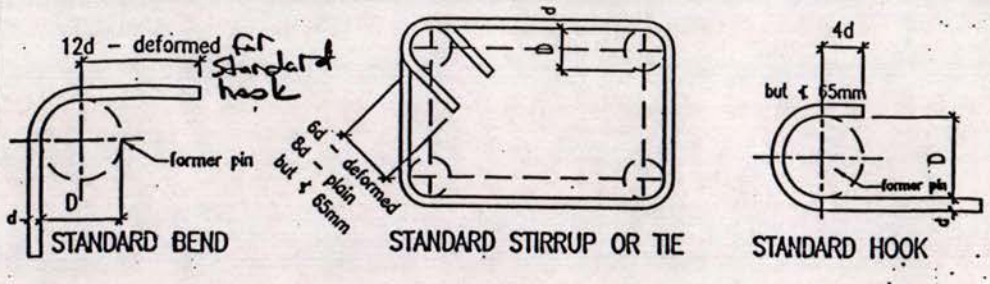
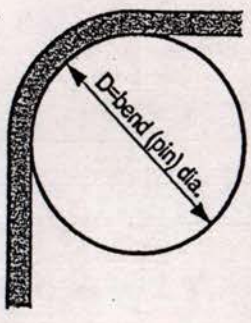


FIG. 1. STANDARD BEND, HOOK & STIRRUP d = bar diameter

MINIMUM RECOMMENDED BEND (PIN) DIAMETER = D



REBAR TYPE	bar diameter = b					
	6	10	12	16	20	25
plain bars	30	50	60	80	100	150
deformed bars	30	50	60	80	100	150
plain bars (stirrups & ties)	20	20	30	40	40	80
deformed bars (stirrups & ties)	30	40	50	70	80	150

ALL REINFORCEMENT SHALL BE COLD BENT ONLY

SPECIFIC DESIGN CONSTRUCTION SPECIFICATION

1.0 General

1.1 Check all the dimensions and levels on site before fabrication. Locate and protect any existing services before commencement of any excavation.

1.2 Proprietary systems and products shall be installed strictly in accordance with manufacturers' recommendations. Garage superstructure shall be constructed in accordance with building consented plans and specifications. Slab and footing construction is to be in accordance with attached sketch detailing (sketch 01-03).

1.3 The attached sketch detailing is diagrammatic and intended only to convey specific engineering design conclusions. Read in conjunction with the building consented architectural drawings and specifications. It is assumed that the Territorial Authority, being the building control authority, will undertake the necessary inspections to confirm that the elements are constructed in accordance with the attached detailing and elements not covered by our review are installed in accordance with NZS 4229 and NZS 3604:1999 and building consented drawings. Any variation should be reported to the designer for a design review and alternative detailing.

1.4 Light timber framed construction shall be in accordance with the latest amendment of NZS 3604:1999 unless specified otherwise in the engineering design.

1.5 Corrosion protection for steel components shall be as required by the proprietary system manufacturer and NZS 3604:1999 for the appropriate corrosion zone.

1.6 Bolts shall be fitted with washers on all timber faces. For M12 use 50 square x 3 mm; M16 use 65 square x 5 mm.

2.0 Concrete

2.1 Prior to concrete pour footing trenches shall be clear of any loose debris and ground water.

2.2 Concrete construction shall be in accordance with NZS 3109 and NZS 3101. Concrete shall be Ordinary Grade unless mentioned otherwise. Concrete strength at 28 days shall be 20MPa. Concrete slump shall be the lowest possible to allow thorough compaction of the concrete. The slump however shall not exceed 75 mm.
Slump and compression tests shall be regularly conducted in accordance with procedure outlined in NZS 3112: 1986 Methods of Test for Concrete parts 1, 2 and 4. Test results shall be forwarded to the Territorial Authority.

2.3 The contractor shall protect the floor slabs against early plastic and thermal cracking. The slab shall be cured by water ponding for at least 5 days starting immediately after the slab has been finished. The attached sketch details show the location and depth of the slab shrinkage control joints. Sawcuts shall be 6mm wide x 33mm deep. The timing of sawcutting is critical; cutting too early should be avoided to reduce the risk of spalling the joint edge; however cutting shall take place no later than 8 to 24 hrs, depending on the ambient conditions, after the slab has been finished. Cutting with a 'wet-type' saw immediately after slab finishing is recommended. Whilst care has been taken in the location of these joints no guarantees are provided that uncontrolled cracking will not occur.

2.4 Reinforcement specified as HD shall be Pacific Steel Seismic Grade 500E®E MA; D or R shall be Grade 300. Reinforcement shall comply with AS/NZS 4671 and NZS 3402:1989, with construction, including bar fabrication, in accordance with NZS 3109:1997. Reinforcement shall be 'cold-bent' with minimum former pin diameters as shown on the attached standard details. Welding of reinforcement is not allowed. The construction reviewers shall satisfy themselves that reinforcement does comply with these standards.

2.5 Minimum lap lengths for reinforcement shall be; 600mm for D12, unless shown otherwise on the drawings. Lap and tie mesh 305 mm minimum.

2.6 NO IMPORTED REINFORCING STEEL IS TO BE USED IN THIS PROJECT.

2.7 Refer to the attached standard details sheet for construction of footing junctions and any steeping of the footing.

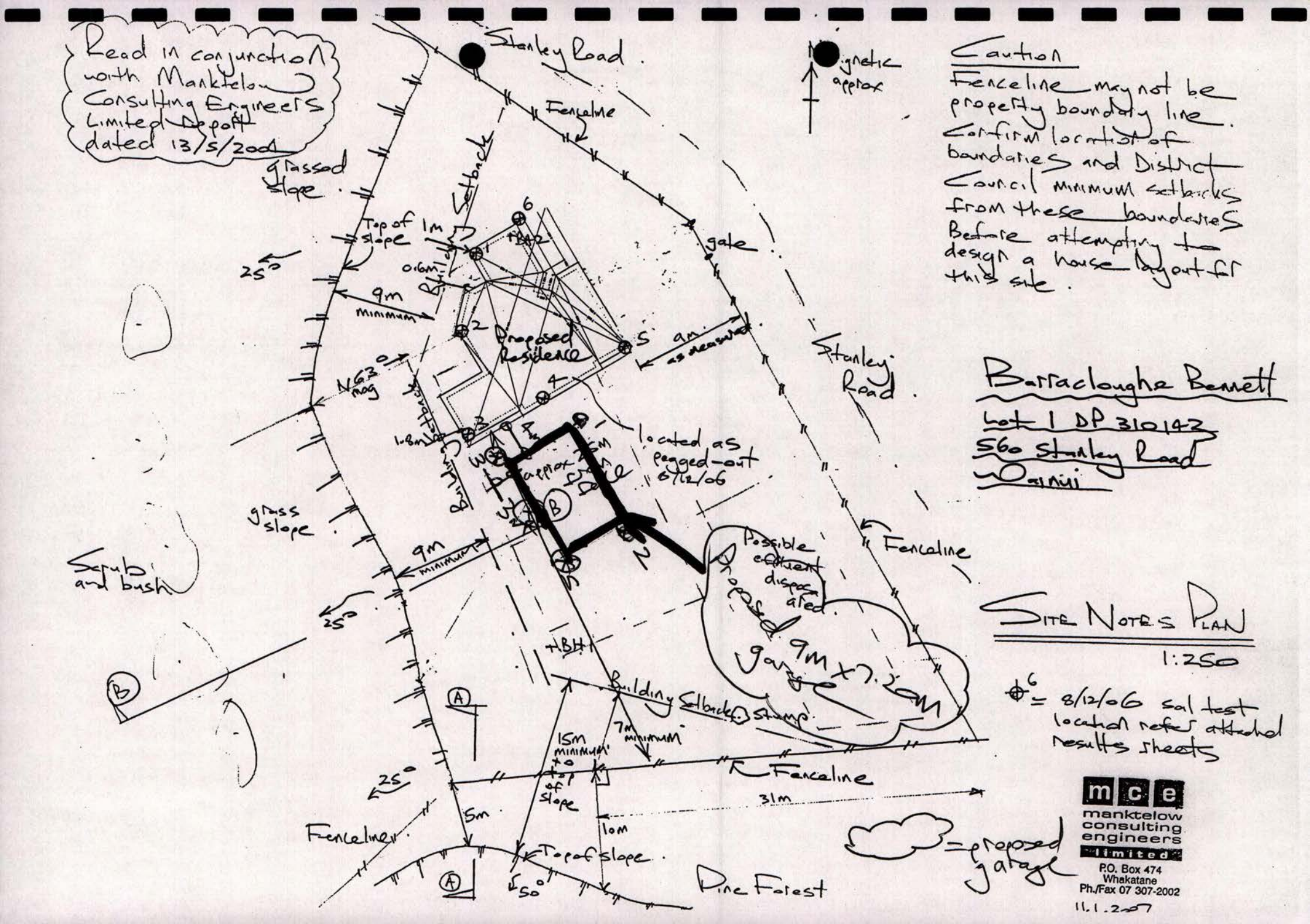
2.8 Surface finishes shall be per the building consented specification or as directed by the client.

3.0 Slab Sub-Base Filling

3.1 The existing soil shall be removed to achieve at least a 150mm and maximum of 600mm depth of compacted hardfill below slab. The area to be filled shall be benched so that fill is placed on a level surface. This shall be undertaken during the time of the year when the watertable is well below the excavated depth.

3.2 Backfill shall be placed in layers not exceeding 150mm loose depth and shall be compacted in place prior to the placement of successive layers with a heavy ride-on vibrating roller to achieve either 96% relative standard compaction to NZS 4402 test 6.5.2, or no more than 25 mm/blow with a scala penetrometer and undrained shear vane strength of at least 240kPa. Depending on fill type, it is likely that at least 6 slow passes of the roller per layer will be required to achieve this compaction. Care will be required close to the slab edge, such that damage or overstressing of the wall does not occur.

3.3 Backfill material shall be a well-graded pumice material or an approved equivalent (up to 100mm maximum particle size). The finished surface shall be blinded and levelled with fine sands that will not damage the d.p.c.


Read in conjunction with Manktelow Consulting Engineers Limited Report dated 13/5/2004
Stanley Road
Fenceline
Magnetic approx
Caution
Fenceline may not be property boundary line. Confirm location of boundaries and District Council minimum setbacks from these boundaries Before attempting to design a house layout for this site.
grassed slope
Top of slope
1m
Setback
25°
9m minimum
0.6m Building
gate
Proposed Residence
9m as measured
Stanley Road
N63° mag
1.8m
Building
Barraclough Bennett
Lot 1 DP 310142
560 Stanley Road
Opotiki
located as pegged-out 6/12/06
approx
grass slope
9m minimum
Scrub and bush
Possible effluent disposal area
Fenceline
Proposed 9m x 7.2m Garage
+BH1
Building Setback
Stump
15m minimum
7m minimum
Fenceline
25°
Top of slope
5m
1om
31m
Fenceline
Top of slope
50°
Pine Forest
Site Notes Plan
1:250
= 8/12/06 soil test located refer attached results sheets
= proposed garage
mce manktelow consulting engineers limited
P.O. Box 474
Whakatane
Ph./Fax 07 307-2002
11.1.2007

IDEAL Garages / Beulah Logistics
38 Melville Rd, RD3, Whakatane
Ph: (07) 3048111 / Donna: (07) 304 9468
Fax: (07) 304 9473

IDEAL Garages Eastern Bay of Plenty

IDEAL Garages Eastern Bay of Plenty

Prompt Service – Putting Quality First

Garages, buildings & floors – Concrete driveways – Bobcat – Digger & Truck Hire – Site Works

27 September 2007

Dave Barraclough
996A SH/Way 30
R D
WHAKATANE

Hi Dave

Price for a 9 x 7.2 Ideal Classic garage with a 3 mtr' stud and coloursteel cladding with a lined room 7.2 x 3.....Total $25,720.00 incl (garage has to be ordered in Oct). After 5 November price will be $26,970.00 incl. Add on an extra $354.00 each for a 3 mtr' high door.

- **Includes two roller doors 2.2 x 2.4, one access door and 12 fixed windows, one aluminium ranchslider 1793 x 2106, one aluminium opening window 1193 x 853.**
- **100% NZ Coloursteel, kilne dried MSG timber (machine stressed guaged) to conform to NZIS standards.**
- **Studs at 600 centres with two rows of nogs and trusses at 1800 centres garage and 1200 centres room. Studs, nogs, top and bottom plate for internal wall.**
- **Building of garage with building paper under roof and room and to line room, includes batts in room area, perimeter walls and ceiling, including 7.2 mtr' partition wall, gib board lining – gib stopped to paint finish, skirting and scotia.**
- **Concrete floor for a flat site only, there may be more if site is uneven or if site requires a non-standard foundation.**

Permits, drainage and electrical are all extra.

Thanks and I look forward to hearing back from you.

Kind regards
Donna Walker
Manager & Sales

Dealers Nationwide - Over 35 years experience - 5 and 10 year Guarantees

IDEAL®
Putting Quality First

Project Barraclough & Barrett Garage 560 Stanley Road Dainui	file 574.20. date 30.10.07 page 1.

1.0 Site investigation

Five Scala penetrometer and borelog test sites have been completed at the site of the proposed garage.

MCE have previously completed a geotechnical report for this building site and specific soil investigation and design for the house foundation.

A copy of this report is attached.

It is noted that the proposed garage is well within the permitted building area (slope stability based) as is likely beyond slope instability issues provided the restrictions and stormwater control systems are installed per report

Testing reveals soils softer than permitted by NZS 3604:1999.

Review for reduced theoretical bearing pressures

Project	file 574.20. date page 2.

2.0 Bearing Pressure Review

- assumed loads.

Roof · colorsteel @15°, LTF trusses, No access — G = 400 Pa, Q_B = 250 Pa

Ext wall LTF, colorsteel cladding — G = 300 Pa

2.1 External strip footing

Consider unit length of footing

(Gravity) 0 = 3.60 x (0.40 + 0.25) roof
+ 3.0 x (0.30) ext wall
+ 3.60 footing DL
= 5.94 (G) + 0.90 (Q) = 6.84 kPa

e_{max} = 100 mm (base)

⇒ q_a = 36 kPa

200 wide footing x 450 deep concrete footing

Sand modification ÷ 2.0 ← saturated

$q_{an} = q_a \left(1 + \frac{H}{B}\right) \times \frac{2}{3}$ $\frac{H}{B} \geq 1$

$= \frac{4}{3} q_a = 48$ kPa.

knife edge effect ignored due to slab confinement

S.H modification

Project

file 574.20
date
page 3

$q_u = 2a\left(1 + \frac{H}{4B}\right) \neq 1.5q$ $= 1.5q_a$ H=450 B=200

Sand modifactors critical

$q_u = 48\,kPa$

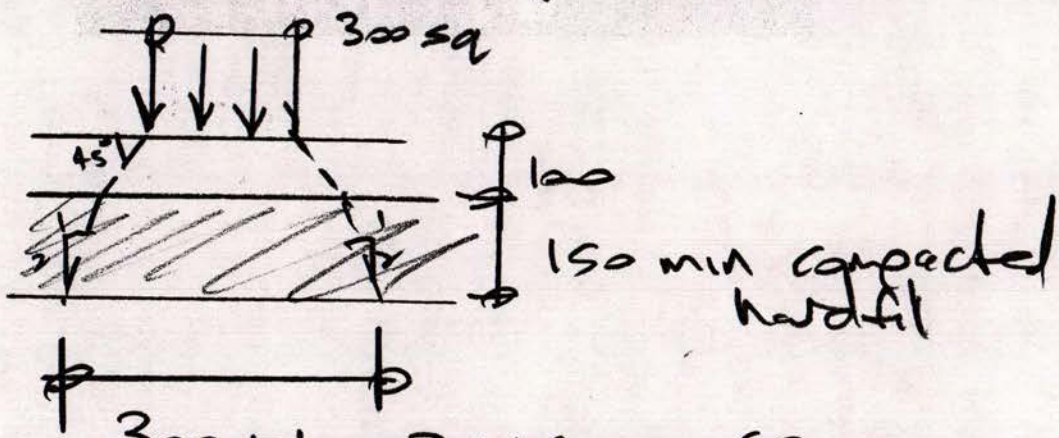
$q_a = \frac{0.84}{0.20} = 34\,kPa$ ∴ OK

Provide a minimum of 200 wide

× 450 deep cordate footing

2.20 Slab + fill

check 9.0 kN point load



300 + 100×2 + 150 = 650 sq

(6 m²) $P = 9.0 + 0.65^2 \times 0.10 \times 24$ slab
$+ 0.15 \times 0.65^2 \times 18$ fill
$= 11.15$ kN

Project	file 514.20 date page 4

$p_a = 11.1\,S / 0.6S^2 = 26\,kPa$

$< 36\,kPa$

Provide a minimum of HRC 665 mesh central in 100mm slab on 0.25mm polythene on 150 mm compacted hardfill

Shrinkage control joints (saw cut) per NZS 3604:1999.

SOIL TEST RESULTS SHEET

Client: Dave Barraclough & Anne Bennett

Project Location: Proposed garage
560 Stanley Road, Lot 1 DP 310143, Wainui

Test Site 1 of 5

Ref: 574.2

Date: 2/10/2007

Comments	Soil Sensitivity	Shear vane Cu (kPa)	Scala (mm/blow)	Depth (m)	Soil, Engineering Description
			52		silty SAND (fg), yellow-brown
			46	0.5	SILT, grey-brown, slight clay,moist
			33		
			25	1.0	
			20	1.5	
			30		clayey SAND, fine to medium grained, slight plastic, moist
			50		at 1.7m- wet
			28	2.0	
			25	2.5	end of drilling at 2.4
			35		
			eot	3.0	
				3.5	
				4.0	
				4.5	
				5.0	
				5.5	
				6.0	

mce manktelow consulting engineers limited

Structural and Geotechnical Engineers
(07) 307 2002

Auger dia: 50mm
Depth measured from existing ground level
Logged: CM

SOIL TEST RESULTS SHEET

Client:	Dave Barraclough & Anne Bennett	**Test Site**	**2** of 5
		Ref:	574.2
Project Location:	Proposed garage 560 Stanley Road, Lot 1 DP 310143, Wainui	Date:	2/10/2007

Comments	Soil Sensitivity	Shear vane Cu (kPa)	Scala (mm/blow)	Depth (m)	Soil, Engineering Description
				0.0	
			60		
				0.5	
			50		
			22		
			30	1.0	
			27	1.5	
			28		
			50	2.0	
			17		
			18		
			27	2.5	
			26	3.0	
			eot		
				3.5	
				4.0	
				4.5	
				5.0	
				5.5	
				6.0	

manktelow consulting engineers limited

Structural and Geotechnical Engineers
(07) 307 2002

Auger dia: 50mm
Depth measured from existing ground level
Logged: CM

SOIL TEST RESULTS SHEET

Client:	Dave Barraclough & Anne Bennett	**Test Site**	**3** of 5
		Ref:	574.2
Project Location:	Proposed garage 560 Stanley Road, Lot 1 DP 310143, Wainui	Date:	2/10/2007

Comments	Soil Sensitivity	Shear vane Cu (kPa)	Scala (mm/blow)	Depth (m)	Soil, Engineering Description
					silty SAND (fg), yellow-brown
			60		
			58	0.5	SILT, grey-brown, slight clay,moist
			30	1.0	
			71	1.5	clayey SAND, fine to medium grained, slight plastic, moist
			65		
			42	2.0	
			28	2.5	end of drilling at 2.4m depth
			35	3.0	
			eot	3.5	
				4.0	
				4.5	
				5.0	
				5.5	
				6.0	

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Structural and Geotechnical Engineers
(07) 307 2002

Auger dia: 50mm
Depth measured from existing ground level
Logged: CM

SOIL TEST RESULTS SHEET

Client: Dave Barraclough & Anne Bennett

Project Location: Proposed garage
560 Stanley Road, Lot 1 DP 310143, Wainui

Test Site 4 of 5

Ref: 574.2

Date: 2/10/2007

Comments	Soil Sensitivity	Shear vane Cu (kPa)	Scala (mm/blow)	Depth (m)	Soil, Engineering Description
				0.0	
			60	0.5	
			46		
			25	1.0	
				1.5	
			17	2.0	
			eot		
				2.5	
				3.0	
				3.5	
				4.0	
				4.5	
				5.0	
				5.5	
				6.0	

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Structural and Geotechnical Engineers
(07) 307 2002

Auger dia: 50mm
Depth measured from existing ground level
Logged: CM

SOIL TEST RESULTS SHEET

Client: Dave Barraclough & Anne Bennett

Project Location: Proposed garage
560 Stanley Road, Lot 1 DP 310143, Wainui

Test Site 5 of 5

Ref: 574.2

Date: 2/10/2007

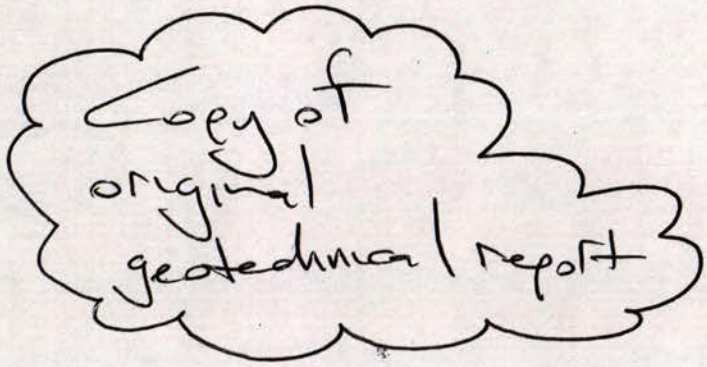
Comments	Soil Sensitivity	Shear vane Cu (kPa)	Scala (mm/blow)	Depth (m)	Soil, Engineering Description
					silty SAND (fg), yellow-brown
	3.1	130	100	0.5	SILT, grey-brown, slight clay,moist
	2.6	136	50		
			33	1.0	
			29	1.5	
			30		clayey SAND, fine to medium grained, slight plastic, moist
			20	2.0	
			21	2.5	
			31		end of drilling at 2.5m depth
			eot	3.0	
				3.5	
				4.0	
				4.5	
				5.0	
				5.5	
				6.0	

mce manktelow consulting engineers limited

Structural and Geotechnical Engineers
(07) 307 2002

Auger dia: 50mm
Depth measured from existing ground level
Logged: CM

Manktelow Consulting Engineers Ltd
28 Martin Place
Whakatane
Phone/Fax 07 3072002
Mobile 025 6125548
Email mankshouse@xtra.co.nz



BUILDING SITE FEASIBILITY REPORT
FOR
LOT 1 OF PROPOSED SUBDIVISION OF LOT 2 DP 310143
560 STANLEY ROAD
WHAKATANE

CLIENT: J. AND N. COWPER

Ref. 103.1
14/5/2004

Contents page

1.0 Background....3
2.0 Site notes....3
3.0 Site geology....3
4.0 Theoretical building setbacks....4
5.0 House foundations....4
6.0 Stormwater controls and erosion protection....4
7.0 Effluent disposal....4
8.0 Conclusions....5
Photographs....6
Survey Plan....8
Site notes plan....9
Critical slope profiles....10
Soil test data sheets....11

Limitations

This report has been prepared at the specific instructions of J. and N. Cowper and supports a subdivision consent application, and should not be relied upon for any other purpose, or by any other party, and is based on data from preliminary scala penetrometer and borelog testing. The nature and continuity of subsoil conditions away from the test sites is inferred and it must be appreciated that actual conditions could vary considerably from the assumed model.

This review has been limited to the area identified on the attached site notes plan and is based on information collected from a site visit and engineering judgment. This report should not be construed as a guarantee for continued slope stability.

This report does not preclude the need for normal foundation inspections at the time of construction of any building on the site.

Restrictions to building arising from the proximity of property boundaries, archaeological issues, and the like, have not been investigated

1.0 Background

This property is located on an elevated portion of ground adjacent to Stanley Road. The attached survey plan by Ross J. Overington dated March 2004, outlines the subdivision proposal. To support a subdivision resource consent application this geotechnical engineering feasibility report has been commissioned. Theoretical minimum building setbacks from slopes, possible house foundation requirements, effluent disposal system siting and stormwater controls are issues reviewed in this report. Restrictions to building arising from the proximity of property boundaries, archaeological issues, and the like, have not been investigated.

2.0 Site Notes

We visited the site on 29th April 2004. Fieldwork undertaken comprised; a walkover inspection, measurement of platform dimensions, plots of critical slopes using a measuring tape and clinometer. Two augured borelog and scala penetrometer test sites were also carried out at the locations identified on the attached site notes plan. A copy of the test data and slope cross-sections are included also.

Access was gained to the building site directly from Stanley Road. The ground surface over the potential house site is relatively level, however there is some undulation with a few tree stumps evident.

To the west beyond this the ground slopes down to the valley floor some 40 metres below. Slopes of between 25 to 43 degrees to the horizontal were recorded. Groundwater was seen exiting in a few locations. Relic slip and erosion features were also seen down this slope. These shallow features were particularly evident in areas of ground water seepage or natural surface water run-off. Visual evidence suggests that there have been no deep-seated failures; ground movements appear to be isolated to groundwater induced shallow slides and regressive erosion of the weaker upper soils. I understand that stock have extensively grazed this property for a number of years, and despite the large number of mature trees and scrub the ground surface does not have a good covering of grass or ground cover. It is evident that the strongly interbedded volcanic soils contain perched "ribbon" aquifers.

Beyond the southern boundary fence the ground slopes away steeply down to a drainage valley which traverses around to the base of the western slope. Slopes of up to 50 degrees to the horizontal were recorded down to the valley floor approximately 15 metres below. At the time of our visit a small stream flowed at the base, with the valley head adjacent to Stanley Road.

Borelogs reveal that the building site is underlain with a combination of interbedded volcanic pumice, pumice sand and weathered ash deposits down to a depth of at least 3m. Similar volcanic lapilli and tuff deposits were seen exposed on the Stanley Road cuttings; some of which stand near vertical at 4 to 5m high. Scala penetrometer testing suggests that the near surface soil is loose, with allowable bearing pressures as low as 45 kPa (135 kPa ultimate) being recorded. Soil densities improve with depth.

A recent slip has occurred to the south of this property on the edge of Stanley Road. A portion of the road has slumped into the previously mentioned valley. I understand this failure occurred during a period of intense rainfall. It was raining during our visit and surface water flows from the sealed Stanley Road, given the road profile, were directed to the slip zone. At least a 150m length of roadway would have contributed to the catchment area for this surfacewater flow.

3.0 Site Geology

Soil maps describe the geology of this area as Whakatane Hill soils comprising Tarawera and Kaharoa Ash and Taupo Pumice, on Whakatane Ash to 41cm, on volcanic ash, lapilli, and weathered ash (clay) to 15m, on sandstone and on greywacke.

4.0 Theoretical Building Setbacks

Observations indicate that the slopes below the site are at a lower degree of stability than is acceptable to permit buildings to be erected on or at the crest of the slopes. Further movement of the upper soil layers should be expected. I understand that the bush clad slopes will be retired from stock grazing. Re-growth of vegetation groundcover should be encouraged to reduce erosion potential.

As a general rule of thumb for weathered and pumice ash deposits a building set-back margin based on a 2:1 (horizontal to vertical) 26° plane applied to the slope profile has been established as a practical and prudent tool for preliminary assessment of hillside slopes. Applying this approach to the existing contours suggests that a building line set at 9m from the top edge is appropriate for the western slopes.

A similar process was undertaken for the southern slope profile beyond the boundary fence with a 15m setback resulting.

The attached Site Notes Plan showing the potential building area with the above mentioned setback distances and the slope profiles refer.

5.0 House Foundations

Preliminary scala penetrometer probing indicates that the pumice ash deposits within the defined building area have allowable bearing pressures less than 100 kPa (300 kPa ultimate) as required for buildings designed within the scope of NZS 3604:1999. Specific soil testing and design of foundations for any building on this site will be required.

6.0 Stormwater Controls and Erosion Protection

Evidence suggests that the loose upper layers of the pumice ash deposits that underlie the site are prone to erosion if left exposed. The overall stability of the site will be subject to prudent practices in terms of vegetation and surface water control.

It is important that building developments do not result in discharge of stormwater onto the adjacent slopes (this includes during construction) and that the appropriate slope vegetation is planted and maintained. Stormwater from the house roof, driveway, paths and any other hard surfaces needs to be collected and conveyed in sealed pipes away from the slopes. The final location of any dwelling, auxiliary buildings, effluent disposal system and driveways will influence the placing of any disposal system on this site. An appropriate stormwater disposal system might include a series of soakholes along the Stanley Road boundary with an overflow into the roadside watertable. If it is proposed to collect the water from the house roof the overflow pipe from the collection tank should be connected into this disposal system.

7.0 Effluent Disposal

The Environment Bay of Plenty Regional Plan for On-site Disposal of Effluent specifies for soil type encountered at the test sites (soil category 3 with good drainage) the disposal area required for a conventional septic tank with standard seepage trenches is 590 square metres, this includes a reserve area.

As with the stormwater disposal system the layout of this system will require particular attention to ensure that the trenches are of adequate length and spacing, minimal longitudinal fall, and are not too close to slope surfaces. A designated area should be assigned to the seepage trenches where vehicle and stock movements over the disposal area can be avoided.

The exact nature of any house and driveway proposal at this stage is unknown. Given the large area that would be needed for soakage the extent of the building proposal will have a bearing on whether a conventional septic tank and seepage trench system could be accommodated on this site. Site information

would suggest that a suitable area exists in the south-eastern corner of the site.

Alternatively, a proprietary package plant treatment system (some of the suppliers include: Hynds Environmental, Septech NZ, Biocycle, Enviroflow....) with low dose drip lines could be considered. This type of system allows more freedom in location of the seepage area, which could be split into different zones and be on slopes away from the residence with suitable planting. The manufacturer and supplier should visit the site and will need to provide a report that details the appropriate system for this site. This information will need to be included in the documentation for a Building Consent application to the District Council.

8.0 Conclusions

8.1 As with any elevated hillside property there is a risk of slope instability. Our investigations suggest that it is prudent to observe minimum setback distances from the top edges of the slopes at this site. Observations suggest there is a low risk that instability will extend back into the building area at these setback distances. Specialist geotechnical review and investigation will be required before consideration can be given to locate any buildings closer to the tops of the slopes than specified on the attached site notes plan.

8.2 The overall stability of the site is subject to prudent practices in terms of vegetation and surface water control. It is important that building developments do not result in discharge of stormwater to the adjacent slopes, and that the appropriate bank vegetation is planted and maintained. A suitable plan detailing the stormwater control systems from roofs, driveways and paths, should form part of the documentation in a Building Consent application to the District Council for any residential development on this site. Ground soakage systems shall not be placed in between any building and the steep slopes below the building site.

8.3 Preliminary soils investigations suggest that specific engineering design of any building foundation system on this lot is required.

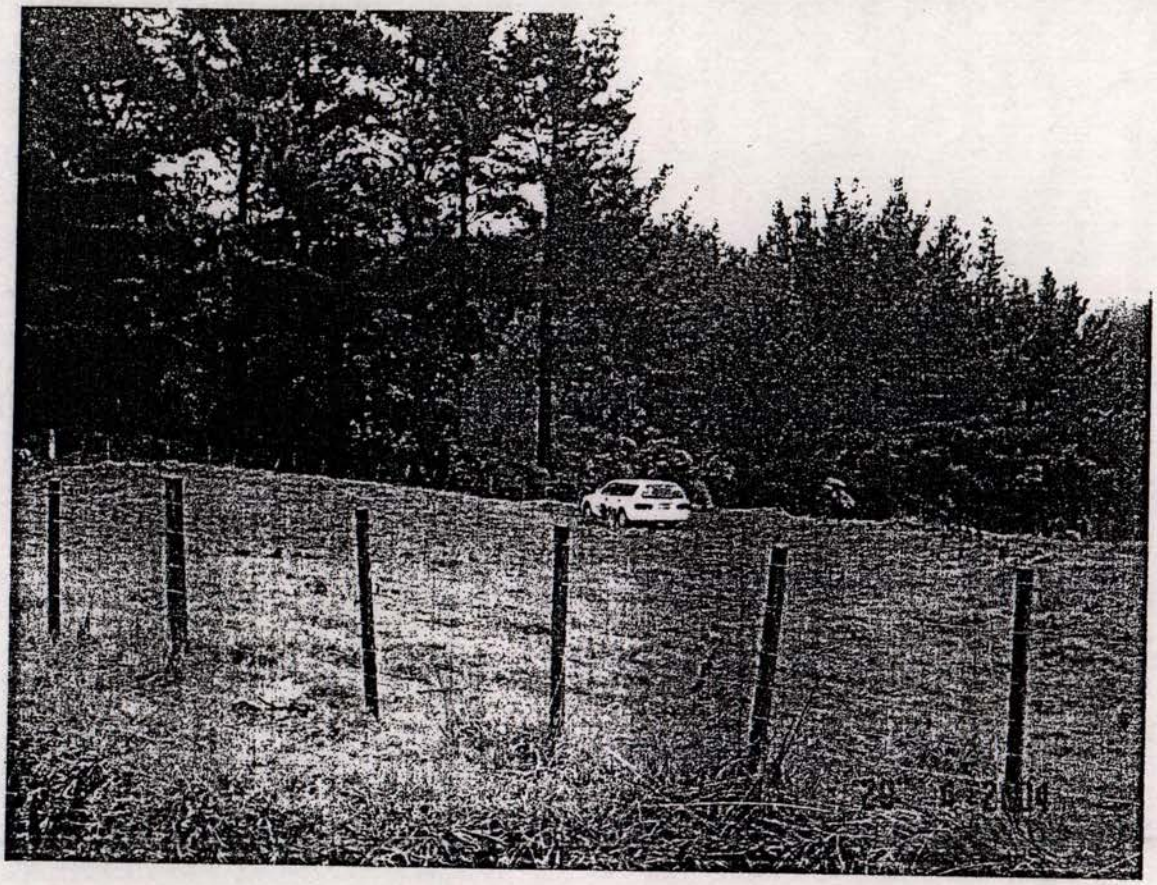
8.4 Effluent disposal from a proposed dwelling should be undertaken in accordance with the Environment Bay of Plenty Regional Plan for On-Site Disposal of Effluent, District Council requirements and comply with AS/NZS1547:2000. A conventional septic tank and seepage trench system shall not be placed between any buildings and the steep slopes around this building site. A proprietary package plant treatment system with low dose drip lines is an alternative if a conventional septic tank system cannot be accommodated given the extent of the building proposal. The manufacturer and supplier should visit the site and provide a report that details the appropriate system for this site. This information should form part of the documentation in a Building Consent application to the Distinct Council.

8.5 No filling should take place on the sloping ground around the building site. No filling in excess of 0.6 m deep should be undertaken within the building area unless endorsed by a Professional Engineer experienced in geomechanics who is familiar with our report.

8.6 Regardless, construction of a house and effluent disposal system on the proposed lot 2 is believed feasible given the site constraints subject to final boundary location.

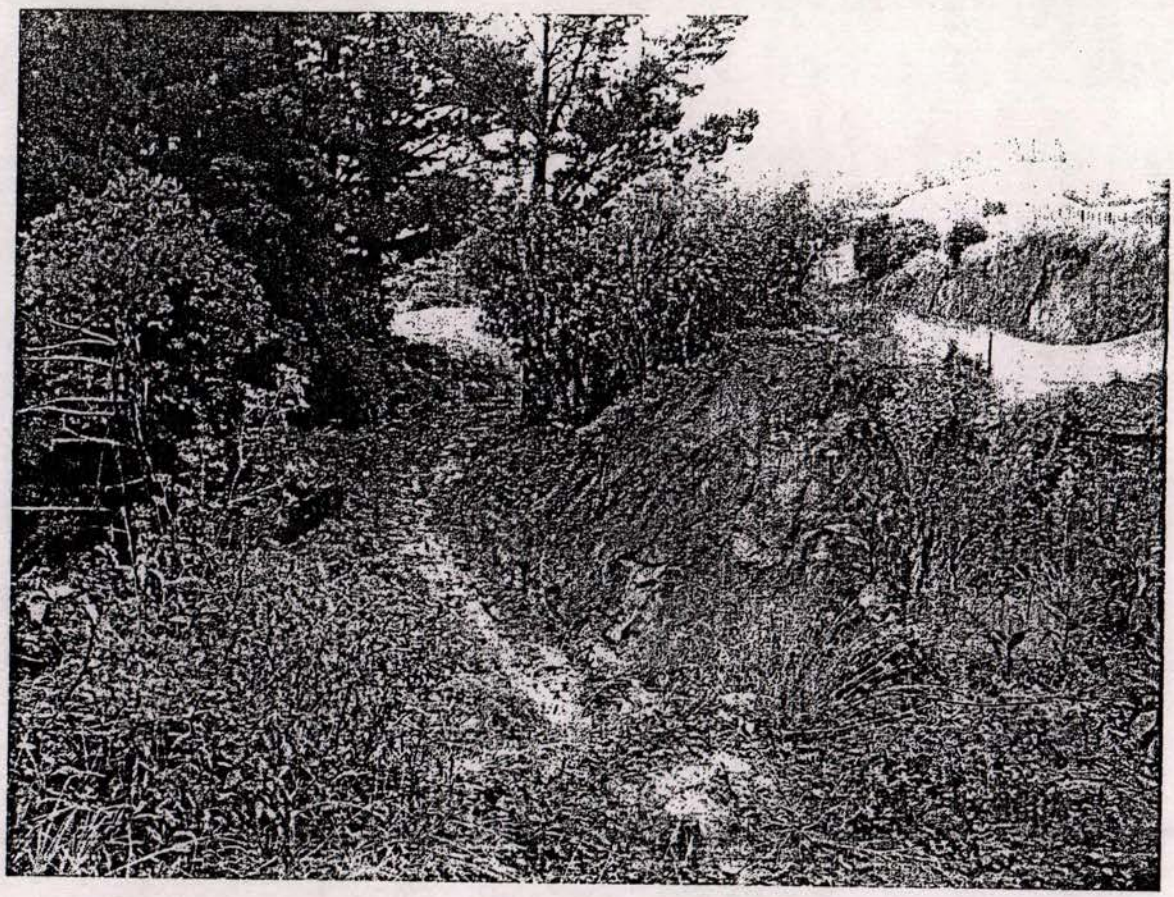
MANKTELOW CONSULTING ENGINEERS LIMITED

Craig Manktelow BE (Hons) MIPENZ

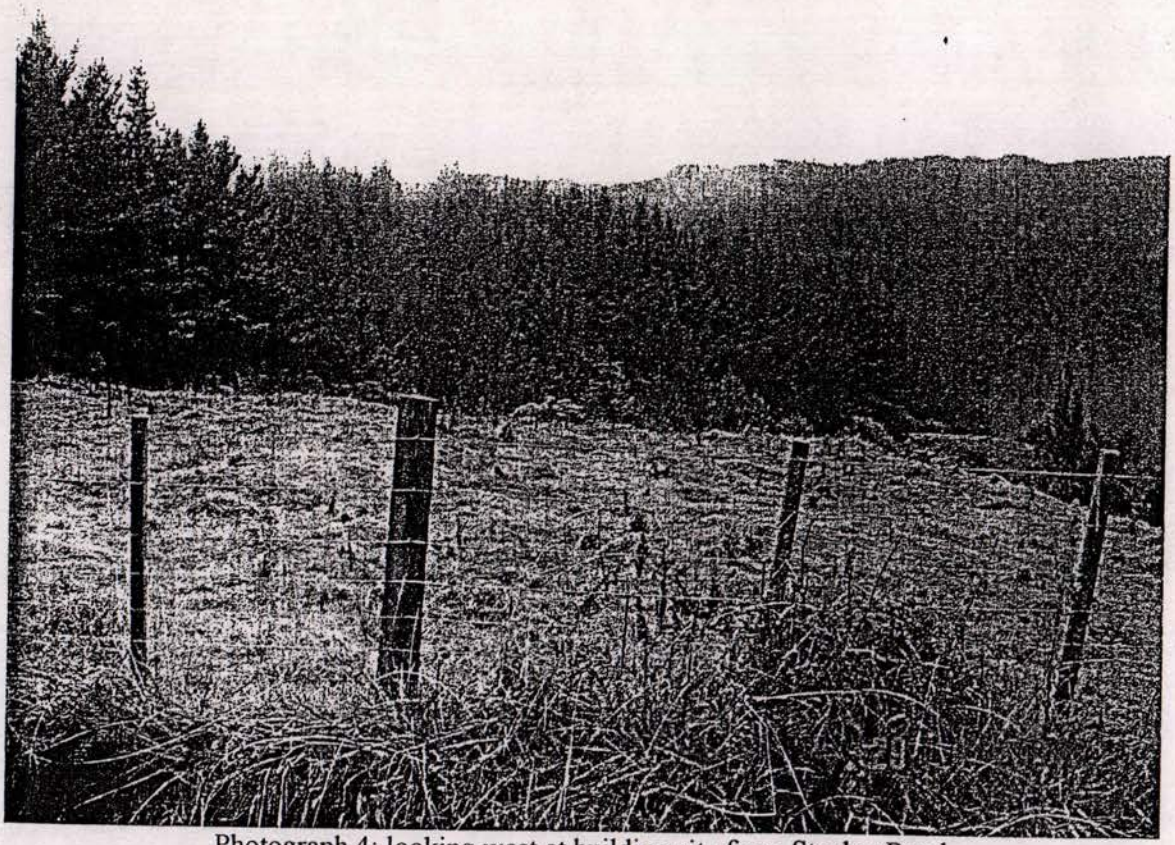


Photograph 1: view looking from Stanley Road south-west to site

Photograph 2: view looking south at western slopes below building site



Photograph 3: view looking north building site through trees, Stanley Road slip at right



Photograph 4: looking west at building site from Stanley Road

Manktelow Consulting Engineers Limited

Project Site Notes
Cooper: 560 Starkey Rd
BH1

file 103.1
date 29/4/04
page 1 of 2

Soil Description	Depth m	Scala mm/blow	water table	Remarks.
Topsoil	0			50ϕ auger hand
	-0.2			
Yellow Pumice Sand/Silt loose in upper ash layers density increasing with depth	-0.4	80		Scala penetrometer readings = mm/blow.
	-	40		
	-			
	1.0	25		
	-1.2			
Silty Pumice				
Weathered Pumice Sand	-	35		
	-			
Moist	2.0	25		Despite soils moist @ around 1.80m. No watertable encountered down to 3.0m depth.
	-2.2			
Clay content evident	-2.4			
	-2.6	33		
	-2.8			
	3.0			
E.o.B	-	29		Scala results Soft below topsoil.
	-			
	-	24.		
	-			
	4.0			
		EOT.		

logged by CM.

5.0

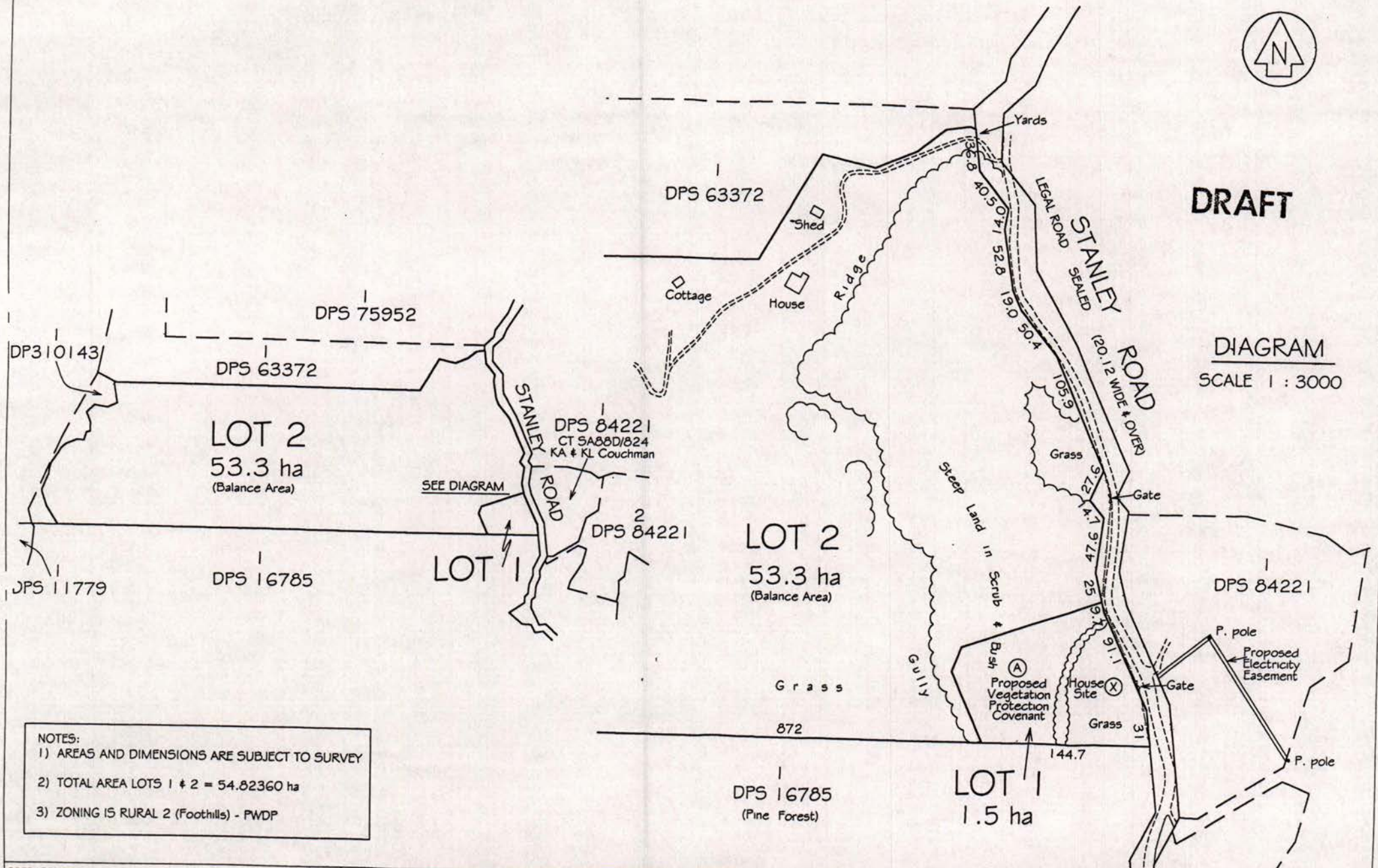
Civil and Structural Consulting Engineers
Phone/fax 07 307 2002

Manktelow Consulting Engineers Limited

Project Soil test results
Cowper: 560 Stanley Road

file 103.1
date 29/4/04
page 2 of 2

Soil Description	Depth m	Scala mm/blow	Remarks
Topsoil			BH2
Yellow Pumice Silt ash. loose		75	
		38	
	1.0	29	
Silty Pumice		40	
weathered ash. Clayey Silt sand flecks		32	
	2.0	29	
		25	
		EOT	
	3.0		
EOT			
	4.0		



NOTES:
1) AREAS AND DIMENSIONS ARE SUBJECT TO SURVEY
2) TOTAL AREA LOTS 1 & 2 = 54.82360 ha
3) ZONING IS RURAL 2 (Foothills) - PWDP

PREPARED FOR:
J. & N. Cowper
560 Stanley Road
Wainui

PROPOSED SUBDIVISION OF LOT 2 DP 310143

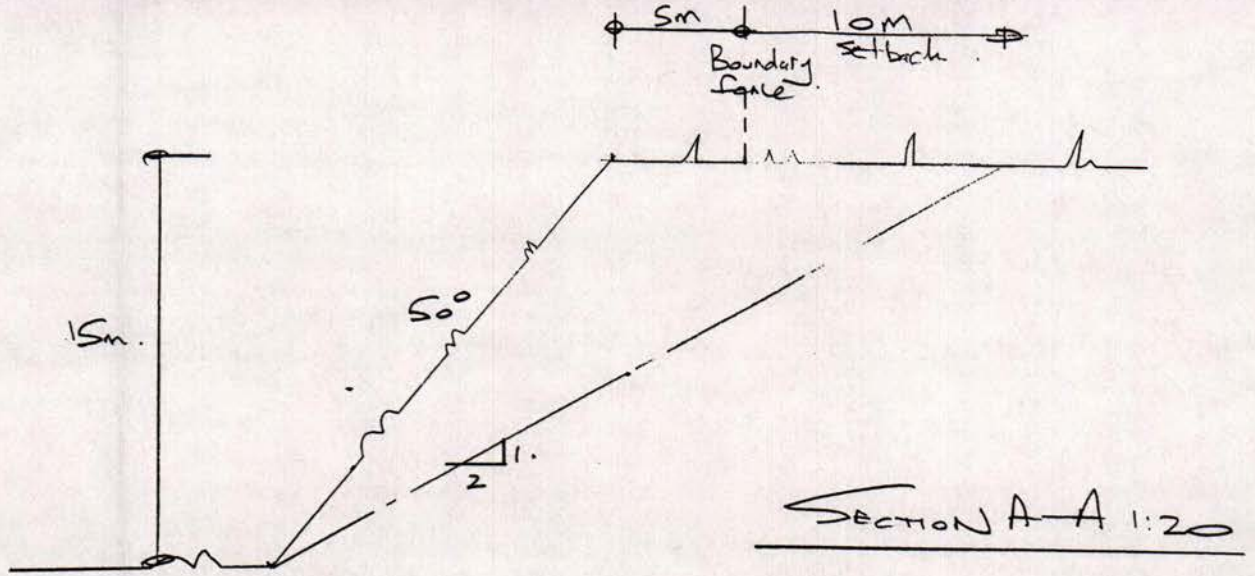
COMPRISED IN CT 39972

WHAKATANE DISTRICT

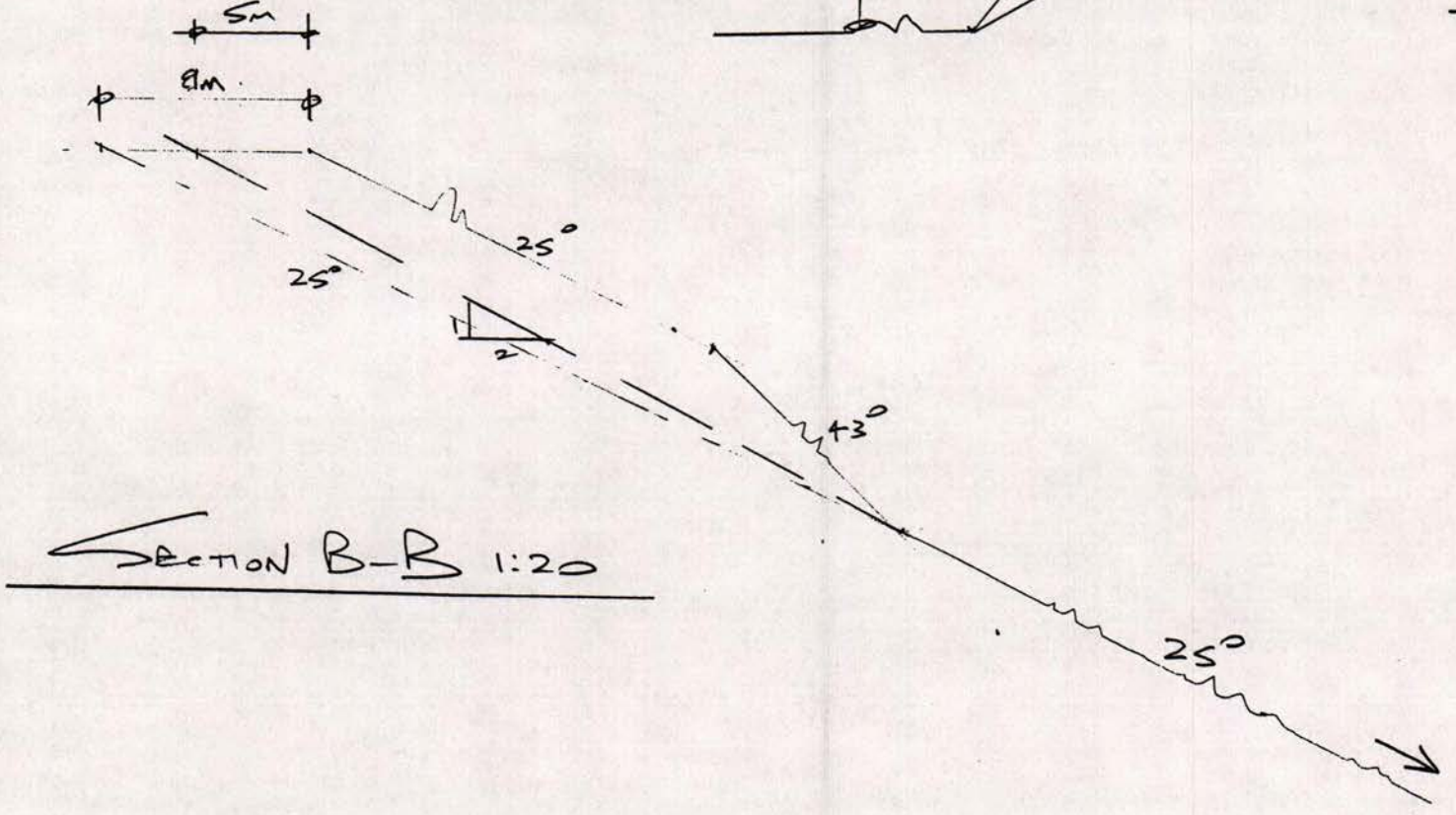
ROSS J. OVERINGTON
REGISTERED SURVEYORS
P O BOX 596 • WHAKATANE • Phone 3086384

DRAWING No. S2058/1

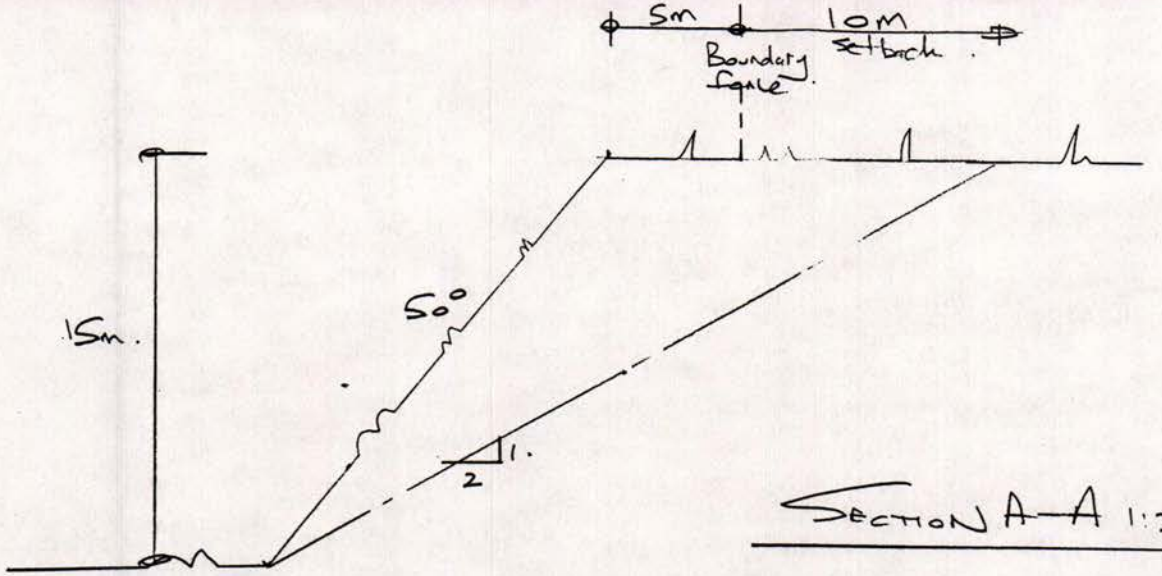
DRAWN RJO | DATE MARCH 2004 | SCALES 1:1,000 | TRACED SAW | CAD No



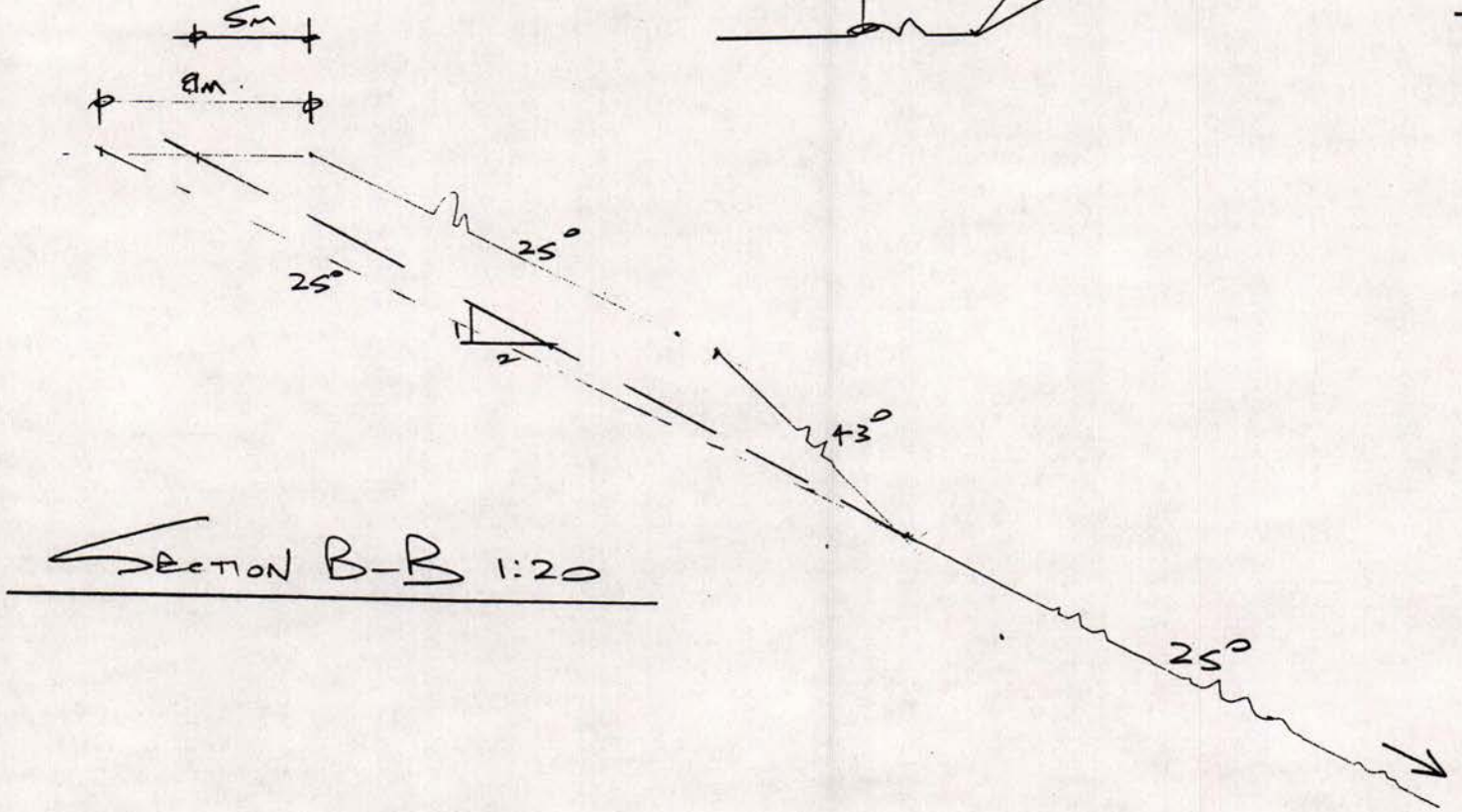
SECTION A-A 1:20



SECTION B-B 1:20



SECTION A-A 1:20



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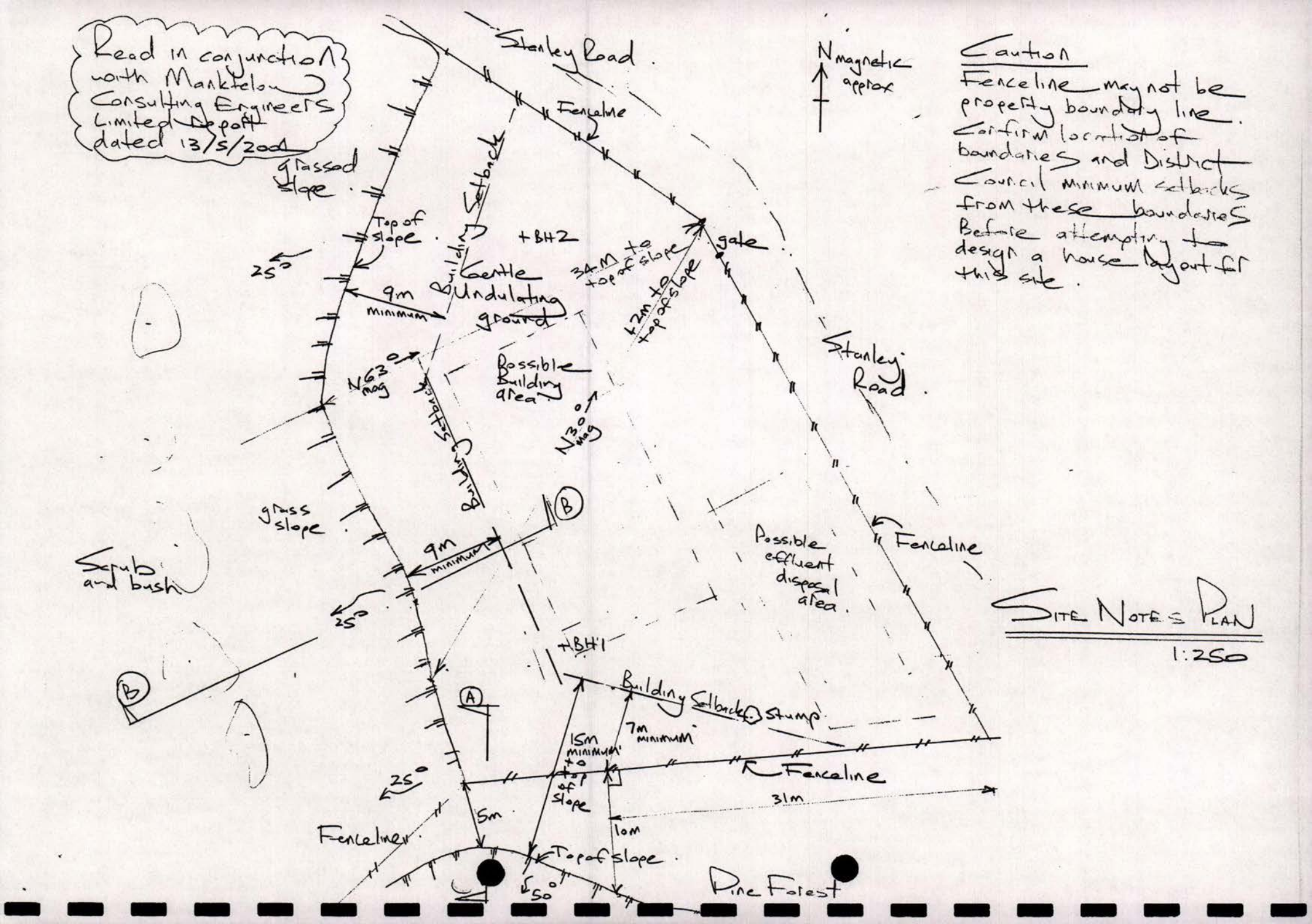

Read in conjunction with Marktelo Consulting Engineers Limited Report dated 13/5/2004
Stanley Road
N magnetic approx
Caution
Fenceline may not be property boundary line. Confirm location of boundaries and District Council minimum setbacks from these boundaries Before attempting to design a house layout for this site.
Fenceline
grassed slope
Top of slope
+BH2
Building Setback
25°
9m minimum
Gentle Undulating ground
34.4m to top of slope
gate
42m to top of slope
Stanley Road
N63° mag
Possible Building area
N30° mag
Building Setback
grass slope
B
9m minimum
Scrub and bush
Possible effluent disposal area
Fenceline
25°
+BH1
Building Setback
Stump
A
15m minimum to top of slope
7m minimum
Fenceline
25°
31m
5m
10m
Fenceline
Top of slope
50°
Pine Forest
SITE NOTES PLAN
1:250

BC# 16479

Geoffrey Winship

From: Fowell Builders [fowellbuilders@xtra.co.nz]
Sent: Tuesday, 17 July 2007 11:19 a.m.
To: Geoffrey Winship
Subject: Barraclough Bennett Engineering
Attachments: Barraclough Eng.pdf

Good Morning Geoff,

Please find attached the Engineering report for the Barraclough Bennett job.

Regards

David Laurent
For Eastern Bay Truss & Prenail

Att: Geoff Windship.

pryda

FACSIMILE

TO:	Eastern Bay Truss and Prenail	**FAX NO:**	
ATTN:	David		
FROM:	Lin		
DATE:	July 17, 2007	**NO. of PAGES (inclusive):**	2
SUBJECT:	**14053**		

Re: beam for Barraclough and Bennett Res.

L/W roof
High Wind

Beam maximum span 3.2: 2/240x45 MSG8 or MSG6 is sufficient.

Please come back should you have any questions or want changes made.

Regards,

Yang Lin (Design Engineer)

Pryda Timber Connectors/ Reids Engineering Systems

::Pryda New Zealand (a division of ITW New Zealand Limited)

Auckland:	64A Diana Drive, Glenfield	Tel: (09) 920 4360	Fax: (09) 920 4364	Free Phone:	0800 88 22 44
Napier:	75 Niven St, Onekawa	Tel: (06) 843 3069	Fax: (06) 843 3065	Free Fax:	0800 88 22 55
Wellington:	Unit 2, 1 Gough St, Lower Hutt	Tel: (04) 568 4505	Fax: (04) 568 0098	Email:	office@pryda.co.nz
Christchurch	125 Wrights Rd, Middleton	Tel: (03) 338 3844	Fax: (03) 338 8846	Website:	www.pryda.co.nz

Pryda Timber Connectors

Beam maximum span 3200mm

$L := 3.2$ $C := 2.345 + 1.2$ $G := 0.35$ $Q := 0.25$

Dead + Live load case

UDL from roof

$w_u := 1.2 \cdot G \cdot \frac{C}{2} + 1.6 \cdot Q \cdot \frac{C}{2}$ $w_u = 1.453$ $w_s := G \cdot \frac{C}{2}$ $w_s = 0.62$

$M_{star1} := \frac{w_u \cdot L^2}{8}$ $M_{star1} = 1.86$

Dead + Wind load case: $k_2 := 1.0$

$V_d := 44$ m/s

Design wind pressure $q_z := 0.6 \cdot V_d^2 \cdot 10^{-3}$ $q_z = 1.162$ kN/m2

$C_{pn} := -1.2$

$w_w := C_{pn} \cdot q_z$ $w_w = -1.394$ $w_{ws} := 0.65 \cdot w_w$

UDL from roof

$w_{wind} := 0.9 \cdot G \cdot \frac{C}{2} + w_w \cdot \frac{C}{2}$ $w_{wind} = -1.912$ $w'_s := \left(G + 0.7 \cdot Q + w_{ws}\right) \cdot \frac{C}{2}$ $w'_s = -0.675$

$M_{star2} := \frac{w_{wind} \cdot L^2}{8}$ $M_{star2} = -2.448$

2/240x45 MSG6

$b := 90$ $d := 240$ $I := \frac{b \cdot d^3}{12}$ $\phi := 0.8$

$E := 5$ $f_h := 10$ $k_1 := 0.8$ $k_2 := 2.0$

$$s_1 := \text{if}\left[\frac{d}{b} < 1, 10, 1.35 \cdot \left[\frac{0.9}{b \cdot .001} \cdot \left[\left(\frac{d}{b}\right)^2 - 1\right]^{0.5}\right]^{0.5}\right]$$ Compression edge

$S_1 := \text{if}(s_1 < 10, 10, s_1)$ $S_1 = 10$

$a_1 := 0.21$ $a_2 := 0.175$ $a_3 := -0.0116$ $a_4 := \frac{1}{5000}$ $a_5 := 235.5$ $a_6 := -1.937$

$k'_8 := a_1 + a_2 \cdot S_1 + a_3 \cdot S_1^2 + a_4 \cdot S_1^3$

$k''_8 := a_5 \cdot S_1^{a_6}$ $k_{8m} := \text{if}(S_1 > 25, k''_8, k'_8)$

$s_1 = 6.712$ *Final figure for* $k_{8\ beam}$ $k_{8m} = 1$

$\phi M_n := \phi \cdot k_1 \cdot k_{8m} \cdot f_b \cdot \frac{b \cdot d^2}{6} \cdot 10^{-6}$ $\phi M_n = 5.53$ $|M_{star2}| > |M_{star1}|$ $M_{star2} = -2.448$ $M_{star1} = 1.86$ $\frac{M_{star2}}{\phi M_n} = -44.268\,\%$

Deflection: OK

$\Delta := \frac{5 \cdot k_2 \cdot w_s \cdot (L \cdot 1000)^4}{384 \cdot E \cdot I} \cdot 10^{-3}$ $\Delta = 3.268$ $\frac{L \cdot 1000}{\Delta} = 979.246$ OK

Allen Shaun Re Bennett/Barraclough.

BC# 16479

Eastern Bay Truss & Prenail
35 Karenza Lane
859 State Highway 30
AWAKERI

Tel: (07) 307 0872 Fax: (07) 307 0874 email: ebtp@xtra.co.nz

frame

NOT APPROVED

Pryda Frame 2.2 Output

Version: 2.2.47, Output Date: July 9, 2007
Copyright: (c) Pryda Australia- 1996-2004 Web site: www.pryda.com.au
New Zealand Contacts: Auckland: Tel: (09) 4444 122 Fax: (09) 4440 199 E-mail: office@reids.co.nz
Christchurch: Tel: (03) 9644 515 Fax: (03) 9644 517

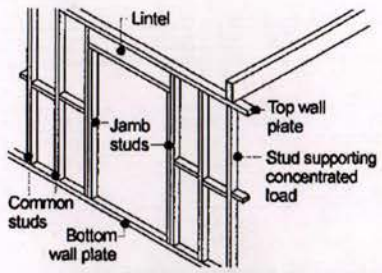
Job Details
Barraclough/Bennett

WALL LINTELS - Machine graded beams

Design Data

Design Options	Design Values
Loading on lintel	Standard trusses
Truss or rafter spacing (mm)	900
Roof mass (kg/m2)	34
Snow load (Pa)	0
Wind zone	Medium
Top plate or not	With top plate
Top plate details	90,1,45,F5
Span type	Single
Size limits	No
Member & building type; Loading codes	House, Jan. 2000
Deflection limit set	AS1684

Loading on member data	
Roof pitch (degs)	22.5
Overhang (mm)	600



WALL FRAMING MEMBERS

Span Table

	Beam Type	MC	Plate(s)	No. Of Vert. Lams.	Beam Size mm	Grade	Roof Load Width (mm) 4135 MAX SPAN (mm)
1	Unjoined	Dry	NA	1	70x45	MSG10	550^
2					90x45	MSG10	850^
3						MSG12	1050^
4						MSG8	650^
5					140x45	MSG10	2050^
6						MSG12	2250^
7						MSG8	1800^
8					190x45	MSG10	2650^
9						MSG12	2950^
10						MSG8	2250^
11					240x45	MSG10	3400^
12						MSG12	3550^
13						MSG8	2800^
14					290x45	MSG10	3900%
15						MSG12	4050%
16						MSG8	3500^
17				2	70x70		650^
18					90x90	MSG10	1850^
19						MSG12	1900^
20						MSG8	1050^
21					140x90	MSG10	2550^
22						MSG12	2700^

NOT APPROVED → THESE TABLES DO NOT COVER GIRDER TRUSS LOADED LINTELS & ALSO NOT CORRECT WIND ZONE – SHOULD BE HIGH WIND. GEOFF W.

23	Unjoined	Dry	NA	2	140x90	MSG8 2300^
24						MSG10 3350^
25					190x90	MSG12 3500^
26						MSG8 3150^
27						MSG10 3950^
28					240x90	MSG12 4100^
29						MSG8 3750^
30						MSG10 4500^
31					290x90	MSG12 4700^
32						MSG8 4250^

Notes:
1. 'Span' in this table is opening width, ie: face to face distance between jamb studs.
2. Jamb stud thickness Spans marked
   35 mm minimum for ^
   45 mm minimum for %
   70 mm minimum for #
   90 mm minimum for !
3. Critical case code colours for wall lintels are: Red - Deflection, Blue - Bending strength, Purple - Shear, Black - Bearing, Magenta - Other.
4. For End Reactions table, double click on any span (Output Menu- not Report).
5. Design standards, rules and criteria for timber framing change from time to time. Users of this table are advised to check at least once a year whether this table remains valid. Pryda Australia will not assume responsibility for out-of date tables.

Design Loads & Factors

	Load Case	Wind		Defln Limits		ıs. Loads for LV	
		Speed	Coeff.	Set	L/	4135	
		(m/s)		(mm)		UDL	Conc
1	1.0Dead- service			10	300	123	1240
2	1.0Live only- service			15	250	98	930
3	1.0Wind up- service	30	1.2	100	200	98	2412
4	1.25DL					153	1550
5	1.25DL + 1.5LLudl					153	2946
6	1.25DL + 1.5LLconc					153	0
7	0.8DL - WLup	37	1.2			98	2676
8	1.25DL + WLdown	37	0.8			153	3995
9	1.25DL + 1.5SL					153	1550

Notes:
1. 'DL' = Dead Load; 'LLudl' = Live Load uniformly distributed; 'LLconc' = Concentrated Live Load; 'WL' = Wind load (up or down); 'SL' = Snow Load; 'UDL' = uniformly distributed load; 'Conc' = concentrated load.
2. These loads apply to the last size in the span table.
3. For Case 7: positive values are uplift
4. Deflection limits do not include camber.
5. See AS 1684.1 for the basis of these loads and deflection limits.

The timber member designs for this job have been determined using the 'Pryda Frame' software package supplied by Pryda (NZ) Ltd. These designs and details (including all timber components, nailplates, fixings and bracing details shown on computer outputs) comply with the New Zealand Building Code (Section B1) having been designed in accordance with sound and widely accepted engineering principles to comply with the following New Zealand and Australian Standards:
NZS4203: 1992 General Structural Design and Design Loadings for Buildings
NZS3603: 1993 Timber Design
AS1649: 1974 Determination of Basic Working Loads for Metal Fasteners for Timber
ROGER THOMSON, M.I.E. Aust.
SENIOR ENGINEER, Pryda Australia

Eastern Bay Truss & Prenail
35 Karenza Lane
859 State Highway 30
AWAKERI

Tel: (07) 307 0872 Fax: (07) 307 0874 email: ebtp@xtra.co.nz

frame

Pryda Frame 2.2 Council Report

Version: 2.2.47, Date: July 9, 2007
Copyright: (c) Pryda Australia- 1996-2004 Web site: www.pryda.com.au
New Zealand Contacts: Auckland: Tel: (09) 4444 122 Fax: (09) 4440 199 E-mail: office@reids.co.nz
Christchurch: Tel: (03) 9644 515 Fax: (03) 9644 517

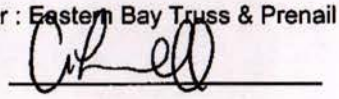
Customer Name
Barraclough/Bennett

Site Address
610 Stanley Road
R D 2
OPOTIKI

DESIGN CRITERIA
Design criteria and assumptions used in 'Pryda Frame' are in accordance with current, relevant Australian standards and reference documents, ie:
* AS1684.1-1999 Residential Timber-framed Construction- Part 1: Design
* AS4055-1992 Wind Loads for Housing- Wind Loads and criteria
* AS1720.1-1997 Timber Structures, Part 1: Design methods
* AS1170.1-1989 SAA Loading Code - Dead and Live Loads and Load Combinations

MANUFACTURER'S STATEMENT
We confirm that the beams or framing covered by this application have been manufactured in accordance with the relevant Australian and industry standards for these products. These beams or framing must be installed in accordance with the relevant Australian standards, Pryda specifications and publications.

Manufacturer : Eastern Bay Truss & Prenail

Signed : 

Date : July 9, 2007

BARRACLOUGH & BENNETT

LIST OF INFORMATION INCLUDED:

- HALLMARK HOMES DRAWINGS 1 - 10 – ISSUE A
- HALLMARK HOMES SPECIFICATION
- COPY OF TITLE
- RISK MATRIX FORM
- BRACING CALCULATIONS
- BRACING FIXING DETAILS
- WINDOW INSTALLATION DETAILS
- ALUBAND SPECIFICATION
- GLENNS GLASS WINDOW SCHEDULE
- INTERIOR DOOR TRIM SIZES
- JAMES HARDIE SPECIFICATION
- ENGINEERS DESIGN FOR BEAMS
- ENGINEERS FOUNDATION DESIGN
- TOP PLATE STRENGTHENING DETAILS
- PLACEMAKERS DETAILS
- CROSS-SECTIONAL AREA EXTERNAL GUTTER/ROOF DISCHARGE GRAPH
- CONTINUOUS SPOUTING DETAILS
- ROOF INSTALLATION DETAILS
- FLASHING FOR PIPE PENETRATIONS THROUGH ROOF
- WOODBURNING STOVE SPECIFICATION AND TECHNICAL DETAILS

SECTION 1
PRELIMINARY & GENERAL

PRELIMINARY & GENERAL
This specification is of a general type covering all the basic requirements of the building. Should there be any words that do not pertain to this contract, eg unit instead of house etc, the wording shall be read to mean this contract. All work is to comply with the Building Act 1991, the New Zealand Standard for Timber Framed Buildings NZS 3604: 1999 and any respective standard or authority for any subtrade, these will take precedence over the any section of this specification or any manufacturers recommendation.

CONTRACT
This contract includes the supply and delivery of all materials, labour, tools, fittings, plant etc, necessary for the due and proper completion of the building shown on plans and herein specified in a thorough and workmanlike manner in strict accordance with the New Zealand Building Code and the territorial authority concerned. Amendments to, or new bylaws instituted by the territorial authority or new or special requirements after the date of pricing and which involve additional cost, will be carried out and such additional cost added to the contract.

BUILDING CONSENT AND NOTICES
Contractor to comply with labour and building laws of the district, to apply for and obtain the necessary building consents and pay all fees for same. The contractor shall be responsible for the giving of all notices to the territorial authority for all works which require inspection and approval before they are covered in. Should any such notices not be given and works have to be uncovered, any expense caused by this shall be paid by the contractor for that particular works.

SITE
The site is to be prepared by the Owner, so the building can be erected in accordance with the Plans and Specifications. The site is to be level with no more than 300mm fall over the building platform unless specifically shown on the Drawings. Any costs due to extra height not shown on Plans will be charged as an extra to Owners Account. NOTE: Where any extra work or materials are required through foundation excavation encountering peat, fill or any unusual ground conditions not providing satisfactory bearing, the cost shall be charged to the Owner as an extra to the Contract Price. Where rock or other difficult ground conditions are encountered, the extra costs of excavation shall likewise be charged as an extra to the Contract Price. No guarantee or warranty is given regarding the soil or soil stability which is solely the Owners care. Not more than 300mm top soil.

Owner is to ensure access to the building site is in all weather conditions for all vehicles during the course of construction

PROVIDE AND FIX
The words 'provide and fix' shall be construed to mean 'provide and fix' where mentioned separately unless otherwise specified.

INSURANCE
The contractor is to take out a builder's risk insurance for a sufficient sum to cover the contract cost. This policy is to remain in force unless taken over by the owner. Proof of such insurance shall be lodged with the building owner.

QUOTATION
The specifications must be read in conjunction with the quotation and if a conflict arises between the quotation and the specifications the quotation will be deemed to be correct. If a conflict arises between the plan and quotation the plan will be interpreted with the assistance of the quotation.

All Prime Cost or PC sums are deemed to be inclusive of GST unless specified otherwise.

MATERIALS AND WORKMANSHIP
The contractor shall provide all materials and labour of every description necessary, whether or not particularly noted or specified, needed for the completion of the building. All plant, haulage and cartage shall be allowed for the work carried out according to the true intent and meaning of the drawings and specification. All workmanship must be careful and thorough and in accordance with normal trade practices and all materials to the approval of the territorial authority and comply with the manufacturers recommendation. Any specified materials non procurable when required and thus retarding progress of contract, may be substituted with others similar provided that such substituted materials conform to the territorial authority bylaws and are approved by the owners. Where an item is specified and an equivalent is preferred for a reason this can be substituted if in terms of look or performance there is no difference (i.e. 665 Mesh vs. Economesh)

INTERPRETATION
Materials shown and not specified must be of the kinds commonly used for the services they are intended to perform. Any figured dimensions shall be taken in preference to scale. Any difference between specification and plan, to be read as plans being correct. Anything shown on plan and not mentioned in specifications and vice-versa and that is necessary to complete job to be read as being included in both.

STABILITY OF STRUCTURE
The contractor shall, in all cases, use proper care and diligence in bracing and supporting all parts of his work against damage by wind. He shall also support and protect the work from damage by water. His work shall at all times be self-supporting, absolutely strong and fully equal to resist all strains to which it may be subject.

LEVELS
The contractor shall check all levels on the site. It is the contractor's responsibility to confirm the accuracy levels.

SETTING OUT
The contractor shall perform all setting out and he shall be responsible for its accuracy and shall ament any error without cost to the employer.

MAINTENANCE
Maintenance period is thirty (31) days after the owner has taken possession. Any defects in materials, workmanship, or any part(s) that require replacing or adjusting which have been included in this contract shall be adjusted or replaced as specified in this specification at the contractor's own expense.

WATER AND POWER - OWNER TO SUPPLY
Owner to provide for all temporary water and power connections from reticulation laid to the head of the drive, and remove on completion.

PROTECTION OF WORK
The contractor shall substantially cover and protect all parts of his work exposed to damage either during progress of the work or when same is finished and shall deliver the same done by him or his sub-contractors upon completion of the contract in a new, sound, clean and perfect condition.

VARIATIONS AND EXTRA WORKS
After the final approval of plans by the owner, no variation or extra works shall be carried out by the contractor except with the written authority of the owner. Before such works are proceeded with, the owner shall pay for the same or the next payment as specified by the contract. Verbal Instructions on site will be binding on the parties if each party act upon the instruction in goodfaith, and will alter any pre-contractural condition, however any major change should be confirmed in writing.

DAMAGE TO PROPERTY
The contractor shall provide for making good all damage to any adjoining buildings, footpaths, fences, right-of-ways, trees, shrubs, garden walls and all damage of every kind arising during or out of his works.

FOOTPATH DEPOSIT
If required by the Territorial Authority, the contractor has to pay for a footpath deposit, then this sum of money belongs to the contractor providing they have not damaged the footpath.

If the Territorial Authority will not release the deposit to the contractor, due to the Owner being required to install a vehicle crossing to the site, then this is to be completed prior to the completion of the works. If the Owner is not able to complete this prior to the issuing of the Code of Compliance then the Owner will pay to the contractor the amount of the footpath deposit and claim ownership of the deposit lodged with the Territorial Authority.

Please note WDC believes that the footpath from the road to the section boundary by way of vehicle access should be replaced by the owner at the time of pouring the driveway and the vehicle crossing. Hallmark will not be responsible for the damage to this during the course of construction as it is anticipated to be removed anyway. Hallmark will be responsible for damage beyond the vehicle access / driveway caused by Hallmark or Hallmark's contractors only.

PROGRESS PAYMENTS
Progress payments shall be made in accordance with those specified in clause 2 of the Master Builder's contract, in accordance with the general conditions of the contract on receipt of the contractors written claim. The contractor shall also make written application for liens and maintenance moneys as these become due.

FLUCTUATION IN COST
If there should be either a rise or fall in the award of ruling rate of labour or price of materials between the date of the quotation and the date when such labour is employed or such materials are procured for this contract, then on final settlement a compensating adjustment of the contract price shall be made and the owner shall make such additional payment or receive such allowance from the contract price as such a rise or fall shall cause.

CLEANING
At conclusion of the work, premises shall be given a builders clean. The site should have all signs of building debris removed.

EXTENT OF WORK
The extent of the work will be as per the quotation, but excludes all of the following or any other item not mentioned in the quotation (Mirrors, Driveways, Paths, Concrete porches, Cobblestone porches, Fences,

Landscaping, Blinds, Louvres, Curtains, Carpet, Vinyl, Ceramic tiles to floor and walls, Mirrors, Clothes lines, letterboxes, Tooth brush holders, Soap containers and Non standard light fittings).

EXCLUDED WORKS
Any work excluded in the Full Contract or any subsequent variations will not be covered by the Builder/Main Contractor or the Master Build Guarantee.

Works undertaken by the owner/owners contractor or employed by the owner will be at the owners responsibility and the owner must ensure that these works are up to the appropriate standards.
The builder/main contractor will not be responsible for overseeing or following up any excluded work.

NATURAL AND COLOURED PRODUCTS
The contractor cannot guarantee natural and coloured products due to size and colour variation ie, Bricks, Timber Weatherboards, Concrete Tiles, Concrete Cobblestones etc. Any variation within batches is outside the contractors control and this is accepted by the owner. Should the owner require any additional sorting, selecting or sourcing in order to achieve a particular look, all costs are to be borne by the owner.

STANDARD ITEMS
All items will be white unless specified in quotation (ie Bath, WC, Toilet Cistern, Vanity, Shower wall linings and Hardiglaze)

Kitchen cupboards will be standard range – Woodgrain or gourmet / premium colour range and multi coloured units may incur an extra charge.

Garage floors are not painted unless specifically requested.

SURPLUS MATERIALS
All materials supplied by the Builder on the land and not actually incorporated in the Works shall remain the property of the Builder and shall be removed by the Builder prior to completion

SECTION 2
EXCAVATION

PRELIMINARY AND GENERAL
Refer to the preliminary and general section which also applies to this section of work.

EXCAVATION
Excavate as required for all foundations, footings, steps, piles, water pipes, drainage, etc, to the various depths, levels and grades as required for the proper excavation of the works. All footings to have a solid bottom and all to the approval of the territorial authority.

SECTION 3
CONCRETE WORK

17.50 MPa for Ring Foundations

17.50 Mpa for Floor Slab

Or as specified by NZS 3604 1999

PRELIMINARY AND GENERAL
Refer to the preliminary and general section which also applies to this section of the work.

WORKMANSHIP
Placing - before placing, all boxing and reinforcing steel shall be inspected and approved. Clean out and hose down all formwork before placing concrete.

FORMWORK
Formwork shall be of timber if required

FOOTINGS, ETC
Box for and reinforce concrete work as shown on the drawings. Allow for stepping the foundations down to ensure adequate bearing on undisturbed ground. Where foundations step down reinforcement shall be bent down and shall be continuous at this point.

SLABS
Lay 100mm thick reinforced concrete slabs over D P C membrane, reinforced with a layer of 665 HRC mesh or equivalent 35mm down from top of slab. Lap mesh joints 225mm and wire tie. Screen off and trowel and finish off with a steel float. Econo-mesh of the equivalent grade may be substituted.

WATERPROOF MEMBRANES
Under all concrete slabs provide and lay .250 thick polythene DPC membrane. Heat seal or tape joints using approved tapes and overlay and wrap around all penetrations through this membrane.

SECTION 4
CONCRETE MASONRY

Reinforced concrete masonry construction shall be in accordance with NZS 4210

PRELIMINARY AND GENERAL
Refer to the preliminary and general clauses which also apply to this section of the work.

WALL CONSTRUCTION

WORKMANSHIP

(a) **General**
All masonry walls shall be laid true and plumb and to the plane surface.

(b) **Joints**
Mortar joints shall be straight, clean and uniform in thickness and shall be tooled as shown on the plans. Where no joint details is shown, exposed walls shall have joints tooled with a round bar to produce a dense slightly concave surface will bonded to the block at the edges. Tooling shall be done when the mortar is partially set, but still sufficiently plastic to bond. All tooling shall be done with a tool which compacts the mortar, pressing the excess mortar out of the joint rather than dragging it out. Where the walls are to receive plaster, the joints shall be struck flush to provide uniform bending surface.

(c) **Provision for other Trades**
The masonry contractor shall provide chases, openings, install anchors, nailing strips, bolt hanger, etc in masonry walls where shown on the drawings.

(c) Clean -up
At the conclusion of the masonry work, the masonry contractor shall clean down all masonry walls, remove his scaffolding and equipment, clean up all debris and surplus materials and remove them from the site.

SECTION 5
BRICKLAYER

PRELIMINARY AND GENERAL
Refer to the preliminary and general Clauses which also apply to this section of the work.

WORKMANSHIP AND JOINTING AND AS DETAILED IN CURRENT NZS SPECIFICATIONS
Build the whole of the brickwork as shown on the drawings, avoid wetting bricks before use. Fully flush all joints with mortar. Carry up in even heights with no part rising more than 900mm above adjoining work.

BRICKS
Type: (AS PER QUOTATION)

NOTE:
The contractor cannot guarantee the bricks ie, size and colour variations within batches due to the natural characteristics of the product and the manufacturing process.
A sample panel will be provided from which written approval will be sought and upon receiving this approval, work will proceed on that basis.
The contractor will endeavour to maintain a similar laying pattern as that used in the sample panel. However, if a modified blending ratio is required due to an inconsistent number of coloured bricks received from the manufacturer, the owner acknowledges this variation to be acceptable without written approval.

MORTAR
Colour variation may occur between batches.

Unless specifically mentioned natural mortar colour shall be allowed for

WIRE TIES
Brickwork as required by NZ Standards Building paper is required on outside of studs, and surface mounted wall ties will be used.

FLASHING TRAYS AND WEATHER PROOFING
To houses with basement garage or rooms, weep holes shall be left on the bottom course of bricks.

See that adequate weather grooves are provided in the joinery to make weather-proof. All windows and door frames where exposed to cavity must be well primed with an approved primer.

SEAL OF OPENINGS
Particular attention is to be paid to waterproofing of openings at doors and windows, completely fill space behind bead and up surface of same wherein contact with brickwork with an approved mastic as the work proceeds. On completion, along edge of bead, mastic is to be forced into joints of brickwork and the whole struck off. Clean along edge of bead.

SECTION 6
CARPENTRY AND JOINERY

PRELIMINARY AND GENERAL
Refer to the preliminary and general section which also applies to this section of the work.

All timber to comply with NZSS 3631 for classification and grading National Grading Rules.

GENERAL
(a) All nails, screws and iron work used externally shall be galvanised. Junctions of all woodwork and concrete shall be separated by 3 ply Malthoid.
(b) All exposed timber shall be planed sanded and primed before fixing and all inside work shall be hand-dressed and glass papered to a smooth surface. All nails shall be carefully punched and all bruises and tool marks shall be removed. All framing timber shall be gauged.

WORKMANSHIP
All work to comply with NZS 3604 1999 and the New Zealand Building Code unless otherwise stated.

(a) All carpentry work shall be set up and constructed to the dimensions given. The carpenter shall set out and ensure the proper execution of the work carried out by other tradesman and shall attend on and make good for all other trades. He shall provide and fix all necessary plant and temporary structure including framework, centring, boxing, shoring, strutting, and scaffolding and shall remove them as required; he shall provide and maintain any temporary coverings for any finished work subject to likely damage; he shall ensure the proper closure for the works during construction and shall clean up on completion.

(b) **Framing**
To existing walls where required. All work shall be according to the best trade practice. The framework shall be so arranged and will provide all necessary support and fixing for the linings, and all post beams, studs, joists and walings shall extend in one piece between supports and shall only be joined over solid bearings. Spacings of all framing shall be regular throughout and shall be to suit the sizes and standards of all linings and sheathings specified. Joints shall be constructed to transmit the loads and stresses to which they are subjected. Plates shall be joined by 3kn and 6kn connections and shall be double nailed to every stud. Framework shall be well anchored to foundations, the steel framework and the roof structure.

Finishing
Finishing timbers generally shall be machine dressed, hand finished, free from blemishes, machine and hammer marks. Changes in direction shall be made by mitring or scribing. Butt ends shall be bored for nailing. Door frames shall be constructed with the jambs housed into the head and stops shall be mitred corners. All beading and timber trim shall be scribed to irregular surfaces as required and shall be mitred external angles. All linings shall be fixed with mails neatly punched ready for painting and polishing.

FRAMING SCHEDULE (unless stated on plans)
Timber exposed to the weather to be Pinus Radiata H3 treated. All other framing shall be Pinus Radiata (or as per quotation or as approved by NZS 3602) unless specified otherwise. All framing shall be machine gauged.

(a) **Floor Framing**
N/A

(b) **Wall Framing (as per quotation)**

Top and bottom plates	Pine/DFir	100 x 50/75 x 50
Studs	Pine/DFir	100 x 50 at 600mm crs max. 75 x 50 at 600mm crs max.
Nogging	Pine/DFir	100 x 50 and 75 x 50 at staggered as per Wall lining or as per the final drawings. Generally staggered.
Bracing		(refer bracing sheets)
Beams over openings	Pine/DFir	as NZS 3604

(c) **Roof Framing**

Ceiling joist/rafters	Pine/DFir	as NZS 3604
Nogging	Pine/DFir	to suit linings

(d) **Finishing Timbers (as per quotation)**

Door frames internal	Pine
Skirting	Pine
Architrave	Pine
Cornice	Pine or Plaster
Kitchen fittings etc	Customwood or as owner advises.

Place on all external walls from floor joists to top plate breathing bitumin building paper.

JOINERY (if not shown as Aluminium on Plans)
All external door frames to be grooved, throated and constructed in a proper tradesmanlike manner. Prime before fixing. Doors to be grooved all round or aluminium.

Remaining joinery shall be aluminium awning windows to comply with NZS and aluminium window handbook. Aluminium sliding exterior doors as shown on drawings.

All aluminium windows and doors shall be supplied, powder coated to colour as advised by owner, glazed to conform with NZS 4223.

DOOR SCHEDULE (As shown on Plans to 1980 mm height).
Kitchen cupboards etc 18mm thick to owners specification.

FLOOR
100mm thick concrete slab on 1 layer of 665 mesh on 0.25 polythene DPM on compacted hardfill.
CEILINGS – as per quotation
All interior ceilings shall be lines with 13mm Gibraltar Board fixed in approved manner. Line cupboards and wardrobe ceilings with 13mm Gibraltar Board. Metal ceiling battens and metal perimeter channel can be used in lieu of timber at the option of the builder unless specified in the quotation.

WALL LININGS – as per quotation
Line all walls unless specified otherwise with 10mm Gibraltar Board.

Gibraltar Board - Internal Walls
Where scheduled, line walls with the best quality 10mm thick Gibraltar Board. Check that all framing is true to line and fix sheets using nails or screw as per Winstone Wall Boards Specifications. Before stopping fix all necessary architraves, skirting trim, fillings, etc. On completion stop all joints and all nails etc ready for painting or wall paper as scheduled.

INSULATION
40mm polystyrene insulation below concrete floor DPM. See Drawings for areas of Insulation. All exterior walls and ceiling have fibreglass batts R1.8, R2.0 installed respectively (excluding garage). Garage walls to have no insulation except the wall dividing the house to the garage, no ceiling insulation to the garage. Building paper to be 'Thermacraft' Bitumen type as approved by NZ Standard 3604.

CUPBOARDS AND FITTINGS

(a) Kitchen
Form sink units, dressers and cupboards to family room where shown on the plans. Construct with customwood, whitewood or timber with shelving and drawers positioned where directed by the owner. Cover dresser tops with selected Formica, SS sink benches to complete, as shown on plans.

(b) Bathroom – as per quotation
Form bench type vanity units with Formica, Aakronite or as specified on quotation complete with acrylic or Aakronite bowl, cupboards and/or drawers under. Fix in porcelain on steel or acrylic bath to suit.

(c) Wardrobes
Frame up for wardrobes with hinged doors, 1/300mm shelf and hanging rail.

(d) Airing Cupboard
Construct cupboard where shown and fit with shelves.

(e) Linen Cupboard
To have five full width shelves.

(f) Laundry Tub Cabinet
To be SS Tub or Supertub as per quotation.

(g) Pantry
Construct with customwood, whitewood or timber as per plan with shelving complete.

(h) Kickboards
These will be unfinished to kitchen cupboards, unless specified in quote

ARCHITRAVE, CORNICE AND TRIM
To all interior door, window and other openings provide all architraves, cornices and trim. Mitre and scribe in accordance with good trade practice. Provide cornices to all wardrobes, coat cupboards etc.

HARDWARE P C Sum $.....
OR
Type:..... Door Furniture (or as specified in quotation)

Provide and fix good quality hardware. All external hinges shall be galvanised or cast and all internal hinges shall be A C loose pin.

Front and back door locksets shall be push button locking type or lever type.
Internal doors latch set and furniture) or as specified on quotation
Bathrooms and toilet Privacy bolt)

Sliding wardrobe doors to have flush pulls.
All hardware shall be left in working order

PLATES
All to be straight and in long lengths, butted at all joints fixed together with nail plates of the correct Kn capacity (refer NZS 3604)

STUDS
To be shown as scheduled

BRACING
Gib galvanised bracing (see Bracing calculation sheet and Bracing Plan Drawing).

ROOF
Framing
To be nail trusses at 900 ctrs with 22.50 degree pitch. Fix 75 x 50mm purlins at 800mm centres. Fix 75 x 100mm under purlins to rafters and cut braces and round same.

EAVES
Allow rafters to overhang 450, 600mm or as shown on plan and finish with colorsteel external fascia and gutter. Line eaves with 4.75mm Flat Hardie flex sheets. Fix joints with extruded plastic mould and house sheets in fascia.

NOGGING
To be 50mm material on all walls and ceilings, spaced at approximately 600mm centres and cut between the studs. Nogging to ceiling maximum of 600mm centres includes backing to all margins or as directed by ceiling lining manufacturer.

TELEPHONE AND T V
Arrange with Telecom to run a telephone cable whilst in the framing stage. Similarly have a T V cable to aerial and points installed during construction.

METER BOX
Form recess for meter box in thickness of wall where directed to the requirements of the local power authority.

EXTERIOR SHEATHING
(a) Walls:.....BRICK
(b) Above window and door headers:..... FULL HEIGHT
(c) Roof:.....COLORSTEEL ENDURA

FIREPLACE
As shown on plan.

SECTION 7
PLUMBING

PRELIMINARY AND GENERAL
Refer to the preliminary and general clauses with also apply to this section of the work.

GENERAL
All work shall be carried out in accordance with the drawing, specifications and of the New Zealand Building Code. All materials shall be of the best of their respective kinds. Water pipes and tubes shall be set out in straight runs of even gradients, where possible avoiding all places where air locks are likely to occur. Secure

copper tubing in position with copper straps. All piping including water, waste and vents shall be concealed. Provide for wet-back to fireplace if indicated on plans.

FLASHINGS
Flash as necessary to render building water-tight Flashings must be provided over all windows and doors.

SPOUTING AND DOWNPIPES
Hutlock 150 x 25 mm Fascia and Marley spouting and gutter where shown supported with clips to manufacturer's instructions. Downpipes shall be as required by PVC if required.

VENTS AND SOIL STACK
Provide terminal vent and soil pipes as required. Soil pipe shall be 80mm PVC. Fix PVC cage to top.

WASTES
All wastes to be discharged over gully traps. Provide and fix back vents to all wastes over 3.600 metres in length.

COLD WATER
Lay water from supply in 12mm copper, close cap up with all necessary bends, tees, elbow, etc lead off with 12mm copper branches to sink, basin, laundry tubs, washing machine, W C, shower and two stand pipes and 12mm branch to bath. Connect from branch to 'Ajax' valve and to hot water cylinder with 12mm copper pipe.

HOT WATER
Provide and fix one Infinity Gas Fired External Continuous Water Heater – XR24 Extreme 180 and all necessary connections to make the same in working order. Lay water through 19mm copper piping to bath, then with 12mm to sink, hand basin, laundry tub, washing machine and shower. Provide tempering valve to hot water line.

BATHROOM AND SHOWER
Provide acrylic hand basin to vanity unit, 1675mm Sorrento bath, shower tray as shown. (or as specified in the quotation)

W C
Provide and fix W. One toiler toll holder to be fixed in suitable position.

TAPS
All taps and extensions except hose taps to be chrome plated, streamlined bibcocks marked 'hot' and 'cold'.

SECTION 8
ELECTRICAL

PRELIMINARY AND GENERAL
Refer to the preliminary and general section which also applies to this section of the work.

SCOPE OF WORK
The work includes the provision and installation of all electrical work in the contract, providing meter board, fuse box and taking out and paying all fees to the electrical supply authority, all to comply with the New Zealand Electrical Codes of Practice.

POINT OF ENTRY, METERS ETC.
Apply to the power authority for the provision of the electrical supply connection to the building. From the point of entry run appropriate cable to the meter box. Neatly mount MOB's and label switches on board.

POWER POINTS
Power points shall be 3 pin 10 amp. With combined switches in flush boxes. Provide power points where shown at heights as directed by the owner. Make connections for hot water cylinder, stove, washing machine and drier.

SWITCHES
Shall be in flush boxes.

CABLES
Shall be in flush boxes.

LIGHT FITTINGS
Allow for light points to be wired for and fixed in rooms and places as shown.

ELECTRIC RANGE/WALL OVEN AND HOTPLATE
Allow for connecting electric range and a PC Sum of $..... or as per quotation for range.

SWITCHBOARD

Allow for the provision of switchboard complete as required by local authority.

INSPECTION AND TESTING
On completion of the whole installation, arrange for the installation to be tested by the local authority inspector. Remedy all faults and replace all faulty bulbs and/or damaged fittings.

COMPLETION
On completion, clean all fittings, check the correct operation of all fittings including power points and lodge any and all guarantees with the principal.

SECTION 9
DRAINAGE

PRELIMINARY AND GENERAL
Refer to the preliminary and general section which also applies to this section of the work.

DRAINAGE
The drainage will be carried out strictly in accordance with the New Zealand Building Code and the local bylaws. Provide and lay in first grade glazed earthenware pipes of 110mm diameter, or PVC, all to have the necessary junction bends, angles, gully traps, inspection pipes, grease traps and chambers, buchan traps, etc and all vents and fittings necessary to complete the system to the Environmental Health Officers satisfaction. Stormwater to be carried out in materials specified by the inspector.

STORMWATER
To local authority requirements and the New Zealand Building Code.

SEPTIC TANK
Build septic tank to local authority requirements and the New Zealand Building Code.

SEWER
Connect to sewer where available as shown on plans. All to comply with the New Zealand Building Code.

SECTION 10
ROOFING

PRELIMINARY AND GENERAL
Refer to the preliminary and general section which also applies to this section of the work.

ROOFING
Supply and lay to roof joists / trusses
Allow for all necessary flashings in materials to match roof. All work shall be in strict accordance with the manufacturer's instructions, drawings and details.

SECTION 11
DECORATING

PRELIMINARY AND GENERAL
Refer to the Preliminary and General Clauses which also apply to this section of the work.

WORKMANSHIP
All work shall be done by skilled tradesmen. Protect all work from weather, dust, etc and provide protection for other work against all paint drops, stains, and other defects. No paints is to be applied to damp surfaces and no external surfaces are to be painted during frosty or unsuitable weather. Between each coat, rough patches etc shall be rubbed down with glass paper to obtain a good surface. Any work damaged by dust, rain or any other cause shall be rubbed down and recoated. Paint shall impinge upon glass for weather protection.
COLOUR
All colours are to be as specified in the quotation, or to be of a light base and a maximum of 4 colours including interior and exterior paint colours.

EXTERIOR WORK
Timber: Stain
All timber to be stained to receive two full coats of an oil base stain. All laps etc to be stained before fixing of timber.

Timber: Paint
Prime and stop. Apply two full coats of gloss acrylic.

Hardiflex Products

Clean any dusty surfaces and apply two full coats of a gloss acrylic.

Galvanised Steel
Apply one coat of galvanised primer followed by two coats of acrylic.

INTERIOR WORK
Varnish work to receive three full coats of polyurethane Satin, or two coats of polyurethane Satin and one coat of polyurethane Gloss.

Timber: Painted
Apply one coat of interior primer-undercoat, stopping nail holes etc after first coat, followed by two coats of enamel, tints and gloss to the approval of the owners.

Ceilings: Plasterglass or Gib-board
Lightly sand and brush down. Apply one coat of Sealer, two top coats of arcylic dead flat Lightly sand and brush down between coats.

Pinex Tiles: Factory Undercoated
Apply two full coats of a water base paint.

Garage floors:
Not painted unless specifically requested.

PAPERHANGING
Allow for papering all rooms of a new dwelling, or any areas affected by alterations etc. All surfaces to be papered are to be perfectly smooth and prepared with size. Allow for cutting in all angles and hanging with butt joints and with patterns truly matched and plumb. All papers to be selected by owner. Allow the PC sum of $..... per roll for paper (or as per quotation). Paste to contain a fungicide.

610 STANLEY ROAD
WAINUI

Table 2 from E2/AS1: Building envelope risk matrix

	Risk severity				
Risk factor	**low** score	**medium** score	**high** score	**very high** score	**subtotals for each risk factor**
Wind zone (per NZS 3604)	0	0	1	2 ✓	
Number of storeys	0 ✓	1	2	4	
Roof/wall intersection design	0 ✓	1	3	5	
Eaves width	0 ✓	1	2	5	
Envelope complexity	0	1 ✓	3	6	
Deck design	0 ✓	2	4	6	
				Total risk score:	3 ✓

Table 2 from E2/AS1: Building envelope risk matrix

	Risk severity				
Risk factor	**low** score	**medium** score	**high** score	**very high** score	**subtotals for each risk factor**
Wind zone (per NZS 3604)	0	0	1	2	
Number of storeys	0	1	2	4	
Roof/wall intersection design	0	1	3	5	
Eaves width	0	1	2	5	
Envelope complexity	0	1	3	6	
Deck design	0	2	4	6	
				Total risk score:	

GIB® Wall Bracing Calculation Sheet A — single storey — V85A

GIB® EzyBrace™
GIB® Bracing Systems, 2006

Job Details

Name	D BARRACLOUGH & A BENNETT	
Street and Number	610 STANLEY ROAD	
Lot and DP Number	Lot 1 DP 310143	
City/Town/District	WHAKATANE	
Designer and date	STIRLING HOMES LTD	2-Mar-07
Company Name	STIRLING HOMES LTD	

Building Specification

Location of Storey	single	
Floor Loading	2 kPa	
Foundation Type	slab	
Building Height to Apex (m)	5	
Roof Height above Eaves (m)	2	
Stud Height (m)	2.4	
Cladding Weight (top or single)	heavy	
Cladding Weight (lower)	light	*not applicable (single storey building)*
Cladding Weight (subfloor)	light	*not applicable (slab)*
Roof Weight	light	
Roof Pitch (degrees)	25-45	
Room in Roof Space	no	
Building Length (m)	15.3	*Use roof length including eaves*
Building Width (m)	13.7	*Use roof length including eaves*
Gross Building Plan Area (m2)	141.14	

Building Location

Wind Zone	***High***	**Earthquake Zone**	
Region	R1	A	
Terrain	Inland		
Exposure	Exposed		
Topography	Moderate		

Bracing Units required for Wind

per m	subfloor	walls	
W along	n/a	64	BUs/m
W across	n/a	54	BUs/m
Totals	subfloor	walls	
W along	n/a	877	BUs
W across	n/a	826	BUs

Bracing Units required for Earthquake

per m2	subfloor	walls	
E	n/a	5.6	BUs/m2
Totals	subfloor	walls	
E along	n/a	790	BUs
E across	n/a	790	BUs

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WHAKATANE DISTRICT COUNCIL
APPROVED FOR CONSTRUCTION
..... Building Control Office
Date 29-03-07

GIB® Wall Bracing Calculation Sheet B — single storey — V85A

GIB® EzyBrace™ — *GIB® Bracing Systems, 2006*

Along									
Wall or Bracing Line		*Bracing Elements provided*						*Wind*	*Earthq.*
1	2	3	4	5	7	8	6	9W	10EQ
Line Label	Minimum BUs Req/Ach	Bracing Element No.	Supplier	Bracing Type	Element Length L (m)	Element Height H (m)	Angle to Bracing line (degrees)	BUs Achieved	BUs Achieved
A	58	1	GIB®	BL1	0.4	2.4		48	46
		2	GIB®	BL1	0.6	2.4		75	69
line totals		3	GIB®	BL1	1.2	2.4		150	138
W	273	4							
EQ	253	5							
B	58	1	GIB®	GS2	1.6	2.4		112	96
		2	GIB®	GS2	1.2	2.4		84	72
line totals		3	GIB®	BL1	0.9	2.4		113	104
W	421	4	GIB®	BL1	0.9	2.4		113	104
EQ	375	5							
C	70	1	GIB®	BL1	0.4	2.4	50% of Brace only	48	46
		2	GIB®	BL1	1.05	2.4	45°	~~131~~ 65	121 60.5
line totals		3	GIB®	BL1	1.05	2.4	45°	~~131~~ 65	121 60.5
W	361	4	GIB®	BL1	~~0.42~~ 0.60	2.4	45°	~~50~~ 25	~~48~~ 24
EQ	336	5							
D	125	1	GIB®	BL1	0.6	2.4		75	69
		2	GIB®	BL1	0.6	2.4		75	69
line totals		3							
W	150	4							
EQ	138	5							
E	enter	1							
		2							
line totals		3							
W		4							
EQ		5							
F	enter	1							
		2							
line totals		3							
W		4							
EQ		5							
G	enter	1							
		2							
line totals		3							
W		4							
EQ		5							
H	enter	1							
		2							
line totals		3							
W		4							
EQ		5							

ONLY LOOK AT ½ VALUE.

								Wind	Earthq.
Totals Achieved								~~1205~~	1102
								OK 1049	OK 958
Totals Required (from Sheet A)								877	790

GIB® Bracing Systems, 2006

For full construction details see literature
GIB® Bracing Systems, 2006

Supplier	System	Minimum Length (m)	BUs W/m	BUs EQ/m
	none			
GIB®	GS1a	1.8	65	55
		2.4	75	65
GIB®	GS2	1.2	70	60
		1.8	80	70
		2.4	90	80
GIB®	BL1	0.4	120	115
		0.6	125	115
GIB®	BL1a	1.8	130	115
GIB®	BLP	0.6	145	135
		0.9	145	145
GIB®	BLG	0.6	145	130
		1.2	150	130
Custom	Custom			
Custom	Custom			
Custom	Custom			
Custom	Custom			
Custom	Custom			
Custom	Custom			
Custom	Custom			
Custom	Custom			
Custom	Custom			
Custom	Custom			
Custom	Custom			
Custom	Custom			
Custom	Custom			

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GIB® Wall Bracing Calculation Sheet B — single storey — V85A

GIB® EzyBrace™ — *GIB® Bracing Systems, 2006*

Across									
Wall or Bracing Line		*Bracing Elements provided*						*Wind*	*Earthq.*
1	2	3	4	5	7	8	6	9W	10EQ
Line Label	Minimum BUs Req/Ach	Bracing Element No.	Supplier	Bracing Type	Element Length L (m)	Element Height H (m)	Angle to Bracing line (degrees)	BUs Achieved	BUs Achieved
M	100	1	GIB®	BL1	0.9	2.4		113	104
		2	GIB®	BL1	0.9	2.4		113	104
line totals		3							
W	225	4							
EQ	207	5							
N	150	1	GIB®	BL1	0.9	2.4		113	104
		2	GIB®	BL1	0.42	2.4		~~50~~ 25	~~48~~ 24
line totals		3							
W	163	4							
EQ	152	5							
O	72	1	GIB®	BL1	1.6	2.4		200	184
		2	GIB®	BL1	1.2	2.4		150	138
line totals		3	GIB®	BL1	1.2	2.4		150	138
W	500	4							
EQ	460	5							
P	72	1	GIB®	BL1	0.6	2.4		75	69
		2	GIB®	BL1	1.2	2.4		150	138
line totals		3							
W	225	4							
EQ	207	5							
Q	enter	1							
		2							
line totals		3							
W		4							
EQ		5							
R	enter	1							
		2							
line totals		3							
W		4							
EQ		5							
S	enter	1							
		2							
line totals		3							
W		4							
EQ		5							
T	enter	1							
		2							
line totals		3							
W		4							
EQ		5							

								Wind	Earthq.
Totals Achieved								~~1113~~	~~1026~~
								OK 1038	OK 1002 OK ✓
Totals Required (from Sheet A)								826	790

CHECKED AGAIN IN BRACE MANUAL. 1:7 OR UNDER. SO THEREFORE STOCK ANGLE SINCE IT WORKED IT OUT AT 50°

½ VALUE AT 45°.

GIB® Bracing Systems, 2006

For full construction details see literature
GIB® Bracing Systems, 2006

Supplier	System	Minimum Length (m)	BUs W/m	BUs EQ/m
	none			
GIB®	GS1a	1.8	65	55
		2.4	75	65
GIB®	GS2	1.2	70	60
		1.8	80	70
		2.4	90	80
GIB®	BL1	0.4	120	115
		0.6	125	115
GIB®	BL1a	1.8	130	115
GIB®	BLP	0.6	145	135
		0.9	145	145
GIB®	BLG	0.6	145	130
		1.2	150	130
Custom	Custom			
Custom	Custom			
Custom	Custom			
Custom	Custom			
Custom	Custom			
Custom	Custom			
Custom	Custom			
Custom	Custom			
Custom	Custom			
Custom	Custom			
Custom	Custom			
Custom	Custom			
Custom	Custom			

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29-03-06

Construction Details

GIB® Bracing Systems Changes

GIB® Bracing Systems have undergone a thorough review as part of Winstone Wallboards ongoing programme to make GIB® systems simpler, easier and faster for customers to use. Users of the previous systems will notice some significant changes. Please review this technical literature in detail to make yourself aware of these changes. The key differences are as follows:

- The new EzyBrace™ Specification Numbering System is designed to make specification, installation and identification of GIB® Bracing Systems easier.
- A rationalised number of bracing element types and a more consistent construction method.
- Fasteners must not be placed closer than 18mm to a sheet end or a cut edge or no closer than 12mm to the tapered (paper bound) machine edge of the GIB® plasterboard sheets.
- Some hold down details and corner fastening details have changed.
- A new 35mm GIB Braceline® Nail replaces the 32mm GIB Braceline® Nail in GIB Braceline® bracing elements.
- GIB® plasterboard sheets used in GIB® Bracing Systems March 2006 must have a manufacturing date after 16 January 2006.
- No additional framing is required for narrow panels.
- Introduction of a shorter 0.4m bracing element.
- Ability to substitute GIB Aqualine® for GIB Braceline® with modified fastener patterns.

Note: The bracing systems in the GIB® Bracing Systems 1999-2003 technical literature will remain valid, however, transfer to the systems contained in this publication is recommended for new designs for the benefits these systems offer.

Framing

General framing requirements such as grade, spacings and installation shall comply with the provisions of NZS 3604:1999. Winstone Wallboards Ltd recommends the use of kiln-dried machine stress graded framing (KD MSG). To achieve the published bracing performance the minimum actual framing dimensions are 90 x 35mm for external walls and 70 x 35mm for internal walls.
Wall bracing tests on GIB® Bracing Systems were undertaken without nogs. Nogs are not considered to add to the bracing performance of the wall.

Fastening GIB® plasterboard Linings

GIB® Standard Plasterboard bracing systems must be fastened using minimum length 32mm x 6g GIB® Grabber® Drywall Screws or 30 x 2.8mm GIB® Nails. GIB Braceline® bracing systems must be fastened with 32mm x 7g GIB Braceline® screws, or 35mm GIB Braceline® nails.
GIB® plasterboard linings for designated bracing elements are fastened at 150mm centres around the perimeter of the bracing element. For GIB® Standard bracing elements fasteners are placed at 50 and 150mm from the sheet corner (see page 30). For GIB Braceline® bracing elements fasteners start at 50, 100 and 150mm from the sheet corner (see page 31). Fasteners must be placed 12mm from the tapered edge (paper bound) and 18mm from the cut edge.
Fastening in the field of the bracing element is conventional and the screw and glue method is recommended as outlined in the "GIB® Site Guide".
When fixing part sheets of GIB® plasterboard, a minimum width of 300mm applies for bracing elements.
Horizontal fixing is recommended. If fixing vertically, full height sheets shall be used where possible. Where sheet end butt joints are unavoidable they must be formed over nogs or over the studs and fastened at 200mm centres. Alternatively, the sheet end butt joints may be back-blocked.

Plywood

'Plywood' specified in BLP is grade D-D 7mm construction plywood manufactured to AS/NZS 2269:2004, fixed with 30 x 2.8mm flat head nails at 150mm centres around the perimeter of the bracing element and at 300mm centres to intermediate framing.

Fire Resistance and Noise Ratings

10mm GIB Braceline®, 10mm GIB Aqualine®, 10mm GIB Noiseline®, 10mm and 13mm GIB Ultraline® and 10mm GIB Toughline® may be substituted for 10mm GIB Fyreline® in fire rated constructions. 10mm GIB Braceline® and 10mm GIB Toughline® may be substituted for 10mm GIB Noiseline® in GIB® Noise Control Systems.The fastener length for the fire rated system applies. The field of the braced element must also be fastened in accordance with the fire rated specification (adhesive not permitted).

Jointing and Stopping

All sheet joints must be paper tape reinforced and stopped in accordance with the publication entitled "GIB® Site Guide".

Fastening the Bracing Element to Timber Floors

Fastening the bottom plate of a GIB® wall bracing element to a timber framed floor must be in accordance with NZS3604:1999 with pairs of 100 x 3.75mm hand driven nails or three 90 x 3.15mm power driven nails at 600mm centres. In addition panel hold-downs, as detailed on page 29, must be installed when specified for the particular bracing element type (BL1, BL1a, BLG and BLP).

Fastening the Bracing Element to Concrete Slabs

Fastening the bottom plate of an external wall for bracing element GS1a is in accordance with NZS 3604:1999. On internal bracing lines, the bottom plate of wall bracing elements GS1a and GS2 may be fixed using minimum 65mm x 3.8mm shot fired fasteners fitted with 16mm discs, spaced at 150mm and 300mm from the end studs and thereafter at 600mm centres. Wall bracing elements BL1, BL1a, BLG and BLP installed on both external and internal walls require a panel hold-down connection at each end of the bracing element (see page 29). Within the length of the bracing element bottom plates are fixed in accordance with NZS 3604:1999.

In order for GIB® systems to perform as tested, all components must be installed exactly as prescribed. Substituting components produces an entirely different system and may seriously compromise performance. Follow system specifications.

Construction Details

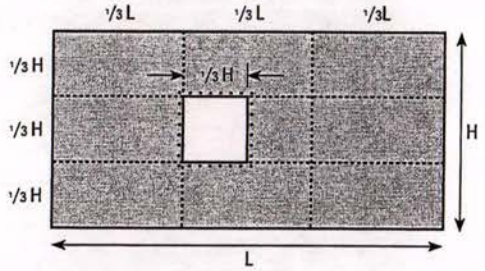
MARCH 2006

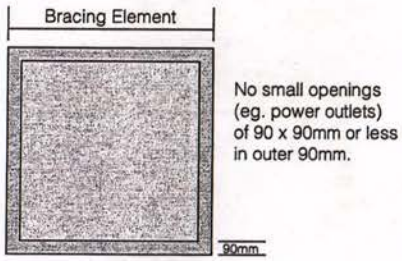
Panel Hold-Down Details

GIB® Standard Bracing Systems GS1a and GS2 do not require specific connections at the bracing element ends.
GIB Braceline® Bracing Systems BL1, BL1a, BLP and BLG all have panel hold-down connections at each end of the bracing element. Refer to page 29 for construction details.

Openings in Bracing Elements

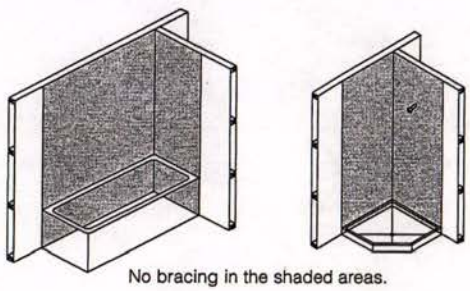
Openings are allowed within the middle third of a wall bracing element's length and height. Neither opening dimension shall be more than one third of the element height. Wall linings are fixed to opening trimmers at 150mm centres. Small openings (e.g. power outlets) of 90 x 90mm or less may be placed no closer than 90mm to the edge of the braced element.





GIB® Bracing in Water-Splash Areas

Bracing elements are required to have a durability of 50 years. Winstone Wallboards recommends that bracing elements are not located in shower cubicles or behind baths because of durability requirements, the likelihood of renovation, and practical issues associated with fixing bracing elements to perimeter framing members.
Otherwise GIB® Bracing Systems can be used in water-splash areas as defined by NZBC Clause E3, provided these are maintained impervious for the life of the building.
GIB Aqualine® can be used in place of GIB® Standard in bracing elements.
GIB Aqualine® can be used in place of GIB Braceline® in bracing elements 900mm or longer, provided the perimeter of the element is fixed with GIB Braceline® nails or screws at 100mm centres generally, using the GIB Braceline® corner fixing pattern.



No bracing in the shaded areas.

Renovation

When relining walls during the process of renovation, ensure that bracing elements are reinstated (check the building plans).

Angle Braces

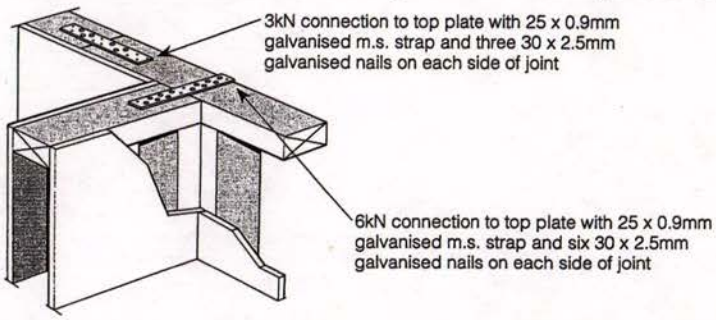
Angle braces serve to keep frames square during transport and construction. They also act as part of the temporary bracing of a building under construction.
Where specified, metal angle braces must be placed at an angle no steeper than 55 degrees, and within the designated length of the bracing element. For elements longer than 3.6 metres, pairs of angle braces (in opposite directions) are required. Fixing of angle braces is with three 30 x 2.8mm galvanised flat head nails to top and bottom plates, and two 30 x 2.8mm nails to intermediate framing.

Top Plate Connections

The top plate of a wall that contains one or more wall bracing elements shall be jointed according to the rating of the highest-rated individual wall bracing element as follows:

(a) Rating not exceeding 100 bracing units: A 3kN connection as shown or by an alternative fixing of 3kN capacity in tension or compression along the plate;

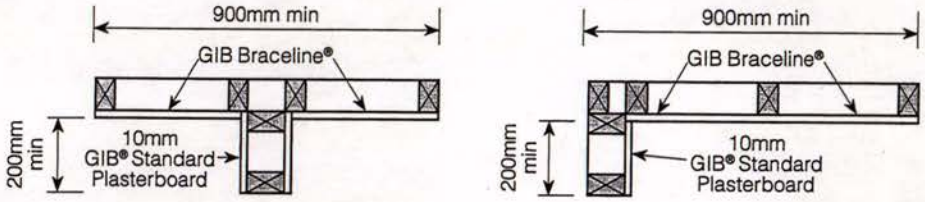
(b) Rating exceeding 100 bracing units: A 6kN connection as shown or by an alternative fixing of 6kN capacity tension or compression along the plate.



Construction Details

Guidelines for Intersecting Walls

GIB® Bracing Elements may have intersecting walls with a minimum length of 200mm. Bracing element sheets shall be fixed and jointed as given on pages 30 and 31. Fasteners are required around the perimeter of the bracing element. Vertical joints at T-junctions (illustrated below) shall be fixed and jointed as specified for intermediate sheet joints. **The bracing element length must be no less than 900mm.**



Where a Wall Bracing Element is interrupted by a T or L junction the element is deemed to be continuous for the whole length (900mm in the example illustrated above).

Fixing the Perimeter of a Bracing Element

A bracing element can consist of a part sheet (such as in a 600 mm long BL1 element), or multiple sheets (such as in a 2.4 metre or longer GS1a element). The critical fasteners are located around the perimeter of a bracing element as outlined on the fastener layout pages. The perimeter of a bracing element must be connected to a continuous member such as studs or plates. Connection to a row of nogs is not acceptable.

Fixing in the Field of the Bracing Element

Fixing in the field of a bracing element is conventional and for GIB® wall bracing elements this means that adhesive fixing is recommended, eliminating the need for mechanical fasteners in the body of the sheets.

For GIB® ceiling diaphragms the screw and glue method is recommended resulting in a minimum number of mechanical fasteners along the centre line in the body of the sheets.

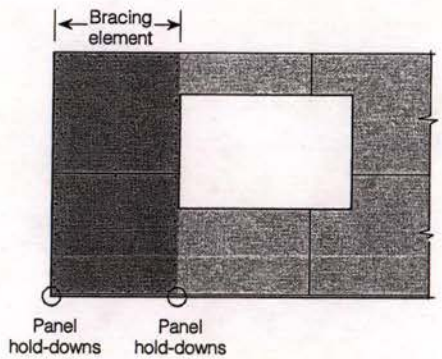
When applied correctly, paper-tape and stopped joints within the bracing element are strong enough to transfer loads within the element and conventional fixing of intermediate sheet joints to framing is sufficient.

Any sheet end butt joints within the field of the bracing element must be back-blocked in accordance with the "GIB® Site Guide".

Consult the "GIB® Site Guide" for further details on recommended fixing details.

Horizontal Fixing

GIB Braceline® linings may be fixed horizontally when linings extend under/ over door or window openings. GIB Braceline® fasteners are provided around the perimeter of the bracing element.



GIB® Bracing Systems – EzyBrace™ Specification Numbering System

The EzyBrace™ Specification Numbering System is designed to make specification of GIB® Bracing Systems by designers and identification on site by builders and building officials more transparent. Note: the EzyBrace™ Specification Numbering System (and sub-components thereof) are protected by copyright.

GS = GIB® Standard Plasterboard
BL = GIB Braceline®
BLP = GIB Braceline® / Plywood
BLG = GIB Braceline® / GIB® Standard Plasterboard

1 = lined one side
2 = lined both sides
a = angle brace

Therefore,
GS1a = GIB® Standard Plasterboard one side with an angle brace
GS2 = GIB® Standard Plasterboard both sides
BL1 = GIB Braceline® one side
BL1a = GIB Braceline® one side with an angle brace
BLP = GIB Braceline® one side, Plywood on the other
BLG = GIB Braceline® one side, GIB® Standard Plasterboard on the other

In order for GIB® systems to perform as tested, all components must be installed exactly as prescribed. Substituting components produces an entirely different system and may seriously compromise performance. Follow system specifications.

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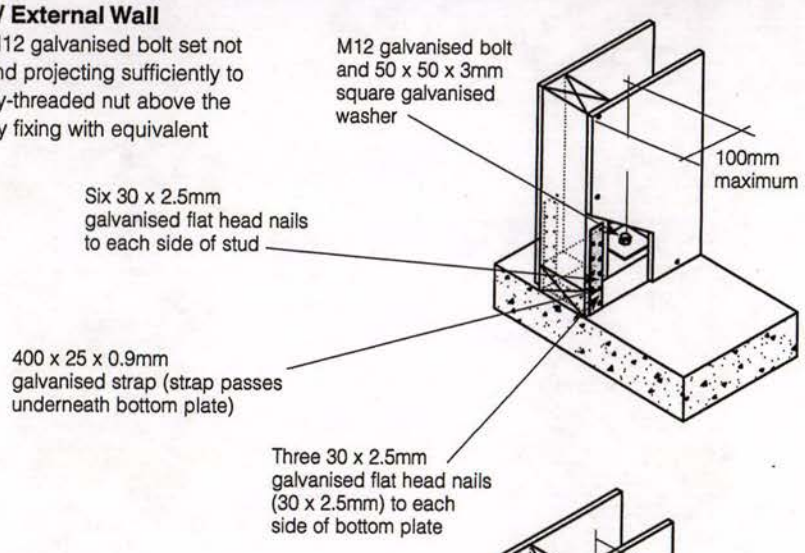
Panel Hold-down Details

MARCH 2006

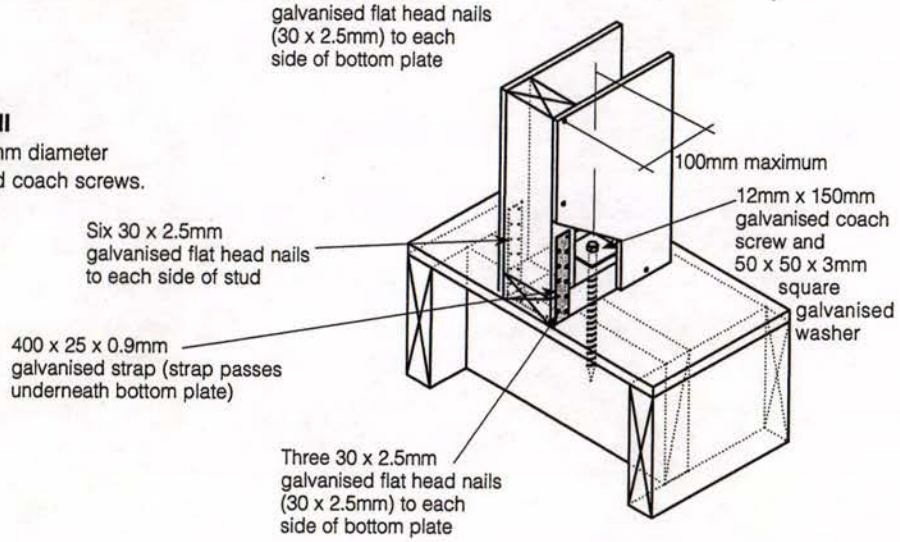
Concrete Floor – Internal / External Wall

Bottom plate is fixed using an M12 galvanised bolt set not less than 75mm into concrete and projecting sufficiently to allow for a 3mm washer and fully-threaded nut above the timber. Alternatively a proprietary fixing with equivalent capacity may be used.



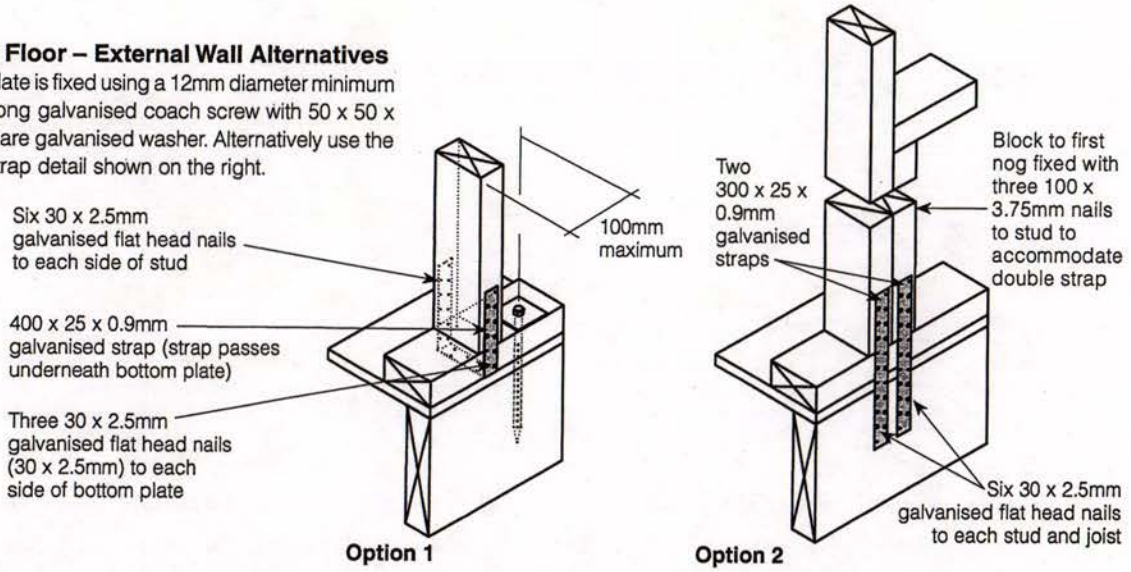
Timber Floor – Internal Wall

Bottom plate is fixed using a 12mm diameter minimum 150mm long galvanised coach screws.



Timber Floor – External Wall Alternatives

Bottom plate is fixed using a 12mm diameter minimum 150mm long galvanised coach screw with 50 x 50 x 3mm square galvanised washer. Alternatively use the double strap detail shown on the right.



Notes:

Additional thickness and/or corrosion protection is required in exposed and sheltered applications. (Consult NZS 3604:1999).
To maintain a flush surface for the wall linings, it is recommended that hold down straps are checked into the framing.

In order for GIB® systems to perform as tested, all components must be installed exactly as prescribed. Substituting components produces an entirely different system and may seriously compromise performance. Follow system specifications.

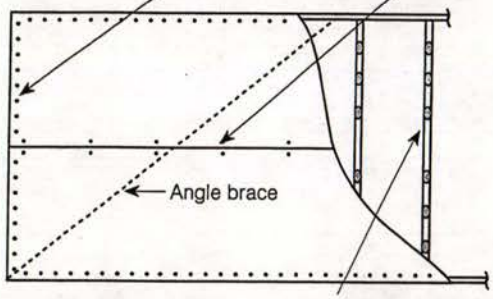
Fastener Layouts – GIB® Standard Bracing Elements

MARCH 2006

For 10mm GIB® Standard Plasterboard and any other 10mm and 13mm GIB® plasterboard

32mm x 6g GIB® Grabber® Drywall Screws or 30mm GIB® Nails at 150mm centres to perimeter of bracing element

Single 32mm x 6g GIB® Grabber® Drywall Screws or 30mm GIB® Nails where sheets cross studs

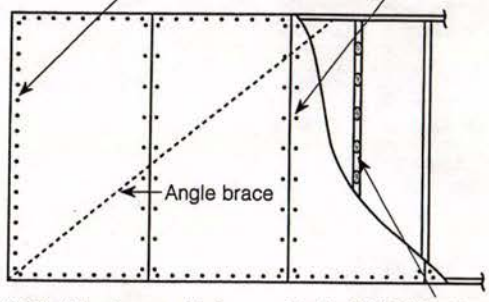


GS1a (lined one side) (Horizontal Fixing)

Daub of GIBFix® adhesive at 300mm centres to intermediate studs

32mm x 6g GIB® Grabber® Drywall Screws or 30mm GIB® Nails at 150mm centres to perimeter of bracing element

Single 32mm x 6g GIB® Grabber® Drywall Screws or 30mm GIB® Nails at 300mm centres

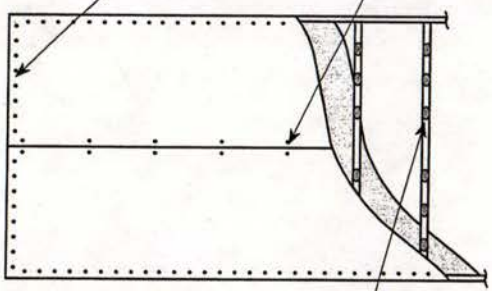


GS1a (lined one side) (Vertical Fixing)

Daub of GIBFix® adhesive at 300mm centres to intermediate studs and nogs

32mm x 6g GIB® Grabber® Drywall Screws or 30mm GIB® Nails at 150mm centres to perimeter of bracing element

Single 32mm x 6g GIB® Grabber® Drywall Screws or 30mm GIB® Nails where sheets cross studs

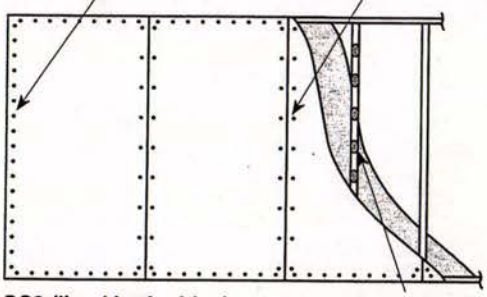


GS2 (lined both sides) (Horizontal Fixing)

Daub of GIBFix® adhesive at 300mm centres to intermediate studs

32mm x 6g GIB® Grabber® Drywall Screws or 30mm GIB® Nails at 150mm centres to perimeter of bracing element

Single 32mm x 6g GIB® Grabber® Drywall Screws or 30mm GIB® Nails at 300mm centres



GS2 (lined both sides) (Vertical Fixing)

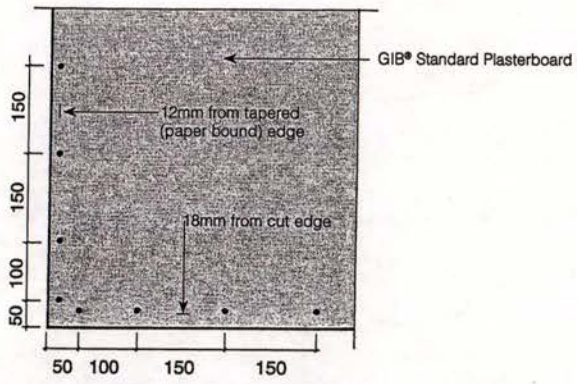
Daub of GIBFix® adhesive at 300mm centres to intermediate studs and nogs

Fixing the perimeter of a GIB® Standard Plasterboard bracing element

Fasteners are placed no closer than 12mm to the tapered (paper bound) machine edge of the GIB® plasterboard sheets. Fasteners are placed no closer than 18mm to a sheet end or a cut sheet edge.

For GIB® Standard bracing elements fasteners are placed at 150mm centres around the bracing element perimeter, starting at 50 and 150mm from the sheet corners.

Fastening pattern for GIB® Standard bracing elements



In order for GIB® systems to perform as tested, all components must be installed exactly as prescribed. Substituting components produces an entirely different system and may seriously compromise performance. Follow system specifications.

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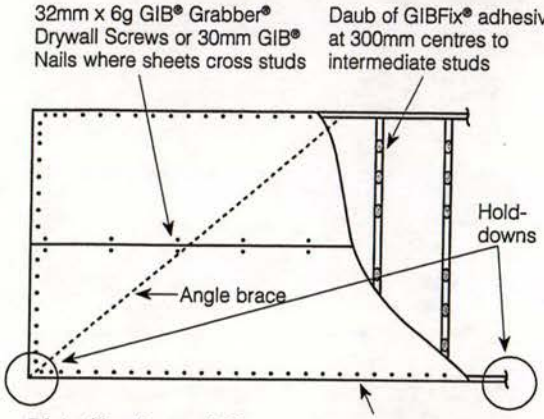
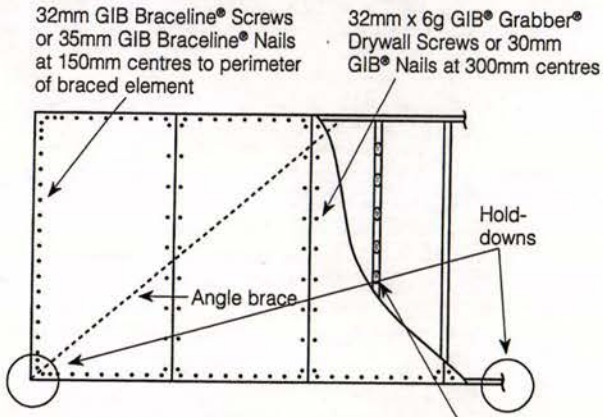
Fastener Layouts – GIB Braceline® Bracing Elements MARCH 2006

For 10mm GIB Braceline®, 10mm GIB Noiseline® and 10mm GIB Toughline®



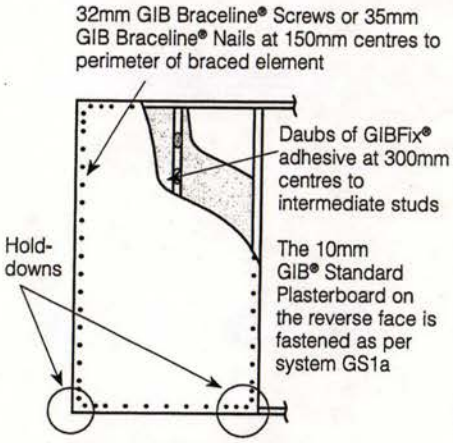
BL1a (lined one side) (Horizontal Fixing)

32mm GIB Braceline® screws or 35mm GIB Braceline® nails at 150mm centres to perimeter of braced element

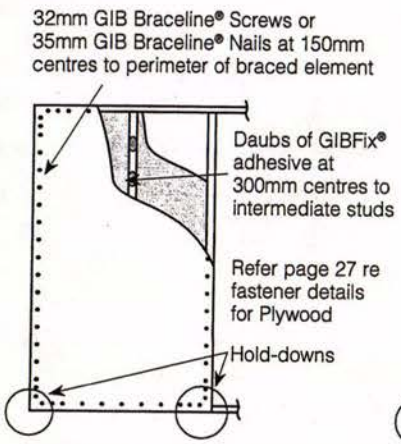


BL1a (lined one side) (Vertical Fixing)

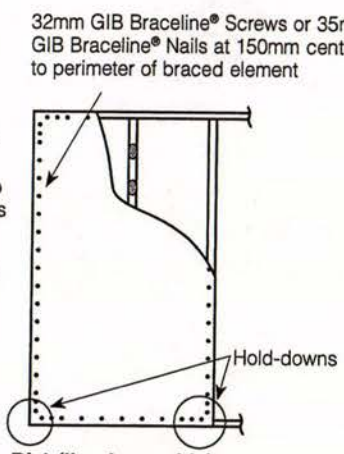
Daub of GIBFix® adhesive at 300mm centres to intermediate studs and nogs



BLG (lined both sides)



BLP (lined both sides)



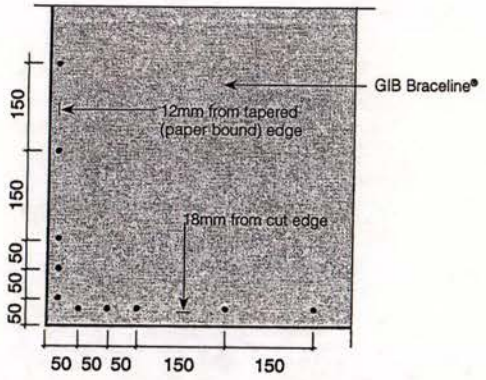
BL1 (lined one side)

Fixing the perimeter of a GIB Braceline® bracing element

Fasteners are placed no closer than 12mm to the tapered (paper bound) machine edge of the GIB® plasterboard sheets. Fasteners are placed no closer than 18mm to a sheet end or a cut sheet edge.

For GIB Braceline® systems, fasteners are placed at 150mm centres around the bracing element perimeter, starting at 50, 100 and 150mm from the sheet corners.

Fastening pattern for GIB Braceline® bracing elements



In order for GIB® systems to perform as tested, all components must be installed exactly as prescribed. Substituting components produces an entirely different system and may seriously compromise performance. Follow system specifications.

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9.1.9.4 Inter-storey junctions

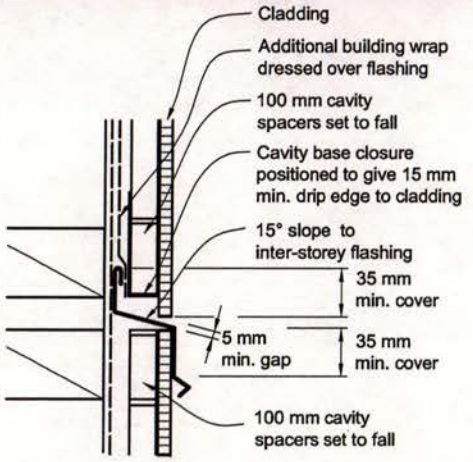
Inter-storey junctions in *claddings* over *drained cavities* shall be formed for walls:

a) Up to a maximum of 2 *storeys* in height, as shown for the specific wall *claddings* in Paragraph 9.2 to Paragraph 9.9, or

b) Over 2 *storeys*, by using an inter-storey *flashing* bridging the *drained cavity* as shown in Figure 70.

COMMENT:
A *drained cavity* is limited to a height of 2 *storeys* to limit the amount of moisture handled by the cavity before it is directed to the outside.

Figure 70: General inter-storey junction
Paragraph 9.1.9.4, Figures 108, 121, 123, 124 and 125



NOTE: To be used to limit continuous cavities to a height of two storeys.

9.1.10 Windows and doors

Windows and doors shall comply with the requirements of NZS 4211, and reveals shall comply with NZS 3602. *Flashings* shall comply with Paragraph 4.0. Window details specific to particular *claddings* are given in Paragraph 9.2 to Paragraph 9.9. Door details shall be based on window details.

After installation, the flange forming the window or door facing shall have a 10 mm overlap over the surrounding *cladding* material or associated back *flashings*. A minimum of 8 mm effective overlap on the sill shall be permitted where necessary to allow for on-site tolerances.

9.1.10.1 Scope

This Acceptable Solution is limited to frame sizes of 5000 mm x 5000 mm or less, and to fixed hinged and stayed windows and doors. This Acceptable Solution does not cover bi-fold, sliding and other opening types.

COMMENT:
Certain aluminium joinery sections with a deep profile (such as bi-fold and sliding doors and windows) will not be able to use the sill details included in this Acceptable Solution and achieve the required window facing cover and sill support with a sloped sill tray. The sill details in these cases shall be specifically designed.

Amend 2 Jul 2005

9.1.10.2 Treatment of opening

Treatment of the window opening for *direct fixed* wall *claddings* shall be as shown in Figure 72. As shown, the sill trimmer may need to be chamfered to allow installation of the sill tray. A sloped packer may be used to support the tray.

Amend 2 Jul 2005

Window openings for wall *claddings* over *drained cavities* shall be as shown in Figure 72, except that there shall be no sill *flashing*.

9.1.10.3 Window heads

All windows and doors shall include head *flashings*, sealed to the *building wrap* as shown in Figure 71.

In walls with a *drained cavity*, a *flashing* system shall be installed at the head of the window to:

a) Protect the window opening from water entry, and

b) Direct any water entering the *drained cavity* above the window opening to the outside away from the opening.

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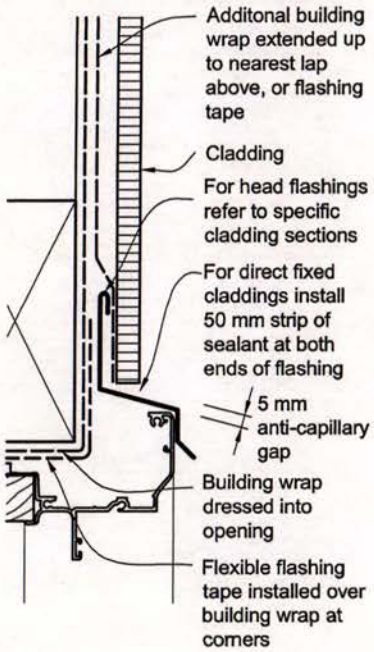
Building Control Office
Date 29-03-07

Figure 71: General sealing of head flashing
Paragraphs 9.1.7 e), 9.1.10.3 and 9.1.10.4 c)

NOTE: May also use *building wrap* lapped over flashing upstand in lieu of *flexible flashing tape*. Refer cladding window details, for example Figure 115.



Amend 2 Jul 2005

9.1.10.4 Head flashings

Head *flashings* shall be in accordance with Paragraph 4.6.1.6 and Table 7, unless specifically shown otherwise, and shall: Amend 2 Jul 2005

a) Direct water to the outside of the wall *cladding*, and

b) For wall *claddings* on cavity walls, incorporate 10 mm turn-ups as *stopends*. *Stopends* shall be terminated at the inside face of the *cladding* so they do not pass through the *cladding*, and Amend 2 Jul 2005

COMMENT:
Stopends are useful to prevent water moving past the ends of head *flashings*. However, additional problems of weatherproofing occur where the *stopend* penetrates the *cladding*. Amend 2 Jul 2005

c) Have the upstand of the *flashing* protected from moisture by lapping an additional layer of *building wrap* over the upstand, or by using *flexible flashing tape* as shown in Figure 71. The additional *building wrap* shall extend from the nearest lap above, and be lapped under the top layer.

9.1.10.5 Window sills

Sill tray *flashings* shall be in accordance with Table 7. Amend 2 Jul 2005

a) *Direct fixed claddings* shall have sill tray *flashings* that direct moisture to the outside face of the *cladding system* as shown in the details included in Paragraph 9.2 to Paragraph 9.9. The sill *flashing* shall extend back past the condensation channel of the window. The 5 mm gap between the window facing and sill tray must not be sealed.

b) *Claddings* over a *drained cavity* shall have:
   i) face-fixed windows and doors, installed so the window frame flange facing is forward of the line of the *cavity battens*, and
   ii) no sill trays,
   iii) there is no requirement to maintain a 5 mm gap between the *cladding* and window facing at the sill or jamb with a cavity. Sealing this gap may reduce water entry during routine maintenance such as washing the *building*. Amend 2 Jul 2005

COMMENT:
If a *cladding* requires continuous horizontal support below the window sill, a sill tray will be needed to direct water from the back of the *drained cavity* out over the *cladding*. This will require *specific design*. Amend 2 Jul 2005

c) Where sill supports are required, they shall be supplied as an integral part of the window installation and installed to the window manufacturer's recommendations. Amend 2 Jul 2005

COMMENT:
Alternatives may include a flat extruded sill tray with a *stopend* on three sides. Manufacturers should be consulted for specific details and results of testing on these.

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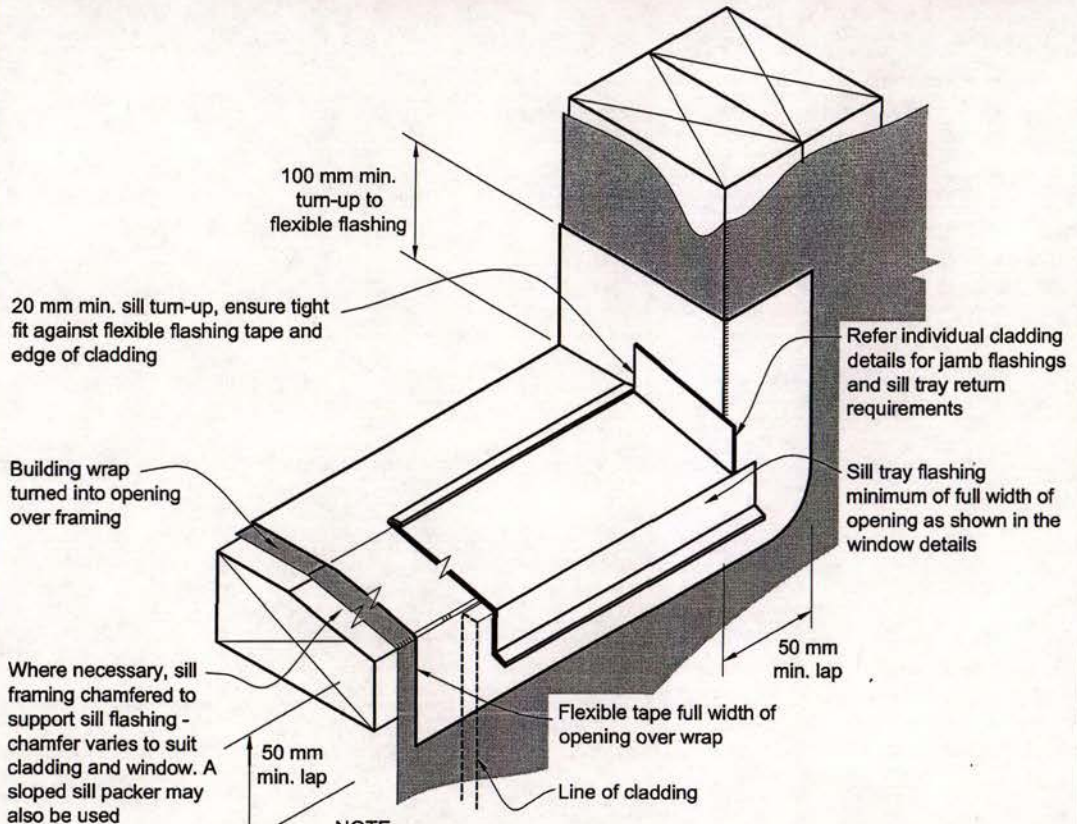
Figure 72: General window opening
Paragraphs 9.1.5 and 9.1.10.2, Figures 76, 81-86, 90, 91, 95, 99, 115, 116, 127 and 128



NOTE:
(1) Detailed *cladding* omitted for clarity, refer to specific *claddings*.
(2) Sill *flashing* shall extend back past the condensation channel of the window.
(3) Head to be treated similarly with continuous *building wrap* and *flexible tape* at corners.
(4) Openings in *cavity walls* shall be treated similarly, except the sill *flashings* shall be omitted.

Amend 2 Jul 2005

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9.1.10.6 Jamb flashings

Amend 2 Jul 2005 |

Jamb *flashings* shall be in accordance with Paragraph 4.0 and Table 7, and shall be installed where required in the figures included in Paragraph 9.2 to Paragraph 9.9.

Where required, jamb *flashings* shall overlap sill *flashings*, and direct moisture to the outside face of the *cladding system*.

9.1.10.7 Closed cell foam tape

Compressible foam tape shown behind window facings and *cladding* joints shall be closed cell PVC foam, with:

a) Hardness 55-60 to ASTM D2240 Scale OO,

b) Grade VE-43 to ASTM D1667,

c) Compression set of 20% maximum to ASTM D1667, and

d) UV weathering in UV Weatherometer for 1500 light hours to ASTM G154 or ASTM G155 with no visible deterioration in appearance.

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3 GREAT PRODUCTS
providing THE SYSTEM THAT MATTERS
SIMPLE • QUICK • EASY • ECONOMICAL

BEAL C403

ALUBAND

Window Sealing Tape

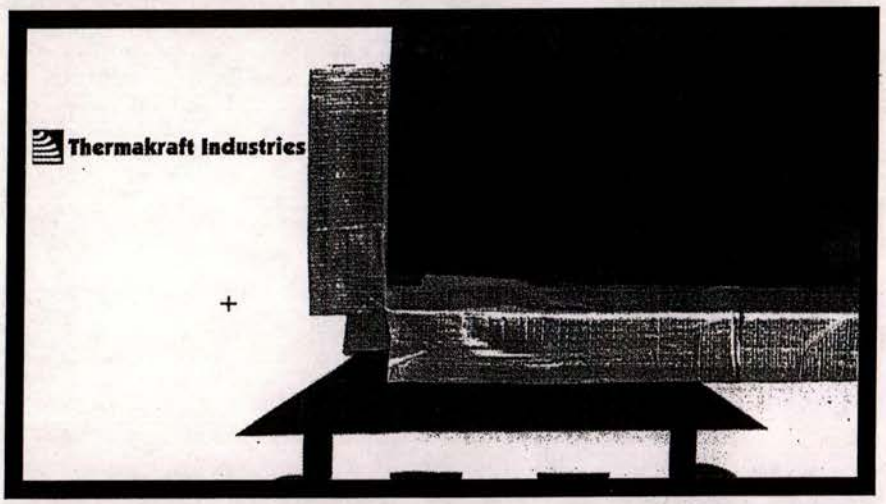
WHAKATANE DISTRICT COUNCIL APPROVED FOR CONSTRUCTION
Building Control Office
Date 29-03-05

NOTE *that when* **THERMAKRAFT ALUBAND WINDOW SEALING TAPE** *is used in conjunction with* **LOSP treated timber,** *the solvent must be allowed to flash off before installation of the tape (i.e. minimal smell).*

ALUBAND

1

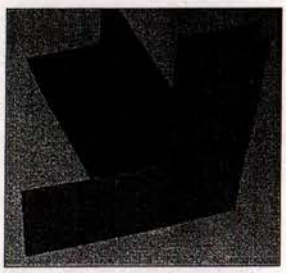
- High quality bituminous modified self adhesive tape
- Full appraisal
- 50 year durability
- Meets all building codes
- An appraised solution
- The complete system
- Must not be exposed for more than 10 weeks
- May be used on all building membranes:-
  woven & non-woven
  such as:
  Cover-up & WaterGate, Bituminous & FR Paper
  such as:
  Thermakraft FR and Thermakraft Building Papers



Corner Moulded Piece

2

- Sill/jamb moisture protection
- Quick & simple to use
- Fits both left & right corners
- Flexible to allow 5° chamfer
- 50 year guarantee
- Easy fixing with staples

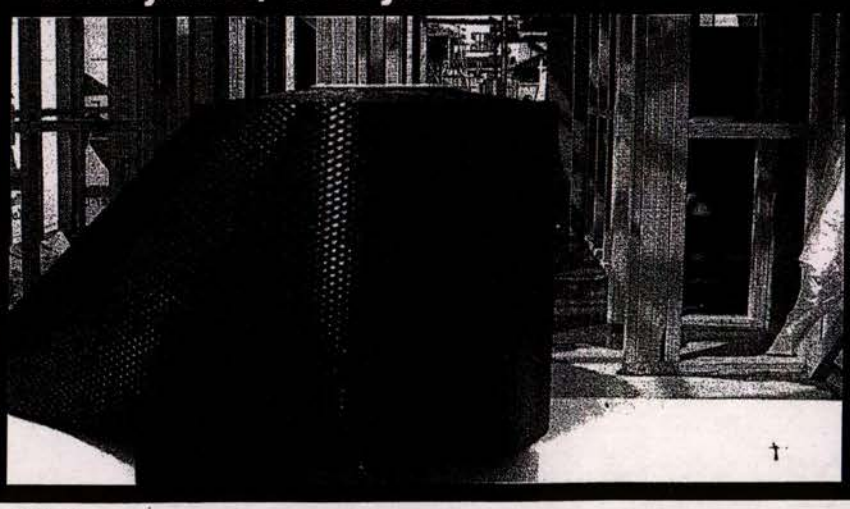


Supercourse 500

3

- Embossed for a mortar key
- Tear resistant
- 50 year durability
- A permanent concealed window flashing
- Rot & tear resistant
- Stops moisture migration from the footings
- Unaffected by LOSP solvent

No more call backs for leaky window frames, head jambs, door jambs and brick veneer



Super 500
Damp Proof Course & Concealed Flashing

BRANZ APPRAISED SPECIFY WITH CONFIDENCE

APPRAISAL CERTIFICATE No. 329

CI/SfB
FEBRUARY 2005

hermakraft ALU WINDOW SEALING SYSTEM

FIG 1 STAPLE GUN•KNIFE•ALUBAND•SUPERCOURSE•CORNER MOULD•ALUBAND TOOL

FIG 2 CUT OPENING AS SHOWN ABOVE. FOLD BACK & STAPLE

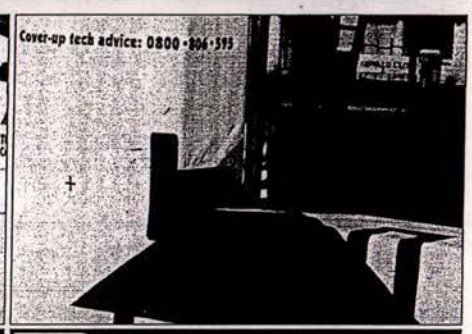


FIG 3 STAPLE THE CORNER MOULDS TO ALL FRAME CORNERS

ALUBAND Window Sealing Tape IS AN ALUMINIUM-FACED, BITUMINOUS, SELF ADHESIVE, WITH A POLYETHYLENE BACKING.

THE SYSTEM • THE METHOD

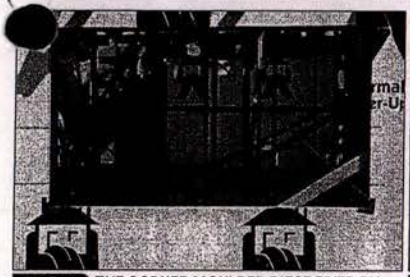


FIG 4 THE CORNER MOULDED PIECE FIXED BY STAPLES TO ALL JAMB/SILL INTERSECTIONS, BOTH TOP AND BOTTOM. THE SPECIALLY DESIGNED PIECE FITS LEFT OR RIGHT HAND CORNERS.

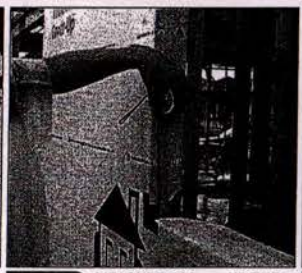


FIG 5 MEASURE 200mm UP THE JAMB, ADD BOTH UPSTANDS TO THE SILL MEASUREMENT AND CUT THE ALUBAND. NEXT REMOVE RELEASE POLYETHYLENE FILM AS YOU ADHERE THE TAPE TO THE FRAME.

FIG 6 ENSURE A FIRM PRESSURE IS MAINTAINED DURING THE APPLICATION. THE EDGES OF ALUBAND MUST BE PUSHED FIRMLY INTO THE WRAP OR BUILDING MEMBRANE.

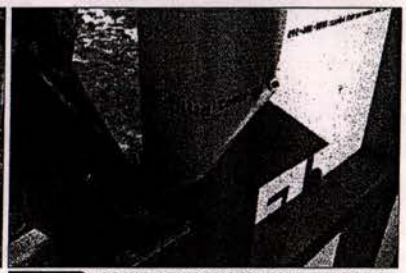


FIG 7 AS WITH THIS PHOTO, ***NOTE THE USE OF THE ALUBAND TOOL TO PUSH THE ALUBAND TIGHTLY INTO THE CORNER MOULD. ENSURE ALUBAND IS NOT ADHERED PAST THE INSIDE FACE OF THE SILL. THE ALUBAND IS NOW READY TO BE CUT AT THE SILL/JAMB INTERSECT. (REFER FIG 9).***

FIG 8 PRESS FIRMLY ALONG THE SILL AND JAMB PRIOR TO MAKING THE CORNER CUT.

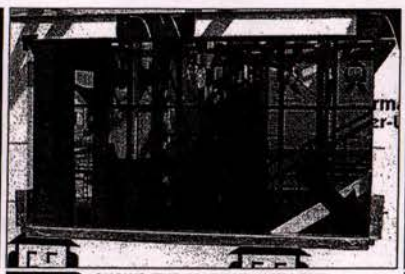


FIG 9 SHOWS THE ALUBAND WITH THE FLANGES FOLDED BACK ONTO THE COVER-UP MEMBRANE, EXPOSING THE BOTTOM EDGE OF THE CORNER MOULDED PIECE.

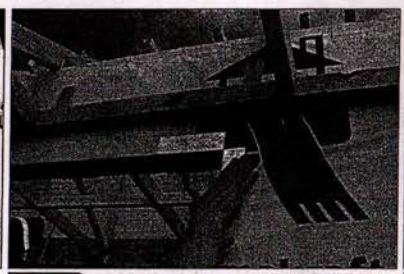


FIG 10 PROCEED TO FIX ALUBAND TO THE TOP CORNERS OF THE FRAME, CUTTING THE TAPE AND FOLDING BACK ONTO THE COVER-UP, LEAVING THE EXPOSED CORNER OF OUR MOULDED PIECE.

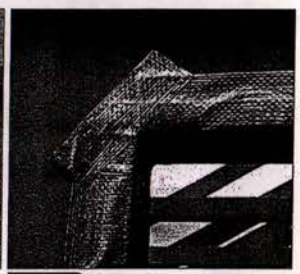


FIG 11 CUT A 100mm x 50mm WIDE ALUBAND AND FIX THE TAPE AT 45° ANGLE, COVERING THE CORNER MOULDED PIECE. THE FRAME IS NOW READY FOR THE WINDOW.

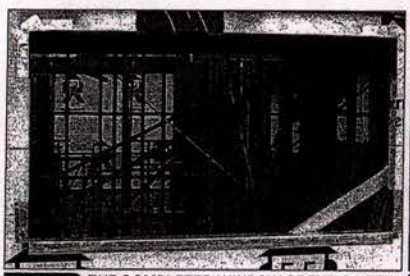


FIG 12 THE COMPLETED WINDOW OPENING WITH THE ALUBAND AND CORNER MOULDED PIECE, NOW READY TO ACCEPT THE WINDOW FRAME.

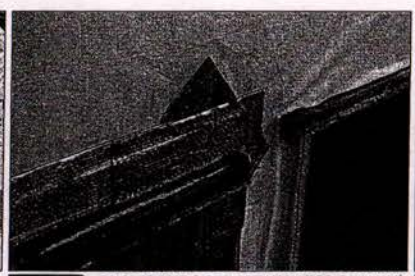


FIG 13 SHOWS THE CORRECT WAY FOR SEALING THE TOP WINDOW FLASHING, USING ALUBAND TO ADHERE THE FLASHING DIRECT TO THE COVER-UP WALL WRAP. ***NOTE THE ADJACENT FLASHING WHICH HAS BEEN INCORRECTLY FITTED UNDER THE COVER-UP.***

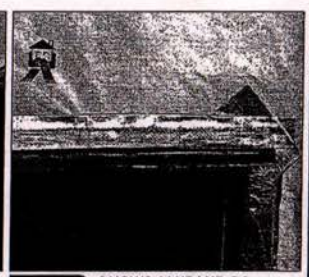


FIG 14 SHOWS ALUBAND 50mm WINDOW SEALING TAPE FIRMLY ADHERED TO THE COVER-UP MEMBRANE. ***NOTE THE TAPE IS EXTENDED 50mm PAST THE ENDS OF THE METAL FLASHING.***

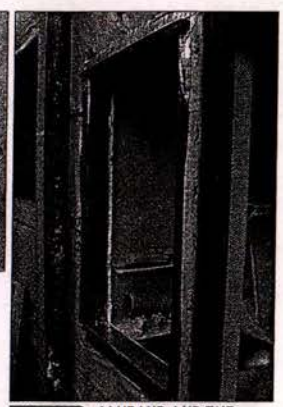


FIG 15 ALUBAND AND THE CORNER MOULDED PIECE COVERING THE WHOLE FRAME, WITH THE METAL FLASHING TAPED TO THE COVER-UP. THE FULL WINDOW TAPING IS A REQUIREMENT FOR SPECIFIC EXTERIOR SHEATHINGS.

Thermakraft ALU WINDOW SEALING SYSTEM
is used for: REPAIRS•WATERPROOFING•PIPEWORK•TILES•CONCRETE

F & O F

Thermakraft ALU WINDOW SEALING TAPE

Results of Material Test - Copies & Full Report available on request - B.E.A.L. Cert. No. C403

TEST	METHOD	RESULT
ACCELERATED AGING	AC148S4.3.12. METHOD B	PASS
COMPATABILITY	BQ1 TM1 410 NO INCOMPATABILITY	PASS
PEEL ADHESION	ASTM D903	PASS
UV RESISTANCE	ASTM D4587-01 240HRS	PASS
TENSILE STRENGTH	ASTM E154 (DRY NOT WET)	PASS
WATER PERMEABILITY	AS/NZ 4347.1.1995	PASS
NAIL RESISTANCE	ASTM D 1970	PASS
TEAR RESISTANCE	ASTM D 1938	PASS
COLD BEND TEST	AC 148 S4.6.1	PASS

THERMAKRAFT ALUBAND TABLE OF PROPERTIES		
COMPOUND - BITUMEN MODIFIED WITH SYNTHETIC COMPOUNDS		
THICKNESS - 1.06mm (MINIMUM)		ASTMD 1000
TOTAL THICKNESS - 1.12mm (MINIMUM)		ASTM 1000
ADHERENCE ON PRIME STEEL - 27.7n/cm		DIN 30672
RESISTANCE TO PENETRATION - SATISFACTORY		DIN 30672
TEMPERATURE OF APPLICATION		5° +50°C
TEMPERATURE OF OPERATION		-10° +50°C
ALUBAND ROLL DIMENSIONS	150mm x 25.0m	4 ROLL CARTON
	50mm x 25.0m	12 ROLL CARTON

Thermakraft Corner Moulded Piece

Corner Moulded Pieces = 50 units per packet / 20 packets per box (1000 pieces)

WINDOW SEALING TECHNOLOGY FOR SILL & JAMB INTERSECT

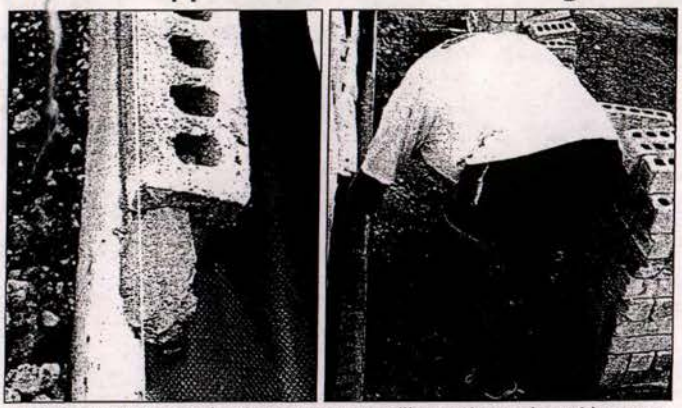
Simple application providing a sure and permanent
WATER & MOISTUREPROOF BARRIER *for* WINDOWS & DOORS

NOTE: *When using the corner mouldings at the top corners of the window, use a 50mm flashing tape over the top corner piece angled at 45° (Refer Fig 11)*

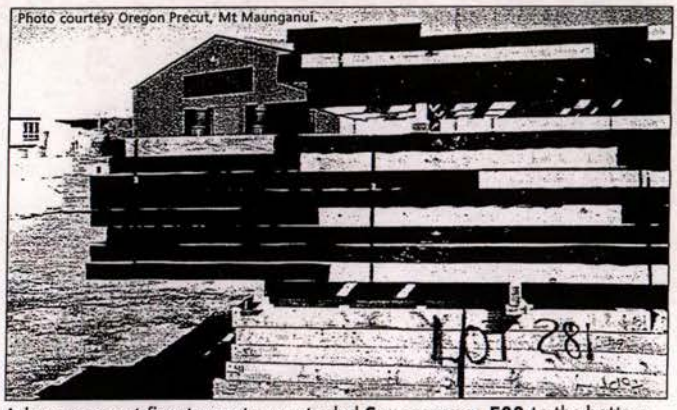
E & O E

Thermakraft Supercourse 500 Embossed

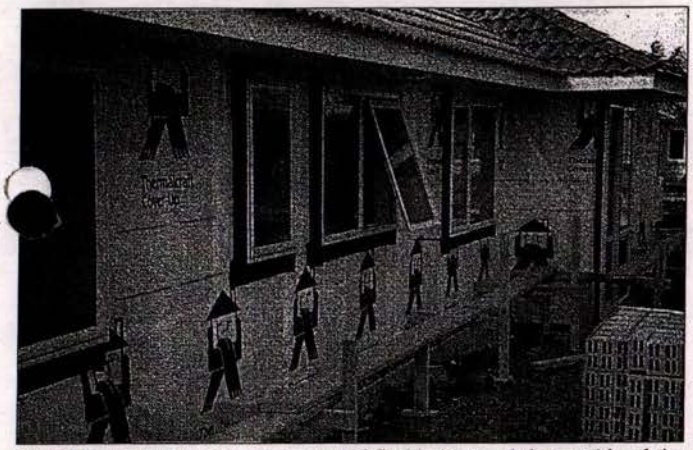
Hi-tensile appraised concealed flashing for WINDOWS, DOORS, BRICK & DAMP-PROOF COURSE



Supercourse 500 as a barrier to prevent capillary action and provides a run-off from the Wall Wrap. **Supercourse 500** is stapled on the stud face down to the brick course running longitudinally, then sandwiched into the mortar.



Ask your pre-cut firm to quote pre-stapled **Supercourse 500** to the bottom plate. It saves time, no fuss - no mess, and the stapled **Supercourse 500** will not pull away from the frame.



Supercourse 500 used as a concealed flashing around the outside of the window frame.

Supercourse 500 as a flashing below the ranchslider and fixed into the block work.

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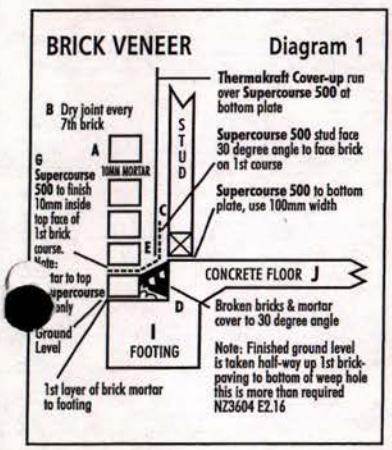
Building Control Office
Date 29-03-07

Supercourse 500 used under the Wall Wrap and down the stud face covering the footing, prior to commencing brick work.

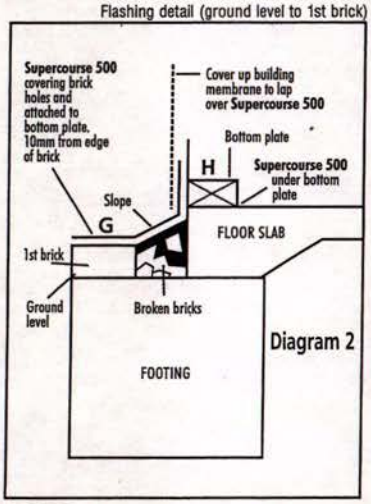


Supercourse 500
Method:

A) Mortar 10mm.
B) Dry Joint every 7th brick.
C) 40mm cavity brick to frame.
D) Back fill behind 1st layer of bricks. Fill 40mm cavity with broken bricks.
E) Cover broken bricks and fill with mortar. Provide a 30-40 degree angle.
F) Mortar corners and slope upwards to edge of bottom plate.
G) Lay **Supercourse 500** over top of first layer of bricks. Longitudinally ensure all holes in the brick are covered, allow 10mm clearance from edge of brick. (This will prevent rise of moisture which can exceed a height of 6 bricks).
H) Bottom plate.
I) Foundation 200mm.
J) Floor thickness 100mm.

Note: On all corners use two layers of **Supercourse 500.**

Flashing detail (ground level to 1st brick)



Supercourse 500
Place 1st run of bricks as normal, with mortar to foundation.
Supercourse 500 width 300mm and 250mm staple to bottom plate or frame longitudinally with galvanised staples or clouts.
Thermakraft Cover-up fire retardant breather type wall membrane must extend over the face of the **Supercourse 500,** to complete the moisture barrier and provide run off.
Supercourse 500 flashing fold longitudinally down over top of mortared angle onto the top of the first layer of bricks.
Supercourse 500 should cover the brick cavity holes and finish 10mm from it's edge. (Refer Fig 4a and 4b).
Once this is completed, brick and mortar to required wall height. (On the first course of bricks above the flashing, leave a dry joint on each 7th brick).

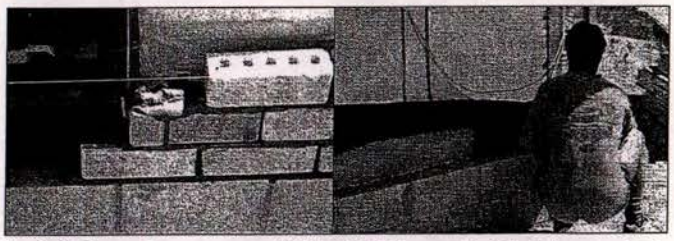
NOTE: Supercourse 500 IS UNAFFECTED BY LOSP SOLVENT

Supercourse 500 D.P.C. & Concealed Flashings meets the performance provisions of NZBC E2.3•2, E2.3•3 & E2.3•5. Full copies of BRANZ Appraisal available on request.

Durability: Supercourse 500 D.P.C. & Concealed Flashings meets the provision of B2•3(b) 50yrs

Impact resistance Supercourse 500 D.P.C. & Concealed Flashings has passed the standard impact requirements (AS/NZS 4347•6 1995)

Product Description: Supercourse 500 Damp Proof Course & Concealed Flashing is a 0.5mm thick extruded hi-impact Polyethylene and is embossed on both faces and is now available in standard widths of 50-75-90-100-150-200-250 & 300mm, with an extended width of 1000mm also available and special widths are available on request.
Each roll is 20 metres in length and is similar in price to Bitumen D.P.C.



Installation: Supercourse 500 D.P.C. & Concealed Flashing must not be used where it is exposed to direct sunlight. When it is used as a D.P.C. to separate materials from source of moisture, the surfaces to be separated must be smooth and flat and free from projections or sharp ridges.
When used as a window or door flashing **Supercourse 500** must be installed in a way that ensures the joint between the window and door frame and cladding is at least as waterproof as cladding itself.

Thermakraft Industries (NZ) Ltd

11 Turin Place, East Tamaki, Auckland, New Zealand
P.O. Box 58-112, Greenmount, Auckland, NZ
Freephone: 0800-806 595 Phone: 09-273 3727 Fax: 09-273 3726
Email: sales@thermakraft.co.nz Website: www.thermakraft.co.nz

CUSTOMER COPY

GLENN'S Glass & Aluminium
Now and then you do need Glenn !

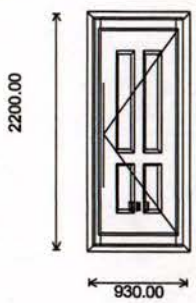
Quote No. **-1301- Ver 4**
Quote Date: **24/01/2007**
Last Modify Date: **24/01/2007**

Quote Valid Until: **23/02/2007**
Job No.

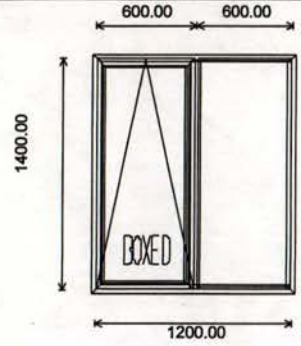
Customer Details	Company Details
HALLMARK HOMES	Phone: **07 307 0059**
	Fax: **07 307 0814**
	Sales Rep:
	Client Code: **HM**
	Company Address: **141 COMMERCEST WHAKATANE**
Phone: 3086655	
Fax: 3086625	
Mobile :	
Contact : MIKE	
Title: BARRACLOUGH & BENNETT	Quote Comments:
Delivery Address	

Quote Summary:

Total Frames: **19**

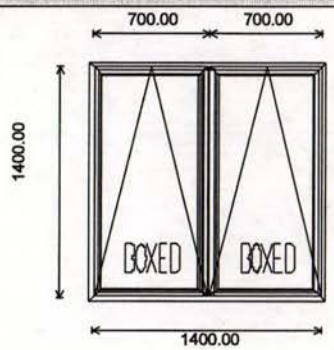
Item 1: ENTRY (4 PANEL ALI CLASSIC)		Quantity	Level
 Open In	Trim Size: 2215 x 945 Finish: POWDER COAT ONE Reveal: FJ H3 PINE 19mm Quote Option: STANDARD HARDWARE Wind Loading: High Wind Zone WANZ WIS N (Neither) Flashing: 01095 66MM FLASHING Glass: MYSESONDFILLNOTTOCHANGE Hardware: LCL 30mm 3PT VERONA K/K 5PIN	1	
		Special Comments	

WHAKATANE DISTRICT COUNCIL
APPROVED FOR CONSTRUCTION
..... Building Control Office
Date 29-03-07

Item 2: BED 3	Quantity	Level
	1	

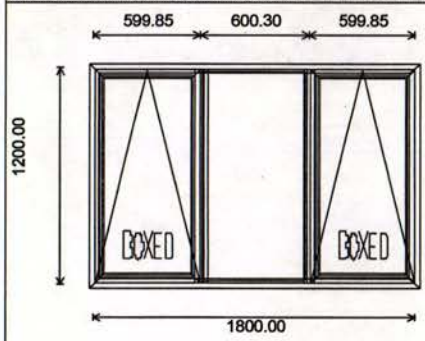
Trim Size:	1415 x 1215
Finish:	POWDER COAT ONE
Reveal:	FJ H3 PINE 19mm
Quote Option:	STANDARD HARDWARE
Wind Loading:	High Wind Zone
WANZ WIS	N (Neither)
Flashing:	01095
	66MM FLASHING
Glass:	4mm Clear Float
Hardware:	ARIA WEDGELESS H/P FF LH BLACK

Special Comments

Item 3: BED 3	Quantity	Level
	1	

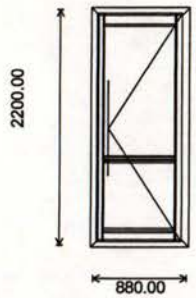
Trim Size:	1415 x 1415
Finish:	POWDER COAT ONE
Reveal:	FJ H3 PINE 19mm
Quote Option:	STANDARD HARDWARE
Wind Loading:	High Wind Zone
WANZ WIS	N (Neither)
Flashing:	01095
	66MM FLASHING
Glass:	4mm Clear Float
Hardware:	ARIA WEDGELESS H/P FF LH BLACK, ARIA WEDGELESS H/P FF RH BLACK

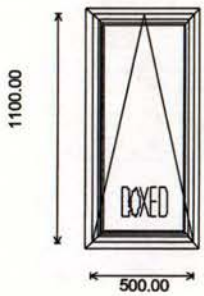
Special Comments

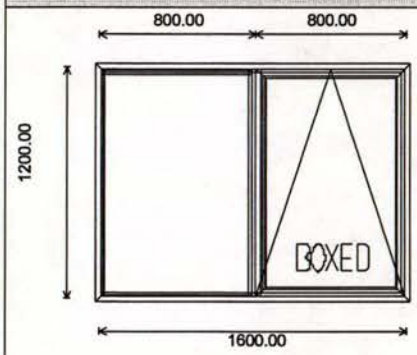
Item 4: LAUNDRY	Quantity	Level
	1	

Trim Size:	1215 x 1815
Finish:	POWDER COAT ONE
Reveal:	FJ H3 PINE 19mm
Quote Option:	STANDARD HARDWARE
Wind Loading:	High Wind Zone
WANZ WIS	N (Neither)
Flashing:	01095
	66MM FLASHING
Glass:	4mm Clear Float
Hardware:	ARIA WEDGELESS H/P FF LH BLACK

Special Comments

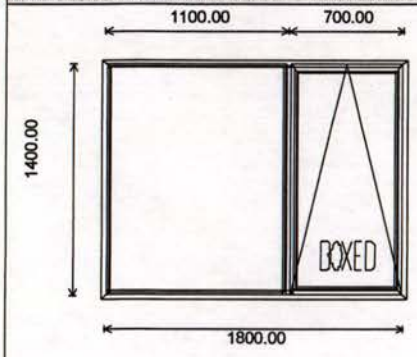
Item 5: LAUNDRY		Quantity	Level
 Open In	Trim Size: 2215 x 895 Finish: POWDER COAT ONE Reveal: FJ H3 PINE 19mm Quote Option: STANDARD HARDWARE Wind Loading: High Wind Zone WANZ WIS N (Neither) Flashing: 01095 66MM FLASHING Glass: 4mm Clear Float Tough 5mm Clear Float Hardware: LCL 30mm 3PT VERONA K/K 5PIN	1	
		Special Comments	

Item 6: W/C		Quantity	Level
	Trim Size: 1115 x 515 Finish: POWDER COAT ONE Reveal: FJ H3 PINE 19mm Quote Option: STANDARD HARDWARE Wind Loading: High Wind Zone WANZ WIS N (Neither) Flashing: 01095 66MM FLASHING Glass: 4mm Clear Cathedral Hardware: ARIA WEDGELESS H/P FF LH BLACK	1	
		Special Comments	

Item 7: BATH		Quantity	Level
	Trim Size: 1215 x 1615 Finish: POWDER COAT ONE Reveal: FJ H3 PINE 19mm Quote Option: STANDARD HARDWARE Wind Loading: High Wind Zone WANZ WIS N (Neither) Flashing: 01095 66MM FLASHING Glass: 4mm Clear Cathedral Tough Hardware: ARIA WEDGELESS H/P FF LH BLACK, ARIA WEDGELESS H/P FF RH BLACK	1	
		Special Comments	

Item 8: BED 2

Quantity	Level
1	

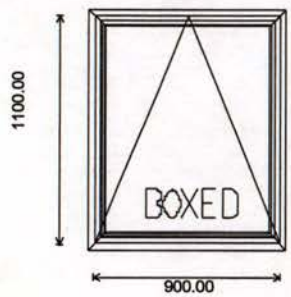


Trim Size:	1415 x 1815
Finish:	POWDER COAT ONE
Reveal:	FJ H3 PINE 19mm
Quote Option:	STANDARD HARDWARE
Wind Loading:	High Wind Zone
WANZ WIS	N (Neither)
Flashing:	01095
	66MM FLASHING
Glass:	4mm Clear Float 5mm Clear Float
Hardware:	ARIA WEDGELESS H/P FF LH BLACK, ARIA WEDGELESS H/P FF RH BLACK

Special Comments

Item 9: ENS

Quantity	Level
1	

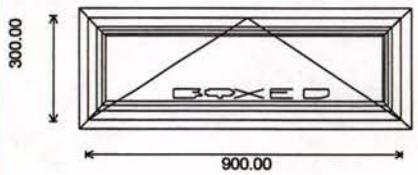


Trim Size:	1115 x 915
Finish:	POWDER COAT ONE
Reveal:	FJ H3 PINE 19mm
Quote Option:	STANDARD HARDWARE
Wind Loading:	High Wind Zone
WANZ WIS	N (Neither)
Flashing:	01095
	66MM FLASHING
Glass:	4mm Clear Cathedral Tough
Hardware:	ARIA WEDGELESS H/P FF LH BLACK, ARIA WEDGELESS H/P FF RH BLACK

Special Comments

Item 10: ROBE

Quantity	Level
1	



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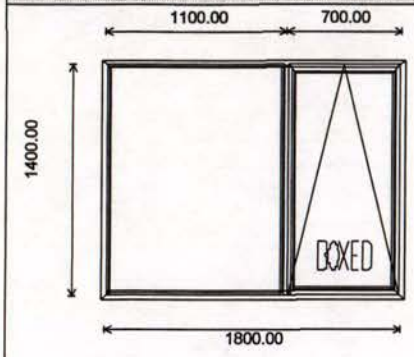
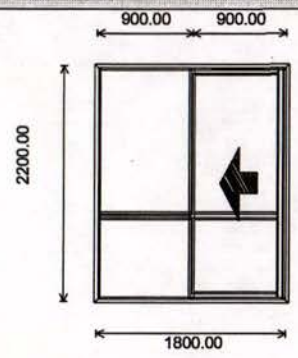
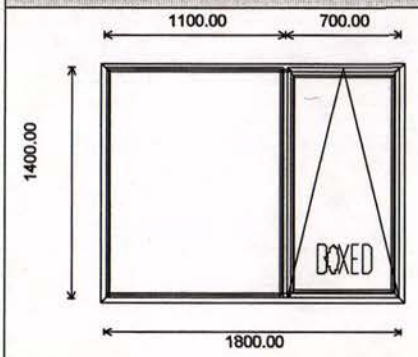
Finish:	POWDER COAT ONE
Reveal:	FJ H3 PINE 19mm
Quote Option:	STANDARD HARDWARE
Wind Loading:	High Wind Zone
WANZ WIS	N (Neither)
Flashing:	01095
	66MM FLASHING
Glass:	4mm Clear Float
Hardware:	ARIA WEDGELESS H/P FF LH BLACK, ARIA WEDGELESS H/P FF RH BLACK

Special Comments

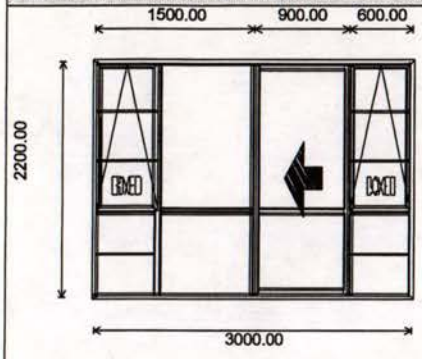
Item 11: BED	Quantity	Level
	1	
Trim Size: 1415 x 1815 Finish: POWDER COAT ONE Reveal: FJ H3 PINE 19mm Quote Option: STANDARD HARDWARE Wind Loading: High Wind Zone WANZ WIS N (Neither) Flashing: 01095 66MM FLASHING Glass: 4mm Clear Float 5mm Clear Float Hardware: ARIA WEDGELESS H/P FF LH BLACK, ARIA WEDGELESS H/P FF RH BLACK	Special Comments	

Item 12: BED	Quantity	Level
	1	
Trim Size: 2215 x 1815 Finish: POWDER COAT ONE Reveal: FJ H3 PINE 19mm Quote Option: STANDARD HARDWARE Wind Loading: High Wind Zone WANZ WIS N (Neither) Flashing: 01095 66MM FLASHING Glass: 5mm Clear Float Hardware: ALBANYS/FACE LK BLACK	Special Comments	

Item 13: DINING	Quantity	Level
	1	
Trim Size: 1415 x 1815 Finish: POWDER COAT ONE Reveal: FJ H3 PINE 19mm Quote Option: STANDARD HARDWARE Wind Loading: High Wind Zone WANZ WIS N (Neither) Flashing: 01095 66MM FLASHING Glass: 4mm Clear Float 5mm Clear Float Hardware: ARIA WEDGELESS H/P FF LH BLACK, ARIA WEDGELESS H/P FF RH BLACK	Special Comments	

Item 14: FAMILY & LIVING

Quantity	Level
2	

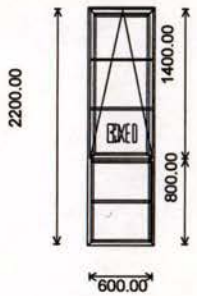


Trim Size:	2215 x 3015
Finish:	POWDER COAT ONE
Reveal:	FJ H3 PINE 19mm
Quote Option:	STANDARD HARDWARE
Wind Loading:	High Wind Zone
WANZ WIS	N (Neither)
Flashing:	01095
	66MM FLASHING
Glass:	4mm Clear Float 5mm Clear Float
Hardware:	ALBANYS/FACE LK BLACK, ARIA WEDGELESS H/P FF LH BLACK

Special Comments

Item 15: FAMILY

Quantity	Level
1	



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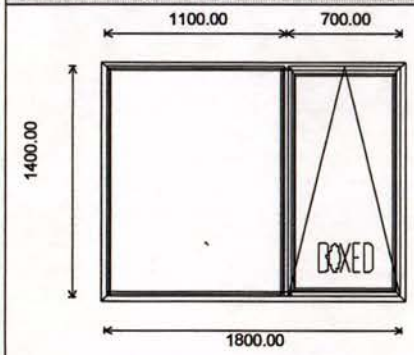
Finish:	POWDER COAT ONE
Reveal:	FJ H3 PINE 19mm
Quote Option:	STANDARD HARDWARE
Wind Loading:	High Wind Zone
WANZ WIS	N (Neither)
Flashing:	01095
	66MM FLASHING
Glass:	4mm Clear Float 5mm Clear Float
Hardware:	ARIA WEDGELESS H/P FF LH BLACK

Special Comments

Item 16: LIVING

Quantity	Level
1	



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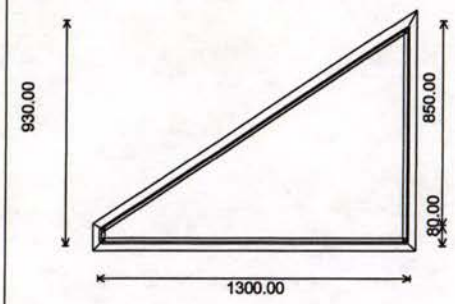
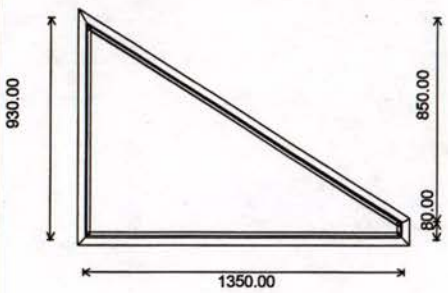
Finish:	POWDER COAT ONE
Reveal:	FJ H3 PINE 19mm
Quote Option:	STANDARD HARDWARE
Wind Loading:	High Wind Zone
WANZ WIS	N (Neither)
Flashing:	01095
	66MM FLASHING
Glass:	4mm Clear Float 5mm Clear Float
Hardware:	ARIA WEDGELESS H/P FF LH BLACK, ARIA WEDGELESS H/P FF RH BLACK

Special Comments

Item 17: ABOVE		Quantity	Level
	Trim Size: 945 x 1315 Finish: POWDER COAT ONE Reveal: FJ H3 PINE 19mm Quote Option: STANDARD HARDWARE Wind Loading: High Wind Zone WANZ WIS N (Neither) Flashing: 01095 66MM FLASHING Glass: 4mm Clear Float Hardware:	1	
		Special Comments	

Item 18: ABOVE		Quantity	Level
	Trim Size: 945 x 1365 Finish: POWDER COAT ONE Reveal: FJ H3 PINE 19mm Quote Option: STANDARD HARDWARE Wind Loading: High Wind Zone WANZ WIS N (Neither) Flashing: 01095 66MM FLASHING Glass: 4mm Clear Float Hardware:	1	
		Special Comments	

19	UNITS VIEWED FROM OUTSIDE	1
20	GLAZED TO NZS 4223	1
21	HEAD FLASHINGS ONLY	1
22	UNITS DELIVERED TO SITE	1

Nett	$8,552.46
G.S.T.	$1,069.05
Total	$9,621.51

INTERIOR DOOR TRIM SIZES

FAXED

	Single Hung	Double Hung	Face Slider	Double Slider	Single Bi-fold	Double Bi-fold	Single Cavity Slider	Double Cavity Slider
Slimline Double Groove 18mm	2035 High door width + 55mm	2035 High 2 x door widths + 55mm	2025 High door width + 10mm	2080 High 2 x door width + 20mm	2060 High 2 x door width + 70mm	2060 High 4 x door width + 70mm	2075 High 2 x door width + 30mm	2075 High 4 x door width + 10mm
Slimline for Arc's 18mm	2035 High door width + 55mm	2035 High 2 x door width + 55mm	2025 High door width + 10mm	2075 High 2 x door width + 20mm	2055 High 2 x door width + 60mm	2055 High 4 x door width + 60mm	2075 High 2 x door width + 30mm	2075 High 4 x door width + 10mm
Flat for Arc's 18mm	2035 High door width + 55mm	2035 High 2 x door width + 55mm	2025 High door width + 10mm	2075 High 2 x door width + 20mm	2055 High 2 x door width + 60mm	2055 High 4 x door width + 60mm	2075 High 2 x door width + 30mm	2075 High 4 x door width + 10mm
2 Piece Jamb	2035 High door width + 55mm	2035 High 2 x door width + 55mm	2025 High door width + 10mm	2075 High 2 x door width + 20mm	2055 High 2 x door width + 60mm	2055 High 4 x door width + 60mm	2075 High 2 x door width + 30mm	2075 High 4 x door width + 10mm
25mm Double Grooved	2045 High door width + 65mm	2045 High 2 x door width + 65mm	2025 High door width + 10mm	2080 High 2 x door width + 20mm	2060 High 2 x door width + 70mm	2060 High 4 x door width + 70mm	2075 High 2 x door width + 30mm	2075 High 4 x door width + 10mm
30mm Double Grooved	2050 High door width + 75mm	2050 High 2 x door width + 75mm	2025 High door width + 10mm	2085 High 2 x door width + 20mm	2070 High 2 x door width + 80mm	2070 High 4 x door width + 80mm	2075 High 2 x door width + 30mm	2075 High 4 x door width + 10mm
30mm Slimline Double Grooved	2050 High door width + 75mm	2050 High 2 x door width + 75mm	2025 High door width + 10mm	2085 High 2 x door width + 20mm	2070 High 2 x door width + 80mm	2070 High 4 x door width + 80mm	2075 High 2 x door width + 30mm	2075 High 4 x door width + 10mm

Note: Standard Cavity Sliders should be in a 90 or 94mm Stud Wall

Note: 2 Piece jamb fixing relys on a return stud on each side

NEW ZEALAND
APRIL 2006

JAMES HARDIE WEATHERBOARDS

TECHNICAL SPECIFICATION

James Hardie®

CONTENTS

SECTION		PAGE
1	APPLICATION & SCOPE	2
1.1	Application	2
1.2	Scope	2
1.3	Details	2
1.4	Specific Design	3
2	DESIGN	3
2.1	Compliance	3
2.2	Responsibility	3
2.3	Site & Foundation	3
2.4	Ground Clearances	3
2.5	Moisture Management	3
2.6	Structure	3
2.7	Wind Loading	3
2.8	Fire Rated Walls	3
2.9	Energy Efficiency	3
3	FRAMING	4
3.1	General	4
3.2	Dimensions	4
3.3	Structural Grade	4
3.4	Durability	4
3.5	Frame Construction	4
3.5.1	Direct Fix Construction Method	4
3.5.2	Cavity Construction Method	4
3.6	Tolerances	4
4	PREPARATION	4
4.1	Building Wrap	4
4.2	Vent Strip	4
4.3	Cavity Battens	4
4.4	Flashing	4
4.5	Intermediate support	5
4.6	Corners	5
4.7	External Corners	5
4.8	Internal Corners	5
4.9	Junctions & Penetrations	5
5	FIXING JAMES HARDIE WEATHERBOARD & JAMES HARDIE TRIM	5
5.1	General	5
5.2	Fastener Durability	5
5.3	Nail Sizes & Fixing Method	5
5.4	Gun Nailing	6
6	JOINTING	6
7	FINISHING	6
7.1	Preparation	6
7.2	Sealants	6
7.3	Painting	6
7.4	Staining	6
8	STORAGE & HANDLING	6
9	MAINTENANCE	6
10	PRODUCT INFORMATION	7
10.1	Manufacturing & Classification	7
10.2	Durability	7
10.2.1	Resistance to Moisture/Rotting	7
10.2.2	Resistance to Fire	7
10.3	Product Size & Mass	7
11	SAFE WORKING PRACTICES	7
12	PRODUCT SIZES	8
13	ACCESSORIES	9
14	DETAILS	10
15	WARRANTY	35

WE VALUE YOUR FEEDBACK

To continue with the development of our products and systems, we value your input. Please send any suggestions, including your name, contact details, and relevant sketches to:

James Hardie
Fax 0800 808 988
literaturefeedback@jameshardie.co.nz

1 APPLICATION AND SCOPE

1.1 APPLICATION

James Hardie Weatherboards are made of fibre cement and are pre-primed. They are categorised as a lightweight cladding product as per NZS 3604.

James Hardie Weatherboards are manufactured in different profiles ranging between smooth and patterned finishes such as;

SMOOTH WEATHERBOARD

Smooth Weatherboard (7.5mm) is available in three widths (180mm,240mm and 305mm) and has a smooth finish. It is 205mm wide.

RUSTICATED WEATHERBOARD

Rusticated Weatherboard (7.5mm) combines a rough- sawn texture with a smooth strip in the lap area. It is 205mm wide.

STYLELINE™ WEATHERBOARD

Styleline Weatherboard (7.5mm) has a texture of indented vertical and horizontal lines. It has a smooth strip in the area of the lap. It is 205mm wide.

COLONIAL® WEATHERBOARD

Colonial Weatherboard (7.5mm) reproduces the classic smoothness of traditional weatherboards. A recessed lap section provides a shadow line to enhance the horizontal definition of the finished cladding. It is 205mm wide.

FRONTIER WEATHERBOARD

Frontier Weatherboard (7.5mm) is available in two widths (245mm and 310mm). The board has a surface woodgrain texture.

SUMMIT WEATHERBOARD

Summit Weatherboard (9.0mm) gives a modern narrow look which is enhanced by the fine horizontal texture. It can also be concealed fixed. It is 150mm wide.

If you are a specifier

Or other responsible party for a project, ensure that the information in this document is appropriate for the application you are planning and that you undertake specific design and detailing for areas which fall outside the scope of these specifications.

If you are an installer

Ensure that you follow the design, moisture management and associated details and material selection provided by the designer. All the details provided in this document must be read in conjunction with the specifier's specification.

Make sure your information is up to date

When specifying or installing James Hardie products, ensure you have the current manual. If you're not sure you do, or you need more information, visit www.jameshardie.co.nz or Ask James Hardie on 0800 808 868.

1.2 SCOPE

This specification covers the use of James Hardie Weatherboard for buildings that fall within the scope of the NZBC Acceptable Solution 'E2/AS1', paragraph 1.1. This specification covers the use of James Hardie Weatherboards in both direct fixed and cavity construction methods. Please refer to 'E2/AS1' for further information regarding the selection of construction method for claddings.

1.3 DETAILS

Various James Hardie Weatherboard details are provided at the rear of this document. This specification and details in CAD file are also available to download from our web site at www.jameshardie.co.nz

1.4 SPECIFIC DESIGN

For use of James Hardie Weatherboards outside the scope of this document, the architect, designer or engineer must undertake specific design. For advice on designs outside the scope of this specification, Ask James Hardie on 0800 808 868.

2 DESIGN

2.1 COMPLIANCE

James Hardie Weatherboards comply with section 9.5.2 of 'E2/AS1'. Information contained in this document regarding the installation of James Hardie Weatherboards are aligned with 'E2/AS1' of NZBC.

2.2 RESPONSIBILITY

The specifier or other party responsible for the project must ensure that the information and details in this specification are appropriate for the intended application and that additional detailing is performed for specific design or any areas that fall outside the scope of this technical specification. For applications outside the scope of this literature and details which are not provided herein, the architect, designer or engineer must undertake specific design and it should be ensured that the intent of their design meets the requirements of the NZBC.

All dimensions shown are in millimetres unless noted otherwise.

All New Zealand Standards referenced in this manual are current edition and must be complied with.

James Hardie conduct stringent quality checks to ensure that any product manufactured falls within our quality spectrum. It is the responsibility of the builder to ensure that the product meets aesthetic requirements before installation. James Hardie will not be responsible for rectifying obvious aesthetic surface variations following installation.

2.3 SITE & FOUNDATION

The site on which the building is situated must comply with the NZBC (New Zealand Building Code) Acceptable Solution 'E2/AS1' 'Surface Water'. Foundation design must comply with the requirements of NZS 3604 'Timber Framed Buildings' or be as per specific engineering design. The grade of adjacent finished ground must slope away from the building to avoid the possibility of water accumulating.

2.4 GROUND CLEARANCES

The bottom of claddings must comply with the NZBC Acceptable Solution 'E2/AS1', section 9.1.3. The floor must have a minimum clearance to paved or unpaved ground as required by NZS 3604. James Hardie Weatherboards must overhang the bottom plate on a concrete slab by a minimum of 50mm as required by NZS 3604. James Hardie Weatherboard must have a minimum clearance of 100mm from paved ground and 150mm from unpaved ground.

2.5 MOISTURE MANAGEMENT

It is the responsibility of specifier to identify moisture related risks associated with any particular building design.

Wall construction design must effectively manage moisture, considering both the interior and exterior environments of the building, particularly in buildings that have a higher risk of wind driven rain penetration or that are artificially heated or cooled. Walls shall include those provisions as required by the NZBC Acceptable Solution 'E2/AS1' (third edition) 'External Moisture'. In addition all wall openings, penetrations, junctions, connections, window sills, heads and jambs must incorporate appropriate flashing for waterproofing. The other materials, components and installation methods used to manage moisture in the walls, must comply with the requirements of relevant standards and the NZBC. For further information in relation to designing for weathertightness, refer to the Building Research Association of New Zealand (BRANZ) and the Department of Building and Housing (DBH) updates on the following websites, respectively www.branz.co.nz and www.dbh.govt.nz.

2.6 STRUCTURE

Timber-framed buildings must be designed in accordance with NZS 3604 (Timber Framed Buildings). When the framing is provided as per the specific engineering design, the framing stiffness must be equivalent to or more than the stiffness requirements of NZS 3604.

2.7 WIND LOADING

James Hardie Weatherboard cladding is suitable for use in all New Zealand wind zones up to and including VH as defined in NZS 3604. A specific design is required for all situations where a building falls in a specific design (SD) wind zone.

2.8 FIRE RATED WALLS

Walls clad with James Hardie Weatherboard using a direct fix or cavity construction method can achieve fire ratings of up to 60/60/60 when constructed in accordance with this literature, including the fire rated system requirements as specified in James Hardie 'Fire and Acoustic' Technical Specification Manual. Refer to the fire and acoustic technical literature for further information about fire rated systems.

2.9 ENERGY EFFICIENCY

The R-Value of walls constructed with James Hardie Weatherboard in accordance with this manual and using bulk insulation, will comply with the Section 3.1 - 'Schedule Method' of NZS 4218 (Energy Efficiency – Small Building Envelope) required under Table 1. To meet these insulation requirements, bulk insulation as mentioned in Table 1 of this specification must be used. This calculation is based on a timber framing member size of 90 x 45mm and internal linings of James Hardie Villaboard® Lining or plasterboard.

TABLE 1:

INSULATION CAPABILITY		
Climate Zone*	**R-Value Requirement**	**Cavity Insulation Infill Requirement**
1 & 2	1.5 m^2 °C/W	R1.8 Fibreglass batts.
3	1.9 m^2 °C/W	R2.2 Fibreglass batts.

*as defined in NZS 4218

3 FRAMING

3.1 GENERAL
This James Hardie Weatherboard technical specification is only suitable for timber-framed buildings. Other framing materials are outside the scope of this specification.

3.2 DIMENSIONS
A 35mm minimum stud width is required unless noted otherwise in this specification.

3.3 STRUCTURAL GRADE
Minimum timber grade requirements are No.1 framing grade in accordance with NZS 3631 'New Zealand Timber Grading Rules' or equivalent.

3.4 DURABILITY
To comply with the NZBC requirements the external framing must be treated to a minimum H1.2 treatment. Refer to the NZBC Acceptable Solution B2/AS1 'Durability' for further information about the durability requirements.
For timber treatment information refer to NZS 3602 (Timber and Wood-Based Products for use in Buildings) and NZS 3640 (Chemical Preservation of Round and Sawn Timber) for minimum timber treatment selection and treatment requirements.
Also refer to framing manufacturer's literature for further guidance on timber selection. Framing must be protected from moisture at sites in accordance with the recommendations of framing manufacturer's.
Note: Refer to NZS 3602 for information about the allowable moisture contents in timber.

3.5 FRAME CONSTRUCTION
All timber framing sizes and set-out must comply with NZS 3604 and stud, nogs / dwangs centres as required by this specification: Use of timber framing must be in accordance with framing manufacturer's specifications.

3.5.1 DIRECT FIX CONSTRUCTION METHOD
The following framing must be provided for direct fixed construction method:
- Studs must be provided at 600mm centres maximum.
- Nogs must be provided at 1200mm centres maximum.
- Double studs will be required at internal corners for fixing weatherboards without drilling the weatherboard ends.

3.5.2 CAVITY CONSTRUCTION METHOD
The following framing must be provided for cavity construction method:
- When studs are at 600mm centres the nogs must be provided at 800mm centres maximum.
- When studs are at 400mm centres the nogs may be provided at 1200mm centres maximum.
- Double studs are required at internal corners.
- Extra packers may be required at external corners.

3.6 TOLERANCES
In order to achieve an acceptable wall finish, it is imperative that framing is straight and true.
Framing tolerances must comply with the requirements of NZS 3604.

4 PREPARATION

4.1 BUILDING WRAP
Building wrap must be provided as per the requirements of the NZBC Acceptable Solution 'E2/AS1' 'External Moisture' and NZS 3604.
The building wraps must comply with Table 23 of 'E2/AS1'.
The building wraps must be fixed in accordance with 'E2/AS1', NZS 3604 and the wrap manufacturer's recommendations.
Walls which are not lined on the inside face e.g. garage walls or gable ends must include a rigid sheathing or an air barrier behind the cladding which complies with the requirements of the NZBC 'Acceptable Solution' 'E2/AS1'.

4.2 VENT STRIP
The James Hardie uPVC cavity vent strip has opening area of 1000m²/m length and must be installed at the bottom of all walls constructed using the drained and ventilated cavity construction method. It is important that the openings in the vent strip are kept clear and unobstructed to allow free drainage and ventilation of cavities.

4.3 CAVITY BATTENS
Buildings with a risk score of 7-20 calculated in accordance with the NZBC Acceptable Solution 'E2/AS1' Table 2 require James Hardie Weatherboards to be installed on a cavity.
The battens provide airspace between the frame and cladding and are considered a 'packer' only in this specification.
The timber battens must be minimum H3.1 treated in accordance with NZS 3640 (Chemical preservation of Round and sawn timber) to comply with the durability requirements of B2/AS1.
Cavity battens must comply with 'E2/AS1' and
- be minimum 18mm thick
- be minimum as wide as the width of studs
- be fixed by the cladding fixings to the main framing through the building wrap
- until claddings are fixed the battens need only to be tacked to framing.
  (Batten fixing is required temporarily to keep them straight on the wall during construction.)

The cavity battens are installed as described below:
- Fix cavity battens to studs.
- Battens must be fixed with 40mm x 2.8mm galvanised nails at 800mm centres maximum.

4.4 FLASHING
All wall openings, penetrations, intersections, connections, window sills, heads and jambs must be flashed prior to weatherboard installation. Please refer to moisture management requirements in Clause 2.5. The building wraps must be appropriately incorporated with penetration and junction flashings. Materials must be lapped in such a way that water tracks down to the exterior on the face of building wrap. James Hardie will assume no responsibility for water infiltration within the wall due to poor installation of flashings or building wraps.
The selected flashing materials must comply with the durability requirements of table 20 of Acceptable Solution 'E2/AS1'.

4.5 INTERMEDIATE SUPPORT

Where studs are at 600mm centres an intermediate means of restraining the building wrap and insulation from bulging into the cavity shall be installed. An acceptable method to achieve this is using a

- intermediate cavity batten between the studs
- 75 mm galvanized mesh
- polypropylene tape

No intermediate supports are required

- where studs are at 400mm centres or
- when rigid sheathings instead of building wraps are used.

4.6 CORNERS

Anticipated joist shrinkage must be allowed for in the design process. Do not run trims or aluminium extrusions continuously across solid floor joists.

4.7 EXTERNAL CORNERS

James Hardie Weatherboards can be finished at external corners using uPVC or aluminium corner mould, corner soakers and box corner. Refer to Figures 5, 6, 7 & 8.

4.8 INTERNAL CORNERS

James Hardie Weatherboards can be finished at internal corners using uPVC or aluminium 'W' mould. Refer to Detail 9, 10 & 11.

4.9 JUNCTIONS & PENETRATIONS

Refer to Clause 2.5 of this specification for moisture management requirements. All windows and doors must be detailed as per the requirements of this specification. James Hardie has developed the window details for James Hardie Weatherboards which meet the requirements of E2 'External Moisture' approved document of the NZBC. Refer to Figures 13, 14 & 15 and Figures 23 to 28.

5 FIXING JAMES HARDIE WEATHERBOARDS

5.1 GENERAL

The horizontal lap of James Hardie Weatherboards must be 30mm. James Hardie Weatherboards must be kept dry and under cover whilst in storage prior to and during fixing.

Cut ends which are exposed or where sealant is applied to the boards must be primed prior to installation. Dust and loose material must be removed before priming.

An H3.1 treated timber cant strip must be provided to support the bottom board on the wall. Refer to Figures 3 & 19.

5.2 FASTENER DURABILITY

Fasteners must meet the durability requirements of NZ Building Code. NZS 3604 specifies requirements for fixing material to be used in relation to the exposure conditions and are summarized in Table 2.

TABLE 2:

EXPOSURE CONDITIONS & NAIL SELECTION PRESCRIBED BY NZS 3604		
NAIL MATERIAL		
Sea Spray Zones *	Zone 1 outside sea spray zone and Zones 2 – 4 & Geothermal hot spots	Bracing – All zones
Grade 316 Stainless	Hot-dipped galvanised or 316 stainless	Grade 316 Stainless

** (Zone 1 areas where local knowledge dictates that increased durability is required, appropriate selection shall be made)*

Also refer to the NZBC Acceptable Solution 'E2/AS1' Table 20 and 21 for information regarding the selection of suitable fixing materials and their compatibility with other materials.

5.3 NAIL SIZES AND FIXING METHOD

James Hardie Weatherboards must be fixed to studs with the types of nails specified in Table 3, in accordance with the following requirements

- All nails must be driven flush with the board surface.
- When fixing Summit Weatherboard using a concealed nailing method ensure at all corners and vertical edges of openings. Summit Weatherboards are face fixed.
- When fixing weatherboard at the ends, nail must be driven at a minimum distance of 20mm from the end.
- For nails driven 50mm or closer from the end edges of James Hardie weatherboards, holes must be pre –drilled using a 3mm Titanium drill bit.

TABLE 3:

NAIL REQUIREMENTS FOR JAMES HARDIE WEATHERBOARDS	
DIRECT TO STUD FIXING	
Concealed Nailing (Summit Weatherboard only)	
40 x 2.8mm HardiFlex® nails	Finish flush with the board surface
Face Nailing	
50 x 2.8mm HardiFlex® nails	Finish flush with the board surface
CAVITY FIXING	
Concealed Nailing (Summit Weatherboard only)	
60 x 3.15 mm HardiFlex® nails	Finish flush with the board surface.
Face Nailing	
75 x 3.15 mm HardiFlex® nails	Finish flush with the board surface.

** Use a 3.0mm drill bit*

5.4 GUN NAILING

James Hardie weatherboard can also be gun-nailed for both concealed and face nailing fixing methods.
Round head nails must be used and the size of these nails must comply with the requirements of Table 3.
Nails must be fired at a minimum distance of 50 mm from the ends of boards when gun nailing is used – double studs will be required.
Note: Do not use 'D' head nails.

6 JOINTING

The ends of James Hardie Weatherboards are jointed off-stud using a back soaker. The joints may be located centrally between studs but no closer than 150mm from the studs. The joints must be staggered by 600mm minimum. Flexible silicon sealant must be used with back soakers for jointing. Refer to Figure 4.

7 FINISHING

Note: Protective coating of James Hardie Weatherboards is required in order to meet the durability requirements of the New Zealand Building Code.

7.1 PREPARATION

Remove any surface dirt, grime or other contaminants and ensure the James Hardie Weatherboards are dry before painting.

7.2 SEALANTS

All sealants must demonstrate the ability to meet the relevant requirements of the NZBC. Application and use of sealants must comply with manufacturer's instructions. Sealants, if coated, must be compatible with the paint system.

7.3 PAINTING

All James Hardie Weatherboards are pre-primed on their face and bottom edge with a factory-applied acrylic base coat.
James Hardie Weatherboards must be painted within 90 days of installation. All exposed faces, including the top edges under the sills and bottom edges of James Hardie Weatherboard and accessories must be finished with two coats of latex exterior paint system complying with any of parts 7, 8, 9, and 10 of AS 3730.
When using uPVC corner moulds or flashings, the light reflective value of the colour used must be more than 40% as required under section 4.3.1 of 'E2/AS1'. Dark colours cause excessive movements and deteriorate the cladding performance.
Some environments require special coatings. Painting selection and specifications is dependant on the paint system chosen. Refer to the paint manufacturer.

7.4 STAINING

Stains containing linseed oil are specifically designed for wood and may not be suitable for fibre cement cladding products, primed or unprimed. Semi-transparent stains can vary in uniformity of appearance depending on method of application and conditions and will require a high level of skill and craftsmanship to achieve a uniform appearance. Clear coats have not proven durable in exterior exposure and James Hardie considers them a maintenance item that may require application of a refurbishing sealer at regular intervals. James Hardie does not warrant the appearance and durability of the use of semi-transparent stains and clear coats.
For further information refer to stain manufacturer's recommendations.

8 STORAGE AND HANDLING

James Hardie Weatherboards must be laid flat on a smooth level surface. To ensure optimum performance, store weatherboards under cover and keep dry prior to fixing. If the weatherboards should become wet, allow to dry thoroughly before fixing.
Do not carry weatherboards on the flat, always carry in the vertical position to avoid excessive bending.

9 MAINTENANCE

It is the responsibility of the specifier to determine normal maintenance requirements to comply with the NZBC Acceptable Solution B2/AS1.
The extent and nature of maintenance will depend on the geographical location and exposure of the building.
As a guide, it is recommended that basic normal maintenance tasks shall include but not be limited to:

- Washing down exterior surfaces every 6-12 months*,
- Re-applying exterior protective finishes*,
- Maintaining the exterior envelope and connections including joints, penetrations, flashings and sealants.
- Cleaning out gutters, blocked pipes and overflows as required,
- Pruning back vegetation which is close to or touching the building.

**Refer to your paint manufacturer for washing down and recoating requirements related to paint performance.*

10 PRODUCT INFORMATION

10.1 MANUFACTURING & CLASSIFICATION

James Hardie New Zealand is an ISO 9001(2000) Telarc certified manufacturer. James Hardie Weatherboard is manufactured to meet the requirements of AS/NZS 2908.2: 2000 'Cellulose-Cement Products', James Hardie Weatherboard has a classification of Type A Category 3 in accordance with this standard.

The weatherboards are supplied pre-primed on their face and bottom edge with an acrylic primer. The bottom front edge is chamfered. The top covered edge is square water-jet trimmed. James Hardie Weatherboards are identified by the printing of the name at regular intervals on the back face.

10.2 DURABILITY

James Hardie Weatherboard, when installed and maintained as per the technical specification, will meet the durability requirements for claddings as required in the NZBC Approved Document B2 'Durability'.

10.2.1 RESISTANCE TO MOISTURE/ROTTING

James Hardie Weatherboard demonstrates resistance to permanent moisture induced deterioration (rotting) by passing the following tests in accordance with AS/NZS2908.2

- Water Permeability (Clause 8.2.2)
- Warm Water (Clause 8.2.4)
- Heat Rain (Clause 6.5)
- Soak Dry (Clause 8.2.5).

10.2.2 RESISTANCE TO FIRE

James Hardie Weatherboard has the following Early Fire Hazard Indices (tested to AS 1530 Part 3).

TABLE 4:

EARLY FIRE HAZARD INDICES	
Ignition Index	0
Flame Spread Index	0
Heat Evolved Index	0
Smoke Developed Index	0 -1

10.3 PRODUCT SIZES & MASS

Available sizes of James Hardie Weatherboards and their weights are given in Table 5 on the next page. James Hardie Weatherboards are classified as a light weight wall cladding (not exceeding 30kg/m^2) in accordance with NZS 3604.

11 SAFE WORKING PRACTICES

WARNING

DO NOT BREATHE DUST AND CUT ONLY IN WELL VENTILATED AREA

James Hardie products contain respirable crystalline silica which is considered by some international authorities to be a cause of cancer from some occupational sources. Breathing excessive amounts of respirable silica dust can also cause a disabling and potentially fatal lung disease called silicosis, and has been linked with other diseases. Some studies suggest smoking may increase these risks. During installation or handling: (1) work in outdoor areas with ample ventilation; (2) minimise dust when cutting by using either 'Score and Snap' knife, fibre cement shears or, where not feasible, use a HardiBlade® Saw Blade and dust-reducing circular saw attached to a HEPA vacuum; (3) warn others in the immediate area to avoid breathing dust; (4) wear a properly-fitted, approved dust mask or respirator (e.g. P1 or P2) in accordance with applicable government regulations and manufacturer instructions to further limit respirable silica exposures. During clean-up, use HEPA vacuums or wet cleanup methods - never dry sweep. For further information, refer to our installation instructions and Material Safety Data Sheets available at www.jameshardie.co.nz. FAILURE TO ADHERE TO OUR WARNINGS, MATERIAL SAFETY DATA SHEETS, AND INSTALLATION INSTRUCTIONS MAY LEAD TO SERIOUS PERSONAL INJURY OR DEATH.

JAMES HARDIE RECOMMENDED SAFE WORKING PRACTICES
CUTTING OUTDOORS
Position cutting station so that wind will blow dust away from user or others in working area. Use one of the following methods based on the required cutting rate: **BEST** ■ Score and snap ■ Hand guillotine ■ Fibreshear **GOOD** ■ Dust reducing circular saw equipped with HardiBlade® Saw Blade and HEPA vacuum extraction.
CUTTING INDOORS
■ Cut only using score and snap, hand guillotine or fibreshears (manual, electric or pneumatic). ■ Position cutting station in well-ventilated area
DRILLING/OTHER MACHINING
When drilling or machining you should always wear a P1 or P2 dust mask and warn others in the immediate area.

JAMES HARDIE RECOMMENDED SAFE WORKING PRACTICES

IMPORTANT NOTES:

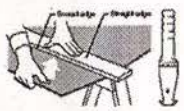
1. For maximum protection (lowest respirable dust production), James Hardie recommends always using "Best"- level cutting methods where feasible
2. NEVER use a power saw indoors
3. NEVER use a circular saw blade that does not carry the HardiBlade® logo
4. NEVER dry sweep – Use wet suppression or HEPA Vacuum
5. NEVER use grinders
6. ALWAYS follow tool manufacturer's safety recommendations

P1 or P2 respirators can be used in conjunction with above cutting practices to further reduce dust exposures. Additional exposure information is available at www.jameshardie.co.nz to help you determine the most appropriate cutting method for your job requirements. If concern still exists about exposure levels or you do not comply with the above practices, you should always consult a qualified industrial hygienist or contact James Hardie for further information.

WORKING INSTRUCTIONS

Refer to Recommended Safe Working Practices before starting any cutting or machining of product.

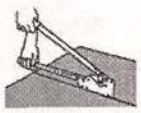
SCORE AND SNAP



Score and Snap is a fast and efficient method of cutting the product using James Hardie's special tungsten tipped Score and Snap knife.

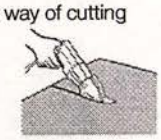
Preferably score on the face side of the product. Score against a straight edge and repeat the action to obtain adequate depth for clean break – normally 1/3 of sheet thickness. Snap upwards to achieve break. Smooth any rough edges with a rasp.

HAND GUILLOTINE



Make guillotine cut on the off-cut side of line to allow for the thickness of the blade.

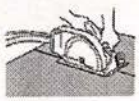
FIBRESHEAR HEAVY DUTY



An electrically powered, fast, clean and effortless way of cutting James Hardie building products, especially around curves such as archways. Make Fibreshear cut on the "off-cut" side of the line to allow for the thickness of the shear.

HARDIBLADE® SAW BLADE

The HardiBlade® Saw Blade used with a dust-reducing saw is ideal for fast, clean cutting of James Hardie fibre cement products. A dust-reducing saw uses a dust deflector or a dust collector connected to a vacuum system. When sawing, clamp a straight-edge to the sheet as a guide and run the saw base plate along the straight edge when making the cut.



HOLE-FORMING

For smooth clean cut circular holes:

Mark the centre of the hole on the sheet.

Pre-drill a 'pilot' hole.

Using the pilot hole as a guide, cut the hole to the appropriate diameter with a hole saw fitted to a heavy duty electric drill.

For irregular holes:

Small rectangular or circular holes can be cut by drilling a series of small holes around the perimeter of the hole then tapping out the waste piece from the sheet face. Tap carefully to avoid damage to sheets, ensuring that the sheet edges are properly supported.

STORAGE AND HANDLING

All James Hardie building products should be stored to avoid damage, with edges and corners of the sheets protected from chipping. James Hardie building products must be installed in a dry state and be protected from rain during transport and storage. The product must be laid flat under cover on a smooth level surface clear of the ground to avoid exposure to water or moisture, etc.

QUALITY

James Hardie conducts stringent quality checks to ensure that any product manufactured falls within our quality spectrum. It is the responsibility of the builder to ensure that the product meets aesthetic requirements before installation. James Hardie will not be responsible for rectifying obvious aesthetic surface variations following installation.

12 PRODUCT SIZES

TABLE 5:

PRODUCT INFORMATION

				COVERAGE INFORMATION				
Product	Length (mm)	Width (mm)	Thickness (mm)	Effective Cover (mm)	No. of planks/ metre height (approx.)	Mass kg/lineal m (approx. at EMC)	Mass kg/m² approx. at EMC)	Pallet weight kg (60/120 units/pack)
Smooth	4200	180	7.5	150	6.7	2.4	16.0	600/1170
	4200	240	7.5	210	4.8	2.6	13.7	770/1540
	4200	305	7.5	275	3.6	3.6	12.9	950 /1900
Rusticated	4200	205	7.5	175	5.7	2.6	14.9	700/1350
Styleline	4200	205	7.5	175	5.7	2.6	14.9	700/1350
Colonial	4200	205	7.5	175	5.7	2.6	14.9	700/1350
Frontier	4200	245	7.5	215	4.7	3.1	14.4	790/1580
	4200	310	7.5	280	3.6	3.8	13.6	970/1950
Summit	4200	150	9	120	8.3	2.4	19.8	593/1186

Note:All dimensions provided are based on nominal only and subject to manufacturing tolerances.

13 ACCESSORIES

ACCESSORIES SUPPLIED BY JAMES HARDIE FOR JAMES HARDIE WEATHERBOARDS

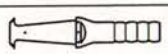
9MM WEATHERBOARDS

	ACCESSORY AND MATERIAL NUMBER		SIZE (MM)	MATERIAL / APPEARANCE
	External Box Corner - 2400 - 2700	 **300377** **300379**	 2400 long 2700 long	Etch Primed Aluminium Self colour
	Concealed Back Soaker - Aluminium	 **303937**	 150 long	Etch Primed Aluminium Self colour
	HardiFlex® nail - Jar - 5kg	**302781** **302782**	60 x 3.15 ø	316 Stainless Steel
	HardiFlex® nail - Jar - 5kg	**302783** **302784**	60 x 3.15 ø	Hot Dip Galvanised

7.5MM WEATHERBOARDS

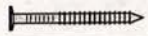
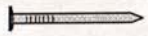
	External Corner Soaker - 310 - 245 - 180	 **303930** **303931** **303932**	 310 245 180	Etch Primed Aluminium Self colour
	Concealed Back Soaker - 310 - 245 - 205 - 180	 **303933** **303934** **303935** **303936**	 310 245 205 180	Etch Primed Aluminium Self colour
	External Flashing (box) - 3000 - 2700 - 2400	 **300852** **300851** **300850**	 3000 2700 2400	uPVC
	External Corner (box) mould - 3000 - 2700 - 2400	 **300380** **300378** **300376**	 3000 2700 2400	Aluminium
	External Corner Mould 135° - 2700	 **300375**	 2700	Etch Primed Aluminium
	Weatherboard Cap Mould - 3000	 **300995**	 3000	uPVC

ALL WEATHERBOARDS

	Internal 'W' Corner Mould - 2700	 **300870**	 2700 long	uPVC
	Internal Corner Mould 135° - 2700	 **300383**	 2700 long	Etch Primed Aluminium
	Corner Underflashing - 50 x 50	 **303745**	 3000 long	uPVC
	Vent Strip	**302490**	3000 long	PVC White
	Internal 'W' corner - 2400 - 2700	 **300385** **300386**	 2400 long 2700 long	Etch Primed Aluminium
	HardiFlex® nail - 500g Bag - 5kg	**304252** **304253**	75 x 3.15 ø	316 Stainless Steel
	HardiFlex® nail - 500g Bag - 5kg	**304250** **304251**	75 x 3.15 ø	Hot Dip Galvanised
	HardiDrive Screw - self drilling & embedding timber screw 100 jar	**300928**	7g x 30mm	316 Stainless Steel
	Scoring Knife	**300914**		Tungsten Carbide

ACCESSORIES NOT SUPPLIED BY JAMES HARDIE FOR JAMES HARDIE WEATHERBOARDS

James Hardie recommends the following products for use in conjunction with its Weatherboards. James Hardie does not supply these products. Please contact component manufacturer for information on their warranties and further information on their products.

	ACCESSORY AND MATERIAL NUMBER	SIZE (MM)	MATERIAL / APPEARANCE
	HardiFlex® nail	40 x 2.8 ø & 50 x 2.8 ø	316 Stainless Steel
	HardiFlex® nail	40 x 2.8 ø & 50 x 2.8 ø	Hot Dip Galvanised
	Flexible sealant or expandable foam	Tube	Fosroc, Holdfast or similar
	PEF rod	Polyethylene foam	Fosroc or similar
	Flashing tape	Proprietary tape to adhere to building wrap	Tyvek, Protecto wrap or similar
	Flashing to table 20 'E2/AS1'	Refer Figure 13	Flashing fabricator
	Inseal 3109 Sealing Strip	19 x 10	Black compressible foam
	Timber Scriber	As required	H3.1 Treated Timber. Timber Merchant or cut on site

14 DETAILS

Various details outlined in the following table are available on Pages 11 to 42.

TABLE 7:

DETAILS

DESCRIPTION	DIRECT FIXED	CAVITY CONSTRUCTION
Framing Setout	Figure 1	
Sheet Fixing Setout	Figure 2	Figure 18
Concrete Footing	Figure 3	Figure 19
Weatherboard Fixing	Figure 4	Figure 20
PVC or Aluminium Box Corner (7.5mm Weatherboard)	Figure 5	Figure 21
Aluminium Box Corner (9.0mm Summit Weatherboard)	Figure 6	Figure 22
External Boxed Corner	Figure 7	Figure 23
External Corner Soaker	Figure 8	Figure 24
Internal 90° PVC or Aluminium 'W' Mould	Figure 9	Figure 25
Internal 90° Aluminium 'W' Mould	Figure 10	Figure 26
Internal 135° Aluminium 'W' Mould	Figure 11	Figure 27
Soffit Detail	Figure 12	Figure 28
Window Detail without Facings	Figure 13	
One Piece Head Flashing without Facings	Figure 14	Figure 30
Jamb Flashing without Facings	Figure 15	Figure 31
Batten Setout		Figures 16 & 32
Batten Fixing		Figure 17
Sill Flashings without Facings		Figure 29
Parapet Flashing		Figure 33
Pipe Penetration		Figure 34
One Piece Apron Flashing Joint		Figure 35

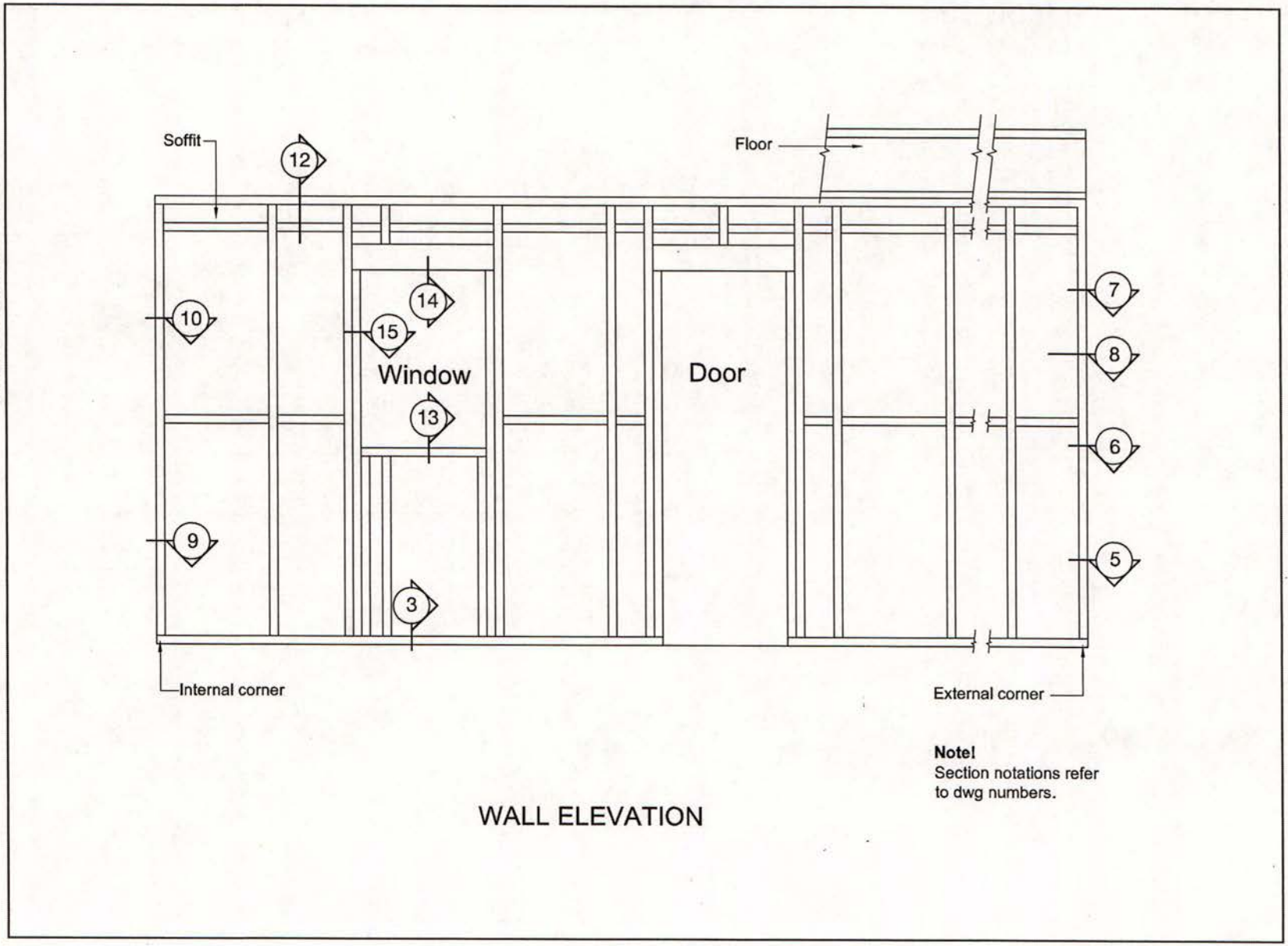


FIGURE 1: DIRECT FIX FRAMING SETOUT

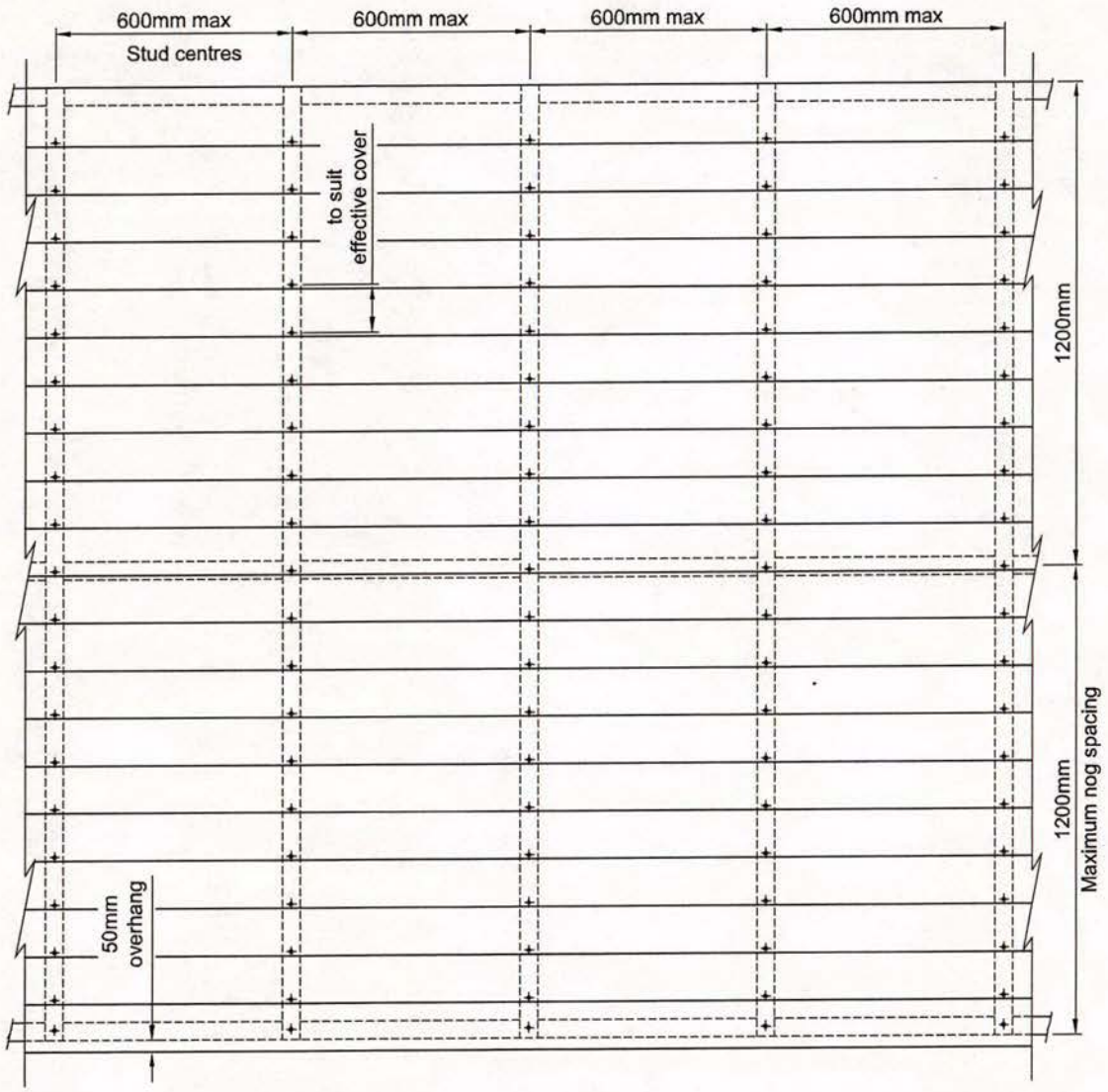


FIGURE 2: DIRECT FIX SHEET FIXING SETOUT

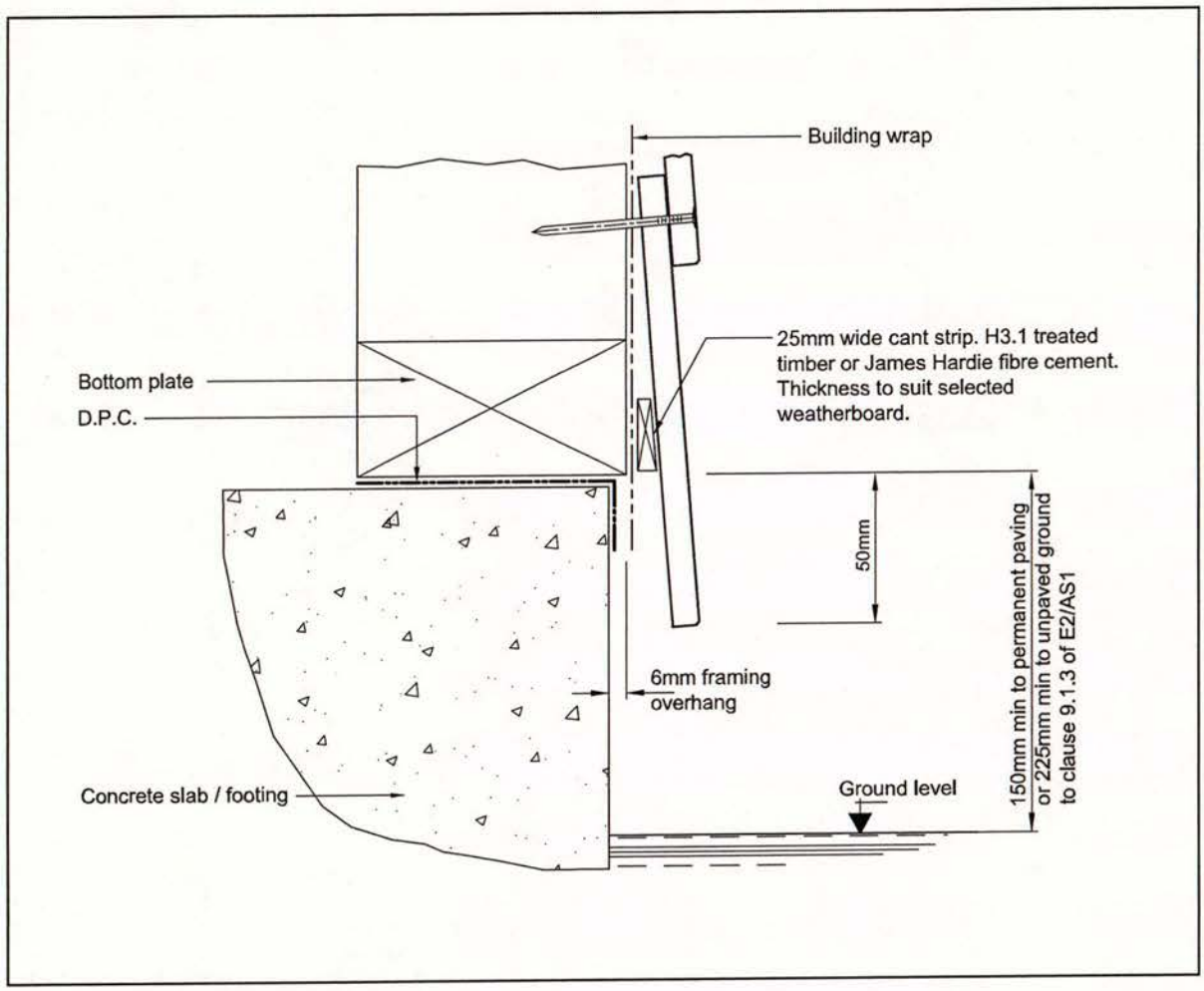


FIGURE 3: DIRECT FIX CONCRETE FOOTING

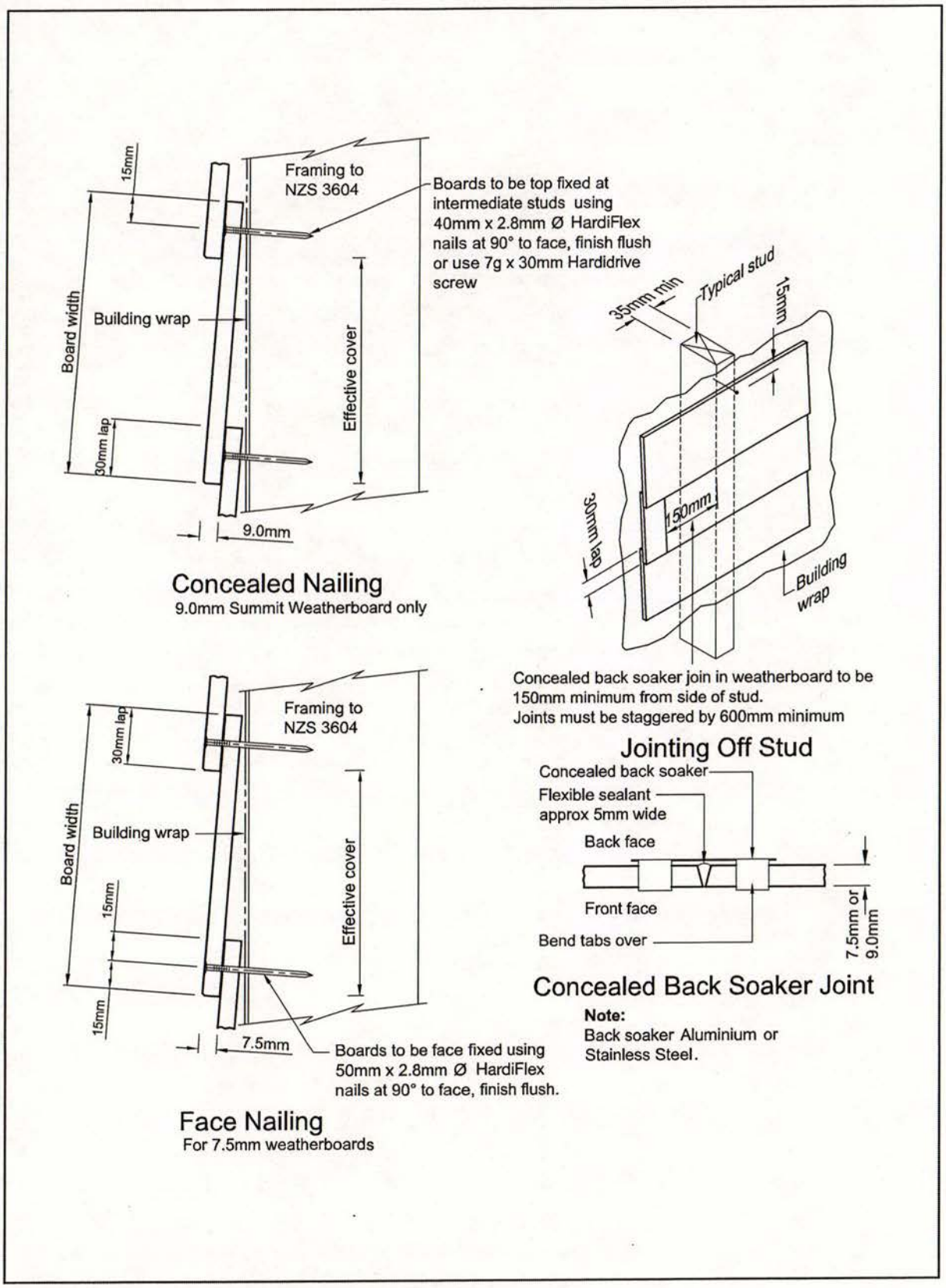


FIGURE 4: DIRECT FIX WEATHERBOARD FIXING

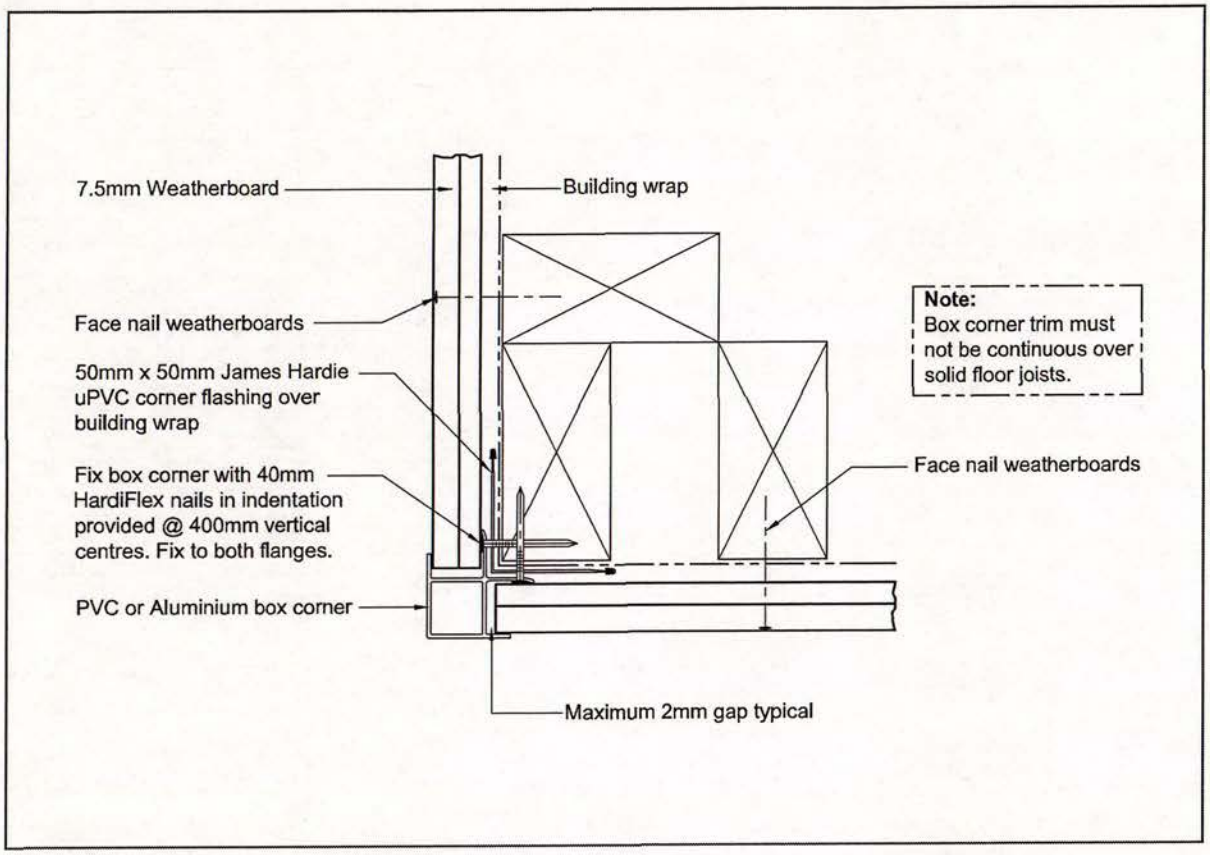


FIGURE 5: DIRECT FIX PVC OR ALUMINIUM BOX CORNER (7.5MM WEATHERBOARD)

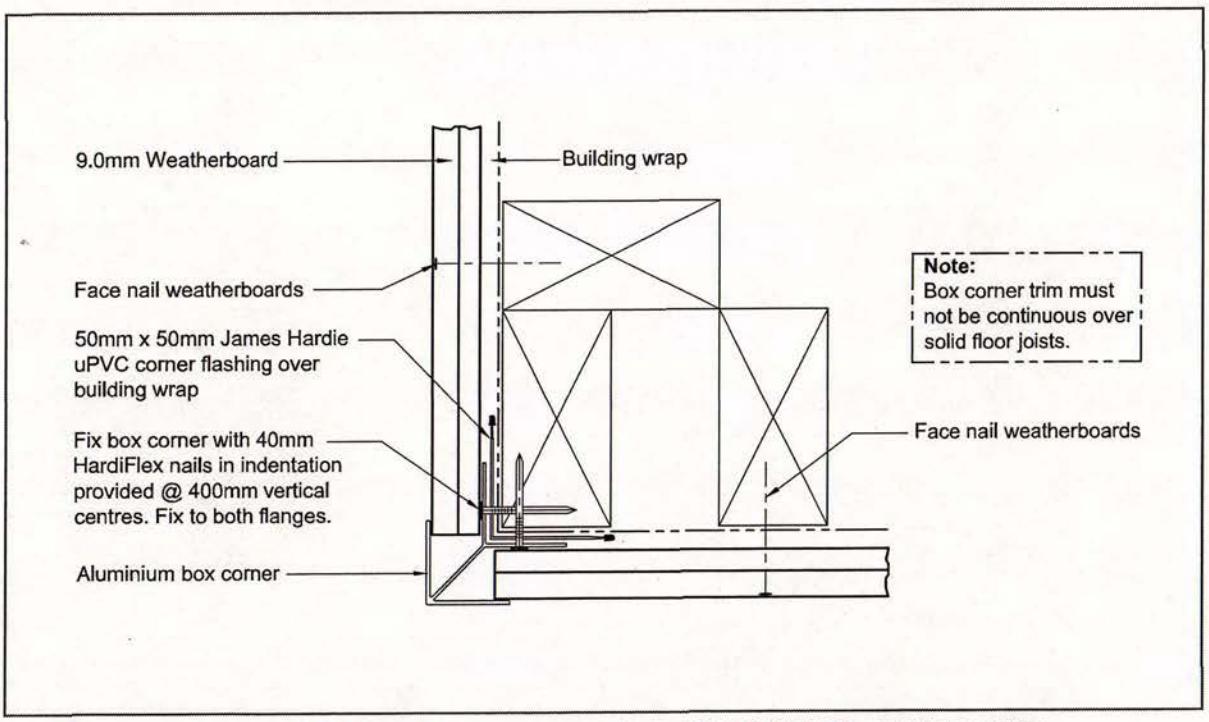


FIGURE 6: DIRECT FIX ALUMINIUM BOX CORNER (9.0MM SUMMIT WEATHERBOARD)

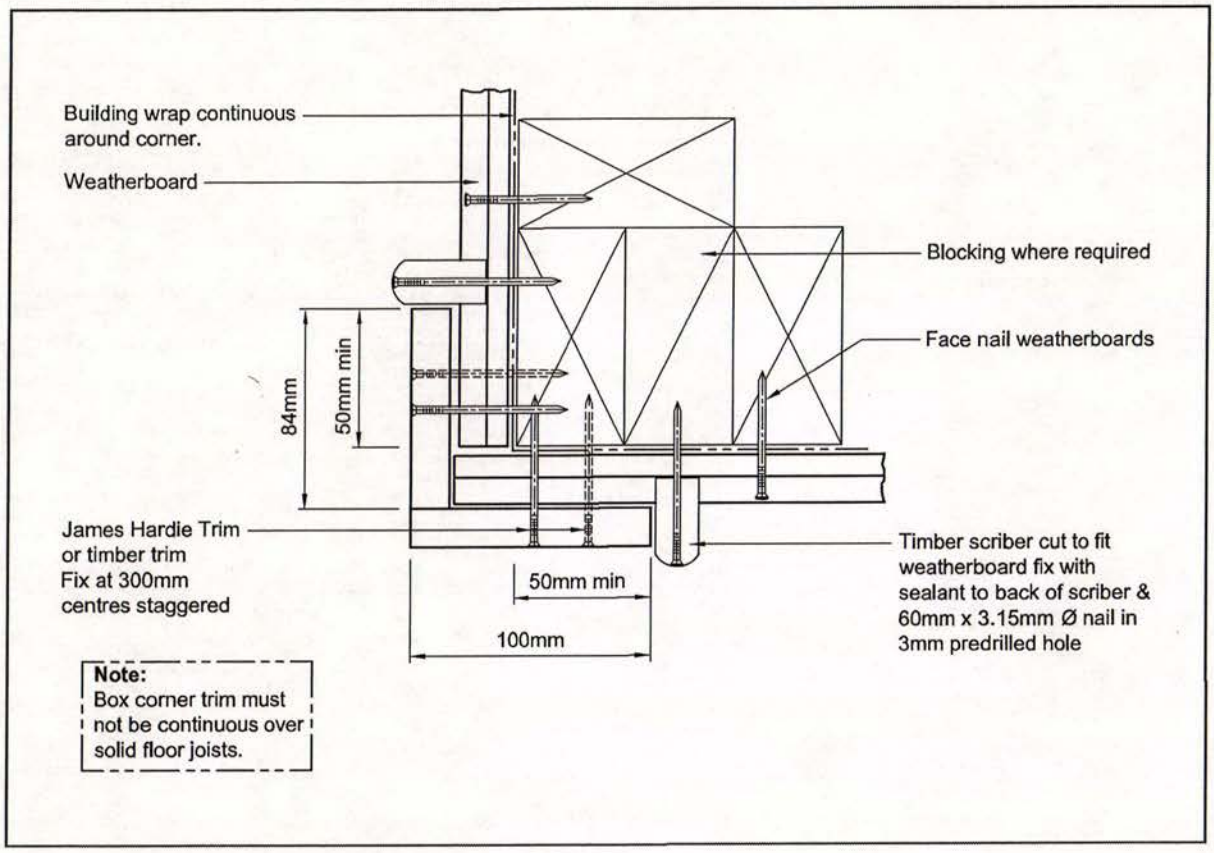


FIGURE 7: DIRECT FIX EXTERNAL BOXED CORNER

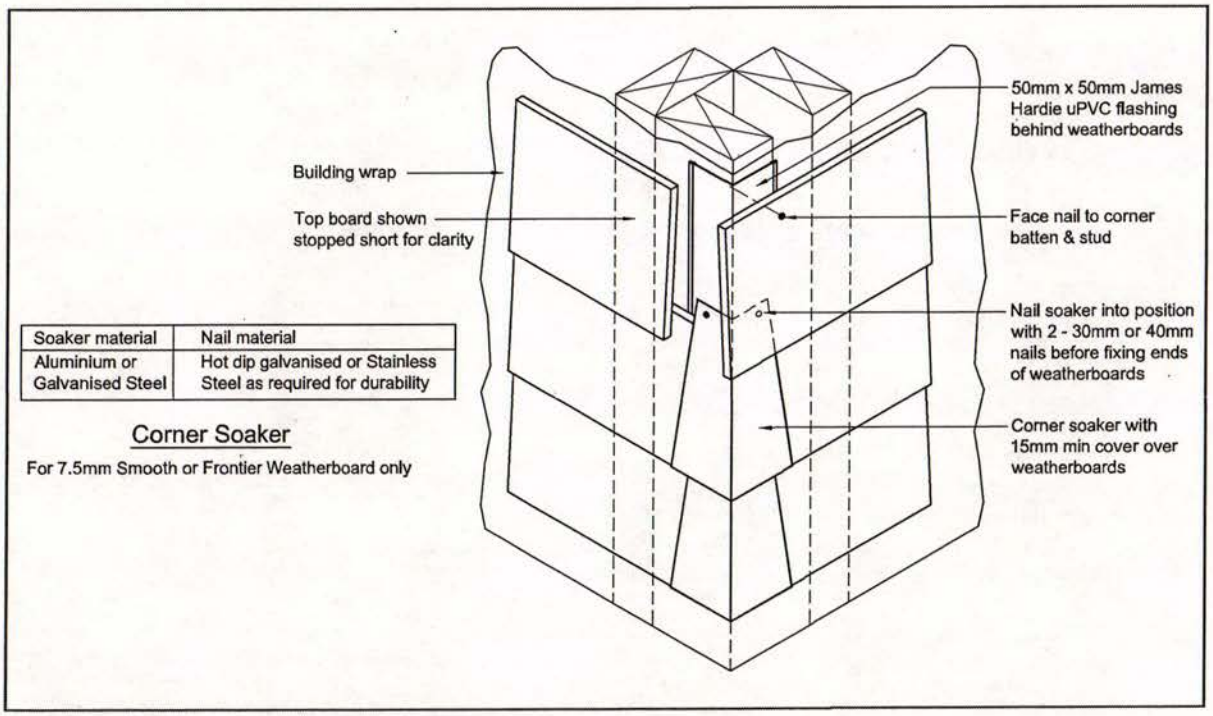


FIGURE 8: DIRECT FIX EXTERNAL CORNER SOAKER

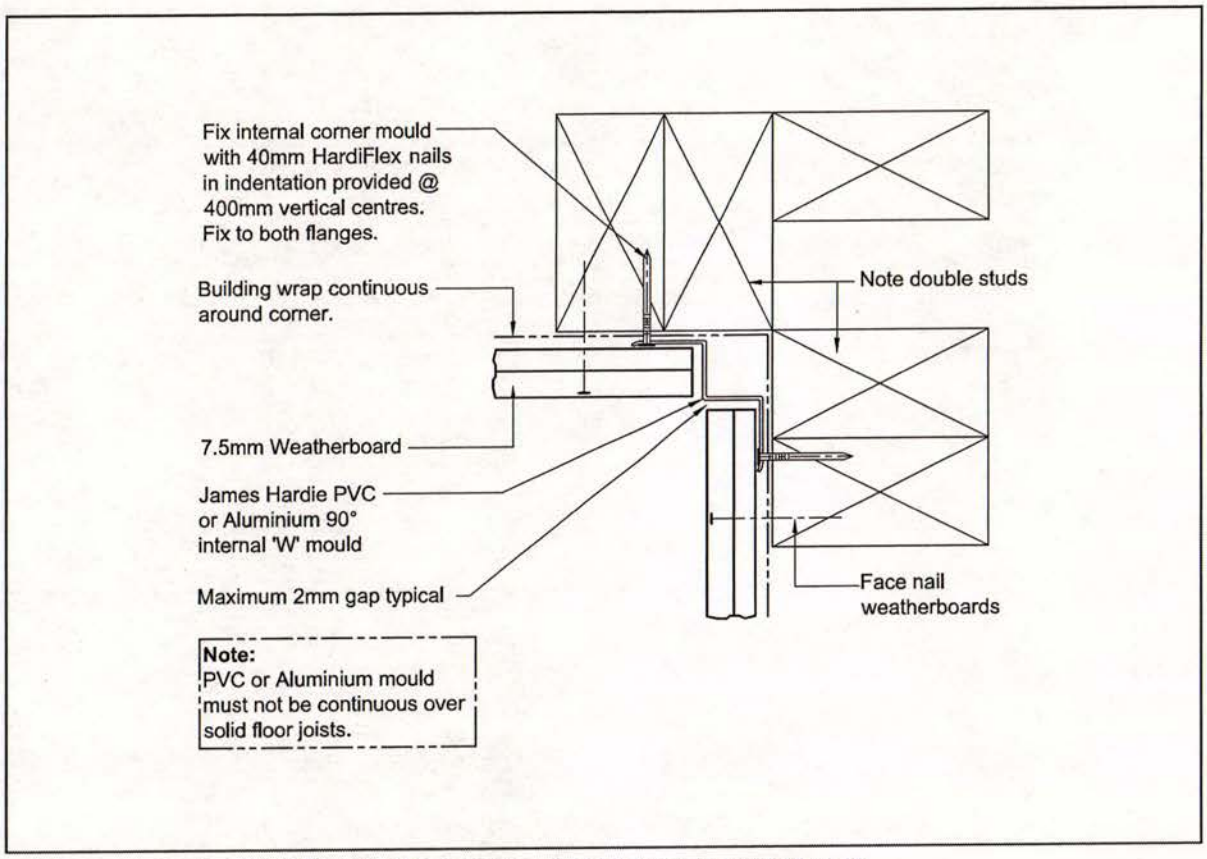


FIGURE 9: DIRECT FIX INTERNAL 90° PVC OR ALUMINIUM 'W' MOULD

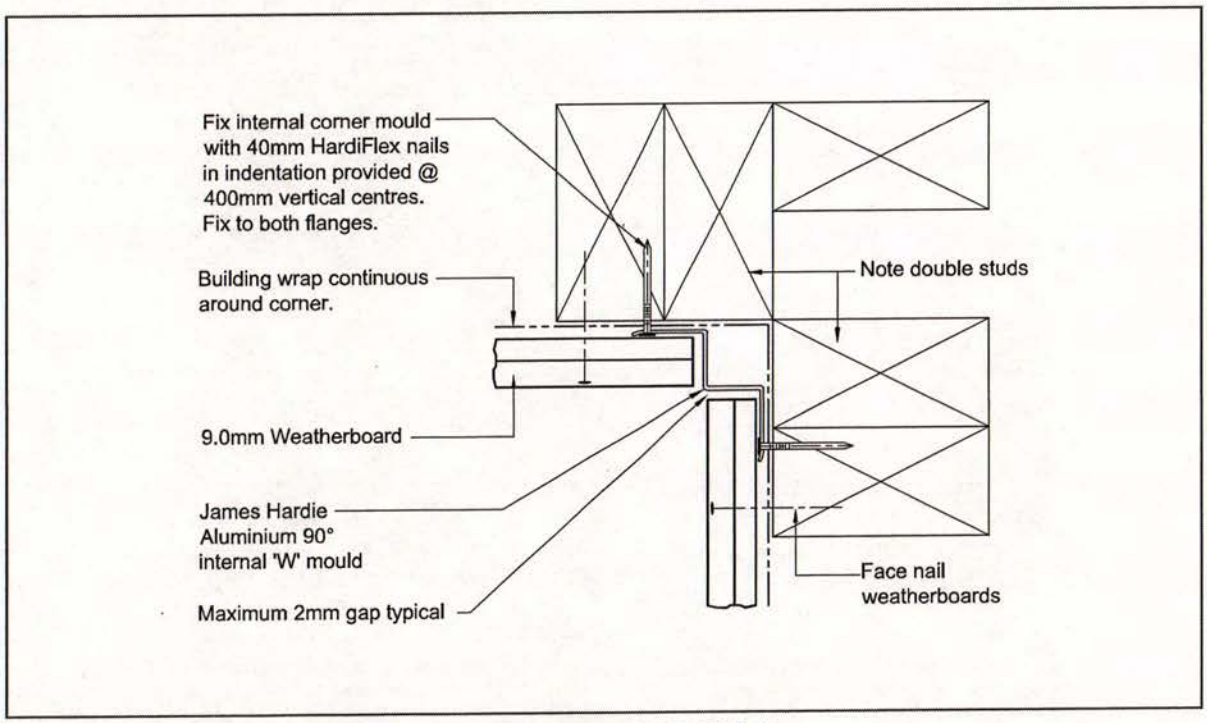


FIGURE 10: DIRECT FIX INTERNAL 90° ALUMINIUM 'W' MOULD

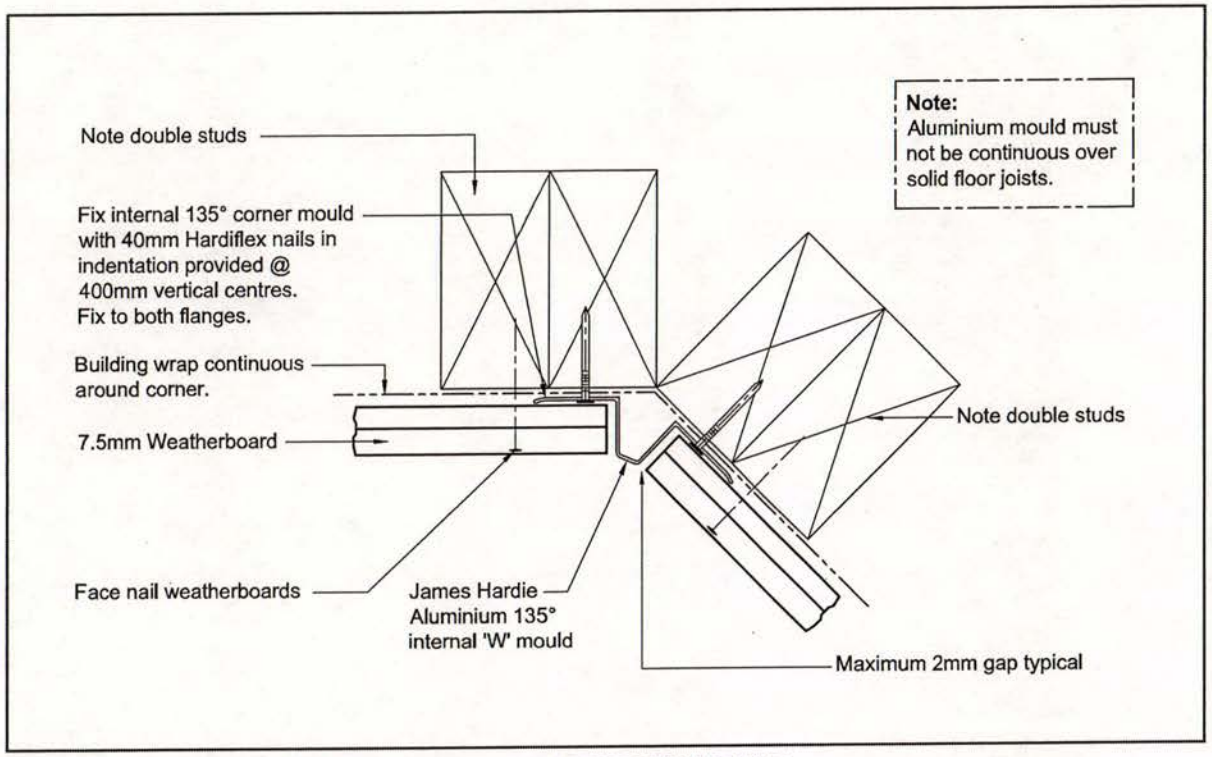


FIGURE 11: DIRECT FIX INTERNAL 135° ALUMINIUM 'W' MOULD

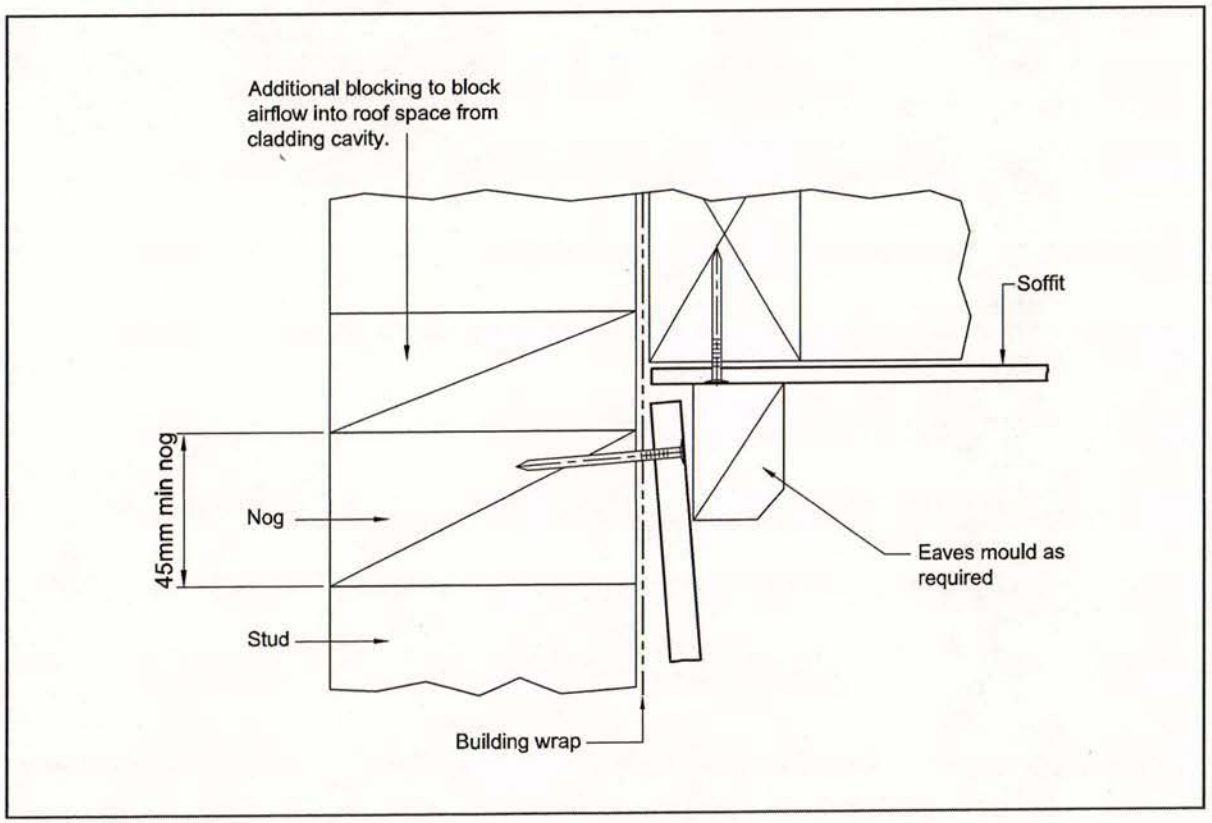
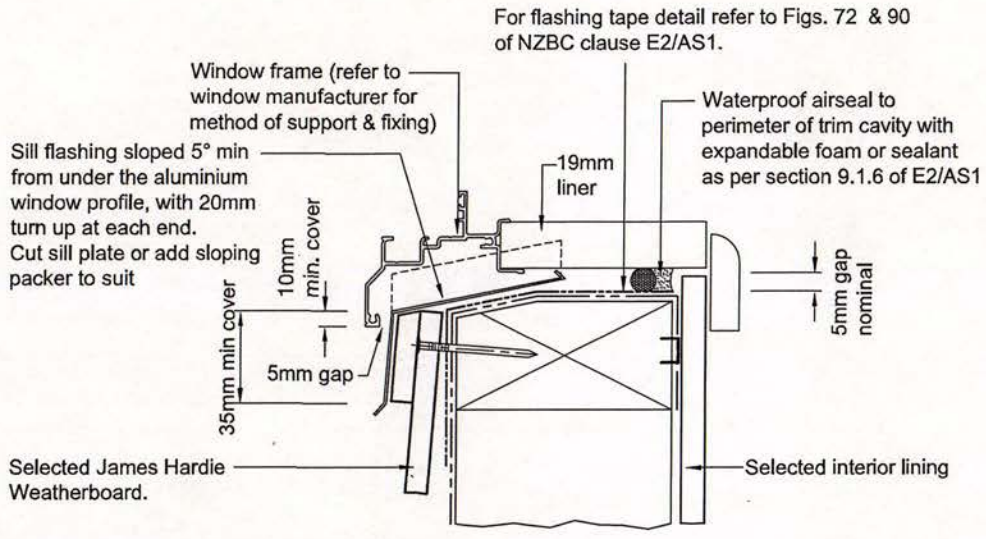


FIGURE 12: DIRECT FIX SOFFIT DETAIL



General notes for materials section

1. Flashing materials must be selected based on environmental exposure, refer to NZS 3604 and table 20 of NZBC 'E2/AS1' (third edition).
2. Building wrap must comply with acceptable solution NZBC 'E2/AS1' (third edition) and NZS 3604.
3. Flashing tape must have proven compatability with the selected building wrap and other materials with which it comes into contact as per table 21 of NZBC 'E2/AS1' (third edition).

(Refer to the manufacturer or supplier for technical information on these materials.)

FIGURE 13: DIRECT FIX WINDOW DETAIL WITHOUT FACINGS

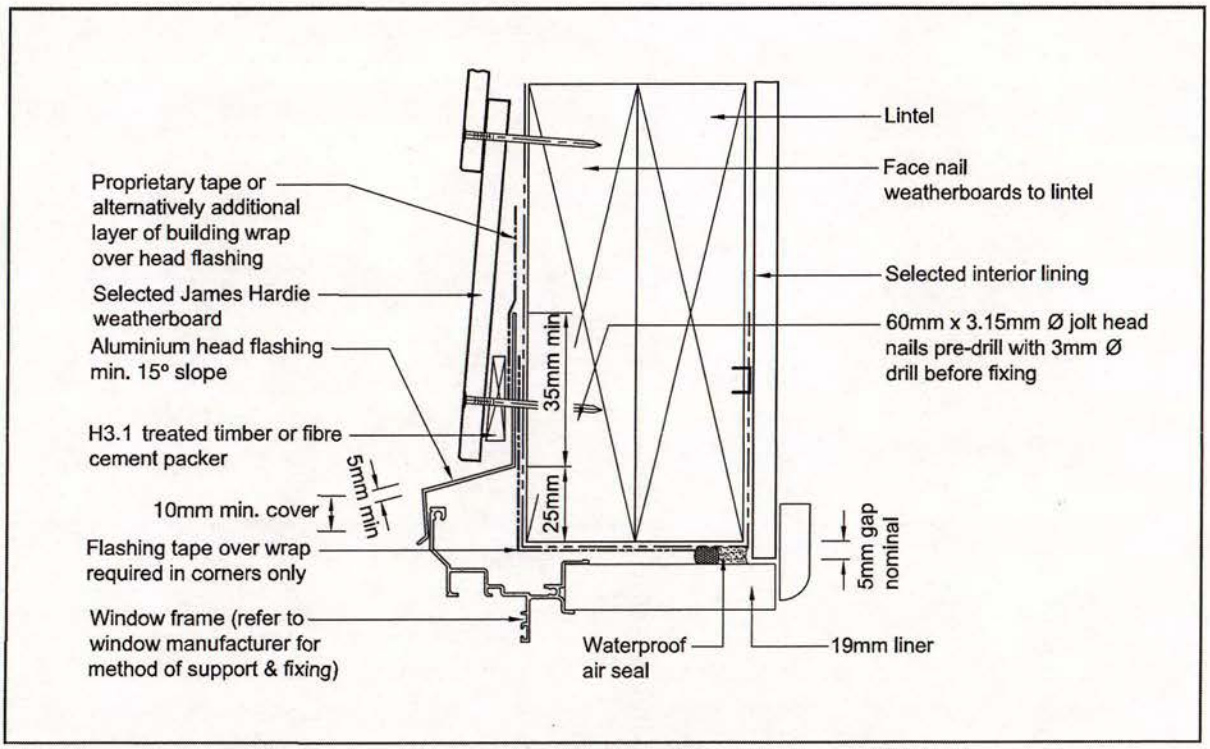


FIGURE 14: DIRECT FIX ONE PIECE HEAD FLASHING WITHOUT FACINGS

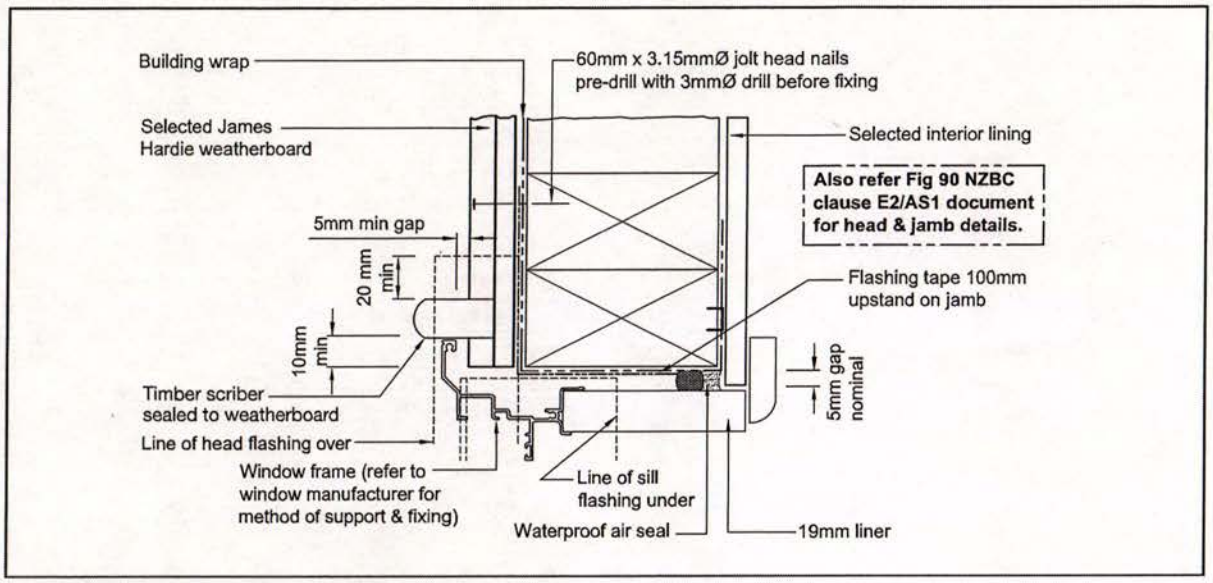


FIGURE 15: DIRECT FIX JAMB FLASHING WITHOUT FACINGS

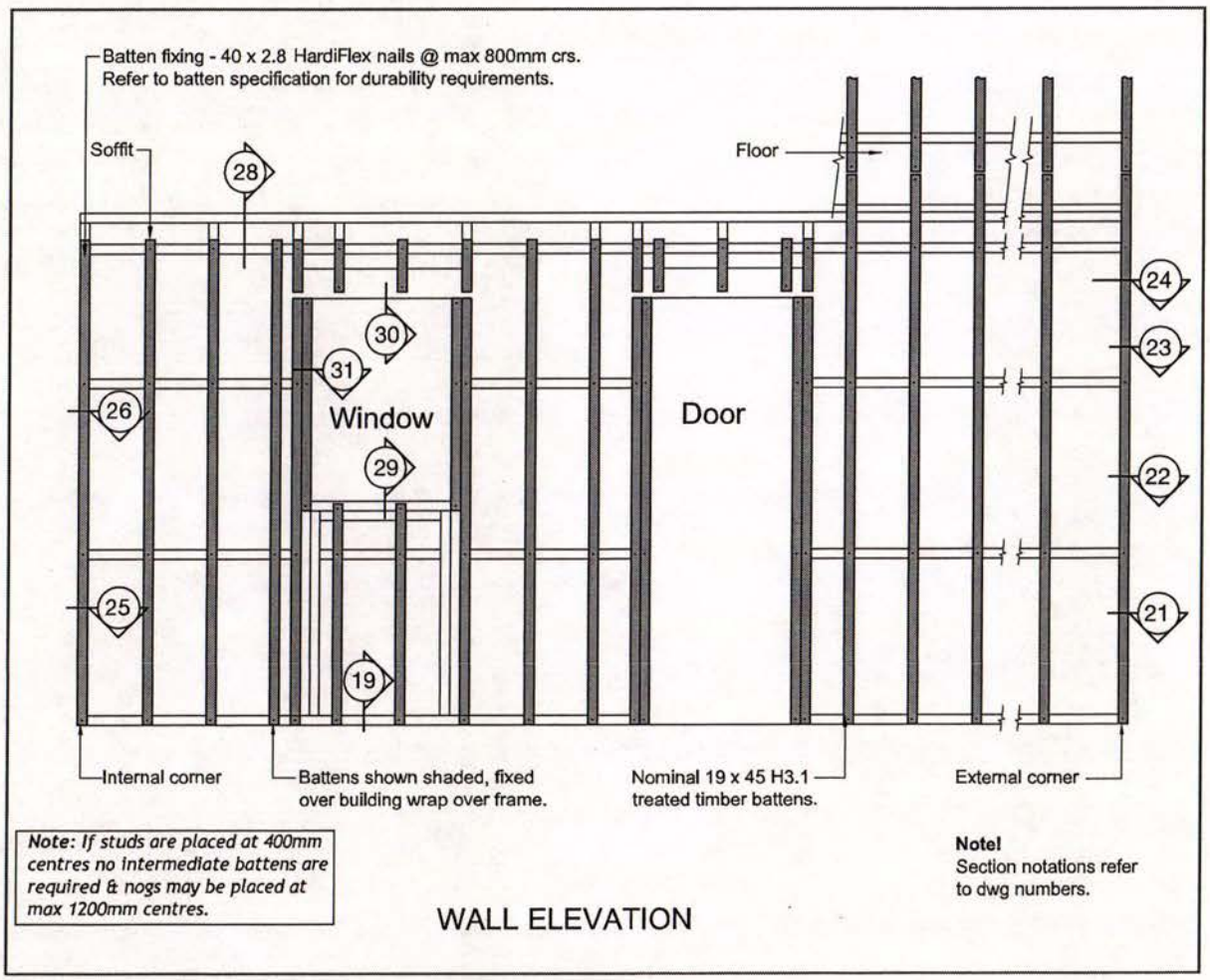


FIGURE 16: CAVITY FRAMING AND BATTEN SETOUT

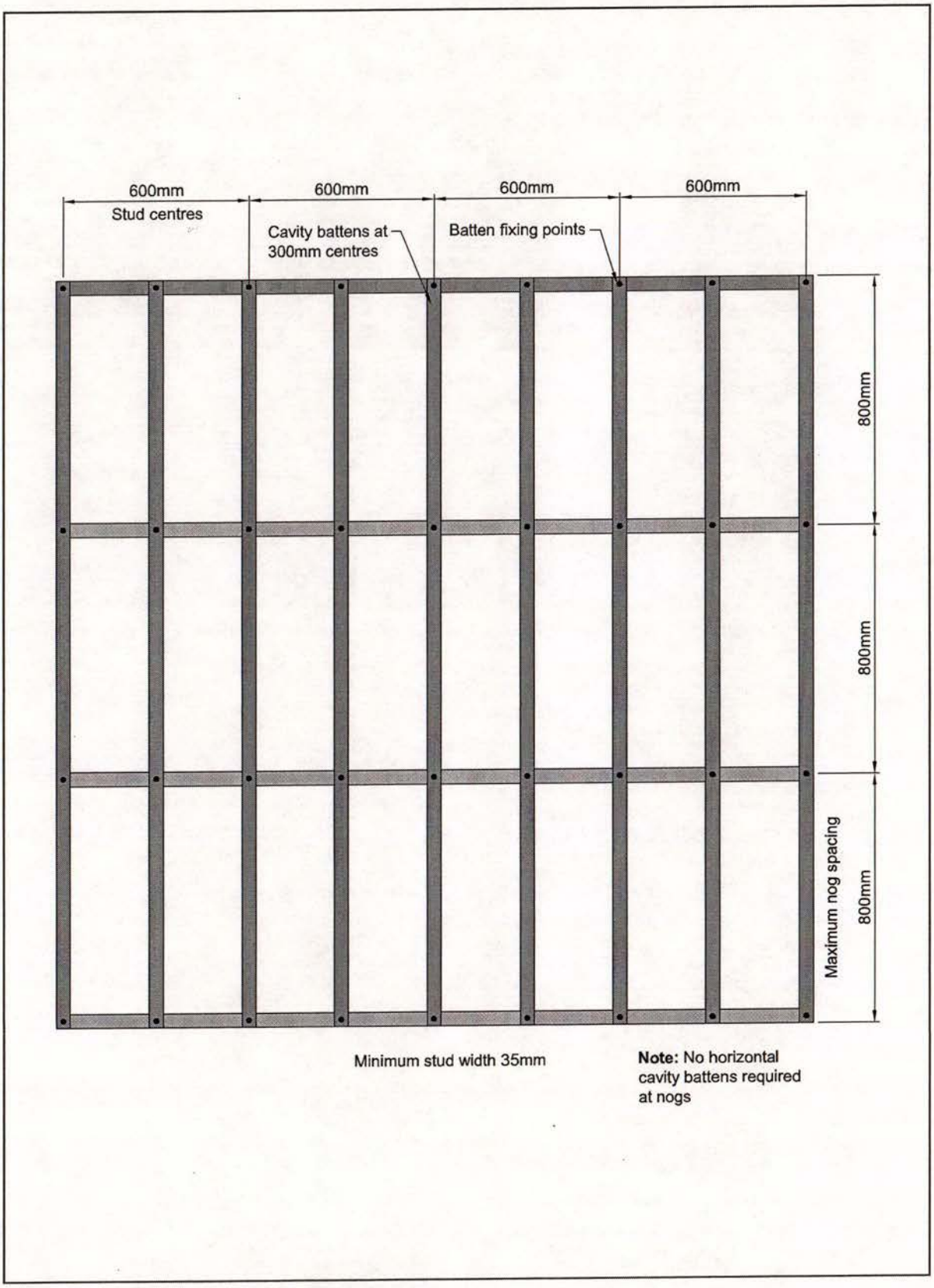


FIGURE 17: CAVITY FRAMING BATTEN FIXING

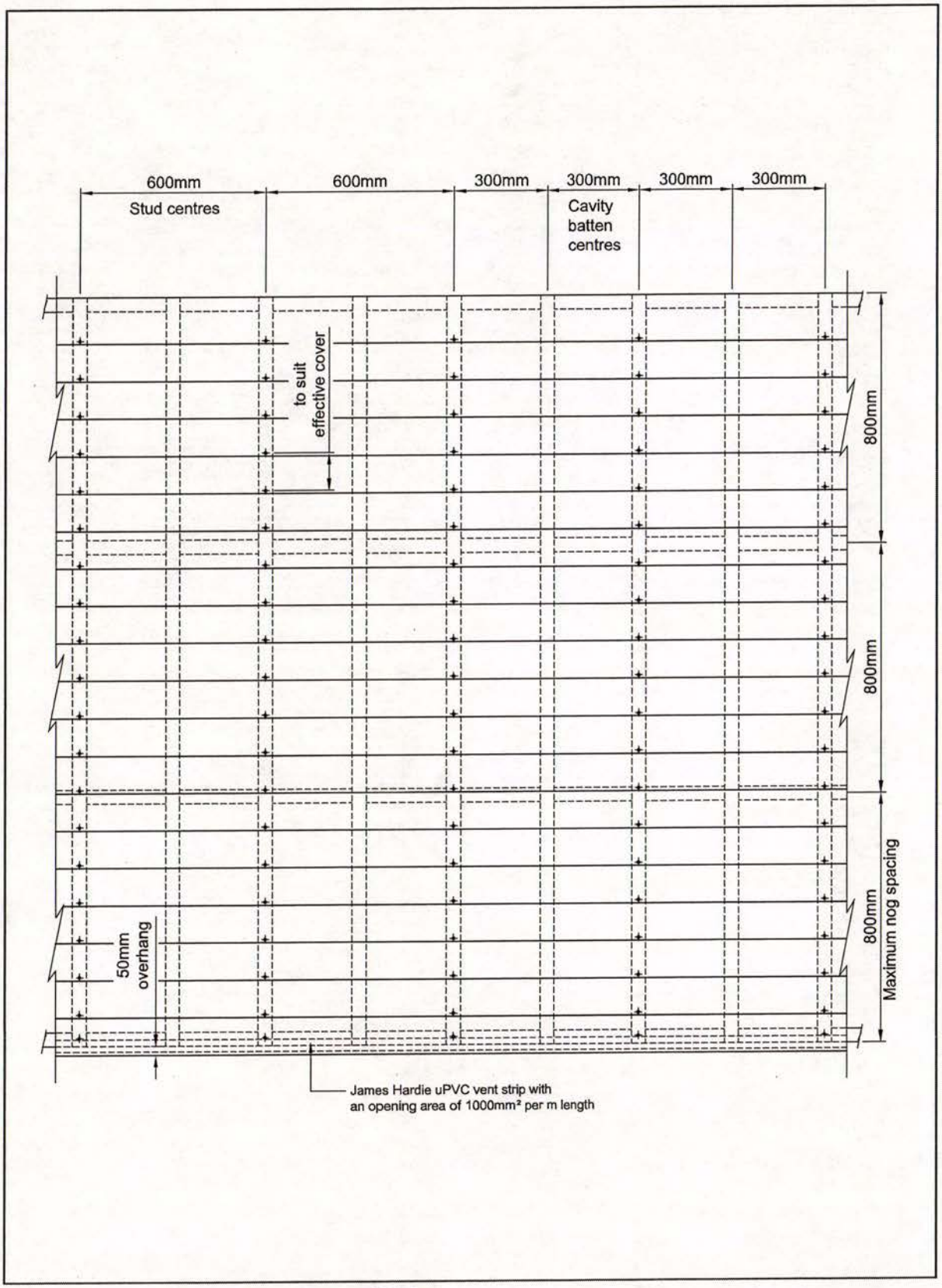


FIGURE 18: CAVITY SHEET FIXING SETOUT

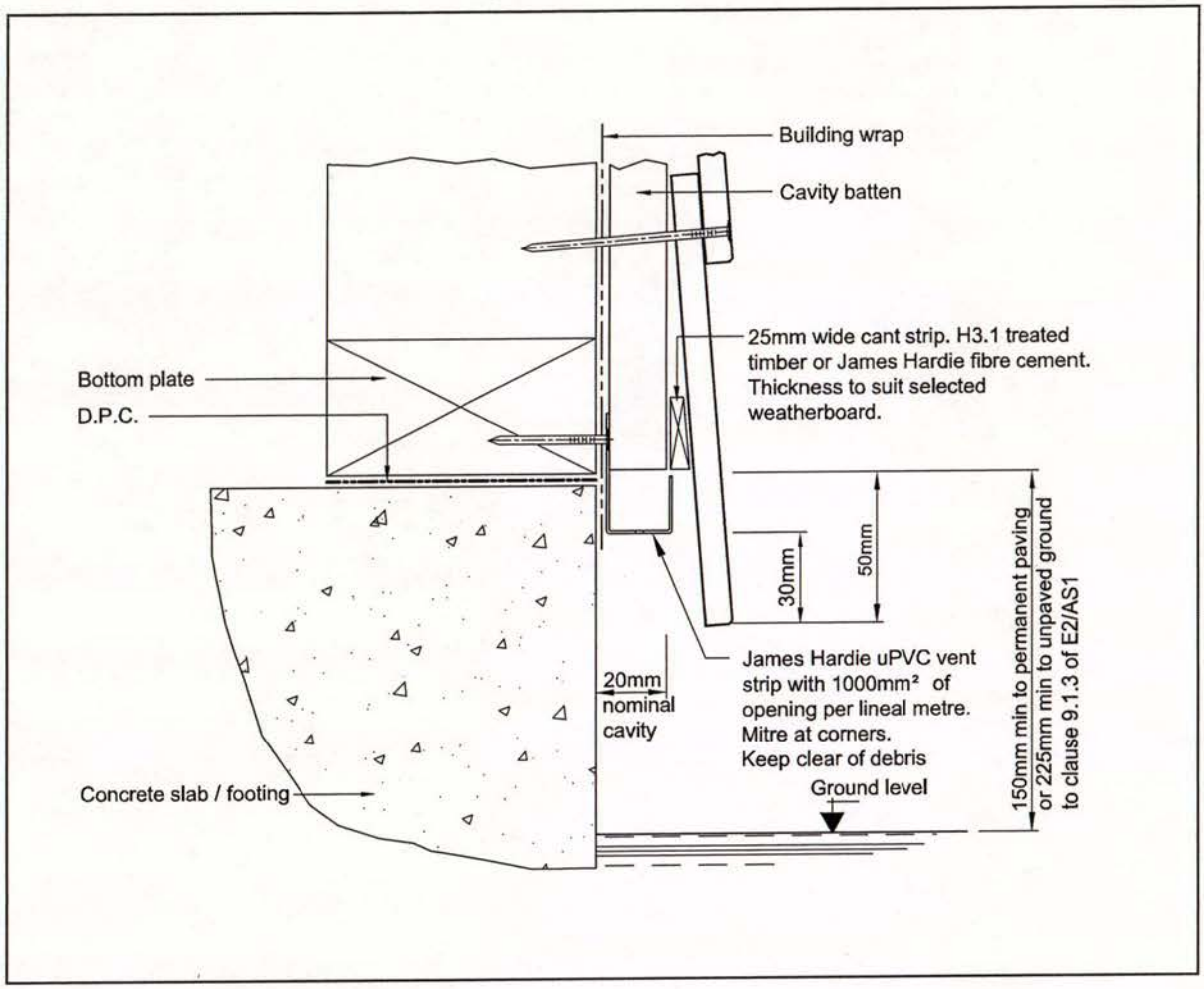


FIGURE 19: CAVITY CONCRETE FOOTING

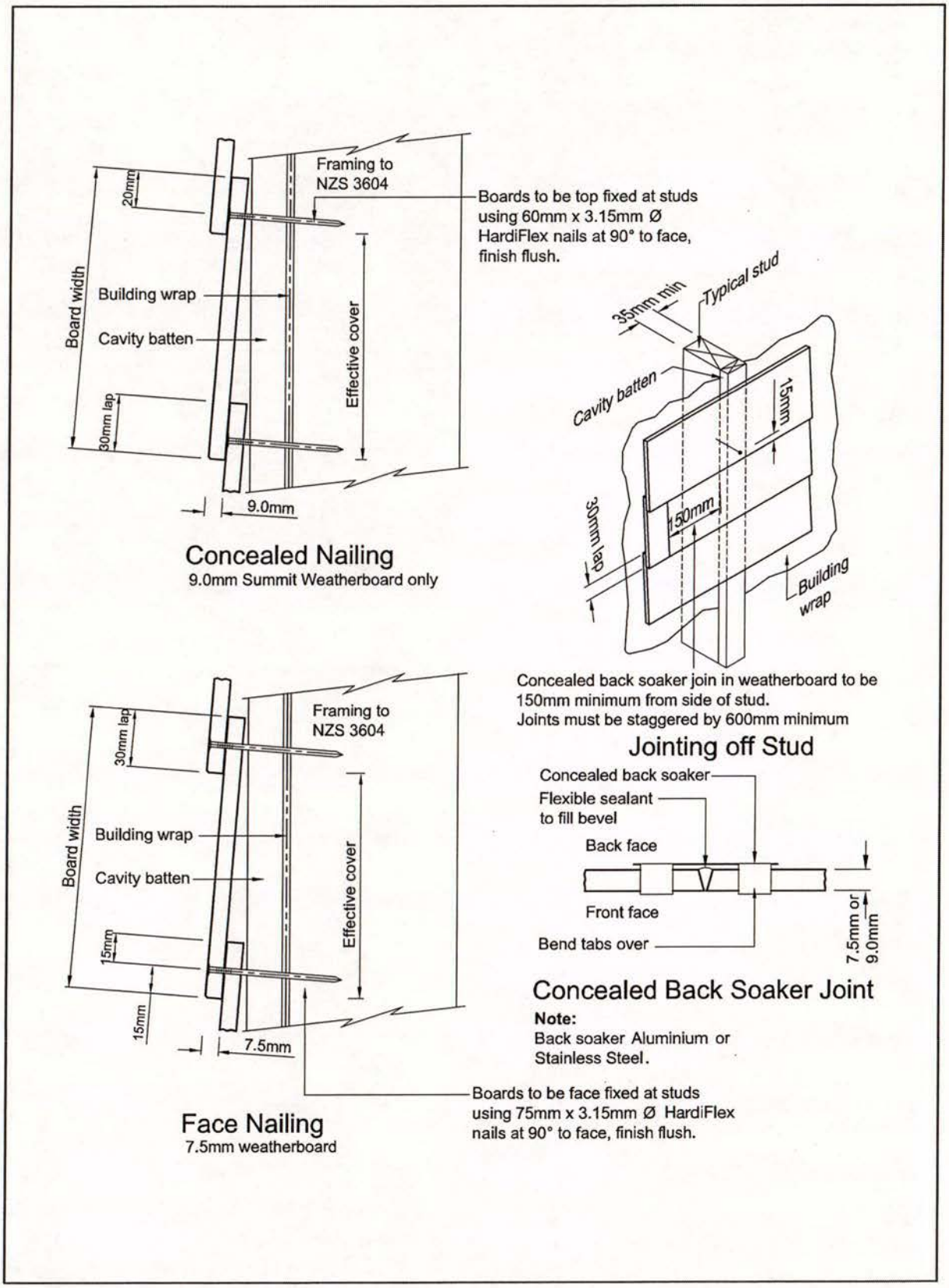


FIGURE 20: CAVITY WEATHERBOARD FIXING

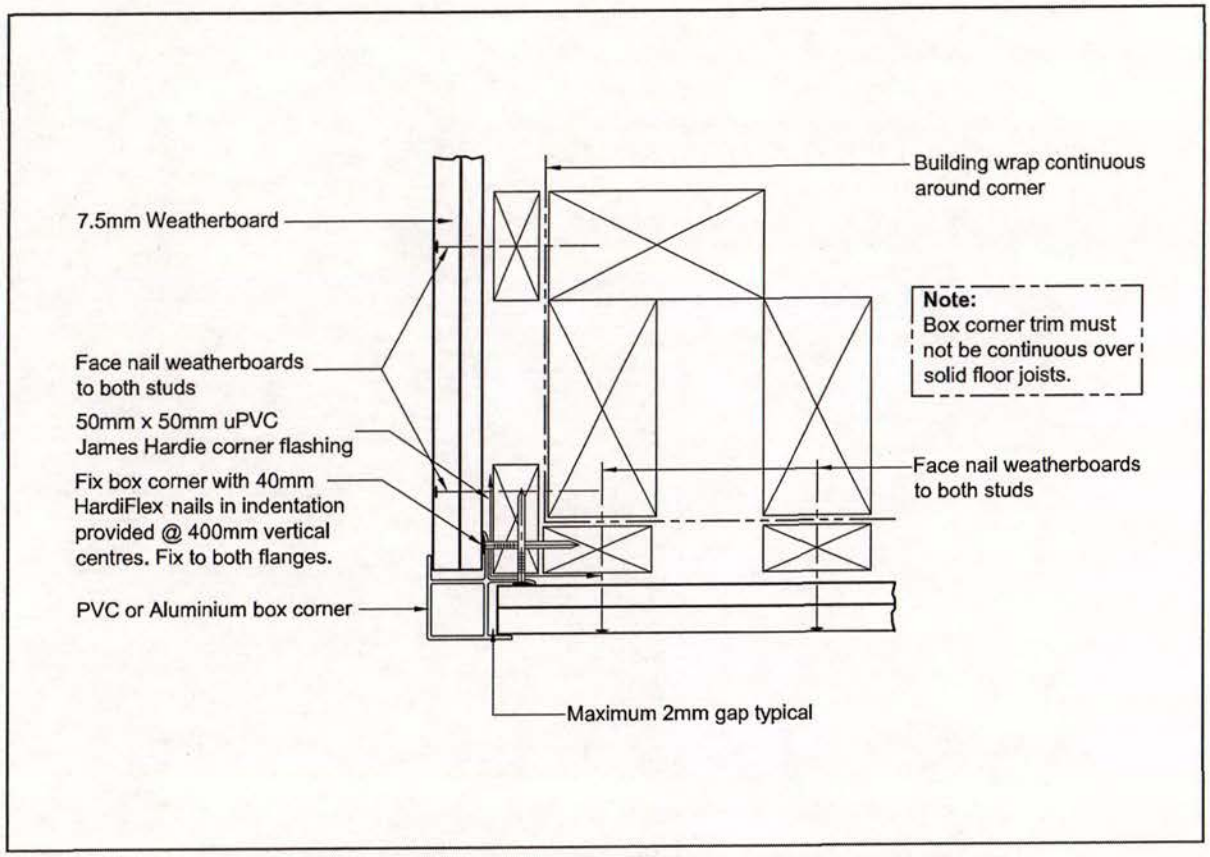


FIGURE 21: CAVITY PVC OR ALUMINIUM BOX CORNER (7.5MM WEATHERBOARD)

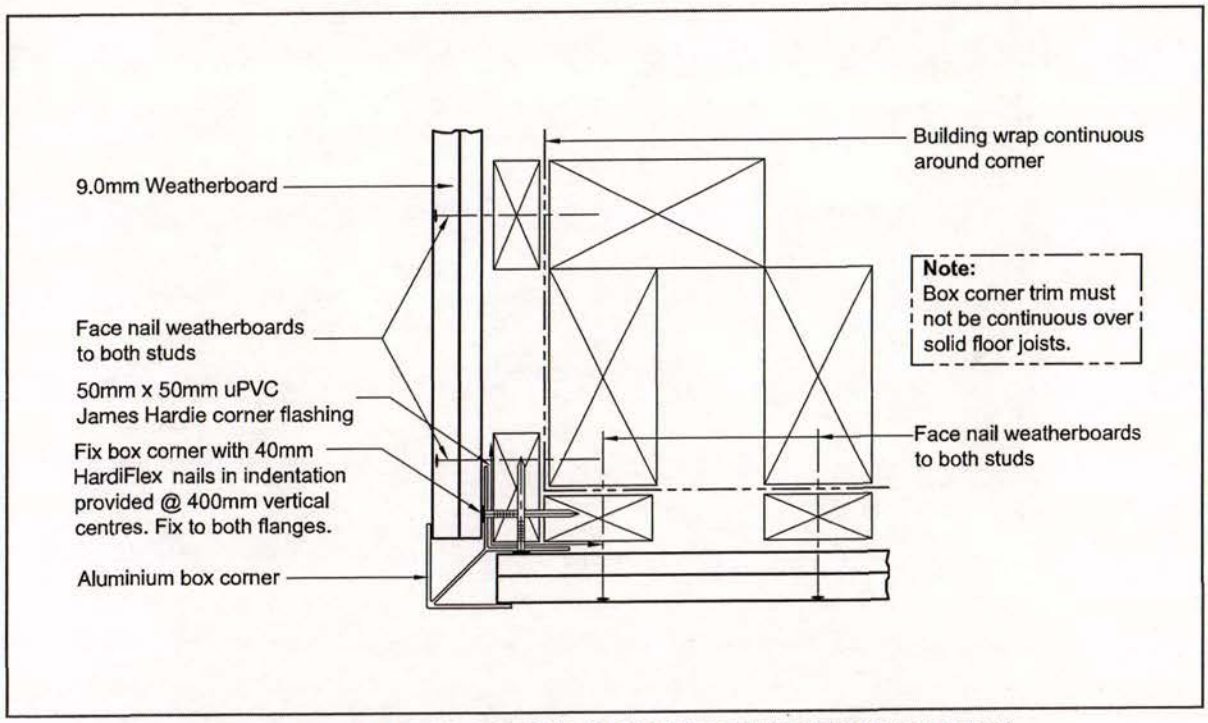


FIGURE 22: CAVITY ALUMINIUM BOX CORNER (9.0MM SUMMIT WEATHERBOARD)

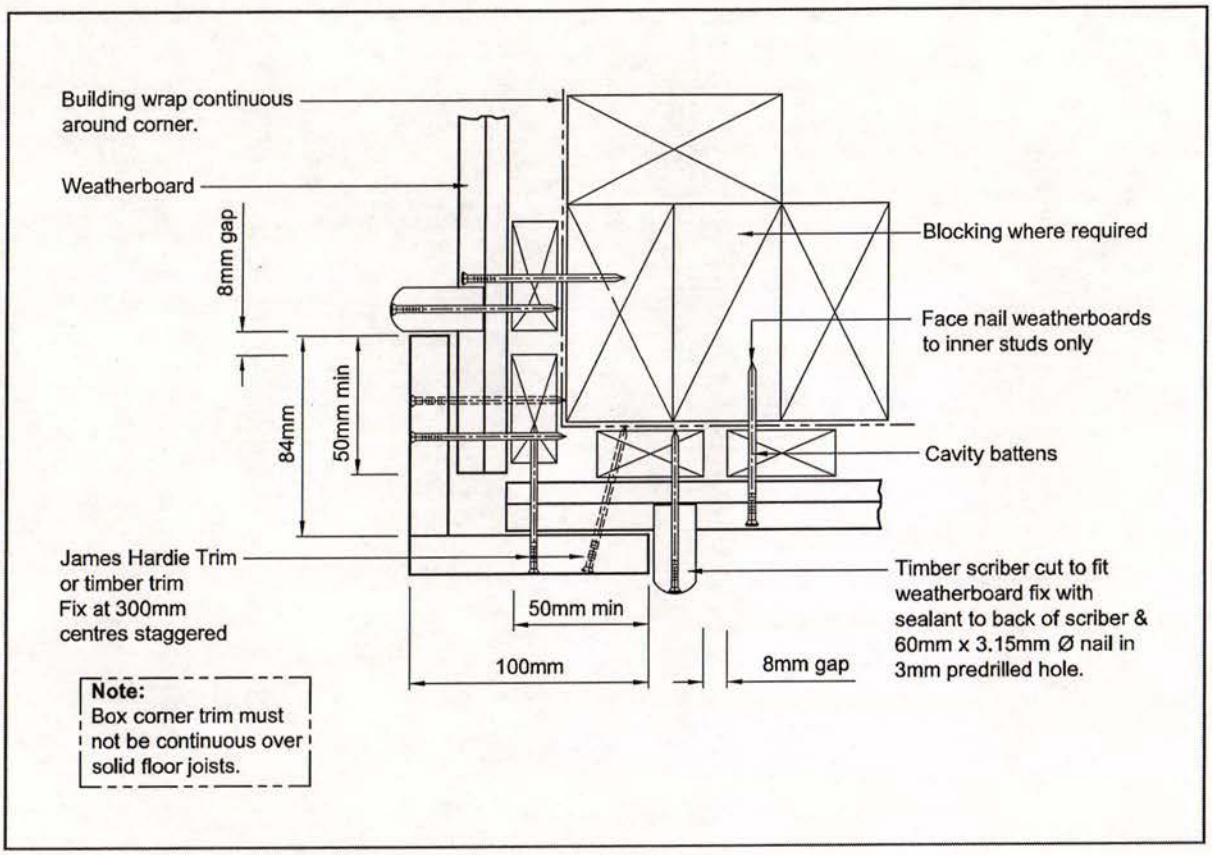


FIGURE 23: CAVITY BOXED CORNER

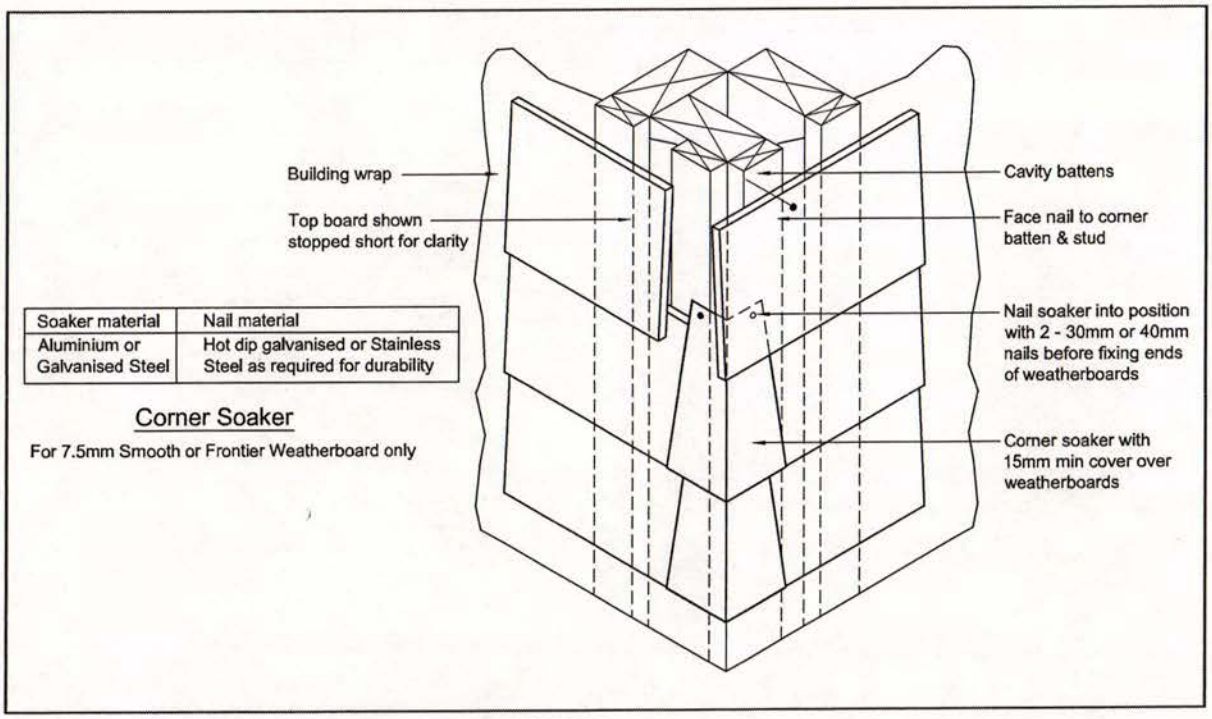


FIGURE 24: CAVITY EXTERNAL CORNER SOAKER

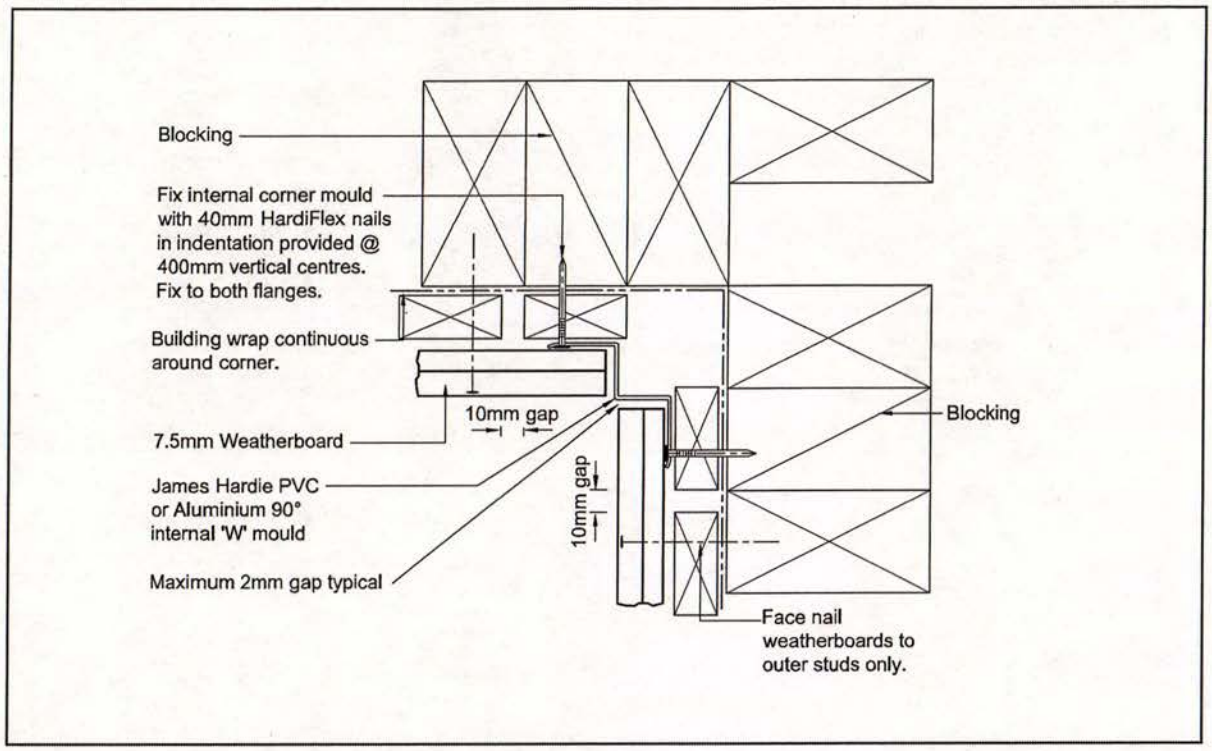


FIGURE 25: CAVITY INTERNAL 90° PVC OR ALUMINIUM 'W' MOULD

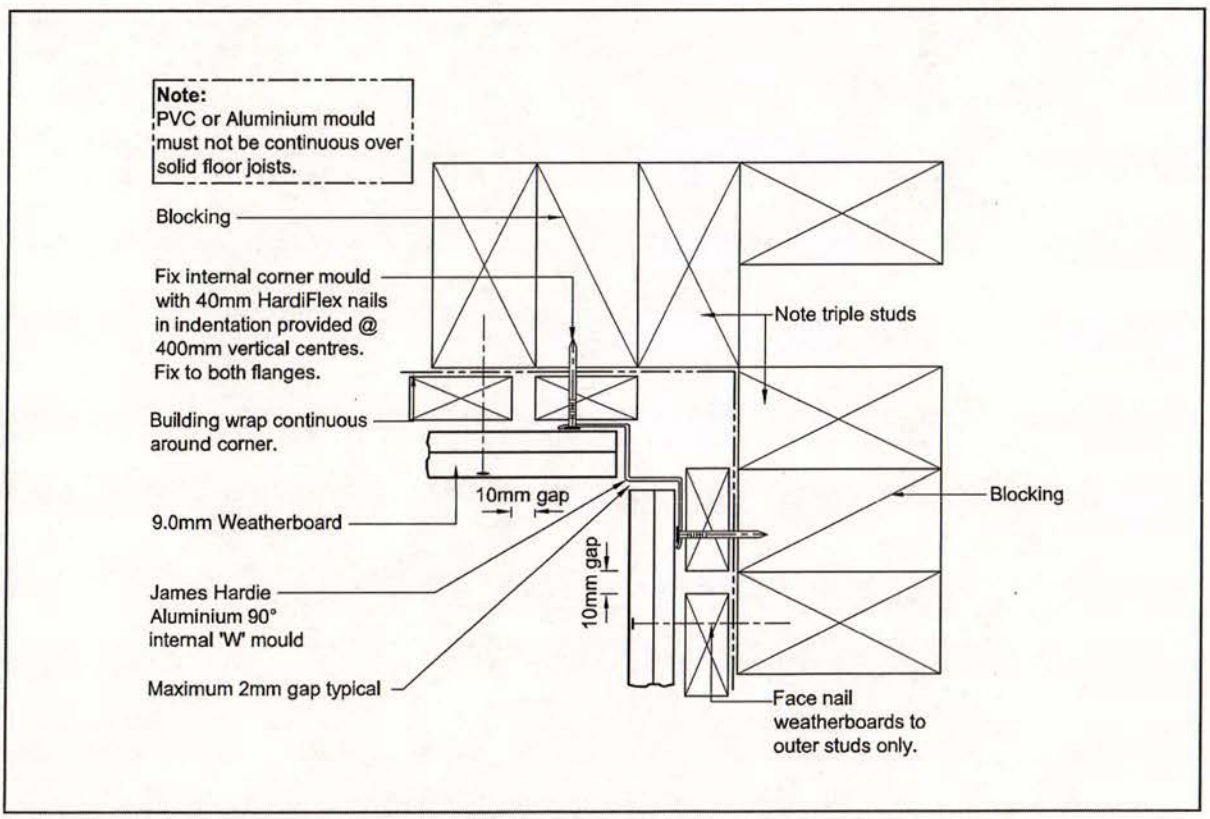


FIGURE 26: CAVITY INTERNAL 90° ALUMINIUM 'W' MOULD

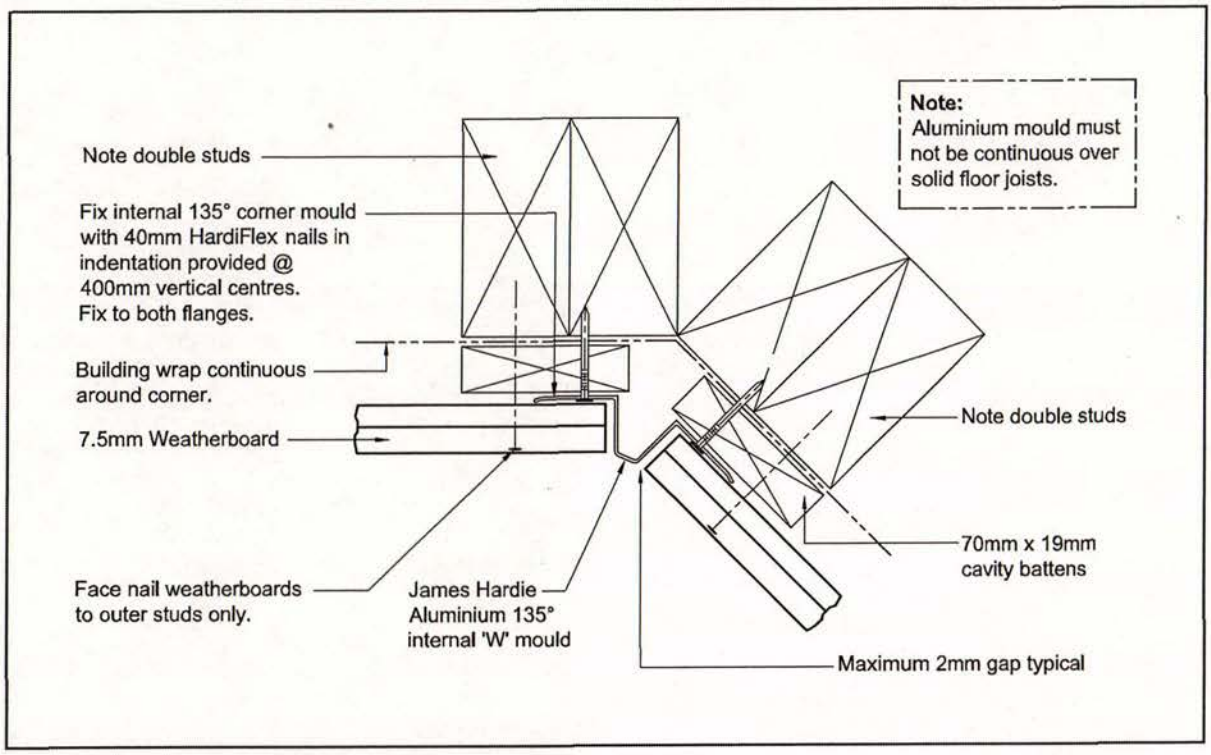


FIGURE 27: CAVITY INTERNAL 135° ALUMINIUM 'W' MOULD

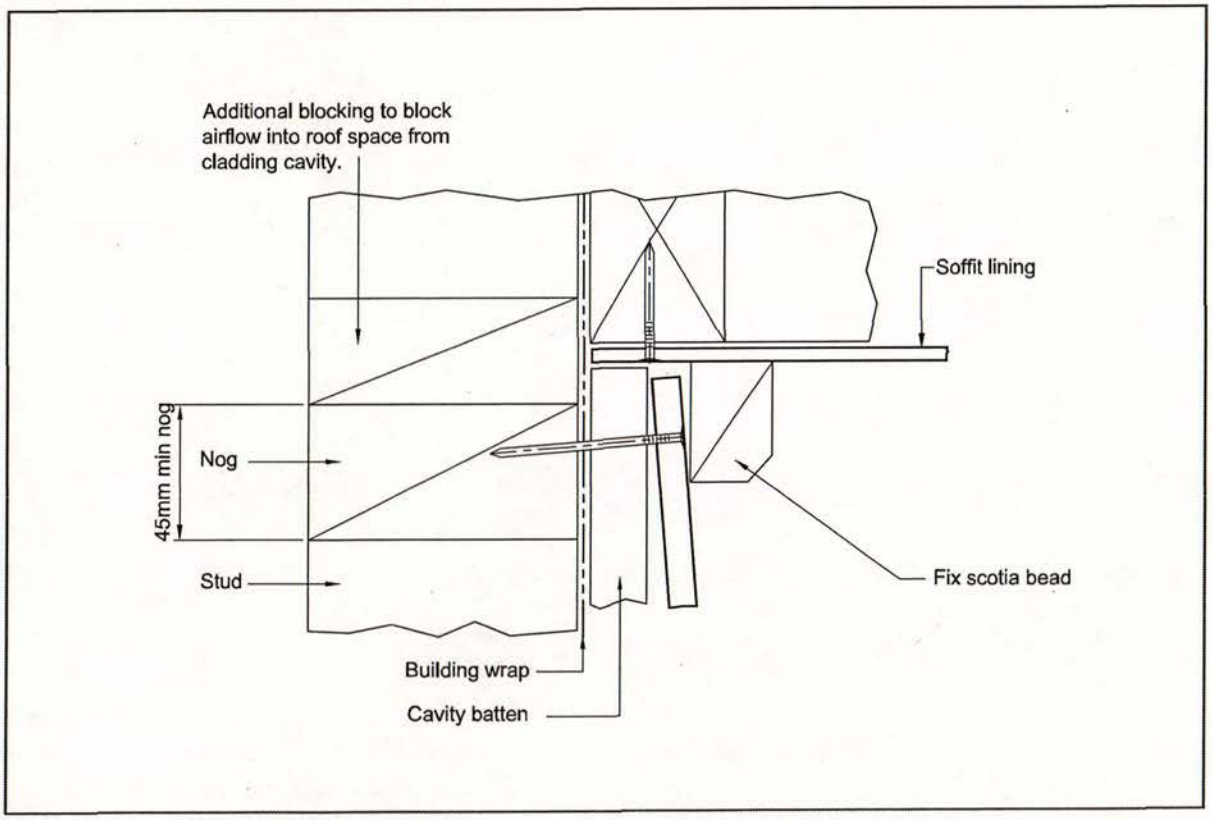
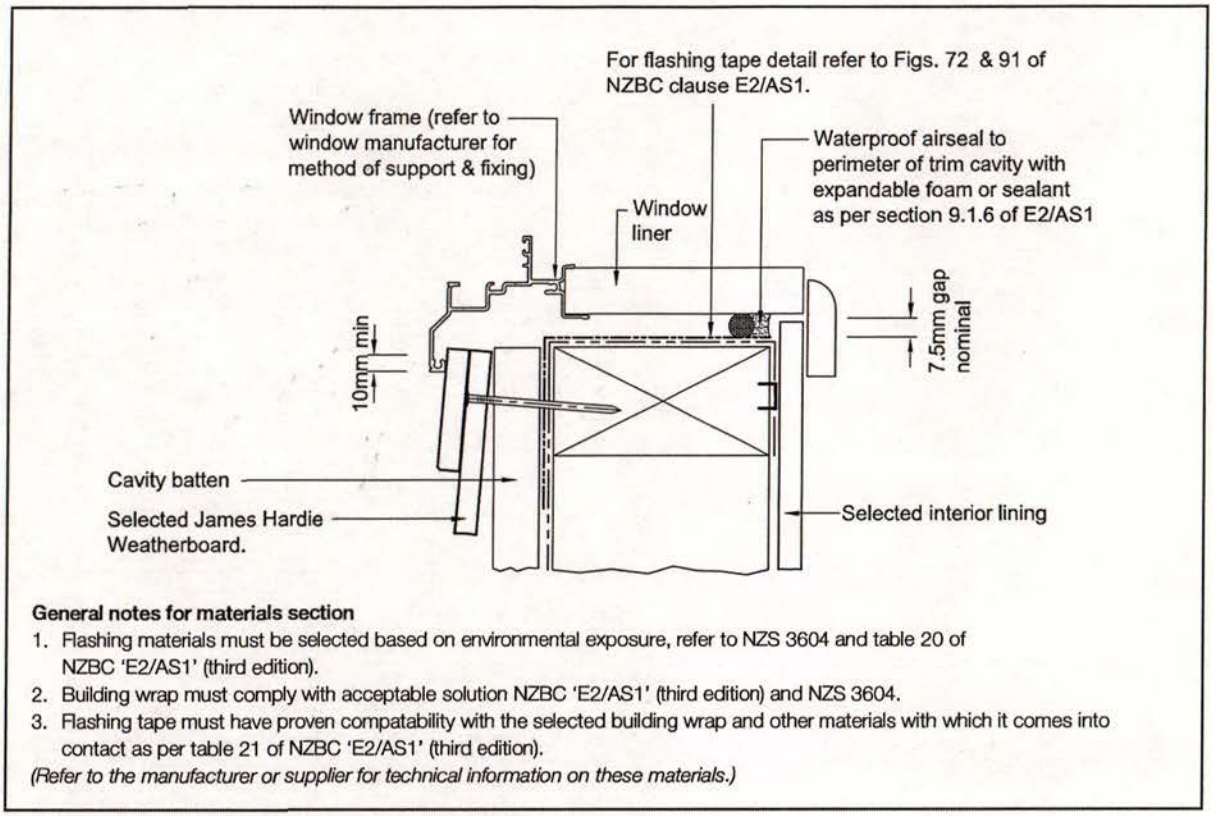


FIGURE 28: CAVITY SOFFIT DETAIL



General notes for materials section

1. Flashing materials must be selected based on environmental exposure, refer to NZS 3604 and table 20 of NZBC 'E2/AS1' (third edition).
2. Building wrap must comply with acceptable solution NZBC 'E2/AS1' (third edition) and NZS 3604.
3. Flashing tape must have proven compatability with the selected building wrap and other materials with which it comes into contact as per table 21 of NZBC 'E2/AS1' (third edition).

(Refer to the manufacturer or supplier for technical information on these materials.)

FIGURE 29: CAVITY SILL FLASHINGS WITHOUT FACINGS

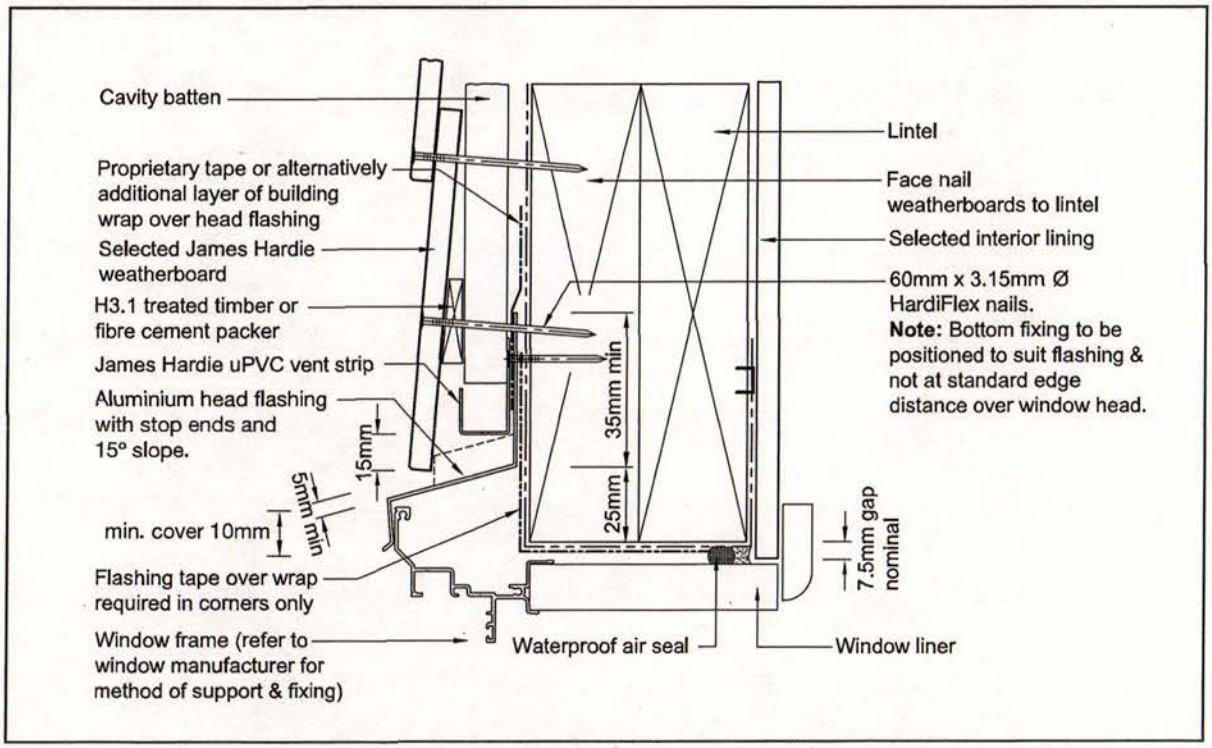


FIGURE 30: CAVITY ONE PIECE HEAD FLASHING WITHOUT FACINGS

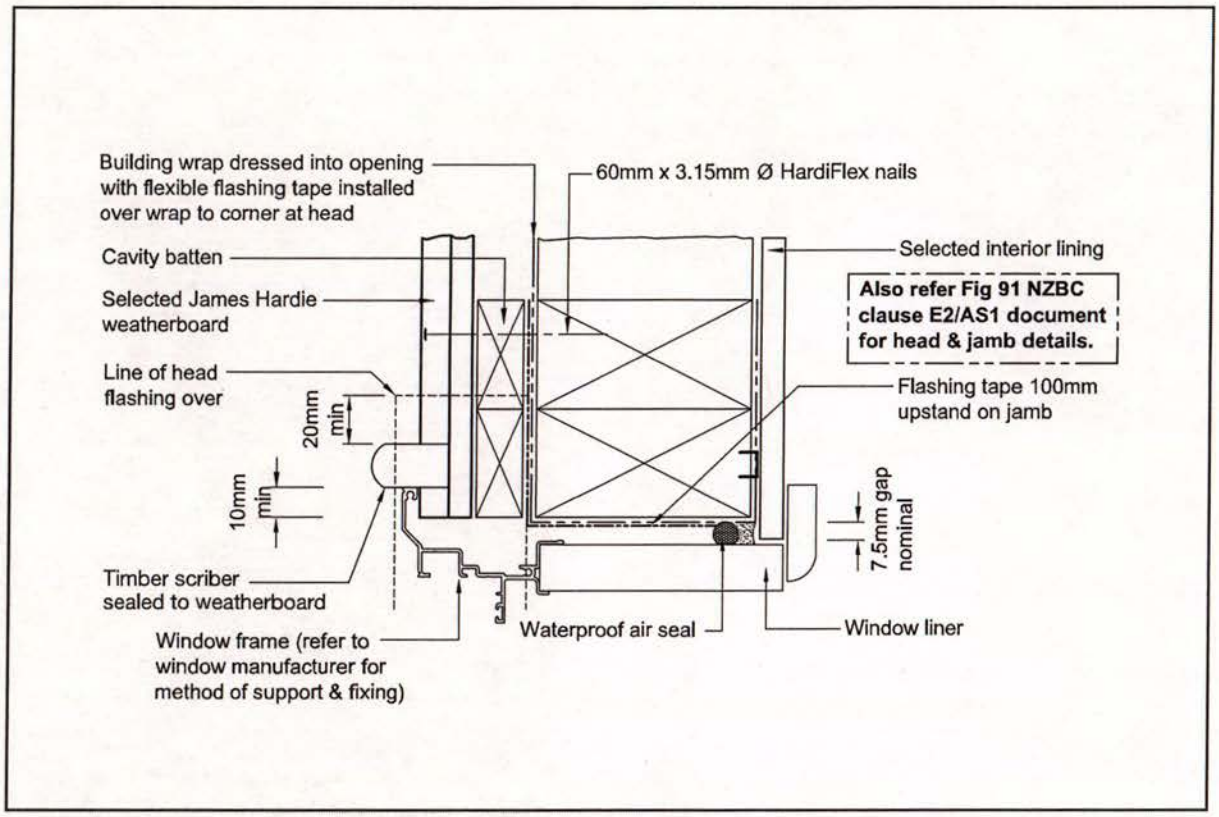
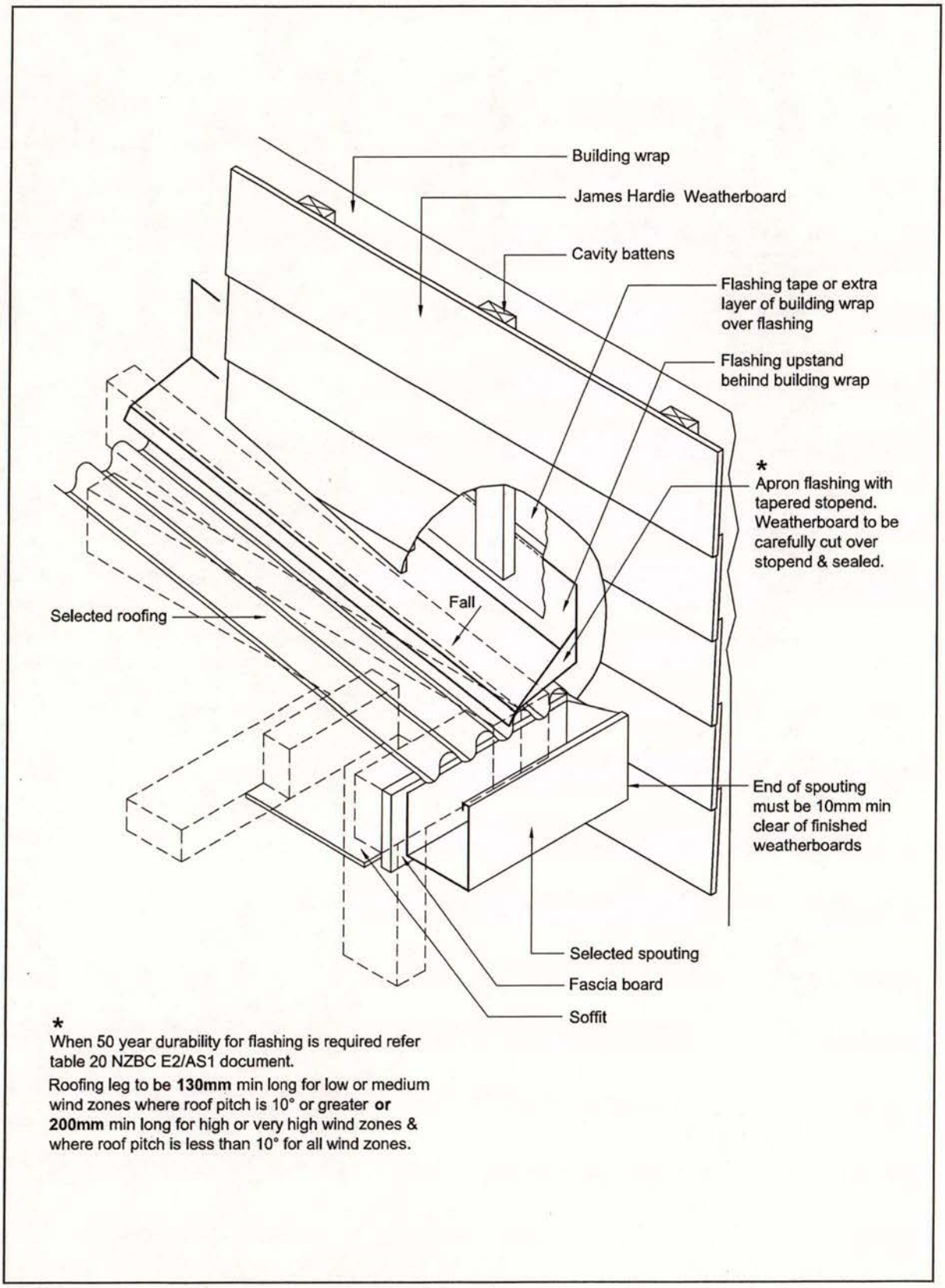


FIGURE 31: CAVITY JAMB FLASHING WITHOUT FACINGS



*
When 50 year durability for flashing is required refer table 20 NZBC E2/AS1 document.

Roofing leg to be **130mm** min long for low or medium wind zones where roof pitch is 10° or greater **or** **200mm** min long for high or very high wind zones & where roof pitch is less than 10° for all wind zones.

FIGURE 32: CAVITY FRAMING AND BATTEN SETOUT

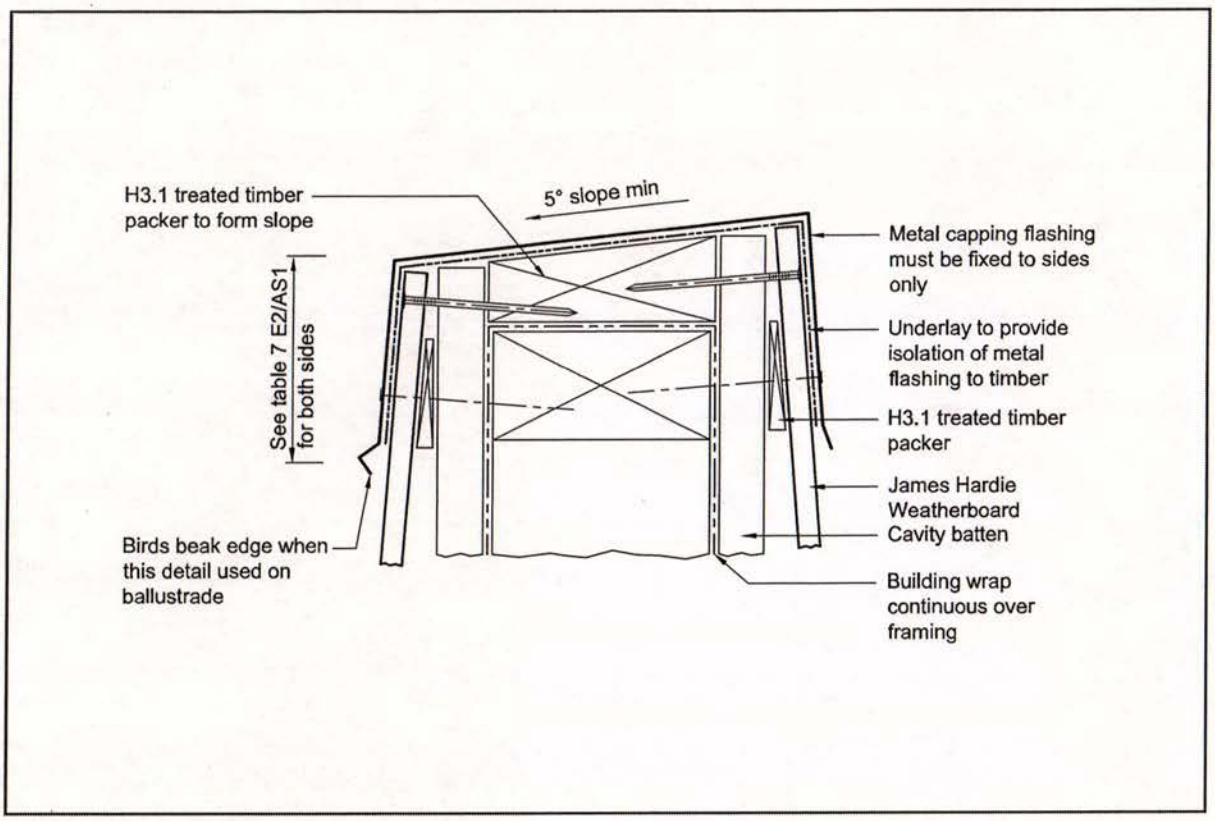


FIGURE 33: CAVITY PARAPET FLASHING

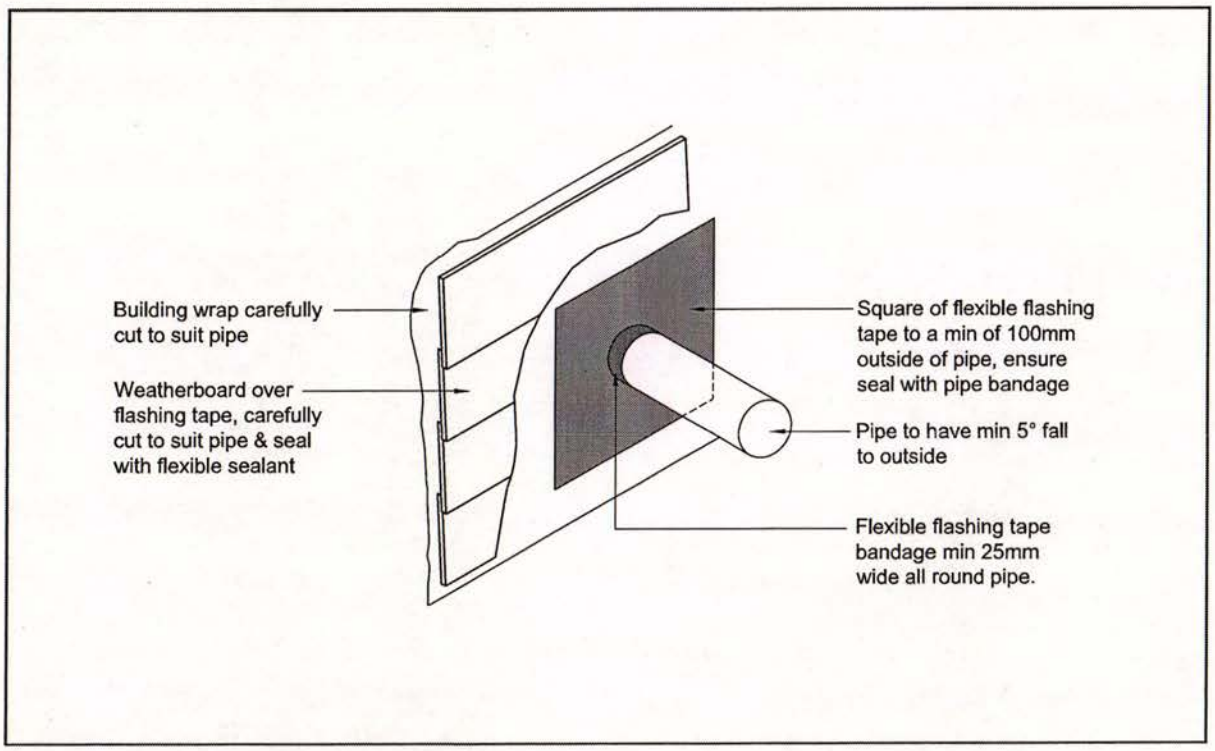


FIGURE 34: CAVITY PIPE PENETRATION

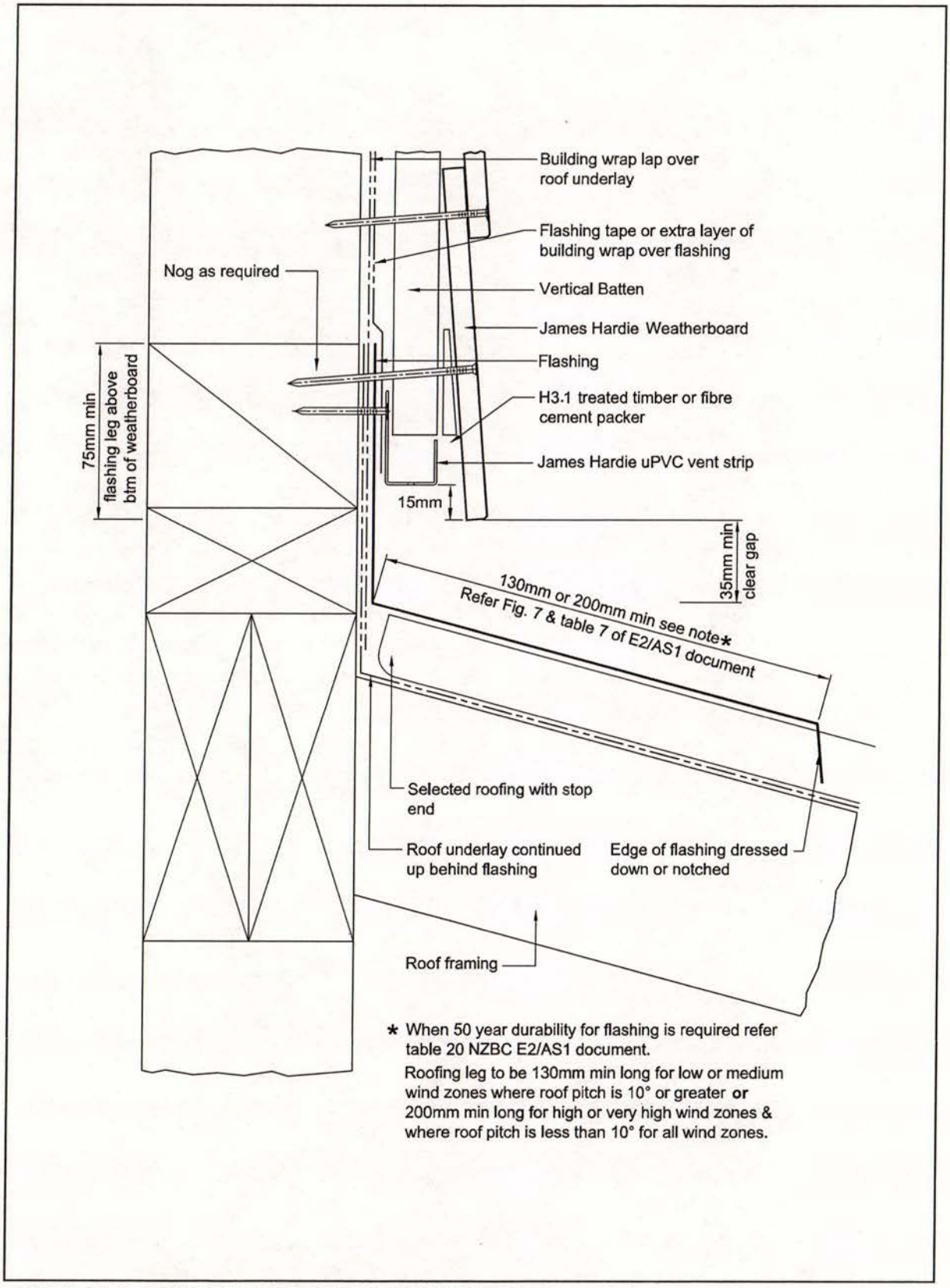


FIGURE 35: CAVITY ONE PIECE APRON FLASHING JOINT

NOTES

15 WARRANTY

JAMES HARDIE WEATHERBOARDS

PRODUCT WARRANTY

APRIL 2006

WARRANTY: James Hardie New Zealand Limited ("James Hardie") warrants for a period of 15 years from the date of purchase that the James Hardie Weatherboards (the "Product"), will be free from defects due to defective factory workmanship or materials and, subject to compliance with the conditions below, will be resistant to cracking, rotting, fire and damage from termite attacks to the extent set out in James Hardie's relevant published literature current at the time of installation. James Hardie warrants for a period of 12 months from the date of purchase that the accessories supplied by James Hardie will be free from defects due to defective factory workmanship or materials.

Nothing in this document shall exclude or modify any legal rights a customer may have under the Consumer Guarantees Act or otherwise which cannot be excluded or modified at law.

CONDITIONS OF WARRANTY: The warranty is strictly subject to the following conditions:

(a) James Hardie will not be liable for breach of warranty unless the claimant provides proof of purchase and makes a written claim either within 30 days after the defect would have become reasonably apparent or, if the defect was reasonably apparent prior to installation, then the claim must be made prior to installation.

(b) This warranty is not transferable.

(c) The Product must be installed and maintained strictly in accordance with the relevant James Hardie literature current at the time of installation and must be installed in conjunction with the components or products specified in the literature. Further, all other products, including coating and jointing systems, applied to or used in conjunction with the Product must be applied or installed and maintained strictly in accordance with the relevant manufacturer's instructions and good trade practice.

(d) The project must be designed and constructed in strict compliance with all relevant provisions of the current New Zealand Building Code ("NZBC"), regulations and standards.

(e) The claimant's sole remedy for breach of warranty is (at James Hardie's option) that James Hardie will either supply replacement product, rectify the affected product or pay for the cost of the replacement or rectification of the affected product.

(f) James Hardie will not be liable for any losses or damages (whether direct or indirect) including property damage or personal injury, consequential loss, economic loss or loss of profits, arising in contract or negligence or howsoever arising. Without limiting the foregoing James Hardie will not be liable for any claims, damages or defects arising from or in any way attributable to poor workmanship, poor design or detailing, settlement or structural movement and/or movement of materials to which the Product is attached, incorrect design of the structure, acts of God including but not limited to earthquakes, cyclones, floods or other severe weather conditions or unusual climatic conditions, efflorescence or performance of paint/coatings applied to the Product, normal wear and tear, growth of mould, mildew, fungi, bacteria, or any organism on any Product surface or Product (whether on the exposed or unexposed surfaces).

(g) All warranties, conditions, liabilities and obligations other than those specified in this warranty are excluded to the fullest extent allowed by law.

(h) If meeting a claim under this warranty involves re-coating of Products, there may be slight colour differences between the original and replacement Products due to the effects of weathering and variations in materials over time.

DISCLAIMER: The recommendations in James Hardie's literature are based on good building practice, but are not an exhaustive statement of all relevant information and are subject to conditions (c), (d), (f) and (g) above. Further, as the successful performance of the relevant system depends on numerous factors outside the control of James Hardie (eg quality of workmanship and design) James Hardie shall not be liable for the recommendations in that literature and the performance of the relevant system, including its suitability for any purpose or ability to satisfy the relevant provisions of the NZBC, regulations and standards.

Ask James Hardie™
Call 0800 808 868
www.jameshardie.co.nz

James Hardie®

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Design-In-Hyne v4 NZ Hyne & Son Pty Ltd Compliance Report

Job Number: BED 2
Job Description: LOT 1, DP 310143610 STANLEY ROADWAINUI
Run by: on 24/01/2007, at 11:04:14 a.m. Phone:
This design was carried out for domestic or secondary element design using Limit State techniques
in accordance with AS/NZS1170.0-2002, and AS1720.1-1997, and using recommendations only of AS1684.1-1999

Section L1, Lintel Design

Use preferred section size 2/200x45 HYNE EDGEBEAM H3.1 Treated from Hyne & Son Pty Ltd

DIMENSIONAL DETAILS:

Span type is Single Span for an overall length of 3.2 metres
Supported rafter/truss spacing is 0.9 metres, with roof load width of 4.5 metres
The lintel design did not rely on assistance from top plate stiffness

DESIGN DETAILS:

Roofing material of Sheet (20)
Roof pitch of 22.5 deg
Wind Classification for this project is VHigh
Temperature Factor (K6) = 1.00
Defined Snow Load Region is n/a
Ground Snow Load is: Ultimate = 0.00kPa,

Ceiling material of 13mm P'Board (20)

Design ultimate wind pressure is 1.750 kPa
Design serviceability wind pressure is 1.162kPa
Altitude = 0 m; No snow load is applicable
and Serviceable = 0.00kPa.

CERTIFICATION:

I hereby certify that above nominated section size has been designed applying the accepted principles of structural mechanics in accordance with the relevant building codes and industry standards as stated below:

AS/NZS 1170	Part 0: Structural design actions - General Principles 2002
	Part 1: Structural design actions - Permanent, imposed and other actions 2002
	Part 2: Structural design actions - Wind actions - 2002
AS 1684	Residential Timber Framed Construction - 1999
AS 1720	Timber Structures - Part 1: Design - 1997
AS 4055	Wind Loads for Housing - 1992
NZS 3603	Timber Structures Standard - 1993 for NZ Timber Strengths and capacity factors
GLTAA	Industry recommendations from the GLTAA - "Unified Design Criteria"

The design actions, methods, assumptions and other criteria used in this structural design are precedent upon AS1720.1-1997 and AS1170-2002, in preference to other Standards listed above. Deflection limits recommended in AS1684.1-1999 have not been followed for this design.

The nominated section size has been designed for the loading and dimensional data stated above. Hyne & Son Pty Ltd and Hunt Robinson Pty Ltd cannot accept liability for loss or damage, either direct or consequential, arising from the use of this product in an application not consistent with the input data.

HUNT ROBINSON Consulting Engineers
Stephen J Hunt BE(Civil)
(MIEAust #368737), (NPER),
(RPEQ #3731)

Checked by: G Lawrie
for Hyne Timber Homes
Date Checked: 24/01/2007

WHAKATANE DISTRICT COUNCIL
APPROVED FOR CONSTRUCTION
Building Control Office
Date 29-03-07

.Design-In-Hyne v4 NZ Hyne & Son Pty Ltd Deflection Report

Job Number: BED 2
Job Description: LOT 1, DP 310143610 STANLEY ROADWAINUI
Run by: on 24/01/2007, at 11:04:19 a.m. Phone:
This design was carried out for domestic or secondary element design using Limit State techniques
in accordance with AS/NZS1170.0-2002, and AS1720.1-1997, and using recommendations only of AS1684.1-1999

Section L1, Lintel Design

Use preferred section size 2/200x45 HYNE EDGEBEAM H3.1 Treated from Hyne & Son Pty Ltd

DIMENSIONAL DETAILS:

Span type is Single Span for an overall length of 3.2 metres
Supported rafter/truss spacing is 0.9 metres, with roof load width of 4.5 metres
The lintel design did not rely on assistance from top plate stiffness

DESIGN DETAILS:

Roofing material of Sheet (20)
Roof pitch of 22.5 deg
Wind Classification for this project is VHigh
Temperature Factor (K6) = 1.00
Defined Snow Load Region is n/a
Ground Snow Load is: Ultimate = 0.00kPa,

Ceiling material of 13mm P'Board (20)

Design ultimate wind pressure is 1.750 kPa
Design serviceability wind pressure is 1.162kPa
Altitude = 0 m; No snow load is applicable
and Serviceable = 0.00kPa.

Allowable Deflections:

Load Case Type	Span Ratio	Fixed value mm
Permanent Loads	L/500	10
Floor Live Loads	L/400	10
Long Term Snow Loads	L/500	15
Short Term Snow Loads	L/400	15
Roof Live Loads	L/250	15
Wind Loads	L/200	n/a
Dynamic Floor Loads	n/a	2

Member Actions - Serviceability Properties:

Member Number	Load Combination Name	Bending Deflection	Total Deflection	Camber Value	Check Deflection
1	Dead Load Only	-6.1	-6.1	0.0	6.1
	Roof Live Load Only	-1.2	-1.2	0.0	1.2
	Wind Uplift Only	8.7	8.7	0.0	8.7
	Wind Downdrag Only	-5.6	-5.6	0.0	5.6

Design-In-Hyne v4 NZ Hyne & Son Pty Ltd Engineering Report

Job Number: BED 2
Job Description: LOT 1, DP 310143610 STANLEY ROADWAINUI
Run by: on 24/01/2007, at 11:04:22 a.m. Phone:
This design was carried out for domestic or secondary element design using Limit State techniques in accordance with AS/NZS1170.0-2002, and AS1720.1-1997, and using recommendations only of AS1684.1-1999

Section L1, Lintel Design

Use preferred section size 2/200x45 HYNE EDGEBEAM H3.1 Treated from Hyne & Son Pty Ltd

DIMENSIONAL DETAILS:

Span type is Single Span for an overall length of 3.2 metres
Supported rafter/truss spacing is 0.9 metres, with roof load width of 4.5 metres
The lintel design did not rely on assistance from top plate stiffness

DESIGN DETAILS:

Roofing material of Sheet (20)
Roof pitch of 22.5 deg
Wind Classification for this project is VHigh
Temperature Factor (K6) = 1.00
Defined Snow Load Region is n/a
Ground Snow Load is: Ultimate = 0.00kPa,

Ceiling material of 13mm P'Board (20)

Design ultimate wind pressure is 1.750 kPa
Design serviceability wind pressure is 1.162kPa
Altitude = 0 m; No snow load is applicable
and Serviceable = 0.00kPa.

SECTION DETAILS (2/200x45 HYNE EDGEBEAM H3.1 Treated):

Seasoned (Creep factor = 2)
Depth = 200mm, Width = 45mm
Gross Area = 9000sq mm
Mom Inertia.major = 30.000x10^6 mm^4
Elasticity = 15000MPa (Elb 10000MPa)
Rigidity = 1000MPa
Bending Stress = 41MPa
Tension Stress = 17MPa
Bearing Parallel = 35MPa

Durability Class = 4
Mass = 4.860kg/m
Shear Area = 6000sq mm
Mom Inertia.minor = 1.519x10^6 mm^4
Torsion Constant = 5.214x10^6 mm^4

Shear Stress = 5MPa
Compression Stress = 30MPa
Bearing Perpendicular = 12MPa

ENGINEERING DATA:

Members:

Member	Length	X1-coord	Y1-coord	X2-coord	Y2-coord
1	3200	0	0	3200	0

Restraints:

Top Restraint	Bottom Restraint	Side Restraint
900mm	unrestrained	unrestrained

Wind Coefficients:

Uplift Strength	DownDrag Strength	Uplift Deflection	DownDrag Deflection
1.10	0.56	1.10	0.70

Allowable Deflections:

Load Case Type	Span Ratio	Fixed value mm
Permanent Loads	L/500	10
Floor Live Loads	L/400	10
Long Term Snow Loads	L/500	15
Short Term Snow Loads	L/400	15
Roof Live Loads	L/250	15
Wind Loads	L/200	n/a
Dynamic Floor Loads	n/a	2

Load Case Data:

Case	Name	Type	Duration
0	Self Weight	Dead Load	Permanent
1	Dead Load	Dead Load	Permanent
2	0.25kPa Roof Live Load	Distibuted Roof Live Load	Medium-term
3	Wind Uplift Strength	Vertical Wind Load	Wind gust
4	Wind Uplift Deflection	Vertical Wind Load	Wind gust
5	Wind Downdrag Strength	Vertical Wind Load	Wind gust
6	Wind Downdrag Deflection	Vertical Wind Load	Wind gust
7	Dead Load for max shear	Dead Load	Permanent

8	0.25kPa Roof Live Load for max shear	Distibuted Roof Live Load	Medium-term
9	Wind Uplift Strength for max shear	Vertical Wind Load	Wind gust
10	Wind Downdrag Strength for max shear	Vertical Wind Load	Wind gust
11	Dead Load for max shear	Dead Load	Permanent
12	0.25kPa Roof Live Load for max shear	Distibuted Roof Live Load	Medium-term
13	Wind Uplift Strength for max shear	Vertical Wind Load	Wind gust
14	Wind Downdrag Strength for max shear	Vertical Wind Load	Wind gust

Load Combinations for Maximum Strength:

Combine	Combination Name	Load Case	Multiplier
1	Dead Load Only	0	1.35
		1	1.35
3	Dead Load + Roof Live Load	0	1.20
		1	1.20
		2	1.50
5	Dead Load + Wind Uplift	0	0.90
		1	0.90
		3	1.00
7	Dead Load + Wind Downdrag	0	1.25
		1	1.25
		5	1.00
9	Dead Load Only	0	1.35
		7	1.35
10	Dead Load + Roof Live Load	0	1.20
		7	1.20
		8	1.50
11	Dead Load + Wind Uplift	0	0.90
		7	0.90
		9	1.00
12	Dead Load + Wind Downdrag	0	1.25
		7	1.25
		10	1.00
13	Dead Load Only	0	1.35
		11	1.35
14	Dead Load + Roof Live Load	0	1.20
		11	1.20
		12	1.50
15	Dead Load + Wind Uplift	0	0.90
		11	0.90
		13	1.00
16	Dead Load + Wind Downdrag	0	1.25
		11	1.25
		14	1.00

Load Combinations for Maximum Deflection:

Combine	Combination Name	Load Case	Creep Applies
2	Dead Load Only	0	true
		1	true
4	Roof Live Load Only	2	false
6	Wind Uplift Only	4	false
8	Wind Downdrag Only	6	false

Member Distributed Loads:

Load Case	Member Number	Start Load (kN/m)	Start Position (m)	Finish Load (kN/m)	Finish Position (m)
0	All	-0.095	From Start	-0.095	To Finish

Member Concentrated Loads:

Load Case	Member Number	Applied for Maximum	Load Value (kN)	At Position (m)
1	1	Bending/Deflection	-1.720	0.700
	1	Bending/Deflection	-1.720	1.600
	1	Bending/Deflection	-1.720	2.500
2	1	Bending/Deflection	-1.013	0.700
	1	Bending/Deflection	-1.013	1.600
	1	Bending/Deflection	-1.013	2.500
3	1	Bending/Deflection	7.794	0.700
	1	Bending/Deflection	7.794	1.600
	1	Bending/Deflection	7.794	2.500
4	1	Bending/Deflection	5.175	0.700
	1	Bending/Deflection	5.175	1.600
	1	Bending/Deflection	5.175	2.500
5	1	Bending/Deflection	-3.968	0.700

	1	Bending/Deflection	-3.968	1.600
	1	Bending/Deflection	-3.968	2.500
6	1	Bending/Deflection	-3.293	0.700
	1	Bending/Deflection	-3.293	1.600
	1	Bending/Deflection	-3.293	2.500
7	1	Shear Stress	-1.720	0.300
	1	Shear Stress	-1.720	1.200
	1	Shear Stress	-1.720	2.100
	1	Shear Stress	-1.720	3.000
8	1	Shear Stress	-1.013	0.300
	1	Shear Stress	-1.013	1.200
	1	Shear Stress	-1.013	2.100
	1	Shear Stress	-1.013	3.000
9	1	Shear Stress	7.794	0.300
	1	Shear Stress	7.794	1.200
	1	Shear Stress	7.794	2.100
	1	Shear Stress	7.794	3.000
10	1	Shear Stress	-3.968	0.300
	1	Shear Stress	-3.968	1.200
	1	Shear Stress	-3.968	2.100
	1	Shear Stress	-3.968	3.000
11	1	Shear Stress	-1.720	0.200
	1	Shear Stress	-1.720	1.100
	1	Shear Stress	-1.720	2.000
	1	Shear Stress	-1.720	2.900
12	1	Shear Stress	-1.013	0.200
	1	Shear Stress	-1.013	1.100
	1	Shear Stress	-1.013	2.000
	1	Shear Stress	-1.013	2.900
13	1	Shear Stress	7.794	0.200
	1	Shear Stress	7.794	1.100
	1	Shear Stress	7.794	2.000
	1	Shear Stress	7.794	2.900
14	1	Shear Stress	-3.968	0.200
	1	Shear Stress	-3.968	1.100
	1	Shear Stress	-3.968	2.000
	1	Shear Stress	-3.968	2.900

Member Actions - Strength Properties:

Member	Load	Axial	Bending Moments (kN.m)				End Shears (kN)	
Number	Combination	(kN)	Left End	Right End	Internal	At	Left Shear	Right Shear
1	1	0.000	0.000	0.000	-3.647	1600	3.649	-3.649
	3	0.000	0.000	0.000	-5.520	1600	5.522	-5.522
	5	0.000	0.000	0.000	9.260	1600	-9.259	9.259
	7	0.000	0.000	0.000	-9.329	1600	9.331	-9.331
	9	0.000	0.000	0.000	-3.462	1200	4.665	-2.634
	10	0.000	0.000	0.000	-5.242	1200	7.089	-3.955
	11	0.000	0.000	0.000	8.799	1200	-11.992	6.526
	12	0.000	0.000	0.000	-8.861	1200	12.008	-6.655
	13	0.000	0.000	0.000	-3.462	2000	2.634	-4.665
	14	0.000	0.000	0.000	-5.242	2000	3.955	-7.089
	15	0.000	0.000	0.000	8.799	2000	-6.526	11.992
	16	0.000	0.000	0.000	-8.861	2000	6.655	-12.008

Member Actions - Serviceability Properties:

Member		Bending	Total	Camber	Check
Number	Load Combination Name	Deflection	Deflection	Value	Deflection
1	Dead Load Only	-6.1	-0.5	-6.6	6.6
	Roof Live Load Only	-1.2	-0.1	-1.3	1.3
	Wind Uplift Only	8.7	0.6	9.4	9.4
	Wind Downdrag Only	-5.6	-0.4	-6.0	6.0

Support Reactions - Strength Combinations Only: (Limit state values)

Load	Joint	Vertical	
Combination	Number	Reaction (kN)	Load Combination Name
1	1	3.688	Dead Load Only
	2	3.688	
3	1	5.556	Dead Load + Roof Live Load
	2	5.556	
5	1	-9.233	Dead Load + Wind Uplift
	2	-9.233	
7	1	9.367	Dead Load + Wind Downdrag
	2	9.367	

9	1	4.704	Dead Load Only
	2	4.994	
10	1	7.124	Dead Load + Roof Live Load
	2	7.571	
11	1	-11.966	Dead Load + Wind Uplift
	2	-12.747	
12	1	12.043	Dead Load + Wind Downdrag
	2	12.808	
13	1	4.994	Dead Load Only
	2	4.704	
14	1	7.571	Dead Load + Roof Live Load
	2	7.124	
15	1	-12.747	Dead Load + Wind Uplift
	2	-11.966	
16	1	12.808	Dead Load + Wind Downdrag
	2	12.043	

Design-In-Hyne v4 NZ Hyne & Son Pty Ltd Compliance Report

Job Number: LOUNGE
Job Description: LOT 1, DP 310143610 STANLEY ROADWAINUI
Run by: on 24/01/2007, at 11:05:45 a.m. Phone:
This design was carried out for domestic or secondary element design using Limit State techniques in accordance with AS/NZS1170.0-2002, and AS1720.1-1997, and using recommendations only of AS1684.1-1999

Section L1, Lintel Design

Use preferred section size 2/200x45 HYNE EDGEBEAM H3.1 Treated from Hyne & Son Pty Ltd

DIMENSIONAL DETAILS:

Span type is Single Span for an overall length of 3.2 metres
Supported rafter/truss spacing is 0.9 metres, with roof load width of 4.5 metres
The lintel design did not rely on assistance from top plate stiffness

DESIGN DETAILS:

Roofing material of Sheet (20)
Roof pitch of 22.5 deg
Wind Classification for this project is VHigh
Temperature Factor (K6) = 1.00
Defined Snow Load Region is n/a
Ground Snow Load is: Ultimate = 0.00kPa,

Ceiling material of 13mm P'Board (20)

Design ultimate wind pressure is 1.750 kPa
Design serviceability wind pressure is 1.162kPa
Altitude = 0 m; No snow load is applicable
and Serviceable = 0.00kPa.

CERTIFICATION:

I hereby certify that above nominated section size has been designed applying the accepted principles of structural mechanics in accordance with the relevant building codes and industry standards as stated below:

AS/NZS 1170	Part 0: Structural design actions - General Principles 2002
	Part 1: Structural design actions - Permanent, imposed and other actions 2002
	Part 2: Structural design actions - Wind actions - 2002
AS 1684	Residential Timber Framed Construction - 1999
AS 1720	Timber Structures - Part 1: Design - 1997
AS 4055	Wind Loads for Housing - 1992
NZS 3603	Timber Structures Standard - 1993 for NZ Timber Strengths and capacity factors
GLTAA	Industry recommendations from the GLTAA - "Unified Design Criteria"

The design actions, methods, assumptions and other criteria used in this structural design are precedent upon AS1720.1-1997 and AS1170-2002, in preference to other Standards listed above. Deflection limits recommended in AS1684.1-1999 have not been followed for this design.

The nominated section size has been designed for the loading and dimensional data stated above. Hyne & Son Pty Ltd and Hunt Robinson Pty Ltd cannot accept liability for loss or damage, either direct or consequential, arising from the use of this product in an application not consistent with the input data.

HUNT ROBINSON Consulting Engineers
Stephen J Hunt BE(Civil)
(MIEAust #368737), (NPER),
(RPEQ #3731)

Checked by: .....
for Hallmark Homes

Date Checked: 24/01/2007

WHAKATANE DISTRICT COUNCIL
APPROVED FOR CONSTRUCTION
..... Building Control Office
Date 29-03-07

Design-In-Hyne v4 NZ Hyne & Son Pty Ltd Deflection Report

Job Number: LOUNGE
Job Description: LOT 1, DP 310143610 STANLEY ROADWAINUI
Run by: on 24/01/2007, at 11:05:49 a.m. Phone:
This design was carried out for domestic or secondary element design using Limit State techniques
in accordance with AS/NZS1170.0-2002, and AS1720.1-1997, and using recommendations only of AS1684.1-1999

Section L1, Lintel Design

Use preferred section size 2/200x45 HYNE EDGEBEAM H3.1 Treated from Hyne & Son Pty Ltd

DIMENSIONAL DETAILS:

Span type is Single Span for an overall length of 3.2 metres
Supported rafter/truss spacing is 0.9 metres, with roof load width of 4.5 metres
The lintel design did not rely on assistance from top plate stiffness

DESIGN DETAILS:

Roofing material of Sheet (20)
Roof pitch of 22.5 deg
Wind Classification for this project is VHigh
Temperature Factor (K6) = 1.00
Defined Snow Load Region is n/a
Ground Snow Load is: Ultimate = 0.00kPa,

Ceiling material of 13mm P'Board (20)

Design ultimate wind pressure is 1.750 kPa
Design serviceability wind pressure is 1.162kPa
Altitude = 0 m; No snow load is applicable
and Serviceable = 0.00kPa.

Allowable Deflections:

Load Case Type	Span Ratio	Fixed value mm
Permanent Loads	L/500	10
Floor Live Loads	L/400	10
Long Term Snow Loads	L/500	15
Short Term Snow Loads	L/400	15
Roof Live Loads	L/250	15
Wind Loads	L/200	n/a
Dynamic Floor Loads	n/a	2

Member Actions - Serviceability Properties:

Member Number	Load Combination Name	Bending Deflection	Total Deflection	Camber Value	Check Deflection
1	Dead Load Only	-6.1	-6.1	0.0	6.1
	Roof Live Load Only	-1.2	-1.2	0.0	1.2
	Wind Uplift Only	8.7	8.7	0.0	8.7
	Wind Downdrag Only	-5.6	-5.6	0.0	5.6

Design-In-Hyne v4 NZ Hyne & Son Pty Ltd Engineering Report

Job Number: LOUNGE
Job Description: LOT 1, DP 310143610 STANLEY ROADWAINUI
Run by: on 24/01/2007, at 11:05:54 a.m. Phone:
This design was carried out for domestic or secondary element design using Limit State techniques
in accordance with AS/NZS1170.0-2002, and AS1720.1-1997, and using recommendations only of AS1684.1-1999

Section L1, Lintel Design

Use preferred section size 2/200x45 HYNE EDGEBEAM H3.1 Treated from Hyne & Son Pty Ltd

DIMENSIONAL DETAILS:

Span type is Single Span for an overall length of 3.2 metres
Supported rafter/truss spacing is 0.9 metres, with roof load width of 4.5 metres
The lintel design did not rely on assistance from top plate stiffness

DESIGN DETAILS:

Roofing material of Sheet (20)
Roof pitch of 22.5 deg
Wind Classification for this project is VHigh
Temperature Factor (K6) = 1.00
Defined Snow Load Region is n/a
Ground Snow Load is: Ultimate = 0.00kPa,

Ceiling material of 13mm P'Board (20)

Design ultimate wind pressure is 1.750 kPa
Design serviceability wind pressure is 1.162kPa
Altitude = 0 m; No snow load is applicable
and Serviceable = 0.00kPa.

SECTION DETAILS (2/200x45 HYNE EDGEBEAM H3.1 Treated):

Seasoned (Creep factor = 2)
Depth = 200mm, Width = 45mm
Gross Area = 9000sq mm
Mom Inertia.major = 30.000x10^6 mm^4
Elasticity = 15000MPa (Elb 10000MPa)
Rigidity = 1000MPa
Bending Stress = 41MPa
Tension Stress = 17MPa
Bearing Parallel = 35MPa

Durability Class = 4
Mass = 4.860kg/m
Shear Area = 6000sq mm
Mom Inertia.minor = 1.519x10^6 mm^4
Torsion Constant = 5.214x10^6 mm^4

Shear Stress = 5MPa
Compression Stress = 30MPa
Bearing Perpendicular = 12MPa

ENGINEERING DATA:

Members:

Member	Length	X1-coord	Y1-coord	X2-coord	Y2-coord
1	3200	0	0	3200	0

Restraints:

Top Restraint	Bottom Restraint	Side Restraint
900mm	unrestrained	unrestrained

Wind Coefficients:

Uplift Strength	DownDrag Strength	Uplift Deflection	DownDrag Deflection
1.10	0.56	1.10	0.70

Allowable Deflections:

Load Case Type	Span Ratio	Fixed value mm
Permanent Loads	L/500	10
Floor Live Loads	L/400	10
Long Term Snow Loads	L/500	15
Short Term Snow Loads	L/400	15
Roof Live Loads	L/250	15
Wind Loads	L/200	n/a
Dynamic Floor Loads	n/a	2

Load Case Data:

Case	Name	Type	Duration
0	Self Weight	Dead Load	Permanent
1	Dead Load	Dead Load	Permanent
2	0.25kPa Roof Live Load	Distibuted Roof Live Load	Medium-term
3	Wind Uplift Strength	Vertical Wind Load	Wind gust
4	Wind Uplift Deflection	Vertical Wind Load	Wind gust
5	Wind Downdrag Strength	Vertical Wind Load	Wind gust
6	Wind Downdrag Deflection	Vertical Wind Load	Wind gust
7	Dead Load for max shear	Dead Load	Permanent

8	0.25kPa Roof Live Load for max shear	Distibuted Roof Live Load	Medium-term
9	Wind Uplift Strength for max shear	Vertical Wind Load	Wind gust
10	Wind Downdrag Strength for max shear	Vertical Wind Load	Wind gust
11	Dead Load for max shear	Dead Load	Permanent
12	0.25kPa Roof Live Load for max shear	Distibuted Roof Live Load	Medium-term
13	Wind Uplift Strength for max shear	Vertical Wind Load	Wind gust
14	Wind Downdrag Strength for max shear	Vertical Wind Load	Wind gust

Load Combinations for Maximum Strength:

Combine	Combination Name	Load Case	Multiplier
1	Dead Load Only	0	1.35
		1	1.35
3	Dead Load + Roof Live Load	0	1.20
		1	1.20
		2	1.50
5	Dead Load + Wind Uplift	0	0.90
		1	0.90
		3	1.00
7	Dead Load + Wind Downdrag	0	1.25
		1	1.25
		5	1.00
9	Dead Load Only	0	1.35
		7	1.35
10	Dead Load + Roof Live Load	0	1.20
		7	1.20
		8	1.50
11	Dead Load + Wind Uplift	0	0.90
		7	0.90
		9	1.00
12	Dead Load + Wind Downdrag	0	1.25
		7	1.25
		10	1.00
13	Dead Load Only	0	1.35
		11	1.35
14	Dead Load + Roof Live Load	0	1.20
		11	1.20
		12	1.50
15	Dead Load + Wind Uplift	0	0.90
		11	0.90
		13	1.00
16	Dead Load + Wind Downdrag	0	1.25
		11	1.25
		14	1.00

Load Combinations for Maximum Deflection:

Combine	Combination Name	Load Case	Creep Applies
2	Dead Load Only	0	true
		1	true
4	Roof Live Load Only	2	false
6	Wind Uplift Only	4	false
8	Wind Downdrag Only	6	false

Member Distributed Loads:

Load Case	Member Number	Start Load (kN/m)	Start Position (m)	Finish Load (kN/m)	Finish Position (m)
0	All	-0.095	From Start	-0.095	To Finish

Member Concentrated Loads:

Load Case	Member Number	Applied for Maximum	Load Value (kN)	At Position (m)
1	1	Bending/Deflection	-1.720	0.700
	1	Bending/Deflection	-1.720	1.600
	1	Bending/Deflection	-1.720	2.500
2	1	Bending/Deflection	-1.013	0.700
	1	Bending/Deflection	-1.013	1.600
	1	Bending/Deflection	-1.013	2.500
3	1	Bending/Deflection	7.794	0.700
	1	Bending/Deflection	7.794	1.600
	1	Bending/Deflection	7.794	2.500
4	1	Bending/Deflection	5.175	0.700
	1	Bending/Deflection	5.175	1.600
	1	Bending/Deflection	5.175	2.500
5	1	Bending/Deflection	-3.968	0.700

	1	Bending/Deflection	-3.968	1.600
	1	Bending/Deflection	-3.968	2.500
6	1	Bending/Deflection	-3.293	0.700
	1	Bending/Deflection	-3.293	1.600
	1	Bending/Deflection	-3.293	2.500
7	1	Shear Stress	-1.720	0.300
	1	Shear Stress	-1.720	1.200
	1	Shear Stress	-1.720	2.100
	1	Shear Stress	-1.720	3.000
8	1	Shear Stress	-1.013	0.300
	1	Shear Stress	-1.013	1.200
	1	Shear Stress	-1.013	2.100
	1	Shear Stress	-1.013	3.000
9	1	Shear Stress	7.794	0.300
	1	Shear Stress	7.794	1.200
	1	Shear Stress	7.794	2.100
	1	Shear Stress	7.794	3.000
10	1	Shear Stress	-3.968	0.300
	1	Shear Stress	-3.968	1.200
	1	Shear Stress	-3.968	2.100
	1	Shear Stress	-3.968	3.000
11	1	Shear Stress	-1.720	0.200
	1	Shear Stress	-1.720	1.100
	1	Shear Stress	-1.720	2.000
	1	Shear Stress	-1.720	2.900
12	1	Shear Stress	-1.013	0.200
	1	Shear Stress	-1.013	1.100
	1	Shear Stress	-1.013	2.000
	1	Shear Stress	-1.013	2.900
13	1	Shear Stress	7.794	0.200
	1	Shear Stress	7.794	1.100
	1	Shear Stress	7.794	2.000
	1	Shear Stress	7.794	2.900
14	1	Shear Stress	-3.968	0.200
	1	Shear Stress	-3.968	1.100
	1	Shear Stress	-3.968	2.000
	1	Shear Stress	-3.968	2.900

Member Actions - Strength Properties:

Member	Load	Axial	Bending Moments (kN.m)				End Shears (kN)	
Number	Combination	(kN)	Left End	Right End	Internal	At	Left Shear	Right Shear
1	1	0.000	0.000	0.000	-3.647	1600	3.649	-3.649
	3	0.000	0.000	0.000	-5.520	1600	5.522	-5.522
	5	0.000	0.000	0.000	9.260	1600	-9.259	9.259
	7	0.000	0.000	0.000	-9.329	1600	9.331	-9.331
	9	0.000	0.000	0.000	-3.462	1200	4.665	-2.634
	10	0.000	0.000	0.000	-5.242	1200	7.089	-3.955
	11	0.000	0.000	0.000	8.799	1200	-11.992	6.526
	12	0.000	0.000	0.000	-8.861	1200	12.008	-6.655
	13	0.000	0.000	0.000	-3.462	2000	2.634	-4.665
	14	0.000	0.000	0.000	-5.242	2000	3.955	-7.089
	15	0.000	0.000	0.000	8.799	2000	-6.526	11.992
	16	0.000	0.000	0.000	-8.861	2000	6.655	-12.008

Member Actions - Serviceability Properties:

Member		Bending	Total	Camber	Check
Number	Load Combination Name	Deflection	Deflection	Value	Deflection
1	Dead Load Only	-6.1	-0.5	-6.6	6.6
	Roof Live Load Only	-1.2	-0.1	-1.3	1.3
	Wind Uplift Only	8.7	0.6	9.4	9.4
	Wind Downdrag Only	-5.6	-0.4	-6.0	6.0

Support Reactions - Strength Combinations Only: (Limit state values)

Load	Joint	Vertical	
Combination	Number	Reaction (kN)	Load Combination Name
1	1	3.688	Dead Load Only
	2	3.688	
3	1	5.556	Dead Load + Roof Live Load
	2	5.556	
5	1	-9.233	Dead Load + Wind Uplift
	2	-9.233	
7	1	9.367	Dead Load + Wind Downdrag
	2	9.367	

9	1	4.704	Dead Load Only
	2	4.994	
10	1	7.124	Dead Load + Roof Live Load
	2	7.571	
11	1	-11.966	Dead Load + Wind Uplift
	2	-12.747	
12	1	12.043	Dead Load + Wind Downdrag
	2	12.808	
13	1	4.994	Dead Load Only
	2	4.704	
14	1	7.571	Dead Load + Roof Live Load
	2	7.124	
15	1	-12.747	Dead Load + Wind Uplift
	2	-11.966	
16	1	12.808	Dead Load + Wind Downdrag
	2	12.043	

Design-In-Hyne v4 NZ Hyne & Son Pty Ltd Compliance Report

Job Number: Barraclough
Job Description: Skillion Roof610 Stanley RoadWainui
Run by: Hallmark Homes on 23/02/2007, at 11:05:09 a.m. Phone: 07 3086655
This design was carried out for domestic or secondary element design using Limit State techniques in accordance with AS/NZS1170.0-2002, and AS1720.1-1997, and using recommendations only of AS1684.1-1999

Section L1, Girder Lintel Design

Use preferred section size 240x45 KD Pine MSG8

DIMENSIONAL DETAILS:

Span type is Single Span for an overall length of 2.4 metres
Supported truss spacing is 0.6 metres, with truss roof load width of 2.5 metres, included O/Hang of 0.6 metres.
The girder truss is also a TG1800 and has a load width of 1.8 metres, all standard trusses
The Girder is supported 1.8 metres, from left end.
The lintel design did not rely on assistance from top plate stiffness

DESIGN DETAILS:

Roofing material of Light Sheet (10)
Roof pitch of 30 deg
Wind Classification for this project is VHigh
Temperature Factor (K6) = 1.00
Defined Snow Load Region is n/a
Ground Snow Load is: Ultimate = 0.00kPa,

Ceiling material of 13mm P'Board (20)

Design ultimate wind pressure is 1.750 kPa
Design serviceability wind pressure is 1.162kPa
Altitude = 0 m; No snow load is applicable
and Serviceable = 0.00kPa.

CERTIFICATION:

I hereby certify that above nominated section size has been designed applying the accepted principles of structural mechanics in accordance with the relevant building codes and industry standards as stated below:

AS/NZS 1170	Part 0: Structural design actions - General Principles 2002
	Part 1: Structural design actions - Permanent, imposed and other actions 2002
	Part 2: Structural design actions - Wind actions - 2002
AS 1684	Residential Timber Framed Construction - 1999
AS 1720	Timber Structures - Part 1: Design - 1997
AS 4055	Wind Loads for Housing - 1992
NZS 3603	Timber Structures Standard - 1993 for NZ Timber Strengths and capacity factors
GLTAA	Industry recommendations from the GLTAA - "Unified Design Criteria"

The design actions, methods, assumptions and other criteria used in this structural design are precedent upon AS1720.1-1997 and AS1170-2002, in preference to other Standards listed above. Deflection limits recommended in AS1684.1-1999 have not been followed for this design.

The nominated section size has been designed for the loading and dimensional data stated above. Hyne & Son Pty Ltd and Hunt Robinson Pty Ltd cannot accept liability for loss or damage, either direct or consequential, arising from the use of this product in an application not consistent with the input data.

HUNT ROBINSON Consulting Engineers
Stephen J Hunt BE(Civil)
(MIEAust #368737), (NPER),
(RPEQ #3731)

Checked by: .....
for Hallmark Homes

Date Checked: 23/02/07

WHAKATANE DISTRICT COUNCIL
APPROVED FOR CONSTRUCTION
..... Building Control Office
Date 29-03-07

Design-In-Hyne v4 NZ Hyne & Son Pty Ltd Deflection Report

Job Number: Barraclough
Job Description: Skillion Roof610 Stanley RoadWainui
Run by: Hallmark Homes on 23/02/2007, at 11:05:17 a.m. Phone: 07 3086655
This design was carried out for domestic or secondary element design using Limit State techniques
in accordance with AS/NZS1170.0-2002, and AS1720.1-1997, and using recommendations only of AS1684.1-1999

Section L1, Girder Lintel Design

Use preferred section size 240x45 KD Pine MSG8

DIMENSIONAL DETAILS:

Span type is Single Span for an overall length of 2.4 metres
Supported truss spacing is 0.6 metres, with truss roof load width of 2.5 metres, included O/Hang of 0.6 metres.
The girder truss is also a TG1800 and has a load width of 1.8 metres, all standard trusses
The Girder is supported 1.8 metres, from left end.
The lintel design did not rely on assistance from top plate stiffness

DESIGN DETAILS:

Roofing material of Light Sheet (10)
Roof pitch of 30 deg
Wind Classification for this project is VHigh
Temperature Factor (K6) = 1.00
Defined Snow Load Region is n/a
Ground Snow Load is: Ultimate = 0.00kPa,

Ceiling material of 13mm P'Board (20)

Design ultimate wind pressure is 1.750 kPa
Design serviceability wind pressure is 1.162kPa
Altitude = 0 m; No snow load is applicable
and Serviceable = 0.00kPa.

Allowable Deflections:

Load Case Type	Span Ratio	Fixed value mm
Permanent Loads	L/500	10
Floor Live Loads	L/400	10
Long Term Snow Loads	L/500	15
Short Term Snow Loads	L/400	15
Roof Live Loads	L/250	15
Wind Loads	L/200	n/a
Dynamic Floor Loads	n/a	2

Member Actions - Serviceability Properties:

Member Number	Load Combination Name	Bending Deflection	Total Deflection	Camber Value	Check Deflection
1	Dead Load Only	-3.7	-3.7	0.0	3.7
	Roof Live Load Only	-1.9	-1.9	0.0	1.9
	Wind Uplift Only	7.2	7.2	0.0	7.2
	Wind DownDrag Only	-4.6	-4.6	0.0	4.6

Design-In-Hyne v4 NZ Hyne & Son Pty Ltd Engineering Report

Job Number: Barraclough
Job Description: Skillion Roof610 Stanley RoadWainui
Run by: Hallmark Homes on 23/02/2007, at 11:05:20 a.m. Phone: 07 3086655
This design was carried out for domestic or secondary element design using Limit State techniques
in accordance with AS/NZS1170.0-2002, and AS1720.1-1997, and using recommendations only of AS1684.1-1999

Section L1, Girder Lintel Design

Use preferred section size 240x45 KD Pine MSG8

DIMENSIONAL DETAILS:

Span type is Single Span for an overall length of 2.4 metres
Supported truss spacing is 0.6 metres, with truss roof load width of 2.5 metres, included O/Hang of 0.6 metres.
The girder truss is also a TG1800 and has a load width of 1.8 metres, all standard trusses
The Girder is supported 1.8 metres, from left end.
The lintel design did not rely on assistance from top plate stiffness

DESIGN DETAILS:

Roofing material of Light Sheet (10)
Roof pitch of 30 deg
Wind Classification for this project is VHigh
Temperature Factor (K6) = 1.00
Defined Snow Load Region is n/a
Ground Snow Load is: Ultimate = 0.00kPa,

Ceiling material of 13mm P'Board (20)

Design ultimate wind pressure is 1.750 kPa
Design serviceability wind pressure is 1.162kPa
Altitude = 0 m; No snow load is applicable
and Serviceable = 0.00kPa.

SECTION DETAILS (240x45 KD PINE MSG8):

Seasoned (Creep factor = 2)
Depth = 240mm, Width = 45mm
Gross Area = 10800sq mm
Mom Inertia.major = 51.840x10^6 mm^4
Elasticity = 8000MPa (Elb 5333MPa)
Rigidity = 533MPa
Bending Stress = 14MPa
Tension Stress = 6MPa
Bearing Parallel = 18MPa

Durability Class = 4
Mass = 5.940kg/m
Shear Area = 7200sq mm
Mom Inertia.minor = 1.823x10^6 mm^4
Torsion Constant = 6.429x10^6 mm^4

Shear Stress = 3.8MPa
Compression Stress = 18MPa
Bearing Perpendicular = 8.9MPa

ENGINEERING DATA:

Members:

Member	Length	X1-coord	Y1-coord	X2-coord	Y2-coord
1	2400	0	0	2400	0

Restraints:

Top Restraint	Bottom Restraint	Side Restraint
600mm	unrestrained	unrestrained

Wind Coefficients:

Uplift Strength	DownDrag Strength	Uplift Deflection	DownDrag Deflection
1.10	0.56	1.10	0.70

Allowable Deflections:

Load Case Type	Span Ratio	Fixed value mm
Permanent Loads	L/500	10
Floor Live Loads	L/400	10
Long Term Snow Loads	L/500	15
Short Term Snow Loads	L/400	15
Roof Live Loads	L/250	15
Wind Loads	L/200	n/a
Dynamic Floor Loads	n/a	2

Load Case Data:

Case	Name	Type	Duration
0	Self Weight	Dead Load	Permanent
1	Dead Load	Dead Load	Permanent

2	Partial Area Roof Live Load	Distibuted Roof Live Load	Medium-term
3	Wind Uplift Strength	Vertical Wind Load	Wind gust
4	Wind Uplift Deflection	Vertical Wind Load	Wind gust
5	Wind DownDrag Strength	Vertical Wind Load	Wind gust
6	Wind DownDrag Deflection	Vertical Wind Load	Wind gust

Load Combinations for Maximum Strength:

Combine	Combination Name	Load Case	Multiplier
1	Dead Load Only	0	1.35
		1	1.35
3	Dead Load + Roof Live Load	0	1.20
		1	1.20
		2	1.50
5	Dead Load + Wind Uplift	0	0.90
		1	0.90
		3	1.00
7	Dead Load + Wind DownDrag	0	1.20
		1	1.20
		5	1.00

Load Combinations for Maximum Deflection:

Combine	Combination Name	Load Case	Creep Applies
2	Dead Load Only	0	true
		1	true
4	Roof Live Load Only	2	false
6	Wind Uplift Only	4	false
8	Wind DownDrag Only	6	false

Member Distributed Loads:

Load Case	Member Number	Start Load (kN/m)	Start Position (m)	Finish Load (kN/m)	Finish Position (m)
0	All	-0.058	From Start	-0.058	To Finish
1	-	-0.464	0.000	-0.464	1.800
	-	-0.186	1.800	-0.186	2.400
2	-	-0.724	0.000	-0.724	1.800
	-	-0.290	1.800	-0.290	2.400
3	-	2.887	0.000	2.887	1.800
	-	1.155	1.800	1.155	2.400
4	-	1.917	0.000	1.917	1.800
	-	0.767	1.800	0.767	2.400
5	-	-1.470	0.000	-1.470	1.800
	-	-0.588	1.800	-0.588	2.400
6	-	-1.220	0.000	-1.220	1.800
	-	-0.488	1.800	-0.488	2.400

Member Concentrated Loads:

Load Case	Member Number	Applied for Maximum	Load Value (kN)	At Position (m)
1	1	Bending/Deflection	-1.536	1.800
2	1	Bending/Deflection	-2.396	1.800
3	1	Bending/Deflection	9.554	1.800
4	1	Bending/Deflection	6.343	1.800
5	1	Bending/Deflection	-4.864	1.800
6	1	Bending/Deflection	-4.036	1.800

Member Actions - Strength Properties:

Member Number	Load Combination	Axial (kN)	Bending Moments (kN.m) Left End	Right End	Internal	At	End Shears (kN) Left Shear	Right Shear
1	1	0.000	0.000	0.000	-1.263	1800	1.082	-1.950
	3	0.000	0.000	0.000	-3.238	1800	2.724	-4.999
	5	0.000	0.000	0.000	4.782	1800	-3.962	7.381
	7	0.000	0.000	0.000	-3.986	1800	3.346	-6.153

Member Actions - Serviceability Properties:

Member Number	Load Combination Name	Bending Deflection	Total Deflection	Camber Value	Check Deflection
1	Dead Load Only	-3.7	-0.4	-4.1	4.1
	Roof Live Load Only	-1.9	-0.2	-2.1	2.1
	Wind Uplift Only	7.2	0.8	8.0	8.0

Wind DownDrag Only	-4.6	-0.5	-5.1	5.1

Support Reactions - Strength Combinations Only: (Limit state values)

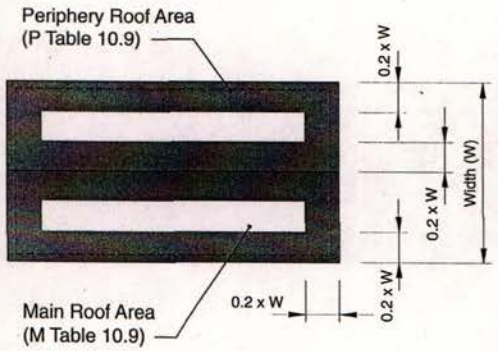
Load Combination	Joint Number	Vertical Reaction (kN)	Load Combination Name
1	1	1.336	Dead Load Only
	2	2.204	
3	1	3.340	Dead Load + Roof Live Load
	2	5.615	
5	1	-4.832	Dead Load + Wind Uplift
	2	-8.251	
7	1	4.101	Dead Load + Wind DownDrag
	2	6.907	

PURLIN & BATTEN FIXING CHART

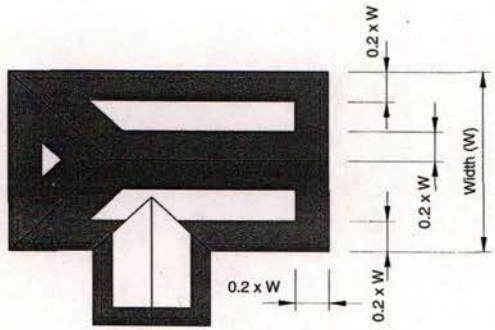
(COMPLIES WITH NZS 3604:1999 TABLE 10.10)

NOTE:

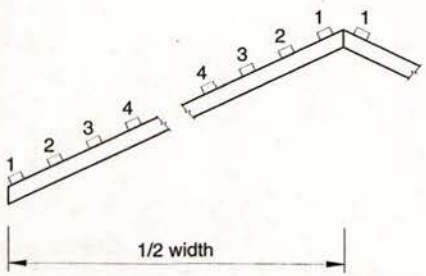
- Max. truss overall roof span 12m
- All purlin and batten sizes as NZS 3604:1999 Section 10.
- These fixings assume purlin or battens are fixed over top of truss or rafter.



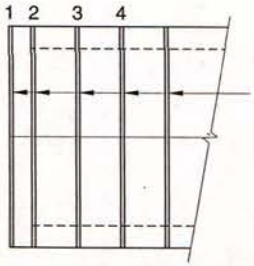
PLAN GABLE



PLAN HIP ENDS



PURLIN LAYOUT (MAX 1200 crs.)



LAYOUT ON GABLE END

LUMBERLOK®

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SELECTION CHART

(minimum fixing requirements)

1. HEAVY ROOFS

All purlins and/or battens use fixing Type A only on roof width (w) up to 12m.

2. LIGHT ROOFS

A. BATTENS - Max. span 1200
- Max crs. 400
- Roof width (w) up to 12m.

L & M wind loads use Type B fixing on all battens.

H & VH wind loads use Type C on all battens.

B. PURLINS - Max. span 1200, Max crs. 900 or
- Max. span. 900, Max crs. 1200

L & M wind loads use Type C fixing on purlin No.2 and Type B on all other purlins for all roof widths (w) up to 12m.

H & VH wind loads

1. On roof width (w) up to 8m;
Use Type D fixing on purlin No. 2 and Type C on all other purlins.

2. On roof width (w) up to 12m;
Use Type D fixing on purlins No. 2 & 3 and Type C on all other purlins.

C. PURLINS AND BATTENS ON GABLE END
- Max. span 1200, Max crs. 900 or
- Max. span. 900, Max crs. 1200

L & M wind loads use Type B fixing on support line No. 1, Type C on support lines No. 2, 3, & 4 and all other support lines as per Section A or B above.

H & VH wind loads use Type C fixing on support line No. 1, Type D on support lines No. 2, 3, & 4 and all other support lines as per Section A or B above.

APPROVED FOR CONSTRUCTION
WHAKATANE DISTRICT COUNCIL
Date 30-03-07
Building Control Office

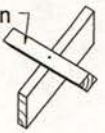
STANDARD FIXING OPTIONS

FIXING DEFINITIONS

NAIL = Either 90 x 3.15 Power driven
or 100 x 3.75 Hand driven
SCREW = 80 x 10 gauge **LUMBERLOK** Purlin screw (Blue Screw)
WIREDOG = Either left hand or right hand **LUMBERLOK** wiredog.

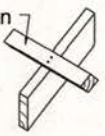
FIXING TYPE A
0.40kN

1 NAIL



FIXING TYPE B
0.70kN

2 NAILS

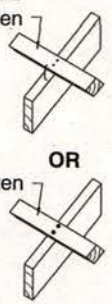


FIXING TYPE C
1.20kN

3 NAILS
OR
1 NAIL + 1 SCREW

FIXING TYPE D
2.00kN

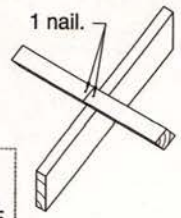
2 NAILS + 1 WIREDOG
OR
2 SCREWS



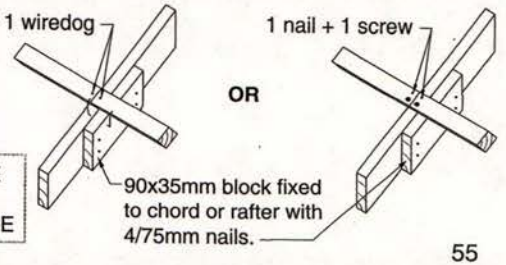
PURLIN / BATTEN SPLICE FIXING OPTIONS

FIXING TYPE A & B OVER PURLIN SPLICE

NOTE: Skew nail when fixing to 35mm rafter or truss.



FIXING TYPE C & D OVER PURLIN SPLICE



Truss Profile

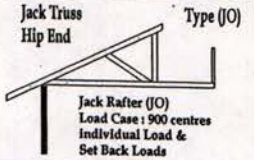
Belgium Standard Truss — Type (TO)

Howe Truss Girder Truss — Type (GTO)

Truncated Girder — Type (TGO)

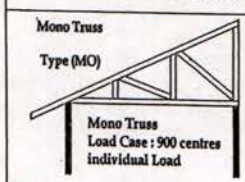
Truncated Rafter — Type (TRO)

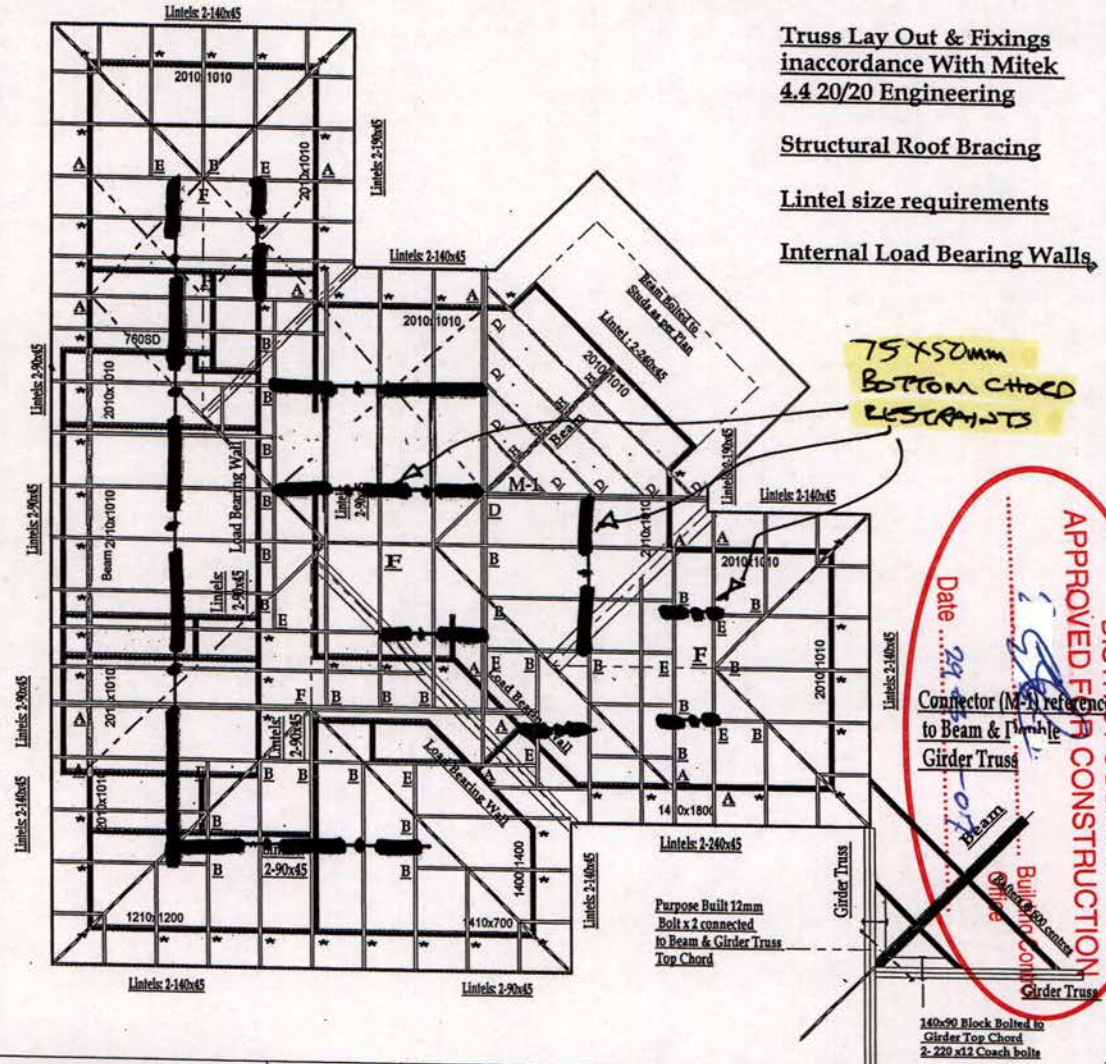
Jack Truss Hip End — Type (JO)



Gable end Truss — Type (ENO) Type (ETO)

Mono Truss — Type (MO)





75 X 50mm BOTTOM CHORD RESTRAINTS

Connector (M-1) reference to Beam & Typical Girder Truss

WHAKATANE DISTRICT COUNCIL
APPROVED FOR CONSTRUCTION
Date 29
For Building Consent Office

Truss Lay Out & Fixings inaccordance With Mitek 4.4 20/20 Engineering

Structural Roof Bracing

Lintel size requirements

Internal Load Bearing Walls

Proposed New Dwelling Structural Roof Details

Trusses designed successfully by Mitek NZ 4.4 20/20 Engineering

Timber specs:Radiata Kiln dried H1.2 treated MSG8

Truss centres @ 900mm

Point Load - one stud support under Truncated Girder & Girder Trusses

Purlins & battens fixed in accordance Mitek NZ lumberlok Manual

Lintel & Beams designed in accordance Mitek NZ Ganglam & Flitch beam Manual

notify detailer; any changes to above plan relating to walls windows & doors required to be redesigned

Occupation Category - Residential	
Roof Pitch	- 22.5°
Wind Load	- High
Roof Load	- Heavey weight
Roof Material	- Concrete Tiles
Roof Type	- Hip-Valley
Overhang	- 000
Heel Height	- 99 mm
Truss Centres	- 900mm
Cantilevered	- 000
Vaulted Ceiling	- 000
Raised Ceiling	- 000

Fixings in Accordance with Mitek 20/20 Engineering

A = Cyclone Tie CT400	18
B = Joist Hanger 47x90	26
C= Cyclone Tie CT200	00
D = Nailon Plares 200mm	7
E = Joist Hanger 47x120	12
G= Strap bracing 25x1mm	30m
F = Roof Brace	0
H = 6kn stap bracing (400mm)	4
J= Joist Hanger 165x95	0
x = Pair Wire Dogs	80

PlaceMakers Know how. Can do.

Whakatane 07-3087239
Landscape scale 1.125

Proposed New Residence for Hallmark Plan A331 Whakatane

Truss Design & Detailed Infomation prepared for Hallmark Homes Whakatane
by : Motiti island detailers
ph: 07-5783709
fax: 07-5783756
e-mail ranapia@xtra.co.nz

Plan Preparation : Pre-consent
Plan number : as per supply
date issued : 27-09-2006
date detailed :19-02-2007

Whakatane Placemakers
Job number W6231-A

PlaceMakers

New Zealand
Telephone:
Fax:

Name: Hallmark Plan A331
Address:

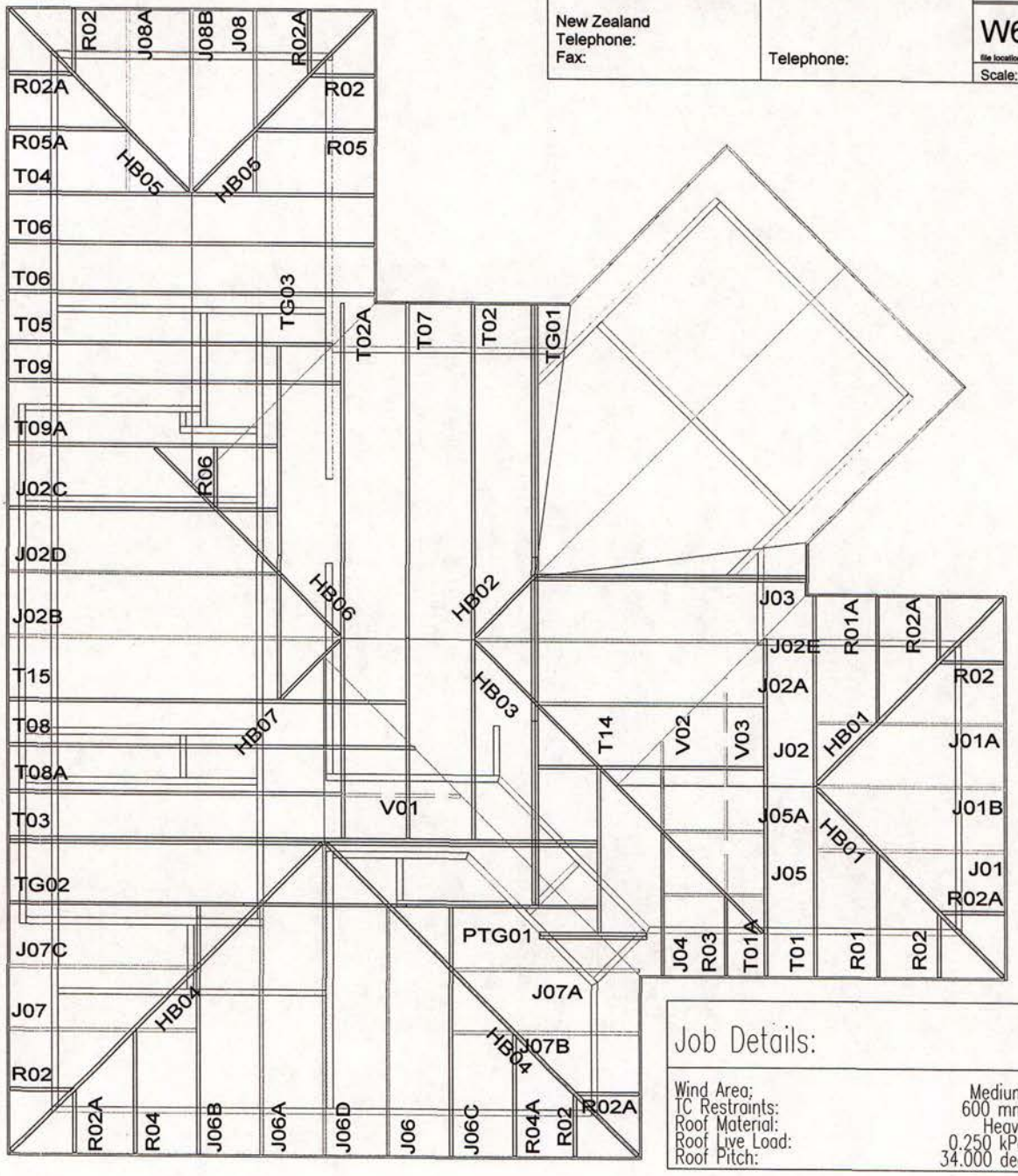
Telephone:

New Residence

W6231A

file location: C:\M4G13\JOBS\W6231A\

Scale: 1 : 94 | Date: 2/10/2006 | Drawn By: Administra



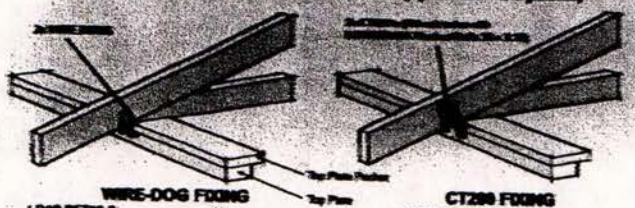
WHAKATANE DISTRICT COUNCIL
APPROVED FOR CONSTRUCTION
Date 24-02-07
Building Control Office

Job Details:

Wind Area:	Medium	Design Wind Speed:	37.0 m/s
TC Restraints:	600 mm	BC Restraints:	400 mm
Roof Material:	Heavy	Ceiling Material:	Standard
Roof Live Load:	0.250 kPa		
Roof Pitch:	34.000 deg	Truss Centres:	900 mm

LUMBERLOK TRUSS FIXING CHART

RAFTER TRUSS TO TOP PLATE FIXINGS



WIRE-DOG FIXING

LOAD DETAILS

Truss Span	3000 - 10000 Low to Medium Wind 3000 - 5000 High to Very High Wind
Roof Weight	Heavy or Light
Truss Centres	900 max.
Snow Load	to 1.0 kPa

CT200 FIXING

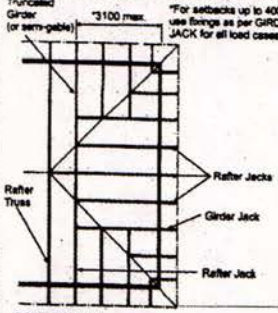
LOAD DETAILS

Truss Span	5000 - 15000
Wind	Low to Very High
Roof Weight	Heavy or Light
Truss Centres	900 max.
Snow Load	to 1.0 kPa

GIRDER TRUSS TO TOP PLATE FIXING

All girder trusses up to a span of 9000 and the above load details are to be fixed to the top plate using the CT200 FIXING shown above

JACK TRUSS FIXINGS

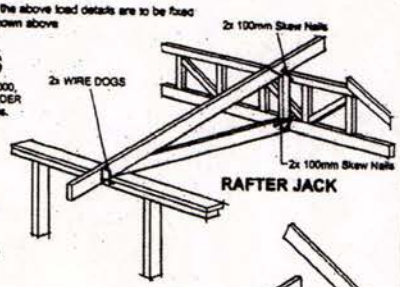


*For setbacks up to 4000, use fixings as per GIRDER JACK for all load cases.

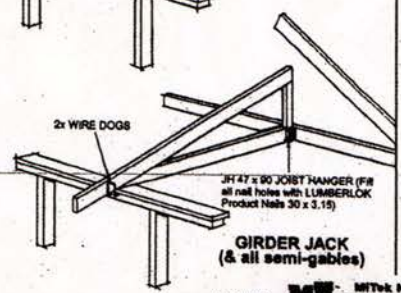
LOAD DETAILS

Truss Span	3100
Max. Wind	High
Roof Weight	Heavy or Light
Truss Centres	900 max.
Snow Load	to 1.0 kPa

*For Very High Wind, fix rafter jack as per GIRDER JACK



RAFTER JACK



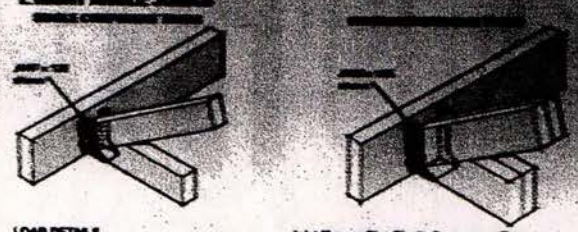
GIRDER JACK (& all semi-gables)

AUCKLAND
P.O. Box 58-014, Greenmount. Ph. 274-7109 Fax. 274-7100

MiTek New Zealand Ltd.
HOME OF GANG-NAIL® BUILDING SYSTEMS

CHRISTCHURCH
P.O. Box 8367, Riccarton. Ph. 348-8891 Fax. 348-0314

RAFTER TRUSS TO [illegible]



LOAD DETAILS
SINGLE & DOUBLE COMPONENT TRUSS

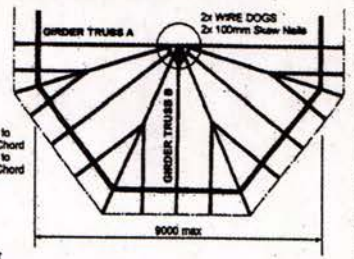
Wind	Low to Very High
Roof Weight	Heavy or Light
Truss Centres	900 max.
Snow Load	up to 1.0 kPa
Max. Supported Truss Span	12000

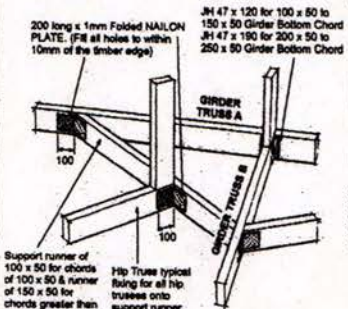
Joist Hanger Size Single Component Truss
JH 47 x 120 on Girder Bottom Chords up to 150 x 50 deep
JH 47 x 190 on Girder Bottom Chords of 200 x 50 deep and above in all cases the max. area of roof supported (ie. setback x supported truss span) not to exceed 48m²
Joist Hanger Size Double Component Truss – JH 95 x 165
Fit all holes with LUMBERLOK Product Nails 30 x 3.15e

2. ANGLE JOINTS - Octagonal Roof

LOAD DETAILS

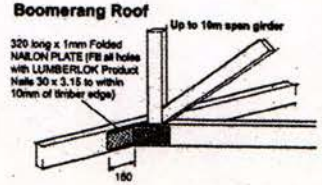
Max Supported Truss Span	9000
Wind	Low to Very High
Roof Weight	Heavy
Supported Truss Centres	900 max.
Snow Load	to 1.0 kPa





VIEW OF AREA CIRCLED

Boomerang Roof



WHAKATANE DISTRICT COUNCIL
APPROVED FOR CONSTRUCTION
Date 29-03-07
Building Control Office

manktelow consulting engineers limited

1st Floor, 240 The Strand
P.O. Box 474
Whakatane
ph/f. 07 3072002
m. 027 6125548
e. mankshouse@xtra.co.nz

Engineering Soils Investigation Report for Proposed Residence Lot 1 DP 310143, 560 Stanley Road Whakatane

CLIENT: D. Barraclough & A. Bennett

File ref. 574.1
12.01.2007

Contents **page**

1.0 Background..... 1

2.0 Site Notes..... 1

3.0 Building Foundations..... 1

Copies of 3 sheets of Hallmark Homes architectural drawings

Manktelow Consulting Engineers Ltd report dated 14.05.2004

Site Notes Plan and 6 sheets of soil test results

Structural calculations

Architectural foundation plan with additional MCE notes

Two sheets of details and specific design construction notes

Report Limitations and Scope

This report reviews the foundation soils at the location of the proposed building and has been prepared at the specific instruction of D. Barraclough & A. Bennett and supports a building consent application to the Whakatane District Council, and should not be used for any other purpose, or by any other party. As factual evidence has been obtained from visual inspections, six scala penetrometer tests, shear vane and borelog test sites, which by their nature only provide information about a relatively small volume of subsoil, there may be special conditions pertaining to the building site which have not been disclosed and which have not been taken into account in the report. All other areas of this project, including weatherproofing, proprietary systems and elements within the scope of the non-specific design codes NZS 3604 and NZS 4229 are specifically excluded from our review. The performance of the various specified proprietary systems are not covered by these calculations. Guarantees should be sought from the manufacturer if required.

This review has been limited to the area identified on the attached site notes plan and is based on information collected from two site visits and engineering judgment. This report should not be construed as a guarantee for continued slope stability.

Restrictions to building arising from the proximity of property boundaries, archaeological issues, and the like, have not been investigated

Refer to the attached specific design notes; these outline some of the design assumptions. It is assumed that the Territorial Authority, being the building control authority, will undertake the necessary inspections to confirm the design assumptions and that the elements designed herein are installed in accordance with the intentions of the attached specific design sketch details and NZS 3604:1999. Any variation should be reported to the designer for a design review and alternative detailing.

1.0 Background

1.1 Specific engineering soil investigation has been requested at the site of your proposed extensions. We understand that this was in response to 'soft' ground being encountered at the proposed house site as identified in our 14.05.04 feasibility report.

1.2 Our report dated 14.05.04 outlines building restriction in regard to the adjacent slopes. Building setback distances have been recommended. A copy of this report is included herewith; development guidelines in terms of stormwater control and effluent disposal are also mentioned.

1.3 Hallmark Homes architectural drawings dated 15.06.06, detail the proposed single storey light timber framed extensions. A conventional shallow bearing concrete floor has been detailed.

2.0 Site Notes

2.1 We visited the site on the 11th November and on 8th December, 2006. Prior to our visit earthworks had levelled an area of ground and the proposed building had been 'pegged-out'.

2.2 Borelogs confirm that sand; weathered sand and pumice gravel combinations underlay the site down to the investigation depth of 2.9 m.

2.3 Scala penetrometer results show that the near surface soils have serviceability allowable bearing pressures as low as 48kPa.

2.4 The attached site notes plan and soil results sheets refer.

3.0 Building Foundations

3.1 Soil investigation results suggest that soils softer than permitted by NZS 3604:1999 (Timber Framed Buildings) exist at this site. We have reviewed the proposed foundation system for the measured reduced bearing pressures.

3.2 Because there is some variance in penetrometer resistance, some differential settlement of building foundations can be expected. The design procedure outlined in "Determination of allowable bearing pressure under small structures" MJ Stockwell 06/1977, suggests that differential settlement might be in the order of 20mm if applied pressures are less than measured values. This paper concludes, "These deflections are regarded as the acceptable limits a modern building can withstand without distress".

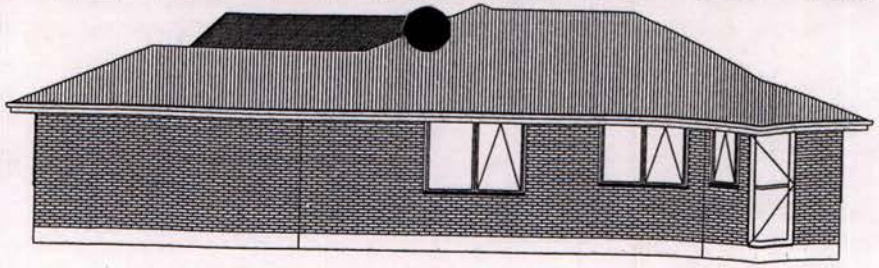
3.3 A review using this procedure shows that the exterior footings need to increase in depth to 0.9m and width to 0.35m for the applied pressures to be less than measured theoretical values. Similarly the roof post footings need to increase to 550 square x 900 mm deep.

3.4 This analysis suggests that the underlying soil is suitable to support the modified shallow bearing foundation system as detailed, and the risk of differential settlement greater than mentioned above is low. Our calculations and detailing is attached.

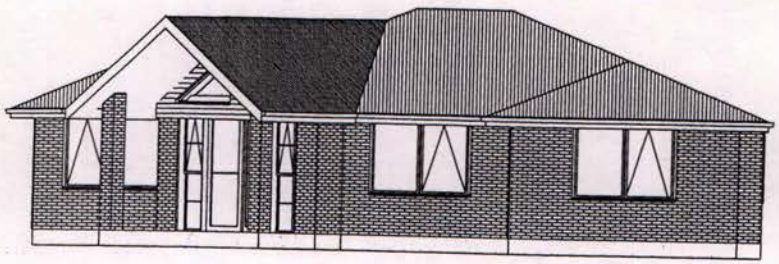
3.5 Stormwater and effluent disposal systems should be detailed and located in accordance with our earlier feasibility report.

Manktelow Consulting Engineers Limited

Craig Manktelow BE (Hons) MIPENZ



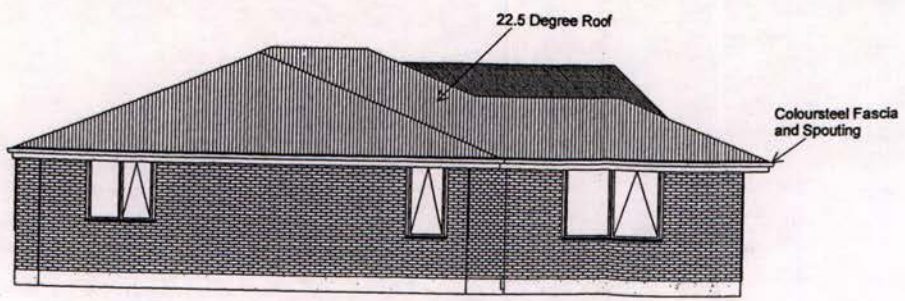
ELEVATION A



ELEVATION B

ELEVATION C

ELEVATION TO GABLE



ELEVATION D

HALLMARK HOMES
159 COMMERCE STREET
WHAKATANE
PH (07) 3086655 FAX (07) 3086625

PLANS FOR

BARRACLOUGH

SITE ADDRESS:
LOT 1 OF LOT DP 310143
560 STANLEY ROAD
WHAKATANE

STANDARD NOTES

REVISIONS

WIND ZONE - MEDIUM
EARTHQUAKE - ZONE A
CORROSION ZONE - ZONE 2

ELEVATIONS

SCALES:
1:100
DO NOT SCALE PLANS

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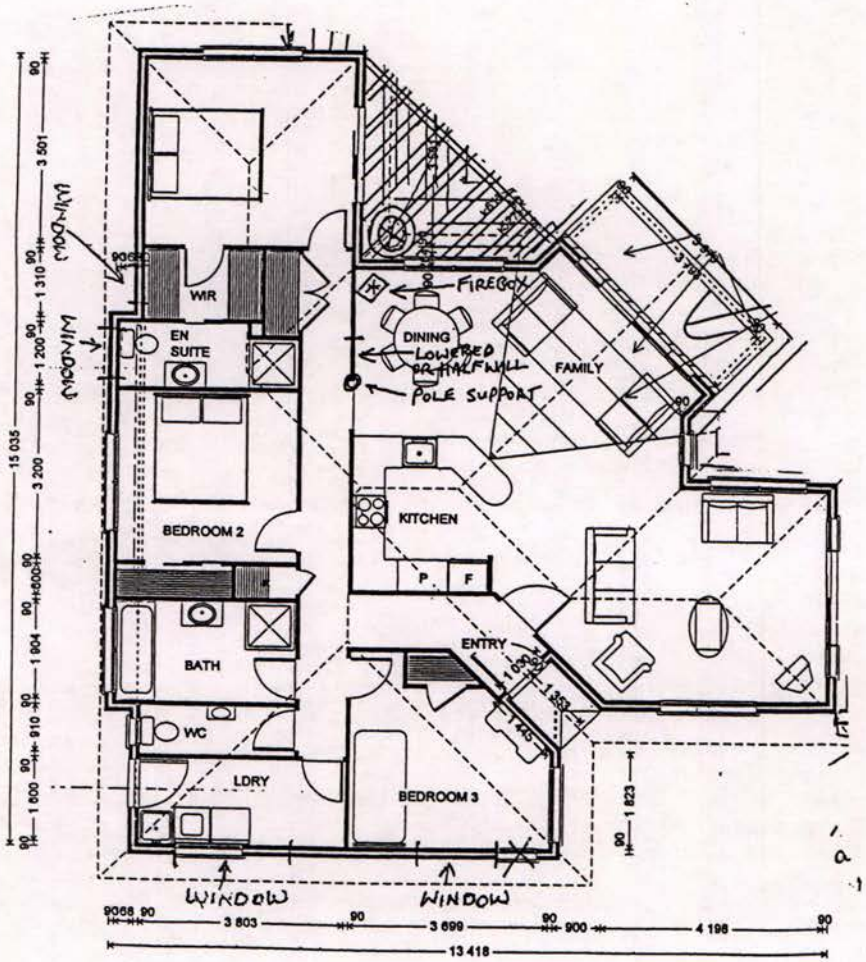

GROUND FLOOR PLAN

ELEVATION KEY

A B C D

HALLMARK HOMES
159 COMMERCE STREET
WHAKATANE
PH (07) 3086655 FAX (07) 3086625

PLANS FOR

BARRACLOUGH

SITE ADDRESS:
LOT 1 OF LOT DP 310143
560 STANLEY ROAD
WHAKATANE

STANDARD NOTES

REVISIONS

- WIND ZONE - MEDIUM
  EARTHQUAKE - ZONE A
  CORROSION ZONE - ZONE 2

FLOOR PLAN

SCALES:
1:100
DO NOT SCALE PLANS

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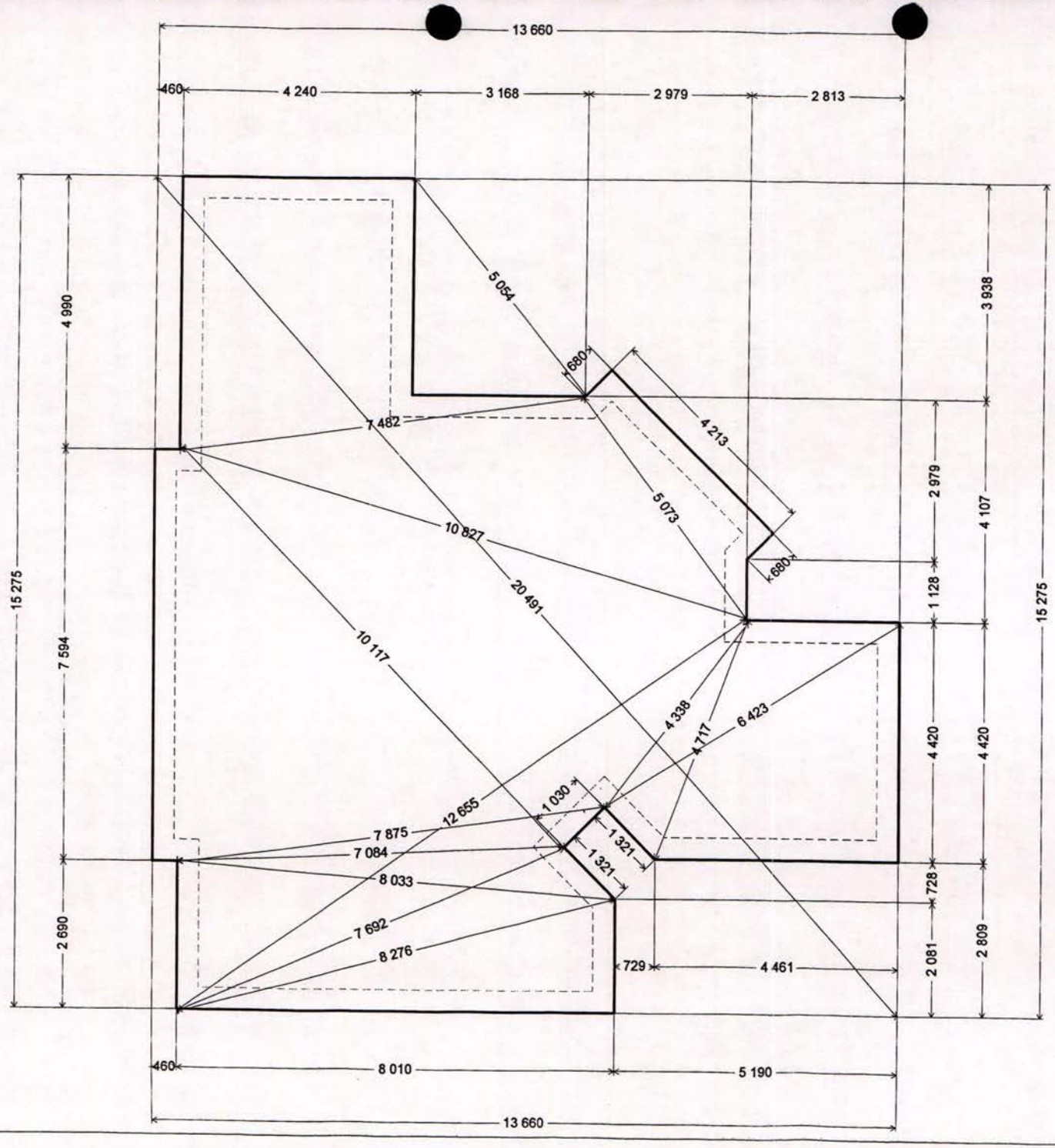


HALLMARK HOMES
159 COMMERCE STREET
WHAKATANE
PH (07) 3086655 FAX (07) 3086625

PLANS FOR

D BARRACLOUGH & ANNE BENNETT

SITE ADDRESS:
LOT 1, DP 310143
560 Stanley Road
Wainui

STANDARD NOTES

100MM CONCRETE SLAB
1 LAYER OF 665 MESH
ON 0.25 POLYTHENE DPM
ON COMPACTED HARDFILL

17.5 MPa CONCRETE UNLESS
SPECIFIED BY ENGINEER

REVISIONS

WIND ZONE - MEDIUM
EARTHQUAKE - ZONE A
CORROSION ZONE - ZONE 1

FOUNDATION PLAN

SCALES:

1:75

DO NOT SCALE PLANS

ISSUE NO.		DWG NO
DATE PRINTED:	15/06/06	3
DRAWN BY:	GIL	

Manktelow Consulting Engineers Ltd
28 Martin Place
Whakatane
Phone/Fax 07 3072002
Mobile 025 6125548
Email mankshouse@xtra.co.nz

BUILDING SITE FEASIBILITY REPORT
FOR
LOT 1 OF PROPOSED SUBDIVISION OF LOT 2 DP 310143
560 STANLEY ROAD
WHAKATANE

CLIENT: J. AND N. COWPER

Ref. 103.1
14/5/2004

Contents page

1.0 Background....3

2.0 Site notes....3

3.0 Site geology....3

4.0 Theoretical building setbacks....4

5.0 House foundations....4

6.0 Stormwater controls and erosion protection....4

7.0 Effluent disposal....4

8.0 Conclusions....5

Photographs....6

Survey Plan....8

Site notes plan....9

Critical slope profiles....10

Soil test data sheets....11

Limitations

This report has been prepared at the specific instructions of J. and N. Cowper and supports a subdivision consent application, and should not be relied upon for any other purpose, or by any other party, and is based on data from preliminary scala penetrometer and borelog testing. The nature and continuity of subsoil conditions away from the test sites is inferred and it must be appreciated that actual conditions could vary considerably from the assumed model.

This review has been limited to the area identified on the attached site notes plan and is based on information collected from a site visit and engineering judgment. This report should not be construed as a guarantee for continued slope stability.

This report does not preclude the need for normal foundation inspections at the time of construction of any building on the site.

Restrictions to building arising from the proximity of property boundaries, archaeological issues, and the like, have not been investigated

1.0 Background

This property is located on an elevated portion of ground adjacent to Stanley Road. The attached survey plan by Ross J. Overington dated March 2004, outlines the subdivision proposal. To support a subdivision resource consent application this geotechnical engineering feasibility report has been commissioned. Theoretical minimum building setbacks from slopes, possible house foundation requirements, effluent disposal system siting and stormwater controls are issues reviewed in this report. Restrictions to building arising from the proximity of property boundaries, archaeological issues, and the like, have not been investigated.

2.0 Site Notes

We visited the site on 29th April 2004. Fieldwork undertaken comprised; a walkover inspection, measurement of platform dimensions, plots of critical slopes using a measuring tape and clinometer. Two augured borelog and scala penetrometer test sites were also carried out at the locations identified on the attached site notes plan. A copy of the test data and slope cross-sections are included also.

Access was gained to the building site directly from Stanley Road. The ground surface over the potential house site is relatively level, however there is some undulation with a few tree stumps evident.

To the west beyond this the ground slopes down to the valley floor some 40 metres below. Slopes of between 25 to 43 degrees to the horizontal were recorded. Groundwater was seen exiting in a few locations. Relic slip and erosion features were also seen down this slope. These shallow features were particularly evident in areas of ground water seepage or natural surface water run-off. Visual evidence suggests that there have been no deep-seated failures; ground movements appear to be isolated to groundwater induced shallow slides and regressive erosion of the weaker upper soils. I understand that stock have extensively grazed this property for a number of years, and despite the large number of mature trees and scrub the ground surface does not have a good covering of grass or ground cover. It is evident that the strongly interbedded volcanic soils contain perched "ribbon" aquifers.

Beyond the southern boundary fence the ground slopes away steeply down to a drainage valley which traverses around to the base of the western slope. Slopes of up to 50 degrees to the horizontal were recorded down to the valley floor approximately 15 metres below. At the time of our visit a small stream flowed at the base, with the valley head adjacent to Stanley Road.

Borelogs reveal that the building site is underlain with a combination of interbedded volcanic pumice, pumice sand and weathered ash deposits down to a depth of at least 3m. Similar volcanic lapilli and tuff deposits were seen exposed on the Stanley Road cuttings; some of which stand near vertical at 4 to 5m high. Scala penetrometer testing suggests that the near surface soil is loose, with allowable bearing pressures as low as 45 kPa (135 kPa ultimate) being recorded. Soil densities improve with depth.

A recent slip has occurred to the south of this property on the edge of Stanley Road. A portion of the road has slumped into the previously mentioned valley. I understand this failure occurred during a period of intense rainfall. It was raining during our visit and surface water flows from the sealed Stanley Road, given the road profile, were directed to the slip zone. At least a 150m length of roadway would have contributed to the catchment area for this surfacewater flow.

3.0 Site Geology

Soil maps describe the geology of this area as Whakatane Hill soils comprising Tarawera and Kaharoa Ash and Taupo Pumice, on Whakatane Ash to 41cm, on volcanic ash, lapilli, and weathered ash (clay) to 15m, on sandstone and on greywacke.

4.0 Theoretical Building Setbacks

Observations indicate that the slopes below the site are at a lower degree of stability than is acceptable to permit buildings to be erected on or at the crest of the slopes. Further movement of the upper soil layers should be expected. I understand that the bush clad slopes will be retired from stock grazing. Re-growth of vegetation groundcover should be encouraged to reduce erosion potential.

As a general rule of thumb for weathered and pumice ash deposits a building set-back margin based on a 2:1 (horizontal to vertical) 26° plane applied to the slope profile has been established as a practical and prudent tool for preliminary assessment of hillside slopes. Applying this approach to the existing contours suggests that a building line set at 9m from the top edge is appropriate for the western slopes.

A similar process was undertaken for the southern slope profile beyond the boundary fence with a 15m setback resulting.

The attached Site Notes Plan showing the potential building area with the above mentioned setback distances and the slope profiles refer.

5.0 House Foundations

Preliminary scala penetrometer probing indicates that the pumice ash deposits within the defined building area have allowable bearing pressures less than 100 kPa (300 kPa ultimate) as required for buildings designed within the scope of NZS 3604:1999. Specific soil testing and design of foundations for any building on this site will be required.

6.0 Stormwater Controls and Erosion Protection

Evidence suggests that the loose upper layers of the pumice ash deposits that underlie the site are prone to erosion if left exposed. The overall stability of the site will be subject to prudent practices in terms of vegetation and surface water control.

It is important that building developments do not result in discharge of stormwater onto the adjacent slopes (this includes during construction) and that the appropriate slope vegetation is planted and maintained. Stormwater from the house roof, driveway, paths and any other hard surfaces needs to be collected and conveyed in sealed pipes away from the slopes. The final location of any dwelling, auxiliary buildings, effluent disposal system and driveways will influence the placing of any disposal system on this site. An appropriate stormwater disposal system might include a series of soakholes along the Stanley Road boundary with an overflow into the roadside watertable. If it is proposed to collect the water from the house roof the overflow pipe from the collection tank should be connected into this disposal system.

7.0 Effluent Disposal

The Environment Bay of Plenty Regional Plan for On-site Disposal of Effluent specifies for soil type encountered at the test sites (soil category 3 with good drainage) the disposal area required for a conventional septic tank with standard seepage trenches is 590 square metres, this includes a reserve area.

As with the stormwater disposal system the layout of this system will require particular attention to ensure that the trenches are of adequate length and spacing, minimal longitudinal fall, and are not too close to slope surfaces. A designated area should be assigned to the seepage trenches where vehicle and stock movements over the disposal area can be avoided.

The exact nature of any house and driveway proposal at this stage is unknown. Given the large area that would be needed for soakage the extent of the building proposal will have a bearing on whether a conventional septic tank and seepage trench system could be accommodated on this site. Site information

would suggest that a suitable area exists in the south-eastern corner of the site.

Alternatively, a proprietary package plant treatment system (some of the suppliers include: Hynds Environmental, Septech NZ, Biocycle, Enviroflow....) with low dose drip lines could be considered. This type of system allows more freedom in location of the seepage area, which could be split into different zones and be on slopes away from the residence with suitable planting. The manufacturer and supplier should visit the site and will need to provide a report that details the appropriate system for this site. This information will need to be included in the documentation for a Building Consent application to the District Council.

8.0 Conclusions

8.1 As with any elevated hillside property there is a risk of slope instability. Our investigations suggest that it is prudent to observe minimum setback distances from the top edges of the slopes at this site. Observations suggest there is a low risk that instability will extend back into the building area at these setback distances. Specialist geotechnical review and investigation will be required before consideration can be given to locate any buildings closer to the tops of the slopes than specified on the attached site notes plan.

8.2 The overall stability of the site is subject to prudent practices in terms of vegetation and surface water control. It is important that building developments do not result in discharge of stormwater to the adjacent slopes, and that the appropriate bank vegetation is planted and maintained. A suitable plan detailing the stormwater control systems from roofs, driveways and paths, should form part of the documentation in a Building Consent application to the District Council for any residential development on this site. Ground soakage systems shall not be placed in between any building and the steep slopes below the building site.

8.3 Preliminary soils investigations suggest that specific engineering design of any building foundation system on this lot is required.

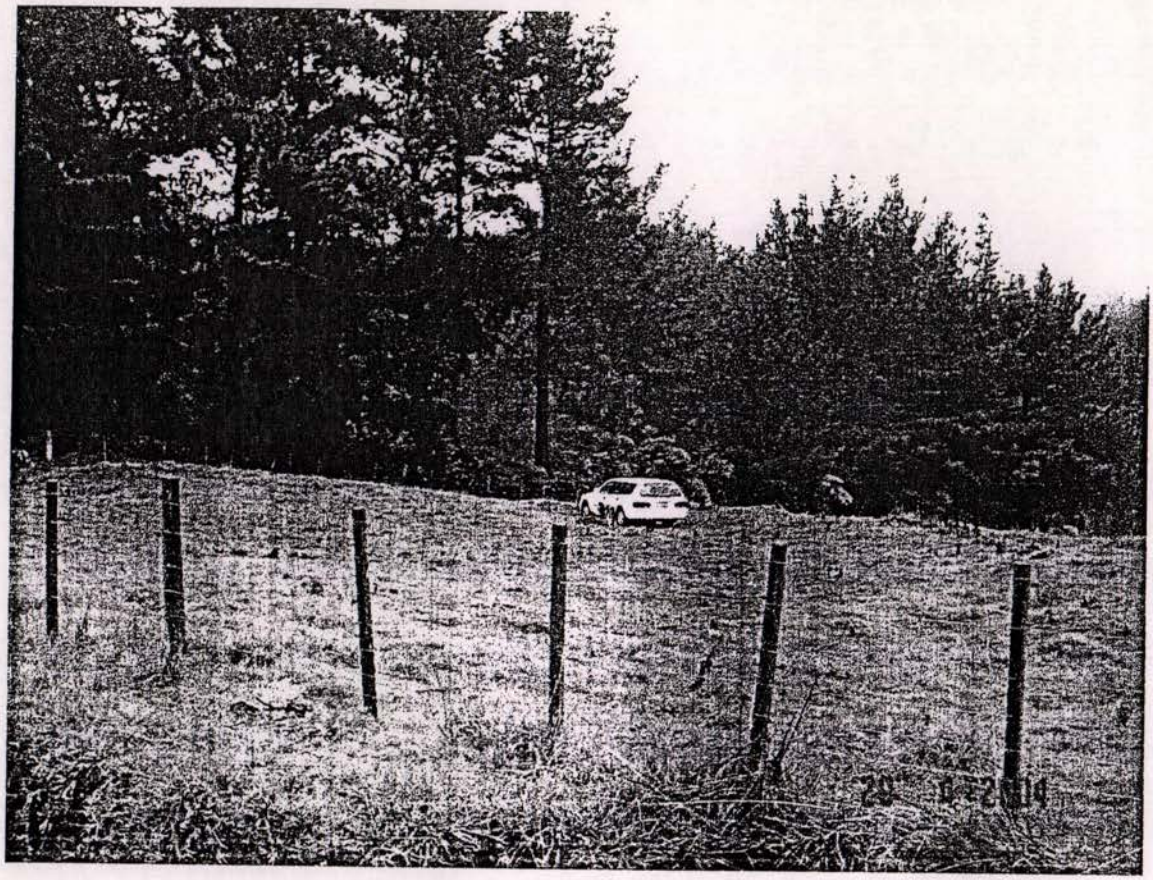
8.4 Effluent disposal from a proposed dwelling should be undertaken in accordance with the Environment Bay of Plenty Regional Plan for On-Site Disposal of Effluent, District Council requirements and comply with AS/NZS1547:2000. A conventional septic tank and seepage trench system shall not be placed between any buildings and the steep slopes around this building site. A proprietary package plant treatment system with low dose drip lines is an alternative if a conventional septic tank system cannot be accommodated given the extent of the building proposal. The manufacturer and supplier should visit the site and provide a report that details the appropriate system for this site. This information should form part of the documentation in a Building Consent application to the Distinct Council.

8.5 No filling should take place on the sloping ground around the building site. No filling in excess of 0.6 m deep should be undertaken within the building area unless endorsed by a Professional Engineer experienced in geomechanics who is familiar with our report.

8.6 Regardless, construction of a house and effluent disposal system on the proposed lot 2 is believed feasible given the site constraints subject to final boundary location.

MANKTELOW CONSULTING ENGINEERS LIMITED

Craig Manktelow BE (Hons) MIPENZ



Photograph 1: view looking from Stanley Road south-west to site

Photograph 2: view looking south at western slopes below building site

Photograph 3: view looking north building site through trees, Stanley Road slip at right

Photograph 4: looking west at building site from Stanley Road

Manktelow Consulting Engineers Limited

Project: Site Notes — Cooper: 560 Starkey Rd — BH1

file 103.1
date 29/4/04
page 1 of 2

Soil Description	Depth m	Scala mm/blow	water table	Remarks
Topsoil	0			50ϕ auger hand
	-0.2			
Yellow Pumice Sand/Silt loose in upper ash layers density increasing with depth	-0.4	80		Scala penetrometer readings = mm/blow.
	-	40		
	-1.0	25		
Silty Pumice	-1.2			
Weathered Pumice Sand Moist	-	35		Despite soils moist @ around 1.80M. No watertable encountered down to 3.0m depth.
	2.0	25		
Clay content evident	-2.2			
	-2.4			
	-2.6	33		
	-2.8			
	3.0			
E.o.B	-	29		Scala results soft below topsoil.
	-			
	-	24.		
	-			
	4.0			
		EOT.		
				logged by CM.
	5.0			

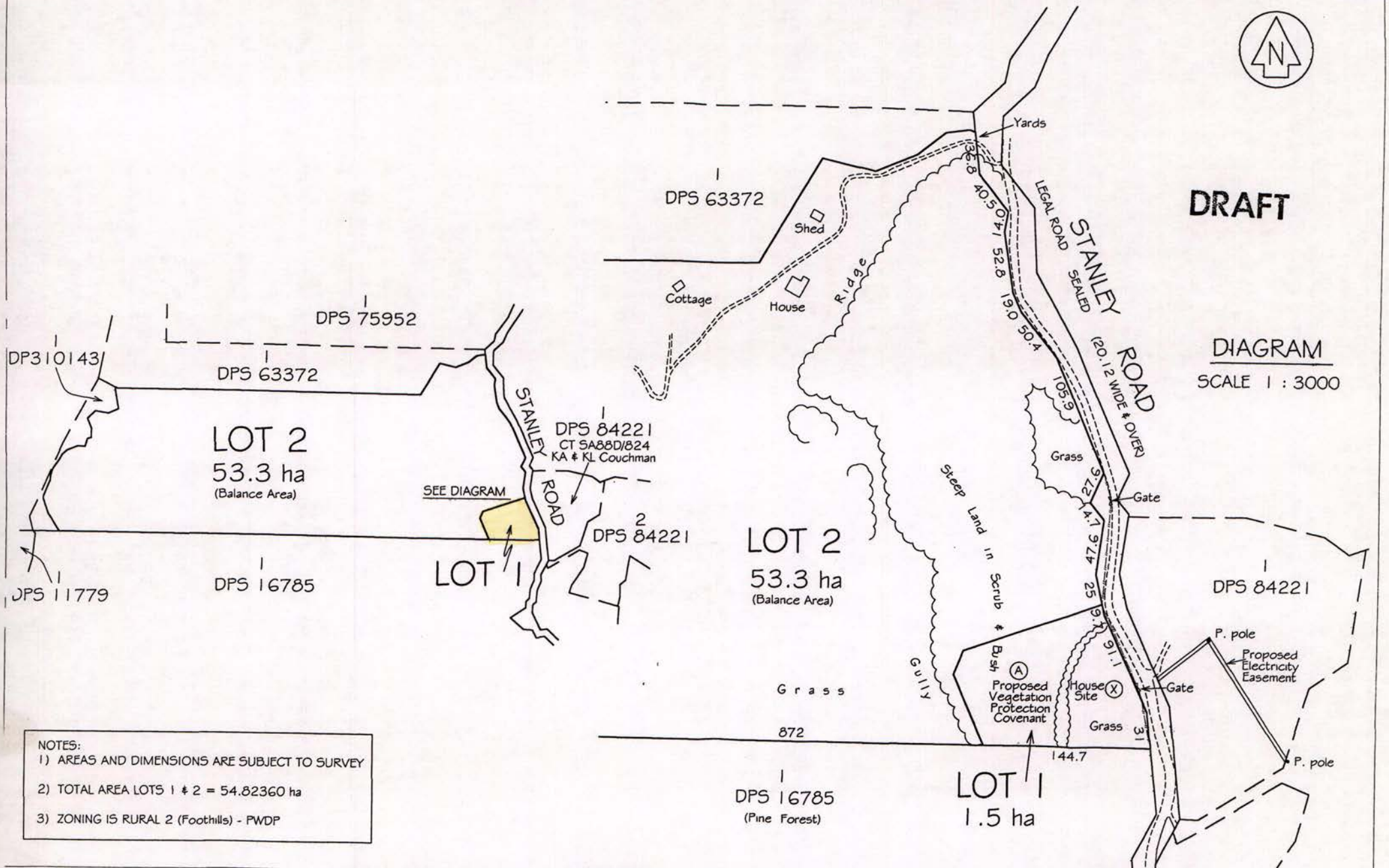
Manktelow Consulting Engineers Limited

Project Soil test results
Cooper: 560 Stanley Road

file 103.1
date 29/4/04
page 2 of 2

Soil Description	Depth m	Scala mm/blow	Remarks
Topsoil	0		BH2
Yellow Pumice Silt ash. loose		75	
		38	
	1.0	29	
Silty Pumice		40	
Weathered ash. Clayey Silt Sand flecks		32	
	2.0	29	
		25	
		EOT	
	3.0		
EOT			
	4.0		

Civil and Structural Consulting Engineers
Phone/fax 07 307 2002



NOTES:
1) AREAS AND DIMENSIONS ARE SUBJECT TO SURVEY
2) TOTAL AREA LOTS 1 & 2 = 54.82360 ha
3) ZONING IS RURAL 2 (Foothills) - PWDP

PREPARED FOR:
J. & N. Cowper
560 Stanley Road
Wainui

PROPOSED SUBDIVISION OF LOT 2 DP 310143

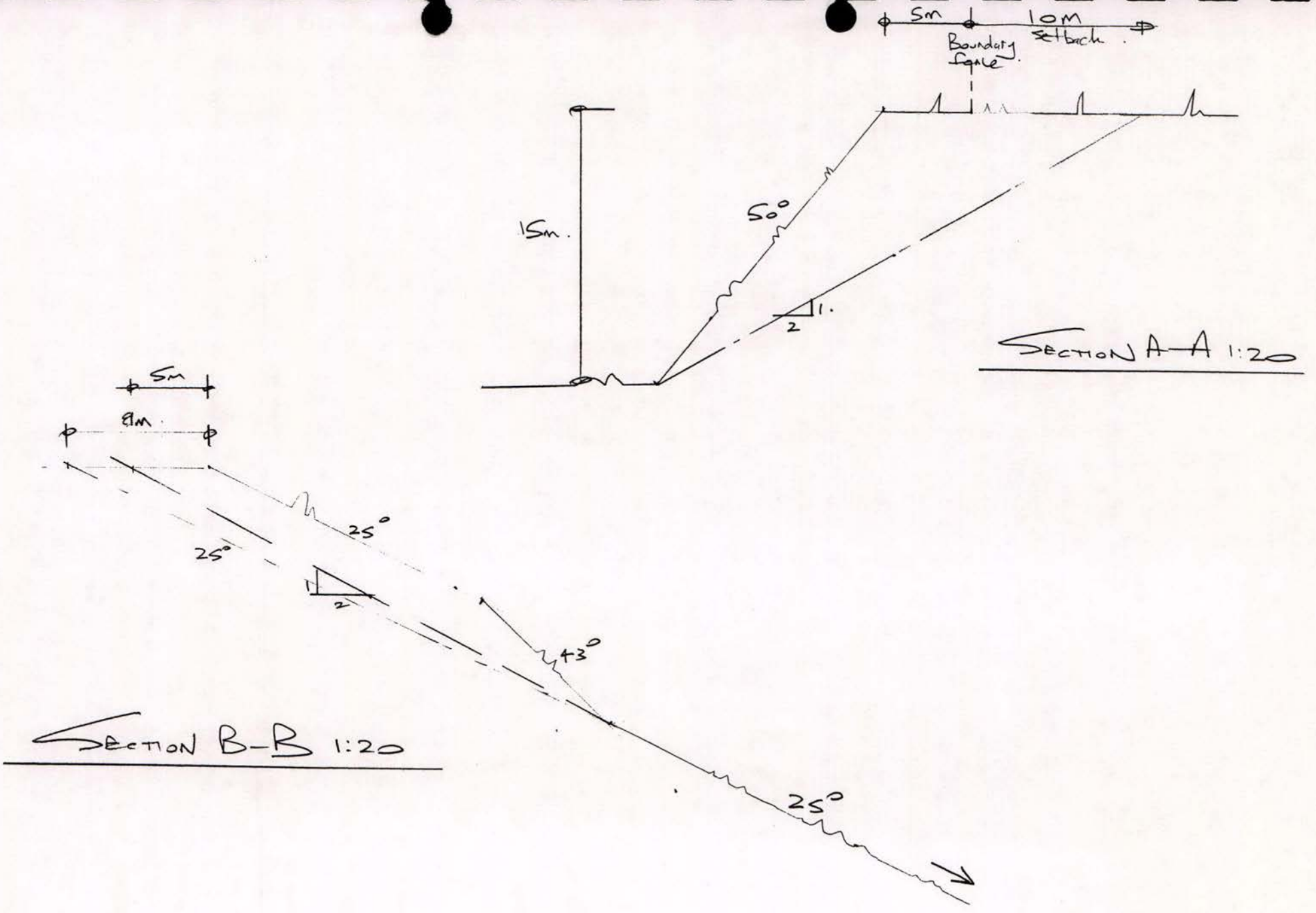
COMPRISED IN CT 39972

WHAKATANE DISTRICT

ROSS J. OVERINGTON
REGISTERED SURVEYORS
P O BOX 596 • WHAKATANE • Phone 3086384

DRAWING No. S2058/1

DRAWN	DATE	SCALES
RJO	MARCH 2004	1 : 10 000
TRACED SAW		CAD No 2058 Survey



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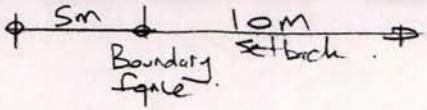
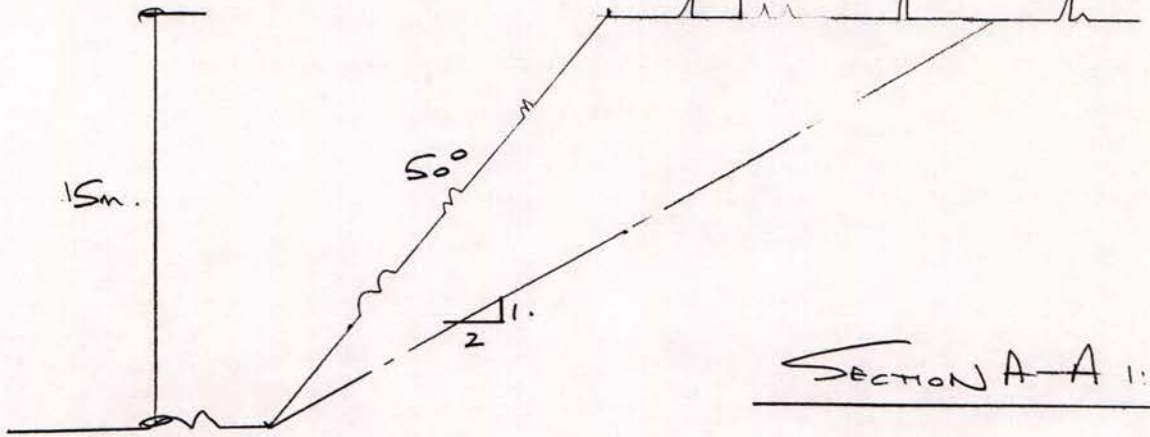
SECTION B-B 1:20





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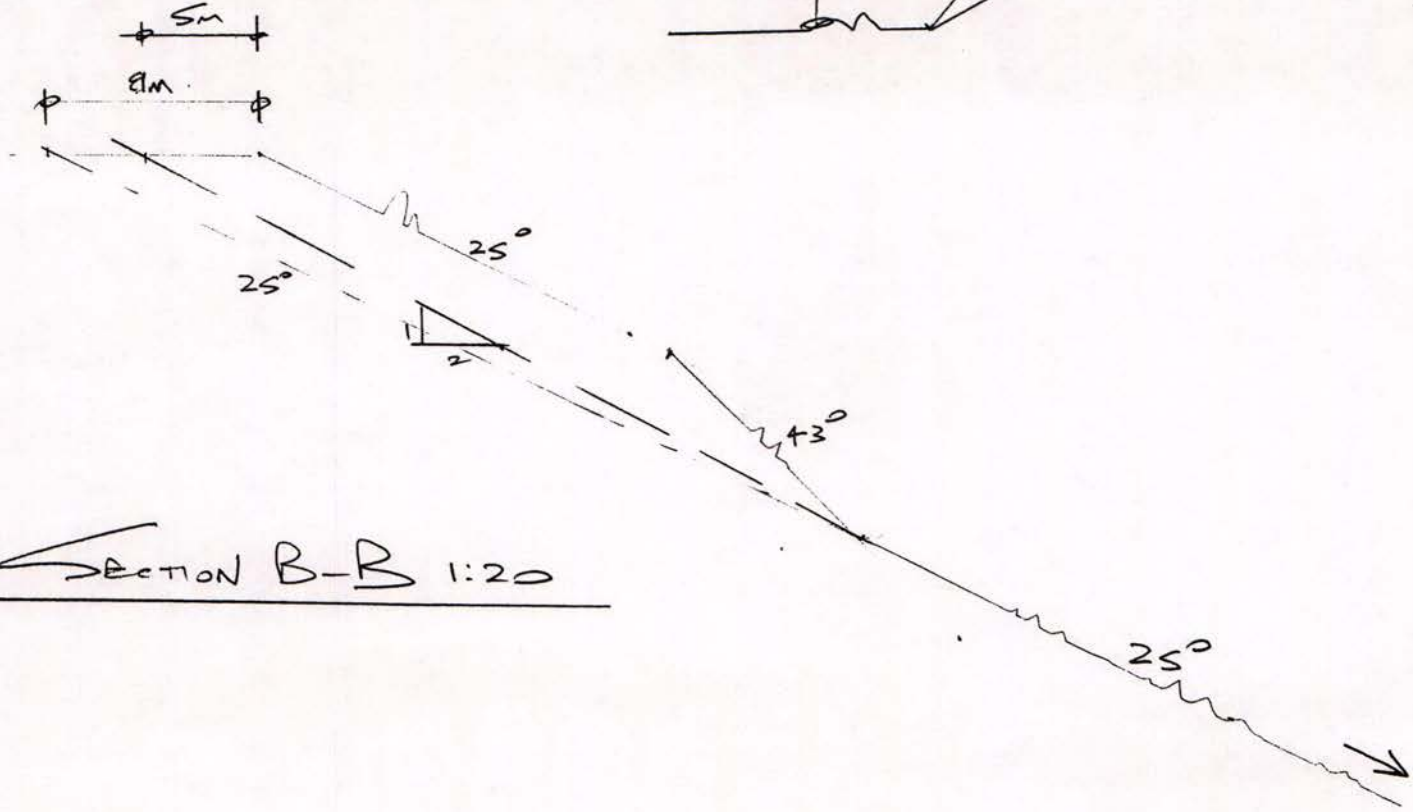

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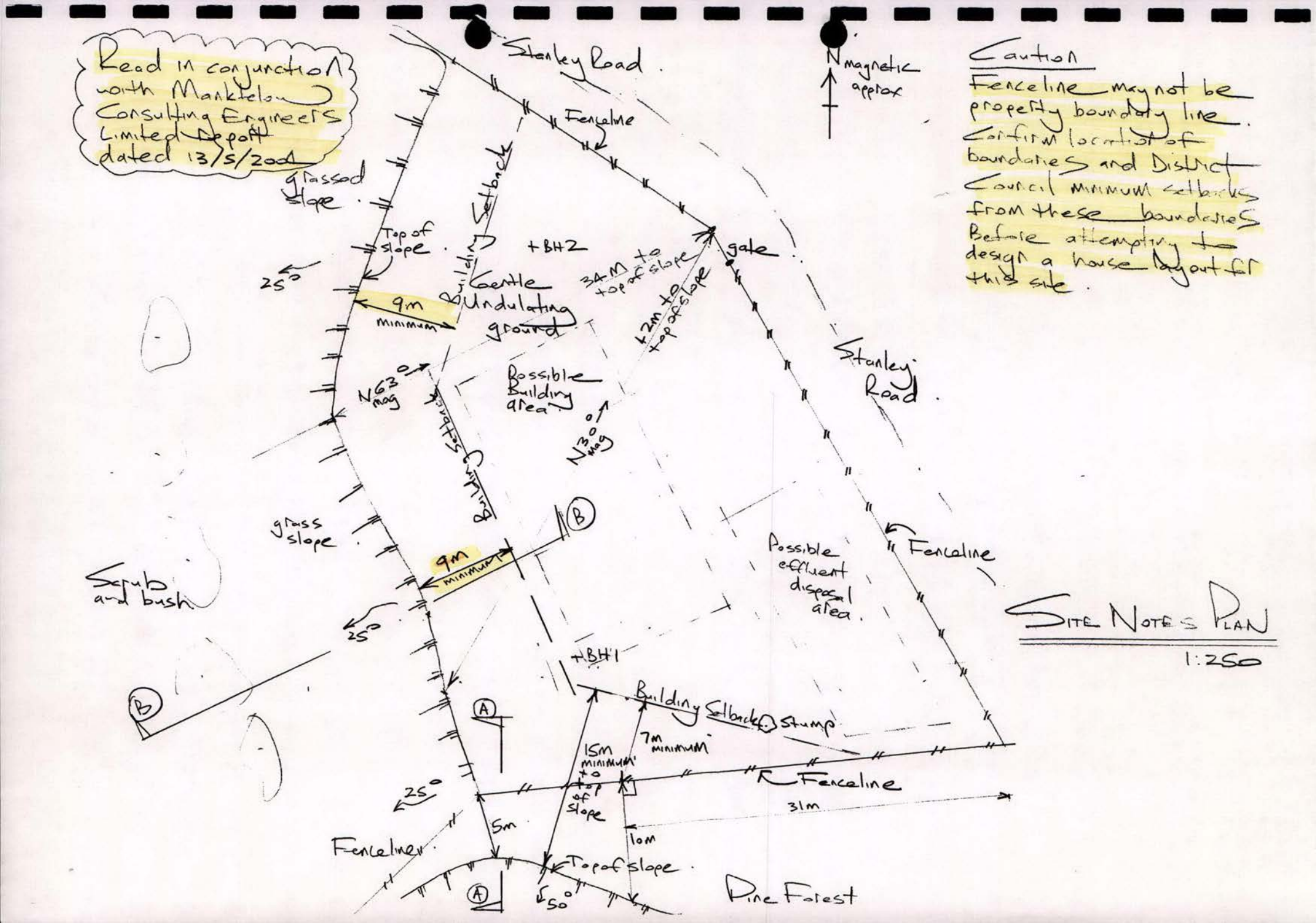
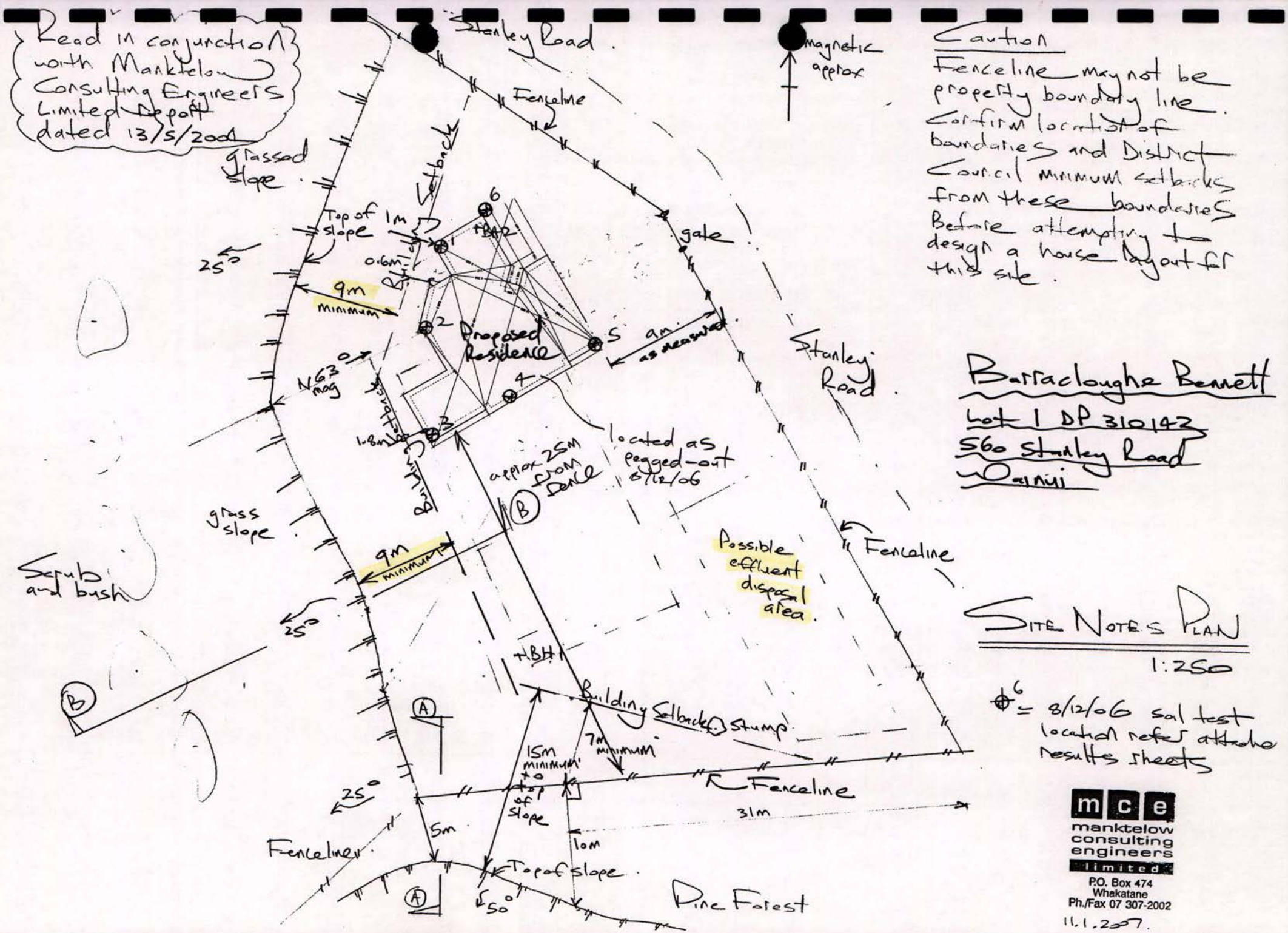

Read in conjunction with Marktelow Consulting Engineers Limited report dated 13/5/2004
Caution
Fenceline may not be property boundary line. Confirm location of boundaries and District Council minimum setbacks from these boundaries Before attempting to design a house layout for this site.
Stanley Road
Fenceline
N magnetic approx
grassed slope
Top of slope
Building Setback
+BH2
25°
9m minimum
Gentle Undulating ground
34m to top of slope
42m to top of slope
gate
Stanley Road
N63° mag
Possible Building area
N30° mag
Building Setback
grass slope
9m minimum
B
Scrub and bush
25°
Possible effluent disposal area
Fenceline
+BH1
Building Setback
Stump
A
15m minimum to top of slope
7m minimum
Fenceline
31m
25°
5m
1om
Fenceline
Top of slope
50°
Pine Forest
SITE NOTES PLAN
1:250


Read in conjunction with Manktelow Consulting Engineers Limited Report dated 13/5/2004
Stanley Road
Magnetic approx
Caution
Fenceline may not be property boundary line. Confirm location of boundaries and District Council minimum setbacks from these boundaries Before attempting to design a house layout for this site.
Fenceline
Grassed slope
Top of slope
1m
Setback
25°
9m minimum
0.6m
Bldg Setback
6
TBH2
gate
Proposed Residence
2
5
9m as measured
Stanley Road
N63° mag
Elevated
1.8m
3
4
approx 25M from Dwelling
located as pegged-out 6/12/06
B
grass slope
Possible effluent disposal area
Fenceline
Scrub and bush
9m minimum
25°
TBH1
Building Setback
Stump
A
15m minimum
7m minimum
Top of slope
Fenceline
31m
25°
5m
10m
Fenceline
Top of slope
50°
Pine Forest
Barraclough Bennett
Lot 1 DP 310143
560 Stanley Road
Oamaru
SITE NOTES PLAN
1:250
6 = 8/12/06 soil test located refer attached results sheets
mce
manktelow consulting engineers limited
P.O. Box 474
Whakatane
Ph./Fax 07 307-2002
11.1.2007.

SOIL TEST RESULTS SHEET

Client: Dave Barraclough & Anne Bennett

Project Location: Proposed residence
560 Stanley Road, Lot 1 DP 310143, Wainui

Test Site 1 of 6

Ref: 574.1

Date: 8.12.06

Comments	Soil Sensitivity	Shear vane Cu (kPa)	Scala (mm/blow)	Depth (m)	Soil, Engineering Description
			68	0.0	SAND, silty, pumicey, yellow
			50	0.5	
			30	1.0	
			14		pumice GRAVEL, fine grained, silty
			50	1.5	clayey SAND, fine to medium grained, slight plastic, moist
			31		
			30	2.0	
			25	2.5	at 2.2m- silty sand
			29	3.0	end of drilling at 2.9m depth
			eot	3.5	
				4.0	
				4.5	
				5.0	
				5.5	
				6.0	

mce manktelow consulting engineers limited

Structural and Geotechnical Engineers
(07) 307 2002

Auger dia: 50mm
Depth measured from existing ground level
Logged: CM

SOIL TEST RESULTS SHEET

Client: Dave Barraclough & Anne Bennett

Project Location: Proposed residence
560 Stanley Road, Lot 1 DP 310143, Wainui

Test Site 2 of 6

Ref: 574.1

Date: 8.12.06

Comments	Soil Sensitivity	Shear vane Cu (kPa)	Scala (mm/blow)	Depth (m)	Soil, Engineering Description
			60		SAND, silty, pumicey, yellow
			56	0.5	
			31	1.0	
			20		pumice GRAVEL, fine grained, silty
			27	1.5	
			40		clayey SAND, fine to medium grained, slight plastic, moist
			28	2.0	
			35	2.5	
			17		end of drilling at 2.7m depth
			eot	3.0	
				3.5	
				4.0	
				4.5	
				5.0	
				5.5	
				6.0	

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Structural and Geotechnical Engineers
(07) 307 2002

Auger dia: 50mm
Depth measured from existing ground level
Logged: CM

SOIL TEST RESULTS SHEET

Client:	Dave Barraclough & Anne Bennett	**Test Site**	**3** of 6
		Ref:	574.1
Project Location:	Proposed residence 560 Stanley Road, Lot 1 DP 310143, Wainui	Date:	8.12.06

Comments	Soil Sensitivity	Shear vane Cu (kPa)	Scala (mm/blow)	Depth (m)	Soil, Engineering Description
			46	0.5	SAND, silty, pumicey, yellow
			45		
			25	1.0	
			23	1.5	pumice GRAVEL, fine grained, silty
			40		clayey SAND, fine to medium grained, slight plastic, moist
			34		
			30	2.0	
			eot	2.5	end of drilling at 2.2m depth
				3.0	
				3.5	
				4.0	
				4.5	
				5.0	
				5.5	
				6.0	

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Structural and Geotechnical Engineers
(07) 307 2002

Auger dia: 50mm
Depth measured from existing ground level
Logged: CM

SOIL TEST RESULTS SHEET

Client: Dave Barraclough & Anne Bennett

Project Location: Proposed residence
560 Stanley Road, Lot 1 DP 310143, Wainui

Test Site 4 of 6

Ref: 574.1

Date: 8.12.06

Comments	Soil Sensitivity	Shear vane Cu (kPa)	Scala (mm/blow)	Depth (m)	Soil, Engineering Description
					SAND, silty, pumicey, yellow
			50	0.5	
			38		
			40	1.0	clayey SAND, fine to medium grained, slight plastic, moist
			20	1.5	
			25		
			15	2.0	
			eot		End of drilling at 2.0m depth
				2.5	
				3.0	
				3.5	
				4.0	
				4.5	
				5.0	
				5.5	
				6.0	

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Structural and Geotechnical Engineers
(07) 307 2002

Auger dia: 50mm
Depth measured from existing ground level
Logged: CM

SOIL TEST RESULTS SHEET

Client: Dave Barraclough & Anne Bennett

Project Location: Proposed residence
560 Stanley Road, Lot 1 DP 310143, Wainui

Test Site 5 of 6

Ref: 574.1

Date: 8.12.06

Comments	Soil Sensitivity	Shear vane Cu (kPa)	Scala (mm/blow)	Depth (m)	Soil, Engineering Description
				0.0	SAND, silty, pumicey, yellow
			58	0.5	
			38		
			29	1.0	
			30	1.5	end of drilling at 1.1m depth
			23	2.0	
			eot	2.5	
				3.0	
				3.5	
				4.0	
				4.5	
				5.0	
				5.5	
				6.0	

mce manktelow consulting engineers limited

Structural and Geotechnical Engineers
(07) 307 2002

Auger dia: 50mm
Depth measured from existing ground level
Logged: CM

SOIL TEST RESULTS SHEET

Client: Dave Barraclough & Anne Bennett

Project Location: Proposed residence
560 Stanley Road, Lot 1 DP 310143, Wainui

Test Site 6 of 6

Ref: 574.1

Date: 8.12.06

Comments	Soil Sensitivity	Shear vane Cu (kPa)	Scala (mm/blow)	Depth (m)	Soil, Engineering Description
Limit testing at this location as previous test site undertaken close-by			34		
			50	0.5	
			75		
			33	1.0	
			eot		
				1.5	
				2.0	
				2.5	
				3.0	
				3.5	
				4.0	
				4.5	
				5.0	
				5.5	
				6.0	

mce manktelow consulting engineers limited

Structural and Geotechnical Engineers
(07) 307 2002

Auger dia: 50mm
Depth measured from existing ground level
Logged: CM

Project Barraclough & Bennett
C60 Stanley Road
Waiuku

file 574.1
date 11.1.07
page 1.

1.0 Soil testing.

With reference to attached MCE geotechnical feasibility report.
Per attached Site Note Plan the proposed residence as detailed on Hallmark Homes drawings dated 26/09/06 is sited back beyond the minimum building setback distance of 9m
We have undertaken subsequent Scala penetrometer bore log testing around the permeter of the proposal.
Our original report suggested that soils softer than permitted by NZS 3604:1999 exist at this site.
Results from six test sites are attached.
- Review proposed foundation system for measured theoretical allowable bearing pressures

Project	file S7414.1 date page 2

2.0 Bearing pressure review

- assumed loadings

Roof - colorsteel LHF trusses @ 34° gib ceiling — $G = 500 Pa$, $Q_B = 250 Pa$

No access

Ext wall 70 series brick LHF — $G = 1400 Pa$, $G = 300 Pa$

Concrete — $\gamma = 24 kN/m^3$

2.1 Exterior Strip footing

Consider unit length of footing bearing at 450mm minimum below ground level, 900 for walls adjacent to slope edge.

(Gsw) $w = 6.0 \times (0.5 + 0.25)$ roof
$+ 2.4 \times (1.10 + 0.30)$ ext wall
$+ 7.0$ footing + found wall
DL

$= 14.08 (G) + 1.50 (Q) = 15.58 kN/m$

Project	file 5710 date page 3

e 450 or below

Cu = 75 kPa / blow

q_a = 48 kPa

Sand modification factors

$q_m = q_a \left(1 + \frac{H}{B}\right)^{P2} \times \frac{2}{3}$ ← saturated condition

for 350 wide footing

$q_m = q_a \times \frac{4}{3}$ = 64 kPa

$q_a = \frac{15.58}{0.35}$ = 44 kPa ok

Provide a minimum of 350 wide x 450 deep (or 900 where shown)

2.2 Slab

Floor level ≤ 0.60m above surrounding ground.

Check dispersal pressures at base of 600 + 300 = 900mm compacted slab sub-base fill

Project

file S14.1
date
page 4.

(6 to) p_a = 0.2 partitions
slab + 0.1 x 24 + 1.50
Fill + 0.90 x 18
p_a = 20 kPa

Conventional
100mm concrete slab, HRC 665 mesh
control, 0.25mm polythene
150mm minimum compacted hardfill

2.3 Exterior post footings

Bearing @ 900 below ground level.

(6 to) P = 1.60 x (1.40 + 0.30) x 3.0 (4 x 0.4) brick column
+ 1.0 x 2.0 x (0.50 + 0.25) roof
+ 8.0 DL self
= 17.66 kN

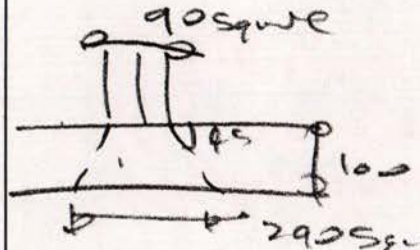
A_{req} = 17.66 / 48 = 0.37 m^2

Provide 650 square x 900 deep
A = 0.42 m^2

Project	file S14.1 date page 5

2.40 Slab point loads : Bedroom 2 / Ensuite

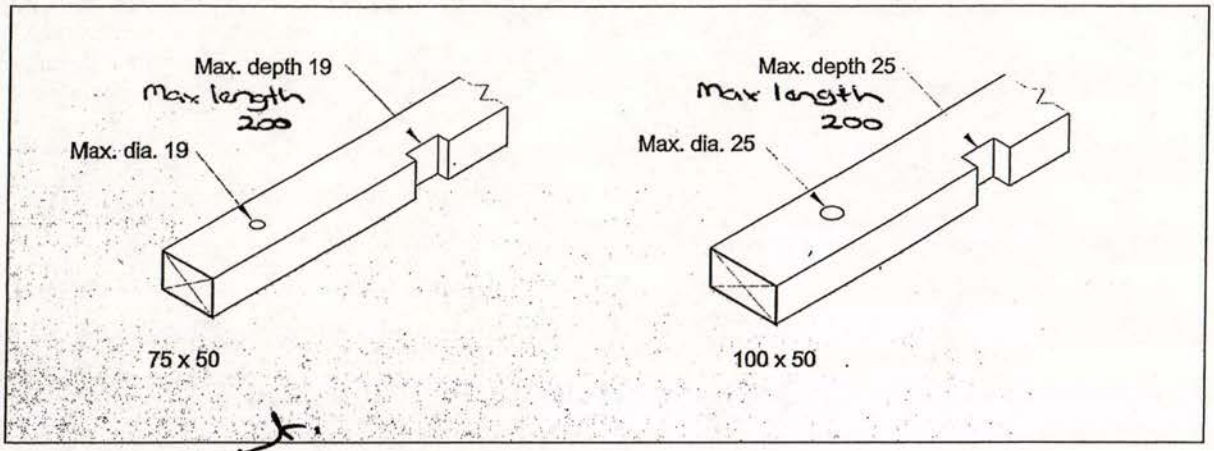
(6 No) P = 2.30 x 6.0 x (0.50 + 0.25) Roof
+ 2.0 DL
= 8.90 (6) + 3.45 (0) = 12.35kN



Area required = $\frac{12.35}{48}$ = 0.25M^2

Provide 500 sq x 250 deep

300 wide x 250 deep slab thickening elsewhere



see amendment.

Figure 8.19 – Checking and boring top plates (see 8.7.5.1)

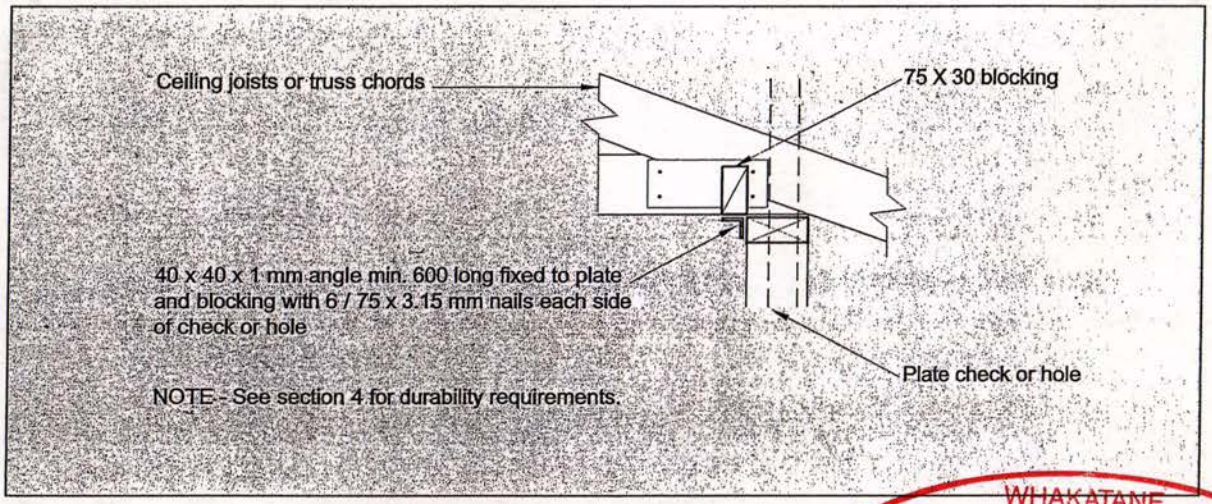


Figure 8.20 – Cut top plate (see 8.7.5.1(c))

WHAKATANE DISTRICT COUNCIL
APPROVED FOR CONSTRUCTION
Building Control Office
Date 29-03-07

(* amendment).

C8.7.5.1
Strengthening is required against loads vertical to, horizontal to, or along the plate.

8.7.5 *Holes and checks in plates*

8.7.5.1 *Top plates*

The sizes of holes or notches shall comply with the dimensions shown in figure 8.19. Where the size of a hole or notch exceeds these dimensions the plates shall be strengthened by one of the following methods:

(a) A 75 mm x 40 mm member x 600 mm long nailed to the exterior side of the plate with 4/75 x 3.15 nails on each side of the hole or notch; or

(b) A 75 mm x 40 mm eaves runner connected to all *studs* and no more than 250 mm below the *top plate*; or

(c) A 75 x 30 mm *blocking* fitted between ceiling joists or trusses above cut *top plates* and the steel angle shown in figure 8.20.

8.7.5.2 *Bottom plates*

Where holes or face notches exceed 50 % of the width of the *bottom plate*, fix the plate against sideways movement on each side of the hole or notch, with one 100 mm x 3.75 mm nail.

Tag Sheet - Job 4748 W6231

QUANTITIES BY PLACEMAKERS

TAGS:

#1 The quantities in this schedule have been assessed by Cliff Stuart "The Estimator" Whakatane,Ph 07 308 7157.

#2 Where quantities have been assessed it has been done to the best of our ability from the information supplied. But it remains your responsibility and should be checked prior to using for pricing, or the placing of a firm order. Any variation from NZS3604 is the responsibility of the designer, and may need to be checked for conformance before ordering.

#3 Plan : Hallmark Homes Ltd. Ph 308 6655. Provided 2 sheets (A3). NO CROSS SECTION, NO BRACING SCHEDULE. NO GUARANTEE ON THESE QUANTITIES. Assume HEAVY roof.

#4 This schedule allows materials for framing the walls only. Exterior walls allowed as H1.2 treated . All bottom Plates allowed as H3.1 treated. Interior walls allowed as treatment free framing.

#5 All walls have been allowed at 2.4m high apart from the Entry wall to the family room, allowed as a full height raking wall. Extent of raking ceiling is not defined on this copy of the plan. Check requirements.

#6 No lintel, bottom plate or bracing strapping has been allowed. Assume this will be done on site.

#7 Truss designs are not produced until quotation has been accepted, therefore no allowance has been made for increased sized lintels due to special point loadings, should girder trusses land over lintels. Builders must confirm lintel sizes with roof manufacturer before erecting wall framing.

#8 Trusses manufactured in H1.2 Timber unless otherwise specified

#9 Subject to supply selected lengths may vary up to 1m

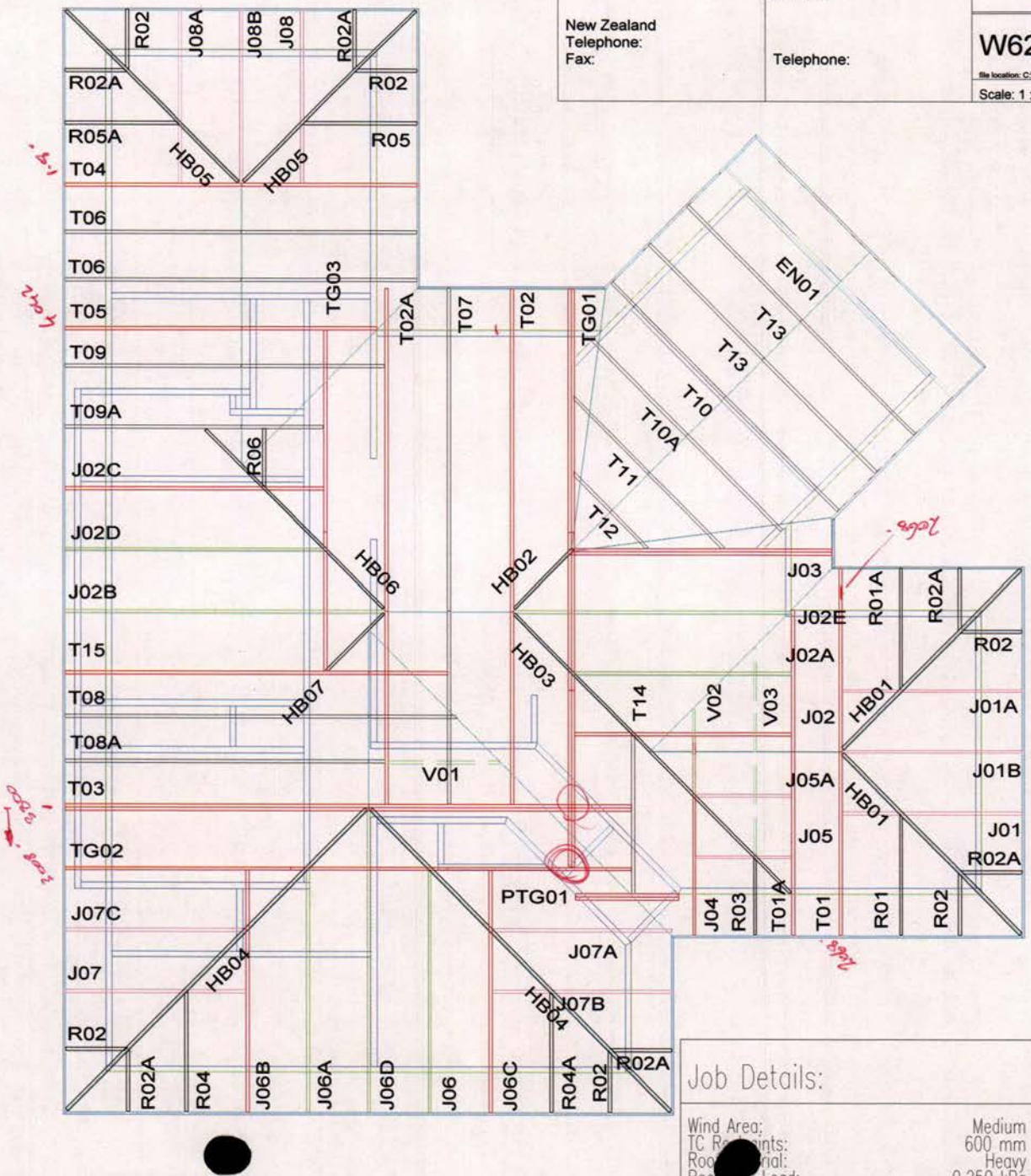
#10 Truss and Prenail prices are an estimate only not a firm quote. Prices can vary due to a number of factors including: clarity of plans, changes made on plans between pricing and prefabricating

#11 Prenail price includes labour, timber and nails it does not include manufactured beams or hyspan lintels these are additional

#12 We reserve the right to decline a plan for prefabrication in the event that the Detailer believes there is insufficient information and/or extensive site measuring is required prior to detailing.

#13 Customer please note that we have been advised of Price Increases for the following suppliers. Supplier CHH Interior has increased prices on all board products, effective 1st October 2006. Cavity Sliders will increase in price by around 2% effective 1st October 2006. And supplier Winstone Wallboards have advised of a price increases for Gib Goldline Platinum Trims increase being 8%, Gib Rail increase by 25% and Gib Woodbond, Soundseal and Wood Fix will increase by 6.5%, these prices will take effect on the 7th October 2006. We hope this doesn't inconvenience you to much.

PlaceMakers				
	Name: Hallmark Plan A331 Address:	New Residence		
New Zealand Telephone: Fax:	Telephone:	W6231 file location: C:\M44G13\JOBS\W6231\		
		Scale: 1 : 94	Date: 2/10/2006	Drawn By: John C



Job Details:

Wind Area:	Medium	Design Wind Speed:	37.0 m/s
TC Restraints:	600 mm	BC Restraints:	400 mm
Roof Material:	Heavy	Ceiling Material:	Standard
Roof Live Load:	0.250 kPa		
Roof Pitch:	34.000 deg	Truss Centres:	900 mm

Job: W6231 Client: Hallmark Plan A331 Site:
Phone:

Description: New Residence
Building Consent No.: Phone:

PRODUCER STATEMENT
MiTek 20/20™ TRUSS DESIGN PROGRAM

Certification of MiTek 20/20™ Truss Design Program

The MiTek 20/20™ truss design program has been developed by MiTek New Zealand Ltd for the design of GANG-NAIL timber roof, floor and attic trusses in New Zealand. The truss designs computed by this program are prepared using sound and widely accepted engineering principles, and in accordance with NZS 4203, NZS 3603 and NZS 3604 as verification methods and acceptable solutions of the approved documents issued by the Building Industry Authority to satisfy the requirements of Clause B1:Structure of the Building Regulations 1992. This computer design for the proposed building complies with the relevant provisions of the NZ Building Code. This is subject to all proprietary products meeting their performance specification requirements, the provision of adequate bracing, fixings and the correct input of design data carried out by suitably trained personnel.

Summary of MiTek 20/20™ Truss Design Data and Output

The MiTek 20/20™ computer design output for this job titled and located at the site identified on the top of this page is based on the following parameters entered into the program. The owner must ensure that the following job details below are current and relevant to the project before fabrication and erection of the GANG-NAIL trusses.

Job Details

Roof Truss

Timber Group:	MSG8ROTORUA	Pitch:	34.000 deg	Std Overhang:	600 mm
Roof		**Ceiling**		**Wind**	
Material:	Heavy	Material:	Standard	Area:	Medium (37.0 m/s)
Dead Load:	0.650 kPa	Dead Load:	0.200 kPa	Pressure Coeff:	Cpe = varies; Cpi = -0.30, 0.20
[redacted]straints:	600 mm centres	Restraints:	400 mm centres		
[redacted]e Load:	Qur = 0.250 kPa				
	Qc = 1.000 kN				

These trusses must be fabricated and erected in accordance with the GANG-NAIL manual. Proper erection bracing must be installed to hold the components true and plumb and in a safe condition until permanent bracing is fixed. All permanent bracing and fixing must be installed before any loads are applied. The specifications for timber shall be as shown on the output. The timber shall be standard gauged and treated to the requirements of NZMP 3640. Unless otherwise noted, this design assumes that the steel fixings and timber connectors are situated in a closed environment, as defined by NZS3604:1999 Section 4.

Truss List

Legend: * = detail only, ? = input only, ~~Txx~~ = failed design, Unmarked trusses = designed successfully, LB = lateral bracing required

Truss	Qty	Span (mm)	Pitch (deg)	Spacing (mm)	Truss	Qty	Span (mm)	Pitch (deg)	Spacing (mm)	Truss	Qty	Span (mm)	Pitch (deg)	Spacing (mm)
EN01	1	3973	34.000	900	J06B	1	2961	22.500	900	T02A	1	6978	22.500	900
*HB01	2	3727	16.325	900	J06C	1	2961	22.500	900	T03	1D	7767	22.500	900
*HB02	1	1228	16.325	900	J06D	1	2961	22.500	900	T04	1	4003	22.500	900
*HB03	1	5783	16.325	900	J07	1	2061	22.500	900	T05	1	4003	22.500	701
*HB04	2	6264	16.325	900	J07A	1	2061	22.500	900	T06	2	4003	22.500	701
*HB05	2	3602	16.325	900	J07B	1	2061	22.500	900	T07	1	6978	22.500	929
*HB06	1	3710	16.325	900	J07C	1	2061	22.500	900	T08	1	4121	22.500	660
*HB07	1	1209	16.325	900	J08	1	1979	22.500	900	T08A	1	4121	22.500	660
J01	1	2067	22.500	900	J08A	1	1979	22.500	900	T08B	1	4121	22.500	660
J01A	1	2067	22.500	900	J08B	1	1979	22.500	900	T09	1	3221	22.500	900
J01B	1	2067	22.500	900	PTG01	1D	1541	0.000	900	T09A	1	3221	22.500	900
J02	1	3221	22.500	900	*R01	1	1780	22.500	900	T10	1	3973	34.000	796
J02[redacted]	1	3221	22.500	900	*R01A	1	1780	22.500	900	T10A	1	3973	34.000	796
J0[redacted]	1	3221	22.500	900	*R02	6	913	22.500	900	T11	1	3186	34.000	796
J02C[redacted]	1	3221	22.500	900	*R02A	6	913	22.500	900	T12	1	1593	34.000	796
J02D	1	3221	22.500	900	*R03	1	1134	22.500	900	T13	2	3973	34.000	800
J02E	1	3221	22.500	900	*R04	1	1774	22.500	900	T14	1	2321	22.500	900
J03	1D	3221	22.500	900	*R04A	1	1774	22.500	900	T15	1	4121	22.500	660
J04	1	2321	22.500	900	*R05	1	1692	22.500	900	TG01	1D	6978	22.500	900
J04A	1	2321	22.500	900	*R05A	1	1692	22.500	900	TG02	1	7767	22.500	900
J05	1	1421	22.500	900	*R06	1	855	22.500	900	TG03	1	5021	22.500	900
J05A	1	1421	22.500	900	T01	1	4180	22.500	900	V01	1	1700	22.500	900
J06	1	2961	22.500	900	T01A	1	4180	22.500	900	V02	1	1248	22.500	900
J06A	1	2961	22.500	900	T02	1	6978	22.500	900	V03	1	3048	22.500	900

Total quantity : 87

Job: W6231 Client: Hallmark Plan A331 Site:
Phone:

Description: New Residence
Building Consent No.: Phone:

The computer design input has been carried out by:

Signed: ..... Date: .....

Name of Computer Operator: .....

Qualifications and Title: .....

Company: **PlaceMakers**

Verification / Acceptance of Input Data:

I have checked the input data against the construction drawings and specifications and verify that they are correct and suitable for this job.

Signed: ..... Date: .....

Name: ..... Company: .....

Job: W6231 Client: Hallmark Plan A331 Site:
Phone:

Description: New Residence
Building Consent No.: Phone:

TRUSS FIXING SELECTION REPORT

Truss List

Legend: * = detail only, ? = input only, ~~Txx~~ = failed design, Unmarked trusses = designed successfully

Truss	Qty	Span (mm)	Joint	Down (kN)	Uplift (kN)	Bearing	Fixing Qty	Fixing Selected
EN01	1	3973	B			Wide		No fixing selected
*HB01	2	3727						
*HB02	1	1228						
*HB03	1	5783						
*HB04	2	6264						
*HB05	2	3602						
*HB06	1	3710						
*HB07	1	1209						
J01	1	2067	B	3.715	0.310	Cross	1	Pair of Wire Dog Staples
			E	1.465	0.084	Butt	1	JH 47x90
J01A	1	2067	B	3.715	0.310	Cross	1	Pair of Wire Dog Staples
			E	1.465	0.084	Butt	1	JH 47x90
J01B	1	2067	B	3.720	0.247	Cross	1	Pair of Wire Dog Staples
			E	1.434	0.069	Butt	1	JH 47x90
			D	0.856	0.132	Butt	1	Pair of 3.15d Nails
J02	1	3221	A	5.140	0.190	Butt	1	JH 47x90
			E	4.413	0.437	Butt	1	JH 47x90
J02A	1	3221	A	3.820	0.000	Butt	1	JH 47x90
			E	2.811	0.252	Butt	1	JH 47x90
			C	1.009	0.141	Butt	1	Pair of 3.15d Nails
J02[redacted]	1	3221	C	5.171	1.145	Cross	1	Pair of Wire Dog Staples
			F	0.488	0.131	Butt	1	Pair of 3.15d Nails
			E	4.099	1.038	Cross	1	Pair of Wire Dog Staples
			B	0.883	0.619	Cross	1	Pair of Wire Dog Staples
			H	0.988	0.745	Cross	1	Pair of Wire Dog Staples
J02C	1	3221	C	5.062	0.689	Cross	1	Pair of Wire Dog Staples
			H	1.569	0.222	Butt	1	JH 47x90
			B	0.407	0.430	Cross	1	Pair of Wire Dog Staples
			G	1.060	0.870	Cross	1	Pair of Wire Dog Staples
J02D	1	3221	C	5.199	1.153	Cross	1	Pair of Wire Dog Staples
			H	1.835	0.452	Butt	1	JH 47x90
			E	1.099	0.282	Butt	1	Pair of 3.15d Nails
			B	0.712	0.530	Cross	1	Pair of Wire Dog Staples
			G	1.001	0.809	Cross	1	Pair of Wire Dog Staples
J02E	1	3221	A	3.737	0.000	Cross	1	Pair of Wire Dog Staples
			D	0.535	0.080	Butt	1	Pair of 3.15d Nails
			C	5.030	0.559	Cross	1	Pair of Wire Dog Staples
J03	1D	3221	B	7.193	0.000	Cross	1	Pair of Wire Dog Staples
			F	5.569	0.000	Butt	1	Pair of MultiGrips
J04	1	2321	B	4.709	0.435	Cross	1	Pair of Wire Dog Staples
			F	2.305	0.175	Butt	1	JH 47x90
J04A	1	2321	A	2.748	0.000	Cross	1	Pair of Wire Dog Staples
			E	2.122	0.190	Butt	1	JH 47x90
			C	0.681	0.094	Cross	1	Pair of Wire Dog Staples
J05	1	1421	A	1.914	0.034	Butt	1	JH 47x90
			D	0.862	0.057	Butt	1	Pair of 3.15d Nails
J05[redacted]	1	1421	A	1.650	0.000	Butt	1	JH 47x90
			C	0.367	0.000	Butt	1	Pair of 3.15d Nails
			B	1.283	0.182	Butt	1	JH 47x90
J06	1	2961	B	4.732	0.213	Cross	1	Pair of Wire Dog Staples
			F	2.416	0.178	Butt	1	JH 47x90
			D	0.983	0.149	Butt	1	Pair of 3.15d Nails
J06A	1	2961	B	3.709	0.152	Cross	1	Pair of Wire Dog Staples
			H	1.205	0.110	Butt	1	Pair of 3.15d Nails
			D	0.968	0.148	Butt	1	Pair of 3.15d Nails
			F	2.519	0.195	Cross	1	Pair of Wire Dog Staples
			G	0.208	1.011	Cross	1	Pair of Wire Dog Staples
J06B	1	2961	B	4.353	0.302	Cross	1	Pair of Wire Dog Staples
			H	1.834	0.122	Butt	1	JH 47x90
			F	2.220	0.193	Cross	1	Pair of Wire Dog Staples
			G	0.238	0.812	Cross	1	Pair of Wire Dog Staples
J06C	1	2961	B	5.816	0.420	Cross	1	Pair of Wire Dog Staples
			F	3.901	0.307	Butt	1	JH 47x90
J06D	1	2961	B	3.693	0.024	Cross	1	Pair of Wire Dog Staples
			E	0.566	0.077	Butt	1	Pair of 3.15d Nails
			D	3.223	0.486	Cross	1	Pair of Wire Dog Staples
			G	2.314	0.173	Cross	1	Pair of Wire Dog Staples
J07	1	2061	B	3.708	0.310	Cross	1	Pair of Wire Dog Staples
			E	1.457	0.083	Butt	1	JH 47x90
J07A	1	2061	B	3.699	0.249	Cross	1	Pair of Wire Dog Staples
			E	1.406	0.065	Butt	1	JH 47x90
			D	0.833	0.129	Butt	1	Pair of 3.15d Nails

PlaceMakers

Job: W6231 Client: Hallmark Plan A331 Site:
Phone:

Description: New Residence
Building Consent No.: Phone:

MiTek 20/20 Engineering 4.4 Gamma1.3 (build 1597-6) MiTek New Zealand Ltd. Printed: 15:05:26 16 Oct 2006

Truss	Qty	Span (mm)	Joint	Down (kN)	Uplift (kN)	Bearing	Fixing Qty	Fixing Selected
J07B	1	2061	B	3.708	0.310	Cross	1	Pair of Wire Dog Staples
			E	1.457	0.083	Butt	1	JH 47x90
J07C	1	2061	B	3.700	0.249	Cross	1	Pair of Wire Dog Staples
			E	1.404	0.065	Cross	1	Pair of Wire Dog Staples
			D	0.833	0.129	Butt	1	Pair of 3.15d Nails
J08	1	1979	B	3.618	0.314	Cross	1	Pair of Wire Dog Staples
			E	1.353	0.071	Butt	1	JH 47x90
J08A	1	1979	B	3.618	0.314	Cross	1	Pair of Wire Dog Staples
			E	1.353	0.071	Butt	1	JH 47x90
J08B	1	1979	B	3.623	0.251	Cross	1	Pair of Wire Dog Staples
			E	1.309	0.055	Butt	1	JH 47x90
			D	0.870	0.133	Butt	1	Pair of 3.15d Nails
PTG01	1D	1541	A	1.977	0.062	Cross	1	Pair of Wire Dog Staples
			B	2.151	0.048	Cross	1	Pair of Wire Dog Staples
*R01	1	1780						
*R01A	1	1780						
*R02	6	913						
*R02A	6	913						
*R03	1	1134						
*R04	1	1774						
*R04A	1	1774						
*R05	1	1692						
*R05A	1	1692						
*R06	1	855						
T01	1	4180	B	7.553	0.569	Cross	1	Pair of Wire Dog Staples
			F	7.553	0.569	Cross	1	Pair of Wire Dog Staples
T01	1	4180	B	10.606	0.504	Cross	1	Pair of Wire Dog Staples
			F	10.222	0.164	Cross	1	Pair of Wire Dog Staples
T02	1	6978	B	8.033	0.491	Cross	1	Pair of Wire Dog Staples
			P	4.661	0.140	Butt	1	JH 47x90
			N	2.192	0.102	Cross	1	Pair of Wire Dog Staples
T02A	1	6978	B	8.456	0.612	Cross	1	Pair of Wire Dog Staples
			P	6.400	0.361	Butt	1	JH 47x90
			N	4.453	0.425	Cross	1	Pair of Wire Dog Staples
T03	1D	7767	C	6.295	0.439	Cross	1	Pair of Wire Dog Staples
			R	5.227	2.392	Cross	1	Pair of Wire Dog Staples
			B	0.432	0.537	Cross	1	Pair of Wire Dog Staples
			M	11.000	0.691	Cross	1	Pair of Wire Dog Staples
T04	1	4003	B	7.176	0.541	Cross	1	Pair of Wire Dog Staples
			F	7.176	0.541	Cross	1	Pair of Wire Dog Staples
T05	1	4003	B	3.495	0.338	Cross	1	Pair of Wire Dog Staples
			F	2.589	0.150	Cross	1	Pair of Wire Dog Staples
			J	12.973	0.905	Cross	1	Pair of Wire Dog Staples
			I	0.928	1.695	Cross	1	Pair of Wire Dog Staples
T06	2	4003	B	4.563	0.344	Cross	2	Pair of Wire Dog Staples
			F	4.563	0.344	Cross	2	Pair of Wire Dog Staples
T07	1	6978	B	9.401	0.593	Cross	1	Pair of Wire Dog Staples
			P	6.132	0.254	Butt	1	JH 47x90
			N	2.696	0.130	Cross	1	Pair of Wire Dog Staples
T08	1	4121	C	3.237	0.733	Cross	1	Pair of Wire Dog Staples
			N	2.982	0.382	Butt	1	JH 47x90
			I	0.548	0.147	Cross	1	Pair of Wire Dog Staples
			B	0.416	0.471	Cross	1	Pair of Wire Dog Staples
			K	1.369	0.272	Cross	1	Pair of Wire Dog Staples
			L	2.182	0.324	Cross	1	Pair of Wire Dog Staples
T08A	1	4121	C	3.676	0.511	Cross	1	Pair of Wire Dog Staples
			L	1.478	0.154	Butt	1	JH 47x90
			B	0.411	0.490	Cross	1	Pair of Wire Dog Staples
			J	3.068	0.331	Cross	1	Pair of Wire Dog Staples
T08B	1	4121	C	3.674	0.822	Cross	1	Pair of Wire Dog Staples
			M	2.299	0.328	Butt	1	JH 47x90
			I	0.476	0.129	Cross	1	Pair of Wire Dog Staples
			B	0.438	0.490	Cross	1	Pair of Wire Dog Staples
			K	2.967	0.573	Cross	1	Pair of Wire Dog Staples
T09	1	3221	B	4.444	0.435	Cross	1	Pair of Wire Dog Staples
			L	2.313	0.081	Butt	1	JH 47x90
			G	0.639	0.094	Cross	1	Pair of Wire Dog Staples
			I	1.256	0.055	Cross	1	Pair of Wire Dog Staples
			K	1.713	0.101	Cross	1	Pair of Wire Dog Staples
T09A	1	3221	C	4.735	0.459	Cross	1	Pair of Wire Dog Staples
			K	2.414	0.084	Butt	1	JH 47x90
			B	0.403	0.207	Cross	1	Pair of Wire Dog Staples
			J	1.456	0.151	Cross	1	Pair of Wire Dog Staples
T10	1	3973	B	5.242	0.143	Cross	1	Pair of Wire Dog Staples
			F	5.242	0.143	Cross	1	Pair of Wire Dog Staples
T10A	1	3973	A	4.541	0.035	Cross	1	Pair of Wire Dog Staples
			E	4.541	0.035	Cross	1	Pair of Wire Dog Staples

Job: W6231 Client: Hallmark Plan A331 Site:
Phone:

Description: New Residence
Building Consent No.: Phone:

Truss	Qty	Span (mm)	Joint	Down (kN)	Uplift (kN)	Bearing	Fixing Qty	Fixing Selected
T11	1	3186	F	3.538	0.028	Butt	1	JH 47x90
			I	3.538	0.028	Butt	1	JH 47x90
T12	1	1593	D	1.718	0.187	Butt	1	JH 47x90
			E	2.989	0.000	Butt	1	JH 47x90
T13	2	3973	B	5.266	0.143	Cross	2	Pair of Wire Dog Staples
			F	5.266	0.143	Cross	2	Pair of Wire Dog Staples
T14	1	2321	A	2.179	0.000	Butt	1	JH 47x90
			E	2.486	0.293	Butt	1	JH 47x90
			D	0.840	0.000	Cross	1	Pair of Wire Dog Staples
T15	1	4121	C	3.134	0.366	Cross	1	Pair of Wire Dog Staples
			M	3.177	0.268	Butt	1	JH 47x90
			H	0.455	0.069	Cross	1	Pair of Wire Dog Staples
			B	0.343	0.480	Cross	1	Pair of Wire Dog Staples
			K	11.929	1.933	Cross	1	Pair of Wire Dog Staples
TG01	1D	6978	B	15.347	0.767	Cross	1	Pair of Wire Dog Staples
			Q	27.925	1.513	Cross	1	Pair of Wire Dog Staples
			R	0.005	6.615	Butt	1	Pair of MultiGrips
TG02	1	7767	C	5.040	0.451	Cross	1	Pair of Wire Dog Staples
			O	14.322	1.123	Cross	1	Pair of Wire Dog Staples
			T	5.831	0.366	Cross	1	Pair of Wire Dog Staples
			B	0.356	0.447	Cross	1	Pair of Wire Dog Staples
			N	2.946	0.100	Cross	1	Pair of Wire Dog Staples
			S	1.542	0.131	Cross	1	Pair of Wire Dog Staples
TG03	1	5021	A	9.882	0.699	Butt	1	Pair of MultiGrips
			I	10.145	1.731	Butt	1	Pair of MultiGrips
V01	1	1700	A			Wide		No fixing selected
V02	1	1248	A			Wide		No fixing selected
V03	1	3048	A			Wide		No fixing selected

Fixing List

Qty	Selected Fixing	Cost
104	Pair of Wire Dog Staples	35.36
38	JH 47x90	38.00
14	Pair of 3.15d Nails	1.40
4	Pair of MultiGrips	3.04
4	No fixing selected	
Total		77.80

Note:
1) Fixings have been selected based on loading only. Please check that selected fixings are practical for each situation and that appropriate nailing can be applied on site.
2) Truss with the strike through denotes failed to design.

PlaceMakers

New Zealand
Telephone:
Fax:

Name: Hallmark Plan A331
Address:

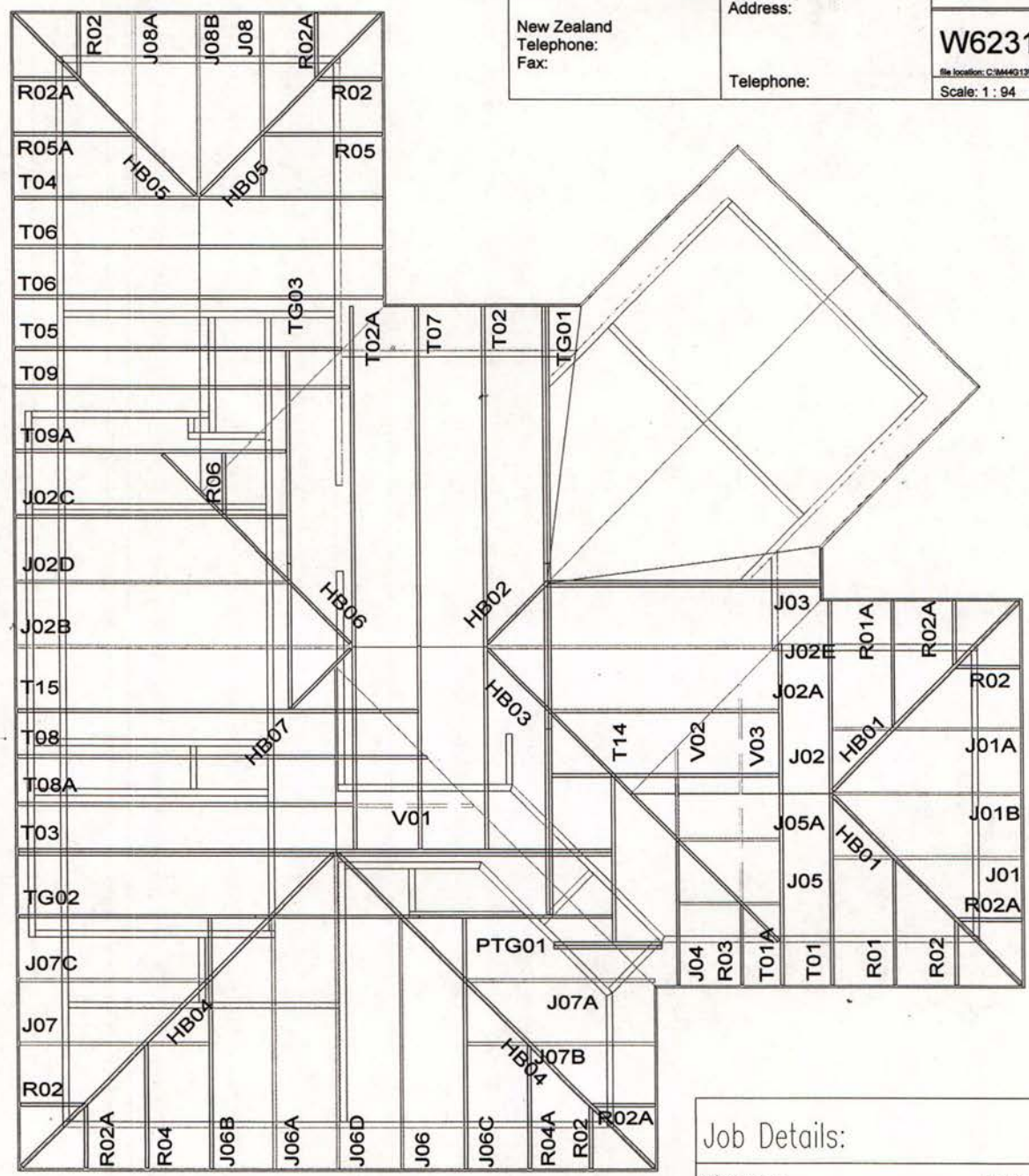
Telephone:

New Residence

W6231A

file location: C:\M44G13\JOBS\W6231A\

Scale: 1 : 94 | Date: 2/10/2006 | Drawn By: John C

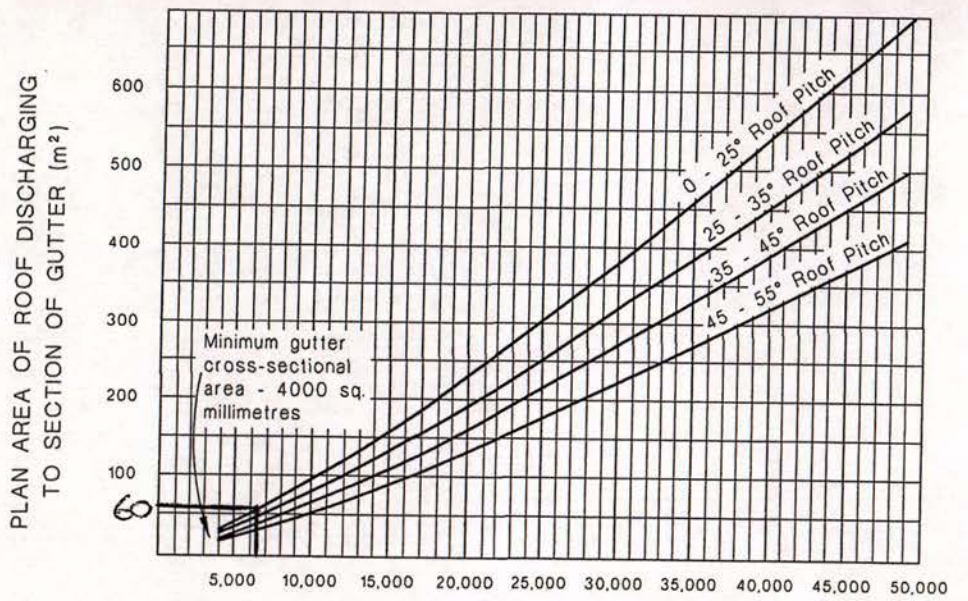


Job Details:

Wind Area:	Medium	Design Wind Speed:	37.0 m/s
TC Restraints:	600 mm	BC Restraints:	400 mm
Roof Material:	Heavy	Ceiling Material:	Standard
Roof Live Load:	0.250 kPa		
Roof Pitch:	34.000 deg	Truss Centres:	900 mm

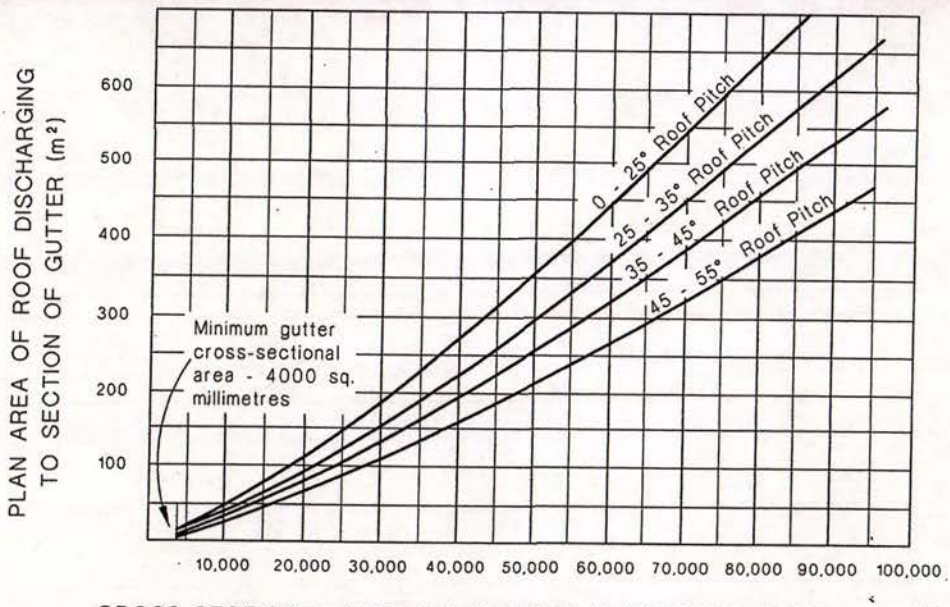
Quarter Round Profile

Figure 15: Cross-sectional Area of External Gutter
Paragraphs 5.1.2 and 5.1.3



Amend 1 Sep 1993

Figure 16: Cross-sectional Area of Internal Gutter
Paragraphs 5.1.2 and 5.1.3



Amend 1 Sep 1993

WHAKATANE DISTRICT COUNCIL
APPROVED FOR CONSTRUCTION
Building Control Office
Date 29-03-07

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Capacity of Spouting

SPOUTING PROFILE	cross section mm (sq)
125mm O/G	5800
1/4 Round	6300
150mm O/G	9000
Gutter Box	7500
1/2 Round	7700
THE TEXAN	20100

Capacity of Downpipes

DOWNPIPE SIZE	Maximum plan area of roof served by downpipe (m2)			
	0 - 25 degrees Roof pitch	26 - 35 degrees Roof pitch	36 - 45 degrees Roof pitch	46 - degre Roof pi
65mm Round	60	50	40	35
80mm Round	100	80	70	60
100mm Round	155	130	110	90
80 x 55 Rectangle	85	70	60	50

18/07/2043 18:14 0783918131 PAGE 02/03

Spouting
Downpipes
Fascia
Rainwater Heads
Colour Options
Capacity Calculations

Products → Capacity Calculations

Capacity of Spouting

SPOUTING PROFILE	cross section mm (sq)
125mm O/G	5800
1/4 Round	6300
150mm O/G	9000
Gutter Box	7500
1/2 Round	7700
THE TEXAN	20100

Capacity of Downpipes

Maximum plan area of roof served by downpipe (m2)

DOWNPIPE SIZE	degrees Roof pitch			
	0 - 25	26 - 35	36 - 45	46 - 55
65mm Round	60	50	40	35
80mm Round	100	80	70	60
100mm Round	155	130	110	90
80 x 55 Rectangle	85	70	60	50

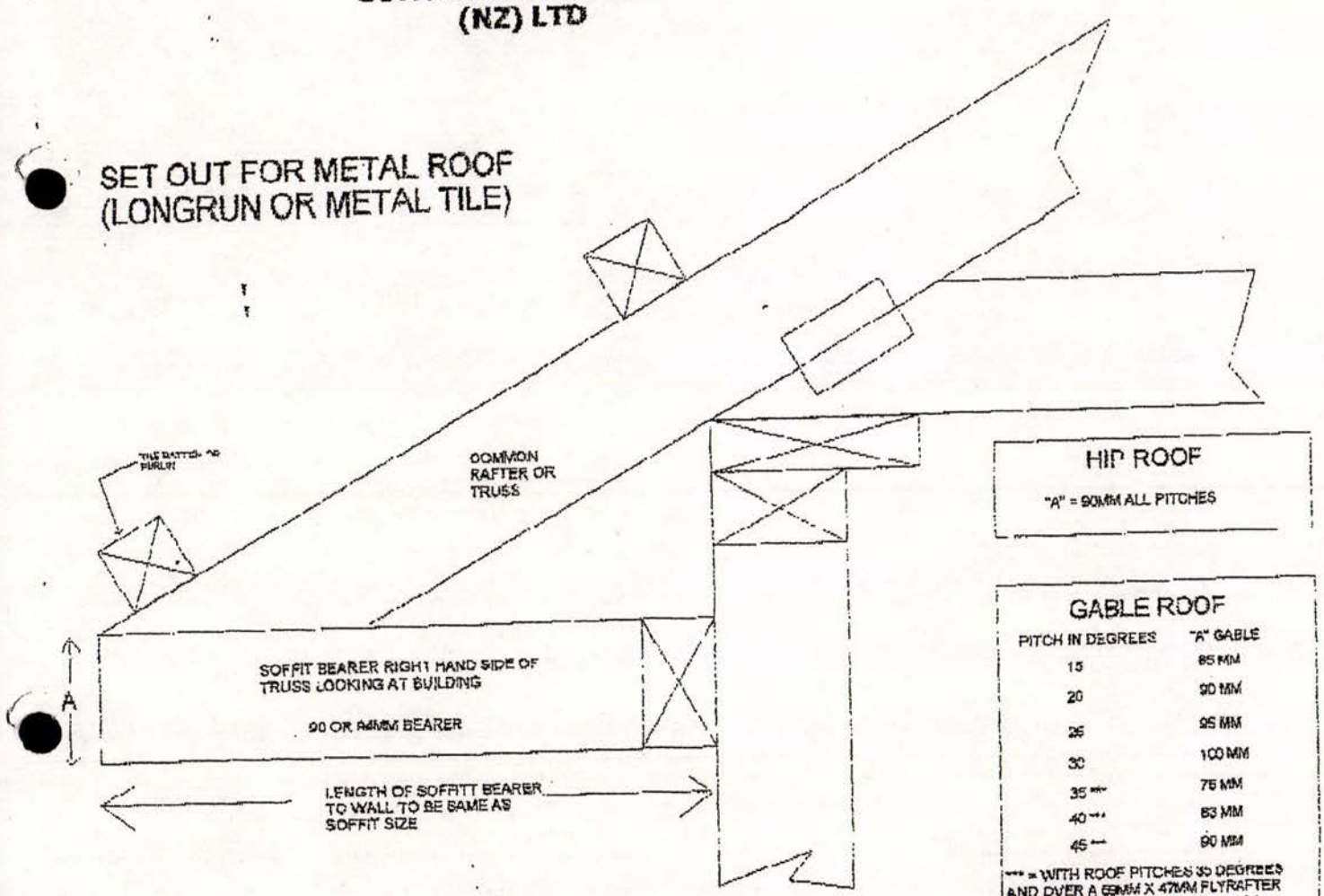
Scope of Use

Continuous Spouting systems are solely intended for the collection of water from the surface of the roof. They are not intended to support concentrated or distributed loads heavier than the spouting being full of water (e.g. snow build up). Product performance, life expectancy and warranty are dependent upon environment, maintenance and material selection. Ensure the correct product is chosen for the environment. Installation of Continuous Spouting spouting systems must comply with the following sections of the NZ Building Code E1 Surface Water 4.1.2, 4.2.1, 4.3.1, 5.1.1, 5.1.2, 5.1.3, 5.3.1, 5.4.1.

nother site by: thewebcompany

CONTINUOUS SPOUTING (NZ) LTD

SET OUT FOR METAL ROOF (LONGRUN OR METAL TILE)



HIP ROOF

"A" = 90MM ALL PITCHES

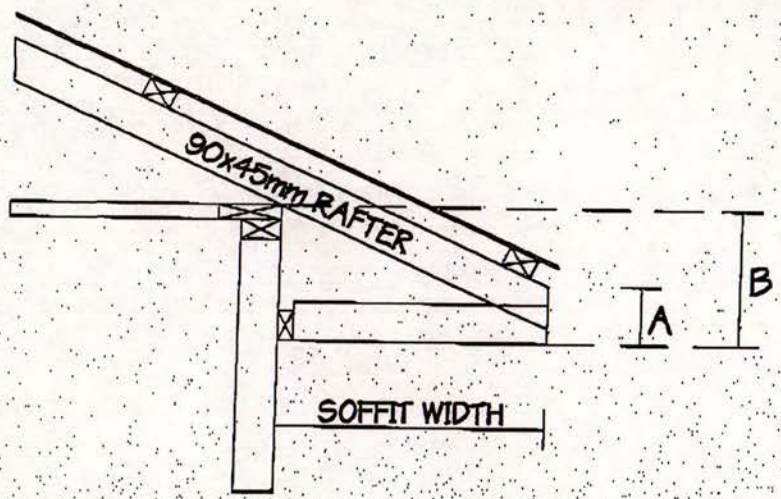
GABLE ROOF

PITCH IN DEGREES	"A" GABLE
15	85 MM
20	90 MM
25	95 MM
30	100 MM
35 ***	75 MM
40 ***	83 MM
45 ***	90 MM

*** = WITH ROOF PITCHES 35 DEGREES AND OVER A 69MM X 47MM FLYRAFTER TO BE USED RUNNING FLUSH WITH COMMON RAFTERS

Metalcraft
INDUSTRIES LIMITED

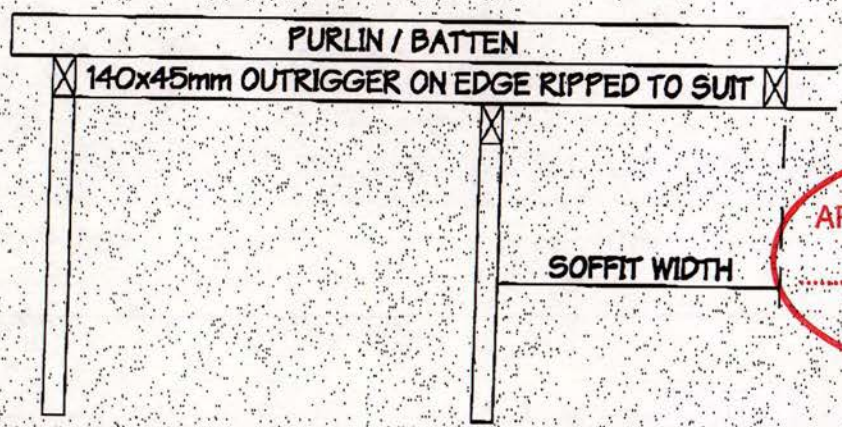
185mm ON GABLE & EAVE TO SUIT METAL ROOF



Eaves Detail

NOTES

- 50x50 batten required for metal tile.
- 70x45 purlin for longrun.



Gable End Detail

NOTES

- Gable flashing required.

WHAKATANE DISTRICT COUNCIL
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Building Control Office
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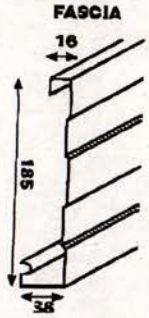
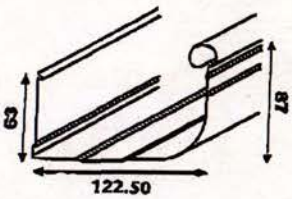
GENERAL NOTES

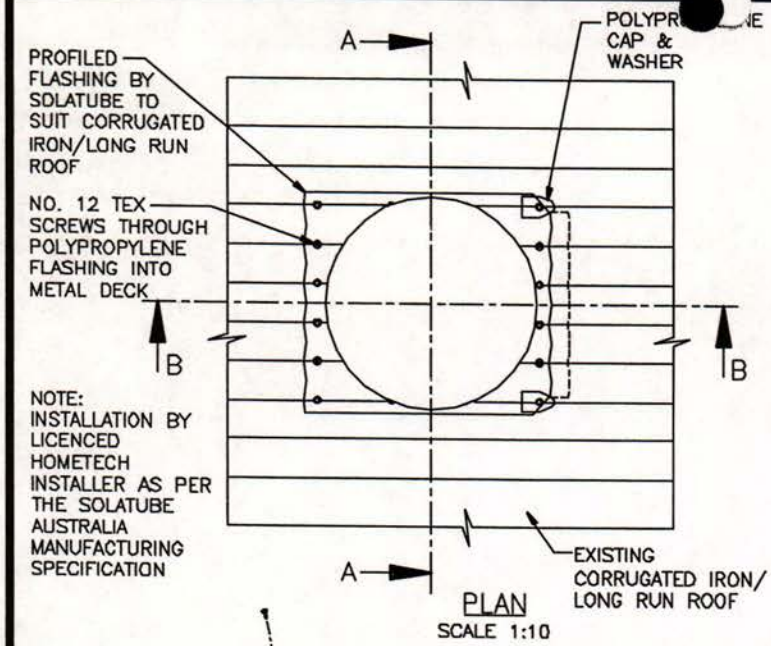
- Please inform your precutter which Metalcraft external fascia system you have selected.
- Prior to installation, scaffolding must be supplied by the customer to:
  - extend at least 500mm past external/gable corners
  - be approximately 1700mm below the rafter end in height
  - meet OSH-approved safety standards
- Metalcraft external rainwater products must be washed regularly to ensure maximum longevity. Areas that do not get regular washing by rain may require special attention.

PITCH	TOE CUT (A)	TOP CHORD DROP (C)	SOFFIT DROP (B)		
			450 O/H	600 O/H	750 O/H
10	127mm	125mm	115mm	141mm	168mm
12.5	128mm	125mm	135mm	169mm	202mm
15	129mm	125mm	156mm	197mm	237mm
17.5	131mm	125mm	179mm	226mm	273mm
20	133mm	125mm	201mm	256mm	310mm
22.5	135mm	125mm	224mm	286mm	348mm
25	138mm	125mm	249mm	318mm	388mm
27.5	141mm	125mm	274mm	352mm	430mm
30	144mm	125mm	300mm	386mm	473mm
32.5	133mm	115mm	313mm	409mm	504mm
35	140mm	115mm	345mm	450mm	555mm
37.5	139mm	110mm	371mm	486mm	601mm
40	144mm	110mm	404mm	530mm	656mm
42.5	149mm	110mm	439mm	577mm	714mm
45	156mm	110mm	479mm	629mm	778mm

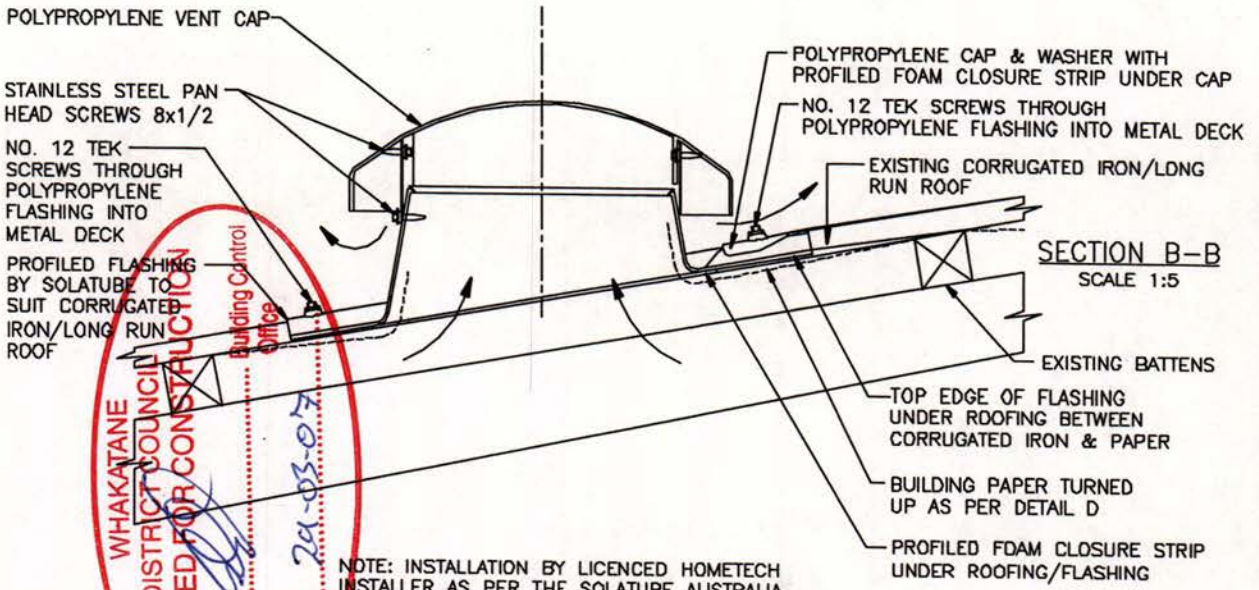




26 Trugood Drive, East Tamaki. PO Box 51286 Pakuranga.
Phone 09 273 2820, Fax 09 274 0251, Email info@metalcraft.net.nz
www.metalcraft.net.nz



PLAN
SCALE 1:10



SECTION B–B
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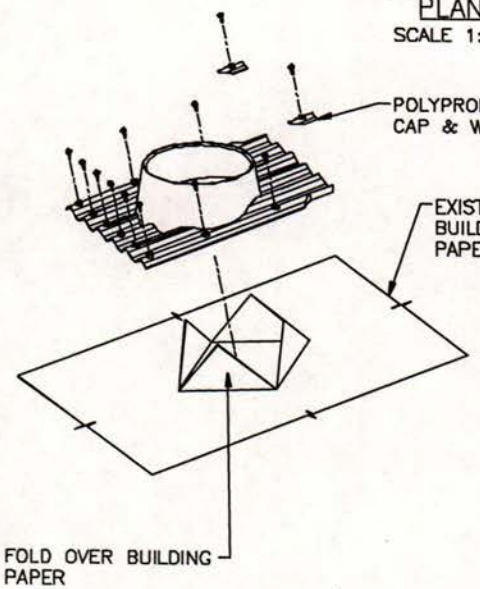
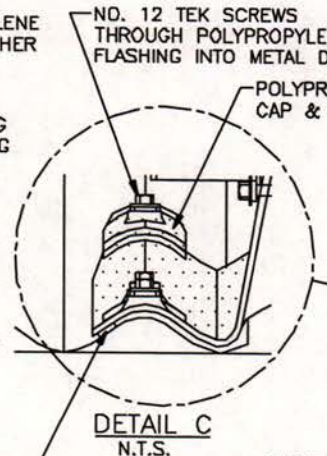
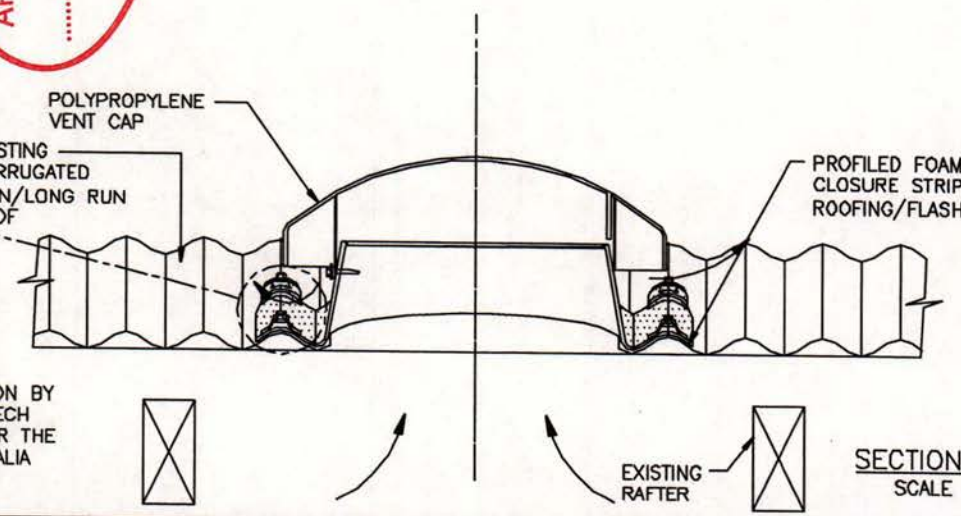


DETAIL D – 3D EXPLODED VIEW
N.T.S.



DETAIL C
N.T.S.



SECTION A–A
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VS2002 STATVENT 250ø PASSIVE VENTILATION INSTALLATION FOR CORRUGATED IRON/LONG RUN ROOF

INSTALLATION: INSTALLED BY A LICENCED HOMETECH INST ER AS PER THE TUBE AUSTRALIA MANUFACTURING SPECIFICATION

© HomeTech Ltd

DRAWN	PCR
DATE	20/10/05
APPROVED	PN
DATE	20/10/05

REVISION	C
SCALE	1:5,1:10,NTS
DWG NO.	VS2002–C

STEEL & TUBE
ROOFING PRODUCTS

Rib Profile
HIP JUNCTION

WHAKATANE
DISTRICT COUNCIL
APPROVED FOR CONSTRUCTION
..... Building Control Office
Date 29-03-07

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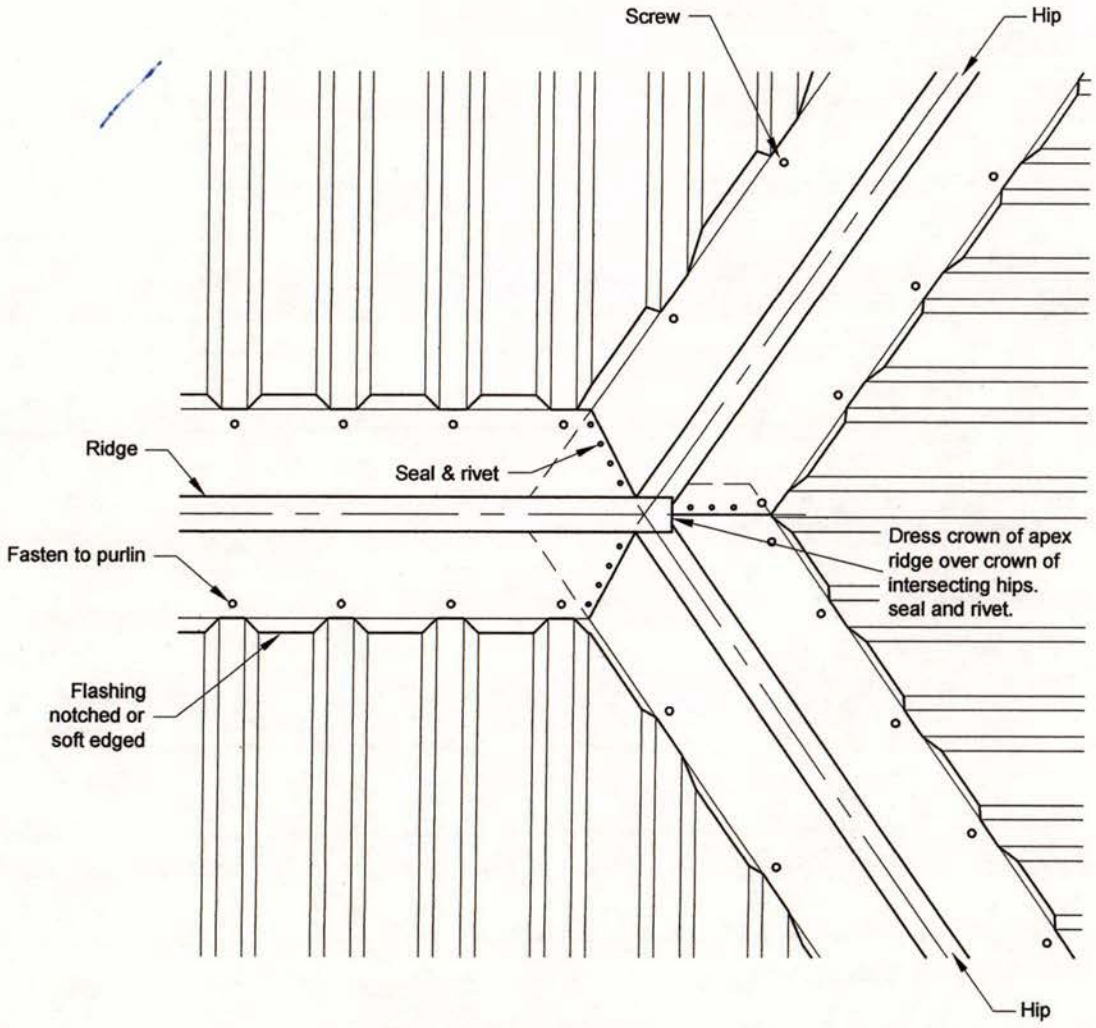
PLAN VIEW



Note:
Soft edged flashings to be colour matched prior to installation.

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STEEL & TUBE ROOFING PRODUCTS

Rib Profile
RIDGE CUT DETAIL

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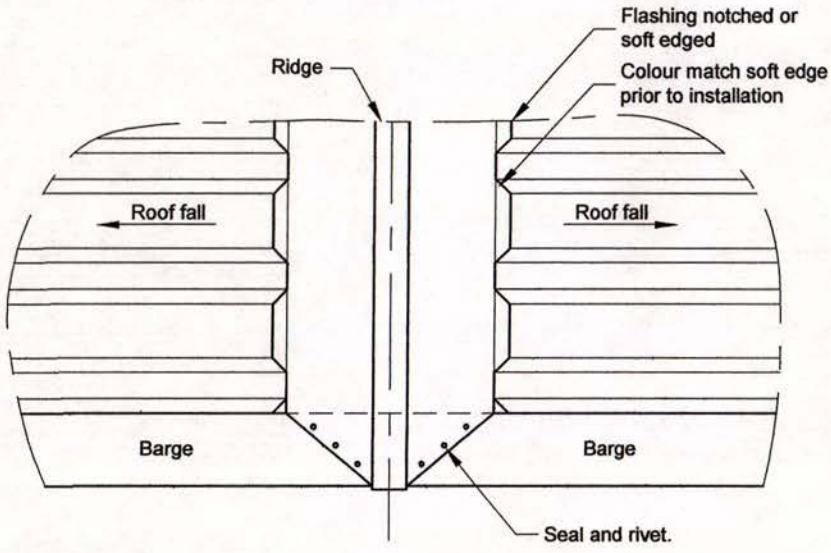
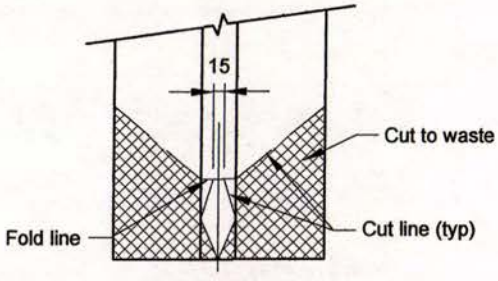
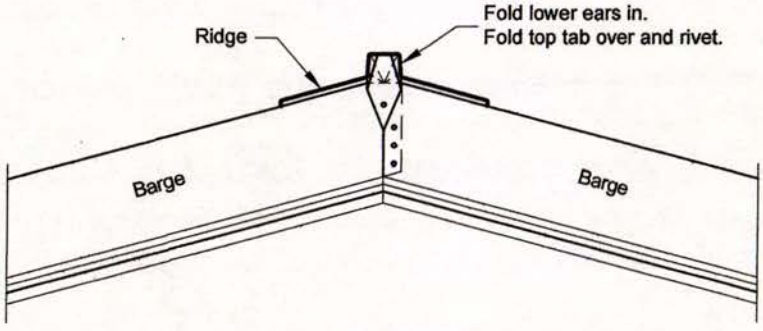
PLAN VIEW





DETAIL
RIDGE END CUT

END VIEW



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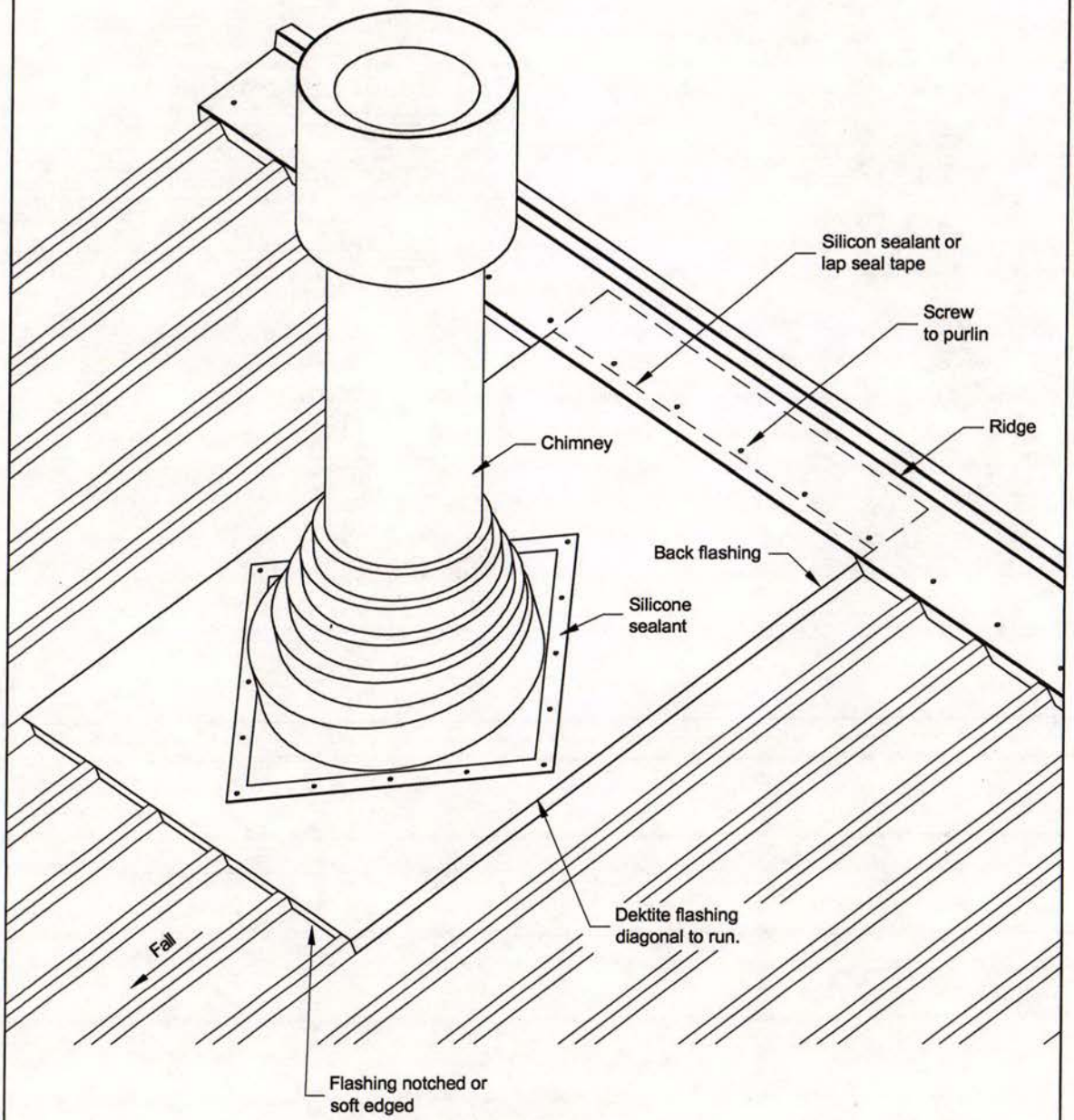
STEEL & TUBE ROOFING PRODUCTS

Rib Profile

CHIMNEY FLASHING - ROUND FLUE

SCALE: NTS



Note: Soft edged flashings to be colour matched prior to installation.

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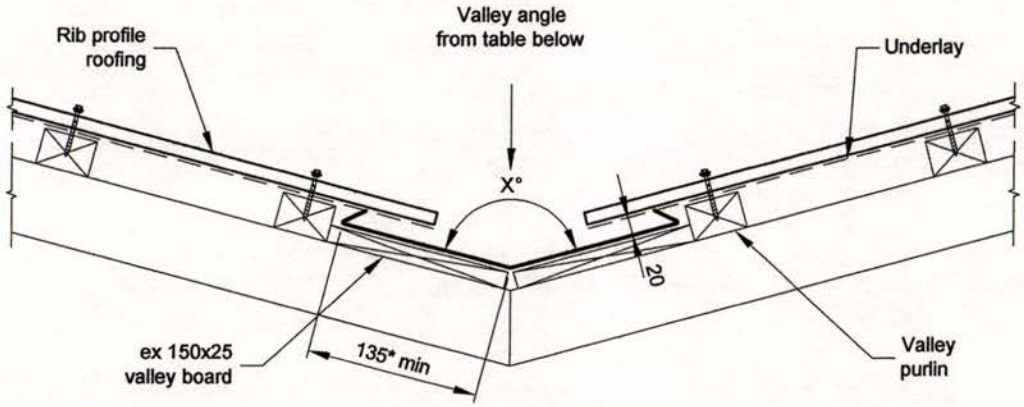
CAD File: RIBB-06
REV 2 : NOV' 2004

STEEL & TUBE ROOFING PRODUCTS

Rib Profile
VALLEY

SCALE: 1:10

CROSS SECTION



Valley Angle Table

Roof Pitch	5	10	15	20	25	30	35	45	60
Valley Angle X°	173	166	159	152	145	139	132	120	104

* Dimensions suitable for 25m² catchment at 12°. For larger catchments or lower pitches design as for internal gutter.

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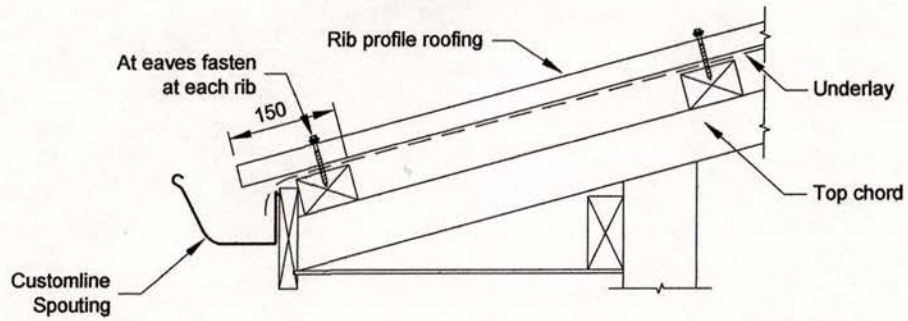
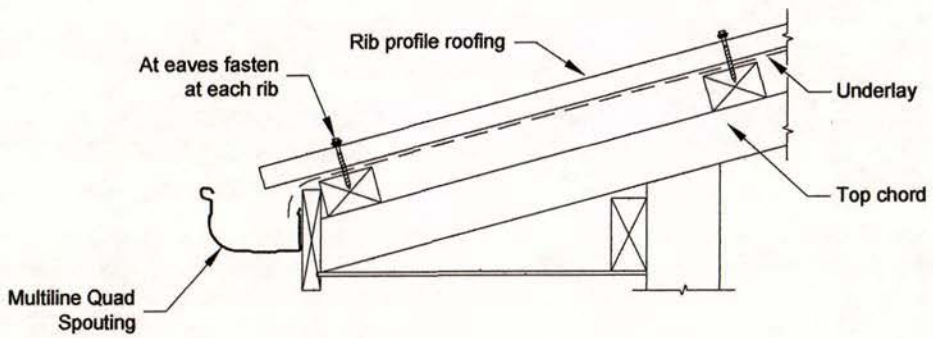
STEEL & TUBE ROOFING PRODUCTS

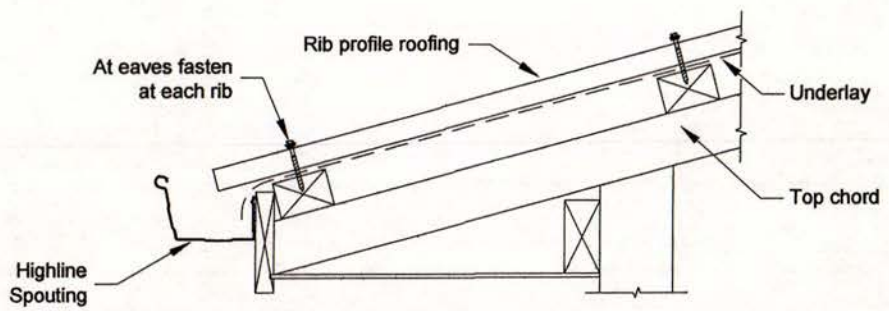
Rib Profile
EAVES GUTTER

SCALE: 1:10

CROSS SECTION







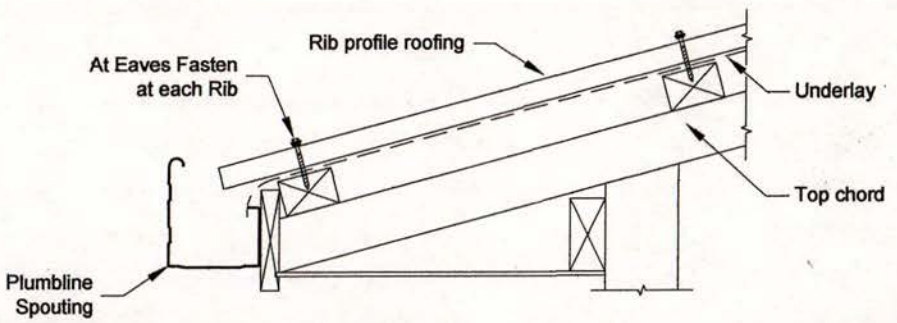


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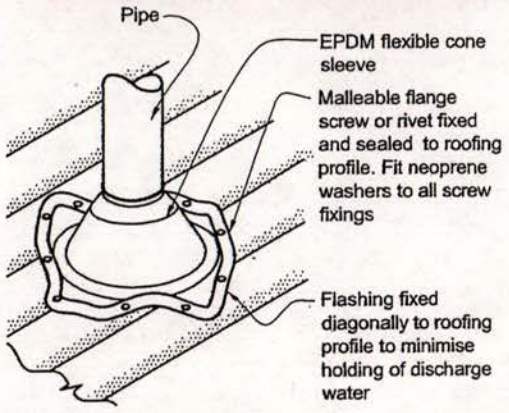
Figure 53: Flashing for small pipes
Paragraphs 8.3.10, 8.4.17 a), 9.6.8.5 and 9.6.9.6

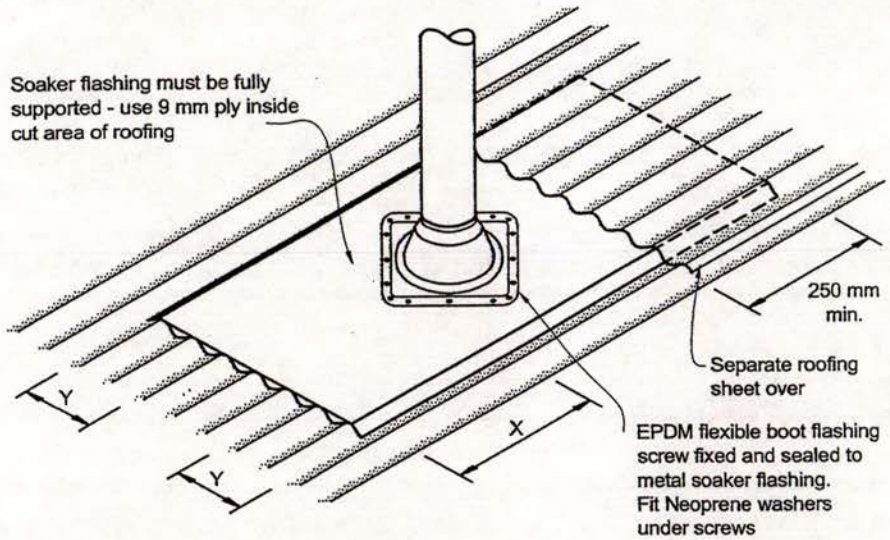


NOTE:
(1) Max. roof pitch for this flashing 45°, minimum pitch 10°.
(2) For pipes up to 60 mm diameter.

Figure 54: Soaker flashing for pipe penetrations
Paragraphs 8.3.10 and 8.4.17 b)

NOTE: (1) X = variable according to *wind zone* – refer Table 7.
(2) Y = to cover minimum of two crests – refer Table 7.
(3) Suitable for pipes from 60 mm to 500 mm diameter.
(4) Suitable only for roof pitches of 10° or higher.

Amend 2 Jul 2005



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8.4 Profiled Metal Roof Cladding

8.4.1 Limitations

This Acceptable Solution is limited to the following types of profiled metal roof *cladding*:

a) Profiled as outlined in Paragraph 8.4.4,

b) Without *valley gutters* that change direction in plan form,

c) Not curved, and

COMMENT:

Amend 2 Jul 2005

If curved profiled metal sheet is used, the radius of the curve may affect *durability*. *Specific design* is required, and manufacturers and the New Zealand Metal Roof and Wall Cladding Code of Practice should be consulted for recommendations.

d) With sheets no more than 18 metres long.

8.4.2 General

Amend 2 Jul 2005

COMMENT:

Amend 2 Jul 2005

It is recommended that the installation of profiled metal roof *cladding* be by trained installers, approved by the manufacturer or the NZ agent (in the case of imported *cladding*).

8.4.3 Materials

8.4.3.1 Choice of metal

Metal roof *cladding* shall be selected according to the exposure conditions as defined in:

Amend 2 Jul 2005

a) NZS 3604 Clause 4.2, or

b) AS/NZS 2728.

The metal *cladding*, *flashings* and fixings shall be selected from Table 20 according to the *durability* required for the specific application.

COMMENT:

The exposure zone in which a *building* is located can affect the *durability* of metal roof *cladding*.

AS/NZS 2728 lists atmospheric classes derived from ISO 9223 for Australia and New Zealand. Exposure zones are defined in Clause 4.2 of NZS 3604, based on the likely exposure to wind-driven sea-salt or geothermal gases.

8.4.3.2 Steel

Materials for the manufacture of profiled steel roof *cladding* shall:

Amend 2 Jul 2005

a) Have *base metal thickness (BMT)* of 0.4 mm minimum,

b) Be grade G550 minimum for 0.4 mm BMT steel and G300 minimum for 0.55 mm BMT steel,

(Note: Tables 11 to 13 have limited grade requirements for given roofing spans)

Amend 2 Jul 2005

c) Have a minimum protective metal coating of:
   i) Aluminium-zinc AZ150 to AS 1397, or
   ii) Zinc Z450 to AS 1397, or
   iii) Zinc ZM275 with a factory-applied finish, and

Amend 2 Jul 2005

d) Where required for additional *durability*, a factory-applied finish shall comply with AS/NZS 2728.

Amend 2 Jul 2005

COMMENT:

While galvanized metal roofing may be left unpainted in some environments, this may shorten its life, especially in areas where it is not washed naturally by the rain.

8.4.3.3 Aluminium

Aluminium for the manufacture of profiled aluminium roofing shall comply with AS/NZS 1734, and be a minimum:

a) *Base metal thickness (BMT)* of 0.7 mm,

b) 5000 series.

Pre-painted aluminium *flashings* shall have a factory-applied finish complying with AS/NZS 2728.

Amend 2 Jul 2005

COMMENT:

A deterioration in the appearance of the coating of the metal does not necessarily relate to a deterioration in the *weathertightness* of the roof *cladding*.

8.4.4 Profiles

Profiles covered in this Acceptable Solution are shown in Figure 38, and consist of:

Amend 2 Jul 2005

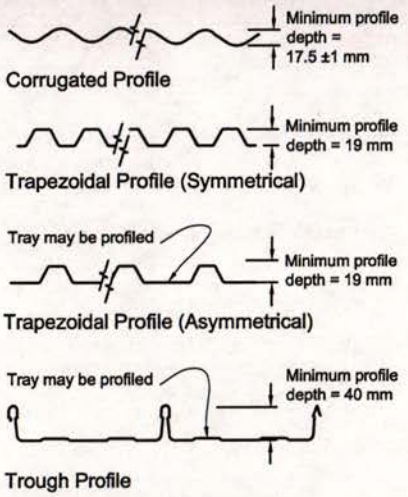
a) **Corrugated** – curved with a crest height of 17.5 ±1 mm,

b) ***Trapezoidal*** – symmetrical or asymmetrical, with a minimum crest height of 19 mm, and

c) ***Trough profile*** – with vertical ribs at a minimum height of 40 mm, and flat, or lightly profiled, pans between the ribs.

Figure 38: Profiled metal profiles
Paragraphs 8.4.4, 9.6.1 and 9.6.5, Table 3

Amend 2 Jul 2005



NOTE: Tables 11 to 13 have limited profile requirements for given roofing spans.

8.4.5 Roof pitch

Amend 2 Jul 2005

For roofs up to 18 metres in length, pitches shall be:

a) Corrugated – not less than 10° (1:6), or 8° (1:7) if no end laps are present.

b) *Trapezoidal* – not less than:
   i) 4° (1:14) where the crest height is less than 27 mm, or
   ii) 3° (1:20) where the crest height is 27 mm or higher.

c) *Trough profile* – not less than 3° (1:20).

COMMENT:
For roofs over 18 metres in length refer to the manufacturer for minimum pitch requirements. Where manufacturers have more stringent requirements, these should be followed to optimise performance and to avoid invalidating guarantees.

Amend 2 Jul 2005

8.4.6 Structure

The maximum span of profiled metal roof *cladding* between *purlins* to comply with this Acceptable Solution is given in Table 11, Table 12 or Table 13. Spans shown are for steel with BMT, grade and profile as specified in each Table.

Amend 2 Jul 2005

COMMENT:
For *purlin* sizes, spacing and fixing, refer to NZS 3604.

Amend 2 Jul 2005

Additional support will be required around roof-mounted services such as air-conditioning in order to avoid roof distortion.

Refer to manufacturer's recommendations for spans of roof *cladding* with profiles, BMTs, grades or spans other than those shown in Tables 11 to 13.

Amend 2 Jul 2005

Table 11: Corrugated profile roofing – maximum spans[1] for limited access roof[2] with profile height of 17-50 mm
Paragraph 8.4.6

Metal	BMT mm	Building wind zone[3]					
		Low + medium		High		Very high	
		Maximum span of roof cladding mm					
		End	Internal	End	Internal	End	Internal
Steel	0.4	700	1200	700	1100	650	900
Steel	0.55	950	1600	950	1450	900	1200

NOTES: Spans are for minimum G550 steel.

1 Spans are measured between centre lines of support
2 Roof access is limited to an occasional maintenance load of not more than 110 kg
3 *Wind zones* are as per NZS 3604: 1999
4 Every sheet of roof *cladding* shall span at least three supports and shall have end and internal spans as shown in this table
5 Spans assume there is a lined ceiling sealed off from internal spaces and the *building* has boxed *eaves* with soffit

Amend 2 Jul 2005

COMMENT:

Amend 2 Jul 2005

Reduced cover for barge and *apron flashings* may be applicable for specifically designed roofs in low *wind zones*. For further information refer to the New Zealand Metal Roof and Wall Cladding Code of Practice.

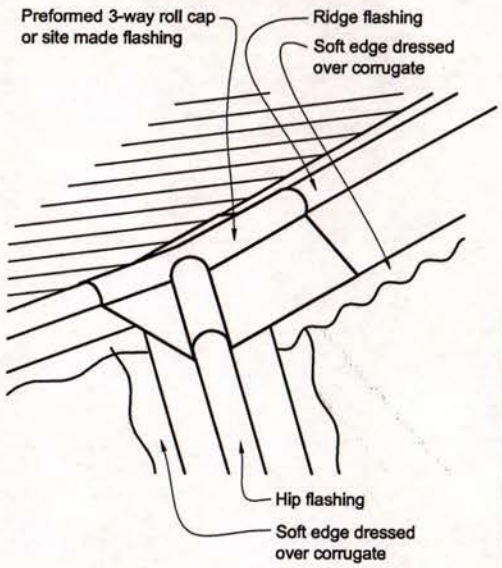
Figure 43: Corrugated – ridge to hip
Paragraphs 8.4.11 a) and 8.4.12 a)

Amend 2 Jul 2005

NOTE: *Flashing* cover varies according to *wind zone* – refer Table 7.

For other ridge to hip flashings refer to New Zealand Metal Roof and Wall Cladding Code of Practice.

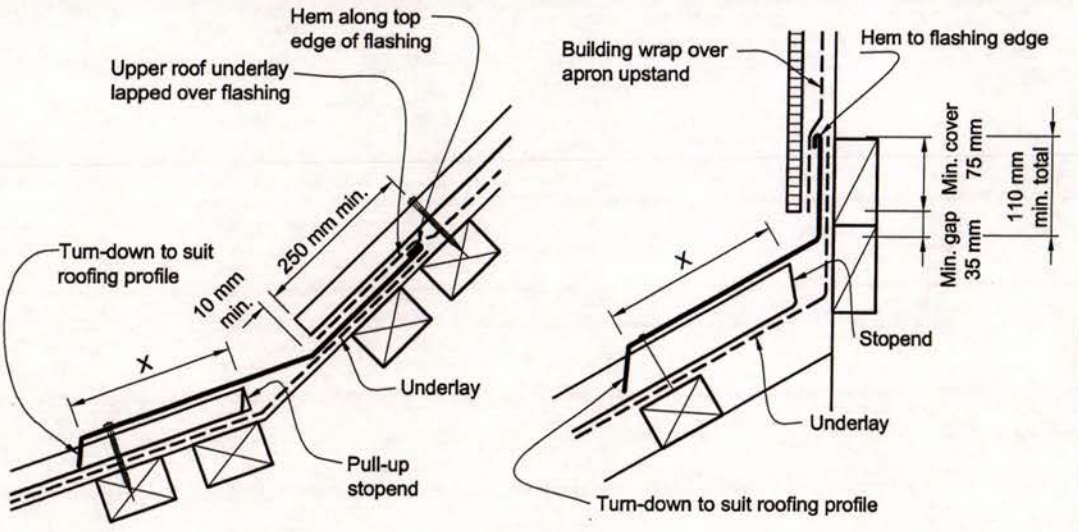
Amend 2 Jul 2005



Amend 2 Jul 2005

Figure 44: Apron flashing and change in pitch for profiled metal
Paragraphs 4.6.1.3, 8.4.11 and 8.4.12 b)

NOTE: X = variable according to *wind zone* – refer Table 7.



(a) CHANGE IN PITCH **(b) APRON FLASHING**

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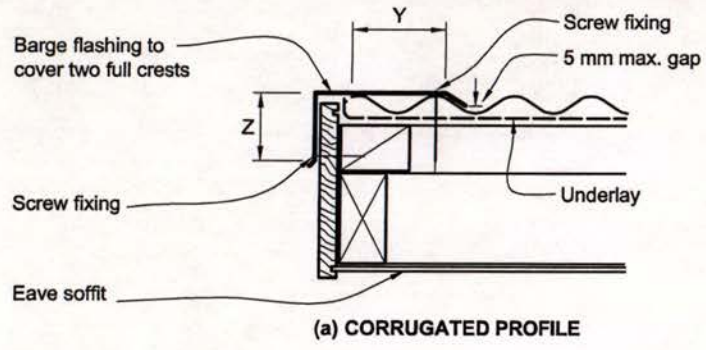
Figure 47: Barge flashings for profiled metal
Paragraphs 4.6.1.5 and 8.4.12 e)

NOTE: (1) Y = variable according to *wind zone* – refer Table 7.
(2) Z = variable according to *wind zone* – refer Table 7.



(a) CORRUGATED PROFILE

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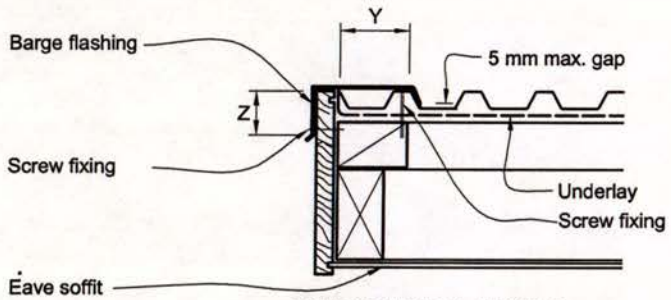

(b) TRAPEZOIDAL PROFILE

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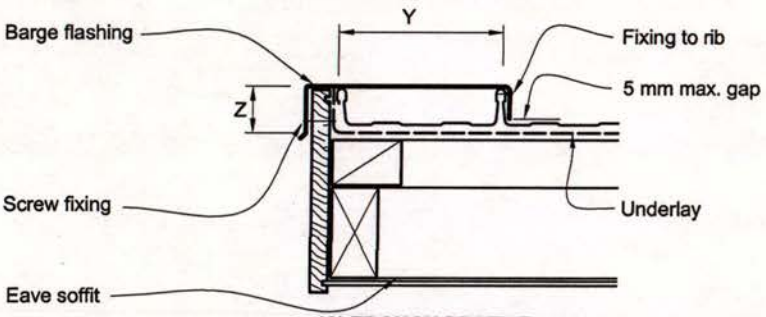


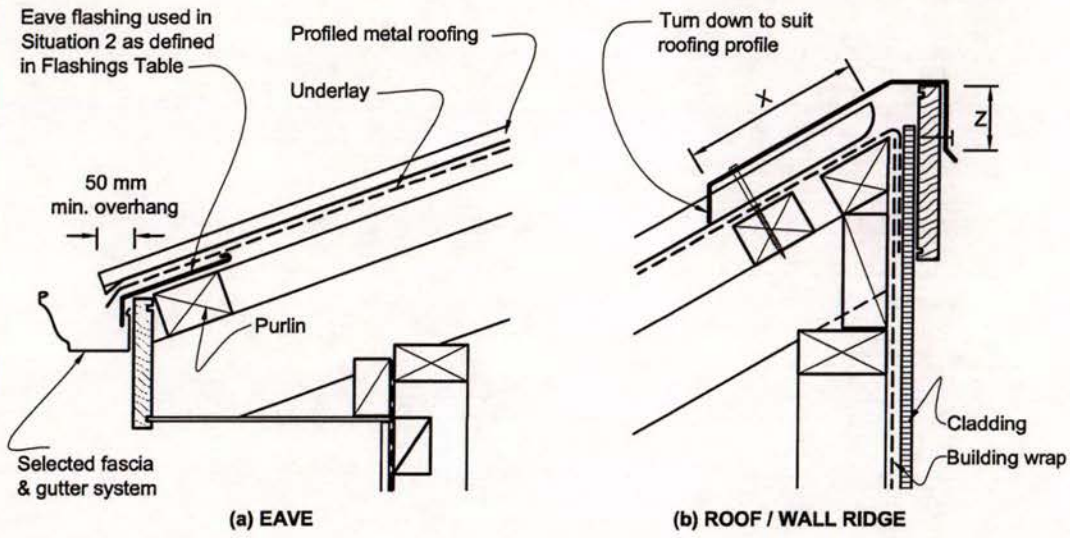
(C) TROUGH PROFILE

Amend 2 Jul 2005

Amend 2 Jul 2005

Figure 45: Eaves and roof/wall ridge for profiled metal
Paragraphs 8.4.11 and 8.4.12 c)

NOTE: (1) Situation 2 – *Flashings* table – refer Table 7.
(2) X = variable according to *wind zone* – refer Table 7.
(3) Z = variable according to *wind zone* – refer Table 7.

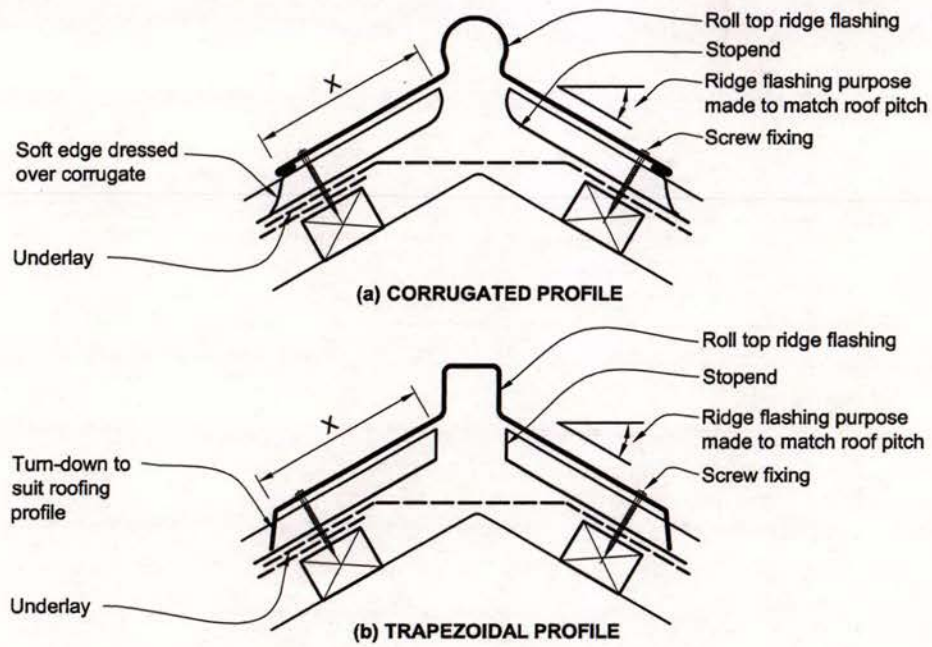


Amend 2 Jul 2005

Amend 2 Jul 2005

Figure 46: Ridge and hip flashings for profiled metal
Paragraphs 4.6.1.2, 8.4.11 and 8.4.12 d)

NOTE: X = variable according to *wind zone* – refer Table 7.



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8.4.13 Stopends

The top ends of profiled metal roof *cladding* shall have *stopends* as shown in Figure 49.

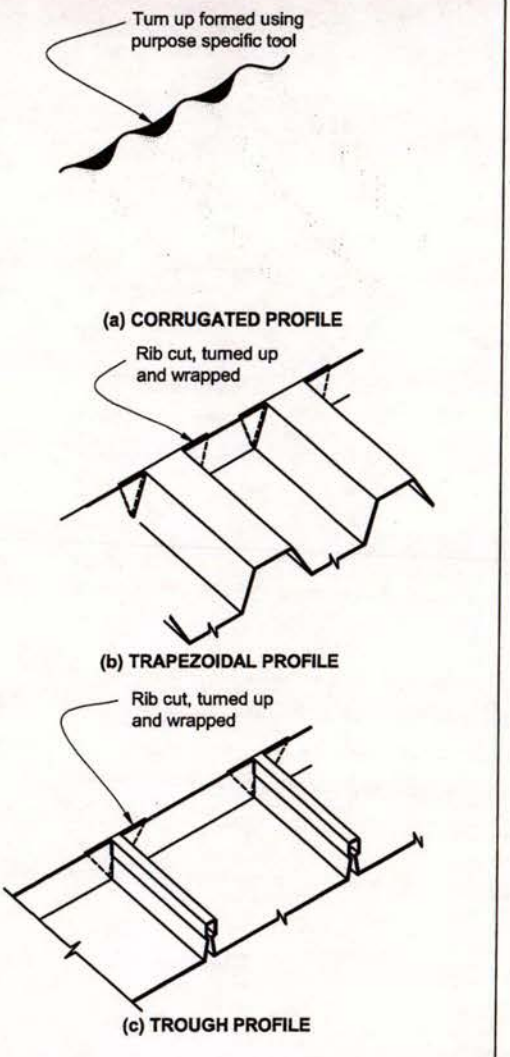
Folded *stopends*, as shown in Figure 49, shall be provided for *trapezoidal* and *trough profile* metal roof *cladding*, where:

a) The roof pitch is less than 25°, or

b) The *building* is in a high/very high *wind zone*.

For other situations, *stopends* shall be provided by pulling up the *cladding* to the maximum allowable, without tearing the metal.

Figure 49: Profiled metal stopends
Paragraph 8.4.13, Figure 7



8.4.14 Turn-downs at gutters

The ends of *trapezoidal* and *trough profile* roofing shall be turned down at gutters, where the roof pitch is less than 10°.

The turn-down shall be 30° from the plane of the sheet.

COMMENT:
Specific tools are available and should be used to turn up or turn down ends. Care should be taken to ensure the sheet does not split.

Refer to the New Zealand Metal Roof and Wall Cladding Code of Practice for guidance on methods. | Amend 2 Jul 2005

8.4.15 Profile closure

Crests of *trapezoidal* metal roof *cladding* shall be closed at the *eaves* with a fixing through the centre of each crest.

COMMENT:
Refer to the New Zealand Metal Roof and Wall Cladding Code of Practice for guidance.

Preformed compressible seals shall not be used at the *eaves*.

8.4.16 Internal, valley and hidden gutters

Internal, *valley* and *hidden gutters* shall be in accordance with Paragraph 8.1.6.1.

8.4.16.1 Hidden gutters

Parallel *hidden gutters* shall be as shown in Figure 50. | Amend 2 Jul 2005

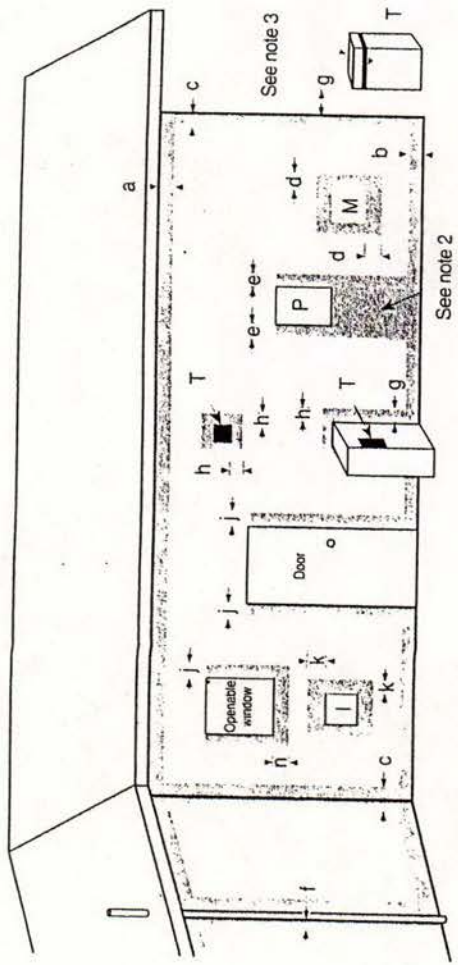
8.4.16.2 Valley gutters

Valley gutters shall be in accordance with Paragraphs 8.1.6.1 and 8.1.6.2. Sizes in relation to catchment areas shall be as shown in Table 8, and gutters shall be formed as shown in Figure 51. | Amend 2 Jul 2005

COMMENT:
Refer to the New Zealand Metal Roof and Wall Cladding Code of Practice for additional guidance on sizing, materials and fixing.

8.4.16.3 Internal gutters

Internal gutters shall be in accordance with Paragraph 8.1.6.3, and shall be as shown in Figure 52.



T = Flue terminal M = Gas meter
I = Mechanical air inlet P = Electricity meter or fuse box

Shading indicates prohibited areas for flue terminals

NOTE – For clearances and notes see table 16 on next page.

Figure 3 – Minimum clearances required for balanced flue terminals, fan-assisted flue terminals, room-sealed gas appliance terminals or the terminals of outdoor gas appliances

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Table 16 – Minimum clearances required for flue terminals shown in figure 3

Ref.	Item	Minimum clearances (mm)	
		Natural draught	Fan assisted
a	Below eaves, balconies and other projections:		
	Gas appliances up to 50 MJ/h input	300	200
	Gas appliances over 50 MJ/h input	500	300
b	From the ground, above a balcony or other surface (see Note 6)	300	300
c	From a return wall or external corner (see Note 6)	500	300
d	From a gas meter (M) (see 2.5.4.9 for vent terminal location of regulator)	1000	1000
e	From an electricity meter or fuse box (P)	500	500
f	From a drain pipe or soil pipe	150	75
g	Horizontally from any building structure (see Note 6) or obstruction facing a terminal	500	500
h	From any other flue terminal, cowl, or combustion air intake (see Note 6)	500	300
j	Horizontally from an openable window, door, non-mechanical air inlet, or any other opening into a building with the exception of sub-floor ventilation:		
	Gas appliances up to 150 MJ/h input	500	300
	Gas appliances over 150 MJ/h input up to 200 MJ/h input	1500	500
	Gas appliances over 200 MJ/h input	1500	1500
	All fan-assisted flue gas appliances, in the direction of discharge		1500
k	From a mechanical air inlet, including a spa blower	1500	1000
n	Vertically below an openable window, non-mechanical air inlet, or any other opening into a building with the exception of sub-floor ventilation:		
	Space heaters up to 50 MJ/h input	150	150
	Other gas appliances up to 50 MJ/h input	500	500
	Gas appliances over 50 MJ/h input and up to 150 MJ/h input	1000	1000
	Gas appliances over 150 MJ/h input	1500	1500

NOTE –

(1) All distances are measured to the nearest part of the flue terminal.
(2) Prohibited area below electricity meter or fuse box extends to ground level.
(3) See 2.6.13.3 for restrictions on a flue terminal under a covered area.
(4) See Appendix G LPG Cylinder Locations, figure G2 and figure G3, for clearances required from a flue terminal to an LPG cylinder. A flue terminal is considered to be a source of ignition.
(5) For gas appliances not addressed above, the design shall be certified by a suitably qualified engineer.
(6) Some gas appliances may be suitable for closer installation; refer to the manufacturer's instructions.

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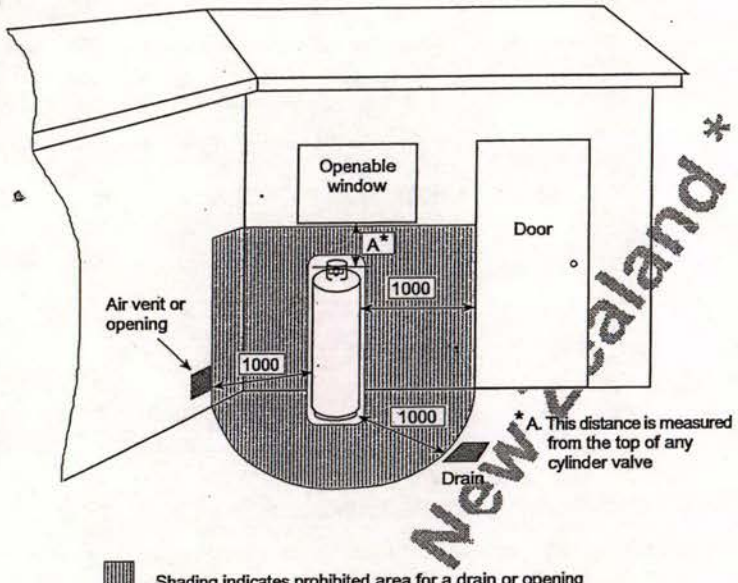

	Exchange cylinder (mm)	*In-situ* fill cylinder (mm)
A	150	500

Figure G3 – Minimum clearance to a drain or openings into a building

G5 Cylinder safety valve discharge

The discharge point of the cylinder safety valve should be directed away from any other cylinder, piping, building, drain and any opening into or under a building.

G6 Cylinder regulators

Cylinder regulators are required to have an overseas approval acceptable to the relevant regulatory authority.

Cylinder regulators should be located outside buildings, except where an indoor location is permitted by AS/NZS 1596.

Cylinder regulators should be:

(a) Rigidly fixed to an adequate support independent of the cylinder and mounted with the diaphragm vertical and the vent pointing vertically downwards;

(b) Connected to the cylinder by pipework in accordance with G3.3; and

(c) Protected from the entry and accumulation of water (e.g. sprinkler water, rain water etc.) and other foreign matter.

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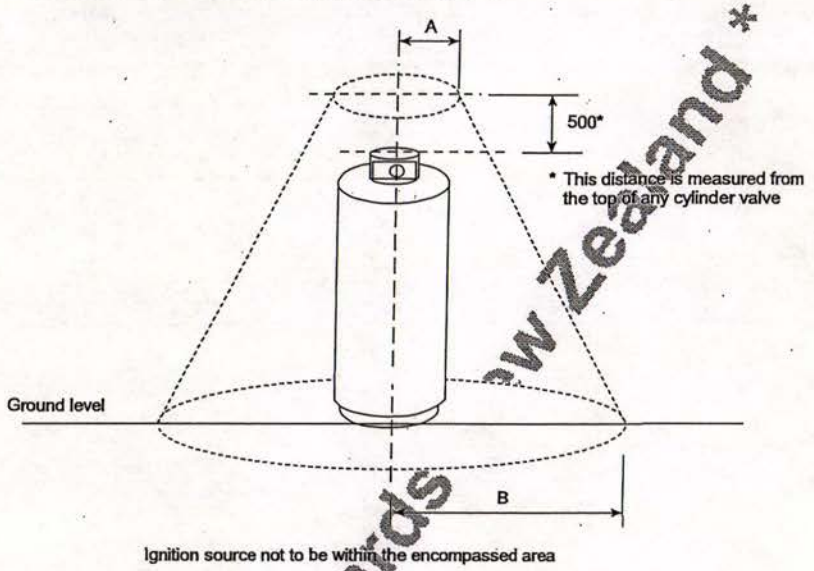
G4 Clearances around cylinders

Cylinders should be installed with clearances complying with figure G2 and figure G3 and at least 1 metre from readily ignitable material.



	Exchange cylinder (mm)	*In-situ* fill cylinder (mm)
A	500	1500
B	1500	3500

Figure G2 – Minimum clearance to ignition sources

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RINNAI INFINITY XR SINGLE UNIT SPECIFICATIONS

INFINITY MODEL		XR16i	XR16	XR18	XR20	XR20 plus	XR24	XR26i	XR26	XR26 plus	XR32
Mounting		Internal	External	External	External	External	External	Internal	External	External	External
Hot Water Capacity	(lt/min)	2.4-16	2.4-20	2.4-18	2.4-24	2.4-24	2.4-26	2.4-32	2.4-30	2.4-30	2.4-37
	(lt/hr)	960	1200	1080	1440	1440	1560	1920	1800	1800	2220
Nominal Hot water Capacity*	(lt/min)	16	16	18	20	20	24	26	26	26	32
Height	(mm)	538	530	530	530	500	530	600	530	500	600
Width	(mm)	350	350	350	350	355	350	350	350	355	470
Depth	(mm)	170	170	170	170	180	170	224	170	180	220
Input (max)	(MJ/h)	125	125	140	160	160	188	195	199	199	250
	(kW)	35	35	39	44	44	52	54	55	55	69
Water Pressure	(kPa)	100	120	100	160	160	180	180	190	190	140
Gas Type		Natural Gas or LPG									
Controllers		Maximum of 4 controllers, incorporating a maximum of 3 Deluxe controllers + 1 standard controller. XR16i only - Maximum of 3 Compact controllers. (Not suitable for Deluxe controllers)									

*Raised 25°C

This information is not intended as an installation guide. Please consult product specification material. Specifications may change without notice.

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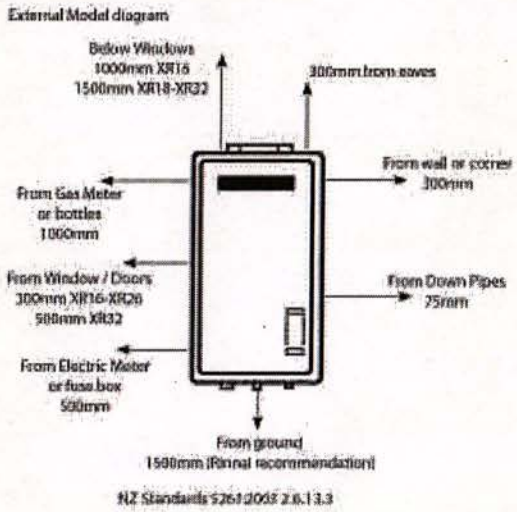
..... Building Officer

Date 29-03-07

How Rinnai Infinity Works
How Rinnai Infinity Compares
Which Infinity Is Right For You
Internal Models
External Models
Heavier Demand
Digital Controllers
Rinnai Infinity Accessories
Infinity Boosted Solar Hot Water

Installation Clearances



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Rinnai Infinity XR18 External

- Apartment or 1 bathroom home
- 2.4 to 18 litres per min
- Height 530mm
- Width 350mm
- Depth 170mm
- Input 140 Mj/hr or 39kW (max)
- Water pressure 100 kPa (min)
- Water temperature range 37-55° when fitted with controllers.

View specification

Rinnai Infinity XR16 Exte

- Suitable for two or more bat
- Hot water capacity 2.4 to 2C
- Height 530mm
- Width 350mm
- Depth 170mm
- Input (max) 125Mj/hr 35kW
- Water pressure 120 kPa (mi
- Water temperature range 37 with controllers.

View specification

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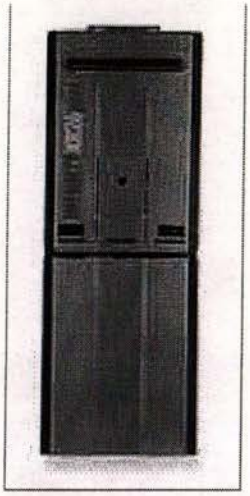
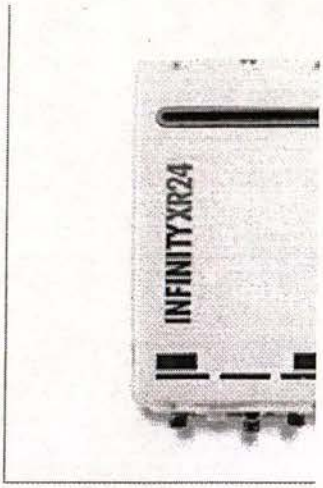


Rinnai Infinity XR26 Plus External

- The flangeless case design and pipe cover gives the unit a more modern look for those concerned with aesthetics.
- Suitable for 2+ bathroom homes/couples or family with medium level simultaneous hot water demands
- Hot water capacity 2.7-26lt/min
- Height 500mm
- Width 355mm
- Depth 180mm
- Input (max) 199 Mj/hr 55kW input
- Water pressure 190 kPa (min)
- Water temperature range 37-55°C when fitted with controllers.

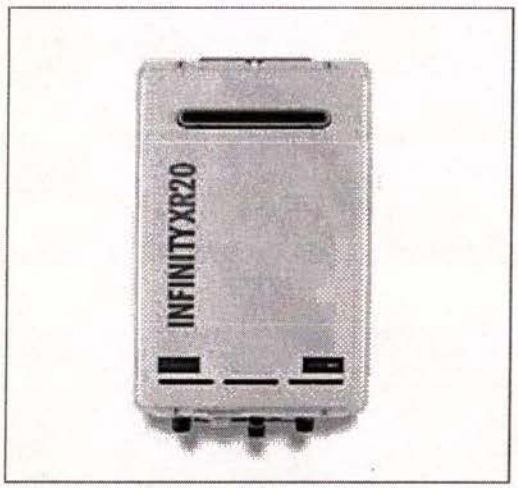
View specification



Rinnai Infinity XR24 Exte

- Suitable for up to two bathr
- Hot water capacity 2.4-26lt/
- Height 530mm
- Width 350mm
- Depth 170mm
- Input (max) 188 Mj/hr 52kV
- Water pressure 180 kPa (mi
- Water temperature range 3
  with controllers.

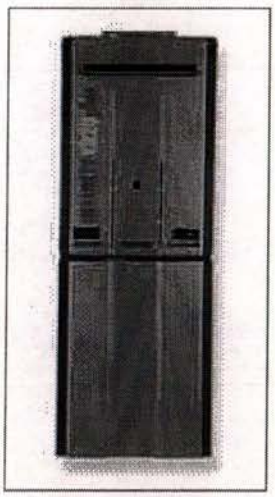
View specification



Rinnai Infinity XR20 External

- Suitable for 2 bathroom homes/single people or couple with medium level simultaneous hot water demands
- Hot water capacity 2.4-24lt/min
- Height 530mm
- Width 350mm
- Depth 170mm
- Input (max) 160 Mj/hr 44 kW input
- Water pressure 160 kPa (min)
- Water temperature range 37-55°C when fitted with controllers.

View specification



Rinnai Infinity XR20 Plus

- Flangeless case design and
  the unit a more modern loo
  concerned with aesthetics.
- 2 bathroom home
- 2.4 to 24 litres per min
- Height 500mm
- Width 355mm
- Depth 180mm
- Input 160 Mj/hr or 44kW (r
- Water pressure 160 kPa (mi
- Water temperature range 3
  fitted with controllers

View specification

Water Heating

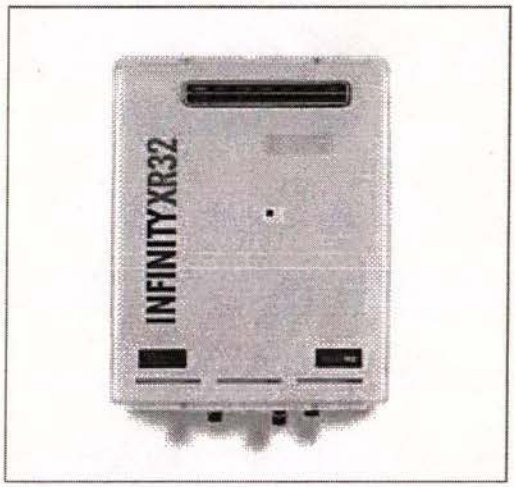
How Rinnai Infinity Works
How Rinnai Infinity Compares
Which Infinity Is Right For You
Internal Models
External Models
Heavier Demand
Digital Controllers
Rinnai Infinity Accessories
Infinity Boosted Solar Hot Water

Many homeowvers choose to mount their Infinity externally on a wall or inside a recess box if camouflaging the unit is important. From here, the Infinity unit can be readily serviced and doesn't require a flueing system

It is important that you select the right Rinnai Infinity to deliver the optimum results. Heating capacity requirements are determined by considering how many bathrooms (and kitchens) there are in your home and also by considering how much simultaneous demand there will be for hot water. This is usually effected by how many people there are in the house using hot water at one time.

Related Lin
- Case Stuc switch fror heating
- Case Stuc shower, al
- Request a
- Installatior
- Warranty i

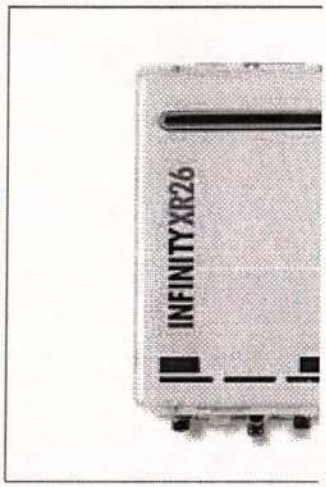
External Models



Rinnai Infinity XR32 External

- Suitable for two or more bathrooms
- Hot water capacity 2.4 to 32 litres
- Height 600mm
- Width 470mm
- Depth 220mm
- Input (max) 250Mj/hr 34.7kW input
- Water pressure 140 kPa (min)
- Water temperature range 37-55°C when fitted with controllers.
-

View specification



Rinnai Infinity XR26 Exte

- This is the definitive family r
- Suitable for 2+ bathroom hc family with medium level sir water demands
- Hot water capacity 2.7-30lt/
- Height 530mm
- Width 350mm
- Depth 170mm
- Input (max) 199 Mj/hr 55kV
- Water pressure 190 kPa (mi
- Water temperature range 3? with controllers.

View specification

R33 CONTEMPORARY WOOD STOVE

NESTOR MARTIN

NESTOR MARTIN

R33 CONTEMPORARY WOOD STOVE

FEATURING NESTOR MARTIN'S NEW WOODBOX TECHNOLOGY, THE R33 WOOD STOVE IS HIGH PERFORMING BUT EASY TO USE. WITH THE OPTIONAL REMOTE CONTROL YOU CAN OPERATE YOUR FIRE WITH THE PUSH OF A BUTTON! LOW BURN, HIGH BURN OR DANCING FLAMES, YOU DECIDE.

WITH ITS OPTIONAL THERMOSTATIC REMOTE CONTROL SYSTEM, YOU CAN ALSO SET THE DESIRED ROOM TEMPERATURE.

THE NESTOR MARTIN WOOD STOVES ARE EQUIPPED TO AUTOMATICALLY REACTIVATE OR SLOW DOWN THE FIRE AT A DESIRED TIME BY USING YOUR REMOTE.

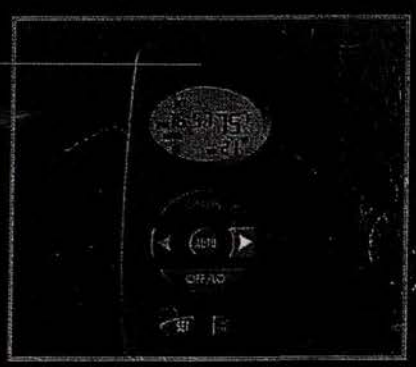
YOUR NESTOR MARTIN WOODSTOVE CAN ALSO BE ENTIRELY MANUALLY OPERATED IF YOU CHOOSE NOT TO PURCHASE THE REMOTE CONTROL MODEL.

FEATURES:

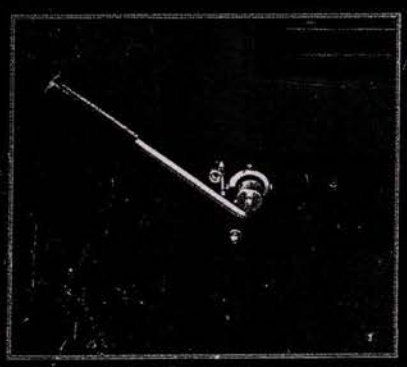
- INTEGRATED PRIMARY AND SECONDARY COMBUSTION SYSTEMS
- EFFICIENT AIRWASH SYSTEM FOR A CONTINUOUS CLEAN GLASS
- IGNITION BOOSTER FOR A FAST START
- LARGE ASH PAN
- CHOICE OF MANUAL OR REMOTE CONTROL MODELS
- COMPLIES WITH NES AND ECAN REQUIREMENTS

WITH ITS DISCREET CURVES, THE NESTOR MARTIN R33 WOOD STOVE WILL NICELY COMPLEMENT ANY DECOR. ITS EXTRA LARGE GLASS DOOR OFFERS THE ULTIMATE VIEW OF YOUR FIRE.

N.E.S COMPLIANT



THERMOSTATIC REMOTE CONTROL



MANUAL CONTROL

WIDTH - FRONT	570MM
WIDTH - BACK	450MM
HEIGHT	800MM
DEPTH	430MM
FLUE SIZE	150MM
FLUE POSITION	TOP
CONSTRUCTION	PLATE STEEL
WEIGHT	146 KG
EMISSIONS TESTED TO AS/NZS 4013:1999	0.72G/KG
EFFICIENCY TESTED TO AS/NZS 4013:1999	66.2%
HIGH OUTPUT	14KW

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Issued: 1 Jan 2006

NESTOR MARTIN

R33 Woodstove Installation and Operating Instructions

These instructions should be read in conjunction with the flue installation instructions and drawings supplied with each HFT HeatSaver flue system.

Testing and Certification

MODEL	AS/NZS 2918:2001	AS/NZS 2918:2001, App E	AS/NZS 4012:1999	AS/NZS 4013:1999	ECan Cert. Number
R33	Complies	n/a	66.2%	0-72g/kg	05015

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TELARC REGISTERED SUPPLIER

KEEP THESE INSTRUCTIONS FOR FUTURE REFERENCE

MINIMUM SAFE INSTALLATION CLEARANCES

FIG 1. WALL INSTALLATION

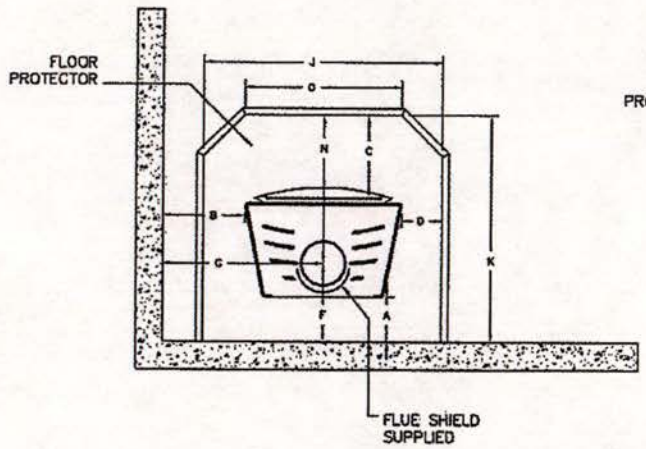
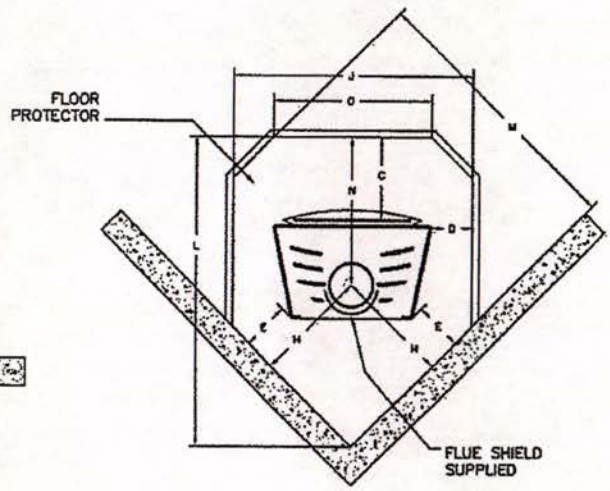


FIG 2. CORNER INSTALLATION



	R33
A	160
B	300
C	300
D	150
E	175
F	281
G	585
H	413
J	871
K	817
L	1120
M	995
N	536
O	571

Table 1.

All dimensions are given in millimetres.

If the clearances in the European Nestor Martin Instruction manual are closer than stated in this document, the clearances in the document must be adhered to and are given as a result of testing to AS/NZS 2918:2000

INSTALLATION INSTRUCTIONS

THIS APPLIANCE SHOULD ONLY BE INSTALLED BY A TRAINED AND QUALIFIED INSTALLER

WARNING: THE APPLIANCE AND FLUE SYSTEM SHALL BE INSTALLED IN ACCORDANCE WITH AS/NZS 2918 AND THE APPROPRIATE REQUIREMENTS OF THE RELEVANT BUILDING CODE/CODES.
WARNING: APPLIANCES INSTALLED IN ACCORDANCE WITH THIS STANDARD SHALL COMPLY WITH THE REQUIREMENTS OF AS/NZS 4013 WHERE REQUIRED BY THE REGULATORY AUTHORITY, i.e. THE APPLIANCE SHALL BE IDENTIFIABLE BY A COMPLIANCE PLATE WITH THE MARKING 'TESTED TO AS/NZS 4013'.
ANY MODIFICATION OF THE APPLIANCE THAT HAS NOT BEEN APPROVED IN WRITING BY THE TESTING AUTHORITY IS CONSIDERED TO BE IN BREACH OF THE APPROVAL GRANTED FOR COMPLIANCE WITH AS/NZS 4013.
CAUTION: MIXING OF APPLIANCE OR FLUE SYSTEM COMPONENTS FROM DIFFERENT SOURCES OR MODIFYING THE DIMENSIONAL SPECIFICATION OF COMPONENTS MAY RESULT IN HAZARDOUS CONDITIONS. WHERE SUCH ACTION IS CONSIDERED, THE MANUFACTURER SHOULD BE CONSULTED IN THE FIRST INSTANCE.
CAUTION: CRACKED AND BROKEN COMPONENTS, E.G. GLASS PANELS OR CERAMIC TILES, MAY RENDER THE INSTALLATION UNSAFE.
WARNING: DO NOT CONNECT TO AN UNVENTED HOT WATER SYSTEM.
INSTALL IN ACCORDANCE WITH AS 3500.4.1 OR NZS 4603 AND THE APPROPRIATE REQUIREMENTS OF THE RELEVANT BUILDING CODE OR CODES.

- Maintain a clearance of at least 1 metre between front of the appliance and building structure or any other substantial immovable object.
- If the appliance is installed on a heat sensitive floor, the floor should be protected with an insulation floor protector which should extend not less than 300mm in front from the firebox door (Ref FIG 1 & 2).
- The insulation floor protector shall be made of minimum 12mm Hardiflex or other non-combustible materials of similar thermal insulation properties.

MINIMUM FLUE HEIGHT

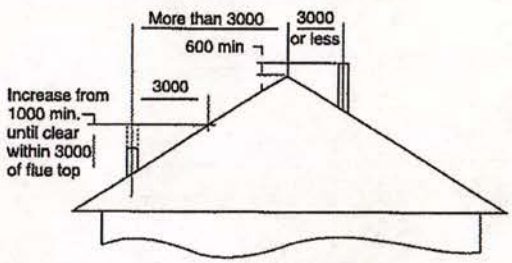
The top of the HeatSaver flue system should be at least 600mm above the highest point of the roof ridgeline, if the point of intersection of the flue system and the roof line is less than 3 metres from the ridgeline, horizontally.

If the point of intersection of the flue system and the roofline is greater than 3 metres horizontally, the top of the flue system shall be at least 1 metre above the point of intersection with the roofline. (Ref FIG 3).

These are considered to be **minimum dimensions,** and depending on local conditions, **taller flue system heights may be required for satisfactory performance.**

FIG 3.

DIMENSIONS IN MILLIMETRES



MINIMUM HEIGHT OF FLUE SYSTEM EXIT

FLUE INSTALLATION DETAIL

Your Nestor Martin R33 appliance should be installed with a **HeatSaver Flue System**

A HeatSaver Flue System is available from all authorized Nestor Martin dealers throughout New Zealand. The HeatSaver Flue System contains a complete installation drawing and correct clearances from the ceiling level, up. Minimum clearances from the appliance to nearby combustible surfaces are given in FIGS 1. and 2.

Use of a flue system, other than a genuine HeatSaver Flue System, may effect the safety of the installation, and may effect your Nestor Martin Warranty. INSIST ON A GENUINE HeatSaver Flue System.

Your appliance should be seismically restrained, including the floor protector.

OPERATING INSTRUCTIONS
(Burning Wood)

KEEP THESE INSTRUCTIONS FOR FUTURE REFERENCE

IMPORTANT:
ENSURE INSTALLATION INSTRUCTIONS HAVE BEEN ADHERED TO BEFORE LIGHTING THE APPLIANCE.

IMPORTANT:
PLEASE REFER TO THE FACTORY MANUAL SUPPLIED, FOR ALL ASPECTS OF CORRECT OPERATION OF THE UNIT.

WARNING: ANY MODIFICATION OF THE APPLIANCE THAT HAS NOT BEEN APPROVED IN WRITING BY THE TESTING AUTHORITY IS CONSIDERED AS BREACHING AS/NZS 4013.
WARNING: DO NOT USE FLAMMABLE LIQUIDS OR AEROSOLS TO START OR REKINDLE THE FIRE.
WARNING: DO NOT USE INFLAMMABLE LIQUIDS OR AEROSOLS IN THE VICINITY OF THIS APPLIANCE WHEN IT IS OPERATING.
WARNING: DO NOT STORE FUEL WITHIN HEATER INSTALLATION CLEARANCES.
For your comfort, it is advised that you light your first fire with the windows open to allow the escape of paint fumes. This will normally happen for the first 30 minutes of the first burn. Fully open the Heat Control. Place wood kindling and paper or firelighter in the firebox. Ignite and close door.
When the fire is underway, adjust the Heat Control to suit. If the firebox or the flue becomes visibly red-hot, adjust the Heat control to a lower heat position to avoid being unnecessarily harsh on the unit as well as wasting excessive heat up the flue.

APPLIANCE CONTROLS.
When cold starting, rotate the Burn Rate Control knob anticlockwise to open fully, and move Burn Type Selection Lever to position B (down). Light your fire normally and when a bright fire is burning (usually between 5 - 10 minutes) shift Burn Type Selection lever to position A (up) for normal operation.

CAUTION:
The ashpan door should not be opened while the fire is burning, and all door seals should be kept in good condition.

WARNING: ALWAYS OPEN THE HEAT CONTROL BEFORE OPENING THE FIRE DOOR.
For longholding operation level the ashes and load with the firewood. After loading new wood, operate the fire with the Heat Control fully open for 20 minutes before closing the Heat Control to the lower burn position. By following this simple method of low burn firing, you will achieve very low emission rates and obtain the high efficiency burn that is associated with the Nestor Martin product.
The fuel approved for use in Clean Air Zones in this appliance is wood with a moisture content of not greater than 25% on a dry weight basis. This usually means green timber left for at least three months to air-dry.

CAUTION: THE USE OF SOME TYPES OF PRESERVATIVE-TREATED WOOD AS A FUEL CAN BE HAZARDOUS.

CAUTION: THIS APPLIANCE SHOULD NOT BE OPERATED WITH A CRACKED GLASS.

CAUTION: THIS APPLIANCE SHOULD BE MAINTAINED AND OPERATED AT ALL TIMES IN ACCORDANCE WITH THESE INSTRUCTIONS.

Please refer to the European Manual also supplied with this appliance, for the Instructions on how to operate the R33 using the remote control.

CREOSOTE FORMATION

A small intense fire is preferable to a large smouldering one, to reduce the amount of creosote. When wood is burned slowly it produces tar and other organic vapours which combine with expelled vapour to form creosote. These creosote vapours condense in the relatively cool flue of a slow burning fire. As a result, creosote residue accumulates on the flue. When ignited, this creosote makes an extremely hot fire. The flue should be checked at least every 2 months, during the burning season, to determine if a creosote build up has occurred.

If this is the case, it should be removed by a chimney sweep to reduce the risk of an unexpected flue fire. Your appliance has been designed to produce low levels of creosote at high and low heat settings.

IN THE EVENT OF A CHIMNEY FIRE, CLOSE THE FIREBOX DOOR, FULLY CLOSE THE HEAT CONTROL, VACATE THE PREMISES AND CALL THE FIRE SERVICE.

STORAGE OF FUEL

Do not store fuel within installation clearances or within the space required for refuelling or ash removal.

DISPOSAL OF ASHES

Ashes should be placed in a metal container with a tight fitting lid. The closed container of ashes should be placed on a non-combustible floor or on the ground well away from all combustible materials, pending final disposal once cooled.

The door must be closed at all times during the operation, except during refuelling and occasional poking of the fire when necessary. Ensure door seals are maintained in good condition.

Your Appliance and flue system should ***not*** be modified in any way without the approval of the manufacturer.

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9.1.9.4 Inter-storey junctions

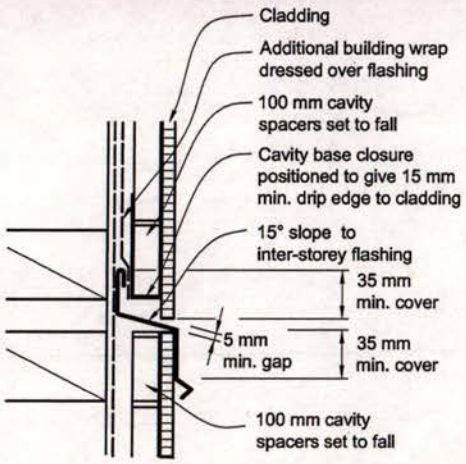
Inter-storey junctions in *claddings* over *drained cavities* shall be formed for walls:

a) Up to a maximum of 2 *storeys* in height, as shown for the specific wall *claddings* in Paragraph 9.2 to Paragraph 9.9, or

b) Over 2 *storeys*, by using an inter-storey *flashing* bridging the *drained cavity* as shown in Figure 70.

COMMENT:
A *drained cavity* is limited to a height of 2 *storeys* to limit the amount of moisture handled by the cavity before it is directed to the outside.

Figure 70: General inter-storey junction
Paragraph 9.1.9.4, Figures 108, 121, 123, 124 and 125



NOTE: To be used to limit continuous cavities to a height of two storeys.

9.1.10 Windows and doors

Windows and doors shall comply with the requirements of NZS 4211, and reveals shall comply with NZS 3602. *Flashings* shall comply with Paragraph 4.0. Window details specific to particular *claddings* are given in Paragraph 9.2 to Paragraph 9.9. Door details shall be based on window details.

After installation, the flange forming the window or door facing shall have a 10 mm overlap over the surrounding *cladding* material or associated back *flashings*. A minimum of 8 mm effective overlap on the sill shall be permitted where necessary to allow for on-site tolerances.

9.1.10.1 Scope

This Acceptable Solution is limited to frame sizes of 5000 mm x 5000 mm or less, and to fixed hinged and stayed windows and doors. This Acceptable Solution does not cover bi-fold, sliding and other opening types.

COMMENT:
Certain aluminium joinery sections with a deep profile (such as bi-fold and sliding doors and windows) will not be able to use the sill details included in this Acceptable Solution and achieve the required window facing cover and sill support with a sloped sill tray. The sill details in these cases shall be specifically designed.

Amend 2 Jul 2005

9.1.10.2 Treatment of opening

Treatment of the window opening for *direct fixed* wall *claddings* shall be as shown in Figure 72. As shown, the sill trimmer may need to be chamfered to allow installation of the sill tray. A sloped packer may be used to support the tray.

Amend 2 Jul 2005

Window openings for wall *claddings* over *drained cavities* shall be as shown in Figure 72, except that there shall be no sill *flashing*.

9.1.10.3 Window heads

All windows and doors shall include head *flashings*, sealed to the *building wrap* as shown in Figure 71.

In walls with a *drained cavity*, a *flashing* system shall be installed at the head of the window to:

a) Protect the window opening from water entry, and

b) Direct any water entering the *drained cavity* above the window opening to the outside away from the opening.

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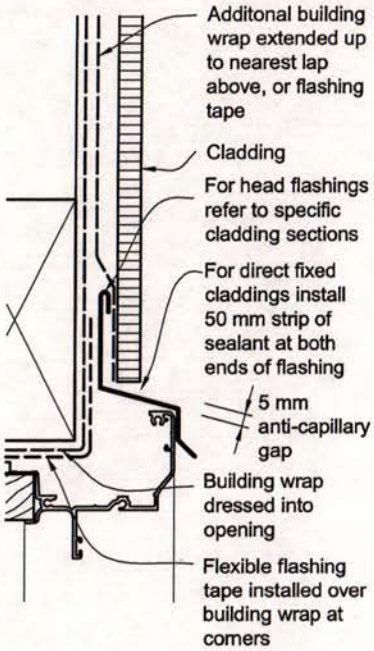
Building Control Office
Date 29-03-07

Figure 71: General sealing of head flashing
Paragraphs 9.1.7 e), 9.1.10.3 and 9.1.10.4 c)

NOTE: May also use *building wrap* lapped over flashing upstand in lieu of *flexible flashing tape*. Refer cladding window details, for example Figure 115.



Amend 2 Jul 2005

9.1.10.4 Head flashings

Head *flashings* shall be in accordance with Paragraph 4.6.1.6 and Table 7, unless specifically shown otherwise, and shall:

Amend 2 Jul 2005

a) Direct water to the outside of the wall *cladding*, and

Amend 2 Jul 2005

b) For wall *claddings* on cavity walls, incorporate 10 mm turn-ups as *stopends*. *Stopends* shall be terminated at the inside face of the *cladding* so they do not pass through the *cladding*, and

Amend 2 Jul 2005

COMMENT:
Stopends are useful to prevent water moving past the ends of head *flashings*. However, additional problems of weatherproofing occur where the *stopend* penetrates the *cladding*.

Amend 2 Jul 2005

c) Have the upstand of the *flashing* protected from moisture by lapping an additional layer of *building wrap* over the upstand, or by using *flexible flashing tape* as shown in Figure 71. The additional *building wrap* shall extend from the nearest lap above, and be lapped under the top layer.

9.1.10.5 Window sills

Sill tray *flashings* shall be in accordance with Table 7.

Amend 2 Jul 2005

a) *Direct fixed claddings* shall have sill tray *flashings* that direct moisture to the outside face of the *cladding system* as shown in the details included in Paragraph 9.2 to Paragraph 9.9. The sill *flashing* shall extend back past the condensation channel of the window. The 5 mm gap between the window facing and sill tray must not be sealed.

b) *Claddings* over a *drained cavity* shall have:
   i) face-fixed windows and doors, installed so the window frame flange facing is forward of the line of the *cavity battens*, and
   ii) no sill trays,
   iii) there is no requirement to maintain a 5 mm gap between the *cladding* and window facing at the sill or jamb with a cavity. Sealing this gap may reduce water entry during routine maintenance such as washing the *building*.

Amend 2 Jul 2005

COMMENT:
If a *cladding* requires continuous horizontal support below the window sill, a sill tray will be needed to direct water from the back of the *drained cavity* out over the *cladding*. This will require *specific design*.

Amend 2 Jul 2005

c) Where sill supports are required, they shall be supplied as an integral part of the window installation and installed to the window manufacturer's recommendations.

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COMMENT:
Alternatives may include a flat extruded sill tray with a *stopend* on three sides. Manufacturers should be consulted for specific details and results of testing on these.

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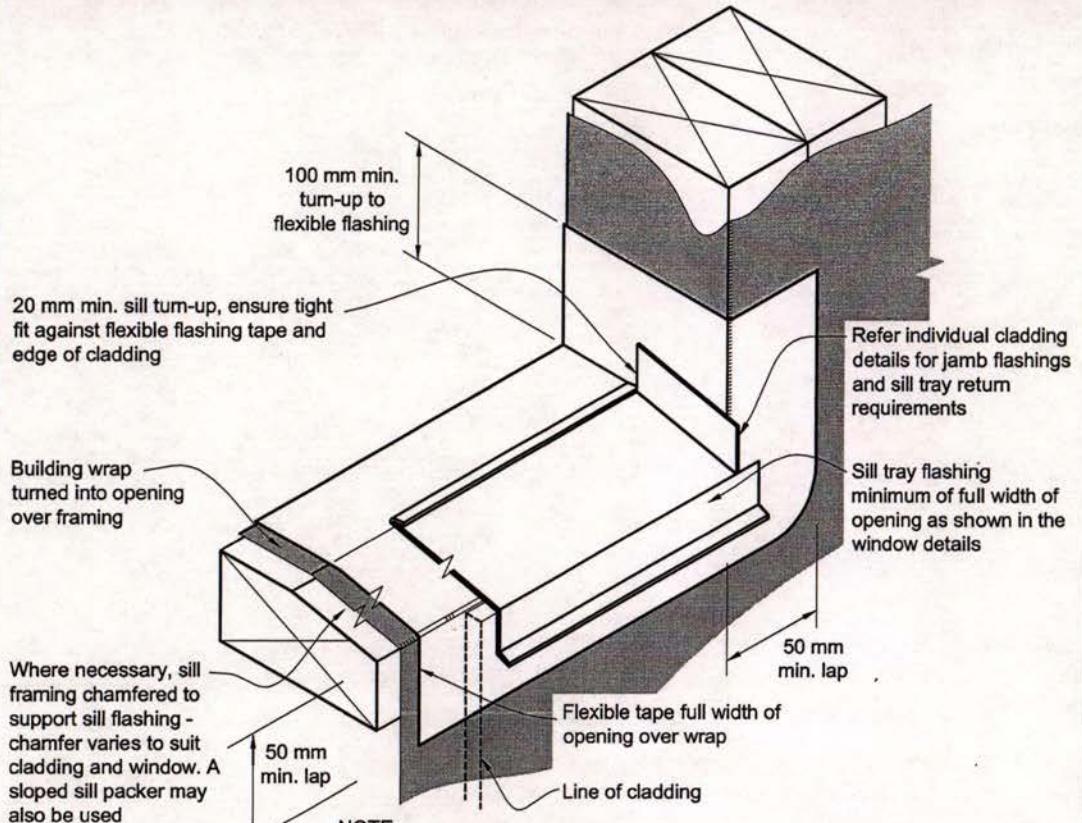
Figure 72: General window opening
Paragraphs 9.1.5 and 9.1.10.2, Figures 76, 81-86, 90, 91, 95, 99, 115, 116, 127 and 128



NOTE:
(1) Detailed *cladding* omitted for clarity, refer to specific *claddings*.
(2) Sill *flashing* shall extend back past the condensation channel of the window.
(3) Head to be treated similarly with continuous *building wrap* and *flexible tape* at corners.
(4) Openings in *cavity walls* shall be treated similarly, except the sill *flashings* shall be omitted.

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9.1.10.6 Jamb flashings

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Jamb *flashings* shall be in accordance with Paragraph 4.0 and Table 7, and shall be installed where required in the figures included in Paragraph 9.2 to Paragraph 9.9.

Where required, jamb *flashings* shall overlap sill *flashings*, and direct moisture to the outside face of the *cladding system*.

9.1.10.7 Closed cell foam tape

Compressible foam tape shown behind window facings and *cladding* joints shall be closed cell PVC foam, with:

a) Hardness 55-60 to ASTM D2240 Scale OO,

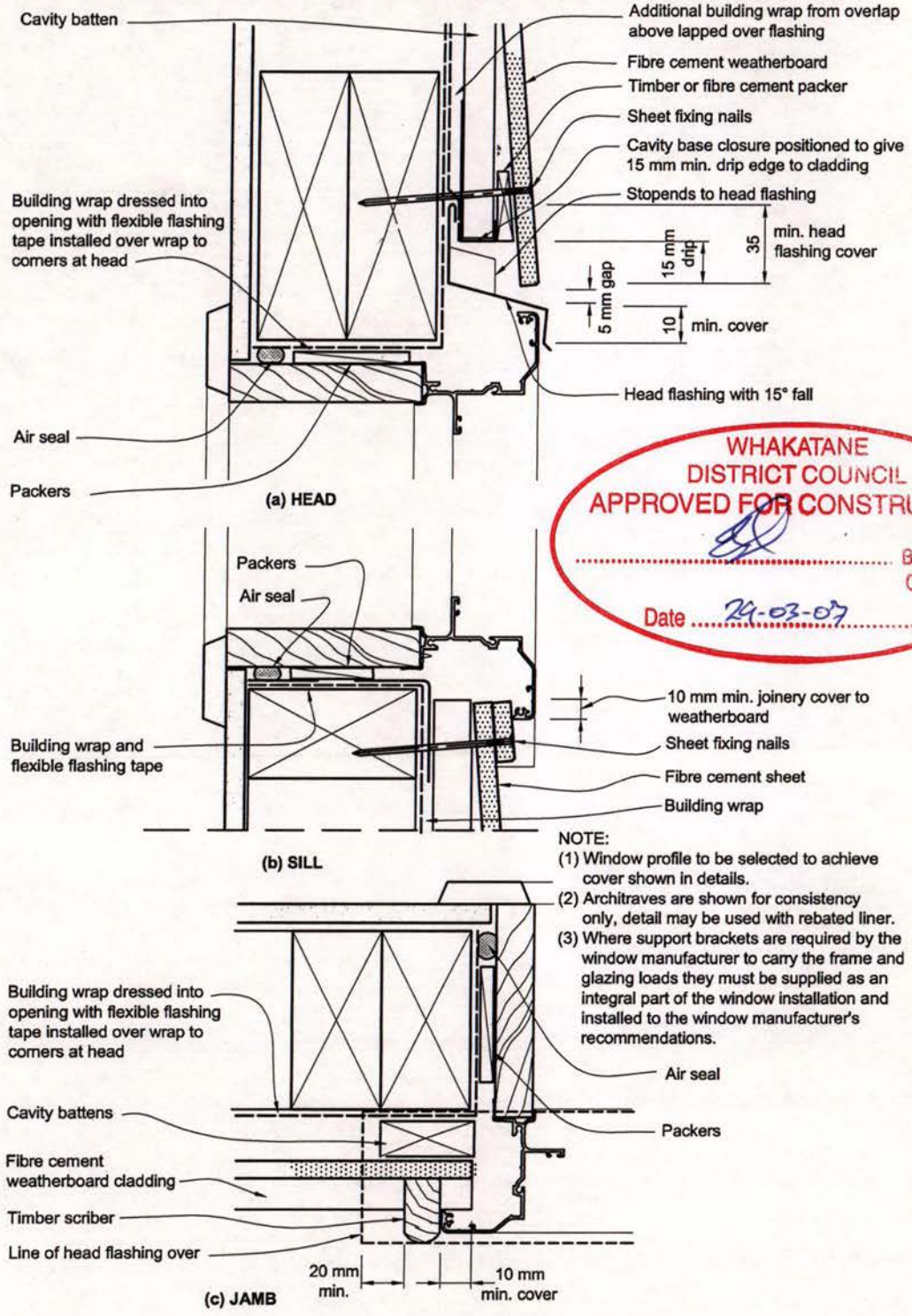
b) Grade VE-43 to ASTM D1667,

c) Compression set of 20% maximum to ASTM D1667, and

d) UV weathering in UV Weatherometer for 1500 light hours to ASTM G154 or ASTM G155 with no visible deterioration in appearance.

Figure 91: Windows in fibre cement weatherboards on cavity
Paragraph 9.5.4.2

GENERAL: (a) Refer Figure 72 for wrapping of framed opening prior to window installation.
(b) Sliding and bi-fold windows will require specific design.
(c) A minimum of 8 mm effective cover at sills shall be permitted where necessary to allow for tolerances.



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Amend 2
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Table 7: Metal flashings – general dimensions
Paragraphs 4.6, 4.6.1.1 a), 4.6.1.2 b), 4.6.1.3 a), b), 4.6.1.4, 4.6.1.5 b), 4.6.1.7 a), b), 5.1 a), c), d), 6.4 c), 7.4.4, 8.3.8, 9.1.10.4, 9.1.10.5, 9.1.10.6 and 9.4.5.3 b) Figures 7, 9, 10, 36, 41-48, 54, 55, 61, 92, 97 and 101

Type	Description	All [1]	Situation 1 [2] minimum mm	Situation 2 [3] minimum mm	Figure reference (as example)
Aprons: general	*Transverse flashing* over roofing		130 [4]	200 [4]	Figure 7 (X values)
	Parallel flashing over roofing		Two crests, finish in next trough – Paragraph 4.6.1.1 b)		Figure 48 (Y values)
Ridges/ hips	*Transverse flashing* over roofing		Refer **Aprons: general**		Figure 46 (X values)
Changes in roof pitches	Upper lap under roofing	250 mm min.			Figure 44 (X values)
	Transverse flashing over roofing		Refer **Aprons: general**		
Barges	Overlap to barge board		50 [8]	70 [8]	Figure 47 (Z values)
Cappings	Overlaps to *cladding*		50 [8]	70 [8]	Figure 10 (Z values)
	Slope to top: *parapet*	5°			
	Housing – balustrade [5]	5°			
Roof or deck to wall	Overlaps to roofing		Refer **Aprons: general**		Figure 7 (X or Y values)
	Lap under *cladding* above	75 mm min.			
	Clearance below *cladding*	35 mm min.			
	Total upstand	**110** mm min.			
Windows	Window flange clearance for *direct fixed* claddings	5 mm			Figure 81
	Cover to window flange	10 mm [7]			
Sills	Sill *flashing* slope [6]	5°			
Heads	Head *flashing* slope	15°			
	Lap under *cladding* above	35 mm min.			
	Anti-capillary gap to *cladding*	5 mm			
	Total upstand	**40** mm min.			
Corners	Corner *flashings* [1]	50 mm x 50 mm minimum			Figure 79
Inter-storey junctions	Junction *flashing*: slope	15°			Figure 70
	Lap over *cladding* below [1]	35 mm min. [8]			
	Lap under *cladding* above	35 mm min.			
	Clearance under *cladding*	5 mm			
	Total upstand	**40** mm min.			

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NOTES:
(1) Unless otherwise dimensioned in details.
(2) **Situation 1:** In low, medium or high *wind zones*, where roof pitch is 10° or greater (X or Z values).
(3) **Situation 2:** For all roof pitches in very high *wind zones*,
For all *wind zones* where roof pitch is less than 10° (X or Z values).
(4) Excluding any *soft edge* or turn-down to roofing.
(5) For *buildings* other than housing, slope shall be as per F4/AS1.
(6) Where applicable, unless shown otherwise in details – for windows requiring sill *flashings*. Sill *flashings* must extend past the condensation channel.
(7) Excluding *drip edge*. The aim is for at least 10 mm, but this may be reduced if necessary to account for on-site tolerances – to give an absolute minimum of 8 mm.
(8) Excluding *drip edge*.

Amend 2 Jul 2005

Figure 47: Barge flashings for profiled metal
Paragraphs 4.6.1.5 and 8.4.12 e)

NOTE: (1) Y = variable according to *wind zone* – refer Table 7.
(2) Z = variable according to *wind zone* – refer Table 7.

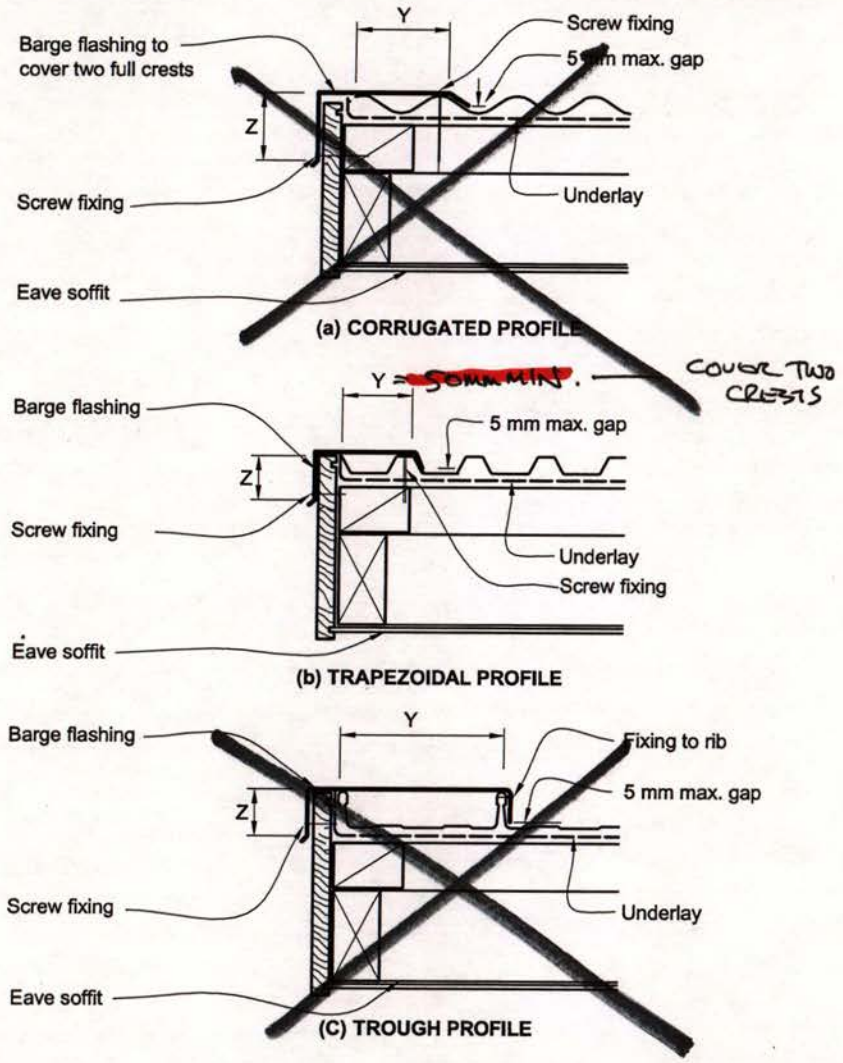

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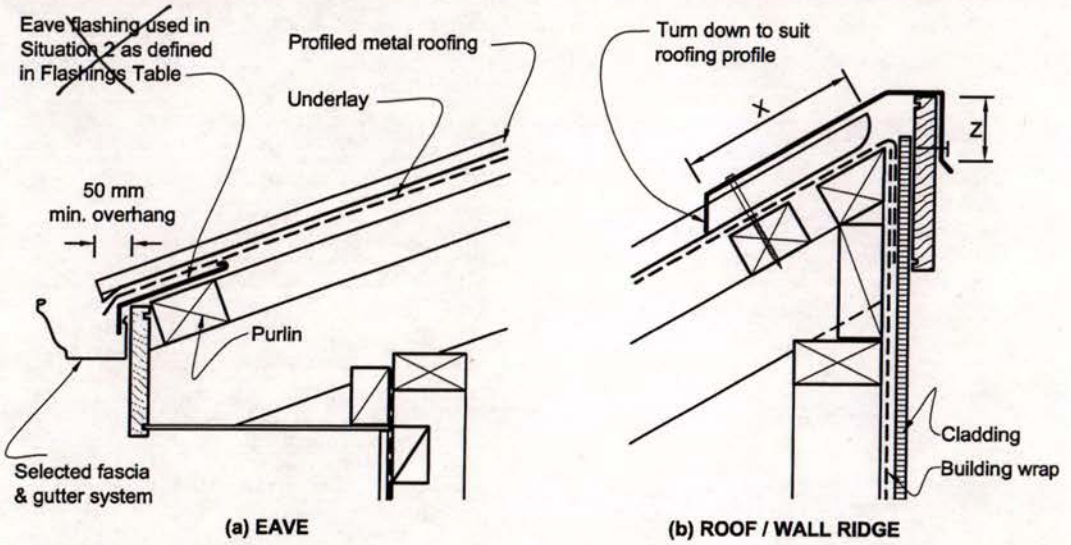
Figure 45: Eaves and roof/wall ridge for profiled metal
Paragraphs 8.4.11 and 8.4.12 c)

NO OTHER FLASHING REQD – UNDER TABLE 7

NOTE: (1) Situation 2 – *Flashings* table – refer Table 7.
(2) X = variable according to *wind zone* – refer Table 7.
(3) Z = variable according to *wind zone* – refer Table 7.



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Amend 2 Jul 2005

Figure 46: Ridge and hip flashings for profiled metal
Paragraphs 4.6.1.2, 8.4.11 and 8.4.12 d)

NOTE: X = variable according to *wind zone* – refer Table 7.

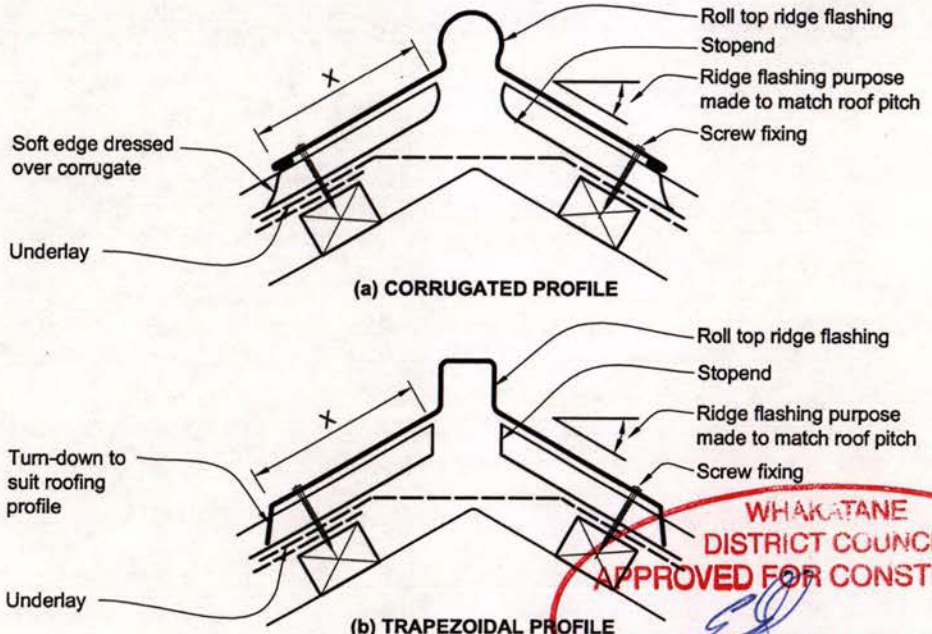

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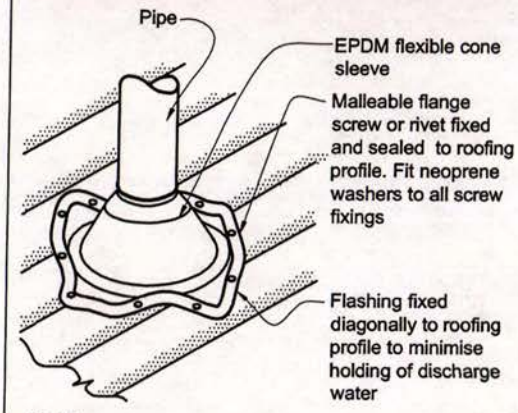
Figure 53: Flashing for small pipes
Paragraphs 8.3.10, 8.4.17 a), 9.6.8.5 and 9.6.9.6



NOTE:
(1) Max. roof pitch for this flashing 45°, minimum pitch 10°.
(2) For pipes up to 60 mm diameter.

Figure 54: Soaker flashing for pipe penetrations
Paragraphs 8.3.10 and 8.4.17 b)

NOTE: (1) X = variable according to *wind zone* – refer Table 7.
(2) Y = to cover minimum of two crests – refer Table 7.
(3) Suitable for pipes from 60 mm to 500 mm diameter.
(4) Suitable only for roof pitches of 10° or higher.

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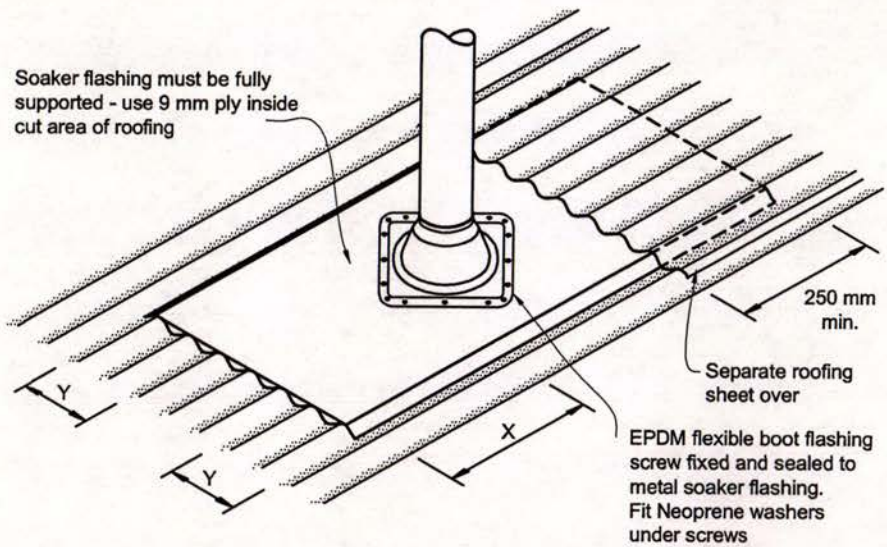

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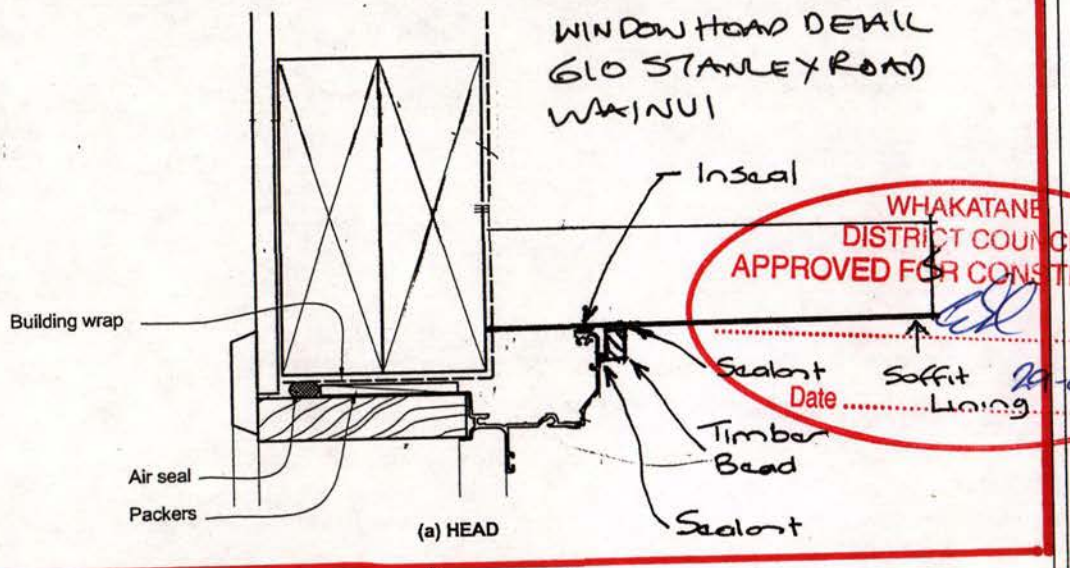
Figure 116: Windows for fibre cement sheet on cavity
Paragraphs 9.7.7.2 and 9.8.8.2

GENERAL: (a) Refer Figure 72 for wrapping of framed opening prior to window installation.
(b) Sliding and bi-fold windows will require specific design.
(c) A minimum of 8 mm effective cover at sills shall be permitted where necessary to allow for tolerances.



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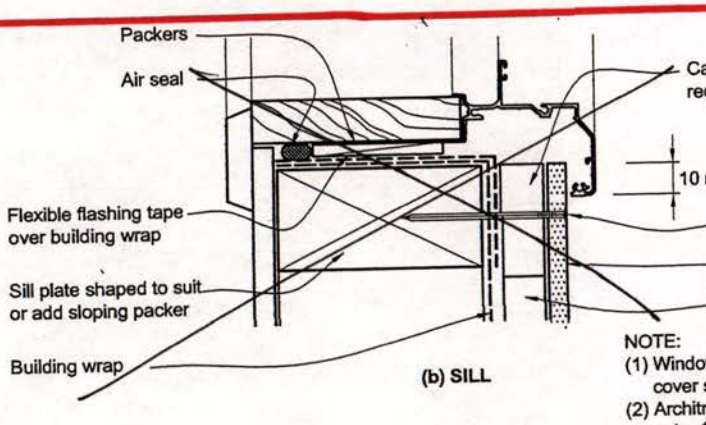
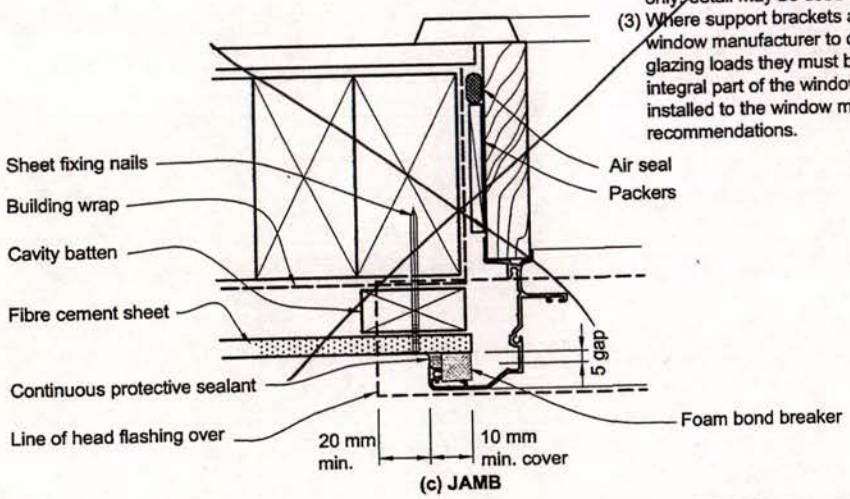


NOTE:
(1) Window profile to be selected to achieve cover shown in details.
(2) Architraves are shown for consistency only, detail may be used with rebated liner.
(3) Where support brackets are required by the window manufacturer to carry the frame and glazing loads they must be supplied as an integral part of the window installation and installed to the window manufacturer's recommendations.



Amend 2
Jul 2005

PURLIN & BATTEN FIXING CHART

(COMPLIES WITH NZS 3604:1999 TABLE 10.10)

NOTE:

- Max. truss overall roof span 12m
- All purlin and batten sizes as NZS 3604:1999 Section 10.
- These fixings assume purlin or battens are fixed over top of truss or rafter.

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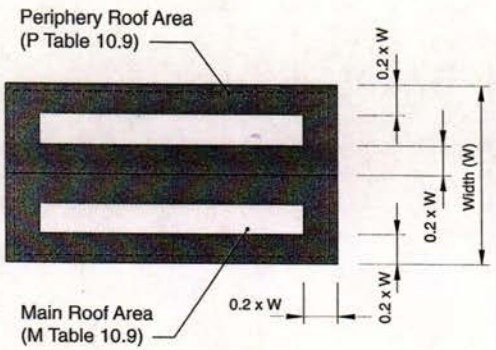
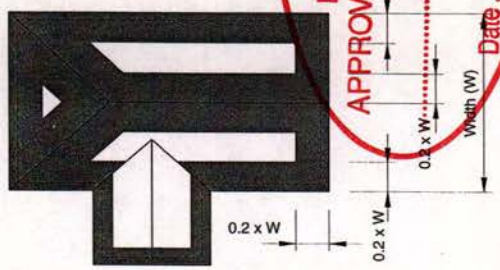
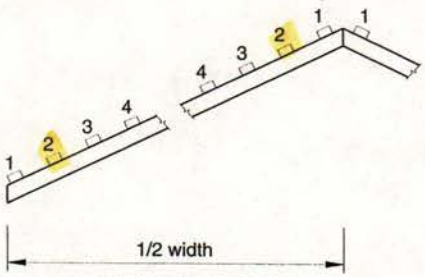


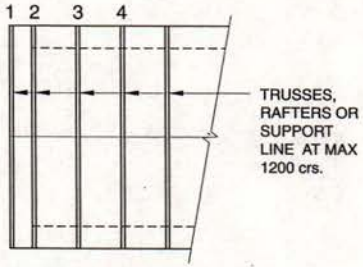
PLAN GABLE



PLAN HIP ENDS



PURLIN LAYOUT (MAX 1200 crs.)



LAYOUT ON GABLE END

LUMBERLOK®

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SELECTION CHART

(minimum fixing requirements)

1. **HEAVY ROOFS**

   All purlins and/or battens use fixing Type A only on roof width (w) up to 12m.

2. **LIGHT ROOFS**

   A. **BATTENS** - Max. span 1200
   - Max crs. 400
   - Roof width (w) up to 12m.

   L & M wind loads use Type B fixing on all battens.

   H & VH wind loads use Type C on all battens.

   B. **PURLINS** - Max. span 1200, Max crs. 900 or
   - Max. span. 900, Max crs. 1200

   L & M wind loads use Type C fixing on purlin No.2 and Type B on all other purlins for all roof widths (w) up to 12m.

   H & VH wind loads
   1. On roof width (w) up to 8m;
      Use Type D fixing on purlin No. 2 and Type C on all other purlins.
   2. On roof width (w) up to 12m;
      Use Type D fixing on purlins No. 2 & 3 and Type C on all other purlins.

   C. **PURLINS AND BATTENS ON GABLE END**
   - Max. span 1200, Max crs. 900 or
   - Max. span. 900, Max crs. 1200

   L & M wind loads use Type B fixing on support line No. 1, Type C on support lines No. 2, 3, & 4 and all other support lines as per Section A or B above.

   H & VH wind loads use Type C fixing on support line No. 1, Type D on support lines No. 2, 3, & 4 and all other support lines as per Section A or B above.

STANDARD FIXING OPTIONS

LUMBERLOK®

FIXING DEFINITIONS

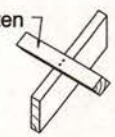
NAIL = Either 90 x 3.15 Power driven
or 100 x 3.75 Hand driven
SCREW = 80 x 10 gauge **LUMBERLOK** Purlin screw (Blue Screw)
WIREDOG = Either left hand or right hand **LUMBERLOK** wiredog.

FIXING TYPE A
0.40kN

1 NAIL

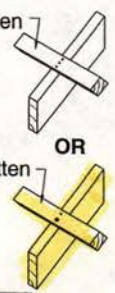
FIXING TYPE B
0.70kN

2 NAILS



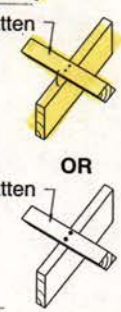
FIXING TYPE C
1.20kN

3 NAILS
OR
1 NAIL + 1 SCREW



FIXING TYPE D
2.00kN

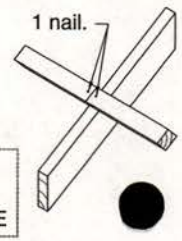
2 NAILS + 1 WIREDOG
OR
2 SCREWS



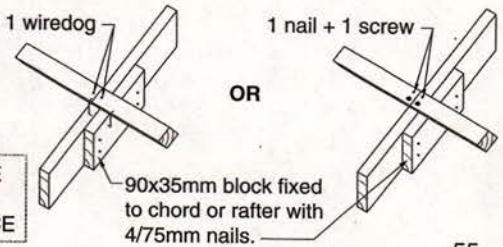
PURLIN / BATTEN SPLICE FIXING OPTIONS

NOTE:
Skew nail when fixing to 35mm rafter or truss.

FIXING TYPE A & B OVER PURLIN SPLICE



FIXING TYPE C & D OVER PURLIN SPLICE



Truss Profile

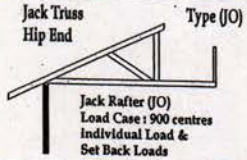
Belgium Standard Truss — Type (TO)

Howe Truss Girder Truss — Type (GTO)

Truncated Girder — Type (TGO)

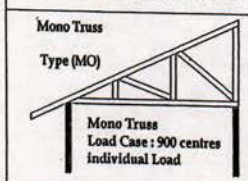
Truncated Rafter — Type (TGO)

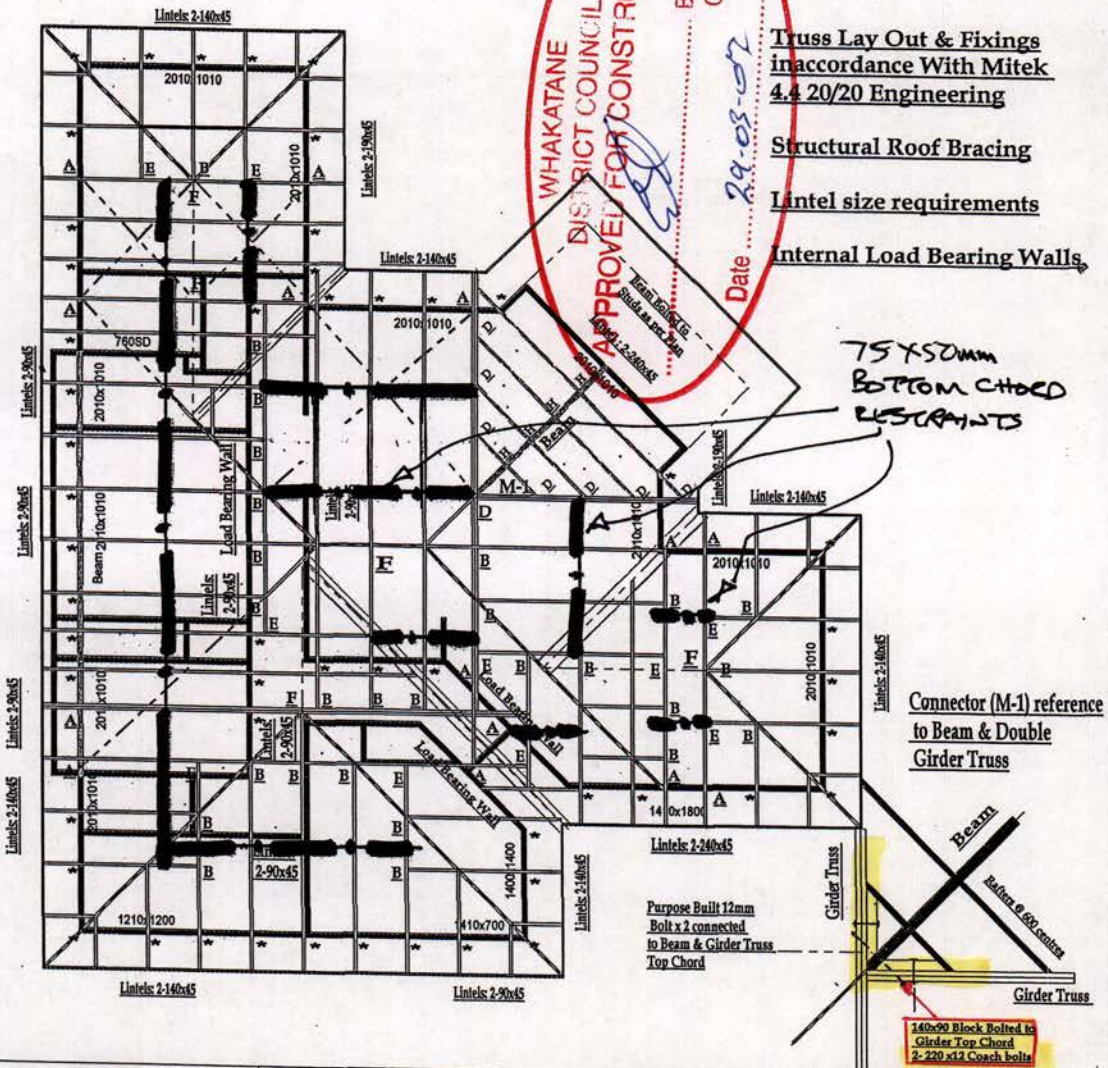
Jack Truss Hip End — Type (JO)



Gable end Truss — Type (ENO) Type (ETO)

Mono Truss — Type (MO)





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Truss Lay Out & Fixings inaccordance With Mitek 4.4 20/20 Engineering

Structural Roof Bracing

Lintel size requirements

Internal Load Bearing Walls

Proposed New Dwelling Structural Roof Details

Trusses designed successfully by Mitek NZ 4.4 20/20 Engineering

Timber specs:Radiata Kiln dried H1.2 treated MSG8

Truss centres @ 900mm

Point Load - one stud support under Truncated Girder & Girder Trusses

Purlins & battens fixed in accordance Mitek NZ lumberlok Manual

Lintel & Beams designed in accordance Mitek NZ Ganglam & Flitch beam Manual

notify detailer; any changes to above plan relating to walls windows & doors required to be redesigned

Occupation Category - Residential

Roof Pitch	- 22.5°
Wind Load	- High
Roof Load	- Heavey weight
Roof Material	- Concrete Tiles
Roof Type	- Hip-Valley
Overhang	- 000
Heel Height	- 99 mm
Truss Centres	- 900mm
Cantilevered	- 000
Vaulted Ceiling	- 000
Raised Ceiling	- 000

Fixings in Accordance with Mitek 20/20 Engineering

A = Cyclone Tie CT400	18
B = Joist Hanger 47x90	26
C= Cyclone Tie CT200	00
D = Nailon Plares 200mm	7
E = Joist Hanger 47x120	12
G= Strap bracing 25x1mm	30m
F = Roof Brace	0
H = 6kn stap bracing (400mm)	4
I= Joist Hanger 165x95	0
x = Pair Wire Dogs	80

PlaceMakers Know how. Can do.

Whakatane 07-3087239
Landscape scale 1.125

Proposed New Residence for Hallmark Plan A331 Whakatane

Truss Design & Detailed Infomation prepared for Hallmark Homes Whakatane
by : Motiti island detailers
ph: 07-5783709
fax: 07-5783756
e-mail ranapia@xtra.co.nz

Plan Preparation : Pre-consent
Plan number : as per supply
date issued : 27-09-2006
date detailed :19-02-2007

Whakatane Placemakers
Job number W6231-A

Dealing with your wastewater

A guide to the On-Site Effluent Treatment Regional Plan 2006

Working with our communities for a better environment

Environment Bay of Plenty
REGIONAL COUNCIL

Regional Plans for the Bay of Plenty

- Operative Regional Air Plan (Air Plan)
- Operative Rotorua Geothermal Regional Plan
- Operative River Gravel Management Plan (Gravel Plan)
- Operative Regional Plan for the Tarawera River Catchment (Tarawera River Plan)
- Operative Transitional Regional Plan
- Operative Regional Land Management Plan (Land Plan)
- Operative Regional Coastal Environment Plan
- Operative On-Site Effluent Treatment Regional Plan 2006
- Proposed Regional Water and Land Plan (Water and Land Plan)

Contents

Section One - Introduction 4
How we can help 6
How to find out what rules and schedules apply to you 7

Section Two – What are the options? 8
Conventional septic tank systems 8
Advanced on-site effluent treatment systems 11
Alternative 'non-water' systems 14
Sewer Reticulation 15

Section Three – Do I need a resource consent? 16
Flowchart key information 16
Do I need a resource consent? 18
Flowcharts 19-24

Section Four – Planning your system 25
Working out what type of on-site system you need 25
Tank capacity (Table 5) 25
Conventional systems - Can I go permitted? (Table 6) 26
Modify the treatment or site conditions (Table 8) 27
Advanced Systems - Can I go permitted? (Table 11) 28
Modify the treatment or site conditions (Table 12) 29
Size of trench 31
Example of soakage trenches 31
Wastewater flow design allowance (Table 9) 32
To work out the amount of wastewater 33
Appearance and feeling of soil types (Table 10) 34
Soil category by feel 35
Land treatment area 36

Section Five – Region-wide rules 37

Section Six – Looking after it/ongoing management 39
Maintenance and Performance Inspection and Certification Programme 40

Section Seven – How to apply for a resource consent 42
Does your activity require a consent or permission from someone else? 43

Section One - Introduction

This guide is to help people with on-site effluent treatment systems interpret Environment Bay of Plenty's Operative On-Site Effluent Treatment Regional Plan 2006 (the plan). The plan has been reviewed to deal with water quality issues caused by the discharge of domestic wastewater in the Bay of Plenty. This guide takes you through the process of finding out if your system needs a resource consent or not. It also explains how to deal with the harmful effects your activity could have on the environment.

This guide helps you work out which of the plan's rules and schedules apply to you.

Once you know this, you will need to refer to the plan for more detailed information.

The plan can be viewed on our website www.envbop.govt.nz, at your local library, district or city council or at our offices.

Wastewater is the used water from domestic activities (kitchen, laundry, bathroom and toilet) in dwellings, institutions or commercial facilities.

Domestic greywater is wastewater flow from kitchen, bathroom and laundry facilities.

Domestic blackwater is wastewater flow from the toilet.

! When applying for a building permit from a district/city council to install an on-site effluent treatment system you need to provide all the necessary information from Section Four – Planning your system, of this guide. Not providing this information could delay the processing of your building permit.

The plan sets out policies and rules that manage the effects on the environment caused by the discharge of treated domestic wastewater to land. You do not need resource consent from us if your system can meet the conditions in the plan for a **permitted** activity.

If your system cannot meet these conditions then your activity is **discretionary**. This means you need resource consent from us. This ensures that any bad effects your activity might have on the environment are controlled through compliance with conditions of your consent.

Activities that are not allowed at all are classified as **prohibited**.

The plan's aim is to enable the discharge of up to 2 cubic metres per day (which is 2000 litres per day) of treated domestic effluent (wastewater) into land. If your wastewater discharge is more than 2 cubic metres per day then you fall outside of all the permitted rules for this plan and you need resource consent from us.

Key

Prohibited activities

Good practice

Contact us for more information

Website links

Important note

See the related booklet or pamphlet on the subject

How we can help

We can help you work out if you need a resource consent. We can also help you look at different ways of planning and carrying out your on-site effluent management so that a resource consent may not be needed.

Information on resource consents and how to apply for them is found at the end of this guide on page 42.

If you are not sure how to meet the conditions or other requirements of the plan, or need further information on resource consents or any other assistance, please contact us.

Environment Bay of Plenty staff are available to help you and answer your questions.

Phone us:	0800 ENV BOP (368 267)
Fax us:	0800 ENV FAX (368 329)
Visit our website:	www.envbop.govt.nz
Email us:	info@envbop.govt.nz

A copy of the plan is available for viewing at your local library, district or city council, or at our offices in Rotorua, Mount Maunganui and Whakatane.

Environment Bay of Plenty staff are available to answer any questions you have about the plan.

How to find out what rules and schedules apply to you

The plan's rules set out the legal obligations you must meet. Its schedules provide information to help you work out if you can meet the rules or not. From this you will know if your activity needs a resource consent or not.

Use the table of contents at the front of this guide to find the information you are interested in. Go to that section of the guide or follow the flow charts (see pages 16-24) to find the information you need.

Throughout the guide there are shaded boxes that give a quick reference about what the plan requires and where you can get more information. If you need help at any stage, give us a call on 0800 ENV BOP (368 267).

! To work out the daily wastewater discharge from your home or dwelling please see the table – Wastewater flow design allowances on page 32.

! You will need to upgrade or replace your system if it does not meet the minimum standards required by the plan. The new system you choose must comply with the rules of the plan. If it does not, you will need to apply for resource consent from us.

! A resource consent (building permit) is also required from your district or city council for the installation of all tank systems. Please check with them to see what other requirements you need to meet. Their contact details are on page 43.

✓ As with anything maintenance of the system is essential. By following a simple maintenance programme you can ensure that you will continue to have an efficient and healthy disposal system for many years. Environment Bay of Plenty has information to help you work out a maintenance programme.

Section Two – What are the options?

There are three types of on-site effluent treatment systems used in the Bay of Plenty. These are:

- Conventional septic tank systems
- Advanced on-site effluent treatment systems
- Alternative 'non-water' systems

These options are explained below. If you do not have one of these systems, your waste water system will be connected to a sewer reticulation system.

Conventional septic tank systems

The conventional septic tank system has two main parts: the **septic tank**, in which larger particles are removed from the waste and some decomposition takes place, and the **land treatment area** where the effluent soaks into the ground through perforated pipes.

What is it?

A typical septic tank is either a single tank or a tank fitted with a partition to create two chambers (two stage septic tank).

The main job of the septic tank is to pre-treat household waste before it enters the land treatment area. In the tank the heavier, solid particles in the sewage settle to the bottom and form a sludge. Lighter materials, including

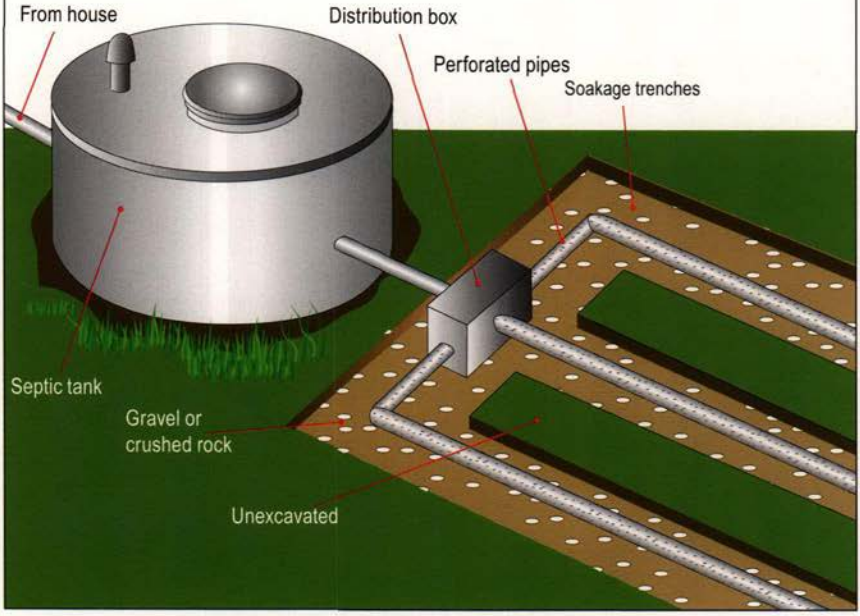
✓ To improve the lifetime of the land treatment area it is worth installing an outlet solids filter to the septic tank's outlet pipe. This stops solids clogging the pipes and soil around the land treatment area, however you will have to clean the filter from time to time. Filters require regular checks and cleaning by hosing down with the discharge back to the tank.

fats and grease, float to the surface forming a scum layer. Sludge and scum are stored in the tank.

Bacteria living in the septic tank break down some of the organic solids into a liquid, helping reduce the build-up of sludge in the tank. The liquid effluent between the sludge and scum layers is piped out to the land treatment area.

The land treatment area is where treated effluent is discharged into the ground through perforated pipes. The partially treated effluent flows out of the tank into the land treatment area, where natural processes in the soil absorb and purify it. This removes any remaining viruses and bacteria, and some of the nutrients.

Example of a conventional septic tank and soakage field system

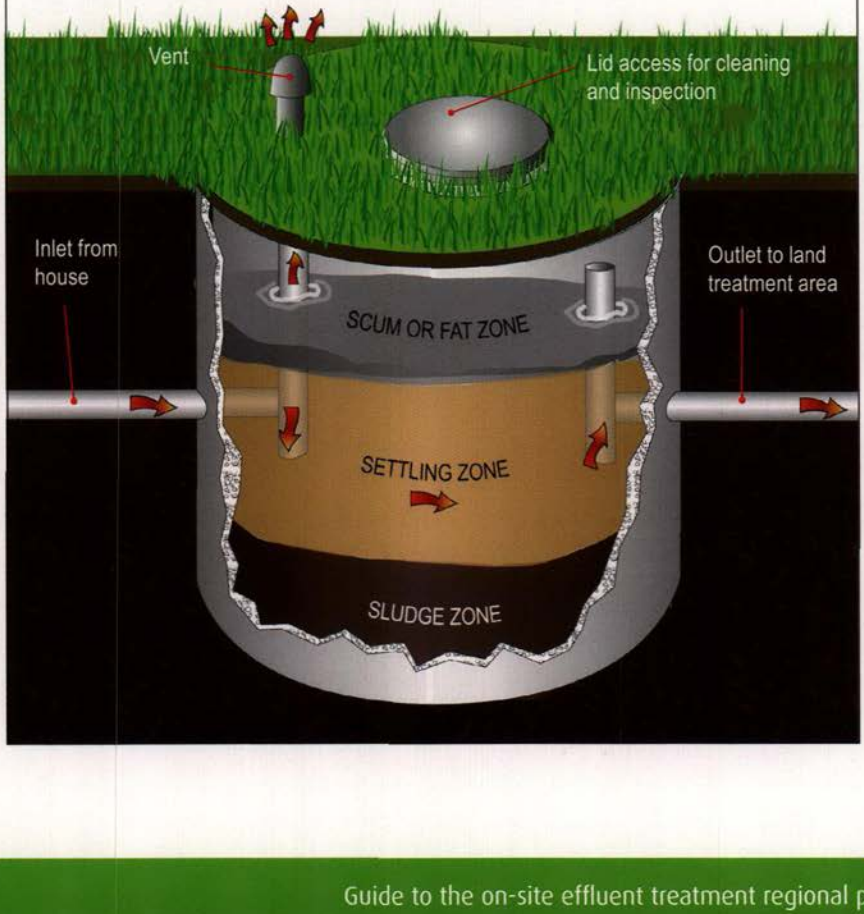


How it works

Septic tanks and land treatment areas *can* work well for large sections, but are limited in treating effluent in clay soils (poor soakage) or gravely soils (rapid soakage). Poor treatment of effluent results in pollution of groundwater and surface waters. Septic tanks that are not maintained make these problems worse.

Your land treatment area should be chosen carefully. It will need lots of topsoil and organic matter so bacteria can break down the effluent and allow effective soakage. For septic tank systems it is the soil in the land treatment area that provides the majority of the treatment. An outlet solids filter helps protect your land treatment area (see page 31).

Example of a conventional septic tank system



Distribution options for land treatment areas include:

- Gravity fed soakage trenches with distribution box to disposal lines.
- Low-pressure effluent dosing using a pump system to intermittently distribute controlled quantities of effluent.
- Specially designed beds of plants that absorb a proportion of the effluent through their roots - known as evapo-transpiration systems.

> **!** All land treatment areas must be placed away from areas prone to slippage, subsidence, erosion, ponding or overland flow of water, and where it can be compacted by stock or vehicles.

Advanced on-site effluent treatment systems

What is it?

An advanced on-site effluent treatment system (advanced system) initially does the same as a conventional septic tank system, but has an extra step that provides secondary treatment. This results in a better quality of effluent to be discharged to the land treatment area.

The types of advanced systems include aerated wastewater treatment systems (AWT) or packed bed reactor systems (PBR).

- Aerated wastewater treatment systems: activated sludge; biofilter; trickling filter
- Packed bed reactor systems: intermittent sand filters; recirculating sand filter; textile filters

Advanced systems have several chambers, pump dosing mechanisms, filters and come in a range of configurations and sizes. The treated effluent is pumped to the land treatment area where the effluent soaks into the ground through perforated pipes.

How it works

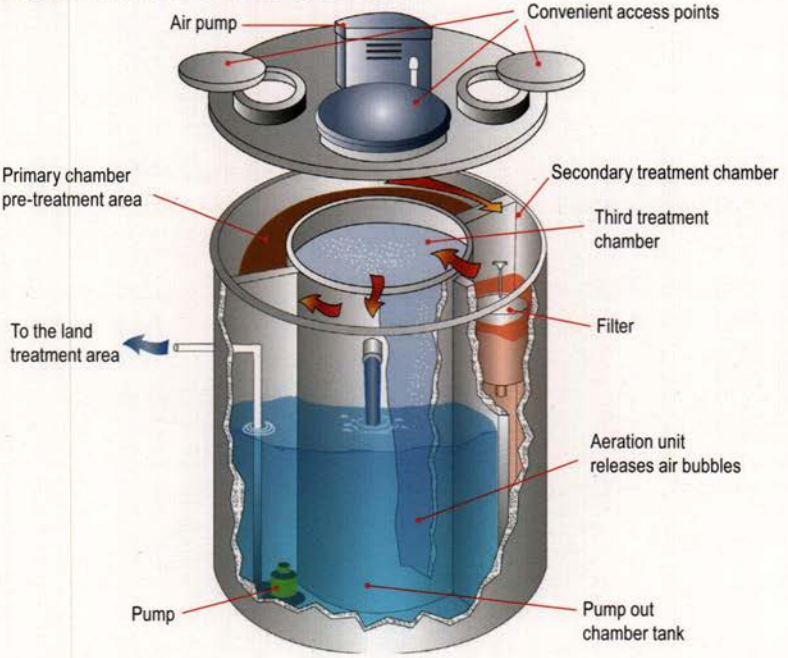
Advanced systems are a more thorough treatment process, which helps get a higher effluent quality more often. AWT systems pump air into the effluent while PBR systems pump effluent over materials that take nutrients and other contaminants out.

Advanced systems are typically designed, manufactured, installed and maintained under contract by a specialist company. These systems need to be checked regularly, so a maintenance contract is required. This is crucial to the effectiveness of your system. Inspection by the company needs to take place at least six monthly. You will then know when your tank compartments need pumping out or if other maintenance is required. The maintenance contract must be continued for the life of the system.

Distribution options for land treatment areas include:

- Pump dosing to a subsurface dripline irrigation system.
- Low pressure effluent dosing using a pump system to intermittently feed the soils with controlled quantities of effluent.
- Pump dosing to raised beds (Wisconsin Mounds) for areas with high groundwater tables or thin soil coverage.

Example of an advanced (AWT) system



- Some advanced systems are more effective at reducing nutrients. This is important to consider when selecting a system if you live in a nutrient sensitive environment, like near lakes and harbours where nutrient standards must be met.
- It is important to get a performance guarantee from the supplier of the system stating it is able to meet the plan's effluent quality standards on a consistent basis. For specific areas of the Bay of Plenty there are standards for five-day Biochemical Oxygen Demand (BOD_5), suspended solids (SS) and total nitrogen (TN) that must be met.
- A trial has been carried out providing the public with information on the performance of some advanced systems and what they can achieve in the treatment of effluent required by the plan. A list of those approved by us is available from our website www.envbop.govt.nz.
- All land treatment areas must be placed away from areas prone to slippage, subsidence, erosion, ponding or overland flow of water, and where it can be compacted by stock or vehicles.

Alternative 'non-water' systems

Alternative systems such as composting toilets deal only with blackwater (toilet waste). If there is no discharge of liquid from your system then the plan does not apply. You will need to contact your district or city council to get a building permit for a composting toilet.

The remaining wastewater from the kitchen, laundry and bathroom (greywater) still needs to be treated and disposed of. A greywater septic tank and land treatment area is needed and is covered by the plan.

Distribution options for greywater land treatment areas include:

- Gravity fed with distribution box to disposal lines.
- Low pressure effluent dosing using a pump system to intermittently feed the soils with controlled quantities of effluent.

✓ Incorporating a composting toilet and disposing of greywater in a manner that meets the plan's permitted requirements for greywater will mean no resource consent is needed from us.

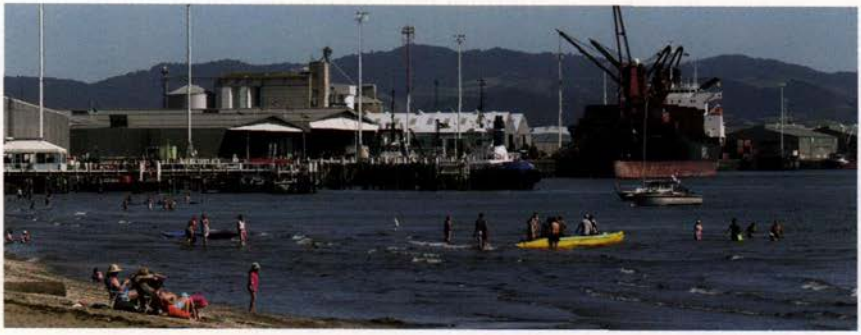
Sewerage Reticulation

Where sewerage reticulation is available, houses/dwellings must connect onto it. Under the Local Government Act you must connect to a reticulated system if reticulation is within 30 metres of your property boundary or within 60 metres of any dwelling on your property.

The main difference between conventional and advanced systems is the level of treatment.

Conventional systems rely on having an adequate quantity of good quality soil that the effluent is discharged into to remove contaminants (suspended solids, some nutrients, bacteria and viruses). The soil type and trench construction are crucial for effective treatment of the effluent.

With advanced systems most of the treatment is done in the tank before the treated effluent is discharged to soil. The same volume of effluent will still be discharged to land but most of its treatment will already have taken place in the tank system. However, the land treatment area still needs to be large enough for effective soakage, final evaporation and plant uptake of the treated effluent.



Section Three – Do I need a resource consent?

The following pages contain flow charts and maps so you can find out what rules and schedules in the plan relate to your property. From this you will know if your on-site effluent discharge needs a resource consent or not.

Start at the flow diagram on page 18 to find the rules that apply to you.

Flowchart key information

♦ **You live near reticulation:**

Dwellings with on-site effluent treatment systems must connect to a sewer reticulation system if one is available. Once a sewer reticulation system becomes available you must connect onto it. Under the Local Government Act you are required to connect to a reticulated system if reticulation is within 30 metres of the property boundary or within 60 metres of any dwelling. The plan also requires this in Rules 3 and 10 to 13.

♦♦ **Rotorua lakes catchments:**

You will have to improve the discharge quality of your effluent so that the **total nitrogen** is reduced to 15 grams per cubic metre (g/m^3) or less, **biochemical oxygen demand** is reduced to 30 g/m^3 or less, and **suspended solids** are reduced to 45 g/m^3 or less before the effluent enters the ground. The date you will have to do this by, either 1 December 2010 or 1 December 2014, will depend on where you live (see page 18) unless you get a consent from us.

♦♦♦ **Western Bay coastal communities:**

If your property is in one of the specified communities you have until **1 December 2010** to improve the discharge quality of your effluent so that the **biochemical oxygen demand** is reduced to 30 g/m^3 or less, and **suspended solids** are reduced to 45 g/m^3 or less before the effluent enters the ground (see page 22).

Permitted. If you can meet all conditions of the rule you do not need resource consent from us.

Discretionary. You need to apply for resource consent from us, as the activity is not permitted.

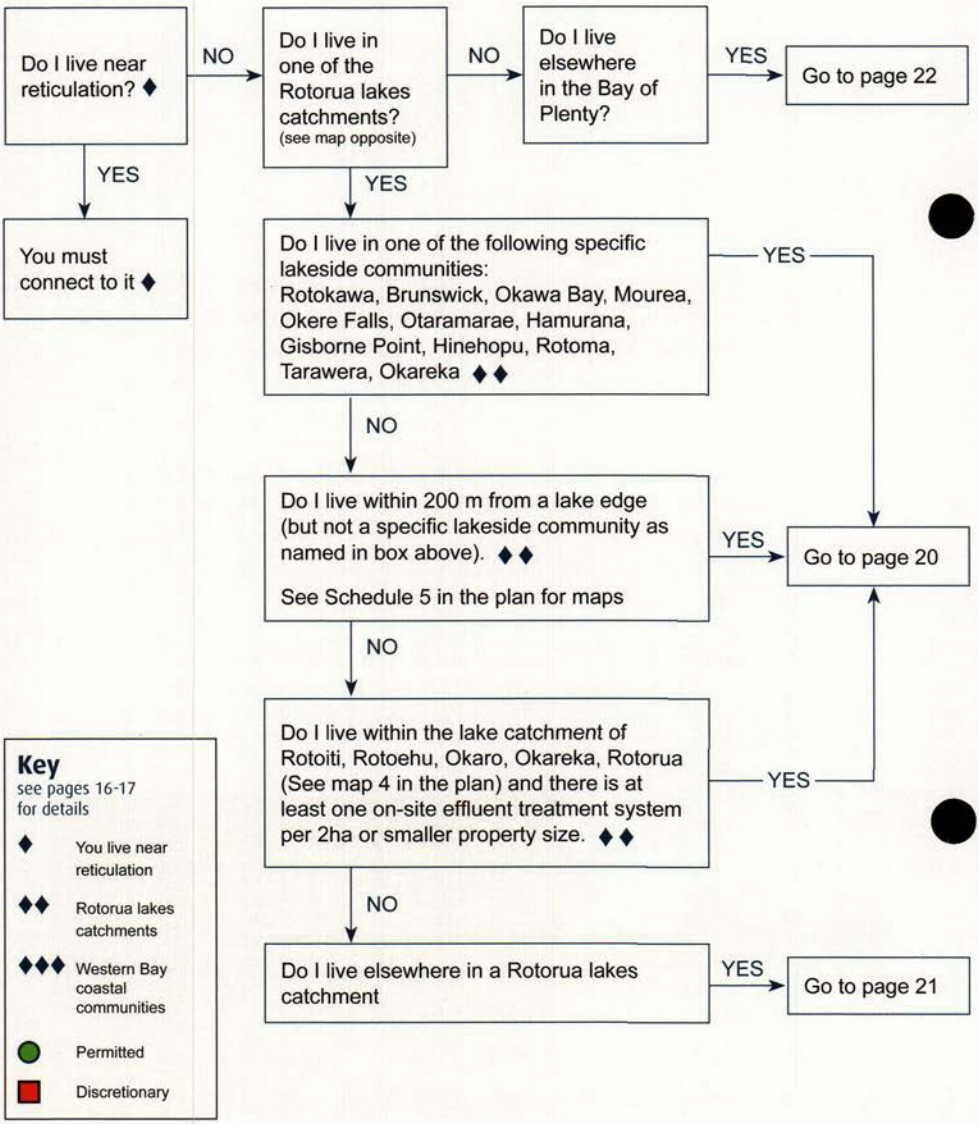
An advanced on-site effluent treatment system should provide the BOD_5 and SS quality improvements required by the plan. Specific advanced systems will provide the TN quality required.

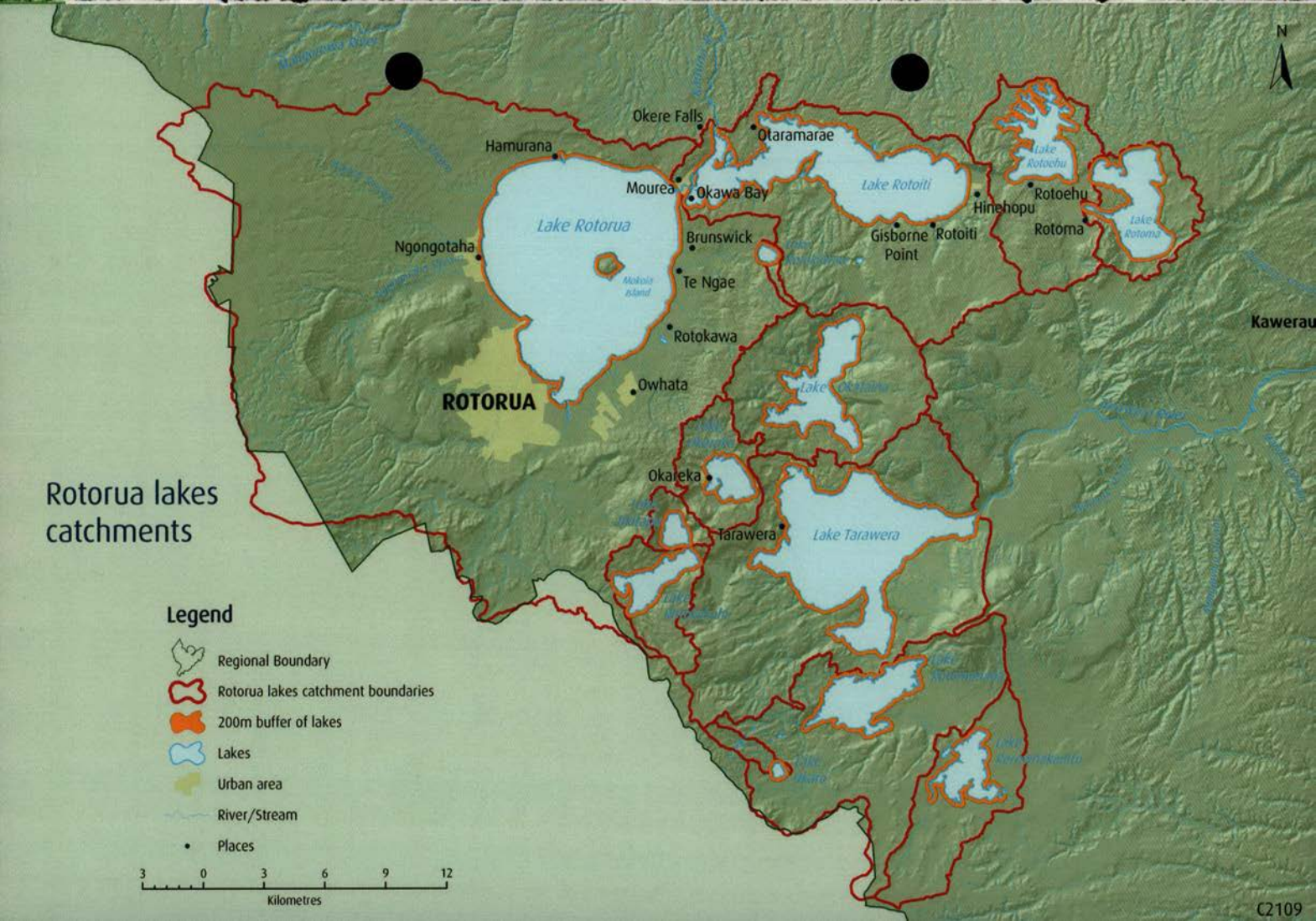
This booklet will refer you to a rule and/or schedule in the plan that is relevant to your situation. You can view the plan at any Environment Bay of Plenty office, your local city or district council, local library or on our website www.envbop.govt.nz

If you have an existing system that is unable to connect to sewer reticulation or cannot be upgraded to comply with the permitted conditions of the plan then you will require resource consent from us to continue to discharge effluent from your septic tank system.

Available from Environment Bay of Plenty is the factsheet *OSET: Rotorua Lakes Catchments - Lakes Factsheet 10.*

Do I need a resource consent?

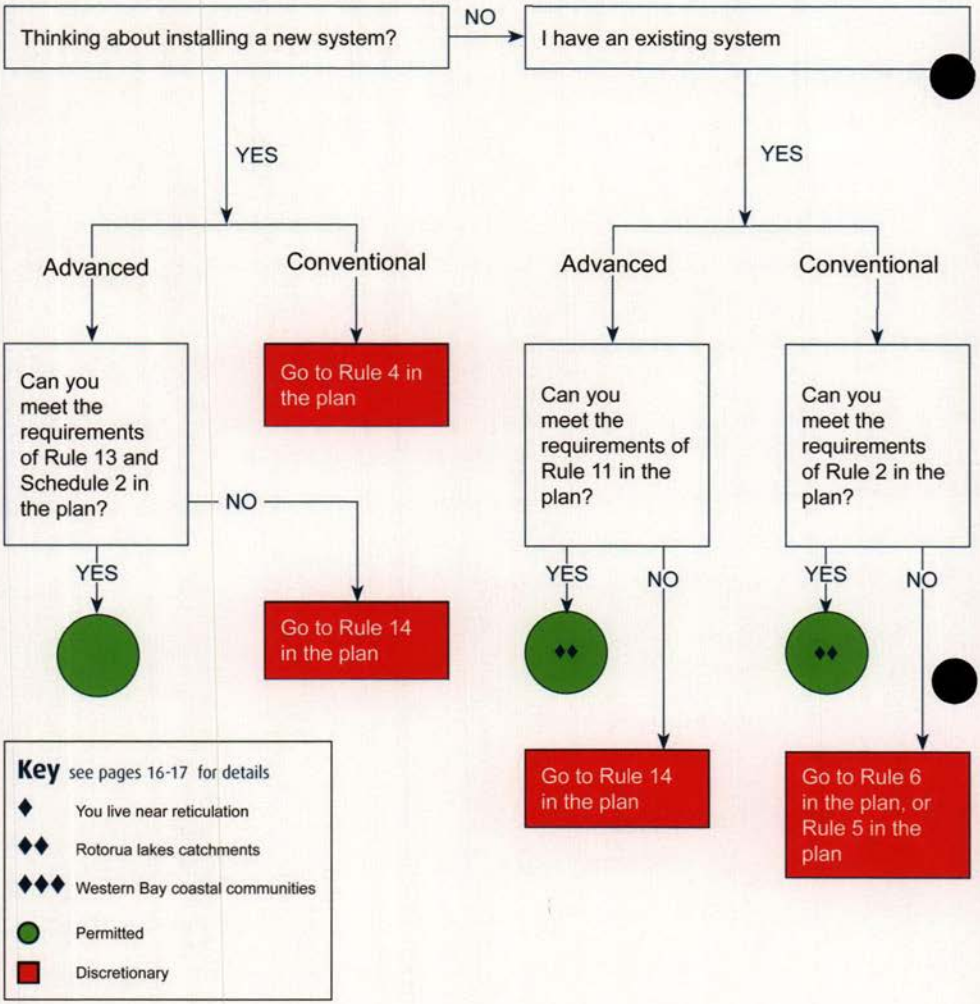



Rotorua lakes catchments
N
Okere Falls
Hamurana
Otaramarae
Mourea
Okawa Bay
Lake Rotoiti
Lake Rotoehu
Rotoehu
Hinehopu
Lake Rotoma
Rotoma
Gisborne Point
Rotoiti
Brunswick
Lake Rotorua
Ngongotaha
Te Ngae
Mokoia Island
Rotokawa
Kawerau
ROTORUA
Owhata
Okareka
Tarawera
Lake Tarawera
Legend
Regional Boundary
Rotorua lakes catchment boundaries
200m buffer of lakes
Lakes
Urban area
River/Stream
Places
3 0 3 6 9 12
Kilometres
C2109

Rotorua lakes catchments

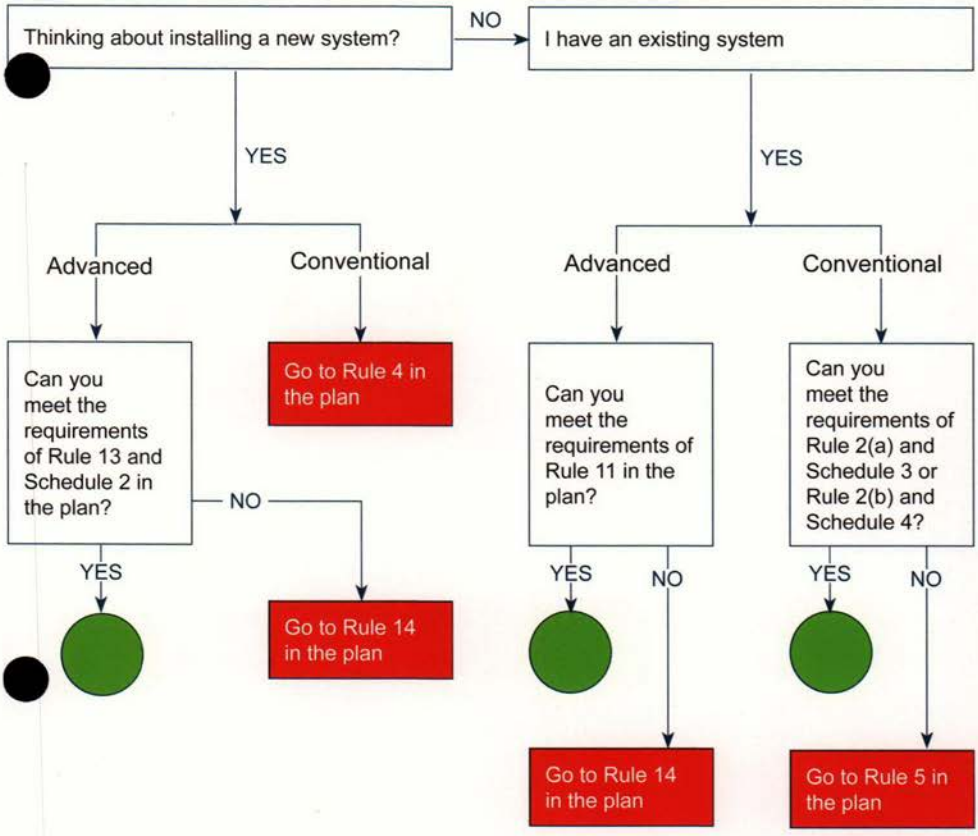
- Specific lake communities
- 200m buffer
- Specific lake catchments (see flowchart on page 18)

NB: Systems within 200 metres of the edge of any lake that are not identified in the Rotorua District Council's Ten Year Plan for reticulation must be cleaned out and inspected by 1 December 2006.

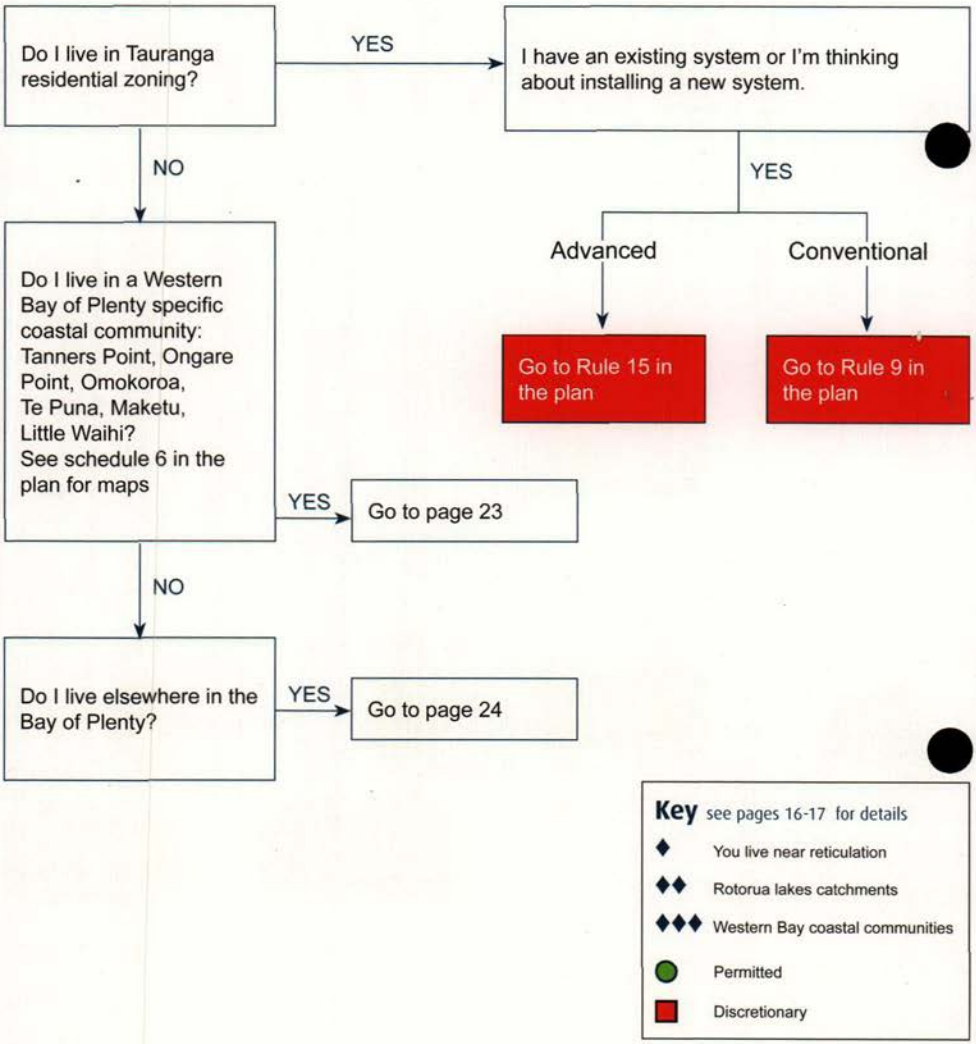


Rotorua lakes catchments

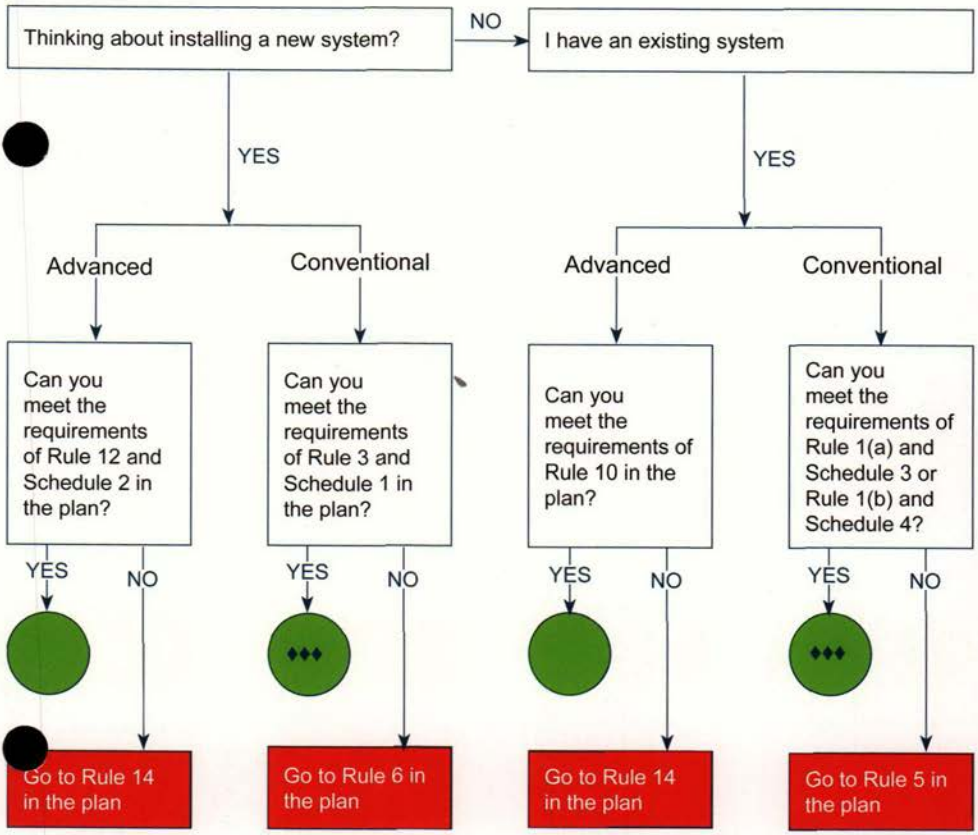
- Elsewhere in the Rotorua lakes catchments (see flowchart on page 18)



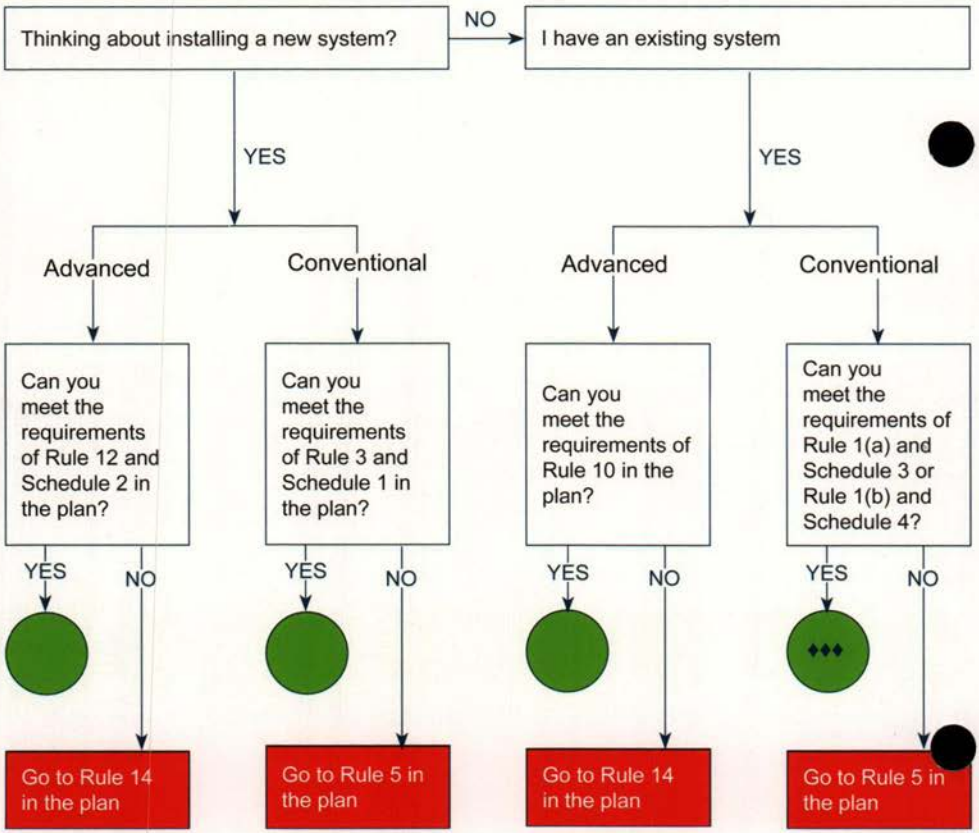
Bay of Plenty excluding Rotorua lakes catchments



Western Bay of Plenty specific communities



Elsewhere in the Bay of Plenty



Section Four – Planning your system

Working out what type of on-site system you need

Schedules 1 and 2 of the plan have information so you can work out what type of system can be installed at your site. Depending on your location (Rotorua lakes catchments or coastal communities) you may now need to comply with Schedule 2 by 2010 or 2014.

Schedules 3 and 4 set out the rules that apply to existing systems (those installed before the reviewed plan became operative on 7 August 2006).

Schedules 5 and 6 are maps of areas referred to in the rules.

✓ To help you, a *summary* of tables from Schedule 1 and 2 are included in this guide. These tables cover how to work out your water usage, tank capacity, soil type, how much trench you will need, and how to work out if your activity is permitted and what modifications you can make for it to be permitted.

Tank capacity (Table 5)

To work out minimum size of tank required

Number of bedrooms	Minimum tank capacity/size (litres)
1 to 3	2700
4 to 6	3300 (typically caters for up to 9 people)

To cater for 10 people or more the capacity (C) can be determined by the formula C = (P x A) + 2000 litres
Where: P = the number of persons to be served, and A = the daily wastewater flow allowance in litres/person/day (see Table 9 on page 32).
For motels/hotels with a restaurant use the formula C = (P x A) + 3000 litres

! If you are altering your dwelling and increasing the number of rooms that can be used as bedrooms then your treatment system must be modified or replaced to cope with the additional wastewater to be generated.

610 STANLEY ROAD WAIWHE BARRACLOUGH.

Conventional systems - Can I go permitted? (Table 6)

Select one item from each of the numbered sections and note the score.
A **total** score of 1 to 4 means you have a permitted activity subject to Rule 3. Scores higher than this need resource consent unless modification can be carried out as suggested in Table 8 on page 27, which may influence the final score. If you can meet the conditions of Rule 3 then a resource consent is not required from us. If you have any questions about this table then contact Environment Bay of Plenty on 0800 ENV BOP (368 267).

		Factor	Score
1	**Tank treatment**		
	• single stage or two-stage septic tank with approved effluent outlet solids filter	2	2
	• greywater only	1	
2	**Water table** The distance to the water table from the base of the disposal line		
	• greater than 1500 millimetres	0	0
	• between 1200 - 1500 millimetres	1	
	• between 600 - 1200 millimetres	2	
	• between 0 - 600 millimetres	4	
3	**Soil type and drainage (see Table 10 for soil type)**		
	• gravel, coarse sand - rapid draining (category 1)	2	
	• sand coarse to medium - free draining (category 2)	1	
	• loamy sand - good drainage (category 3)	1	1
	• sandy loam, loam, silt loam - moderate drainage (category 4)	0	
	• sandy clay-loam, clay-loam, silty clay-loam - moderate to slow drainage (category 5)	0	
	• sandy clay, non-swelling clay, silty clay - slow drainage (category 6)	4	
	• swelling clay, grey clay, hardpan - poorly or non-draining (category 7)	4	
4	**Barrier to vertical soakage**	4	
	• restrictive drainage soil horizon within 2 metres of soil surface.		0
	• restrictive drainage soil horizon deeper than 2 metres of soil surface.	0	
5	**Slope of land at treatment area**		
	• less than 8.5° (less than 15% slope).	0	0
	• greater than 8.5° (more than 15% slope).	3	
6	**Barrier to horizontal soakage** (e.g. vertical cuttings, retaining walls, building walls in the soil profile)		
	• greater than 3 metres and greater than 45° slope from the toe of a wall/embankment.	0	0
	• less than 3 metres or less than 45° slope from the toe of the wall/ embankment.	4	
7	**Distance to surface water (including ephemeral) or bore**		
	• greater than or equal to 40 metres	0	0
	• between 20 – 40 metres	1	
	• less than 20 metres	4	
TOTAL SCORE			3

Modify the treatment or site conditions (Table 8)

Limiting factors	Requirement	Solution or recommendation	Go back to Table 6 (✓)
1 Tank treatment	Improve the treatment level	• install outlet solids filter • increase tank size • install advanced treatment system	✓ ✓ Go to Rule 12 or 13
Water table	• improve the clearance to the water table *or* • improve the treatment level	• raise soakage field • use mound systems • install advanced treatment system and irrigation lines	✓ ✓ Go to Rule 12 or 13
3 Soil type and drainage	• remove restriction *or* • increase depth to restriction or • decrease loading or • improve the treatment level	• break up iron pan/ clay pan • raise or move the soakage field • use pump dosing • install advanced treatment system and irrigation lines	✓ ✓ ✓ Go to Rule 12 or 13
4 Barrier to horizontal soakage	Increase distance to barrier	• move system	✓
5 Distance to surface water or bore	• increase distance from surface water or bore • improve treatment level	• move system • install advanced treatment system and irrigation lines	✓ Go to Rule 12 or 13

Advanced Systems - Can I go permitted? (Table 11)

Select one item from each of the numbered sections and note the score.
A total score of 1 to 4 means you have a permitted activity subject to Rule 12 or 13. Scores higher than this need resource consent unless modification can be carried out as suggested in Table 12 on page 29, which may influence the final score. If you can meet the conditions of Rule 12 or 13 then a resource consent is not required from us. If you have any questions about the information in this table contact Environment Bay of Plenty on 0800 ENV BOP (368 267).

	Factor	Score
1 Tank treatment Advanced treatment unit	1	
2 Water table The distance to the water table from the base of the disposal line		
• greater than 1200 millimetres	0	
• between 1000 – 1200 millimetres	1	
• between 300 – 1000 millimetres	2	
• between 0 – 300 millimetres	4	
3 Soil type and drainage (see Table 10 for soil type)		
• gravel, coarse sand – rapid draining	2	
• sand coarse to medium – free draining	1	
• loamy sand – good drainage	1	
• sandy loam, loam, silt loam – moderate drainage	0	
• sandy clay-loam, clay-loam, silty clay-loam – moderate to slow drainage	0	
• sandy clay, non-swelling clay, silty clay – slow drainage	2	
• swelling clay, grey clay, hardpan – poorly or non-draining	2	
4 Barrier to vertical soakage For irrigation line, i.e. pressure compensating emitters:		
• restrictive drainage soil horizon within 0.5 metres of soil surface.	2	
• restrictive drainage soil horizon deeper than 0.5 metres of soil surface.	0	
5 Slope of land at treatment area		
• less than 8.5° (less than 15% slope)	0	
• greater than 8.5° (more than 15% slope)	2	
6 Barrier to horizontal soakage (e.g. vertical cuttings, retaining walls, building walls in the soil profile)		
• greater than 3 metres and greater than 45° slope from the toe of a wall/embankment	0	
• less than 3 metres or less than 45° slope from the toe of the wall/ embankment	4	
7 Distance to surface water (including ephemeral) or bore		
• greater than or equal to 30 metres	0	
• between 25 – 30 metres	1	
• between 20 – 25 metres	2	
• less than 20 metres	4	
TOTAL SCORE		

Modify the treatment or site conditions (Table 12)

Limiting factors	Requirement	Solution or recommendation	Go back to Table 11 (✓) or apply for resource consent
1 Tank treatment	Improve the treatment level	• add disinfection	Apply for resource consent
		• add nutrient removal	Apply for resource consent
2 Water table	Increase the clearance to water table	• provide raised bed for land application	✓
		• improve treatment by adding disinfection	Apply for resource consent
3 Soil type and drainage	• remove restriction	• break up iron pan/clay pan	✓
	• increase depth to restriction	• provide raised bed for land application	✓
	• decrease loading	• reduce the design irrigation rate to 3 millimetres per day	Apply for resource consent
		• reduce the design irrigation rate to 2 millimetres per day	Apply for resource consent
	• improve treatment	• add disinfection	Apply for resource consent
		• add disinfection and nutrient removal	Apply for resource consent
4 Barrier to horizontal soakage	• increase distance to barrier	• move system	✓
	• improve treatment level	• add disinfection	Apply for resource consent
		• add disinfection and nutrient removal	Apply for resource consent
5 Distance to surface water or bore	• increase distance to surface water	• move system	✓
	• improve treatment level	• add disinfection	Apply for resource consent
		• add disinfection and nutrient removal	Apply for resource consent

Trench length and reserve area (Table 7)

		Gravel, coarse sand - Rapid draining		Sand coarse to medium - Free draining		Loamy sand - Good drainage		Sandy loam, loam, silt loam - Moderate drainage		Sandy clay loam, clay loam, silty clay loam - Moderate to slow drainage	
		Category 1		Category 2		Category 3		Category 4		Category 5	
Average daily flow (L)	Number of bedrooms	Trench length (m)	Reserve area (m^2)	Trench length (m)	Reserve area (m^2)	Trench length (m)	Reserve area (m^2)	Trench length (m)	Reserve area (m^2)	Trench length (m)	Reserve area (m^2)
Up to 500	0*	16	64	22	90	37	150	45	180	75	300
Up to 1000	1 to 3	32	128	45	180	74	300	90	360	150	600
1000 - 1400	4	45	180	60	240	105	420	125	500	210	840
1400 - 1600	5	50	200	70	280	120	480	145	580	240	960
1600 - 2000	6	64	256	90	360	148	590	180	720	300	1200
More than 2000	7 or more	Resource consent is required for discharges of more than 2 m^3/day									

* This applies to offices or service stations and the like. The building is not a residence.

See page 31 for more information

Size of trench

Table 7 is based on a 45 cm wide trench filled with gravel. The width of the trench may be reduced as long as the trench length from Table 7 is increased by the following formula:

Narrow trench = (L x 0.45) ÷ W, where: L = trench length from Table 7, W = trench width.

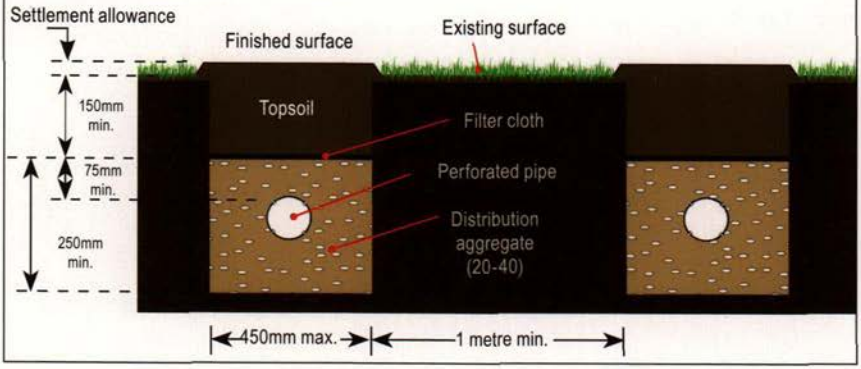
The trench width must not exceed 45 cm. The minimum spacing between adjacent trenches (sidewall to sidewall) is 1 m, although 2 m is preferable (see diagram below).

Pump dosing of lines is required for rapid draining and moderate to poor drainage soils. Free draining and good drainage soils may not require pump dosing of effluent, however this is recommended for even distribution throughout the full length of disposal line.

The reserve area provides room to install a new land treatment area in the event of system failure. For future enlargement of a dwelling the reserve area can provide for additional land treatment area and cope with any increased loading. The reserve area can still be used for garden or lawn purposes.

The installation of an outlet solids filter prevents solids passing from the tank to the land treatment area. The filter also regulates flow so that waste is held longer in the tank. You may have to clean out your tank more often to maintain the capacity, but the filter will prevent the land treatment area from clogging. Filters require regular checks and cleaning by hosing down with the discharge back to the tank.

Example of soakage trenches



Wastewater flow design allowance (Table 9)

Wastewater source	Typical wastewater flow allowance in litres/person/day[1]	
	On-site roof water tank supply	Reticulated community or bore water supply
Households with standard facilities (including automatic washing machine)	140	180
Households with standard water reduction fixtures[2]	115	145
Households with full water reduction facilities[3]	80	110
Households with full water reduction facilities plus reclaimed water recycle for water closet flushing[4]	65	95
Households with extra wastewater producing facilities (e.g. garbage grinders; douches)	170	220
Households - blackwater only (standard facilities)	50	60
Households - greywater only (standard facilities)	90	120
Motels/hotels		
- guests, resident staff	140	180
- non-resident staff	30	40
- reception rooms	20	30
- bar trade (per customer)	20	25
- restaurant (per diner)	20	30
Community halls		
- banqueting	20	30
- meetings	10	15
Marae		
- day only visitors	30	40
- day plus overnight visitors	130	150
Restaurants (per diner)		
- dinner	20	30
- lunch	15	25
Tea rooms (per customer)		
- without restroom facilities	10	15
- with restroom facilities	15	25
Schools (pupils plus staff)	30	40
Rural factories, shopping centres (staff)	30	50
Public toilets (including hand wash)	8	10
Camping grounds		
- fully serviced	100	130
- recreation areas	50	65

See page 33 for more information

Table 9 notes:

1 These flows are recommended minimums for design purposes.

2 Standard water reduction fixtures include dual flush 11/5.5 litre toilets, shower flow restrictors, aerator faucets (taps), water conserving automatic washing machines.

3 Full water reduction fixtures include the combined use of reduced flush 6/3 litre toilets, shower flow restrictors, aerator faucets, front-load washing machines and flow/pressure control inserts on all water use outlets.

4 As for note 3, plus on-site greywater treatment and recycle to toilet cistern, or on-site/off-site treatment and recycle of reclaimed water for toilet flushing.

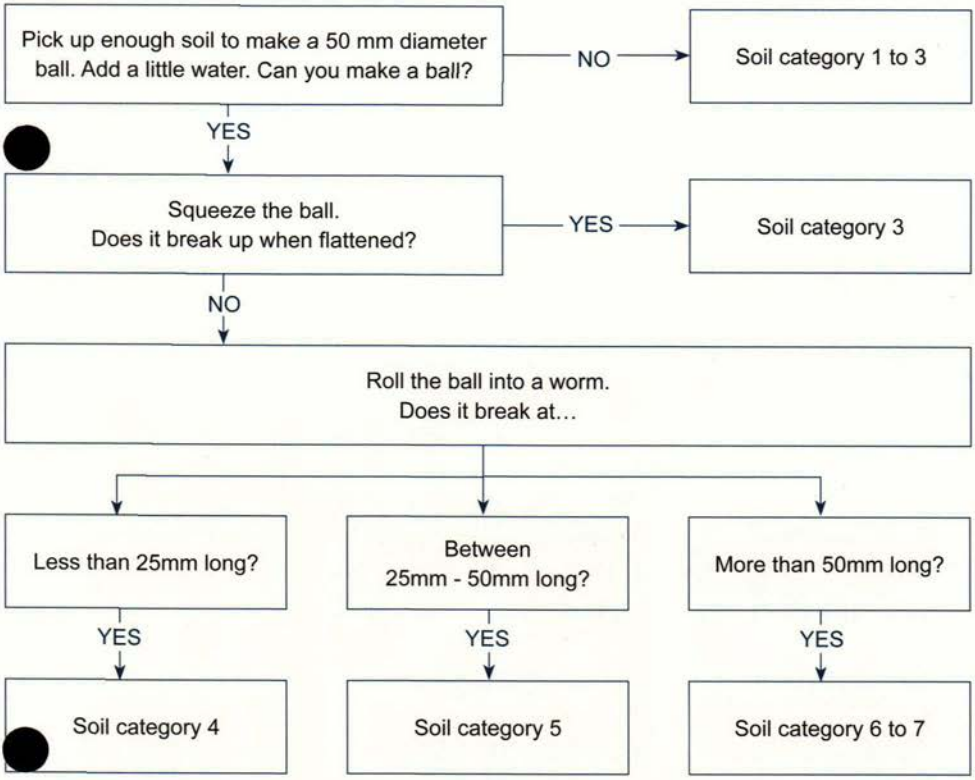
To work out the amount of wastewater

To work out the amount of wastewater that is typically discharged from a dwelling, allow for the number of people reasonably expected to use it. Allow 1.5 people per bedroom (including offices or any other similar room that could be used as a bedroom) and round the number up e.g. for 3 bedrooms 3 x 1.5 = 4.5 is rounded up to 5 people. You then use Table 9 (page 32) and multiply the number of people by the wastewater flow allowance for your situation.

Appearance and feeling of soil types (Table 10)

Soil type	Appearance and feeling of moist soil	Approximate clay content (%)	Soil Category
Gravel, Sand	Cannot be moulded; single sand grains adhere to fingers	Always less than 10 % and commonly less than 5 %	1 to 3
Loamy sand	Slight coherence; can be sheared between thumb and forefinger to make a snake of about 5 mm	5 to 10 %	3
Clayey sand	Slight coherence; sticky when wet, many sand grains stick to fingers; will make a snake of 5 to 15 mm; discolours fingers with clay stain	5 to 10 %	3
Sandy loam	Just coherent but very sandy to touch; will make a snake of 15 to 25 mm; dominant sand grains are of medium size and are readily visible	10 to 15 %	4
Light sandy clay loam	Strongly coherent but sandy to touch; sand grains are of medium size and are readily visible; will make a snake of about 20 to 25 mm	15 to 20 %	4
Loam	Coherent and rather spongy; smooth feel when manipulated but with no obvious sandiness or silkiness; may be somewhat greasy to touch if much organic matter present; will make a snake of about 25 mm	About 25 %	4
Silt loam	Coherent; very smooth to silky when manipulated; will make a snake of 25 mm	About 25 % and with 25 % or more silt	4
Sandy clay loam	Strongly coherent; sandy to touch; medium size sand grains visible in finer matrix; will make a snake of 25 to 40 mm	20 to 30 %	5
Clay loam	Coherent and plastic; smooth to manipulate; will make a snake of 40 to 50 mm	30 to 35 %	5
Silty clay loam	Coherent and smooth; plastic and silky to touch; will make a snake of 40 to 50 mm	30 to 35 % and with 25 % or more silt	5
Sandy clay	Plastic; fine to medium sand grains can be seen, felt or heard in clayey matrix; will make a snake of 50 to 75 mm	35 to 40 %	6
Silty clay	Plastic; smooth and silky to manipulate; will make a snake of 50 to 75 mm	35 to 40 % and with 25 % or more silt	6
Light clay (non-swelling)	Plastic; smooth to touch; slight resistance to shearing between thumb and forefinger; will make a snake of 50 to 75 mm	35 to 40 %	6
Medium clay	Smooth plastic; handles like plasticine and can be moulded into rods without fracture; has some resistance to shear; will make a snake of about 75 mm or more	45 to 55 %	7
Heavy clay (swelling)	Smooth plastic; handles like stiff plasticine; can be moulded into rods without fracture; has firm resistance to shear; will make a snake of 75 mm or more	50 % or more	7

Soil category by feel



Land treatment area

By using Table 9 on page 32 you can work out your daily wastewater flow design allowance. For every 100 litres of wastewater, you will need at least 20 square metres of land treatment area where subsurface irrigation is installed for the disposal of the treated effluent. Using more area will improve the performance of the treatment area; the greater the area the better the treatment will be.

Section Five – Region-wide rules

As well as specific rules for the disposal of treated effluent to land that are based on your property's location, there are other region-wide rules that govern what you can and cannot do in regard to on-site effluent treatment and disposal. These are listed and summarised below. Please refer to the following rules in the plan for more detail.

- **Greywater**
  Rule 16 permitted, Rule 17 discretionary
  Greywater is specifically water from your bath, shower, handbasin, kitchen and washing machine. Greywater can be managed and re-used within your home and property.
- **System upgrade**
  Rule 21 discretionary
  When an on-site effluent treatment system fails it will need to be upgraded or replaced with a new system.
- **Dwelling expansion/alteration**
  Rule 20 discretionary
  If you change the size of your dwelling so more people can live in it, you may need to upgrade your system.
- **Soak holes**
  Rule 7 discretionary, Rule 8 prohibited
  Soak holes are holes in the ground where the wastewater from the toilet, kitchen, bathroom, and laundry is discharged to. They are generally filled with coarse material to help rapid soakage into the soil.
- **The use of explosives** to maintain soak hole infiltration is *prohibited Rule 8*. Once a soak hole has failed it must be replaced *Rule 7*.
- **Pit latrines**
  Rule 18 permitted, Rule 19 discretionary
  Pit latrines (also referred to as long drop toilets or privies) are holes in the ground and are non-flush toilets. No other wastewater is discharged to a pit latrine. Pit latrines are only to be installed in remote locations where the level of use is low, and where other on-site disposal systems are not possible. Permission may be required from the district or city council in respect of building regulations, other legislation or bylaws.

- **Septage to land**
  Rule 22 discretionary
  Septage is the entire contents of a septic tank, usually removed when the tank is cleaned.
- **Spray irrigation of wastewater effluent**
  Rule 23 discretionary
  When wastewater is irrigated onto land for disposal, instead of using ground soakage methods.

The plan sets out policies and rules that manage the effects on the environment caused by discharging treated domestic wastewater to land. You do not require resource consent from us if the conditions in the plan for a **permitted** activity can be met. If however you cannot meet these conditions then your activity is **discretionary**. This means you need resource consent from us. This ensures that any bad effects your activity might have on the environment are controlled through the conditions of your consent. Activities that are not allowed at all are classified as **prohibited**.

Section Six – Looking after it/ ongoing management

Provided your on-site effluent treatment system is properly cared for it will be an effective means of effluent disposal and give you many years of reliable service.

Do: ✓	Don't: ✗
• Scrape dishes before washing • Keep all possible solids out of your system. • Install water saving devices e.g. dual flush toilets. • Take showers instead of baths. Use biodegradable soaps and washing powder. • Divert stormwater away from your land treatment area. • Make sure your tank lid is kept easily accessible. • Install an outlet solids filter.	• Use a garbage grinder. • Put items like sanitary napkins or disposable nappies into your system. • Wash clothes until you have a full load. • Over-use powerful bleaches and disinfectants or put chemicals or paint down the drain. • Allow vehicles or stock on the land treatment area. • Cover the mushroom vent. • Grow deep rooting plants over soakage trenches or pipes. • Empty chemical toilet waste into your system. • Build on your reserve soakage field area.

By following a simple maintenance programme you will continue to have an efficient and healthy disposal system for many years. A failed septic tank system is a serious health and environmental hazard. The warning signs are obvious: wastewater ponding on the ground surface; the smell of sewage near the tank or land treatment area; slow running drains or toilets.

For conventional septic tank systems a pump-out of the system is typically required every three years, or possibly sooner if an outlet solids filter is installed. The septic tank is cleaned by taking the concrete lid off the tank, not by putting the pipe down the 'mushroom' vent. So make sure the lid is easily accessible.

For advanced on-site effluent treatment systems a record of servicing and maintenance must be kept, and a certificate (guarantee) of performance from the manufacturer (supplier) lodged with Environment Bay of Plenty (see rules 10 to 13 of the plan).

✓ If you neglect your system it will let you down. If your system needs maintenance contact a local plumber or drainlayer, or maintenance contractor.

Maintenance and Performance Inspection and Certification Programme

Environment Bay of Bay runs maintenance and inspection programmes for conventional systems located in the Western Bay and in the Rotorua lakes catchments. These communities and areas are shown in Schedule 5 and Schedule 6 of the plan.

For Western Bay the communities are Maketu, Little Waihi, Omokoroa, Ongare Point, Te Puna, and Tanners Point (see Schedule 6).

For Ongare Point the first round of septic tank pump-outs and inspections must be completed by
1 December 2006.

For the Rotorua lakes catchments the communities are Brunswick, Rotokawa, Mourea, Okawa Bay, Okere Falls, Otaramarae, Hamurana, Gisborne Point, Hinehopu, Rotoma, Okareka, and Tarawera (see Schedule 5 and Schedule 6).

For Rotoma the first round of septic tank pump-outs and inspections must be completed by 1 December 2006.

For the Rotorua lakes catchments where septic tank systems are within 200 metres of a lake edge (see Schedule 5), a maintenance and performance inspection and certification program must be completed.

The first round of septic tank pump-outs and inspections must be completed by 1 December 2006 for Lakes Rotorua, Rotoiti, Rotoehu, Rotoma, Rotokawau, Okataina, Okareka, Tikitapu, Rotokakahi, Tarawera, Rotomahana, Okaro and Rerewhakaaitu.

These are systems that are not identified for reticulation in the Rotorua District Council's Ten Year Plan.

Information on these programmes is available from our website (www.envbop.govt.nz) or by contacting us.

Environment Bay of Plenty-certified operators carry out the maintenance and inspection. For a list of our certified septic tank inspectors contact us at 0800 ENV BOP (368 267) or visit our website (www.envbop.govt.nz). These tank inspectors complete forms issued by Environment Bay of Plenty that are then lodged with us to maintain a record of the servicing and condition of your system.

You can also ask for an inspection to be done on a system when you are selling or purchasing a property, for assurance that the system is functional and complies with the plan. If your system fails the inspection, it may need to be upgraded or modified.

Section Seven – How to apply for a resource consent

Contact our consents and compliance staff to discuss your proposal and find out the information we require. We have specific application forms for on-site effluent discharge. The forms can be posted to you, or visit our website to download them at www.envbop.govt.nz. There is an annual charge on each resource consent. The amount you are charged varies depending on the activity you do.

> **!** It is essential you provide all the relevant information required. Failure to do so can delay the processing of your application. If you are in doubt about what is required then please contact us for advice.

Mushroom vents above septic tank.

Does your activity require a consent or permission from someone else?

Permitted activities under the plan only relate to disposal of effluent on your property. A resource consent may be required if your effluent land treatment area is on a property owned by someone else. You will need written permission from the property owner as part of your application to Environment Bay of Plenty for resource consent to authorise the effluent discharge.

Installing or upgrading an on-site effluent treatment system requires a building permit from the relevant district or city council. You will need to contact one of these councils to obtain a building permit to authorise installing the tank system:

Tauranga City Council	07 577 7000
Rotorua District Council	07 348 4199
Western Bay of Plenty District Council	07 571 8008
Whakatane District Council	07 306 0500
Kawerau District Council	07 323 8779
Opotiki District Council	07 315 3030

For more information on the On-Site Effluent Treatment Regional Plan 2006 or on which systems meet the standards, visit our website at www.envbop.govt.nz, or contact us at 0800 ENV BOP (368 267) or email us at info@envbop.govt.nz.

Environment Bay of Plenty

- 5 Quay Street, Whakatane
- 1125 Arawa Street, Rotorua
- 6 Rata Street, Mount Maunganui

Post: P O Box 364, Whakatane

Phone: 0800 ENV BOP (368 267)
Fax: 0800 ENV FAX (368 329)

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Email: info@envbop.govt.nz
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