

18 March 1998

The Resource Engineer  
Rotorua District Council  
Private Bag RO 3029  
**ROTORUA**

Dear Sir,

**RE: G. HARPER, GEMINI PLACE, ROTORUA**  
**LOTS 5 - 12 AND LOT 15 BEING SUBDIVISION OF LOT 1 DPS 79664**  
**OUR REF: 9648a**

We confirm that we visited the above site at the completion of excavation works on Lots 6, 7, and 15 of this subdivision, and have carried out a number of Scala Penetrometer tests in the earth fills placed on Lots 6 and 7.

The sections were completely excavated to clean sandy subsoils prior to the placing and compaction by static rolling of the fill materials.

The results of these tests are shown on BSK Consulting Engineers drawing Ref: 9648A.

In addition to the above, Opus International Consultants have carried out a number of Density tests in the fill that completely fills the three lots, the results of which are noted in their reports dated 27 June 1997 and 12 March 1998.

The filling in these lots comprises both a Pumice Ash / Lappilli mix and crushed Ignumbrite rock to depths varying from approximately zero at the Gemini Street boundary to approximately 1.5 metres at the northern corner of Lot 7.

The test results are all consistent with allowable bearing pressures of 100 KPa and better below normal founding depths of 300mm for Light Timber Framed construction. The results of the Density tests varied between 91.4% and 96.7% indicating that compaction achieved was within the requirements of the Rotorua District Council Subdivisional requirements.

We are, therefore, of the opinion that the filling carried out on Lots 6, 7 and 15 is suitable for the erection of Light Timber Framed Buildings not requiring specific design.

*DIRECTORS*

*E. Don Stotter*

*C.Eng., M.I.C.E.*

*M.I.P.E.N.Z*

*Reg. Engineer*

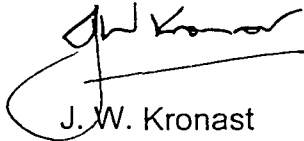
*John W Kronast*

*B.E., M.I.P.E.N.Z*

*Reg. Engineer*

We trust this provides the information you require at this time. Please contact the writer should you require any additional information regarding this matter.

Yours faithfully

A handwritten signature in black ink, appearing to read 'J. W. Kronast', with a large, sweeping flourish underneath.

J. W. Kronast  
**BSK CONSULTING ENGINEERS LTD**

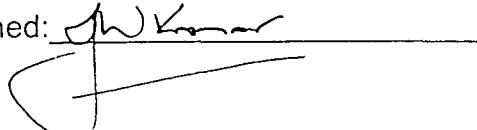
To: District Engineer  
Rotorua District Council  
Private Bag  
ROTORUA

STATEMENT OF PROFESSIONAL OPINION AS TO SUITABILITY OF LAND  
FOR BUILDING DEVELOPMENT

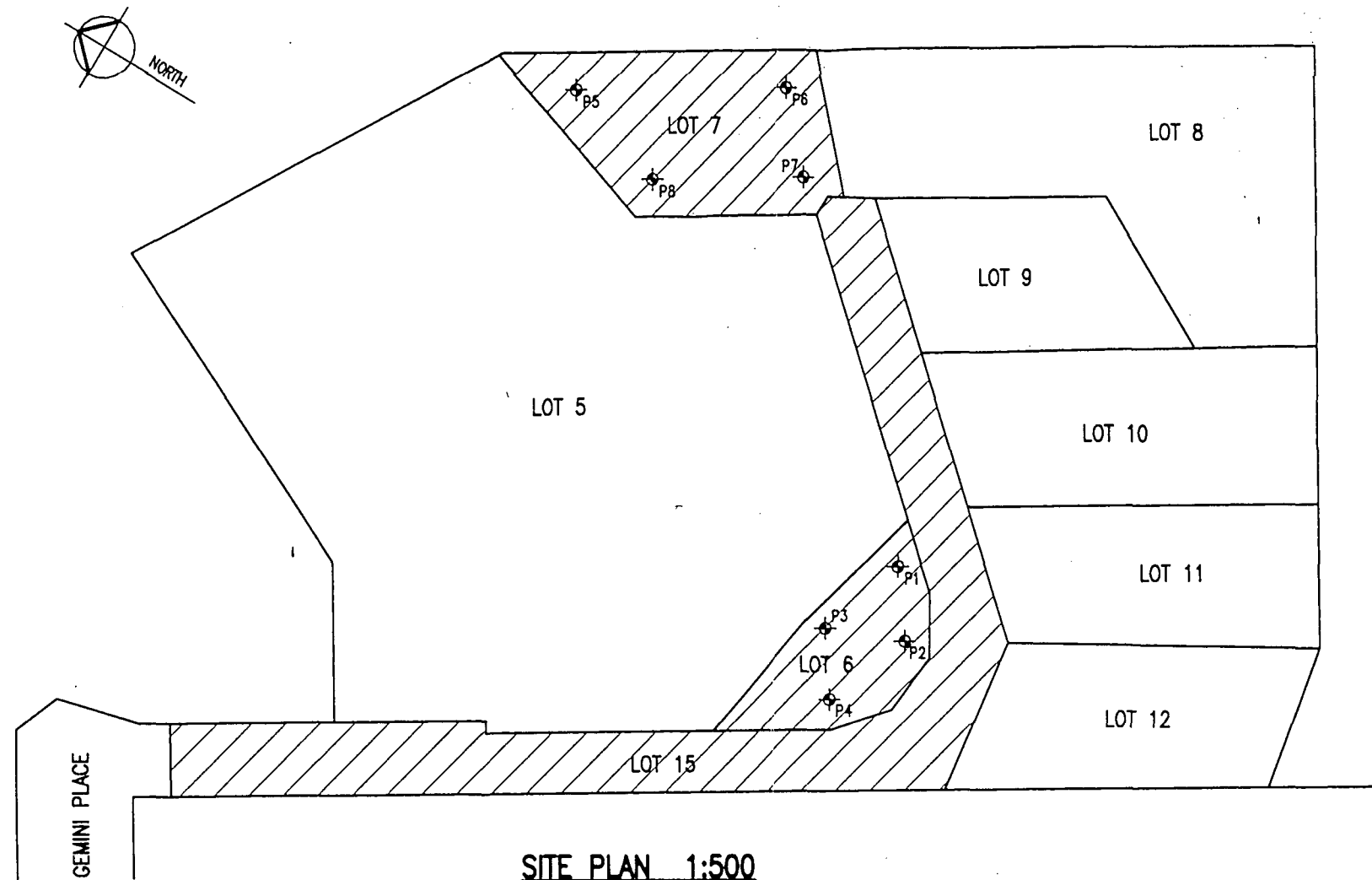
Subdivision: Lots 5 to 12, and Lot 15 (Being subdivision of Lot 1 DPS  
79664)  
Owner / Developer: Mr G. Harper  
Location: Gemini Place, Rotorua

I, John William Kronast of BSK Consulting Engineers Ltd, 144 Hinemoa Street  
Rotorua, hereby confirm that -

- (1) I am a Registered Engineer experienced in the field of soils engineering  
and was retained by the owner as the Soils Engineer on the above  
subdivision.
- (2) The results of all tests carried out are described in my report dated  
18/3/98.
- (3) In my professional opinion, not to be construed as a guarantee, I certify  
that -
  - (a) The earth fills shown on the attached plan No. 9648A have been placed in  
compliance with the Code of Practice of the Rotorua District Council.
  - (b) The filled ground on Lots 6 and 7 (Being subdivision of Lot 1 DPS 79664)  
is suitable for the erection thereon of residential buildings not  
requiring specific design in terms of the New Zealand Building Act 1991,  
New Zealand Building Regulations 1992, and related documents.
- (4) This professional opinion is furnished to the Council and the owner 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 the dwelling.

Signed: 

18 March 1998



**SITE PLAN 1:500**  
 LOTS 5 - 12 & LOT 15 BEING SUBDIVISION  
 OF LOT 1 DPS 79664  
 ◆ SCALA PENETROMETER TEST LOCATIONS

REFER ALSO TO PHIPPS HAWLEY LTD  
 DRAWING DPS 79547

GROUND LEVEL	P1	P2	P3	P4	P5	P6	P7	P8
500	1 1 1 2	2 1 2 4	2 1 1 2	2 2 1 1	3 2 3 2	6 3 2 1 2	4 3 2 1 2	9 5 3 1 2
1000	2 1 1 2 1	4 2 4 2 3	1 1 1 1 1	1 2 2 2 2	3 3 3 3 5	2 2 2 2 2	2 2 1 2 2	2 1 1 1 2
1500	1 1 1 1 1	3 3 4 4 1	2 1 1 2 1	2 2 1 1 1	4 4 2 2 2	2 2 2 3 2	2 2 2 5 2	2 2 1 1 1
2000		1 1 1 1 1			3 2 3 2 3	1 1 1 2 2	2 1 1 1 2	2 1 2 1 3
2500					2 2 2	1 1 1	1 2 1	2 2 3 2 3

**SCALA PENETROMETER RESULTS IN CM/BLOW**

REVISION	DATE	DESCRIPTION
<b>bsk</b> CONSULTING ENGINEERS LTD PO BOX 23, 144 HINEMOA STREET, ROTORUA NEW ZEALAND PHONE (07) 348 5394 FAX (07) 348 2311 EMAIL: BSK.144@CLEAR.NET.NZ		
PROJECT: <b>G. HARPER          GEMINI PLACE          ROTORUA</b>		
COMMENTS: <b>PART KAWAHA 3E BLOCK          SUBDIVISION SUBSOILS (LOTS 6 &amp; 7)</b>		
DRAWN: MM	DATE: MARCH 1998	
CHECKED: JWK	JOB REF NO: 9648A	
SCALE: 1:500	SHEET NO: 1 OF 1	

13/3/98



Inquires to: J P O'Connor

12-Mar-98

Project No: 287030.00

Dossier No: '98/035

BKS Consulting Engineering Ltd  
P O Box 23  
ROTORUA

Attention: Mr J Kronast

Dear Sir,

**DENSITY TESTING , LOT 6, KAWAHA 3E BLOCK SUBDIVISION.**

Please find attached results of Spot Desity testing carried out on site on the 10th March 1998.

Testing was carried out in accordance with specification NZS 4407:1991

Yours Faithfully

**OPUS INTERNATIONAL CONSULTANTS**

A handwritten signature in dark ink, appearing to be "JP O'Connor", written over the typed name and title.

J P O'Connor  
**LABORATORY MANAGER**

Page 1 of 2

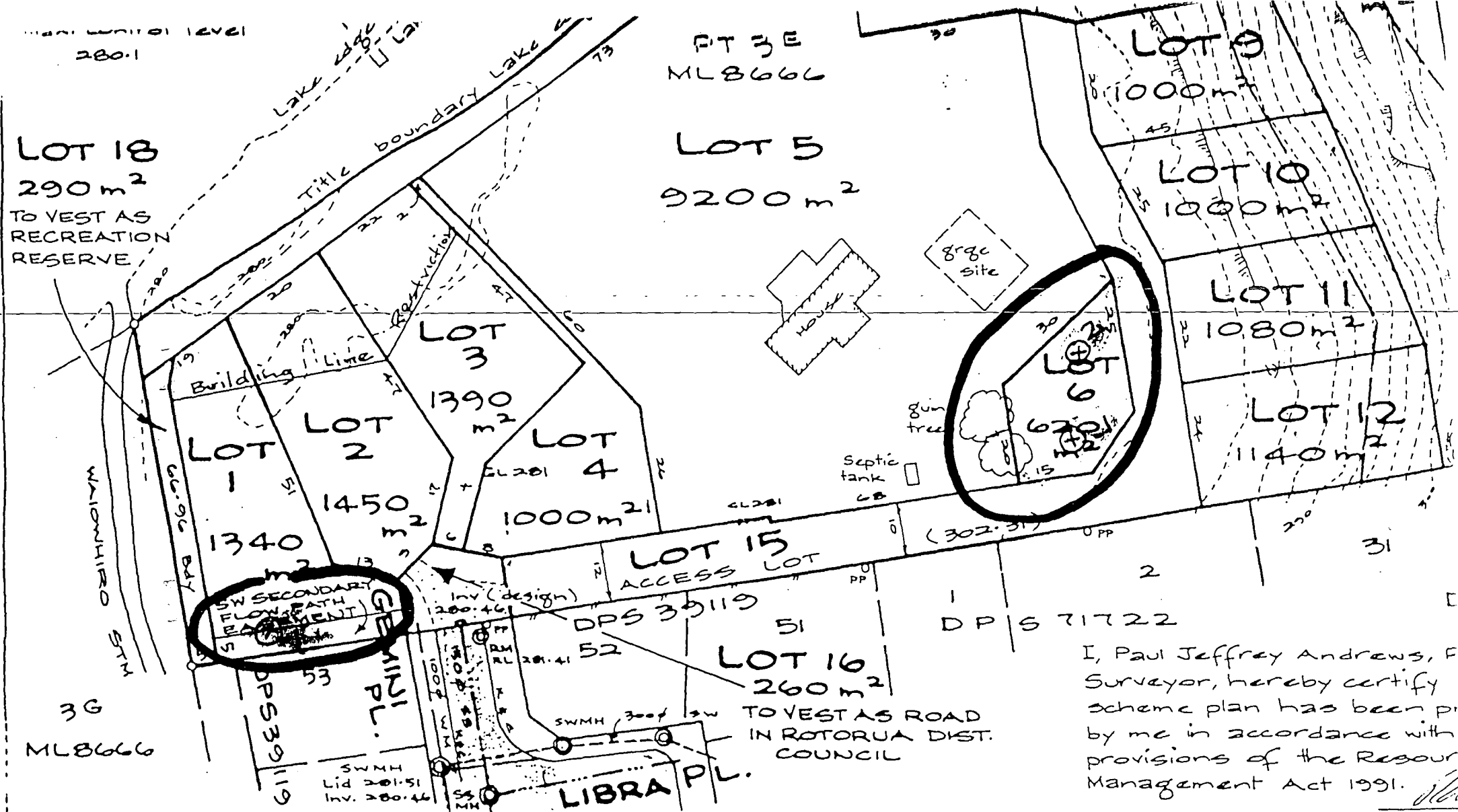
<b>FIELD RELATIVE COMPACTION COMPARISON TESTING</b>		Project Number	287030
		Dossier Number	98/035
Field Test by	S Elvy	Lab Test by	S Elvy
Date Tested	10/03/98	Date Tested	10/03/98

<b>Sample # 1, Lot 6</b>			
Ignimbrite Fill			
	Field (NDM)	Proctor (recompacted natural)	
Wet Density (t/m3)	1.506		1.617
Moisture Content (%)	25.8		25.8
Dry Density (t/m3)	1.197		1.285
Percentage of Proctor		93.2	%
<b>Sample # 2, Lot 6</b>			
Ignimbrite Fill			
	Field (NDM)	Proctor (recompacted natural)	
Wet Density (t/m3)	1.487		1.627
Moisture Content (%)	23.4		23.4
Dry Density (t/m3)	1.205		1.318
Percentage of Proctor		91.4	%

#### Test Methods

Nuclear Densometer Field Testing: NZS 4407:1991 Test 4.2.1  
Proctor Compaction: NZS 4402:1986 Test 4.1.1 (in part)

Reported by: J OConnor	Approved Signatory
Checked by: S Elvy	Designation
Date 12-Mar-98	Lab Manager



I, Paul Jeffrey Andrews, F  
Surveyor, hereby certify  
scheme plan has been pr  
by me in accordance with  
provisions of the Resour.  
Management Act 1991.

## PROPOSED SUBDIVISION OF PART KAWAHA 3E BLOCK.

PREPARED FOR G. HARPER

CT 52A/431

ROTORUA DISTRICT

Phipps Hawkey Ltd

REGISTERED SURVEYOR:  
20 Haupapa Street,  
P.O. Box 190, Rotorua.  
Phone (073) 476-995  
Fax: (073) 476-991



Inquires to: J P O'Connor

27-Jun-97

bsk Consulting Engineers Ltd  
P O Box 23,  
ROTORUA

Project No: 287030.00  
Dossier No: 97/384

Attention Mr J Kronast

Dear Sir

# DENSITY TESTING OF PART KAWAHA 3E BLOCK SUBDIVISION FILLS.

Please find attached results for density testing carried out on Lots 1,2,3 4 & 15 of the Kawaha 3E Block subdivision. Testing was carried out on the 26 of June 1997.

Spot density tests were carried out and samples were taken for standard compaction in the laboratory. Results attached show field density result as a percentage of that obtained in the laboratory. Laboratory Water Contents were used for calculations.

Testing was carried out in accordance with specification NZS 4407:1991.

Yours Faithfully

**OPUS INTERNATIONAL CONSULTANTS**

  
J P O'Connor

**LABORATORY MANAGER**

Page 1 of 5



<b>INSITU DENSITY/ LAB DENSITY COMPARISION TESTING</b>		Project Number	287030
		Dossier Number	97/384
Field Test by	J O'Connor	Lab Test by	J O'Connor
Date Tested	26/6/97	Date Tested	26/6/97

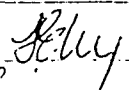
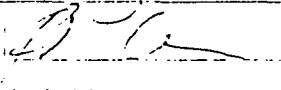
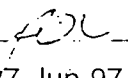
<b>Sample # 1</b>			
refer plan for location			
Light brown fine SAND & SILT with some pumice Stone.			
	Field (NDM)	Proctor (recompacted natural)	
Wet Density (t/m3)	1.599		1.658
Moisture Content (%)	38.4		38.4
Dry Density (t/m3)	1.155		1.200
Percentage of Proctor		96.3	%

<b>Sample # 2</b>			
refer attached plan for test location			
Light brown fine SAND & SILT with some pumice Stone.			
	Field (NDM)	Proctor (recompacted natural)	
Wet Density (t/m3)	1.598		1.655
Moisture Content (%)	44.0		44.0
Dry Density (t/m3)	1.110		1.150
Percentage of Proctor		96.5	%

<b>Sample # 3</b>			
refer attached plan for test location			
Light brown fine SAND & SILT with some pumice Stone.			
	Field (NDM)	Proctor (recompacted natural)	
Wet Density (t/m3)	1.687		1.683
Moisture Content (%)	34.7		34.7
Dry Density (t/m3)	1.252		1.250
Percentage of Proctor		100.2	%

<b>Sample # 4</b>			
refer attached plan for test locations			
Light brown fine SAND & SILT with some pumice Stone.			
	Field (NDM)	Proctor (recompacted natural)	
Wet Density (t/m3)	1.614		1.697
Moisture Content (%)	37.2		37.2
Dry Density (t/m3)	1.176		1.240
Percentage of Proctor		94.8	%

<b>Test Methods</b>	
Nuclear Densometer Field Testing: NZS 4407:1991 Test 4.2.1	
Proctor Compaction: NZS 4402:1986 Test 4.1.1 (in part)	

Reported by: 	Approved Signatory 
Checked by: 	Designation Lab Manager
Date 27-Jun-97	

<b>INSITU DENSITY/ LAB DENSITY</b>		Project Number	287030
<b>COMPARISION TESTING</b>		Dossier Number	97/384
Field Test by	J O'Connor	Lab Test by	J O'Connor
Date Tested	26/6/97	Date Tested	26/6/97

<b>Sample # 5</b>			
refer plan for location			
Light brown fine SAND & SILT with some pumice Stone.			
	Field (NDM)	Proctor (recompacted natural)	
Wet Density (t/m3)	1.664		1.701
Moisture Content (%)	35.3		35.3
Dry Density (t/m3)	1.230		1.260
Percentage of Proctor		97.6	%

<b>Sample # 6</b>			
refer attached plan for test location			
Light brown fine SAND & SILT with some pumice Stone.			
	Field (NDM)	Proctor (recompacted natural)	
Wet Density (t/m3)	1.698		1.728
Moisture Content (%)	32.8		32.8
Dry Density (t/m3)	1.279		1.301
Percentage of Proctor		98.3	%

<b>Sample # 7 Suspect reading due to depth of meter in hole</b>			
refer attached plan for test location			
Light brown fine SAND & SILT with some pumice Stone.			
	Field (NDM)	Proctor (recompacted natural)	
Wet Density (t/m3)	1.630		1.774
Moisture Content (%)	31.5		31.5
Dry Density (t/m3)	1.240		1.349
Percentage of Proctor		91.9	%

<b>Sample # 8</b>			
refer attached plan for test locations			
Light brown fine SAND & SILT with some pumice Stone.			
	Field (NDM)	Proctor (recompacted natural)	
Wet Density (t/m3)	1.539		1.646
Moisture Content (%)	38.3		38.3
Dry Density (t/m3)	1.113		1.190
Percentage of Proctor		93.5	%

<b>Test Methods</b>	
Nuclear Densometer Field Testing: NZS 4407:1991 Test 4.2.1	
Proctor Compaction: NZS 4402:1986 Test 4.1.1 (in part)	

Reported by: <u>[Signature]</u>	Approved Signatory	<u>[Signature]</u>
Checked by: <u>[Signature]</u>	Designation	Lab Manager
Date	27-Jun-97	

<b>INSITU DENSITY/ LAB DENSITY COMPARISION TESTING</b>		Project Number	287030
		Dossier Number	97/384
Field Test by	J O'Connor	Lab Test by	J O'Connor
Date Tested	26/6/97	Date Tested	26/6/97

<b>Sample # 9</b>			
refer plan for location			
Light brown fine SAND & SILT with some pumice Stone.			
	Field (NDM)	Proctor (recompacted natural)	
Wet Density (t/m3)	1.583		1.648
Moisture Content (%)	38.8		38.8
Dry Density (t/m3)	1.140		1.187
Percentage of Proctor		96.0	%

<b>Sample # 10</b>			
refer attached plan for test location			
Crushed Ignimbrite rock			
	Field (NDM)	Proctor (recompacted natural)	
Wet Density (t/m3)	1.693		1.757
Moisture Content (%)	26.0		26.0
Dry Density (t/m3)	1.344		1.394
Percentage of Proctor		96.4	%

<b>Sample # 11</b>			
refer attached plan for test location			
Crushed Ignimbrite rock			
	Field (NDM)	Proctor (recompacted natural)	
Wet Density (t/m3)	1.703		1.760
Moisture Content (%)	26.2		26.2
Dry Density (t/m3)	1.349		1.395
Percentage of Proctor		96.7	%

	Field (NDM)	Proctor (recompacted natural)	
Wet Density (t/m3)			
Moisture Content (%)			
Dry Density (t/m3)			
			%

#### Test Methods

Nuclear Densometer Field Testing: NZS 4407:1991 Test 4.2.1  
Proctor Compaction: NZS 4402:1986 Test 4.1.1 (in part)

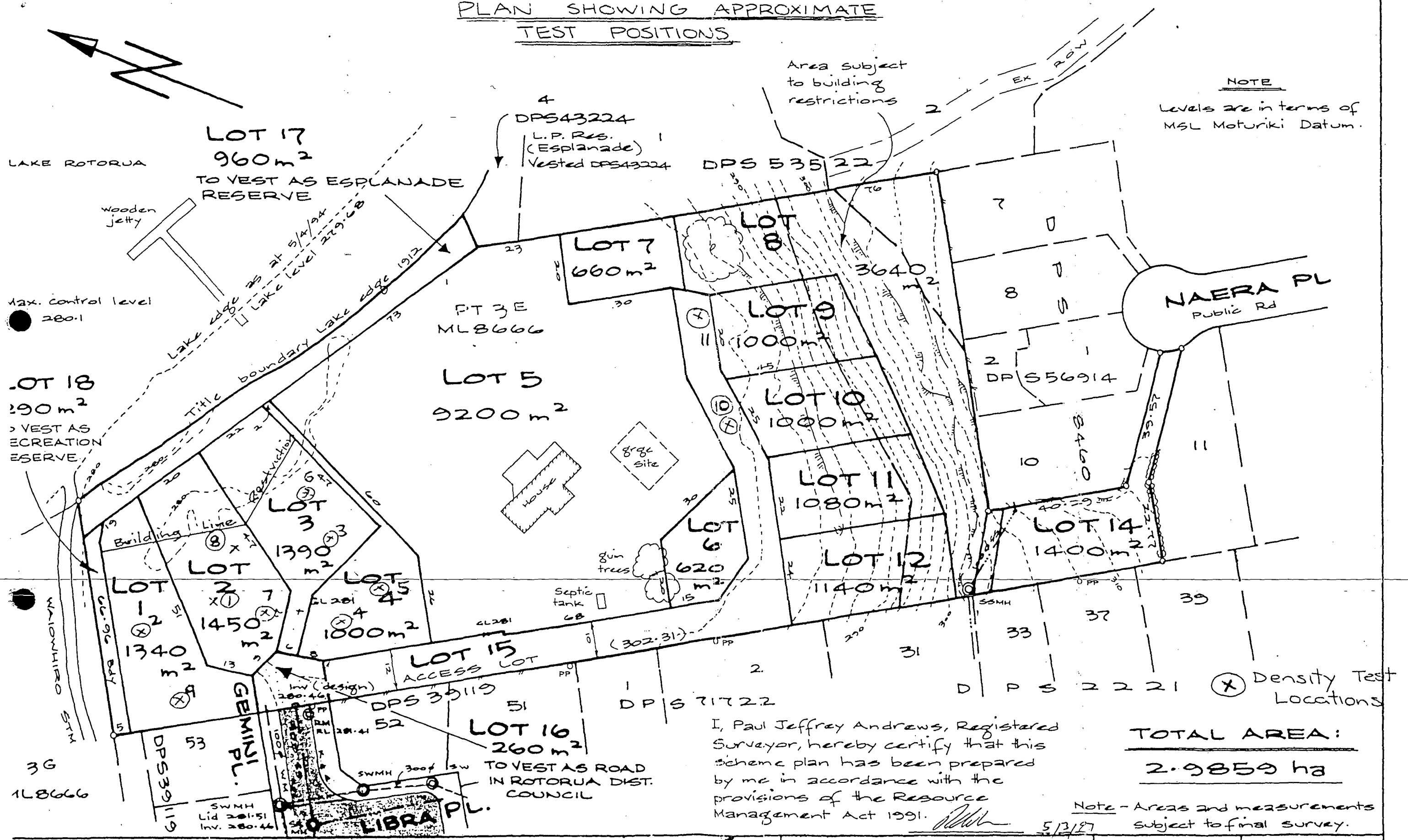
Reported by: Shay  
Checked by: Shay  
Date: 27-Jun-97

Approved Signatory

Designation

Shay  
Lab Manager

PLAN SHOWING APPROXIMATE  
TEST POSITIONS



NOTE  
Levels are in terms of  
MSL Moturiki Datum.

(X) Density Test  
Locations

TOTAL AREA:  
2.9859 ha

Note - Areas and measurements  
subject to final survey.

PROPOSED SUBDIVISION OF  
PART KAWAHA 3E BLOCK.

PREPARED FOR G. HARPER CT 52/431 ROTORUA DISTRICT

Phipps Hawkey Ltd.  
REGISTERED SURVEYOR  
20 Haupapa Street,  
P.O. Box 190, Rotorua.  
Phone (073) 476-995  
Fax: (073) 476-991



SCALE  
1:1000  
DATE  
MAR, 1997

DRAWING No.  
22375  
JF 4122