Appendix C: Laboratory Test Results

- Atterberg Limits
- PSD
- Heavy compaction
- UCS
- CU Triaxial
- Triaxial Permeability
- Pinhole
- Allophane

GEOTECHNICS

Our Ref: 1007084.0.4.0/rep 1
Customer Ref: 1005069.1120
26 June 2018

Tonkin & Taylor
PO BOX 5213
Wellesly Road
Auckland

Attention: Alex Naylor

Dear Alex

Dome Valley Project

Laboratory Test Report

Samples from the above mentioned site have been tested as received according to your instructions. Test results are included in this report.

Samples not destroyed during testing will be retained for one month from the date of this report before being discarded.

Descriptions are enclosed for your information, but are not covered under the IANZ endorsement of this report.

Please reproduce this report in full when transmitting to others or including in internal reports.

If we can be of any further assistance, feel free to get in touch. Contact details are provided at the bottom of this page.

GEOTECHNICS LTD

Report prepared by:

.....

Jack Singh
Laboratory Technician

Authorised for Geotechnics by:

Paul Burton
I have reviewed this document
2018.06.27 06:38:34 +12'00'

.....

Paul Burton
Project Director

Report checked by:

Corey Papu Gread
Christchurch Manager
Approved Signatory

IANZ ACCREDITED LABORATORY

All tests reported herein have been performed in accordance with the laboratory's scope of accreditation

GEOTECHNICS

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Geotechnics Project ID	1007084.0.4.0
Customer Project ID	1005069.112
Customer Project Name	Dome Valley

DETERMINATION OF WATER CONTENT - NZS 4402:1986 Test 2.1

TEST DETAILS

LOCATION	**ID**	TT Dome Valley		
	Description	TT Dome Valley		
	Data	N/A		
SAMPLE	**Geotechnics ID**	GEOT201805230	**Date Received**	18/05/2018
	Reference	BH01	**Depth**	2.00m - 2.50m
	Description	SILT with minor clay and trace sand, light brown mixed with grey. Moist, extremely high plasticity.		
SPECIMEN	**Reference**	1	**Depth**	N/A
	Description	N/A		

TEST RESULT

Natural Water Content **49.0%**

TEST REMARKS

• The material used for testing was natural.

This test result is IANZ accredited.

Approved By	CXPG	**Date**	12/06/2018

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Geotechnics Project ID	1007084.0.4.0
Customer Project ID	1005069.112
Customer Project Name	Dome Valley

DETERMINATION OF WATER CONTENT - NZS 4402:1986 Test 2.1

TEST DETAILS

LOCATION	**ID**	TT Dome Valley		
	Description	TT Dome Valley		
	Data	N/A		
SAMPLE	**Geotechnics ID**	GEOT201805234	**Date Received**	18/05/2018
	Reference	BH11	**Depth**	1.50m - 2.00m
	Description	SILT with minor clay and trace sand, reddish brown mixed with grey. Moist, extremely high plasticity.		
SPECIMEN	**Reference**	1	**Depth**	N/A
	Description	N/A		

TEST RESULT

Natural Water Content	**48.7%**

TEST REMARKS

- The material used for testing was natural.

This test result is IANZ accredited.

Approved By	CXPG	**Date**	14/06/2018

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Geotechnics Project ID	1007084.0.4.0
Customer Project ID	1005069.112
Customer Project Name	Dome Valley

DETERMINATION OF WATER CONTENT - NZS 4402:1986 Test 2.1

TEST DETAILS

LOCATION	**ID**	TT Dome Valley		
	Description	TT Dome Valley		
	Data	N/A		
SAMPLE	**Geotechnics ID**	GEOT201805233	**Date Received**	18/05/2018
	Reference	BH12	**Depth**	2.00m - 2.50m
	Description	SILT with minor to some clay and trace sand, brown mixed with red and orange. Moist, extremely high plasticity.		
SPECIMEN	**Reference**	1	**Depth**	N/A
	Description	N/A		

TEST RESULT

Natural Water Content **61.9%**

TEST REMARKS

• The material used for testing was natural.

This test result is IANZ accredited.

Approved By	CXPG	**Date**	12/06/2018

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Geotechnics Project ID	1007084.0.4.0
Customer Project ID	1005069.112
Customer Project Name	Dome Valley

DETERMINATION OF WATER CONTENT - NZS 4402:1986 Test 2.1

TEST DETAILS

LOCATION	**ID**	TT Dome Valley		
	Description	TT Dome Valley		
	Data	N/A		
SAMPLE	**Geotechnics ID**	GEOT201805232	**Date Received**	18/05/2018
	Reference	BH13	**Depth**	1.50m - 2.00m
	Description	SILT with minor clay, trace sand and trace organics, dark brown mottled black. Moist to wet, very high.		
SPECIMEN	**Reference**	1	**Depth**	N/A
	Description	N/A		

TEST RESULT

Natural Water Content **52.7%**

TEST REMARKS

• The material used for testing was natural.

This test result is IANZ accredited.

Approved By	CXPG	**Date**	12/06/2018

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Geotechnics Project ID	1007084.0.3000.0
Customer Project ID	1005069.1120
Customer Project Name	Dome Valley

DETERMINATION OF WATER CONTENT - NZS 4402:1986 Test 2.1

TEST DETAILS

LOCATION	ID	TP10		
	Description	N/A		
	Data	N/A		
SAMPLE	Geotechnics ID	GEOT201805213	Date Received	Unknown
	Reference	N/A	Depth	0.10m - 1.00m
	Description	Clayey SILT, minor sand and trace gravel; light brown with grey, and orange, and red mottling. Moist to wet.		
SPECIMEN	Reference	1	Depth	N/A
	Description	N/A		

TEST RESULT

Natural Water Content	42.9%

TEST REMARKS

• The material used for testing was natural.

This test result is IANZ accredited.

Approved By	RTH	Date	14/06/2018

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Geotechnics Project ID	1007084.0.4.0
Customer Project ID	1005069.112
Customer Project Name	Dome Valley

DETERMINATION OF LIQUID & PLASTIC LIMIT, PLASTICITY INDEX - NZS 4402: 1986 Tests 2.2 (4 Point), 2.3 & 2.4

TEST DETAILS

LOCATION	**ID**	TT Dome Valley		
	Description	TT Dome Valley		
	Data	N/A		
SAMPLE	**Geotechnics ID**	GEOT201805230	**Date Received**	18/05/2018
	Reference	BH01	**Depth**	2.00m - 2.50m
	Description	SILT with minor clay and trace sand, light brown mixed with grey. Moist, extremely high plasticity.		
SPECIMEN	**Reference**	2	**Depth**	N/A
	Description	N/A		

TEST RESULTS

Liquid Limit	**96**
Plastic Limit	**36**
Plasticity Index	**60**

TEST REMARKS

- The material used for testing was natural, fraction passing a 425um sieve.

This test result is IANZ accredited.

Approved By	CXPG	**Date**	13/06/2018

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Geotechnics Project ID	1007084.0.4.0
Customer Project ID	1005069.112
Customer Project Name	Dome Valley

DETERMINATION OF LIQUID & PLASTIC LIMIT, PLASTICITY INDEX - NZS 4402: 1986 Tests 2.2 (4 Point), 2.3 & 2.4

TEST DETAILS

LOCATION	**ID**	TT Dome Valley		
	Description	TT Dome Valley		
	Data	N/A		
SAMPLE	**Geotechnics ID**	GEOT201805235	**Date Received**	18/05/2018
	Reference	BH03	**Depth**	2.00m - 2.50m
	Description	SILT with trace to minor clay and minor sand, light brown mottled black. Moist, high plasticity.		
SPECIMEN	**Reference**	1	**Depth**	N/A
	Description	N/A		

TEST RESULTS

Liquid Limit	**64**
Plastic Limit	**27**
Plasticity Index	**37**

TEST REMARKS

• The material used for testing was natural, fraction passing a 425um sieve.

This test result is IANZ accredited.

Approved By	CXPG	**Date**	13/06/2018

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Geotechnics Project ID	1007084.0.4.0
Customer Project ID	1005069.112
Customer Project Name	Dome Valley

DETERMINATION OF LIQUID & PLASTIC LIMIT, PLASTICITY INDEX - NZS 4402: 1986 Tests 2.2 (4 Point), 2.3 & 2.4

TEST DETAILS

LOCATION	**ID**	TT Dome Valley		
	Description	TT Dome Valley		
	Data	N/A		
SAMPLE	**Geotechnics ID**	GEOT201805231	**Date Received**	18/05/2018
	Reference	BH9	**Depth**	1.50m - 2.00m
	Description	SILT with minor clay, trace sand and trace organics, reddish brown mixed with grey mottled pink. Moist, very high plasticity.		
SPECIMEN	**Reference**	1	**Depth**	N/A
	Description	N/A		

TEST RESULTS

Liquid Limit	**78**
Plastic Limit	**39**
Plasticity Index	**39**

TEST REMARKS

- The material used for testing was natural, fraction passing a 425um sieve.

This test result is IANZ accredited.

Approved By	CXPG	**Date**	11/06/2018

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Geotechnics Project ID	1007084.0.4.0
Customer Project ID	1005069.112
Customer Project Name	Dome Valley

DETERMINATION OF LIQUID & PLASTIC LIMIT, PLASTICITY INDEX - NZS 4402: 1986 Tests 2.2 (4 Point), 2.3 & 2.4

TEST DETAILS

LOCATION	**ID**	TT Dome Valley		
	Description	TT Dome Valley		
	Data	N/A		
SAMPLE	**Geotechnics ID**	GEOT201805234	**Date Received**	18/05/2018
	Reference	BH11	**Depth**	1.50m - 2.00m
	Description	SILT with minor clay and trace sand, reddish brown mixed with grey. Moist, extremely high plasticity.		
SPECIMEN	**Reference**	2	**Depth**	N/A
	Description	N/A		

TEST RESULTS

Liquid Limit	**96**
Plastic Limit	**39**
Plasticity Index	**57**

TEST REMARKS

• The material used for testing was natural, fraction passing a 425um sieve.

This test result is IANZ accredited.

Approved By	CXPG	**Date**	11/06/2018

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Geotechnics Project ID	1007084.0.4.0
Customer Project ID	1005069.112
Customer Project Name	Dome Valley

DETERMINATION OF LIQUID & PLASTIC LIMIT, PLASTICITY INDEX - NZS 4402: 1986 Tests 2.2 (4 Point), 2.3 & 2.4

TEST DETAILS

LOCATION	**ID**	TT Dome Valley		
	Description	TT Dome Valley		
	Data	N/A		
SAMPLE	**Geotechnics ID**	GEOT201805233	**Date Received**	18/05/2018
	Reference	BH12	**Depth**	2.00m - 2.50m
	Description	SILT with minor to some clay and trace sand, brown mixed with red and orange. Moist, extremely high plasticity.		
SPECIMEN	**Reference**	2	**Depth**	N/A
	Description	N/A		

TEST RESULTS

Liquid Limit	**121**
Plastic Limit	**37**
Plasticity Index	**84**

TEST REMARKS

• The material used for testing was natural, fraction passing a 425um sieve.

This test result is IANZ accredited.

Approved By	CXPG	**Date**	13/06/2018

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Geotechnics Project ID	1007084.0.4.0
Customer Project ID	1005069.112
Customer Project Name	Dome Valley

DETERMINATION OF LIQUID & PLASTIC LIMIT, PLASTICITY INDEX - NZS 4402: 1986 Tests 2.2 (4 Point), 2.3 & 2.4

TEST DETAILS

LOCATION	**ID**	TT Dome Valley		
	Description	TT Dome Valley		
	Data	N/A		
SAMPLE	**Geotechnics ID**	GEOT201805232	**Date Received**	18/05/2018
	Reference	BH13	**Depth**	1.50m - 2.00m
	Description	SILT with minor clay, trace sand and trace organics, dark brown mottled black. Moist to wet, very high plasticity.		
SPECIMEN	**Reference**	2	**Depth**	N/A
	Description	N/A		

TEST RESULTS

Liquid Limit	**75**
Plastic Limit	**40**
Plasticity Index	**35**

TEST REMARKS

• The material used for testing was natural, fraction passing a 425um sieve.

This test result is IANZ accredited.

Approved By	CXPG	**Date**	11/06/2018

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Geotechnics Project ID	1007084.0.3000.0
Customer Project ID	1005069.1120
Customer Project Name	Dome Valley

DETERMINATION OF LIQUID & PLASTIC LIMIT, PLASTICITY INDEX - NZS 4402: 1986 Tests 2.2 (4 Point), 2.3 & 2.4

TEST DETAILS

LOCATION	ID	TP10		
	Description		N/A	
	Data		N/A	
SAMPLE	Geotechnics ID	GEOT201805213	Date Received	Unknown
	Reference	N/A	Depth	0.10m - 1.00m
	Description	Clayey SILT, minor sand and trace gravel; light brown with grey, and orange, and red mottling. Moist to wet.		
SPECIMEN	Reference	2	Depth	N/A
	Description	N/A		

TEST RESULTS

Liquid Limit	76
Plastic Limit	37
Plasticity Index	39

TEST REMARKS

- The material used for testing was natural, fraction passing a 425um sieve.

This test result is IANZ accredited.

Approved By	RTH	Date	14/06/2018

GEOTECHNICS

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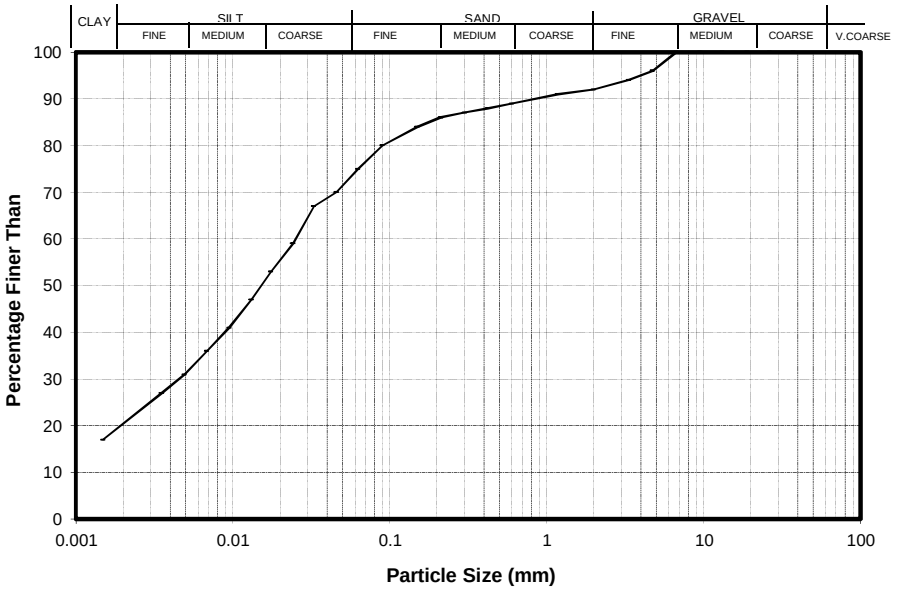
Page 1 of 1

Your Job No.: 1005069.1120
Our Job No.: 1007804.000

Site : TT Dome Valley
BH No.: TP08 Sample No.: 087/18-1 Depth (m): 2.6 - 4.1
Test Method Used : NZS 4402:1986 Test 2.8.1 Wet Sieve Test 2.8.4 Hydrometer

PARTICLE SIZE ANALYSIS



Sieve (mm)	Total % Passing	Sieve (mm)	Total % Passing
37.5	-	0.600	89
26.5	-	0.425	88
19.0	.-	0.300	87
13.2	-	0.212	86
9.50	-	0.150	84
6.70	100	0.090	80
4.75	96	0.063	75
3.35	94		
2.00	92		
1.18	91		

Equivalent Particle Diameter D (mm)	% of Particles Finer than D
0.0458	70
0.0329	67
0.0242	59
0.0175	53
0.0132	47
0.0095	41
0.0068	36
0.0049	31
0.0035	27
0.0015	17

Sample history : Natural, whole soil
Solid Density: (assumed) 2.65 t/m^3
Description : clayey SILT with some sand and minor gravel, reddish brown, mottled light grey. Moist. Sand fine to coarse.

Remarks : A representative sub sample was split from the original sample for wet sieve and hydrometer analysis. Material was washed over the 0.063mm sieve, wash water was collected and oven dried for hydrometer analysis. Material retained on the 0.063mm sieve was oven dried and dry sieved. The sieve data was combined with the hydrometer analysis to give a continous curve. Suspension pH 8. The classification of gravel- sand-silt-clay components are described on the basis of particle size analysis. Use of assumed values in calculations is at the customers discretion and risk. Sample description is not IANZ accredited.

Entered by : JASI Date : 09/06/2018 Checked by : CXPG Date : 11/06/2018

GEOTECHNICS

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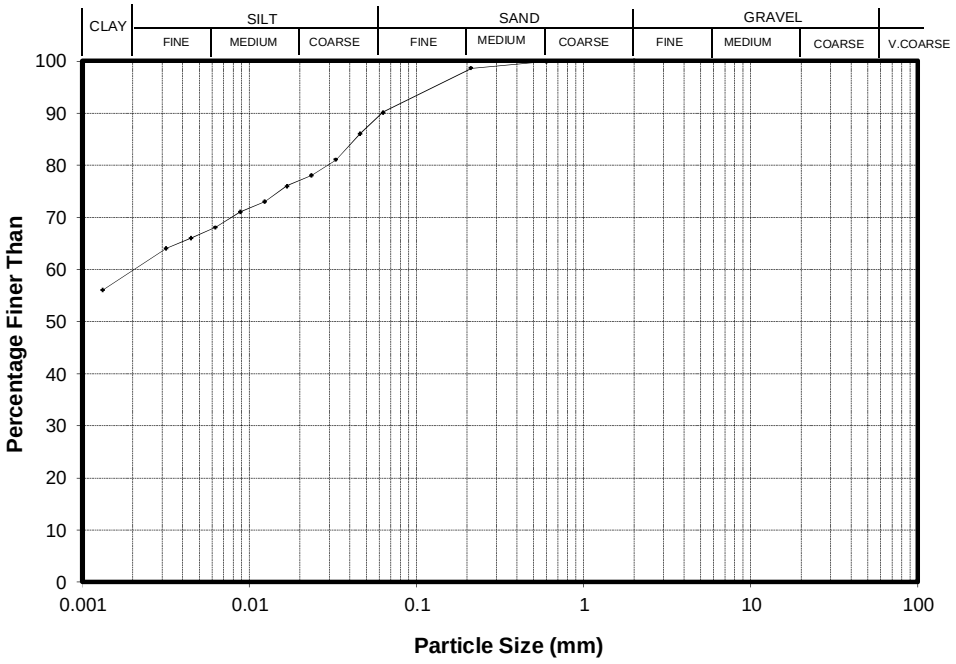
Christchurch 8042
www.geotechnics.co.nz

Your Job No.: 1005069.1120
Our Job No.: 1007084.0.0.0

Site: TT Dome Valley
BH No.: TP30 Sample ID.: 0087/18-2 Depth: 0.5m - 1.5m
Test Method Used : NZS 4402:1986 Test 2.8.4 Hydrometer

PARTICLE SIZE ANALYSIS



Sieve (mm)	Total % Passing	Sieve (mm)	Total % Passing
4.75	100		
3.35	100		
2.00	100		
0.600	100		
0.212	99		
0.063	90		

Equivalent Particle Diameter D (mm)	% of Particles Finer than D
0.0458	86
0.0329	81
0.0235	78
0.0167	76
0.0123	73
0.0088	71
0.0063	68
0.0045	66
0.0032	64
0.0013	56

Sample history : Natural, whole soil
Description : silty CLAY with some sand, yellowish brown. Moist.

Solid Density (assumed) : 2.65t/m^3

Remarks : A sub sample was split from the original sample for hydrometer analysis. This sample was soaked with a dispersing agent (~2 hrs), then the mechanical shaker was used, until the material was brought into suspension, before proceeding with the test.
Suspension pH 8.0
The classification of sand-silt-clay components were described on the basis of particle size analysis. Use of assumed values in calculations is at the customers discretion and risk.
Sample description is not IANZ accredited.

Entered by : JASI Date : 11/06/2018 Checked by : CXPG Date : 11/06/2018

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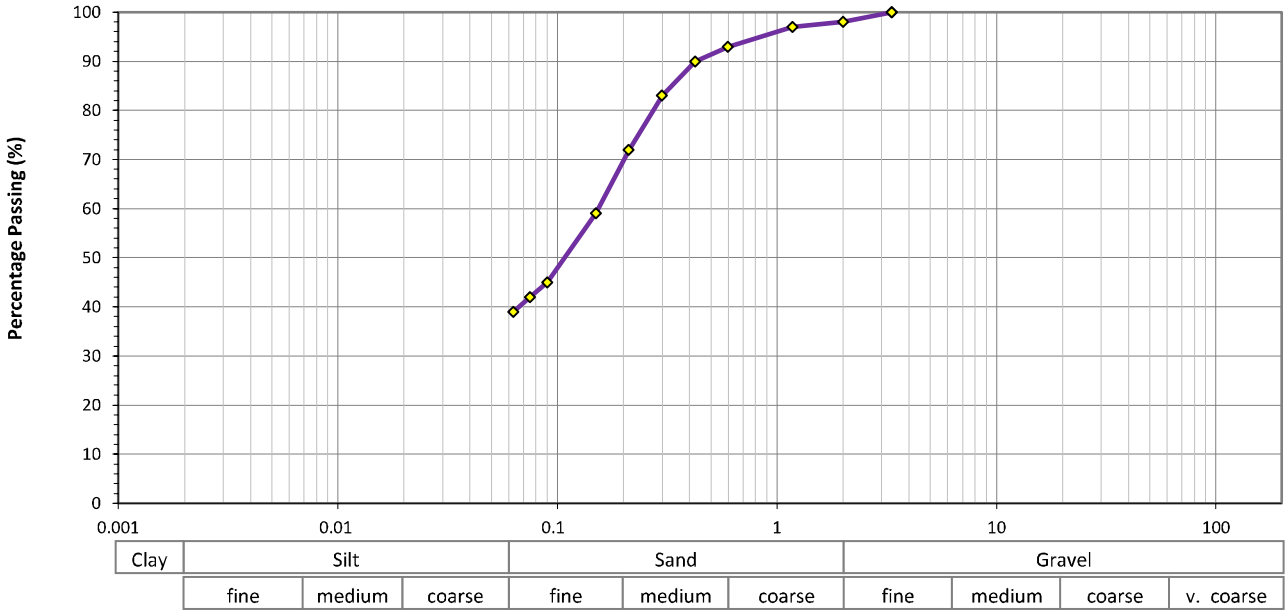
Geotechnics Project ID	1007084.0.4.0
Customer Project ID	1005069.112
Customer Project Name	Dome Valley

DETERMINATION OF THE PARTICLE SIZE DISTRIBUTION - NZS 4402:1986 - Test 2.8.1 (Wet Sieve)

TEST DETAILS

LOCATION	**ID**	TT Dome Valley		
	Description	TT Dome Valley		
	Data	N/A		
SAMPLE	**Geotechnics ID**	GEOT201805236	**Date Received**	18/05/2018
	Reference	BH01	**Depth**	5.00m - 5.50m
	Description	silty fine to coarse SAND with trace gravel, brown. Moist. Gravel fine.		
SPECIMEN	**Reference**	1	**Depth**	N/A
	Description	N/A		

TEST RESULTS



Sieve Size (mm)	Percentage Passing (%)	Sieve Size (mm)	Percentage Passing (%)	Sieve Size (mm)	Percentage Passing (%)	Sieve Size (mm)	Percentage Passing (%)
150	-	26.5	-	4.75	-	0.300	83
100	-	19.0	-	3.35	100	0.212	72
75.0	-	16.0	-	2.00	98	0.150	59
63.0	-	13.2	-	1.18	97	0.090	45
53.0	-	9.50	-	0.600	93	0.075	42
37.5	-	6.70	-	0.425	90	0.063	39

TEST REMARKS

• The material used for testing was natural, whole soil. • The percentage passing the <0.063mm was obtained by difference.

This test result is IANZ accredited.

Approved By	CXPG	**Date**	12/06/2018

GEOTECHNICS

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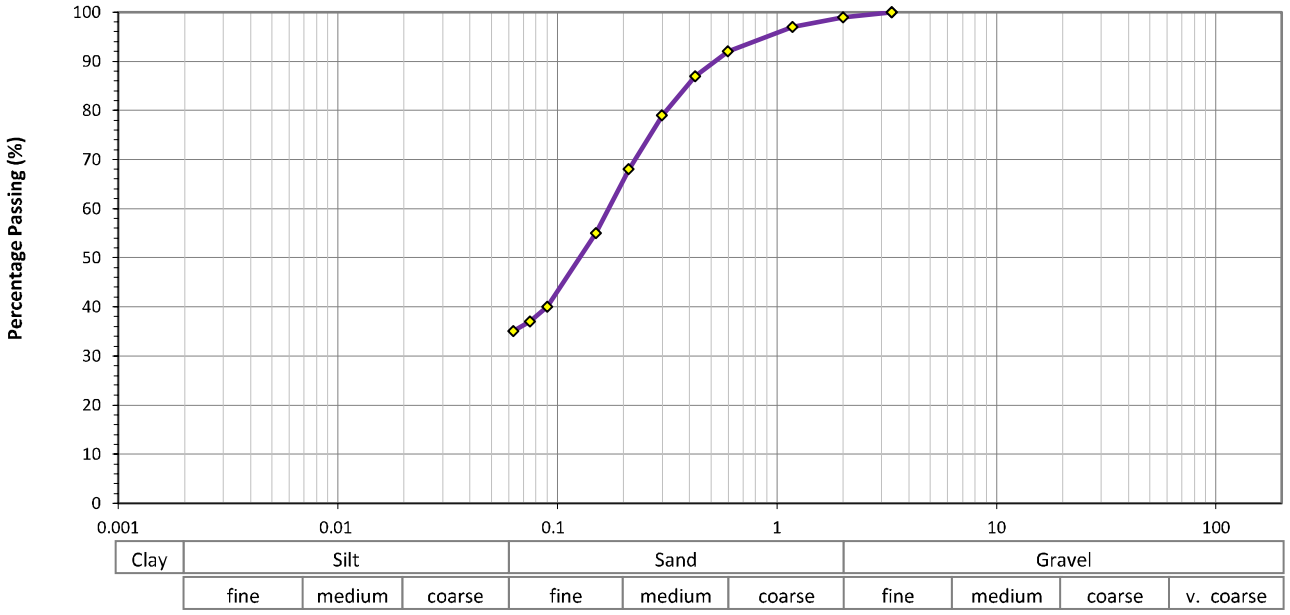
Geotechnics Project ID	1007084.0.4.0
Customer Project ID	1005069.112
Customer Project Name	Dome Valley

DETERMINATION OF THE PARTICLE SIZE DISTRIBUTION - NZS 4402:1986 - Test 2.8.1 (Wet Sieve)

TEST DETAILS

LOCATION	**ID**	TT Dome Valley		
	Description	TT Dome Valley		
	Data	N/A		
SAMPLE	**Geotechnics ID**	GEOT2018052310	**Date Received**	18/05/2018
	Reference	BH2	**Depth**	3.00m - 3.50m
	Description	silty fine to coarse SAND with trace gravel, light brown mottled dark brown. Moist. Gravel fine.		
SPECIMEN	**Reference**	1	**Depth**	N/A
	Description	N/A		

TEST RESULTS



Sieve Size (mm)	Percentage Passing (%)	Sieve Size (mm)	Percentage Passing (%)	Sieve Size (mm)	Percentage Passing (%)	Sieve Size (mm)	Percentage Passing (%)
150	-	26.5	-	4.75	-	0.300	79
100	-	19.0	-	3.35	100	0.212	68
75.0	-	16.0	-	2.00	99	0.150	55
63.0	-	13.2	-	1.18	97	0.090	40
53.0	-	9.50	-	0.600	92	0.075	37
37.5	-	6.70	-	0.425	87	0.063	35

TEST REMARKS

• The material used for testing was natural, whole soil. • The percentage passing the <0.063mm was obtained by difference.

This test result is IANZ accredited.

Approved By	CXPG	**Date**	12/06/2018

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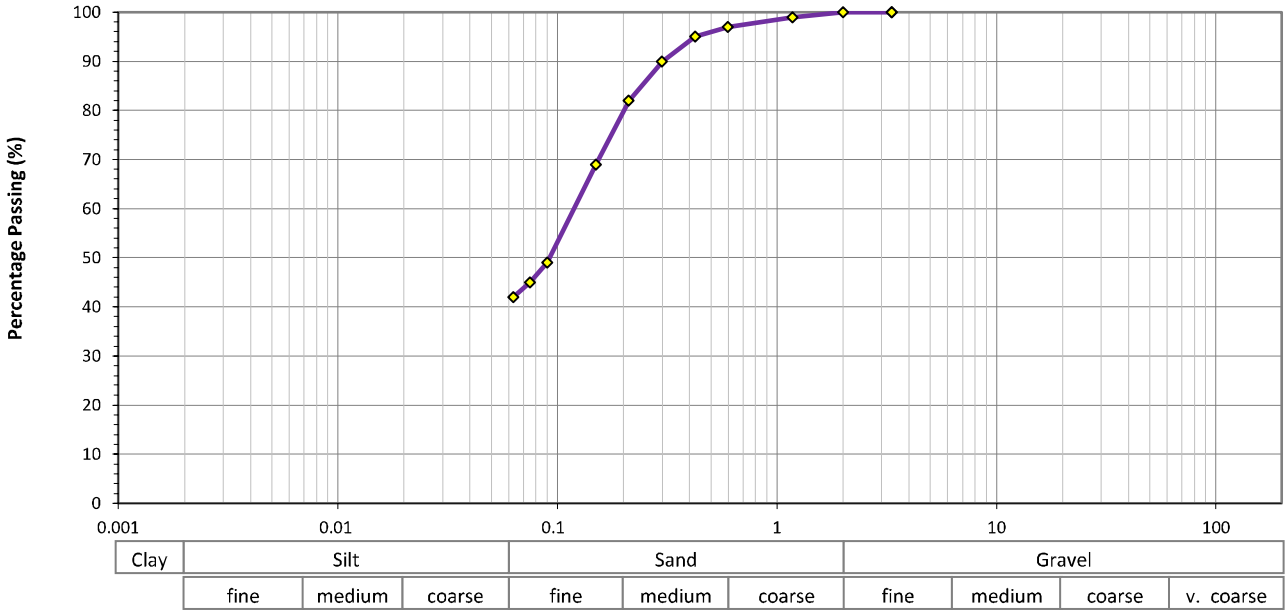
Geotechnics Project ID	1007084.0.4.0
Customer Project ID	1005069.112
Customer Project Name	Dome Valley

DETERMINATION OF THE PARTICLE SIZE DISTRIBUTION - NZS 4402:1986 - Test 2.8.1 (Wet Sieve)

TEST DETAILS

LOCATION	**ID**	TT Dome Valley		
	Description	TT Dome Valley		
	Data	N/A		
SAMPLE	**Geotechnics ID**	GEOT201805238	**Date Received**	18/05/2018
	Reference	BH07	**Depth**	2.00m - 2.50m
	Description	silty fine to coarse SAND, brown. Moist.		
SPECIMEN	**Reference**	1	**Depth**	N/A
	Description	N/A		

TEST RESULTS



Sieve Size (mm)	Percentage Passing (%)	Sieve Size (mm)	Percentage Passing (%)	Sieve Size (mm)	Percentage Passing (%)	Sieve Size (mm)	Percentage Passing (%)
150	-	26.5	-	4.75	-	0.300	90
100	-	19.0	-	3.35	100	0.212	82
75.0	-	16.0	-	2.00	100	0.150	69
63.0	-	13.2	-	1.18	99	0.090	49
53.0	-	9.50	-	0.600	97	0.075	45
37.5	-	6.70	-	0.425	95	0.063	42

TEST REMARKS

• The material used for testing was natural, whole soil. • The percentage passing the <0.063mm was obtained by difference.

This test result is IANZ accredited.

Approved By	CXPG	**Date**	12/06/2018

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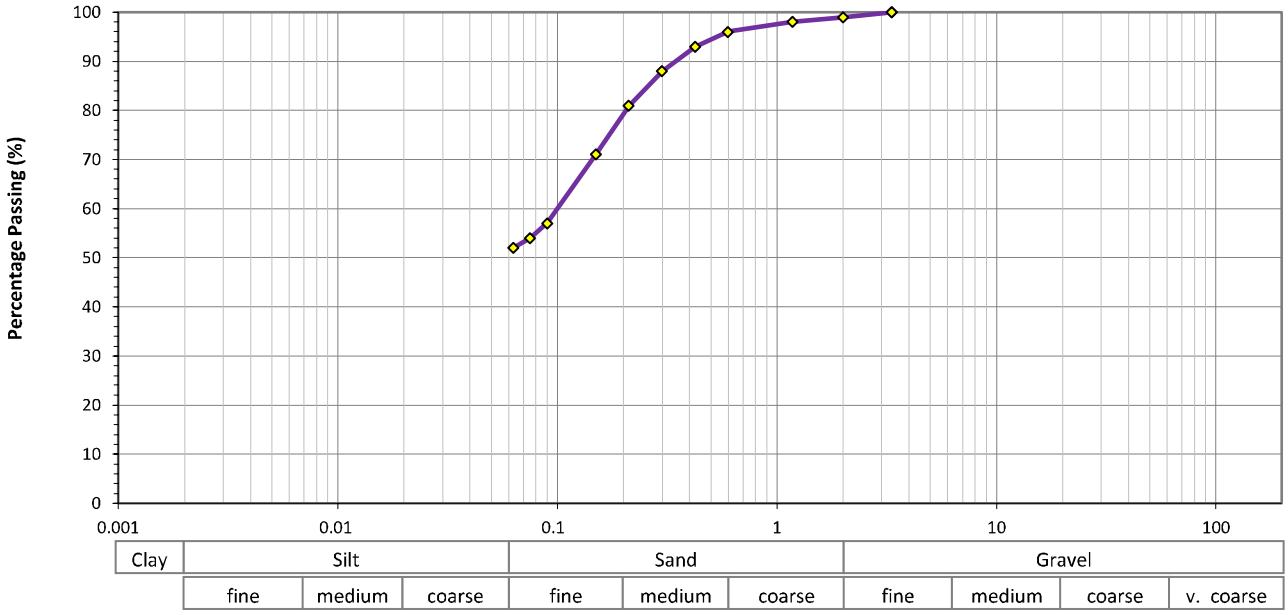
Geotechnics Project ID	1007084.0.4.0
Customer Project ID	1005069.112
Customer Project Name	Dome Valley

DETERMINATION OF THE PARTICLE SIZE DISTRIBUTION - NZS 4402:1986 - Test 2.8.1 (Wet Sieve)

TEST DETAILS

LOCATION	**ID**	TT Dome Valley		
	Description	TT Dome Valley		
	Data	N/A		
SAMPLE	**Geotechnics ID**	GEOT201805239	**Date Received**	18/05/2018
	Reference	BH11	**Depth**	3.00m - 3.50m
	Description	sandy SILT with trace gravel, reddish brown mottled black. Moist. Sand fine to coarse. Gravel fine.		
SPECIMEN	**Reference**	1	**Depth**	N/A
	Description	N/A		

TEST RESULTS



Sieve Size (mm)	Percentage Passing (%)	Sieve Size (mm)	Percentage Passing (%)	Sieve Size (mm)	Percentage Passing (%)	Sieve Size (mm)	Percentage Passing (%)
150	-	26.5	-	4.75	-	0.300	88
100	-	19.0	-	3.35	100	0.212	81
75.0	-	16.0	-	2.00	99	0.150	71
63.0	-	13.2	-	1.18	98	0.090	57
53.0	-	9.50	-	0.600	96	0.075	54
37.5	-	6.70	-	0.425	93	0.063	52

TEST REMARKS

• The material used for testing was natural, fraction passing an unknown sieve. • The percentage passing the <0.063mm was obtained by difference.

This test result is IANZ accredited.

Approved By	CXPG	**Date**	8/06/2018

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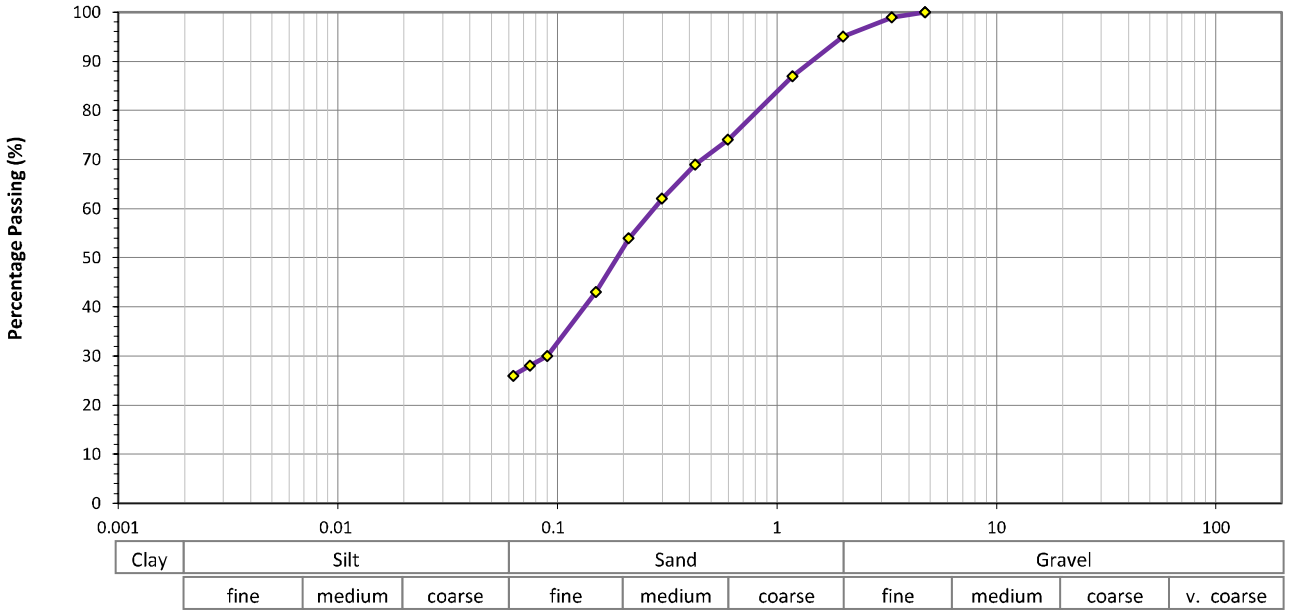
Geotechnics Project ID	1007084.0.4.0
Customer Project ID	1005069.112
Customer Project Name	Dome Valley

DETERMINATION OF THE PARTICLE SIZE DISTRIBUTION - NZS 4402:1986 - Test 2.8.1 (Wet Sieve)

TEST DETAILS

LOCATION	**ID**	TT Dome Valley		
	Description	TT Dome Valley		
	Data	N/A		
SAMPLE	**Geotechnics ID**	GEOT201805237	**Date Received**	18/05/2018
	Reference	BH13	**Depth**	6.00m - 6.50m
	Description	silty fine to coarse SAND with trace gravel, brown mottled black - orange. Wet. gravel fine.		
SPECIMEN	**Reference**	1	**Depth**	N/A
	Description	N/A		

TEST RESULTS



Sieve Size (mm)	Percentage Passing (%)	Sieve Size (mm)	Percentage Passing (%)	Sieve Size (mm)	Percentage Passing (%)	Sieve Size (mm)	Percentage Passing (%)
150	-	26.5	-	4.75	100	0.300	62
100	-	19.0	-	3.35	99	0.212	54
75.0	-	16.0	-	2.00	95	0.150	43
63.0	-	13.2	-	1.18	87	0.090	30
53.0	-	9.50	-	0.600	74	0.075	28
37.5	-	6.70	-	0.425	69	0.063	26

TEST REMARKS

• The material used for testing was natural, whole soil. • The percentage passing the <0.063mm was obtained by difference.

This test result is IANZ accredited.

Approved By	CXPG	**Date**	12/06/2018

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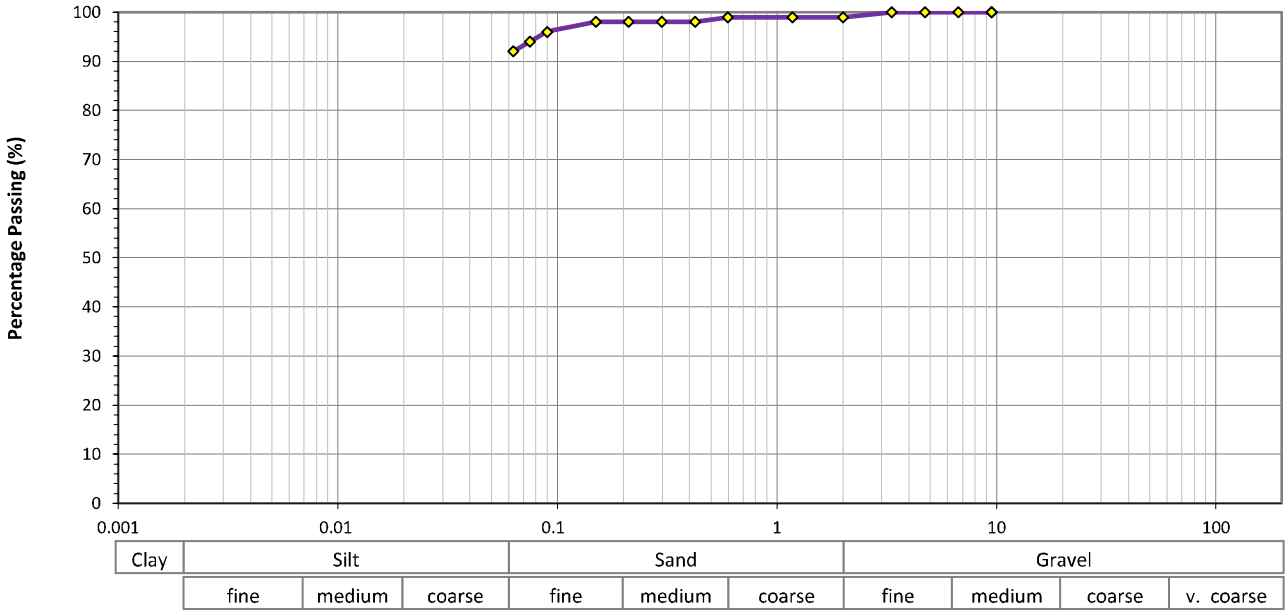
Geotechnics Project ID	1007084.0.4.0
Customer Project ID	1005069.112
Customer Project Name	Dome Valley

DETERMINATION OF THE PARTICLE SIZE DISTRIBUTION - NZS 4402:1986 - Test 2.8.1 (Wet Sieve)

TEST DETAILS

LOCATION	**ID**	TT Dome Valley		
	Description	TT Dome Valley		
	Data	N/A		
SAMPLE	**Geotechnics ID**	GEOT201805281	**Date Received**	23/05/2018
	Reference	TP03	**Depth**	0.20m - 1.00m
	Description	SILT with minor sand and trace gravel, reddish brown. Moist. Sand fine to coarse. Gravel fine.		
SPECIMEN	**Reference**	1	**Depth**	N/A
	Description	N/A		

TEST RESULTS



Sieve Size (mm)	Percentage Passing (%)	Sieve Size (mm)	Percentage Passing (%)	Sieve Size (mm)	Percentage Passing (%)	Sieve Size (mm)	Percentage Passing (%)
150	-	26.5	-	4.75	100	0.300	98
100	-	19.0	-	3.35	100	0.212	98
75.0	-	16.0	-	2.00	99	0.150	98
63.0	-	13.2	-	1.18	99	0.090	96
53.0	-	9.50	100	0.600	99	0.075	94
37.5	-	6.70	100	0.425	98	0.063	92

TEST REMARKS

• The material used for testing was natural, whole soil. • The percentage passing the <0.063mm was obtained by difference.

This test result is IANZ accredited.

Approved By	CXPG	**Date**	12/06/2018

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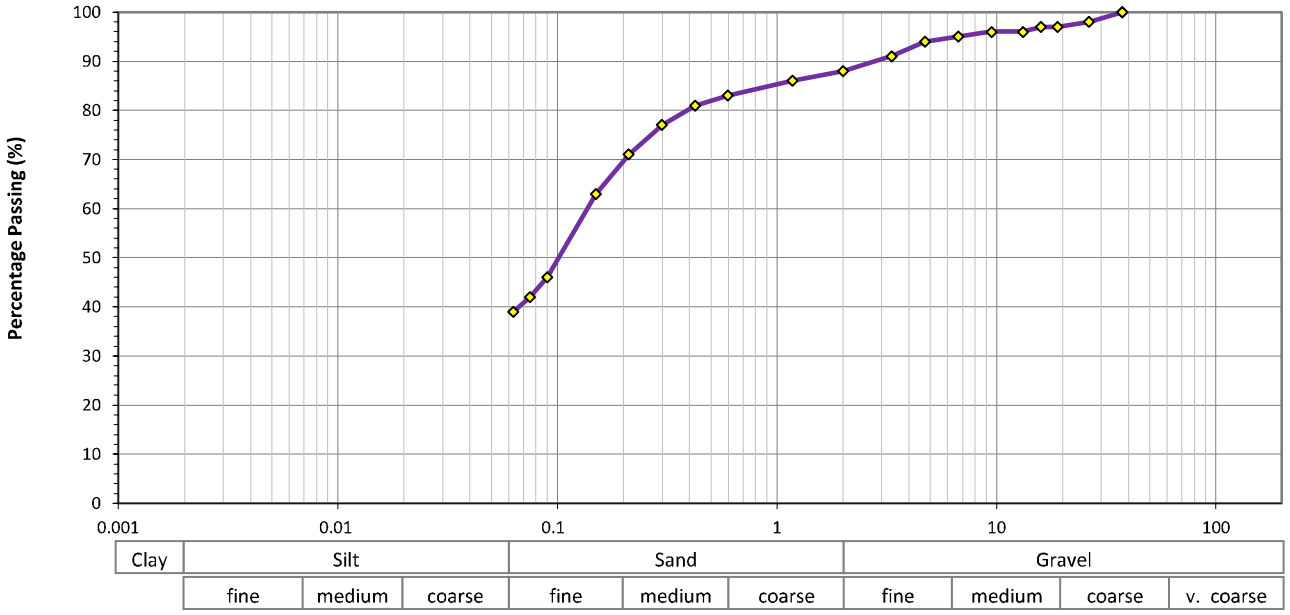
Geotechnics Project ID	1007084.0.4.0
Customer Project ID	1005069.112
Customer Project Name	Dome Valley

DETERMINATION OF THE PARTICLE SIZE DISTRIBUTION - NZS 4402:1986 - Test 2.8.1 (Wet Sieve)

TEST DETAILS

LOCATION	**ID**	TT Dome Valley		
	Description	TT Dome Valley		
	Data	N/A		
SAMPLE	**Geotechnics ID**	GEOT201805280	**Date Received**	23/05/2018
	Reference	TP06	**Depth**	0.70m - 1.50m
	Description	silty fine to coarse SAND with some gravel, light brown. Moist. Gravel fine to coarse.		
SPECIMEN	**Reference**	1	**Depth**	N/A
	Description	N/A		

TEST RESULTS



Sieve Size (mm)	Percentage Passing (%)	Sieve Size (mm)	Percentage Passing (%)	Sieve Size (mm)	Percentage Passing (%)	Sieve Size (mm)	Percentage Passing (%)
150	-	26.5	98	4.75	94	0.300	77
100	-	19.0	97	3.35	91	0.212	71
75.0	-	16.0	97	2.00	88	0.150	63
63.0	-	13.2	96	1.18	86	0.090	46
53.0	-	9.50	96	0.600	83	0.075	42
37.5	100	6.70	95	0.425	81	0.063	39

TEST REMARKS

• The material used for testing was natural, whole soil. • The percentage passing the <0.063mm was obtained by difference.

This test result is IANZ accredited.

Approved By	CXPG	**Date**	8/06/2018

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Geotechnics Project ID	1007084.0.3000.0
Customer Project ID	1005069.1120
Customer Project Name	Dome Valley

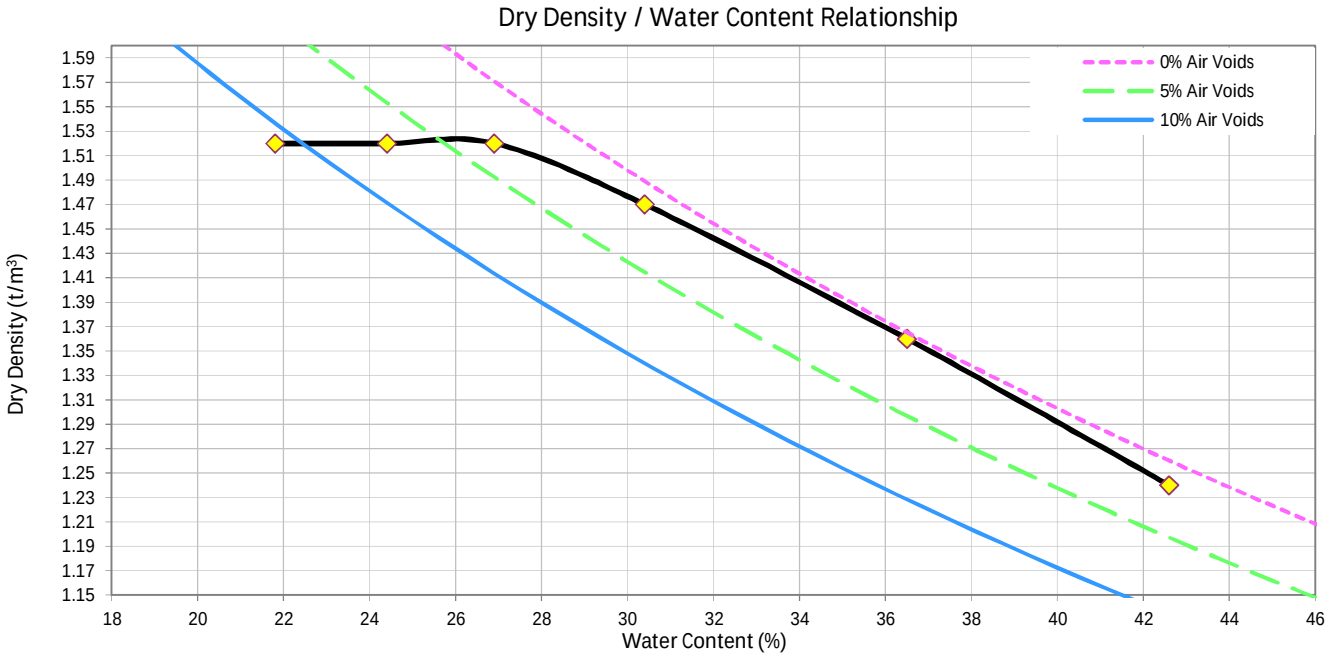
DETERMINATION OF THE DRY DENSITY / WATER CONTENT RELATIONSHIP
NZS 4402:1986 Test 4.1.2 (Heavy Compaction)

VANE SHEAR STRENGTH OF COHESIVE SOIL - NZGS GUIDELINE FOR HAND HELD SHEAR VANE TEST - 2001

TEST DETAILS

LOCATION	ID	TP03		
	Description	Dome Valley		
	Data	N/A		
SAMPLE	Geotechnics ID	GEOT201805210	Date Received	Unknown
	Reference	N/A	Depth	0.20m - 1.80m
	Description	SILT with minor sand and trace gravel, reddish brown. Moist. Sand fine to coarse. Gravel fine.		
SPECIMEN	Reference	1	Depth	N/A
	Description	N/A		

TEST RESULTS



Maximum Dry Density	Optimum Water Content	Solid Density*	Whole Sample NWC
1.52 t/m³	26%	2.72 t/m³	N/A

Natural Water Content	(NWC)						✔	
Water Content	(%)	21.8	24.4	26.9	30.4	36.5	42.6	
Dry Density	(t/m³)	1.520	1.522	1.521	1.471	1.355	1.242	
Undrained Shear Strength	(kPa)	UTP	UTP	UTP	UTP	>193	110	

TEST REMARKS

• The material used for testing was natural, whole soil. • *Use of assumed values in calculations is at the customers discretion and risk. • The amount of material retained on a 19mm sieve was 0% by wet mass. • Too wet at natural to compact effectively, therefore dry density and shear strengths at this point (NWC) are not reliable.

This test result is IANZ accredited.

Approved By	RTH	Date	14/06/2018

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Geotechnics Project ID	1007084.0.3000.0
Customer Project ID	1005069.1120
Customer Project Name	Dome Valley

DETERMINATION OF THE DRY DENSITY / WATER CONTENT RELATIONSHIP
NZS 4402:1986 Test 4.1.2 (Heavy Compaction)

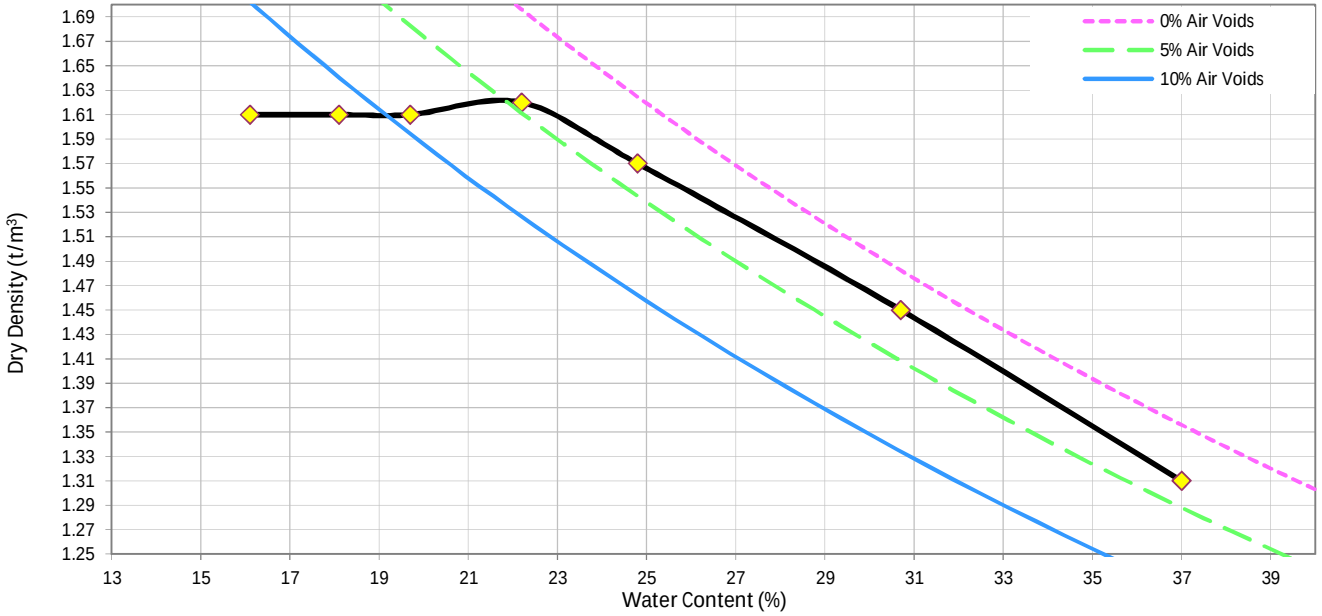
VANE SHEAR STRENGTH OF COHESIVE SOIL - NZGS GUIDELINE FOR HAND HELD SHEAR VANE TEST - 2001

TEST DETAILS

LOCATION	ID	TP06		
	Description	Dome Valley		
	Data	N/A		
SAMPLE	Geotechnics ID	GEOT201805211	Date Received	Unknown
	Reference	N/A	Depth	0.70m - 1.50m
	Description	silty fine to coarse SAND with some gravel, light brown. Moist. Gravel fine to coarse.		
SPECIMEN	Reference	1	Depth	N/A
	Description	N/A		

TEST RESULTS

Dry Density / Water Content Relationship



Maximum Dry Density	Optimum Water Content	Solid Density*	Whole Sample NWC
1.62 t/m³	22%	2.72 t/m³	N/A

Natural Water Content	(NWC)							✓
Water Content	(%)	16.1	18.1	19.7	22.2	24.8	30.7	37.0
Dry Density	(t/m³)	1.608	1.612	1.613	1.619	1.574	1.448	1.312
Undrained Shear Strength	(kPa)	UTP	UTP	UTP	UTP	UTP	135	28

TEST REMARKS

• The material used for testing was natural, fraction <19mm sieve. • *Use of assumed values in calculations is at the customers discretion and risk. • The amount of material retained on a 19mm sieve was 1% by wet mass. • Too wet at natural to compact effectively, therefore dry density and shear strengths at this point (NWC) are not reliable.

This test result is IANZ accredited.

Approved By	RTH	Date	14/06/2018

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Geotechnics Project ID	1007084.0.3000.0
Customer Project ID	1005069.1120
Customer Project Name	Dome Valley

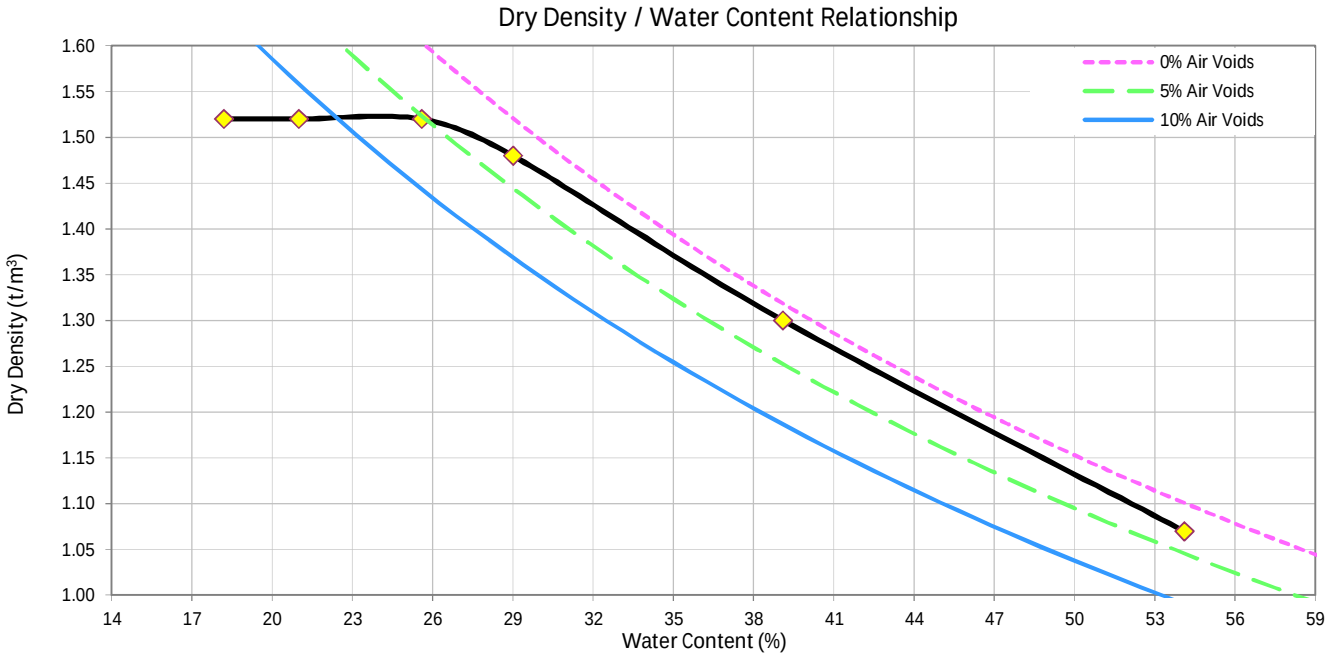
DETERMINATION OF THE DRY DENSITY / WATER CONTENT RELATIONSHIP
NZS 4402:1986 Test 4.1.2 (Heavy Compaction)

VANE SHEAR STRENGTH OF COHESIVE SOIL - NZGS GUIDELINE FOR HAND HELD SHEAR VANE TEST - 2001

TEST DETAILS

LOCATION	ID	TP08		
	Description	Dome Valley		
	Data	N/A		
SAMPLE	Geotechnics ID	GEOT201805212	Date Received	Unknown
	Reference	N/A	Depth	2.60m - 4.10m
	Description	clayey SILT with some sand and minor gravel, reddish brown, mottled light grey. Moist. Sand fine to coarse.		
SPECIMEN	Reference	1	Depth	N/A
	Description	N/A		

TEST RESULTS



Maximum Dry Density	Optimum Water Content	Solid Density*	Whole Sample NWC
1.53 t/m³	26%	2.72 t/m³	N/A

Natural Water Content	(NWC)						✔	
Water Content	(%)	18.2	21.0	25.6	29.0	39.1	54.1	
Dry Density	(t/m³)	1.517	1.523	1.524	1.476	1.295	1.073	
Undrained Shear Strength	(kPa)	UTP	UTP	UTP	UTP	143	11	

TEST REMARKS

• The material used for testing was natural, whole soil. • *Use of assumed values in calculations is at the customers discretion and risk. • The amount of material retained on a 19mm sieve was 0% by wet mass. • Too wet at natural to compact effectively, therefore dry density and shear strengths at this point (NWC) are not reliable.

This test result is IANZ accredited.

Approved By	RTH	Date	14/06/2018

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Geotechnics Project ID	1007084.0.3000.0
Customer Project ID	1005069.1120
Customer Project Name	Dome Valley

DETERMINATION OF THE DRY DENSITY / WATER CONTENT RELATIONSHIP
NZS 4402:1986 Test 4.1.2 (Heavy Compaction)

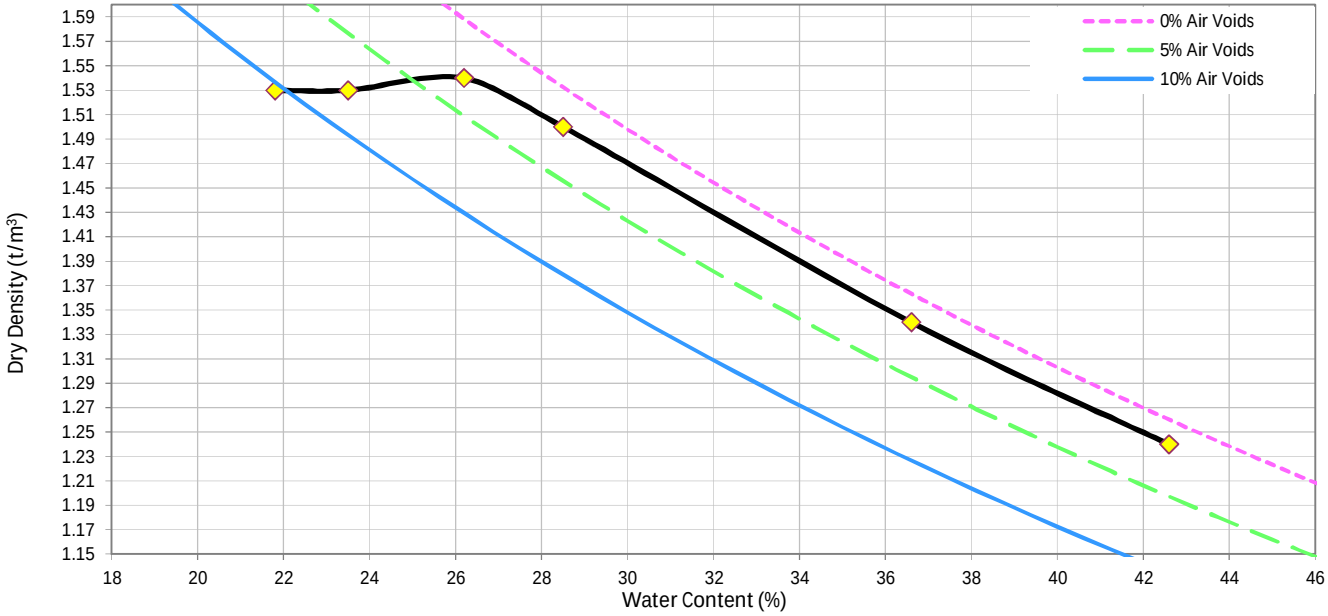
VANE SHEAR STRENGTH OF COHESIVE SOIL - NZGS GUIDELINE FOR HAND HELD SHEAR VANE TEST - 2001

TEST DETAILS

LOCATION	ID	TP10		
	Description		N/A	
	Data		N/A	
SAMPLE	Geotechnics ID	GEOT201805213	Date Received	Unknown
	Reference	N/A	Depth	0.10m - 1.00m
	Description	Clayey SILT, minor sand and trace gravel; light brown with grey, and orange, and red mottling. Moist to wet.		
SPECIMEN	Reference	3	Depth	N/A
	Description	N/A		

TEST RESULTS

Dry Density / Water Content Relationship



Maximum Dry Density	Optimum Water Content	Solid Density*	Whole Sample NWC
1.54 t/m³	26%	2.72 t/m³	42.9%

Natural Water Content	(NWC)						✔	
Water Content	(%)	21.8	23.5	26.2	28.5	36.6	42.6	
Dry Density	(t/m³)	1.530	1.534	1.535	1.498	1.343	1.239	
Undrained Shear Strength	(kPa)	UTP	UTP	UTP	UTP	138	58	

TEST REMARKS

• The material used for testing was natural, fraction <19mm sieve. • *Use of assumed values in calculations is at the customers discretion and risk. • The amount of material retained on a 19mm sieve was 0% by wet mass. • Too wet at natural to compact effectively, therefore dry density and shear strengths at this point (NWC) are not reliable.

This test result is IANZ accredited.

Approved By	RTH	Date	14/06/2018

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Geotechnics Project ID	1007084.0.3000.0
Customer Project ID	1005069.1120
Customer Project Name	Dome Valley

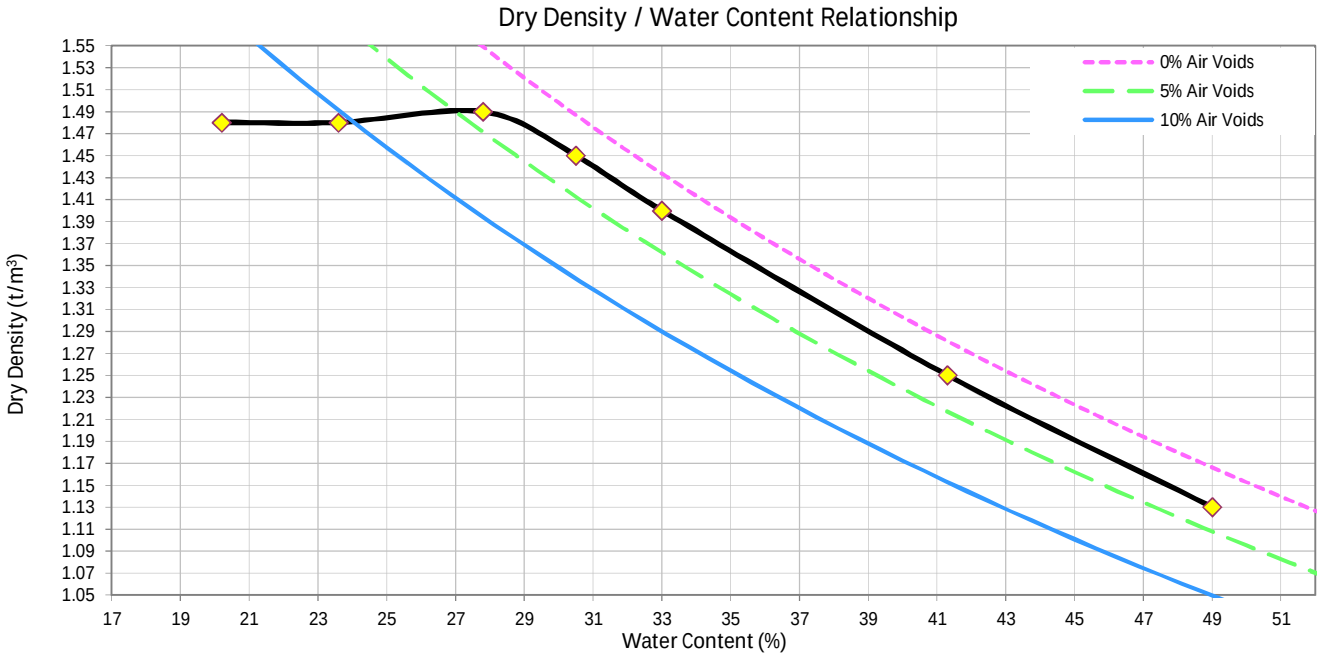
DETERMINATION OF THE DRY DENSITY / WATER CONTENT RELATIONSHIP
NZS 4402:1986 Test 4.1.2 (Heavy Compaction)

VANE SHEAR STRENGTH OF COHESIVE SOIL - NZGS GUIDELINE FOR HAND HELD SHEAR VANE TEST - 2001

TEST DETAILS

LOCATION	ID	TP29		
	Description	Dome Valley		
	Data	N/A		
SAMPLE	Geotechnics ID	GEOT201805214	Date Received	Unknown
	Reference	N/A	Depth	1.80m - 4.00m
	Description	Clayey SILT, minor sand, trace rootlets; reddish brown with light grey mottleing. Wet.		
SPECIMEN	Reference	1	Depth	N/A
	Description	N/A		

TEST RESULTS



Maximum Dry Density	Optimum Water Content	Solid Density*	Whole Sample NWC
1.49 t/m³	27%	2.72 t/m³	N/A

Natural Water Content	(NWC)							✓
Water Content	(%)	20.2	23.6	27.8	30.5	33.0	41.3	49.0
Dry Density	(t/m³)	1.478	1.482	1.485	1.452	1.404	1.253	1.128
Undrained Shear Strength	(kPa)	UTP	UTP	UTP	UTP	UTP	116	36

TEST REMARKS

• The material used for testing was natural, whole soil. • *Use of assumed values in calculations is at the customers discretion and risk. • The amount of material retained on a 19mm sieve was 0% by wet mass. • Too wet at natural to compact effectively, therefore dry density and shear strengths at this point (NWC) are not reliable.

This test result is IANZ accredited.

Approved By	RTH	Date	14/06/2018

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Geotechnics Project ID	1007084.0.3000.0
Customer Project ID	1005069.1120
Customer Project Name	Dome Valley

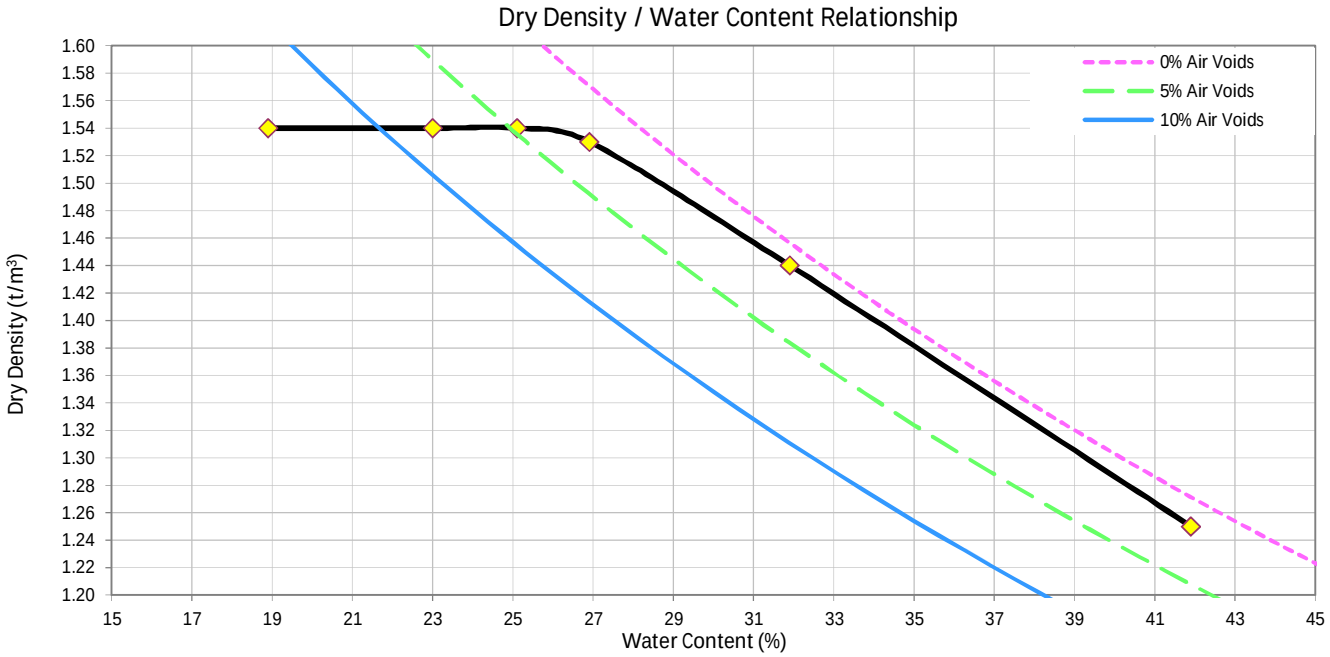
DETERMINATION OF THE DRY DENSITY / WATER CONTENT RELATIONSHIP
NZS 4402:1986 Test 4.1.2 (Heavy Compaction)

VANE SHEAR STRENGTH OF COHESIVE SOIL - NZGS GUIDELINE FOR HAND HELD SHEAR VANE TEST - 2001

TEST DETAILS

LOCATION	ID	TP30		
	Description	Dome Valley		
	Data	N/A		
SAMPLE	Geotechnics ID	GEOT201805215	Date Received	Unknown
	Reference	N/A	Depth	0.50m - 1.50m
	Description	silty CLAY with some sand, yellowish brown. Moist.		
SPECIMEN	Reference	1	Depth	N/A
	Description	N/A		

TEST RESULTS



Maximum Dry Density	Optimum Water Content	Solid Density*	Whole Sample NWC
1.54 t/m³	25%	2.72 t/m³	N/A

Natural Water Content	(NWC)						✔	
Water Content	(%)	18.9	23.0	25.1	26.9	31.9	41.9	
Dry Density	(t/m³)	1.538	1.542	1.542	1.526	1.442	1.250	
Undrained Shear Strength	(kPa)	UTP	UTP	UTP	UTP	UTP	113	

TEST REMARKS

• The material used for testing was natural, whole soil. • *Use of assumed values in calculations is at the customers discretion and risk. • The amount of material retained on a 19mm sieve was 0% by wet mass. • Too wet at natural to compact effectively, therefore dry density and shear strengths at this point (NWC) are not reliable.

This test result is IANZ accredited.

Approved By	RTH	Date	14/06/2018

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Geotechnics Project ID	1007084.0.3000.0
Customer Project ID	1005069.1120
Customer Project Name	Dome Valley

DETERMINATION OF THE DRY DENSITY / WATER CONTENT RELATIONSHIP
NZS 4402:1986 Test 4.1.2 (Heavy Compaction)

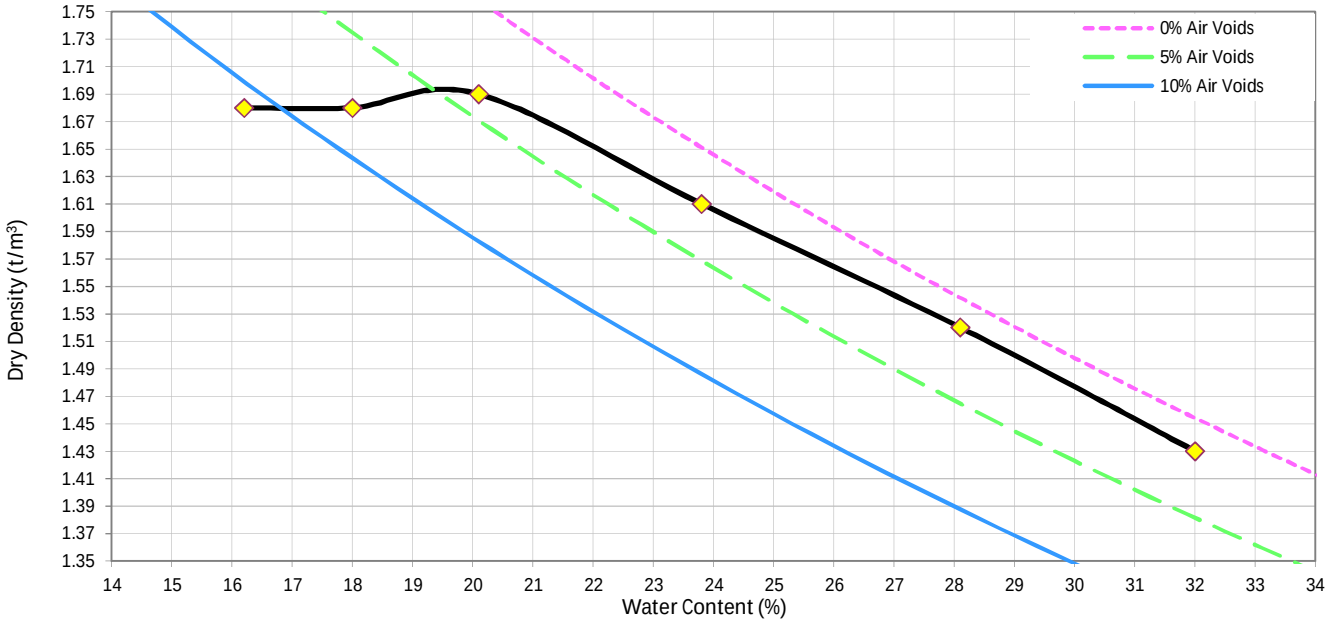
VANE SHEAR STRENGTH OF COHESIVE SOIL - NZGS GUIDELINE FOR HAND HELD SHEAR VANE TEST - 2001

TEST DETAILS

LOCATION	ID	TP31		
	Description	Dome Valley		
	Data	N/A		
SAMPLE	Geotechnics ID	GEOT201805216	Date Received	Unknown
	Reference	N/A	Depth	0.60m - 1.50m
	Description	SILT, some clay, minor sand, trace to minor gravel and trace rootlets; greyish light brown with orange mottling. Moist to wet.		
SPECIMEN	Reference	1	Depth	N/A
	Description	N/A		

TEST RESULTS

Dry Density / Water Content Relationship



Maximum Dry Density	Optimum Water Content	Solid Density*	Whole Sample NWC
1.69 t/m³	20%	2.72 t/m³	N/A

Natural Water Content	(NWC)						✔	
Water Content	(%)	16.2	18.0	20.1	23.8	28.1	32.0	
Dry Density	(t/m³)	1.679	1.683	1.687	1.609	1.522	1.427	
Undrained Shear Strength	(kPa)	UTP	UTP	UTP	UTP	168	74	

TEST REMARKS

• The material used for testing was natural, fraction <19mm sieve. • *Use of assumed values in calculations is at the customers discretion and risk. • The amount of material retained on a 19mm sieve was 1% by wet mass. • Too wet at natural to compact effectively, therefore dry density and shear strengths at this point (NWC) are not reliable.

This test result is IANZ accredited.

Approved By	RTH	Date	14/06/2018

GEOTECHNICS

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Geotechnics Project ID
1007084.1000.0.0

Customer Project ID
1005069.1120

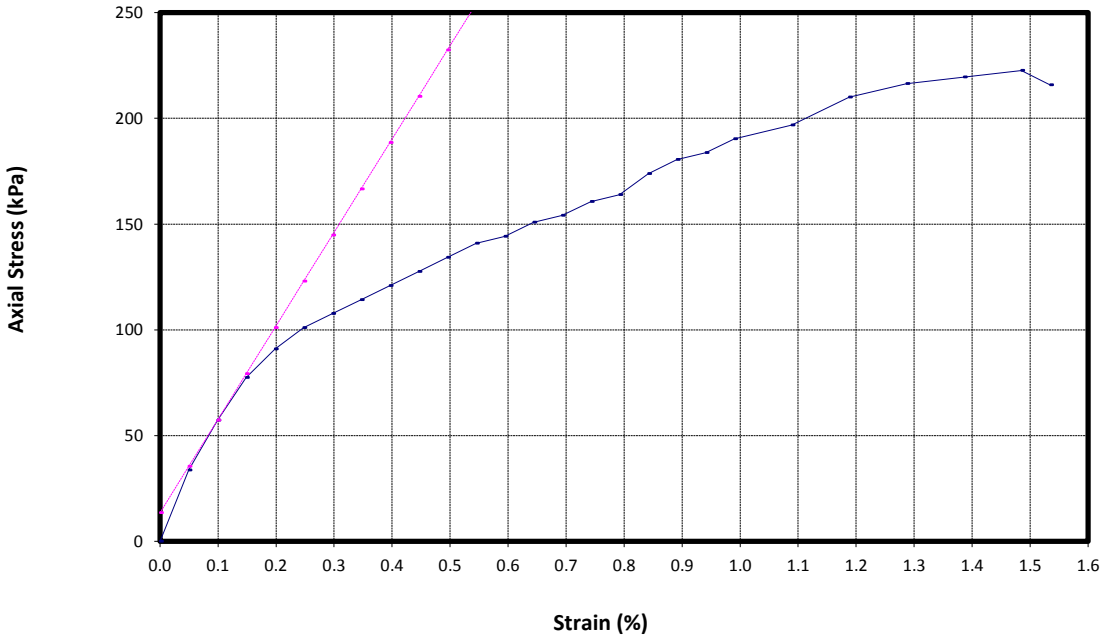
Determination of the unconfined compressive strength of cohesive soil - NZS 4402:1986 Test 6.3.1

Sample Details

Geotechnics Sample ID	---				
Site	Dome Valley				
BH No	BH01	Sample ID	--	Depth	15.35-15.50m
Sample Description	Light brown mixed with light yellow-orange-red, extremely weak, silty fine to medium grained SANDSTONE.				

Test Result

Unconfined Compressive Strength Test
Axial Stress vs Strain



Sample Parameters

Sample Height	(mm)	101.01	Bulk Density	(t/m³)	1.97
Sample Diameter	(mm)	61.45	Dry Density	(t/m³)	1.58
Test Height	(mm)	101.01	Water Content	(%)	24.7
Test H/D Ratio		1.64			

Failure Value

Axial Strain (%)	Unconfined Compressive Strength qu (kPa)	Rate of Compression (mm/min)	Modulus of Elasticity (MPa)
1.49	223	0.23	44

Mode of Failure Shear

Sample History Undisturbed core trimmed at natural water content.

Test Remarks

The sample height to diameter ratio is less than the required 2. The strength may be lower, due to the h/d ratio.

Unconfined Compressive Strength reported to the nearest 1 kPa. This test result is IANZ accredited.

Modulus of Elasticity value reported based on the straight line portion of the curve and provided as indicative only.

Sample description, modulus of elasticity and UCS values reported are not IANZ accredited.

Entered by JK Date 19/06/2018 Checked by ST Date 19/06/2018

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Geotechnics Project ID 1007084.1000.0.0
Customer Project ID 1005069.1120

Determination of the unconfined compressive strength of cohesive soil - NZS 4402:1986 Test 6.3.1

Sample Details

Geotechnics Sample ID	---				
Site	Dome Valley				
BH No	BH02	Sample ID	--	Depth (m)	16.10-16.25m
Sample Description	Light greenish grey, mottled white, moderately strong, fine grained SANDSTONE with occasional fine gravel size SILTSTONE clasts (dark grey).				

Sample Parameters

Sample Height	(mm)	122.36	Bulk Density	(t/m³)	2.34
Sample Diameter	(mm)	61.02	Dry Density	(t/m³)	2.19
Test Height	(mm)	122.36	Water Content	(%)	6.9
Test H/D Ratio		2.01			

Failure Value
Unconfined Compressive Strength qu (kPa)
22949

Mode of Failure Shear

Sample History Undisturbed core trimmed at natural water content.

Test Remarks

The sample was tested in a concrete machine. Therefore strain could not be measured.

The UCS value reported to the nearest 1 kPa.

Sample description and UCS value reported are not IANZ accredited.

Entered by JK Date 19/06/2018 Checked by ST Date 19/06/2018

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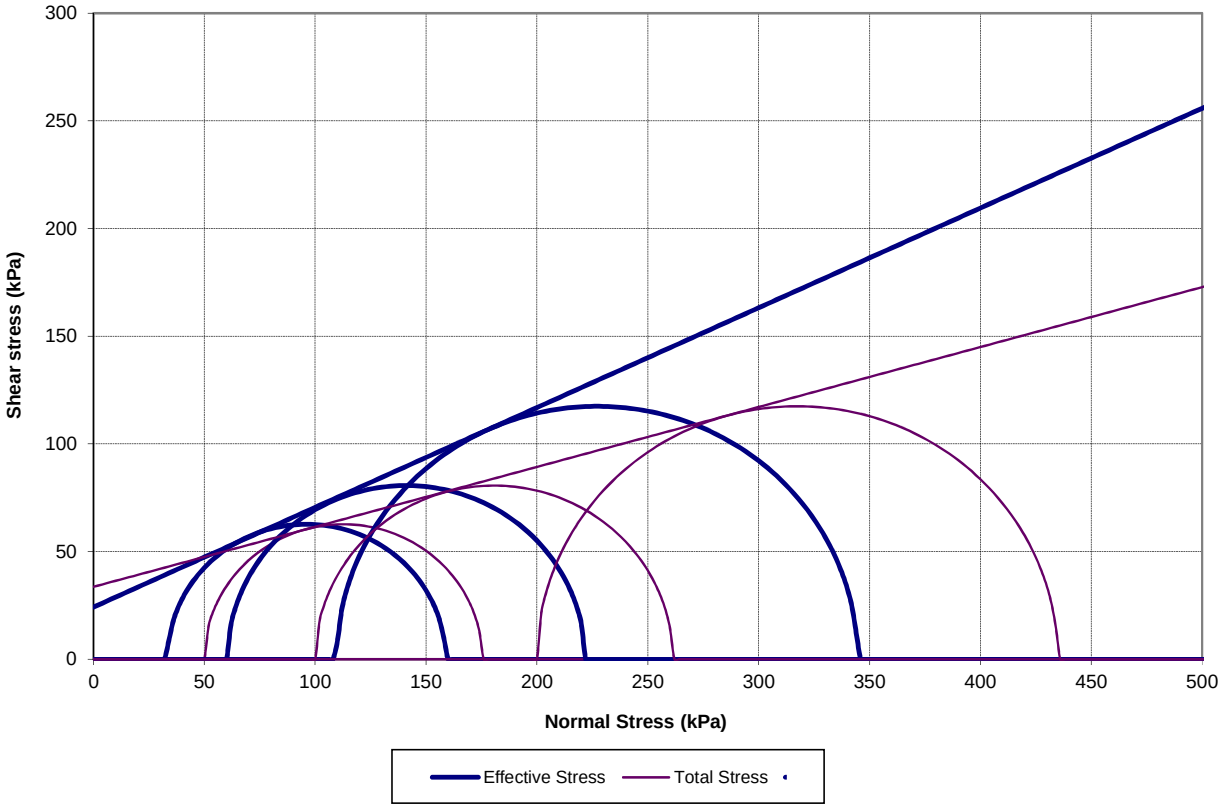
Site: Dome Valley | Your Project ID: 1005069.1120 | Project ID: 1007084.0.2000.0
Location ID: BH01 | Sample Ref.: -- | Depth: 1.56 -- 1.68 (m)
Test method used: BS1377:Part 8:1990:Clause 5 Saturation | BS1377:Part 8:1990:Clause 6 Consolidation
BS1377:Part 8:1990:Clause 7 Consolidated-undrained triaxial compression test with pore pressure measurement
NZS 4402:1986 Test 2.1 Determination of Water Content

CONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION TEST (3 STAGES)
MOHR CIRCLES OF TOTAL AND EFFECTIVE STRESSES



Initial Sample Height:	118.09	mm	Initial Water Content:	53.0	%
Initial Sample Diameter:	53.94	mm	Initial Bulk Density:	1.67	t/m³
Initial B Value:	18	%	Initial Dry Density:	1.09	t/m³
B Value before Consolidation:	92	%	Final Water Content:	53.0	%

	Consolidation Stage			Failure Values				
	Cell Pressure (kPa)	Back Pressure (kPa)	Eff. Consol. Stress (kPa)	Deviator Stress (kPa)	Pore Pressure Change During Shearing δμ (kPa)	Effective Principal Stress (kPa) Major σ1'	Minor σ3'	Vertical Strain (%)
STAGE 1	450	400	50	125.39	16.6	158.79	33.40	1.70
STAGE 2	500	400	100	161.30	39.6	221.70	60.40	2.24
STAGE 3	600	400	200	234.94	90.3	344.64	109.70	2.98

		Total			Effective	
Angle of Frictional Resistance:	ϕ =	16	°	ϕ′ =	25	°
Cohesion:	c =	34	kPa	c' =	24	kPa
Linear Regression Coefficient:	r =	1.000		r =	1.000	

Sample History: Undisturbed core trimmed at natural water content.

Soil description: SILT, clayey, firm to stiff, orangey brown with light brown / white and red, high plasticity, slightly dilatant.

Failure Mode: Planar / Plastic | Test Speed: 0.015 (mm/min)

Test Remarks: The sample was saturated by increments of cell pressure and back pressure.
Failure for each stage was determined by the maximum effective stress ratio. Strength parameters have been derived by using a linear regression fitting method.

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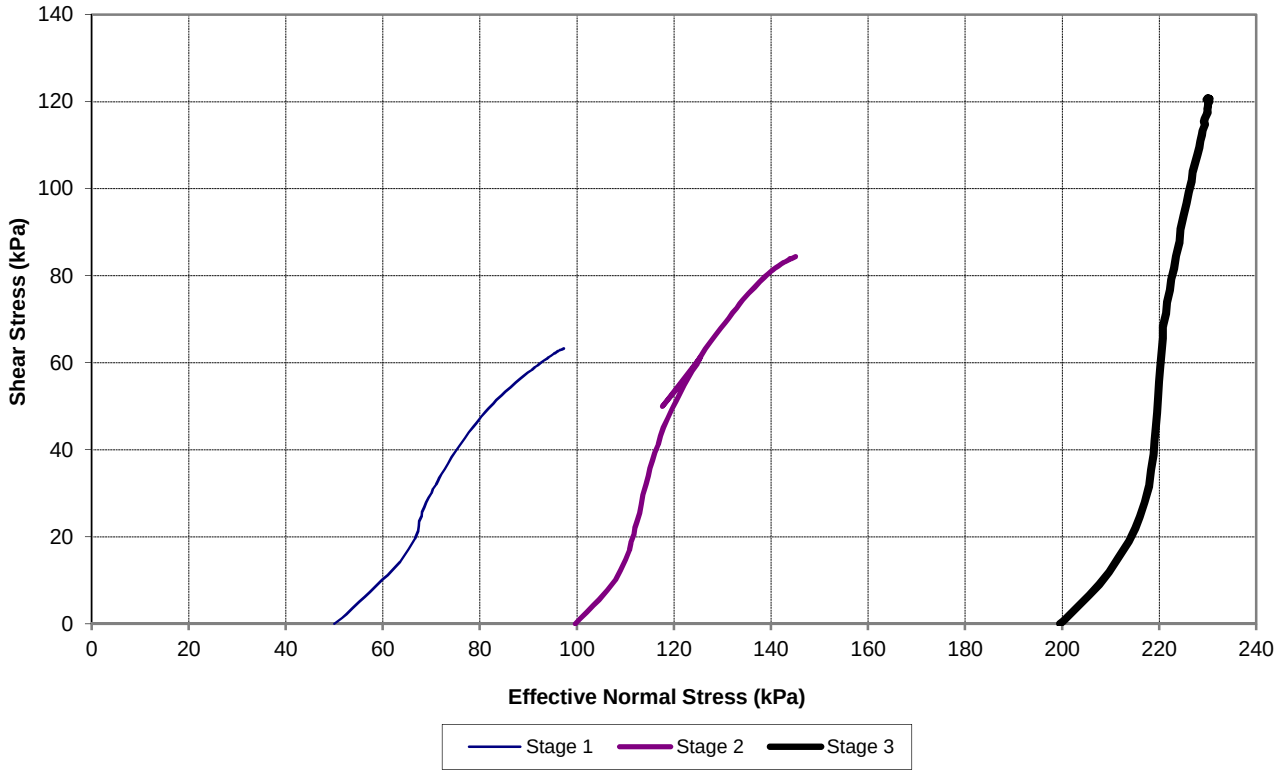
Site: Dome Valley | Your Project ID: 1005069.1120 | Project ID: 1007084.0.2000.0

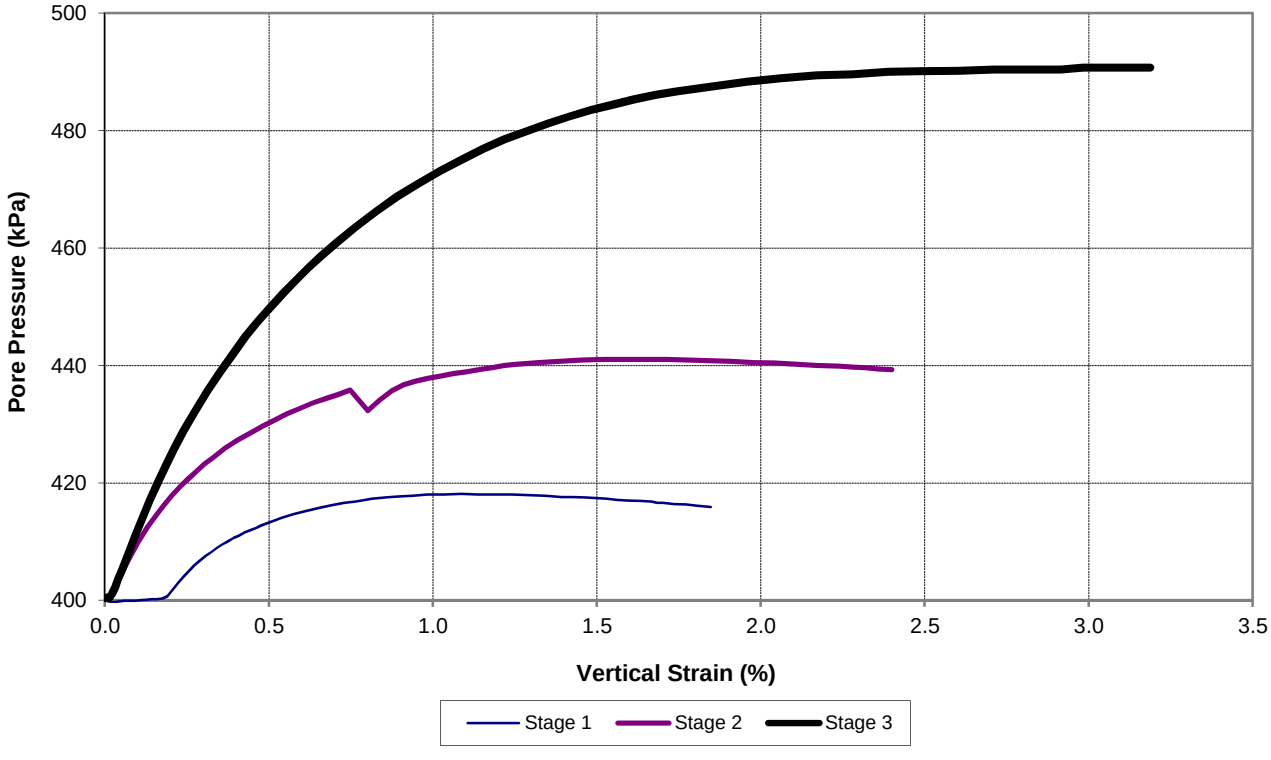
Location ID: BH01 | Sample Ref.: -- | Depth: 1.56 -- 1.68 (m)

GRAPHS

STRESS PATH



PORE PRESSURE Vs VERTICAL STRAIN



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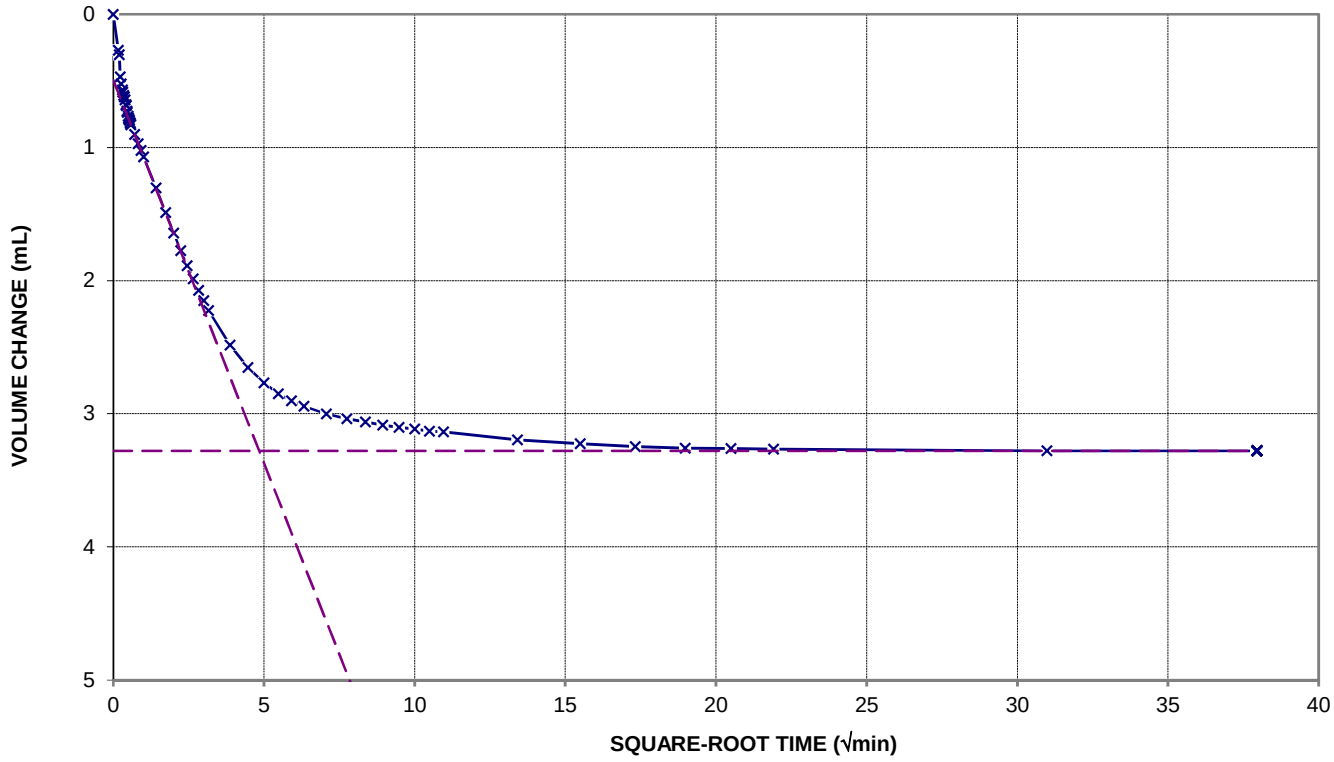
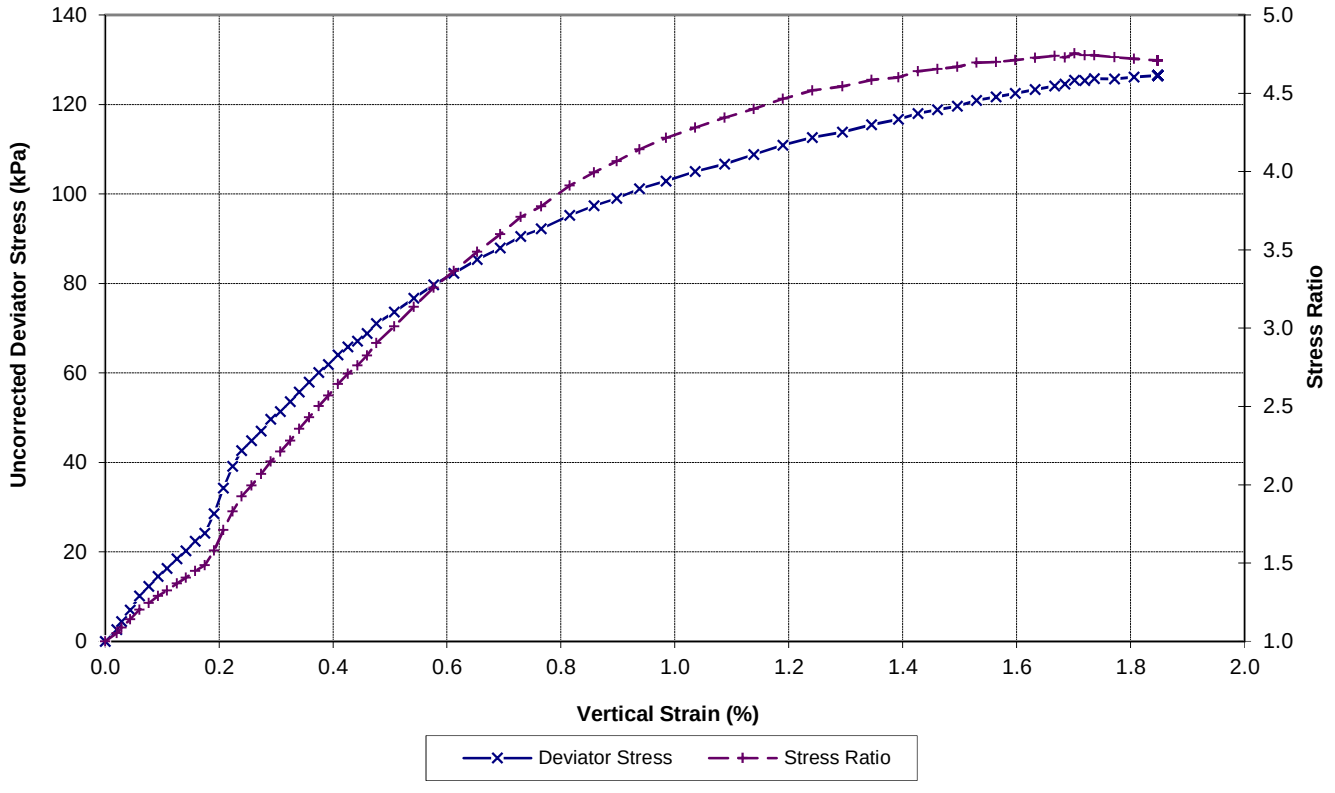
Site: Dome Valley | Your Project ID: 1005069.1120 | Project ID: 1007084.0.2000.0
Location ID: BH01 | Sample Ref.: -- | Depth: 1.56 -- 1.68 (m)

STAGE 1 GRAPHS

CONSOLIDATION



STRESS-STRAIN CURVE



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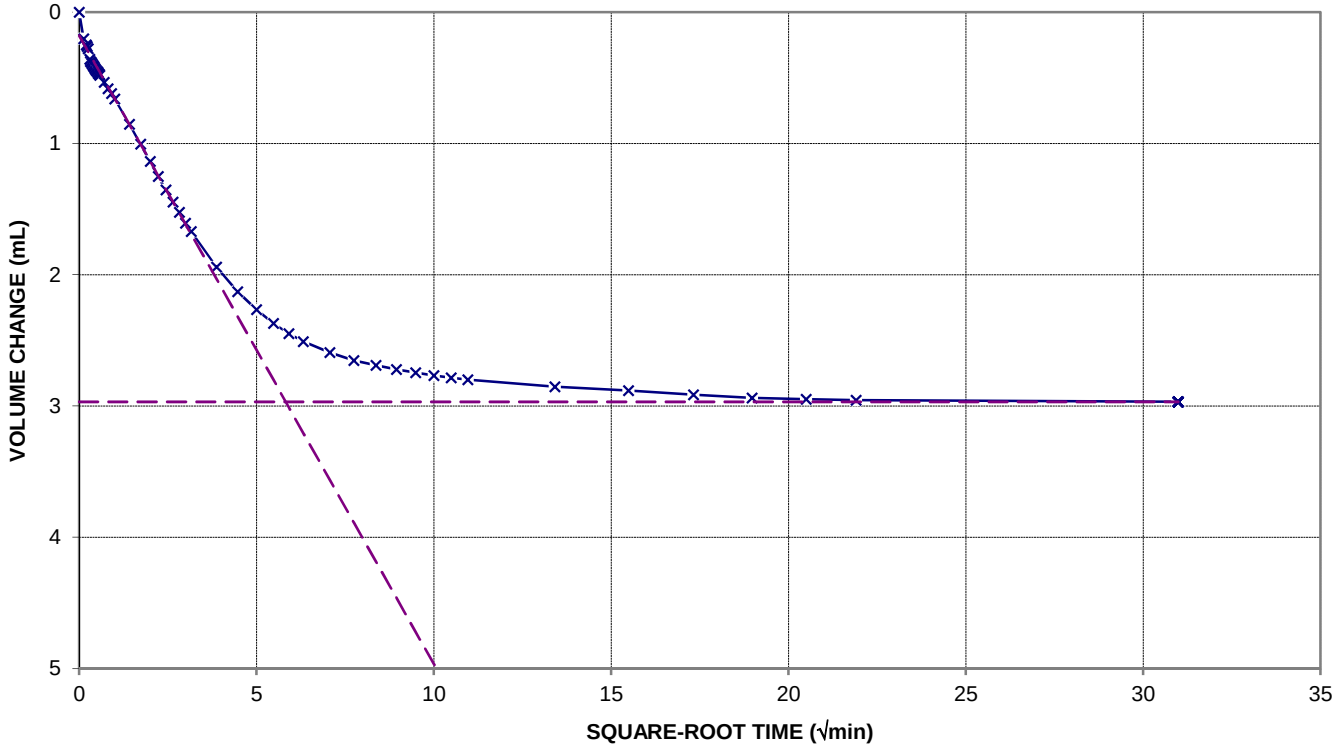
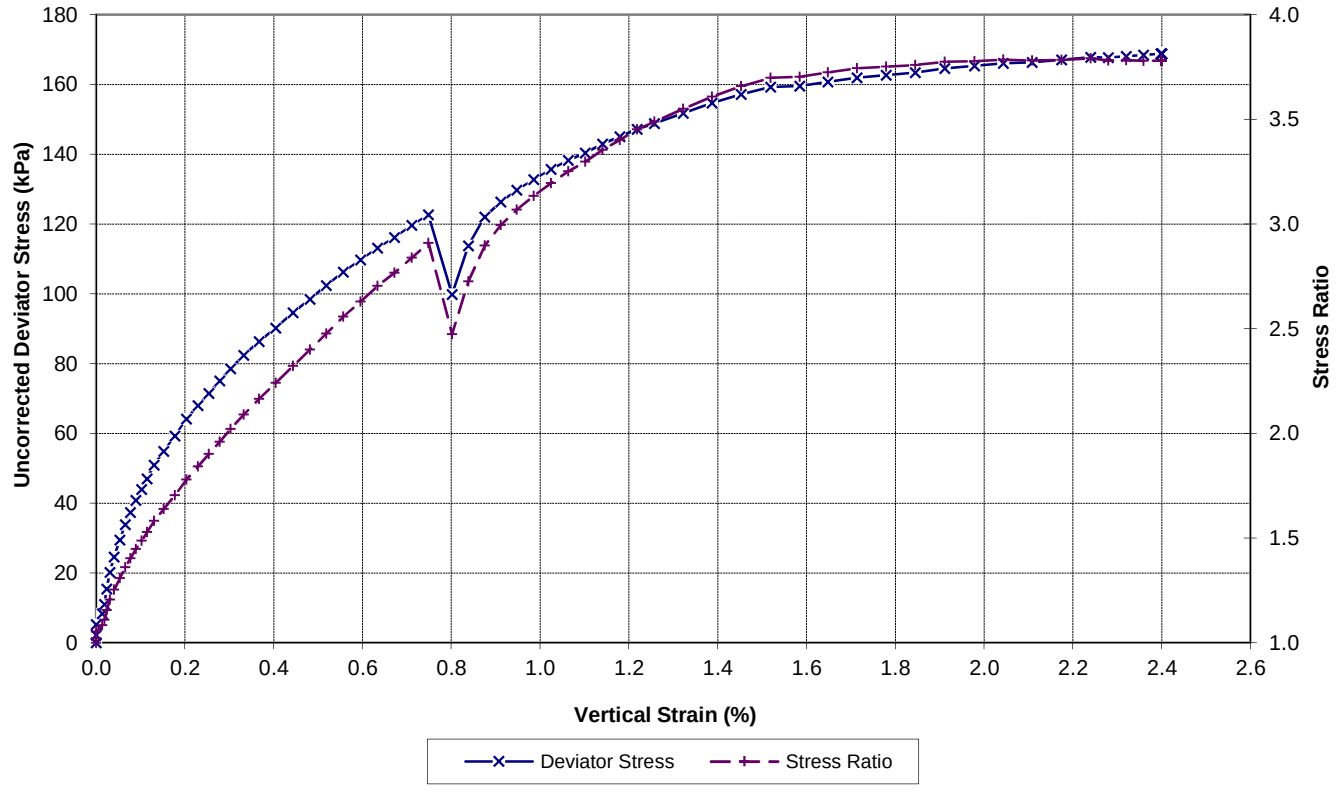
Site: Dome Valley | Your Project ID: 1005069.1120 | Project ID: 1007084.0.2000.0
Location ID: BH01 | Sample Ref.: -- | Depth: 1.56 -- 1.68 (m)

STAGE 2 GRAPHS

CONSOLIDATION



STRESS-STRAIN CURVE



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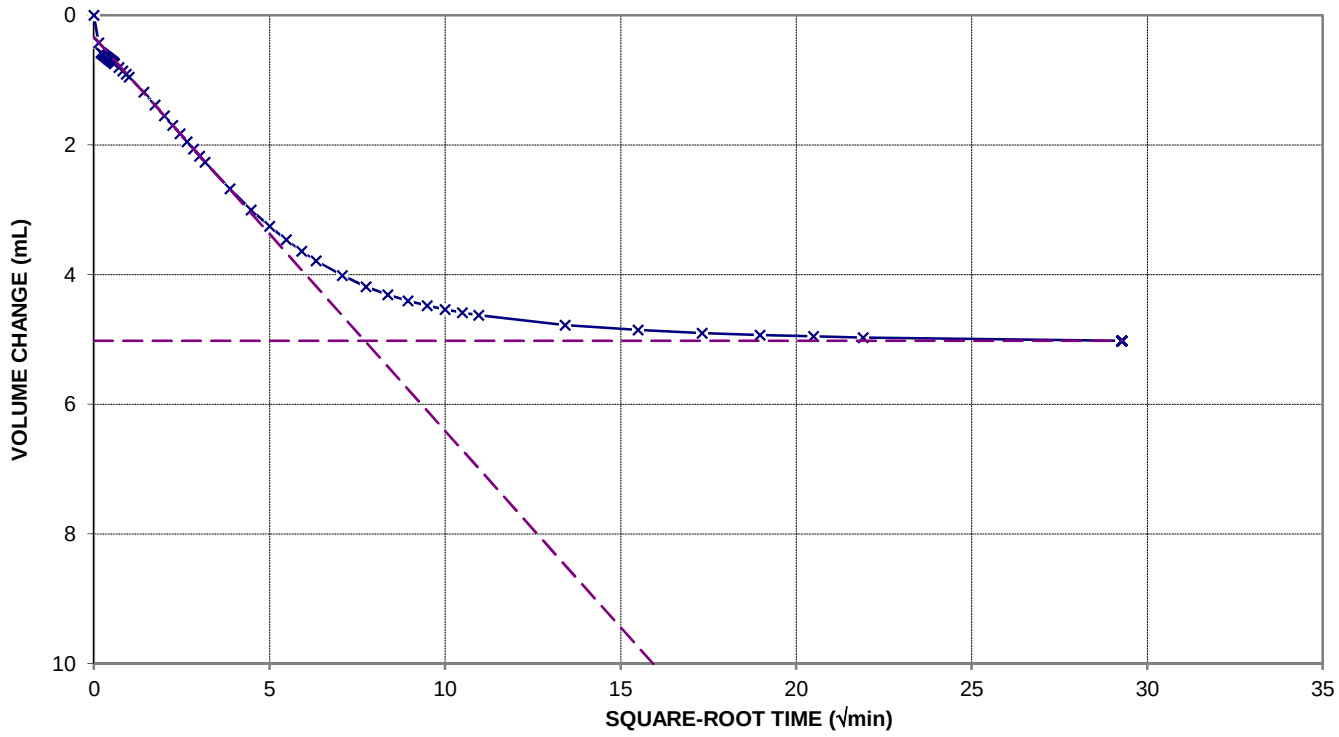
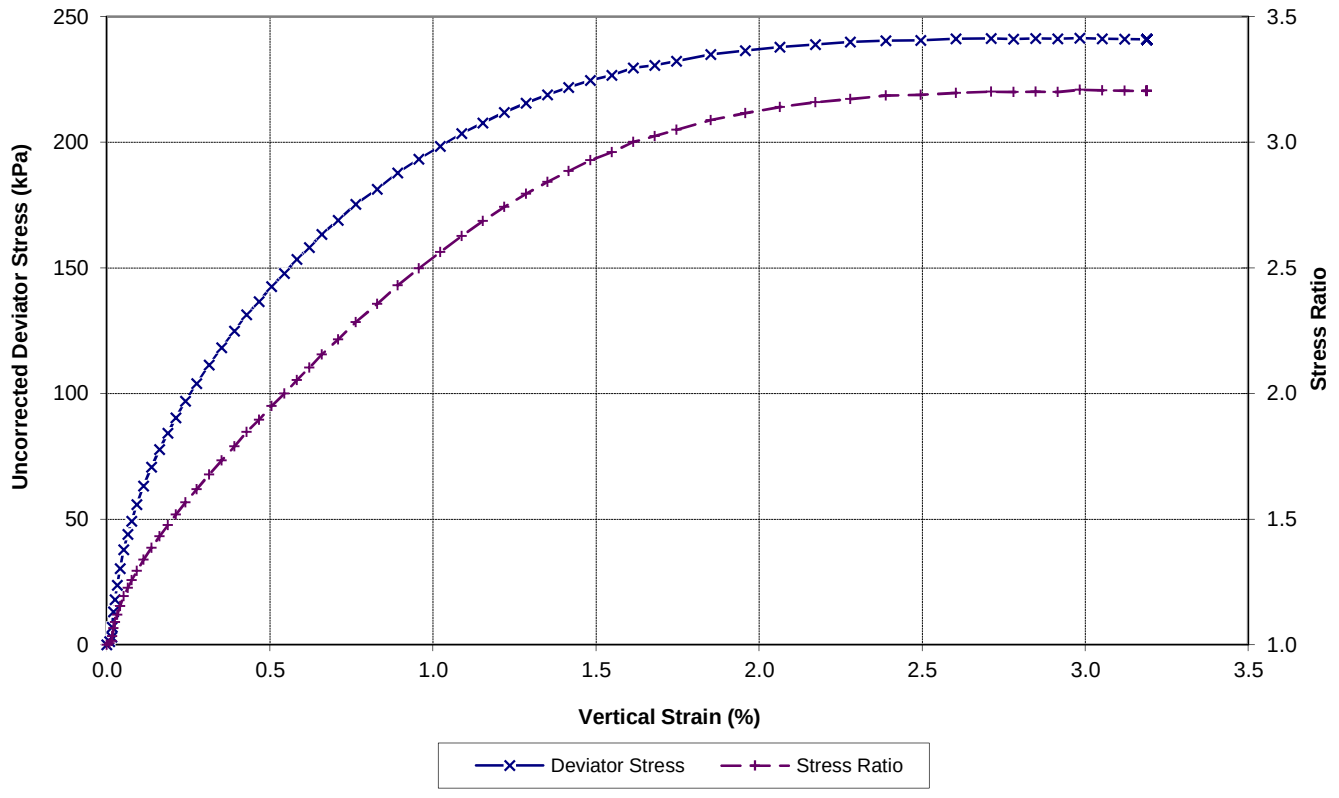
Site: Dome Valley | Your Project ID: 1005069.1120 | Project ID: 1007084.0.2000.0
Location ID: BH01 | Sample Ref.: -- | Depth: 1.56 -- 1.68 (m)

STAGE 3 GRAPHS

CONSOLIDATION



STRESS-STRAIN CURVE



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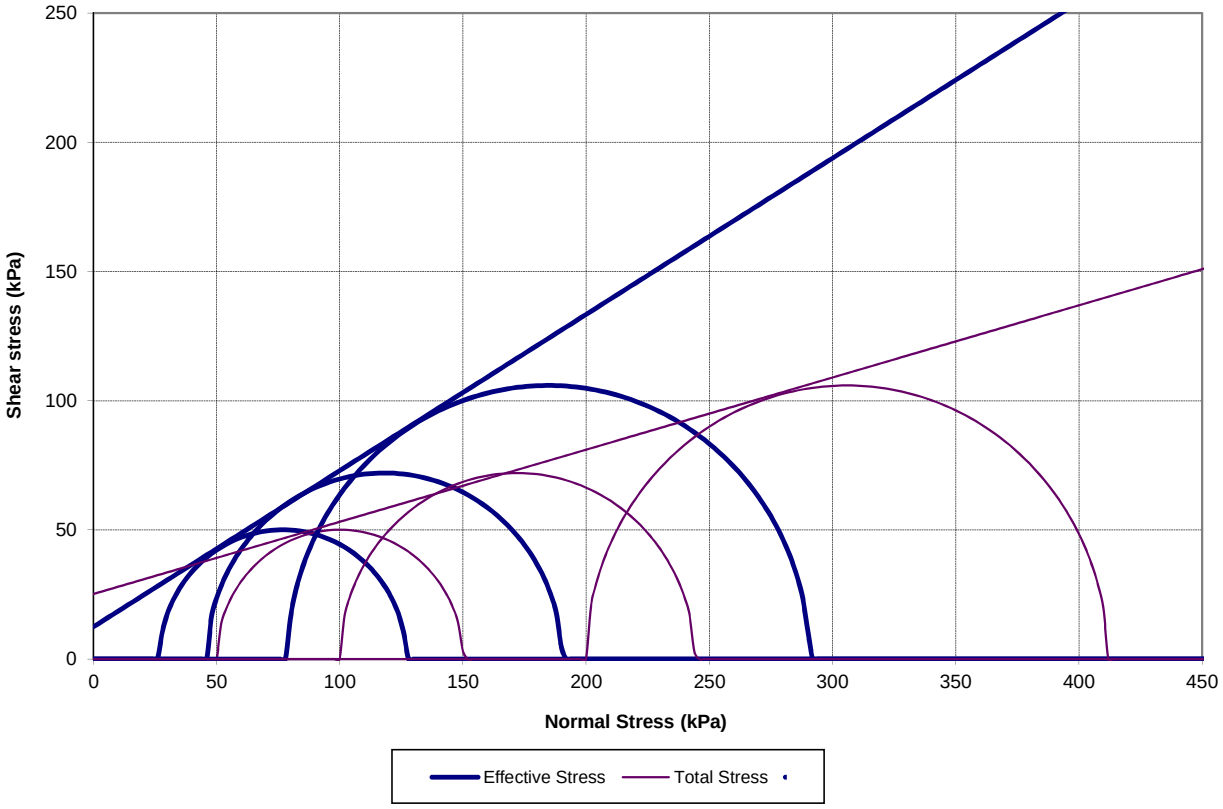
Site: Dome Valley | Your Project ID: 1005069.1120 | Project ID: 1007084.0.2000.0
Location ID: BH03 | Sample Ref.: -- | Depth: 1.62 -- 1.73 (m)
Test method used: BS1377:Part 8:1990:Clause 5 Saturation | BS1377:Part 8:1990:Clause 6 Consolidation
BS1377:Part 8:1990:Clause 7 Consolidated-undrained triaxial compression test with pore pressure measurement
NZS 4402:1986 Test 2.1 Determination of Water Content

CONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION TEST (3 STAGES)
MOHR CIRCLES OF TOTAL AND EFFECTIVE STRESSES



Initial Sample Height:	112.16 mm	Initial Water Content:	47.1 %
Initial Sample Diameter:	54.16 mm	Initial Bulk Density:	1.75 t/m³
Initial B Value:	28 %	Initial Dry Density:	1.19 t/m³
B Value before Consolidation:	92 %	Final Water Content:	45.3 %

	Consolidation Stage			Failure Values				
	Cell Pressure (kPa)	Back Pressure (kPa)	Eff. Consol. Stress (kPa)	Deviator Stress (kPa)	Pore Pressure Change During Shearing δμ (kPa)	Effective Principal Stress (kPa) Major σ1'	Minor σ3'	Vertical Strain (%)
STAGE 1	350	300	50	100.10	23.1	127.00	26.90	2.72
STAGE 2	400	300	100	144.05	53.9	190.15	46.10	2.27
STAGE 3	500	300	200	211.78	121.2	290.58	78.80	3.61

		Total			Effective	
Angle of Frictional Resistance:	ϕ =	16	°	ϕ′ =	31	°
Cohesion:	c =	25	kPa	c' =	12	kPa
Linear Regression Coefficient:	r =	0.998		r =	1.000	

Sample History: Undisturbed core trimmed at natural water content.

Soil description: SILT, with some clay and minor sand, stiff, light brown with orangey brown and black.

Failure Mode: Planar / Plastic | Test Speed: 0.022 (mm/min)

Test Remarks: The sample was saturated by increments of cell pressure and back pressure.
Failure for each stage was determined by either the maximum effective stress ratio or the maximum deviator stress. Strength parameters have been derived by using a linear regression fitting method.

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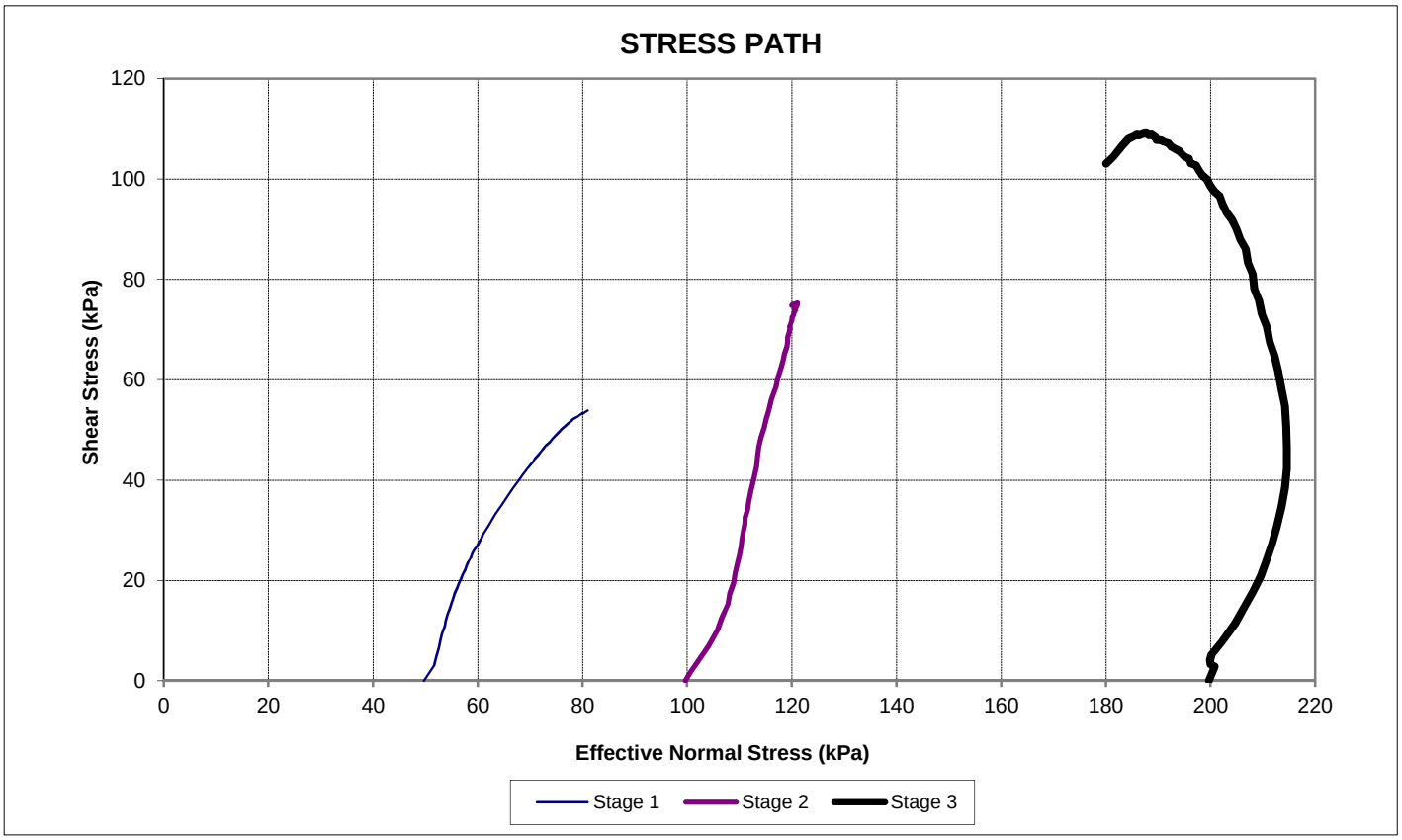
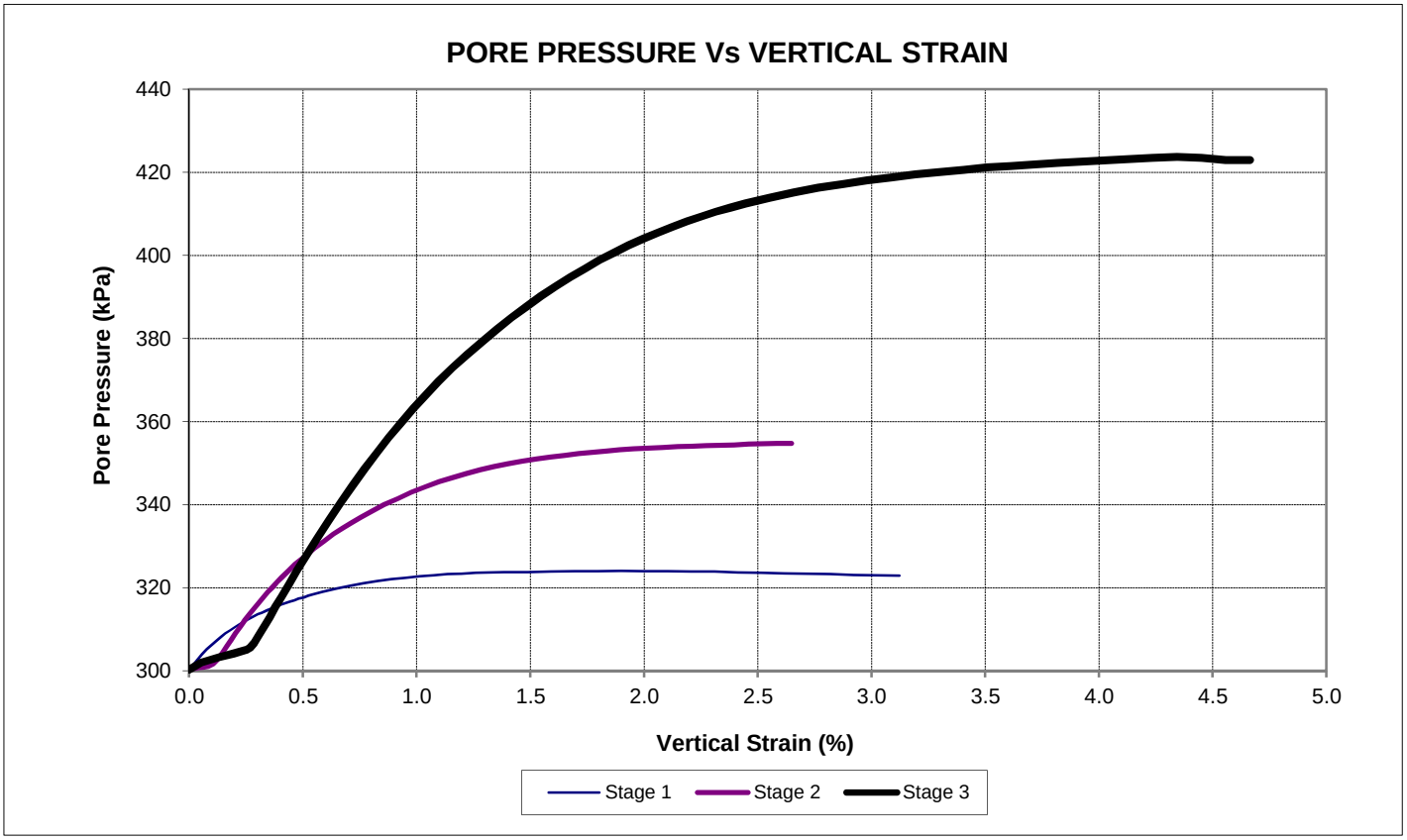
Site: Dome Valley | Your Project ID: 1005069.1120 | Project ID: 1007084.0.2000.0

Location ID: BH03 | Sample Ref.: -- | Depth: 1.62 -- 1.73 (m)

GRAPHS





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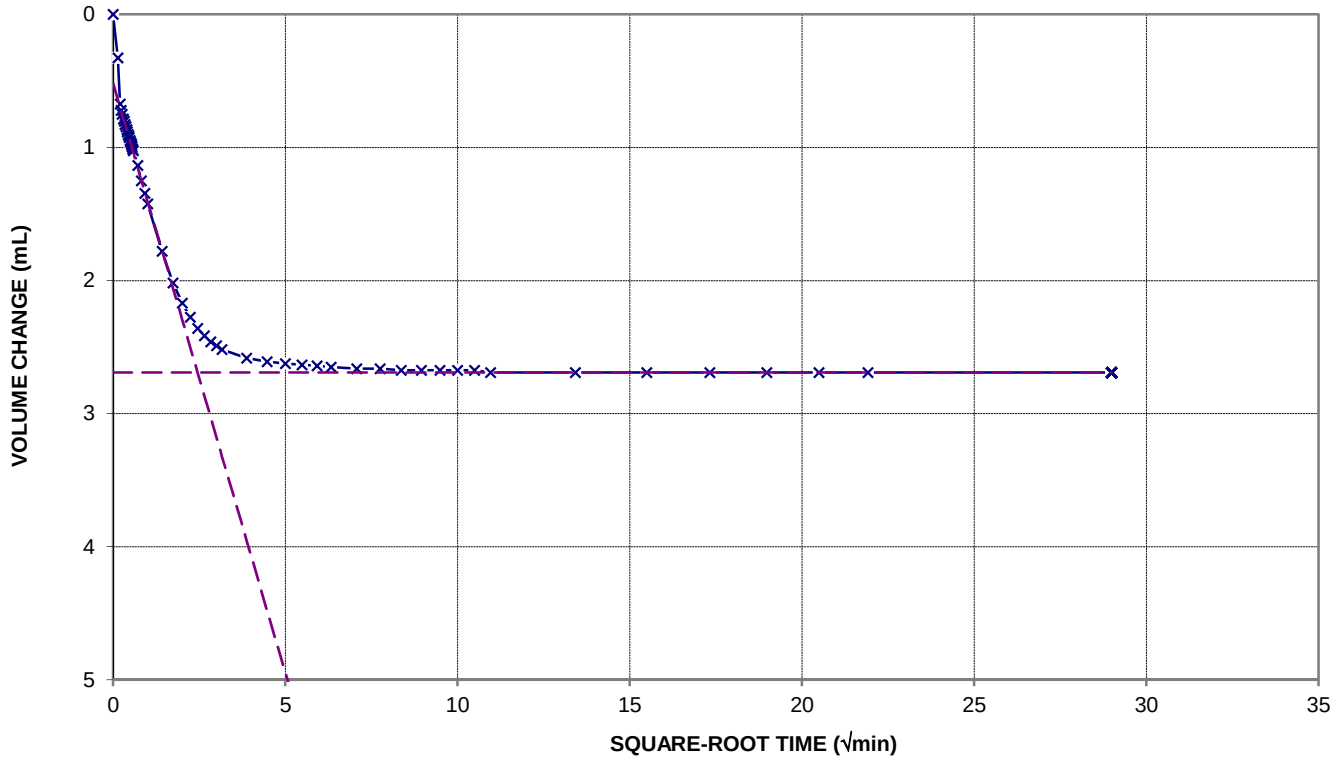
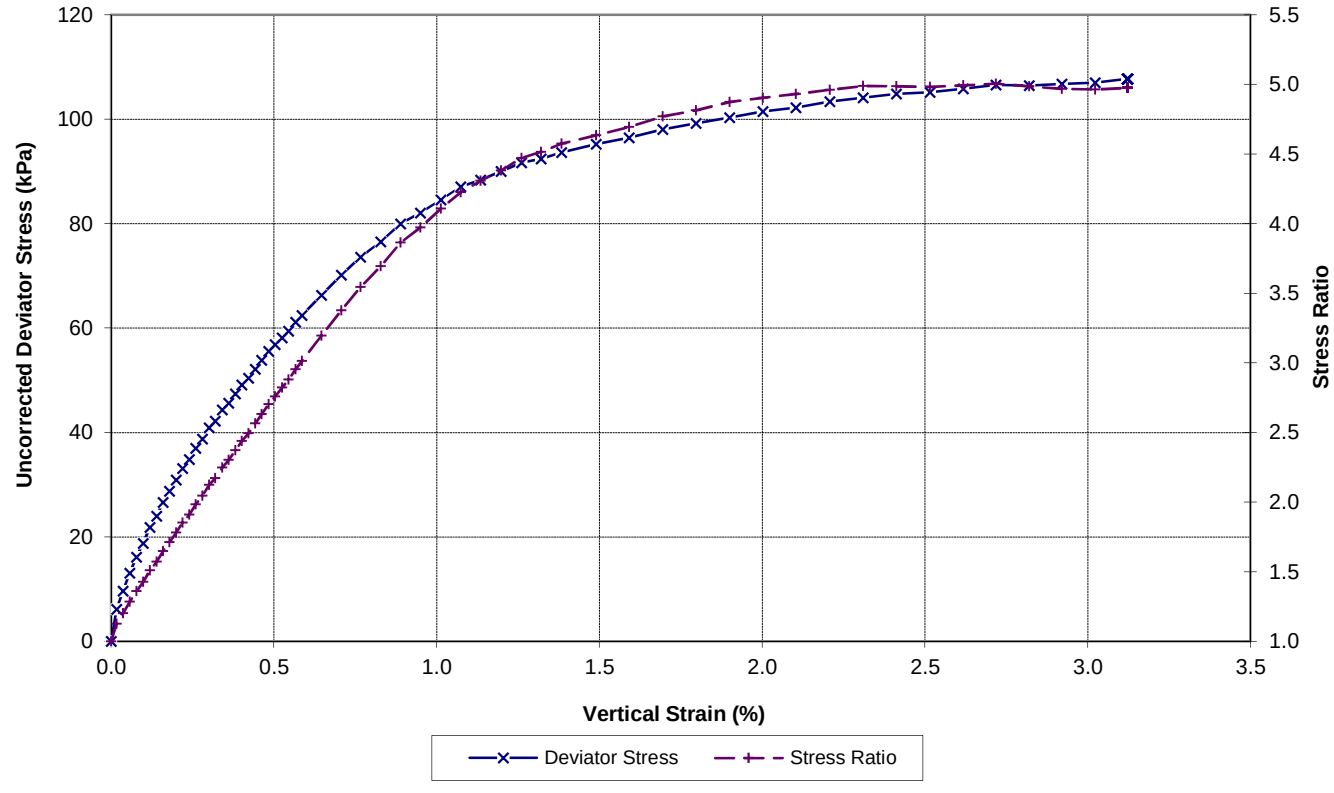
Site: Dome Valley | Your Project ID: 1005069.1120 | Project ID: 1007084.0.2000.0
Location ID: BH03 | Sample Ref.: -- | Depth: 1.62 -- 1.73 (m)

STAGE 1 GRAPHS

CONSOLIDATION



STRESS-STRAIN CURVE



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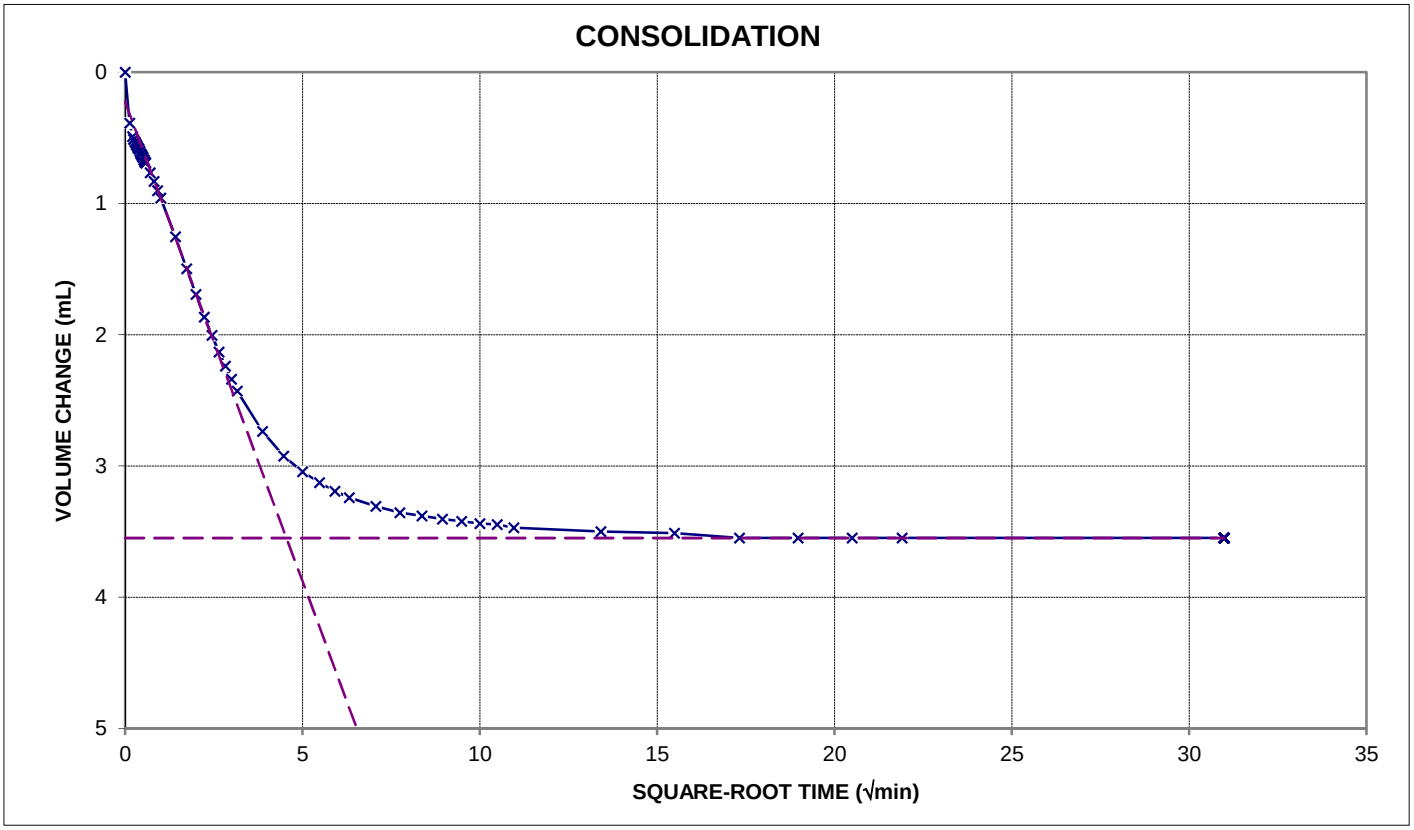
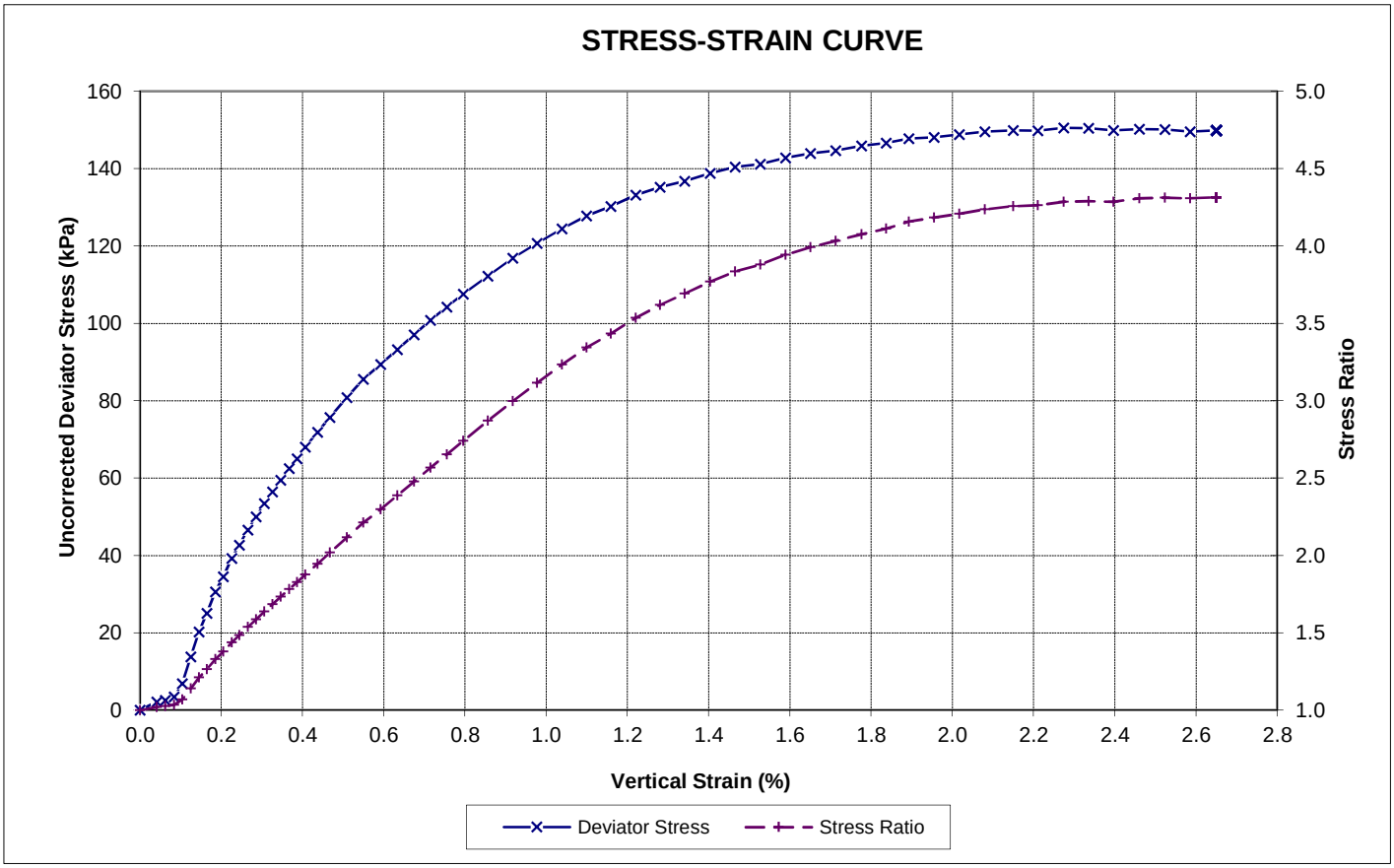
Site: Dome Valley | Your Project ID: 1005069.1120 | Project ID: 1007084.0.2000.0
Location ID: BH03 | Sample Ref.: -- | Depth: 1.62 -- 1.73 (m)

STAGE 2 GRAPHS

CONSOLIDATION



STRESS-STRAIN CURVE



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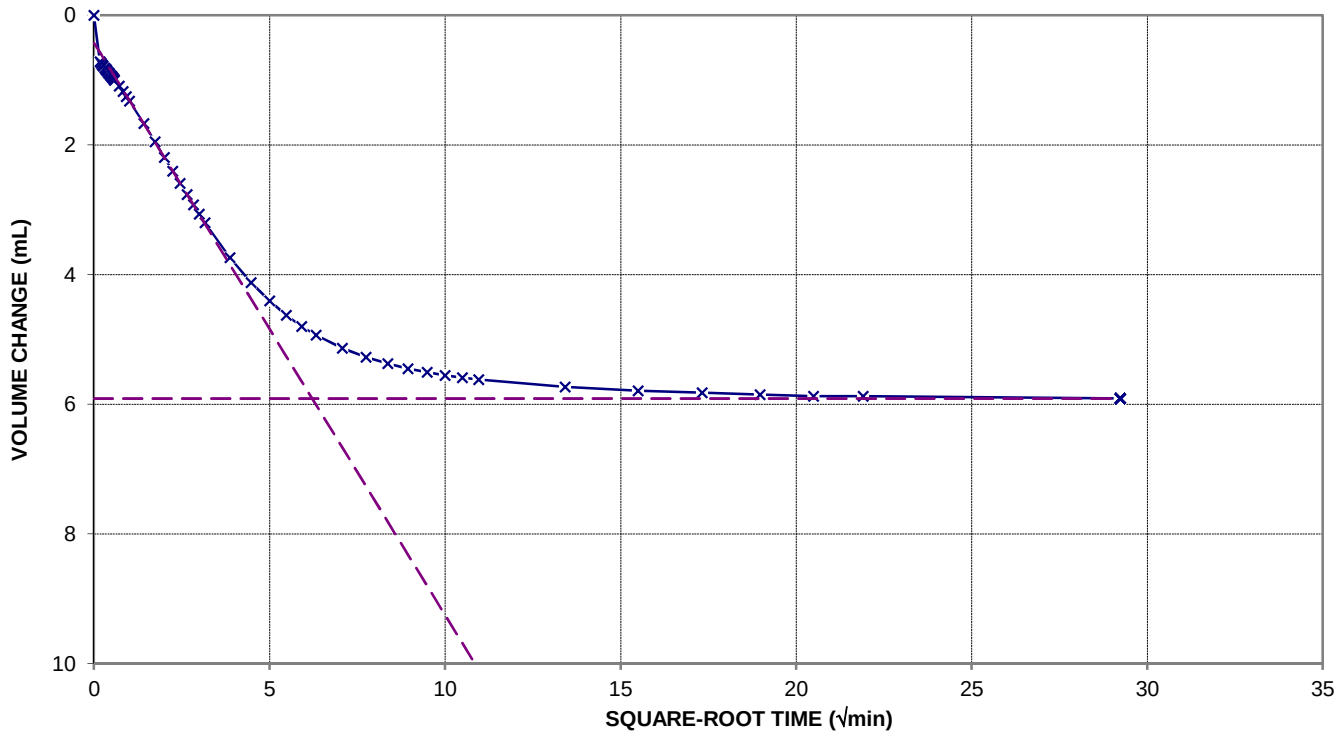
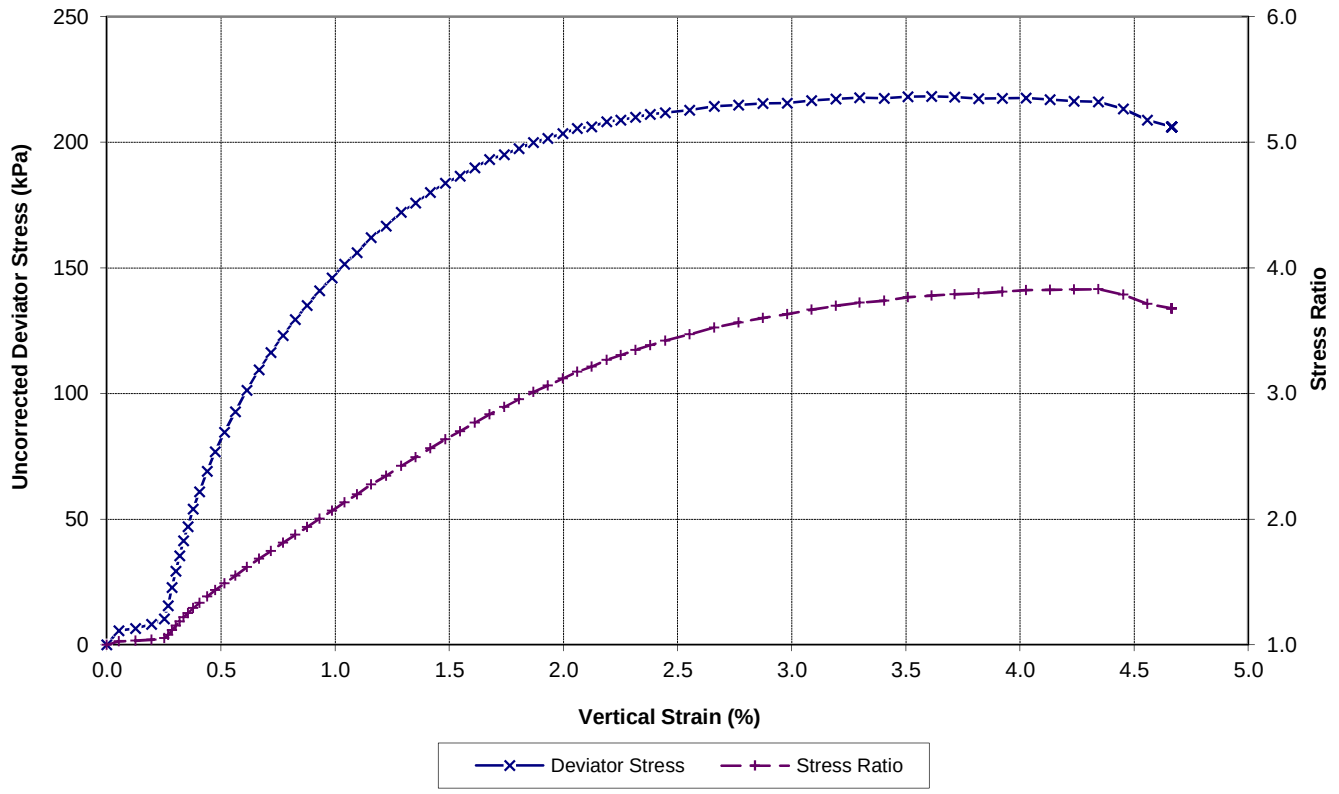
Site: Dome Valley | Your Project ID: 1005069.1120 | Project ID: 1007084.0.2000.0
Location ID: BH03 | Sample Ref.: -- | Depth: 1.62 -- 1.73 (m)

STAGE 3 GRAPHS

CONSOLIDATION



STRESS-STRAIN CURVE



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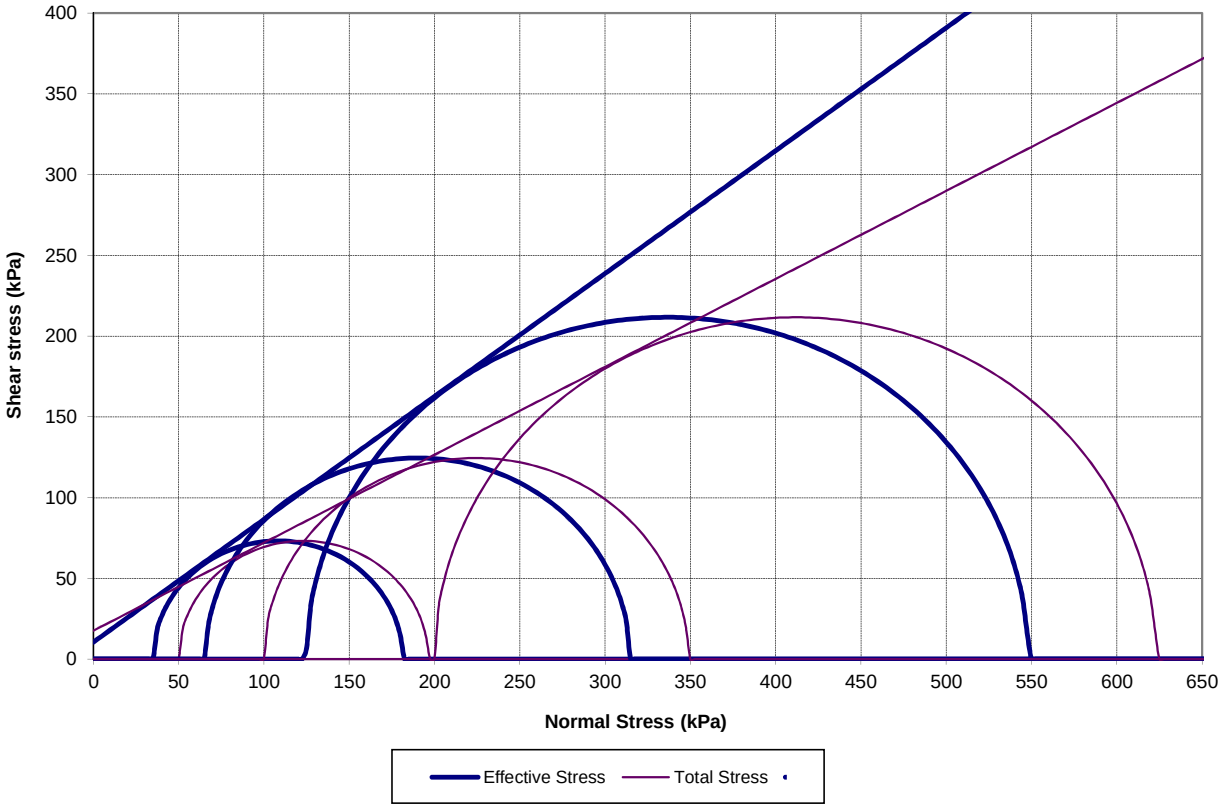
Site: Dome Valley | Your Project ID: 1005069.1120 | Project ID: 1007084.0.2000.0
Location ID: BH07 | Sample Ref.: -- | Depth: 1.51 - 1.62 (m)
Test method used: BS1377:Part 8:1990:Clause 5 Saturation | BS1377:Part 8:1990:Clause 6 Consolidation
BS1377:Part 8:1990:Clause 7 Consolidated-undrained triaxial compression test with pore pressure measurement
NZS 4402:1986 Test 2.1 Determination of Water Content

CONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION TEST (3 STAGES)
MOHR CIRCLES OF TOTAL AND EFFECTIVE STRESSES



Initial Sample Height:	110.63	mm	Initial Water Content:	37.1	%
Initial Sample Diameter:	54.38	mm	Initial Bulk Density:	1.74	t/m³
Initial B Value:	12	%	Initial Dry Density:	1.27	t/m³
B Value before Consolidation:	98	%	Final Water Content:	38.6	%

	Consolidation Stage			Failure Values				
	Cell Pressure (kPa)	Back Pressure (kPa)	Eff. Consol. Stress (kPa)	Deviator Stress (kPa)	Pore Pressure Change During Shearing δμ (kPa)	Effective Principal Stress (kPa) Major σ1'	Minor σ3'	Vertical Strain (%)
STAGE 1	350	300	50	146.38	14.9	181.48	35.10	4.14
STAGE 2	400	300	100	248.99	34.3	314.69	65.70	2.44
STAGE 3	500	300	200	423.24	75.1	548.14	124.90	3.31

		Total			Effective	
Angle of Frictional Resistance:	ϕ =	29	°	ϕ′ =	37	°
Cohesion:	c =	18	kPa	c' =	10	kPa
Linear Regression Coefficient:	r =	1.000		r =	1.000	

Sample History: Undisturbed core trimmed at natural water content.

Soil description: SAND, silty, tightly packed, orangey brown with black, friable. Some organic matter and pieces of wooden chips were present.

Failure Mode: Planar / Plastic | Test Speed: 0.024 (mm/min)

Test Remarks: The sample was saturated by increments of cell pressure and back pressure.
Failure for each stage was determined by the maximum effective stress ratio. Strength parameters have been derived by using a linear regression fitting method.

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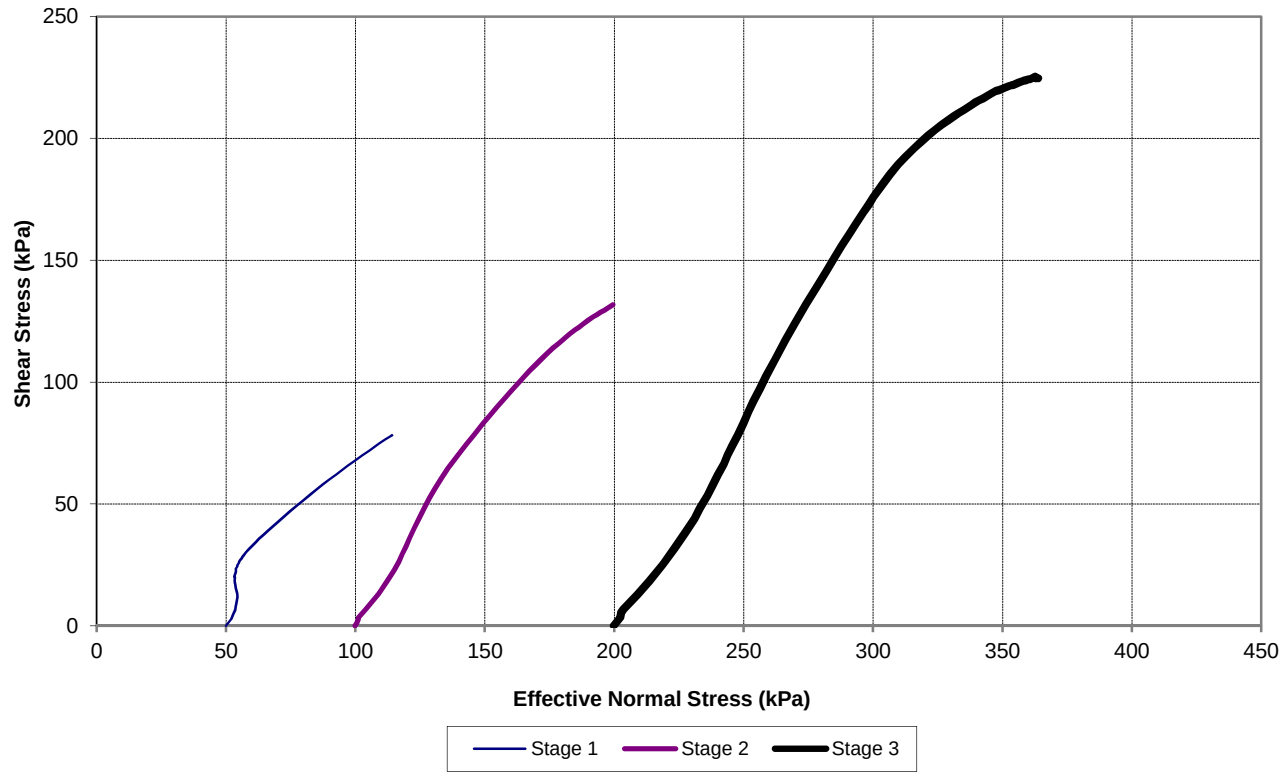
Site: Dome Valley | Your Project ID: 1005069.1120 | Project ID: 1007084.0.2000.0

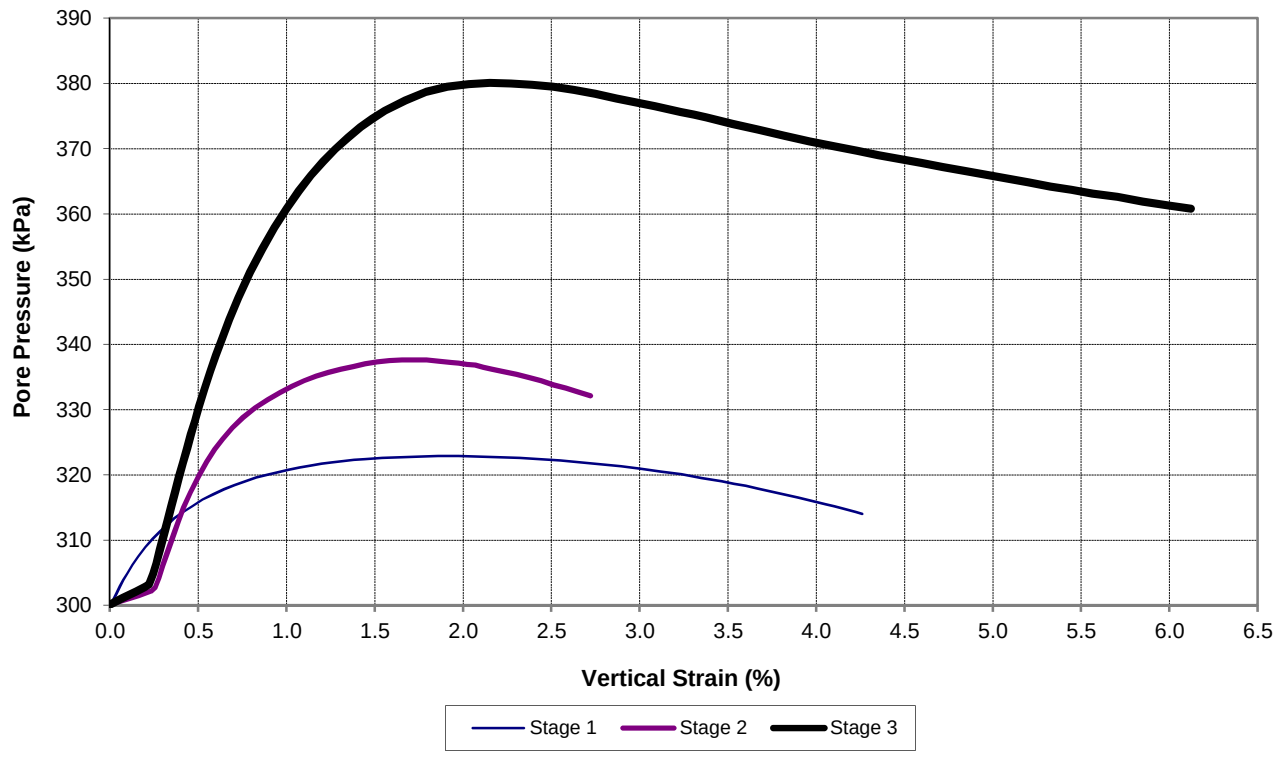
Location ID: BH07 | Sample Ref.: -- | Depth: 1.51 - 1.62 (m)

GRAPHS

STRESS PATH



PORE PRESSURE Vs VERTICAL STRAIN



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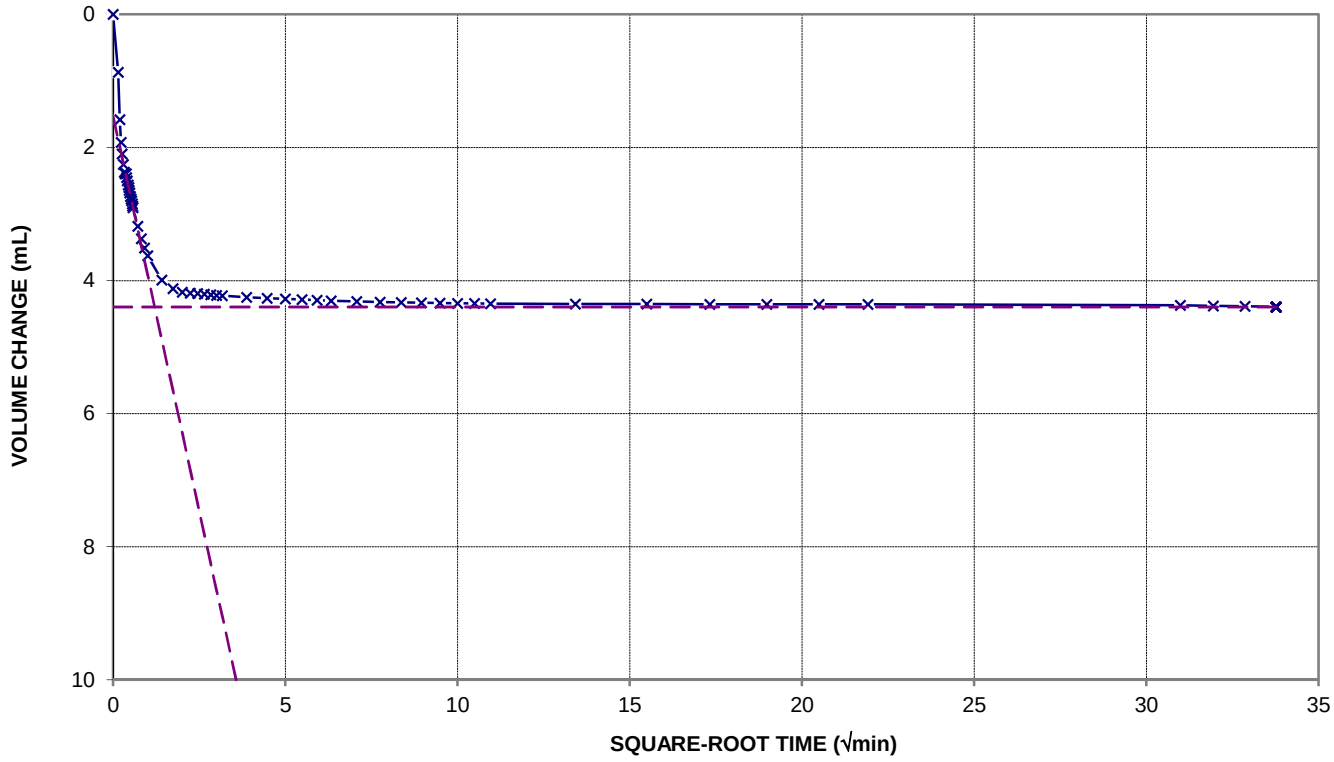
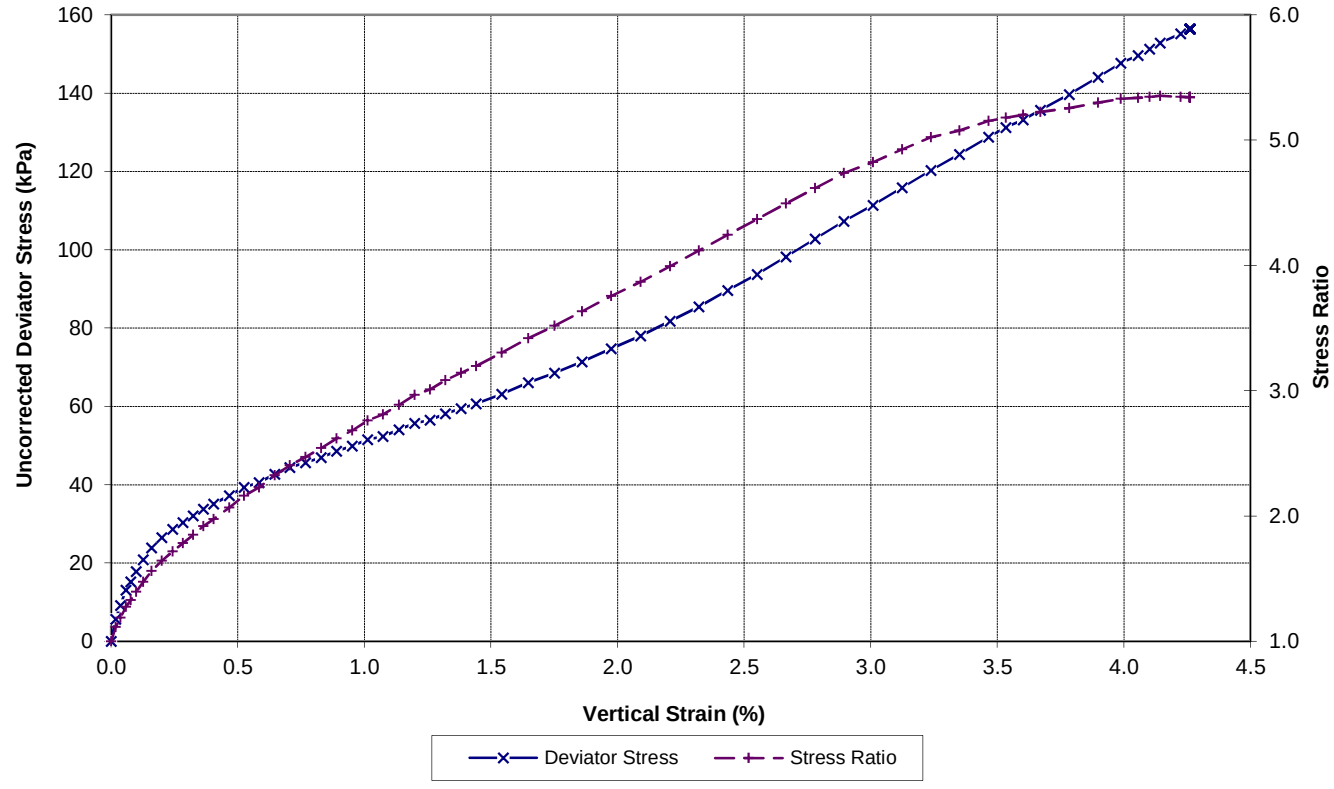
Site: Dome Valley | Your Project ID: 1005069.1120 | Project ID: 1007084.0.2000.0
Location ID: BH07 | Sample Ref.: -- | Depth: 1.51 - 1.62 (m)

STAGE 1 GRAPHS

CONSOLIDATION



STRESS-STRAIN CURVE



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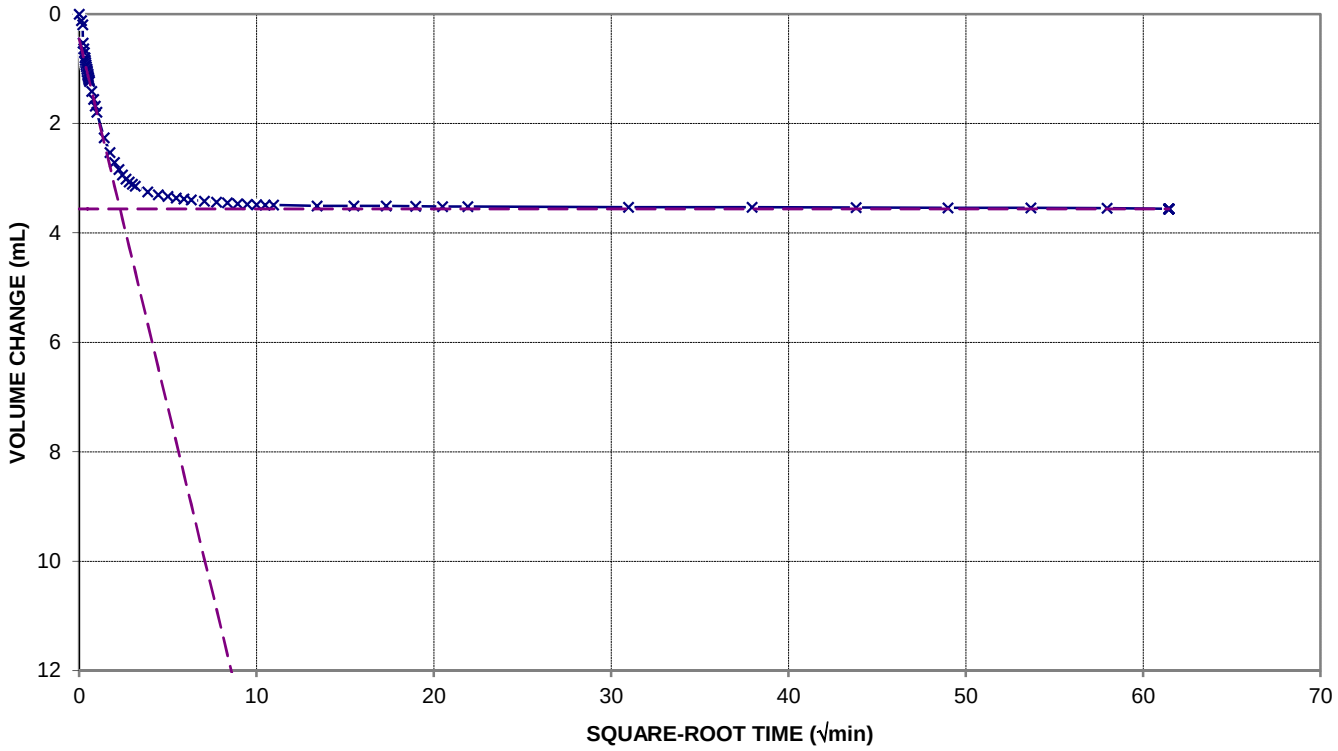
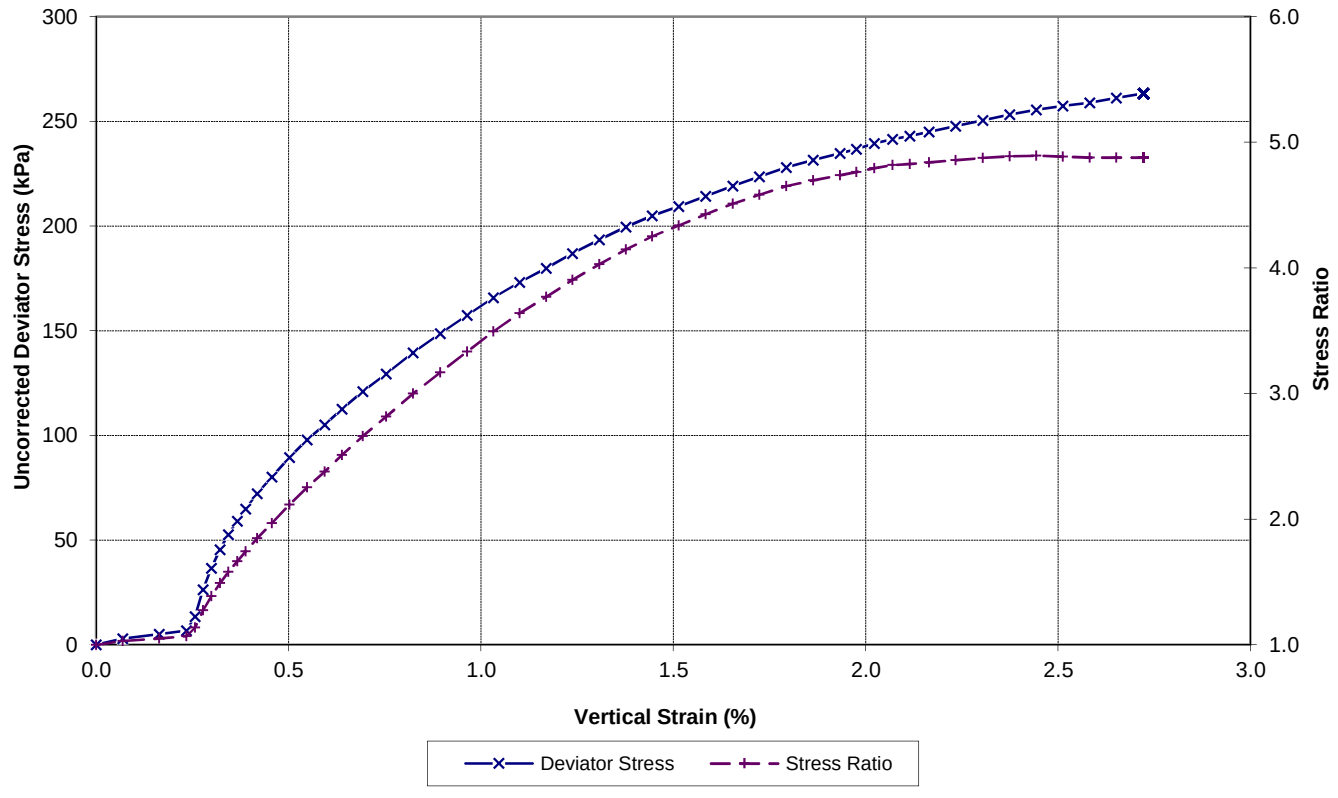
Site: Dome Valley | Your Project ID: 1005069.1120 | Project ID: 1007084.0.2000.0
Location ID: BH07 | Sample Ref.: -- | Depth: 1.51 - 1.62 (m)

STAGE 2 GRAPHS

CONSOLIDATION



STRESS-STRAIN CURVE



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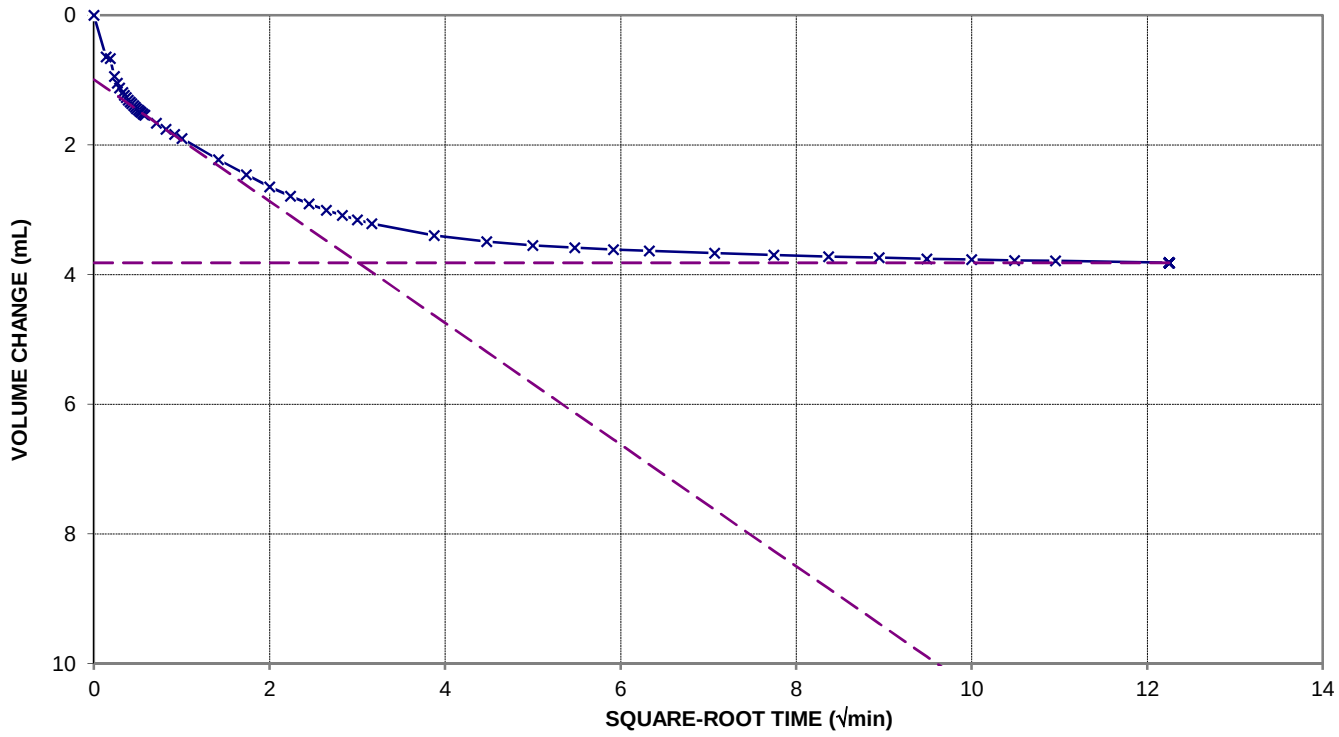
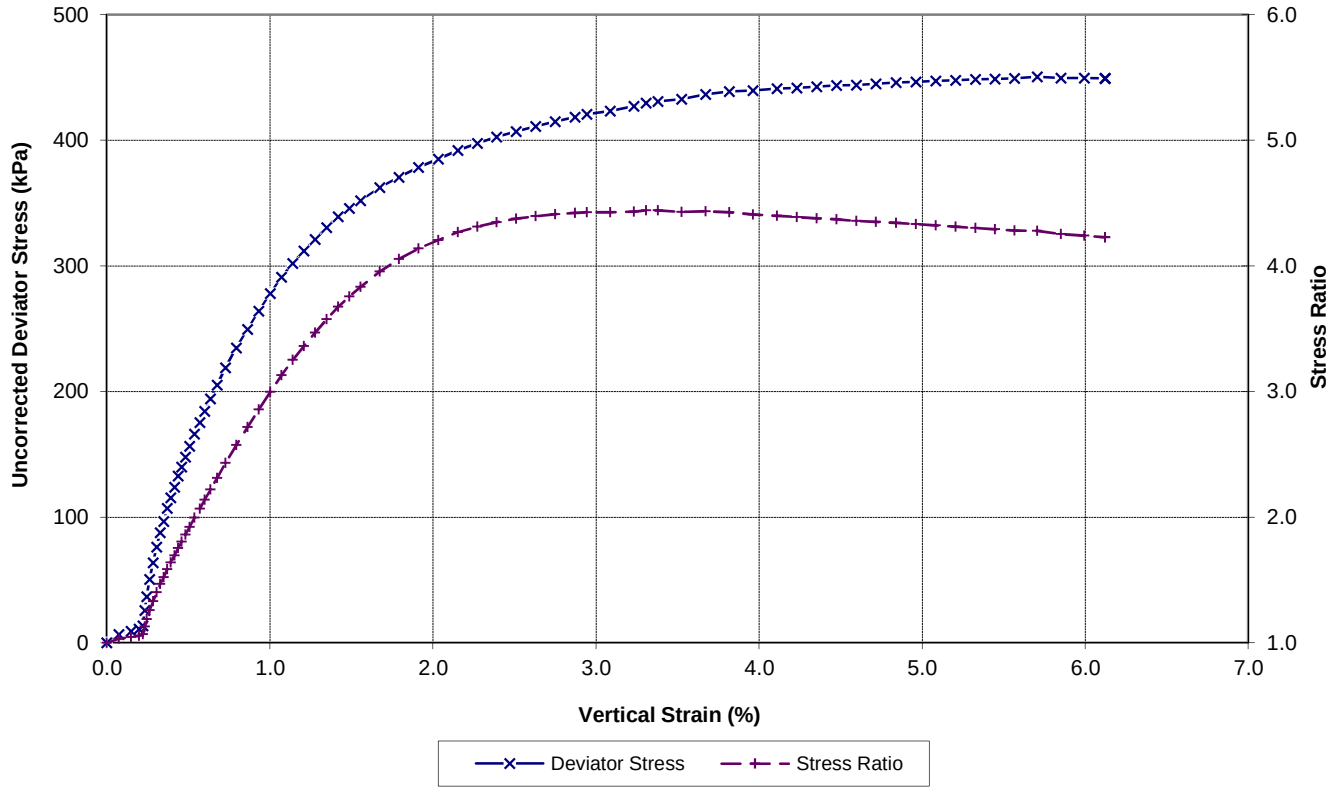
Site: Dome Valley | Your Project ID: 1005069.1120 | Project ID: 1007084.0.2000.0
Location ID: BH07 | Sample Ref.: -- | Depth: 1.51 - 1.62 (m)

STAGE 3 GRAPHS

CONSOLIDATION



STRESS-STRAIN CURVE



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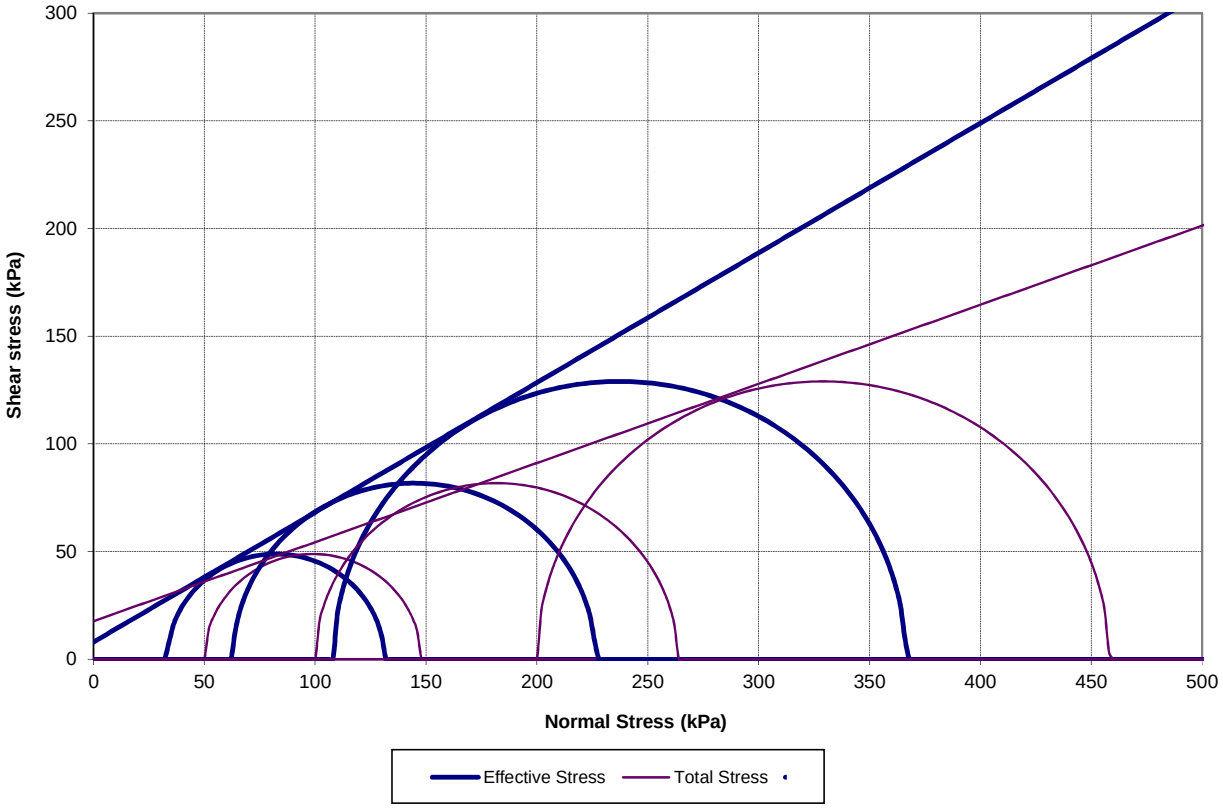
Site: Dome Valley | Your Project ID: 1005069.1120 | Project ID: 1007084.0.2000.0
Location ID: BH08 | Sample Ref.: -- | Depth: 1.58 -- 1.69 (m)
Test method used: BS1377:Part 8:1990:Clause 5 Saturation | BS1377:Part 8:1990:Clause 6 Consolidation
BS1377:Part 8:1990:Clause 7 Consolidated-undrained triaxial compression test with pore pressure measurement
NZS 4402:1986 Test 2.1 Determination of Water Content

CONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION TEST (3 STAGES)
MOHR CIRCLES OF TOTAL AND EFFECTIVE STRESSES



Initial Sample Height:	110.10	mm	Initial Water Content:	45.0	%
Initial Sample Diameter:	54.55	mm	Initial Bulk Density:	1.74	t/m³
Initial B Value:	18	%	Initial Dry Density:	1.20	t/m³
B Value before Consolidation:	94	%	Final Water Content:	45.1	%

	Consolidation Stage			Failure Values				
	Cell Pressure (kPa)	Back Pressure (kPa)	Eff. Consol. Stress (kPa)	Deviator Stress (kPa)	Pore Pressure Change During Shearing δμ (kPa)	Effective Principal Stress (kPa) Major σ1'	Minor σ3'	Vertical Strain (%)
STAGE 1	450	400	50	97.76	16.6	131.16	33.40	3.23
STAGE 2	500	400	100	163.54	37.1	226.44	62.90	3.63
STAGE 3	600	400	200	258.04	91.7	366.34	108.30	4.50

		Total			Effective	
Angle of Frictional Resistance:	ϕ =	20	°	ϕ′ =	31	°
Cohesion:	c =	18	kPa	c' =	8	kPa
Linear Regression Coefficient:	r =	0.997		r =	1.000	

Sample History: Undisturbed core trimmed at natural water content.

Soil description: SILT, with minor clay and trace of to minor sand, firm, red with light brown, black and light grey.

Failure Mode: Planar / Plastic | Test Speed: 0.020 (mm/min)

Test Remarks: The sample was saturated by increments of cell pressure and back pressure.
Failure for each stage was determined by the maximum effective stress ratio. Strength parameters have been derived by using a linear regression fitting method.

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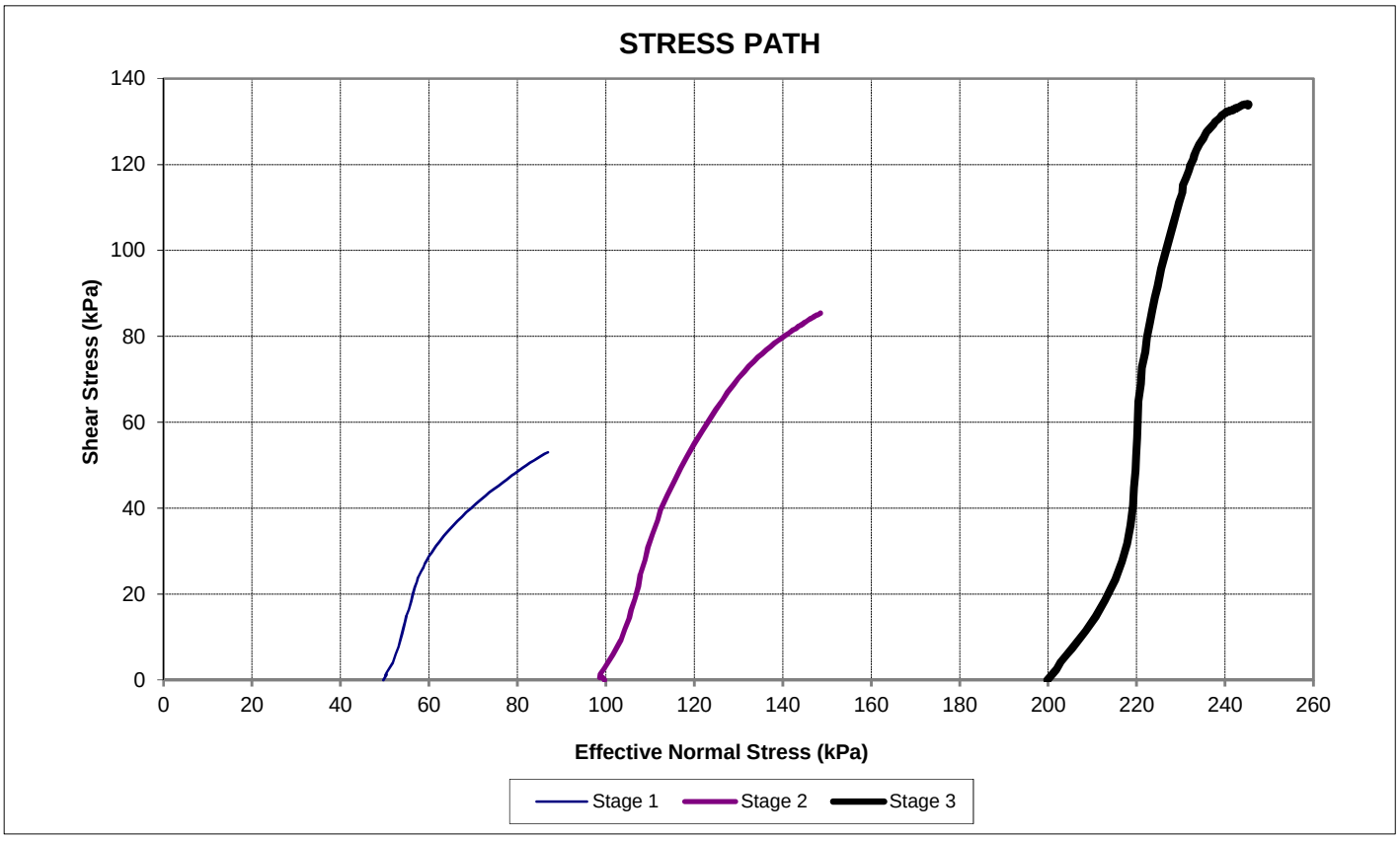
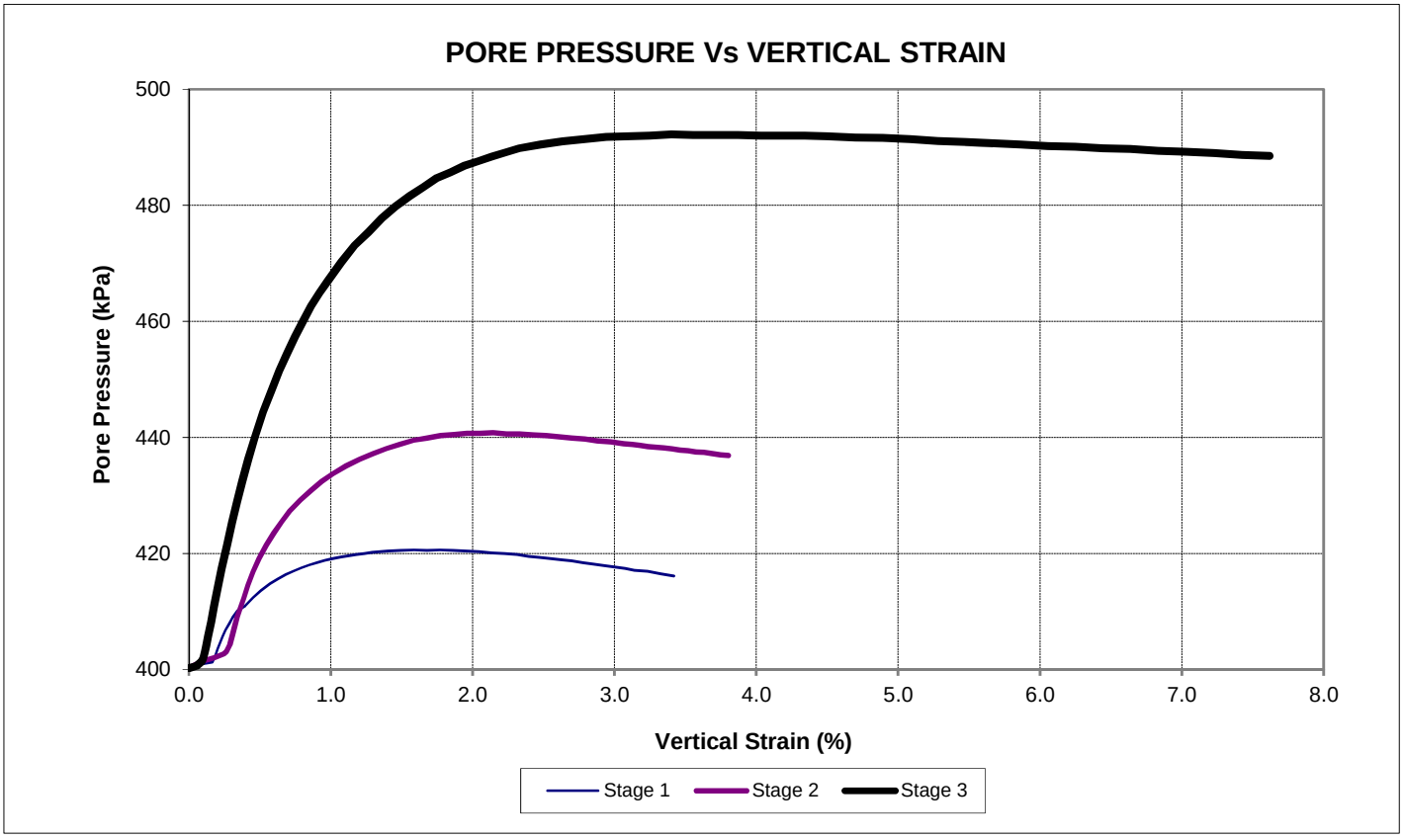
Site: Dome Valley | Your Project ID: 1005069.1120 | Project ID: 1007084.0.2000.0

Location ID: BH08 | Sample Ref.: -- | Depth: 1.58 -- 1.69 (m)

GRAPHS





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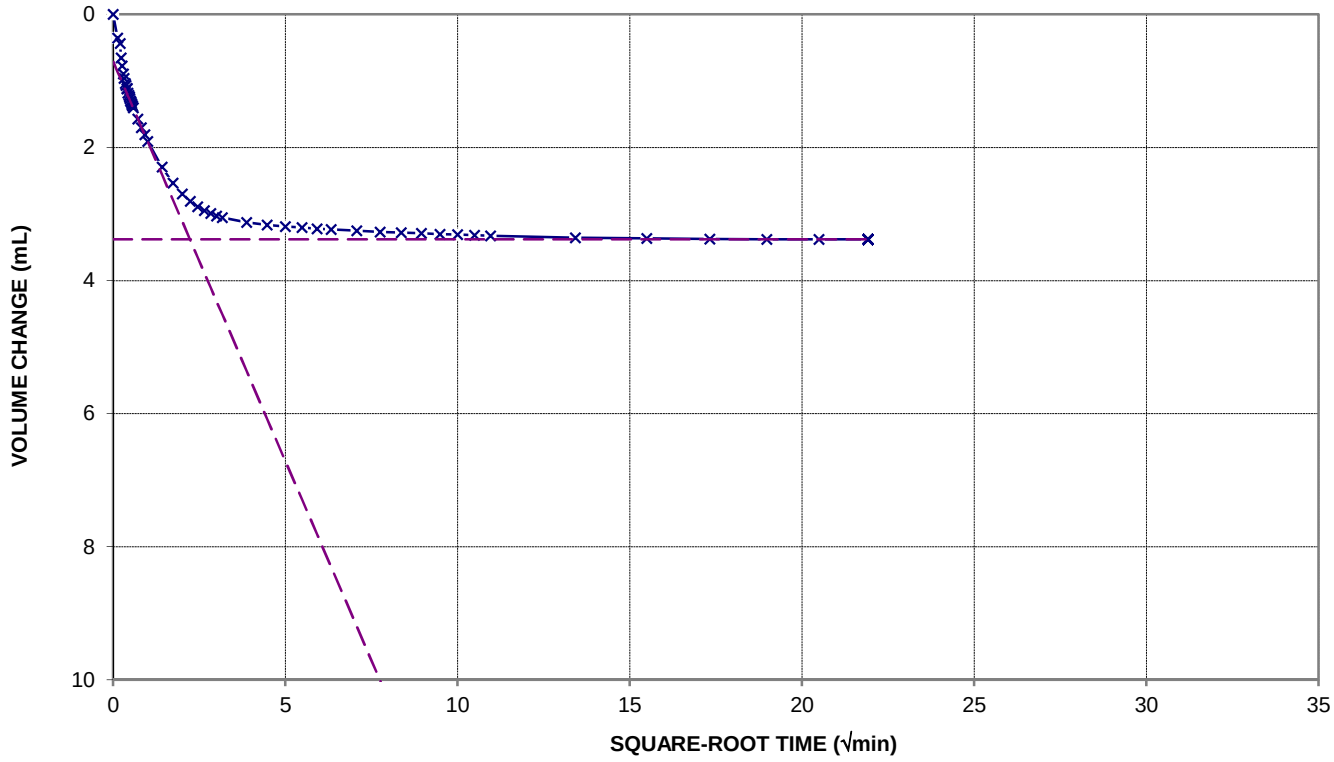
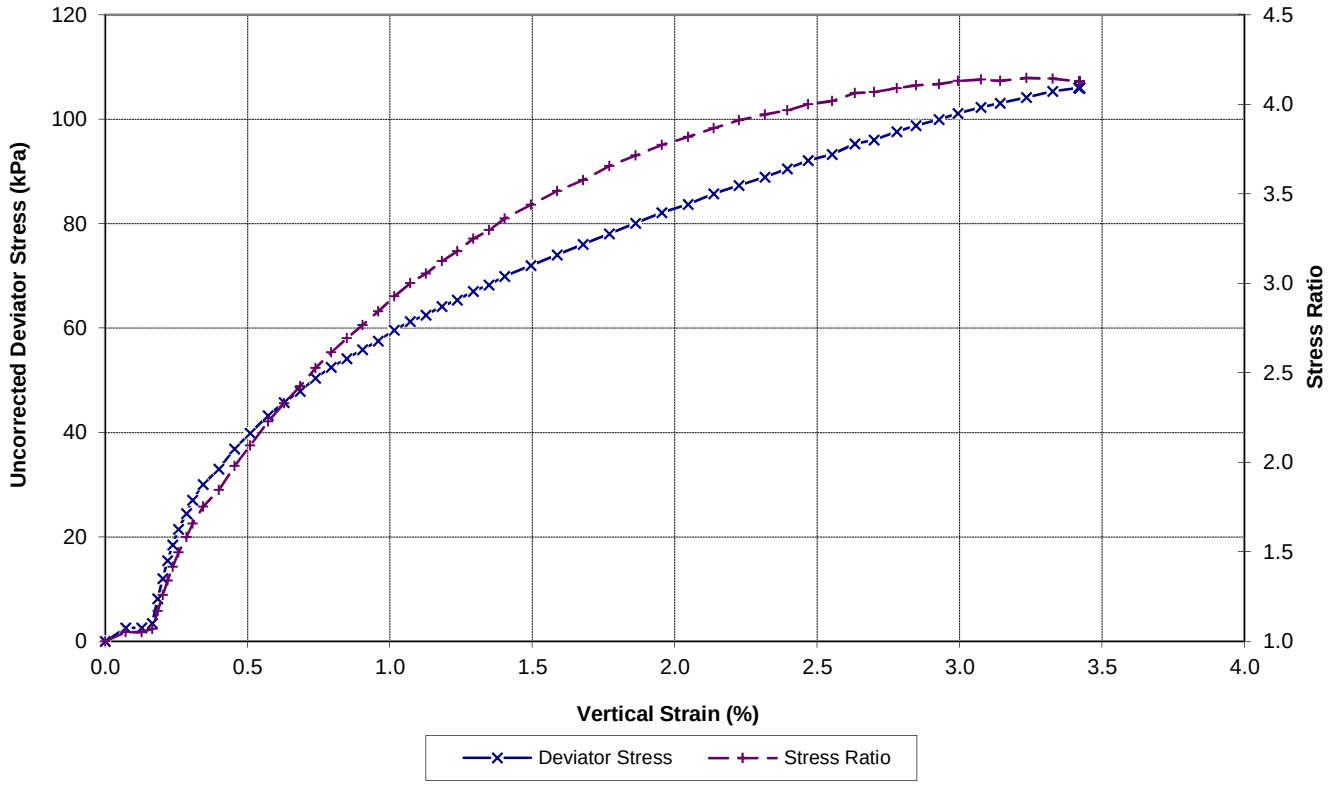
Site: Dome Valley | Your Project ID: 1005069.1120 | Project ID: 1007084.0.2000.0
Location ID: BH08 | Sample Ref.: -- | Depth: 1.58 -- 1.69 (m)

STAGE 1 GRAPHS

CONSOLIDATION



STRESS-STRAIN CURVE



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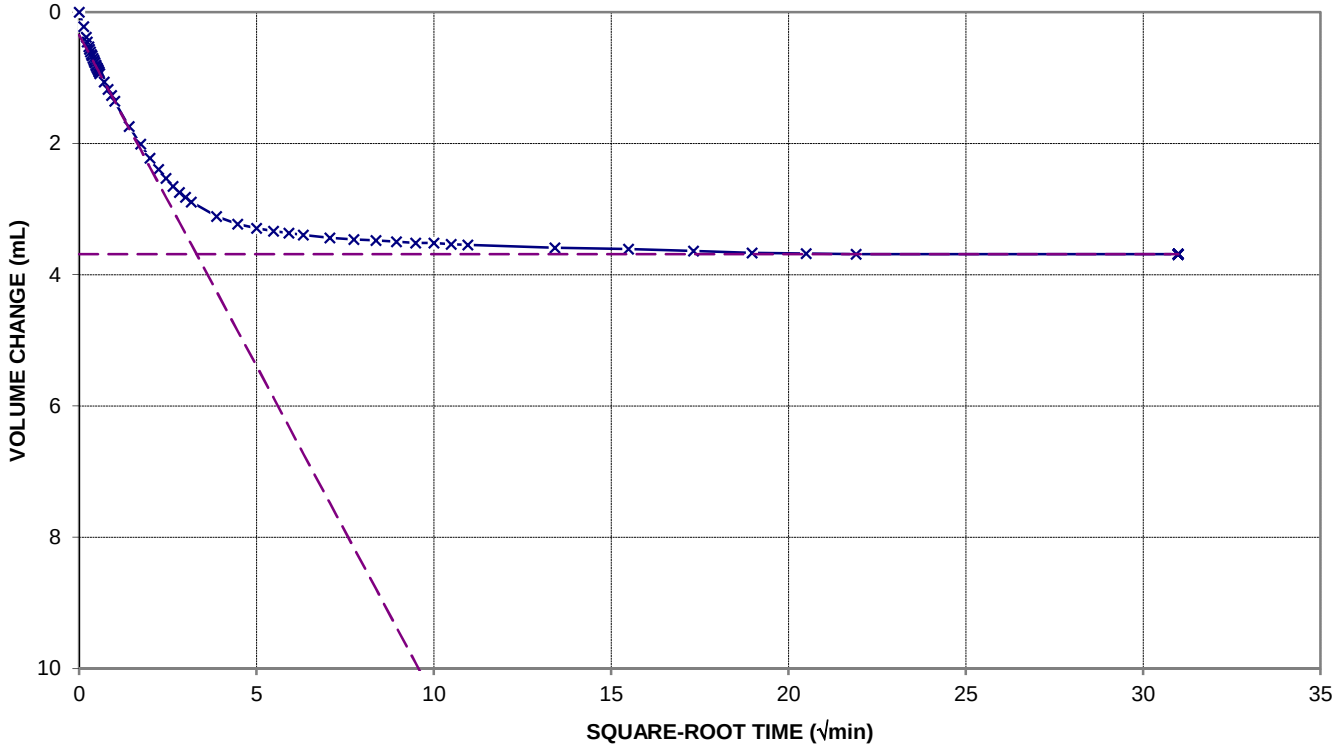
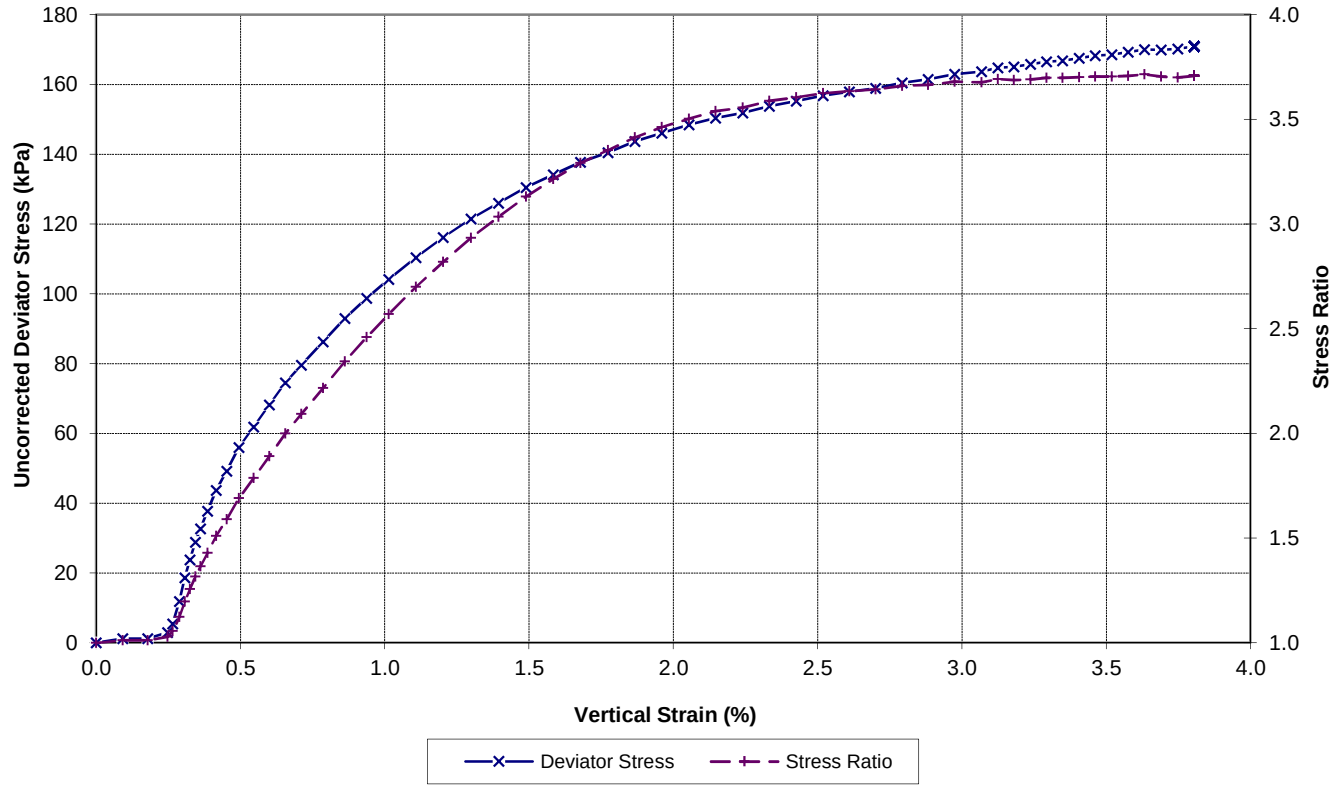
Site: Dome Valley | Your Project ID: 1005069.1120 | Project ID: 1007084.0.2000.0
Location ID: BH08 | Sample Ref.: -- | Depth: 1.58 -- 1.69 (m)

STAGE 2 GRAPHS

CONSOLIDATION



STRESS-STRAIN CURVE



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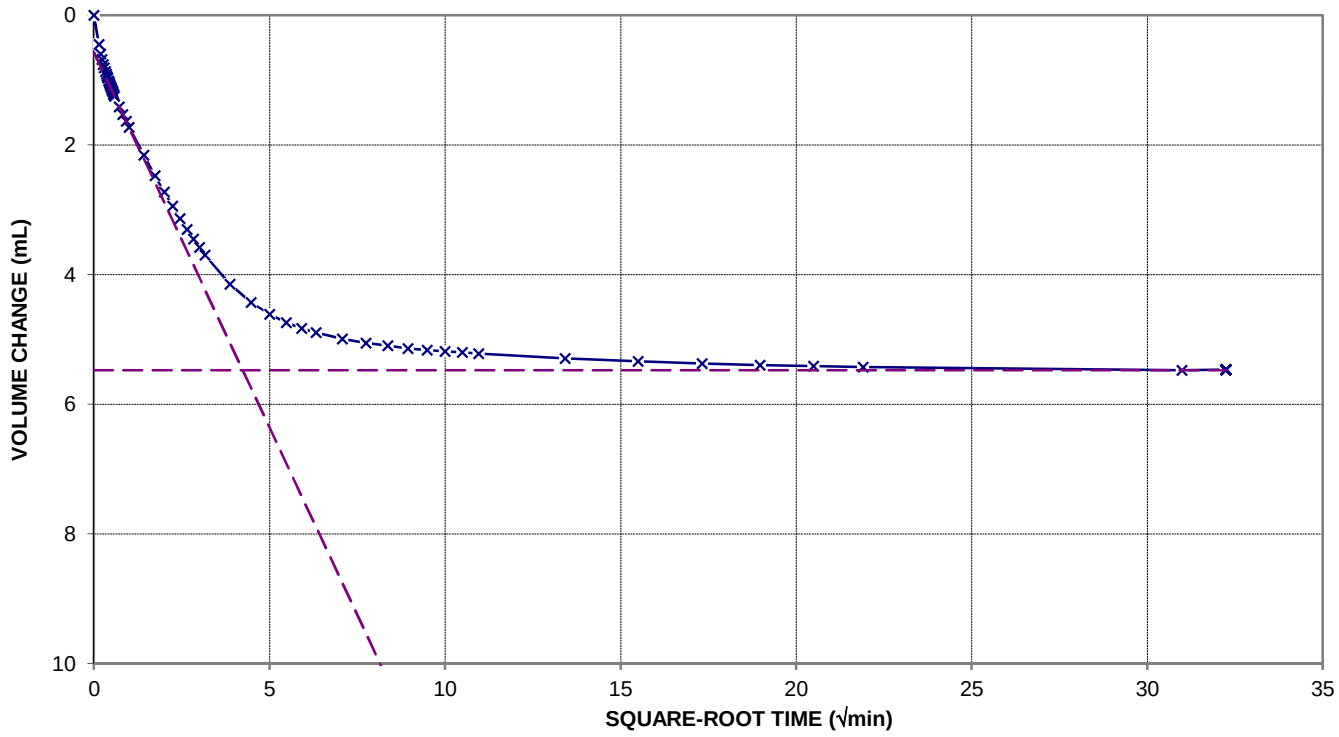
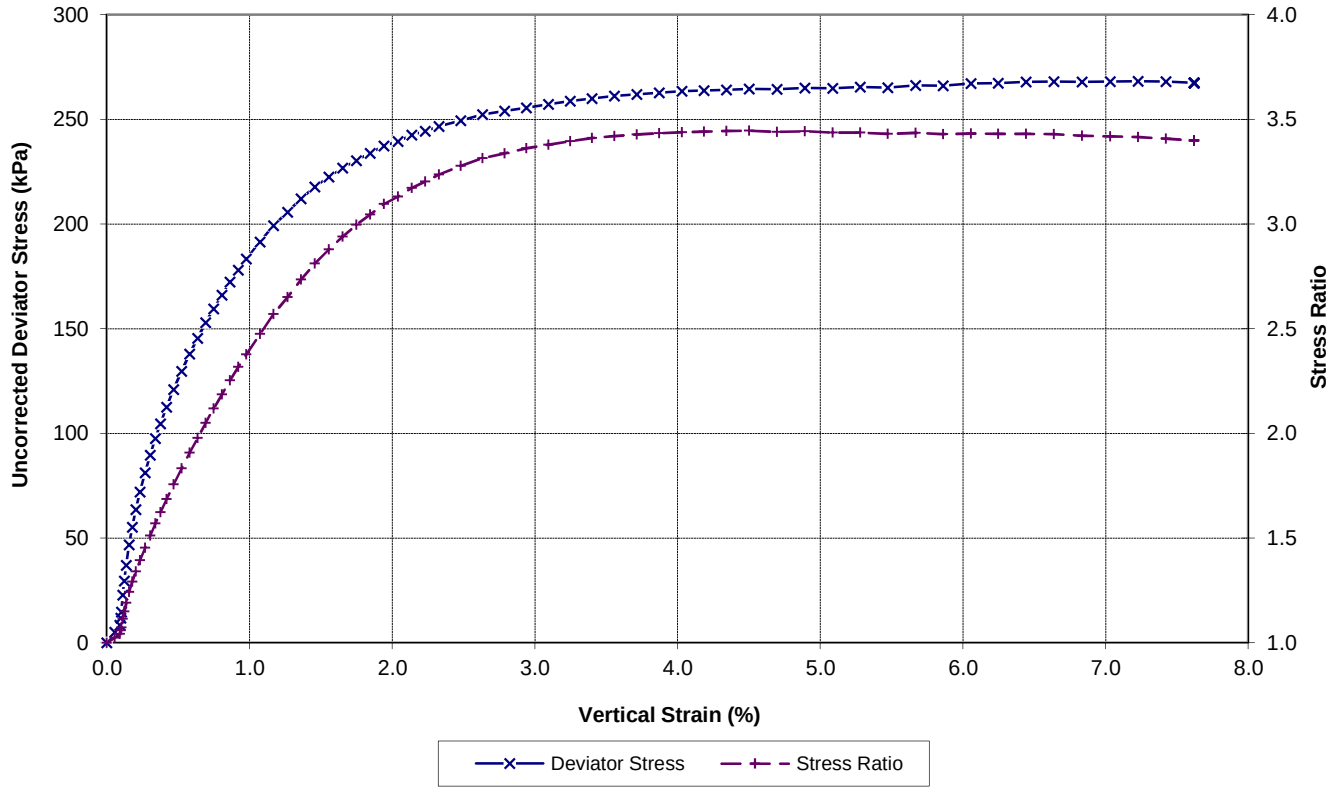
Site: Dome Valley | Your Project ID: 1005069.1120 | Project ID: 1007084.0.2000.0
Location ID: BH08 | Sample Ref.: -- | Depth: 1.58 -- 1.69 (m)

STAGE 3 GRAPHS

CONSOLIDATION



STRESS-STRAIN CURVE



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Your Project ID: 1005069.1120 Project ID: 1007084.0.2000.0

Site / Location: Dome Valley

Test Method Used: BS 1377 : Part 6 : 1990 : Clause 6 Constant Head Permeability Test in a Triaxial Cell
NZS 4402:1986 Test 2.1 Determination of Water Content

SUMMARY OF PERMEABILITY RESULTS

LOCATION ID			TP03
SAMPLE REFERENCE ID			--
DEPTH		(m)	0.2-1.8
SAMPLE HISTORY			The sample was remoulded at the target water content of 29 %, to the target dry density of 1.44 t/m³, which is the optimum water content plus 3 % and 95 % of the maximum dry density obtained from NZ heavy compaction test respectively. The test was performed on whole soil.
SAMPLE DESCRIPTION			SILT, clayey, with minor sand, reddish brown.
SAMPLE PARAMETERS	Height	(mm)	101.61
	Diameter	(mm)	100.28
	Sample mass	(g)	1525.00
	Initial bulk density	(t/m³)	1.90
	Initial dry density	(t/m³)	1.467
	Initial water content	(%)	29.5
	Final water content	(%)	38.8
	Final bulk density	(t/m³)	1.81
	Saturation at test (B)*	(%)	90
TESTING CONDITIONS	Mean effective consolidation stress	(kPa)	75
	Head difference	(kPa)	50
	Hydraulic gradient		50
COEFFICIENT OF PERMEABILITY AT 20 °C		(m/s)	5.80E-10

COMMENTS: *: The sample was saturated by increments of cell pressure and back pressure

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Your Project ID: 1005069.1120 Project ID: 1007084.0.2000.0

Site / Location: Dome Valley

Test Method Used: BS 1377 : Part 6 : 1990 : Clause 6 Constant Head Permeability Test in a Triaxial Cell
NZS 4402:1986 Test 2.1 Determination of Water Content

SUMMARY OF PERMEABILITY RESULTS

LOCATION ID			TP06
SAMPLE REFERENCE ID			--
DEPTH		(m)	0.70 -- 1.50
SAMPLE HISTORY			The sample was remoulded at the target water content of 25 %, to the target dry density of 1.54 t/m³, which is the optimum water content plus 3 % and 95 % of the maximum dry density obtained from NZ heavy compaction test respectively. The test was performed on whole soil.
SAMPLE DESCRIPTION			silty fine to coarse SAND, with some gravel, light brown. Moist. Gravel fine to coarse.
SAMPLE PARAMETERS	Height	(mm)	101.57
	Diameter	(mm)	100.25
	Sample mass	(g)	1543.00
	Initial bulk density	(t/m³)	1.92
	Initial dry density	(t/m³)	1.545
	Initial water content	(%)	24.6
	Final water content	(%)	29.8
	Final bulk density	(t/m³)	1.90
	Saturation at test (B)*	(%)	92
TESTING CONDITIONS	Mean effective consolidation stress	(kPa)	75
	Head difference	(kPa)	50
	Hydraulic gradient		50
COEFFICIENT OF PERMEABILITY AT 20 °C		(m/s)	9.01E-10

COMMENTS: *: The sample was saturated by increments of cell pressure and back pressure

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Your Project ID: 1005069.1120 Project ID: 1007084.0.2000.0

Site / Location: Dome Valley

Test Method Used: BS 1377 : Part 6 : 1990 : Clause 6 Constant Head Permeability Test in a Triaxial Cell
NZS 4402:1986 Test 2.1 Determination of Water Content

SUMMARY OF PERMEABILITY RESULTS

LOCATION ID			TP08
SAMPLE REFERENCE ID			--
DEPTH		(m)	2.60 -- 4.10
SAMPLE HISTORY			The sample was remoulded at the target water content of 29 %, to the target dry density of 1.45 t/m³, which is the optimum water content plus 3 % and 95 % of the maximum dry density obtained from NZ heavy compaction test respectively. The test was performed on whole soil.
SAMPLE DESCRIPTION			SILT, clayey, with some sand and minor gravel, reddish brown with light grey mottles.
SAMPLE PARAMETERS	Height	(mm)	101.89
	Diameter	(mm)	100.20
	Sample mass	(g)	1502.00
	Initial bulk density	(t/m³)	1.87
	Initial dry density	(t/m³)	1.452
	Initial water content	(%)	28.8
	Final water content	(%)	37.1
	Final bulk density	(t/m³)	1.84
	Saturation at test (B)*	(%)	92
TESTING CONDITIONS	Mean effective consolidation stress	(kPa)	75
	Head difference	(kPa)	50
	Hydraulic gradient		50
COEFFICIENT OF PERMEABILITY AT 20 °C		(m/s)	7.57E-10

COMMENTS: *: The sample was saturated by increments of cell pressure and back pressure

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Your Project ID: 1005069.1120 Project ID: 1007084.0.2000.0

Site / Location: Dome Valley

Test Method Used: BS 1377 : Part 6 : 1990 : Clause 6 Constant Head Permeability Test in a Triaxial Cell
NZS 4402:1986 Test 2.1 Determination of Water Content

SUMMARY OF PERMEABILITY RESULTS

LOCATION ID			TP 30
SAMPLE REFERENCE ID			--
DEPTH		(m)	0.50 -- 1.50
SAMPLE HISTORY			The sample was remoulded at the target water content of 28 %, to the target dry density of 1.46 t/m³, which is the optimum water content plus 3 % and 95 % of the maximum dry density obtained from NZ heavy compaction test respectively. The test was performed on whole soil.
SAMPLE DESCRIPTION			SILT, clayey, with some sand, light brown.
SAMPLE PARAMETERS	Height	(mm)	101.50
	Diameter	(mm)	100.08
	Sample mass	(g)	1499.00
	Initial bulk density	(t/m³)	1.88
	Initial dry density	(t/m³)	1.470
	Initial water content	(%)	27.8
	Final water content	(%)	40.5
	Final bulk density	(t/m³)	1.79
	Saturation at test (B)*	(%)	96
TESTING CONDITIONS	Mean effective consolidation stress	(kPa)	75
	Head difference	(kPa)	50
	Hydraulic gradient		50
COEFFICIENT OF PERMEABILITY AT 20 °C		(m/s)	3.53E-10

COMMENTS: *: The sample was saturated by increments of cell pressure and back pressure

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Site/Location:	Dome Valley	Your Project ID:	1005069.1120	Project ID: 1007084.0.2000.0	
Location ID:	TP03	Sample Ref.:	--	Depth: 0.2 - 1.8	(m)
Test Method Used:	ASTM D4647-13 Pinhole Test				
	NZS 4402:1986 Test 2.1 Determination of Water Content				

Initial Water Content	29.1	(%)	Initial Bulk Density	1.86	(t/m³)
Final Water Content	33.0	(%)	Initial Dry Density	1.44	(t/m³)

Hydraulic head H (mm)	Duration of flow (min)	Rate of flow q (mL/sec)	Cloudiness of flow	
			From side	From top
50	5	0.20	Perfectly clear	Perfectly clear
		0.20	Perfectly clear	Perfectly clear
		0.19	Perfectly clear	Perfectly clear
50	--			
180	5	0.41	Perfectly clear	Perfectly clear
		0.40	Perfectly clear	Perfectly clear
		0.39	Perfectly clear	Perfectly clear
380	5	0.83	Perfectly clear	Perfectly clear
		0.86	Perfectly clear	Perfectly clear
		0.86	Perfectly clear	Perfectly clear
1020	5	1.87	Perfectly clear	Perfectly clear
		1.83	Perfectly clear	Perfectly clear
		1.93	Perfectly clear	Perfectly clear
Hole diameter after test:		1.0	(mm) Dispersion Category:	ND1

Sample Description: SILT, clayey, with minor sand, reddish brown.

Sample History: The sample was remoulded at the target water content of 29.0 %, to the target dry density of 1.444 t/m³, which is the optimum water content plus 3 % and 95 % of the maximum dry density obtained from NZ heavy compaction test respectively.

The test was performed on whole soil.

Test Remarks:

1. The pinhole was formed with 1.1 mm diameter pin.
2. Distilled water was used in test.
3. Classification:
   D1, D2 -- Dispersive;
   ND4, ND3 -- Moderately to slightly dispersive;
   ND2, ND1 -- Non-dispersive.
4. The soil classified as non-dispersive still can erode in some circumstances.

Entered by: Date: 28/06/2018 Checked by: MH Date: 29/06/2018

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Site/Location:	Dome Valley	Your Project ID:	1005069.1120	Project ID: 1007084.0.2000.0	
Location ID:	TP06	Sample Ref.:	--	Depth: 0.7 - 1.5	(m)
Test Method Used:	ASTM D4647-13 Pinhole Test				
	NZS 4402:1986 Test 2.1 Determination of Water Content				

Initial Water Content	25.3	(%)	Initial Bulk Density	1.93	(t/m³)
Final Water Content	26.2	(%)	Initial Dry Density	1.54	(t/m³)

Hydraulic head H (mm)	Duration of flow (min)	Rate of flow q (mL/sec)	Cloudiness of flow	
			From side	From top
50	5	0.25	Perfectly clear	Perfectly clear
		0.21	Perfectly clear	Perfectly clear
		0.21	Clear	Barely visible
50	--			
180	5	0.59	Clear	Barely visible
		0.57	Clear	Barely visible
		0.60	Clear	Barely visible
380	5	1.18	Clear	Barely visible
		1.16	Clear	Barely visible
		1.23	Clear	Barely visible
1020	--			
Hole diameter after test:		1.55	(mm) Dispersion Category:	ND3

Sample Description: SILT, sandy, with some clay, and trace of gravel, light brown.

Sample History: The sample was remoulded at the target water content of 25.0 %, to the target dry density of 1.539 t/m³, which is the optimum water content plus 3 % and 95 % of the maximum dry density obtained from NZ heavy compaction test respectively.

The test was performed on the fraction passing 2 mm sieve.

Test Remarks:

1. The pinhole was formed with 1.1 mm diameter pin.
2. Distilled water was used in test.
3. Classification:
   D1, D2 -- Dispersive;
   ND4, ND3 -- Moderately to slightly dispersive;
   ND2, ND1 -- Non-dispersive.
4. The soil classified as non-dispersive still can erode in some circumstances.

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Site/Location:	Dome Valley	Your Project ID:	1005069.1120	Project ID: 1007084.0.2000.0	
Location ID:	TP08	Sample Ref.:	--	Depth: 2.6 - 4.1	(m)
Test Method Used:	ASTM D4647-13 Pinhole Test				
	NZS 4402:1986 Test 2.1 Determination of Water Content				

Initial Water Content	29.5	(%)	Initial Bulk Density	1.88	(t/m³)
Final Water Content	31.0	(%)	Initial Dry Density	1.45	(t/m³)

Hydraulic head H (mm)	Duration of flow (min)	Rate of flow q (mL/sec)	Cloudiness of flow	
			From side	From top
50	5	0.03	Perfectly clear	Perfectly clear
50	--			
180	5	0.34	Perfectly clear	Perfectly clear
		0.35	Perfectly clear	Perfectly clear
		0.37	Perfectly clear	Perfectly clear
380	5	1.17	Perfectly clear	Perfectly clear
		1.12	Perfectly clear	Perfectly clear
		1.13	Perfectly clear	Perfectly clear
1020	5	2.05	Perfectly clear	Perfectly clear
		2.08	Perfectly clear	Perfectly clear
		2.05	Perfectly clear	Perfectly clear
Hole diameter after test:		1.0	(mm) Dispersion Category:	ND1

Sample Description: SILT, clayey, with some sand and minor gravel, reddish brown with light grey mottles.

Sample History: The sample was remoulded at the target water content of 29.0 %, to the target dry density of 1.454 t/m³, which is the optimum water content plus 3 % and 95 % of the maximum dry density obtained from NZ heavy compaction test respectively.

The test was performed on the fraction passing 2 mm sieve.

Test Remarks:

1. The pinhole was formed with 1.1 mm diameter pin.
2. Distilled water was used in test.
3. Classification:
   D1, D2 -- Dispersive;
   ND4, ND3 -- Moderately to slightly dispersive;
   ND2, ND1 -- Non-dispersive.
4. The soil classified as non-dispersive still can erode in some circumstances.

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Site/Location:	Dome Valley	Your Project ID:	1005069.1120	Project ID: 1007084.0.2000.0	
Location ID:	TP30	Sample Ref.:	--	Depth: 0.5 - 1.5	(m)
Test Method Used:	ASTM D4647-13 Pinhole Test				
	NZS 4402:1986 Test 2.1 Determination of Water Content				

Initial Water Content	27.8	(%)	Initial Bulk Density	1.86	(t/m³)
Final Water Content	32.5	(%)	Initial Dry Density	1.46	(t/m³)

Hydraulic head H (mm)	Duration of flow (min)	Rate of flow q (mL/sec)	Cloudiness of flow	
			From side	From top
50	5	0.19	Perfectly clear	Perfectly clear
		0.17	Perfectly clear	Perfectly clear
		0.13	Perfectly clear	Perfectly clear
50	--			
180	5	0.24	Perfectly clear	Perfectly clear
		0.22	Perfectly clear	Perfectly clear
		0.21	Perfectly clear	Perfectly clear
380	5	0.45	Perfectly clear	Perfectly clear
		0.41	Perfectly clear	Perfectly clear
		0.41	Perfectly clear	Perfectly clear
1020	5	1.42	Perfectly clear	Perfectly clear
		1.39	Perfectly clear	Perfectly clear
		1.44	Perfectly clear	Perfectly clear
Hole diameter after test:		1.0	(mm) Dispersion Category:	ND1

Sample Description: SILT, clayey, with some sand, light brown.

Sample History: The sample was remoulded at the target water content of 28.0 %, to the target dry density of 1.463 t/m³, which is the optimum water content plus 3 % and 95 % of the maximum dry density obtained from NZ heavy compaction test respectively.

The test was performed on whole soil.

Test Remarks:

1. The pinhole was formed with 1.1 mm diameter pin.
2. Distilled water was used in test.
3. Classification:
   D1, D2 -- Dispersive;
   ND4, ND3 -- Moderately to slightly dispersive;
   ND2, ND1 -- Non-dispersive.
4. The soil classified as non-dispersive still can erode in some circumstances.

Entered by: Date: 28/06/2018 Checked by: MH Date: 29/06/2018

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Geotechnics Project ID	1007084.0.3000.0
Customer Project ID	1005069.112
Customer Project Name	Dome Valley

DETECTION OF PRESENCE OF ALLOPHANE IN SOILS - NZS 4402:1986 - Test 3.4

TEST DETAILS

LOCATION	ID	TP03		
	Description	Dome Valley		
	Data	N/A		
SAMPLE	Geotechnics ID	GEOT201805210	Date Received	Unknown
	Reference	N/A	Depth	0.20m - 1.80m
	Description	SILT with minor sand and trace gravel, reddish brown. Moist. Sand fine to coarse. Gravel fine.		
SPECIMEN	Reference	1	Depth	N/A
	Description	N/A		

TEST RESULTS

Colour Intensity	Pink to Red
Allophane Content	5% to 7%

This result is an approximate indication of allophane content.

Bright Red - More than 7% Allophane Presence
Pink to Red - 5 to 7 % Allophane Presence
Colourless - Less than 5% Allophane Presence

TEST REMARKS

- The material used for testing was natural.

Approved By	RTH	Date	20/06/2018

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Geotechnics Project ID	1007084.0.3000.0
Customer Project ID	1005069.112
Customer Project Name	Dome Valley

DETECTION OF PRESENCE OF ALLOPHANE IN SOILS - NZS 4402:1986 - Test 3.4

TEST DETAILS

LOCATION	ID	TP30		
	Description	Dome Valley		
	Data	N/A		
SAMPLE	Geotechnics ID	GEOT201805215	Date Received	Unknown
	Reference	N/A	Depth	0.50m - 1.50m
	Description	silty CLAY with some sand, yellowish brown. Moist.		
SPECIMEN	Reference	1	Depth	N/A
	Description	N/A		

TEST RESULTS

Colour Intensity	Colourless
Allophane Content	Less than 5%

This result is an approximate indication of allophane content.

Bright Red - More than 7% Allophane Presence
Pink to Red - 5 to 7 % Allophane Presence
Colourless - Less than 5% Allophane Presence

TEST REMARKS

- The material used for testing was natural.

Approved By	RTH	Date	20/06/2018

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Geotechnics Project ID	1007084.0.3000.0
Customer Project ID	1005069.112
Customer Project Name	Dome Valley

DETECTION OF PRESENCE OF ALLOPHANE IN SOILS - NZS 4402:1986 - Test 3.4

TEST DETAILS

LOCATION	ID	TP29		
	Description	Dome Valley		
	Data	N/A		
SAMPLE	Geotechnics ID	GEOT201805214	Date Received	Unknown
	Reference	N/A	Depth	1.80m - 4.00m
	Description	Clayey SILT, minor sand, trace rootlets; reddish brown with light grey mottleing. Wet.		
SPECIMEN	Reference	1	Depth	N/A
	Description	N/A		

TEST RESULTS

Colour Intensity	Pink to Red
Allophane Content	5% to 7%

This result is an approximate indication of allophane content.

Bright Red - More than 7% Allophane Presence
Pink to Red - 5 to 7 % Allophane Presence
Colourless - Less than 5% Allophane Presence

TEST REMARKS

- The material used for testing was natural.

Approved By	RTH	Date	20/06/2018

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Geotechnics Project ID	1007084.0.3000.0
Customer Project ID	1005069.112
Customer Project Name	Dome Valley

DETECTION OF PRESENCE OF ALLOPHANE IN SOILS - NZS 4402:1986 - Test 3.4

TEST DETAILS

LOCATION	ID	TP08		
	Description	Dome Valley		
	Data	N/A		
SAMPLE	Geotechnics ID	GEOT201805212	Date Received	Unknown
	Reference	N/A	Depth	2.60m - 4.10m
	Description	clayey SILT with some sand and minor gravel, reddish brown, mottled light grey. Moist. Sand fine to coarse.		
SPECIMEN	Reference	1	Depth	N/A
	Description	N/A		

TEST RESULTS

Colour Intensity	Pink to Red
Allophane Content	5% to 7%

This result is an approximate indication of allophane content.

Bright Red - More than 7% Allophane Presence
Pink to Red - 5 to 7 % Allophane Presence
Colourless - Less than 5% Allophane Presence

TEST REMARKS

- The material used for testing was natural.

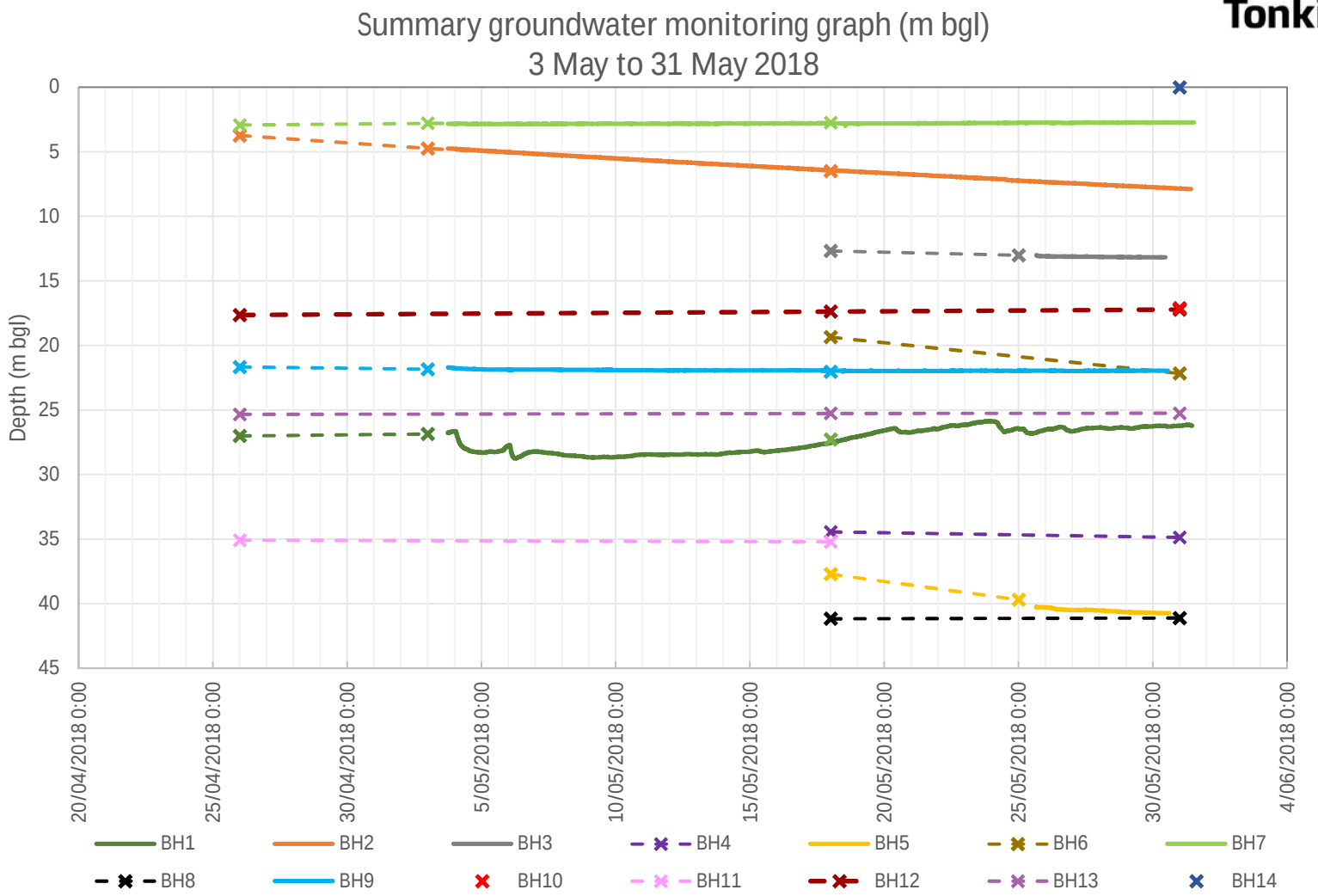
Approved By	RTH	Date	20/06/2018

Appendix D: Groundwater summary plots

- Groundwater monitoring summary plot

Project Name: Dome Project
T+T Ref: 1005069.1120
Date: 29/06/2017
Issue: Rev A

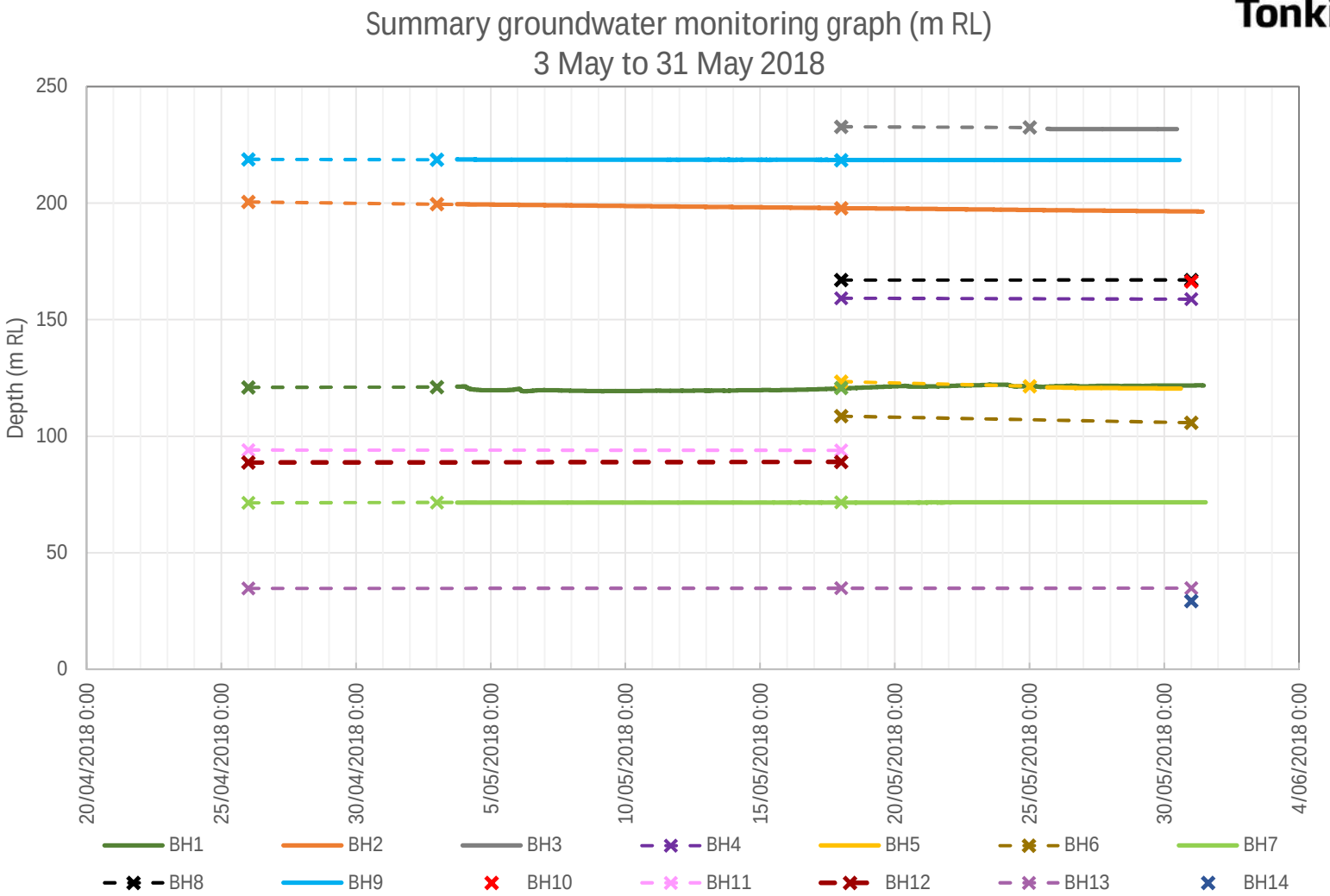
Tonkin+Taylor



Notes: Solid Line = Groundwater level based on Sonlist Levelogger 'continuous' monitoring (one reading every 5 minutes).
Dashed line = Inferred groundwater level between dip meter readings
Borehole BH14 groundwater level is artesian and with a head > 1.3m above ground level (31/5/2018)

Project Name: Dome Project
T+T Ref: 1005069.1120
Date: 29/06/2017
Issue: Rev A

Tonkin+Taylor



Notes: Solid Line = Groundwater level based on Sonlist Levelogger 'continuous' monitoring (one reading every 5 minutes).
Dashed line = Inferred groundwater level between dip meter readings
Borehole BH14 groundwater level is artesian and with a head > 1.3m above ground level (31/5/2018)