Sigma Consultants Limited

1281 Hinemoa Street PO Box 553 Rotorua, New Zealand Phone 07-347 3456, Fax 07-347 3459

Email: info@sigmaco.co.nz



8 July 2004

Chief Executive Rotorua District Council Private Bag **ROTORUA**

TAX INVOICE GST NO. 60-045-410

PLEASE PAY ON INVOICE No statements will be issued for current accounts

Attn: Alison Ellery

TO PROFESSIONAL SERVICES RE

INVESTIGATION OF PROPOSED CEMETERY SITE AT THE

OFF NGONGOTAHA ROAD

TO investigating the site; power augering holes and providing a report with our initial findings on the suitability of the site for a proposed cemetery.

OUR FEE:

as quoted

\$2,000.00

GST @ 12.5 %

\$250.00

\$2,250.00

443/9080/8510

AEllery.

Invoice No. 6958/5524

Payment of this account is due 29.07.04. Unpaid accounts may incur interest at the rate of 1.5% per month and collection costs.

Sigma Consultants Limited

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8 July 2004

Chief Executive Rotorua District Council Private Bag ROTORUA

Attention: Alison Ellery

Dear Alison

RE:

NGONGOTAHA PROPERTY ADJACENT THE WAITETI STREAM

Thank you for the instructions to carry out a preliminary investigation into the suitability of the subject property for use as a possible cemetery.

On Thursday 24 June, we augered ten representative holes generally to 2.2 metres to check on the depth of possible ex wastewater treatment plant sludge, the type of subsoil and the depth below the surface to water level.

Unfortunately the owner of the property fronting Ngongotaha Road would not allow us on the property as she had "skitterish" horses grazing and a network of electric fences. To get an idea of what might be there, we augered on the Ngongotaha Road boundary, and along the western boundary. The results of our investigations are shown on the attached aerial photo, and can be summarised thus.

- On the ex Lepper's farm, much of the topsoil had been stripped and replaced with sludge, often only 150mm thick. The farmer that is grazing the property indicated that the sludge was widespread and not fertile, resulting in very poor grass growth.
- 2. The area of sludge around borehole 7 was deep, possibly in excess of 1.5 metres, and was mixed in with sawdust. The 4-wheel drive vehicle got hopelessly bogged here.
- 3. There were other areas that we wanted to test, (hole 11 and 12) but the ground was excessively soft and we were unable to get to them with the power auger. These areas are marked on the plan as not tested.
- 4. Water was found in five of the holes.
- 5. The horse paddock that was not tested is higher than our test holes. None of the three boundary holes had water in them, so it is reasonable to assume that the horse paddock has good relatively dry material.
- 6. The soils in the auger holes below the sludge were sandy silts and probably flood plain sediment. There were examples of similar soils in the semi vertical free standing banks along the stream bank which indicates that where there is no free water, the sides of any excavation would be stable.

CONCLUSIONS

- The proposed site has 4 or 5 hectares that would probably remain usable as a cemetery in most weather conditions. This mainly is the area that fronts Ngongotaha Road.
- Considerable stripping of the sludge would be necessary to make the remainder of the
 ex Lepper property usable as a park. This area would then need to be filled with free
 draining material. The stock had made some areas impassable on foot.
- Much of the ex Lepper property is relatively low lying, and in a sustained wetter than average winter, would probably have a water table not too far below the surface.

We would be happy to carry out a more detailed investigation to confirm, or otherwise, our initial findings, but we would not be hopeful of discovering anything that would significantly alter the above conclusions.

We attach copies of the bore logs and our account.

Yours faithfully

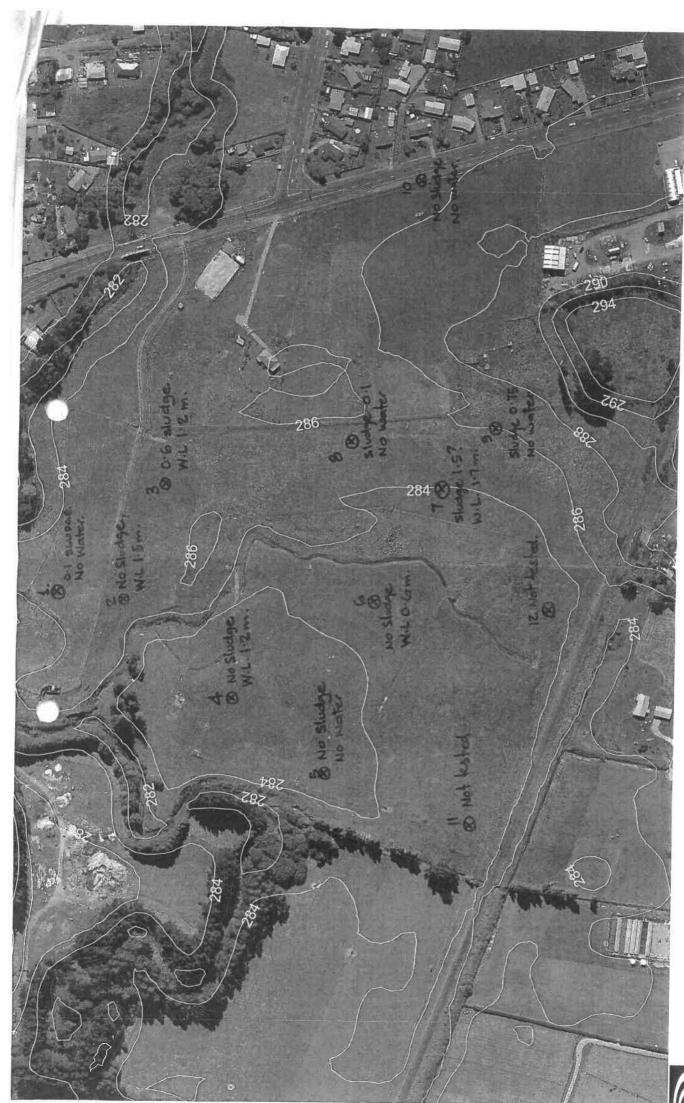
SIGMA CONSULTANTS LTD

Dennis Whimp Principal - Roading

(DW/6958r01-ltr)

charged \$2000 + 957.

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Rotorua District Council

Aerial Photography





ECES Evans Clvif Engineering Services

14 Atkins Way Ohaulti Rd Tauranga

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hcevans@bop.quik.co.nz

NZS 4407 : 1991 Test 2.4.2

25/06/2004

06/04/10/A

Hayden Evans

Unknown

25/06/2004

25/06/2004

27/06/2004

TGA0002.05 1TL

Dennis Whimp Sigma Consultant Ltd ²O Box 553 Rotorua

ittention: Mr D Whimp

E:

Contract Name Proposed Rotorua Cemetery Contract Number Unknown

Location of Test Location off sit

See Attached Arial Photos E2791329, N6342948

Lab Reference: Report No: Order No:

Sample By:

Sample Method: Sample No.:

Date Sampled:

Test Completion Date:

Date Received: Date Reported: Sample Condition:

Auger Test Pit No: Page:

1 of 1

Natura!

1481

ient Request

carry out auger test pits (2000mm) at selected locations on D & M Roe & Adams Douglas Investment Trust Farm Rotorua

st Method:

e Investigation in House Test Pits

termination of the Penetration Resistance of a Soil NZS 4402-1988 Test 6.5.2

Depth	mm	Layer Description	
0.0 - 0.1	1	Top Soil	
		Black Organic Matter, Containing no saw dust or bark	
0.11 - 1.1		Subgrade 1 Silghtly Sandy Silt, Fine Graded, Non Plastic, Light Brown getting lighter with depth Damp	
1.10 - 2.20	F	Subgrade 2 Slightly Sandy Silt , Finely Graded, Non Plastic Pumice Sand Pamp Io Water	
2.200	B	ore Discontinued	
-		DRAFT	
course samp ase improve	ole reco ment s	overed @ N/A mm	
rade sample	recove	ared @ IV/A mm	
Penetromete	er Star	0.11 mm N/A mm	

ents:

fficient mass of aggregate sample was taken in order to comply with: NZS 4407:1991 Test 3.1 The water content of aggregate. ed By:

Karl Harrison

Approved Signatory

Date:

Laboratory Technician

Hayden Evans Laboratory Manager

ssued:

25/06/2002

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ıme:

In House Site Investigation Pits

Date:



· 14 Atkins Way Ohaulti Rd Taurangà

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hcevans@bop.quik.co.nz

Dènnis Whimp Sigma Consultant Ltd PO Box 553 Rotorua

Test Completion Date: Lab Reference: Report No:

TGA0002.05 1TL 06/04/11/A Unknown

25/06/2004

Order No: Sanfple By:

Hayden Evans

Sample Method: Sample No.:

NZS 4407 : 1991 Test 2.4.2 1481

Date Sampled:

25/06/2004

Date Received: Date Reported:

25/06/2004 27/06/2004 Natural

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Sample Condition:

Auger Test Pit No:

1 of 1

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carry out auger test pits (2000mm) at selected locations on D & M Roe & Adams Douglas Investment Trust Farm Rotorua Page: st Method:

Proposed Rotorua Cemetery

See Attached Arial Photos

E2791314, N6342889

e Investigation In House Test Pits

Mr D Whimp

Contract Name

Contract Number

Location of Test

Location off sit

termination of the Penetration Resistance of a Soil NZS 4402-1988 Test 6.5.2

Unknown

Depth	Layer Description		
0.0 - 0.1	Top Soil	Top Soil Black Organic Matter, Containing and an all	
0.10 - 1.40	Subgrade 1 Slightly Sandy Sllt, Fine Graded, Non Plastic, Light Brown getting lighter with depth Damp		
1 400 - 2000	Subgrade 2 Slightly Sandy Silt , Finely Graded, Non Plastic Very Wet Water at 1.50m		
2.000	Bore Discontinued	DRAFT	
course sample ase improveme rade sample red Penetrometer S	nt sample recovered @ covered @	N/A mm N/A mm 0.1 mm	
		N/A mm	

ficient mass of aggregate sample was taken in order to comply with; NZS 4407:1991 Test 3.1 The water content of aggregate.

Date:

Approved Signatory:

Date:

Karl Harrison **Laboratory Technician**

Hayden Evans **Laboratory Manager**

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ne:

25/06/2002

1 01/ 6004 20:20 ECES Evans Civil Engineering Services Dennis Whimp

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hcevans@bop.quik.co.nz

Test Completion Date: Lab Reference:

Report No: Order No:

Sample By: Sample Method:

Sample No.:

Date Sampled:

06/04/12/A Unknown

TGA0002.05 1TL

25/06/2004

Hayden Evens NZS 4407 : 1991 Test 2.4 2

1481 25/06/2004 25/06/2004 27/06/2004

Date Received: Date Reported: Sample Condition: Natural Auger Test Plt No: 3

1 of 1

Attention:

PO Box 553

Rotorua

Sigma Consultant Ltd

Mr D Whimp

E:

Contract Name

Contract Number

Location of Test Location off sit

Unknown See Attached Arial Photos E2791414, N6342864

Proposed Rotorus Cemetery

lent Request

carry out auger test pits (2000mm) at selected locations on D & M Roe & Adams Douglas Investment Trust Farm Rotorua Page:

e Investigation In House Test Pits

termination of the Penetration Resistance of a Soil NZS 4402-1988 Test 6.5.2

Depth	mm	Layer Description	
0.0 - 0.	- 1	Top Soll	
		Black Organic Matter, Containing saw dust & b Wet	ark
0.60 - 1.		Subgrade 1	
		Slightly Sandy Silt, Fine Graded, Non Plastic, Blue Brown Roylite	
1.00 - 2.0	_	Damp	
	s	ubgrade 2 lightly Silty Sand. Fine getting courser with dep rown White, Purnice	rth, Non Plastic,
		ery Wer	
	M	ater at 1.2m	
2.000	Bo	re Discontinued	
		n.	DRAF
maa esruoce			· · · · · · · · · · · · · · · · · · ·
base improve	ement e:	mple recovered @	N/A mm
grade sample	recove	aeq (g) hisa saconeteq (f)	N/A mm
Penetrome	ter Start	= - € ≥d (B)	0.6 mm
	_		N/A mm

ficient mass of aggregate sample was taken in order to comply with; NZS 4407:1991 Test 3.1 The water content of aggregate. ∌d By:

Approved Signatory:

Date:

Karl Harrison Laboratory Technician

Hayden Evans **Laboratory Manager**

sued: 25/06/2002 1:

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In House Site Investigation Pits

Date:

رے ، سے ECES Evans Civil Engineering Services Dennis Whimp

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Test Completion Date: Lab Reference:

Report No: Order No:

TGA0002.05 1TL 06/04/13/A Unknown

25/06/2004

Sample By: Sample Method:

Hayden Evens NZS 4407 : 1991 Test 2.4.2

Sample No.; Date Sampled:

1481 25/06/2004 25/06/2004

Date Reported: Sample Condition:

Date Received:

27/06/2004 Natural

Auger Test Pit No:

4 1 of 1

Attention:

E:

Rotorua

PO Box 553

Sigma Consultant Ltd

Mr D Whimp

Contract Name

Contract Number

Location of Test Location off sit

Unknown See Attached Arial Photos E2791414 N6342864

Proposed Rotorua Cemetery

ient Request

carry out auger test pits (2000mm) at selected locations on D & M Roe & Adams Douglas Investment Trust Farm Rotorua

e Investigation In House Test Pits

termination of the Penetration Resistance of a Soil NZS 4402-1988 Test 6.5.2

Depth	mm Layer Description	_
0.0 - 0.10	Top Soil Black Organic Matter, Not Containing saw dust & bark Damp	_
0.10 - 1.40	Subgrade 1 Slightly Sandy Slit, Fine Greded, Non Plastic, Light Brown getting lighter with depth Demp	_
1.40 - 2.20	Subgrade 2 Slightly Silty Sand, Fine getting courser with depth, Non Plastic, Brown White, Pumice Very Wet Water at 1.2m	
2.000	Bore Discontinued DRAFT	
ecourse sample r		
grade sample reci a Penetrometer S	overed a N/A mm	
	tarted @ N/A mm	

nts:

∌d By:

Date:

Approved Signatory

Date:

Karl Harrison **Laboratory Technician**

Hayden Evans Laboratory Manager

sued:

25/06/2002

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812/ 81/ 2004 20.23 ECES Evans Civil Engineering Services Dannis Whimp

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TGA0002.05 1TL

25/06/2004

06/04/14/A

hcevans@bop.quik.co.nz

Test Completion Date: Lab Reference:

Report No: Order No:

Date Sampled:

Date Received:

Sample By: Sample Method: Sample No.:

Unknown. Hayden Evans NZS 4407 : 1991 Test 2.4.2

1481

25/06/2004 25/06/2004 27/06/2004

Date Reported: Sample Condition: Auger Test Pit No: Page:

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Sigma Consultant Ltd

PO Box 553

Rotorua

Attention:

RE:

carry out auger test pits (2000mm) at selected locations on D & M Roe & Adams Douglas Investment Trust Farm Rotorua

Proposed Rotorua Cemetery

See Attached Arial Photos

E2791193, N6342756

st Method:

e Investigation in House Test Pits

Mr D Whimp

Contract Name

Contract Number

Location of Test

Location off sit

termination of the Penetration Resistance of a Soil NZS 4402-1988 Test 6.5.2

Unknown

Depth	nm Layer Description	
0.0 - 0.10	Top Soil Black Organic Matter, Not Containing saw dust & t Damp	
0.10 - 1.20	Subgrade 1 Slightly Sandy Silt, Fine Graded, Non Plastic, Light Brown getting lighter with depth Damp	
1.20 - 1.500	Subgrade 2 Slightly Sandy Silt, Fine Graded, Non Plastic, Light Grey White Damp	
1500 - 2.200	Subgrade 3 Slightly Silty Sand, Fine getting courser with depth, N Brown White, Pumice Damp No water	Ion Plastic. DRAFT
2.200	Bore Discontinued	
ecourse sample base improvem	ecovered @ it sample recovered @	N/A mm
rade sample re	overed w	N/A mm
Penetrometer	tarted @	0.1 mm
		N/A mm

nts:

ad By:

Date:

Date:

Karl Harrison **Laboratory Technician** Approved Signatory:

Hayden Evans **Laboratory Manager**

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me:

25/06/2002

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WUN WIN 2 CWEIG 20:20 ECES Evans Civil Engineering Services Dennis Whimp

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Test Completion Date: Lab Reference:

Report No: Order No:

TGA0002.05 1TL 08/04/15/A Unknown Hayden Evans

25/06/2004

Sample By: Sample Method:

NZS 4407 : 1991 Test 2.4.2

Sample No.: 1481 Date Sampled: Date Received:

25/06/2004 25/06/2004 27/08/2004

Date Reported: Sample Condition: Auger Test Pit No:

Natural

1 of 1

lent Request

Sigma Consultant Ltd

PO Box 553

Rotorua

Attention:

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carry out auger test pits (2000mm) at selected locations on D & M Roe & Adams Douglas Investment Trust Farm Rotorua

Proposed Rotorua Cemetery

See Attached Arial Photos

E2791335, N6342696

e Investigation in House Test Pits

Mr D Whimp

Contract Name

Contract Number

Location of Test

Location off sit

termination of the Penetration Resistance of a Soil NZS 4402-1988 Test 6.5.2

Unknown

Pepth	mm Layer	Description
0	Top Soil	- on paron
0 - 900		*
	Subgrade 1 Slightly Sandy Silt, Fine Graded, Plast Light Orange Brown Wet	de,
900 - 1.800	Subgrade 2 Slightly Sandy Silt, Fine Graded, Plastle Light Brown Very wet	5,
1800 - 2.200	Subgrade 3 Slightly Sandy Slit, Fine Graded, Plastic, Light Brown Orange Brown Very wet Water At 600mm	
2.200	Bore Discontinued	
ourse sample	recovered @	Nu
ade sample re	nt sample recovered @	N/A mm ~ N/A mm
enetrometer	Started @	0.1 mm N/A mm

d By:

Date:

Approved Signatory:

Date:

Karl Harrison **Laboratory Technician**

Hayden Evans Laboratory Manager

sued:

ne:

25/06/2002

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47/11/2004 20:26 ECES Evans Civil Engineering Services Dennis Whirmp

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25/06/2004

hcevans@bop.quik.co.nz

Test Completion Date: Lab Reference:

TGA0002.05 1TL Report No: 06/04/16/A Order No: Unknown Sample By: Hayden Evans

Sample Method: Sample No.:

NZS 4407 : 1991 Test 2.4.2 1481 25/06/2004

Date Sampled: Date Received: Date Reported: Sample Condition: Auger Test Pit No: 7

25/06/2004 27/06/2004 Natura!

1 of 1

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Sigma Consultant Ltd

PO Box 553

Rotorua

Attention:

ľΕ:

carry out auger test pits (2000mm) at selected locations on D & M Roe & Adams Douglas Investment Trust Farm Rotorua

Proposed Rotorua Cemetery

See Attached Arial Photos

E2791395, N6342650

e Investigation In House Test Pits

Mr D Whimp

Contract Name

Contract Number

Location of Test

Location off sit

termination of the Penetration Resistance of a Soil NZS 4402-1988 Test 6.5.2

Unknown

Depth	mm	Layer Desc	cription
0 - 2,2	1	Top Soil Containing Bark, Sawdust, Wood Chip, Thin layers of light brown ash Very Damp To Wet Water At 1.7m	DRAFT
2.200	E	Bore Discontinued	and the same
S			
ecourse sam	ple reco	vered @	N/A mm
rade samni	ement se Program	ample recovered @	N/A mm
grade sample recovered @ a Penetrometer Started @		N/A mm	
Penetrome	ier Stani	ea m	

125

d By:

Date:

Approved Signatory:

Date:

Karl Harrison **Laboratory Technician**

Hayden Evans

Laboratory Manager

·ued;

25/06/2002

ie:

20:26 ECES Evans Civil Engineering Services ennis Whimp igma Consultant Ltd O Box 553

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25/06/2004

Test Completion Date: Lab Reference:

Report No: Order No: Sample By:

TGA0002.05 1TL 06/04/18/A Unknown Hayden Evans

Sample Method; Sample No.: Date Sampled:

NZS 4407 : 1991 Test 2.4.2 25/06/2004 25/06/2004 27/08/2004

Date Received.

Date Reported: Sample Condition:

Natural 8 1 of 1

Location off sit lient Request

Rotorua

Attention:

RE:

o carry out auger test pits (2000mm) at selected locations on D & M Roe & Adams Douglas Investment Trust Farm Rotorua

Proposed Rotorua Cemetery

See Attached Arial Photos

E2791445, N6342781

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Mr D Whimp

Contract Name

Contract Number

Location of Test

etermination of the Penetration Resistance of a Soil NZS 4402-1988 Teat 6.5.2

Unknown

0 - 0.100	mm Layer Descri	Ption
0.1 - 2.200	Black Organic Matter; Not Containing saw dus	ił & bark
2.200	Slightly Slity Sand, White, Containing rear cour Damp Getting wetter with depth, Coursely Grad Damp Bore Discontinued	se AP 10 Pumice ling
	No water	
	I)RAI	
	DRAF	-1
course sample re ase improvement rade aample reco	ecovered @	N/A mm

Date:

Date:

Karl Harrison Laboratory Technician

Approved Signatory:

Hayden Evans Laboratory Manager

ď; 25/06/2002

ECES Evans Civil Engineering Services Dennis Whimp Sigma Consultant Ltd

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Test Completion Date:

TGA0002.05 1TL 06/04/19/A Unknown

Hayden Evans NZS 4407 : 1991 Test 2.4.2

25/06/2004

1481 25/06/2004 25/06/2004

1 of 1

27/06/2004 Natural

Lab Reference: Report No:

Order No: Sample By: Sample Method:

Sample No.:

Date Sampled:

Date Received: Date Reported: Sample Condition:

Auger Test Pit No:

lient Request

PO Box 553

Rotorua

Attention:

RE :

o carry out auger test pits (2000mm) at selected locations on D & M Roe & Adams Douglas Investment Trust Farm Rotorua

Proposed Rotorua Cemetery

See Attached Arial Photos

E2791452, N6342684

te Investigation In House Test Pits

Mr D Whimp

Contract Name

Contract Number

Location of Test

Location off sit

itermination of the Penetration Resistance of a Soil NZS 4402-1988 Test 6.5.2

Unknown

	mm Layer Description
0.0 - 0.75	Top Soil
	Black Organic Matter, New Co.
0.75	Black Organic Matter, Not Containing saw dust & bark
0. 75 - 1.1	Subgrade 1:
	Slightly Slity Sand, Light Brown Getting Courser & Lighter With Depth Dame
	Non Plastic, Coursely Graded Pumice. Non Plastic, Coursely Graded Pumice.
1.10 - 2.20	Subgrede 2
	Slightly Slity Sand White Co.
	Non Plastic, Coursely Graded Pumice,
	1
2.20	No Water
	Bore Discontinued
	DRAFT
- 1	-11/41
1	The same ages
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course sample re	covered @
ase improvement	t sample recovered @ N/A mm
ase improvement ade sample reco	t sample recovered @ N/A mm
ase improvement	t sample recovered @ N/A mm

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By:

Date:

Approved Signatory:

Date:

Hayden Evans Laboratory Manager

red: 25/06/2002

Laboratory Technician

Karl Harrison

500 5 1 7 KBB4 20.21 ECES Evans Civil Engineering Services Dennis Whimsp

14 Atkins Way Ohaulti Rd Tauranga

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25/06/2004

hcevans@bop.quik.co.nz

Test Completion Date: Lab Reference: Report No:

Order Na:

Sample By: Sample Method:

Sample No.: Date Sampled:

Date Received: Date Reported: Sample Condition:

Natural Auger Test Pit No: 10 Page: 1 of 1

TGA0002.05 1TL 06/04/20/A Unknown Hayden Evans NZ\$ 4407 : 1991 Test 2.4.2 1481 25/06/2004 25/06/2004 27/06/2004

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carry out auger test pits (2000mm) at selected locations on D & M Roa & Adams Douglas Investment Trust Farm Rotorua

Proposed Rotorus Cemetery

See Attached Arial Photos

E2791628, N6342691

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Investigation In House Test Pita

Mr D Whimp

Contract Name

Contract Number

Location of Test

Location off sit

armination of the Penetration Resistance of a Soil NZS 4402-1988 Test 6.5.2

Unknown

Depth	mm	Layer Description	
0.0 - 0.300		Top Soil	
		Black Organic Matter, Not Containing Damp	saw dust & bark
0.30 -2.		Subgrade 1 Slightly Slity Sand, White Getting Cou Von Plastlo, Coursely Graded Pumice Jamp Io Water	riser With Depth b, Getting Weter withb depth
2.20		ore Discontinued	
		DRA	
secourse sar			N/A mm
oosse Impro	vêment s	ample recovered @	N/A mm
igrade samp			300 mm
la Penetrom	etor St	and dis	N/A mm

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ad By:

Date:

Date:

Karl Harrison Laboratory Technician Approved Signatory:

Hayden Evans Laboratory Manager

sued: 25/06/2002

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