

フィジー国

農業・農村・海洋開発・国家災害管理省

フィジー国
ナンディ川洪水対策策定
プロジェクト最終報告書

第Ⅲ巻 データブック

Part Ⅱ：データブック（その2）

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独立行政法人
国際協力機構（JICA）

八千代エンジニアリング株式会社
株式会社建設技研インターナショナル

環境
CR(1)
16-090

フィジー国

ナンディ川洪水対策策定プロジェクト

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フィジー国
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第Ⅲ巻 データブック

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Data Book-15

ボーリング・地質調査結果

Geotechnical Engineering Investigation Report for Nadi River Basin Project

1.0 INTRODUCTION

Entec Limited, Engineering & Science Consultants of Suva, Fiji (Entec) were engaged by Japan International Cooperation Agency (JICA) Study Team to carry out the geotechnical engineering investigation and laboratory testing for the Nadi River Basin Project as per Entec proposal (Ref:P1920815.L01) dated 22 September 2015. Entec were granted authority to carry out the geotechnical engineering investigation as per the signed contract agreement between JICA and ENTEC Limited, 'GEOTECHNICAL INVESTIGATION IN NADI RIVER BASIN', dated 01 October 2015.

Further details of the required drilling works and laboratory testing were advised by Mr Toyoda of JICA during a site meeting on 6 October 2010 and confirmed via email dated 8 October 2015. A summary is provided below:

- Maximum borehole depth to be the nominated 20m or 30m as per the Terms of Reference (ToR) (Dated 2 September 2015) regardless of soil/rock conditions encountered at final depth.
- Laboratory schedule and laboratory testing of samples to be determined and selected by Entec.

The investigation, laboratory testing and reporting was completed in general accordance with our proposal and further confirmation and correspondence with the JICA.

2.0 FIELDWORK SUMMARY

The fieldwork for the investigation was completed between 7 October 2015 and 27 October 2015 and comprised the drilling of thirteen (13No.) boreholes at thirteen individual sites as designated and directed by JICA. The approximate location of the thirteen (13 No.) sites of borehole drilling investigation is shown below on Figure 1 Sites Location Plan with Borehole Test Locations for each individual site shown in the respective Site Appendix 'b'.

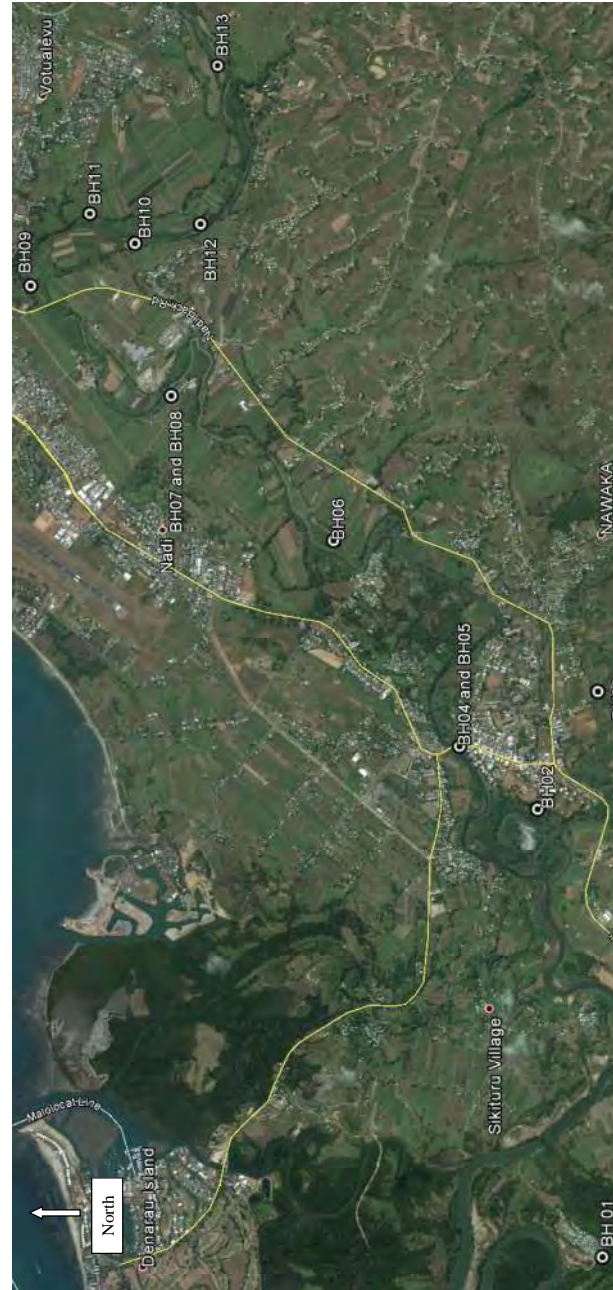


Figure 1: Sites Locality Plan

2.1 Geotechnical Investigation Borehole Drilling

The fieldwork completed at each site comprised the machine borehole drilling of one (1No.) borehole and the following scope of in-situ testing and sampling within the borehole:

- Standard Penetrometer Testing (SPT) was completed initially at 1.0m or 1.5m, 2.0m and at 1.5m intervals thereafter.
- Undisturbed samples were obtained using U60 push tubes at selected depths as an alternative to SPT testing within the soil profile, where appropriate.
- The core sample, disturbed and undisturbed samples were returned to the Entec Laboratory (Nadi).

A summary of the geotechnical investigation completed at each site is provided below with the borehole location shown on the "Test Locality Plan", the Engineering Borehole Log (including in-situ test results) and photos of the core return provided in the respective attached Appendix for each site.

SITE 1 – Moala Village, Nadi, Fiji.

The fieldwork for the Site 1 investigation was completed on 7 October 2015 and comprised the following scope of work:

- One (1No.) borehole designated BH01 was drilled using a track mounted drilling rig (Geotech Drilling International Services Ltd.) to a depth of 27.5m with the final SPT test extended to a depth of 27.95m below existing surface level.

Brief Site Description

Site 1 is located approximately 800m from the coastline and on the southern side of Nadi River adjacent to a mangrove area. Nadi River meanders from the ocean inlet on the western side of the site towards the east of the site. Mangroves are located on the western side of the site, adjacent to the borehole location, where a narrow water channel extends to the Nadi River. The edge of the mangroves extends along the western side of the Moala village boundary and connects with Nadi River.

At the time of the investigation the site was occupied by small shrubs and mango trees. Single storey concrete houses with wooden shed extensions generally surrounded the site.

SITE 2 - Navo, Nadi, Fiji.

The fieldwork for the Site 2 investigation was completed on 8 October 2015 and comprised the following scope of work:

- One (1No.) borehole was drilled using a track mounted drilling rig (Geotech Drilling International Services Ltd.) to a depth of 27.93m below existing surface level.

Brief Site Description

The site is located near Navo village off Nadi Back Road approximately 400m to the south. The site is situated on the northern riverbank of a Nadi River tributary river. Nadi town is approximately 4km to the north east of the site.

The site is located on the northern riverbank of a Nadi River tributary river. Floodplain farming area surrounds the site to the north. At the time of the investigation the site was vegetated with grass and shrubs.

SITE 3 - Qeileoa, Nadi, Fiji.

The fieldwork for the Site 3 investigation was completed on 8 and 27 October 2015 and comprised the following scope of work:

- One (1No.) borehole designated BH03 was drilled using a track mounted drilling rig (Geotech Drilling International Services Ltd.) to a depth of 26.0m with the final SPT test extended to a depth of 26.45m below existing surface level.

Brief Site Description

The site is located off the main Nadi Back Road approximately 650m south east of Nadi town, Viti Levu, Fiji. The site is located on farm land on the northern side of a river. At the time of the investigation the site was generally occupied by farming crops and sparse trees and shrubs. Residential houses were located to the northern and eastern sides from the site.

SITE 4 - Nadi Bridge Queens Road, Namotomoto, Nadi, Fiji.

The fieldwork for the investigation was undertaken on 12 and 13 October 2015 and comprised the following scope of work:

- One (1No.) borehole, designated BH04, was drilled using a track mounted drilling rig (Geotech Drilling International Services Ltd.) to a depth of 30.0m with the final SPT test extended to a depth of 30.39m below existing surface level.

Brief Site Description

Site 4 is located on the northern bank of the main Nadi town bridge, north-west from Nadi town, Viti Levu, Fiji.

SITE 5 - Nadi Bridge, Queens Road, Namotomoto, Fiji.

The fieldwork for the Site 5 investigation was completed on 13 October 2015 and comprised the following scope of work:

- One (1No.) borehole designated BH01 was drilled using a track mounted drilling rig (Geotech Drilling International Services Ltd.) to a depth of 30.0m with the final SPT test extended to a depth of 30.45m below existing surface level.

Brief Site Description

Site 5 is located on the southern side of Nadi Bridge, Queens Road, Nadi, Fiji. At the time of the investigation farming plantations extended along the river bank to the north east and retail shops, restaurants and supermarkets were located to the south.

SITE 6 – Moala Saunaka Village Fiji.

The fieldwork for the Site 6 investigation was completed on 9 October 2015 and comprised the following scope of work:

- One (1No.) borehole, designated BH06, was drilled using a track mounted drilling rig (Geotech Drilling International Services Ltd.) to a depth of 20.0m with the final SPT test extended to a depth of 20.5m below existing surface level.

Brief Site Description

The site is located on the eastern side of Nadi River, approximately 750m off Nadi Back Road. The site is accessed through Nadi Back Road opposite Flame Tree office followed by a dirt road. At the time of the investigation vegetation consisted mostly of sugar cane. The Nadi river ran along the northern side of the site boundary.

SITE 7 – Old Nadi Back Road Bridge (south west), Nadi, Fiji.

The fieldwork for the Site 7 investigation was completed on 14 October 2015 and comprised the following scope of work:

- One (1No.) borehole designated BH01 was drilled using a track mounted drilling rig (Geotech Drilling International Services Ltd.) to a depth of 20.0m with the final SPT test extended to a depth of 20.45m below existing surface level.

Brief Site Description

The site is located on the Old Nadi Back Road on the south western side of the Old Nadi Back Road Bridge. At the time of the investigation vegetation consisted of small shrubs, tall grass and trees extending towards the river bank. On the south eastern side of the site, infrastructure was mostly of single storey houses, yards for mechanical works and sugar cane fields. Nadi River was approximately 50m to 60m east and north east of the site.

SITE 8 – Old Nadi Back Road Bridge (north east), Nadi, Fiji.

The fieldwork for the Site 8 investigation was undertaken on 14 and 15 October 2015 and comprised the following scope of work:

- One (1No.) borehole designated BH08 was drilled using a track mounted drilling rig (Geotech Drilling International Services Ltd.) to a depth of 23.0m with the final SPT test extended to a depth of 23.5m below existing surface level.

Brief Site Description

The site is located on the north eastern side of Nadi River, adjacent to the northern side of the Old Nadi Back Road Bridge. At the time of the investigation the site was vegetated by of small shrubs and tall grass. Adjacent to the site to the north was the Standard Concrete Industries site.

SITE 9 – Nadi Back Road Bridge Tobacco Farm Opposite Tanoa Apartment, Nadi, Fiji.

The fieldwork for the Site 9 investigation was undertaken on 15 and 16 October 2015 and comprised the following scope of work:

- One (1No.) borehole designated BH09 was drilled using a track mounted drilling rig (Geotech Drilling International Services Ltd.) to a depth of 30.50m with the final SPT test extended to a depth of 31.00m below existing surface level.

Brief Site Description

Site 9 is located approximately 600m off the Nadi Back Road. At the time of the investigation vegetation was considered dense and consisted of tobacco plants, tall grass and few trees. The topography of the site was generally flat with housing located towards the western and eastern side of the site.

SITE 10 – Nadi Back Road Bridge Export Farm, Nadi, Fiji.

The fieldwork for the investigation was undertaken on 19 and 21 October 2015 and comprised the following scope of work:

- One (1No.) borehole designated BH10 was drilled using a track mounted drilling rig (Geotech Drilling International Services Ltd.) to a depth of 29.00m with the final SPT test extended to a depth of 29.50m below existing surface level.

Brief Site Description

Site 10 is located adjacent to the Nadi River which extends along the eastern side of the site. At the time of the investigation vegetation was considered dense and consisted of small shrubs and crop plantations of tomatoes and pawpaw.

SITE 11 – Votualevu Sugar Cane Farm Opposite Nasau, Nadi, Fiji.

The fieldwork for the Site 11 investigation was undertaken on 21 and 22 October 2015 and comprised the following scope of work:

- One (1No.) borehole designated BH11 was drilled using a track mounted drilling rig (Geotech Drilling International Services Ltd.) to a depth of 24.00m with the final SPT test extended to a depth of 24.50m below existing surface level.

Brief Site Description

The site located on a cane field adjacent to the Nadi River which ran along the site boundary towards the northwestern end. At the time of the investigation vegetation consisted of small shrubs, burnt sugar cane and few trees.

SITE 12 – Votualevu Tobacco Farm Opposite Nasau, Nadi, Fiji.

The fieldwork for the investigation was undertaken on 22 and 23 October 2015 and comprised the following scope of work:

- One (1No.) borehole designated BH12 was drilled using a track mounted drilling rig (Geotech Drilling International Services Ltd.) to a depth of 27.50m with the final SPT test extended to a depth of 28.00m below existing surface level.

Brief Site Description

Site 12 is located in Votualevu, approximately 1.4km of Carreras Road. The site is located within a tobacco plantation. At the time of the investigation vegetation was dense and consisted of small shrubs, tobacco plants and few trees. Nadi River extended along the southern site boundary.

SITE 13 – Votuavevu Vegetable Farm Opposite Nasau, Nadi, Fiji.

The fieldwork for the investigation was undertaken on 26 October 2015 and comprised the following scope of work:

- One (1No.) borehole designated BH13 was drilled using a track mounted drilling rig (Geotech Drilling International Services Ltd.) to a depth of 18.5m with the final SPT test extended to a depth of 19.0m below existing surface level.

Brief Site Description

Site 13 is located approximately 600m off Carrers Road on the northern side of Nadi River.

3.0 LABORATORY TESTING

The following laboratory testing was undertaken on samples recovered from the boreholes:

- Permeability Testing
- Bulk Density Testing
- Natural Moisture Content (NMC) Tests
- Particle Size Distribution (PSD) Testing
- Atterberg Limits Determinations
- Unconfined Compressive Strength (UCS) Testing
- Oedometer consolidation testing

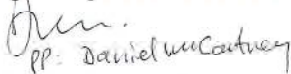
The Laboratory testing schedule and associated laboratory test certificates for each borehole/site are provided in the respective Appendix.

5.0 APPLICABILITY

This factual report has been prepared solely for the benefit in accordance with the project brief only, which is based on information provided directed by the client JICA. All data contained in it may not be used in other contexts or for any other purpose without our prior review and agreement. It does not provide a complete assessment of the geotechnical engineering status of the site and it is limited to the scope defined herein.

Whilst every care has been taken in the investigation, testing program and compilation of this report, it is to be known that the report presents conditions on the day of the investigation. No responsibility or liability is accepted for consequences arising from either errors or omissions in that data.

ENTEC LIMITED
Engineering & Science Consultants


PP: Daniel McCartney

Pratarp Singh, B.E., F.F.I.E., AIAMA, FIEAust.
Managing Director

APPENDIX ATTACHMENT LIST:

Appendix 1: Site 1, Maolo Village, BH1

- Appendix 1a. - Site Information and Fieldwork Detail
- Appendix 1b. - BH01 Test Location Plan
- Appendix 1c. - Borehole Engineering Log and Core Photos
- Appendix 1d. - Laboratory Test Schedule and Test Results

Appendix 2: Site 2, Navo Village, BH2

- Appendix 2a. - Site Information and Fieldwork Detail
- Appendix 2b. - BH02 Test Location Plan
- Appendix 2c. - Borehole Engineering Log and Core Photos
- Appendix 2d. - Laboratory Test Schedule and Test Results

Appendix 3: Site 3, Qeileoa, Nadi, BH3

- Appendix 3a. - Site Information and Fieldwork Detail
- Appendix 3b. - BH03 Test Location Plan
- Appendix 3c. - Borehole Engineering Log and Core Photos
- Appendix 3d. - Laboratory Test Schedule and Test Results

Appendix 4: Site 4 - Nadi Bridge Queens Road, Namotomoto, Nadi, Fiji.

- Appendix 4a. - Site Information and Fieldwork Detail
- Appendix 4b. - BH03 Test Location Plan
- Appendix 4c. - Borehole Engineering Log and Core Photos
- Appendix 4d. - Laboratory Test Schedule and Test Results

Appendix 5: Site 5 - Nadi Bridge, Queens Road, Namotomoto, Fiji.

- Appendix 5a. - Site Information and Fieldwork Detail
- Appendix 5b. - BH03 Test Location Plan
- Appendix 5c. - Borehole Engineering Log and Core Photos
- Appendix 5d. - Laboratory Test Schedule and Test Results

Appendix 6: Site 6, - Moala Saunaka Village Fiji.

- Appendix 6a. - Site Information and Fieldwork Detail
- Appendix 6b. - BH03 Test Location Plan
- Appendix 6c. - Borehole Engineering Log and Core Photos
- Appendix 6d. - Laboratory Test Schedule and Test Results

Appendix 7: Site 7, Old Nadi Back Road Bridge (south west), Nadi, Fiji.

- Appendix 7a. - Site Information and Fieldwork Detail
- Appendix 7b. - BH03 Test Location Plan
- Appendix 7c. - Borehole Engineering Log and Core Photos
- Appendix 7d. - Laboratory Test Schedule and Test Results

Appendix 8: Site 8, Old Nadi Back Road Bridge (north east), Nadi, Fiji.

- Appendix 8a. - Site Information and Fieldwork Detail
- Appendix 8b. - BH03 Test Location Plan
- Appendix 8c. - Borehole Engineering Log and Core Photos
- Appendix 8d. - Laboratory Test Schedule and Test Results

Appendix 9: Site 9, Nadi Back Road Bridge Tobacco Farm Opposite Tanoa Apartment, Nadi, Fiji.

- Appendix 9a. - Site Information and Fieldwork Detail
- Appendix 9b. - BH03 Test Location Plan
- Appendix 9c. - Borehole Engineering Log and Core Photos
- Appendix 9d. - Laboratory Test Schedule and Test Results

Appendix 10: Site 10, Nadi Back Road Bridge Export Farm, Nadi, Fiji.

- Appendix 10a. - Site Information and Fieldwork Detail
- Appendix 10b. - BH03 Test Location Plan
- Appendix 10c. - Borehole Engineering Log and Core Photos
- Appendix 10d. - Laboratory Test Schedule and Test Results

Appendix 11: Site 11, Votualevu Sugar Cane Farm Opposite Nasau, Nadi, Fiji.

- Appendix 11a. - Site Information and Fieldwork Detail
- Appendix 11b. - BH03 Test Location Plan
- Appendix 11c. - Borehole Engineering Log and Core Photos
- Appendix 11d. - Laboratory Test Schedule and Test Results

Appendix 12: Site 12, Votualevu Tobacco Farm Opposite Nasau, Nadi, Fiji.

- Appendix 12a. - Site Information and Fieldwork Detail
- Appendix 12b. - BH03 Test Location Plan
- Appendix 12c. - Borehole Engineering Log and Core Photos
- Appendix 12d. - Laboratory Test Schedule and Test Results


Appendix 13: Site 13, Votualevu Vegetable Farm Opposite Nasau, Nadi, Fiji.

- Appendix 13a. - Site Information and Fieldwork Detail
- Appendix 13b. - BH03 Test Location Plan
- Appendix 13c. - Borehole Engineering Log and Core Photos
- Appendix 13d. - Laboratory Test Schedule and Test Results

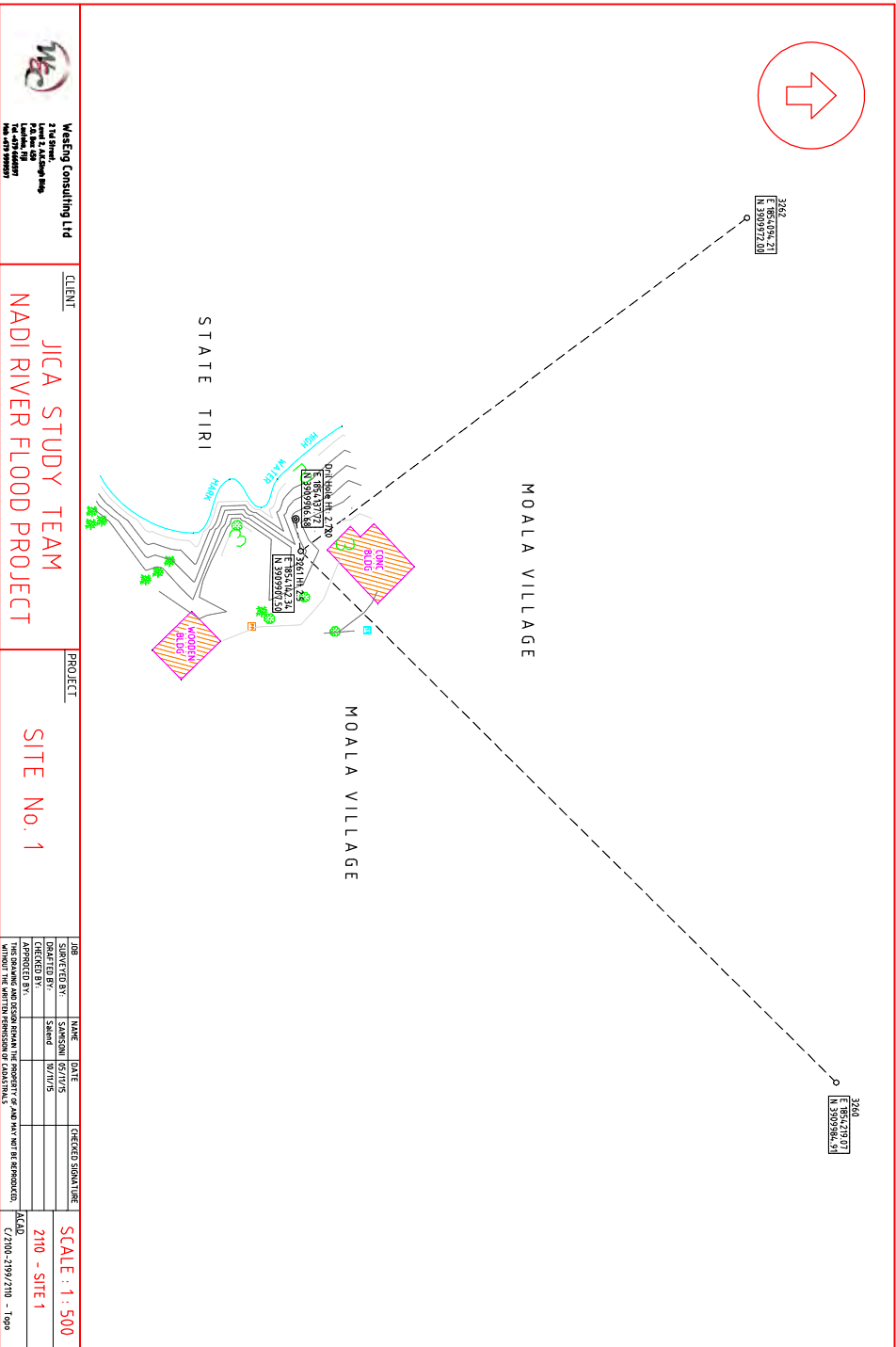
APPENDIX 1
SITE 1 – Moala Village, Nadi, Fiji.

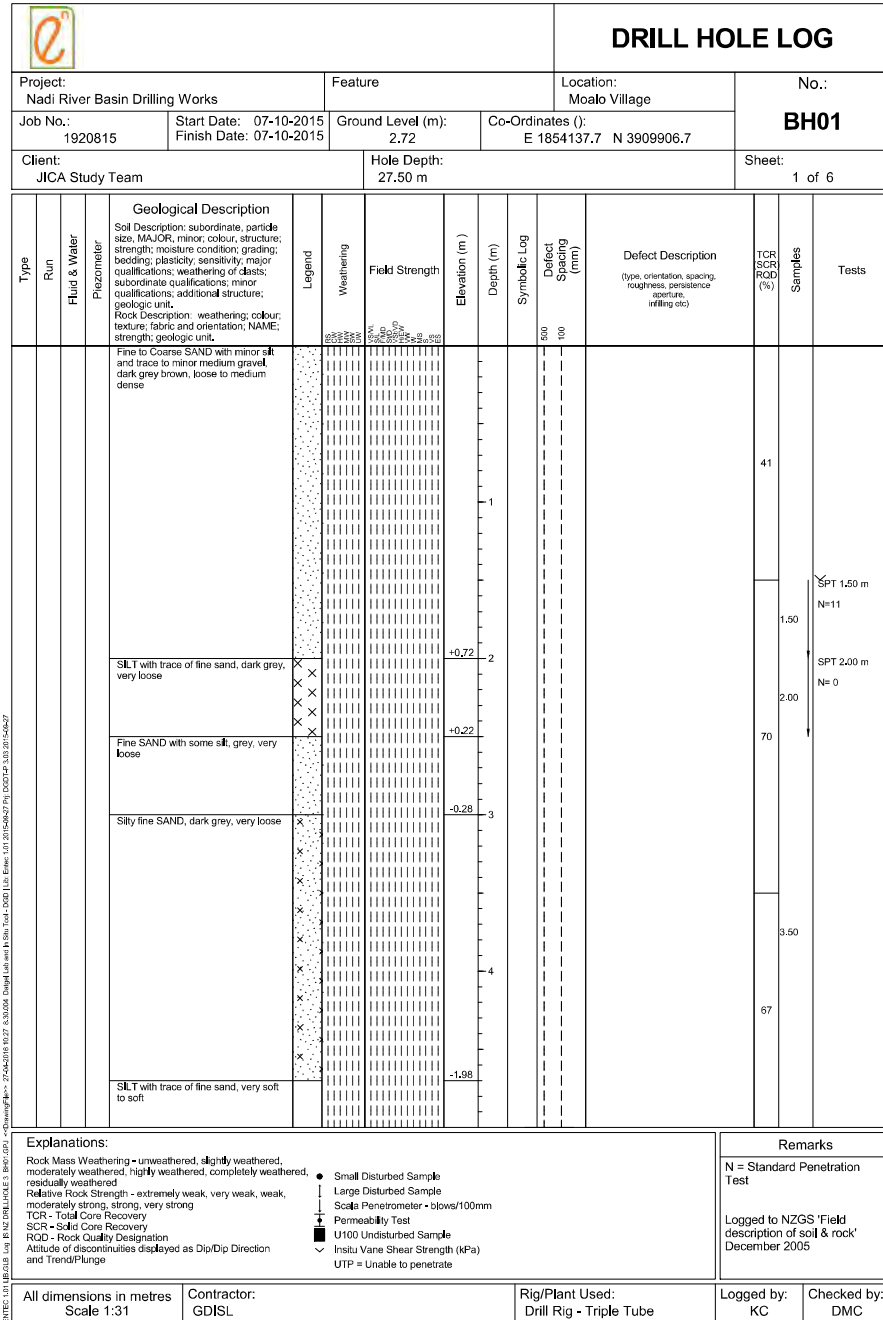
APPENDIX 1a Test Locality Plan



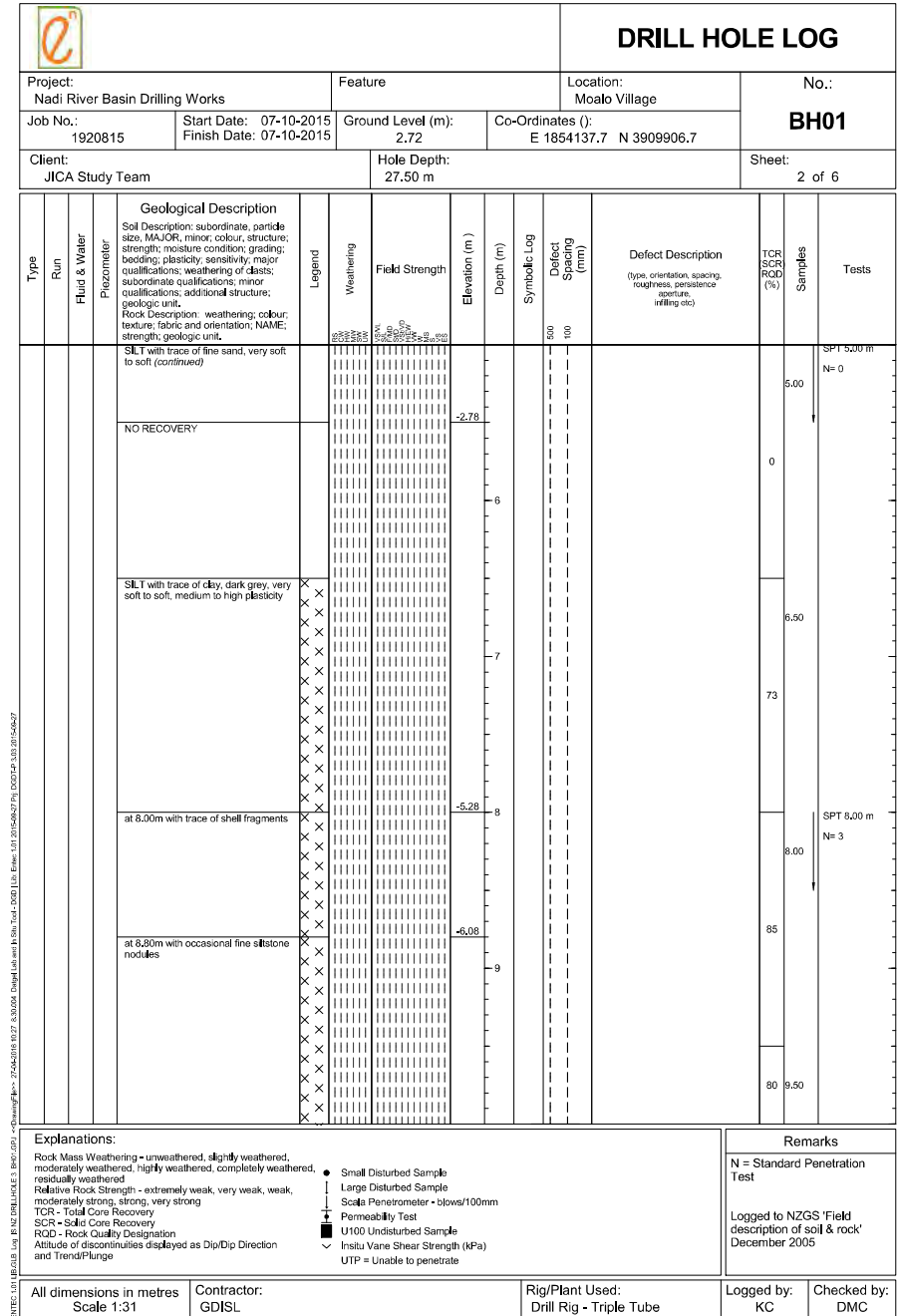
	ENTECH LIMITED Level 2, Mid City Plaza Cor. Cumming St & G. Street P.O. Box 12309 Suva, Fiji	ENGINEERING AND SCIENCE CONSULTANTS Unit 2, VT Solutions 24, Gawa Road P.O. Box 12309 Nadi, Fiji	Phone: (679) 330 0300 Fax: (679) 331 8618 Email: info@entechfiji.com	CLIENT: Japan International Cooperation Agency (JICA) Nadi River Basin Project	NOTE: THIS DRAWING HAS BEEN REPRODUCED BY ENTECH TO SHOW THE APPROXIMATE BOREHOLE LOCATION.	DRAWN BY: ISS CHECKED BY: MC APPROVED BY: JD	ISSUE DATE: November 2015	A3
	PROJECT:		SHEET TITLE: TEST LOCALITY PLAN	SCALE: NTS	PROJECT NO.: 1920815	DRAWING NO.: 1 of 1		

APPENDIX 1b Engineering Borehole Log and Core Photos

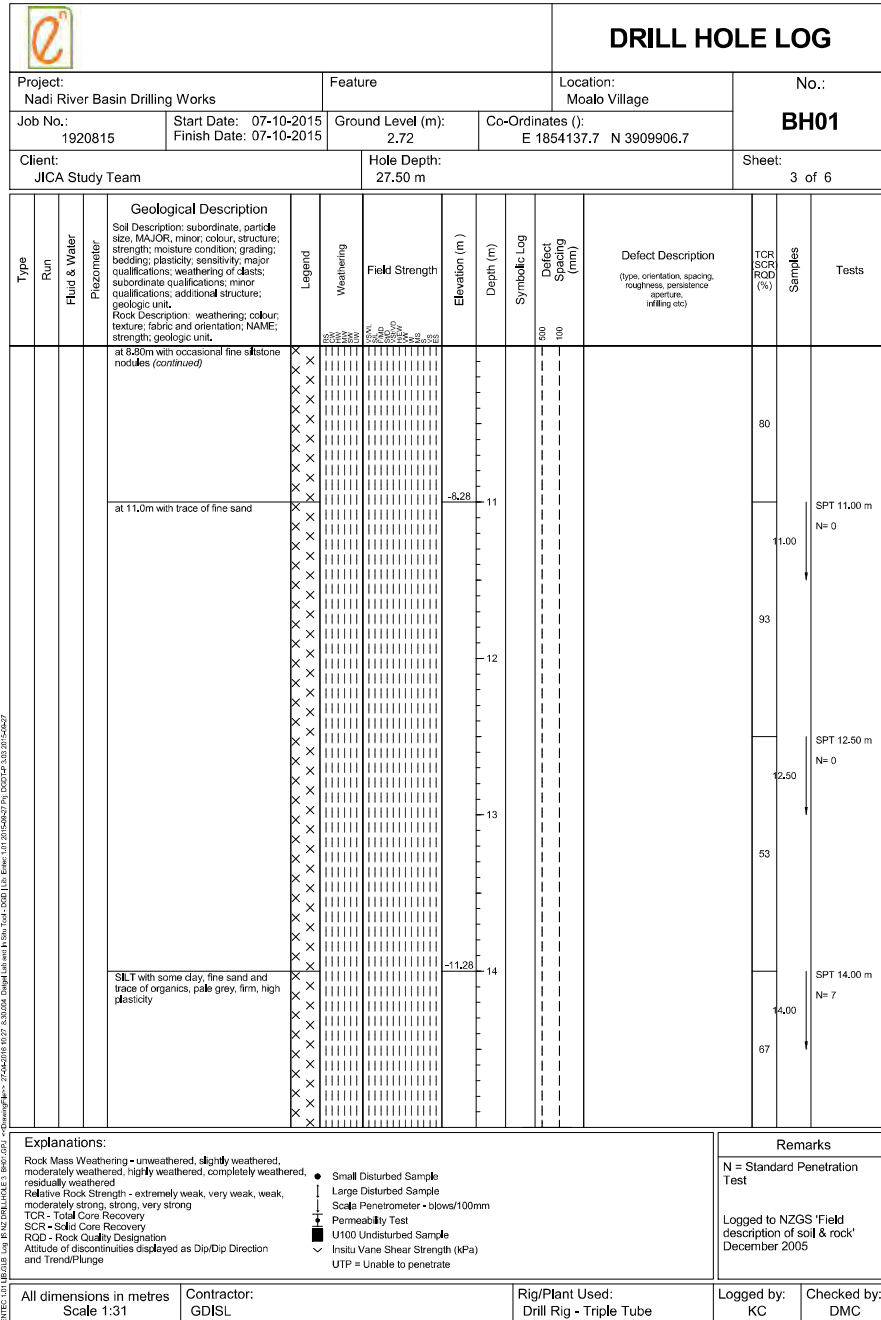




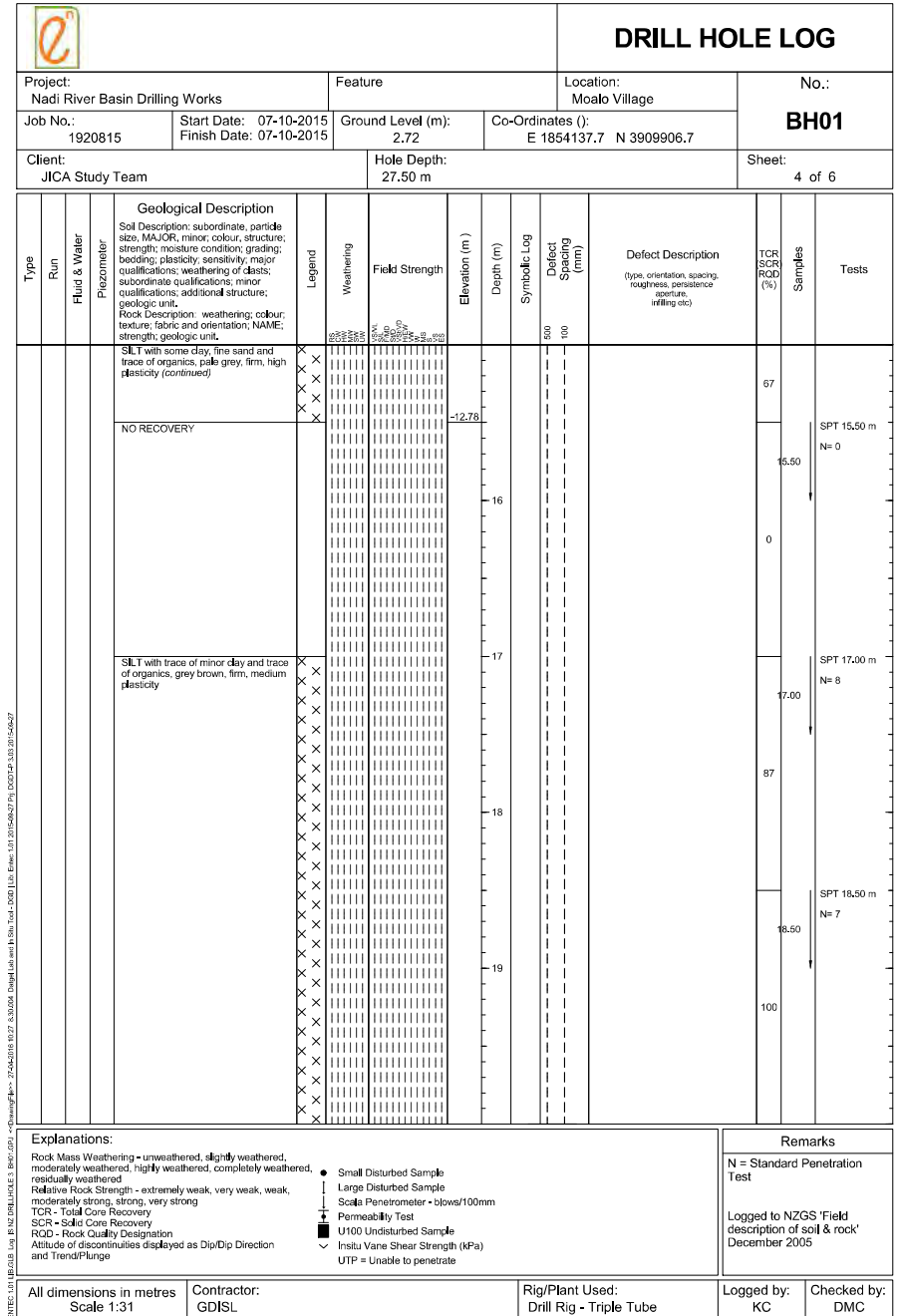
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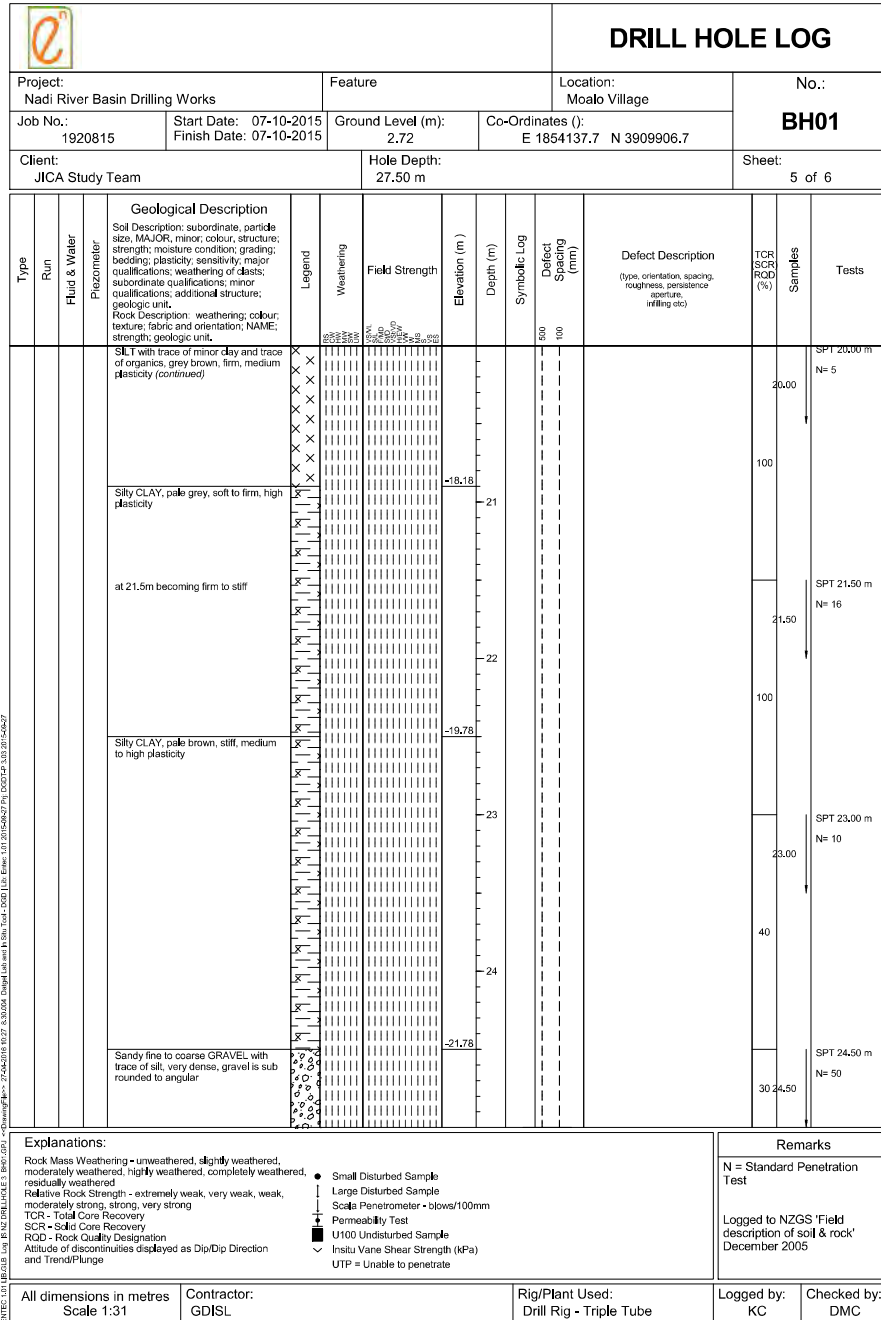
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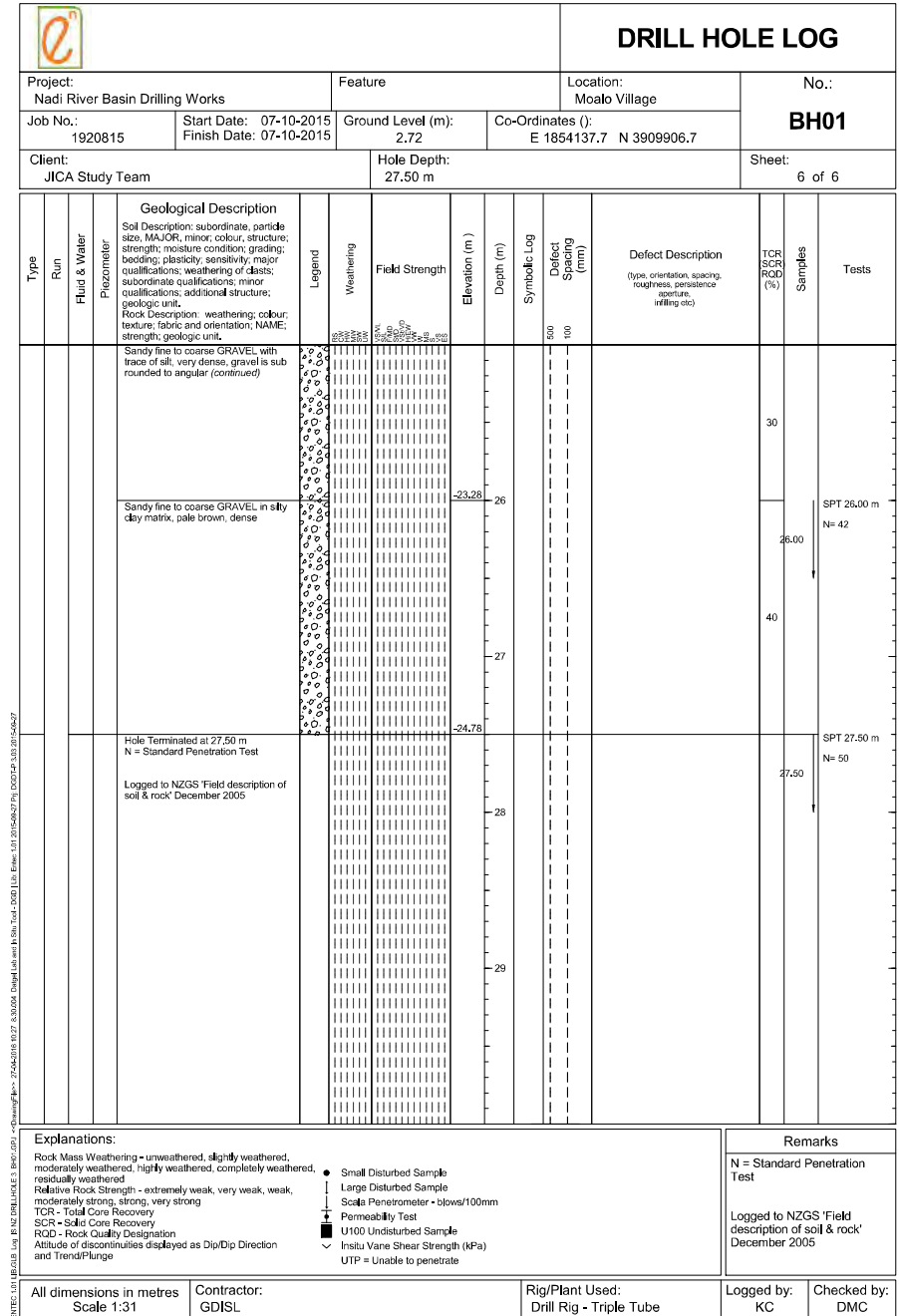
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Borehole 1 Core Photos (0.00m to 27.5m)



0.00m to 4.70m



4.70m to 8.80m



8.80m to 11.50m

11.50m to 14.90m



14.90m to 19.10m



19.10m to 21.95m



21.95m to 26.00m



26.00m to 27.5m

APPENDIX 1c

Laboratory Test Schedule and Laboratory Test Results



PRINCIPAL : JICA
 PROJECT NAME : Nadi River Project Drilling Works
 SITE ADDRESS : Site one, Moala Village (BH 01)
 PROJECT NUMBER : 1920815

Date: 06.10.2015

Laboratory Test Schedule

Project No.	Site	Soil Type	Sample type	Depth (m)	Lab Tests Required							Remarks		
					Permeability	Density	Moisture Content	PSD	Atterberg	UCS	Consolidation			
1920815.01	Site one, Moala Village	Sandy GRAVEL	SPT	1.5-1.80										
		Clayey SAND	SPT	2.0-2.50										
		Clayey SAND	U	3.50-4.00	1	1	1	1		1	1			
		Clayey SAND	SPT	5.0-5.5										
		Silty CLAY w/ shell and sand	U	6.5-8.70				1	1					
		Silty CLAY w/ shell and sand	SPT	8.0-8.45			1							
		Silty CLAY w/ shell and sand	U	9.5-9.9			1				1	1		
		Silty CLAY w/ shell and sand	SPT	11.0-11.50			1							
		Sandy SILT w/ clay and shell	SPT	12.5-13.00			1			1				
		Sandy SILT w/ clay, shell and organic	SPT	14.0-14.45			1	1						
		Silty CLAY w/ sand and organic	SPT	17.0-17.45				1	1	1				
		Sandy SILT w/ clay and organic	SPT	18.5-18.95			1							
		Sandy SILT w/ clay and organic	SPT	20.0-20.45			1							
		Clayey SILT w/ sand	SPT	21.5-21.95										
		Clayey SILT w/ sand	SPT	23.0-23.45			1	1						
		Sandy GRAVEL w/ silt	SPT	24.50-24.99			1							
		GRAVEL	SPT	26.00-26.45				1						
Silty GRAVEL	SPT	27.50 - 27.93					1					Total		
TOTALS					1	2	10	6	3	2	2	2	25	
Bill of Quantity					1	3	10	6	3	3	3	3	29	

Lab Test Schedule checked by: DMC

PRINCIPAL	: Japan International Cooperation Agency (JICA)	PROJECT No.	: 1920815
PROJECT NAME	: Geotechnical Investigation for Nadi River Basin Drilling Works	DATE	: 13 October 2015
SITE ADDRESS	: BH01, Moala Village, Nadi	TECHNOLOGIST	: LN
MATERIAL TYPE & DESCRIPTION	: SILT with trace clay, dark grey, very soft to soft, medium to high plasticity with trace of sand	TEST METHOD	: NZS 4402:1986 (amended version)
		SAMPLE No.	: N501 BH01 12.50m - 13.00m

NATURAL MOISTURE CONTENT						
TEST No.	1	2				Average
Container No.	g	77	17			
Mass of Container	g	99.34	31.75			
Mass of Container + Wet Soil	g	144.09	75.83			
Mass of Container + Dry Soil	g	128.48	60.55			
Mass of Dry Soil	g	29.14	28.80			
Mass of Moisture	g	15.61	15.28			
Moisture Content	%	53.57	53.06			53.31

PLASTIC LIMIT						
TEST No.	1	2				Average
Container No.		171	172			
Mass of Container	g	11.80	12.35			
Mass of Container + Wet Soil	g	16.26	16.28			
Mass of Container + Dry Soil	g	15.05	15.17			
Mass of Dry Soil	g	3.25	2.82			
Mass of Moisture	g	1.21	1.11			
Moisture Content	%	37.23	39.36			38.30

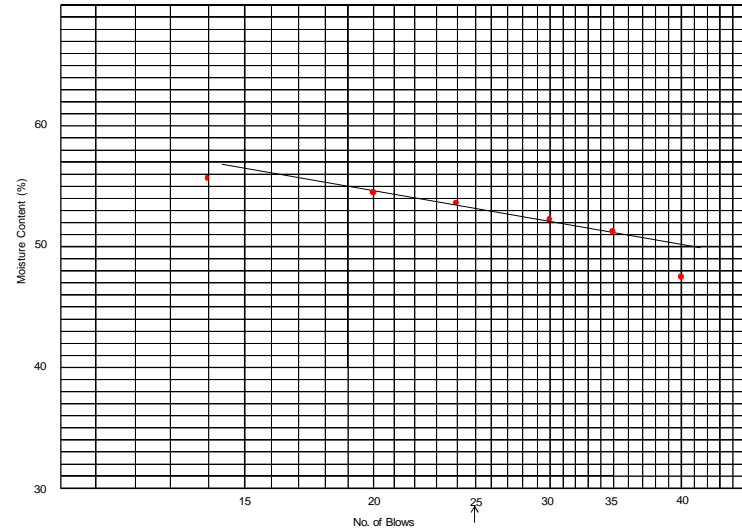
LIQUID LIMIT						
TEST No.	1	2	3	4	5	6
Number of Blows	40	35	30	24	20	14
Container No.		165	166	167	168	169
Mass of Container	g	11.75	11.72	11.84	11.54	11.36
Mass of Container + Wet Soil	g	24.02	23.58	26.69	27.24	26.38
Mass of Container + Dry Soil	g	20.07	19.56	21.60	21.76	21.09
Mass of Dry Soil	g	8.32	7.84	9.76	10.22	9.73
Mass of Moisture	g	3.95	4.02	5.09	5.48	5.29
Moisture Content	%	47.48	51.28	52.15	53.62	54.37

LINEAR SHRINKAGE TEST						
Mould No.	1	2	3	4	5	Average
Initial length of Sample				125.00		
Final length of Sample after Shrinkage				110.00		
% Shrinkage				12.00		12.00

Sample Preparation	
as received	Liquid Limit
washed/sieved on 425 µ sieve	Plastic Limit
air dried/oven dried 105°C	Plasticity Index
after making a paste cured for 12-16 hrs	Shrinkage Limit
	53.00 %
	38.30 %
	14.70 %
	12.00 %

Tested By: LN Q.A. Checked By: MK Approved By: IG
Date: 13 October 2015 Date: 18 October 2015 Date: 18 November 2015

Graph of Moisture Content vs. No. of Blows



Project No: 1920815
Sample No: N501

PRINCIPAL	: Japan International Cooperation Agency (JICA)	PROJECT No.	: 1920815
PROJECT NAME	: Geotechnical Investigation for Nadi River Basin Drilling Works	DATE	: 12 October 2015
SITE ADDRESS	: BH01, Moala Village, Nadi	TECHNOLOGIST	: KB
MATERIAL TYPE & DESCRIPTION	SILT with trace of minor clay and trace of organics, grey brown, firm, medium plasticity.	TEST METHOD	: NZS 4402:1986 (amended version)
		SAMPLE No.	: N503 BH01 17.00m -17.40m

NATURAL MOISTURE CONTENT						
TEST No.		1	2			Average
Container No.	g	77	67			
Mass of Container	g	99.38	72.09			
Mass of Container + Wet Soil	g	133.03	114.18			
Mass of Container + Dry Soil	g	121.51	99.59			
Mass of Dry Soil	g	22.13	27.50			
Mass of Moisture	g	11.52	14.59			
Moisture Content	%	52.06	53.05			52.56

PLASTIC LIMIT						
TEST No.		1	2			Average
Container No.		44	36			
Mass of Container	g	14.58	14.09			
Mass of Container + Wet Soil	g	20.37	20.42			
Mass of Container + Dry Soil	g	18.56	18.45			
Mass of Dry Soil	g	3.98	4.36			
Mass of Moisture	g	1.81	1.97			
Moisture Content	%	45.48	45.18			45.33

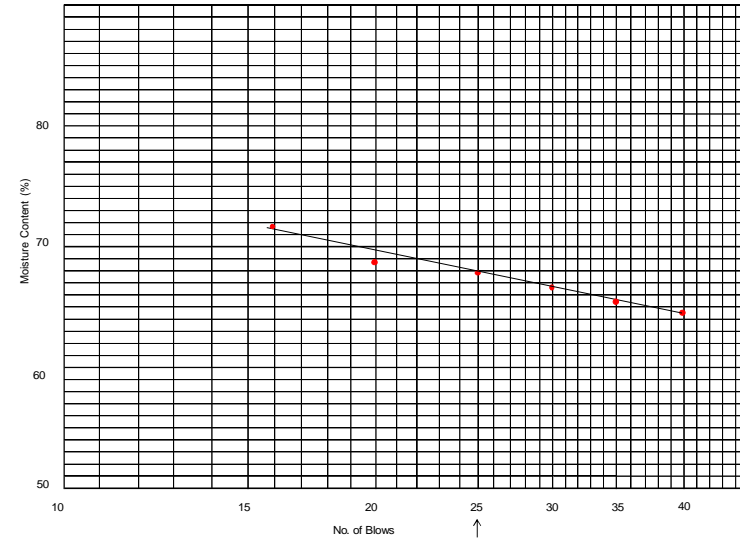
LIQUID LIMIT							
TEST No.		1	2	3	4	5	6
Number of Blows		40	35	30	25	20	16
Container No.		30	37	29	35	42	41
Mass of Container	g	13.44	14.66	14.28	14.29	14.52	14.34
Mass of Container + Wet Soil	g	20.46	23.51	23.44	22.79	23.62	22.92
Mass of Container + Dry Soil	g	17.70	20.02	19.78	19.35	19.91	19.34
Mass of Dry Soil	g	4.26	5.36	5.50	5.06	5.39	5.00
Mass of Moisture	g	2.76	3.49	3.66	3.44	3.71	3.58
Moisture Content	%	64.79	65.11	66.55	67.98	68.83	71.60

LINEAR SHRINKAGE TEST							
Mould No.		1	2	3	4	5	Average
Initial length of Sample			125.00				
Final length of Sample after Shrinkage			109.00				
% Shrinkage			12.80				12.80

Sample Preparation		
as received	Liquid Limit	67.90 %
washed/sieved on 425 µm sieve	Plastic Limit	45.33 %
air dried/oven dried 105°C	Plasticity Index	22.57 %
after making a paste cured for 12-16 hrs	Shrinkage Limit	12.80 %

Tested By: KB Q.A. Checked By: MK Approved By: IG
Date: 12 October 2015 Date: 18 October 2015 Date: 18 November 2015

Graph of Moisture Content vs. No. of Blows



Project No: 1920815
Sample No: N 503

PRINCIPAL	: Japan International Cooperation Agency (JICA)	PROJECT No.	: 1920815
PROJECT NAME	: Geotechnical Investigation for Nadi River Basin Drilling Works	DATE	: 12 October 2015
SITE ADDRESS	: BH01, Moala Village, Nadi	TECHNOLOGIST	: LN
MATERIAL TYPE & DESCRIPTION	: SILT with trace of clay, dark grey, very soft to soft, medium to high plasticity.	TEST METHOD	: NZS 4402:1986 (amended version)
		SAMPLE No.	: N509 BH01 6.50m - 7.00m

NATURAL MOISTURE CONTENT						
TEST No.		1	2			Average
Container No.	g	20	130			
Mass of Container	g	14.12	11.64			
Mass of Container + Wet Soil	g	27.80	24.74			
Mass of Container + Dry Soil	g	22.84	20.09			
Mass of Dry Soil	g	8.72	8.45			
Mass of Moisture	g	4.96	4.65			
Moisture Content	%	56.88	55.03			55.96

PLASTIC LIMIT						
TEST No.		1	2			Average
Container No.		133	129			
Mass of Container	g	11.27	11.53			
Mass of Container + Wet Soil	g	16.27	16.09			
Mass of Container + Dry Soil	g	15.27	15.16			
Mass of Dry Soil	g	4.00	3.63			
Mass of Moisture	g	1.00	0.93			
Moisture Content	%	25.00	25.62			25.31

LIQUID LIMIT							
TEST No.		1	2	3	4	5	6
Number of Blows		40	35	29	26	20	15
Container No.		120	119	118	117	116	115
Mass of Container	g	11.66	11.41	11.76	11.21	11.69	11.73
Mass of Container + Wet Soil	g	28.65	28.82	32.70	26.90	27.33	28.55
Mass of Container + Dry Soil	g	24.07	24.12	26.93	22.51	22.78	23.57
Mass of Dry Soil	g	12.41	12.71	15.17	11.30	11.09	11.84
Mass of Moisture	g	4.58	4.70	5.77	4.39	4.55	4.98
Moisture Content	%	36.91	36.98	38.04	38.85	41.03	42.06

LINEAR SHRINKAGE TEST							
Mould No.		1	2	3	4	5	Average
Initial length of Sample		140.00					
Final length of Sample after Shrinkage		129.00					
% Shrinkage		7.86					7.86

Sample Preparation

as received
washed/sieved on 425 µm sieve
air dried/oven dried 105°C
after making a paste cured for 12-16 hrs

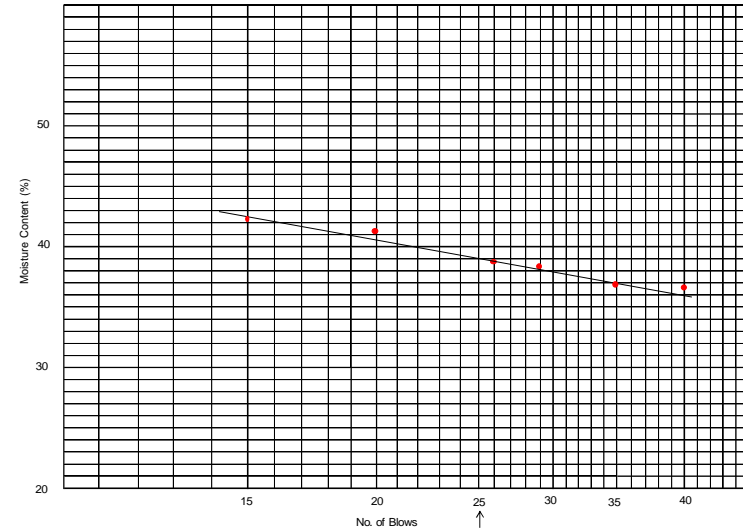
Liquid Limit	39.00 %
Plastic Limit	25.31 %
Plasticity Index	13.69 %
Shrinkage Limit	7.86 %

Tested By: LN
Date: 13 October 2015

Q.A. Checked By: MK
Date: 18 October 2015

Approved By: IG
Date: 18 November 2015

Graph of Moisture Content vs. No. of Blows



Project No: 1920815
Sample No: N509

PRINCIPAL :	Japan International Cooperation Agency (JICA)	PROJECT No. :	1920815
PROJECT NAME :	Geotechnical Engineering Investigation for Nadi River Basin Drilling Works	DATE / TESTED :	13 October 2015
SITE ADDRESS :	Site 01, Moala Village	TECHNOLOGIST :	RK/IG
SAMPLE LOCATION :	BH01 3.50m - 4.00m	MATERIAL TYPE :	Silty fine SAND, dark grey, very loose.
TEST NUMBER :	N496		
SAMPLE HISTORY : NATURAL / AIR-DRIED / OVEN-DRIED / UNKNOWN			

Moisture Content	Container No.	-	90	
	Mass of Container	g	118.07	
	Mass of Container + Wet Soil	g	493.11	
	Mass of Container + Dry Soil	g	383.09	
	Mass of Dry Soil	g	265.02	
	Mass of Moisture	g	110.02	
	Moisture Content	%	41.51	41.51

Bulk Density	Sample No.	-	N496
	Diameter of Specimen	mm	53.10
	Initial area of specimen A_0 ($\pi/4 d^2$)	mm ²	213.39
	Initial length of specimen L_0	mm	93.25
	Initial mass of specimen M_i	g	375.99
	Bulk Density ρ	t/m ³	1.82
	Dry Density ρ_d	t/m ³	1.29

Tested by : RK/IG	Q.A. Check by : MK	Approved by : IG
Date : 13 October 2015	Date : 18 October 2015	Date : 18 November 2015

PRINCIPAL :	Japan International Cooperation Agency (JICA)	PROJECT No. :	1920815
PROJECT NAME :	Geotechnical Engineering Investigation for Nadi River Basin Drilling Works	DATE / TESTED :	15 October 2015
SITE ADDRESS :	Site 01, Moala Village.	TECHNOLOGIST :	RK/IG
SAMPLE LOCATION :	BH01 9.50m - 10.00m	MATERIAL TYPE :	SILT with trace clay, dark grey, very soft to soft, medium to high plasticity with trace of occasionally fine siltstone.
TEST NUMBER :	N499		
SAMPLE HISTORY : NATURAL / AIR-DRIED / OVEN-DRIED / UNKNOWN			

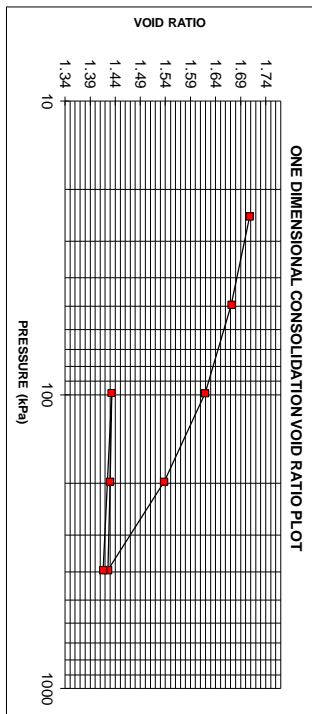
Moisture Content	Container No.	-	62	76	
	Mass of Container	g	72.21	86.38	
	Mass of Container + Wet Soil	g	189.87	256.66	
	Mass of Container + Dry Soil	g	150.43	200.16	
	Mass of Dry Soil	g	78.22	113.78	
	Mass of Moisture	g	39.44	56.50	
	Moisture Content	%	50.42	49.66	50.04

Bulk Density	Sample No.	-	N499
	Diameter of Specimen	mm	52.50
	Initial area of specimen A_0 ($\pi/4 d^2$)	mm ²	2163.66
	Initial length of specimen L_0	mm	75.24
	Initial mass of specimen M_i	g	288.46
	Bulk Density ρ	t/m ³	1.77
	Dry Density ρ_d	t/m ³	1.18

Tested by : RK/IG	Q.A. Check by : MK	Approved by : IG
Date : 15 October 2015	Date : 18 October 2015	Date : 18 November 2015

Project Name: Geotechnical Investigation for Nadi River Basin Drilling Works Sample No: N498
 Client Name: Japan International Cooperation Agency (JICA) Depth: 3.5m - 4.0m
 Job No: 1920815 Tested By: IG
 Site Address: Meala Village Date Tested: 09 October 2015
 Sample Location: BH01 (Site 1)

Sample Description: Silty fine SAND, dark grey, very loose
 Sample History: Undisturbed / Remoulded / Compacted / Shattered / Unknown
 Date Sample Collected: 07/10/15 Temperature: Max: 27°C Min: 25°C
 Loading Cycle: 24 hrs 0 mins Height of ring: 23.8 mm
 Diameter of ring (D): 44.96 mm Area of ring (A): 1587.61 mm²
 Solid density of soil particles (Q_s): 2.65 t/m³ (Measured / Assumed)
 Method used: Square root of time fitting method



Measured thickness of specimen, H	mm	H ₁	23.8	H ₂	20.74
Mass of ring + watch-glass + wet specimen	g	M ₃	258.85	M ₄	256.03
Mass of ring + watch-glass + dry specimen	g	M ₅	242.18	M ₆	206.07
Mass of ring	g	M ₁		M ₂	0
Mass of watch-glass	g	M ₇	36.11	M ₈	13.85
Mass of dry specimen	g	M ₃ -M ₅	16.67	M ₄ -M ₆	38.36
Mass of water	g	W ₁	46.16	W ₂	1.10
Water content, w	%	Q _w	0.96	Q _{w'}	8.58
Dry density, Q _d	t/m ³	Q _d		Q _{d'}	
Height of soil particles, H _s	mm	e ₁	1.77	e ₂	1.42
Voids ratio, e		S ₁	69.00	S ₂	71.77
Degree of saturation, S					

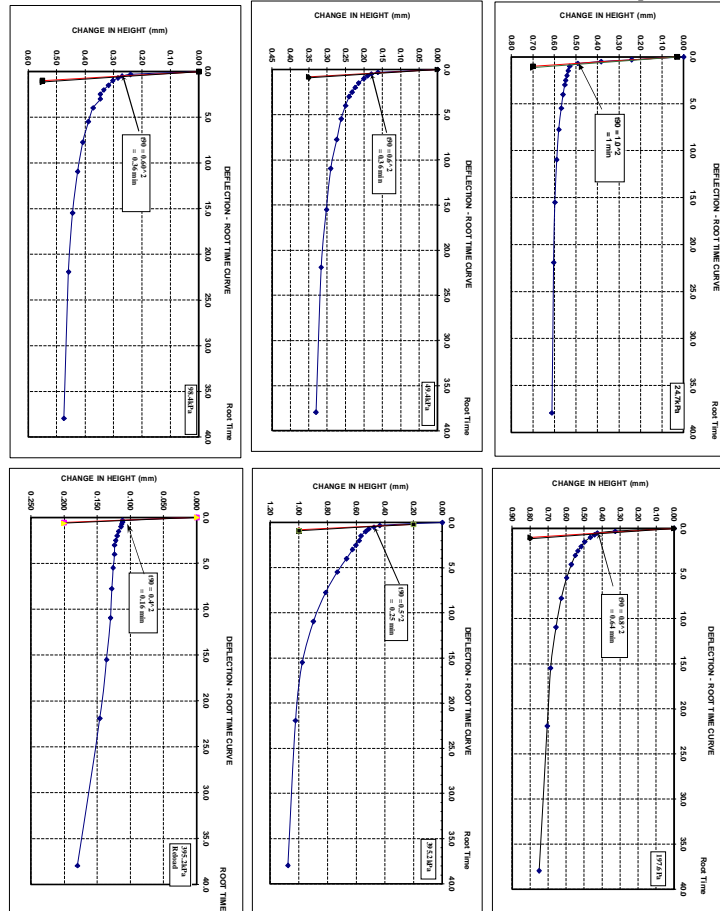
Applied Pressure (kPa)	Incremental deflection (ΔH) (mm)	Thickness of specimen (mm)	% Change in thickness	Height of voids (mm)	Voids ratio	Coefficient of consolidation C _v (m ² /yr)	Coefficient of compressibility M _v (m ² /MN)
24.7	0.558	23.242	0.024	14.66	1.71	59.96	1.48
49.4	0.870	22.930	0.038	14.35	1.67	162.12	1.48
98.8	1.322	22.478	0.059	13.89	1.62	155.79	1.12
197.6	2.018	21.782	0.093	13.20	1.54	82.22	0.86
395.2	2.980	20.820	0.143	12.24	1.43	192.46	0.63
197.6	2.944	20.856	0.141	12.27	1.43	0.00	-0.63
98.6	2.920	20.880	0.140	12.30	1.43	0.00	-1.24
395.2	3.082	20.738	0.148	12.15	1.42	298.36	0.43
0	0.00	23.800	0.000	15.22	1.77	0.00	

Tested by: IG Date: 09 October 2015
 Q.A. Check By: MK Date: 27 October 2015
 Approved By: IG Date: 18 November 2015
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Determination of the One-Dimensional Consolidation Properties
NZS 4402 : 1986 Test 7.1

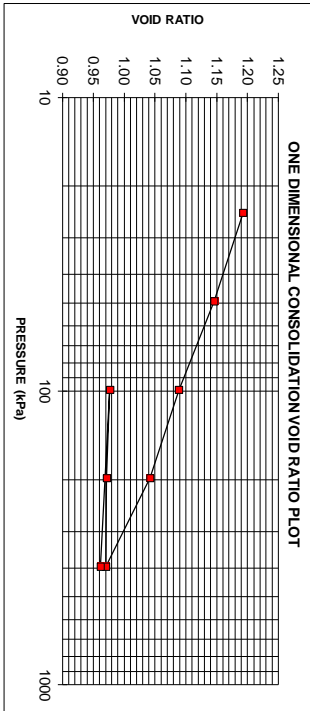
Loading Date & Time		09/10/2015 @ 10:45hrs			10/10/2015 @ 10:47hrs			11/10/2015 @ 10:49hrs			12/10/2015 @ 11:15hrs			13/10/2015 @ 11:35hrs			14/10/15 @ 12:02hrs		
Hanger Load		400g			800g			1600g			3200g			6400g			3200g		
Effective Pressure		24.7kPa			49.4kPa			98.8kPa			197.6kPa			395.2kPa			197.6kPa		
Time Elapsed	Clock	Dial	H	Clock	Dial	H	Clock	Dial	H	Clock	Dial	H	Clock	Dial	H	Clock	Dial	H	
																			Time/4
min	min	min	min	min	min	min	min	min	min	min	min	min	min	min	min	min	min	min	
0	00:00	2211	0.000	10:45:00	1905	0.000	10:49:00	1740	0.000	11:15:00	1503	0.000	11:35:00	1128	0.000	12:02:00	590	0.000	
6	0.100	0.316	0.242	10:45:06	2090	0.242	10:47:06	1824	0.162	10:49:06	1620	0.240	11:15:06	1340	0.326	11:35:06	910	0.436	
15	0.250	0.500	0.384	10:45:15	2019	0.384	10:47:15	1815	0.180	10:49:15	1605	0.270	11:15:15	1290	0.426	11:35:15	890	0.476	
30	0.500	0.707	0.492	10:45:30	1965	0.492	10:47:30	1810	0.190	10:49:30	1598	0.284	11:15:30	1282	0.442	11:35:30	871	0.514	
1	1.000	1.000	0.530	10:46:00	1946	0.530	10:48:00	1805	0.200	10:50:00	1589	0.302	11:16:00	1270	0.466	11:36:00	860	0.536	
2	15	2.250	0.536	10:47:15	1943	0.536	10:49:15	1798	0.214	10:51:15	1581	0.318	11:17:15	1255	0.496	11:37:15	845	0.566	
4	4.000	2.000	0.542	10:49:00	1940	0.542	10:51:00	1793	0.224	10:53:00	1573	0.334	11:19:00	1245	0.516	11:39:00	838	0.580	
6	15	6.250	0.548	10:51:15	1937	0.548	10:53:15	1789	0.232	10:55:15	1567	0.346	11:21:15	1236	0.534	11:41:15	827	0.602	
9	9.000	3.000	0.552	10:54:00	1935	0.552	10:56:00	1785	0.240	10:58:00	1567	0.346	11:24:00	1229	0.548	11:44:00	815	0.626	
16	16.000	4.000	0.560	11:01:00	1931	0.560	11:03:00	1780	0.250	11:05:00	1554	0.372	11:31:00	1218	0.570	11:51:00	794	0.668	
30	30.000	5.480	0.568	11:15:00	1927	0.568	11:17:00	1774	0.262	11:19:00	1546	0.388	11:45:00	1205	0.596	12:05:00	762	0.732	
1	60.000	7.750	0.580	11:45:00	1921	0.580	11:47:00	1768	0.274	11:49:00	1536	0.408	12:15:00	1190	0.626	12:35:00	721	0.814	
2	120.000	10.950	0.590	12:45:00	1916	0.590	12:47:00	1760	0.290	12:49:00	1527	0.426	13:15:00	1175	0.656	13:35:00	679	0.898	
4	240.000	15.490	0.598	14:45:00	1912	0.598	14:47:00	1754	0.302	14:49:00	1518	0.444	15:15:00	1160	0.686	15:35:00	640	0.976	
8	480.000	21.910	0.604	18:45:00	1909	0.604	18:47:00	1747	0.316	18:49:00	1511	0.458	19:15:00	1151	0.704	19:35:00	616	1.024	
24	1440.000	37.950	0.612	10:45:00	1905	0.612	10:47:00	1740	0.330	10:49:00	1503	0.474	11:15:00	1128	0.750	11:35:00	590	1.076	
UNLOADING																			
Machine Correction		0.054			0.018			0.022			0.054			0.114			0.004		
Δ H (Corrected)		0.558			0.312			0.452			0.696			0.962			0.036		
Net Total Settlement		0.558			0.870			1.322			2.018			2.980			2.944		

Loading Date and Time				15/10/2015 @ 12:22hrs			16/10/2015 @ 12:40hrs											
Hanger Load				1600g			6400g											
Effective Pressure				98.6kPa			395.2kPa											
Time Elapsed				Clock	Dial	H	Clock	Dial	H	Clock	Dial	H	Clock	Dial	H	Clock	Dial	H
hrs	min	sec	t min	ΔTime/4	Gauge	x10 mm	ΔTime/4	Gauge	x10 mm	ΔTime/4	Gauge	x10 mm	ΔTime/4	Gauge	x10 mm	ΔTime/4	Gauge	x10 mm
		0	0	12:22:00	611	0.000	12:40:00	637	0.000									
		6	0.100	12:22:06	626	0.030	12:40:06	581	0.112									
		15	0.250	12:22:15	628	0.034	12:40:15	581	0.112									
		30	0.500	12:22:30	630	0.038	12:40:30	581	0.113									
1		1.000	1.000	12:23:00	630	0.038	12:41:00	580	0.114									
2	15	2.250	1.500	12:24:15	630.2	0.038	12:42:15	578	0.118									
4		4.000	2.000	12:26:00	630.3	0.039	12:44:00	577	0.120									
6	15	6.250	2.500	12:28:15	630.4	0.039	12:46:15	576	0.122									
9		9.000	3.000	12:31:00	630.5	0.039	12:49:00	575	0.124									
16		16.000	4.000	12:38:00	630.6	0.039	12:56:00	575	0.124									
30		30.000	5.480	12:52:00	630.7	0.039	13:10:00	574	0.126									
1		60.000	7.750	13:22:00	630.7	0.039	13:40:00	573	0.128									
2		120.0	10.950	14:22:00	631	0.040	14:40:00	572	0.130									
4		240.0	15.49	16:22:00	634	0.046	16:40:00	569	0.136									
8		480.0	21.91	20:22:00	635	0.048	20:40:00	564	0.146									
24		1440	37.95	12:22:00	637	0.052	12:40:00	547	0.180									
RELOADING																		
Machine Correction				0.028			0.038											
Δ H (Corrected)				0.024			0.142											
Net Total Settlement				2.920			3.062											



Project Name: Geotechnical Engineering Investigation for Nadi River
Client Name: Basin Drilling Works
Job No.: Japan International Cooperation Agency (JICA)
Site Address: 1920015 Mcale Village
Sample Location: BH 01

Sample Description: Silty CLAY with trace of fine shell fragments and fine sand, grey, soft, moist, medium plasticity
Sample History: Undisturbed / Remoulded / Compacted / Stirred / Unknown
Date Sample Collected: 07/10/15
Loading Cycle: 24 hrs 0 mins
Temperature: Max 27°C Min: 25°C
Height of ring: 23.8 mm
Area of ring (A): 1587.61 mm²
Height of ring (D): 44.96 mm
Solid density of soil particles (ρ_s): 2.65 t/m³ (Measured / Assumed)
Method used: Square root of time fitting method



Measured thickness of specimen, H	mm	H_i	23.8	H_f	20.43
Mass of ring + watch glass + wet specimen	g	M_3	272.73	M_2	266.41
Mass of ring + watch glass + dry specimen	g	M_5	249.88		
Mass of ring	g	M_1	206.07		
Mass of watch glass	g	M_2	0		
Mass of dry specimen $M_s = M_5 - M_1 - M_2$	g		43.81		
Mass of water	g	$M_w - M_s$	22.85	$M_w - M_s$	16.53
Water content, w	%	w_i	52.16	w_f	37.73
Dry density, ρ_d	gm ³	$\rho_{d,i}$	1.16	$\rho_{d,f}$	1.35
Height of soil particles, H_s	mm		10.41		
Void ratio, e		e_i	1.29	e_f	0.96
Degree of saturation, S		S_i	107.51	S_f	103.97

Applied Pressure (kPa) vs. Thickness of specimen (mm) vs. % Change in thickness (%) vs. Height of voids (mm) vs. Voids ratio vs. Coefficient of consolidation C_v (m²/yr) vs. Coefficient of compressibility M_v (m²/MN)

Tested by: IG
Date: 18 October 2015

Q.A. Check By: MK
Date: 27 October 2015

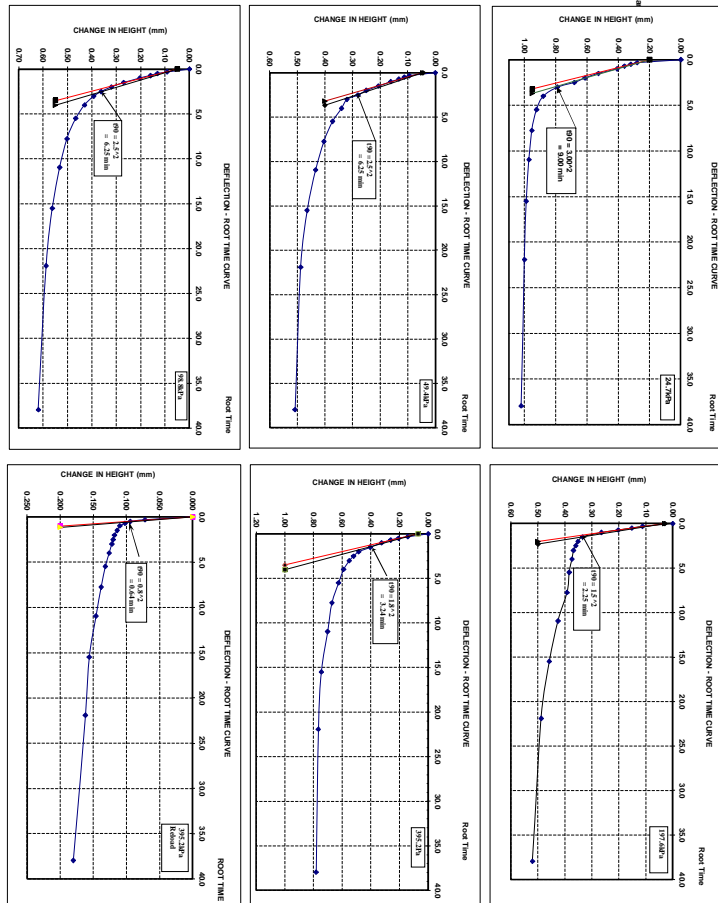
Approved By: IG
Date: 18 November 2015

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Determination of the One-Dimensional Consolidation Properties
NZS 4402 : 1986 Test 7.1

Loading Date & Time	18/10/2015 @ 09:09hrs			19/10/2015 @ 09:37hrs			20/10/2015 @ 09:46hrs			21/10/2015 @ 09:49hrs			22/10/2015 @ 10:07hrs			23/10/2015 @ 10:21hrs											
	Hanger Load			400g			800g			1600g			3200g			6400g			3200g								
	Effective Pressure			24.7kPa			49.4kPa			98.8kPa			197.6kPa			395.2kPa			197.6kPa								
Time Elapsed	Clock			Dial			H			Clock			Dial			H			Clock			Dial			H		
	Time/4	Gauge	x10 mm	Time/4	Gauge	x10 mm	Time/4	Gauge	x10 mm	Time/4	Gauge	x10 mm	Time/4	Gauge	x10 mm	Time/4	Gauge	x10 mm	Time/4	Gauge	x10 mm	Time/4	Gauge	x10 mm			
s/m	t min	√t min	09:09			09:37			09:46			09:49			10:07			10:21									
			0	0.00	0.00	09:09	2350	0.000	09:37	1840	0.000	9:46	1586	0.000	9:49	1276	0.000	10:07	1016	0.000	10:21	625	0.000				
6	0.100	0.316	09:09:06	2210	0.280	09:37:06	1793	0.094	09:46:06	1540	0.092	09:49:06	1220	0.112	10:07:06	945	0.142	10:21:06	634	0.018							
15	0.250	0.500	09:09:15	2190	0.320	09:37:15	1784	0.112	09:46:15	1520	0.132	09:49:15	1200	0.152	10:07:15	912	0.208	10:21:15	633	0.016							
30	0.500	0.707	09:09:30	2170	0.360	09:37:30	1774	0.132	09:46:30	1506	0.160	09:49:30	1175	0.202	10:07:30	885	0.262	10:21:30	632	0.014							
1	1.000	1.000	09:10:00	2146	0.408	09:38:00	1759	0.162	09:47:00	1484	0.204	09:50:00	1144	0.264	10:08:00	854	0.324	10:22:00	631.5	0.013							
2	1.5	2.250	09:11:15	2086	0.528	09:39:15	1737	0.206	09:48:15	1451	0.270	09:51:15	1109	0.334	10:09:15	814	0.404	10:23:15	631	0.012							
4	4.000	2.000	09:13:00	2044	0.612	09:41:00	1715	0.250	09:50:00	1426	0.320	09:53:00	1100	0.352	10:11:00	774	0.484	10:25:00	631.5	0.013							
6	15	6.250	09:15:15	2010	0.680	09:43:15	1700	0.280	09:52:15	1405	0.362	09:55:15	1096	0.360	10:13:15	756	0.520	10:27:15	630	0.010							
9	9.000	3.000	09:18:00	1956	0.788	09:46:00	1680	0.320	09:55:00	1390	0.392	09:58:00	1092	0.368	10:16:00	741	0.550	10:30:00	630	0.010							
16	16.000	4.000	09:25:00	1910	0.880	09:53:00	1670	0.340	10:02:00	1371	0.430	10:05:00	1089	0.374	10:23:00	721	0.590	10:37:00	630	0.010							
30	30.000	5.480	09:39:00	1889	0.922	10:07:00	1654	0.372	10:16:00	1353	0.466	10:19:00	1084	0.384	10:37:00	703	0.626	10:51:00	630	0.010							
1	60.000	7.750	10:09:00	1874	0.952	10:37:00	1638	0.404	10:46:00	1335	0.502	10:49:00	1080	0.392	11:07:00	680	0.672	11:21:00	630	0.010							
2	120.000	10.950	11:09:00	1865	0.970	11:37:00	1623	0.434	11:46:00	1320	0.532	11:49:00	1063	0.426	12:07:00	665	0.702	12:21:00	630	0.010							
4	240.000	15.49	13:09:00	1856	0.988	13:37:00	1608	0.464	13:46:00	1305	0.562	13:49:00	1047	0.458	14:07:00	643	0.746	14:21:00	630.5	0.011							
8	480.000	21.91	17:09:00	1850	1.000	17:37:00	1596	0.488	17:46:00	1292	0.588	17:49:00	1032	0.488	18:07:00	633	0.766	18:21:00	632	0.014							
24	1440.000	37.95	09:09:00	1840	1.020	09:37:00	1586	0.508	09:46:00	1276	0.620	09:49:00	1016	0.520	10:07:00	625	0.782	10:21:00	634	0.018							
UNLOADING																											
Machine Correction			0.054			0.020			0.024			0.034			0.036			0.004									
Δ H (Corrected)			0.966			0.488			0.596			0.486			0.746			0.014									
Net Total Settlement			0.966			1.454			2.050			2.536			3.282			3.268									

Loading Date and Time				24/10/2015 @ 10:29hrs			25/10/2015 @ 10:58hrs												
Hanger Load				1600g			6400g												
Effective Pressure				98.8kPa			395.2kPa												
Time Elapsed				Clock	Dial	H	Clock	Dial	H	Clock	Dial	H	Clock	Dial	H	Clock	Dial	H	
hrs	min	sec	t min	√t min	ΔTime/4	Gauge	x10 mm	ΔTime/4	Gauge	x10 mm	ΔTime/4	Gauge	x10 mm	ΔTime/4	Gauge	x10 mm	ΔTime/4	Gauge	x10 mm
	0	0	0		10:29	634	0.000	10:58	666	0.000									
	6	0.100	0.316		10:29:06	645	0.022	10:58:06	630	0.072									
	15	0.250	0.500		10:29:15	647	0.026	10:58:15	619	0.094									
	30	0.500	0.707		10:29:30	649	0.030	10:58:30	615	0.102									
1		1.000	1.000		10:30:00	651	0.034	10:59:00	611	0.110									
2	15	2.250	1.500		10:31:15	653	0.038	11:00:15	609	0.114									
4		4.000	2.000		10:33:00	654	0.040	11:02:00	607	0.118									
6	15	6.250	2.500		10:35:15	654.5	0.041	11:04:15	606	0.120									
9		9.000	3.000		10:38:00	655	0.042	11:07:00	605	0.122									
16		16.000	4.000		10:45:00	656	0.044	11:14:00	603	0.126									
30		30.000	5.480		10:59:00	656.5	0.045	11:28:00	600	0.132									
1		60.000	7.750		11:29:00	658	0.048	11:58:00	597	0.138									
2		120.0	10.950		12:29:00	658.5	0.049	12:58:00	593	0.146									
4		240.0	15.49		14:29:00	660	0.052	14:58:00	588	0.156									
8		480.0	21.91		18:29:00	661	0.054	18:58:00	585	0.162									
24		1440	37.95		10:29:00	666	0.064	10:58:00	576	0.180									
				UNLOADING			RELOADING												
Machine Correction				0.01			0.022												
Δ H (Corrected)				0.054			0.158												
Net Total Settlement				3.214			3.372												



Moisture Content Test Results

PRINCIPAL	: Japan International Cooperation Agency (JICA)	PROJECT No.	: 1920815
PROJECT NAME	: Geotechnical Investigation for Nadi River Basin Drilling Works	DATE	: 09 October 2015
SITE ADDRESS	: BH01, Moala Village, Nadi	TECHNOLOGIST	: LN
MATERIAL TYPE & DESCRIPTION	: SILT with trace of fine sand, dark grey, very loose	TEST METHOD	: NZS 4402:1986
		SAMPLE No.	: N510 BH01 2.00m - 2.50m

Moisture Content	%					
Container No.	g	27	26			
Mass of Container	g	14.28	15.01			
Mass of Container + Wet Soil	g	27.31	21.92			
Mass of Container + Dry Soil	g	23.95	20.09			
Mass of Dry Soil	g	9.67	5.08			
Mass of Moisture	g	3.36	1.83			
Moisture Content	%	34.75	36.02			35.39

 Tested By: KB
 Date: 09 October 2015

 Q.A. Checked By: UM
 Date: 13 October 2015

 Approved By: IG
 Date: 18 November 2015

Moisture Content Test Results

PRINCIPAL	: Japan International Cooperation Agency (JICA)	PROJECT No.	: 1920815
PROJECT NAME	: Geotechnical Investigation for Nadi River Basin Drilling Works	DATE	: 09 October 2015
SITE ADDRESS	: BH01, Moala Village, Nadi	TECHNOLOGIST	: KB
MATERIAL TYPE & DESCRIPTION	: SILT with trace clay, dark grey, very soft to soft, medium to high plasticity with trace of shell fragments	TEST METHOD	: NZS 4402:1986
		SAMPLE No.	: N498 BH01 8.00m - 8.50m

Moisture Content	%					
Container No.	g	72	78			
Mass of Container	g	86.34	78.57			
Mass of Container + Wet Soil	g	141.89	133.55			
Mass of Container + Dry Soil	g	122.00	113.69			
Mass of Dry Soil	g	35.66	35.12			
Mass of Moisture	g	19.89	19.86			
Moisture Content	%	55.78	56.55			56.16

 Tested By: KB
 Date: 09 October 2015

 Q.A. Checked By: UM
 Date: 13 October 2015

 Approved By: IG
 Date: 18 November 2015

Moisture Content Test Results

PRINCIPAL	: Japan International Cooperation Agency (JICA)	PROJECT No.	: 1920815
PROJECT NAME	: Geotechnical Investigation for Nadi River Basin Drilling Works	DATE	: 09 October 2015
SITE ADDRESS	: BH01, Moala Village, Nadi	TECHNOLOGIST	: KB
MATERIAL TYPE & DESCRIPTION	SILT with trace of occasionally fine siltstone nodules, dark grey, very soft to soft, medium to high plasticity.	TEST METHOD	: NZS 4402:1986
		SAMPLE No.	: N499 BH01 9.50m - 10.00m

Moisture Content	%					
Container No.	g	3	130			
Mass of Container	g	52.42	11.73			
Mass of Container + Wet Soil	g	100.90	25.40			
Mass of Container + Dry Soil	g	83.58	20.68			
Mass of Dry Soil	g	31.16	8.95			
Mass of Moisture	g	17.32	4.72			
Moisture Content	%	55.58	52.74			54.16

Tested By:KB
Date:09 October 2015

Q.A. Checked By: UM
Date:13 October 2015

Approved By: IG
Date:18 November 2015

Moisture Content Test Results

PRINCIPAL	: Japan International Cooperation Agency (JICA)	PROJECT No.	: 1920815
PROJECT NAME	: Geotechnical Investigation for Nadi River Basin Drilling Works	DATE	: 09 October 2015
SITE ADDRESS	: BH01, Moala Village, Nadi	TECHNOLOGIST	: KB
MATERIAL TYPE & DESCRIPTION	SILT with trace of fine sand, dark grey, very soft to soft, medium to high plasticity.	TEST METHOD	: NZS 4402:1986
		SAMPLE No.	: N 500 BH01 11.00m - 11.50m

Moisture Content	%					
Container No.	g	70	68			
Mass of Container	g	90.10	74.10			
Mass of Container + Wet Soil	g	132.70	134.07			
Mass of Container + Dry Soil	g	117.21	112.00			
Mass of Dry Soil	g	27.11	37.90			
Mass of Moisture	g	15.49	22.07			
Moisture Content	%	57.14	58.23			57.68

Tested By:KB
Date:09 October 2015

Q.A. Checked By: UM
Date:13 October 2015

Approved By: IG
Date:18 November 2015

Moisture Content Test Results

PRINCIPAL	: Japan International Cooperation Agency (JICA)	PROJECT No.	: 1920815
PROJECT NAME	: Geotechnical Investigation for Nadi River Basin Drilling Works	DATE	: 09 October 2015
SITE ADDRESS	: BH01, Moala Village, Nadi	TECHNOLOGIST	: KB
MATERIAL TYPE & DESCRIPTION	: SILT with trace clay, dark grey, very soft to soft, medium to high plasticity with trace of fine sand.	TEST METHOD	: NZS 4402:1986
		SAMPLE No.	: N 501 BH01 12.50m - 13.00m

Moisture Content	%					
Container No.	g	77	82			
Mass of Container	g	99.34	90.15			
Mass of Container + Wet Soil	g	144.09	142.90			
Mass of Container + Dry Soil	g	128.48	124.79			
Mass of Dry Soil	g	29.14	34.64			
Mass of Moisture	g	15.61	18.11			
Moisture Content	%	53.57	52.28			52.92

Tested By:KB
Date:09 October 2015

Q.A. Checked By: UM
Date:13 October 2015

Approved By: IG
Date:18 November 2015

Moisture Content Test Results

PRINCIPAL	: Japan International Cooperation Agency (JICA)	PROJECT No.	: 1920815
PROJECT NAME	: Geotechnical Investigation for Nadi River Basin Drilling Works	DATE	: 09 October 2015
SITE ADDRESS	: BH01, Moala Village, Nadi	TECHNOLOGIST	: KB
MATERIAL TYPE & DESCRIPTION	: SILT with some clay, fine sand and trace of organics,pale grey, firm, high plasticity.	TEST METHOD	: NZS 4402:1986
		SAMPLE No.	: N502 BH01 14.00m - 14.45m

Moisture Content	%					
Container No.	g	63	73			
Mass of Container	g	102.00	70.13			
Mass of Container + Wet Soil	g	139.03	132.49			
Mass of Container + Dry Soil	g	128.00	114.22			
Mass of Dry Soil	g	26.00	44.09			
Mass of Moisture	g	11.03	18.27			
Moisture Content	%	42.42	41.44			41.93

Tested By:KB
Date:09 October 2015

Q.A. Checked By: UM
Date:13 October 2015

Approved By: IG
Date:18 November 2015

Moisture Content Test Results

PRINCIPAL	: Japan International Cooperation Agency (JICA)	PROJECT No.	: 1920815
PROJECT NAME	: Geotechnical Investigation for Nadi River Basin Drilling Works	DATE	: 09 October 2015
SITE ADDRESS	: BH01, Moala Village, Nadi	TECHNOLOGIST	: KB
MATERIAL TYPE & DESCRIPTION	SILT trace of minor clay and : trace of organics, grey brown, firm, medium plasticity.	TEST METHOD	: NZS 4402:1986
		SAMPLE No.	: N 504 BH01 18.50m - 18.90m

Moisture Content	%					
Container No.	g	79	65			
Mass of Container	g	86.64	82.05			
Mass of Container + Wet Soil	g	125.14	128.06			
Mass of Container + Dry Soil	g	111.85	112.29			
Mass of Dry Soil	g	25.21	30.24			
Mass of Moisture	g	13.29	15.77			
Moisture Content	%	52.72	52.15			52.43

 Tested By: KB
 Date: 09 October 2015

 Q.A. Checked By: UM
 Date: 13 October 2015

 Approved By: IG
 Date: 18 November 2015

Moisture Content Test Results

PRINCIPAL	: Japan International Cooperation Agency (JICA)	PROJECT No.	: 1920815
PROJECT NAME	: Geotechnical Investigation for Nadi River Basin Drilling Works	DATE	: 09 October 2015
SITE ADDRESS	: BH01, Moala Village, Nadi	TECHNOLOGIST	: KB
MATERIAL TYPE & DESCRIPTION	SILT trace of minor clay and : trace of organics, grey brown, firm, medium plasticity.	TEST METHOD	: NZS 4402:1986
		SAMPLE No.	: N 505 BH01 20.00m - 20.50m

Moisture Content	%					
Container No.	g	74	64			
Mass of Container	g	86.64	82.03			
Mass of Container + Wet Soil	g	130.86	129.05			
Mass of Container + Dry Soil	g	112.69	110.00			
Mass of Dry Soil	g	26.05	27.97			
Mass of Moisture	g	18.17	19.05			
Moisture Content	%	69.75	68.11			68.93

 Tested By: KB
 Date: 09 October 2015

 Q.A. Checked By: UM
 Date: 13 October 2015

 Approved By: IG
 Date: 18 November 2015

Moisture Content Test Results

PRINCIPAL	: Japan International Cooperation Agency (JICA)	PROJECT No.	: 1920815
PROJECT NAME	: Geotechnical Investigation for Nadi River Basin Drilling Works	DATE	: 09 October 2015
SITE ADDRESS	: BH01, Moala Village, Nadi	TECHNOLOGIST	: KB
MATERIAL TYPE & DESCRIPTION	: Silty CLAY, pale brown, stiff, medium to high plasticity.	TEST METHOD	: NZS 4402:1986
		SAMPLE No.	: N506 BH01 23.00m - 23.50m

Moisture Content	%					
Container No.	g	85	84			
Mass of Container	g	88.75	84.97			
Mass of Container + Wet Soil	g	136.72	130.37			
Mass of Container + Dry Soil	g	124.54	118.95			
Mass of Dry Soil	g	35.79	33.98			
Mass of Moisture	g	12.18	11.42			
Moisture Content	%	34.03	33.61			33.82

Tested By: KB
Date: 09 October 2015

Q.A. Checked By: UM
Date: 13 October 2015

Approved By: IG
Date: 18 November 2015

Moisture Content Test Results

PRINCIPAL	: Japan International Cooperation Agency (JICA)	PROJECT No.	: 1920815
PROJECT NAME	: Geotechnical Investigation for Nadi River Basin Drilling Works	DATE	: 09 October 2015
SITE ADDRESS	: BH01, Moala Village, Nadi	TECHNOLOGIST	: KB
MATERIAL TYPE & DESCRIPTION	: Sandy fine to coarse GRAVEL with trace of silt, very dense, gravel is sub rounded to angular	TEST METHOD	: NZS 4402:1986
		SAMPLE No.	: N507 BH01 24.50m - 25.00m

Moisture Content	%					
Container No.	g	69	67			
Mass of Container	g	90.25	72.11			
Mass of Container + Wet Soil	g	133.66	135.98			
Mass of Container + Dry Soil	g	128.93	128.75			
Mass of Dry Soil	g	38.68	56.64			
Mass of Moisture	g	4.73	7.23			
Moisture Content	%	12.23	12.76			12.50

Tested By: KB
Date: 09 October 2015

Q.A. Checked By: UM
Date: 13 October 2015

Approved By: IG
Date: 18 November 2015

**Determination of Permeability of a Soil
Constant Head Method for Remoulded Sample**

PRINCIPAL :	Japan International Cooperation Agency (JICA)	PROJECT No. :	1920815
PROJECT NAME :	Geotechnical Investigation for Nadi River Basin Drilling Works	DATE :	13 October 2015
SITE ADDRESS :	BH01, Moala Village, Nadi	TECHNOLOGIST :	IG/UM
MATERIAL TYPE & DESCRIPTION :	Silty fine SAND, dark grey, very loose	TEST METHOD :	AS 1289.6.7.3-2001
		SAMPLE No. :	N497 (BH01 3.50m - 4.00m)

Total Weight : -
Weight Retained on : -
Percentage retained: : -

MOISTURE CONTENT

Container No.		7
Mass of Container	g	52.76
Mass of Container + Wet	g	82.41
Mass of Container + Dry	g	74.03
Mass of Dry Soil	g	21.27
Mass of Moisture	g	8.38
Moisture Content	%	39.40
Optimum moisture content	%	-
Laboratory moisture ratio	%	-

DENSITY

Mass of Specimen	g	1660
Volume of Specimen	cm ³	869.59
Wet Density	t/m ³	1.91
Dry Density	t/m ³	1.37
Maximum Dry Density	t/m ³	-
Laboratory Density ratio	%	-

Area of stand pipe (dia. 12mm)	mm ²	113.10
Cross sectional area of soil specimen(8cm)	cm ²	50.27
Length of soil specimen	cm	17.30

Surcharge - 920g

TEST #	Constant Head h (cm)	Elapsed Time (t)min	Out Flow Volume Q (cm ³)	Water temp T(°C)	KT cm/min	K ₂₀ cm/min
1	120	4.00	68	26	0.05	0.04
2	120	4.00	71	26	0.05	0.04
3	120	4.00	71	26	0.05	0.04
4	110	4.00	60	26	0.05	0.04
5	110	4.00	59	26	0.05	0.04
6	110	4.00	58	26	0.05	0.04
7	100	4.00	49	26	0.04	0.04
8	100	4.00	48	26	0.04	0.04
9	100	4.00	47	26	0.04	0.04
10	95	4.00	46	26	0.04	0.04
11	95	4.00	45	26	0.04	0.04
12	95	4.00	43	26	0.04	0.03

Average K₂₀ m/s 6.47E-06

Tested By: IG
Date: 13 October 2015

Q.A. Check By: MK
Date: 16 October 2015

Approved By: IG
Date: 18 November 2015

**Unconfined Compressive Strength
NZS 4402:1986 (Test 6.3.1)**

PRINCIPAL :	Japan International Cooperation Agency (JICA)	PROJECT No. :	1920815
PROJECT NAME :	Geotechnical Investigation for Nadi River Basin Drilling Works	DATE TESTED :	11 October 2015
SITE ADDRESS :	BH01, Moala Village, Nadi	TECHNOLOGIST :	IG
SAMPLE LOCATION :	BH 01 3.50m - 4.00m	MATERIAL TYPE :	Silty fine SAND, dark grey, very loose.
TEST NUMBER :	N 496		

SAMPLE HISTORY : NATURAL / AIR-DRIED / OVEN-DRIED / UNKNOWN

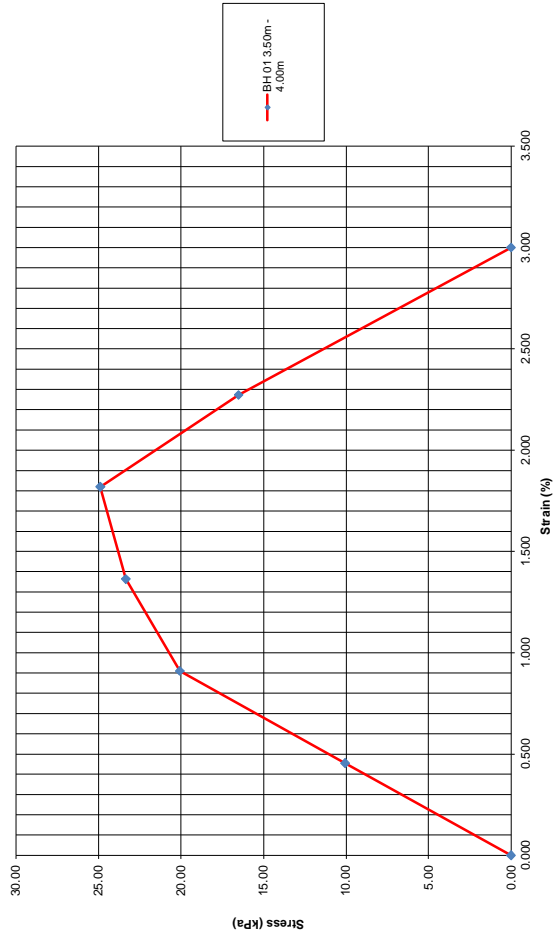
Moisture Content	Container No.		
		-	92
	Mass of Container	g	91.43
	Mass of Container + Wet Soil	g	529.94
	Mass of Container + Dry Soil	g	391.67
	Mass of Dry Soil	g	300.24
	Mass of Moisture	g	138.27
	Moisture Content	%	46.05

Bulk Density	Sample No.		
		-	N 496
	Diameter of Specimen	mm	55.00
	Initial area of specimen A ₀ (π/4 d ²)	mm ²	2374.63
	Initial length of specimen L ₀	mm	110.00
	Initial mass of specimen M _i	g	439.15
	Bulk Density ρ	t/m ³	1.68
	Dry Density ρ_d	t/m ³	1.15

Compression Gauge Reading	Load Gauge Reading	Load	Strain ε = (C _n - C ₀) / L ₀	Corrected Area A = A ₀ / (1 - ε)	Principal Stress Difference σ ₁ - σ ₃ = 1000P/A
mm		(kN)	%	m ²	kPa
0.00	0	0	0.000	0.002375	0.00
0.50	12	0.0240	0.455	0.002385	10.06
1.00	24.0	0.0481	0.909	0.002396	20.07
1.50	28.0	0.0562	1.364	0.002407	23.34
2.00	30.0	0.0602	1.818	0.002419	24.89
2.50	20.0	0.0401	2.273	0.002430	16.50
3.30	0.0	0	3.000	0.002448	0.00

Tested by : IG	Q.A. Check by : LN	Approved by : IG
Date : 11 October 2015	Date : 14 October 2015	Date : 18 November 2015

STRESS VS STRAIN



LOCATION: BH 01 3.50m - 4.00m
DESCRIPTION: Silty fine SAND, dark grey, very loose.
DATE OF TEST: 11 October 2015

Form GE-L-10

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Unconfined Compressive Strength
NZS 4402:1986 (Test 6.3.1)

PRINCIPAL	: Japan International Cooperation Agency (JICA)	PROJECT No.	: 1920815
PROJECT NAME	: Geotechnical Engineering Investigation for Nadi River Project Drilling Works.	DATE TESTED	: 10 October 2015
SITE ADDRESS	: Site one, Moala Village	TECHNOLOGIST	: IG
SAMPLE LOCATION	: BH 01 9.50m - 10.00m	MATERIAL TYPE	: SILT with trace clay, dark grey, very soft to soft, medium to high plasticity with occasional fine siltstone nodules
TEST NUMBER	: N 499		

SAMPLE HISTORY : NATURAL / AIR-DRIED / OVEN-DRIED / UNKNOWN

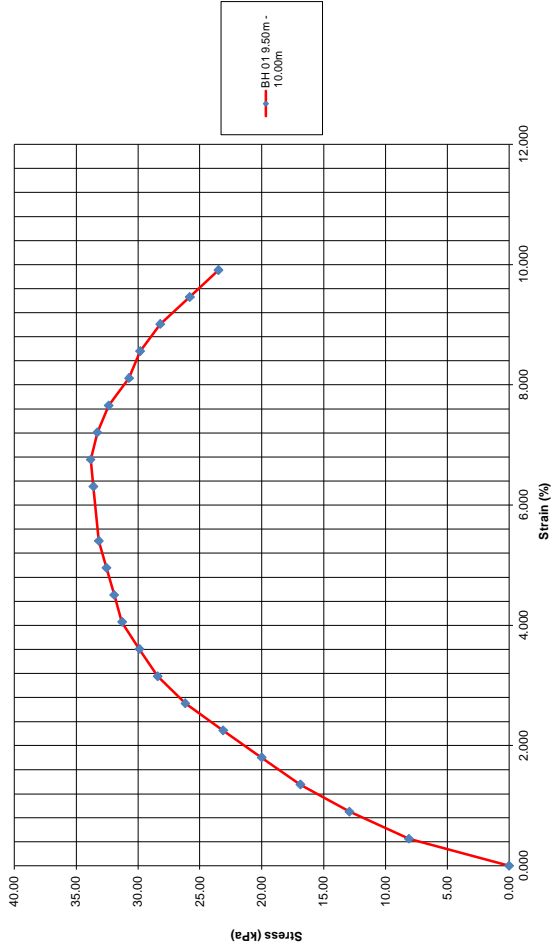
Moisture Content	Container No.	-	96
	Mass of Container	g	101.34
	Mass of Container + Wet Soil	g	422.01
	Mass of Container + Dry Soil	g	307.75
	Mass of Dry Soil	g	206.41
	Mass of Moisture	g	114.26
	Moisture Content	%	55.36

Bulk Density	Sample No.	-	N 499
	Diameter of Specimen	mm	56.00
	Initial area of specimen A_0 (πr^2)	mm ²	2461.76
	Initial length of specimen L_0	mm	111.00
	Initial mass of specimen M_i	g	413.12
	Bulk Density ρ	t/m ³	1.51
	Dry Density ρ_d	t/m ³	0.97

Compression Gauge Reading	Load Gauge Reading	Load	Strain $\epsilon = \frac{C_h - C_0}{L_0}$	Corrected Area $A = A_0 / 1 - \epsilon$	Principal Stress Difference $\sigma_1 - \sigma_3 = 1000P/A$
mm		(kN)	%	m ²	kPa
0.00	0	0	0.000	0.002462	0.00
0.50	10.0	0.0200	0.450	0.002473	8.09
1.00	16.0	0.0321	0.901	0.002484	12.92
1.50	21.0	0.0421	1.351	0.002495	16.87
2.00	25.0	0.0502	1.802	0.002507	20.02
2.50	29.0	0.0582	2.252	0.002518	23.11
3.00	33.0	0.0662	2.703	0.002530	26.16
3.50	36.0	0.0722	3.153	0.002542	28.40
4.00	38.0	0.0763	3.604	0.002554	29.88
4.50	40.0	0.0803	4.054	0.002566	31.30
5.00	41.0	0.0823	4.505	0.002578	31.93
5.50	42.0	0.0843	4.955	0.002590	32.55
6.00	43.0	0.0863	5.405	0.002602	33.16
7.00	44.0	0.0883	6.306	0.002627	33.61
7.50	44.5	0.0893	6.757	0.002640	33.82
8.00	44.0	0.0883	7.207	0.002653	33.28
8.50	43.0	0.0863	7.658	0.002666	32.37
9.00	41.0	0.0823	8.108	0.002679	30.72
9.50	40.0	0.0803	8.559	0.002692	29.83
10.00	38.0	0.0763	9.009	0.002705	28.20
10.50	35.0	0.0702	9.459	0.002719	25.82
11.00	32.0	0.0642	9.910	0.002733	23.49

Tested by : IG	Q.A. Check by : LN	Approved by : IG
Date : 10 October 2015	Date : 14 October 2015	Date : 18 November 2015

STRESS VS STRAIN



BH 01 9.50m -
10.00m

LOCATION: BH 01, 9.50m - 10.00m
DESCRIPTION: SILT with trace clay, dark grey, very soft to stiff, medium to high plasticity with occasional fine siltstone nodules
DATE OF TEST: 10 October 2015

Form G.E.L-10

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Wet Sieve Analysis
NZS 4407:1991 (Test 3.8.1)

PRINCIPAL : Japan International Cooperation Agency (JICA)	PROJECT No. : 1920815
PROJECT NAME : Geotechnical Investigation for Nadi River Basin Drilling Works	DATE / : 13 October 2015
SITE ADDRESS : BH01, Moala Village, Nadi	TECHNOLOGIST : RK
SAMPLE LOCATION : BH 01 3.50m - 4.00m	MATERIAL TYPE & LOCATION : Silty fine SAND, dark grey, very loose.
TEST NUMBER : N 496	
SAMPLE HISTORY : NATURAL / AIR-DRIED / OVEN-DRIED / UNKNOWN	

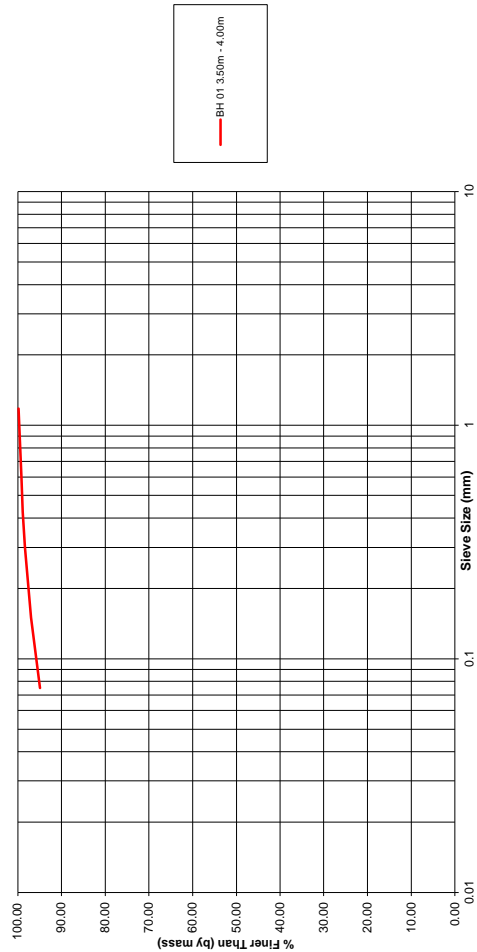
Moisture Content (Material passing 19mm)	Container No.	-	56	60	SPLIT SAMPLE
Mass of Container	g	62.63	62.89	Mass Passing Last Sieve:	- gM ₃
Mass of Container + Wet Soil	g	96.53	95.73	Mass after Splitting:	- gM ₄
Mass of Container + Dry Soil	g	85.59	85.38	Splitting Factor	M ₃
Mass of Dry Soil	g	22.96	22.49	=	M ₄
Mass of Moisture	g	10.94	10.35		
Moisture Content	%	47.65	46.02		
Average Moisture Content	%	46.83			

Total Mass of Dry Sample	Mass of dry sample retained on 19mm test sieve (M _r)	g	Nil
Total Wet Weight (M _w)	g	348.13	
Total Mass of dry sample (M _T)	M _T =	100M _w	
	M _T =	100 + w	
		237.09	

Test Sieve Size mm	Mass of Dry Soil Retained (M _r) g	Corrected Mass g	Percentage Retained = (Mass M _r) x 100 %	Total Percentage Passing %	Maximum Sieve Load (Sieve Diameter 200mm) g	Sieve Diameter mm
75.0mm	N/A	0.00	100.00			300
50.0mm	N/A	0.00	100.00			300
37.5mm	N/A	0.00	100.00			300
26.5mm	N/A	0.00	100.00			300
19.0mm	N/A	0.00	100.00			200
13.2 mm	N/A	0.00	100.00		600	300
9.50 mm	N/A	0.00	100.00		450	300
6.70 mm	N/A	0.00	100.00		300	300
4.75 mm	N/A	0.00	100.00		250	200
2.36 mm	N/A	0.00	100.00		150	200
1.18 mm	0.50	N/A	0.21	99.79	100	200
0.600 mm	1.30	N/A	0.55	99.24	80	200
425 µm	0.90	N/A	0.38	98.86	70	200
300 µm	1.20	N/A	0.51	98.36	60	200
150 µm	3.20	N/A	1.35	97.01	40	200
75 µm	4.90	N/A	2.07	94.94	25	200
Passing 75 µm	225.09	N/A	94.94	0.00	-	-
Pan Total	237.09	-	100.00	-	-	-

- NOTES: 1) Testing performed on fraction passing/retained on 19mm sieve
2) The percentage passing the finest sieve was obtained by difference

Tested by: RK	Q.A. Checked by: LN	Approved by: IG
Date: 13 October 2015	Date: 15 October 2015	Date: 18 November 2015



BH 01 3.50m - 4.00m

LOCATION:	BH 01 3.50m - 4.00m	DESCRIPTION: Silty fine SAND, dark grey, very loose
DATE OF TEST:	13 October 2015	SAMPLE No: N486

Form GE-L-06

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PRINCIPAL :	Japan International Cooperation Agency (JICA)	PROJECT No. :	1920815
PROJECT NAME :	Geotechnical Investigation for Nadi River Basin Drilling Works	DATE / :	10 October 2015
SITE ADDRESS :	BH01, Moala Village, Nadi	TECHNOLOGIST :	KB/TL
SAMPLE LOCATION :	BH 01 6.50m - 7.00m	MATERIAL TYPE & LOCATION :	Silt with trace of clay, dark grey, very soft to soft, medium to high plasticity.
TEST NUMBER :	N 509		

SAMPLE HISTORY : NATURAL / AIR-DRIED / OVEN-DRIED / UNKNOWN

Moisture Content (Material passing 19mm)	Container No.	-	57	58	SPLIT SAMPLE
Mass of Container	g	63.42	62.66	Mass Passing Last Sieve:	gM ₃
Mass of Container + Wet Soil	g	115.13	113.69	Mass after Splitting:	gM ₄
Mass of Container + Dry Soil	g	96.72	95.45	Splitting Factor = $\frac{M_3}{M_4}$	
Mass of Dry Soil	g	33.30	32.79		
Mass of Moisture	g	18.41	18.24		
Moisture Content	%	55.29	55.63		
Average Moisture Content	%	55.46			

Total Mass of Dry Sample	Mass of dry sample retained on 19mm test sieve (M _r)	g	Nil
	Total Wet Weight (M _w)	g	353.45
	Total Mass of dry sample (M _T)	M _T = $\frac{100M_w}{100 + w}$	
		M _T =	227.36

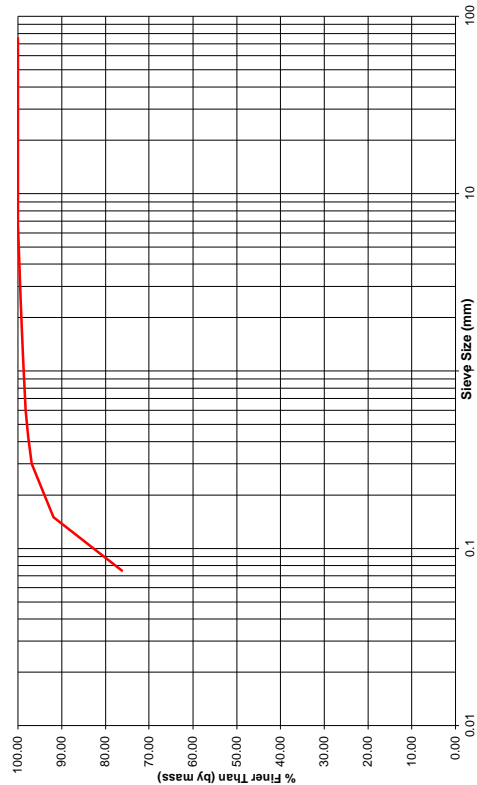
Test Sieve Size mm	Mass of Dry Soil Retained (M _c) g	Corrected Mass g	Percentage Retained = $\frac{(Mass M_c)}{100}$ %	Total Percentage Passing %	Maximum Sieve Load (Sieve Diameter 200mm) g	Sieve Diameter mm
75.0mm	N/A	N/A	0.00	100.00		300
50.0mm	N/A	N/A	0.00	100.00		300
37.5mm	N/A	N/A	0.00	100.00		300
26.5mm	N/A	N/A	0.00	100.00		300
19.0mm	N/A	N/A	0.00	100.00		200
13.2 mm	N/A	N/A	0.00	100.00	600	300
9.50 mm	N/A	N/A	0.00	100.00	450	300
6.70 mm	N/A	N/A	0.00	100.00	300	300
4.75 mm	0.51	N/A	0.22	99.78	250	200
2.36 mm	0.94	N/A	0.41	99.36	150	200
1.18 mm	1.09	N/A	0.48	98.88	100	200
0.600 mm	1.55	N/A	0.68	98.20	80	200
425 µm	1.27	N/A	0.56	97.64	70	200
300 µm	1.92	N/A	0.84	96.80	60	200
150 µm	11.14	N/A	4.90	91.90	40	200
75 µm	35.66	N/A	15.68	76.21	25	200
Passing 75 µm	173.28	N/A	76.21	0.00	-	-
Pan Total	227.36	-	100.00	-	-	-

NOTES: 1) Testing performed on fraction passing/retained on 19mm sieve
2) The percentage passing the finest sieve was obtained by difference

Tested by : KB	O.A. Checked by :LN	Approved by : IG
Date : 10 October 2015	Date :14 October 2015	Date : 18 November 2015

Form GE-L-06

Page 1 of 2



BH of 6.50m - 7.00m

LOCATION:	BH 01 6.50m - 7.00m
DATE OF TEST:	10 October 2015
DESCRIPTION:	Silt with trace of clay, dark grey, very soft to soft, medium to high plasticity.
SAMPLE No:	N 509

Form GE-L-06

Page 2 of 2

PRINCIPAL :	Japan International Cooperation Agency (JICA)	PROJECT No. :	1920815
PROJECT NAME :	Geotechnical Investigation for Nadi River Basin Drilling Works	DATE / :	09 October 2015
SITE ADDRESS :	BH01, Moala Village, Nadi	TECHNOLOGIST :	TL/KB
SAMPLE LOCATION :	BH 01 14.00m - 14.45m	MATERIAL TYPE & LOCATION :	Silt with some clay, fine sand, trace of organics, pale grey, firm, high plasticity.
TEST NUMBER :	N 502		

SAMPLE HISTORY : NATURAL / AIR-DRIED / OVEN-DRIED / UNKNOWN

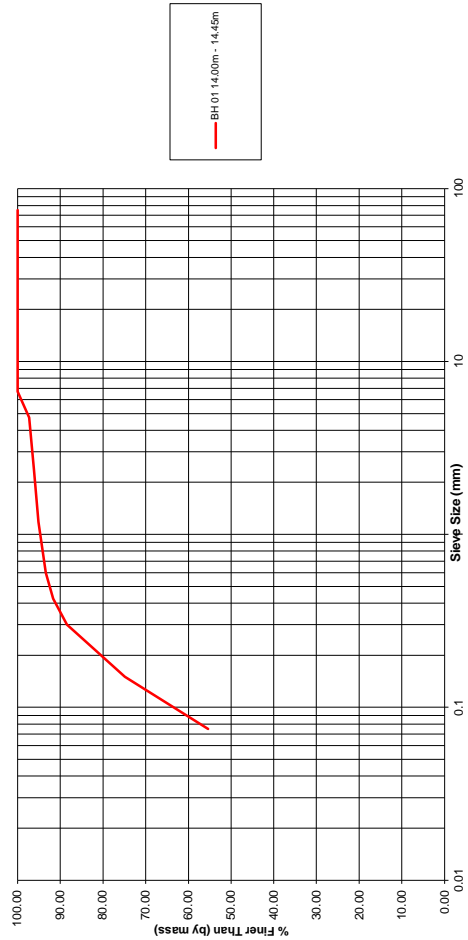
Moisture Content (Material passing 19mm)	Container No.	-	59	61	SPLIT SAMPLE
Mass of Container	g		63.69	62.22	Mass Passing Last Sieve: - gM ₃
Mass of Container + Wet Soil	g		96.71	96.82	Mass after Splitting: - gM ₄
Mass of Container + Dry Soil	g		85.58	85.00	Splitting Factor = M ₃ / M ₄
Mass of Dry Soil	g		21.89	22.78	
Mass of Moisture	g		11.13	11.82	
Moisture Content	%		50.85	51.89	
Average Moisture Content	%		51.37		

Total Mass of Dry Sample	Mass of dry sample retained on 19mm test sieve (M _T)	g	Nil
	Total Wet Weight (M _w)	g	360.72
	Total Mass of dry sample (M _T)	M _T =	$\frac{100M_w}{100 + w}$
		M _T =	238.31

Test Sieve Size mm	Mass of Dry Soil Retained (M ₂)	Corrected Mass	Percentage Retained = (Mass M ₂) x 100	Total Percentage Passing	Maximum Sieve Load (Sieve Diameter 200mm)	Sieve Diameter
	g	g	%	%	g	mm
75.0mm	N/A		0.00	100.00		300
50.0mm	N/A		0.00	100.00		300
37.5mm	N/A		0.00	100.00		300
26.5mm	N/A		0.00	100.00		300
19.0mm	N/A		0.00	100.00		200
13.2 mm	N/A		0.00	100.00	600	300
9.50 mm	N/A		0.00	100.00	450	300
6.70 mm	N/A		0.00	100.00	300	300
4.75 mm	6.64	N/A	2.79	97.21	250	200
2.36 mm	2.51	N/A	1.05	96.16	150	200
1.18 mm	2.66	N/A	1.12	95.04	100	200
0.600 mm	3.96	N/A	1.66	93.38	80	200
425 µm	4.10	N/A	1.72	91.66	70	200
300 µm	7.84	N/A	3.29	88.37	60	200
150 µm	32.33	N/A	13.57	74.81	40	200
75 µm	46.31	N/A	19.43	55.37	25	200
Passing 75 µm	131.96	N/A	55.37	0.00	-	-
Pan Total	238.31	-	100.00	-	-	-

- NOTES: 1) Testing performed on fraction passing/retained on 19mm sieve
2) The percentage passing the finest sieve was obtained by difference

Tested by : TL/KB	Q.A. Checked by : LN	Approved by : IG
Date : 09 October 2015	Date : 15 October 2015	Date : 18 November 2015



BH 01 14.00m - 14.45m

LOCATION: BH 01 14.00m - 14.45m
 DESCRIPTION: Silt with some clay, fine sand, trace of organics; pale grey, firm, high plasticity.
 DATE OF TEST: 09 October 2015
 SAMPLE No: N 502

PRINCIPAL : Japan International Cooperation Agency (JICA)	PROJECT No. : 1920815
PROJECT NAME : Geotechnical Investigation for Nadi River Basin Drilling Works	DATE / : 09 October 2015
SITE ADDRESS : BH01, Moala Village, Nadi	TECHNOLOGIST : KB/TL
SAMPLE LOCATION : BH 01 17.00m - 17.40m	MATERIAL TYPE & LOCATION : Silt with trace of minor claydayn trace of organics, grey brown, firm, medium plasticity
TEST NUMBER : N 503	
SAMPLE HISTORY : NATURAL / AIR-DRIED / OVEN-DRIED / UNKNOWN	

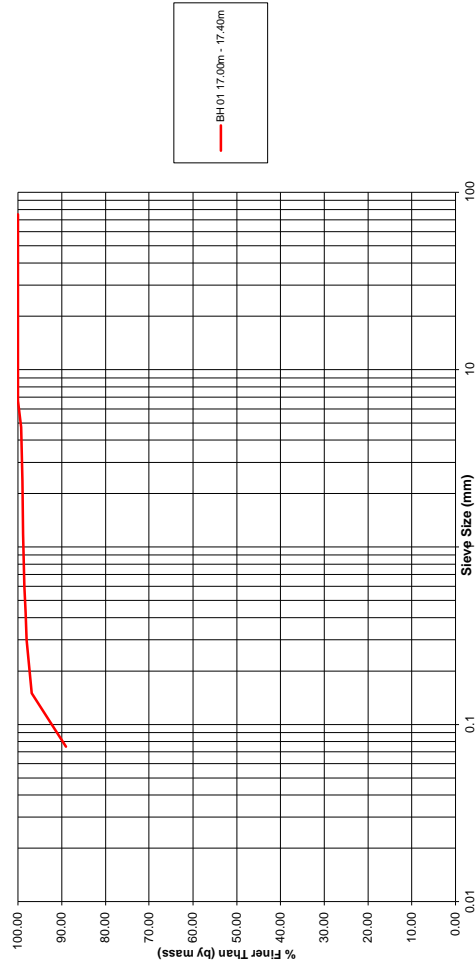
Moisture Content (Material passing 19mm)	Container No.	-	66	81	SPLIT SAMPLE
Mass of Container	g		90.96	87.45	Mass Passing Last Sieve: - gM ₃
Mass of Container + Wet Soil	g		133.68	130.89	Mass after Splitting: - gM ₄
Mass of Container + Dry Soil	g		118.95	115.90	Splitting Factor = M ₃
Mass of Dry Soil	g		27.99	28.45	= M ₄
Mass of Moisture	g		14.73	14.99	
Moisture Content	%		52.63	52.69	
Average Moisture Content	%		52.66		

Total Mass of Dry Sample	Mass of dry sample retained on 19mm test sieve (M _r)	g	Nil
	Total Wet Weight (M _w)	g	364.65
	Total Mass of dry sample (M _T)	M _T =	100M _w
		M _T =	238.87

Test Sieve Size mm	Mass of Dry Soil Retained (M _s)	Corrected Mass	Percentage Retained = (Mass.M _s) x 100	Total Percentage Passing	Maximum Sieve Load (Sieve Diameter 200mm)	Sieve Diameter
	g	g	%	%	g	mm
75.0mm	N/A	0.00	100.00			300
50.0mm	N/A	0.00	100.00			300
37.5mm	N/A	0.00	100.00			300
26.5mm	N/A	0.00	100.00			300
19.0mm	N/A	0.00	100.00			200
13.2 mm	N/A	0.00	100.00		600	300
9.50 mm	N/A	0.00	100.00		450	300
6.70 mm	N/A	0.00	100.00		300	300
4.75 mm	1.81	N/A	0.76	99.24	250	200
2.36 mm	0.76	N/A	0.32	98.92	150	200
1.18 mm	0.24	N/A	0.10	98.82	100	200
0.600 mm	0.67	N/A	0.28	98.54	80	200
425 µm	0.59	N/A	0.25	98.30	70	200
300 µm	0.81	N/A	0.34	97.96	60	200
150 µm	2.65	N/A	1.11	96.85	40	200
75 µm	18.78	N/A	7.86	88.99	25	200
Passing 75 µm	212.56	N/A	88.99	0.00	-	-
Pan Total	238.87	-	100.00	-	-	-

NOTES: 1) Testing performed on fraction passing/retained on 19mm sieve
 2) The percentage passing the finest sieve was obtained by difference

Tested by: KB	Q.A. Checked by: LN	Approved by: IG
Date: 09 October 2015	Date: 15 October 2015	Date: 18 November 2015



LOCATION:	BH 01 17.00m - 17.40m	DESCRIPTION: Silt with trace of minor clay and trace of organics, grey brown, firm, medium plasticity.
DATE OF TEST:	09 October 2015	SAMPLE No: N.503

Form GE-L-06

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Wet Sieve Analysis
NZS 4407:1991 (Test 3.8.1)

PRINCIPAL :	Japan International Cooperation Agency (JICA)	PROJECT No. :	1920815
PROJECT NAME :	Geotechnical Investigation for Nadi River Basin Drilling Works	DATE / :	09 October 2015
SITE ADDRESS :	BH01, Moala Village, Nadi	TECHNOLOGIST :	KB/TL
SAMPLE LOCATION :	BH 01 23.00m - 23.50m	MATERIAL TYPE & LOCATION :	Silty CLAY, pale brown, stiff, medium to high plasticity.
TEST NUMBER :	N 506		

SAMPLE HISTORY : NATURAL / AIR-DRIED / OVEN-DRIED / UNKNOWN

Moisture Content (Material passing 19mm)	Container No.	-	60	56	SPLIT SAMPLE
Mass of Container	g		62.90	62.60	Mass Passing Last Sieve: - gM ₃
Mass of Container + Wet Soil	g		98.90	97.19	Mass after Splitting: - gM ₄
Mass of Container + Dry Soil	g		90.09	88.57	Splitting Factor = $\frac{M_3}{M_4}$
Mass of Dry Soil	g		27.19	25.97	
Mass of Moisture	g		8.81	8.62	
Moisture Content	%		32.40	33.19	
Average Moisture Content	%		32.80		

Total Mass of Dry Sample	Mass of dry sample retained on 19mm test sieve (M _s)	g	Nil
Total Wet Weight (M _w)	g		365.99
Total Mass of dry sample (M _T)	M _T = $\frac{100M_w}{100 + w}$		
	M _T =	275.60	

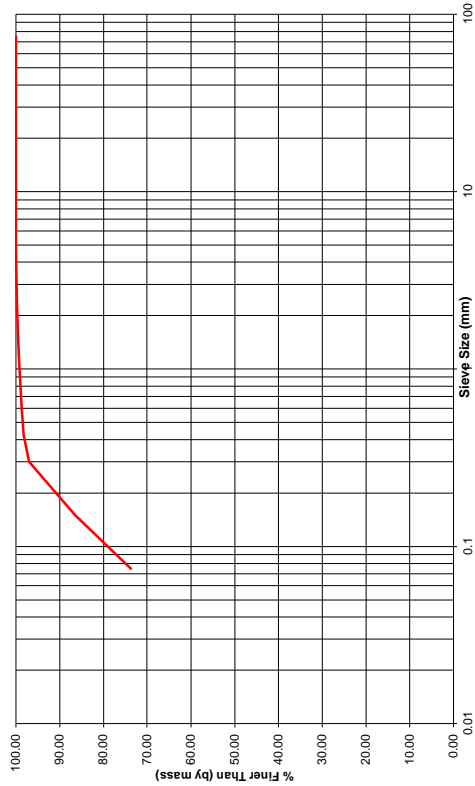
Test Sieve Size mm	Mass of Dry Soil Retained (M _c)	Corrected Mass	Percentage Retained = $\frac{(Mass.M_c)}{100}$	Total Percentage Passing	Maximum Sieve Load (Sieve Diameter 200mm)	Sieve Diameter
	g		%	%	g	mm
75.0mm	N/A	N/A	0.00	100.00		300
50.0mm	N/A	N/A	0.00	100.00		300
37.5mm	N/A	N/A	0.00	100.00		300
26.5mm	N/A	N/A	0.00	100.00		300
19.0mm	N/A	N/A	0.00	100.00		200
13.2 mm	N/A	N/A	0.00	100.00	600	300
9.50 mm	N/A	N/A	0.00	100.00	450	300
6.70 mm	N/A	N/A	0.00	100.00	300	300
4.75 mm	N/A	N/A	0.00	100.00	250	200
2.36 mm	0.57	N/A	0.21	99.79	150	200
1.18 mm	1.48	N/A	0.54	99.26	100	200
0.600 mm	1.70	N/A	0.62	98.64	80	200
425 µm	0.93	N/A	0.34	98.30	70	200
300 µm	3.56	N/A	1.29	97.01	60	200
150 µm	29.15	N/A	10.58	86.43	40	200
75 µm	35.05	N/A	12.72	73.72	25	200
Passing 75 µm	203.16	N/A	73.72	0.00	-	-
Pan Total	275.60	-	100.00	-	-	-

- NOTES: 1) Testing performed on fraction passing/retained on 19mm sieve
2) The percentage passing the finest sieve was obtained by difference

Tested by: KB	Q.A. Checked by: LN	Approved by: IG
Date: 09 October 2015	Date: 14 October 2015	Date: 18 November 2015

Form GE-L-06

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BH 01 23.00m -
23.50m

LOCATION: BH 01 23.00m - 23.50m
DATE OF TEST: 09 October 2015
DESCRIPTION: Silty CLAY (pale brown, stiff, medium to high plasticity)
SAMPLE No: N 508

Form GE-L-06

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PRINCIPAL : Japan International Cooperation Agency (JICA)	PROJECT No. : 1920815
PROJECT NAME : Geotechnical Investigation for Nadi River Basin Drilling Works	DATE / : 12 October 2015
SITE ADDRESS : BH01, Moala Village, Nadi	TECHNOLOGIST : RK
SAMPLE LOCATION : BH 01 26.00m - 26.50m	MATERIAL TYPE & LOCATION : Sandy fine to coarse GRAVEL in silty clay matrix, pale brown, dense
TEST NUMBER : N 508	

SAMPLE HISTORY : NATURAL / AIR-DRIED / OVEN-DRIED / UNKNOWN

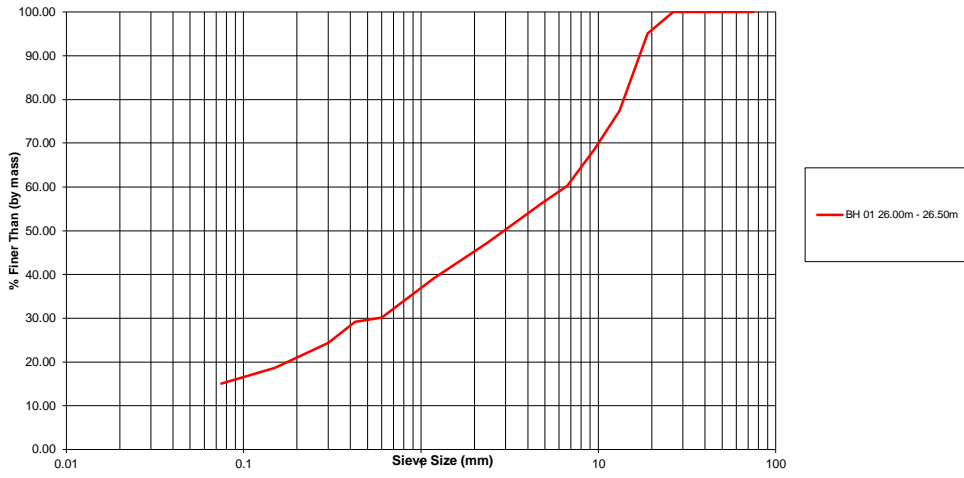
Moisture Content (Material passing 19mm)	Container No.	-	14	15	SPLIT SAMPLE
Mass of Container	g	53.54	52.65	Mass Passing Last Sieve:	gM ₃
Mass of Container + Wet Soil	g	77.52	78.98	Mass after Splitting:	gM ₄
Mass of Container + Dry Soil	g	73.73	75.22	Splitting Factor = $\frac{M_3}{M_4}$	
Mass of Dry Soil	g	20.19	22.57		
Mass of Moisture	g	3.79	3.76		
Moisture Content	%	18.77	16.66		
Average Moisture Content	%	17.72			

Total Mass of Dry Sample	Mass of dry sample retained on 19mm test sieve (M _r)	g	Nil
Total Wet Weight (M _w)	g	294.78	
Total Mass of dry sample (M _T)	M _T = $\frac{100M_w}{100 + w}$		
	M _T =	250.42	

Test Sieve Size mm	Mass of Dry Soil Retained (M _s) g	Corrected Mass	Percentage Retained = $\frac{(Mass.M_s)}{100}$	Total Percentage Passing	Maximum Sieve Load (Sieve Diameter 200mm)	Sieve Diameter mm
75.0mm	N/A	N/A	0.00	100.00		300
50.0mm	N/A	N/A	0.00	100.00		300
37.5mm	N/A	N/A	0.00	100.00		300
26.5mm	N/A	N/A	0.00	100.00		300
19.0mm	12.26	N/A	4.90	95.10		200
13.2 mm	44.49	N/A	17.77	77.34	600	300
9.50 mm	22.14	N/A	8.84	68.50	450	300
6.70 mm	20.57	N/A	8.21	60.28	300	300
4.75 mm	10.46	N/A	4.18	56.11	250	200
2.36 mm	22.25	N/A	8.89	47.22	150	200
1.18 mm	20.30	N/A	8.11	39.11	100	200
0.600 mm	22.43	N/A	8.96	30.16	80	200
425 µm	2.46	N/A	0.98	29.17	70	200
300 µm	12.09	N/A	4.83	24.35	60	200
150 µm	14.37	N/A	5.74	18.61	40	200
75 µm	8.85	N/A	3.53	15.07	25	200
Passing 75 µm	37.75	N/A	15.07	0.00	-	-
Pan Total	250.42	-	100.00	-	-	-

NOTES: 1) Testing performed on fraction passing/retained on 19mm sieve
2) The percentage passing the finest sieve was obtained by difference

Tested by: RK	Q.A. Checked by: LN	Approved by: IG
Date: 12 October 2015	Date: 14 October 2015	Date: 18 November 2015



LOCATION:	BH 01 26.00m - 26.50m	DESCRIPTION: Sandy fine to coarse GRAVEL in silty clay matrix, pale brown, dense
DATE OF TEST:	12 October 2015	SAMPLE No: N 508



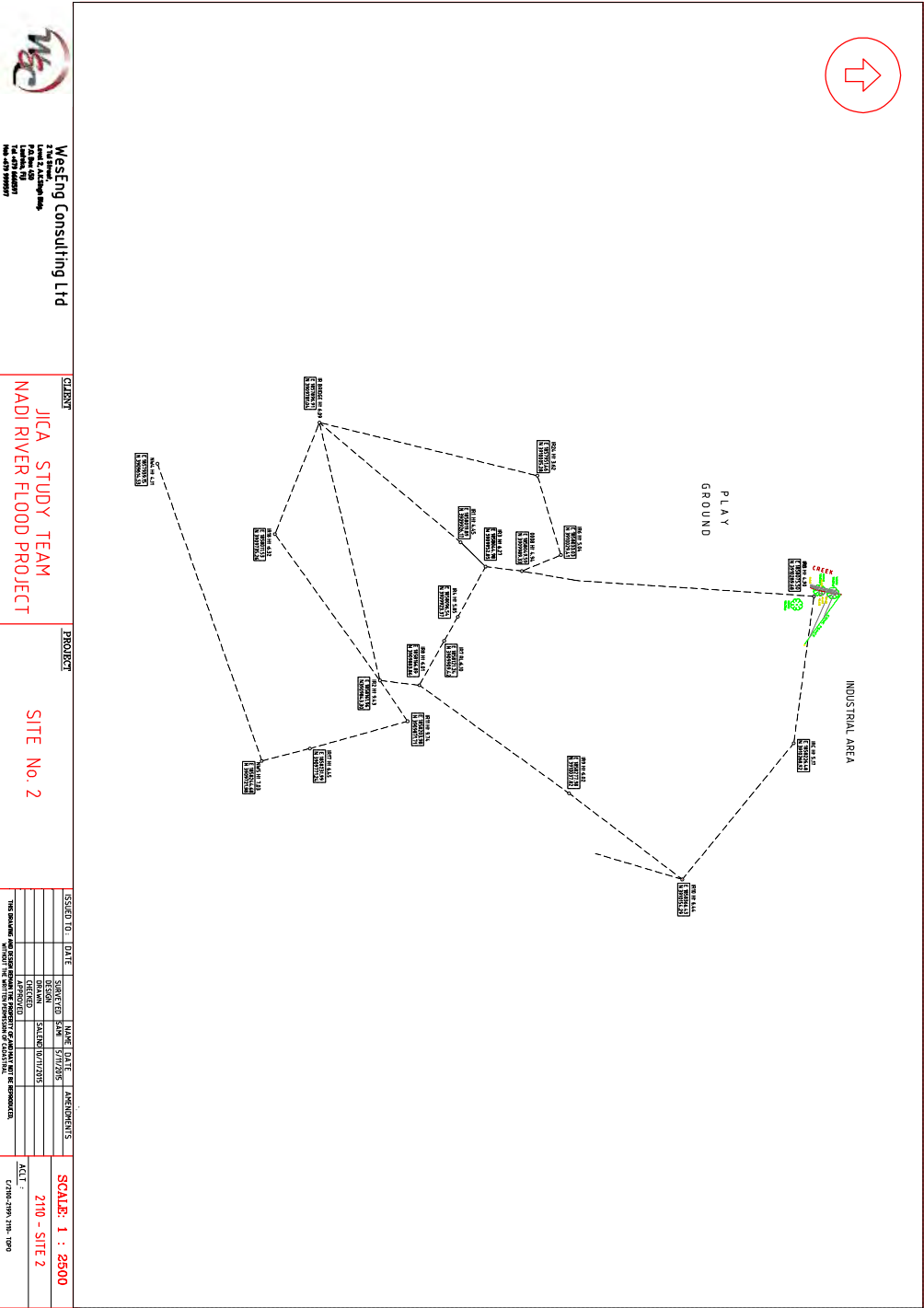
APPENDIX 2
SITE 2 - Navo, Nadi, Fiji.



APPENDIX 2a Test Locality Plan



APPENDIX 2b Engineering Borehole Log and Core Photos



DRILL HOLE LOG																	
Project: Nadi River Basin Drilling Works			Feature		Location: Navo Nadi Town		No.: BH02										
Job No.: 1920815		Start Date: 08-10-2015 Finish Date: 08-10-2015		Ground Level (m): 4.90	Co-Ordinates (): E 1858075.5 N 3910289.7												
Client: JICA Study Team				Hole Depth: 20.00 m			Sheet: 1 of 5										
Type	Run	Fluid & Water	Piezometer	Geological Description	Legend	Weathering	Field Strength	Elevation (m)	Depth (m)	Symbolic Log	Defect Spacing (mm)	Defect Description	TCR	SCR	ROD (%)	Samples	Tests
				Gravelly SILT trace of clay, soft, moist, low to medium plasticity													
				Silty CLAY minor traces of root fibres, brown, firm, moist, high plasticity				+3.00	2								
				Silty CLAY, pale brown, firm, moist, high plasticity				+1.90	3								
				Silty CLAY traces of root fibres, brown, firm, moist, high plasticity				+1.40									
				Silty CLAY with trace of root fibres, red brown, medium to high plasticity				+0.90	4								
				Silty CLAY with trace of ironstone, brown mottled grey				+0.60									
								-0.10									
Explanations:				Remarks													
Rock Mass Weathering - unweathered, slightly weathered, moderately weathered, highly weathered, completely weathered, residually weathered				N = Standard Penetration Test													
Relative Rock Strength - extremely weak, very weak, weak, moderately strong, strong, very strong				Logged to NZGS 'Field description of soil & rock' December 2005													
TCR - Total Core Recovery				● Small Disturbed Sample													
SCR - Solid Core Recovery				○ Large Disturbed Sample													
ROD - Rock Quality Designation				□ Scale Penetrometer - blows/100mm													
Altitude of discontinuities displayed as Dip/Dip Direction and Trend/Plunge				↓ Permeability Test													
				⬇ U100 Undisturbed Sample													
				⬇ Insitu Vane Shear Strength (kPa)													
				⬇ UTP = Unable to penetrate													
All dimensions in metres Scale 1:31		Contractor: GDISL		Rig/Plant Used: Drill Rig - Triple Tube		Logged by: KC/TL		Checked by: DMC									

DRILL HOLE LOG																	
Project: Nadi River Basin Drilling Works			Feature		Location: Navo Nadi Town		No.: BH02										
Job No.: 1920815		Start Date: 08-10-2015 Finish Date: 08-10-2015		Ground Level (m): 4.90	Co-Ordinates (): E 1858075.5 N 3910289.7												
Client: JICA Study Team				Hole Depth: 20.00 m			Sheet: 2 of 5										
Type	Run	Fluid & Water	Piezometer	Geological Description	Legend	Weathering	Field Strength	Elevation (m)	Depth (m)	Symbolic Log	Defect Spacing (mm)	Defect Description	TCR	SCR	ROD (%)	Samples	Tests
				Clayey SILT with traces of fine sand, pale brown, very soft to soft, moist, medium plasticity													
				SILT with fine sand, pale brown				-0.60									
				Clayey SILT, black, soft to very soft, low to medium plasticity				-1.10	6								
				Clayey organic SILT with trace of organics, dark grey, very soft to soft, low to medium plasticity				-1.30									
									7								
									8								
									9								
									8.00								
									83								
									100								
Explanations:				Remarks													
Rock Mass Weathering - unweathered, slightly weathered, moderately weathered, highly weathered, completely weathered, residually weathered				N = Standard Penetration Test													
Relative Rock Strength - extremely weak, very weak, weak, moderately strong, strong, very strong				Logged to NZGS 'Field description of soil & rock' December 2005													
TCR - Total Core Recovery				● Small Disturbed Sample													
SCR - Solid Core Recovery				○ Large Disturbed Sample													
ROD - Rock Quality Designation				□ Scale Penetrometer - blows/100mm													
Altitude of discontinuities displayed as Dip/Dip Direction and Trend/Plunge				↓ Permeability Test													
				⬇ U100 Undisturbed Sample													
				⬇ Insitu Vane Shear Strength (kPa)													
				⬇ UTP = Unable to penetrate													
All dimensions in metres Scale 1:31		Contractor: GDISL		Rig/Plant Used: Drill Rig - Triple Tube		Logged by: KC/TL		Checked by: DMC									



6.10m to 9.30m



9.30m to 12.2m



12.20m to 15.50m



15.50m to 18.30m



18.30m to 20.00m

APPENDIX 2c

Laboratory Test Schedule and Laboratory Test Results

Project No.	Site	Soil Type	Sample type	SPT N value	Depth (m)	Permeability	Density	Moisture Content	PSD	Lab Tests Required	UCS	Consolidation		
1920815.02	Site 2	Gravelly SILT Silty Clay Silty Clay Silty Clay Silty Clay Silty Clay Silty Clay Completely weathered limestone, Clay Silty Clay Completely weathered limestone Completely weathered limestone Unweathered, sedimentary, volcanic Unweathered conglomerate Unweathered conglomerate	SPT	11	1.0-1.5	1	1	1	1	1	1	1		
			SPT	11	2.0-2.5	1	1	1	1	1	1	1	1	
			SPT	0	3.0-3.5	1	1	1	1	1	1	1	1	
			U	0	4.0-4.5	1	1	1	1	1	1	1	1	
			U	0	6.5-7.0	1	1	1	1	1	1	1	1	
			U	0	9.5-10.0	1	1	1	1	1	1	1	1	
			SPT	22	11.0-11.5	1	1	1	1	1	1	1	1	1
			SPT	30	12.5-13.0	1	1	1	1	1	1	1	1	1
			SPT	52	14.0-14.5	1	1	1	1	1	1	1	1	1
			SPT	R	15.5-16.0	1	1	1	1	1	1	1	1	1
			SPT	R	16.5-17.0	1	1	1	1	1	1	1	1	1
			SPT	R	18.05-18.5	1	1	1	1	1	1	1	1	1
SPT	R	19.55-20.0	1	1	1	1	1	1	1	1	1			
TOTALS					BOQ	1	3	10	6	6	3	3		

Lab Testing Schedule to be seen with samples

Turn around time for results - Two Bore hole results per week except consolidation test results

PRINCIPAL	: Japan International Cooperation Agency (JICA)	PROJECT No.	: 1920815
PROJECT NAME	: Geotechnical Investigation for Nadi River Basin Drilling Works	DATE	: 13 October 2015
SITE ADDRESS	: BH02, Navo Nadi Town	TECHNOLOGIST	: RK
MATERIAL TYPE & DESCRIPTION	: Silty, CLAY, minor traces of root fibres, brown, firm, moist, high plasticity.	TEST METHOD	: NZS 4402:1986 (amended version)
		SAMPLE No.	: N512 (BH02 2.00m - 2.50m)

NATURAL MOISTURE CONTENT		1	2	Average	
TEST No.					
Container No.	g	92	95		
Mass of Container	g	91.40	89.87		
Mass of Container + Wet Soil	g	128.64	122.22		
Mass of Container + Dry Soil	g	120.58	115.31		
Mass of Dry Soil	g	29.18	25.44		
Mass of Moisture	g	8.06	6.91		
Moisture Content	%	27.62	27.16		27.39

PLASTIC LIMIT		1	2	Average	
TEST No.					
Container No.		38	39		
Mass of Container	g	14.79	14.21		
Mass of Container + Wet Soil	g	20.58	20.46		
Mass of Container + Dry Soil	g	19.00	18.74		
Mass of Dry Soil	g	4.21	4.53		
Mass of Moisture	g	1.58	1.72		
Moisture Content	%	37.53	37.97		37.75

LIQUID LIMIT		1	2	3	4	5	6
TEST No.							
Number of Blows		40	36	30	25	20	15
Container No.		18	19	22	23	24	25
Mass of Container	g	14.60	14.85	14.40	14.73	14.61	14.44
Mass of Container + Wet Soil	g	24.74	23.75	22.98	21.52	21.25	21.31
Mass of Container + Dry Soil	g	20.82	20.30	19.63	18.83	18.57	18.51
Mass of Dry Soil	g	6.22	5.45	5.23	4.10	3.96	4.07
Mass of Moisture	g	3.92	3.45	3.35	2.69	2.68	2.80
Moisture Content	%	63.02	63.30	64.05	65.61	67.68	68.80

LINEAR SHRINKAGE TEST		1	2	3	4	5	Average
Mould No.							
Initial length of Sample					125.00		
Final length of Sample after Shrinkage					101.00		
% Shrinkage					19.20		19.20

Sample Preparation
 as received
 washed/sieved on 425 µm sieve
 air dried/oven dried 105°C
 after making a paste cured for 12-16 hrs

Liquid Limit	65.30 %
Plastic Limit	37.75 %
Plasticity Index	27.55 %
Shrinkage Limit	19.20 %

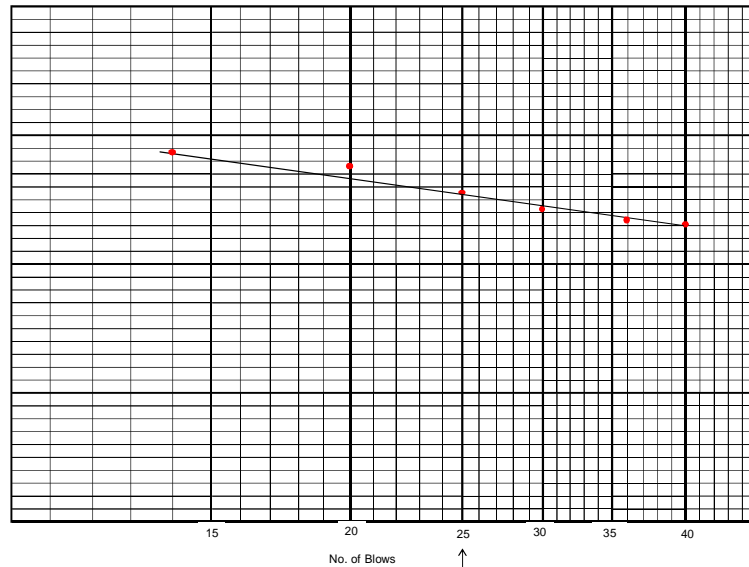
Tested By: RK
 Date: 13 October 2015

Q.A. Checked By: TL
 Date: 15 October 2015

Approved By: IG
 Date: 18 November 2015

Form: GE-L-03

Graph of Moisture Content vs No. of Blows



Project No: 1920815
Sample No: N512

PRINCIPAL	: Japan International Cooperation Agency (JICA)	PROJECT No.	: 1920815
PROJECT NAME	: Geotechnical Investigation for Nadi River Basin Drilling Works	DATE	: 13 October 2015
SITE ADDRESS	: Site 2, Navo Nadi Town	TECHNOLOGIST	: KB
MATERIAL TYPE & DESCRIPTION	: Clayey SILT with traces of fine sand, pale brown, very soft-soft, moist, medium plasticity.	TEST METHOD	: NZS 4402:1986 (amended version)
		SAMPLE No.	: N514 (BH02 5.00m - 5.50m)

NATURAL MOISTURE CONTENT		1	2				Average
TEST No.							
Container No.	g	65	79				
Mass of Container	g	87.16	87.10				
Mass of Container + Wet Soil	g	113.47	114.14				
Mass of Container + Dry Soil	g	106.02	106.30				
Mass of Dry Soil	g	18.86	19.20				
Mass of Moisture	g	7.45	7.84				
Moisture Content	%	39.50	40.83				40.17

PLASTIC LIMIT		1	2				Average
TEST No.							
Container No.		149	150				
Mass of Container	g	11.75	10.77				
Mass of Container + Wet Soil	g	16.55	14.86				
Mass of Container + Dry Soil	g	15.56	14.01				
Mass of Dry Soil	g	3.81	3.24				
Mass of Moisture	g	0.99	0.85				
Moisture Content	%	25.98	26.23				26.11

LIQUID LIMIT		1	2	3	4	5	6
TEST No.							
Number of Blows		40	35	30	25	20	15
Container No.		151	152	160	159	158	157
Mass of Container	g	12.00	11.50	11.93	12.17	12.13	11.92
Mass of Container + Wet Soil	g	21.99	22.74	26.95	26.12	22.31	22.14
Mass of Container + Dry Soil	g	18.80	19.09	21.91	21.41	18.70	18.36
Mass of Dry Soil	g	6.80	7.59	9.98	9.24	6.57	6.44
Mass of Moisture	g	3.19	3.65	5.04	4.71	3.61	3.78
Moisture Content	%	46.91	48.09	50.50	50.97	54.95	58.70

LINEAR SHRINKAGE TEST		1	2	3	4	5	Average
Mould No.							
Initial length of Sample						125.00	
Final length of Sample after Shrinkage						104.00	
% Shrinkage						16.80	16.80

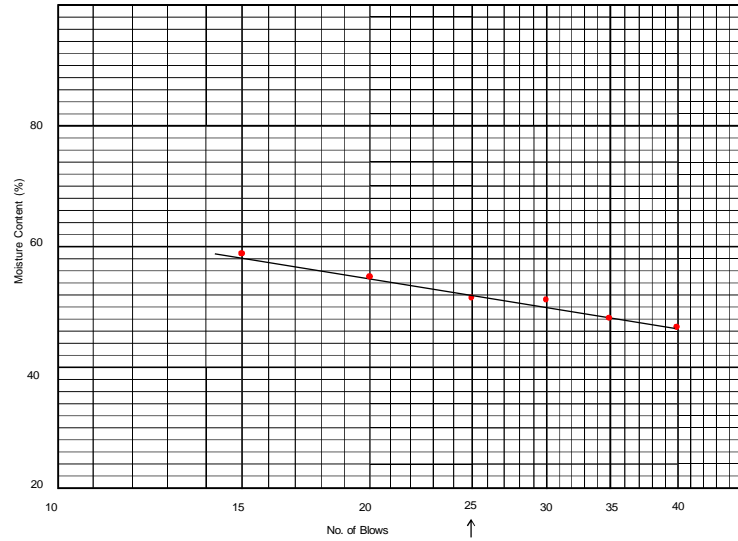
Sample Preparation		
as received	Liquid Limit	52.00 %
washed/sieved on 425 µm sieve	Plastic Limit	26.11 %
air dried/oven dried 105°C	Plasticity Index	25.89 %
after making a paste cured for 12-16 hrs	Shrinkage Limit	16.80 %

Tested By: KB
Date: 15 October 2015

Q.A. Checked By: TL
Date: 16 October 2015

Approved By: IG
Date: 18 November 2015

Graph of Moisture Content vs No. of Blows



Project No: 1920815
Sample No: N 514

PRINCIPAL	: Japan International Cooperation Agency (JICA)	PROJECT No.	: 1920815
PROJECT NAME	: Geotechnical Investigation for Nadi River Basin Drilling Works	DATE	: 15 October 2015
SITE ADDRESS	: Site 2 Navo, Nadi	TECHNOLOGIST	: LN
MATERIAL TYPE & DESCRIPTION	: Silty CLAY, red brown mottled grey with iron stain, medium to high plasticity	TEST METHOD	: NZS 4402:1986 (amended version)
		SAMPLE No.	: N518 (BH02 12.50m -13.00m)

NATURAL MOISTURE CONTENT		1	2	Average	
TEST No.					
Container No.	g	81	82		
Mass of Container	g	87.45	90.15		
Mass of Container + Wet Soil	g	117.97	117.91		
Mass of Container + Dry Soil	g	110.75	111.71		
Mass of Dry Soil	g	23.30	21.56		
Mass of Moisture	g	7.22	6.20		
Moisture Content	%	30.99	28.76		29.87

PLASTIC LIMIT		1	2	Average	
TEST No.					
Container No.		105	106		
Mass of Container	g	11.58	12.04		
Mass of Container + Wet Soil	g	16.03	15.97		
Mass of Container + Dry Soil	g	15.00	15.05		
Mass of Dry Soil	g	3.42	3.01		
Mass of Moisture	g	1.03	0.92		
Moisture Content	%	30.12	30.56		30.34

LIQUID LIMIT		1	2	3	4	5	6
TEST No.							
Number of Blows		40	35	29	25	20	16
Container No.		121	122	123	124	125	126
Mass of Container	g	11.63	11.70	11.60	11.75	11.88	12.83
Mass of Container + Wet Soil	g	24.92	25.60	27.37	28.83	25.49	27.54
Mass of Container + Dry Soil	g	20.89	21.31	22.46	23.44	21.10	22.76
Mass of Dry Soil	g	9.26	9.61	10.86	11.69	9.22	9.93
Mass of Moisture	g	4.03	4.29	4.91	5.39	4.39	4.78
Moisture Content	%	43.52	44.64	45.21	46.11	47.61	48.14

LINEAR SHRINKAGE TEST		1	2	3	4	5	Average
Mould No.							
Initial length of Sample					125.00		
Final length of Sample after Shrinkage					104.00		
% Shrinkage					16.80		16.80

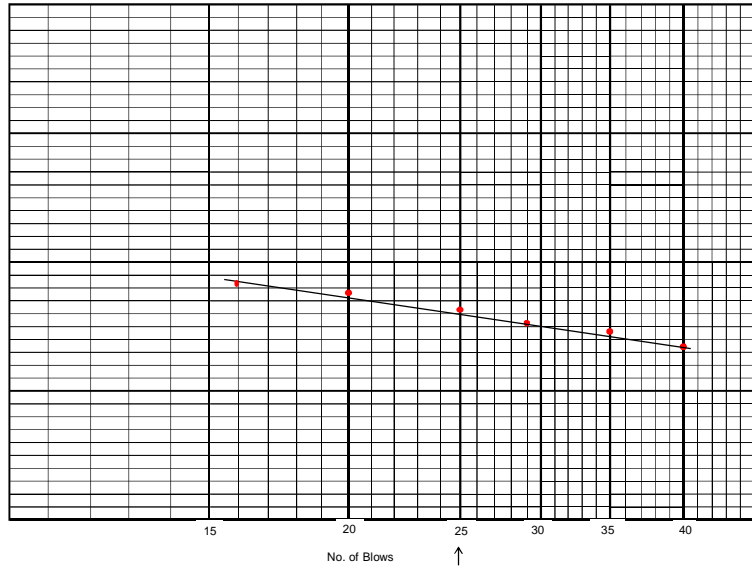
Sample Preparation		
as received	Liquid Limit	46.00 %
washed/sieved on 425 µm sieve	Plastic Limit	30.34 %
air dried/oven dried 105°C	Plasticity Index	15.66 %
after making a paste cured for 12-16 hrs	Shrinkage Limit	16.80 %

Tested By: LN
Date: 15 October 2015

Q.A. Checked By: TL
Date: 16 October 2015

Approved By: IG
Date: 18 November 2015

Graph of Moisture Content vs No. of Blows



Project No: 1920815
Sample No:N518

PRINCIPAL :	Japan International Cooperation Agency (JICA)	PROJECT No. :	1920815
PROJECT NAME :	Geotechnical Engineering Investigation for Nadi River Basin Drilling Works	DATE / TESTED :	16 October 2015
SITE ADDRESS :	BH02, Navo, Nadi Town	TECHNOLOGIST :	LN/IG
SAMPLE LOCATION :	BH02 3.50m - 4.00m	MATERIAL TYPE :	Silty, CLAY traces of root fibres, brown, firm, moist, high plasticity.
TEST NUMBER :	N513	SAMPLE HISTORY : NATURAL / AIR-DRIED / OVEN-DRIED / UNKNOWN	

Moisture Content	Container No.	-	65	79
	Mass of Container	g	87.17	87.13
	Mass of Container + Wet Soil	g	214.36	208.59
	Mass of Container + Dry Soil	g	179.6	175.67
	Mass of Dry Soil	g	92.43	88.54
	Mass of Moisture	g	34.76	32.92
	Moisture Content	%	37.61	37.18
				37.39

Bulk Density	Sample No.	-	N513
	Diameter of Specimen	mm	53.82
	Initial area of specimen A_0 ($\pi/4 d^2$)	mm ²	2273.83
	Initial length of specimen L_0	mm	59.85
	Initial mass of specimen M_i	g	248.77
	Bulk Density ρ	t/m ³	1.83
	Dry Density ρ_d	t/m ³	1.33

Tested by : LN/IG	Q.A. Check by : MK	Approved by : IG
Date : 16 October 2015	Date : 18 October 2015	Date : 18 November 2015

PRINCIPAL :	Japan International Cooperation Agency (JICA)	PROJECT No. :	1920815
PROJECT NAME :	Geotechnical Engineering Investigation for Nadi River Basin Drilling Works	DATE / TESTED :	16 October 2015
SITE ADDRESS :	BH02, Navo, Nadi Town	TECHNOLOGIST :	IG/LN/TL
SAMPLE LOCATION :	BH02 6.50m - 7.00m	MATERIAL TYPE :	Clayey organic SILT with trace of organics, dark grey, very soft to soft, low to medium plasticity
TEST NUMBER :	N515		
SAMPLE HISTORY : NATURAL / AIR-DRIED / OVEN-DRIED / UNKNOWN			

Moisture Content	Container No.	-	89	90
	Mass of Container	g	121.44	118.14
	Mass of Container + Wet Soil	g	210.63	216.78
	Mass of Container + Dry Soil	g	179.79	182.77
	Mass of Dry Soil	g	58.35	64.63
	Mass of Moisture	g	30.84	34.01
	Moisture Content	%	52.85	52.62
				52.74

Bulk Density	Sample No.	-	N515
	Diameter of Specimen	mm	53.05
	Initial area of specimen A_0 ($\pi/4 d^2$)	mm ²	2209.23
	Initial length of specimen L_0	mm	52.69
	Initial mass of specimen M_i	g	189.23
	Bulk Density ρ	t/m ³	1.63
	Dry Density ρ_d	t/m ³	1.06

Tested by : IG/LN/TL	Q.A. Check by : MK	Approved by : IG
Date : 16 October 2015	Date : 18 October 2015	Date : 18 November 2015


PRINCIPAL :	Japan International Cooperation Agency (JICA)	PROJECT No. :	1920815
PROJECT NAME :	Geotechnical Engineering Investigation for Nadi River Project Drilling Works	DATE / TESTED :	16 October 2015
SITE ADDRESS :	BH02, Navo, Nadi Town	TECHNOLOGIST :	IG/TL
SAMPLE LOCATION :	BH02 9.50m -10.00m	MATERIAL TYPE :	Clayey organic SILT with trace of organics, dark grey, very soft to soft, low to medium plasticity
TEST NUMBER :	N516		
SAMPLE HISTORY : NATURAL / AIR-DRIED / OVEN-DRIED / UNKNOWN			

Moisture Content	Container No.	-	70	77
	Mass of Container	g	90.08	91.32
	Mass of Container + Wet Soil	g	195.92	196.13
	Mass of Container + Dry Soil	g	166.00	165.95
	Mass of Dry Soil	g	75.92	74.63
	Mass of Moisture	g	29.82	30.18
	Moisture Content	%	39.28	40.44
				39.86

Bulk Density	Sample No.	-	N516
	Diameter of Specimen	mm	53.43
	Initial area of specimen A_0 ($\pi/4 d^2$)	mm ²	2240.99
	Initial length of specimen L_0	mm	56.34
	Initial mass of specimen M_i	g	210.20
	Bulk Density ρ	t/m ³	1.66
	Dry Density ρ_d	t/m ³	1.19

Tested by : IG/TL	Q.A. Check by : MK	Approved by : IG
Date : 16 October 2015	Date : 18 October 2015	Date : 18 November 2015

Oedometer Settlement Test


Sample Details	Depth	3.50m - 3.76m		
 <i>sketch showing specimen location in original sample</i>	Description	Sample 1 of 3 from Borehole B2		
	Type	Default		
	Initial Height	L ₀	(mm)	20.0
	Initial Diameter	D ₀	(mm)	50.0
	Initial Weight	W ₀	(gr)	66.4
	Bulk Density	ρ ₀	(Mg/m ³)	1.69
	Particle Density	ρ _s	(Mg/m ³)	2.65

Initial Conditions				
Settlement Input	L _{IP}	(mm)	CH 3	
Initial Moisture	ω _i %	(%)	39	
Initial Dry Density	ρ _{di}	(Mg/m ³)	1.22	
Initial Voids Ratio	e _i	.	1.180	
Initial Degree of Saturation	S _i	(%)	87.8	
Initial Swelling	S _s	(kPa)	0	

Final Conditions				
Final Moisture	ω _f %	(%)	0.00	
Dry Density	ρ _{df}	(Mg/m ³)	1.30	
Voids Ratio	e _f	.	1.035	
Saturation	S _f	(%)	0	
Height Settlement	ΔL _s	(mm)	1.325	

Vertical Stress σ' _i (kPa)	Voids Ratio e _f .	Height ΔL _s (mm)	Consolidation C _v (m ² /year)	Compressibility m _v (m ² /MN)	Initial T _i (oC)	Final T _f (oC)	t ₅₀ Time t ₅₀ (min)	t ₉₀ Time t ₉₀ (min)	Secondary C _{SEC} (m ² /MN)
30	1.133	0.433	3.2	0.722	27.0	0.0	3,171		0.0087
60	1.118	0.564	3.1	0.223	27.0	0.0	3,171		0.0087
120	1.090	0.826	3.1	0.225	27.0	0.0	3,171		0.0087
240	1.035	1.325	2.9	0.217	27.0	0.0	3,171		0.0087
480	0.993	1.715	2.8	0.087	27.0	0.0	3,171		0.0087
120	1.010	1.555			27.0	0.0			
30	1.035	1.325			27.0	0.0			

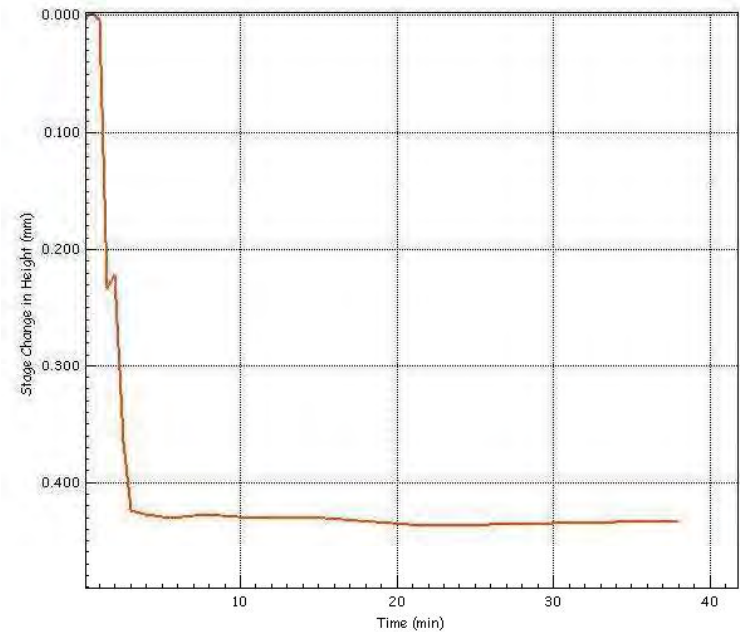
Notes


	Test Method	AS 1289.6.6.1-1998	Test Name	ODO-01	
			Database:	.\SQLEXPRESS \ ENTEC	
	Site Reference	1920815	Test Date	10/27/2015	
	Jobfile	Geotechnical Engineering Investigation	Sample	N513	
	Client	Japan International Cooperation Agency	Borehole	BH02	
Operator	IG/MK	Checked	DMC	Approved	DMC

Entec Limited, Level 2 Mid City, Cnr Cumming Street & Renwick Road, Suva

Oedometer Consolidation Settlement Report

Vertical Stress	σ' _i	(kPa)	30
Initial Temperature	T _i	(oC)	27.0
Frame Correction	L _{CORR}	(mm)	0.000
Height Settlement	ΔL _s	(mm)	0.433
Voids Ratio	e _f	.	1.133
Final Temperature	T _f	(oC)	0.0
t₅₀ Time	t ₅₀	(min)	3.171
t₉₀ Time	t ₉₀	(min)	
Consolidation	C _v	(m ² /year)	3.2
Compressibility	m _v	(m ² /MN)	0.722
Secondary Compression	C _{SEC}	(m ² /MN)	0.0087

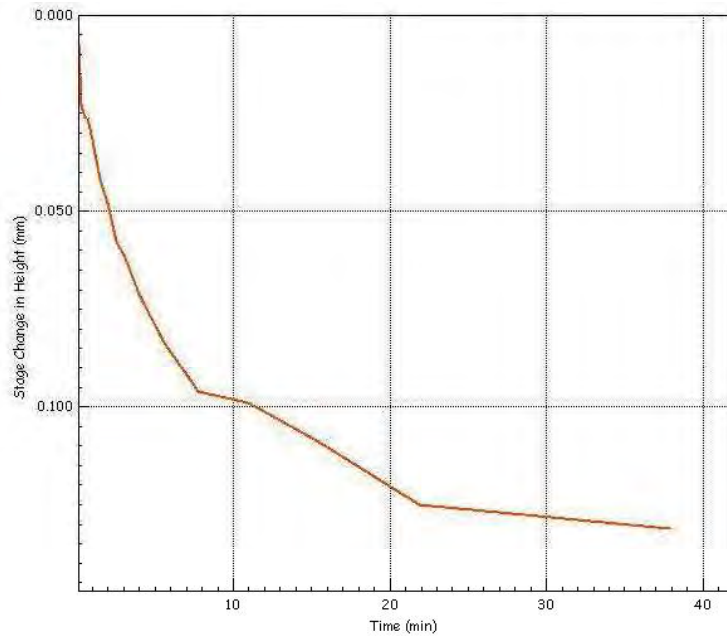


	Test Method	AS 1289.6.6.1-1998	Test Name	ODO-01	
			Database:	.\SQLEXPRESS \ ENTEC	
	Site Reference	1920815	Test Date	10/27/2015	
	Jobfile	Geotechnical Engineering Investigation	Sample	N513	
	Client	Japan International Cooperation Agency	Borehole	BH02	
Operator	IG/MK	Checked	DMC	Approved	DMC

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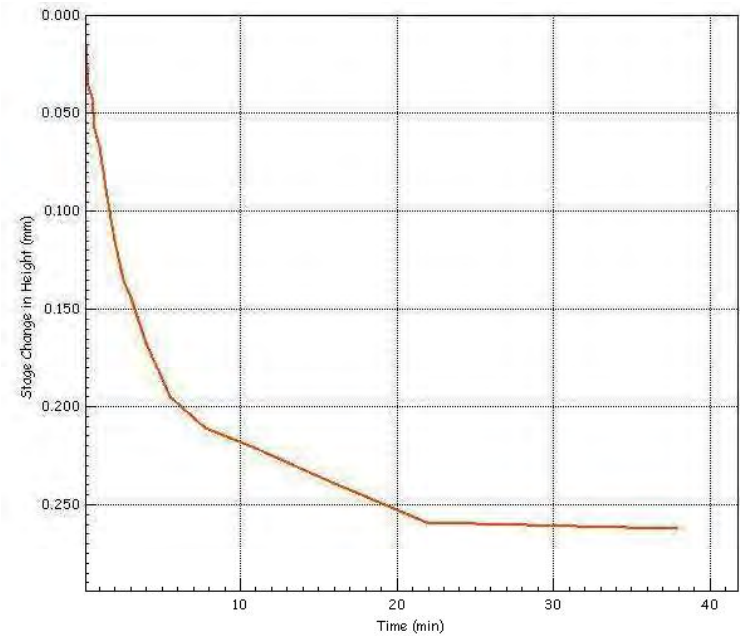
Oedometer Consolidation Settlement Report

Vertical Stress	σ'_{i}	(kPa)	60
Initial Temperature	T_i	(oC)	27.0
Frame Correction	L CORR	(mm)	0.000
Height Settlement	ΔL_s	(mm)	0.564
Voids Ratio	e_f	.	1.118
Final Temperature	T_f	(oC)	0.0
t50 Time	t ₅₀	(min)	3.171
t90 Time	t ₉₀	(min)	
Consolidation	C_v	(m ² /year)	3.1
Compressibility	m_v	(m ² /MN)	0.223
Secondary Compression	C_{SEC}	(m ² /MN)	0.0087



Oedometer Consolidation Settlement Report

Vertical Stress	σ'_{i}	(kPa)	120
Initial Temperature	T_i	(oC)	27.0
Frame Correction	L CORR	(mm)	0.000
Height Settlement	ΔL_s	(mm)	0.826
Voids Ratio	e_f	.	1.090
Final Temperature	T_f	(oC)	0.0
t50 Time	t ₅₀	(min)	3.171
t90 Time	t ₉₀	(min)	
Consolidation	C_v	(m ² /year)	3.1
Compressibility	m_v	(m ² /MN)	0.225
Secondary Compression	C_{SEC}	(m ² /MN)	0.0087



	Test Method	AS 1289.6.6.1-1998	Test Name	ODO-01	
			Database:	.\SQLEXPRESS \ ENTEC	
	Site Reference	1920815	Test Date	10/27/2015	
	Jobfile	Geotechnical Engineering Investigation	Sample	N513	
	Client	Japan International Cooperation Agency	Borehole	BH02	
	Operator	IG/MK	Checked	DMC	Approved

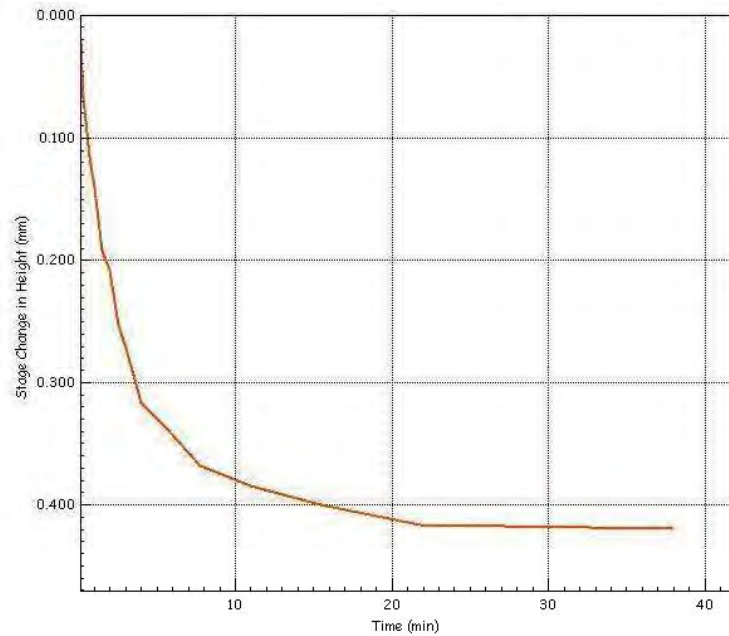
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	Test Method	AS 1289.6.6.1-1998	Test Name	ODO-01	
			Database:	.\SQLEXPRESS \ ENTEC	
	Site Reference	1920815	Test Date	10/27/2015	
	Jobfile	Geotechnical Engineering Investigation	Sample	N513	
	Client	Japan International Cooperation Agency	Borehole	BH02	
	Operator	IG/MK	Checked	DMC	Approved

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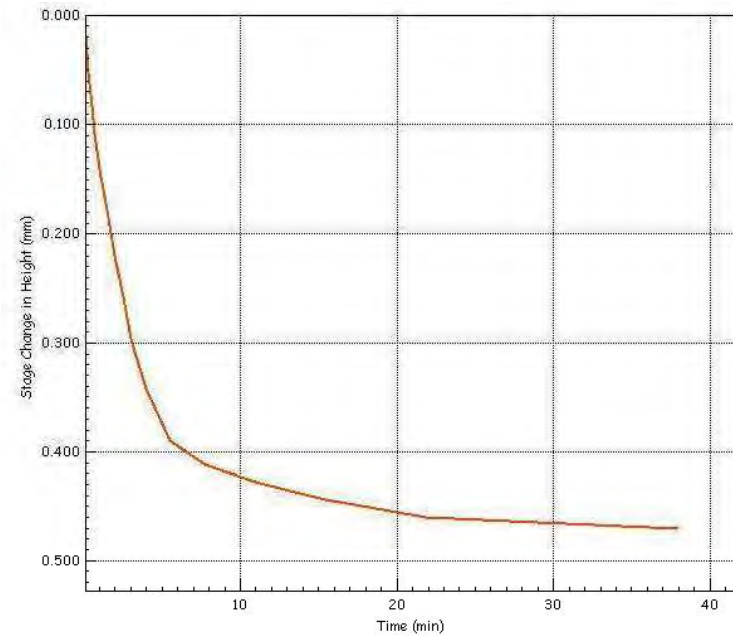
Oedometer Consolidation Settlement Report

Vertical Stress	σ'_{i}	(kPa)	240
Initial Temperature	T_i	(oC)	27.0
Frame Correction	L CORR	(mm)	0.000
Height Settlement	ΔL_s	(mm)	1.325
Voids Ratio	e_f	.	1.035
Final Temperature	T_f	(oC)	0.0
t50 Time	t ₅₀	(min)	3.171
t90 Time	t ₉₀	(min)	
Consolidation	C_v	(m ² /year)	2.9
Compressibility	m_v	(m ² /MN)	0.217
Secondary Compression	C_{SEC}	(m ² /MN)	0.0087



Oedometer Consolidation Settlement Report

Vertical Stress	σ'_{i}	(kPa)	480
Initial Temperature	T_i	(oC)	27.0
Frame Correction	L CORR	(mm)	0.000
Height Settlement	ΔL_s	(mm)	1.715
Voids Ratio	e_f	.	0.993
Final Temperature	T_f	(oC)	0.0
t50 Time	t ₅₀	(min)	3.171
t90 Time	t ₉₀	(min)	
Consolidation	C_v	(m ² /year)	2.8
Compressibility	m_v	(m ² /MN)	0.086
Secondary Compression	C_{SEC}	(m ² /MN)	0.0087



	Test Method	AS 1289.6.6.1-1998	Test Name	ODO-01	
			Database:	.\SQLEXPRESS \ ENTEC	
	Site Reference	1920815	Test Date	10/27/2015	
	Jobfile	Geotechnical Engineering Investigation	Sample	N513	
	Client	Japan International Cooperation Agency	Borehole	BH02	
	Operator	IG/MK	Checked	DMC	Approved

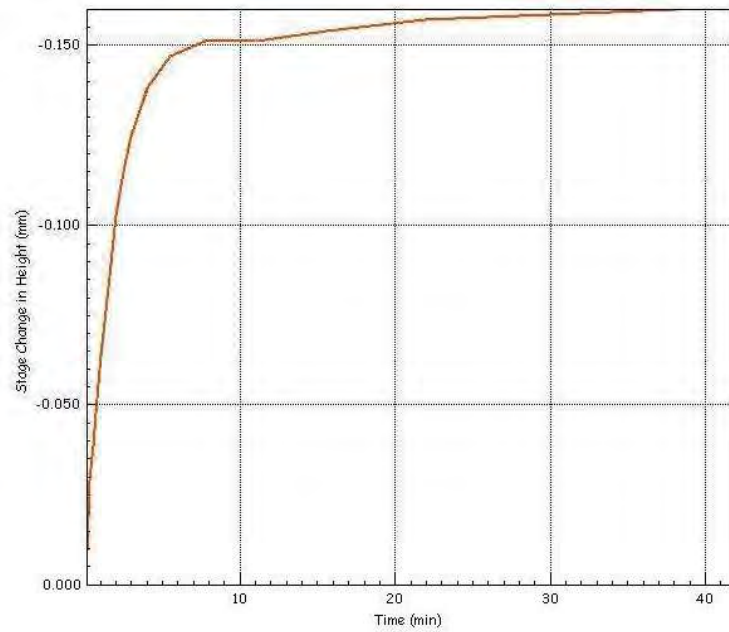
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	Test Method	AS 1289.6.6.1-1998	Test Name	ODO-01	
			Database:	.\SQLEXPRESS \ ENTEC	
	Site Reference	1920815	Test Date	10/27/2015	
	Jobfile	Geotechnical Engineering Investigation	Sample	N513	
	Client	Japan International Cooperation Agency	Borehole	BH02	
	Operator	IG/MK	Checked	DMC	Approved

Entec Limited, Level 2 Mid City, Cnr Cumming Street & Renwick Road, Suva

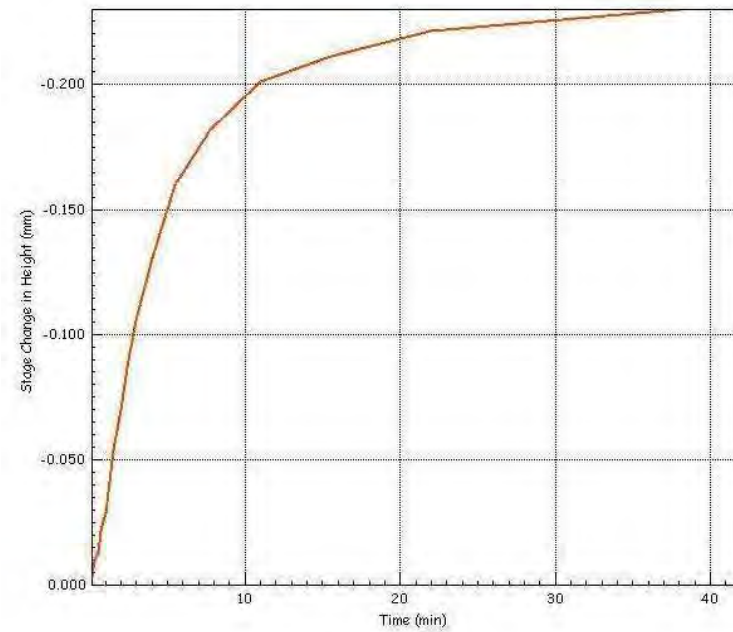
Oedometer Consolidation Settlement Report

Vertical Stress	σ'_{i_1}	(kPa)	120
Initial Temperature	T_i	(°C)	27.0
Frame Correction	L CORR	(mm)	0.000
Height Settlement	ΔL_s	(mm)	1.555
Voids Ratio	e_f	.	1.010
Final Temperature	T_f	(°C)	0.0
t50 Time	t ₅₀	(min)	
t90 Time	t ₉₀	(min)	
Consolidation	C_v	(m ² /year)	
Compressibility	m_v	(m ² /MN)	
Secondary Compression	C_{SEC}	(m ² /MN)	



Oedometer Consolidation Settlement Report

Vertical Stress	σ'_{i_1}	(kPa)	30
Initial Temperature	T_i	(°C)	27.0
Frame Correction	L CORR	(mm)	0.000
Height Settlement	ΔL_s	(mm)	1.325
Voids Ratio	e_f	.	1.035
Final Temperature	T_f	(°C)	0.0
t50 Time	t ₅₀	(min)	
t90 Time	t ₉₀	(min)	
Consolidation	C_v	(m ² /year)	
Compressibility	m_v	(m ² /MN)	
Secondary Compression	C_{SEC}	(m ² /MN)	



	Test Method	AS 1289.6.6.1-1998	Test Name	ODO-01	
			Database:	.\SQLEXPRESS \ ENTEC	
	Site Reference	1920815	Test Date	10/27/2015	
	Jobfile	Geotechnical Engineering Investigation	Sample	N513	
	Client	Japan International Cooperation Agency	Borehole	BH02	
	Operator	IG/MK	Checked	DMC	Approved

Entec Limited, Level 2 Mid City, Cnr Cumming Street & Renwick Road, Suva

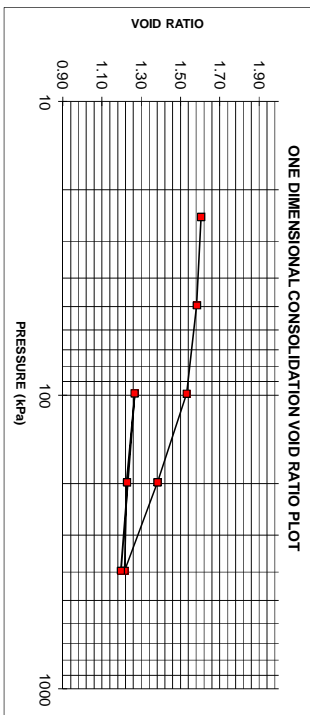
	Test Method	AS 1289.6.6.1-1998	Test Name	ODO-01	
			Database:	.\SQLEXPRESS \ ENTEC	
	Site Reference	1920815	Test Date	10/27/2015	
	Jobfile	Geotechnical Engineering Investigation	Sample	N513	
	Client	Japan International Cooperation Agency	Borehole	BH02	
	Operator	IG/MK	Checked	DMC	Approved

Entec Limited, Level 2 Mid City, Cnr Cumming Street & Renwick Road, Suva

Project Name: Geotechnical Engineering Investigation for Nadi River
Client Name: Basin Drilling Works
Job No.: Japan International Cooperation Agency (JICA) 1920815
Site Address: Navo, Nadi
Sample Location: BH 02

Sample No.: N 515
Depth: 6.50m-7.0m
Tested By: IG
Date Tested: 27 October 2015

Sample Description: Clayey SILT with trace of organics, dark grey, very soft to soft, low to medium plasticity
Sample History: Undisturbed / Remoulded / Compacted / Stirred / Heated / Frozen
Date Sample Collected: 08/10/15
Loading Cycle: 24 hrs 0 mins
Temperature: Max: 27°C Min: 25°C
Diameter of ring (D): 44.96 mm
Height of ring: 23.8 mm
Area of ring (A): 1587.61 mm²
Soil density of soil particles (Q_s): 2.65 t/m³ (Measured / Assumed)
Method used: Square root of time fitting method



Measured thickness of specimen, H	mm	Initial H _i	Final H _f
Mass of ring + watch-glass + wet specimen	g	M ₃ 23.8	M ₄ 19.96
Mass of ring + watch-glass + dry specimen	g	M ₅ 265.81	M ₆ 261.13
Mass of ring	g	M ₁ 206.07	M ₂ 244.29
Mass of watch-glass	g	M ₇ 0	M ₈ 0
Mass of dry specimen	g	M ₉ = M ₅ - M ₁ - M ₂ 38.22	M ₁₀ = M ₆ - M ₂ - M ₈ 16.84
Mass of water	g	M ₁₁ - M ₉ 21.52	M ₁₂ - M ₁₀ 4.06
Water content, w	%	W ₁ 56.31	W ₂ 44.06
Dry density, Q _d	t/m ³	Q _{d1} 1.01	Q _{d2} 1.21
Height of soil particles, H _s	mm	9.08	9.08
Void ratio, e		e _i 1.62	e _f 1.20
Degrees of saturation, S		S _i 92.11	S _f 97.55

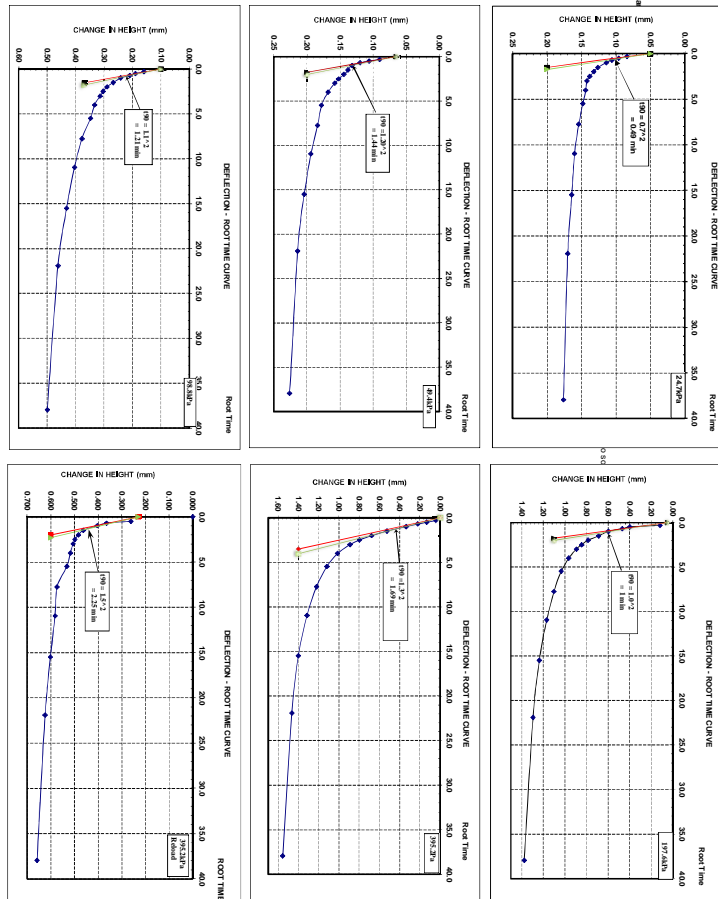
Applied Pressure (kPa)	Incremental deflection (Δh) (mm)	Thickness of specimen (mm)	% Change in thickness	Height of voids (mm)	Void ratio	Coefficient of consolidation C _v (m ² /yr)	Coefficient of compressibility M _v (m ² /MN)
24.7	0.122	23.678	0.005	14.59	1.61	127.00	
49.4	0.328	23.472	0.014	14.39	1.58	42.47	0.56
98.8	0.804	22.996	0.035	13.91	1.53	48.51	0.68
197.6	2.148	21.652	0.099	12.57	1.38	52.04	0.91
395.2	3.668	20.132	0.182	11.05	1.22	26.62	0.78
197.6	3.562	20.238	0.176	11.15	1.23	0.00	-0.76
98.6	3.206	20.594	0.156	11.51	1.27	0.00	-1.36
395.2	3.842	19.968	0.193	10.87	1.20	19.65	0.54
0	0.00	23.800	0.000	14.72	1.62	0.00	

Tested by: IG Date: 27 October 2015
 Q.A. Check By: MK Date: 27 October 2015
 Approved By: IG Date: 18 November 2015
 Page 1 of 4


Determination of the One-Dimensional Consolidation Properties
NZS 4402 : 1986 Test 7.1

Loading Date & Time	27/10/2015 @ 09:33hrs			28/10/2015 @ 09:39hrs			29/10/2015 @ 09:41hrs			30/10/2015 @ 10:46hrs			31/10/2015 @ 10:50hrs			01/11/2015 @ 10:53hrs		
	Hanger Load			800g			1600g			3200g			6400g			3200g		
	Effective Pressure			24.7kPa			49.4kPa			98.8kPa			197.6kPa			395.2kPa		
Time Elapsed	Clock	Dial	H	Clock	Dial	H	Clock	Dial	H	Clock	Dial	H	Clock	Dial	H	Clock	Dial	H
min	min	min	min	min	min	min	min	min	min	min	min	min	min	min	min	min	min	min
0	09:33:00	2251		09:39:00	2163		09:41:00	2050		10:46:00	1800	0.000	10:50:00	1111	0.000	11:53:00	333	0.000
6	09:33:06	2209	0.084	09:39:06	2118	0.090	09:41:06	1970	0.160	10:46:06	1740	0.120	10:50:06	1090	0.042	11:53:06	353	0.040
15	09:33:15	2203	0.096	09:39:15	2110	0.106	09:41:15	1955	0.190	10:46:15	1600	0.400	10:50:15	1045	0.132	11:53:15	357	0.048
30	09:33:30	2198	0.106	09:39:30	2103	0.120	09:41:30	1945	0.210	10:46:30	1565	0.470	10:50:30	1000	0.222	11:53:30	362	0.058
1	09:34:00	2194	0.114	09:40:00	2097	0.132	09:42:00	1929	0.242	10:47:00	1500	0.600	10:51:00	942	0.338	11:54:00	366	0.066
2	09:35:15	2188	0.126	09:41:15	2094	0.138	09:43:15	1916	0.268	10:48:15	1456	0.688	10:52:15	849	0.524	11:55:15	371	0.076
4	09:37:00	2185	0.132	09:43:00	2091	0.144	09:45:00	1905	0.290	10:50:00	1407	0.786	10:54:00	773	0.676	11:57:00	373	0.080
6	09:39:15	2182	0.138	09:45:15	2087	0.152	09:47:15	1898	0.304	10:52:15	1377	0.846	10:56:15	712	0.798	11:59:15	375	0.084
9	09:42:00	2180	0.142	09:48:00	2084	0.158	09:50:00	1893	0.314	10:55:00	1353	0.894	10:59:00	666	0.890	12:02:00	376	0.086
16	09:49:00	2179	0.144	09:55:00	2079	0.168	09:57:00	1883	0.334	11:02:00	1318	0.964	11:06:00	604	1.014	12:09:00	377	0.088
30	10:03:00	2177	0.148	10:09:00	2074	0.178	10:11:00	1876	0.348	11:16:00	1283	1.034	11:20:00	551	1.120	12:23:00	378	0.090
1	10:33:00	2174	0.154	10:39:00	2071	0.184	10:41:00	1861	0.378	11:46:00	1249	1.102	11:50:00	500	1.222	12:53:00	380	0.094
2	11:33:00	2171	0.160	11:39:00	2066	0.194	11:41:00	1848	0.404	12:46:00	1216	1.168	12:50:00	453	1.316	13:53:00	382	0.098
4	13:33:00	2169	0.164	13:39:00	2061	0.204	13:41:00	1834	0.432	14:46:00	1181	1.238	14:50:00	410	1.402	15:53:00	383	0.100
8	17:33:00	2166	0.170	17:39:00	2056	0.214	17:41:00	1819	0.462	18:46:00	1152	1.296	18:50:00	378	1.466	19:53:00	386	0.106
24	09:33:00	2163	0.176	09:39:00	2050	0.226	09:41:00	1800	0.500	10:46:00	1111	1.378	10:50:00	333	1.556	11:53:00	388	0.110
UNLOADING																		
Machine Correction			0.054	0.020			0.024			0.034			0.036			0.004		
Δ H (Corrected)			0.122	0.206			0.476			1.344			1.520			0.106		
Net Total Settlement			0.122	0.328			0.804			2.148			3.668			3.562		

Loading Date and Time				02/11/2015 @ 11:54hrs			03/11/2015 @ 11:56hrs			N 515											
Hanger Load				1600g			6400g			6.50m-7.0m											
Effective Pressure				98.8kPa			395.2kPa														
Time Elapsed				Clock			Dial			H			Clock			Dial			H		
hrs	min	BH	t min	√t min	ΔTime/4	Gauge	x10 mm	Clock	Dial	H	ΔTime/4	Gauge	x10 mm	Clock	Dial	H	ΔTime/4	Gauge	x10 mm		
																				0	0
6	0.250	0.500	11:54:06	390	0.004	11:56:06	500	0.142													
15	0.500	0.707	11:54:15	407	0.038	11:56:15	440	0.262													
30	1.000	1.000	11:54:30	413	0.050	11:56:30	389	0.364													
1	2.250	1.500	11:55:00	419	0.062	11:57:00	369	0.404													
2	4.000	2.000	11:56:15	428	0.080	11:58:15	340	0.462													
4	6.250	2.500	11:58:00	433	0.090	12:00:00	329	0.484													
6	9.000	3.000	12:00:15	436	0.096	12:02:15	322	0.498													
9	16.000	4.000	12:03:00	440	0.104	12:05:00	318	0.506													
16	30.000	5.480	12:10:00	443	0.110	12:12:00	312	0.518													
1	60.000	7.750	12:24:00	446	0.116	12:26:00	305	0.532													
2	120.000	10.950	12:54:00	450	0.124	12:56:00	284	0.574													
4	240.000	15.49	13:54:00	454	0.132	13:56:00	280	0.582													
8	480.000	21.91	15:54:00	559	0.342	15:56:00	270	0.602													
24	1440.000	37.95	19:54:00	564	0.352	19:56:00	259	0.624													
			11:54:00	571	0.366	11:56:00	242	0.658													
				UNLOADING			RELOADING														
Machine Correction				0.01			0.022														
Δ H (Corrected)				0.356			0.636														
Net Total Settlement				3.206			3.842														



Oedometer Settlement Test


Sample Details	Depth	9.50m - 10.00m		
 <i>sketch showing specimen location in original sample</i>	Description	Sample 3 of 3 from Borehole B2		
	Type	Silty CLAY with trace of organic		
	Initial Height	L ₀	(mm)	18.7
	Initial Diameter	D ₀	(mm)	49.9
	Initial Weight	W ₀	(gr)	57.9
	Bulk Density	ρ ₀	(Mg/m ³)	1.58
	Particle Density	ρ _s	(Mg/m ³)	2.65

Initial Conditions				
Settlement Input	L _{IP}	(mm)	CH 3	
Initial Moisture	ω _i %	(%)	40	
Initial Dry Density	ρ _{di}	(Mg/m ³)	1.13	
Initial Voids Ratio	e _i	.	1.343	
Initial Degree of Saturation	S _i	(%)	78.9	
Initial Swelling	S _s	(kPa)	0	

Final Conditions				
Final Moisture	ω _f %	(%)	32	
Dry Density	ρ _{df}	(Mg/m ³)	1.45	
Voids Ratio	e _f	.	0.824	
Saturation	S _f	(%)	100	
Height Settlement	ΔL _s	(mm)	4.138	

Vertical Stress σ' _i (kPa)	Voids Ratio e _f	Height ΔL _s (mm)	Consolidation C _v (m ² /year)	Compressibility m _v (m ² /MN)	Initial T _i (oC)	Final T _f (oC)	t ₅₀ Time t ₅₀ (min)	t ₉₀ Time t ₉₀ (min)	Secondary C _{SEC} (m ² /MN)
40	1.129	1.707	2.6	2.282	27.0	29.0	3.171		0.0087
100	0.989	2.742	2.2	1.015	27.0	29.0	3.171		0.0087
200	0.879	3.700	2.0	0.600	27.0	29.0	3.171		0.0087
450	0.731	4.884	1.7	0.316	27.0	29.0	3.171		0.0087
200	0.756	4.684			27.0	0.0			
100	0.783	4.468			27.0	0.0			
40	0.824	4.138			27.0	0.0			

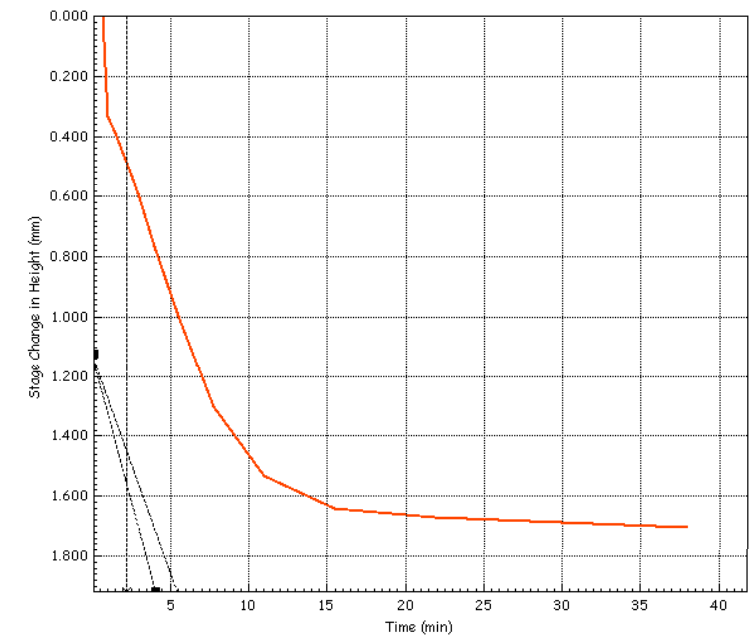
Notes


	Test Method	AS 1289.6.6.1-1998	Test Name	ODO-02	
			Database:	:\SQLEXPRESS\ ENTEC	
	Site Reference	1920815	Test Date	11/3/2015	
	Jobfile	Geotechnical Engineering	Sample	N516	
	Client	Japan International Cooperation	Borehole	BH02	
Operator	IG/MK	Checked	DMC	Approved	DMC

Entec Limited, Level 2 Mid City, Cnr Cumming Street & Renwick Road, Suva

Oedometer Consolidation Settlement Report

Vertical Stress	σ' _i	(kPa)	40
Initial Temperature	T _i	(oC)	27.0
Frame Correction	L _{CORR}	(mm)	0.000
Height Settlement	ΔL _s	(mm)	1.707
Voids Ratio	e _f	.	1.129
Final Temperature	T _f	(oC)	29.0
t₅₀ Time	t ₅₀	(min)	3.171
t₉₀ Time	t ₉₀	(min)	
Consolidation	C _v	(m ² /year)	2.6
Compressibility	m _v	(m ² /MN)	2.282
Secondary Compression	C _{SEC}	(m ² /MN)	0.0087

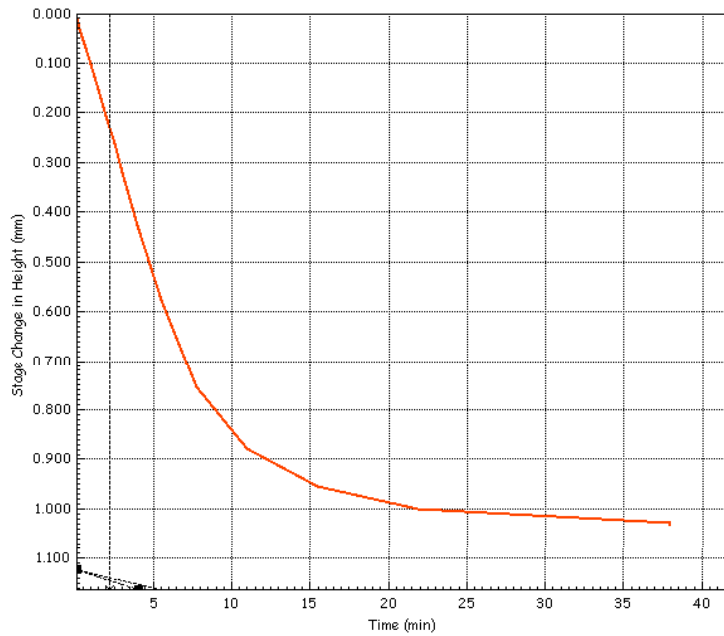


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			Database:	:\SQLEXPRESS\ ENTEC	
	Site Reference	1920815	Test Date	11/3/2015	
	Jobfile	Geotechnical Engineering	Sample	N516	
	Client	Japan International Cooperation	Borehole	BH02	
Operator	IG/MK	Checked	DMC	Approved	DMC

Entec Limited, Level 2 Mid City, Cnr Cumming Street & Renwick Road, Suva

Oedometer Consolidation Settlement Report

Vertical Stress	σ'_{i}	(kPa)	100
Initial Temperature	T_i	(oC)	27.0
Frame Correction	L CORR	(mm)	0.000
Height Settlement	ΔL_s	(mm)	2.742
Voids Ratio	e_f	.	0.999
Final Temperature	T_f	(oC)	29.0
t50 Time	t ₅₀	(min)	3.171
t90 Time	t ₉₀	(min)	
Consolidation	C_v	(m ² /year)	2.2
Compressibility	m_v	(m ² /MN)	1.015
Secondary Compression	C_{SEC}	(m ² /MN)	0.0087

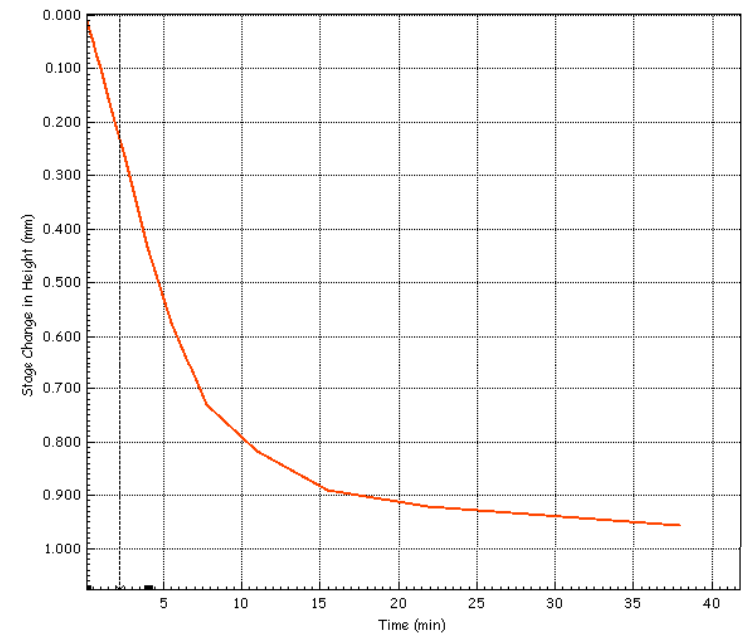


	Test Method	AS 1289.6.6.1-1998	Test Name	ODO-02
	Site Reference	1920815	Database:	.\SQLEXPRESS\ ENTEC
	Jobfile	Geotechnical Engineering	Test Date	11/3/2015
	Client	Japan International Cooperation	Sample	N516
	Operator	IG/MK	Borehole	BH02
	Checked	DMC	Approved	DMC

Entec Limited, Level 2 Mid City, Cnr Cumming Street & Renwick Road, Suva

Oedometer Consolidation Settlement Report

Vertical Stress	σ'_{i}	(kPa)	200
Initial Temperature	T_i	(oC)	27.0
Frame Correction	L CORR	(mm)	0.000
Height Settlement	ΔL_s	(mm)	3.700
Voids Ratio	e_f	.	0.879
Final Temperature	T_f	(oC)	29.0
t50 Time	t ₅₀	(min)	3.171
t90 Time	t ₉₀	(min)	
Consolidation	C_v	(m ² /year)	2.0
Compressibility	m_v	(m ² /MN)	0.600
Secondary Compression	C_{SEC}	(m ² /MN)	0.0087

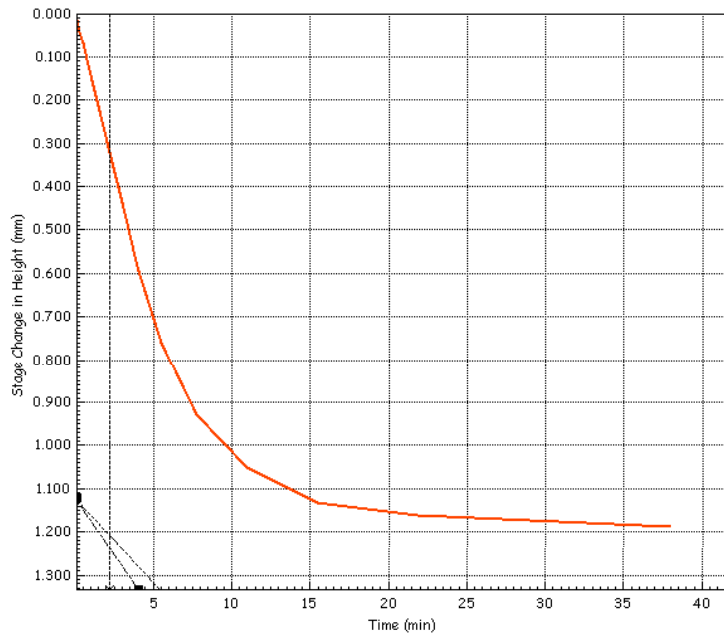


	Test Method	AS 1289.6.6.1-1998	Test Name	ODO-02
	Site Reference	1920815	Database:	.\SQLEXPRESS\ ENTEC
	Jobfile	Geotechnical Engineering	Test Date	11/3/2015
	Client	Japan International Cooperation	Sample	N516
	Operator	IG/MK	Borehole	BH02
	Checked	DMC	Approved	DMC

Entec Limited, Level 2 Mid City, Cnr Cumming Street & Renwick Road, Suva

Oedometer Consolidation Settlement Report

Vertical Stress	σ'_i	(kPa)	450
Initial Temperature	T_i	(oC)	27.0
Frame Correction	L CORR	(mm)	0.000
Height Settlement	ΔL_s	(mm)	4.884
Voids Ratio	e_f	.	0.731
Final Temperature	T_f	(oC)	29.0
t50 Time	t ₅₀	(min)	3.171
t90 Time	t ₉₀	(min)	
Consolidation	C_v	(m ² /year)	1.7
Compressibility	m_v	(m ² /MN)	0.316
Secondary Compression	C_{SEC}	(m ² /MN)	0.0087

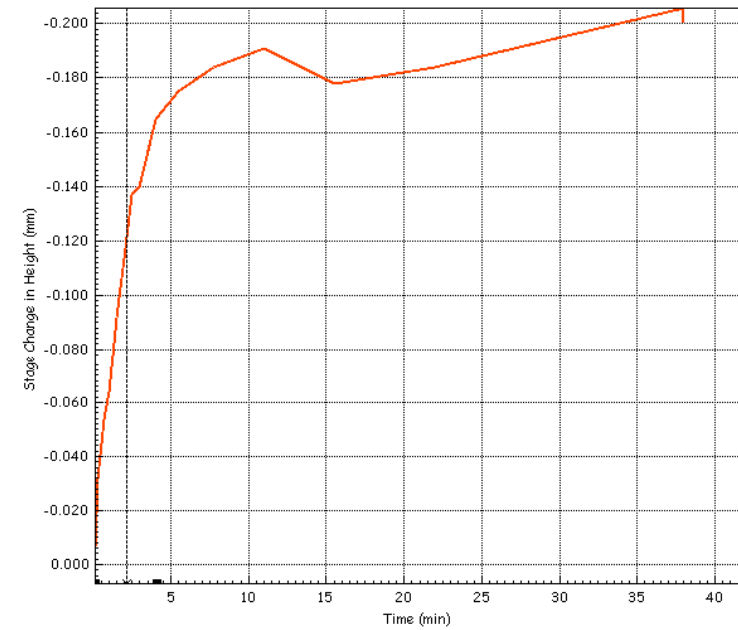


	Test Method	AS 1289.6.6.1-1998	Test Name	ODO-02	
			Database:	.\SQLEXPRESS\ ENTEC	
	Site Reference	1920815	Test Date	11/3/2015	
	Jobfile	Geotechnical Engineering	Sample	N516	
	Client	Japan International Cooperation	Borehole	BH02	
	Operator	IG/MK	Checked	DMC	Approved

Entec Limited, Level 2 Mid City, Cnr Cumming Street & Renwick Road, Suva

Oedometer Consolidation Settlement Report

Vertical Stress	σ'_i	(kPa)	200
Initial Temperature	T_i	(oC)	27.0
Frame Correction	L CORR	(mm)	0.000
Height Settlement	ΔL_s	(mm)	4.684
Voids Ratio	e_f	.	0.756
Final Temperature	T_f	(oC)	0.0
t50 Time	t ₅₀	(min)	
t90 Time	t ₉₀	(min)	
Consolidation	C_v	(m ² /year)	
Compressibility	m_v	(m ² /MN)	
Secondary Compression	C_{SEC}	(m ² /MN)	

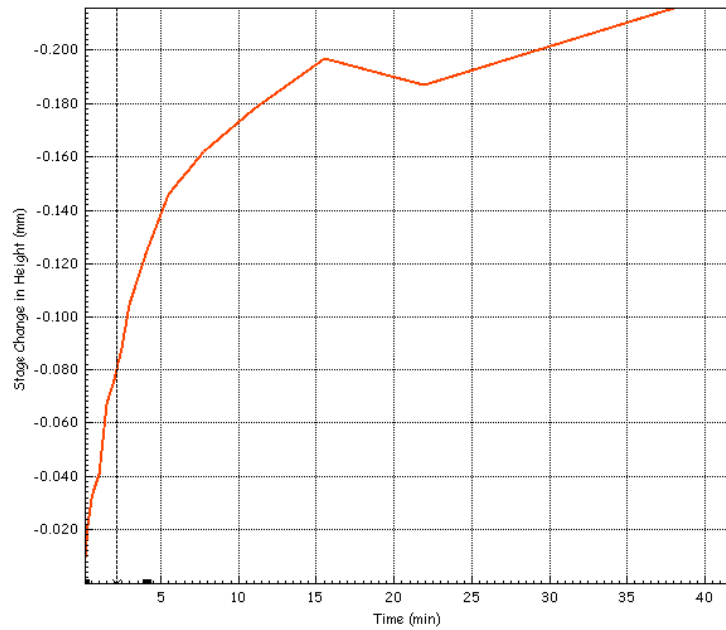


	Test Method	AS 1289.6.6.1-1998	Test Name	ODO-02	
			Database:	.\SQLEXPRESS\ ENTEC	
	Site Reference	1920815	Test Date	11/3/2015	
	Jobfile	Geotechnical Engineering	Sample	N516	
	Client	Japan International Cooperation	Borehole	BH02	
	Operator	IG/MK	Checked	DMC	Approved

Entec Limited, Level 2 Mid City, Cnr Cumming Street & Renwick Road, Suva

Oedometer Consolidation Settlement Report

Vertical Stress	σ'_{i_1}	(kPa)	100
Initial Temperature	T_i	(oC)	27.0
Frame Correction	L CORR	(mm)	0.000
Height Settlement	ΔL_s	(mm)	4.468
Voids Ratio	e_f	.	0.783
Final Temperature	T_f	(oC)	0.0
t50 Time	t ₅₀	(min)	
t90 Time	t ₉₀	(min)	
Consolidation	C_v	(m ² /year)	
Compressibility	m_v	(m ² /MN)	
Secondary Compression	C_{SEC}	(m ² /MN)	

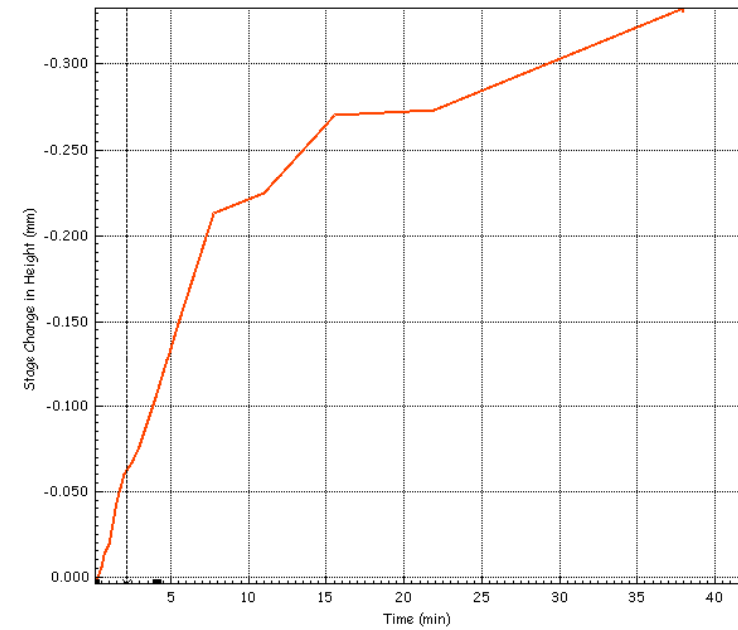


	Test Method	AS 1289.6.6.1-1998	Test Name	ODO-02
			Database:	.\SQLEXPRESS\ ENTEC
	Site Reference	1920815	Test Date	11/3/2015
	Jobfile	Geotechnical Engineering	Sample	N516
	Client	Japan International Cooperation	Borehole	BH02
	Operator	IG/MK	Checked	DMC
		Approved	DMC	

Entec Limited, Level 2 Mid City, Cnr Cumming Street & Renwick Road, Suva

Oedometer Consolidation Settlement Report

Vertical Stress	σ'_{i_1}	(kPa)	40
Initial Temperature	T_i	(oC)	27.0
Frame Correction	L CORR	(mm)	0.000
Height Settlement	ΔL_s	(mm)	4.138
Voids Ratio	e_f	.	0.824
Final Temperature	T_f	(oC)	0.0
t50 Time	t ₅₀	(min)	
t90 Time	t ₉₀	(min)	
Consolidation	C_v	(m ² /year)	
Compressibility	m_v	(m ² /MN)	
Secondary Compression	C_{SEC}	(m ² /MN)	



	Test Method	AS 1289.6.6.1-1998	Test Name	ODO-02
			Database:	.\SQLEXPRESS\ ENTEC
	Site Reference	1920815	Test Date	11/3/2015
	Jobfile	Geotechnical Engineering	Sample	N516
	Client	Japan International Cooperation	Borehole	BH02
	Operator	IG/MK	Checked	DMC
		Approved	DMC	

Entec Limited, Level 2 Mid City, Cnr Cumming Street & Renwick Road, Suva

Moisture Content Test Results

PRINCIPAL	: Japan International Cooperation Agency (JICA)	PROJECT No.	: 1920815
PROJECT NAME	: Geotechnical Investigation for Nadi River Basin Drilling Works	DATE	: 13 October 2015
SITE ADDRESS	: BH 02, Navo Nadi Town	TECHNOLOGIST	: LN
MATERIAL TYPE & DESCRIPTION	: Gravel, SILT traces of clay, soft, moist, low to medium plasticity	TEST METHOD	: NZS 4402:1986
		SAMPLE No.	: N511 BH02 1.00m - 1.50m

Moisture Content		%					
Container No.	g	40	45				
Mass of Container	g	14.53	14.43				
Mass of Container + Wet Soil	g	21.09	23.38				
Mass of Container + Dry Soil	g	19.52	21.20				
Mass of Dry Soil	g	4.99	6.77				
Mass of Moisture	g	1.57	2.18				
Moisture Content	%	31.46	32.20				31.83

 Tested By:LN
 Date: 13 October 2015

 Q.A. Checked By: TL
 Date:15 October 2015

 Approved By: IG
 Date:18 November 2015

Moisture Content Test Results

PRINCIPAL	: Japan International Cooperation Agency (JICA)	PROJECT No.	: 1920815
PROJECT NAME	: Geotechnical Investigation for Nadi River Project Drilling Works	DATE	: 10 October 2015
SITE ADDRESS	: BH 02, Navo Nadi Town	TECHNOLOGIST	: LN
MATERIAL TYPE & DESCRIPTION	: Silty, CLAY traces of root fibres, brown, firm, moist, high plasticity.	TEST METHOD	: NZS 4402:1986
		SAMPLE No.	: N 513 BH02 3.50m - 4.00m

Moisture Content		%					
Container No.	g	10	6				
Mass of Container	g	52.26	53.09				
Mass of Container + Wet Soil	g	109.91	119.98				
Mass of Container + Dry Soil	g	93.83	101.23				
Mass of Dry Soil	g	41.57	48.14				
Mass of Moisture	g	16.08	18.75				
Moisture Content	%	38.68	38.95				38.82

 Tested By:IG
 Date:10 October 2015

 Q.A. Checked By: LN
 Date:15 October 2015

 Approved By: IG
 Date:18 November 2015

Moisture Content Test Results

PRINCIPAL	: Japan International Cooperation Agency (JICA)	PROJECT No.	: 1920815
PROJECT NAME	: Geotechnical Investigation for Nadi River Project Drilling Works	DATE	: 13 October 2015
SITE ADDRESS	: BH 02, Navo Nadi Town	TECHNOLOGIST	: LN
MATERIAL TYPE & DESCRIPTION	: Clayey SILT with traces of fine sand, pale brown, very soft-soft, moist, medium plasticity.	TEST METHOD	: NZS 4402:1986
		SAMPLE No.	: N 514 BH02 5.00m - 5.50m

Moisture Content	%					
Container No.	g	46	34			
Mass of Container	g	14.71	14.89			
Mass of Container + Wet Soil	g	29.25	27.35			
Mass of Container + Dry Soil	g	25.11	23.78			
Mass of Dry Soil	g	10.40	8.89			
Mass of Moisture	g	4.14	3.57			
Moisture Content	%	39.81	40.16			39.98

Tested By:LN
Date: 13 October 2015

Q.A. Checked By: TL
Date:15 October 2015

Approved By: IG
Date:18 November 2015

Moisture Content Test Results

PRINCIPAL	: Japan International Cooperation Agency (JICA)	PROJECT No.	: 1920815
PROJECT NAME	: Geotechnical Investigation for Nadi River Project Drilling Works	DATE	: 10 October 2015
SITE ADDRESS	: BH 02, Navo Nadi Town	TECHNOLOGIST	: IG
MATERIAL TYPE & DESCRIPTION	: Clayey SILT with trace of organics, dark grey, very soft to soft, low to medium plasticity	TEST METHOD	: NZS 4402:1986
		SAMPLE No.	: N 515 BH02 6.50m - 7.00m

Moisture Content	%					
Container No.	g	5	7			
Mass of Container	g	53.34	52.76			
Mass of Container + Wet Soil	g	87.27	90.12			
Mass of Container + Dry Soil	g	74.50	76.35			
Mass of Dry Soil	g	21.16	23.59			
Mass of Moisture	g	12.77	13.77			
Moisture Content	%	60.35	58.37			59.36

Tested By:IG
Date:10 October 2015

Q.A. Checked By: LN
Date:15 October 2015

Approved By: IG
Date:18 November 2015

Moisture Content Test Results

PRINCIPAL	: Japan International Cooperation Agency (JICA)	PROJECT No.	: 1920815
PROJECT NAME	: Geotechnical Investigation for Nadi River Project Drilling Works	DATE	: 10 October 2015
SITE ADDRESS	: BH 02, Navo Nadi Town	TECHNOLOGIST	: IG
MATERIAL TYPE & DESCRIPTION	: Clayey organic SILT with trace of organics, dark grey, very soft to soft, low to medium plasticity	TEST METHOD	: NZS 4402:1986
		SAMPLE No.	: N 516 BH02 9.50m - 10.00m

Moisture Content		%					
Container No.	g	4	11				
Mass of Container	g	52.62	52.76				
Mass of Container + Wet Soil	g	114.83	120.33				
Mass of Container + Dry Soil	g	97.01	101.23				
Mass of Dry Soil	g	44.39	48.47				
Mass of Moisture	g	17.82	19.10				
Moisture Content	%	40.14	39.41				39.77

 Tested By:IG
 Date:10 October 2015

 Q.A. Checked By: LN
 Date:15 October 2015

 Approved By: IG
 Date:18 November 2015

Moisture Content Test Results

PRINCIPAL	: Japan International Cooperation Agency (JICA)	PROJECT No.	: 1920815
PROJECT NAME	: Geotechnical Investigation for Nadi River Project Drilling Works	DATE	: 13 October 2015
SITE ADDRESS	: BH 02, Navo Nadi Town	TECHNOLOGIST	: LN
MATERIAL TYPE & DESCRIPTION	: Silty CLAY, red brown, mottled grey, medium to high plasticity	TEST METHOD	: NZS 4402:1986
		SAMPLE No.	: N517 BH02 11.00m - 11.50m

Moisture Content		%					
Container No.	g	31	43				
Mass of Container	g	14.52	14.86				
Mass of Container + Wet Soil	g	22.23	22.91				
Mass of Container + Dry Soil	g	20.38	20.96				
Mass of Dry Soil	g	5.86	6.10				
Mass of Moisture	g	1.85	1.95				
Moisture Content	%	31.57	31.97				31.77

 Tested By:LN
 Date: 13 October 2015

 Q.A. Checked By: TL
 Date:15 October 2015

 Approved By: IG
 Date:18 November 2015

Moisture Content Test Results

PRINCIPAL	: Japan International Cooperation Agency (JICA)	PROJECT No.	: 1920815
PROJECT NAME	: Geotechnical Investigation for Nadi River Project Drilling Works	DATE	: 13 October 2015
SITE ADDRESS	: BH 02, Navo Nadi Town	TECHNOLOGIST	: LN
MATERIAL TYPE & DESCRIPTION	Silty CLAY, red brown mottled : grey with iron stain, medium to high plasticity	TEST METHOD	: NZS 4402:1986
		SAMPLE No.	: N518 BH02 12.50 - 13.00m

Moisture Content	%					
Container No.	g	32	33			
Mass of Container	g	14.53	14.46			
Mass of Container + Wet Soil	g	26.90	26.94			
Mass of Container + Dry Soil	g	23.65	23.71			
Mass of Dry Soil	g	9.12	9.25			
Mass of Moisture	g	3.25	3.23			
Moisture Content	%	35.64	34.92			35.28

 Tested By:LN
 Date: 13 October 2015

 Q.A. Checked By: TL
 Date:15 October 2015

 Approved By: IG
 Date:18 November 2015

Moisture Content Test Results

PRINCIPAL	: Japan International Cooperation Agency (JICA)	PROJECT No.	: 1920815
PROJECT NAME	: Geotechnical Investigation for Nadi River Project Drilling Works	DATE	: 13 October 2015
SITE ADDRESS	: BH 02, Navo Nadi Town	TECHNOLOGIST	: LN
MATERIAL TYPE & DESCRIPTION	Clayey fine to medium SAND : with trace of some gravel, brown black	TEST METHOD	: NZS 4402:1986
		SAMPLE No.	: N519 BH02 14.00m - 14.50m

Moisture Content	%					
Container No.	g	51	52			
Mass of Container	g	3.56	3.54			
Mass of Container + Wet Soil	g	16.29	14.43			
Mass of Container + Dry Soil	g	13.74	12.26			
Mass of Dry Soil	g	10.18	8.72			
Mass of Moisture	g	2.55	2.17			
Moisture Content	%	25.05	24.89			24.97

 Tested By:LN
 Date: 13 October 2015

 Q.A. Checked By: TL
 Date:15 October 2015

 Approved By: IG
 Date:18 November 2015

Moisture Content Test Results

PRINCIPAL	Japan International Cooperation Agency (JICA)	PROJECT No.	: 1920815
PROJECT NAME	Geotechnical Investigation for Nadi River Project Drilling Works	DATE	: 13 October 2015
SITE ADDRESS	: BH 02, Navo Nadi Town	TECHNOLOGIST	: LN
MATERIAL TYPE & DESCRIPTION	Highly to completely weathered conglomerate, extremely weak to very weak, brown (silty fine to medium sand with some fine to medium gravel, subangular)	TEST METHOD	: NZS 4402:1986
		SAMPLE No.	: N520 BH02 15.50 - 16.00m

Moisture Content		%	
Container No.	g	49	53
Mass of Container	g	3.62	3.52
Mass of Container + Wet Soil	g	14.66	15.88
Mass of Container + Dry Soil	g	12.85	13.84
Mass of Dry Soil	g	9.23	10.32
Mass of Moisture	g	1.81	2.04
Moisture Content	%	19.61	19.77

 Tested By:LN
 Date: 13 October 2015

 Q.A. Checked By: TL
 Date:15 October 2015

 Approved By: IG
 Date:18 November 2015

Moisture Content Test Results

PRINCIPAL	Japan International Cooperation Agency (JICA)	PROJECT No.	: 1920815
PROJECT NAME	Geotechnical Investigation for Nadi River Project Drilling Works	DATE	: 13 October 2015
SITE ADDRESS	: BH 02, Navo Nadi Town	TECHNOLOGIST	: LN
MATERIAL TYPE & DESCRIPTION	Fine to medium SANDSTONE : with trace of gravel, grey green, weak to very weak	TEST METHOD	: NZS 4402:1986
		SAMPLE No.	: N521 BH02 18.50m - 19.00m

Moisture Content		%	
Container No.	g	50	54
Mass of Container	g	3.61	3.55
Mass of Container + Wet Soil	g	15.20	13.36
Mass of Container + Dry Soil	g	13.57	11.90
Mass of Dry Soil	g	9.96	8.35
Mass of Moisture	g	1.63	1.46
Moisture Content	%	16.37	17.49

 Tested By:LN
 Date: 13 October 2015

 Q.A. Checked By: TL
 Date:15 October 2015

 Approved By: IG
 Date:18 November 2015

**Determination of Permeability of a Soil
Constant Head Method for Remoulded Sample**

PRINCIPAL : Japan International Cooperation Agency (JICA)	PROJECT No. : 1920815
PROJECT NAME : Geotechnical Investigation for Nadi River Basin Drilling Works	DATE : 15 October 2015
SITE ADDRESS : BH02, Navo Nadi Town	TECHNOLOGIST : IG
MATERIAL TYPE & DESCRIPTION : Highly to completely weathered conglomerate, extremely weak to very weak, brown (silty fine to medium sand with some fine to medium gravel, subangular)	TEST METHOD : AS 1289.6.7.3-2001
	SAMPLE No. : N520 (BH02 15.50m - 16.00m)

Total Weight : -
Weight Retained on 19mm : -
Percentage retained : -

MOISTURE CONTENT

Container No.		14
Mass of Container	g	53.55
Mass of Container + Wet	g	89.42
Mass of Container + Dry	g	84.14
Mass of Dry Soil	g	30.59
Mass of Moisture	g	5.28
Moisture Content	%	17.26
Optimum moisture content	%	-
Laboratory moisture ratio	%	-

DENSITY

Mass of Specimen	g	1550
Volume of Specimen	cm ³	869.59
Wet Density	t/m ³	1.78
Dry Density	t/m ³	1.52
Maximum Dry Density	t/m ³	-
Laboratory Density ratio	%	-

Area of stand pipe (dia. 12mm)	mm ²	113.10
Cross sectional area of soil	cm ²	50.27
Length of soil specimen	cm	17.30

TEST #	Constant Head h (cm)	Elapsed Time (t)min	Out Flow Volume Q (cm ³)	Water temp T(°C)	KT cm/min	K ₂₀ cm/min
1	120	5.00	22	26	0.013	0.011
2	120	5.00	21	26	0.012	0.011
3	120	5.00	20	26	0.011	0.010
4	110	5.00	15	26	0.009	0.008
5	110	5.00	14	26	0.009	0.008
6	110	5.00	14	26	0.009	0.008
7	100	5.00	11	26	0.008	0.007
8	100	5.00	10	26	0.007	0.006
9	100	5.00	8	26	0.006	0.005
10	95	5.00	5	26	0.004	0.003
11	95	5.00	4	26	0.003	0.003
12	95	5.00	3	26	0.002	0.002

Average K₂₀ m/s : 1.11E-06

Tested By: IG
Date: 15 October 2015

Q.A. Check By: UM
Date: 16 October 2015

Approved By: IG
Date: 18 November 2015

Wet Sieve Analysis
NZS 4407:1991 (Test 3.5.1)

PRINCIPAL : Japan International Cooperation Agency (JICA)	PROJECT No. : 1920815
PROJECT NAME : Geotechnical Investigation for Nadi River Basin Drilling Works	DATE / : 13 October 2015
SITE ADDRESS : Site 2, Navo Nadi Town	TECHNOLOGIST : KB
SAMPLE LOCATION : BH 02 1.00m - 1.50m	MATERIAL TYPE & LOCATION : Gravel, SILT traces of clay, soft, most, low to medium plasticity
TEST NUMBER : N 511	

SAMPLE HISTORY : NATURAL / AIR-DRIED / OVEN-DRIED / UNKNOWN

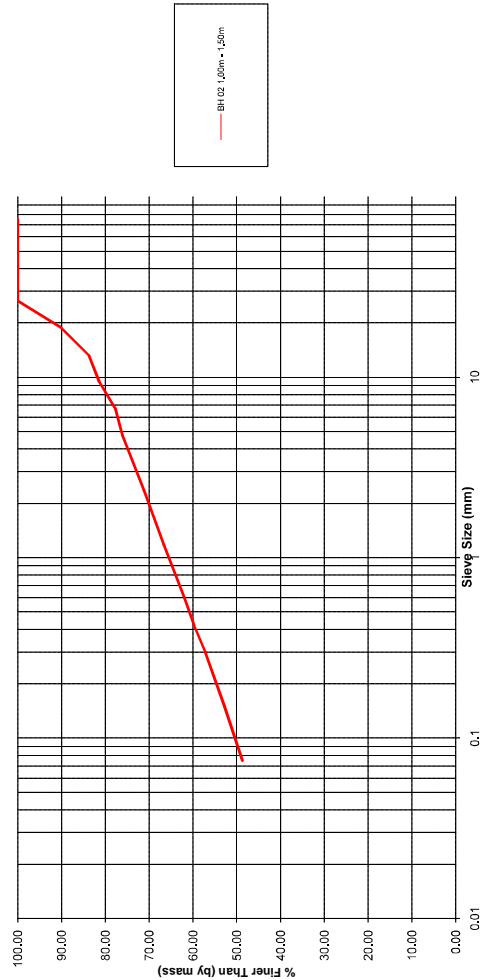
Moisture Content (Material passing 19mm)	Container No.	-	76	62	SPLIT SAMPLE
Mass of Container	g	86.28	72.21	Mass Passing Last Sieve:	- gM _s
Mass of Container + Wet Soil	g	115.27	116.84	Mass after Splitting:	- gM _t
Mass of Container + Dry Soil	g	108.45	106.74	Splitting Factor	$\frac{M_s}{M_t}$
Mass of Dry Soil	g	22.17	34.53	=	$\frac{M_s}{M_t}$
Mass of Moisture	g	6.82	10.10		
Moisture Content	%	30.76	29.25		
Average Moisture Content	%	30.01			

Total Mass of Dry Sample	Mass of dry sample retained on 19mm test sieve (M _s)	g	Nil
	Total Wet Weight (M _w)	g	330.98
	Total Mass of dry sample (M _t)	M _t =	$\frac{100M_w}{100 + w}$
		M _t =	254.59

Test Sieve Size mm	Mass of Dry Soil Retained (M _s)	Corrected Mass	Percentage Retained = (M _s /M _t) × 100	Total Percentage Passing	Maximum Sieve Load (Sieve Diameter 200mm)	Sieve Diameter
	g		%	%	g	mm
75.0mm		N/A	0.00	100.00		300
50.0mm		N/A	0.00	100.00		300
37.5mm		N/A	0.00	100.00		300
26.5mm		N/A	0.00	100.00		300
19.0mm	24.62	N/A	9.67	90.33		200
13.2 mm	16.75	N/A	6.58	83.75	600	300
9.50 mm	5.83	N/A	2.29	81.46	450	300
6.70 mm	9.51	N/A	3.74	77.72	300	300
4.75 mm	4.21	N/A	1.65	76.07	250	200
2.36 mm	12.33	N/A	4.84	71.23	150	200
1.18 mm	11.68	N/A	4.59	66.64	100	200
0.600 mm	11.74	N/A	4.61	62.03	80	200
425 µm	5.79	N/A	2.27	59.75	70	200
300 µm	6.50	N/A	2.55	57.20	60	200
150 µm	11.29	N/A	4.43	52.77	40	200
75 µm	10.36	N/A	4.07	48.70	25	200
Passing 75 µm	123.98	N/A	48.70	0.00	-	-
Pan Total	254.59	-	100.00	-	-	-

NOTES: 1) Testing performed on fraction passing/retained on 19mm sieve
2) The percentage passing the finest sieve was obtained by difference

Tested by: KB	Q.A. Checked by: TL	Approved by: IG
Date: 13 October 2015	Date: 15 October 2015	Date: 18 November 2015



LOCATION: BH 02 1.00m - 1.50m
 DATE OF TEST: 13 October 2015
 DESCRIPTION: Gravel, SILT traces of clay, soft, moist, low to medium plasticity
 SAMPLE No: N 511

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PRINCIPAL : Japan International Cooperation Agency (JICA)	PROJECT No. : 1920815
PROJECT NAME : Geotechnical Investigation for Nadi River Basin Drilling Works	DATE / : 14 October 2015
SITE ADDRESS : Site 2 , Navo Nadi Town	TECHNOLOGIST : RK
SAMPLE LOCATION : BH 02 3.50 - 4.00m	MATERIAL TYPE & LOCATION : Silty, CLAY traces of root fibres, brown, firm, moist, high plasticity.
TEST NUMBER : N 513	

SAMPLE HISTORY : NATURAL / AIR-DRIED / OVEN-DRIED / UNKNOWN

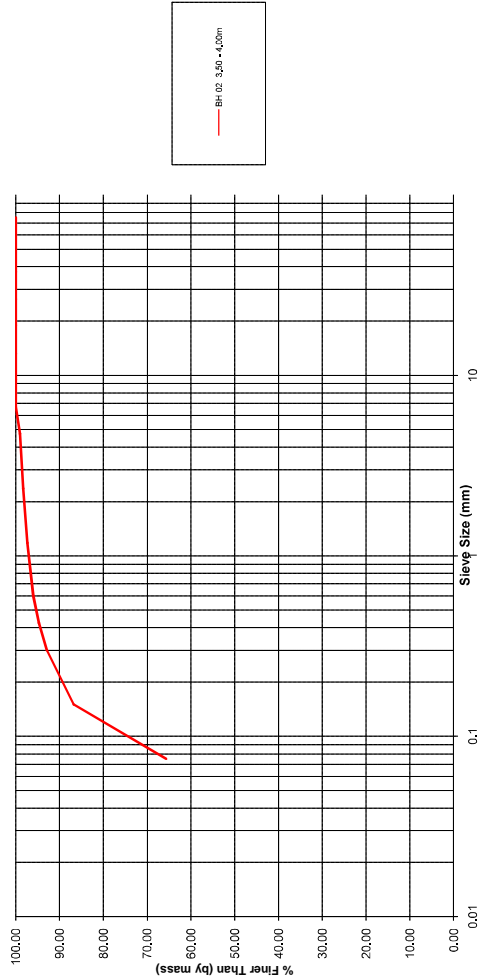
Moisture Content (Material passing 19mm)	Container No.	-	10	6	SPLIT SAMPLE
Mass of Container	g	52.26	53.04	Mass Passing Last Sieve:	gM ₃
Mass of Container + Wet Soil	g	109.91	119.98	Mass after Splitting:	gM ₄
Mass of Container + Dry Soil	g	93.83	101.23	Splitting Factor = $\frac{M_3}{M_4}$	
Mass of Dry Soil	g	41.57	48.19		
Mass of Moisture	g	16.08	18.75		
Moisture Content	%	38.68	38.91		
Average Moisture Content	%	38.80			

Total Mass of Dry Sample	Mass of dry sample retained on 19mm test sieve (M _r)	g	Nil
Total Wet Weight (M _w)	g	195.95	
Total Mass of dry sample (M _t)	M _t = $\frac{100M_w}{100 + w}$		
	M _t =	141.18	

Test Sieve Size mm	Mass of Dry Soil Retained (M _r) g	Corrected Mass %	Percentage Retained = (Mass/M _t) x 100 %	Total Percentage Passing %	Maximum Sieve Load (Sieve Diameter 200mm) g	Sieve Diameter mm
75.0mm	N/A	0.00	100.00			300
50.0mm	N/A	0.00	100.00			300
37.5mm	N/A	0.00	100.00			300
26.5mm	N/A	0.00	100.00			300
19.0mm	N/A	0.00	100.00			200
13.2 mm	N/A	0.00	100.00		600	300
9.50 mm	N/A	0.00	100.00		450	300
6.70 mm	N/A	0.00	100.00		300	300
4.75 mm	1.27	N/A	0.90	99.10	250	200
2.36 mm	1.06	N/A	0.75	98.35	150	200
1.18 mm	1.44	N/A	1.02	97.33	100	200
0.600 mm	1.87	N/A	1.32	96.01	80	200
425 µm	1.84	N/A	1.30	94.70	70	200
300 µm	2.54	N/A	1.80	92.90	60	200
150 µm	8.63	N/A	6.11	86.79	40	200
75 µm	29.78	N/A	21.09	65.70	25	200
Passing 75 µm	92.75	N/A	65.70	0.00	-	-
Pan Total	141.18	-	100.00	-	-	-

NOTES: 1) Testing performed on fraction passing/retained on 19mm sieve
 2) The percentage passing the finest sieve was obtained by difference

Tested by: RK	Q.A. Checked by: TL	Approved by: IG
Date: 14 October 2015	Date: 15 October 2015	Date: 18 November 2015



LOCATION: BH 02: 3.50 - 4.00m
DATE OF TEST: 14 October 2015
DESCRIPTION: SILT, CLAY (trace of root fibres, brown, firm, moist, high plasticity).
SAMPLE No: N 513

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PRINCIPAL :	Japan International Cooperation Agency (JICA)	PROJECT No. :	1920815
PROJECT NAME :	Geotechnical Investigation for Nadi River Basin Drilling Works	DATE / :	14 October 2015
SITE ADDRESS :	Site2 , Navo Nadi Town	TECHNOLOGIST :	RK
SAMPLE LOCATION :	BH 02 6.50m - 7.00m	MATERIAL TYPE & LOCATION :	Clayey organic SILT with trace of organics, dark grey, very soft to soft, low to medium plasticity
TEST NUMBER :	N 515		
SAMPLE HISTORY : NATURAL / AIR-DRIED / OVEN-DRIED / UNKNOWN			

Moisture Content (Material passing 19mm)	Container No.	-	5	7	SPLIT SAMPLE
Mass of Container	g	53.34	52.76		Mass Passing Last Sieve: - gM ₃
Mass of Container + Wet Soil	g	87.27	90.12		Mass after Splitting: - gM ₄
Mass of Container + Dry Soil	g	74.50	76.35		Splitting Factor = $\frac{M_3}{M_4}$
Mass of Dry Soil	g	21.16	23.59		
Mass of Moisture	g	12.77	13.77		
Moisture Content	%	60.35	58.37		
Average Moisture Content	%	59.36			

Total Mass of Dry Sample	Mass of dry sample retained on 19mm test sieve (M ₁)	g	Nil
	Total Wet Weight (M _w)	g	335.45
	Total Mass of dry sample (M _T)	M _T = $\frac{100M_w}{100 + w}$	
		M _T =	210.50

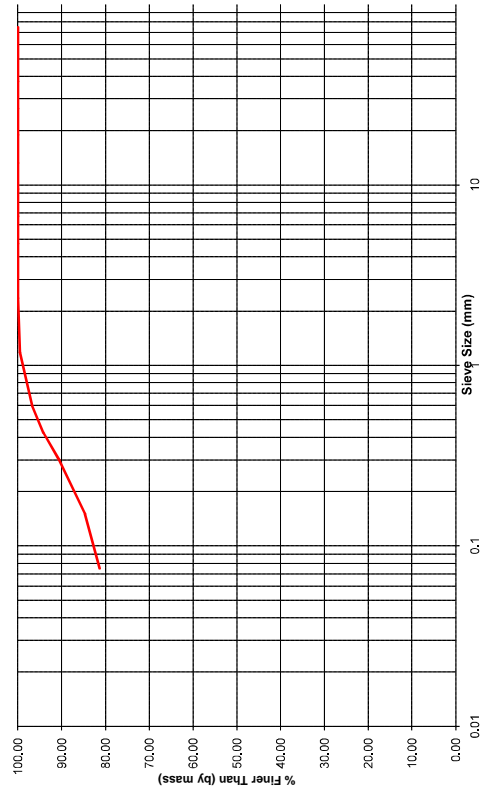
Test Sieve Size mm	Mass of Dry Soil Retained (M _s) g	Corrected Mass g	Percentage Retained = (Mass/M _T) x 100 %	Total Percentage Passing %	Maximum Sieve Load (Sieve Diameter 200mm) g	Sieve Diameter mm
75.0mm	N/A	0.00	100.00			300
50.0mm	N/A	0.00	100.00			300
37.5mm	N/A	0.00	100.00			300
26.5mm	N/A	0.00	100.00			300
19.0mm	N/A	0.00	100.00			200
13.2 mm	N/A	0.00	100.00		600	300
9.50 mm	N/A	0.00	100.00		450	300
6.70 mm	N/A	0.00	100.00		300	300
4.75 mm	N/A	0.00	100.00		250	200
2.36 mm	N/A	0.00	100.00		150	200
1.18 mm	0.93	N/A	0.44	99.56	100	200
0.600 mm	5.86	N/A	2.78	96.77	80	200
425 µm	5.36	N/A	2.55	94.23	70	200
300 µm	7.57	N/A	3.60	90.63	60	200
150 µm	12.58	N/A	5.98	84.66	40	200
75 µm	6.91	N/A	3.28	81.37	25	200
Passing 75 µm	171.29	N/A	81.37	0.00	-	-
Pan Total	210.50	-	100.00	-	-	-

NOTES: 1) Testing performed on fraction passing/retained on 19mm sieve
2) The percentage passing the finest sieve was obtained by difference

Tested by: RK	Q.A. Checked by: TL	Approved by: IG
Date: 14 October 2015	Date: 15 October 2015	Date: 18 November 2015

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BH 02 8.50m - 7.00m

LOCATION: BH 02: 8.50m - 7.00m
DATE OF TEST: 14 October 2015
DESCRIPTION: Clayey organic SILT with trace of organics, dark grey, very soft to soft, low to medium plasticity
SAMPLE No.: NS15

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PRINCIPAL : Japan International Cooperation Agency (JICA)	PROJECT No. : 1920815
PROJECT NAME : Geotechnical Investigation for Nadi River Basin Drilling Works	DATE / : 13 October 2015
SITE ADDRESS : Site 2, Navo, Nadi Town.	TECHNOLOGIST : RK
SAMPLE LOCATION : BH 02 11.00m - 11.50m	MATERIAL TYPE & LOCATION : Silty CLAY, red brown, mottled grey, medium to high plasticity
TEST NUMBER : N 517	

SAMPLE HISTORY : NATURAL / AIR-DRIED / OVEN-DRIED / UNKNOWN

Moisture Content (Material passing 19mm)	Container No.	-	69	83	SPLIT SAMPLE
Mass of Container	g	90.25	71.20	Mass Passing Last Sieve:	- gM ₃
Mass of Container + Wet Soil	g	116.28	108.05	Mass after Splitting:	- gM ₄
Mass of Container + Dry Soil	g	109.74	98.75	Splitting Factor	$\frac{M_3}{M_4}$
Mass of Dry Soil	g	19.49	27.55	=	$\frac{M_3}{M_4}$
Mass of Moisture	g	6.54	9.30		
Moisture Content	%	33.56	33.76		
Average Moisture Content	%	33.66			

Total Mass of Dry Sample	Mass of dry sample retained on 19mm test sieve (M _r)	g	Nil
Total Wet Weight (M _w)	g	279.76	
Total Mass of dry sample (M _T)	M _T =	$\frac{100M_w}{100 + w}$	
	M _T =	209.31	

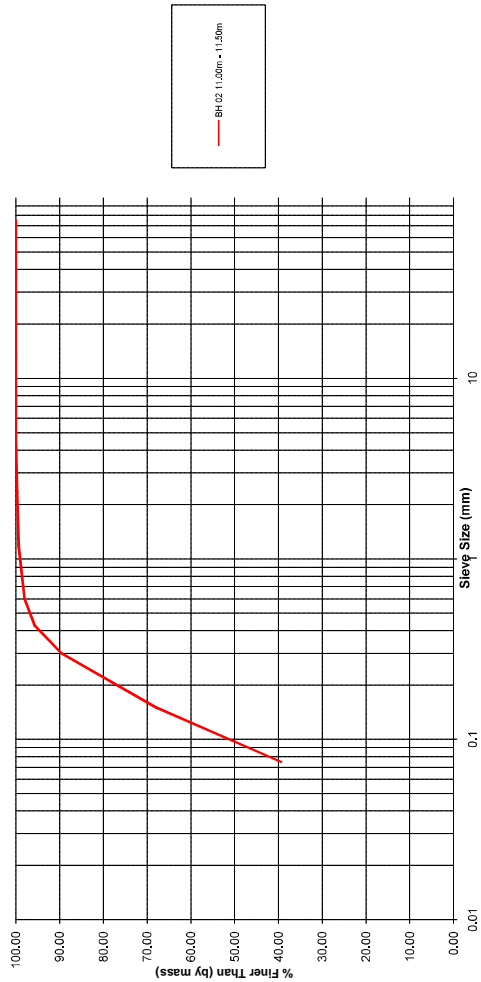
Test Sieve Size mm	Mass of Dry Soil Retained (M _r) g	Corrected Mass %	Percentage Retained = (M _r /M _T) x 100 %	Total Percentage Passing %	Maximum Sieve Load (Sieve Diameter 200mm) g	Sieve Diameter mm
75.0mm	N/A	0.00	100.00			300
50.0mm	N/A	0.00	100.00			300
37.5mm	N/A	0.00	100.00			300
26.5mm	N/A	0.00	100.00			300
19.0mm	N/A	0.00	100.00			200
13.2 mm	N/A	0.00	100.00		600	300
9.50 mm	N/A	0.00	100.00		450	300
6.70 mm	N/A	0.00	100.00		300	300
4.75 mm	N/A	0.00	100.00		250	200
2.36 mm	0.58	N/A	0.28	99.72	150	200
1.18 mm	0.83	N/A	0.40	99.33	100	200
0.600 mm	2.78	N/A	1.33	98.00	80	200
425 µm	5.02	N/A	2.40	95.60	70	200
300 µm	12.58	N/A	6.01	89.59	60	200
150 µm	45.41	N/A	21.69	67.89	40	200
75 µm	59.72	N/A	28.53	39.36	25	200
Passing 75 µm	82.39	N/A	39.36	0.00	-	-
Pan Total	209.31	-	100.00	-	-	-

NOTES: 1) Testing performed on fraction passing/retained on 19mm sieve
2) The percentage passing the finest sieve was obtained by difference

Tested by: RK	Q.A. Checked by: TL	Approved by: IG
Date: 13 October 2015	Date: 15 October 2015	Date: 18 November 2015

Form GE-L-06

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LOCATION: BH 02 11.00m - 11.50m
DATE OF TEST: 13 October 2015
DESCRIPTION: Silty CLAY, red brown, mottled grey, medium to high plasticity
SAMPLE No: N 517

PRINCIPAL : Japan International Cooperation Agency (JICA)	PROJECT No. : 1920815
PROJECT NAME : Geotechnical Investigation for Nadi River Basin Drilling Works	DATE / : 13 October 2015
SITE ADDRESS : Site2 , Navo Nadi Town	TECHNOLOGIST : RK
SAMPLE LOCATION : BH 02 14.00m - 14.50m	MATERIAL TYPE & LOCATION : Clayey fine to medium SAND with trace of some gravel, brown black
TEST NUMBER : N 519	

SAMPLE HISTORY : NATURAL / AIR-DRIED / OVEN-DRIED / UNKNOWN

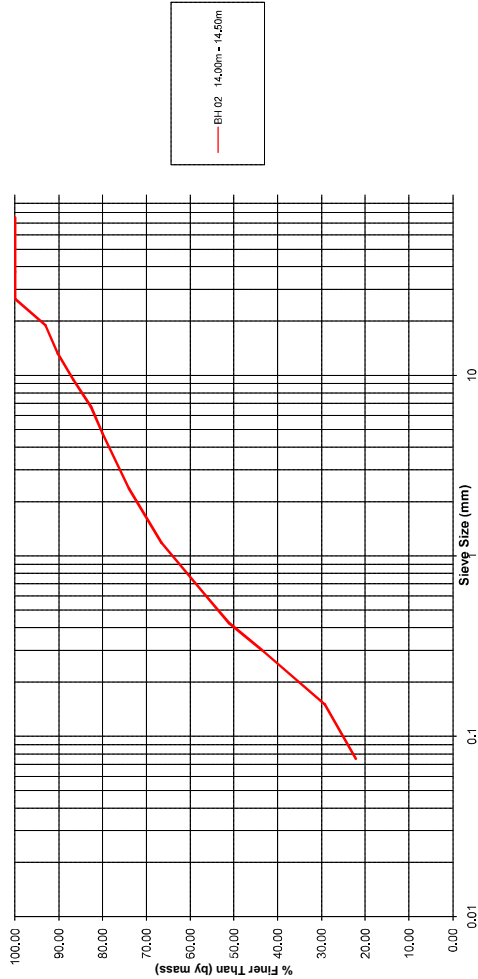
Moisture Content (Material passing 19mm)	Container No.	-	87	89	SPLIT SAMPLE
Mass of Container	g		116.49	121.19	Mass Passing Last Sieve: - gM _s
Mass of Container + Wet Soil	g		182.52	183.59	Mass after Splitting: - gM _t
Mass of Container + Dry Soil	g		171.45	172.46	Splitting Factor = $\frac{M_s}{M_t}$
Mass of Dry Soil	g		54.96	51.27	
Mass of Moisture	g		11.07	11.13	
Moisture Content	%		20.14	21.71	
Average Moisture Content	%		20.93		

Total Mass of Dry Sample	Mass of dry sample retained on 19mm test sieve (M _s)	g	Nil
Total Wet Weight (M _w)	g		269.81
Total Mass of dry sample (M _t)	M _t = $\frac{100M_w}{100 + w}$		
	M _t =	223.12	

Test Sieve Size mm	Mass of Dry Soil Retained (M _s) g	Corrected Mass g	Percentage Retained = (Mass/M _t) x 100 %	Total Percentage Passing %	Maximum Sieve Load (Sieve Diameter 200mm) g	Sieve Diameter mm
75.0mm	N/A	N/A	0.00	100.00		300
50.0mm	N/A	N/A	0.00	100.00		300
37.5mm	N/A	N/A	0.00	100.00		300
26.5mm	N/A	N/A	0.00	100.00		300
19.0mm	15.45	N/A	6.92	93.08		200
13.2 mm	6.23	N/A	2.79	90.28	600	300
9.50 mm	7.79	N/A	3.49	86.79	450	300
6.70 mm	9.19	N/A	4.12	82.67	300	300
4.75 mm	6.05	N/A	2.71	79.96	250	200
2.36 mm	13.28	N/A	5.95	74.01	150	200
1.18 mm	16.63	N/A	7.45	66.56	100	200
0.600 mm	22.68	N/A	10.16	56.39	80	200
425 µm	11.67	N/A	5.23	51.16	70	200
300 µm	16.96	N/A	7.60	43.56	60	200
150 µm	31.94	N/A	14.32	29.24	40	200
75 µm	15.80	N/A	7.08	22.16	25	200
Passing 75 µm	49.45	N/A	22.16	0.00	-	-
Pan Total	223.12	-	100.00	-	-	-

NOTES: 1) Testing performed on fraction passing/retained on 19mm sieve
2) The percentage passing the finest sieve was obtained by difference

Tested by: RK	Q.A. Checked by: TL	Approved by: IG
Date: 13 October 2015	Date: 15 October 2015	Date: 18 November 2015



LOCATION: BH 02 14.00m - 14.50m
DATE OF TEST: 13 October 2015
DESCRIPTION: Clayey fine to medium SAND with trace of some gravel, brown black
SAMPLE No: NS19

Form GE-L-06

Page 2 of 2

PRINCIPAL : Japan International Cooperation Agency (JICA)	PROJECT No. : 1920815
PROJECT NAME : Geotechnical Investigation for Nadi River Basin Drilling Works	DATE / : 13 October 2015
SITE ADDRESS : Site2 , Navo Nadi Town	TECHNOLOGIST : RK
SAMPLE LOCATION : BH 02 15.50m - 16.00m	MATERIAL TYPE & LOCATION : Highly to completely weathered conglomerate, extremely weak to very weak, brown (silty fine to medium sand with some fine to medium gravel, subangular)
TEST NUMBER : N 520	
SAMPLE HISTORY : NATURAL / AIR-DRIED / OVEN-DRIED / UNKNOWN	

Moisture Content (Material passing 19mm)	Container No.		-		8		12		SPLIT SAMPLE	
	Mass of Container	g	53.04	53.13	Mass Passing Last Sieve:	-	gM ₃			
Mass of Container + Wet Soil	g	75.40	74.86	Mass after Splitting:	-	gM ₄				
Mass of Container + Dry Soil	g	72.23	71.76	Splitting Factor	M ₃					
Mass of Dry Soil	g	19.19	18.63	=	M ₄					
Mass of Moisture	g	3.17	3.10							
Moisture Content	%	16.52	16.64							
Average Moisture Content	%	16.58								

Total Mass of Dry Sample	Mass of dry sample retained on 19mm test sieve (M ₁)	g	Nil
	Total Wet Weight (M _w)	g	267.89
	Total Mass of dry sample (M _T)	M _T =	$\frac{100M_w}{100 + w}$
	M _T =	229.79	

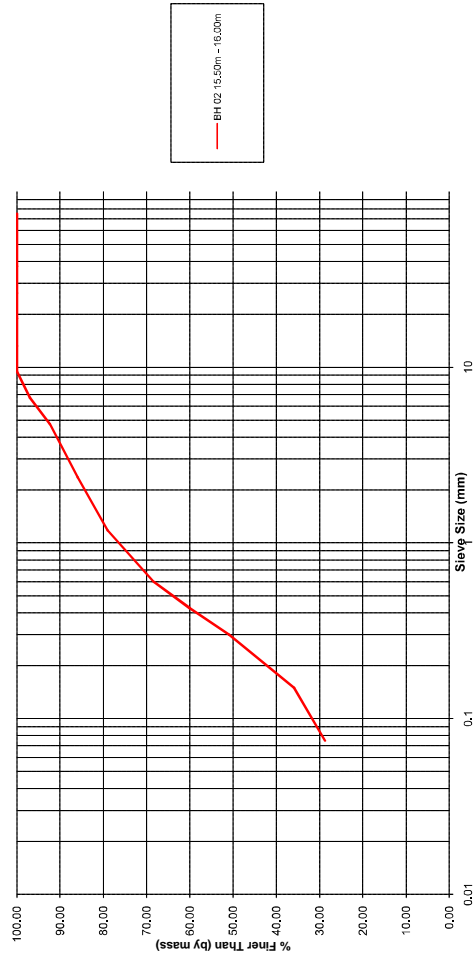
Test Sieve Size mm	Mass of Dry Soil Retained (M _s)	Corrected Mass	Percentage Retained = (Mass/M _T) x 100	Total Percentage Passing	Maximum Sieve Load (Sieve Diameter 200mm)	Sieve Diameter
	g	g	%	%	g	mm
75.0mm	N/A	0.00	100.00			300
50.0mm	N/A	0.00	100.00			300
37.5mm	N/A	0.00	100.00			300
26.5mm	N/A	0.00	100.00			300
19.0mm	N/A	0.00	100.00			200
13.2 mm	N/A	0.00	100.00		600	300
9.50 mm	N/A	0.00	100.00		450	300
6.70 mm	7.01	N/A	3.05	96.95	300	300
4.75 mm	10.56	N/A	4.60	92.35	250	200
2.36 mm	14.86	N/A	6.47	85.89	150	200
1.18 mm	15.82	N/A	6.88	79.00	100	200
0.600 mm	24.54	N/A	10.68	68.32	80	200
425 µm	19.17	N/A	8.34	59.98	70	200
300 µm	20.82	N/A	9.06	50.92	60	200
150 µm	34.56	N/A	15.04	35.88	40	200
75 µm	16.40	N/A	7.14	28.74	25	200
Passing 75 µm	66.05	N/A	28.74	0.00	-	-
Pan Total	229.79	-	100.00	-	-	-

NOTES: 1) Testing performed on fraction passing/retained on 19mm sieve
2) The percentage passing the finest sieve was obtained by difference

Tested by : RK	Q.A. Checked by : TL	Approved by : IG
Date : 15 October 2015	Date : 16 October 2015	Date : 18 November 2015

Form GE-L-06

Page 1 of 2



DESCRIPTION: Highly to completely weathered conglomerate, extremely weak to very weak, brown (slly) fine to medium sand with some fine to medium gravel, subangular.
 LOCATION: BH 02 15.50m - 16.00m
 DATE OF TEST: 13 October 2015
 SAMPLE No. N520

Unconfined Compressive Strength
NZS 4402:1986 (Test 6.3.1)

PRINCIPAL :	Japan International Cooperation Agency (JICA)	PROJECT No. :	1920815
PROJECT NAME :	Geotechnical Investigation for Nadi River Basin Drilling Works.	DATE TESTED :	11 October 2015
SITE ADDRESS :	BH 02, Navo, Nadi Town	TECHNOLOGIST :	IG
SAMPLE LOCATION :	BH 02 3.50m -4.00m	MATERIAL TYPE :	Silty CLAY with trace of root fibres, brown, firm, moist, high plasticity.
TEST NUMBER :	N513		

SAMPLE HISTORY : NATURAL / AIR-DRIED / OVEN-DRIED / UNKNOWN

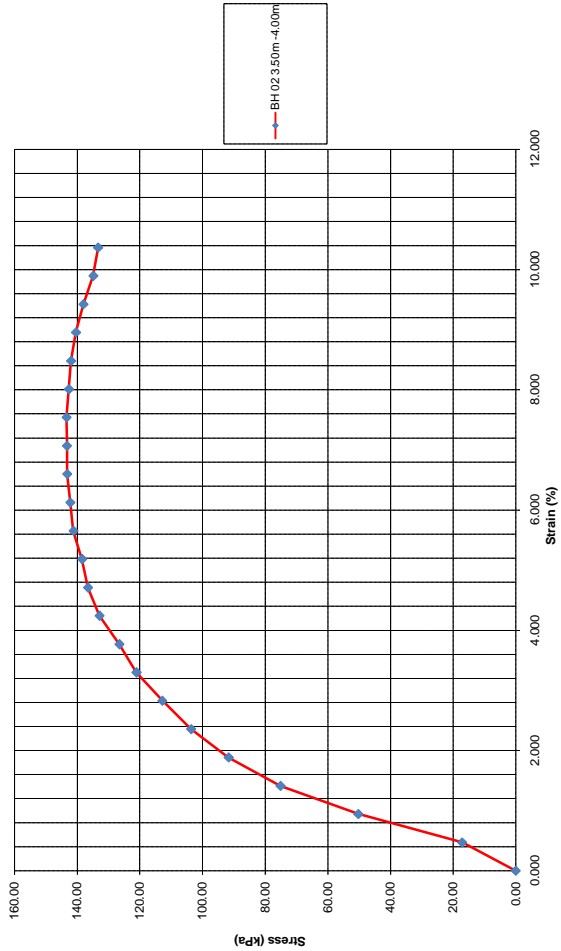
Moisture Content	Container No.	-	93
	Mass of Container	g	88.60
	Mass of Container + Wet Soil	g	535.79
	Mass of Container + Dry Soil	g	413.31
	Mass of Dry Soil	g	324.71
	Mass of Moisture	g	122.48
	Moisture Content	%	37.72

Bulk Density	Sample No.	-	N 513
	Diameter of Specimen	mm	53.10
	Initial area of specimen A ₀ (π/4 d ²)	mm ²	2213.39
	Initial length of specimen L ₀	mm	106.10
	Initial mass of specimen M _i	g	447.79
	Bulk Density ρ	t/m ³	1.91
	Dry Density ρ _d	t/m ³	1.38

Compression Gauge Reading	Load Gauge Reading	Load	Strain $\epsilon = \frac{C_n - C_0}{L_0}$	Corrected Area $A = A_0 / (1 - \epsilon)$	Principal Stress Difference $\sigma_1 - \sigma_3 = 1000P/A$
mm		(kN)	%	m ²	kPa
0.00	0	0	0.000	0.002213	0.00
0.50	19	0.0381	0.471	0.002224	17.13
1.00	56.0	0.1124	0.943	0.002234	50.30
1.50	84.0	0.1686	1.414	0.002245	75.10
2.00	103.0	0.2068	1.885	0.002256	91.67
2.50	117.0	0.2349	2.356	0.002267	103.63
3.00	128.0	0.2570	2.828	0.002278	112.83
3.50	138.0	0.2771	3.299	0.002289	121.06
4.00	145.0	0.2911	3.770	0.002300	126.56
4.50	153.0	0.3072	4.241	0.002311	132.90
5.00	158.0	0.3172	4.713	0.002323	136.56
5.50	161.0	0.3232	5.184	0.002334	138.45
6.00	165.0	0.3313	5.655	0.002346	141.22
6.50	167.0	0.3353	6.126	0.002358	142.21
7.00	169.0	0.3393	6.598	0.002370	143.18
7.50	170.0	0.3413	7.069	0.002382	143.30
8.00	171.0	0.3433	7.540	0.002394	143.41
8.50	171.0	0.3433	8.011	0.002406	142.68
9.00	171.0	0.3433	8.483	0.002419	141.94
9.50	170.0	0.3413	8.954	0.002431	140.39
10.00	168.0	0.3373	9.425	0.002444	138.03
10.50	165.0	0.3313	9.896	0.002456	134.87
11.00	164.0	0.3293	10.368	0.002469	133.35

Tested by : IG	Q.A. Check by : LN	Approved by : IG
Date : 11 October 2015	Date : 14 October 2015	Date : 18 November 2015

STRESS VS STRAIN



LOCATION: BH 02 3.50m - 4.00m
DESCRIPTION: Silty CLAY with trace of root fibres, brown, firm, moist, high plasticity.
DATE OF TEST : 11 October 2015

Form GE-L-10

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Unconfined Compressive Strength
NZS 4402:1986 (Test 6.3.1)

PRINCIPAL :	Japan International Cooperation Agency (JICA)	PROJECT No. :	1920815
PROJECT NAME :	Geotechnical Investigation for Nadi River Basin Drilling Works.	DATE TESTED :	10 October 2015
SITE ADDRESS :	BH 02, Navo, Nadi Town	TECHNOLOGIST :	IG
SAMPLE LOCATION :	BH 02 6.50m - 7.00m	MATERIAL TYPE :	Clayey organic SILT with trace of organics, dark grey, very soft to soft, low to medium plasticity
TEST NUMBER :	N 515		
SAMPLE HISTORY : NATURAL / AIR-DRIED / OVEN-DRIED / UNKNOWN			

Moisture Content	Container No.	-	94
	Mass of Container	g	88.03
	Mass of Container + Wet Soil	g	390.02
	Mass of Container + Dry Soil	g	277.14
	Mass of Dry Soil	g	189.11
	Mass of Moisture	g	112.88
	Moisture Content	%	59.69

Bulk Density	Sample No.	-	N 515
	Diameter of Specimen	mm	53.00
	Initial area of specimen A ₀ (π/4 d ²)	mm ²	2205.07
	Initial length of specimen L ₀	mm	101.20
	Initial mass of specimen M	g	375.96
	Bulk Density ρ	t/m ³	1.68
	Dry Density ρ _d	t/m ³	1.06

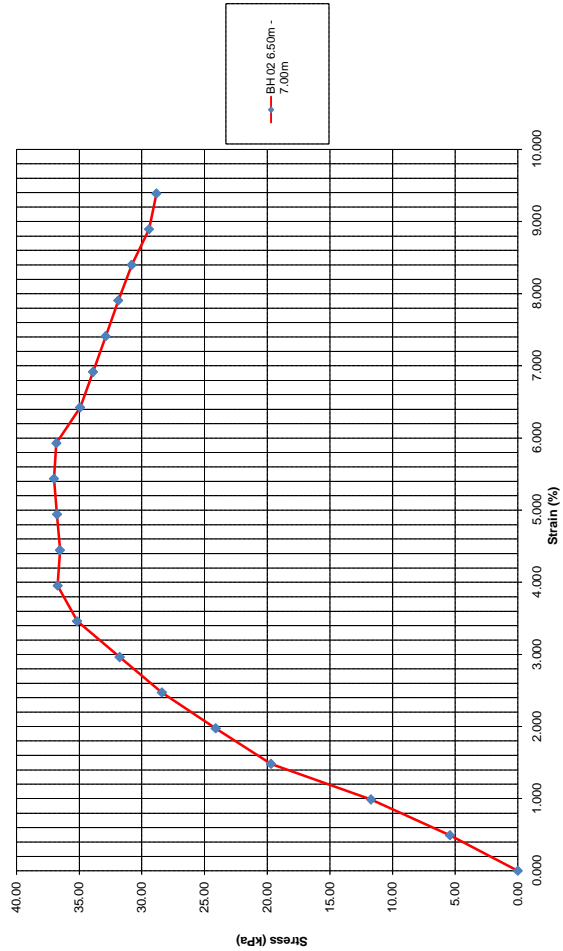
Compression Gauge Reading	Load Gauge Reading	Load	Strain $\epsilon = \frac{C_n - C_0}{L_0}$	Corrected Area $A = A_0 / 1 + \epsilon$	Principal Stress Difference $\sigma_1 - \sigma_3 = 1000P/A$
mm		(kN)	%	m ²	kPa
0.00	0	0.000	0.000	0.002205	0.00
0.50	6.0	0.0120	0.494	0.002216	5.42
1.00	13.0	0.0261	0.988	0.002227	11.72
1.50	22.0	0.0441	1.482	0.002238	19.70
2.00	27.0	0.0542	1.976	0.002250	24.09
2.50	32.0	0.0642	2.470	0.002261	28.40
3.00	36.0	0.0722	2.964	0.002272	31.77
3.50	40.0	0.0803	3.458	0.002284	35.16
4.00	42.0	0.0843	3.953	0.002296	36.72
4.50	42.0	0.0843	4.447	0.002308	36.53
5.00	42.5	0.0853	4.941	0.002320	36.77
5.50	43.0	0.0863	5.435	0.002332	37.01
6.00	43.0	0.0863	5.929	0.002344	36.82
6.50	41.0	0.0823	6.423	0.002356	34.93
7.00	40.0	0.0803	6.917	0.002369	33.90
7.50	39.0	0.0783	7.411	0.002382	32.88
8.00	38.0	0.0763	7.905	0.002394	31.87
8.50	37.0	0.0742	8.399	0.002407	30.82
9.00	35.5	0.0712	8.893	0.002420	29.42
9.50	35.0	0.0702	9.387	0.002434	28.85
10.00	34.5	0.0692	9.881	0.002447	28.28

Tested by : IG	Q.A. Check by : LN	Approved by : IG
Date : 10 October 2015	Date : 14 October 2015	Date : 18 November 2015

Form GE-L-10

Page 1 of 2

STRESS VS STRAIN



LOCATION : BH 02 6.5m - 7.0m
 DESCRIPTION: Clayey organic SILT with trace of organics, dark grey, very soft to soft, low to medium plasticity
 DATE OF TEST : 10 October 2015

Form GE-L-10

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Unconfined Compressive Strength
NZS 4402:1986 (Test 6.3.1)

PRINCIPAL	: Japan International Cooperation Agency (JICA)	PROJECT No.	: 1920815
PROJECT NAME	: Geotechnical Investigation for Nadi River Basin Drilling Works.	DATE TESTED	: 10 October 2015
SITE ADDRESS	: BH 02: Navo, Nadi Town	TECHNOLOGIST	: IG
SAMPLE LOCATION	: BH 02 9.50m - 10.00m	MATERIAL TYPE	: Clayey organic SILT with trace of organics, dark grey, very soft to soft, low to medium plasticity
TEST NUMBER	: N 516		

SAMPLE HISTORY : NATURAL / AIR-DRIED / OVEN-DRIED / UNKNOWN

Moisture Content	Container No.	-	95
	Mass of Container	g	89.87
	Mass of Container + Wet Soil	g	396.75
	Mass of Container + Dry Soil	g	309.82
	Mass of Dry Soil	g	219.95
	Mass of Moisture	g	86.93
	Moisture Content	%	39.52

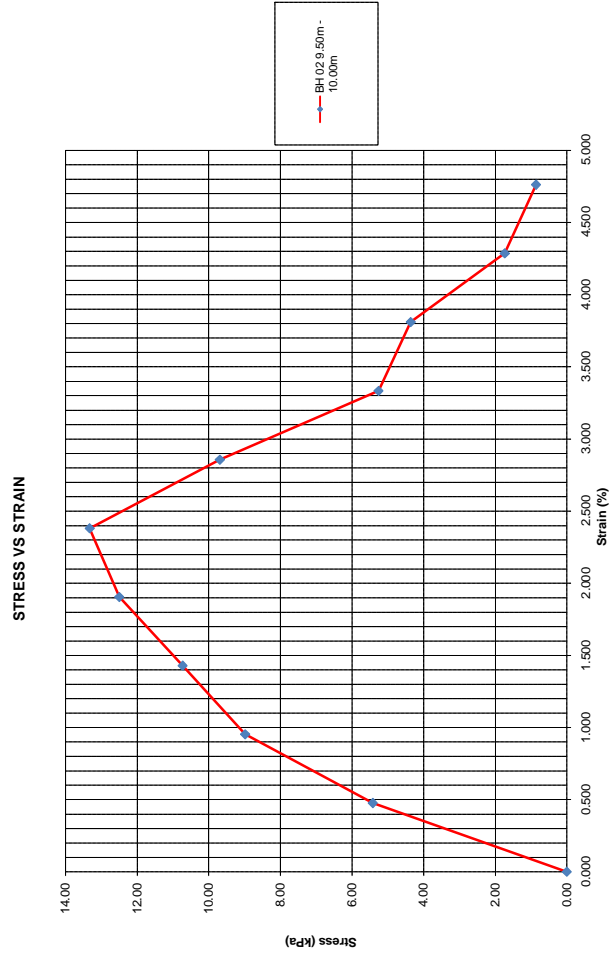
Bulk Density	Sample No.	-	N 516
	Diameter of Specimen	mm	53.00
	Initial area of specimen A ₀ (π/4 d ²)	mm ²	2205.07
	Initial length of specimen L ₀	mm	105.00
	Initial mass of specimen M _i	g	440.50
	Bulk Density ρ	t/m ³	1.90
	Dry Density ρ_d	t/m ³	1.36

Compression Gauge Reading	Load Gauge Reading	Load	Strain $\epsilon = \frac{C_n - C_0}{L_0}$	Corrected Area A = A ₀ / 1 - ϵ	Principal Stress Difference $\sigma_1 - \sigma_3 = 1000P/A$
mm		(kN)	%	m ²	kPa
0.00	0	0	0.000	0.002205	0.00
0.50	6.0	0.0120	0.476	0.002216	5.42
1.00	10.0	0.0200	0.952	0.002226	8.98
1.50	12.0	0.0240	1.429	0.002237	10.73
2.00	14.0	0.0281	1.905	0.002248	12.50
2.50	15.0	0.0301	2.381	0.002259	13.33
3.00	11.0	0.0220	2.857	0.002270	9.69
3.50	6.0	0.0120	3.333	0.002281	5.26
4.00	5.0	0.0100	3.810	0.002292	4.36
4.50	2.0	0.0040	4.286	0.002304	1.74
5.00	1.0	0.0020	4.762	0.002315	0.86

Tested by : IG	Q.A. Check by : LN	Approved by : IG
Date : 10 October 2015	Date : 14 October 2015	Date : 18 November 2015

Form GE-L-10

Page 1 of 2



LOCATION: BH 02:9.50m - 10.00m. DESCRIPTION: Clayey organic SILT with trace of organics, dark grey, very soft to soft, low to medium plasticity. DATE OF TEST: 10 October 2015.

Form GE-L-10

Page 2 of 2

Unconfined Compressive Strength
NZS 4402:1986 (Test 6.3.1)

PRINCIPAL :	Japan International Cooperation Agency (JICA)	PROJECT No. :	1920815
PROJECT NAME :	Geotechnical Investigation for Nadi River Basin Drilling Works.	DATE TESTED :	21 October 2015
SITE ADDRESS :	BH 02: Navo, Nadi Town	TECHNOLOGIST :	IG
SAMPLE LOCATION :	BH 02 19.0m - 19.30m (Core)	MATERIAL TYPE :	Sandstone CONGLORNERATE, fine to medium gravel, highly to moderately weathered, very weak to weak
TEST NUMBER :	N 621		
SAMPLE HISTORY : NATURAL / AIR-DRIED / OVEN-DRIED / UNKNOWN			

Moisture Content	Container No.	-	90
	Mass of Container	g	118.07
	Mass of Container + Wet Soil	g	784.35
	Mass of Container + Dry Soil	g	742.83
	Mass of Dry Soil	g	624.76
	Mass of Moisture	g	41.52
	Moisture Content	%	6.65

Bulk Density	Sample No.	-	N 612
	Diameter of Specimen	mm	60.79
	Initial area of specimen A ₀ (π/4 d ²)	mm ²	2900.91
	Initial length of specimen L ₀	mm	103.85
	Initial mass of specimen M _i	g	670.94
	Bulk Density ρ	t/m ³	2.23
	Dry Density ρ _d	t/m ³	2.09

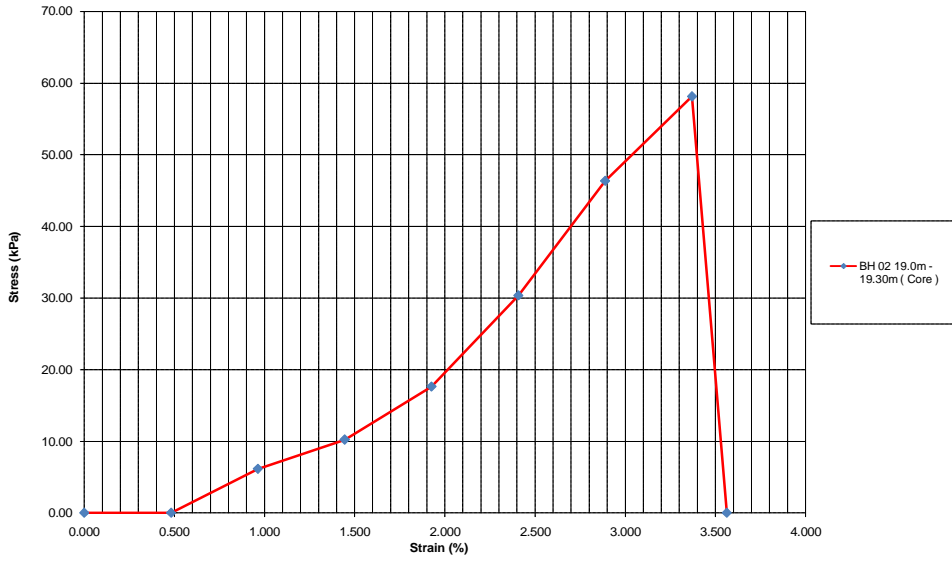
Compression Gauge Reading	Load Gauge Reading	Load	Strain $\epsilon = \frac{C_n - C_o}{L_o}$	Corrected Area A = A ₀ / 1-ε	Principal Stress Difference σ ₁ - σ ₃ = 1000P/A
mm		(kN)	%	m ²	kPa
0.00	0	0	0.000	0.002901	0.00
0.50	0.0	0	0.481	0.002915	0.00
1.00	9.0	0.0180	0.963	0.002929	6.15
1.50	15.0	0.0301	1.444	0.002943	10.23
2.00	26.0	0.0522	1.926	0.002958	17.65
2.50	45.0	0.0903	2.407	0.002972	30.38
3.00	69.0	0.1385	2.889	0.002987	46.36
3.50	87.0	0.1746	3.370	0.003002	58.16
3.70	0.0	0	3.563	0.000108	0.00

Tested by : IG	Q.A. Check by : LN	Approved by : IG
Date : 10 October 2015	Date : 14 October 2015	Date : 18 November 2015

Form GE-L-10

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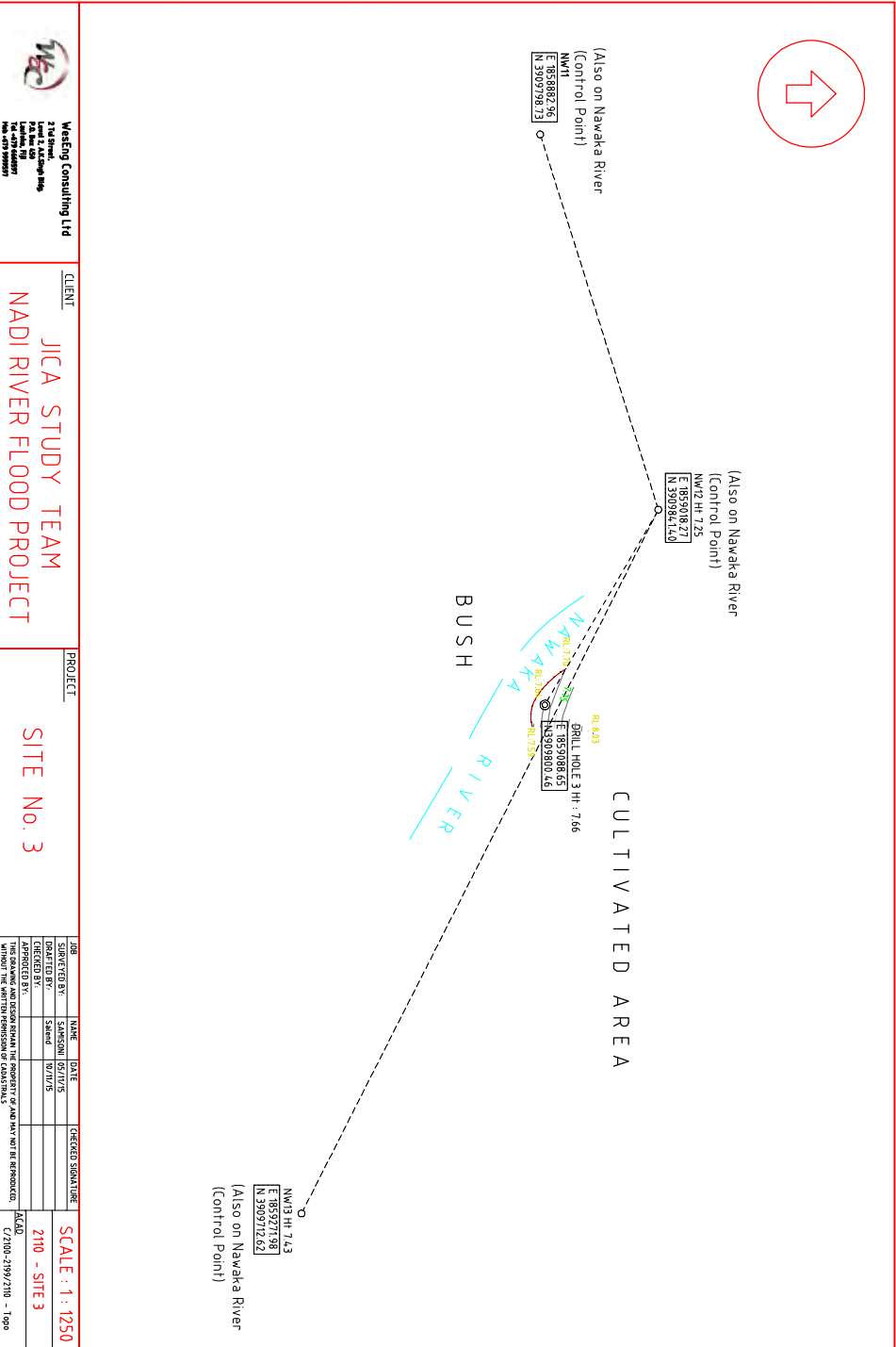
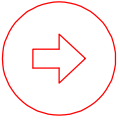
STRESS VS STRAIN



LOCATION: BH 02 19.00m - 19.30m	DESCRIPTION: Sandstone CONGLORNERATE, fine to medium gravel, highly to moderately weathered,
DATE OF TEST :21 October 2015	very weak to weak

D15-74

APPENDIX 3
SITE 3 - Qeleloa, Nadi, Fiji.



Wasting Consulting Ltd
 27th Street,
 Level 2, KALANGONGONG
 Lumbini, BKK
 Ph: +63 999033

CLIENT
JICA STUDY TEAM
NADI RIVER FLOOD PROJECT

PROJECT
SITE No. 3

NO.	NAME	DATE	CHECKED SIGNATURE
DESIGNED BY:	SANSONI	12/11/18	
CHECKED BY:	Sansoni	12/11/18	
APPROVED BY:	Special Director, Department of Water Resources Development, Ministry of Agriculture, Forestry and Fisheries		

SCALE : 1 : 1250
 210 - SITE 3
 C/7100-2199/2710 - Topo

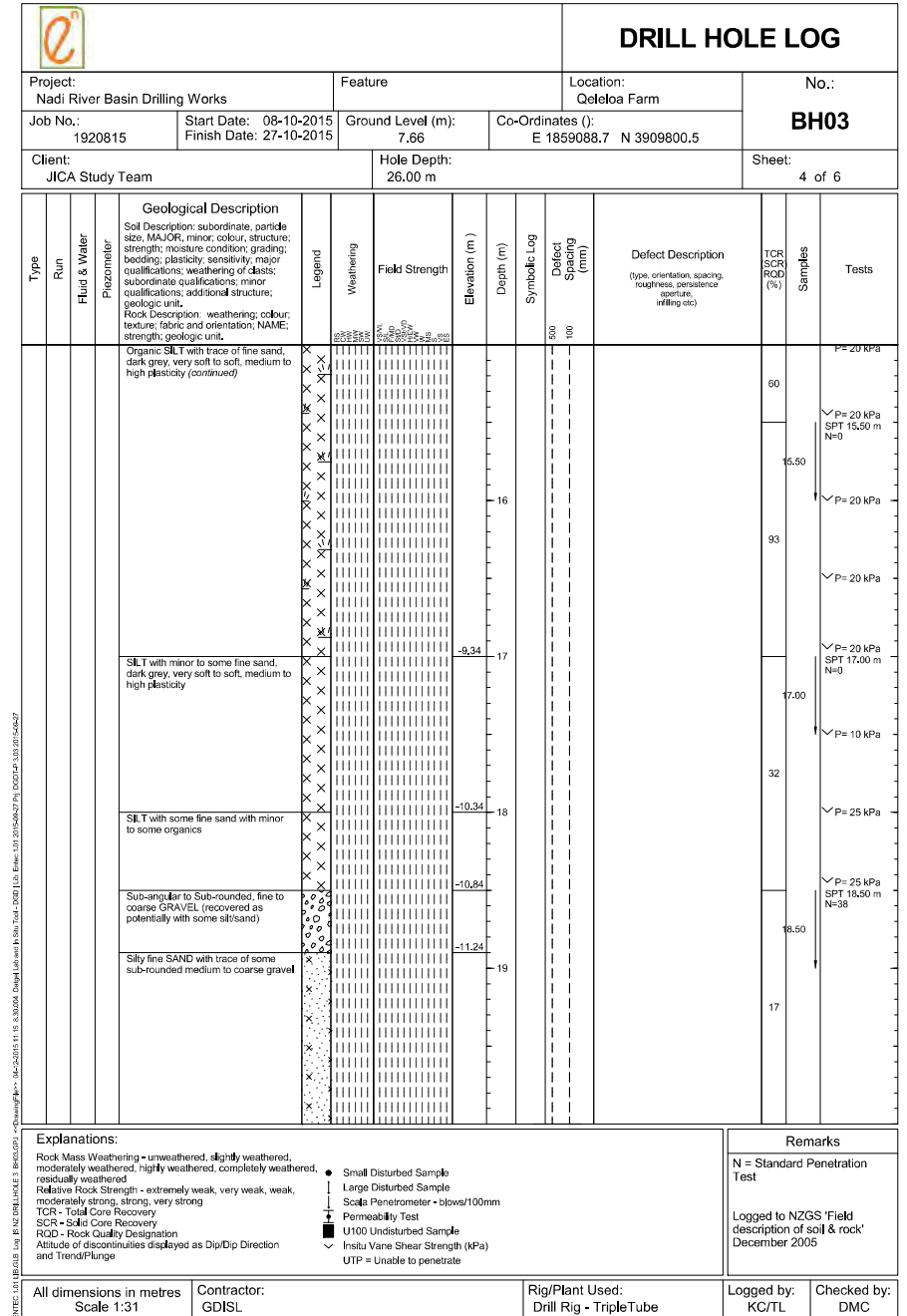
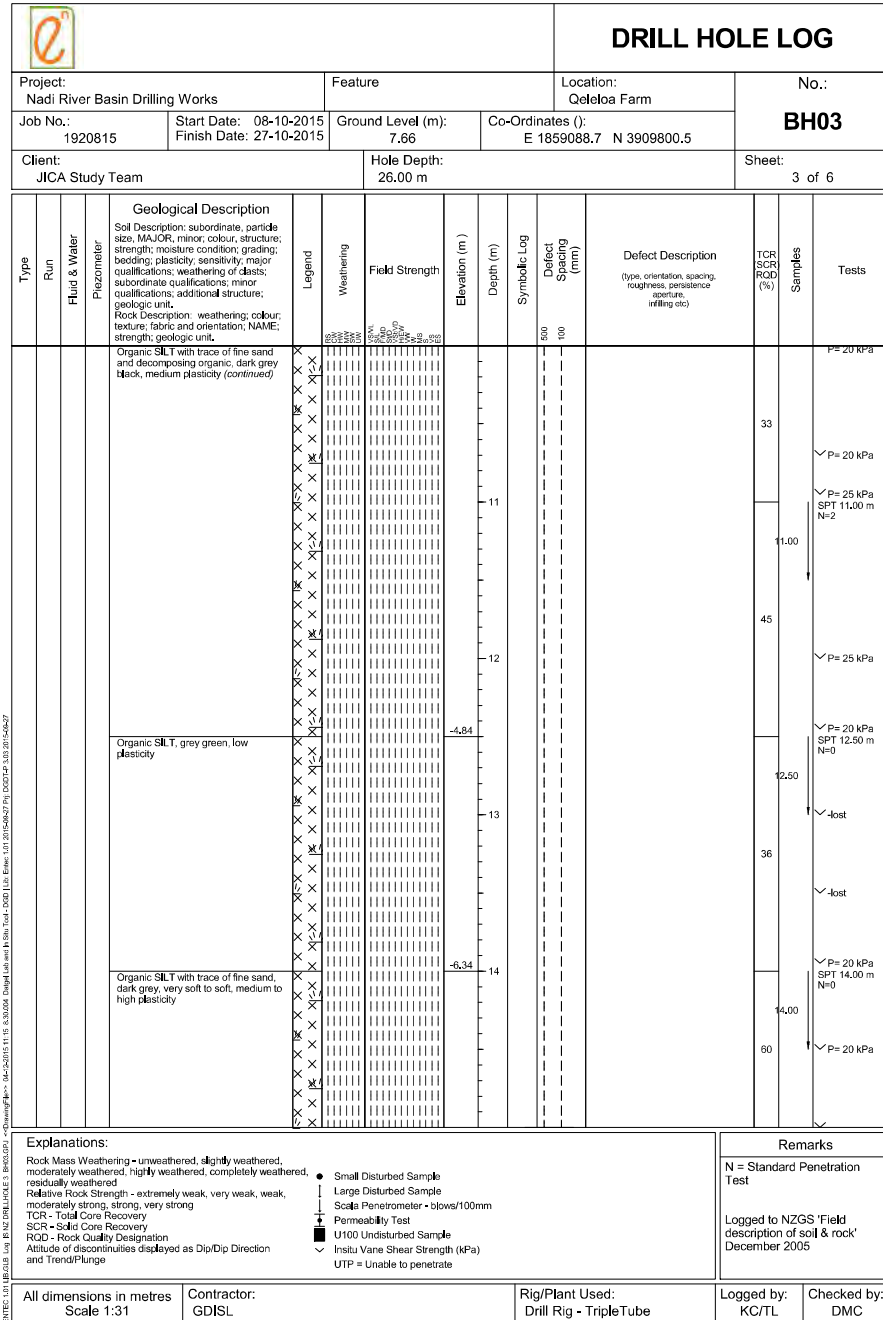
APPENDIX 3a Test Locality Plan



APPENDIX 3b Engineering Borehole Log

DRILL HOLE LOG															
Project: Nadi River Basin Drilling Works			Feature		Location: Qeleloa Farm		No.: BH03								
Job No.: 1920815		Start Date: 08-10-2015 Finish Date: 27-10-2015		Ground Level (m): 7.66	Co-Ordinates (): E 1859088.7 N 3909800.5										
Client: JICA Study Team			Hole Depth: 26.00 m				Sheet: 1 of 6								
Type	Run	Fluid & Water	Piezometer	Geological Description	Legend	Weathering	Field Strength	Elevation (m)	Depth (m)	Symbolic Log	Defect Spacing (mm)	Defect Description	TCR SCR ROD (%)	Samples	Tests
				Silty CLAY with root fibres, red brown, medium plasticity				+6.76	1		500 100		90	✓ P= 10 kPa	
				Silty CLAY, red brown, medium plasticity				+6.16	1				1.00	✓ P= 0 kPa friable SPT 1.00 m N=3	
				Clayey SILT, red brown, medium plasticity					2				2.00 - 2.50 PT	✓ P= 75 kPa	
									2				90	✓ P= 10 kPa	
									3				3.50	✓ P= 225 kPa SPT 3.50 m N=9	
				Silty CLAY, red brown, medium plasticity				+3.56	4				71	✓ P= 80 kPa	
								+2.66						✓ P= 80 kPa	
Explanations: Rock Mass Weathering - unweathered, slightly weathered, moderately weathered, highly weathered, completely weathered, residually weathered Relative Rock Strength - extremely weak, very weak, weak, moderately strong, strong, very strong TCR - Total Core Recovery SCR - Solid Core Recovery ROD - Rock Quality Designation Altitude of discontinuities displayed as Dip/Dip Direction and Trend/Plunge												Remarks N = Standard Penetration Test Logged to NZGS 'Field description of soil & rock' December 2005			
All dimensions in metres Scale 1:31			Contractor: GDJSL		Rig/Plant Used: Drill Rig - TripleTube		Logged by: KC/TL	Checked by: DMC							

DRILL HOLE LOG															
Project: Nadi River Basin Drilling Works			Feature		Location: Qeleloa Farm		No.: BH03								
Job No.: 1920815		Start Date: 08-10-2015 Finish Date: 27-10-2015		Ground Level (m): 7.66	Co-Ordinates (): E 1859088.7 N 3909800.5										
Client: JICA Study Team			Hole Depth: 26.00 m				Sheet: 2 of 6								
Type	Run	Fluid & Water	Piezometer	Geological Description	Legend	Weathering	Field Strength	Elevation (m)	Depth (m)	Symbolic Log	Defect Spacing (mm)	Defect Description	TCR SCR ROD (%)	Samples	Tests
				Organic SILT, dark grey, soft to very soft, low to medium plasticity					6				90	✓ P= 15 kPa	
									6				1.00	✓ P= 15 kPa	
									7				2.00 - 2.50 PT	✓ P= 20 kPa SPT 6.50 m N=9	
									7				90	✓ P= 10 kPa	
									8				3.50	✓ P= 20 kPa SPT 3.50 m N=9	
				Sandy SILT with organics				-0.04					71	✓ P= 20 kPa	
				Silty fine to medium SAND, grey				-0.34	8					✓ P= 20 kPa	
									8				8.00 - 8.50 PT	✓ P= 20 kPa	
									9				60	✓ P= 20 kPa	
				Silty SAND with trace of fine gravel, dark grey brown				-1.24						✓ P= 20 kPa	
				Sandy GRAVEL with trace of silt				-1.44						✓ P= 20 kPa	
				Silty fine to medium SAND, dark grey				-1.54						✓ P= 20 kPa	
									9					✓ P= 80 kPa	
				Organic SILT with trace of fine sand and decomposing organic, dark grey black, medium plasticity				-1.84						✓ P= 75 kPa	
														✓ P= 80 kPa	
														✓ P= 20 kPa SPT 9.50 m N=4	
Explanations: Rock Mass Weathering - unweathered, slightly weathered, moderately weathered, highly weathered, completely weathered, residually weathered Relative Rock Strength - extremely weak, very weak, weak, moderately strong, strong, very strong TCR - Total Core Recovery SCR - Solid Core Recovery ROD - Rock Quality Designation Altitude of discontinuities displayed as Dip/Dip Direction and Trend/Plunge												Remarks N = Standard Penetration Test Logged to NZGS 'Field description of soil & rock' December 2005			
All dimensions in metres Scale 1:31			Contractor: GDJSL		Rig/Plant Used: Drill Rig - TripleTube		Logged by: KC/TL	Checked by: DMC							



DRILL HOLE LOG														
Project: Nadi River Basin Drilling Works			Feature		Location: Qetleoa Farm		No.:							
Job No.: 1920815		Start Date: 08-10-2015 Finish Date: 27-10-2015		Ground Level (m): 7.66	Co-Ordinates (): E 1859088.7 N 3909800.5		BH03							
Client: JICA Study Team			Hole Depth: 26.00 m			Sheet: 5 of 6								
Type	Run	Fluid & Water Piezometer	Geological Description	Legend	Weathering	Field Strength	Elevation (m)	Depth (m)	Symbolic Log	Defect Spacing (mm)	Defect Description (type, orientation, spacing, roughness, persistence aperture, infilling etc)	TCR SCR ROD (%)	Samples	Tests
			Silty fine SAND with trace of some sub-rounded medium to coarse gravel (continued) SLT with trace of fine sand, very soft, wet to saturated				-12.54	20.00						SPT 20.00 m N=0 P=0 kPa
			Silty CLAY, dark grey mottled orange, very soft to soft, medium plasticity				-13.34	21						
			Silty CLAY with some fine to medium sub-angular gravel, medium plasticity				-13.54							P=20 kPa
			Silty CLAY with fine to medium sub-angular to rounded gravel, green grey, medium plasticity				-13.84	21.50						SPT 21.50 m N=51
			Organic decomposing matter				-14.34	22						
			Clayey fine sub-angular to angular GRAVEL, dry, medium to high plasticity					80						P=125 kPa
								23.00						SPT 23.00 m N=50 P=50 kPa
								70						
								24						
			Fine to coarse GRAVEL, angular to sub-rounded				-18.84	80						SPT 24.50 m N=50
Explanations:			Remarks											
Rock Mass Weathering - unweathered, slightly weathered, moderately weathered, highly weathered, completely weathered, residually weathered			N = Standard Penetration Test											
Relative Rock Strength - extremely weak, very weak, weak, moderately strong, strong, very strong			Logged to NZGS 'Field description of soil & rock' December 2005											
TCR - Total Core Recovery			<ul style="list-style-type: none"> ● Small Disturbed Sample ○ Large Disturbed Sample □ Scale Penetrometer - blows/100mm ↓ Permeability Test ▣ U100 Undisturbed Sample ◁ Insitu Vane Shear Strength (kPa) UTP = Unable to penetrate 											
ROD - Rock Quality Designation			Rig/Plant Used: Drill Rig - TripleTube											
Altitude of discontinuities displayed as Dip/Dip Direction and Trend/Plunge			Logged by: KC/TL											
All dimensions in metres Scale 1:31			Checked by: DMC											
Contractor: GDISL			Rig/Plant Used: Drill Rig - TripleTube											
			Logged by: KC/TL											
			Checked by: DMC											

ENTR: L0118(03).L01.F1.NZ (REVISIONS: 000000) - 04/2015 11.15 8/30/05 (Dip/Dip Direction and Trend/Plunge)

DRILL HOLE LOG														
Project: Nadi River Basin Drilling Works			Feature		Location: Qetleoa Farm		No.:							
Job No.: 1920815		Start Date: 08-10-2015 Finish Date: 27-10-2015		Ground Level (m): 7.66	Co-Ordinates (): E 1859088.7 N 3909800.5		BH03							
Client: JICA Study Team			Hole Depth: 26.00 m			Sheet: 6 of 6								
Type	Run	Fluid & Water Piezometer	Geological Description	Legend	Weathering	Field Strength	Elevation (m)	Depth (m)	Symbolic Log	Defect Spacing (mm)	Defect Description (type, orientation, spacing, roughness, persistence aperture, infilling etc)	TCR SCR ROD (%)	Samples	Tests
			Fine to coarse GRAVEL, angular to sub-rounded (continued)				-18.14	80						
			Clayey fine to coarse sub-rounded to sub-angular GRAVEL				-18.34	26						
			Hole Terminated at 26.00 m N = Standard Penetration Test					26.00						SPT 26.00 m N=50
			Logged to NZGS 'Field description of soil & rock' December 2005					27						
								28						
								29						
Explanations:			Remarks											
Rock Mass Weathering - unweathered, slightly weathered, moderately weathered, highly weathered, completely weathered, residually weathered			N = Standard Penetration Test											
Relative Rock Strength - extremely weak, very weak, weak, moderately strong, strong, very strong			Logged to NZGS 'Field description of soil & rock' December 2005											
TCR - Total Core Recovery			<ul style="list-style-type: none"> ● Small Disturbed Sample ○ Large Disturbed Sample □ Scale Penetrometer - blows/100mm ↓ Permeability Test ▣ U100 Undisturbed Sample ◁ Insitu Vane Shear Strength (kPa) UTP = Unable to penetrate 											
ROD - Rock Quality Designation			Rig/Plant Used: Drill Rig - TripleTube											
Altitude of discontinuities displayed as Dip/Dip Direction and Trend/Plunge			Logged by: KC/TL											
All dimensions in metres Scale 1:31			Checked by: DMC											
Contractor: GDISL			Rig/Plant Used: Drill Rig - TripleTube											
			Logged by: KC/TL											
			Checked by: DMC											

ENTR: L0118(03).L01.F1.NZ (REVISIONS: 000000) - 04/2015 11.15 8/30/05 (Dip/Dip Direction and Trend/Plunge)

Borehole 3 Core Photos (0.00m to 26.0m)



0.00m to 4.10m



4.10m to 7.40m



7.40m to 12.50m



12.50m to 17.00m



17.00m to 20.00m



20.00m to 26.00m

APPENDIX 3c

Laboratory Test Schedule and Laboratory Test Results

Date: _____
 SAMPLES SENT BY: Collected from Site by ENTEC on _____
 Notes: _____

Lab test Schedule

Project No.	Site	Soil Type	SPT N value	Sample type	Depth (m)	Lab Tests Required			Moisture Content	PSD	Atterberg	UCS	Consolidation
						Permeability	Density	BOQ					
1920815.03	Site 3	Silty CLAY	3	SPT	1.00-1.50			1	1	1			
		Clayey SILT		U	2.0-2.5			1	1	1			1
		Clayey SILT	9	SPT	3.5-4.0			1	1	1			1
		SILT with fine sand		U	5.0-5.50			1	1	1			1
		SILT with fine sand	0	SPT	6.50-7.00			1	1	1			1
		SAND trace of Gravel		U	8.00m-8.5			1	1	1			1
		SAND trace of Gravel	4	SPT	8.50-9.00m			1	1	1			1
		SAND trace of Gravel	1	SPT	10.55-11.0m			1	1	1			1
		SAND trace of Gravel	0	SPT	12.50-13.00			1	1	1			1
		SAND trace of Gravel	0	SPT	13.55-14.0			1	1	1			1
		SAND trace of Gravel	0	SPT	15.50-16.00			1	1	1			1
		SAND trace of Gravel	0	SPT	17.00-17.5			1	1	1			1
		SAND trace of Gravel	38	SPT	18.50-19.00			1	1	1			1
SAND trace of Gravel	0	SPT	20.00-20.50			1	1	1			1		
TOTALS								1	3	3	3	3	2

Turn around time for results - Two Bore hole results per week except consolidation test results

Atterberg Limit Test Results

PRINCIPAL	: Japan International Cooperation Agency (JICA)	PROJECT No.	: 1920815
PROJECT NAME	: Geotechnical Investigation for Nadi River Basin Drilling Works	DATE	: 15 October 2015
SITE ADDRESS	: BH03, Qeileoa, Nadi	TECHNOLOGIST	: UM
MATERIAL TYPE & DESCRIPTION	: Clayey SILT, red brown, medium plasticity	TEST METHOD	: NZS 4402:1986 (amended version)
		SAMPLE No.	: N523 (BH03 2.00m - 2.50m)

NATURAL MOISTURE CONTENT		TEST No.		1	2	Average	
Container No.	g	81	82				
Mass of Container	g	87.50	90.16				
Mass of Container + Wet Soil	g	199.00	208.76				
Mass of Container + Dry Soil	g	175.76	184.08				
Mass of Dry Soil	g	88.26	93.92				
Mass of Moisture	g	23.24	24.68				
Moisture Content	%	26.33	26.28				26.30

PLASTIC LIMIT		TEST No.		1	2	Average	
Container No.		165	175				
Mass of Container	g	11.77	11.32				
Mass of Container + Wet Soil	g	17.53	17.90				
Mass of Container + Dry Soil	g	16.28	16.46				
Mass of Dry Soil	g	4.51	5.14				
Mass of Moisture	g	1.25	1.44				
Moisture Content	%	27.72	28.02				27.87

LIQUID LIMIT		TEST No.		1	2	3	4	5	6
Number of Blows		40	35	29	26	19	16		
Container No.		140	102	164	162	163	128		
Mass of Container	g	11.88	12.14	11.84	11.99	11.75	11.85		
Mass of Container + Wet Soil	g	22.48	25.87	22.85	21.48	25.58	23.62		
Mass of Container + Dry Soil	g	19.55	22.07	19.75	18.78	21.47	20.13		
Mass of Dry Soil	g	7.67	9.93	7.91	6.79	9.72	8.28		
Mass of Moisture	g	2.93	3.80	3.10	2.70	4.11	3.49		
Moisture Content	%	38.20	38.27	39.19	39.76	42.28	42.15		

LINEAR SHRINKAGE TEST		Mould No.		1	2	3	4	5	Average
Initial length of Sample						125.00			
Final length of Sample after Shrinkage						113.00			
% Shrinkage						9.60			9.60

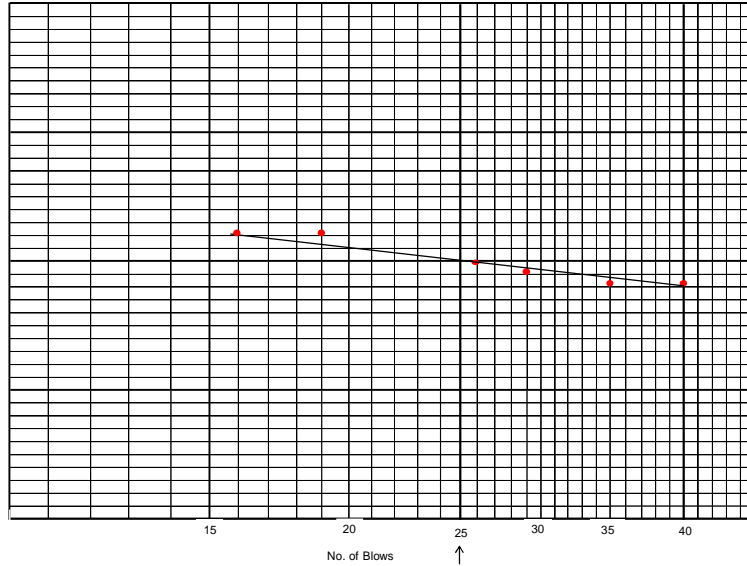
Sample Preparation	as received	Liquid Limit	40.10 %
	washed/sieved on 425 µm sieve	Plastic Limit	27.87 %
	air dried/oven dried 105°C	Plasticity Index	12.23 %
	after making a paste cured for 12-16 hrs	Shrinkage Limit	9.60 %

Tested By: UM
 Date: 13 October 2015
 Form: GE-L-03

Q.A. Checked By: MK
 Date: 24 October 2015

Approved By: IG
 Date: 19 November 2015

Graph of Moisture Content vs No. of Blows



Project No: 1920815
Sample N523

PRINCIPAL	: Japan International Cooperation Agency (JICA)	PROJECT No.	: 1920815
PROJECT NAME	: Geotechnical Investigation for Nadi River Basin Drilling Works	DATE	: 14 October 2015
SITE ADDRESS	: BH03, Qeileloa, Nadi	TECHNOLOGIST	: KB
MATERIAL TYPE & DESCRIPTION	: Clayey SILT, red brown, medium plasticity	TEST METHOD	: NZS 4402:1986 (amended version)
		SAMPLE No.	: N524 (BH03 3.50m - 4.00m)

NATURAL MOISTURE CONTENT						
TEST No.		1	2			Average
Container No.	g	31	34			
Mass of Container	g	14.55	14.90			
Mass of Container + Wet Soil	g	28.68	31.26			
Mass of Container + Dry Soil	g	25.69	27.79			
Mass of Dry Soil	g	11.14	12.89			
Mass of Moisture	g	2.99	3.47			
Moisture Content	%	26.84	26.92			26.88

PLASTIC LIMIT						
TEST No.		1	2			Average
Container No.		114	128			
Mass of Container	g	11.92	11.83			
Mass of Container + Wet Soil	g	16.89	17.07			
Mass of Container + Dry Soil	g	15.75	15.86			
Mass of Dry Soil	g	3.83	4.03			
Mass of Moisture	g	1.14	1.21			
Moisture Content	%	29.77	30.02			29.89

LIQUID LIMIT							
TEST No.		1	2	3	4	5	6
Number of Blows		40	35	30	25	20	15
Container No.		107	108	109	110	113	112
Mass of Container	g	11.59	11.28	11.88	11.91	11.89	11.74
Mass of Container + Wet Soil	g	18.49	21.01	22.33	22.10	19.74	19.95
Mass of Container + Dry Soil	g	16.41	18.06	19.17	18.97	17.31	17.36
Mass of Dry Soil	g	4.82	6.78	7.29	7.06	5.42	5.62
Mass of Moisture	g	2.08	2.95	3.16	3.13	2.43	2.59
Moisture Content	%	43.15	43.51	43.35	44.33	44.83	46.09

LINEAR SHRINKAGE TEST							
Mould No.		1	2	3	4	5	Average
Initial length of Sample			125.00				
Final length of Sample after Shrinkage			105.00				
% Shrinkage			16.00				16.00

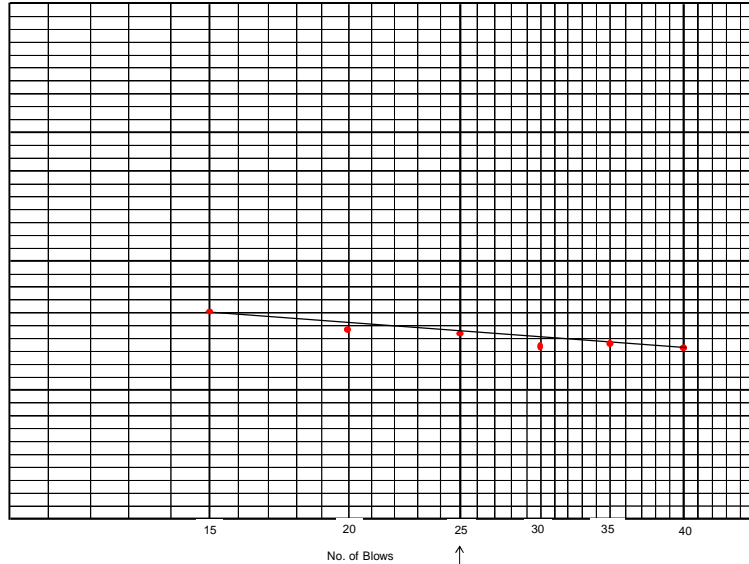
Sample Preparation		
as received	Liquid Limit	44.50 %
washed/sieved on 425 µm sieve	Plastic Limit	29.89 %
air dried/oven dried 105°C	Plasticity Index	14.61 %
after making a paste cured for 12-16 hrs	Shrinkage Limit	16.00 %

Tested By: KB
Date: 14 October 2015

Q.A. Checked By: MK
Date: 24 October 2015

Approved By: IG
Date: 19 November 2015

Graph of Moisture Content vs No. of Blows



Project No: 1920815
Sample No: N524

PRINCIPAL	: Japan International Cooperation Agency (JICA)	PROJECT No.	: 1920815
PROJECT NAME	: Geotechnical Investigation for Nadi River Basin Drilling Works	DATE	: 15 October 2015
SITE ADDRESS	: BH03, Qeleloa, Nadi	TECHNOLOGIST	: RK/LN
MATERIAL TYPE & DESCRIPTION	: SILT with minor to some fine sand, dark grey, very soft to soft, medium to high plasticity	TEST METHOD	: NZS 4402:1986 (amended version)
		SAMPLE No.	: N530 (BH03 17.00m - 17.50m)

NATURAL MOISTURE CONTENT						
TEST No.		1	2			Average
Container No.	g	45	40			
Mass of Container	g	14.45	14.56			
Mass of Container + Wet Soil	g	39.39	34.59			
Mass of Container + Dry Soil	g	31.41	28.11			
Mass of Dry Soil	g	16.96	13.55			
Mass of Moisture	g	7.98	6.48			
Moisture Content	%	47.05	47.82			47.44

PLASTIC LIMIT						
TEST No.		1	2			Average
Container No.		173	124			
Mass of Container	g	11.98	12.24			
Mass of Container + Wet Soil	g	16.44	16.96			
Mass of Container + Dry Soil	g	15.53	15.97			
Mass of Dry Soil	g	3.55	3.73			
Mass of Moisture	g	0.91	0.99			
Moisture Content	%	25.63	26.54			26.09

LIQUID LIMIT							
TEST No.		1	2	3	4	5	6
Number of Blows		40	35	30	25	19	15
Container No.		140	163	164	102	162	176
Mass of Container	g	11.89	11.77	11.82	12.14	11.97	11.76
Mass of Container + Wet Soil	g	16.08	17.23	18.42	18.33	20.40	20.20
Mass of Container + Dry Soil	g	14.97	15.76	16.62	16.64	18.06	17.87
Mass of Dry Soil	g	3.08	3.99	4.80	4.50	6.09	6.11
Mass of Moisture	g	1.11	1.47	1.80	1.69	2.34	2.33
Moisture Content	%	36.04	36.84	37.50	37.56	38.42	38.13

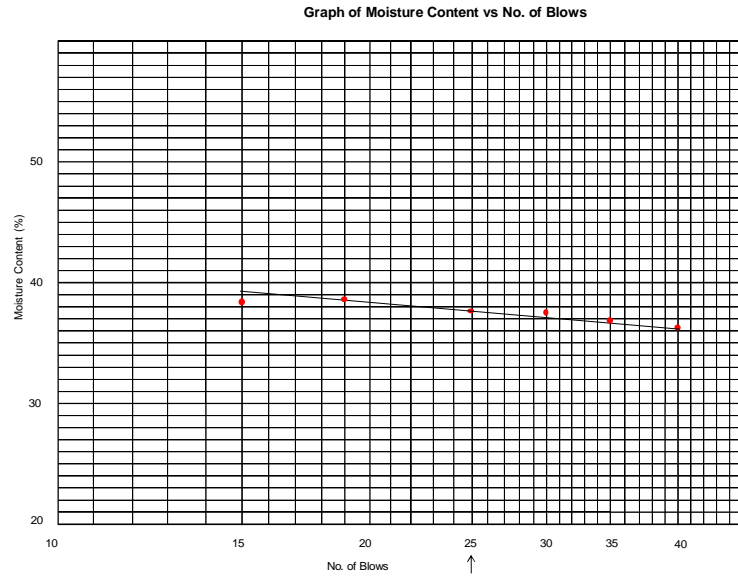
LINEAR SHRINKAGE TEST							
Mould No.		1	2	3	4	5	Average
Initial length of Sample			125.00				
Final length of Sample after Shrinkage			102.00				
% Shrinkage			18.40				18.40

Sample Preparation	
as received	Liquid Limit <u>37.50 %</u>
washed/sieved on 425 µm sieve	Plastic Limit <u>26.09 %</u>
air dried/oven dried 105°C	Plasticity Index <u>11.41 %</u>
after making a paste cured for 12-16 hrs	Shrinkage Limit <u>18.40 %</u>

Tested By: RK/LN
Date: 15 October 2015

Q.A. Checked By: MK
Date: 24 October 2015

Approved By: IG
Date: 19 November 2015



Project No: 1920815
Sample No: N 530

PRINCIPAL :	Japan International Cooperation Agency (JICA)	PROJECT No. :	1920815
PROJECT NAME :	Geotechnical Investigation for Nadi River Basin Drilling Works	DATE / TESTED :	16 October 2015
SITE ADDRESS :	BH03, Qeileloa, Nadi	TECHNOLOGIST :	LN
SAMPLE LOCATION :	BH03 2.00m - 2.50m	MATERIAL TYPE :	Clayey SILT, red brown, medium plasticity
TEST NUMBER :	N523	SAMPLE HISTORY : NATURAL / AIR-DRIED / OVEN-DRIED / UNKNOWN	

Moisture Content	Container No.	-	81	82
	Mass of Container	g	87.50	90.16
	Mass of Container + Wet Soil	g	199.00	208.76
	Mass of Container + Dry Soil	g	175.76	184.08
	Mass of Dry Soil	g	88.26	93.92
	Mass of Moisture	g	23.24	24.68
	Moisture Content	%	26.33	26.28
				26.30

Bulk Density	Sample No.	-	N523
	Diameter of Specimen	mm	53.59
	Initial area of specimen A_0 ($\pi/4 d^2$)	mm ²	2254.43
	Initial length of specimen L_0	mm	63.52
	Initial mass of specimen M_i	g	230.89
	Bulk Density ρ	t/m ³	1.61
	Dry Density ρ_d	t/m ³	1.28

Tested by : LN	Q.A. Check by : MK	Approved by : IG
Date : 16 October 2015	Date : 24 October 2015	Date : 19 November 2015

BULK DENSITY
NZS 4402:1986 (Test 5.1.3)

PRINCIPAL :	Japan International Cooperation Agency (JICA)	PROJECT No. :	1920815
PROJECT NAME :	Geotechnical Investigation for Nadi River Basin Drilling Works	DATE / TESTED :	16 October 2015
SITE ADDRESS :	BH03, Qeleloa, Nadi	TECHNOLOGIST :	TL
SAMPLE LOCATION :	BH03 5.00m - 5.50m	MATERIAL TYPE :	Organic SILT, dark grey, soft to very soft, low to medium plasticity
TEST NUMBER :	N525		
SAMPLE HISTORY : NATURAL / AIR-DRIED / OVEN-DRIED / UNKNOWN			

Moisture Content	Container No.	-	7	5	
	Mass of Container	g	52.77	53.38	
	Mass of Container + Wet Soil	g	99.72	95.30	
	Mass of Container + Dry Soil	g	86.03	82.93	
	Mass of Dry Soil	g	33.26	29.55	
	Mass of Moisture	g	13.69	12.37	
	Moisture Content	%	41.16	41.86	41.51

Bulk Density	Sample No.	-	N525
	Diameter of Specimen	mm	51.69
	Initial area of specimen A_0 ($\pi/4 d^2$)	mm ²	2097.41
	Initial length of specimen L_0	mm	26.44
	Initial mass of specimen M_i	g	88.91
	Bulk Density ρ	t/m ³	1.60
	Dry Density ρ_d	t/m ³	1.13

Tested by : TL	Q.A. Check by : MK	Approved by : IG
Date : 16 October 2015	Date : 24 October 2015	Date : 19 November 2015

BULK DENSITY
NZS 4402:1986 (Test 5.1.3)

PRINCIPAL :	Japan International Cooperation Agency (JICA)	PROJECT No. :	1920815
PROJECT NAME :	Geotechnical Investigation for Nadi River Basin Drilling Works	DATE / TESTED :	16 October 2015
SITE ADDRESS :	BH03, Qeleloa, Nadi	TECHNOLOGIST :	IG
SAMPLE LOCATION :	BH03 8.00m - 8.50m	MATERIAL TYPE :	Silty fine to medium SAND, grey
TEST NUMBER :	N527		
SAMPLE HISTORY : NATURAL / AIR-DRIED / OVEN-DRIED / UNKNOWN			

Moisture Content	Container No.	-	59	96	
	Mass of Container	g	63.70	101.33	
	Mass of Container + Wet Soil	g	169.54	197.77	
	Mass of Container + Dry Soil	g	130.70	161.75	
	Mass of Dry Soil	g	67.00	60.42	
	Mass of Moisture	g	38.84	36.02	
	Moisture Content	%	57.97	59.62	58.79

Bulk Density	Sample No.	-	N527
	Diameter of Specimen	mm	53.12
	Initial area of specimen A_0 ($\pi/4 d^2$)	mm ²	2215.06
	Initial length of specimen L_0	mm	57.33
	Initial mass of specimen M_i	g	202.38
	Bulk Density ρ	t/m ³	1.59
	Dry Density ρ_d	t/m ³	1.00

Tested by : IG	Q.A. Check by : MK	Approved by : IG
Date : 16 October 2015	Date : 24 October 2015	Date : 19 November 2015

Moisture Content Test Results

PRINCIPAL	: Japan International Cooperation Agency (JICA)	PROJECT No.	: 1920815
PROJECT NAME	: Geotechnical Investigation for Nadi River Basin Drilling Works	DATE	: 14 October 2015
SITE ADDRESS	: BH 03, Qeileloa, Nadi	TECHNOLOGIST	: UM
MATERIAL TYPE & DESCRIPTION	: Silty CLAY with root fibre, red brown, medium plasticity	TEST METHOD	: NZS 4402:1986
		SAMPLE No.	: N522 (BH03 1.00m - 1.50m)

Moisture Content		%	
Container No.	g	77	70
Mass of Container	g	99.34	90.06
Mass of Container + Wet Soil	g	127.30	118.32
Mass of Container + Dry Soil	g	122.24	113.19
Mass of Dry Soil	g	22.90	23.13
Mass of Moisture	g	5.06	5.13
Moisture Content	%	22.10	22.18

Tested By: UM
Date: 14 October 2015

Q.A. Checked By: MK
Date: 24 October 2015

Approved By: IG
Date: 19 November 2015

Moisture Content Test Results

PRINCIPAL	: Japan International Cooperation Agency (JICA)	PROJECT No.	: 1920815
PROJECT NAME	: Geotechnical Investigation for Nadi River Basin Drilling Works	DATE	: 14 October 2015
SITE ADDRESS	: BH 03, Qeileloa, Nadi	TECHNOLOGIST	: UM
MATERIAL TYPE & DESCRIPTION	: Clayey SILT, red brown, medium plasticity	TEST METHOD	: NZS 4402:1986
		SAMPLE No.	: N523 (BH03 2.00m - 2.50m)

Moisture Content		%	
Container No.	g	15	6
Mass of Container	g	52.66	53.04
Mass of Container + Wet Soil	g	74.19	71.47
Mass of Container + Dry Soil	g	69.94	67.82
Mass of Dry Soil	g	17.28	14.78
Mass of Moisture	g	4.25	3.65
Moisture Content	%	24.59	24.70

Tested By: UM
Date: 14 October 2015

Q.A. Checked By: MK
Date: 24 October 2015

Approved By: IG
Date: 19 November 2015

Moisture Content Test Results

PRINCIPAL	: Japan International Cooperation Agency (JICA)	PROJECT No.	: 1920815
PROJECT NAME	: Geotechnical Investigation for Nadi River Basin Drilling Works	DATE	: 14 October 2015
SITE ADDRESS	: BH 03, Qeileloa, Nadi	TECHNOLOGIST	: UM
MATERIAL TYPE & DESCRIPTION	: Organic SILT, dark grey, soft to very soft, low to medium plasticity	TEST METHOD	: NZS 4402:1986
		SAMPLE No.	: N526 (BH03 5.00m - 5.50m)

Moisture Content		%				
Container No.	g	18	19			
Mass of Container	g	14.61	14.85			
Mass of Container + Wet Soil	g	23.19	22.69			
Mass of Container + Dry Soil	g	20.31	20.04			
Mass of Dry Soil	g	5.70	5.19			
Mass of Moisture	g	2.88	2.65			
Moisture Content	%	50.53	51.06			50.79

Tested By:UM
Date: 14 October 2015

Q.A. Checked By: MK
Date: 24 October 2015

Approved By: IG
Date: 13 November 2015

Moisture Content Test Results

PRINCIPAL	: Japan International Cooperation Agency (JICA)	PROJECT No.	: 1920815
PROJECT NAME	: Geotechnical Investigation for Nadi River Basin Drilling Works	DATE	: 14 October 2015
SITE ADDRESS	: BH 03, Qeileloa, Nadi	TECHNOLOGIST	: UM
MATERIAL TYPE & DESCRIPTION	: Organic SILT, dark grey, soft to very soft, low to medium plasticity	TEST METHOD	: NZS 4402:1986
		SAMPLE No.	: N526 (BH03 6.50m - 7.00m)

Moisture Content		%				
Container No.	g	68	78			
Mass of Container	g	74.11	78.57			
Mass of Container + Wet Soil	g	97.10	104.02			
Mass of Container + Dry Soil	g	88.90	95.14			
Mass of Dry Soil	g	14.79	16.57			
Mass of Moisture	g	8.20	8.88			
Moisture Content	%	55.44	53.59			54.52

Tested By:UM
Date: 14 October 2015

Q.A. Checked By: MK
Date: 24 October 2015

Approved By: IG
Date: 19 November 2015

Moisture Content Test Results

PRINCIPAL	: Japan International Cooperation Agency (JICA)	PROJECT No.	: 1920815
PROJECT NAME	: Geotechnical Investigation for Nadi River Basin Drilling Works	DATE	: 14 October 2015
SITE ADDRESS	: BH 03, Qeileoa, Nadi	TECHNOLOGIST	: UM
MATERIAL TYPE & DESCRIPTION	: Silty fine to medium SAND, grey	TEST METHOD	: NZS 4402:1986
		SAMPLE No.	: N527 (BH03 8.00m - 8.50m)

Moisture Content	%					
Container No.	g	108	109			
Mass of Container	g	11.27	11.83			
Mass of Container + Wet Soil	g	18.09	18.41			
Mass of Container + Dry Soil	g	16.90	17.29			
Mass of Dry Soil	g	5.63	5.46			
Mass of Moisture	g	1.19	1.12			
Moisture Content	%	21.14	20.51			20.82

 Tested By:UM
 Date: 14 October 2015

 Q.A. Checked By: MK
 Date: 24 October 2015

 Approved By: IG
 Date: 19 November 2015

Moisture Content Test Results

PRINCIPAL	: Japan International Cooperation Agency (JICA)	PROJECT No.	: 1920815
PROJECT NAME	: Geotechnical Investigation for Nadi River Basin Drilling Works	DATE	: 14 October 2015
SITE ADDRESS	: BH 03, Qeileoa, Nadi	TECHNOLOGIST	: UM
MATERIAL TYPE & DESCRIPTION	: Organic SILT, grey green, low plasticity	TEST METHOD	: NZS 4402:1986
		SAMPLE No.	: N528 (BH03 12.50m - 13.00m)

Moisture Content	%					
Container No.	g	67	85			
Mass of Container	g	72.12	88.73			
Mass of Container + Wet Soil	g	94.51	112.04			
Mass of Container + Dry Soil	g	85.97	103.14			
Mass of Dry Soil	g	13.85	14.41			
Mass of Moisture	g	8.54	8.90			
Moisture Content	%	61.66	61.76			61.71

 Tested By:UM
 Date: 14 October 2015

 Q.A. Checked By: MK
 Date: 24 October 2015

 Approved By: IG
 Date: 19 November 2015

Moisture Content Test Results

PRINCIPAL	: Japan International Cooperation Agency (JICA)	PROJECT No.	: 1920815
PROJECT NAME	: Geotechnical Investigation for Nadi River Basin Drilling Works	DATE	: 14 October 2015
SITE ADDRESS	: BH 03, Qeleloa, Nadi	TECHNOLOGIST	: UM
MATERIAL TYPE & DESCRIPTION	Organic SILT with trace of fine sand, dark grey, very soft to soft, medium to high plasticity (Core Sample)	TEST METHOD	: NZS 4402:1986
		SAMPLE No.	: N529 (BH03 15.50m - 16.00m)

Moisture Content		%					
Container No.	g	69	73				
Mass of Container	g	90.24	70.13				
Mass of Container + Wet Soil	g	107.13	87.63				
Mass of Container + Dry Soil	g	101.37	81.75				
Mass of Dry Soil	g	11.13	11.62				
Mass of Moisture	g	5.76	5.88				
Moisture Content	%	51.75	50.60				51.18

Tested By:UM
Date: 14 October 2015

Q.A. Checked By: MK
Date: 24 October 2015

Approved By: IG
Date: 19 November 2015

Moisture Content Test Results

PRINCIPAL	: Japan International Cooperation Agency (JICA)	PROJECT No.	: 1920815
PROJECT NAME	: Geotechnical Investigation for Nadi River Basin Drilling Works	DATE	: 14 October 2015
SITE ADDRESS	: BH 03, Qeleloa, Nadi	TECHNOLOGIST	: UM
MATERIAL TYPE & DESCRIPTION	SILT with minor to some fine sand, dark grey, very soft to soft, medium to high plasticity	TEST METHOD	: NZS 4402:1986
		SAMPLE No.	: N530 (BH03 17.00m - 17.50m)

Moisture Content		%					
Container No.	g	57	84				
Mass of Container	g	63.46	85.00				
Mass of Container + Wet Soil	g	95.95	126.65				
Mass of Container + Dry Soil	g	86.98	115.20				
Mass of Dry Soil	g	23.52	30.20				
Mass of Moisture	g	8.97	11.45				
Moisture Content	%	38.14	37.91				38.03

Tested By:UM
Date: 14 October 2015

Q.A. Checked By: MK
Date: 24 October 2015

Approved By: IG
Date: 19 November 2015

Moisture Content Test Results

PRINCIPAL	: Japan International Cooperation Agency (JICA)	PROJECT No.	: 1920815
PROJECT NAME	: Geotechnical Investigation for Nadi River Basin Drilling Works	DATE	: 14 October 2015
SITE ADDRESS	: BH 03, Qeileoa, Nadi	TECHNOLOGIST	: UM
MATERIAL TYPE & DESCRIPTION	: Sub-angular to Sub-rounded, fine to coarse GRAVEL, (recovered as potentially with some silt/sand)	TEST METHOD	: NZS 4402:1986
		SAMPLE No.	: N531 (BH03 18.50m - 19.00m)

Moisture Content		%					
Container No.	g	33	46				
Mass of Container	g	14.45	14.69				
Mass of Container + Wet Soil	g	42.12	39.29				
Mass of Container + Dry Soil	g	41.15	38.28				
Mass of Dry Soil	g	26.70	23.59				
Mass of Moisture	g	0.97	1.01				
Moisture Content	%	3.63	4.28				3.96

Tested By:UM
Date: 14 October 2015

Q.A. Checked By: MK
Date: 24 October 2015

Approved By: IG
Date: 19 November 2015

Moisture Content Test Results

PRINCIPAL	: Japan International Cooperation Agency (JICA)	PROJECT No.	: 1920815
PROJECT NAME	: Geotechnical Investigation for Nadi River Basin Drilling Works	DATE	: 14 October 2015
SITE ADDRESS	: BH 03, Qeileoa, Nadi	TECHNOLOGIST	: UM
MATERIAL TYPE & DESCRIPTION	: Silt with trace of fine sand, very soft, wet to saturated	TEST METHOD	: NZS 4402:1986
		SAMPLE No.	: N532 (BH03 20.00m - 20.50m)

Moisture Content		%					
Container No.	g	43	32				
Mass of Container	g	14.86	14.54				
Mass of Container + Wet Soil	g	46.81	45.58				
Mass of Container + Dry Soil	g	39.04	38.05				
Mass of Dry Soil	g	24.18	23.51				
Mass of Moisture	g	7.77	7.53				
Moisture Content	%	32.13	32.03				32.08

Tested By:UM
Date: 14 October 2015

Q.A. Checked By: MK
Date: 24 October 2015

Approved By: IG
Date: 19 November 2015

**Determination of Permeability of a Soil
Constant Head Method for Remoulded Sample**

PRINCIPAL :	Japan International Cooperation Agency (JICA)	PROJECT No. :	1920815
PROJECT NAME :	Geotechnical Investigation for Nadi River Basin Drilling Works	DATE :	16 October 2015
SITE ADDRESS :	BH03, Qeileoa Nadi	TECHNOLOGIST :	IG/TL/LN
MATERIAL TYPE & DESCRIPTION :	Silty fine to medium SAND, grey (Core Sample)	TEST METHOD :	AS 1289.6.7.3-2001
		SAMPLE No. :	N527 (BH03 8.50m - 9.00m)

Total Weight : -
Weight Retained on : -
Percentage retained: -

MOISTURE CONTENT

Container No.	16
Mass of Container	g 114.49
Mass of Container + Wet	g 133.10
Mass of Container + Dry	g 128.56
Mass of Dry Soil	g 14.07
Mass of Moisture	g 4.54
Moisture Content	% 32.27
Optimum moisture content	% -
Laboratory moisture ratio	% -

DENSITY

Mass of Specimen	g	1700
Volume of Speciman	cm ³	839.43
Wet Density	t/m ³	2.03
Dry Density	t/m ³	1.53
Maximum Dry Density	t/m ³	-
Laboratory Density ratio	%	-
Area of stand pipe (dia. 12mm)	mm ²	113.10
Cross sectional area of soil speciman(8cm)	cm ²	50.27
Length of soil speciman	cm	16.70

TEST #	Constant Head h (cm)	Elapsed Time (t)min	Out Flow Volume Q (cm ³)	Water temp T(°C)	KT cm/min	K ₂₀ cm/min
1	102	4.00	90	26	0.07	0.07
2	102	4.00	90	26	0.07	0.07
3	102	4.00	90	26	0.07	0.07
4	94	4.00	88	26	0.08	0.07
5	94	4.00	88	26	0.08	0.07
6	94	4.00	88	26	0.08	0.07
7	83	4.00	78	26	0.08	0.07
8	83	4.00	77	26	0.08	0.07
9	83	4.00	78	26	0.08	0.07
10	65	4.00	69	26	0.09	0.08
11	65	4.00	68	26	0.09	0.08
12	65	4.00	68	26	0.09	0.08

Average K₂₀ m/s 1.17E-05

Tested By: IG/TL/LN Q.A. Check By: KB Approved By: IG
Date: 16 October 2015 Date: 19 November 2015 Date: 19 November 2015

**Unconfined Compressive Strength
NZS 4402:1986 (Test 6.3.1)**

PRINCIPAL :	Japan International Cooperation Agency (JICA)	PROJECT No. :	1920815
PROJECT NAME :	Geotechnical Investigation for Nadi River Basin Drilling Works.	DATE TESTED :	15 October 2015
SITE ADDRESS :	BH 03, Qeileoa, Nadi	TECHNOLOGIST :	IG
SAMPLE LOCATION :	BH 03 2.00m - 2.50m	MATERIAL TYPE :	Clayey SILT, red brown, medium plasticity
TEST NUMBER :	N523		

SAMPLE HISTORY : NATURAL / AIR-DRIED / OVEN-DRIED / UNKNOWN

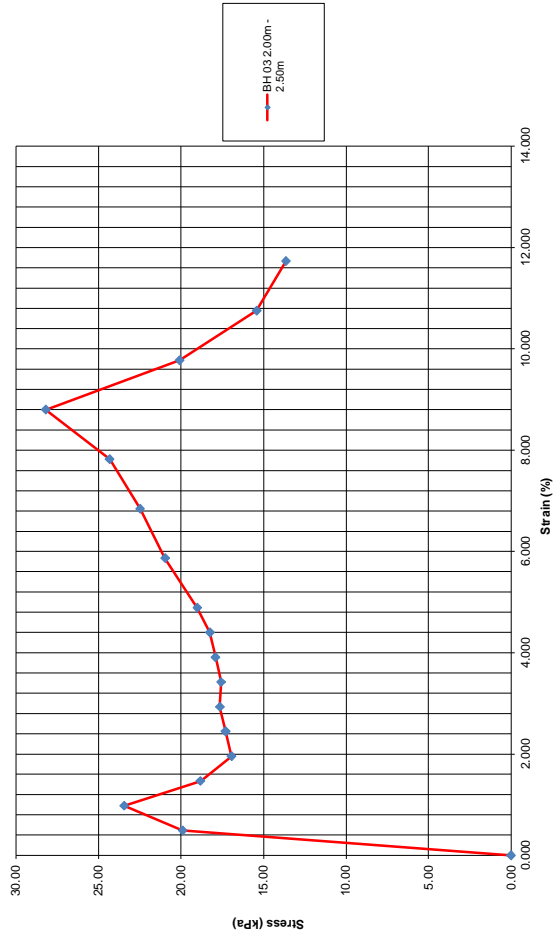
Moisture Content	Container No.		
	Container No.	-	91
	Mass of Container	g	115.01
	Mass of Container + Wet Soil	g	444.91
	Mass of Container + Dry Soil	g	379.12
	Mass of Dry Soil	g	264.11
	Mass of Moisture	g	65.79
	Moisture Content	%	24.91

Bulk Density	Sample No.		
	Sample No.	-	N523
	Diameter of Specimen	mm	53.00
	Initial area of specimen A ₀ (π/4 d ²)	mm ²	2205.07
	Initial length of specimen L ₀	mm	102.30
	Initial mass of specimen M _i	g	379.70
	Bulk Density ρ	t/m ³	1.68
	Dry Density ρ_d	t/m ³	1.35

Compression Gauge Reading	Load Gauge Reading	Load	Strain ε = C _n - C ₀ / L ₀	Corrected Area A = A ₀ / 1-ε	Principal Stress Difference σ ₁ - σ ₃ = 1000P/A
mm		(kN)	%	m ²	kPa
0.00	0	0	0.000	0.002205	0.00
0.50	22.0	0.0441	0.489	0.002216	19.90
1.00	26.0	0.0522	0.978	0.002227	23.44
1.50	21.0	0.0421	1.466	0.002238	18.81
2.00	19.0	0.0381	1.955	0.002249	16.94
2.50	19.5	0.0391	2.444	0.002260	17.30
3.00	20.0	0.0401	2.933	0.002272	17.65
3.50	20.0	0.0401	3.421	0.002283	17.56
4.00	20.5	0.0411	3.910	0.002295	17.91
4.50	21.0	0.0421	4.399	0.002307	18.25
5.00	22.0	0.0441	4.888	0.002318	19.02
6.00	24.5	0.0491	5.865	0.002342	20.96
7.00	26.5	0.0532	6.843	0.002367	22.48
8.00	29.0	0.0582	7.820	0.002392	24.33
9.00	30.0	0.0682	8.798	0.002418	28.21
10.00	24.5	0.0491	9.775	0.002444	20.09
11.00	19.0	0.0381	10.753	0.002471	15.42
12.00	17.0	0.0341	11.730	0.002498	13.65

Tested by : IG Q.A. Check by : MK Approved by : IG
Date : 15 October 2015 Date : 25 October 2015 Date : 19 November 2015

STRESS VS STRAIN



LOCATION: BH 03 2.00m - 2.50m
DESCRIPTION: Clayey SILT, red brown, medium plasticity
DATE OF TEST: 15 October 2015

Form GE-L-10

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Unconfined Compressive Strength
NZS 4402:1986 (Test 6.3.1)

PRINCIPAL	: Japan International Cooperation Agency (JICA)	PROJECT No.	: 1920815
PROJECT NAME	: Geotechnical Investigation for Nadi River Basin Drilling Works.	DATE TESTED	: 11 October 2015
SITE ADDRESS	: BH 03, Geletoa, Nadi	TECHNOLOGIST	: IG
SAMPLE LOCATION	: BH 03 5.00m - 5.50m	MATERIAL TYPE	: Organic SILT, dark grey, soft to very soft, low to medium plasticity
TEST NUMBER	: N525		

SAMPLE HISTORY : NATURAL / AIR-DRIED / OVEN-DRIED / UNKNOWN

Moisture Content	Container No.	-	91
	Mass of Container	g	114.98
	Mass of Container + Wet Soil	g	317.59
	Mass of Container + Dry Soil	g	253.58
	Mass of Dry Soil	g	138.60
	Mass of Moisture	g	64.01
	Moisture Content	%	46.18

Bulk Density	Sample No.	-	N525
	Diameter of Specimen	mm	51.00
	Initial area of specimen Ao (π/4 d²)	mm²	2041.79
	Initial length of specimen Lo	mm	100.20
	Initial mass of specimen Mi	g	386.59
	Bulk Density ρ	t/m³	1.89
	Dry Density ρd	t/m³	1.29

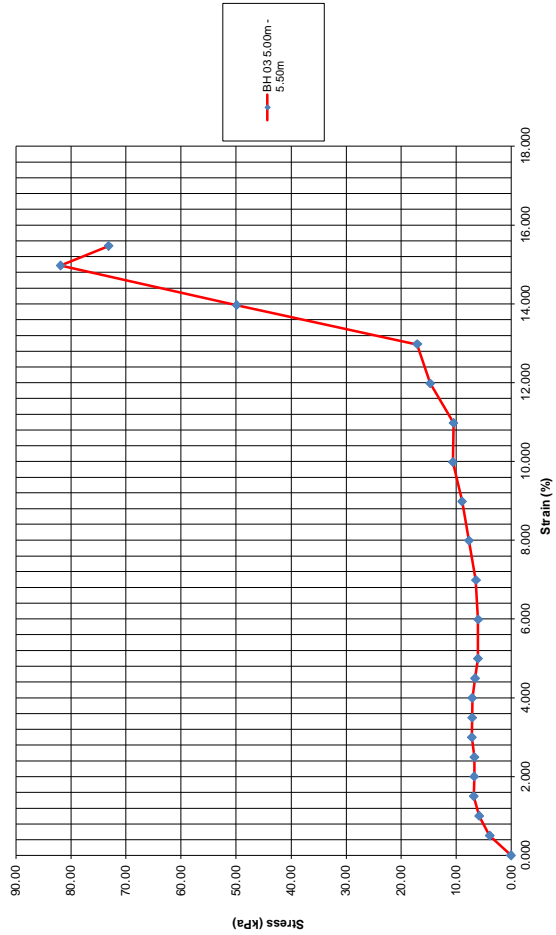
Compression Gauge Reading	Load Gauge Reading	Load	Strain $\epsilon = \frac{C_p - C_0}{L_0}$	Corrected Area $A = A_0 / 1 - \epsilon$	Principal Stress Difference $\sigma_1 - \sigma_3 = 1000P/A$
mm		(kN)	%	m²	kPa
0.00	0	0.000	0.000	0.002042	0.00
0.50	4.0	0.0080	0.499	0.002052	3.90
1.00	6.0	0.0120	0.998	0.002062	5.82
1.50	7.0	0.0140	1.497	0.002073	6.75
2.00	7.0	0.0140	1.996	0.002083	6.72
2.50	7.0	0.0140	2.495	0.002094	6.69
3.00	7.5	0.0150	2.994	0.002105	7.13
3.50	7.5	0.0150	3.493	0.002116	7.09
4.00	7.5	0.0150	3.992	0.002127	7.05
4.50	7.0	0.0140	4.491	0.002138	6.55
5.00	6.5	0.0130	4.990	0.002149	6.05
6.00	6.5	0.0130	5.988	0.002172	5.99
7.00	7.0	0.0140	6.986	0.002195	6.38
8.00	8.5	0.0170	7.984	0.002219	7.66
9.00	10.0	0.0200	8.982	0.002243	8.92
10.00	12.0	0.0240	9.980	0.002268	10.58
11.00	12.0	0.0240	10.978	0.002294	10.46
12.00	17.0	0.0341	11.976	0.002320	14.70
13.00	20.0	0.0401	12.974	0.002346	17.09
14.00	59.0	0.1184	13.972	0.002373	49.89
15.00	98.0	0.1967	14.970	0.002401	81.92
15.50	88.0	0.1767	15.469	0.002415	73.15

Tested by : IG	Q.A. Check by :LN	Approved by : IG
Date : 11 October 2015	Date : 14 October 2015	Date : 19 November 2015

Form GE-L-10

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STRESS VS STRAIN



LOCATION: BH 03 5.00m - 5.50m
DESCRIPTION: Organic SILT, dark grey, soft to very soft, low to medium plasticity
DATE OF TEST: 11 October 2015

Form G.E.L-10

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Unconfined Compressive Strength
NZS 4402:1986 (Test 6.3.1)

PRINCIPAL :	Japan International Cooperation Agency (JICA)	PROJECT No. :	1920815
PROJECT NAME :	Geotechnical Investigation for Nadi River Basin Drilling Works.	DATE TESTED :	16 October 2015
SITE ADDRESS :	BH 03, Qeleloa, Nadi	TECHNOLOGIST :	IGLN/TLKB
SAMPLE LOCATION :	BH 03 8.00m - 8.50m	MATERIAL TYPE :	Silty fine to medium SAND, grey
TEST NUMBER :	N527		

SAMPLE HISTORY : NATURAL / AIR-DRIED / OVEN-DRIED / UNKNOWN

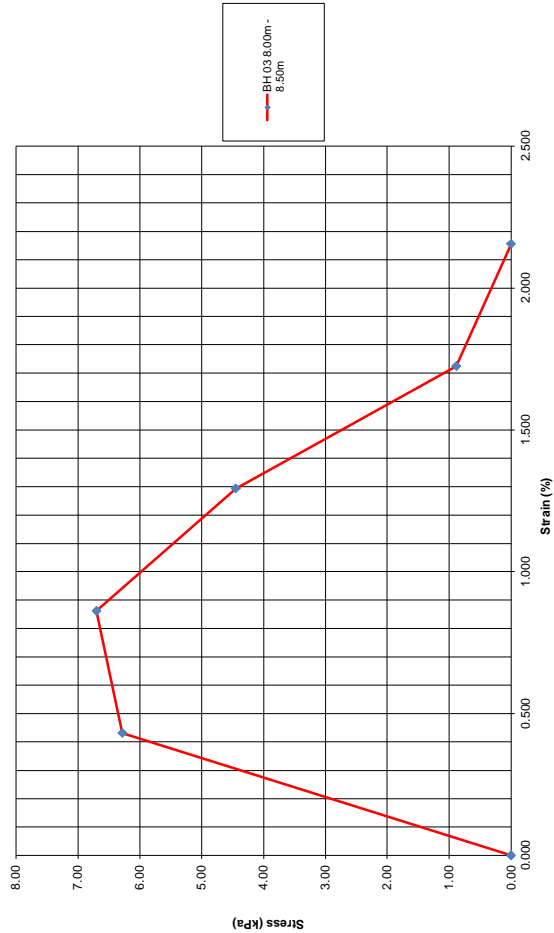
Moisture Content	Container No.	-	86
	Mass of Container	g	117.80
	Mass of Container + Wet Soil	g	538.88
	Mass of Container + Dry Soil	g	412.54
	Mass of Dry Soil	g	294.74
	Mass of Moisture	g	126.34
	Moisture Content	%	42.86

Bulk Density	Sample No.	-	N527
	Diameter of Specimen	mm	53.17
	Initial area of specimen A ₀ (π/4 d ²)	mm ²	2219.23
	Initial length of specimen L ₀	mm	115.99
	Initial mass of specimen M _i	g	422.91
	Bulk Density ρ	t/m ³	1.64
	Dry Density ρ _d	t/m ³	1.15

Compression Gauge Reading	Load Gauge Reading	Load	Strain ε = C _n - C _o / L _o	Corrected Area A = A ₀ / (1 - ε)	Principal Stress Difference σ ₁ - σ ₃ = 1000P/A
mm		(kN)	%	m ²	kPa
0.00	0	0	0.000	0.002219	0.00
0.50	7	0.0140	0.431	0.002229	6.28
1.00	7.5	0.0150	0.862	0.002239	6.70
1.50	5.0	0.0100	1.293	0.002248	4.45
2.00	1.0	0.0020	1.724	0.002258	0.89
2.50	0.0	0	2.155	0.002268	0.00

Tested by : IGLN/TLKB	Q.A. Check by : MK	Approved by : IG
Date : 16 October 2015	Date : 25 October 2015	Date : 19 November 2015

STRESS VS STRAIN

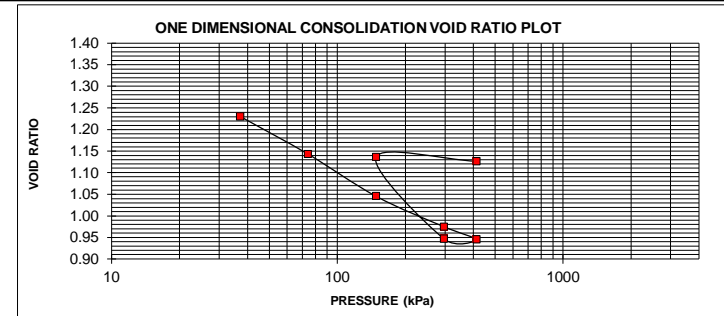


LOCATION: BH 03 8.00m - 8.50m
 DESCRIPTION: Silty fine to medium SAND, grey
 DATE OF TEST: 16 October 2015

ENTEC LIMITED **Determination of The One-Dimensional Consolidation Properties**
 ENGINEERING & SCIENCE CONSULTANTS **NZS 4402 : 1986 Test 7.1**

Project Name: Geotechnical Investigation in Nadi River Basin **Sample No:** N 523
Client Name: JICA **Depth:** 2.0m - 2.5m
Job No: 1920815 **Tested By:** IG
Site Address : Qeleloa Nadi **Date Tested:** 04/11/15
Sample Location: BH 03

Sample Description: Clayey SILT, red brown, medium plasticity
Sample History: Undisturbed / Remoulded / Compacted / Slurried / Unknown
Date Sample Collected: 08/10/15 **Temperature:** Max: 27°C Min: 25°C
Loading Cycle: 24 hrs 0 mins **Height of ring:** 23.8 mm
Diameter of ring (D): 44.96 mm **Area of ring (A):** 1587.61 mm²
Solid density of soil particles (Q_s): 2.65 t/m³ (Measured+Assumed) 2
Method used: Square root of time fitting method



		Initial	Final
Measured thickness of specimen, H	mm	H_i 23.8	H_f 21.65
Mass of ring + watch glass + wet specimen	g	M_3 263.81	M_4 259.13
Mass of ring + watch glass + dry specimen	M_5 g		252.58
Mass of ring	M_1 g		206.07
Mass of watch glass	M_2 g		0
Mass of dry specimen $M_s = M_5 - M_1 - M_2$	g		42.84
Mass of water	g	$M_3 - M_5$ 11.23	$M_4 - M_5$ 6.55
Water content, w	%	w_i 26.21	w_f 15.29
Dry density, Q_d	t/m ³	$Q_{d,i}$ 1.13	$Q_{d,f}$ 1.25
Height of soil particles, H_s	mm		10.18
Void ratio, e		e_i 1.34	e_f 1.13
Degree of saturation, S		S_i 51.95	S_f 35.97

Applied Pressure kPa	Incremental deflection (ΔH) mm	Thickness of specimen mm	% Change in thickness %	Height of voids mm	Void ratio	Coefficient of consolidation C_v (m ² /yr)	Coefficient of compressibility M_v (m ² /MN)
37.1	1.092	22.708	0.048	12.53	1.23	357.73	
74.1	1.980	21.820	0.091	11.64	1.14	107.85	2.25
148.3	2.968	20.832	0.142	10.65	1.05	75.27	1.68
296.6	3.690	20.110	0.183	9.93	0.97	70.14	1.05
414	3.992	19.808	0.202	9.63	0.95	88.88	1.43
296.6	3.976	19.824	0.201	9.64	0.95	0.00	-1.42
148.3	2.050	21.750	0.094	11.57	1.14	0.00	-0.58
414	2.146	21.654	0.099	11.47	1.13	208.19	0.34
0.0	0.00	23.800	0.000	13.62	1.34	0.00	

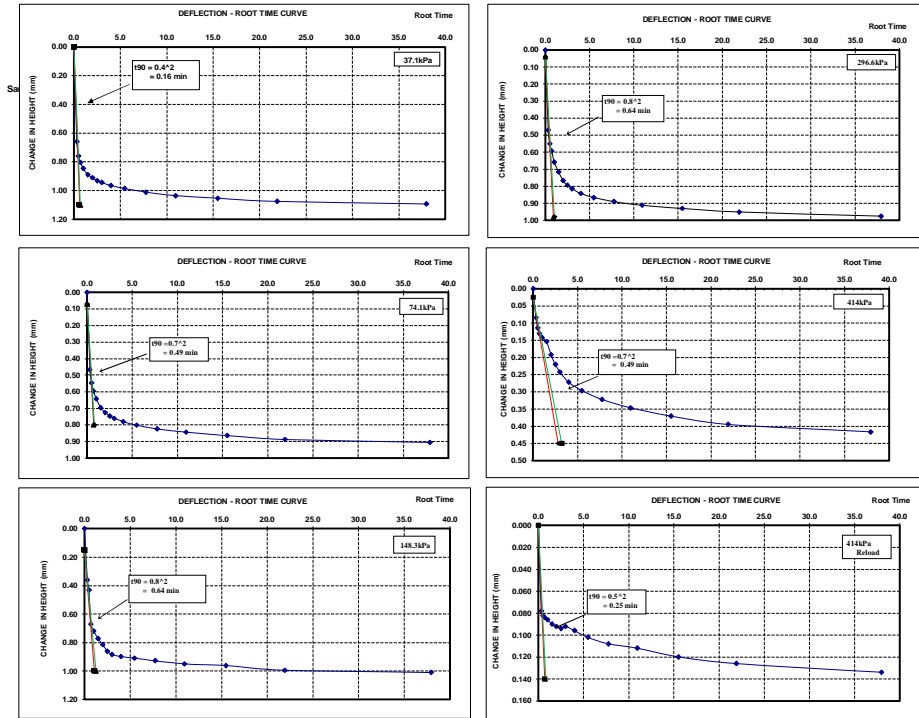
Tested by: IG Q.A. Check By: KB Approved By: IG
 Date: 04 November 2015 Date: 19 November 2015 Date: 19 November 2015

Loading Date & Time				05/11/2015 @ 07:11hrs			06/11/2015 @ 07:13hrs			07/11/2015 @ 07:24hrs			08/11/2015 @ 07:29hrs			09/11/2015 @ 07:34hrs			08/09/2013 @ 08:43hrs			
Hanger Load				600g			1200g			2400g			4800g			6,700g			4,800g			
Effective Pressure				37.1kPa			74.1kPa			148.3kPa			296.6kPa			414kPa			296.6kPa			
Time Elapsed				Clock	Dial	H	Clock	Dial	H	Clock	Dial	H	Clock	Dial	H	Clock	Dial	H	Clock	Dial	H	
hrs	min	sec	t min	√t min	Time/4	Gauge	x10 mm	Time/4	Gauge	x10 mm	Time/4	Gauge	x10 mm	Time/4	Gauge	x10 mm	Time/4	Gauge	x10 mm	Time/4	Gauge	x10 mm
		0	0.00		07:11	2270	0.000	07:13	1723	0.000	07:24	1270	0.000	07:29	765	0.000	07:34	2127	0.000	07:39	1919	0.000
		6	0.100	0.316	07:11:06	1940	0.660	07:13:06	1490	0.466	07:24:06	1090	0.360	07:29:06	530	0.470	07:34:06	2085	0.084	07:39:06	1925	0.012
		15	0.250	0.500	07:11:15	1890	0.760	07:13:15	1450	0.546	07:24:15	1055	0.430	07:29:15	490	0.550	07:34:15	2070	0.114	07:39:15	1926	0.014
		30	0.500	0.707	07:11:30	1868	0.804	07:13:30	1425	0.596	07:24:30	935	0.670	07:29:30	468	0.594	07:34:30	2062	0.130	07:39:30	1927	0.016
1		1.000	1.000	1.000	07:12	1847	0.846	07:14	1402	0.642	07:25	910	0.720	07:30	436	0.658	07:36:15	2056	0.142	07:40	1927	0.016
2	15	2.250	1.500	07:13:15	1825	0.890	07:15:15	1375	0.696	07:26:15	884	0.772	07:31:15	407	0.716	07:36:15	2050	0.154	07:41:15	1927.5	0.017	
4		4.000	2.000	07:15	1814	0.912	07:17	1360	0.726	07:28	863	0.814	07:33	382	0.766	07:38	2031	0.192	07:43	1927.5	0.017	
6	15	6.250	2.500	07:17:15	1804	0.932	07:19:15	1350	0.746	07:30:15	840	0.860	07:35:15	368	0.794	07:40:15	2017	0.220	07:45:15	1928	0.018	
9		9.000	3.000	07:20	1798	0.944	07:22	1343	0.760	07:33	828	0.884	07:38	358	0.814	07:43	2006	0.242	07:48	1928	0.018	
16		16.000	4.000	07:27	1787	0.966	07:29	1333	0.780	07:40	821	0.898	07:45	344	0.842	07:50	1991	0.272	07:55	1928	0.018	
30		30.000	5.480	07:41	1777	0.986	07:43	1322	0.802	07:54	815	0.910	07:59	332	0.866	08:04	1979	0.296	08:09	1928	0.018	
1		60.00	7.750	08:11	1764	1.012	08:13	1311	0.824	08:24	806	0.928	08:29	320	0.890	08:34	1966	0.322	08:39	1928.2	0.018	
2		120.0	10.950	09:11	1752	1.036	09:13	1301	0.844	09:24	795	0.950	09:29	309	0.912	09:34	1954	0.346	09:39	1928.3	0.019	
4		240.0	15.49	11:11	1743	1.054	11:13	1291	0.864	11:24	789	0.962	11:29	300	0.930	11:34	1942	0.370	11:39	1928.3	0.019	
8		480.0	21.91	15:11	1732	1.076	15:13	1279	0.888	15:24	773	0.994	15:29	289	0.952	15:34	1930	0.394	15:39	1928.8	0.020	
24		1440	37.95	07:11	1723	1.094	07:13	1270	0.906	07:24	765	1.010	7:29	277	0.976	7:34	1919	0.416	7:39	1929	0.020	
UNLOADING																						
Machine Correction				0.002			0.018			0.022			0.054			0.114			0.004			
Δ H (Corrected)				1.092			0.888			0.988			0.922			0.302			0.016			
Net Total Settlement				1.092			1.980			2.968			3.890			4.192			4.176			


D15-96

Loading Date and Time				11/11/2015 @ 07:49hrs			12/11/2015 @ 08:00hrs												
Hanger Load				2,400g			6,700g												
Effective Pressure				148.3kPa			414kPa												
Time Elapsed				Clock	Dial	H	Clock	Dial	H	Clock	Dial	H	Clock	Dial	H	Clock	Dial	H	
hrs	min	sec	t min	√t min	ΔTime/4	Gauge	x10 mm	ΔTime/4	Gauge	x10 mm	ΔTime/4	Gauge	x10 mm	ΔTime/4	Gauge	x10 mm	ΔTime/4	Gauge	x10 mm
		0	0	0	07:49	1929	0.000	08:00	1962	0.000									
		6	0.100	0.316		1947	0.036		1923	0.078									
		15	0.250	0.500		1949	0.040		1921	0.082									
		30	0.500	0.707		1950	0.042		1920	0.084									
1		1.000	1.000	1.000	07:50	1951	0.044	08:01	1919	0.086									
2	15	2.250	1.500	07:51:15	1953	0.048	08:02:15	1917	0.090										
4		4.000	2.000	07:53	1954	0.050	08:04	1916	0.092										
6	15	6.250	2.500	07:55:15	1955	0.052	08:06:15	1915	0.094										
9		9.000	3.000	07:58	1955.3	0.053	08:09	1916	0.092										
16		16.000	4.000	08:05	1956	0.054	08:16	1914	0.096										
30		30.000	5.480	08:19	1956.6	0.055	08:30	1911	0.102										
1		60.00	7.750	08:49	1957	0.056	09:00	1908	0.108										
2		120.0	10.950	09:49	1959	0.060	10:00	1906	0.112										
4		240.0	15.49	11:49	1961	0.064	12:00	1902	0.120										
8		480.0	21.91	15:49	1961	0.064	16:00	1899	0.126										
24		1440	37.95	7:49	1962	0.066	8:00	1895	0.134										
				UNLOADING			RELOADING												
Machine Correction				0.028			0.038												
Δ H (Corrected)				0.038			0.096												
Net Total Settlement				2.050			2.146												

Determination of the One-Dimensional Consolidation Properties
NZS 4402 : 1986 Test 7.1



Oedometer Settlement Test


Sample Details  sketch showing specimen location in original sample	Depth Description Type	5.0m - 5.50m Organic Silt, dark grey
	Initial Height Initial Diameter Initial Weight Bulk Density Particle Density	L ₀ (mm) D ₀ (mm) W ₀ (gr) ρ ₀ (Mg/m ³) ρ _s (Mg/m ³)

Initial Conditions			
Settlement Input	L _{IP} (mm)	CH	3
Initial Moisture	ω _i %	(%)	46
Initial Dry Density	ρ _{di} (Mg/m ³)		1.15
Initial Voids Ratio	e _i		1.308
Initial Degree of Saturation	S _i (%)		93.5
Initial Swelling	S _s (kPa)		0

Final Conditions			
Final Moisture	ω _f %	(%)	35
Dry Density	ρ _{df} (Mg/m ³)		0.77
Voids Ratio	e _f		2.459
Saturation	S _f (%)		38
Height Settlement	ΔL _s (mm)		-9.972

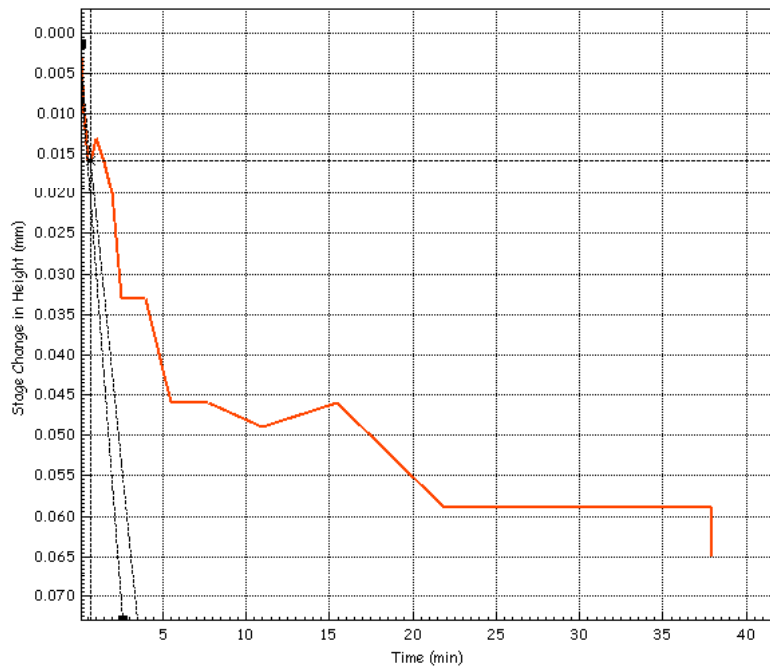
Vertical Stress σ' _i (kPa)	Voids Ratio e _f	Height ΔL _s (mm)	Consolidation C _v (m ² /year)	Compressibility m _v (m ² /MN)	Initial T _i (oC)	Final T _f (oC)	t ₅₀ Time t ₅₀ (min)	t ₉₀ Time t ₉₀ (min)	Secondary C _{SEC} (m ² /MN)
20.0	1.301	0.065	85.9	0.163	29.0	29.0		0.515	0.0087
40	1.285	0.201	8.2	0.341	29.0	29.0		5.360	0.0087
100	2.459	-9.968	19.9	8.560	29.0	29.0		3.455	0.0087
200	2.459	-9.968	7.8		29.0	29.0		12.749	0.0087
400	2.459	-9.968	7.6		29.0	29.0		13.159	0.0087
200	2.459	-9.968			29.0	0.0			
100	2.459	-9.968			29.0	0.0			

Notes

	Test Method AS 1289.6.6.1-1998	Test Name ODO-03 Database: .\SQLEXPRESS \ ENTEC
	Site Reference 1920815	Test Date 11/11/2015
	Jobfile Geotechnical Engineering	Sample N525
	Client Japan International Cooperation	Borehole BH03
	Operator IG/MK	Checked DMC

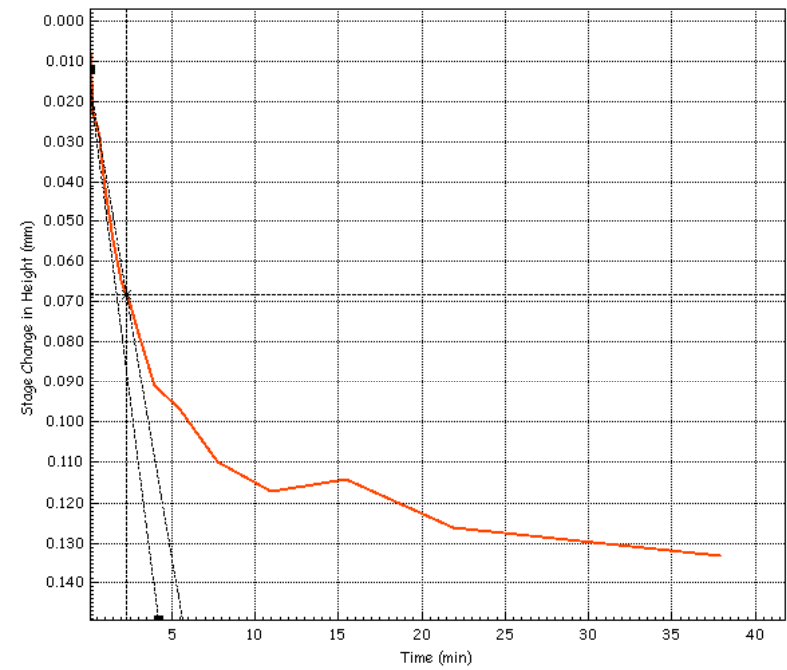
Oedometer Consolidation Settlement Report

Vertical Stress	σ'_{i}	(kPa)	20.0
Initial Temperature	T_i	(oC)	29.0
Frame Correction	L CORR	(mm)	0.000
Height Settlement	ΔL_s	(mm)	0.065
Voids Ratio	e_f	.	1.250
Final Temperature	T_f	(oC)	29.0
t50 Time	t ₅₀	(min)	
t90 Time	t ₉₀	(min)	0.515
Consolidation	C_v	(m ² /year)	84.2
Compressibility	m_v	(m ² /MN)	0.164
Secondary Compression	C_{SEC}	(m ² /MN)	0.0087



Oedometer Consolidation Settlement Report

Vertical Stress	σ'_{i}	(kPa)	40
Initial Temperature	T_i	(oC)	29.0
Frame Correction	L CORR	(mm)	0.000
Height Settlement	ΔL_s	(mm)	0.201
Voids Ratio	e_f	.	1.235
Final Temperature	T_f	(oC)	29.0
t50 Time	t ₅₀	(min)	
t90 Time	t ₉₀	(min)	5.360
Consolidation	C_v	(m ² /year)	8.0
Compressibility	m_v	(m ² /MN)	0.345
Secondary Compression	C_{SEC}	(m ² /MN)	0.0087



	Test Method	AS 1289.6.6.1-1998	Test Name	ODO-03
	Site Reference	1920815	Database:	.\SQLEXPRESS\ENTEC
	Jobfile	Geotechnical Engineering	Test Date	11/11/2015
	Client	Japan International Cooperation	Sample	N525
	Operator	IG/MK	Borehole	BH03
	Checked	DMC	Approved	DMC

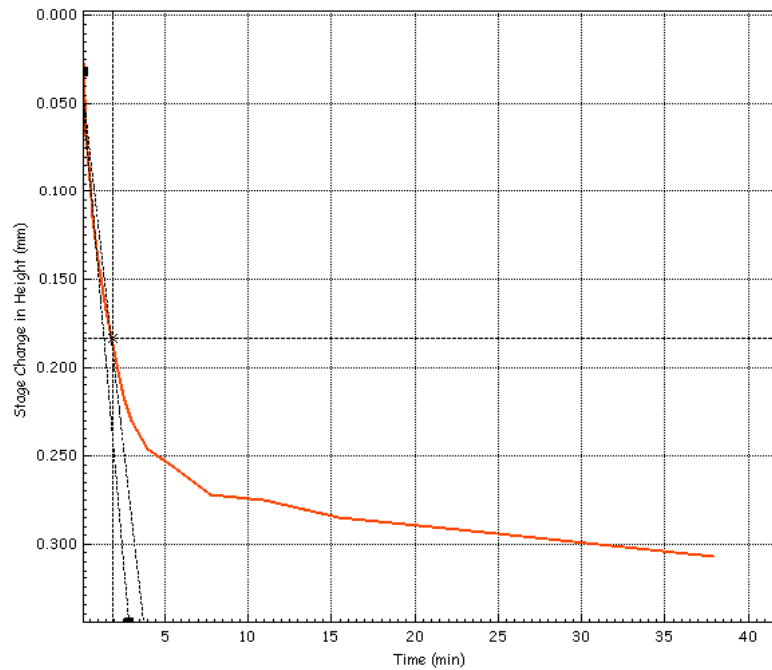
Entec Limited, Level 2 Mid City, Cnr Cumming Street & Renwick Road, Suva

	Test Method	AS 1289.6.6.1-1998	Test Name	ODO-03
	Site Reference	1920815	Database:	.\SQLEXPRESS\ENTEC
	Jobfile	Geotechnical Engineering	Test Date	11/11/2015
	Client	Japan International Cooperation	Sample	N525
	Operator	IG/MK	Borehole	BH03
	Checked	DMC	Approved	DMC

Entec Limited, Level 2 Mid City, Cnr Cumming Street & Renwick Road, Suva

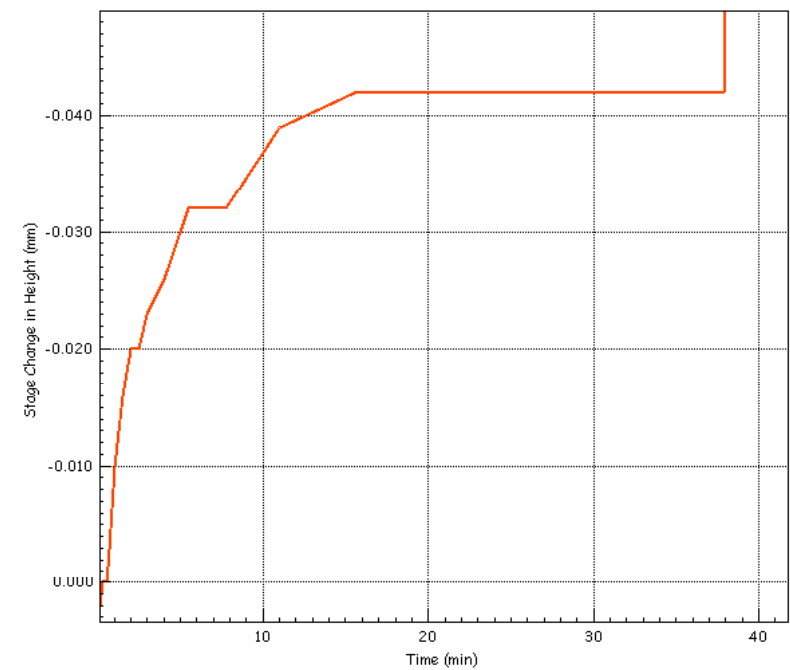
Oedometer Consolidation Settlement Report

Vertical Stress	σ'_{i}	(kPa)	100
Initial Temperature	T_i	(oC)	29.0
Frame Correction	L CORR	(mm)	0.000
Height Settlement	ΔL_s	(mm)	-11.044
Voids Ratio	e_f	.	2.517
Final Temperature	T_f	(oC)	29.0
t50 Time	t ₅₀	(min)	
t90 Time	t ₉₀	(min)	3.455
Consolidation	C_v	(m ² /year)	20.4
Compressibility	m_v	(m ² /MN)	9.563
Secondary Compression	C_{SEC}	(m ² /MN)	0.0087



Oedometer Consolidation Settlement Report

Vertical Stress	σ'_{i}	(kPa)	100
Initial Temperature	T_i	(oC)	29.0
Frame Correction	L CORR	(mm)	0.000
Height Settlement	ΔL_s	(mm)	-10.117
Voids Ratio	e_f	.	2.412
Final Temperature	T_f	(oC)	0.0
t50 Time	t ₅₀	(min)	
t90 Time	t ₉₀	(min)	
Consolidation	C_v	(m ² /year)	
Compressibility	m_v	(m ² /MN)	
Secondary Compression	C_{SEC}	(m ² /MN)	



	Test Method	AS 1289.6.6.1-1998	Test Name	ODO-03	
			Database:	.\SQLEXPRESS\ENTEC	
	Site Reference	1920815	Test Date	11/11/2015	
	Jobfile	Geotechnical Engineering	Sample	N525	
	Client	Japan International Cooperation	Borehole	BH03	
Operator	IG/MK	Checked	DMC	Approved	DMC

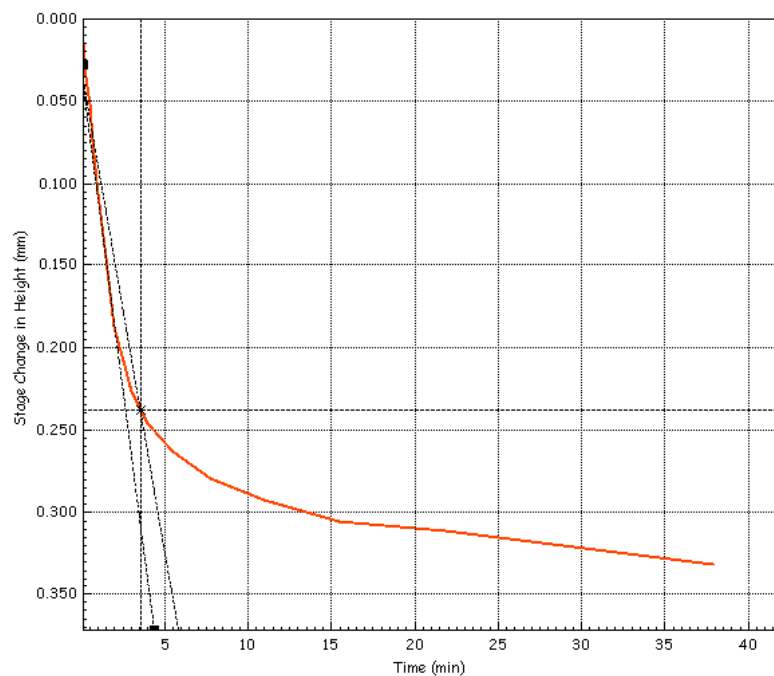
Entec Limited, Level 2 Mid City, Cnr Cumming Street & Renwick Road, Suva

	Test Method	AS 1289.6.6.1-1998	Test Name	ODO-03	
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	Site Reference	1920815	Test Date	11/11/2015	
	Jobfile	Geotechnical Engineering	Sample	N525	
	Client	Japan International Cooperation	Borehole	BH03	
Operator	IG/MK	Checked	DMC	Approved	DMC

Entec Limited, Level 2 Mid City, Cnr Cumming Street & Renwick Road, Suva

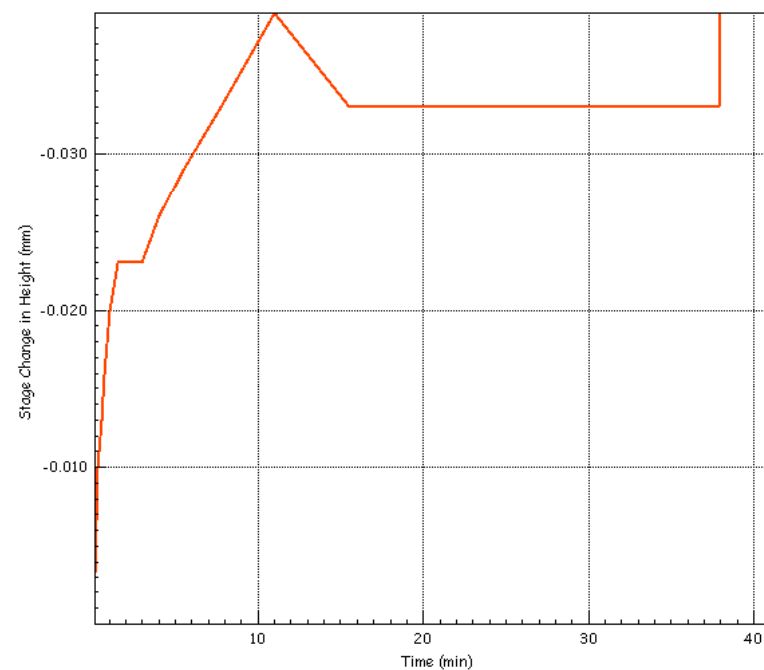
Oedometer Consolidation Settlement Report

Vertical Stress	σ'_{i}	(kPa)	200
Initial Temperature	T_i	(oC)	29.0
Frame Correction	L CORR	(mm)	0.000
Height Settlement	ΔL_s	(mm)	-10.263
Voids Ratio	e_f	.	2.428
Final Temperature	T_f	(oC)	29.0
t50 Time	t ₅₀	(min)	
t90 Time	t ₉₀	(min)	12.749
Consolidation	C_v	(m ² /year)	7.9
Compressibility	m_v	(m ² /MN)	
Secondary Compression	C _{SEC}	(m ² /MN)	0.0087



Oedometer Consolidation Settlement Report

Vertical Stress	σ'_{i}	(kPa)	200
Initial Temperature	T_i	(oC)	29.0
Frame Correction	L CORR	(mm)	0.000
Height Settlement	ΔL_s	(mm)	-10.146
Voids Ratio	e_f	.	2.415
Final Temperature	T_f	(oC)	0.0
t50 Time	t ₅₀	(min)	
t90 Time	t ₉₀	(min)	
Consolidation	C_v	(m ² /year)	
Compressibility	m_v	(m ² /MN)	
Secondary Compression	C _{SEC}	(m ² /MN)	



	Test Method	AS 1289.6.6.1-1998	Test Name	ODO-03
	Site Reference	1920815	Database:	.\SQLEXPRESS\ENTEC
	Jobfile	Geotechnical Engineering	Test Date	11/11/2015
	Client	Japan International Cooperation	Sample	N525
	Operator	IG/MK	Borehole	BH03
	Checked	DMC	Approved	DMC

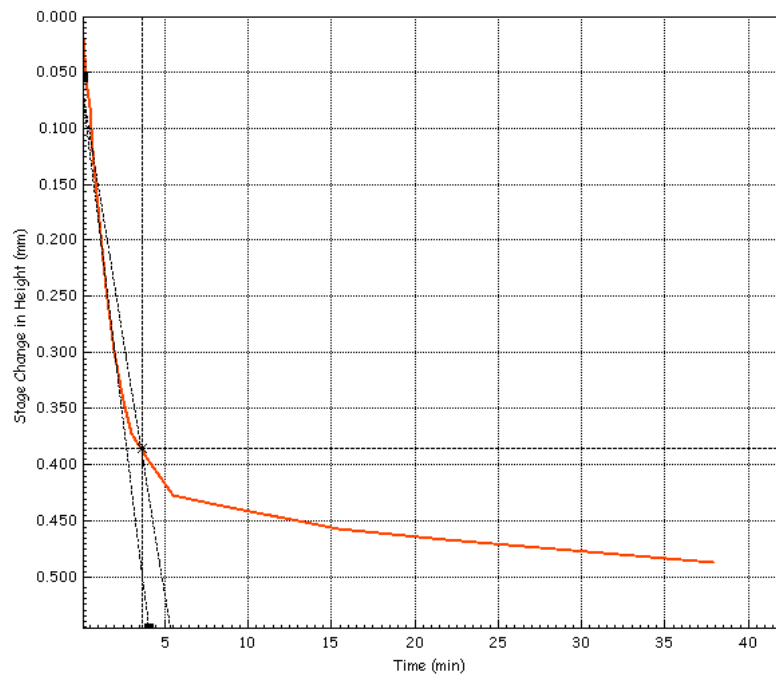
Entec Limited, Level 2 Mid City, Cnr Cumming Street & Renwick Road, Suva

	Test Method	AS 1289.6.6.1-1998	Test Name	ODO-03
	Site Reference	1920815	Database:	.\SQLEXPRESS\ENTEC
	Jobfile	Geotechnical Engineering	Test Date	11/11/2015
	Client	Japan International Cooperation	Sample	N525
	Operator	IG/MK	Borehole	BH03
	Checked	DMC	Approved	DMC

Entec Limited, Level 2 Mid City, Cnr Cumming Street & Renwick Road, Suva

Oedometer Consolidation Settlement Report

Vertical Stress	σ'_{i}	(kPa)	400
Initial Temperature	T_i	(oC)	29.0
Frame Correction	L CORR	(mm)	0.000
Height Settlement	ΔL_s	(mm)	-10.179
Void Ratio	e_f	.	2.419
Final Temperature	T_f	(oC)	29.0
t50 Time	t ₅₀	(min)	
t90 Time	t ₉₀	(min)	13.159
Consolidation	C_v	(m ² /year)	7.6
Compressibility	m_v	(m ² /MN)	
Secondary Compression	C_{SEC}	(m ² /MN)	0.0087



	Test Method	AS 1289.6.6.1-1998	Test Name	ODO-03
	Site Reference	1920815	Database:	.\SQLEXPRESS \ ENTEC
	Jobfile	Geotechnical Engineering	Test Date	11/11/2015
	Client	Japan International Cooperation	Sample	N525
	Operator	IG/MK	Checked	DMC
			Approved	DMC

Entec Limited, Level 2 Mid City, Cnr Cumming Street & Renwick Road, Suva



Wet Sieve Analysis

NZS 4407:1991 (Test 3.8.1)

PRINCIPAL : Japan International Cooperation Agency (JICA)	PROJECT No. : 1920815
PROJECT NAME : Geotechnical Investigation for Nadi River Basin Drilling Works	DATE / : 15 October 2015
SITE ADDRESS : BH03, Qeleloa, Nadi	TECHNOLOGIST : RK
SAMPLE LOCATION : BH03 1.00m - 1.50m	MATERIAL TYPE & LOCATION : Silty CLAY, red brown, medium plasticity
TEST NUMBER : N522	
SAMPLE HISTORY : NATURAL/AIR-DRIED/ OVEN-DRIED/UNKNOWN	

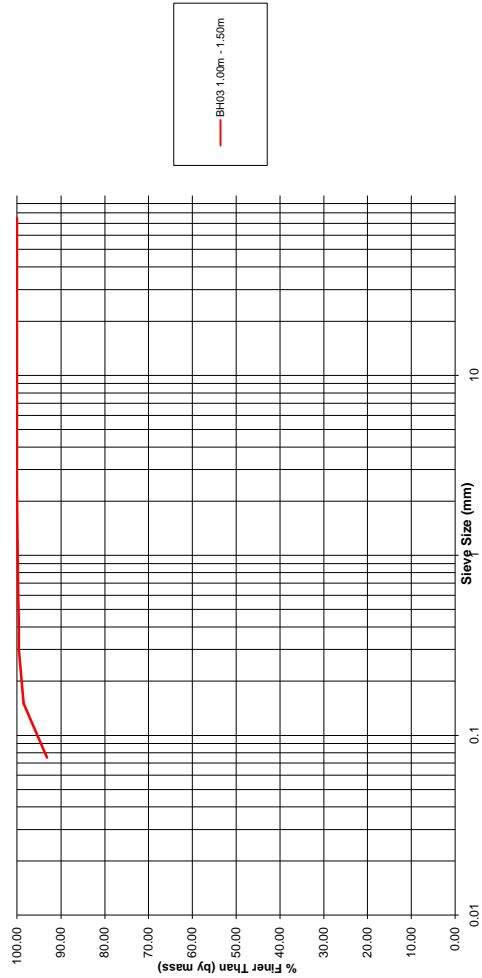
Moisture Content (Material passing 19mm)	Container No.	-	93	94	SPLIT SAMPLE
Mass of Container	g		88.60	88.03	Mass Passing Last Sieve: - gM _s
Mass of Container + Wet Soil	g		121.47	120.20	Mass after Splitting: - gM _t
Mass of Container + Dry Soil	g		115.16	114.26	Splitting Factor = M _s
Mass of Dry Soil	g		26.56	26.23	= M _t
Mass of Moisture	g		6.31	5.94	
Moisture Content	%		23.76	22.65	
Average Moisture Content	%		23.20		

Total Mass of Dry Sample	Mass of dry sample retained on 19mm test sieve (M _t)	g	Nil
	Total Wet Weight (M _w)	g	303.17
	Total Mass of dry sample (M _t)	M _t =	$\frac{100M_w}{100 + w}$
		M _t =	246.08

Test Sieve Size mm	Mass of Dry Soil Retained (M _s) g	Corrected Mass g	Percentage Retained = (Mass/M _t) x 100 %	Total Percentage Passing %	Maximum Sieve Load (Sieve Diameter 200mm) g	Sieve Diameter mm
75.0mm	N/A	0.00	0.00	100.00		300
50.0mm	N/A	0.00	0.00	100.00		300
37.5mm	N/A	0.00	0.00	100.00		300
26.5mm	N/A	0.00	0.00	100.00		300
19.0mm	N/A	0.00	0.00	100.00		200
13.2 mm	N/A	0.00	0.00	100.00	600	300
9.50 mm	N/A	0.00	0.00	100.00	450	300
6.70 mm	N/A	0.00	0.00	100.00	300	300
4.75 mm	N/A	0.00	0.00	100.00	250	200
2.36 mm	N/A	0.00	0.00	100.00	150	200
1.18 mm	0.30	N/A	0.12	99.88	100	200
600 μm	0.39	N/A	0.16	99.72	80	200
425 μm	0.20	N/A	0.08	99.64	70	200
300 μm	0.24	N/A	0.10	99.54	60	200
150 μm	2.52	N/A	1.02	98.52	40	200
75 μm	13.11	N/A	5.33	93.19	25	200
Passing 75 μm	229.32	N/A	93.19	0.00	-	-
Pan Total	246.08	-	100.00	-	-	-

NOTES: 1) Testing performed on fraction passing/retained on 19mm sieve
2) The percentage passing the finest sieve was obtained by difference

Tested by : RK	Q.A. Checked by : MK	Approved by : IG
Date : 15 October 2015	Date : 25 October 2015	Date : 19 November 2015



LOCATION: BH03 1.00m - 1.50m
DATE OF TEST: 15 October 2015
DESCRIPTION: Silty CLAY, red brown, medium plasticity
SAMPLE No. N.522

Form GE-L-06

Page 2 of 2

Wet Sieve Analysis
NZS 4407:1991 (Test 3.8.1)

PRINCIPAL :	Japan International Cooperation Agency (JICA)	PROJECT No. :	1920815
PROJECT NAME :	Geotechnical Investigation for Nadi River Basin Drilling Works	DATE / :	20 October 2015
SITE ADDRESS :	BH03, Qeileoa, Nadi	TECHNOLOGIST :	RK/RL
SAMPLE LOCATION :	BH03 5.00m - 5.50m	MATERIAL TYPE & LOCATION :	Organic SILT, dark grey, soft to very soft, low to medium plasticity
TEST NUMBER :	N 525		

SAMPLE HISTORY : NATURAL / AIR-DRIED / OVEN-DRIED / UNKNOWN

Moisture Content (Material passing 19mm)	Container No.	-	18	19	SPLIT SAMPLE
Mass of Container	g		14.61	14.85	Mass Passing Last Sieve: - gM ₁
Mass of Container + Wet Soil	g		23.19	22.69	Mass after Splitting: - gM ₂
Mass of Container + Dry Soil	g		20.31	20.04	Splitting Factor = $\frac{M_1}{M_2}$
Mass of Dry Soil	g		5.70	5.19	
Mass of Moisture	g		2.88	2.65	
Moisture Content	%		50.53	51.06	
Average Moisture Content	%		50.79		

Total Mass of Dry Sample	Mass of dry sample retained on 19mm test sieve (M ₁)	g	Nil
	Total Wet Weight (M _w)	g	308.62
	Total Mass of dry sample (M ₁)	M ₁ =	$\frac{100M_w}{100 + w}$
		M ₁ =	204.66

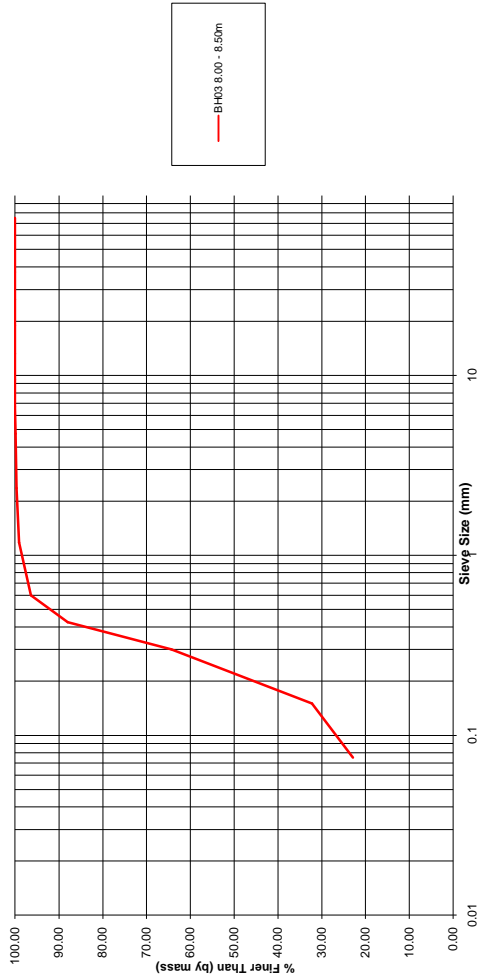
Test Sieve Size mm	Mass of Dry Soil Retained (M _s)	Corrected Mass	Percentage Retained = (Mass/M ₁) x 100	Total Percentage Passing	Maximum Sieve Load (Sieve Diameter 200mm)	Sieve Diameter
	g	g	%	%	g	mm
75.0mm	N/A	N/A	0.00	100.00		300
50.0mm	N/A	N/A	0.00	100.00		300
37.5mm	N/A	N/A	0.00	100.00		300
26.5mm	N/A	N/A	0.00	100.00		300
19.0mm	N/A	N/A	0.00	100.00		200
13.2 mm	N/A	N/A	0.00	100.00	600	300
9.50 mm	N/A	N/A	0.00	100.00	450	300
6.70 mm	N/A	N/A	0.00	100.00	300	300
4.75 mm	N/A	N/A	0.00	100.00	250	200
2.36 mm	0.08	N/A	0.04	99.96	150	200
1.18 mm	0.37	N/A	0.18	99.78	100	200
600 µm	1.13	N/A	0.55	99.23	80	200
425 µm	0.73	N/A	0.36	98.87	70	200
300 µm	1.61	N/A	0.79	98.08	60	200
150 µm	22.23	N/A	10.86	87.22	40	200
75 µm	44.65	N/A	21.82	65.41	25	200
Passing 75 µm	133.86	N/A	65.41	0.00	-	-
Pan Total	204.66	-	100.00	-	-	-

- NOTES: 1) Testing performed on fraction passing/retained on 19mm sieve
2) The percentage passing the finest sieve was obtained by difference

Tested by :RK/TL	Q.A. Checked by : MK	Approved by : IG
Date :20 October 2015	Date : 25 October 2015	Date : 19 November 2015

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BH03 8.00 - 8.50m

LOCATION: BH03 8.00 - 8.50m
DATE OF TEST: 16 October 2015
DESCRIPTION: Silty fine to medium SAND, grey
SAMPLE No: NSZ7

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Wet Sieve Analysis
NZS 4407:1991 (Test 3.8.1)

PRINCIPAL : Japan International Cooperation Agency (JICA)	PROJECT No. : 1920815
PROJECT NAME : Geotechnical Investigation for Nadi River Basin Drilling Works	DATE / : 15 October 2015
SITE ADDRESS : BH03, Oeteleoa, Nadi	TECHNOLOGIST : RJK
SAMPLE LOCATION : BH03 12.50m - 13.00m	MATERIAL TYPE & LOCATION : Organic SILT, grey green, low plasticity
TEST NUMBER : N 528	
SAMPLE HISTORY : NATURAL / AIR-DRIED / OVEN-DRIED / UNKNOWN	

Moisture Content (Material passing 19mm)	Container No.	-	86	67	SPLIT SAMPLE
Mass of Container	g	117.70	72.12	Mass Passing Last Sieve:	- gM ₃
Mass of Container + Wet Soil	g	145.69	94.51	Mass after Splitting:	- gM ₄
Mass of Container + Dry Soil	g	135.12	85.97	Splitting Factor	$\frac{M_3}{M_4}$
Mass of Dry Soil	g	17.42	13.85	=	$\frac{M_3}{M_4}$
Mass of Moisture	g	10.57	8.54		
Moisture Content	%	60.68	61.66		
Average Moisture Content	%	61.17			

Total Mass of Dry Sample	Mass of dry sample retained on 19mm test sieve (M ₁)	g	Nil
Total Wet Weight (M _w)	g	288.87	
Total Mass of dry sample (M _T)	M _T =	$\frac{100M_w}{100 + w}$	
	M _T =	179.23	

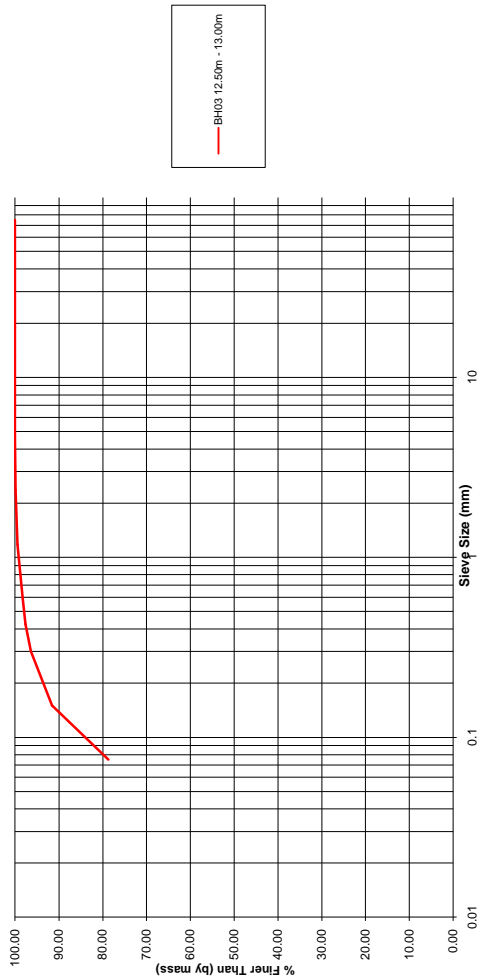
Test Sieve Size mm	Mass of Dry Soil Retained (M _b) g	Corrected Mass g	Percentage Retained = (M _{ba} /M _T) x 100 %	Total Percentage Passing %	Maximum Sieve Load (Sieve Diameter 200mm) g	Sieve Diameter mm
75.0mm	N/A	N/A	0.00	100.00		300
50.0mm	N/A	N/A	0.00	100.00		300
37.5mm	N/A	N/A	0.00	100.00		300
26.5mm	N/A	N/A	0.00	100.00		300
19.0mm	N/A	N/A	0.00	100.00		200
13.2 mm	N/A	N/A	0.00	100.00	600	300
9.50 mm	N/A	N/A	0.00	100.00	450	300
6.70 mm	N/A	N/A	0.00	100.00	300	300
4.75 mm	N/A	N/A	0.00	100.00	250	200
2.36 mm	0.16	N/A	0.09	99.91	150	200
1.18 mm	0.88	N/A	0.49	99.42	100	200
600 µm	2.05	N/A	1.14	98.28	80	200
425 µm	1.24	N/A	0.69	97.58	70	200
300 µm	2.10	N/A	1.17	96.41	60	200
150 µm	8.73	N/A	4.87	91.54	40	200
75 µm	23.07	N/A	12.87	78.67	25	200
Passing 75 µm	141.00	N/A	78.67	0.00	-	-
Pan Total	179.23	-	100.00	-	-	-

NOTES: 1) Testing performed on fraction passing/retained on 19mm sieve
2) The percentage passing the finest sieve was obtained by difference

Tested by : RJK	Q.A. Checked by : MK	Approved by : IG
Date : 15 October 2015	Date : 25 October 2015	Date : 19 November 2015

Form GE-L-06

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LOCATION: BH03 12.50m - 13.00m
DATE OF TEST: 15 October 2015
DESCRIPTION: Organic SILT, grey green, low plasticity
SAMPLE No: N.528

Form GE-L-06

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Wet Sieve Analysis
NZS 4407:1991 (Test 3.6.1)

PRINCIPAL :	Japan International Cooperation Agency (JICA)	PROJECT No. :	1920815
PROJECT NAME :	Geotechnical Investigation for Nadi River Basin Drilling Works	DATE / :	16 October 2015
SITE ADDRESS :	BH03, Ceileloa, Nadi	TECHNOLOGIST :	RK
SAMPLE LOCATION :	BH03 15.50m - 16.00m	MATERIAL TYPE & LOCATION :	Organic SILT with trace of fine sand, dark grey, very soft to soft, medium to high plasticity (Core Sample)
TEST NUMBER :	N 529		

SAMPLE HISTORY : NATURAL / AIR-DRIED / OVEN-DRIED / UNKNOWN

Moisture Content (Material passing 19mm)	Container No.	-	50	49	SPLIT SAMPLE
Mass of Container	g	3.61	3.56		Mass Passing Last Sieve: - gM _s
Mass of Container + Wet Soil	g	5.95	5.87		Mass after Splitting: - gM _t
Mass of Container + Dry Soil	g	5.10	5.02		Splitting Factor $\frac{M_s}{M_t}$
Mass of Dry Soil	g	1.49	1.46		= $\frac{M_s}{M_t}$
Mass of Moisture	g	0.85	0.85		
Moisture Content	%	57.05	58.22		
Average Moisture Content	%		57.63		

Total Mass of Dry Sample	Mass of dry sample retained on 19mm test sieve (M _s)	g	Nil
	Total Wet Weight (M _w)	g	163.44
	Total Mass of dry sample (M _t)	M _t = $\frac{100M_w}{100 + w}$	
		M _t =	103.68

Test Sieve Size mm	Mass of Dry Soil Retained (M _s) g	Corrected Mass g	Percentage Retained (Mass/M _t) x 100 %	Total Percentage Passing %	Maximum Sieve Load (Sieve Diameter 200mm) g	Sieve Diameter mm
75.0mm	N/A	N/A	0.00	100.00		300
50.0mm	N/A	N/A	0.00	100.00		300
37.5mm	N/A	N/A	0.00	100.00		300
26.5mm	N/A	N/A	0.00	100.00		300
19.0mm	N/A	N/A	0.00	100.00		200
13.2 mm	N/A	N/A	0.00	100.00	600	300
9.50 mm	N/A	N/A	0.00	100.00	450	300
6.70 mm	N/A	N/A	0.00	100.00	300	300
4.75 mm	N/A	N/A	0.00	100.00	250	200
2.36 mm	0.40	N/A	0.39	99.61	150	200
1.18 mm	0.22	N/A	0.21	99.40	100	200
600 µm	0.70	N/A	0.68	98.73	80	200
425 µm	0.52	N/A	0.50	98.23	70	200
300 µm	0.70	N/A	0.68	97.55	60	200
150 µm	3.86	N/A	3.72	93.83	40	200
75 µm	7.72	N/A	7.45	86.38	25	200
Passing 75 µm	89.56	N/A	86.38	0.00	-	-
Pan Total	103.68	-	100.00	-	-	-

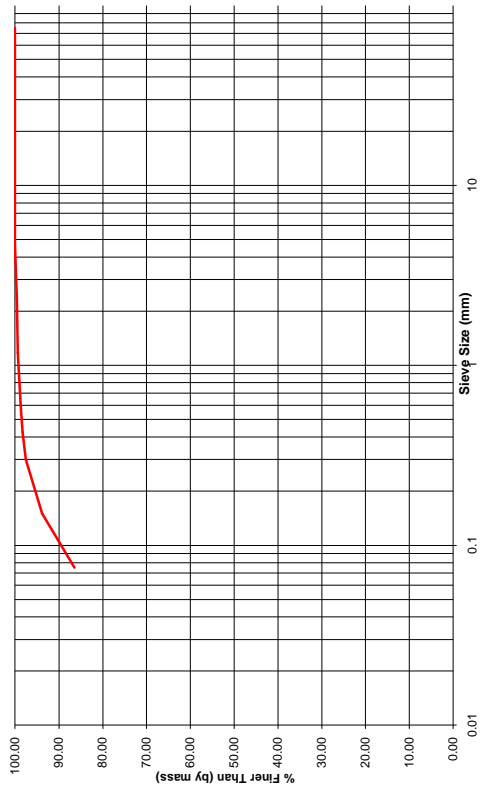
NOTES: 1) Testing performed on fraction passing/retained on 19mm sieve
2) The percentage passing the finest sieve was obtained by difference

Tested by: RK	C.A. Checked by: MK	Approved by: IG
Date: 16 October 2015	Date: 25 October 2015	Date: 19 November 2015

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BH03, Qeleloa, Nadi



BH03 15.50m - 16.00m

LOCATION: BH03 15.50m - 16.00m
DATE OF TEST: 16 October 2015
DESCRIPTION: Organic SILT with trace of fine sand, dark grey, very soft to soft, medium to high plasticity
SAMPLE No: NS29

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Wet Sieve Analysis
NZS 4407:1991 (Test 3.8.1)

PRINCIPAL : Japan International Cooperation Agency (JICA)	PROJECT No. : 1920815
PROJECT NAME : Geotechnical Investigation for Nadi River Basin Drilling Works	DATE / : 16 October 2015
SITE ADDRESS : BH03, Qeleloa, Nadi	TECHNOLOGIST : RK
SAMPLE LOCATION : BH03 20.00m - 20.50m	MATERIAL TYPE & LOCATION : Silty fine SAND with trace of some sub-rounded medium to coarse gravel, Silt with trace of fine sand, very soft, wet to saturated
TEST NUMBER : N 532	
SAMPLE HISTORY : NATURAL / AIR-DRIED / OVEN-DRIED / UNKNOWN	

Moisture Content (Material passing 19mm)	Container No.	-	10	11	SPLIT SAMPLE
Mass of Container	g	52.28	52.88		Mass Passing Last Sieve: - gM ₃
Mass of Container + Wet Soil	g	76.46	76.90		Mass after Splitting: - gM ₄
Mass of Container + Dry Soil	g	70.67	71.16		Splitting Factor = $\frac{M_3}{M_4}$
Mass of Dry Soil	g	18.39	18.28		
Mass of Moisture	g	5.79	5.74		
Moisture Content	%	31.48	31.40		
Average Moisture Content	%	31.44			

Total Mass of Dry Sample	Mass of dry sample retained on 19mm test sieve (M ₁)	g	Nil
	Total Wet Weight (M _w)	g	269.65
	Total Mass of dry sample (M _T)	M _T = $\frac{100M_w}{100 + w}$	
		M _T =	205.15

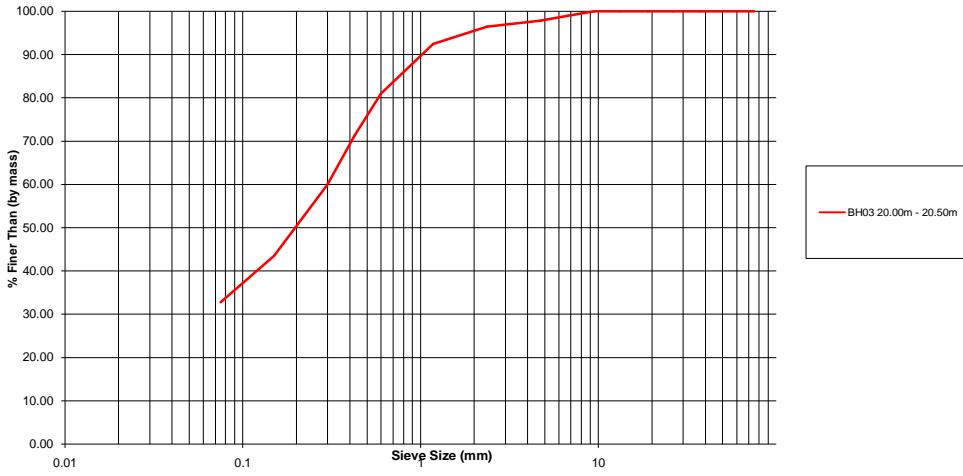
Test Sieve Size mm	Mass of Dry Soil Retained (M ₂) g	Corrected Mass g	Percentage Retained = (Mass/M _T) × 100 %	Total Percentage Passing %	Maximum Sieve Load (Sieve Diameter 200mm) g	Sieve Diameter mm
75.0mm	N/A	N/A	0.00	100.00		300
50.0mm	N/A	N/A	0.00	100.00		300
37.5mm	N/A	N/A	0.00	100.00		300
26.5mm	N/A	N/A	0.00	100.00		300
19.0mm	N/A	N/A	0.00	100.00		200
13.2 mm	N/A	N/A	0.00	100.00	600	300
9.50 mm	N/A	N/A	0.00	100.00	450	300
6.70 mm	2.16	N/A	1.05	98.95	300	300
4.75 mm	2.31	N/A	1.13	97.82	250	200
2.36 mm	2.87	N/A	1.40	96.42	150	200
1.18 mm	8.16	N/A	3.98	92.44	100	200
600 μm	23.63	N/A	11.52	80.93	80	200
425 μm	19.92	N/A	9.71	71.22	70	200
300 μm	22.97	N/A	11.20	60.02	60	200
150 μm	33.92	N/A	16.53	43.48	40	200
75 μm	22.12	N/A	10.78	32.70	25	200
Passing 75 μm	67.09	N/A	32.70	0.00	-	-
Pan Total	205.15	-	100.00	-	-	-

- NOTES: 1) Testing performed on fraction passing/retained on 19mm sieve
2) The percentage passing the finest sieve was obtained by difference

Tested by :RK	Q.A. Checked by : MK	Approved by : IG
Date : 16 October 2015	Date : 25 October 2015	Date : 13 November 2015

Form GE-L-06

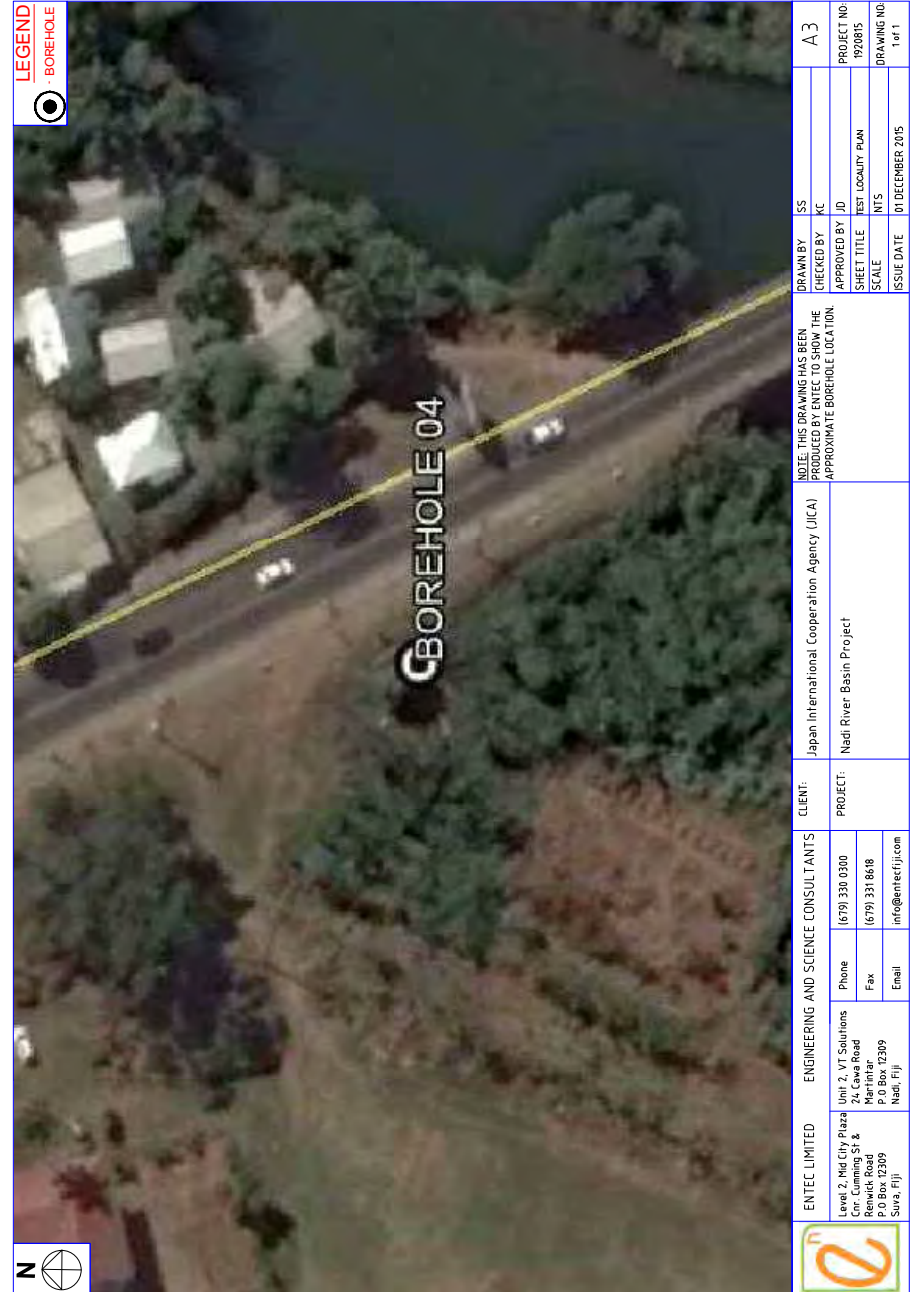
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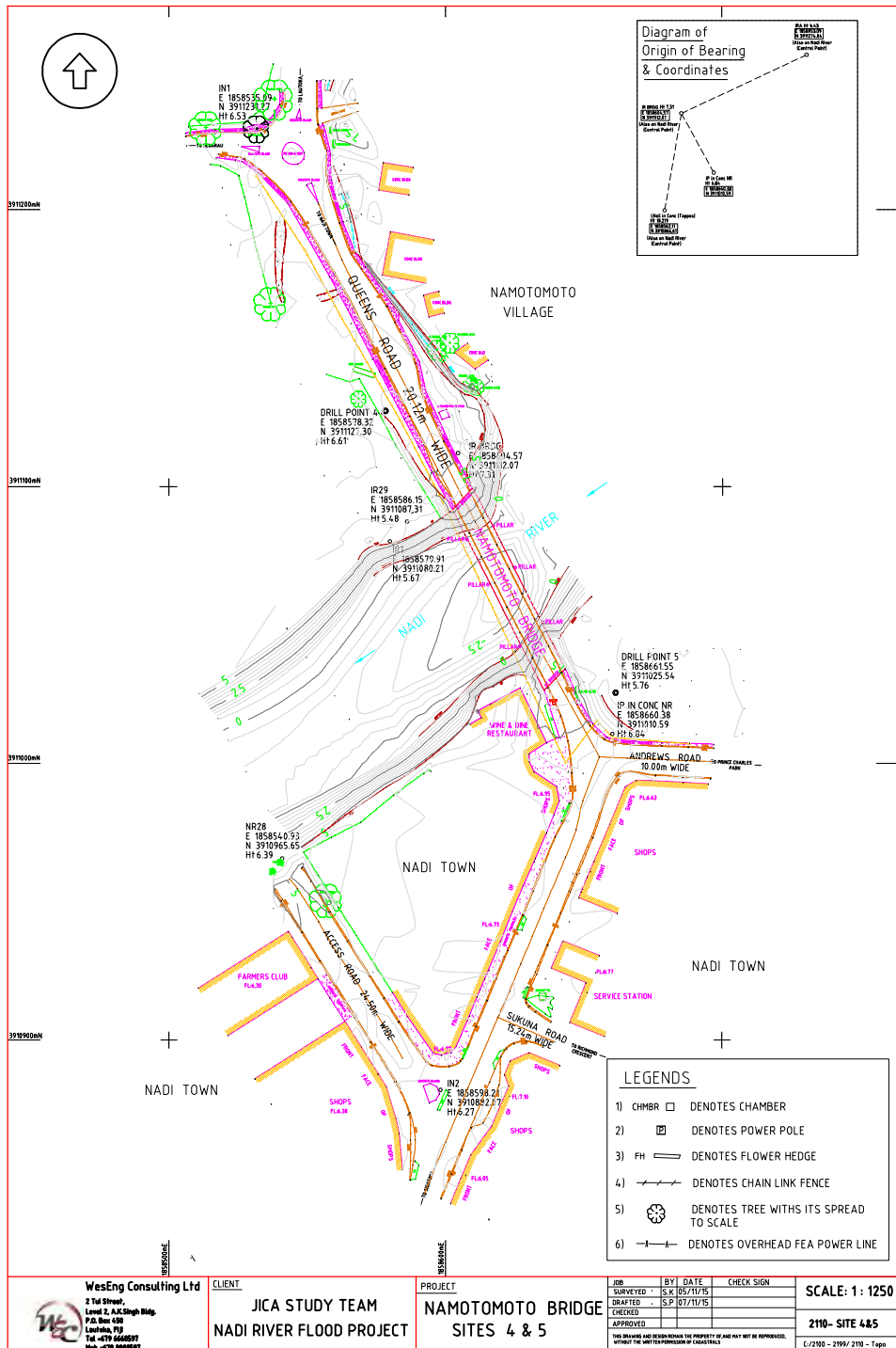


LOCATION:	BH03 20.00m - 20.50m	DESCRIPTION:	Silty fine SAND with trace of some sub-rounded medium to coarse gravel, Silt with trace of fine sand, very soft, wet to saturated
DATE OF TEST :	16 October 2015	SAMPLE No:	N532

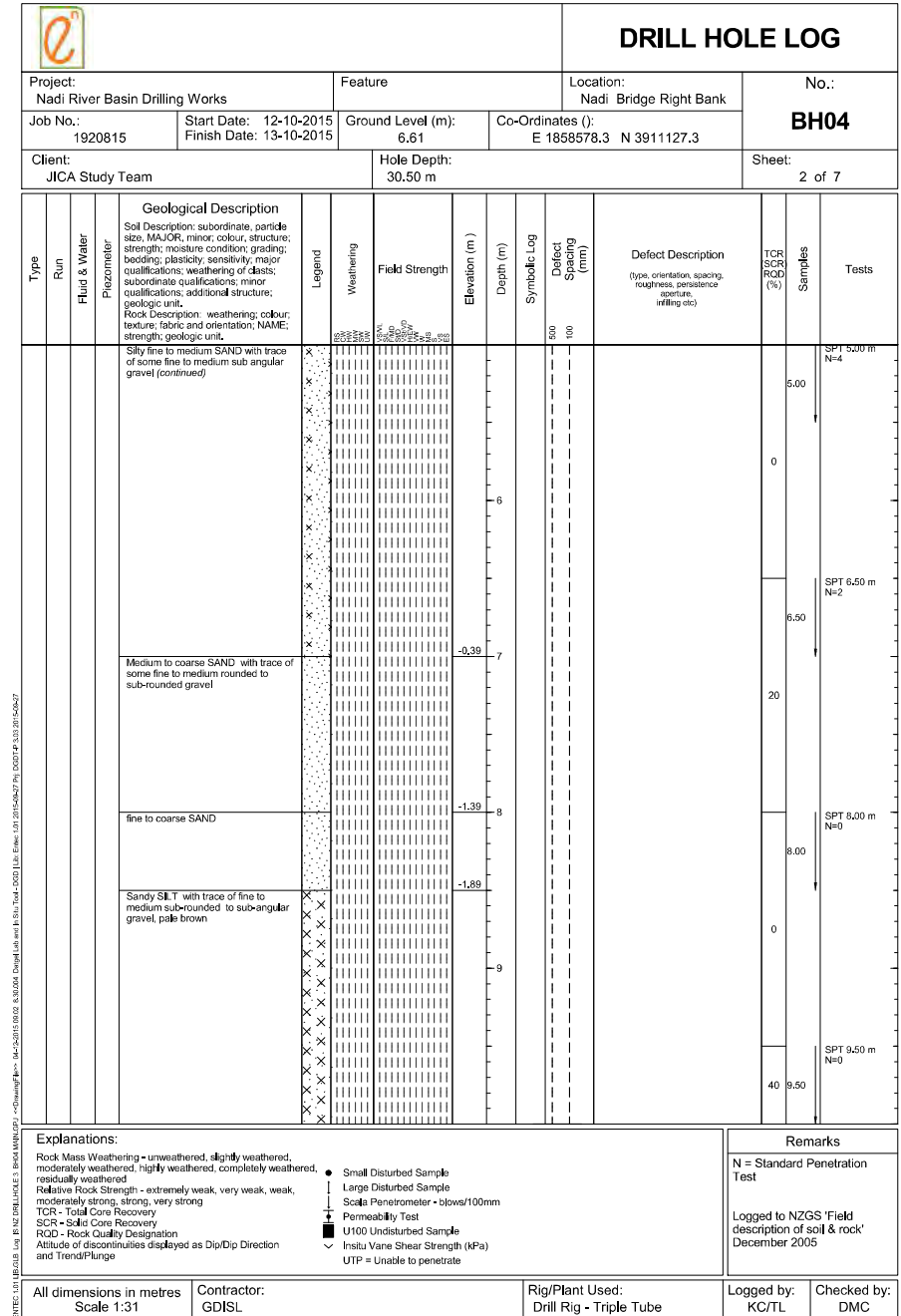
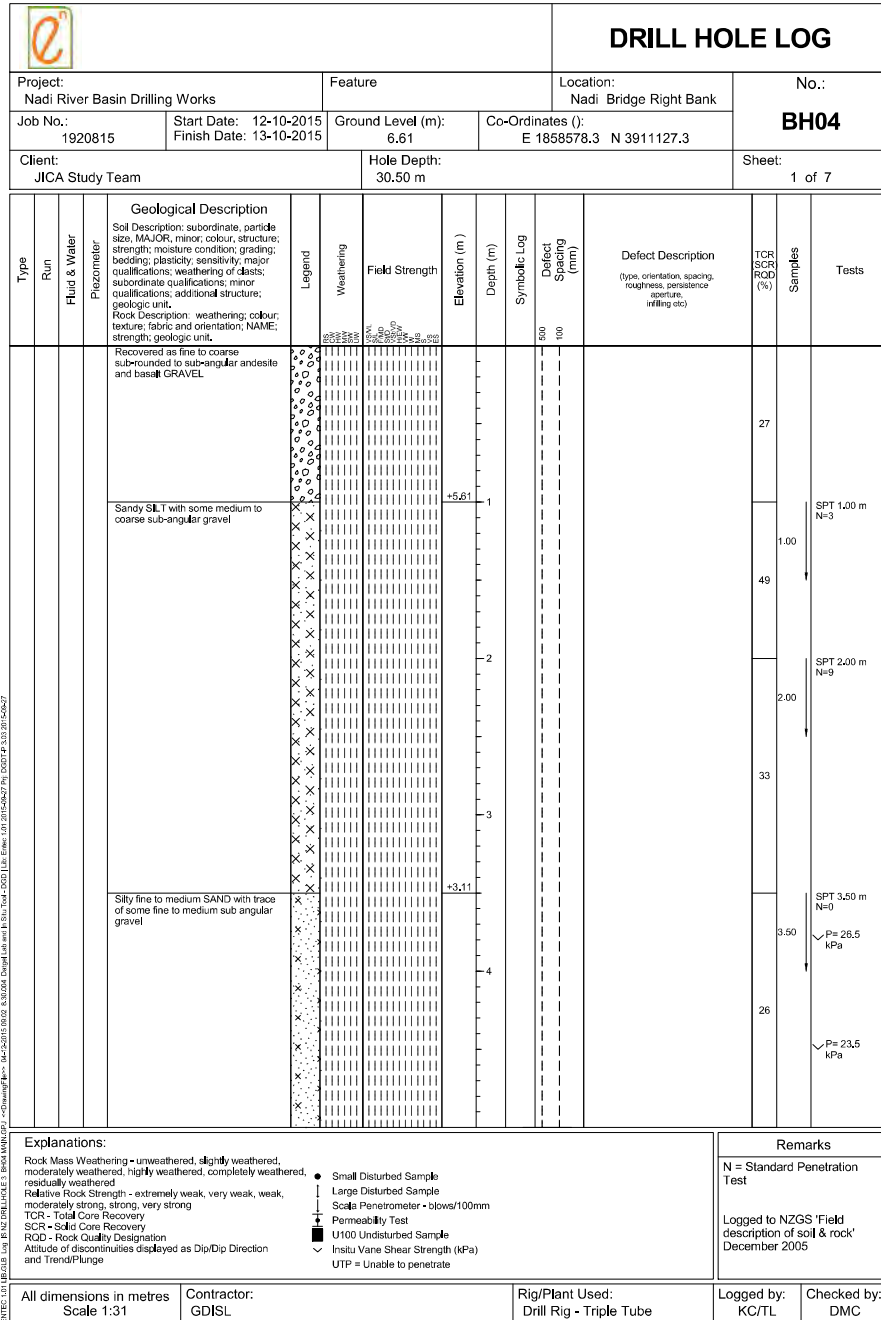
APPENDIX 4
SITE 4 - Nadi Bridge, Queens Road, Namotomoto,
Fiji.

APPENDIX 4a Test Locality Plan





APPENDIX 4b Engineering Borehole Log



DRILL HOLE LOG														
Project: Nadi River Basin Drilling Works			Feature		Location: Nadi Bridge Right Bank		No.: BH04							
Job No.: 1920815	Start Date: 12-10-2015 Finish Date: 13-10-2015		Ground Level (m): 6.61	Co-Ordinates (): E 1858578.3 N 3911127.3										
Client: JICA Study Team			Hole Depth: 30.50 m			Sheet: 3 of 7								
Type	Run	Fluid & Water Piezometer	Geological Description	Legend	Weathering	Field Strength	Elevation (m)	Depth (m)	Symbolic Log	Defect Spacing (mm)	Defect Description (type, orientation, spacing, roughness, persistence aperture, infilling etc)	TCR SCR ROD (%)	Samples	Tests
			Sandy SILT with trace of fine to medium sub-rounded to sub-angular gravel, pale brown (continued)				-3.89	11		500 100				
			Silty CLAY with occasional siltstone, pale brown orange, firm to stiff, low to medium plasticity				-4.39	11						
			Silty CLAY with trace of siltstone nodules with fine gravel, pale brown, soft, low to medium plasticity				-5.29	12						
			Clayey fine to medium GRAVEL with trace of sand, yellow brown, moist, tightly packed, soft to firm, moist, medium to high plasticity				-5.89	13						
			Highly weathered conglomerate comprising siltstone and sand stone with trace of subrounded basaltic fine to medium basaltic gravel				-6.89	14						
			Silty CLAY with some medium sub-angular to sub rounded basaltic gravel with minor fine sand, low to medium plasticity				-7.39	14						
			Silty fine SAND with trace of fine sub-angular gravel, pale brown				-8.39	14						
Explanations: Rock Mass Weathering - unweathered, slightly weathered, moderately weathered, highly weathered, completely weathered, residually weathered Relative Rock Strength - extremely weak, very weak, weak, moderately strong, strong, very strong TCR - Total Core Recovery SCR - Solid Core Recovery ROD - Rock Quality Designation Altitude of discontinuities displayed as Dip/Dip Direction and Trend/Plunge Small Disturbed Sample Large Disturbed Sample Scale Penetrometer - blows/100mm Permeability Test U100 Undisturbed Sample In situ Vane Shear Strength (kPa) UTP = Unable to penetrate											Remarks N = Standard Penetration Test Logged to NZGS 'Field description of soil & rock' December 2005			
All dimensions in metres Scale 1:31			Contractor: GDISL		Rig/Plant Used: Drill Rig - Triple Tube		Logged by: KC/TL	Checked by: DMC						

ENTR: L01 BEG: 0.00, FIN: NZGS: 0.00, B: 0.00, S: 0.00, T: 0.00, D: 0.00, E: 0.00, W: 0.00, H: 0.00, I: 0.00, O: 0.00, P: 0.00, Q: 0.00, R: 0.00, S: 0.00, T: 0.00, U: 0.00, V: 0.00, W: 0.00, X: 0.00, Y: 0.00, Z: 0.00

DRILL HOLE LOG														
Project: Nadi River Basin Drilling Works			Feature		Location: Nadi Bridge Right Bank		No.: BH04							
Job No.: 1920815	Start Date: 12-10-2015 Finish Date: 13-10-2015		Ground Level (m): 6.61	Co-Ordinates (): E 1858578.3 N 3911127.3										
Client: JICA Study Team			Hole Depth: 30.50 m			Sheet: 4 of 7								
Type	Run	Fluid & Water Piezometer	Geological Description	Legend	Weathering	Field Strength	Elevation (m)	Depth (m)	Symbolic Log	Defect Spacing (mm)	Defect Description (type, orientation, spacing, roughness, persistence aperture, infilling etc)	TCR SCR ROD (%)	Samples	Tests
			Sandy fine to medium subrounded to subangular GRAVEL with some silt and clay, pale brown				-9.19	16						
			Silty CLAY with some sand, pale brown, stiff, low to medium plasticity				-9.69	17						
			Clayey SILT with trace of gravel fragments and fine sand, dark grey black, stiff, low to medium plasticity				-11.89	19						
			Clayey SILT with some fine silt stone and trace of fine sand and shell fragments, dark grey black, friable, low plasticity				-11.89	19						
Explanations: Rock Mass Weathering - unweathered, slightly weathered, moderately weathered, highly weathered, completely weathered, residually weathered Relative Rock Strength - extremely weak, very weak, weak, moderately strong, strong, very strong TCR - Total Core Recovery SCR - Solid Core Recovery ROD - Rock Quality Designation Altitude of discontinuities displayed as Dip/Dip Direction and Trend/Plunge Small Disturbed Sample Large Disturbed Sample Scale Penetrometer - blows/100mm Permeability Test U100 Undisturbed Sample In situ Vane Shear Strength (kPa) UTP = Unable to penetrate											Remarks N = Standard Penetration Test Logged to NZGS 'Field description of soil & rock' December 2005			
All dimensions in metres Scale 1:31			Contractor: GDISL		Rig/Plant Used: Drill Rig - Triple Tube		Logged by: KC/TL	Checked by: DMC						


ENTR: L01 BEG: 0.00, FIN: NZGS: 0.00, B: 0.00, S: 0.00, T: 0.00, D: 0.00, E: 0.00, W: 0.00, H: 0.00, I: 0.00, O: 0.00, P: 0.00, Q: 0.00, R: 0.00, S: 0.00, T: 0.00, U: 0.00, V: 0.00, W: 0.00, X: 0.00, Y: 0.00, Z: 0.00

DRILL HOLE LOG																	
Project: Nadi River Basin Drilling Works			Feature		Location: Nadi Bridge Right Bank		No.:										
Job No.:	Start Date:		Ground Level (m):	Co-Ordinates ():			BH04										
1920815	12-10-2015 13-10-2015		6.61	E 1858578.3 N 3911127.3													
Client: JICA Study Team			Hole Depth: 30.50 m				Sheet: 5 of 7										
Type	Run	Fluid & Water	Piezometer	Geological Description	Legend	Weathering	Field Strength	Elevation (m)	Depth (m)	Symbolic Log	Defect Spacing (mm)	Defect Description	TCR	SCR	ROD (%)	Samples	Tests
				Clayey SILT with some fine silt stone and trace of fine sand and shell fragments, dark grey/black, friable, low plasticity (continued)	X	U		-13.89	21		500 100					SPT 20.00 m N=50 P= 8.5 kPa	
				Clayey SILT with some fine sand and trace of shell fragments, dark grey, friable	X	U			26								P= 225 kPa
				Clayey SILT with trace of fine sand and fine gravel with decomposing organic matter, grey green, low plasticity	X	U		-15.79	22							SPT 21.50 m N=50	
				Highly to moderately weathered SILTSTONE, grey green, very weak to weak	X	U		-17.19	23							SPT 23.00 m N=51	
				Organic SILT with trace of fine sand, dark grey green, low plasticity	X	U		-17.89	24							SPT 24.50 m N=50+	
					X	U		-18.39									
Explanations:				Remarks													
Rock Mass Weathering - unweathered, slightly weathered, moderately weathered, highly weathered, completely weathered, residually weathered				N = Standard Penetration Test													
Relative Rock Strength - extremely weak, very weak, weak, moderately strong, strong, very strong				Logged to NZGS 'Field description of soil & rock' December 2005													
TCR - Total Core Recovery				<ul style="list-style-type: none"> ● Small Disturbed Sample ○ Large Disturbed Sample ○ Scale Penetrometer - blows/100mm ⬇ Permeability Test ⬆ U100 Undisturbed Sample ⬇ Insitu Vane Shear Strength (kPa) ⬇ UTP = Unable to penetrate 													
ROD - Rock Quality Designation				Rig/Plant Used: Drill Rig - Triple Tube													
Altitude of discontinuities displayed as Dip/Dip Direction and Trend/Plunge				Logged by: KC/TL													
All dimensions in metres Scale 1:31				Checked by: DMC													
Contractor: GDISL				Rig/Plant Used: Drill Rig - Triple Tube													
				Logged by: KC/TL													
				Checked by: DMC													

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DRILL HOLE LOG																	
Project: Nadi River Basin Drilling Works			Feature		Location: Nadi Bridge Right Bank		No.:										
Job No.:	Start Date:		Ground Level (m):	Co-Ordinates ():			BH04										
1920815	12-10-2015 13-10-2015		6.61	E 1858578.3 N 3911127.3													
Client: JICA Study Team			Hole Depth: 30.50 m				Sheet: 6 of 7										
Type	Run	Fluid & Water	Piezometer	Geological Description	Legend	Weathering	Field Strength	Elevation (m)	Depth (m)	Symbolic Log	Defect Spacing (mm)	Defect Description	TCR	SCR	ROD (%)	Samples	Tests
				Highly weathered to moderately weathered SILTSTONE, grey green, very weak to weak. Silty fine to medium SAND with trace of gravel, greenish grey, loosely packed moist	X	U		-18.49	26								P= 85 kPa SPT 26.00 m N= 50+
				Sandy SILT with trace of fine to coarse sub-rounded to rounded gravel, dark green grey. Silty fine to medium subrounded to angular GRAVEL with some fine sand, red brown	X	U		-19.89 -19.99	40								P= 151.5 kPa
				Sandy fine to medium GRAVEL with some silt and coarse gravel	X	U		-21.39	28								P= 275 kPa SPT 27.50 m N=50
					X	U			30								P= 146.5 kPa P= 193 kPa
					X	U			29								P= 283 kPa SPT 29.00 m N=50
					X	U			50								P= 121.5 kPa
Explanations:				Remarks													
Rock Mass Weathering - unweathered, slightly weathered, moderately weathered, highly weathered, completely weathered, residually weathered				N = Standard Penetration Test													
Relative Rock Strength - extremely weak, very weak, weak, moderately strong, strong, very strong				Logged to NZGS 'Field description of soil & rock' December 2005													
TCR - Total Core Recovery				<ul style="list-style-type: none"> ● Small Disturbed Sample ○ Large Disturbed Sample ○ Scale Penetrometer - blows/100mm ⬇ Permeability Test ⬆ U100 Undisturbed Sample ⬇ Insitu Vane Shear Strength (kPa) ⬇ UTP = Unable to penetrate 													
ROD - Rock Quality Designation				Rig/Plant Used: Drill Rig - Triple Tube													
Altitude of discontinuities displayed as Dip/Dip Direction and Trend/Plunge				Logged by: KC/TL													
All dimensions in metres Scale 1:31				Checked by: DMC													
Contractor: GDISL				Rig/Plant Used: Drill Rig - Triple Tube													
				Logged by: KC/TL													
				Checked by: DMC													

ENTR: L01 (BEG) (L) (M) (F) (N) Z (RE) (H) (K) (L) (S) (M) (N) (P) (Q) (R) (S) (T) (U) (V) (W) (X) (Y) (Z) (AA) (AB) (AC) (AD) (AE) (AF) (AG) (AH) (AI) (AJ) (AK) (AL) (AM) (AN) (AO) (AP) (AQ) (AR) (AS) (AT) (AU) (AV) (AW) (AX) (AY) (AZ) (BA) (BB) (BC) (BD) (BE) (BF) (BG) (BH) (BI) (BJ) (BK) (BL) (BM) (BN) (BO) (BP) (BQ) (BR) (BS) (BT) (BU) (BV) (BW) (BX) (BY) (BZ) (CA) (CB) (CC) (CD) (CE) (CF) (CG) (CH) (CI) (CJ) (CK) (CL) (CM) (CN) (CO) (CP) (CQ) (CR) (CS) (CT) (CU) (CV) (CW) (CX) (CY) (CZ) (DA) (DB) (DC) (DD) (DE) (DF) (DG) (DH) (DI) (DJ) (DK) (DL) (DM) (DN) (DO) (DP) (DQ) (DR) (DS) (DT) (DU) (DV) (DW) (DX) (DY) (DZ) (EA) (EB) (EC) (ED) (EE) (EF) (EG) (EH) (EI) (EJ) (EK) (EL) (EM) (EN) (EO) (EP) (EQ) (ER) (ES) (ET) (EU) (EV) (EW) (EX) (EY) (EZ) (FA) (FB) (FC) (FD) (FE) (FF) (FG) (FH) (FI) (FJ) (FK) (FL) (FM) (FN) (FO) (FP) (FQ) (FR) (FS) (FT) (FU) (FV) (FW) (FX) (FY) (FZ) (GA) (GB) (GC) (GD) (GE) (GF) (GG) (GH) (GI) (GJ) (GK) (GL) (GM) (GN) (GO) (GP) (GQ) (GR) (GS) (GT) (GU) (GV) (GW) (GX) (GY) (GZ) (HA) (HB) (HC) (HD) (HE) (HF) (HG) (HH) (HI) (HJ) (HK) (HL) (HM) (HN) (HO) (HP) (HQ) (HR) (HS) (HT) (HU) (HV) (HW) (HX) (HY) (HZ) (IA) (IB) (IC) (ID) (IE) (IF) (IG) (IH) (II) (IJ) (IK) (IL) (IM) (IN) (IO) (IP) (IQ) (IR) (IS) (IT) (IU) (IV) (IW) (IX) (IY) (IZ) (JA) (JB) (JC) (JD) (JE) (JF) (JG) (JH) (JI) (JJ) (JK) (JL) (JM) (JN) (JO) (JP) (JQ) (JR) (JS) (JT) (JU) (JV) (JW) (JX) (JY) (JZ) (KA) (KB) (KC) (KD) (KE) (KF) (KG) (KH) (KI) (KJ) (KK) (KL) (KM) (KN) (KO) (KP) (KQ) (KR) (KS) (KT) (KU) (KV) (KW) (KX) (KY) (KZ) (LA) (LB) (LC) (LD) (LE) (LF) (LG) (LH) (LI) (LJ) (LK) (LL) (LM) (LN) (LO) (LP) (LQ) (LR) (LS) (LT) (LU) (LV) (LW) (LX) (LY) (LZ) (MA) (MB) (MC) (MD) (ME) (MF) (MG) (MH) (MI) (MJ) (MK) (ML) (MN) (MO) (MP) (MQ) (MR) (MS) (MT) (MU) (MV) (MW) (MX) (MY) (MZ) (NA) (NB) (NC) (ND) (NE) (NF) (NG) (NH) (NI) (NJ) (NK) (NL) (NM) (NO) (NP) (NQ) (NR) (NS) (NT) (NU) (NV) (NW) (NX) (NY) (NZ) (OA) (OB) (OC) (OD) (OE) (OF) (OG) (OH) (OI) (OJ) (OK) (OL) (OM) (ON) (OO) (OP) (OQ) (OR) (OS) (OT) (OU) (OV) (OW) (OX) (OY) (OZ) (PA) (PB) (PC) (PD) (PE) (PF) (PG) (PH) (PI) (PJ) (PK) (PL) (PM) (PN) (PO) (PP) (PQ) (PR) (PS) (PT) (PU) (PV) (PW) (PX) (PY) (PZ) (QA) (QB) (QC) (QD) (QE) (QF) (QG) (QH) (QI) (QJ) (QK) (QL) (QM) (QN) (QO) (QP) (QQ) (QR) (QS) (QT) (QU) (QV) (QW) (QX) (QY) (QZ) (RA) (RB) (RC) (RD) (RE) (RF) (RG) (RH) (RI) (RJ) (RK) (RL) (RM) (RN) (RO) (RP) (RQ) (RS) (RT) (RU) (RV) (RW) (RX) (RY) (RZ) (SA) (SB) (SC) (SD) (SE) (SF) (SG) (SH) (SI) (SJ) (SK) (SL) (SM) (SN) (SO) (SP) (SQ) (SR) (SS) (ST) (SU) (SV) (SW) (SX) (SY) (SZ) (TA) (TB) (TC) (TD) (TE) (TF) (TG) (TH) (TI) (TJ) (TK) (TL) (TM) (TN) (TO) (TP) (TQ) (TR) (TS) (TT) (TU) (TV) (TW) (TX) (TY) (TZ) (UA) (UB) (UC) (UD) (UE) (UF) (UG) (UH) (UI) (UJ) (UK) (UL) (UM) (UN) (UO) (UP) (UQ) (UR) (US) (UT) (UU) (UV) (UW) (UX) (UY) (UZ) (VA) (VB) (VC) (VD) (VE) (VF) (VG) (VH) (VI) (VJ) (VK) (VL) (VM) (VN) (VO) (VP) (VQ) (VR) (VS) (VT) (VU) (VV) (VW) (VX) (VY) (VZ) (WA) (WB) (WC) (WD) (WE) (WF) (WG) (WH) (WI) (WJ) (WK) (WL) (WM) (WN) (WO) (WP) (WQ) (WR) (WS) (WT) (WU) (WV) (WW) (WX) (WY) (WZ) (XA) (XB) (XC) (XD) (XE) (XF) (XG) (XH) (XI) (XJ) (XK) (XL) (XM) (XN) (XO) (XP) (XQ) (XR) (XS) (XT) (XU) (XV) (XW) (XX) (XY) (XZ) (YA) (YB) (YC) (YD) (YE) (YF) (YG) (YH) (YI) (YJ) (YK) (YL) (YM) (YN) (YO) (YP) (YQ) (YR) (YS) (YT) (YU) (YV) (YW) (YX) (YY) (YZ) (ZA) (ZB) (ZC) (ZD) (ZE) (ZF) (ZG) (ZH) (ZI) (ZJ) (ZK) (ZL) (ZM) (ZN) (ZO) (ZP) (ZQ) (ZR) (ZS) (ZT) (ZU) (ZV) (ZW) (ZX) (ZY) (ZZ)

										<h2 style="text-align: center;">DRILL HOLE LOG</h2>									
Project: Nadi River Basin Drilling Works					Feature:					Location: Nadi Bridge Right Bank					No.:				
Job No.: 1920815			Start Date: 12-10-2015 Finish Date: 13-10-2015			Ground Level (m): 6.61			Co-Ordinates (): E 1858578.3 N 3911127.3			BH04							
Client: JICA Study Team					Hole Depth: 30.50 m					Sheet: 7 of 7									
Type	Run	Fluid & Water	Piezometer	Geological Description	Legend	Weathering	Field Strength	Elevation (m)	Depth (m)	Symbolic Log	Defect Spacing (mm)	Defect Description	TCR	SCR	ROD (%)	Samples	Tests		
				Sandy fine to medium GRAVEL with some silt and coarse gravel (continued)				-23.89									P= 300 kPa		
				Hole Terminated at 30.50 m N = Standard Penetration Test Logged to NZGS 'Field description of soil & rock' December 2005					31								SPT 30.50 m N=50		
									32										
									33										
									34										

Explanations:

Rock Mass Weathering - unweathered, slightly weathered, moderately weathered, highly weathered, completely weathered, residually weathered

Relative Rock Strength - extremely weak, very weak, weak, moderately strong, strong, very strong

TCR - Total Core Recovery

SCR - Solid Core Recovery

ROD - Rock Quality Designation

Altitude of discontinuities displayed as Dip/Dip Direction and Trend/Plunge

● Small Disturbed Sample
 ○ Large Disturbed Sample
 Scale Penetrometer - blows/100mm
 ⊕ Permeability Test
 ⊕ U100 Undisturbed Sample
 < In situ Vane Shear Strength (kPa)
 UTP = Unable to penetrate

Remarks

N = Standard Penetration Test

Logged to NZGS 'Field description of soil & rock' December 2005

All dimensions in metres
Scale 1:31

Contractor:
GDISL

Rig/Plant Used:
Drill Rig - Triple Tube

Logged by:
KC/TL

Checked by:
DMC

FACTUAL REPORT – APPENDIX 2
Nadi River Basin Project, SITE 4, Main Road Bridge Right Bank, Nadi, Fiji.

Borehole 4 Core Photos (0.00m to 31.50m)



0.00m to 3.50m



3.50m to 11.90m



11.90m to 15.50m



15.50m to 18.20m



18.20m to 20.20m



20.20m to 22.40m



22.40m to 24.50m



24.50m to 29.00m



29.0m to 31.50m

APPENDIX 4c

Laboratory Test Schedule and Laboratory Test Results



PRINCIPAL : JICA
 PROJECT NAME : Nadi River Project Drilling Works
 SITE ADDRESS : Nadi Bridge (BH 04),
 PROJECT NUMBER :1920815

Date: 13.2015
SAMPLES SENT BY: Collected from Site by ENTEC on 12.10.15
Notes:

Lab test Schedule

Project No.	Site	Soil Type	Sample type	SPT N value	Depth (m)	Lab Tests Required						Remarks	
						Permeability	Density	Moisture Content	PSD	Atterberg	UCS		Consolidation
1920815.02	Site 4 (BHD4), near Denarau junction.	Gravelly Sand	SPT	24	1.00 - 1.40								
		Gravelly Sand	SPT	24	2.00 - 2.5				1				
		Sandy Gravel	SPT	22	3.50 - 4.0			1					
		Sandy Gravel	SPT	11	5.00								no recovery
		Sandy Gravel	SPT	12	6.5								no recovery
		Gravel	SPT	17	8.00 - 8.5				1				
		Gravel	SPT	16	9.50 - 9.75								
		Silty Clay	SPT	21	11.00 - 11.50			1			1		
		Clayey Gravel	U		12.50 - 13.00		1	1	1		1	1	
		Gravelly Sand	SPT	53	14.00 - 14.5		1		1				
		Clayey Silt	SPT	50	15.5								
		Silty Sand	SPT	42	17.00 - 17.5				1		1		no recovery
		Silty Sand	SPT	50	18.50 - 19.0				1				
		Silty Sand	SPT	50	20.00 - 20.41								
		Silty Sand	SPT	51	21.50 - 22.00					1			
		Silty Sand	SPT	51	23.00 - 23.45								
		Clayey Silt	SPT	50	24.50 - 25.0			1				1	
		Silty Sand	SPT	50	26.00 - 26.5					1		1	
		Gravel	SPT	50	27.50 - 28.0					1			
		Gravel	SPT	50	29.00 - 29.5						1		
Sandy Silt	SPT	50	31.00 - 31.45										
TOTALS						1	2	10	6	3	1	2	0
Bill of Quantity						1	3	10	6	3	3	3	

PRINCIPAL	: Japan International Cooperation Agency (JICA)	PROJECT No.	: 1920815
PROJECT NAME	: Geotechnical Engineering Investigation for Nadi River Project Drilling Works	DATE	: 16 October 2015
SITE ADDRESS	: BH04, Nadi Bridge	TECHNOLOGIST	: RK
MATERIAL TYPE & DESCRIPTION	: Silty CLAY with trace of siltstone nodules with fine gravel, pale brown, soft, low to medium plasticity	TEST METHOD	: NZS 4402:1986 (amended version)
		SAMPLE No.	: N537 (BH04 11.0 - 11.5m)

NATURAL MOISTURE CONTENT						
TEST No.		1	2			Average
Container No.	g	173	174			
Mass of Container	g	12.00	12.21			
Mass of Container + Wet Soil	g	19.73	19.29			
Mass of Container + Dry Soil	g	17.42	17.21			
Mass of Dry Soil	g	5.42	5.00			
Mass of Moisture	g	2.31	2.08			
Moisture Content	%	42.62	41.60			42.11

PLASTIC LIMIT						
TEST No.		1	2			Average
Container No.		27	29			
Mass of Container	g	14.29	14.26			
Mass of Container + Wet Soil	g	20.88	20.37			
Mass of Container + Dry Soil	g	18.82	18.42			
Mass of Dry Soil	g	4.53	4.16			
Mass of Moisture	g	2.06	1.95			
Moisture Content	%	45.47	46.88			46.17

LIQUID LIMIT							
TEST No.		1	2	3	4	5	6
Number of Blows		40	35	30	25	20	16
Container No.		30	35	37	38	39	41
Mass of Container	g	13.46	14.27	14.68	14.78	14.21	14.32
Mass of Container + Wet Soil	g	19.84	20.56	20.29	20.30	20.21	22.38
Mass of Container + Dry Soil	g	17.18	17.92	17.90	17.91	17.57	18.80
Mass of Dry Soil	g	3.72	3.65	3.22	3.13	3.36	4.48
Mass of Moisture	g	2.66	2.64	2.39	2.39	2.64	3.58
Moisture Content	%	71.51	72.33	74.22	76.36	78.57	79.91

LINEAR SHRINKAGE TEST							
Mould No.		1	2	3	4	5	Average
Initial length of Sample				125.00			
Final length of Sample after Shrinkage				102.00			
% Shrinkage				18.40			18.40

Sample Preparation
as received
washed/sieved on 425 µm sieve
air dried/oven dried 105°C
after making a paste cured for 12-16 hrs

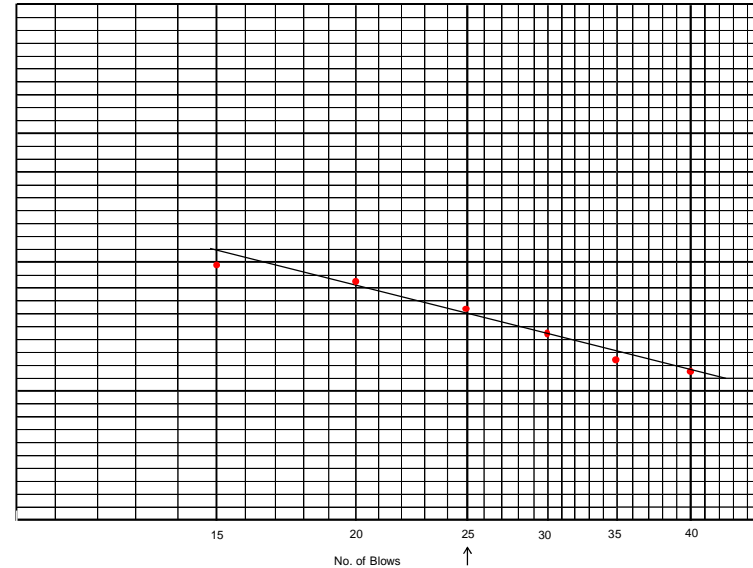
Liquid Limit	76.00 %
Plastic Limit	46.17 %
Plasticity Index	29.83 %
Shrinkage Limit	18.40 %

Tested By: RK
Date: 16 October 2015

Q.A. Checked By: KB
Date: 25 November 2015

Approved By: IG
Date: 25 November 2015

Graph of Moisture Content vs No. of Blows



Project No: 1920815
Sample No: N537

Atterberg Limit Test Results

PRINCIPAL	: Japan International Cooperation Agency (JICA)	PROJECT No.	: 1920815
PROJECT NAME	: Geotechnical Engineering Investigation for Nadi River Project Drilling Works	DATE	: 16 October 2015
SITE ADDRESS	: BH04, Nadi Bridge	TECHNOLOGIST	: LN
MATERIAL TYPE & DESCRIPTION	: Highly weathered conglomerate comprising siltstone and sandstone with trace of subrounded fine to medium basaltic gravel	TEST METHOD	: NZS 4402:1986 (amended version)
		SAMPLE No.	: N538 (BH04 12.50 - 12.90m)

NATURAL MOISTURE CONTENT						
TEST No.		1	2			Average
Container No.	g	6	15			
Mass of Container	g	53.15	52.75			
Mass of Container + Wet Soil	g	69.12	69.90			
Mass of Container + Dry Soil	g	63.12	63.49			
Mass of Dry Soil	g	9.97	10.74			
Mass of Moisture	g	6.00	6.41			
Moisture Content	%	60.18	59.68			59.93

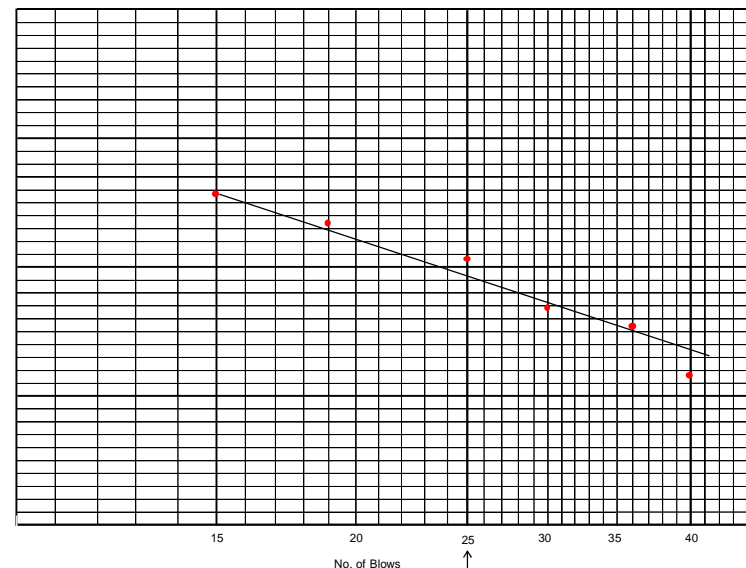
PLASTIC LIMIT						
TEST No.		1	2			Average
Container No.		146	147			
Mass of Container	g	11.63	11.62			
Mass of Container + Wet Soil	g	16.98	16.73			
Mass of Container + Dry Soil	g	15.46	15.29			
Mass of Dry Soil	g	3.83	3.67			
Mass of Moisture	g	1.52	1.44			
Moisture Content	%	39.69	39.24			39.46

LIQUID LIMIT							
TEST No.		1	2	3	4	5	6
Number of Blows		40	36	30	25	19	15
Container No.		107	109	110	119	133	176
Mass of Container	g	11.59	11.89	11.93	11.42	11.29	11.80
Mass of Container + Wet Soil	g	21.23	21.74	22.98	21.94	21.80	25.14
Mass of Container + Dry Soil	g	16.85	17.07	17.65	16.66	16.35	18.12
Mass of Dry Soil	g	5.26	5.18	5.72	5.24	5.06	6.32
Mass of Moisture	g	4.38	4.67	5.33	5.28	5.45	7.02
Moisture Content	%	83.27	90.15	93.18	100.76	107.71	111.08

LINEAR SHRINKAGE TEST							
Mould No.		1	2	3	4	5	Average
Initial length of Sample					125.00		
Final length of Sample after Shrinkage					99.00		
% Shrinkage					20.80		20.80

Sample Preparation		
as received	Liquid Limit	98.50 %
washed/sieved on 425 µm sieve	Plastic Limit	39.46 %
air dried/oven dried 105°C	Plasticity Index	59.04 %
after making a paste cured for 12-16 hrs	Shrinkage Limit	20.80 %

Graph of Moisture Content vs No. of Blows



Project No: 1920815
Sample No: N538

Tested By: LN
Date: 16 October 2015

Q.A. Checked By: KB
Date: 25 November 2015

Approved By: /G
Date: 25 November 2015

Atterberg Limit Test Results

PRINCIPAL	: Japan International Cooperation Agency (JICA)	PROJECT No.	: 1920815
PROJECT NAME	: Geotechnical Engineering : Investigation for Nadi River Project Drilling Works	DATE	: 16 October 2015
SITE ADDRESS	: BH04, Nadi Bridge	TECHNOLOGIST	: RK
MATERIAL TYPE & DESCRIPTION	: Sandy fine to medium GRAVEL : with some silt and coarse gravel	TEST METHOD	: NZS 4402:1986 : (amended version)
		SAMPLE No.	: N547 (BH04 30.50 - 31.00m)

NATURAL MOISTURE CONTENT					
TEST No.		1	2		Average
Container No.	g	68	84		
Mass of Container	g	74.15	85.05		
Mass of Container + Wet Soil	g	123.09	125.27		
Mass of Container + Dry Soil	g	111.23	115.72		
Mass of Dry Soil	g	37.08	30.67		
Mass of Moisture	g	11.86	9.55		
Moisture Content	%	31.98	31.14		31.56

PLASTIC LIMIT					
TEST No.		1	2		Average
Container No.		167	171		
Mass of Container	g	11.83	11.80		
Mass of Container + Wet Soil	g	16.32	16.73		
Mass of Container + Dry Soil	g	15.14	15.47		
Mass of Dry Soil	g	3.31	3.67		
Mass of Moisture	g	1.18	1.26		
Moisture Content	%	35.65	34.33		34.99

LIQUID LIMIT							
TEST No.		1	2	3	4	5	6
Number of Blows		40	35	30	25	20	15
Container No.		170	168	172	129118		115
Mass of Container	g	12.04	11.54	12.35	11.54	11.28	11.74
Mass of Container + Wet Soil	g	18.42	18.35	19.18	19.86	19.19	19.36
Mass of Container + Dry Soil	g	16.43	16.20	17.00	17.16	16.64	16.74
Mass of Dry Soil	g	4.39	4.66	4.65	5.62	5.36	5.00
Mass of Moisture	g	1.99	2.15	2.18	2.70	2.55	2.62
Moisture Content	%	45.33	46.14	46.88	48.04	47.57	52.31

LINEAR SHRINKAGE TEST							
Mould No.		1	2	3	4	5	Average
Initial length of Sample				125.00			
Final length of Sample after Shrinkage				102.00			
% Shrinkage				18.40			18.40

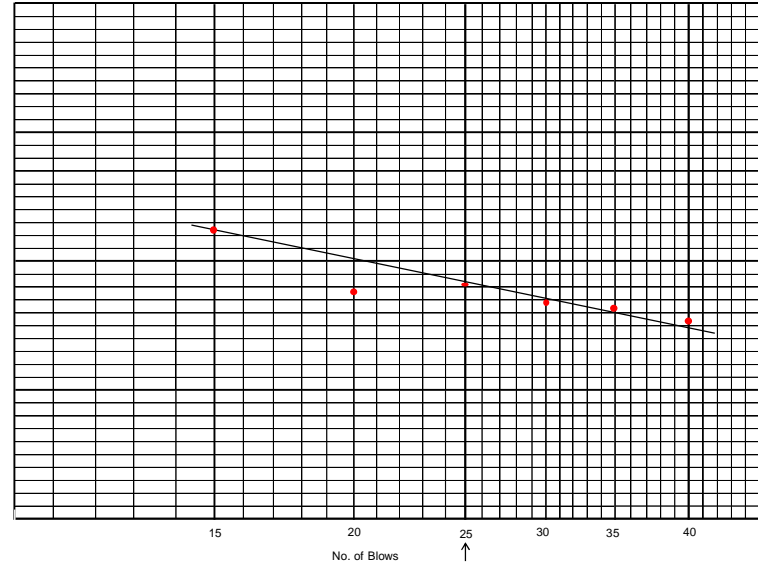
Sample Preparation		
as received	Liquid Limit	48.30 %
washed/sieved on 425 µm sieve	Plastic Limit	34.99 %
air dried/oven dried 105°C	Plasticity Index	13.31 %
after making a paste cured for 12-16 hrs	Shrinkage Limit	18.40 %

Tested By: RK
Date: 16 October 2015

Q.A. Checked By: KB
Date: 25 November 2015

Approved By: JG
Date: 25 November 2015

Graph of Moisture Content vs No. of Blows



Project No: 1920815
Sample No: N547

PRINCIPAL :	Japan International Cooperation Agency (JICA)	PROJECT No. :	1920815
PROJECT NAME :	Geotechnical Engineering Investigation for Nadi River Project Drilling Works	DATE / TESTED :	16 October 2015
SITE ADDRESS :	Site04 Nadi Bridge	TECHNOLOGIST :	RK
SAMPLE LOCATION :	BH04 12.5m - 12.90m	MATERIAL TYPE :	Highly weathered conglomerate comprising siltstone and sandstone with trace of subrounded fine to medium basaltic gravel
TEST NUMBER :	N538	SAMPLE HISTORY : NATURAL / AIR-DRIED / OVEN-DRIED / UNKNOWN	

Moisture Content	Container No.	-	14	2
	Mass of Container	g	53.54	53.95
	Mass of Container + Wet Soil	g	78.89	77.02
	Mass of Container + Dry Soil	g	71.98	70.29
	Mass of Dry Soil	g	18.44	16.34
	Mass of Moisture	g	6.91	6.73
	Moisture Content	%	37.47	41.19
				39.33

Bulk Density	Sample No.	-	N538
	Diameter of Specimen	mm	51.73
	Initial area of specimen A_0 ($\pi r^4 d^2$)	mm ²	2100.65
	Initial length of specimen L_0	mm	62.89
	Initial mass of specimen M_i	g	330.42
	Bulk Density ρ	t/m ³	2.5
	Dry Density ρ_d	t/m ³	1.80

Tested by : KB	Q.A. Check by : KB	Approved by : IG
Date : 16 October 2015	Date : 25 November 2015	Date : 25 November 2015

PRINCIPAL :	Japan International Cooperation Agency (JICA)	PROJECT No. :	1920815
PROJECT NAME :	Geotechnical Engineering Investigation for Nadi River Basin Drilling Works	DATE / TESTED :	16 October 2015
SITE ADDRESS :	Site 04 Nadi Bridge	TECHNOLOGIST :	TL/LN
SAMPLE LOCATION :	BH04 24.10m -24.40m	MATERIAL TYPE :	Highly to moderately weathered SILTSTONE, grey green, very weak to very weak
TEST NUMBER :	N543	SAMPLE HISTORY : NATURAL / AIR-DRIED / OVEN-DRIED / UNKNOWN	

Moisture Content	Container No.	-	8	14
	Mass of Container	g	53.07	53.54
	Mass of Container + Wet Soil	g	73.00	75.37
	Mass of Container + Dry Soil	g	68.02	70.17
	Mass of Dry Soil	g	14.95	16.63
	Mass of Moisture	g	4.98	5.20
	Moisture Content	%	33.31	31.27
				32.29

Bulk Density	Sample No.	-	N543
	Diameter of Specimen	mm	63.45
	Initial area of specimen A_0 ($\pi r^4 d^2$)	mm ²	3160.33
	Initial length of specimen L_0	mm	28.52
	Initial mass of specimen M_i	g	154.72
	Bulk Density ρ	t/m ³	1.72
	Dry Density ρ_d	t/m ³	1.30

Tested by : LN/TL	Q.A. Check by : KB	Approved by : IG
Date : 16 October 2015	Date : 25 November 2015	Date : 25 November 2015

Moisture Content Test Results

PRINCIPAL	: Japan International Cooperation Agency (JICA)	PROJECT No.	: 1920815
PROJECT NAME	: Geotechnical Engineering Investigation for Nadi River Project Drilling Works	DATE	: 16 October 2015
SITE ADDRESS	: BH 04, Nadi Bridge Towards Denarau Junction	TECHNOLOGIST	: RK
MATERIAL TYPE & DESCRIPTION	Sandy SILT with trace of some medium to coarse sub-angular gravel, pale brown	TEST METHOD	: NZS 4402:1986
		SAMPLE No.	: N535 (BH04 2.0m - 2.50m)

Moisture Content	%					
Container No.	g	2	4			
Mass of Container	g	53.97	52.60			
Mass of Container + Wet Soil	g	85.13	85.37			
Mass of Container + Dry Soil	g	80.86	81.01			
Mass of Dry Soil	g	26.89	28.41			
Mass of Moisture	g	4.27	4.36			
Moisture Content	%	15.88	15.35			15.61

Tested By: RK
Date: 16 October 2015

Q.A. Checked By: KB
Date: 25 November 2015

Approved By: IG
Date: 25 November 2015

Moisture Content Test Results

PRINCIPAL	: Japan International Cooperation Agency (JICA)	PROJECT No.	: 1920815
PROJECT NAME	: Geotechnical Engineering Investigation for Nadi River Project Drilling Works	DATE	: 16 October 2015
SITE ADDRESS	: BH 04, Nadi Bridge Towards Denarau Junction	TECHNOLOGIST	: RK
MATERIAL TYPE & DESCRIPTION	: Fine to course SAND	TEST METHOD	: NZS 4402:1986
		SAMPLE No.	: N536 (BH04 8.0m - 8.50m)

Moisture Content	%					
Container No.	g	103	138			
Mass of Container	g	11.31	11.14			
Mass of Container + Wet Soil	g	24.91	25.21			
Mass of Container + Dry Soil	g	23.27	23.59			
Mass of Dry Soil	g	11.96	12.45			
Mass of Moisture	g	1.64	1.62			
Moisture Content	%	13.71	13.01			13.36

Tested By: RK
Date: 16 October 2015

Q.A. Checked By: KB
Date: 25 November 2015

Approved By: IG
Date: 25 November 2015

Moisture Content Test Results

PRINCIPAL	: Japan International Cooperation Agency (JICA)	PROJECT No.	: 1920815
PROJECT NAME	: Geotechnical Engineering Investigation for Nadi River Project Drilling Works	DATE	: 16 October 2015
SITE ADDRESS	: BH 04, Nadi Bridge Towards Denarau Junction	TECHNOLOGIST	: RK
MATERIAL TYPE & DESCRIPTION	Silty CLAY with trace of siltstone nodules with fine gravel, pale brown, soft, low to medium plasticity	TEST METHOD	: NZS 4402:1986
		SAMPLE No.	: N537 (BH04 11.0m - 11.5m)

Moisture Content	%					
Container No.	g	99	134			
Mass of Container	g	11.83	11.26			
Mass of Container + Wet Soil	g	25.06	23.48			
Mass of Container + Dry Soil	g	21.30	20.01			
Mass of Dry Soil	g	9.47	8.75			
Mass of Moisture	g	3.76	3.47			
Moisture Content	%	39.70	39.66			39.68

 Tested By: RK
 Date: 16 October 2015

 Q.A. Checked By: KB
 Date: 25 November 2015

 Approved By: IG
 Date: 25 November 2015

Moisture Content Test Results

PRINCIPAL	: Japan International Cooperation Agency (JICA)	PROJECT No.	: 1920815
PROJECT NAME	: Geotechnical Engineering Investigation for Nadi River Project Drilling Works	DATE	: 16 October 2015
SITE ADDRESS	: BH 04, Nadi Bridge Towards Denarau Junction	TECHNOLOGIST	: RK
MATERIAL TYPE & DESCRIPTION	Highly weathered conglomerate comprising siltstone and sandstone with trace of subrounded fine to medium basaltic gravel	TEST METHOD	: NZS 4402:1986
		SAMPLE No.	: N538 (BH04 12.5m - 12.9m)

Moisture Content	%					
Container No.	g	22	25			
Mass of Container	g	14.39	14.44			
Mass of Container + Wet Soil	g	23.25	25.64			
Mass of Container + Dry Soil	g	21.01	22.79			
Mass of Dry Soil	g	6.62	8.35			
Mass of Moisture	g	2.24	2.85			
Moisture Content	%	33.84	34.13			33.98

 Tested By: RK
 Date: 16 October 2015

 Q.A. Checked By: KB
 Date: 25 November 2015

 Approved By: IG
 Date: 25 November 2015

Moisture Content Test Results

PRINCIPAL	: Japan International Cooperation Agency (JICA)	PROJECT No.	: 1920815
PROJECT NAME	: Geotechnical Engineering Investigation for Nadi River Project Drilling Works	DATE	: 16 October 2015
SITE ADDRESS	: BH 04, Nadi Bridge Towards Denarau Junction	TECHNOLOGIST	: RK
MATERIAL TYPE & DESCRIPTION	: Silty fine SAND with trace of fine subangular gravel, pale brown	TEST METHOD	: NZS 4402:1986
		SAMPLE No.	: N539 (BH04 14.0m - 14.50m)

Moisture Content	%					
Container No.	g	98	139			
Mass of Container	g	11.93	11.34			
Mass of Container + Wet Soil	g	28.66	26.04			
Mass of Container + Dry Soil	g	25.73	23.51			
Mass of Dry Soil	g	13.80	12.17			
Mass of Moisture	g	2.93	2.53			
Moisture Content	%	21.23	20.79			21.01

 Tested By: RK
 Date: 16 October 2015

 Q.A. Checked By: KB
 Date: 25 November 2015

 Approved By: IG
 Date: 25 November 2015

Moisture Content Test Results

PRINCIPAL	: Japan International Cooperation Agency (JICA)	PROJECT No.	: 1920815
PROJECT NAME	: Geotechnical Engineering Investigation for Nadi River Project Drilling Works	DATE	: 16 October 2015
SITE ADDRESS	: BH 04, Nadi Bridge Towards Denarau Junction	TECHNOLOGIST	: RK
MATERIAL TYPE & DESCRIPTION	: Clayey SILT with trace of gravel fragments and fine sand, dark grey black, stiff, low to medium plasticity	TEST METHOD	: NZS 4402:1986
		SAMPLE No.	: N540 (BH04 17.0m - 17.5m)

Moisture Content	%					
Container No.	g	136	137			
Mass of Container	g	11.77	11.31			
Mass of Container + Wet Soil	g	25.12	28.00			
Mass of Container + Dry Soil	g	21.55	23.54			
Mass of Dry Soil	g	9.78	12.23			
Mass of Moisture	g	3.57	4.46			
Moisture Content	%	36.50	36.47			36.49

 Tested By: RK
 Date: 16 October 2015

 Q.A. Checked By: KB
 Date: 25 November 2015

 Approved By: IG
 Date: 25 November 2015

Moisture Content Test Results

PRINCIPAL	: Japan International Cooperation Agency (JICA)	PROJECT No.	: 1920815
PROJECT NAME	: Geotechnical Engineering Investigation for Nadi River Project Drilling Works	DATE	: 16 October 2015
SITE ADDRESS	: BH 04, Nadi Bridge Towards Denarau Junction	TECHNOLOGIST	: RK
MATERIAL TYPE & DESCRIPTION	Clayey SILT with some fine siltstone with trace of fine sand and shell fragments, dark grey black, friable, low plasticity	TEST METHOD	: NZS 4402:1986
		SAMPLE No.	: N541 (BH04 18.5m - 19.0m)

Moisture Content	%					
Container No.	g	104	135			
Mass of Container	g	11.90	11.62			
Mass of Container + Wet Soil	g	23.52	23.68			
Mass of Container + Dry Soil	g	20.70	20.67			
Mass of Dry Soil	g	8.80	9.05			
Mass of Moisture	g	2.82	3.01			
Moisture Content	%	32.05	33.26			32.65

Tested By: RK
Date: 16 October 2015

Q.A. Checked By: KB
Date: 25 November 2015

Approved By: IG
Date: 25 November 2015

Moisture Content Test Results

PRINCIPAL	: Japan International Cooperation Agency (JICA)	PROJECT No.	: 1920815
PROJECT NAME	: Geotechnical Engineering Investigation for Nadi River Project Drilling Works	DATE	: 16 October 2015
SITE ADDRESS	: BH 04, Nadi Bridge Towards Denarau Junction	TECHNOLOGIST	: RK
MATERIAL TYPE & DESCRIPTION	Clayey SILT with some fine sand and trace of shell fragments, dark grey, friable	TEST METHOD	: NZS 4402:1986
		SAMPLE No.	: N542 (BH04 21.5m - 22.0m)

Moisture Content	%					
Container No.	g	4	2			
Mass of Container	g	52.64	53.97			
Mass of Container + Wet Soil	g	96.52	101.84			
Mass of Container + Dry Soil	g	86.24	90.37			
Mass of Dry Soil	g	33.60	36.40			
Mass of Moisture	g	10.28	11.47			
Moisture Content	%	30.60	31.51			31.05

Tested By: RK
Date: 16 October 2015

Q.A. Checked By: KB
Date: 25 November 2015

Approved By: IG
Date: 25 November 2015

Moisture Content Test Results

PRINCIPAL	: Japan International Cooperation Agency (JICA)	PROJECT No.	: 1920815
PROJECT NAME	: Geotechnical Engineering Investigation for Nadi River Project Drilling Works	DATE	: 16 October 2015
SITE ADDRESS	: BH 04, Nadi Bridge Towards Denarau Junction	TECHNOLOGIST	: RK
MATERIAL TYPE & DESCRIPTION	Silty SAND with trace of gravel, : greenish grey, fine to medium, loosely packed, moist	TEST METHOD	: NZS 4402:1986
		SAMPLE No.	: N544 (BH04 26.00m - 26.50m)

Moisture Content		%					
Container No.	g	144	145				
Mass of Container	g	12.02	11.93				
Mass of Container + Wet Soil	g	20.09	19.64				
Mass of Container + Dry Soil	g	18.18	17.79				
Mass of Dry Soil	g	6.16	5.86				
Mass of Moisture	g	1.91	1.85				
Moisture Content	%	31.01	31.57				31.29

Tested By: RK
Date: 16 October 2015

Q.A. Checked By: KB
Date: 25 November 2015

Approved By: IG
Date: 25 November 2015

Moisture Content Test Results

PRINCIPAL	: Japan International Cooperation Agency (JICA)	PROJECT No.	: 1920815
PROJECT NAME	: Geotechnical Engineering Investigation for Nadi River Project Drilling Works	DATE	: 16 October 2015
SITE ADDRESS	: BH 04, Nadi Bridge Towards Denarau Junction	TECHNOLOGIST	: RK
MATERIAL TYPE & DESCRIPTION	Silty fine to medium subrounded : to angular GRAVEL with some fine sand, red brown	TEST METHOD	: NZS 4402:1986
		SAMPLE No.	: N545 BH04 27.5m - 28.00m)

Moisture Content		%					
Container No.	g	146	147				
Mass of Container	g	11.75	11.63				
Mass of Container + Wet Soil	g	22.68	23.04				
Mass of Container + Dry Soil	g	20.74	21.07				
Mass of Dry Soil	g	8.99	9.44				
Mass of Moisture	g	1.94	1.97				
Moisture Content	%	21.58	20.87				21.22

Tested By: RK
Date: 16 October 2015

Q.A. Checked By: KB
Date: 25 November 2015

Approved By: IG
Date: 25 November 2015

PRINCIPAL	: Japan International Cooperation Agency (JICA)	PROJECT No.	: 1920815
PROJECT NAME	: Geotechnical Engineering Investigation for Nadi River Project Drilling Works	DATE	: 21 October 2015
SITE ADDRESS	: Site 04, Nadi Bridge,	TECHNOLOGIST	: IG
MATERIAL TYPE & DESCRIPTION	: Medium to coarse SAND with trace of some fine to medium rounded to sub-rounded gravel	TEST METHOD	: AS 1289.6.7.3-2001
		SAMPLE No.	: N541a (BH04 7.0m - 7.5m)

Total Weight : -
Weight Retained on : -
Percentage retained: : -

MOISTURE CONTENT

Container No.		2
Mass of Container	g	53.96
Mass of Container + Wet	g	98.11
Mass of Container + Dry	g	95.12
Mass of Dry Soil	g	41.16
Mass of Moisture	g	2.99
Moisture Content	%	7.26
Optimum moisture content	%	-
Laboratory moisture ratio	%	-

DENSITY

Mass of Specimen	g	1250
Volume of Specimen	cm ³	653.45
Wet Density	t/m ³	1.91
Dry Density	t/m ³	1.78
Maximum Dry Density	t/m ³	-
Laboratory Density ratio	%	-
Area of stand pipe (dia. 12mm)	mm ²	113.10
Cross sectional area of soil	cm ²	50.27
Length of soil specimen	cm	13.00

TEST #	Constant Head h (cm)	Elapsed Time (t)min	Out Flow Volume Q (cm ³)	Water temp T(°c)	KT cm/min	K ₂₀ cm/min
1	81	4.00	61	26	0.049	0.043
2	81	4.00	62	26	0.049	0.044
3	81	4.00	61	26	0.049	0.043
4	89	4.00	70	26	0.051	0.045
5	89	4.00	74	26	0.054	0.048
6	89	4.00	75	26	0.054	0.048
7	94	4.00	86	26	0.059	0.053
8	94	4.00	87	26	0.060	0.053
9	94	4.00	88	26	0.061	0.054
10	102	4.00	101	26	0.064	0.057
11	102	4.00	101	26	0.064	0.057
12	102	4.00	100	26	0.063	0.056

Average K₂₀ m/s : 8.36E-06

Tested By: IG
Date: 21 October 2015

Q.A. Check By: KB
Date: 25 November 2015

Approved By: IG
Date: 25 November 2015

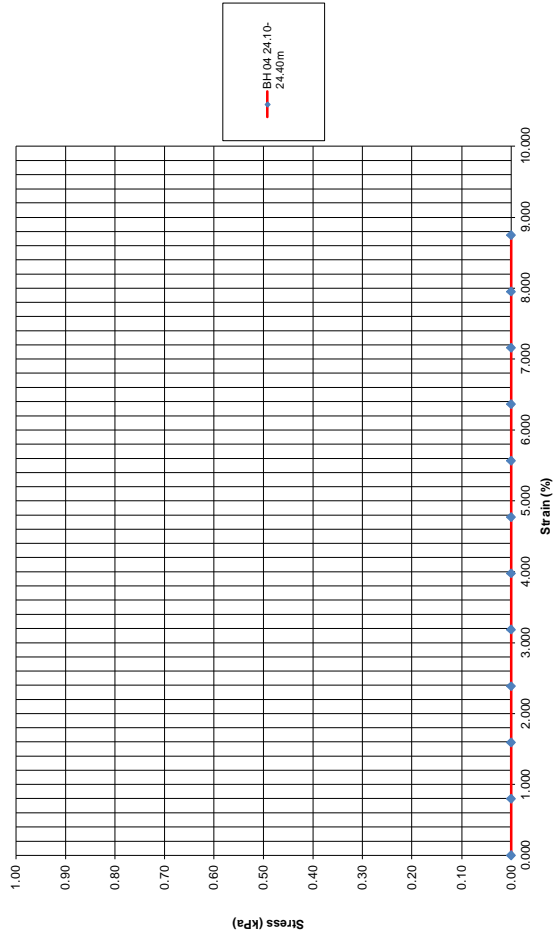
PRINCIPAL	: Japan International Cooperation Agency	PROJECT No.	: 1920815
PROJECT NAME	: Geotechnical Engineering Investigation for Nadi River Project Drilling Works.	DATE TESTED	: 11 October 2015
SITE ADDRESS	: Site 4 Nadi Bridge	TECHNOLOGIST	: IG/TL
SAMPLE LOCATION	: BH 04 12.5-13.0m	MATERIAL TYPE	: Highly weathered conglomerate comprising siltstone and sandstone with trace of subrounded fine to medium basaltic gravel
TEST NUMBER	: N538		
SAMPLE HISTORY : NATURAL / AIR-DRIED / OVEN-DRIED / UNKNOWN			

Moisture Content	Container No.	-	2
	Mass of Container	g	53.95
	Mass of Container + Wet Soil	g	77.02
	Mass of Container + Dry Soil	g	70.29
	Mass of Dry Soil	g	16.34
	Mass of Moisture	g	6.73
	Moisture Content	%	41.19

Bulk Density	Sample No.	-	N538
	Diameter of Specimen	mm	51.73
	Initial area of specimen A ₀ (π/4 d ²)	mm ²	2100.65
	Initial length of specimen L ₀	mm	62.89
	Initial mass of specimen M _i	g	330.42
	Bulk Density ρ	t/m ³	2.50
	Dry Density ρ_d	t/m ³	1.77

Compression Gauge Reading	Load Gauge Reading	Load	Strain $\epsilon = \frac{C_{11} - C_0}{L_0}$	Corrected Area A = A ₀ / 1-ε	Principal Stress Difference σ ₁ - σ ₃ = 1000P/A
mm		(kN)	%	m ²	kPa
0.00			0.000	0.002101	0.00
0.50			0.795	0.002117	0.00
1.00			1.590	0.002135	0.00
1.50			2.385	0.002152	0.00
2.00			3.180	0.002170	0.00
2.50			3.975	0.002188	0.00
3.00			4.770	0.002206	0.00
3.50			5.565	0.002224	0.00
4.00			6.360	0.002243	0.00
4.50			7.155	0.002263	0.00
5.00			7.950	0.002282	0.00
5.50			8.745	0.002302	0.00
6.00					
6.50					

STRESS VS STRAIN



LOCATION: BH 04 - 12.5-13.0m
 DESCRIPTION: Highly weathered conglomerate comprising siltstone and sandstone with trace of subrounded fine to medium basaltic gravel
 DATE OF TEST: 16 October 2015

Unconfined Compressive Strength
NZS 4402:1986 (Test 6.3.1)

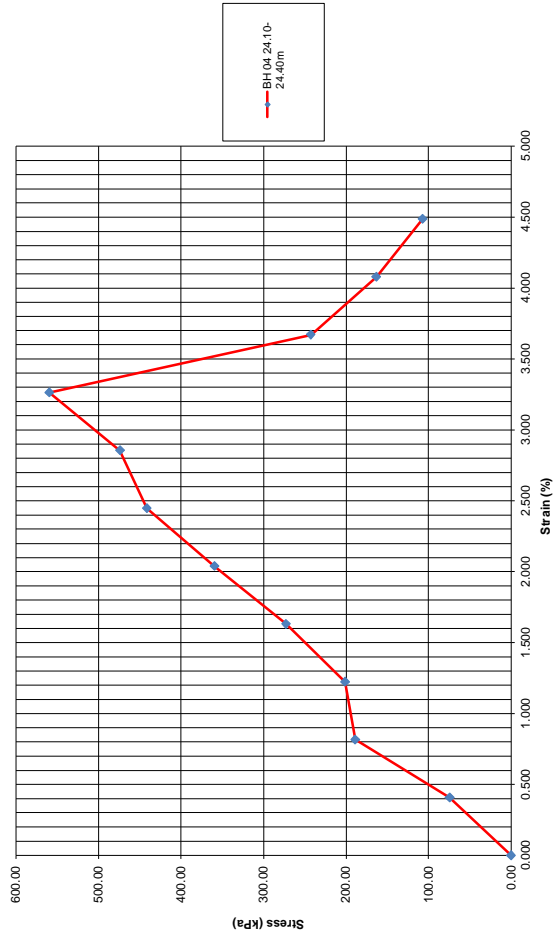
PRINCIPAL :	Japan International Cooperation Agency	PROJECT No. :	1920815
PROJECT NAME :	Geotechnical Engineering Investigation for Nadi River Project Drilling Works.	DATE TESTED :	11 October 2015
SITE ADDRESS :	Site 4 Nadi Bridge	TECHNOLOGIST :	LN/TL
SAMPLE LOCATION :	BH 04 24.10-24.40m	MATERIAL TYPE :	Highly to moderately weathered SILTSTONE, grey green, very weak to weak
TEST NUMBER :	N543		
SAMPLE HISTORY : NATURAL / AIR-DRIED / OVEN-DRIED / UNKNOWN			

Moisture Content	Container No.	-	87
	Mass of Container	g	116.47
	Mass of Container + Wet Soil	g	782.25
	Mass of Container + Dry Soil	g	646.25
	Mass of Dry Soil	g	529.78
	Mass of Moisture	g	136.00
	Moisture Content	%	25.67

Bulk Density	Sample No.	-	N543
	Diameter of Specimen	mm	61.29
	Initial area of specimen A_0 ($\pi/4 d^2$)	mm ²	2948.82
	Initial length of specimen L_0	mm	122.58
	Initial mass of specimen M_i	g	671.36
	Bulk Density ρ	t/m ³	1.86
	Dry Density ρ_d	t/m ³	1.48

Compression Gauge Reading	Load Gauge Reading	Load	Strain $\epsilon = \frac{C_n - C_0}{L_0}$	Corrected Area $A = A_0 / (1 - \epsilon)$	Principal Stress Difference $\sigma_1 - \sigma_3 = 1000P/A$
mm		(kN)	%	m ²	kPa
0.00	0	0	0.000	0.002949	0.00
0.50	110	0.2208	0.408	0.002961	74.57
1.00	280.0	0.5612	0.816	0.002973	188.76
1.50	300.0	0.6007	1.224	0.002985	201.22
2.00	410.0	0.8181	1.632	0.002998	272.91
2.50	544.0	1.0826	2.039	0.003010	359.64
3.00	672.0	1.3346	2.447	0.003023	441.51
3.50	725.0	1.4389	2.855	0.003035	474.02
4.00	860.0	1.7063	3.263	0.003048	559.76
4.50	372.0	0.7430	3.671	0.003061	242.72
5.00	250.0	0.5019	4.079	0.003074	163.26
5.50	165.0	0.3313	4.487	0.003087	107.31

STRESS VS STRAIN



BH 04_24.10-24.40m

LOCATION: BH 04_24.10-24.40m
DATE OF TEST: 16 October 2015
DESCRIPTION: Highly to moderately weathered SILTSTONE, grey green, very weak to weak

Wet Sieve Analysis
NZS 4407:1991 (Test 3.8.1)

PRINCIPAL :	Japan International Cooperation Agency	PROJECT No. :	1920815
PROJECT NAME :	Geotechnical Engineering Investigation for Nadi River Project Drilling	DATE / :	16 October 2015
SITE ADDRESS :	BH04 Nadi Bridge	TECHNOLOGIST :	RK
SAMPLE LOCATION :	BH04 1.00 - 1.50m	MATERIAL TYPE & LOCATION :	Sandy SILT with trace of some medium to coarse sub-angular gravel, pale brown
TEST NUMBER :	N 534		

SAMPLE HISTORY : NATURAL / AIR-DRIED / OVEN-DRIED / UNKNOWN

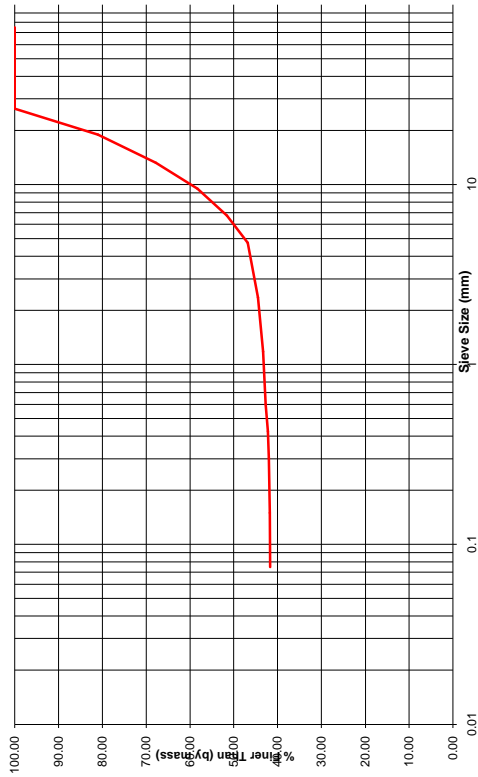
Moisture Content (Material passing 19mm)	Container No.	-	153	154	SPLIT SAMPLE
Mass of Container	g		11.22	11.27	Mass Passing Last Sieve: - gM ₃
Mass of Container + Wet Soil	g		18.37	18.12	Mass after Splitting: - gM ₄
Mass of Container + Dry Soil	g		16.71	16.56	Splitting Factor = $\frac{M_3}{M_4}$
Mass of Dry Soil	g		5.49	5.29	
Mass of Moisture	g		1.66	1.56	
Moisture Content	%		30.24	29.49	
Average Moisture Content	%		29.86		

Total Mass of Dry Sample	Mass of dry sample retained on 19mm test sieve (M _r)	g	Nil
	Total Wet Weight (M _w)	g	306.81
	Total Mass of dry sample (M _t)	M _t = $\frac{100M_w}{100 + w}$	
	M _r =	236.26	

Test Sieve Size mm	Mass of Dry Soil Retained (M _s)	Corrected Mass	Percentage Retained = $\frac{M_{s_i}}{M_t} \times 100$	Total Percentage Passing	Maximum Sieve Load (Sieve Diameter 200mm)	Sieve Diameter
	g	g	%	%	g	mm
75.0mm		N/A	0.00	100.00		300
50.0mm		N/A	0.00	100.00		300
37.5mm		N/A	0.00	100.00		300
26.5mm		N/A	0.00	100.00		300
19.0mm	27.04	N/A	11.45	88.55		200
13.2 mm	19.94	N/A	8.44	80.11	600	300
9.50 mm	15.91	N/A	6.73	73.38	450	300
6.70 mm	14.00	N/A	5.93	67.45	300	300
4.75 mm	13.81	N/A	5.85	61.61	250	200
2.36 mm	27.83	N/A	11.78	49.83	150	200
1.18 mm	25.05	N/A	10.60	39.23	100	200
600 µm	19.89	N/A	8.42	30.81	80	200
425 µm	8.22	N/A	3.48	27.33	70	200
300 µm	8.17	N/A	3.46	23.87	60	200
150 µm	12.09	N/A	5.12	18.75	40	200
75 µm	8.55	N/A	3.62	15.13	25	200
Passing 75 µm	35.76	N/A	15.13	0.00	-	-
Pan Total	236.26	-	100.00	-	-	-

NOTES: 1) Testing performed on fraction passing/retained on 19mm sieve
2) The percentage passing the finest sieve was obtained by difference

Tested by :RK	Q.A. Checked by : KB	Approved by : IG
Date : 16 October 2015	Date : 25 November 2015	Date : 25 November 2015



BH04 1.00 - 1.50m

LOCATION: BH04 1.0-1.5m
DATE OF TEST: 16 October 2015
DESCRIPTION: Sandy SILT with trace of some medium to coarse sub-angular gravel, pale brown
SAMPLE No. N.534

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Wet Sieve Analysis
NZS 4407:1991 (Test 3.8.1)

PRINCIPAL : Japan International Cooperation Agency	PROJECT No. : 1920815
PROJECT NAME : Geotechnical Engineering Investigation for Nadi River Project Drilling	DATE / : 16 October 2015
SITE ADDRESS : BH04 Nadi Bridge	TECHNOLOGIST : RK
SAMPLE LOCATION : BH04 8.0-8.5m	MATERIAL TYPE & LOCATION : Fine to coarse SAND
TEST NUMBER : N 536	

SAMPLE HISTORY : NATURAL / AIR-DRIED / OVEN-DRIED / UNKNOWN

Moisture Content (Material passing 19mm)	Container No.	-	155	156	SPLIT SAMPLE
Mass of Container	g		11.71	11.86	Mass Passing Last Sieve: - gM ₃
Mass of Container + Wet Soil	g		20.60	19.94	Mass after Splitting: - gM ₄
Mass of Container + Dry Soil	g		19.55	19.08	Splitting Factor $\frac{M_3}{M_4}$
Mass of Dry Soil	g		7.84	7.22	= $\frac{M_3}{M_4}$
Mass of Moisture	g		1.05	0.86	
Moisture Content	%		13.39	11.91	
Average Moisture Content	%		12.65		

Total Mass of Dry Sample	Mass of dry sample retained on 19mm test sieve (M ₁)	g	Nil
Total Wet Weight (M _w)	g		292.95
Total Mass of dry sample (M _T)	M _T = $\frac{100M_w}{100 + w}$		
	M _T =	260.05	

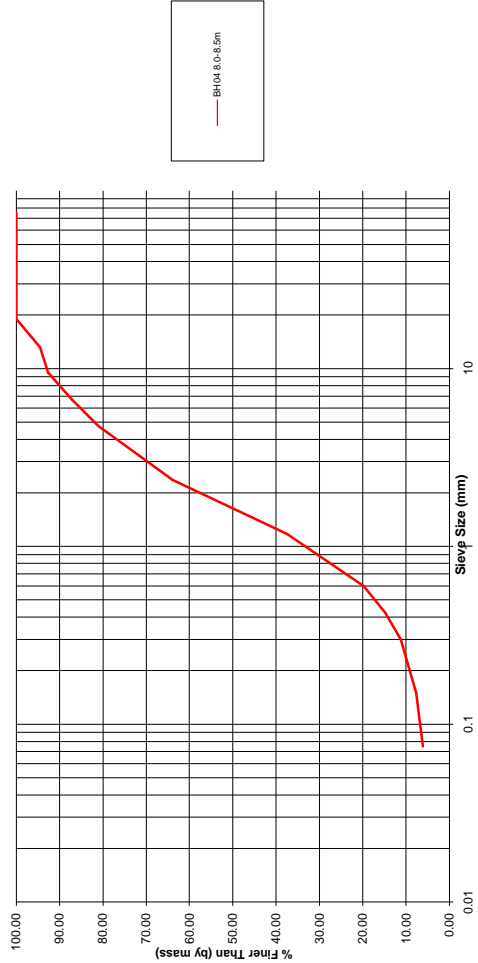
Test Sieve Size mm	Mass of Dry Soil Retained (M _c) g	Corrected Mass g	Percentage Retained = (M _c /M _T) × 100 %	Total Percentage Passing %	Maximum Sieve Load (Sieve Diameter 200mm) g	Sieve Diameter mm
75.0mm	N/A	N/A	0.00	100.00		300
50.0mm	N/A	N/A	0.00	100.00		300
37.5mm	N/A	N/A	0.00	100.00		300
26.5mm	N/A	N/A	0.00	100.00		300
19.0mm	N/A	N/A	0.00	100.00		200
13.2 mm	14.19	N/A	5.46	94.54	600	300
9.50 mm	4.70	N/A	1.81	92.74	450	300
6.70 mm	14.24	N/A	5.48	87.26	300	300
4.75 mm	16.08	N/A	6.18	81.08	250	200
2.36 mm	44.88	N/A	17.26	63.82	150	200
1.18 mm	68.34	N/A	26.28	37.54	100	200
600 µm	46.08	N/A	17.72	19.82	80	200
425 µm	12.93	N/A	4.97	14.85	70	200
300 µm	9.34	N/A	3.59	11.25	60	200
150 µm	9.28	N/A	3.57	7.69	40	200
75 µm	3.99	N/A	1.53	6.15	25	200
Passing 75 µm	16.00	N/A	6.15	0.00	-	-
Pan Total	260.05	-	100.00	-	-	-

NOTES: 1) Testing performed on fraction passing/retained on 19mm sieve
2) The percentage passing the finest sieve was obtained by difference

Tested by : RK	Q.A. Checked by : KB	Approved by : KB
Date : 16 October 2015	Date : 19 November 2015	Date : 19 November 2015

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DESCRIPTION: Fine to coarse SAND
LOCATION: BH04 8.0-8.50m
DATE OF TEST: 16 October 2015
SAMPLE No: N538

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Wet Sieve Analysis
NZS 4407:1991 (Test 3.8.1)

PRINCIPAL : Japan International Cooperation Agency (JICA)	PROJECT No. : 1920815
PROJECT NAME : Geotechnical Engineering Investigation for Nadi River Project Drilling	DATE / : 16 October 2015
SITE ADDRESS : BH04 Nadi Bridge	TECHNOLOGIST : RK
SAMPLE LOCATION : BH04 14.0m - 14.50m	MATERIAL TYPE & LOCATION : Silty fine SAND with trace of fine subangular gravel, pale brown
TEST NUMBER : N 539	
SAMPLE HISTORY : NATURAL / AIR-DRIED / OVEN-DRIED / UNKNOWN	

Moisture Content (Material passing 19mm)	Container No.	-	100	101	SPLIT SAMPLE
Mass of Container	g	11.72	11.64	Mass Passing Last Sieve:	- gM ₃
Mass of Container + Wet Soil	g	23.76	24.13	Mass after Splitting:	- gM ₄
Mass of Container + Dry Soil	g	21.32	21.65	Splitting Factor = $\frac{M_3}{M_4}$	
Mass of Dry Soil	g	9.60	10.01	= $\frac{M_3}{M_4}$	
Mass of Moisture	g	2.44	2.48		
Moisture Content	%	25.42	24.78		
Average Moisture Content	%	25.10			

Total Mass of Dry Sample	Mass of dry sample retained on 19mm test sieve (M ₁)	g	Nil
Total Wet Weight (M _w)	g	350.47	
Total Mass of dry sample (M _T)	M _T = $\frac{100M_w}{100 + w}$		
	M _T =	280.16	

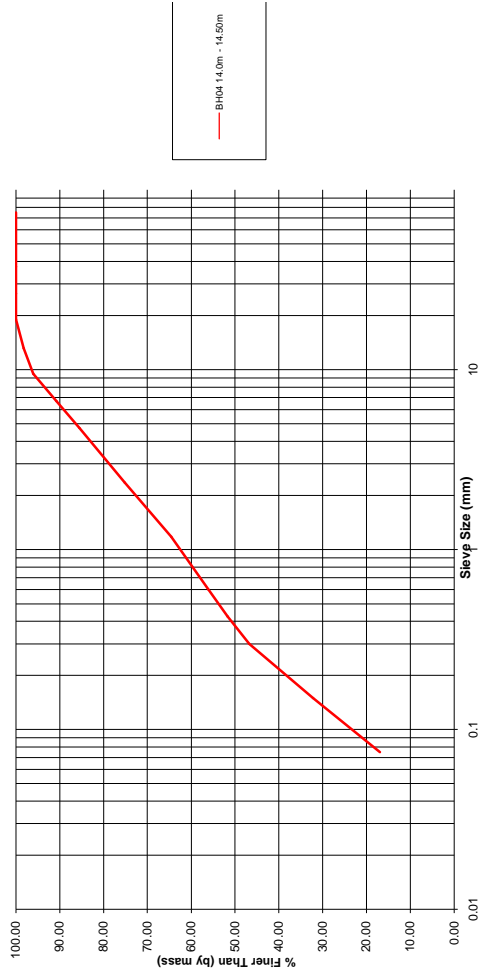
Test Sieve Size mm	Mass of Dry Soil Retained (M _c) g	Corrected Mass g	Percentage Retained = (Mass/M _T) x 100 %	Total Percentage Passing %	Maximum Sieve Load (Sieve Diameter 200mm) g	Sieve Diameter mm
75.0mm	N/A	0.00	100.00			300
50.0mm	N/A	0.00	100.00			300
37.5mm	N/A	0.00	100.00			300
26.5mm	N/A	0.00	100.00			300
19.0mm	N/A	0.00	100.00			200
13.2 mm	4.99	N/A	1.78	98.22	600	300
9.50 mm	6.10	N/A	2.18	96.04	450	300
6.70 mm	14.81	N/A	5.29	90.76	300	300
4.75 mm	14.59	N/A	5.21	85.55	250	200
2.36 mm	29.26	N/A	10.44	75.10	150	200
1.18 mm	29.50	N/A	10.53	64.57	100	200
600 µm	24.05	N/A	8.58	55.99	80	200
425 µm	12.13	N/A	4.33	51.66	70	200
300 µm	13.75	N/A	4.91	46.75	60	200
150 µm	40.80	N/A	14.56	32.19	40	200
75 µm	42.69	N/A	15.24	16.95	25	200
Passing 75 µm	47.49	N/A	16.95	0.00	-	-
Pan Total	280.16	-	100.00	-	-	-

- NOTES: 1) Testing performed on fraction passing/retained on 19mm sieve
2) The percentage passing the finest sieve was obtained by difference

Tested by : RK	Q.A. Checked by : KB	Approved by : IG
Date : 16 October 2015	Date : 25 November 2015	Date : 25 November 2015

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LOCATION: BH04 14.0-14.50m
DATE OF TEST: 16 October 2015
DESCRIPTION: Silty fine SAND with trace of fine subangular gravel, pale brown
SAMPLE No. N.539

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Wet Sieve Analysis
NZS 4407:1991 (Test 3.6.1)

PRINCIPAL :	Japan International Cooperation Agency	PROJECT No. :	1920815
PROJECT NAME :	Geotechnical Engineering Investigation for Nadi River Project Drilling	DATE / :	16 October 2015
SITE ADDRESS :	BH04 Nadi Bridge	TECHNOLOGIST :	RK
SAMPLE LOCATION :	BH04 17.0m - 17.5m	MATERIAL TYPE & LOCATION :	Clayey SILT with trace of gravel fragments and fine sand, dark grey black, stiff, low to medium plasticity
TEST NUMBER :	N 540		

SAMPLE HISTORY : NATURAL / AIR-DRIED / OVEN-DRIED / UNKNOWN

Moisture Content (Material passing 19mm)	Container No.	-	148	161	SPLIT SAMPLE
Mass of Container	g		11.73	11.76	Mass Passing Last Sieve: - gM ₃
Mass of Container + Wet Soil	g		25.00	24.90	Mass after Splitting: - gM ₄
Mass of Container + Dry Soil	g		21.46	21.29	Splitting Factor = $\frac{M_3}{M_4}$
Mass of Dry Soil	g		9.73	9.53	
Mass of Moisture	g		3.54	3.61	
Moisture Content	%		36.38	37.88	
Average Moisture Content	%		37.13		

Total Mass of Dry Sample	Mass of dry sample retained on 19mm test sieve (M ₁)	g	Nil
Total Wet Weight (M _w)	g		303.03
Total Mass of dry sample (M _T)	M _T = $\frac{100M_w}{100 + w}$		
	M _T =	220.98	

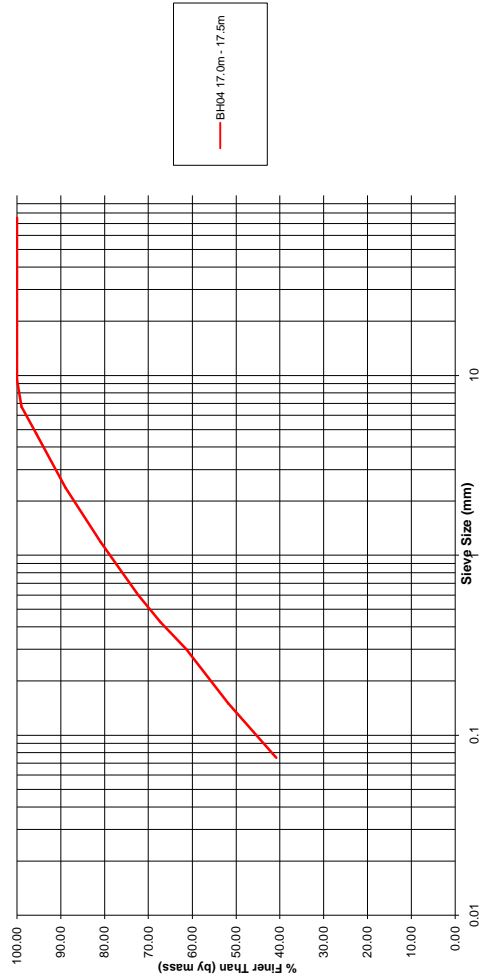
Test Sieve Size mm	Mass of Dry Soil Retained (M _s)	Corrected Mass	Percentage Retained = $\frac{Mass}{M_T} \times 100$	Total Percentage Passing	Maximum Sieve Load (Sieve Diameter 200mm)	Sieve Diameter
	g	g	%	%	g	mm
75.0mm	N/A	N/A	0.00	100.00		300
50.0mm	N/A	N/A	0.00	100.00		300
37.5mm	N/A	N/A	0.00	100.00		300
26.5mm	N/A	N/A	0.00	100.00		300
19.0mm	N/A	N/A	0.00	100.00		200
13.2 mm	N/A	N/A	0.00	100.00	600	300
9.50 mm	N/A	N/A	0.00	100.00	450	300
6.70 mm	2.24	N/A	1.01	98.99	300	300
4.75 mm	7.50	N/A	3.39	95.59	250	200
2.36 mm	14.81	N/A	6.70	88.89	150	200
1.18 mm	17.64	N/A	7.98	80.91	100	200
600 µm	18.92	N/A	8.56	72.35	80	200
425 µm	11.25	N/A	5.09	67.25	70	200
300 µm	12.94	N/A	5.86	61.40	60	200
150 µm	21.31	N/A	9.64	51.76	40	200
75 µm	24.01	N/A	10.87	40.89	25	200
Passing 75 µm	90.36	N/A	40.89	0.00	-	-
Pan Total	220.98	-	100.00	-	-	-

NOTES: 1) Testing performed on fraction passing/retained on 19mm sieve
2) The percentage passing the finest sieve was obtained by difference

Tested by :RK	Q.A. Checked by : KB	Approved by : IG
Date : 16 October 2015	Date : 25 November 2015	Date : 25 November 2015

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BH04 17.0m - 17.5m

DESCRIPTION: Clayey SILT with trace of gravel fragments and fine sand, dark grey black, stiff, low to medium plasticity
SAMPLE No. N540

LOCATION: BH04 17.0m - 17.5m
DATE OF TEST: 16 October 2015

Wet Sieve Analysis
NZS 4407:1991 (Test 3.6.1)

PRINCIPAL : Japan International Cooperation Agency	PROJECT No. : 1920815
PROJECT NAME : Geotechnical Engineering Investigation for Nadi River Project Drilling	DATE / : 16 October 2015
SITE ADDRESS : BH04 Nadi Bridge	TECHNOLOGIST : RK
SAMPLE LOCATION : BH04 26.0-26.5m	MATERIAL TYPE & LOCATION : Silty SAND with trace of gravel, greenish grey, fine to medium, loosely packed, moist
TEST NUMBER : N 544	

SAMPLE HISTORY : NATURAL / AIR-DRIED / OVEN-DRIED / UNKNOWN

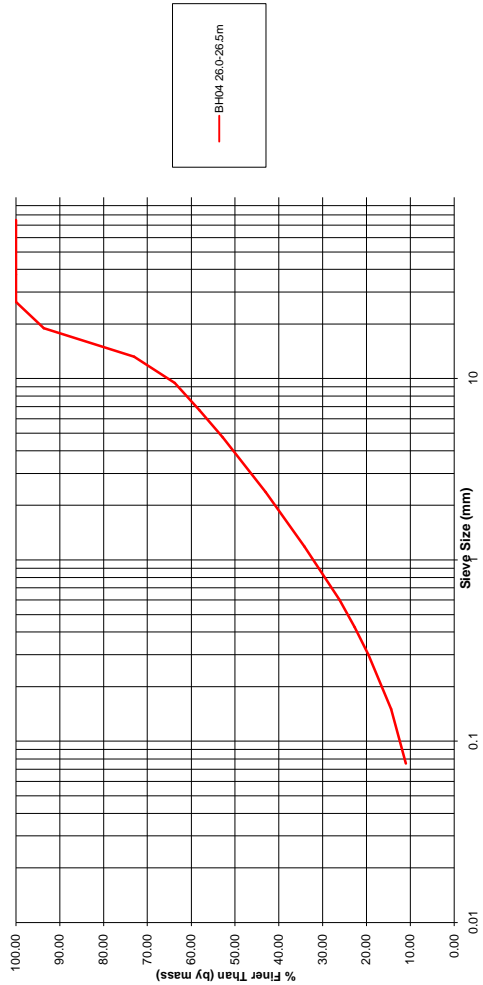
Moisture Content (Material passing 19mm)	Container No.	-	131	132	SPLIT SAMPLE
Mass of Container	g		11.65	11.78	Mass Passing Last Sieve: - gM _s
Mass of Container + Wet Soil	g		19.02	20.00	Mass after Splitting: - gM _w
Mass of Container + Dry Soil	g		17.54	18.46	Splitting Factor $\frac{M_1}{M_2}$
Mass of Dry Soil	g		5.89	6.68	= $\frac{M_1}{M_2}$
Mass of Moisture	g		1.48	1.54	
Moisture Content	%		25.13	23.05	
Average Moisture Content	%		24.09		

Total Mass of Dry Sample	Mass of dry sample retained on 19mm test sieve (M ₁)	g	Nil
Total Wet Weight (M _w)	g		251.57
Total Mass of dry sample (M _T)	M _T = $\frac{100M_w}{100 + w}$		
	M _T =	202.73	

Test Sieve Size mm	Mass of Dry Soil Retained (M _b) g	Corrected Mass	Percentage Retained = (M _{ba} /M _T) x 100 %	Total Percentage Passing	Maximum Sieve Load (Sieve Diameter 200mm) g	Sieve Diameter mm
75.0mm	N/A	N/A	0.00	100.00		300
50.0mm	N/A	N/A	0.00	100.00		300
37.5mm	N/A	N/A	0.00	100.00		300
26.5mm	N/A	N/A	0.00	100.00		300
19.0mm	12.83	N/A	6.33	93.67		200
13.2 mm	41.82	N/A	20.63	73.04	600	300
9.50 mm	18.75	N/A	9.25	63.79	450	300
6.70 mm	11.60	N/A	5.72	58.07	300	300
4.75 mm	10.74	N/A	5.30	52.77	250	200
2.36 mm	19.84	N/A	9.79	42.99	150	200
1.18 mm	17.86	N/A	8.81	34.18	100	200
600 µm	16.38	N/A	8.08	26.10	80	200
425 µm	6.84	N/A	3.37	22.73	70	200
300 µm	6.41	N/A	3.16	19.56	60	200
150 µm	10.44	N/A	5.15	14.41	40	200
75 µm	6.83	N/A	3.37	11.04	25	200
Passing 75 µm	22.39	N/A	11.04	0.00	-	-
Pan Total	202.73	-	100.00	-	-	-

NOTES: 1) Testing performed on fraction passing/retained on 19mm sieve
2) The percentage passing the finest sieve was obtained by difference

Tested by : RK	O.A. Checked by : KB	Approved by : IG
Date : 16 October 2015	Date : 25 November 2015	Date : 25 November 2015



LOCATION: BH04 26.0-26.5m
DATE OF TEST: 16 October 2015
DESCRIPTION: Silty SAND with trace of gravel, greenish grey, fine to medium, loosely packed, moist
SAMPLE No: NS44

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Wet Sieve Analysis
NZS 4407:1991 (Test 3.8.1)

PRINCIPAL : Japan International Cooperation Agency	PROJECT No. : 1920815
PROJECT NAME : Geotechnical Engineering Investigation for Nadi River Project Drilling	DATE / : 16 October 2015
SITE ADDRESS : BH04 Nadi Bridge	TECHNOLOGIST : RK
SAMPLE LOCATION : BH04 29.0m - 29.5m	MATERIAL TYPE & LOCATION : Sandy fine to medium GRAVEL with some silt and coarse gravel
TEST NUMBER : N 546	

SAMPLE HISTORY : NATURAL / AIR-DRIED / OVEN-DRIED / UNKNOWN

Moisture Content (Material passing 19mm)	Container No.	-	36	44	SPLIT SAMPLE
Mass of Container	g	14.10	14.59	Mass Passing Last Sieve:	- gM _s
Mass of Container + Wet Soil	g	31.86	31.28	Mass after Splitting:	- gM _t
Mass of Container + Dry Soil	g	27.95	27.90	Splitting Factor	$\frac{M_1}{M_2}$
Mass of Dry Soil	g	13.85	13.31	=	$\frac{M_2}{M_1}$
Mass of Moisture	g	3.91	3.38		
Moisture Content	%	28.23	25.39		
Average Moisture Content	%	26.81			

Total Mass of Dry Sample	Mass of dry sample retained on 19mm test sieve (M _s)	g	Nil
Total Wet Weight (M _w)	g	251.07	
Total Mass of dry sample (M _t)	M _t =	$\frac{100M_w}{100 + w}$	
	M _t =	197.98	

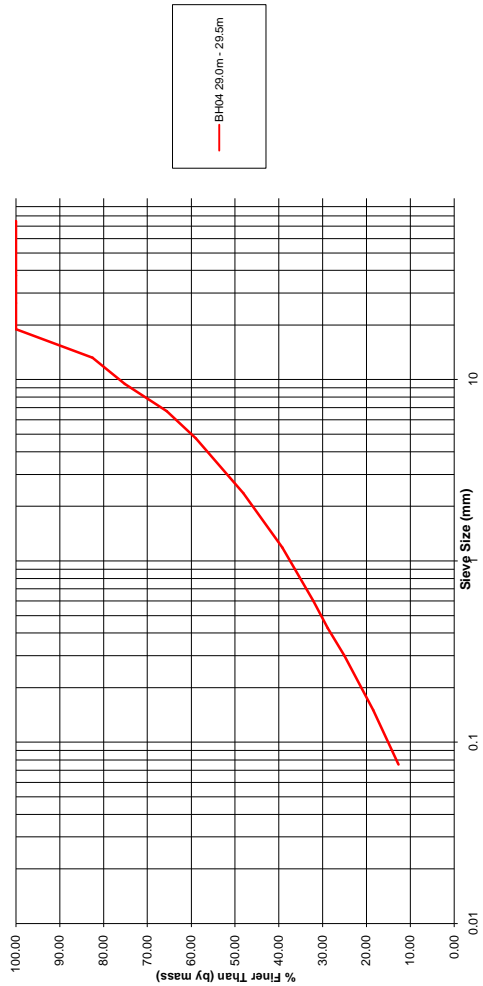
Test Sieve Size mm	Mass of Dry Soil Retained (M _b) g	Corrected Mass	Percentage Retained = (M _b /M _t) x 100 %	Total Percentage Passing %	Maximum Sieve Load (Sieve Diameter 200mm) g	Sieve Diameter mm
75.0mm	N/A	N/A	0.00	100.00		300
50.0mm	N/A	N/A	0.00	100.00		300
37.5mm	N/A	N/A	0.00	100.00		300
26.5mm	N/A	N/A	0.00	100.00		300
19.0mm	N/A	N/A	0.00	100.00		200
13.2 mm	34.52	N/A	17.44	82.56	600	300
9.50 mm	14.67	N/A	7.41	75.16	450	300
6.70 mm	18.85	N/A	9.52	65.64	300	300
4.75 mm	13.30	N/A	6.72	58.92	250	200
2.36 mm	21.41	N/A	10.81	48.10	150	200
1.18 mm	17.58	N/A	8.88	39.22	100	200
600 µm	14.09	N/A	7.12	32.11	80	200
425 µm	6.41	N/A	3.24	28.87	70	200
300 µm	7.53	N/A	3.80	25.07	60	200
150 µm	13.01	N/A	6.57	18.50	40	200
75 µm	11.51	N/A	5.81	12.68	25	200
Passing 75 µm	25.11	N/A	12.68	0.00	-	-
Pan Total	197.98	-	100.00	-	-	-

NOTES: 1) Testing performed on fraction passing/retained on 19mm sieve
2) The percentage passing the finest sieve was obtained by difference

Tested by: RK	Q.A. Checked by: KB	Approved by: IG
Date: 16 October 2015	Date: 25 November 2015	Date: 25 November 2015

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LOCATION: BH04, 29.0m - 29.5m
 DESCRIPTION: Sandy fine to medium GRAVEL with some silt and coarse gravel
 DATE OF TEST: 16 October 2015
 SAMPLE No: N546

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Oedometer Settlement Test


Sample Details  sketch showing specimen location in original sample	Depth	12.5 - 12.9m		
	Description Type	Clayey Gravel		
	Initial Height	L ₀	(mm)	20.0
	Initial Diameter	D ₀	(mm)	50.0
	Initial Weight	W ₀	(gr)	57.0
	Bulk Density	ρ ₀	(Mg/m ³)	1.45
	Particle Density	ρ _s	(Mg/m ³)	2.65

Initial Conditions			
Settlement Input	L _{IP}	(mm)	CH 3
Initial Moisture	ω _i %	(%)	39
Initial Dry Density	ρ _{di}	(Mg/m ³)	1.04
Initial Voids Ratio	e _i	.	1.543
Initial Degree of Saturation	S _i	(%)	67.5
Initial Swelling	S _s	(kPa)	0

Final Conditions			
Final Moisture	ω _f %	(%)	39
Dry Density	ρ _{df}	(Mg/m ³)	1.10
Voids Ratio	e _f	.	1.401
Saturation	S _f	(%)	73
Height Settlement	ΔL _s	(mm)	1.113

Vertical Stress σ' _i (kPa)	Voids Ratio e _f	Height ΔL _s (mm)	Consolidation C _v (m ² /year)	Compressibility m _v (m ² /MN)	Initial T _i (°C)	Final T _f (°C)	t ₅₀ Time t ₅₀ (min)	t ₉₀ Time t ₉₀ (min)	Secondary C _{SEC} (m ² /MN)
100	1.494	0.385	114.6	0.193	29.0	29.0		0.380	0.0087
200	2.839	-10.199	8.2	5.396	29.0	29.0		8.380	0.0087
400	2.838	-10.189	131.0		29.0	29.0		0.772	0.0087
600	1.395	1.162	11116.9	1.880	29.0	29.0		0.006	0.0087
400	2.838	-10.189			29.0	29.0			
200	1.401	1.113			29.0	0.0			

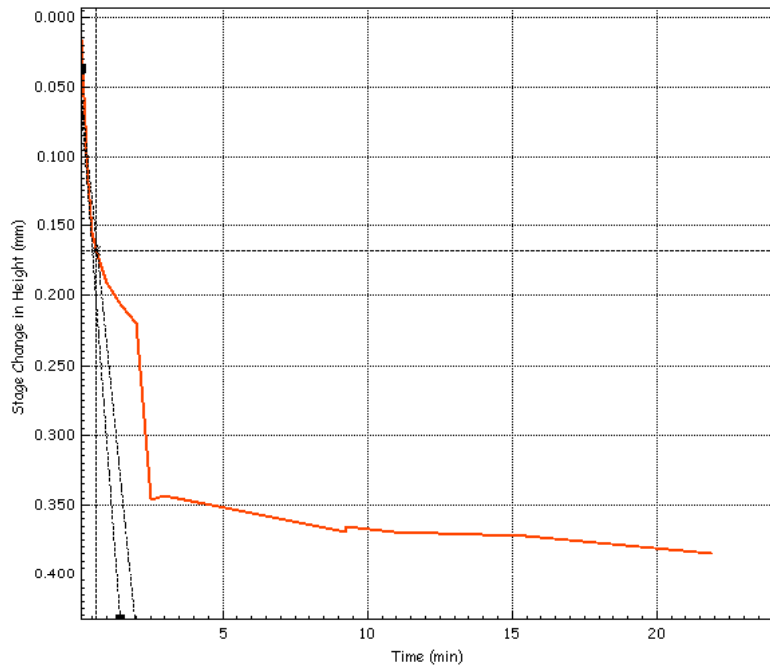
Notes

	Test Method	AS 1289.6.6.1-1998	Test Name	ODO-04_001
	Site Reference	1920815	Database:	.\SQLEXPRESS\ENTEC
	Jobfile	Geotechnical Engineering	Test Date	11/18/2015
	Client	Japan International Cooperation	Sample	N538
	Operator	IG/MK	Borehole	BH04
	Checked	DMC	Approved	DMC

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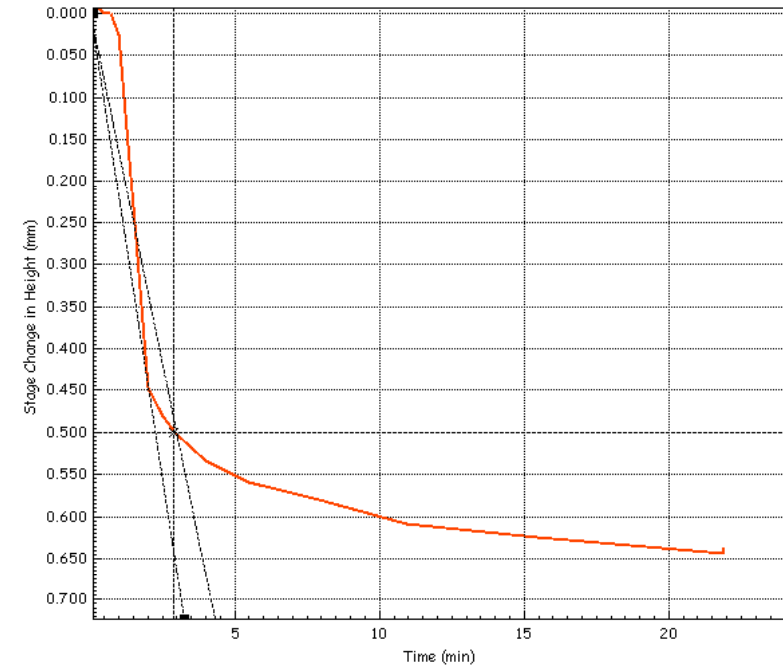
Oedometer Consolidation Settlement Report

Vertical Stress	σ'_{i}	(kPa)	100
Initial Temperature	T_i	(oC)	29.0
Frame Correction	L CORR	(mm)	0.000
Height Settlement	ΔL_s	(mm)	0.385
Voids Ratio	e_f	.	1.494
Final Temperature	T_f	(oC)	29.0
t50 Time	t ₅₀	(min)	
t90 Time	t ₉₀	(min)	0.380
Consolidation	C_v	(m ² /year)	114.6
Compressibility	m_v	(m ² /MN)	0.193
Secondary Compression	C_{SEC}	(m ² /MN)	0.0087



Oedometer Consolidation Settlement Report

Vertical Stress	σ'_{i}	(kPa)	200
Initial Temperature	T_i	(oC)	29.0
Frame Correction	L CORR	(mm)	0.000
Height Settlement	ΔL_s	(mm)	-10.202
Voids Ratio	e_f	.	2.840
Final Temperature	T_f	(oC)	29.0
t50 Time	t ₅₀	(min)	
t90 Time	t ₉₀	(min)	8.380
Consolidation	C_v	(m ² /year)	8.2
Compressibility	m_v	(m ² /MN)	5.397
Secondary Compression	C_{SEC}	(m ² /MN)	0.0087



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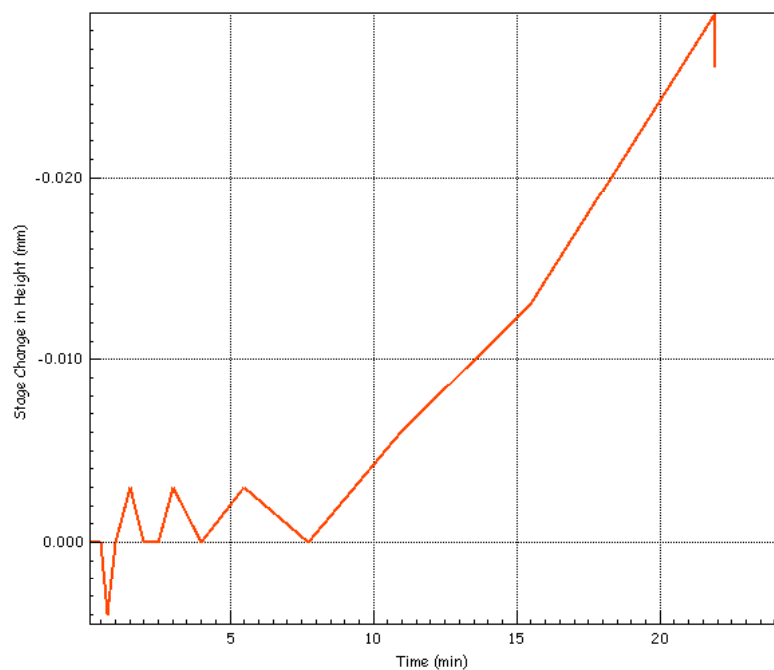
Entec Limited, Level 2 Mid City, Cnr Cumming Street & Renwick Road, Suva

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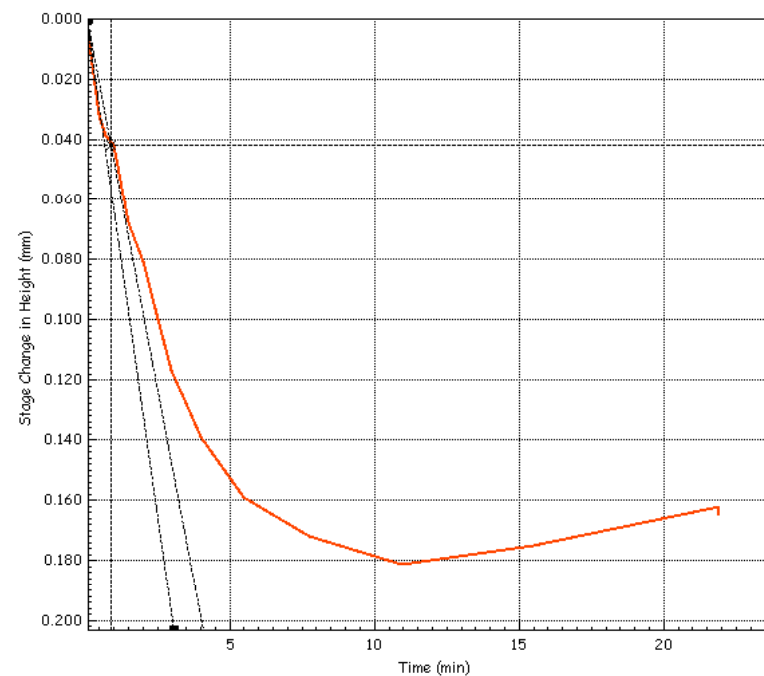
Oedometer Consolidation Settlement Report

Vertical Stress	σ'_{i}	(kPa)	200
Initial Temperature	T_i	(oC)	29.0
Frame Correction	L CORR	(mm)	0.000
Height Settlement	ΔL_s	(mm)	1.113
Voids Ratio	e_f	.	1.401
Final Temperature	T_f	(oC)	0.0
t50 Time	t ₅₀	(min)	
t90 Time	t ₉₀	(min)	
Consolidation	C_v	(m ² /year)	
Compressibility	m_v	(m ² /MN)	
Secondary Compression	C_{SEC}	(m ² /MN)	



Oedometer Consolidation Settlement Report

Vertical Stress	σ'_{i}	(kPa)	400
Initial Temperature	T_i	(oC)	29.0
Frame Correction	L CORR	(mm)	0.000
Height Settlement	ΔL_s	(mm)	-10.189
Voids Ratio	e_f	.	2.838
Final Temperature	T_f	(oC)	29.0
t50 Time	t ₅₀	(min)	
t90 Time	t ₉₀	(min)	0.772
Consolidation	C_v	(m ² /year)	131.0
Compressibility	m_v	(m ² /MN)	
Secondary Compression	C_{SEC}	(m ² /MN)	0.0087



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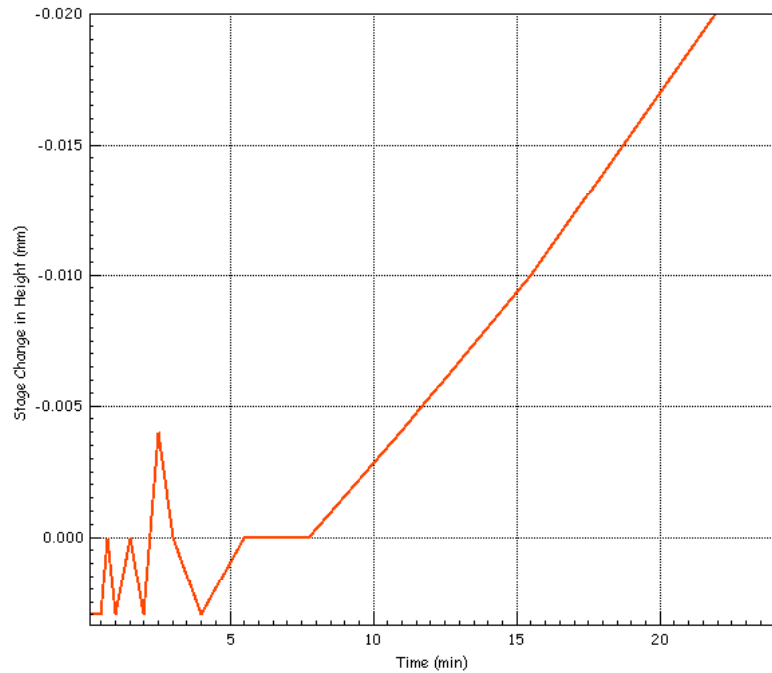
Entec Limited, Level 2 Mid City, Cnr Cumming Street & Renwick Road, Suva

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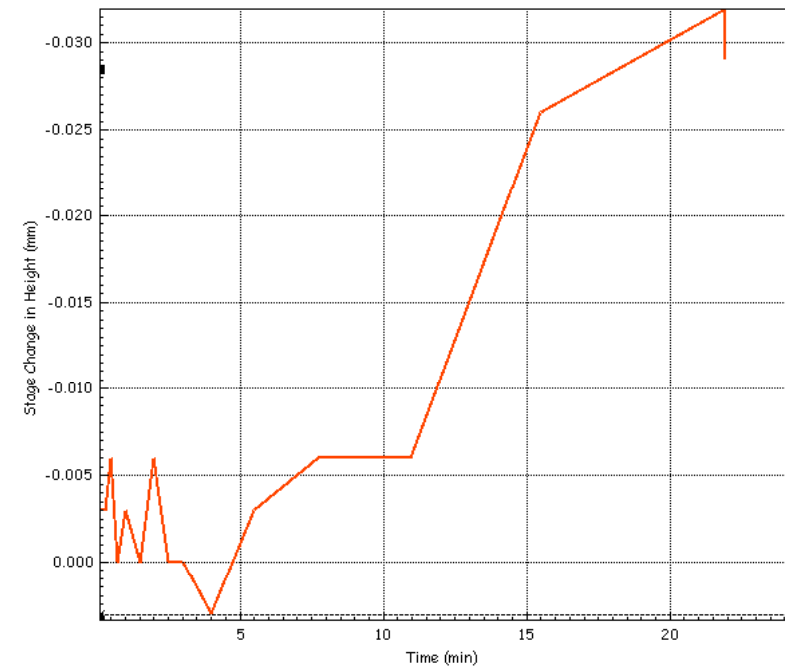
Oedometer Consolidation Settlement Report

Vertical Stress	σ'_{i}	(kPa)	400
Initial Temperature	T_i	(oC)	29.0
Frame Correction	L CORR	(mm)	0.000
Height Settlement	ΔL_s	(mm)	-10.196
Voids Ratio	e_f	.	2.839
Final Temperature	T_f	(oC)	29.0
t50 Time	t ₅₀	(min)	
t90 Time	t ₉₀	(min)	
Consolidation	C_v	(m ² /year)	
Compressibility	m_v	(m ² /MN)	
Secondary Compression	C_{SEC}	(m ² /MN)	



Oedometer Consolidation Settlement Report

Vertical Stress	σ'_{i}	(kPa)	600
Initial Temperature	T_i	(oC)	29.0
Frame Correction	L CORR	(mm)	0.000
Height Settlement	ΔL_s	(mm)	1.162
Voids Ratio	e_f	.	1.395
Final Temperature	T_f	(oC)	29.0
t50 Time	t ₅₀	(min)	
t90 Time	t ₉₀	(min)	0.006
Consolidation	C_v	(m ² /year)	11118.2
Compressibility	m_v	(m ² /MN)	1.880
Secondary Compression	C_{SEC}	(m ² /MN)	0.0087



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