

Sigma Consultants Limited

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FILE

0907031



ENGINEERS • ARCHITECTS • PLANNERS

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
	<hr/>
	\$2,250.00
	<hr/> <hr/>

443/9080/8510

AEllery.
6/8/04

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.

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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.

1. 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.

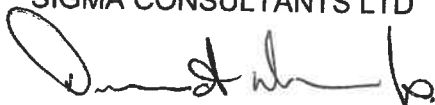
CONCLUSIONS

- 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.

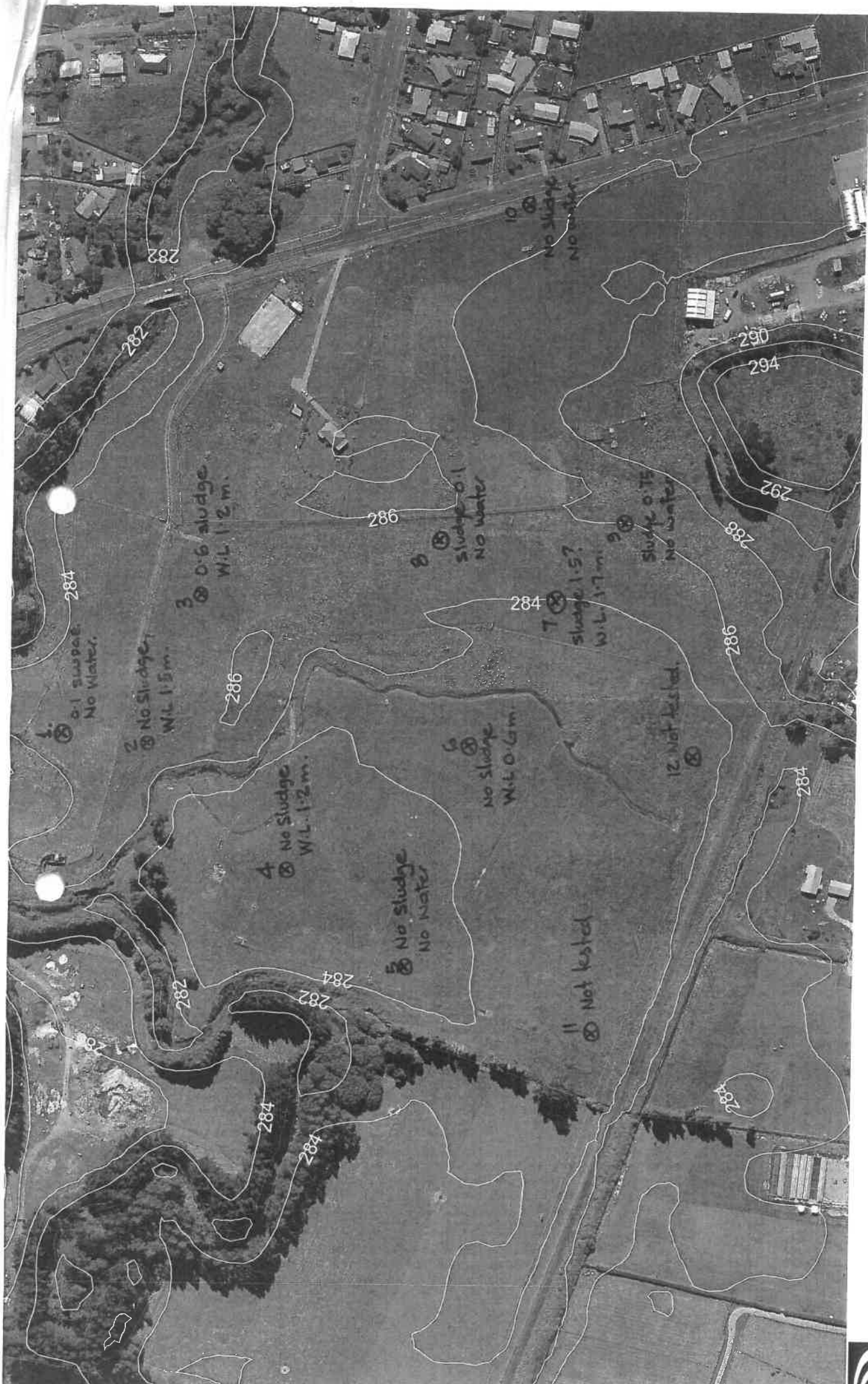
Yours faithfully
SIGMA CONSULTANTS LTD



Dennis Whimp
Principal - Roading

(DW/6958r01-ltr)

charged \$2000 + GST.



1:2000

Rotorua District Council

Aerial Photography

Flown 01-2001





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Dennis Whimp
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Rotorua

Test Completion Date: 25/06/2004
Lab Reference: TGA0002.05 1TL
Report No: 06/04/10/A
Order No: Unknown
Sample By: Hayden Evans
Sample Method: NZS 4407 : 1991 Test 2.4.2
Sample No.: 1481
Date Sampled: 25/06/2004
Date Received: 25/06/2004
Date Reported: 27/06/2004
Sample Condition: Natural
Auger Test Pit No: 1
Page: 1 of 1

Attention: Mr D Whimp

Contract Name: Proposed Rotorua Cemetery
Contract Number: Unknown
Location of Test: See Attached Arial Photos
Location off sit: E2791329, N6342948

Client Request

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

Test Method:

Investigation In House Test Pits
Determination of the Penetration Resistance of a Soil NZS 4402-1988 Test 6.5.2

Depth mm	Layer Description
0.0 - 0.11	Top Soil Black Organic Matter, Containing no saw dust or bark Damp
0.11 - 1.10	Subgrade 1 Slightly Sandy Silt, Fine Graded, Non Plastic, Light Brown getting lighter with depth Damp
1.10 - 2.20	Subgrade 2 Slightly Sandy Silt, Finely Graded, Non Plastic Pumice Sand Damp No Water
2.200	Bore Discontinued
DRAFT	
Basecourse sample recovered @	N/A mm
Subbase Improvement sample recovered @	N/A mm
Subgrade sample recovered @	0.11 mm
Scale Penetrometer Started @	N/A mm

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

Prepared By: **Karl Harrison**
Laboratory Technician

Date:

Approved Signatory:

Hayden Evans
Laboratory Manager

Date:

Issued: 25/06/2002
Number: 2
Name: In House Site Investigation Pits



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Attention: Mr D Whimp

E: Contract Name Proposed Rotorua Cemetery
Contract Number Unknown
Location of Test See Attached Aerial Photos
Location off sit E2791314, N6342889

Test Completion Date: 25/06/2004
Lab Reference: TGA0002.05 1TL
Report No: 06/04/11/A
Order No: Unknown
Sample By: Hayden Evans
Sample Method: NZS 4407: 1991 Test 2.4.2
Sample No.: 1481
Date Sampled: 25/06/2004
Date Received: 25/06/2004
Date Reported: 27/06/2004
Sample Condition: Natural
Auger Test Pit No: 2
Page: 1 of 1

Client Request

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

Test Method:

Investigation In House Test Pits
Determination of the Penetration Resistance of a Soil NZS 4402-1988 Test 6.5.2

Depth mm	Layer Description
0.0 - 0.1	Top Soil Black Organic Matter, Containing no saw dust or bark Damp
0.10 - 1.40	Subgrade 1 Slightly Sandy Silt, 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	
Basecourse sample recovered @	N/A mm
Subbase Improvement sample recovered @	N/A mm
Subgrade sample recovered @	0.1 mm
Scala Penetrometer Started @	N/A mm

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

Prepared By: Karl Harrison
Laboratory Technician

Date:

Approved Signatory:

Date:

Hayden Evans
Laboratory Manager

Prepared: 25/06/2002

Page: 2

Title: In House Site Investigation Pits



Dennis Whimp
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PO Box 553
Rotorua

Test Completion Date: 25/06/2004
Lab Reference: TGA0002.05 1TL
Report No: 06/04/12/A
Order No: Unknown
Sample By: Hayden Evans
Sample Method: NZS 4407 : 1991 Test 2.4 2
Sample No.: 1481
Date Sampled: 25/06/2004
Date Received: 25/06/2004
Date Reported: 27/06/2004
Sample Condition: Natural
Auger Test Pit No: 3
Page: 1 of 1

Attention: Mr D Whimp

Contract Name: Proposed Rotorua Cemetery
Contract Number: Unknown
Location of Test: See Attached Arial Photos
Location off sit: E2791414, N6342864

Client Request

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

Test Method:

Investigation In House Test Pits
Determination of the Penetration Resistance of a Soil NZS 4402-1988 Test 6.5.2

Depth mm	Layer Description
0.0 - 0.60	Top Soil Black Organic Matter, Containing saw dust & bark Wet
0.60 - 1.00	Subgrade 1 Slightly Sandy Silt, Fine Graded, Non Plastic, Blue Brown Royliffe Damp
1.00 - 2.00	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	
Basecourse sample recovered @	N/A mm
Subbase Improvement sample recovered @	N/A mm
Subgrade sample recovered @	0.6 mm
Scala Penetrometer Started @	N/A mm

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

Prepared By: **Karl Harrison**
Laboratory Technician

Date:

Approved Signatory:

Date:

Hayden Evans
Laboratory Manager

Issued: 25/06/2002
No: 2
Name: In House Site Investigation Pits



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Test Completion Date: 25/06/2004
Lab Reference: TGA0002.05 1TL
Report No: 06/04/13/A
Order No: Unknown
Sample By: Hayden Evans
Sample Method: NZS 4407 : 1991 Test 2.4.2
Sample No.: 1481
Date Sampled: 25/06/2004
Date Received: 25/06/2004
Date Reported: 27/06/2004
Sample Condition: Natural
Auger Test Pit No: 4
Page: 1 of 1

Attention: Mr D Whimp

Contract Name: Proposed Rotorua Cemetery
Contract Number: Unknown
Location of Test: See Attached Aerial Photos
Location off sit: E2791414, N6342864

Client Request

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

Test Method:

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 Silt, Fine Graded, Non Plastic, Light Brown getting lighter with depth Damp
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	
Basecourse sample recovered @	N/A mm
Subbase improvement sample recovered @	N/A mm
Subgrade sample recovered @	0.6 mm
Scala Penetrometer Started @	N/A mm

nts:

Prepared By: **Karl Harrison**
Laboratory Technician

Date:

Approved Signatory:

Hayden Evans
Laboratory Manager

Date:

Issued: 25/06/2002

Pages: 2

Title: In House Site Investigation Pits



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Test Completion Date: 25/06/2004
Lab Reference: TGA0002.05 1TL
Report No: 06/04/14/A
Order No: Unknown
Sample By: Hayden Evans
Sample Method: NZS 4407 : 1991 Test 2.4.2
Sample No.: 1481
Date Sampled: 25/06/2004
Date Received: 25/06/2004
Date Reported: 27/06/2004
Sample Condition: Natural
Auger Test Pit No: 5
Page: 1 of 1

Attention: Mr D Whimp

RE: Contract Name Proposed Rotorua Cemetery
Contract Number Unknown
Location of Test See Attached Aerial Photos
Location off sit E2791193, N6342756

Client Request

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

Test Method:

Investigation In House Test Pits
Determination 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 - 1.20	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, Non Plastic, Brown White, Pumice Damp No water
2.200	Bore Discontinued
DRAFT	
Basecourse sample recovered @	N/A mm
Subbase Improvement sample recovered @	N/A mm
Subgrade sample recovered @	0.1 mm
Scala Penetrometer Started @	N/A mm

nts:

ed By: **Karl Harrison**
Laboratory Technician

Date:

Approved Signatory: **Hayden Evans**
Laboratory Manager

Date:

ued: 25/06/2002
t: 2
ne: In House Site Investigation Pits



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Test Completion Date: 25/08/2004
Lab Reference: TGA0002.05 1TL
Report No: 08/04/15/A
Order No: Unknown
Sample By: Hayden Evans
Sample Method: NZS 4407 : 1991 Test 2.4.2
Sample No.: 1481
Date Sampled: 25/06/2004
Date Received: 25/06/2004
Date Reported: 27/08/2004
Sample Condition: Natural
Auger Test Plt No: 6
Page: 1 of 1

Attention: Mr D Whimp

RE: Contract Name Proposed Rotorua Cemetery
Contract Number Unknown
Location of Test See Attached Aerial Photos
Location off sit E2791335, N6342696

Client Request

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

Test Method:

Investigation in House Test Pits
Determination of the Penetration Resistance of a Soil NZS 4402-1988 Test 6.5.2

Depth mm	Layer Description
0	Top Soil
0 - 900	Subgrade 1 Slightly Sandy Silt, Fine Graded, Plastic, Light Orange Brown Wet
900 - 1.800	Subgrade 2 Slightly Sandy Silt, Fine Graded, Plastic, Light Brown Very wet
1800 - 2.200	Subgrade 3 Slightly Sandy Silt, Fine Graded, Plastic, Light Brown Orange Brown Very wet Water At 600mm
2.200	Bore Discontinued
Basecourse sample recovered @ N/A mm Subbase Improvement sample recovered @ N/A mm Subgrade sample recovered @ 0.1 mm Scala Penetrometer Started @ N/A mm	

nts:

By: **Karl Harrison**
Laboratory Technician

Date:

Approved Signatory: **Hayden Evans**
Laboratory Manager

Date:

ued: 25/06/2002
: 2
ne: In House Site Investigation Pits

DRAFT



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Test Completion Date: 25/06/2004
Lab Reference: TGA0002.05 1TL
Report No: 08/04/16/A
Order No: Unknown
Sample By: Hayden Evans
Sample Method: NZS 4407 : 1991 Test 2.4.2
Sample No.: 1481
Date Sampled: 25/06/2004
Date Received: 25/06/2004
Date Reported: 27/06/2004
Sample Condition: Natural
Auger Test Pit No: 7
Page: 1 of 1

Attention: Mr D Whimp

Contract Name: Proposed Rotorua Cemetery
Contract Number: Unknown
Location of Test: See Attached Arial Photos
Location off sit: E2791395, N6342650

Client Request

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

Test Method:

Investigation In House Test Pits
Determination of the Penetration Resistance of a Soil NZS 4402-1988 Test 6.5.2

Depth mm	Layer Description
0 - 2.200	Top Soil Containing Bark, Sawdust, Wood Chip, Thin layers of light brown ash Very Damp To Wet Water At 1.7m
2.200	Bore Discontinued
DRAFT	
Basecourse sample recovered @	N/A mm
Subbase Improvement sample recovered @	N/A mm
Subgrade sample recovered @	N/A mm
Scala Penetrometer Started @	N/A mm

Notes:

Drawn By: Karl Harrison
Laboratory Technician

Date:

Approved Signatory: Hayden Evans
Laboratory Manager

Date:

Issued: 25/06/2002
Page: 2
Title: In House Site Investigation Pits

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Test Completion Date: 25/06/2004
Lab Reference: TGA0002.05 1TL
Report No: 06/04/18/A
Order No: Unknown
Sample By: Hayden Evans
Sample Method: NZS 4407: 1991 Test 2.4.2
Sample No.: 1481
Date Sampled: 25/06/2004
Date Received: 25/06/2004
Date Reported: 27/06/2004
Sample Condition: Natural
Auger Test Pit No: 8
Page: 1 of 1

Attention: Mr D Whimp

RE: Contract Name Proposed Rotorua Cemetery
Contract Number Unknown
Location of Test See Attached Aerial Photos
Location off sit E2791445, N8342761

Client Request

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

Test Method:

Site Investigation In House Test Pits
Determination of the Penetration Resistance of a Soil NZS 4402-1988 Test 6.5.2

Depth mm	Layer Description
0 - 0.100	Top Soil Black Organic Matter, Not Containing saw dust & bark Damp
0.1 - 2.200	Subgrade 1 Slightly Silty Sand, White, Containing rear course AP 10 Pumice Damp Getting wetter with depth, Coarsely Grading Damp
2.200	Bore Discontinued No water
DRAFT	
Basecourse sample recovered @	N/A mm
Subbase Improvement sample recovered @	N/A mm
Subgrade sample recovered @	100 mm
Scale Penetrometer Started @	N/A mm

by: **Karl Harrison**
Laboratory Technician

Date:

Approved Signatory:

Hayden Evans
Laboratory Manager

Date:

date: 25/06/2002

2
In House Site Investigation Pits



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Attention: Mr D Whimp

RE: Contract Name Proposed Rotorua Cemetery
Contract Number Unknown
Location of Test See Attached Arial Photos
Location off sit E2791452, N6342684

Test Completion Date: 25/06/2004
Lab Reference: TGA0002.05 1TL
Report No: 06/04/19/A
Order No: Unknown
Sample By: Hayden Evans
Sample Method: NZS 4407 : 1991 Test 2.4.2
Sample No.: 1481
Date Sampled: 26/06/2004
Date Received: 25/06/2004
Date Reported: 27/06/2004
Sample Condition: Natural
Auger Test Pit No: 9
Page: 1 of 1

Client Request

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

Test Method:

Site Investigation In House Test Pits
Determination of the Penetration Resistance of a Soil NZS 4402-1988 Test 6.5.2

Depth mm	Layer Description
0.0 - 0.75	Top Soil Black Organic Matter, Not Containing saw dust & bark Damp
0.75 - 1.1	Subgrade 1 Slightly Silty Sand, Light Brown Getting Courser & Lighter With Depth Non Plastic, Coursely Graded Pumice, Damp
1.10 - 2.20	Subgrade 2 Slightly Silty Sand, White Getting Courser With Depth Non Plastic, Coursely Graded Pumice, Damp No Water
2.20	Bore Discontinued
DRAFT	
Basecourse sample recovered @	N/A mm
Subbase Improvement sample recovered @	N/A mm
Subgrade sample recovered @	75 mm
Scala Penetrometer Started @	N/A mm

S:

By: Karl Harrison
Laboratory Technician

Date:

Approved Signatory:

Hayden Evans
Laboratory Manager

Date:

Issued: 25/06/2002
2

Project: In House Site Investigation Pits



Dennis Whimp
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Rotorua

Test Completion Date: 25/06/2004
Lab Reference: TGA0002.05 1TL
Report No: 06/04/20/A
Order No: Unknown
Sample By: Hayden Evans
Sample Method: NZS 4407 : 1991 Test 2.4.2
Sample No.: 1481
Date Sampled: 25/06/2004
Date Received: 25/06/2004
Date Reported: 27/06/2004
Sample Condition: Natural
Auger Test Pit No: 10
Page: 1 of 1

Attention: Mr D Whimp

Contract Name Proposed Rotorua Cemetery
Contract Number Unknown
Location of Test See Attached Arial Photos
Location off site E2791628, N6342691

Client Request

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

Test Method:

Investigation In House Test Pits
Determination of the Penetration Resistance of a Soil NZS 4402-1988 Test 6.5.2

Depth mm	Layer Description
0.0 - 0.300	Top Soil Black Organic Matter, Not Containing saw dust & bark Damp
0.30 - 2.20	Subgrade 1 Slightly Silty Sand, White Getting Courser With Depth Non Plastic, Coursely Graded Pumice, Getting Water withb depth Damp No Water
2.20	Bore Discontinued
DRAFT	
Basecourse sample recovered @	N/A mm
Subbase improvement sample recovered @	N/A mm
Subgrade sample recovered @	300 mm
Scala Penetrometer Started @	N/A mm

Notes:

Prepared By: **Karl Harrison**
Laboratory Technician

Date:

Approved Signatory:

Hayden Evans
Laboratory Manager

Date:

Issued: 25/06/2002
No: 2
Name: In House Site Investigation Pits