

MCH Limited

GRAHAM COX BE(Hons) MIPENZ

MIKE HORSLEY BE MIPENZ

CIVIL AND STRUCTURAL ENGINEERS
PROJECT MANAGEMENT

19 Willow Street

PO Box 1029

TAURANGA

Telephone: (07) 578-4071

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**COUNCIL
COPY**

Ref: 026/06-revD

1 February 2012

Meridian Building and Construction Ltd
24 Athelstan Way
TAURANGA

PIM/BC

. . 6 9 3 8 6

RE: LAZER BOXED FLOORING SYSTEM

As requested, we have undertaken specific design calculations for the lateral restraint of concrete floor slabs that are not embedded into the ground. The NZ code for timber framed buildings, NZS 3604:2011, requires a minimum depth of footings below cleared ground level of 200mm. This embedment does provide some lateral restraint to the building, particularly for earthquake, but the majority of the restraint is provided by the shear/friction through the soil.

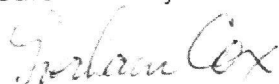
To suit your method of construction, we have undertaken a specific design for the floor slab restraint system. The lateral restraint is provided by friction between the floor slab and the ground, except that in Earthquake Zones 2 and 3 (NZS 3604), some additional restraint is required and shear piles will need to be provided around the perimeter footing (the number of piles, per 100m² of ground floor area is noted on the sketches). The details and requirements are noted on the attached sketches 026/06, S1a, S1b, S2a and S2b and on the Producer Statement.

The design covers 4 cases;

1. Single storey timber framed buildings with a light roof (roofing having a mass not exceeding 20kg/m²) and light wall cladding (cladding mass not exceeding 30kg/m²).
2. Single storey timber framed buildings with a heavy roof (roofing having a mass not exceeding 60kg/m²) and heavy wall cladding (cladding mass not exceeding 220kg/m²).
3. Two storey timber framed buildings with a light roof (roofing having a mass not exceeding 20kg/m²) and light wall cladding to both storeys (cladding mass not exceeding 30kg/m²).
4. Two storey timber framed buildings with a heavy roof (roofing having a mass not exceeding 60kg/m²), light upper storey wall cladding (cladding mass not exceeding 30kg/m²) and heavy lower storey wall cladding (cladding mass not exceeding 220kg/m²).

The design and construction is to comply with the requirements of NZS 3604:2011 except for the requirement for a 200mm minimum embedment of the slab edge thickening into cleared ground. The slab and edge thickening are to be founded on either "good ground" as defined in NZS 3604:2011 or compacted fill. If fill is used, it is to extend a minimum of 500mm beyond the building line or a distance equal to the depth of the fill, whichever is greater.

Yours faithfully



G.B. Cox
Chartered Professional Engineer



RRD001SH3K

Document Number: RDC-286540

Date Registered: 31/7/2012

PRODUCER STATEMENT - PS1- DESIGN

ISSUED BY: Graham Bruce Cox
TO: Meridian Adventure Holdings Ltd
IN RESPECT OF: Lazer Boxed Flooring System - Lateral Restraint

MCH Ltd have been engaged by Meridian Adventure Holdings Ltd to provide structural design services in respect of the requirements of Clauses B1 and B2 of the Building Regulations 1992 for the building work. The design has been prepared in accordance with B1/VM1 and B2/AS1 (respectively) of the approved documents issued by the Department of Building and Housing and the work is described on our report dated 1 February 2012 titled Lazer Boxed Flooring System, reference 026/06-revC and detailed on our A4 plans numbered 026/06, S1a, S1b, S2a and S2b (all revision D), and the specification and other documents according to which the building is proposed to be constructed.

As an independent professional covered by a current policy of Professional Indemnity Insurance to a minimum value of \$200,000, I BELIEVE ON REASONABLE GROUNDS that subject to:
the verification of the following design assumptions

- i) all proprietary products meeting the performance specification requirements.
- ii) all non-specific design construction to NZS 3604:2011 and NZS 4229:1999.
- iii) inspection of construction by the Territorial Authority.
- iv) the bracing of the dwelling meets the requirements of NZS 3604:1999.
- v) the definition of "light" and "heavy" claddings are as defined in NZS 3604:2011.
- vi) the concrete slab and edge thickening are founded on "good ground" as defined in NZS 3604:2011 or compacted fill.

the structural engineering designed elements comply with the relevant provisions of the building code.
This producer statement does not cover;

- the suitability or stability of the site.
- weathertightness of the structure.
- the performance of the concrete floor slab other than for lateral restraint.
- construction and site supervision.

This certificate is for Building Consents issued before 1 February 2014 or the issue of a revision to NZS3604:2011, whichever occurs first.

This Producer Statement applies only to floors constructed under the supervision of Meridian Adventure Holdings Ltd.

GBCox
BE (Civil) MIPENZ CPEng
(Professional Qualifications)

DATE: 20-1-12

This section only to be completed by P Coombes of Meridian Adventure Holdings Ltd.

SITE ADDRESS:

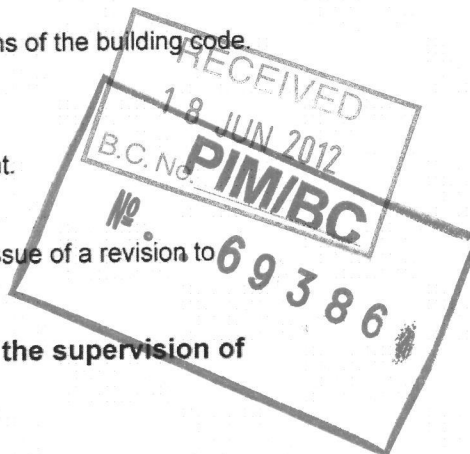
15 Hamon Place, Pukehangī, Roburua

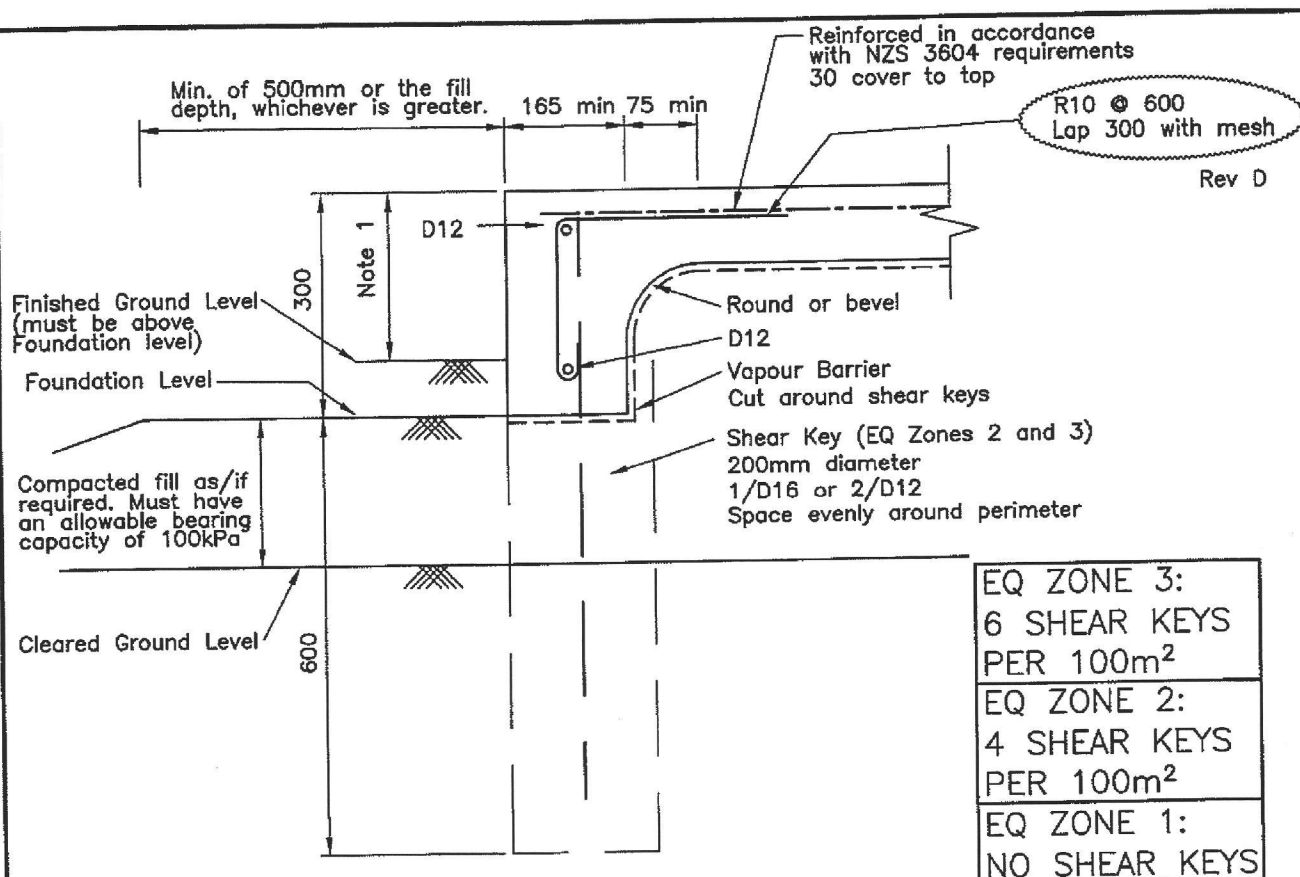
BUILDING CONSENT No: 69386

JOB No:

DATE: 15/6/12

Signed by P.L. Coombes





SINGLE STOREY (LIGHT ROOF, LIGHT WALLS)

NOTE:

1. Depth to the outside ground is to comply with NZS 3604
2. Shear Keys; 4 shear keys required per 100 square metres of ground floor area for EQ Zone 2 (NZS 3604).
Shear Keys; 6 shear keys required per 100 square metres of ground floor area for EQ Zone 3 (NZS 3604).
3. Cleared ground is to be "good ground" as defined in NZS 3604.
4. Foundations must bear either on good ground or or compacted fill. If fill is used, it must extend a min. of 500mm beyond the building line or a distance equal to the fill depth, whichever is greater.
5. Concrete to be 17.5MPa in Durability Zone B.
Concrete to be 20MPa if more than 500m from the mean high tide mark in Zone C.
Concrete to be 25MPa if within 500m of the mean high tide mark (zone D)
Geothermal hot spots shall be to specific engineering design.
6. Shrinkage control joints to be located and formed in accordance with NZS 3604. in accordance with NZS3604.
Spaced at 6.0m centres max.
Bay dimensions to be limited to a max. length:width ratio of 2:1
7. Supplementary reinforcing 2/D10, 1.2m long at each internal corner but not across shrinkage control joints.
8. Mesh in the floor slab is to Ductility Class E in accordance with NZS 4671
The mesh shall consist of a minimum 2.27 kg/m² welded reinforcing sheet (1.15 kg/m² in each direction)
Mesh examples;
Wireplus SE73LDE
Fletcher Reinf R500SE83
9. This design is to be read in conjunction with the MCH Ltd report ref:026/06-revD dated 1 February 2012.

Rev.D (Jan'12):
Changes to comply with amendment 11 of the NZBC clause B1 (from 1 Feb'12) and with revised NZS 3604:2011

THIS DESIGN ONLY APPLIES TO FLOORS CONSTRUCTED BY MERIDIAN ADVENTURE HOLDINGS LTD. IT CAN ONLY BE CONSTRUCTED BY OTHER PARTIES WITH WRITTEN CONSENT FROM MERIDIAN ADVENTURE HOLDINGS LTD.
THE PRODUCER STATEMENT IS ONLY VALID WHEN FILLED-IN AND SIGNED IN INK BY THE DIRECTOR OF THE COMPANY, P.L. COOMBS AND MUST BE VIEWED BY THE BUILDING INSPECTOR ON SITE

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MCH Limited
GRAHAM COX
MIKE HORSLEY

CIVIL AND STRUCTURAL ENGINEERS
PROJECT MANAGEMENT

19 WILLOW STREET
P.O. BOX 1029
TAURANGA
PH: (07) 578-4071
FAX: (07) 578-4176

TITLE
MERIDIAN ADVENTURE HOLDINGS LTD
LAZER BOXED FLOORING SYSTEM
CONCRETE FLOOR EDGE THICKENING
1 STOREY

REF: 026/06

DATE: Jan'08

DRAWING NO.

S1a

Rev D

PRODUCER STATEMENT - PS1- DESIGN

ISSUED BY: Graham Bruce Cox
TO: Meridian Adventure Holdings Ltd
IN RESPECT OF: Lazer Boxed Flooring System - Lateral Restraint

PIM/BC

. . 6 9 3 8 6

MCH Ltd have been engaged by Meridian Adventure Holdings Ltd to provide structural design services in respect of the requirements of Clauses B1 and B2 of the Building Regulations 1992 for the building work. The design has been prepared in accordance with B1/VM1 and B2/AS1 (respectively) of the approved documents issued by the Department of Building and Housing and the work is described on our report dated 1 February 2012 titled Lazer Boxed Flooring System, reference 026/06-revC and detailed on our A4 plans numbered 026/06, S1a, S1b, S2a and S2b (all revision D), and the specification and other documents according to which the building is proposed to be constructed.

As an independent professional covered by a current policy of Professional Indemnity Insurance to a minimum value of \$200,000, I BELIEVE ON REASONABLE GROUNDS that subject to:
the verification of the following design assumptions

- i) all proprietary products meeting the performance specification requirements.
- ii) all non-specific design construction to NZS 3604:2011 and NZS 4229:1999.
- iii) inspection of construction by the Territorial Authority.
- iv) the bracing of the dwelling meets the requirements of NZS 3604:1999.
- v) the definition of "light" and "heavy" claddings are as defined in NZS 3604:2011.
- vi) the concrete slab and edge thickening are founded on "good ground" as defined in NZS 3604:2011 or compacted fill.

the structural engineering designed elements comply with the relevant provisions of the building code.
This producer statement does not cover;

- the suitability or stability of the site.
- weathertightness of the structure.
- the performance of the concrete floor slab other than for lateral restraint.
- construction and site supervision.

This certificate is for Building Consents issued before 1 February 2014 or the issue of a revision to NZS3604:2011, whichever occurs first.

This Producer Statement applies only to floors constructed under the supervision of Meridian Adventure Holdings Ltd.


BE (Civil) MIPENZ CPEng
(Professional Qualifications)

DATE: 19.6.12
**SUPERSEDED AS
ADDITIONAL INFORMATION
PROVIDED DURING
BUILDING CONSENT
PROCESS**
Signed: P. Coombes Date: 19.6.12

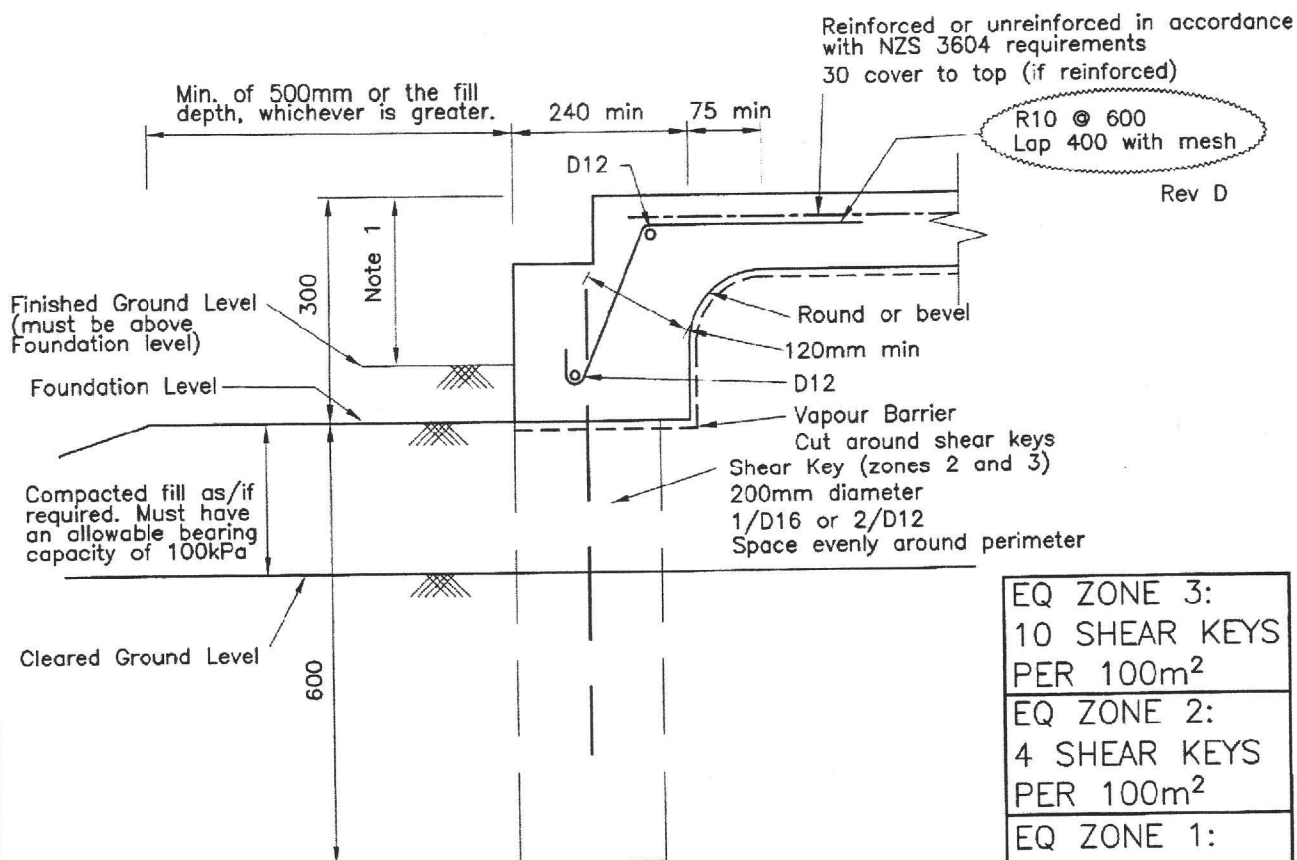
This section only to be completed by P Coombes of Meridian Adventure Holdings Ltd.
SITE ADDRESS:

BUILDING CONSENT No:

JOB No:

DATE:

Signed by P.L. Coombes



SINGLE STOREY (HEAVY ROOF, HEAVY WALLS)

NOTE:

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Spaced at 6.0m centres max.
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2/D10, 1.2m long at each internal corner but not across shrinkage control joints.
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Rev.D (Jan'12):
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TITLE
MERIDIAN ADVENTURE HOLDINGS LTD
LAZER BOXED FLOORING SYSTEM
CONCRETE FLOOR EDGE THICKENING
1 STOREY

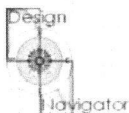
REF: 026/06

DATE: Jan'08

DRAWING NO.

S1b

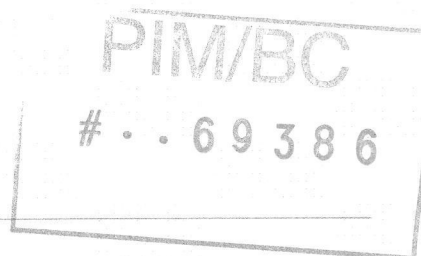
Rev D



Design Navigator H1 Compliance Report

**COUNCIL
COPY****Project Summary**

H1 Report created by: Jennian Services Ltd.
Project Name: MRO 12502 SMITH & GEDDES
Client: SMITH & GEDDES
Lot No: _____
Comment: 15 HAMON PLACE
ROTORUA
Project Id: 36803
Report Date: 27/04/2012

**Compliance Result**

This building complies with H1 via the following methods :

the Calculation Method in NZS4218:2004 (Sept 2008 R-values)

H1 Compliance DetailsNZS4218:2004 Calculation Method Compliance

The use of the Calculation Method is permitted.

In order to comply the Actual Heat Loss must be the same or smaller than the Reference Heat Loss AND all component R-values must be the same or larger than 60% of the R-values in the '60% Rule' table below. This design complies with the NZS4218:2004 Calculation Method.

Heat Loss:

Reference building	Proposed building
380	334

Minimum R-values ("60% rule"):

	Permitted Minimum	Proposed Minimum	
Floor:	0.8	1.49	✓
Non-solid Walls:	1.1	1.97	✓
Glazing in Non-solid Walls:	0.15	0.26	✓
Roof:	1.7	2.63	✓
Skylights:	0.15		✓

The Reference building has the following areas and R-values.

		Non-solid	Solid Timber	Other Solid
		100.0 %	0.0 %	0.0 %
Floor:	Area: 156.9 m ²	R-values: 1.3	1.3	1.5
Walls excl. glazing:	Area: 94.3 m ²	R-values: 1.9	1.2	1
Glazing (up to 30%):	Area: 40.4 m ²	R-values: 0.26	0.26	0.26
Roof:	Area: 156.9 m ²	R-values: 2.9	3.5	3.5
Skylights:	Area: 0 m ²	R-values: 0.31	0.31	0.31
Heat Loss:		380	399	399

For mixed constructions the heat loss of the reference building is calculated as the sum of the heat losses for each type of wall construction multiplied by the fraction of the wall area of each type. This approach is based on clause 4.2.6 of NZS4218:2009 because NZS4218:2004 has no clear guidance on mixed constructions. Note that all other requirements (window area (30%) and skylight area (1.2m²) threshold for Schedule Method, maximum R-value tradeoff (40%), etc.) are still using NZS4218:2004 including the 2007 H1 amendments because this is the Acceptable Solution for Clause H1.

Compliance with Clause E3

This building complies with the R-value targets in NZBC Clause E3.

Component	Minimum R-value	Project R-value
Framed wall constructions with cavities	1.5	—
Single skin masonry wall without a cavity	0.6	—
Solid timber wall no less than 60 mm thick	0.6	—
Roof or ceilings	1.5	—

Design DetailsBuilding Dimensions

Floor Area	<u>156.9</u>
Gross Wall Area	<u>134.7</u>
Net Wall Area	<u>104.2</u>
Wall (North) Area	<u>27.9</u>
Wall (East, South and West) Area	<u>76.3</u>
Gross Roof Area	<u>156.9</u>
Net Roof Area	<u>156.9</u>
Glazing Area	<u>30.4</u>
Window (North) Area	<u>9.6</u>
Window (East, South and West) Area	<u>20.8</u>
Skylight Area	<u>0</u>

Glazing Area Percentages

Total Glazing Percentage	<u>22.6%</u>
East, South and West Window Percentage	<u>21.4%</u>
Total over 30%	<u>no</u>
East, South and West over 30%	<u>no</u>
Total over 50%	<u>no</u>

Information required for BPI calculation

Living Floor Area	<u>0</u>	Note: This includes also internal floors.
Average Room Height	<u>0</u>	
Thermal Mass Level	<u>Light weight</u>	<u>Suspended timber floor with timber framed walls or a heavily carpeted slab floor with timber framed walls.</u>

Climate

Location	<u>Rotorua</u>
Climate Zone	<u>2</u>

Heat Loss Details

	ID	Orient.	Width	Height	Gross Area	Net Area	R-value*	Heat Loss	Shad. Coeff.**	Solid Wall***
<u>Floors</u>										
Floor 1					156.9	156.9	1.49	105.3		
<u>Walls</u>										
Wall 1		North	12.65	2.4	30.4	22.2	1.97	11.3		C
Window 1-1	W06		1.8	1.2		2.2	0.26	8.3		
Window 1-2	W04		1.8	2.15		3.9	0.26	14.9		
Window 1-3	W03		1.8	1.2		2.2	0.26	8.3		
Wall 2		North	3	2.4	7.2	5.8	2.03	2.8		C
Window 2-1	W17		1.2	1.2		1.4	0.26	5.5		
Wall 3		East	12.4	2.4	29.8	22.1	1.97	11.2		C
Window 3-1	W05		2.4	2.15		5.2	0.26	19.8		
Window 3-2	W07		1.5	0.8		1.2	0.26	4.6		
Window 3-3	W09		0.6	2.15		1.3	0.26	5		
Wall 4		South	15.65	2.4	37.6	30	1.97	15.2		C
Window 4-1	W08		0.6	0.8		0.5	0.26	1.8		
Window 4-2	W10		1.8	2.15		3.9	0.26	14.9		
Window 4-3	W11		0.6	0.8		0.5	0.26	1.8		
Window 4-4	W12		1.2	0.8		1	0.26	3.7		
Window 4-5	W13		1.5	1.2		1.8	0.26	6.9		
Wall 5		West	2.5	2.4	6	4.1	2.03	2		C
Window 5-1	W01		0.9	2.15		1.9	0.26	7.4		
Wall 6		West	9.9	2.4	23.8	20.2	1.97	10.2		C
Window 6-1	W02		2.4	1.5		3.6	0.26	13.8		
<u>Roofs</u>										
Roof 1			156.9	1	156.9	156.9	2.63	59.7		
<u>Total Heat Loss</u>								334.4		

* Any slab floor regardless of its dimensions can be assumed to have an R-value of at least R-1.3 (H1/VM1 and H1/AS1, Replacement Table 1, Note (4)).

** The Shading Coefficient is only required for BPI calculations.

*** C: Cavity Construction (any construction that is not solid), T: Solid Timber, S: Other Solid Construction (Note that the use of solid timber and other solid construction types is discretionary, i.e. solid timber walls and other solid walls can be treated as if they are non-solid (NZS4218:2004 section 3.1.4).)

Floor Construction Details

1 Slab floor	
internal surface 0.09	
Flooring	none (Example: polished surface of a concrete floor)
R-value: 0	
Insulation value of the slab/floor	
Slab floor area [m ²]:	156.9
Perimeter length [m]:	57.49
External wall thickness [mm]:	90 
Soil conductivity [W/m °C]:	1.2 
Underslab insulation:	none 
Piles Footings:	Number: 
Slab edge insulation:	none 
Insulation:	 
Penetration Diameter:	 mm
Insulation:	 
R-value: 1.4	
1.49 m ² K/W.	

Wall Construction Details

1 Timber frame with vented cavity	
external surface 0.03	
Cladding	70mm brick <i>R-value: 0.06</i>
15-90mm vented cavity (all R-values on ext. side of cavity will be halved), R: 0.08	
Air Barrier	Building paper <i>R-value: 0.01</i>
Timber Frame & Cavity 90mm studs @ 600mm, dwangs @ 800mm	
Frame Area: 15.1%	Cavity Area: 84.9%
Timber Frame <i>R-value: 0.75</i>	Insulation 2.2 still Airgap <i>R-value: 0</i>
Wall Lining Gypsum plasterboard 10mm <i>R-value: 0.04</i>	
internal surface 0.09	
1.97 m ² K/W.	

2 Timber frame with vented cavity	
external surface 0.03	
Cladding	Palliside Weatherboard <i>R-value: 0.18</i>
15-90mm vented cavity (all R-values on ext. side of cavity will be halved), R: 0.08	
Air Barrier	Building paper <i>R-value: 0.01</i>
Timber Frame & Cavity 90mm studs @ 600mm, dwangs @ 800mm	
Frame Area: 15.1%	Cavity Area: 84.9%
Timber Frame <i>R-value: 0.75</i>	Insulation 2.2 still Airgap <i>R-value: 0</i>
Wall Lining Gypsum plasterboard 10mm <i>R-value: 0.04</i>	
internal surface 0.09	
2.03 m ² K/W.	

Roof Construction Details

1 Timber framed roof, flat ceiling		
external surface 0.03		
Roofing	Metal tiles with building paper R-value: 0.01	
Roof space (still air) 0.11		
Insulation ⓘ		
Timber Frame & Cavity	94mm rafters or joists @ 900mm, battens (covered with insulation)	
Frame Area: 5%	Cavity Area: 95%	
Trusses and dwangs R-value: 0.78	Insulation 2.6	
Ceiling Lining	Gypsum plasterboard 13mm R-value: 0.06	
internal surface 0.09		
Recessed downlights		
Ceiling area [m²]:	Number of downlights:	Clearance from lamp holder side [m]: ⓘ
2.63 m²K/W.		

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**COUNCIL
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**M
TEC**
CONSULTANTS

**EARTHWORKS COMPLETION REPORT
FOR
HAMON PARK
RESIDENTIAL SUBDIVISION
AT HODGKINS ST, ROTORUA
FOR
PINNACLE HILL SUBDIVSIONS LTD**

12 DECEMBER 2007

190801-R-E-C138

PINNACLE HILL SUBDIVISIONS LTD

HAMON PARK SUBDIVISION

EARTHWORKS COMPLETION REPORT

1. INTRODUCTION

The Pinnacle Hill Subdivisions Ltd, Hamon Park Subdivision comprises the development of Pt SECT 20 BLK IV HOROHORO with 63 new residential lots over an area of approximately 6.0 hectares.

The site is located on the western side of Hodgkins St. The property is adjoined by orthodox residential development all around the edge of the property. Lot 13 has access from Blomfield St.

2. TOPOGRAPHY AND SOILS

The property had previously been used as a grazing block with one existing house on the site. The topography of the existing site was undulating and dominated by three moderate deep gullies.

A preliminary geotechnical investigation confirmed that the site is underlain in various silt and sand layers. The upper two metres consisted generally of medium fine sands and silts with the underlying layers consisted of coarse granular sands and pumice gravels.

Earthworks were undertaken to recontour the existing land profile to smooth the Lots, fill the two smaller gullies and provide roading levels that are lower than the Lot levels. The cut and fill operation has produced a finished smoothed contour with a consistent slope across the overall subdivision to tie into the existing contours at the perimeter of the site.

3. EXTENT OF WORKS AND METHODOLOGY

The majority of the site was earth worked and as such this resulted in approximately 4.8 Ha being reworked during earthworks. Lot 40 did not have earthworks carried out as this Lot contains the original house.

The area was cleared of all fences, trees, stumps, logs and other rubbish prior to any excavations. The earthworks operation involved stripping the topsoil to stockpiles and then carrying out cut to fill operations to allow for recontouring of the sections. The gullies were excavated with a longreach digger and involved the removal of 8000m³ of unsuitable material. Granular pumice was laid in the base of the gullies prior to filling approximately 1.5m deep to drain any spring water present.

During the cut to fill operation, fill was placed in thin layers of up to 0.2m deep and compacted with motor scrapers

The earthworks operations were carried out from November 2006 to May 2007.

At the completion of the contouring, the topsoil was re-spread across the Lots to a maximum depth of 250mm (minimum 100mm) and grassed.

4. SUPERVISION AND TESTING

All earthworks were supervised on a regular, but not continuous, basis by a representative of MTEC Consultants Ltd to ensure topsoil and any unsuitable material was completely removed and clean fill placed in an appropriate manner. We can confirm that the insitu and imported fill material was placed in thin layers and compacted satisfactorily.

The depth of earthworks varied from 3.0m cut to 5.0m fill with the gullies having the largest fill depth. The average depth of earthworks was around 1.5m metres of cut and 2.0m of fill, across the site.

A series of 9 boreholes to 2.0m and 9 Scala Penetrometer tests were carried out (prior to earthwork, refer attached).

Every lot has had at least one scala penetrometer test, except Lot 40 which has an existing house on it. At the location of the temporary earthworks sediment ponds, 6 scala penetrometer tests were carried out. The target Scala Penetrometer Test values used as a benchmark in assessing the compaction densities achieved was 200mm per 5 blows for building sites (Factored Ultimate Bearing Capacity of 150kPa or Allowable Bearing Capacity of 100kPa).

On all of the Lots the typical penetration values were 50 to 200mm per 5 blows over the upper 1.0m depth of testing, indicating that a minimum Factored Ultimate Bearing Capacity over the depth of testing was 150kPa.

It is noted that occasionally Scala Penetrometer Values in the upper 300mm indicated a penetration value greater than the permissible. This is due either the upper layer being predominantly of topsoil or due to the loose upper layer of sand that generally can not be compacted to the same level as the underlying soils due to a lack of confinement.

5. SLOPE STABILITY ASSESSMENT ADJACENT TO THE MAIN GULLY

We have carried out a slope stability assessment adjacent to the main gully in order to determine any areas that are restricted from construction without additional foundation design.

The Lots adjacent to the main gully (Lots 39, 40, 53, 54, 55, 57, 58, 59, 60, 61, 62, 63) have been assessed based on a typical cross section and possible future failure plane of 1 vertical to 2 horizontal.

As a "rule of thumb" in the Rotorua Region in the volcanic ashes (pumice silts, sand and gravels), a slope of 26.6 degrees (1 in 2) is considered to be stable provided there are no unfavourable conditions such as uncontrolled stormwater, high ground water table, a long slope (i.e., in excess of 20m) and the grazing of large stock which causes erosion.

Therefore the conditions on the slopes adjacent to the gully can be considered to be favourable provided stormwater is controlled from flowing over the slope and there is no grazing of large stock (cattle, horses & deer) on the slope.

Slope failures in cohesionless pumice soils tend to be shallow planar failures however where near vertical banks are involved the failures tend to progress from frittering back to a slope of close to 26.6 degrees (1 in 2). The attached cross section indicates an assumed failure plane at an angle of 26.6 degrees (1 in 2). The edge of the restricted areas have been located on the edge of the assumed zone of instability. Outside the restricted area is suitable for normal foundations. Buildings should not be located within the restricted area and the following consent notice should be placed on the titles of the Lots identified

The owners and subsequent owners of Lots 39, 40, 53, 54, 55, 57, 58, 59, 60, 61, 62, 63 are advised that area "X" is a restrictive area and is unsuitable for building. No earthworks, building or retaining shall be undertaken within the said area without the approval of the District Engineer

6. BENKLEMANN BEAM TESTING

Benklemann Beam testing was undertaken on the new road alignment.

Benkelman Beam testing on the finished base course was carried out on the 12 December 2007 and indicated that the results were satisfactory with no reading greater than the peak allowable value of 4.55mm (refer attached). There were 5 tests where the allowable deviation was more than the 0.875mm, with the majority less than 3.70mm, in the following locations

SIDE	DISTANCE	DEFLECTION
LEFT	440 (CUL DE SAC)	3.64mm
RIGHT	60	3.62mm
RIGHT	120	3.52mm
RIGHT	160	3.70mm
RIGHT	360	4.12mm

The road was still being prepped on the day of testing and was saturated with water and sensitive due to the construction machinery, therefore leading to high readings. The road will improve once the water has drained and the surfacing as generally there is a minimum improvement of 0.5mm with drying of the basecourse and subgrade

7. CONCLUSION

In our professional opinion, ground conditions on all lots (lots 1- 63) of the subdivision are suitable for construction of residential buildings in accordance with the requirements of clause B1 of the Building Regulations 1992, subject to a Consent Notice with respect to the restricted areas on the titles of the following Lots

The owners and subsequent owners of Lots 39, 40, 53, 54, 55, 57, 58, 59, 60, 61, 62, 63 are advised that area "X" is a restrictive area and is unsuitable for building. No earthworks, building or retaining shall be undertaken within the said area without the approval of the District Engineer

8. LIMITATIONS

The recommendations given in this report are based on limited site data from discrete test locations. Variations in ground conditions could exist across the site. The nature and continuity of subsoil conditions away from the test sites are inferred and it must be appreciated that actual conditions could vary from the assumed model.

This report has been prepared only for the Rotorua District Council and for the initial purchaser of each property for their purposes. It is not to be relied upon or used out of context by any other person without reference to MTEC Consultants Ltd. The reliance by other parties on the information or opinions contained in the report shall, without prior review and agreement in writing, be at such parties sole risk.

MTEC Consultants Ltd



Steve Pittman

BE, MIPENZ (Civil, Struct), CPEng, IntPE

date 12th December 2007

Attachments: - RDC Forms
Plan showing Test Locations
Cut and Fill Plan
Benklelman Beam Test Results
Scala Penetrometer Results

To: The District Engineer
Rotorua District Council
Private Bag
ROTORUA

**1B - STATEMENT OF PROFESSIONAL OPINION AS TO SUITABILITY OF LAND
FOR BUILDING DEVELOPMENT**

Subdivision: STAGE 1

Owner/Developer: PINNACLE SUBDIVISIONS LTD

Location: HODGKINS STREET, PUKEHANGI

I, Stephen Michael Pittman of MTEC Consultants Ltd, PO Box 878, Rotorua
(Full Name) (Name and Address of Firm)

hereby confirm that:

1. I am a Certified Professional Engineer experienced in the field of soils engineering and was retained by the owner/developer as the Soils Engineer on the above subdivision.
2. The extent of my inspections during construction, and the results of all tests carried out are described in my report dated 12 DEC 2007
3. In my professional opinion, not be construed as a guarantee, I certify that:
 - *a) That earth fills shown on the attached Plan No. 190801-A-E-0003 ^{Sheet 12} have been placed in compliance with the Code of Practice of the Rotorua District Council.
 - *b) The completed works give due regard to land slope and foundation stability considerations.
 - *c) The filled ground is suitable for the erection thereon of residential buildings not requiring specific design in terms of NZ Building Act 2004 and NZ Building Regulations 2004, and related documents, providing that:

i)

ii)

iii)

- *d) The original ground not affected by filling is suitable for the erection thereon of residential buildings not requiring specific design in terms of NZ Building Act 2004 and NZ Building Regulations 2004, and related documents, providing that:

i) BUILDING IS PROHIBITED IN THE RESTRICTED AREAS
OF LOT 57 NE TO A SWPE

ii)

iii)

4. This professional opinion is furnished to the Council and the owner/developer for their purposes alone on the express condition that it will not be relied upon by any other person and does not remove the necessity for the normal inspection of foundation conditions at the time of erection of any dwelling.

Signed:

Date:


17/12/2007

*Delete items not applicable.

1D - COMPLETION OF SUBDIVISIONAL WORK

ISSUED BY: **STEPHEN MICHAEL PITTMAN**
(Suitably qualified professional)

TO: **ROTORUA DISTRICT COUNCIL**
(Territorial Authority)

COPY TO BE SUPPLIED TO: **PINNACLE HILL SUBDIVISIONS LTD**
(Subdividing Owner/Principal)

IN RESPECT OF: **STAGE 1**
(Description of subdivisional work)

AT: **HODGKINS STREET, PUKEHANGI**
(Address)

MTEC CONSULTANTS LTD has been engaged by **PINNACLE HILL SUBDIVISIONS LTD**
(Consultants Firm) (Subdividing Owner)

to provide construction observation, review and certification services in respect of the above subdivisional work.
My qualifications and experience related to this work are:

— **BE MIPENZ (CIVIL / STRUCTURAL) CPENG**
— **17 YEARS AS A CONSULTING CIVIL / STRUCTURAL ENGINEER**

I am familiar with the conditions of consent to the subdivisional works, and the specification and drawings as granted and

approved by: **ROTORUA DISTRICT COUNCIL**
(Territorial Authority)

As an independent professional I or personnel under my control have carried out regular observations, inspections and testing of the subdivisional work and based upon these regular observations, inspections and tests, information supplied by the contractor during the course of the subdivisional works and the contractor's certification upon completion of the subdivisional works (copy attached) **I BELIEVE ON REASONABLE GROUNDS** that the subdivisional works other than those outstanding works listed below, have been completed in accordance with the above consent and that good, normally acceptable engineering design and construction implementation practices have been undertaken. I note that the Rotorua Civil Engineering Industry Standard 2000 is the recommended Means of Compliance with the consent conditions and I Believe on Reasonable Grounds that the work has been carried out to the same standard as required by the Rotorua Civil Engineering Industry Standard 2000. Details of the regular observations, inspections and testing are attached.

..... Date **17/12/2007**
(Signature suitably qualified Professional)

..... **BE MIPENZ (CIVIL / STRUCT) CPENG** Member CSNZ ☐ NZIS ☐
(Professional Qualifications)

..... **MTEC CONSULTANTS PO BOX 878 Rotorua** ACENZ ☐ IPENZ ☒
(Address)

Current Policy of Professional Indemnity Insurance: **Yes** No

Outstanding Works **NIL**

