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Page

## TEST REPORT

(This report is issued subject to the conditions set out overleaf)

## SUBSURFACE INVESTIGATION WORKS FOR JELUTONG REHABILITATION AND RECLAMATION AT JELUTONG, PENANG.

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## SUBSURFACE INVESTIGATION WORKS FOR JELUTONG REHABILITATION AND RECLAMATION AT JELUTONG, PENANG.

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## SUBSURFACE INVESTIGATION WORKS FOR JELUTONG REHABILITATION AND RECLAMATION AT JELUTONG, PENANG.

### 1. INTRODUCTION

This report presents the result of the subsurface exploration for **Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.**

The work was carried out in accordance with the drawings and specifications given by the Personnel of **Messrs. PLB Engineering Sdn. Bhd.** The site investigation works was carried out accordance to the British Standard Code of Practice BS 5930: 1999 “Code Practice for Site Investigation” and laboratory tests as per BS 1377: 1990 or otherwise instructed by the client or mentioned in this report.

### 2. SCOPE OF WORK

The scope of works involved in this investigation includes the following: -

- a. To explore the subsurface condition of proposed development area and to provide general data relating to the project.
- b. To carry out Standard Penetration Test (SPT – 63.5kg hammer having a free fall of 760mm) to determine the natural bearing resistance of the subsoil.
- c. To obtain disturbed and undisturbed soil samples for carrying out the laboratory tests to determine the natural and relevant physical properties of the subsoil pertaining to the site.
- d. To carry out Field Vane Shear Test to measure the in-situ shear strength of the soil.
- e. To carry out Cone Penetration Test to determine the Engineering Parameters of the existing soil.

### 3. FIELD EXPLORATION

#### 3.1 GENERAL

Field exploration programme was conducted during the period of **7<sup>th</sup> December 2022 to 24<sup>th</sup> February 2023.** The programme was supervised by our personnel from our office.

The exploration of works involved in this investigation includes:

- a) Nine (9) numbers of **Borehole**
- b) Six (6) numbers of **Vane Shear Test**
- c) Three (3) numbers of **Cone Penetration Test**

to be done for the design of the foundation for the proposed project.

#### 3.2 DEEP BORING

##### 3.2.1 Deep Boring Equipment

The Boring equipment used was “Rotary Drilling Rig” which is capable of boring and drilling to the depth about 120 meters. These boring rigs are also suitable for advancing the borehole, sampling, in-situ testing and rock drilling in accordance with the relevant specifications of each of these operations.

### 3.2.2 Method of Advancing Boreholes

Soil drill was carried out by the rotary action of drill bit attached to the bottom of a hollow rod, which cuts/discharges all material within the diameter of borehole washed to the ground surface by drilling fluid pumped down the drilling rod. Normally the drill bit is rarely allowed to extend more than 150mm ahead of the bottom of the casing (if casing is used). Advancing of the borehole is using drill rods with suitable drill bit and casing or where permitted, proper drilling fluids. Advancing of the borehole will be such that the disturbance to and contamination of the soil(s) immediately below the borehole will be kept to minimum.

Casing was required in the soft or cohesionless soils, but is often omitted in stiff, cohesive soils when only small representative samples are desired.

### 3.2.3 Sampling in Boreholes

#### 3.2.3.1 Disturbed Sample

Disturbed samples may be obtained by any means as long as the soil sample obtained is representative and unchanged in the constituent contents. After the completion of the test, the sampler tube is removed and disassembled to provide ‘disturbed’ but representative samples.

Disturbed samples were taken from continuous sampling and split barrel samples in conjunction with penetration resistance tests for purpose of laboratory soil classification.

Disturbed samples were normally preserved immediately after being recovered in doubled layered heavy polyethylene bags sealed to form an airtight bag. Properly contained samples were stored under a shelter away from the sun and rain.

#### 3.2.3.2 Undisturbed Sample

Undisturbed samples were taken with thin-wall tube sampler or stationary piston sampler as according to the site conditions or as directed. The minimum internal diameter of the tube used was 75mm and the minimum length of the tube was 1000mm.

A minimum of 10.0mm of undisturbed materials was removed from the top and the bottom of the tube to take up a jar sample for both the top and bottom. Subsequent to the penetration of these samples, both ends of the sample will be coated with a non-shrinking wax to ensure airtight seal. The void at the top and bottom of the tube was then filled.

### 3.2.4 Retention and Disposal of Samples

All samples shall be kept for a period of not less than 6 months and shall be discarded after the submission of the approved report.

### 3.2.5 Measurement of Sea Water Level

The measurement of sea water level at each boreholes was done using 30 meter measuring tape. The measuring tool will be lowered from top of working platform until reached the surface of sea water. The level was taken during the drilling process and was recorded in the borehole log.

The observation levels may not necessarily be the actual levels which is depend on the sea water tide fluctuations from time to time.

### 3.3 FIELD TESTING

#### 3.3.1 Standard Penetration Test

Standard Penetration Tests (SPT) was carried in accordance with BS 1377-9:1990, 3.3. ‘Determination of the penetration resistance using a split barrel sampler and a self-tripping hammer of approved design’.

Generally, is carried out in all types of soil except the very soft and soft clays, at 1.5m intervals or change of strata or as instructed by the S.O. representative. In case of soft clay, vane shear test shall be carried out instead of the SPT.

The value of the N as defined in the B.S. method was reported together with the number of blow counts for each 75mm penetration of the sampling tube. The blow counts for the first 150mm penetration (the seating drive) which do not contribute the value of N was also included.

Two examples are 2,3,6,7,10,19 will give  $N= 42$  and 10,12,35 15/25mm will give  $N= 50/100\text{mm}$ . When a penetration resistance of 50 blows or 150mm penetration was encountered in a seating drive, the test would stop and the SPT value would be  $N^*= 50/150\text{mm}$ . The soil samples recovered from the split barrel were preserved as disturbed samples as disturbed samples for subsequent testing.

#### 3.3.2 Field Vane Shear Test

Vane test shall be carried out in accordance to BS 1377: 1990 “Determination of shear strength in the field by the vane test. The field vane shear test gives values of the consolidated undrained shear strength of the soil on site. In general it shall be carried out in very soft to stiff non-fissured cohesive soils. Each operation shall include the determination of both the undisturbed and remoulded strength.

The vane is forced into the ground either from the ground surface or from the bottom of a borehole. For penetration vane testing, the vane is housed in a protective shoe to protect it from damage by stones or obstructions. At the desired depth, the vane is pushed a short distance out of the housing into the undisturbed soil by means of the torque rod, which runs inside the extension tube to the surface. Once the vane is in position, a torque is applied through the extension rod.

The readings were converted to  $\text{kN}/\text{m}^2$  by using the calibration graph attached in **Appendix C**. The dimension of the vane used was 65.00mm diameter and 130.00mm in length. The final results,  $S_u$ , of various depths were presented in **Appendix C - Vane Shear Test Results**.

### 3.4 CONE PENETRATION TEST

The equipment used for the piezocone test follows the British Standard Code of Practice BS 1377: Part 9: 1990 and the International Reference Test Procedure for the Cone Penetration Test (CPT).

The cone has transducers to measure cone resistance, local friction, water pressure and uniaxial inclination. Cones are calibrated by manufacturer. A filter element (Polypropylene) with diameter 35mm one size located in the cylindrical extension above the base of the cone allows the pore water pressure generated during the penetration to be measured by means of a pressure transducer located in the piezometer tip ( $u_2$  type cone). In order to ensure that pore pressure measurements are not affected by the presence of air in the measuring transducer, a de-airing procedure is carried out as required. The filters are saturated by de-aired silicon or glycerin. A new filter is recommended for each sounding location. Please note that following the initial de-airing procedure, it will only be repeated if the cone is removed from the water into air, or at the beginning of each working day, whichever is first.

The data acquisition system is Geomil's GME 500 acquisition system. Signals from the cone are transmitted to the GME 500 system via a cable threaded through the sounding tubes. Depth registration is provided by an event marker activated via the action of the hydraulic rams. The equipment provides:

- a. A continuous listing (10 mm interval) of all measured parameters (cone resistance, local friction, pore water pressure and inclination) recorded inside computer memory.
- b. Graphical presentation of measured parameters at any scale required.
- c. Resolution of the measured parameter is:-

Cone resistance	:	0.01 Mpa
Local friction	:	0.1 kPa
Pore water pressure	:	1 kPa
Inclination	:	0.1 degrees

The jacking unit is a 100 KN twin cylinder hydraulic ram with 120 KN upward forces. The jacks, data acquisition and all accessories are mounted on a self-propelled crawler chassis. The total weight of the unit is approximately 20 ton, additional reaction can be provided by screw anchors installed using a hydraulic turning device.

#### **4. LABORATORY TESTING**

Both disturbed and undisturbed samples were obtained at various depths and at every change of soil strata for the purpose of identification, classification and testing. The following laboratory tests were carried out in our laboratory in accordance with the British Standard Code 1377: 1990.

The tests consisted of:-

1. Soil Classification Test
  - a. Natural Moisture Content
  - b. Bulk and Dry Density
  - c. Particles Size Distributions.
  - d. Atterberg Limits Determination.
2. Consolidated Undrained Triaxial Compression Test
3. Unconsolidated Undrained Triaxial Test
4. Unconfined Compressive Strength Test (UCT)
5. One Dimensional Consolidation Test
6. Direct Shear Box
7. Point Load Test
8. Uniaxial Compression Strength Test On Rock
9. Chemical Test
  - a. PH Test
  - b. Organic Matter Content
  - c. Sulphate Content
  - d. Chloride Content
  - e. Carbonate Content

The results of the laboratory soil test are summarised in the Summary of Laboratory Test Result as presented in **Appendix E**.

##### **4.1 SOIL CLASSIFICATION TEST**

Soil Classification Test was conducted in accordance to BS: 1377. Soil Classification Test was determined of basic physical properties. The tests are required for the classification of soil in accordance with BS 5930. The test was included as follow:-

###### **4.1.1 Natural Moisture Content**

Moisture content and dry density determination were performed on numerous samples in order to provide an identification of the relevant strength of the samples and for correlation of sample type.

###### **4.1.2 Bulk and Dry Density**

This test follows BS 1377: Part 2: 1990 Method 7. The bulk density of a soil is the mass per unit volume of the soil including any water it contains, expressed in Mg/m<sup>3</sup>. The linear measurement method 7.2 was used in this project for sample obtained from undisturbed sampling method.

#### 4.1.3 Particle Size Distribution.

A sieve analysis consists of shaking the soil through a stack of wire screens with opening of known sizes: the definition of particle diameter for a sieve test is, therefore, the side dimensions of a square hole. The hydrometer method is based on Stokes equation for the velocity of a freely falling sphere: the definition of particle diameter for hydrometer test is, therefore the diameter of a sphere of the same density, which falls at the same velocity, as the particle in question. The test procedure, which should be followed, depends on the soil in question. If nearly all the grains are so large that they cannot pass through the square openings at 0.074mm (No. 200 screen), the sieve analysis is preferable. For those soils, which are nearly all finer than a No. 200 screen, the hydrometer test is recommended. Grained size analysis has been widely used as a mean for identification and classification of soils.

#### 4.1.4 Atterberg Limit

Atterberg Limit Determination Test was conducted in accordance to BS: 1377: Part 2: 1990 Test 4 & 5. The Liquid & Plastic Limit was determined to furnish basis for the classification and identification of fine-grained cohesive soils. The liquid limit defines the boundary between the liquid and plastic states. It is the water content at which the soil has such smaller shear strength that it flows to close groove of standard width (13mm) when jarred in a specific manner. The plastic limit defines the boundary between the plastic and semi-solid states; it is the water content at which the soil begins to crumble when rolled into threads of specific size (3mm). The amount of water which must be added to change a soil from its plastic limit to its liquid limit is measured by the “Plasticity Index” which is equal to the liquid limit minus the plastic limit. The “natural” moisture content at the time of testing was also presented in the data.

### 4.2 CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST

Consolidated Undrained Triaxial Compression Test with pore water pressure measurements is carried out according to BS 1377: part 8, Method 3, 4, 5, 6 and 7. Testing is carried out on either a set of 3 x 38mm, x 50mm, or 70mm, diameter specimens whichever is specified. The test procedure involves the successive saturation, consolidation and shearing stages of each of the three specimens.

### 4.3 UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST

The Triaxial Test without measurement of pore-water pressure is carried out in accordance with BS: 1377:1990 using cylindrical soil specimen of diameter 38mm and height 76mm. The sample is fitted between solid end caps so that drainage is prevented. After the all-round cell pressure has been established. The axial load increased is applied immediately. The increase in deviator stress is fairly rapid, allowing no dissipation of pore water pressure and since no drainage is allowed and no pore pressure measurements are taken, the results can only be expressed in terms of total stress. The duration of the test will be about 10 to 15 minutes. Mohr's circles using the major and minor principle stresses are then plotted on graph of shear stress versus normal stress and the Undrained apparent cohesion C and the angle of shearing resistance,  $\phi'_c$ , determined.

### 4.4 UNCONFINED COMPRESSION STRENGTH TEST

Unconfined Compression Strength Test (UCT) is carried out according to BS1377:1990: Part 7 which a cylindrical specimen of cohesive soil is subjected to a steadily increasing axial compression until failure occurs. The test normally performed on 30mm diameter specimens or the specimens up to 100mm diameters. The test provides an immediate approximate value of the compressive strength of the soil, either in the undisturbed or the remoulded condition. It is suitable only for saturated, non-fissured cohesive soils.

#### 4.5 ONE DIMENSION CONSOLIDATION TEST

The odometer consolidation test is used for the determination of the consolidation characteristics of soil of low permeability. Two parameters normally required are:-

The compressibility of the soil (expressed in terms of the coefficient of volume change) which is measure of the amount by which the soil will compress when loaded and allowed consolidating.

The time related parameter (expressed in terms of coefficient of consolidation) which indicates the tare of compression and hence the time period over which consolidation settlement will take place.

The test is carried out by applying a sequence of five vertical loading and two unloading to laterally confined specimen having a height of 20mm, and 50mm diameter. The vertical compression under each load is observed over a period of time. Since no lateral deformation is allowed, it is a One Dimensional Test, from which the One Dimensional Consolidation parameter are derived, other parameters that are determined from the test are the pre-compressions stress,  $P_c$  and compressions index  $C_c$ .

#### 4.6 DRAINED DIRECT SHEAR BOX

Shear strength is determined either by measuring the shearing force causing failure (direct shear tests), or by derivation from the measured compressive strength (unconfined or triaxial compression tests). The test specimen is consolidated under a vertical normal load until the primary consolidation is completed. It is then sheared at a rate of displacement that is slow enough to prevent development of excess pore pressures. Test data enable the effective shear strength parameters  $c'$  and  $\phi'$  to be derived. The residual shear strength parameters  $c' R$ , and  $\phi' R$  can be obtained by extending the tests to give large cumulative displacements by reversals and re-shearing.

#### 4.7 POINT LOAD TEST

Point load test is an indirect method to determine uniaxial compressive strength (UCS) of a sample. Sample is placed in between conical steel platens and loaded under compression. Using correlation  $UCS \approx 20 \times I_s$  (ISRM, 1985), point load strength is converted to uniaxial compressive strength. Equipment used is ELE (England) Point Load apparatus. Testing procedures are as ISRM (1985) and samples tested were irregular blocks of suitable size.

#### 4.8 UNAXIAL COMPRESSIVE STRENGTH TEST ON ROCK

Uniaxial compressive strength test of intact rock often needed properties in engineering designs of structures in rock. The test is carried out on intact rock with no discontinuities and yields data on the rock materials properties. The length to diameter ratio of 2:1 is a minimum for cylinders.

## 4.9 CHEMICAL TEST

Chemical Test was conducted in accordance to BS: 1377: Part 3: 1990. The test was included as follow:-

### 4.9.1 PH Test

The PH Test was carried out in accordance with BS: 1377: Part 3 :1990 to determine the PH value by electrometric method, which gives direct reading of the pH value of a soil suspension water.

### 4.9.2 Organic Matter Content

The organic matter content is carried out in accordance with BS: 1377: Part 3: 1990. The procedure covers the determination of the percentage by dry mass of organic matters present in soil. The method, which uses dichromate oxidation, is known as Walkley and Black's method.

### 4.9.3 Sulphate Content

The sulphate content test is carried out in accordance with BS: 1377: Part 3: 1990. The procedures for determining the sulphate content of soil and ground water. The results obtained give the sulphate content at the time of sampling only. There are two methods for determining the sulphate contents of aggregate either water-soluble sulphate content or total sulphate content.

### 4.9.4 Chloride Content

The chloride content test is carried out in accordance with BS: 1377: Part 3: 1990. The test was carried out for determination of water-soluble and acid-soluble chloride salt content in soil. Both procedures are based on Voldard's Method.

### 4.9.5 Carbonate Content

The carbonate content test is carried out for determination of carbonate content of the soil. The test depends upon the reaction between carbonate and hydrochloric acid, which liberates carbon dioxide. The percentage carbonate in the soil sample expressed as CO<sub>2</sub>. The test was carried out by using rapid titration method as stated in BS: 1377: Part 3: 1990 (Clause 6).

## 5. COMMENTARY

The classification of the soil as represented in the report follows the BS 5930: 1999 Section 6 'Description of soil and rocks'.

It must be pointed out that, where the description of the samples from the laboratory results differ from the field description of the soil layers, the laboratory results was supplemented and in some instances, superseded the field description. The report is limited to the representation of the soil information data gathered from the field works and laboratory test results. It should be noted that natural moisture content and the ground level are subjected to seasonal variation and the drainage condition of the adjoining areas.

With this site investigation report will give part of the information to enable the designer to decide and design the foundation system of the proposed project.



The interpretation of the results of the investigation and the final decision on the type of foundation to adopt, rest with the Engineer.

Should there be any questions regarding our work, we should be pleased to discuss them with you.

Prepared by,

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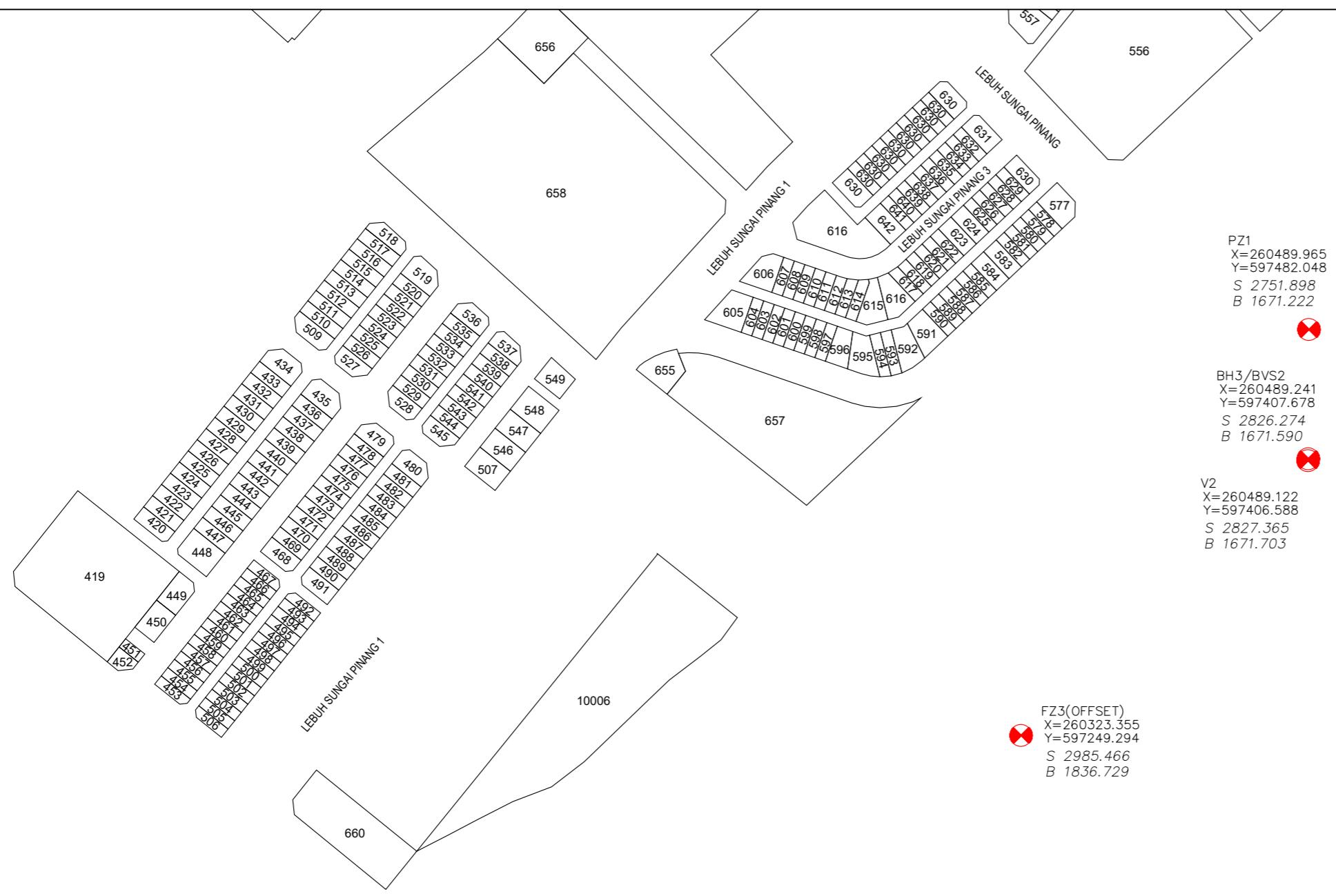
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## APPENDIX A

*Site Plan*





## APPENDIX B

*Engineering Logs*



## Borehole



Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang. Borehole No. : BH1  
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Customer : <b>Messrs. PLB Engineering Sdn. Bhd.</b>		Job No. : <b>GLSB/SI/3971-155/2022</b>
Date Started : 14/12/2022	Coordinate, E : -1414.853	N: -2644.089 Seawater Level (m) : 11.50 m
Date Completed : 19/12/2022	Platform Elevation	: 2.006 mRL Boring Diameter : 75mm to 125mm
Final Depth : 60.45 m	Seabed Elevation	: -11.494 mRL Type of Boring : Rotary Wash Boring

Elevation	Legend	Soil Description and Lithology Jackup Platform Height From Seabed = 13.50 m	Sample			Standard Penetration Test								Remarks
			Sample Ref.	Depth (m)	Recovery Ratio	75 mm	75 mm	75 mm	75 mm	75 mm	75 mm	75 mm	'N' Value	
-11.494		Sea water												
-11.494		Top soil.												
-12.994		Very loose, light brown, Silty/Clayey SAND.	P1/ D1	1.50 to 1.95	180/450	0	1	0	0	1	0	0	1	
-14.494		Very loose, dark grey with medium brown mottled, Very Clayey SAND of Low Plasticity.	P2/ D2	3.00 to 3.45	450/450	0	0	0	0	1	1	1	2	
-15.994		Light brown, Very Silty/Clayey SANDS. S1&S2 - Very Clayey SAND of Intermediate Plasticity. S3 - Very Silty/Clayey SANDS.	UD1	4.50 to 5.50	950/1000									
-17.494		No recovery.	P3	6.00 to 6.45	NIL/450	1	2	1	2	1	2	2	6	
-18.994		Medium dense, light brown, clayey fine to medium SAND.	P4/ D3	7.50 to 7.95	450/450	2	3	3	3	4	4	4	14	
-20.494		Loose, light brown, clayey fine to medium SAND.	P5/ D4	9.00 to 9.45	400/450	2	1	2	1	2	2	2	7	
-21.994		Loose, light brown, Very Clayey SAND of Low Plasticity.	P6/ D5	10.50 to 10.95	400/450	1	1	1	2	1	2	1	6	

<u>Water Observation</u>				
Date	Time	Depth	Casing	Sea W.L.

Scale of Strength			
Cohesive Soil	Non-Cohesive		
0 - 2	Very soft	0 - 4	Very loose
2 - 4	Soft	4 - 10	Loose
4 - 8	Firm	10 - 30	Medium dense
8 - 15	Stiff	30 - 50	Dense
15 - 30	Very stiff	> 50	Very dense
> 30	Hard		

<u><b>Legend</b></u>	
D	: Disturbed Sample
UD	: Undisturbed Sample
(UD)	CL : Cored Length
	TCR : Total Cored Recovery
	RQD : Rock Quality Designation
	V : Vane Shear Test
	Pm : Permeability Test
est	Pr : Pressuremeter Test



Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang. Borehole No. : BH1  
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Customer : <b>Messrs. PLB Engineering Sdn. Bhd.</b>		Job No. : <b>GLSB/SI/3971-155/2022</b>
Date Started : 14/12/2022	Coordinate, E: -1414.853	N: -2644.089 Seawater Level (m) : 11.50 m
Date Completed : 19/12/2022	Platform Elevation	: 2.006 mRL Boring Diameter : 75mm to 125mm
Final Depth : 60.45 m	Seabed Elevation	: -11.494 mRL Type of Boring : Rotary Wash Boring

Elevation	Legend	Soil Description and Lithology <i>Jackup Platform Height From Seabed = 13.50 m</i>	Sample			Standard Penetration Test								Remarks
			Sample Ref.	Depth (m)	Recovery Ratio	75 mm	75 mm	75 mm	75 mm	75 mm	75 mm	75 mm	'N' Value	
-23.494		Loose, pale to light brown, clayey fine to medium SAND.	P7/D6	12.00 to 12.45	450/450	1	2	1	2	2	2	2	7	
-24.994		Stiff to very stiff, pale to light brown, very sandy CLAY.	P8/D7	13.50 to 13.95	450/450	3	2	3	4	3	5	5	15	
-25.994		Pale brown, Sandy CLAY of Intermediate Plasticity.	UD2	14.50 to 14.90	400/400									
-26.494		S1 - Sandy CLAY of Intermediate Plasticity. Medium dense, pale to light brown, clayey fine to medium SAND.	P9/D8	14.90 15.00 to 15.45	400/450	3	4	4	3	5	6	6	18	
-27.994		Medium dense, light brown, very clayey fine to medium SAND.	P10/D9	16.50 to 16.95	420/450	2	4	5	5	5	6	6	21	
-29.494		Stiff, light brown, Sandy CLAY of Low Plasticity.	P11/D10	18.00 to 18.45	400/450	2	3	3	4	3	3	3	13	
-30.994		Medium dense, light brown, clayey fine to medium SAND.	P12/D11	19.50 to 19.95	450/450	3	2	3	3	5	5	5	16	
-32.494		Medium dense, light brown, very clayey fine to medium SAND.	P13/D12	21.00 to 21.45	440/450	2	2	2	3	3	3	3	11	
-33.994		Medium dense, light brown, very clayey fine to medium SAND.	P14/D13	22.50 to 22.95	410/450	3	3	4	2	5	5	5	16	
-35.494		Stiff, light brown, Sandy CLAY of Low Plasticity.	P15/D14	24.00 to 24.45	450/450	3	3	3	3	2	3	3	11	

<u>Water Observation</u>				
Date	Time	Depth	Casing	Sea W.L

Scale of Strength			
Cohesive Soil	Non-Cohesive		
0 - 2	Very soft	0 - 4	Very loose
2 - 4	Soft	4 - 10	Loose
4 - 8	Firm	10 - 30	Medium dense
8 - 15	Stiff	30 - 50	Dense
15 - 30	Very stiff	> 50	Very dense
> 30	Hard		

<u>Legend</u>		
D	:	Disturbed Sample
UD	:	Undisturbed Sample
e (UD)	CL	: Cored Length
	TCR	: Total Cored Recovery
	RQD	: Rock Quality Designation
	V	: Vane Shear Test
	Pm	: Permeability Test
est	Pr	: Pressuremeter Test



Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.								Borehole No. : BH1				
								Pages 3 of 5				
Customer : Messrs. PLB Engineering Sdn. Bhd.						Job No. : GLSB/SI/3971-155/2022						
Date Started : 14/12/2022	Coordinate, E: -1414.853 N: -2644.089			Seawater Level (m) : 11.50 m								
Date Completed : 19/12/2022	Platform Elevation : 2.006 mRL			Boring Diameter : 75mm to 125mm								
Final Depth : 60.45 m	Seabed Elevation : -11.494 mRL			Type of Boring : Rotary Wash Boring								
Elevation	Legend	Soil Description and Lithology <i>Jackup Platform Height From Seabed = 13.50 m</i>	Sample			Standard Penetration Test						Remarks
			Sample Ref.	Depth (m)	Recovery Ratio	75 mm	75 mm	75 mm	75 mm	75 mm	75 mm	
-36.494		No recovery.	UD3	25.00 to 25.30	NIL/300							
-37.494		Medium dense, light brown, clayey fine to medium SAND.	P16/D15	26.00 to 26.45	300/450	3	3	3	3	4	13	
-38.494		Medium dense, light brown, clayey fine to medium SAND.	P17/D16	27.00 to 27.45	300/450	1	2	2	3	4	13	
-39.994		Medium dense, light brown, Very Clayey SAND of Low Plasticity.	P18/D17	28.50 to 28.95	390/450	3	4	3	3	5	14	
-41.494		Stiff, light brown, very sandy CLAY.	P19/D18	30.00 to 30.45	450/450	2	2	2	3	3	11	
-42.994		Very stiff, light brown, very sandy CLAY.	P20/D19	31.50 to 31.95	370/450	3	4	3	4	4	16	
-44.494		Medium dense, light brown, very clayey medium SAND.	P21/D20	33.00 to 33.45	360/450	3	2	4	4	3	16	
-45.994		Firm to stiff, pale to light brown, Sandy CLAY of Intermediate Plasticity.	P22/D21	34.50 to 34.95	425/450	2	2	2	2	2	8	
-47.494		Medium dense, pale grey, coarse SAND.	P23/D22	36.00 to 36.45	300/450	2	3	3	3	5	14	
-48.994		Medium dense, pale grey, coarse SAND.	P24/D23	37.50 to 37.95	255/450	3	4	3	5	5	17	
Water Observation					Scale of Strength				Legend			
Date	Time	Depth	Casing	Sea W.L	Cohesive Soil	Non-Cohesive						
					0 - 2 2 - 4 4 - 8 8 - 15 15 - 30 > 30	Very soft Soft Firm Stiff Very stiff Hard	0 - 4 4 - 10 10 - 30 30 - 50 > 50	Very loose Loose Medium dense Dense Very dense	: Wash Boring UD : Split Spoon Sample CL : Thin Wall Tube Sample (UD) TCR : Piston Sample (Ps) RQD : Maizer Sample (M) Pm : Rock Corer Sample V : Water Level (WL) Pr : Standard Penetration Test	D : Disturbed Sample UD : Undisturbed Sample CL : Cored Length TCR : Total Cored Recovery RQD : Rock Quality Designation V : Vane Shear Test Pm : Permeability Test Pr : Pressuremeter Test		



Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang. Borehole No. : BH1  
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Customer : <b>Messrs. PLB Engineering Sdn. Bhd.</b>		Job No. : <b>GLSB/SI/3971-155/2022</b>
Date Started : 14/12/2022	Coordinate, E: -1414.853	N: -2644.089 Seawater Level (m) : 11.50 m
Date Completed : 19/12/2022	Platform Elevation	: 2.006 mRL Boring Diameter : 75mm to 125mm
Final Depth : 60.45 m	Seabed Elevation	: -11.494 mRL Type of Boring : Rotary Wash Boring

Elevation	Legend	Soil Description and Lithology Jackup Platform Height From Seabed = 13.50 m	Sample			Standard Penetration Test								Remarks
			Sample Ref.	Depth (m)	Recovery Ratio	75 mm	75 mm	75 mm	75 mm	75 mm	75 mm	75 mm	'N' Value	
-50.494		Stiff, pale to light brown, sandy CLAY.	P25/ D24	39.00 to 39.45	450/450	2	3	2	2	3	3		10	
-51.994		Medium dense, pale to light grey, clayey very fine SAND.	P26/ D25	40.50 to 40.95	400/450	1	2	2	2	4	7		15	
-53.494		Medium dense, pale to light grey, Very Silty Clayey SANDS.	P27/ D26	42.00 to 42.45	320/450	6	7	10	8	10	11		39	
-54.994		Medium dense, pale to light grey, clayey very fine SAND.	P28/ D27	43.50 to 43.95	395/450	5	4	2	2	4	6		14	
-56.494		Medium dense, pale to light grey, clayey very fine SAND.	P29/ D28	45.00 to 45.45	320/450	10	9	10	9	8	8		35	
-57.994		Loose to medium dense, light brown, clayey very fine SAND.	P30/ D29	46.50 to 46.95	310/450	2	3	3	3	2	2		10	
-59.494		Dense, light brown, clayey very fine SAND.	P31/ D30	48.00 to 48.45	360/450	3	4	8	9	11	13		41	
-60.994		Medium dense, light brown, clayey very fine SAND.	P32/ D31	49.50 to 49.95	405/450	2	1	2	3	4	6		15	
-62.494		Medium dense, light brown, clayey very fine SAND.	P33/ D32	51.00 to 51.45	375/450	3	1	2	3	5	5		15	

## **Water Observation**

Date	Time	Depth	Casing	Sea W.L.

### Scale of Strength

Cohesive Soil	Non-Cohesive
0 - 2	Very soft
2 - 4	Soft
4 - 8	Firm
8 - 15	Stiff
15 - 30	Very stiff
> 30	Hard
0 - 4	Very loose
4 - 10	Loose
10 - 30	Medium dense
30 - 50	Dense
> 50	Very dense

Legend

	: Wash Boring	D	: Disturbed Sample
	: Split Spoon Sample	UD	: Undisturbed Sample
	: Thin Wall Tube Sample (UD)	CL	: Cored Length
	: Piston Sample (Ps)	TCR	: Total Cored Recovery
	: Maizer Sample (M)	RQD	: Rock Quality Designation
	: Rock Core Sample	V	: Vane Shear Test
	: Water Level (WL)	Pm	: Permeability Test
P	: Standard Penetration Test	Pr	: Pressuremeter Test



Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang. Borehole No. : BH1  
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Customer : <b>Messrs. PLB Engineering Sdn. Bhd.</b>		Job No. : <b>GLSB/SI/3971-155/2022</b>
Date Started : 14/12/2022	Coordinate, E : -1414.853	N: -2644.089 Seawater Level (m) : 11.50 m
Date Completed : 19/12/2022	Platform Elevation	: 2.006 mRL Boring Diameter : 75mm to 125mm
Final Depth : 60.45 m	Seabed Elevation	: -11.494 mRL Type of Boring : Rotary Wash Boring



Project : <b>Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.</b>								Borehole No. : <b>BH2</b>				
Pages 1 of 5												
Customer : <b>Messrs. PLB Engineering Sdn. Bhd.</b>						Job No. : <b>GLSB/SI/3971-155/2022</b>						
Date Started : 21/12/2022	Coordinate, E: -1356.114 N: -2783.828			Seawater Level (m) : 13.60 m								
Date Completed : 30/12/2022	Platform Elevation : 2.731 mRL			Boring Diameter : 75mm to 125mm								
Final Depth : 60.45 m	Seabed Elevation : -12.269 mRL			Type of Boring : Rotary Wash Boring								
Elevation	Legend	Soil Description and Lithology <i>Jackup Platform Height From Seabed = 15.00 m</i>	Sample			Standard Penetration Test						Remarks
			Sample Ref.	Depth (m)	Recovery Ratio	75 mm	75 mm	75 mm	75 mm	75 mm	75 mm	
		Sea water										
		Top soil.										
-13.769		Very loose, light grey, Very Silty/Clayey SANDS.	P1/D1	1.50 to 1.95	400/450	0	0	1	0	0	1	2
-15.269		Very loose, light brown, fine to medium SAND.	P2/D2	3.00 to 3.45	350/450	1	0	0	0	0	0	0
-16.769		Medium dense, medium brown with light grey mottled, Very Silty/Clayey SANDS.	P3/D3	4.50 to 4.95	340/450	1	2	3	3	4	3	13
-18.269		Loose to medium dense, light grey, slightly clayey SAND.	P4/D4	6.00 to 6.45	390/450	1	1	2	2	3	3	10
-19.769		Loose, light grey, slightly clayey SAND.	P5/D5	7.50 to 7.95	450/450	1	1	1	1	1	2	5
-21.269		Loose to medium dense, light grey, slightly clayey SAND.	P6/D6	9.00 to 9.45	325/450	1	2	2	2	3	3	10
-22.769		Stiff, light grey, Sandy CLAY of Low Plasticity.	P7/D7	10.50 to 10.95	420/450	2	2	2	2	2	4	10
Water Observation					Scale of Strength				Legend			
Date	Time	Depth	Casing	Sea W.L	Cohesive Soil	Non-Cohesive			D : Wash Boring	D : Disturbed Sample		
					0 - 2 2 - 4 4 - 8 8 - 15 15 - 30 > 30	Very soft Soft Firm Stiff Very stiff Hard	0 - 4 4 - 10 10 - 30 30 - 50 > 50	Very loose Loose Medium dense Dense Very dense	UD : Split Spoon Sample	UD : Undisturbed Sample		
									CL : Thin Wall Tube Sample (UD)	CL : Cored Length		
									TCR : Piston Sample (Ps)	TCR : Total Cored Recovery		
									M : Maizer Sample (M)	RQD : Rock Quality Designation		
									RC : Rock Corer Sample	V : Vane Shear Test		
									WL : Water Level (WL)	Pm : Permeability Test		
									SP : Standard Penetration Test	Pr : Pressuremeter Test		



Project : <b>Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.</b>								Borehole No. : <b>BH2</b>				
Pages 2 of 5												
Customer : <b>Messrs. PLB Engineering Sdn. Bhd.</b>					Job No. : <b>GLSB/SI/3971-155/2022</b>							
Date Started : 21/12/2022	Coordinate, E: -1356.114 N: -2783.828			Seawater Level (m) : 13.60 m								
Date Completed : 30/12/2022	Platform Elevation : 2.731 mRL			Boring Diameter : 75mm to 125mm								
Final Depth : 60.45 m	Seabed Elevation : -12.269 mRL			Type of Boring : Rotary Wash Boring								
Elevation	Legend	Soil Description and Lithology <i>Jackup Platform Height From Seabed = 15.00 m</i>	Sample			Standard Penetration Test						Remarks
			Sample Ref.	Depth (m)	Recovery Ratio	75 mm	75 mm	75 mm	75 mm	75 mm	75 mm	
-24.269		Medium dense, light grey, clayey fine to coarse SAND.	P8/D8	12.00 to 12.45	425/450	2	3	3	3	3	12	
-25.769		Loose to medium dense, light brown, very clayey fine to medium SAND.	P9/D9	13.50 to 13.95	435/450	2	2	2	2	3	10	
-27.269		Medium dense, light brown, very clayey fine to medium SAND.	P10/D10	15.00 to 15.45	450/450	1	1	2	2	3	4	11
-28.769		Stiff, light brown, Sandy CLAY of Intermediate Plasticity.	P11/D11	16.50 to 16.95	390/450	2	1	2	3	2	3	10
-30.269		Medium dense, light brown, clayey medium SAND.	P12/D12	18.00 to 18.45	360/450	3	3	5	3	4	5	17
-31.769		Medium dense, light brown, clayey medium SAND.	P13/D13	19.50 to 19.95	310/450	2	3	3	3	4	4	14
-33.269		Medium dense, light brown, clayey medium SAND.	P14/D14	21.00 to 21.45	350/450	4	4	5	5	5	5	20
-34.769		Medium dense, light brown, clayey medium SAND.	P15/D15	22.50 to 22.95	440/450	2	3	3	2	3	3	11
-36.269		Stiff, light brown, Sandy CLAY of Low Plasticity.	P16/D16	24.00 to 24.45	390/450	1	2	2	3	3	3	11
Water Observation					Scale of Strength				Legend			
Date	Time	Depth	Casing	Sea W.L.	Cohesive Soil	Non-Cohesive						
					0 - 2 2 - 4 4 - 8 8 - 15 15 - 30 > 30	Very soft Soft Firm Stiff Very stiff Hard	0 - 4 4 - 10 10 - 30 30 - 50 > 50	Very loose Loose Medium dense Dense Very dense	: Wash Boring : Split Spoon Sample : Thin Wall Tube Sample (UD) : Piston Sample (Ps) : Maizer Sample (M) : Rock Corer Sample : Water Level (WL) P : Standard Penetration Test	D : Disturbed Sample UD : Undisturbed Sample CL : Cored Length TCR : Total Cored Recovery RQD : Rock Quality Designation V : Vane Shear Test Pm : Permeability Test Pr : Pressuremeter Test		



Project : <b>Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.</b>								Borehole No. : <b>BH2</b>					
								Pages 3 of 5					
Customer : <b>Messrs. PLB Engineering Sdn. Bhd.</b>								Job No. : <b>GLSB/SI/3971-155/2022</b>					
Date Started : 21/12/2022	Coordinate, E: -1356.114 N: -2783.828				Seawater Level (m) : 13.60 m								
Date Completed : 30/12/2022	Platform Elevation : 2.731 mRL				Boring Diameter : 75mm to 125mm								
Final Depth : 60.45 m	Seabed Elevation : -12.269 mRL				Type of Boring : Rotary Wash Boring								
Elevation	Legend	Soil Description and Lithology <i>Jackup Platform Height From Seabed = 15.00 m</i>			Sample		Standard Penetration Test				Remarks		
-37.769		No recovery.		UD1	Depth (m)	Recovery Ratio	75 mm	75 mm	75 mm	75 mm	'N' Value		
-39.269		Medium dense, light brown, clayey fine to medium SAND.		P17/D17	25.50 to 26.50	NIL/1000							
-40.769		Medium dense, light brown, clayey fine to medium SAND.		P18/D18	27.00 to 27.45	440/450	3	3	3	4	4	15	
-42.269		Medium dense, light brown, very clayey fine SAND.		P19/D19	28.50 to 28.95	365/450	3	4	4	5	7	21	
-43.769		Stiff, light brown, very sandy CLAY.		P20/D20	30.00 to 30.45	420/450	2	2	4	2	5	13	
-45.269		Medium dense, light brown, very clayey fine to medium SAND.		P21/D21	31.50 to 31.95	425/450	3	3	4	4	3	3	14
-46.769		Medium dense, very clayey fine to medium SAND.		P22/D22	33.00 to 33.45	400/450	3	4	4	4	4	4	16
-48.269		Medium dense, light brown, slightly clayey very fine SAND.		P23/D23	34.50 to 34.95	430/450	3	3	4	3	3	4	14
-49.769		Very stiff, light brown, CLAY of Low Plasticity.		P24/D24	36.00 to 36.45	365/450	3	4	3	4	4	5	16
Water Observation					Scale of Strength				Legend				
Date	Time	Depth	Casing	Sea W.L	Cohesive Soil		Non-Cohesive						
					0 - 2	Very soft	0 - 4	Very loose					
					2 - 4	Soft	4 - 10	Loose	D : Disturbed Sample				
					4 - 8	Firm	10 - 30	Medium dense	UD : Undisturbed Sample				
					8 - 15	Stiff	30 - 50	Dense	UD : Undisturbed Sample				
					> 30	Very stiff	> 50	Very dense	CL : Cored Length				
									TCR : Total Cored Recovery				
									RQD : Rock Quality Designation				
									V : Vane Shear Test				
									Pm : Permeability Test				
									Pr : Pressuremeter Test				
									WL : Water Level (WL)				
									SP : Standard Penetration Test				



Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang. Borehole No. : BH2  
Pages 4 of 5

Customer : Messrs. PLB Engineering Sdn. Bhd.		Job No. : GLSB/SI/3971-155/2022
Date Started : 21/12/2022	Coordinate, E : -1356.114	N: -2783.828 Seawater Level (m) : 13.60 m
Date Completed : 30/12/2022	Platform Elevation	: 2.731 mRL Boring Diameter : 75mm to 125mm
Final Depth : 60.45 m	Seabed Elevation	: -12.269 mRL Type of Boring : Rotary Wash Boring

Elevation		Soil Description and Lithology Jackup Platform Height From Seabed = 15.00 m			Sample			Standard Penetration Test								Remarks
Elevation	Legend	Sample Ref.	Depth (m)	Recovery Ratio	75 mm	75 mm	75 mm	75 mm	75 mm	75 mm	'N' Value					
-51.269		Dense, light brown, slightly clayey very fine SAND.	P25/ D25	39.00 to 39.45	345/450	8	8	8	7	7	9	31				
-52.769		Dense, light brown, slightly clayey very fine SAND.	P26/ D26	40.50 to 40.95	400/450	8	8	10	8	8	10	36				
-54.269		Dense, light brown, very fine SAND.	P27/ D27	42.00 to 42.45	300/450	4	7	7	8	8	10	33				
-55.769		Dense, light brown, very fine SAND.	P28/ D28	43.50 to 43.95	340/450	6	9	11	12	10	15	48				
-57.269		Medium dense, light brown, Very Silty/ Clayey SANDS.	P29/ D29	45.00 to 45.45	290/450	4	4	5	5	7	7	24				
-58.769		Medium dense, light brown, very fine SAND.	P30/ D30	46.50 to 46.95	360/450	3	4	5	6	6	6	23				
-60.269		Medium dense, light brown, very fine SAND.	P31/ D31	48.00 to 48.45	190/450	4	4	5	5	7	7	24				
-61.769		Very dense, light brown, very fine to coarse SAND.	P32/ D32	49.50 to 49.95	270/450	4	8	13	11	14	12	50				
-63.269		Dense, pale grey, Silty/Clayey SANDS.	P33/ D33	51.00 to 51.45	280/450	8	8	8	8	8	8	32				

<u>Water Observation</u>				
Date	Time	Depth	Casing	Sea W.L.

Scale of Strength			
Cohesive Soil		Non-Cohesive	
0 - 2	Very soft	0 - 4	Very loose
2 - 4	Soft	4 - 10	Loose
4 - 8	Firm	10 - 30	Medium dense
8 - 15	Stiff	30 - 50	Dense
15 - 30	Very stiff	> 50	Very dense
> 30	Hard		

<u><b>Legend</b></u>	
D	: Disturbed Sample
UD	: Undisturbed Sample
e (UD)	CL : Cored Length
	TCR : Total Cored Recovery
	RQD : Rock Quality Designation
	V : Vane Shear Test
Pm	: Permeability Test
est	Pr : Pressuremeter Test



Project : <b>Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.</b>								Borehole No. : <b>BH2</b>				
Pages 5 of 5												
Customer : <b>Messrs. PLB Engineering Sdn. Bhd.</b>						Job No. : <b>GLSB/SI/3971-155/2022</b>						
Date Started : 21/12/2022	Coordinate, E: -1356.114 N: -2783.828			Seawater Level (m) : 13.60 m								
Date Completed : 30/12/2022	Platform Elevation : 2.731 mRL			Boring Diameter : 75mm to 125mm								
Final Depth : 60.45 m	Seabed Elevation : -12.269 mRL			Type of Boring : Rotary Wash Boring								
Elevation	Legend	Soil Description and Lithology <i>Jackup Platform Height From Seabed = 15.00 m</i>	Sample			Standard Penetration Test						Remarks
			Sample Ref.	Depth (m)	Recovery Ratio	75 mm	75 mm	75 mm	75 mm	75 mm	75 mm	
-64.769		Medium dense, pale grey, medium to coarse SAND.	P34/ D34	52.50 to 52.95	240/450	4	4	4	4	5	17	
-66.269		Dense to very dense, pale brown, medium to coarse SAND.	P35/ D35	54.00 to 54.45	400/450	11	10	13	15	10	12	50
-67.769		Dense, pale brown, medium to coarse SAND.	P36/ D36	55.50 to 55.95	330/450	6	7	7	7	9	8	31
-69.269		Dense, light brown, Sandy CLAY of Low Plasticity.	P37/ D37	57.00 to 57.45	380/450	7	9	10	9	11	11	41
-70.769		Medium dense, pale to light brown, fine to medium grained, clayey SAND.	P38/ D38	58.50 to 58.95	300/450	5	4	6	6	7	8	27
-72.269		Dense, pale to light brown, fine to medium grained, clayey SAND.	P39/ D39	60.00 to 60.45	270/450	6	6	7	8	10	12	37
-72.719		<b>END OF BH2 AT 60.45 m</b>										
Water Observation					Scale of Strength				Legend			
Date	Time	Depth	Casing	Sea W.L	Cohesive Soil	Non-Cohesive			: Wash Boring	D : Disturbed Sample		
					0 - 2 Very soft	0 - 4 Very loose			: Split Spoon Sample	UD : Undisturbed Sample		
					2 - 4 Soft	4 - 10 Loose			: Thin Wall Tube Sample (UD)	CL : Cored Length		
					4 - 8 Firm	10 - 30 Medium dense			: Piston Sample (Ps)	TCR : Total Cored Recovery		
					8 - 15 Stiff	30 - 50 Dense			: Maizer Sample (M)	RQD : Rock Quality Designation		
					15 - 30 Very stiff	> 50 Very dense			: Rock Corer Sample	V : Vane Shear Test		
					> 30 Hard				: Water Level (WL)	Pm : Permeability Test		
									: Standard Penetration Test	Pr : Pressuremeter Test		



Project : **Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.** Borehole No. : **BH3**

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Customer : <b>Messrs. PLB Engineering Sdn. Bhd.</b>		Job No. : <b>GLSB/SI/3971-155/2022</b>
Date Started : 31/12/2022	Coordinate, E: -1671.590	N: -2826.274 Seawater Level (m) : 6.50 m
Date Completed : 04/01/2023	Platform Elevation	: 2.356 mRL Boring Diameter : 75mm to 125mm
Final Depth : 60.45 m	Seabed Elevation	: -6.644 mRL Type of Boring : Rotary Wash Boring

Elevation	Legend	Soil Description and Lithology <i>Jackup Platform Height From Seabed = 9.00 m</i>	Sample			Standard Penetration Test								Remarks
			Sample Ref.	Depth (m)	Recovery Ratio	75 mm	75 mm	75 mm	75 mm	75 mm	75 mm	75 mm	'N' Value	
		Sea Water												
-6.644		Top soil.												
-8.144	xxxxx	Very soft, medium grey, SILT of Extremely High Plasticity.	P1/D1	1.50 to 1.95	450/450	0	0	0	0	0	0	0	0	0
-9.644	.....	Medium grey, CLAY.	UD1	3.00 to 4.00	1000/1000									
-10.644		Vane Shear Test (Unable to penetrate)	VS	4.00 to 4.50										
-11.144	.....	Very loose, medium grey, fine grained, Very Silty/Clayey SANDS.	P2/D2	4.50 to 4.95	250/450	0	0	0	0	1	0	0	1	
-12.644		No recovery.	P3	6.00 to 6.45	NIL/450	3	2	0	0	0	0	0	0	0
-14.144	....	Firm, medium grey with pale brown spotted, sandy CLAY.	P4/D3	7.50 to 7.95	450/450	0	1	1	1	1	2		5	
-15.144	.....	Light grey with light brown spotted, Very Silty/Clayey SANDS. S1&S3 - Very Silty/Clayey SANDS. S2 - Silty/Clayey SAND.	UD2	8.50 to 9.50	840/1000									
-17.144	....	Medium dense, pale to light grey, fine to medium grained, clayey SAND.	P5/D4	10.50 to 10.95	420/450	3	3	3	3	4	4	4	14	

<u>Water Observation</u>				
Date	Time	Depth	Casing	Sea W.L.

Scale of Strength			
Cohesive Soil		Non-Cohesive	
0 - 2	Very soft	0 - 4	Very loose
2 - 4	Soft	4 - 10	Loose
4 - 8	Firm	10 - 30	Medium dense
8 - 15	Stiff	30 - 50	Dense
15 - 30	Very stiff	> 50	Very dense
> 30	Hard		

<u>Legend</u>		
D	:	Disturbed Sample
UD	:	Undisturbed Sample
c (UD)	:	Cored Length
TCR	:	Total Cored Recovery
RQD	:	Rock Quality Designation
V	:	Vane Shear Test
Pm	:	Permeability Test
est	:	Pressuremeter Test



Project : <b>Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.</b>		Borehole No. : <b>BH3</b>											
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Customer : <b>Messrs. PLB Engineering Sdn. Bhd.</b>		Job No. : <b>GLSB/SI/3971-155/2022</b>											
Date Started : 31/12/2022	Coordinate, E: -1671.590 N: -2826.274	Seawater Level (m) : 6.50 m											
Date Completed : 04/01/2023	Platform Elevation : 2.356 mRL												
Final Depth : 60.45 m	Seabed Elevation : -6.644 mRL	Type of Boring : Rotary Wash Boring											
Elevation	Legend	Soil Description and Lithology <i>Jackup Platform Height From Seabed = 9.00 m</i>	Sample Ref.	Depth (m)	Recovery Ratio	75 mm	75 mm	75 mm	75 mm	75 mm	75 mm	'N' Value	Remarks
-18.644		Medium dense, light grey, fine to medium grained, clayey SAND.	P6/D5	12.00 to 12.45	450/450	3	2	3	2	3	3	11	
-20.144		Medium dense, light grey, medium to coarse grained, clayey SAND.	P7/D6	13.50 to 13.95	420/450	2	2	2	3	3	3	11	
-21.644		Medium dense, light grey, fine to medium grained, clayey SAND.	P8/D7	15.00 to 15.45	440/450	2	3	2	3	5	3	13	
-23.144		Medium dense, light grey, fine grained, clayey SAND.	P9/D8	16.50 to 16.95	450/450	1	0	4	2	2	3	11	
-24.644		Stiff to very stiff, light grey, fine grained, sandy CLAY with Low Plasticity.	P10/D9	18.00 to 18.45	390/450	2	3	3	4	4	4	15	
-26.144		Medium dense, light grey, fine to medium grained, clayey SAND.	P11/D10	19.50 to 19.95	270/450	2	4	5	4	4	6	19	
-27.644		Loose to medium dense, light grey, fine to medium grained, clayey SAND.	P12/D11	21.00 to 21.45	450/450	3	2	3	2	2	3	10	
-29.144		Medium dense, light grey, fine to medium grained, clayey SAND.	P13/D12	22.50 to 22.95	450/450	2	1	2	2	3	4	11	
-30.644		Medium dense, light grey, fine to medium grained, slightly clayey SAND.	P14/D13	24.00 to 24.45	375/450	3	4	4	4	5	5	18	
<b>Water Observation</b>					<b>Scale of Strength</b>								<b>Legend</b>
Date	Time	Depth	Casing	Sea W.L.	<b>Cohesive Soil</b>		<b>Non-Cohesive</b>						
					0 - 2	Very soft	0 - 4	Very loose					D : Disturbed Sample
					2 - 4	Soft	4 - 10	Loose					UD : Undisturbed Sample
					4 - 8	Firm	10 - 30	Medium dense					CL : Cored Length
					8 - 15	Stiff	30 - 50	Dense					TCR : Total Cored Recovery
					15 - 30	Very stiff	> 50	Very dense					RQD : Rock Quality Designation
					> 30	Hard							V : Vane Shear Test
													Pm : Permeability Test
													Pr : Pressuremeter Test



Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang. Borehole No. : BH3

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Customer : <b>Messrs. PLB Engineering Sdn. Bhd.</b>		Job No. : <b>GLSB/SI/3971-155/2022</b>
Date Started : 31/12/2022	Coordinate, E: -1671.590	N: -2826.274 Seawater Level (m) : 6.50 m
Date Completed : 04/01/2023	Platform Elevation	: 2.356 mRL Boring Diameter : 75mm to 125mm
Final Depth : 60.45 m	Seabed Elevation	: -6.644 mRL Type of Boring : Rotary Wash Boring

Elevation	Legend	Soil Description and Lithology <i>Jackup Platform Height From Seabed = 9.00 m</i>	Sample			Standard Penetration Test								Remarks
			Sample Ref.	Depth (m)	Recovery Ratio	75 mm	75 mm	75 mm	75 mm	75 mm	75 mm	75 mm	'N' Value	
-32.144		Medium dense, light grey with pale brown spotted, sandy CLAY with Intermediate Plasticity.	P15/D14	25.50 to 25.95	450/450	3	3	3	3	3	3	3	12	
-33.644		Medium dense, light grey with pale brown spotted, fine to medium grained, clayey SAND.	P16/D15	27.00 to 27.45	425/450	3	2	2	3	2	4		11	
-35.144		Medium dense, light grey with pale brown spotted, fine to medium grained, clayey SAND.	P17/D16	28.50 to 28.95	430/450	3	3	2	3	3	4		12	
-36.644		Loose to medium dense, light grey, fine to medium grained, clayey SAND.	P18/D17	30.00 to 30.45	420/450	2	2	3	2	2	3		10	
-38.144		Medium dense, light grey, fine to medium grained, clayey SAND.	P19/D18	31.50 to 31.95	450/450	3	3	4	5	5	5		19	
-39.644		Medium dense, light grey, fine to medium grained, Very Silty/Clayey SANDS.	P20/D19	33.00 to 33.45	450/450	7	6	6	5	3	4		18	
-41.144		Medium dense, light grey, fine to medium grained, very clayey SAND.	P21/D20	34.50 to 34.95	390/450	2	2	2	3	3	4		12	
-42.644		Medium dense, light grey, fine to medium grained, very clayey SAND.	P22/D21	36.00 to 36.45	450/450	2	3	4	4	5	4		17	
-44.144		Medium dense, light grey, fine to medium grained, slightly clayey SAND.	P23/D22	37.50 to 37.95	405/450	4	4	5	6	6	8		25	

**Water Observation**

Water Observation				
Date	Time	Depth	Casing	Sea W.L.

Scale of Strength

Scale of Strength			
Cohesive Soil		Non-Cohesive	
0 - 2	Very soft	0 - 4	Very loose
2 - 4	Soft	4 - 10	Loose
4 - 8	Firm	10 - 30	Medium dense
8 - 15	Stiff	30 - 50	Dense
15 - 30	Very stiff	> 50	Very dense
> 30	Hard		

Legend

	: Wash Boring	D	: Disturbed Sample
	: Split Spoon Sample	UD	: Undisturbed Sample
	: Thin Wall Tube Sample (UD)	CL	: Cored Length
	: Piston Sample (Ps)	TCR	: Total Cored Recovery
	: Maizer Sample (M)	RQD	: Rock Quality Designation
	: Rock Core Sample	V	: Vane Shear Test
	: Water Level (WL)	Pm	: Permeability Test
P	: Standard Penetration Test	Pr	: Pressuremeter Test



Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang. Borehole No. : BH3  
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Customer : <b>Messrs. PLB Engineering Sdn. Bhd.</b>		Job No. : <b>GLSB/SI/3971-155/2022</b>
Date Started : 31/12/2022	Coordinate, E: -1671.590	N: -2826.274 Seawater Level (m) : 6.50 m
Date Completed : 04/01/2023	Platform Elevation	: 2.356 mRL Boring Diameter : 75mm to 125mm
Final Depth : 60.45 m	Seabed Elevation	: -6.644 mRL Type of Boring : Rotary Wash Boring

Elevation	Legend	Soil Description and Lithology <i>Jackup Platform Height From Seabed = 9.00 m</i>	Sample			Standard Penetration Test								Remarks
			Sample Ref.	Depth (m)	Recovery Ratio	75 mm	75 mm	75 mm	75 mm	75 mm	75 mm	75 mm	'N' Value	
-45.644		Medium dense, light grey, fine to medium grained, clayey SAND.	P24/D23	39.00 to 39.45	420/450	3	3	2	3	3	4		12	
-47.144		Stiff, light grey, CLAY with Intermediate Plasticity.	P25/D24	40.50 to 40.95	375/450	3	3	3	2	3	3		11	
-48.644		Medium dense, light grey, fine grained, SAND.	P26/D25	42.00 to 42.45	440/450	3	3	3	4	5	5		17	
-50.144		Medium dense, light grey, fine grained, SAND.	P27/D26	43.50 to 43.95	450/450	3	4	7	6	5	5		23	
-51.644		Medium dense, light grey, fine grained, SAND.	P28/D27	45.00 to 45.45	406/450	6	6	4	4	7	7		22	
-53.144		Medium dense, light grey, fine grained, SAND.	P29/D28	46.50 to 46.95	390/450	2	2	3	6	6	7		22	
-54.644		Medium dense, light grey, Very Silty/Clayey SANDS.	P30/D29	48.00 to 48.45	450/450	3	2	3	3	4	7		17	
-56.144		Medium dense, light grey, fine grained, SAND.	P31/D30	49.50 to 49.95	360/450	4	2	3	3	4	6		16	
-57.644		Dense, light grey, fine grained, SAND.	P32/D31	51.00 to 51.45	450/450	8	7	8	8	8	7		31	

## **Water Observation**

Date	Time	Depth	Casing	Sea W.L.

### Scale of Strength

Cohesive Soil	Non-Cohesive
0 - 2	Very soft
2 - 4	Soft
4 - 8	Firm
8 - 15	Stiff
15 - 30	Very stiff
> 30	Hard
0 - 4	Very loose
4 - 10	Loose
10 - 30	Medium dense
30 - 50	Dense
> 50	Very dense

Legend

	: Wash Boring	D	: Disturbed Sample
	: Split Spoon Sample	UD	: Undisturbed Sample
	: Thin Wall Tube Sample (UD)	CL	: Cored Length
	: Piston Sample (Ps)	TCR	: Total Cored Recovery
	: Maizer Sample (M)	RQD	: Rock Quality Designation
	: Rock Core Sample	V	: Vane Shear Test
	: Water Level (WL)	Pm	: Permeability Test
P	: Standard Penetration Test	Pr	: Pressuremeter Test



Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang. Borehole No. : BH3  
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Customer : <b>Messrs. PLB Engineering Sdn. Bhd.</b>		Job No. : <b>GLSB/SI/3971-155/2022</b>
Date Started : 31/12/2022	Coordinate, E : -1671.590	N : -2826.274 Seawater Level (m) : 6.50 m
Date Completed : 04/01/2023	Platform Elevation	: 2.356 mRL Boring Diameter : 75mm to 125mm
Final Depth : 60.45 m	Seabed Elevation	: -6.644 mRL Type of Boring : Rotary Wash Boring

Elevation	Legend	Soil Description and Lithology Jackup Platform Height From Seabed = 9.00 m	Sample			Standard Penetration Test								Remarks
			Sample Ref.	Depth (m)	Recovery Ratio	75 mm	75 mm	75 mm	75 mm	75 mm	75 mm	75 mm	'N' Value	
-59.144		Dense, light grey, fine grained, SAND.	P33/ D32	52.50 to 52.95	450/450	2	5	7	10	10	10	37		
-60.644		Medium dense, light grey, medium to coarse grained, SAND.	P34/ D33	54.00 to 54.45	415/450	4	4	4	6	7	11	28		
-62.144		Medium dense, light grey, Silty/Clayey SANDS.	P35/ D34	55.50 to 55.95	450/450	7	8	6	5	5	4	20		
-63.644		Medium dense, light grey, medium to coarse grained, SAND.	P36/ D35	57.00 to 57.45	395/450	5	6	5	5	5	5	20		
-65.144		Medium dense, light grey with pale brown spotted, medium to coarse grained, SAND.	P37/ D36	58.50 to 58.95	330/450	6	4	4	3	4	6	17		
-66.644		Vey dense, light tp medium grey, medium to coarse grained, SAND.	P38/ D37	60.00 to 60.17	165/165	18	7/ 10mm	45	5/5mm			50/80mm		
-67.094		<b>END OF BH3 AT 60.45 m</b>												
Water Observation					Scale of Strength					Legend				
Date	Time	Depth	Casing	Sea W.L	Cohesive Soil		Non-Cohesive			Wash Boring		Disturbed Sample		
					0 - 2	Very soft	0 - 4	Very loose		: Wash Boring		: Disturbed Sample		
					2 - 4	Soft	4 - 10	Loose		: Split Spoon Sample		: Undisturbed Sample		
					4 - 8	Firm	10 - 30	Medium dense		: Thin Wall Tube Sample (UD)		: Cored Length		
					8 - 15	Stiff	30 - 50	Dense		: Piston Sample (Ps)		: Total Cored Recovery		
					15 - 30	Very stiff	> 50	Very dense		: Maizer Sample (M)		: Rock Quality Designation		
					> 30	Hard				: Rock Core Sample		: Vane Shear Test		
										: Water Level (WL)		: Permeability Test		
										P : Standard Penetration Test		: Pressuremeter Test		



Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang. Borehole No. : BH4  
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Customer : <b>Messrs. PLB Engineering Sdn. Bhd.</b>		Job No. : <b>GLSB/SI/3971-155/2022</b>
Date Started : 07/01/2023	Coordinate, E : -1523.063	N: -2991.038 Seawater Level (m) : 13.00 m
Date Completed : 16/01/2023	Platform Elevation	: 2.504 mRL Boring Diameter : 75mm to 125mm
Final Depth : 60.45 m	Seabed Elevation	: -12.496 mRL Type of Boring : Rotary Wash Boring

Elevation	Legend	Soil Description and Lithology Jackup Platform Height From Seabed = 15.00 m	Sample			Standard Penetration Test								Remarks
			Sample Ref.	Depth (m)	Recovery Ratio	75 mm	75 mm	75 mm	75 mm	75 mm	75 mm	75 mm	'N' Value	
-12.496		Sea water.												
-13.996		Top soil.												
-13.996		Very soft, light grey, Sandy CLAY with Low Plasticity.	P1/D1	1.50 to 1.95	450/450	1	0	0	0	0	0	0	0	0
-14.996		Vane Shear Test No 1	VS-1	2.50 to 3.00										
-15.496		Very loose to loose, light to medium brownish grey, fine grained, SAND.	P2/D2	3.00 to 3.45	215/450	0	1	1	1	1	1	1	1	4
-16.996		Medium dense, light brownish grey, fine to medium grained, SAND.	P3/D3	4.50 to 4.95	345/450	2	3	3	3	3	3	4	13	
-18.496		Medium dense, pale to light brownish grey, fine grained, clayey SAND.	P4/D4	6.00 to 6.45	450/450	3	3	4	4	4	4	4	16	
-19.996		Stiff, light brownish grey, sandy CLAY with Low Plasticity.	P5/D5	7.50 to 7.95	450/450	2	2	3	3	3	3	2	11	
-21.496		Loose to medium dense, pale brownish grey, fine grained, clayey SAND.	P6/D6	9.00 to 9.45	450/450	2	2	2	3	2	3	3	10	
-22.996		Stiff, pale to light brownish grey, slightly sandy CLAY.	P7/D7	10.50 to 10.95	450/450	3	2	3	2	3	3	3	11	

<u>Water Observation</u>				
Date	Time	Depth	Casing	Sea W.L.

Scale of Strength			
Cohesive Soil		Non-Cohesive	
0 - 2	Very soft	0 - 4	Very loose
2 - 4	Soft	4 - 10	Loose
4 - 8	Firm	10 - 30	Medium dense
8 - 15	Stiff	30 - 50	Dense
15 - 30	Very stiff	> 50	Very dense
> 30	Hard		

<u><b>Legend</b></u>	
D	: Disturbed Sample
UD	: Undisturbed Sample
e (UD)	CL : Cored Length
	TCR : Total Cored Recovery
	RQD : Rock Quality Designation
	V : Vane Shear Test
	Pm : Permeability Test
est	Pr : Pressuremeter Test



Project : <b>Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.</b>		Borehole No. : <b>BH4</b>											
Pages 2 of 5													
Customer : <b>Messrs. PLB Engineering Sdn. Bhd.</b>		Job No. : <b>GLSB/SI/3971-155/2022</b>											
Date Started : 07/01/2023	Coordinate, E: -1523.063 N: -2991.038	Seawater Level (m) : 13.00 m											
Date Completed : 16/01/2023	Platform Elevation : 2.504 mRL												
Final Depth : 60.45 m	Seabed Elevation : -12.496 mRL	Type of Boring : Rotary Wash Boring											
Elevation	Legend	Soil Description and Lithology <i>Jackup Platform Height From Seabed = 15.00 m</i>	Sample Ref.	Depth (m)	Recovery Ratio	75 mm	75 mm	75 mm	75 mm	75 mm	75 mm	'N' Value	Remarks
-23.996		Light brownish grey, Sandy CLAY with Intermediate Plasticity. S1 - CLAY with Intermediate Plasticity. S2&S3 - Sandy CLAY with Intermediate Plasticity.	UD1	11.50 to 12.50	1000/1000								
-25.996		Stiff, light grey, sandy CLAY.	P8/D8	13.50 to 13.95	450/450	2	2	2	2	3	4	11	
-27.496		Medium dense, light grey with light brown spotted, fine grained, slightly clayey SAND.	P9/D9	15.00 to 15.45	450/450	3	3	4	3	3	4	14	
-28.996		Medium dense, light to medium brownish grey, fine to medium grained, clayey SAND.	P10/D10	16.50 to 16.95	270/450	3	3	4	3	4	4	15	
-30.496		Medium dense, light to medium brownish grey, fine to medium grained, Very Clayey SAND of Low Plasticity.	P11/D11	18.00 to 18.45	290/450	3	4	3	3	4	4	14	
-31.996		Medium dense, light brownish grey, fine grained, clayey SAND.	P12/D12	19.50 to 19.95	450/450	3	3	3	3	3	3	12	
-33.496		Medium dense, light brownish grey, fine to medium grained, Very Silty/Clayey SANDS.	P13/D13	21.00 to 21.45	330/450	6	4	4	4	4	4	16	
-34.996		Medium dense, light grey, fine to medium grained, clayey SAND.	P14/D14	22.50 to 22.95	390/450	4	3	3	3	4	4	14	
-36.496		Medium dense, light grey, fine to medium grained, clayey SAND.	P15/D15	24.00 to 24.45	375/450	4	5	5	5	4	4	18	
<b>Water Observation</b>					<b>Scale of Strength</b>								<b>Legend</b>
Date	Time	Depth	Casing	Sea W.L.	<b>Cohesive Soil</b>		<b>Non-Cohesive</b>						
					0 - 2	Very soft	0 - 4	Very loose					D : Disturbed Sample
					2 - 4	Soft	4 - 10	Loose					UD : Undisturbed Sample
					4 - 8	Firm	10 - 30	Medium dense					CL : Cored Length
					8 - 15	Stiff	30 - 50	Dense					TCR : Total Cored Recovery
					15 - 30	Very stiff	> 50	Very dense					RQD : Rock Quality Designation
					> 30	Hard							V : Vane Shear Test
													Pm : Permeability Test
													Pr : Pressuremeter Test

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang. Borehole No. : BH4  
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Customer : <b>Messrs. PLB Engineering Sdn. Bhd.</b>		Job No. : <b>GLSB/SI/3971-155/2022</b>
Date Started : 07/01/2023	Coordinate, E : -1523.063	N: -2991.038 Seawater Level (m) : 13.00 m
Date Completed : 16/01/2023	Platform Elevation	: 2.504 mRL Boring Diameter : 75mm to 125mm
Final Depth : 60.45 m	Seabed Elevation	: -12.496 mRL Type of Boring : Rotary Wash Boring

Elevation	Legend	Soil Description and Lithology Jackup Platform Height From Seabed = 15.00 m	Sample			Standard Penetration Test								Remarks
			Sample Ref.	Depth (m)	Recovery Ratio	75 mm	75 mm	75 mm	75 mm	75 mm	75 mm	75 mm	'N' Value	
-37.996		Medium dense, light grey with medium brown spotted, fine to medium grained, clayey SAND.	P16/D16	25.50 to 25.95	410/450	4	4	4	3	5	4		16	
-39.496		Medium dense, light brownish grey, fine to medium grained, clayey SAND.	P17/D17	27.00 to 27.45	360/450	5	5	4	3	3	5		15	
-40.996		Medium dense, light brownish grey, fine to medium grained, clayey SAND.	P18/D18	28.50 to 28.95	310/450	4	4	4	3	4	4		15	
-42.496		Very stiff, light brownish grey, Sandy CLAY of Low Plasticity.	P19/D19	30.00 to 30.45	305/450	4	5	5	4	5	5		19	
-43.996		Medium dense, light to medium brownish grey, medium grained, clayey SAND.	P20/D20	31.50 to 31.95	370/450	3	3	4	3	4	3		14	
-45.496		Medium dense, pale to light brownish grey, medium grained, clayey SAND.	P21/D21	33.00 to 33.45	245/450	4	3	3	3	4	4		14	
-46.996		Very stiff, light grey with light brown spotted, CLAY with Intermediate Plasticity.	P22/D22	34.50 to 34.95	390/450	5	4	4	5	4	5		18	
-48.496		Stiff, light grey with light brown spotted, Sandy CLAY with Intermediate Plasticity.	P23/D23	36.00 to 36.45	360/450	4	3	2	2	3	5		12	
-49.996		Medium dense, light grey, fine grained, SAND.	P24/D24	37.50 to 37.95	340/450	8	8	7	6	7	9		29	

### **Water Observation**

Water Observation				
Date	Time	Depth	Casing	Sea W.L.

Scale of Strength

Scale of Strength		Soil Type	
Cohesive Soil		Non-Cohesive	
0 - 2	Very soft	0 - 4	Very loose
2 - 4	Soft	4 - 10	Loose
4 - 8	Firm	10 - 30	Medium dense
8 - 15	Stiff	30 - 50	Dense
15 - 30	Very stiff	> 50	Very dense
> 30	Hard		

### Legend

	: Wash Boring	D	: Disturbed Sample
	: Split Spoon Sample	UD	: Undisturbed Sample
	: Thin Wall Tube Sample (UD)	CL	: Cored Length
	: Piston Sample (Ps)	TCR	: Total Cored Recovery
	: Maizer Sample (M)	RQD	: Rock Quality Designation
	: Rock Core Sample	V	: Vane Shear Test
	: Water Level (WL)	Pm	: Permeability Test
P	: Standard Penetration Test	Pr	: Pressuremeter Test



Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang. Borehole No. : BH4  
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Customer : <b>Messrs. PLB Engineering Sdn. Bhd.</b>		Job No. : <b>GLSB/SI/3971-155/2022</b>
Date Started : 07/01/2023	Coordinate, E : -1523.063	N: -2991.038 Seawater Level (m) : 13.00 m
Date Completed : 16/01/2023	Platform Elevation	: 2.504 mRL Boring Diameter : 75mm to 125mm
Final Depth : 60.45 m	Seabed Elevation	: -12.496 mRL Type of Boring : Rotary Wash Boring

Elevation	Legend	Soil Description and Lithology Jackup Platform Height From Seabed = 15.00 m	Sample			Standard Penetration Test								Remarks
			Sample Ref.	Depth (m)	Recovery Ratio	75 mm	75 mm	75 mm	75 mm	75 mm	75 mm	75 mm	'N' Value	
-51.496		Medium dense, pale to light grey, fine grained, SAND.	P25/ D25	39.00 to 39.45	360/450	6	5	5	6	6	7		24	
-52.996		Dense, light grey, fine grained, SAND.	P26/ D26	40.50 to 40.95	400/450	8	5	6	7	8	10		31	
-54.496		Medium dense, light grey, fine grained, SAND.	P27/ D27	42.00 to 42.45	310/450	2	1	0	2	5	4		11	
-55.996		Medium dense, light brownish grey, fine grained, SAND.	P28/ D28	43.50 to 43.95	390/450	4	3	4	5	6	5		20	
-57.496		Medium dense, light grey with light brown spotted, Very Silty/Clayey SANDS.	P29/ D29	45.00 to 45.45	450/450	4	3	3	3	6	6		18	
-58.996		Dense, light grey, fine grained, SAND.	P30/ D30	46.50 to 46.95	395/450	7	8	10	9	7	8		34	
-60.496		Medium dense, light grey with light brown spotted, fine to medium grained, SAND.	P31/ D31	48.00 to 48.45	320/450	6	6	6	6	6	6		24	
-61.996		Medium dense, light grey, fine to medium grained, SAND.	P32/ D32	49.50 to 49.95	330/450	6	3	3	4	7	6		20	
-63.496		Medium dense, light grey, fine to medium grained, SAND.	P33/ D33	51.00 to 51.45	440/450	5	8	7	7	6	9		29	

### **Water Observation**

Water Observation				
Date	Time	Depth	Casing	Sea W.L.

Scale of Strength

Scale of Strength			
Cohesive Soil		Non-Cohesive	
0 - 2	Very soft	0 - 4	Very loose
2 - 4	Soft	4 - 10	Loose
4 - 8	Firm	10 - 30	Medium dense
8 - 15	Stiff	30 - 50	Dense
15 - 30	Very stiff	> 50	Very dense
> 30	Hard		

Legend

<u>Legend</u>	
	: Wash Boring
	: Split Spoon Sample
	: Thin Wall Tube Sample (UD)
	: Piston Sample (Ps)
	: Maizer Sample (M)
	: Rock Core Sample
	: Water Level (WL)
P	: Standard Penetration Test
D	: Disturbed Sample
UD	: Undisturbed Sample
CL	: Cored Length
TCR	: Total Cored Recovery
RQD	: Rock Quality Designation
V	: Vane Shear Test
Pm	: Permeability Test
Pr	: Pressuremeter Test



Project : <b>Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.</b>								Borehole No. : <b>BH4</b>				
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Customer : <b>Messrs. PLB Engineering Sdn. Bhd.</b>						Job No. : <b>GLSB/SI/3971-155/2022</b>						
Date Started : 07/01/2023	Coordinate, E: -1523.063 N: -2991.038			Seawater Level (m) : 13.00 m								
Date Completed : 16/01/2023	Platform Elevation : 2.504 mRL			Boring Diameter : 75mm to 125mm								
Final Depth : 60.45 m	Seabed Elevation : -12.496 mRL			Type of Boring : Rotary Wash Boring								
Elevation	Legend	Soil Description and Lithology <i>Jackup Platform Height From Seabed = 15.00 m</i>	Sample			Standard Penetration Test						Remarks
			Sample Ref.	Depth (m)	Recovery Ratio	75 mm	75 mm	75 mm	75 mm	75 mm	75 mm	
-64.996		No recovery.	P34	52.50 to 52.95	NIL/450	5	6	5	5	5	20	
-66.496		Medium dense, light grey, fine to medium grained, SAND.	P35/ D34	54.00 to 54.45	410/450	5	4	3	3	3	12	
-67.996		Medium dense, light grey, Very Silty/Clayey SANDS.	P36/ D35	55.50 to 55.95	415/450	4	4	4	5	5	19	
-69.496		Loose, light grey with dark grey mottled, medium grained SAND with traces of decayed woods.	P37/ D36	57.00 to 57.45	440/245	1	0	2	2	2	9	
-70.996		Medium dense, light brownish grey, fine to medium grained, SAND.	P38/ D37	58.50 to 58.95	245/450	6	7	6	5	6	25	
-72.496		Medium dense, light to medium brownish grey, fine to coarse grained, SAND.	P39/ D38	60.00 to 60.45	450/450	3	5	6	7	7	28	
-72.946		<b>END OF BH4 AT 60.45 m</b>										
Water Observation					Scale of Strength				Legend			
Date	Time	Depth	Casing	Sea W.L	Cohesive Soil	Non-Cohesive						
					0 - 2 2 - 4 4 - 8 8 - 15 15 - 30 > 30	Very soft Soft Firm Stiff Very stiff Hard	0 - 4 4 - 10 10 - 30 30 - 50 > 50	Very loose Loose Medium dense Dense Very dense	: Wash Boring : Split Spoon Sample : Thin Wall Tube Sample (UD) : Piston Sample (Ps) : Maizer Sample (M) : Rock Corer Sample : Water Level (WL) P : Standard Penetration Test	D : Disturbed Sample UD : Undisturbed Sample CL : Cored Length TCR : Total Cored Recovery RQD : Rock Quality Designation V : Vane Shear Test Pm : Permeability Test Pr : Pressuremeter Test		



Project : <b>Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.</b>		Borehole No. : <b>BH5</b>										
Pages 1 of 5												
Customer : <b>Messrs. PLB Engineering Sdn. Bhd.</b>		Job No. : <b>GLSB/SI/3971-155/2022</b>										
Date Started : 19/01/2023	Coordinate, E: -1979.957	N: -3136.463 Seawater Level (m) : 1.00 m										
Date Completed : 27/01/2023	Platform Elevation	: 2.257 mRL Boring Diameter : 75mm to 125mm										
Final Depth : 60.45 m	Seabed Elevation	: -0.743 mRL Type of Boring : Rotary Wash Boring										
Elevation	Legend	Soil Description and Lithology <i>Jackup Platform Height From Seabed = 3.00 m</i>	Sample	Standard Penetration Test	Remarks							
			Sample Ref.	Depth (m)	Recovery Ratio	75 mm	75 mm	75 mm	75 mm	75 mm	'N' Value	
-0.743		Sea Water.										
-0.743		Top soil.										
-2.243		Very soft, medium grey, CLAY.	P1/D1	1.50 to 1.95	450/450	0	0	0	0	0	0	0
-3.243		Vane Shear Test No 1	VS-1	2.50 to 3.00								
-4.243		Medium grey, CLAY.	UD1	3.50 to 4.50	1000/1000							
-5.743		Vane Shear Test No 2	VS-2	5.00 to 5.50								
-6.743		Very soft, medium grey, CLAY.	P2/D2	6.00 to 6.45	450/450	0	0	0	0	0	0	0
-7.743		Vane Shear Test No 3	VS-3	7.00 to 7.50								
-8.743		Very soft, medium grey, CLAY.	P3/D3	8.00 to 8.45	450/450	0	0	0	0	0	0	0
-9.743		Medium grey, CLAY. S1,S2&S3 - CLAY.	UD2	9.00 to 10.00	1000/1000							
-11.243		Very soft, medium grey, CLAY.	P4/D4	10.50 to 10.95	450/450	0	0	0	0	0	0	0
-12.243		Vane Shear Test	VS	11.50 to 12.00								
-12.743		Very soft to soft, light to medium grey, sandy CLAY with traces of seashell.	P5/D5	12.00	440/450	0	0	0	1	0	1	2
<b>Water Observation</b>					<b>Scale of Strength</b>							
Date	Time	Depth	Casing	Sea W.L	<b>Cohesive Soil</b>		<b>Non-Cohesive</b>		<b>Legend</b>			
					0 - 2	Very soft	0 - 4	Very loose	Wash Boring	D	Disturbed Sample	
					2 - 4	Soft	4 - 10	Loose	Split Spoon Sample	UD	Undisturbed Sample	
					4 - 8	Firm	10 - 30	Medium dense	Thin Wall Tube Sample (UD)	CL	Cored Length	
					8 - 15	Stiff	30 - 50	Dense	Piston Sample (Ps)	TCR	Total Cored Recovery	
					15 - 30	Very stiff	> 50	Very dense	Maizer Sample (M)	RQD	Rock Quality Designation	
					> 30	Hard			Rock Corer Sample	V	Vane Shear Test	
									Water Level (WL)	Pm	Permeability Test	
									Standard Penetration Test	Pr	Pressuremeter Test	



Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang. Borehole No. : BH5  
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Customer : <b>Messrs. PLB Engineering Sdn. Bhd.</b>		Job No. : <b>GLSB/SI/3971-155/2022</b>
Date Started : 19/01/2023	Coordinate, E : -1979.957	N: -3136.463 Seawater Level (m) : 1.00 m
Date Completed : 27/01/2023	Platform Elevation	: 2.257 mRL Boring Diameter : 75mm to 125mm
Final Depth : 60.45 m	Seabed Elevation	: -0.743 mRL Type of Boring : Rotary Wash Boring

Elevation	Legend	Soil Description and Lithology Jackup Platform Height From Seabed = 3.00 m	Sample			Standard Penetration Test								Remarks
			Sample Ref.	Depth (m)	Recovery Ratio	75 mm	75 mm	75 mm	75 mm	75 mm	75 mm	75 mm	'N' Value	
-14.243		Loose, pale to light grey, fine to medium grained, Silty/Clayey SAND.	P6/ D6	to 12.45 13.50 to 13.95	330/450	1	1	1	1	1	2		5	
-15.743		Loose, pale to light grey, fine to medium grained, clayey SAND.	P7/ D7	15.00 to 15.45	450/450	1	2	2	2	3	2		9	
-17.243		Medium dense, light grey, fine to medium grained, clayey SAND.	P8/ D8	16.50 to 16.95	450/450	2	2	2	2	3	4		11	
-18.743		Very loose, light grey, fine to medium grained, clayey SAND.	P9/ D9	18.00 to 18.45	340/450	3	2	1	0	0	1		2	
-20.243		Loose to medium dense, light grey, fine grained, clayey SAND.	P10/ D10	19.50 to 19.95	450/450	2	2	2	3	2	3		10	
-21.743		Stiff, light grey, Sandy CLAY of Low Plasticity.	P11/ D11	21.00 to 21.45	400/450	2	2	2	2	2	3		9	
-23.243		Medium dense, light grey, fine to medium grained, clayey SAND.	P12/ D12	22.50 to 22.95	405/450	2	3	4	3	4	5		16	
-24.743		Loose, light grey, fine grained, clayey SAND.	P13/ D13	24.00 to 24.45	450/450	1	2	1	1	1	2		5	
-26.243		Loose, light grey, fine to medium grained, clayey SAND.	P14/ D14	25.50 to 25.95	340/450	2	1	2	1	2	3		8	

<u>Water Observation</u>				
Date	Time	Depth	Casing	Sea W.L.

Scale of Strength			
Cohesive Soil		Non-Cohesive	
0 - 2	Very soft	0 - 4	Very loose
2 - 4	Soft	4 - 10	Loose
4 - 8	Firm	10 - 30	Medium dense
8 - 15	Stiff	30 - 50	Dense
15 - 30	Very stiff	> 50	Very dense
> 30	Hard		

<u>Legend</u>		
D	:	Disturbed Sample
UD	:	Undisturbed Sample
e (UD)	CL	: Cored Length
	TCR	: Total Cored Recovery
	RQD	: Rock Quality Designation
	V	: Vane Shear Test
	Pm	: Permeability Test
est	Pr	: Pressuremeter Test



Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang. Borehole No. : BH5  
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Customer : <b>Messrs. PLB Engineering Sdn. Bhd.</b>		Job No. : <b>GLSB/SI/3971-155/2022</b>
Date Started : 19/01/2023	Coordinate, E : -1979.957	N: -3136.463 Seawater Level (m) : 1.00 m
Date Completed : 27/01/2023	Platform Elevation	: 2.257 mRL Boring Diameter : 75mm to 125mm
Final Depth : 60.45 m	Seabed Elevation	: -0.743 mRL Type of Boring : Rotary Wash Boring

Elevation	Legend	Soil Description and Lithology Jackup Platform Height From Seabed = 3.00 m	Sample			Standard Penetration Test								Remarks
			Sample Ref.	Depth (m)	Recovery Ratio	75 mm	75 mm	75 mm	75 mm	75 mm	75 mm	75 mm	'N' Value	
-27.743		Medium dense, light grey, fine to medium grained, clayey SAND.	P15/ D15	27.00 to 27.45	355/450	4	5	6	6	5	8		25	
-29.243		Medium dense, light grey, fine to medium grained, Very Silty/Clayey SANDS.	P16/ D16	28.50 to 28.95	240/450	6	6	6	6	8	8		28	
-30.743		Medium dense, light grey, fine grained, clayey SAND.	P17/ D17	30.00 to 30.45	310/450	4	4	4	5	3	5		17	
-32.243		Medium dense, light grey, fine to medium grained, clayey SAND.	P18/ D18	31.50 to 31.95	260/450	4	5	4	4	4	4		16	
-33.743		Medium dense, light grey, fine to medium grained, clayey SAND.	P19/ D19	33.00 to 33.45	390/450	4	5	3	3	2	4		12	
-35.243		Medium dense, light grey with light brown spotted, fine to medium grained, clayey SAND.	P20/ D20	34.50 to 34.95	450/450	3	3	3	3	3	4		13	
-36.743		Loose, light grey with light brown spotted, fine grained, clayey SAND.	P21/ D21	36.00 to 36.45	450/450	3	2	2	2	3	2		9	
-38.243		Medium dense, light grey, fine to medium grained, clayey SAND.	P22/ D22	37.50 to 37.95	450/450	5	5	5	3	3	3		14	
-39.743		Medium dense, light grey with medium brown spotted, fine to medium grained, clayey SAND.	P23/ D23	39.00 to 39.45	450/450	4	4	4	4	5	6		19	

<u>Water Observation</u>				
Date	Time	Depth	Casing	Sea W.L

Scale of Strength			
Cohesive Soil	Non-Cohesive		
0 - 2	Very soft	0 - 4	Very loose
2 - 4	Soft	4 - 10	Loose
4 - 8	Firm	10 - 30	Medium dense
8 - 15	Stiff	30 - 50	Dense
15 - 30	Very stiff	> 50	Very dense
> 30	Hard		

<u><b>Legend</b></u>	
D	: Disturbed Sample
UD	: Undisturbed Sample
e (UD)	: Cored Length
TCR	: Total Cored Recovery
RQD	: Rock Quality Designation
V	: Vane Shear Test
Pm	: Permeability Test
est	
Pr	: Pressuremeter Test



Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang. Borehole No. : BH5  
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Customer : <b>Messrs. PLB Engineering Sdn. Bhd.</b>		Job No. : <b>GLSB/SI/3971-155/2022</b>
Date Started : 19/01/2023	Coordinate, E : -1979.957	N: -3136.463 Seawater Level (m) : 1.00 m
Date Completed : 27/01/2023	Platform Elevation	: 2.257 mRL Boring Diameter : 75mm to 125mm
Final Depth : 60.45 m	Seabed Elevation	: -0.743 mRL Type of Boring : Rotary Wash Boring

Elevation	Legend	Soil Description and Lithology Jackup Platform Height From Seabed = 3.00 m	Sample			Standard Penetration Test								Remarks
			Sample Ref.	Depth (m)	Recovery Ratio	75 mm	75 mm	75 mm	75 mm	75 mm	75 mm	75 mm	'N' Value	
-41.243		Stiff, light grey with light brown spotted, Sandy CLAY of Low Plasticity.	P24/D24	40.50 to 40.95	450/450	4	4	4	4	3	3		14	
-42.743		Medium dense, light grey, medium to coarse grained, clayey SAND.	P25/D25	42.00 to 42.45	450/450	3	4	3	2	4	4		13	
-44.243		Loose, light grey with light to medium brown spotted, Very Silty/Clayey SAND.	P26/D26	43.50 to 43.95	450/450	5	5	3	2	2	2		9	
-45.743		Medium dense, light grey, medium to coarse grained, clayey SAND.	P27/D27	45.00 to 45.45	450/450	3	3	2	2	3	4		11	
-47.243		Very stiff, light grey with light brown spotted, sandy CLAY.	P28/D28	46.50 to 46.95	450/450	5	5	5	6	7	7		25	
-48.743		Very stiff to hard, light grey with light brown spotted, CLAY with Intermediate Plasticity.	P29/D29	48.00 to 48.45	450/450	5	4	4	7	9	10		30	
-50.243		Dense, light grey with light brown spotted, fine grained SAND.	P30/D30	49.50 to 49.95	450/450	4	5	8	8	8	12		36	
-51.743		Dense, light grey, fine grained SAND.	P31/D31	51.00 to 51.45	375/450	6	6	7	7	8	10		32	
-53.243		Dense, light grey, Very Silty/Clayey SANDS.	P32/D32	52.50 to 52.95	290/450	6	7	7	9	9	11		36	

### **Water Observation**

Water Observation				
Date	Time	Depth	Casing	Sea W.L.

Scale of Strength

Scale of Strength		Soil Type	
Cohesive Soil		Non-Cohesive	
0 - 2	Very soft	0 - 4	Very loose
2 - 4	Soft	4 - 10	Loose
4 - 8	Firm	10 - 30	Medium dense
8 - 15	Stiff	30 - 50	Dense
15 - 30	Very stiff	> 50	Very dense
> 30	Hard		

### Legend

	: Wash Boring	D	: Disturbed Sample
	: Split Spoon Sample	UD	: Undisturbed Sample
	: Thin Wall Tube Sample (UD)	CL	: Cored Length
	: Piston Sample (Ps)	TCR	: Total Cored Recovery
	: Maizer Sample (M)	RQD	: Rock Quality Designation
	: Rock Core Sample	V	: Vane Shear Test
	: Water Level (WL)	Pm	: Permeability Test
P	: Standard Penetration Test	Pr	: Pressuremeter Test



Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang. Borehole No. : BH5  
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Customer : <b>Messrs. PLB Engineering Sdn. Bhd.</b>		Job No. : <b>GLSB/SI/3971-155/2022</b>
Date Started : 19/01/2023	Coordinate, E : -1979.957	N: -3136.463 Seawater Level (m) : 1.00 m
Date Completed : 27/01/2023	Platform Elevation	: 2.257 mRL Boring Diameter : 75mm to 125mm
Final Depth : 60.45 m	Seabed Elevation	: -0.743 mRL Type of Boring : Rotary Wash Boring

### **Water Observation**

Date	Time	Depth	Casing	Sea W.L.

Scale of Strength

Cohesive Soil		Non-Cohesive	
0 - 2	Very soft	0 - 4	Very loose
2 - 4	Soft	4 - 10	Loose
4 - 8	Firm	10 - 30	Medium dense
8 - 15	Stiff	30 - 50	Dense
15 - 30	Very stiff	> 50	Very dense
> 30	Hard		

### Legend

	: Wash Boring	D	: Disturbed Sample
	: Split Spoon Sample	UD	: Undisturbed Sample
	: Thin Wall Tube Sample (UD)	CL	: Cored Length
	: Piston Sample (Ps)	TCR	: Total Cored Recovery
	: Maizer Sample (M)	RQD	: Rock Quality Designation
	: Rock Core Sample	V	: Vane Shear Test
	: Water Level (WL)	Pm	: Permeability Test
P	: Standard Penetration Test	Pr	: Pressuremeter Test



Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang. Borehole No. : BH6  
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Customer : <b>Messrs. PLB Engineering Sdn. Bhd.</b>		Job No. : <b>GLSB/SI/3971-155/2022</b>
Date Started : 30/01/2023	Coordinate, E : -1804.510	N: -3341.071 Seawater Level (m) : 14.10 m
Date Completed : 02/02/2023	Platform Elevation	: 2.355 mRL Boring Diameter : 75mm to 125mm
Final Depth : 60.16 m	Seabed Elevation	: -14.145 mRL Type of Boring : Rotary Wash Boring

Elevation	Legend	Soil Description and Lithology Jackup Platform Height From Seabed = 16.50 m	Sample			Standard Penetration Test							Remarks
			Sample Ref.	Depth (m)	Recovery Ratio	75 mm	75 mm	75 mm	75 mm	75 mm	75 mm	'N' Value	
		Sea Water.											
-14.145		Top soil.											
-15.645		No recovery.	P1	1.50 to 1.95	NIL/450	4	3	0	1	2	1	4	
-17.145		Loose to medium dense, light grey, medium grained, slightly clayey SAND.	P2/D1	3.00 to 3.45	340/450	2	2	2	3	2	3	10	
-18.645		Medium dense, light grey, fine to medium grained, clayey SAND.	P3/D2	4.50 to 4.95	420/450	3	3	5	4	3	4	16	
-20.145		Loose, light grey, fine to medium grained, Very Silty/Clayey SANDS.	P4/D3	6.00 to 6.45	370/450	2	2	2	2	2	2	8	
-21.645		Medium dense to dense, light grey, fine to medium grained, clayey SAND.	P5/D4	7.50 to 7.95	450/450	4	4	5	7	10	8	30	
-23.145		Medium dense, light grey, medium grained, clayey SAND.	P6/D5	9.00 to 9.45	400/450	3	2	3	3	2	3	11	
-24.645		Medium dense, light grey, fine to medium grained, clayey SAND.	P7/D6	10.50 to 10.95	450/450	3	4	5	6	7	8	26	

<b>Water Observation</b>				
Date	Time	Depth	Casing	Sea W.L

Scale of Strength			
Cohesive Soil		Non-Cohesive	
0 - 2	Very soft	0 - 4	Very loose
2 - 4	Soft	4 - 10	Loose
4 - 8	Firm	10 - 30	Medium dense
8 - 15	Stiff	30 - 50	Dense
15 - 30	Very stiff	> 50	Very dense
> 30	Hard		

<u>Legend</u>		
D	:	Disturbed Sample
UD	:	Undisturbed Sample
e (UD)	CL	: Cored Length
	TCR	: Total Cored Recovery
	RQD	: Rock Quality Designation
	V	: Vane Shear Test
	Pm	: Permeability Test
est	Pr	: Pressuremeter Test



Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang. Borehole No. : BH6  
Pages 2 of 5

Customer : <b>Messrs. PLB Engineering Sdn. Bhd.</b>		Job No. : <b>GLSB/SI/3971-155/2022</b>
Date Started : 30/01/2023	Coordinate, E: -1804.510	N: -3341.071 Seawater Level (m) : 14.10 m
Date Completed : 02/02/2023	Platform Elevation	: 2.355 mRL Boring Diameter : 75mm to 125mm
Final Depth : 60.16 m	Seabed Elevation	: -14.145 mRL Type of Boring : Rotary Wash Boring

Elevation	Legend	Soil Description and Lithology Jackup Platform Height From Seabed = 16.50 m	Sample			Standard Penetration Test								Remarks
			Sample Ref.	Depth (m)	Recovery Ratio	75 mm	75 mm	75 mm	75 mm	75 mm	75 mm	75 mm	'N' Value	
-26.145		Medium dense, light grey, fine to medium grained, clayey SAND.	P8/D7	12.00 to 12.45	405/450	4	4	5	4	5	5	5	19	
-27.645		Medium dense, light grey, fine to medium grained, clayey SAND.	P9/D8	13.50 to 13.95	450/450	5	3	4	3	3	3	3	13	
-29.145		Very Stiff, light grey, Sandy CLAY of Low Plasticity.	P10/D9	15.00 to 15.45	450/450	3	3	5	4	5	6	6	20	
-30.645		Medium dense, light grey, fine to medium grained, clayey SAND.	P11/D10	16.50 to 16.95	390/450	6	3	3	4	4	4	4	15	
-32.145		Medium dense, light grey with medium brown spotted, fine to medium grained, clayey SAND.	P12/D11	18.00 to 18.45	450/450	4	4	4	3	3	4	4	14	
-33.645		Medium dense, light grey, fine to medium grained, clayey SAND.	P13/D12	19.50 to 19.95	450/450	6	4	4	4	4	4	4	16	
-35.145		Stiff, light grey, Sandy CLAY of Low Plasticity.	P14/D13	21.00 to 21.45	450/450	3	3	2	3	3	4	4	12	
-36.645		Medium dense, light grey, fine to medium grained, clayey SAND.	P15/D14	22.50 to 22.95	450/450	7	4	4	5	4	4	4	17	
-38.145		Medium dense, light grey, fine to medium grained, clayey SAND.	P16/D15	24.00 to 24.45	390/450	5	3	5	4	6	6	6	21	

<u>Water Observation</u>				
Date	Time	Depth	Casing	Sea W.L.

Scale of Strength			
Cohesive Soil		Non-Cohesive	
0 - 2	Very soft	0 - 4	Very loose
2 - 4	Soft	4 - 10	Loose
4 - 8	Firm	10 - 30	Medium dense
8 - 15	Stiff	30 - 50	Dense
15 - 30	Very stiff	> 50	Very dense
> 30	Hard		

<u><b>Legend</b></u>	
D	: Disturbed Sample
UD	: Undisturbed Sample
e (UD)	CL : Cored Length
	TCR : Total Cored Recovery
	RQD : Rock Quality Designation
	V : Vane Shear Test
	Pm : Permeability Test
est	Pr : Pressuremeter Test



Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang. Borehole No. : BH6  
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Customer : <b>Messrs. PLB Engineering Sdn. Bhd.</b>		Job No. : <b>GLSB/SI/3971-155/2022</b>
Date Started : 30/01/2023	Coordinate, E : -1804.510	N: -3341.071 Seawater Level (m) : 14.10 m
Date Completed : 02/02/2023	Platform Elevation	: 2.355 mRL Boring Diameter : 75mm to 125mm
Final Depth : 60.16 m	Seabed Elevation	: -14.145 mRL Type of Boring : Rotary Wash Boring

Elevation	Legend	Soil Description and Lithology Jackup Platform Height From Seabed = 16.50 m	Sample			Standard Penetration Test								Remarks
			Sample Ref.	Depth (m)	Recovery Ratio	75 mm	75 mm	75 mm	75 mm	75 mm	75 mm	75 mm	'N' Value	
-39.645		Medium dense, light grey, fine to medium grained, clayey SAND.	P17/D16	25.50 to 25.95	450/450	6	6	6	6	6	6	6	24	
-41.145		Very stiff, light grey, Sandy CLAY of Intermediate Plasticity.	P18/D17	27.00 to 27.45	450/450	4	4	4	4	4	5	5	17	
-42.645		Medium dense, light grey, fine to medium grained, clayey SAND.	P19/D18	28.50 to 28.95	450/450	5	6	5	6	5	6	6	22	
-44.145		Medium dense, light grey, fine to medium grained, clayey SAND.	P20/D19	30.00 to 30.45	450/450	3	3	2	4	3	4	4	13	
-45.645		Medium dense, light grey, fine grained, clayey SAND.	P21/D20	31.50 to 31.95	390/450	3	2	3	2	3	3	3	11	
-47.145		Medium dense, light grey, fine to medium grained, clayey SAND.	P22/D21	33.00 to 33.45	415/450	3	3	4	3	3	3	3	13	
-48.645		Very stiff, light grey, Sandy CLAY of Low Plasticity.	P23/D22	34.50 to 34.95	380/450	7	7	6	6	6	9	9	27	
-50.145		Medium dense, light grey, fine grained, slightly clayey SAND.	P24/D23	36.00 to 36.45	350/450	4	5	7	6	6	7	7	26	
-51.645		Dense, light grey, medium grained, SAND.	P25/D24	37.50 to 37.95	385/450	5	6	6	9	11	16	16	42	

**Water Observation**

Water Observation				
Date	Time	Depth	Casing	Sea W.L.

Scale of Strength

Scale of Strength		Soil Type	
Cohesive Soil		Non-Cohesive	
0 - 2	Very soft	0 - 4	Very loose
2 - 4	Soft	4 - 10	Loose
4 - 8	Firm	10 - 30	Medium dense
8 - 15	Stiff	30 - 50	Dense
15 - 30	Very stiff	> 50	Very dense
> 30	Hard		

Legend

<u>Legend</u>	
	: Wash Boring
	: Split Spoon Sample
	: Thin Wall Tube Sample (UD)
	: Piston Sample (Ps)
	: Maizer Sample (M)
	: Rock Core Sample
	: Water Level (WL)
P	: Standard Penetration Test
D	: Disturbed Sample
UD	: Undisturbed Sample
CL	: Cored Length
TCR	: Total Cored Recovery
RQD	: Rock Quality Designation
V	: Vane Shear Test
Pm	: Permeability Test
Pr	: Pressuremeter Test



Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang. Borehole No. : BH6  
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Pages 4 of 5

Customer : <b>Messrs. PLB Engineering Sdn. Bhd.</b>		Job No. : <b>GLSB/SI/3971-155/2022</b>
Date Started : 30/01/2023	Coordinate, E: -1804.510	N: -3341.071 Seawater Level (m) : 14.10 m
Date Completed : 02/02/2023	Platform Elevation	: 2.355 mRL Boring Diameter : 75mm to 125mm
Final Depth : 60.16 m	Seabed Elevation	: -14.145 mRL Type of Boring : Rotary Wash Boring

Elevation	Legend	Soil Description and Lithology Jackup Platform Height From Seabed = 16.50 m	Sample			Standard Penetration Test								Remarks
			Sample Ref.	Depth (m)	Recovery Ratio	75 mm	75 mm	75 mm	75 mm	75 mm	75 mm	75 mm	'N' Value	
-53.145		Medium dense, light grey, Very Silty/Clayey SANDS.	P26/D25	39.00 to 39.45	400/450	5	5	5	5	6	7		23	
-54.645		Medium dense, light grey, fine grained, SAND.	P27/D26	40.50 to 40.95	245/450	2	2	3	3	4	5		15	
-56.145		Medium dense, light grey, fine grained, SAND.	P28/D27	42.00 to 42.45	305/450	2	4	6	7	7	8		28	
-57.645		Medium dense, light grey, fine grained, SAND.	P29/D28	43.50 to 43.95	370/450	5	6	7	7	7	7		28	
-59.145		Medium dense, light grey, fine grained, SAND.	P30/D29	45.00 to 45.45	430/450	2	2	2	3	3	3		11	
-60.645		Dense, light grey, Very Silty/Clayey SANDS.	P31/D30	46.50 to 46.95	270/450	8	9	7	8	10	10		35	
-62.145		No recovery.	P32	48.00 to 48.45	NIL/450	3	3	4	3	3	3		13	
-63.645		Medium dense, light grey, fine grained, SAND.	P33/D31	49.50 to 49.95	310/450	5	3	5	4	6	7		22	
-65.145		Medium dense, pale to light grey, fine grained, SAND.	P34/D32	51.00 to 51.45	360/450	5	5	6	6	7	8		27	

### **Water Observation**

Water Observation				
Date	Time	Depth	Casing	Sea W.L.

Scale of Strength

Cohesive Soil	Non-Cohesive
0 - 2	Very soft
2 - 4	Soft
4 - 8	Firm
8 - 15	Stiff
15 - 30	Very stiff
> 30	Hard
0 - 4	Very loose
4 - 10	Loose
10 - 30	Medium dense
30 - 50	Dense
> 50	Very dense

Legend

	: Wash Boring	D	: Disturbed Sample
	: Split Spoon Sample	UD	: Undisturbed Sample
	: Thin Wall Tube Sample (UD)	CL	: Cored Length
	: Piston Sample (Ps)	TCR	: Total Cored Recovery
	: Maizer Sample (M)	RQD	: Rock Quality Designation
	: Rock Core Sample	V	: Vane Shear Test
	: Water Level (WL)	Pm	: Permeability Test
P	: Standard Penetration Test	Pr	: Pressuremeter Test



Project : <b>Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.</b>										Borehole No. : <b>BH6</b>		
Pages 5 of 5												
Customer : <b>Messrs. PLB Engineering Sdn. Bhd.</b>						Job No. : <b>GLSB/SI/3971-155/2022</b>						
Date Started : 30/01/2023	Coordinate, E: -1804.510 N: -3341.071			Seawater Level (m) : 14.10 m								
Date Completed : 02/02/2023	Platform Elevation : 2.355 mRL			Boring Diameter : 75mm to 125mm								
Final Depth : 60.16 m	Seabed Elevation : -14.145 mRL			Type of Boring : Rotary Wash Boring								
Elevation	Legend	Soil Description and Lithology <small>Jackup Platform Height From Seabed = 16.50 m</small>	Sample			Standard Penetration Test						Remarks
			Sample Ref.	Depth (m)	Recovery Ratio	75 mm	75 mm	75 mm	75 mm	75 mm	75 mm	
-66.645	Dense, light grey, medium grained, SAND.	P35/D33	52.50 to 52.95	280/450	5	5	6	8	8	12	34	
-68.145	Medium dense, light to medium grey, medium grained, SAND.	P36/D34	54.00 to 54.45	290/450	4	4	3	5	5	5	18	
-69.645	Hard, light to medium grey with light brown spotted, sandy SILT.	P37/D35	55.50 to 55.95	250/450	7	7	10	10	11	15	46	
-71.145	Hard, light to medium grey, Sandy CLAY of Intermediate Plasticity.	P38/D36	57.00 to 57.45	320/450	8	9	11	12	12	13	48	
-72.645	Hard, light to medium grey, sandy SILT.	P39/D37	58.50 to 58.72	190/215	15	10/40mm	31	19/35mm			50/100mm	
-74.145	Hard, light to medium grey, sandy SILT.	P40/D38	60.00 to 60.16	155/155	19	6/25mm	50/55mm				50/55mm	
<b>END OF BH6 AT 60.16 m</b>												
Water Observation					Scale of Strength			Legend				
Date	Time	Depth	Casing	Sea W.L	Cohesive Soil	Non-Cohesive						
					0 - 2 Very soft	0 - 4 Very loose						
					2 - 4 Soft	4 - 10 Loose						
					4 - 8 Firm	10 - 30 Medium dense						
					8 - 15 Stiff	30 - 50 Dense						
					15 - 30 Very stiff	> 50 Very dense						
					> 30 Hard							

- |   |                              |     |                            |
|---|------------------------------|-----|----------------------------|
| □ | : Wash Boring                | D   | : Disturbed Sample         |
| ▨ | : Split Spoon Sample         | UD  | : Undisturbed Sample       |
| ▢ | : Thin Wall Tube Sample (UD) | CL  | : Cored Length             |
| ▢ | : Piston Sample (Ps)         | TCR | : Total Cored Recovery     |
| ▢ | : Maizer Sample (M)          | RQD | : Rock Quality Designation |
| ▢ | : Rock Corer Sample          | V   | : Vane Shear Test          |
| ▽ | : Water Level (WL)           | Pm  | : Permeability Test        |
| P | : Standard Penetration Test  | Pr  | : Pressuremeter Test       |



Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang. Borehole No. : BH7  
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Customer : <b>Messrs. PLB Engineering Sdn. Bhd.</b>		Job No. : <b>GLSB/SI/3971-155/2022</b>
Date Started : 06/02/2023	Coordinate, E: -1937.418 N: -3652.294	Seawater Level (m) : 10.80 m
Date Completed : 10/02/2023	Platform Elevation : 2.263 mRL	Boring Diameter : 75mm to 125mm
Final Depth : 60.45 m	Seabed Elevation : -11.237 mRL	Type of Boring : Rotary Wash Boring

Elevation	Legend	Soil Description and Lithology <i>Jackup Platform Height From Seabed = 13.50 m</i>	Sample			Standard Penetration Test								Remarks
			Sample Ref.	Depth (m)	Recovery Ratio	75 mm	75 mm	75 mm	75 mm	75 mm	75 mm	75 mm	'N' Value	
		Sea water												
-11.237		Top soil.												
-12.737		Very soft, medium grey, sandy CLAY with traces of seashell.	P1/D1	1.50 to 1.95	320/450	0	0	0	0	0	0	0	0	0
-14.237		Medium grey, CLAY of Very High Plasticity. S1 - CLAY of Very High Plasticity. S2 - SILT of High Plasticity. S3 - SILT of Very High Plasticity. Soft, medium grey, slightly sandy CLAY.	UD1	3.00 to 4.00	1000/1000									
-15.737			P2/D2	4.50 to 4.95	450/450	1	0	1	0	1	1	1	1	3
-17.237		Medium grey, Sandy CLAY of Intermediate Plasticity. UD2-UCT - Very Clayey SAND of Intermediate Plasticity.	UD2	6.00 to 7.00	450/1000									
-18.737		Firm to stiff, light to medium grey, sandy CLAY.	P3/D3	7.50 to 7.95	410/450	2	2	2	2	2	2	2	2	8
-20.237		Medium dense, light to medium brownish grey with light grey spotted, slightly silty SAND.	P4/D4	9.00 to 9.45	240/450	8	4	4	3	3	3	3	3	13
-21.737		Medium dense, light grey, fine grained, clayey SAND.	P5/D5	10.50 to 10.95	310/450	4	4	4	4	4	4	5	5	17

<u>Water Observation</u>				
Date	Time	Depth	Casing	Sea W.L.

Scale of Strength			
Cohesive Soil	Non-Cohesive		
0 - 2	Very soft	0 - 4	Very loose
2 - 4	Soft	4 - 10	Loose
4 - 8	Firm	10 - 30	Medium dense
8 - 15	Stiff	30 - 50	Dense
15 - 30	Very stiff	> 50	Very dense
> 30	Hard		

<u>Legend</u>		
D	:	Disturbed Sample
UD	:	Undisturbed Sample
(UD)	CL	: Cored Length
	TCR	: Total Cored Recovery
	RQD	: Rock Quality Designation
	V	: Vane Shear Test
est	Pm	: Permeability Test
	Pr	: Pressuremeter Test



Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang. Borehole No. : BH7  
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Customer : <b>Messrs. PLB Engineering Sdn. Bhd.</b>		Job No. : <b>GLSB/SI/3971-155/2022</b>
Date Started : 06/02/2023	Coordinate, E: -1937.418 N: -3652.294	Seawater Level (m) : 10.80 m
Date Completed : 10/02/2023	Platform Elevation : 2.263 mRL	Boring Diameter : 75mm to 125mm
Final Depth : 60.45 m	Seabed Elevation : -11.237 mRL	Type of Boring : Rotary Wash Boring

Elevation	Legend	Soil Description and Lithology <i>Jackup Platform Height From Seabed = 13.50 m</i>	Sample			Standard Penetration Test								Remarks
			Sample Ref.	Depth (m)	Recovery Ratio	75 mm	75 mm	75 mm	75 mm	75 mm	75 mm	75 mm	'N' Value	
-23.237		Medium dense, light grey, fine to medium grained, clayey SAND.	P6/ D6	12.00 to 12.45	255/450	4	5	5	3	5	4		17	
-24.737		Medium dense, light grey, fine to medium grained, clayey SAND.	P7/ D7	13.50 to 13.95	230/450	3	4	5	5	5	6		21	
-26.237		Medium dense, light grey with light brown spotted, Very Clayey SAND of Intermediate Plasticity.	P8/ D8	15.00 to 15.45	370/450	4	4	5	7	7	9		28	
-27.737		Medium dense, light grey, fine grained, slightly clayey SAND.	P9/ D9	16.50 to 16.95	260/450	4	4	4	6	6	7		23	
-29.237		Medium dense, light grey, fine grained, clayey SAND.	P10/ D10	18.00 to 18.45	450/450	4	5	4	6	6	8		24	
-30.737		Stiff to very stiff, light grey, Sandy CLAY of Low Plasticity.	P11/ D11	19.50 to 19.95	450/450	2	2	3	4	4	4		15	
-32.237		Very stiff, light grey, sandy CLAY.	P12/ D12	21.00 to 21.45	340/450	5	5	5	5	5	5		20	
-33.737		Medium dense, light grey, fine grained, clayey SAND.	P13/ D13	22.50 to 22.95	420/450	5	4	5	4	4	4		17	
-35.237		Stiff, light grey, sandy CLAY.	P14/ D14	24.00 to 24.45	330/450	4	4	3	3	3	4		13	

### **Water Observation**

Water Observation				
Date	Time	Depth	Casing	Sea W.L.

Scale of Strength

Cohesive Soil	Non-Cohesive
0 - 2	Very soft
2 - 4	Soft
4 - 8	Firm
8 - 15	Stiff
15 - 30	Very stiff
> 30	Hard
0 - 4	Very loose
4 - 10	Loose
10 - 30	Medium dense
30 - 50	Dense
> 50	Very dense

### Legend

	: Wash Boring	D	: Disturbed Sample
	: Split Spoon Sample	UD	: Undisturbed Sample
	: Thin Wall Tube Sample (UD)	CL	: Cored Length
	: Piston Sample (Ps)	TCR	: Total Cored Recovery
	: Maizer Sample (M)	RQD	: Rock Quality Designation
	: Rock Core Sample	V	: Vane Shear Test
	: Water Level (WL)	Pm	: Permeability Test
P	: Standard Penetration Test	Pr	: Pressuremeter Test



Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang. Borehole No. : BH7

Pages 3 of 5

Customer : <b>Messrs. PLB Engineering Sdn. Bhd.</b>		Job No. : <b>GLSB/SI/3971-155/2022</b>
Date Started : 06/02/2023	Coordinate, E: -1937.418	N: -3652.294 Seawater Level (m) : 10.80 m
Date Completed : 10/02/2023	Platform Elevation	: 2.263 mRL Boring Diameter : 75mm to 125mm
Final Depth : 60.45 m	Seabed Elevation	: -11.237 mRL Type of Boring : Rotary Wash Boring

Elevation	Legend	Soil Description and Lithology <i>Jackup Platform Height From Seabed = 13.50 m</i>	Sample			Standard Penetration Test								Remarks
			Sample Ref.	Depth (m)	Recovery Ratio	75 mm	75 mm	75 mm	75 mm	75 mm	75 mm	75 mm	'N' Value	
-36.737		Medium dense, light grey with light brown spotted, fine grained, clayey SAND.	P15/D15	25.50 to 25.95	390/450	3	3	3	3	3	3	3	12	
-38.237		Medium dense, light grey, fine grained, clayey SAND.	P16/D16	27.00 to 27.45	380/450	4	3	2	3	3	3	3	11	
-39.737		Medium dense, light grey, fine to medium grained, clayey SAND.	P17/D17	28.50 to 28.95	320/450	5	4	4	3	4	4	4	15	
-41.237		Medium dense, light grey, medium grained, clayey SAND.	P18/D18	30.00 to 30.45	380/450	3	4	4	3	4	5	5	16	
-42.737		Stiff, light grey, Sandy CLAY of Low Plasticity.	P19/D19	31.50 to 31.95	290/450	3	3	3	3	3	3	3	12	
-44.237		Medium dense, light grey, fine to medium grained, clayey SAND.	P20/D20	33.00 to 33.45	335/450	4	4	4	4	4	5	5	17	
-45.737		Medium dense, light grey with light brown spotted, medium grained, clayey SAND.	P21/D21	34.50 to 34.95	330/450	4	5	5	4	5	5	5	19	
-47.237		Medium dense, light grey, Very Clayey SAND of Intermediate Plasticity.	P22/D22	36.00 to 36.45	290/450	5	6	6	6	5	5	5	22	
-48.737		Very stiff, light grey, SILT.	P23/D23	37.50 to 37.95	250/450	4	5	5	6	8	8	8	27	

### **Water Observation**

Water Observation				
Date	Time	Depth	Casing	Sea W.L.

Scale of Strength

Scale of Strength		Soil Type	
Cohesive Soil		Non-Cohesive	
0 - 2	Very soft	0 - 4	Very loose
2 - 4	Soft	4 - 10	Loose
4 - 8	Firm	10 - 30	Medium dense
8 - 15	Stiff	30 - 50	Dense
15 - 30	Very stiff	> 50	Very dense
> 30	Hard		

Legend

	: Wash Boring	D	: Disturbed Sample
	: Split Spoon Sample	UD	: Undisturbed Sample
	: Thin Wall Tube Sample (UD)	CL	: Cored Length
	: Piston Sample (Ps)	TCR	: Total Cored Recovery
	: Maizer Sample (M)	RQD	: Rock Quality Designation
	: Rock Core Sample	V	: Vane Shear Test
	: Water Level (WL)	Pm	: Permeability Test
P	: Standard Penetration Test	Pr	: Pressuremeter Test



Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang. Borehole No. : BH7  
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Customer : **Messrs. PLB Engineering Sdn. Bhd.** Job No. : **GLSB/SI/3971-155/2022**

Date Started	: 06/02/2023	Coordinate, E	-1937.418	N	-3652.294	Seawater Level (m)	: 10.80 m
Date Completed	: 10/02/2023	Platform Elevation		: 2.263 mRL	Boring Diameter	: 75mm to 125mm	
Final Depth	: 60.45 m	Seabed Elevation		: -11.237 mRL	Type of Boring	: Rotary Wash Boring	

Elevation	Legend	Soil Description and Lithology Jackup Platform Height From Seabed = 13.50 m	Sample			Standard Penetration Test								Remarks
			Sample Ref.	Depth (m)	Recovery Ratio	75 mm	75 mm	75 mm	75 mm	75 mm	75 mm	75 mm	'N' Value	
-50.237		Very stiff, light grey, SILT.	P24/ D24	39.00 to 39.45	235/450	5	5	6	6	6	6	6	24	
-51.737		Very stiff, light grey, SILT.	P25/ D25	40.50 to 40.95	275/450	5	5	5	5	7	6	6	23	
-53.237		Very stiff, light grey, Sandy CLAY of Low Plasticity.	P26/ D26	42.00 to 42.45	250/450	6	6	7	7	5	6	6	25	
-54.737		Very stiff, light grey, sandy SILT.	P27/ D27	43.50 to 43.95	300/450	4	4	5	6	6	6	6	23	
-56.237		Very stiff, light grey, SILT.	P28/ D28	45.00 to 45.45	285/450	5	4	4	7	7	5	23		
-57.737		Very stiff, light grey, sandy SILT.	P29/ D29	46.50 to 46.95	330/450	5	6	6	7	7	7	7	27	
-59.237		Very stiff, light grey, Sandy CLAY of Low Plasticity.	P30/ D30	48.00 to 48.45	310/450	5	5	5	6	5	5	5	21	
-60.737		Very stiff, light grey, sandy SILT.	P31/ D31	49.50 to 49.95	320/450	5	6	6	4	4	6	6	20	
-62.237		No recovery.	P32	51.00 to 51.45	NIL/450	6	6	7	8	8	8	8	31	

<u>Water Observation</u>				
Date	Time	Depth	Casing	Sea W.L.

Scale of Strength			
Cohesive Soil		Non-Cohesive	
0 - 2	Very soft	0 - 4	Very loose
2 - 4	Soft	4 - 10	Loose
4 - 8	Firm	10 - 30	Medium dense
8 - 15	Stiff	30 - 50	Dense
15 - 30	Very stiff	> 50	Very dense
> 30	Hard		

<u><b>Legend</b></u>	
D	: Disturbed Sample
UD	: Undisturbed Sample
e (UD)	: Cored Length
TCR	: Total Cored Recovery
RQD	: Rock Quality Designation
V	: Vane Shear Test
Pm	: Permeability Test
est	: Pressuremeter Test



Project	Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.				Borehole No. : BH7
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Customer	Messrs. PLB Engineering Sdn. Bhd.			Job No.	GLSB/SI/3971-155/2022
Date Started	06/02/2023	Coordinate, E: -1937.418 N: -3652.294		Seawater Level (m) : 10.80 m	
Date Completed	10/02/2023	Platform Elevation : 2.263 mRL		Boring Diameter : 75mm to 125mm	
Final Depth	60.45 m	Seabed Elevation : -11.237 mRL		Type of Boring : Rotary Wash Boring	

Elevation	Legend	Soil Description and Lithology <small>Jackup Platform Height From Seabed = 13.50 m</small>	Sample			Standard Penetration Test								Remarks
			Sample Ref.	Depth (m)	Recovery Ratio	75 mm	75 mm	75 mm	75 mm	75 mm	75 mm	'N' Value		
-63.737	xx	Dense, light grey, Very Silty/Clayey SANDS.	P33/ D32	52.50 to 52.95	320/450	11	10	9	7	7	11	34		
-65.237	xx	Hard, light grey, sandy SILT.	P34/ D33	54.00 to 54.45	340/450	9	10	10	8	8	9	35		
-66.737	xx	Medium dense, light grey, fine grained, silty SAND.	P35/ D34	55.50 to 55.95	215/450	4	3	4	6	6	6	22		
-68.237	xx	Medium dense, light brown, Silty/Clayey GRAVEL.	P36/ D35	57.00 to 57.45	300/450	5	5	6	6	7	6	25		
-69.737	xx	Very dense, light grey with light brown spotted, fine grained, silty SAND.	P37/ D36	58.50 to 58.89	290/390	14	11/ 55mm	12	15	13	10/ 35mm	50/ 260mm		
-71.237	xx	Dense, light grey with light brown spotted, fine grained, clayey SAND.	P38/ D37	60.00 to 60.45	265/450	7	7	8	9	9	13	39		
-71.687		<b>END OF BH7 AT 60.45 m</b>												

Water Observation				
Date	Time	Depth	Casing	Sea W.L

Cohesive Soil		Non-Cohesive	
0 - 2	Very soft	0 - 4	Very loose
2 - 4	Soft	4 - 10	Loose
4 - 8	Firm	10 - 30	Medium dense
8 - 15	Stiff	30 - 50	Dense
15 - 30	Very stiff	> 50	Very dense
> 30	Hard		

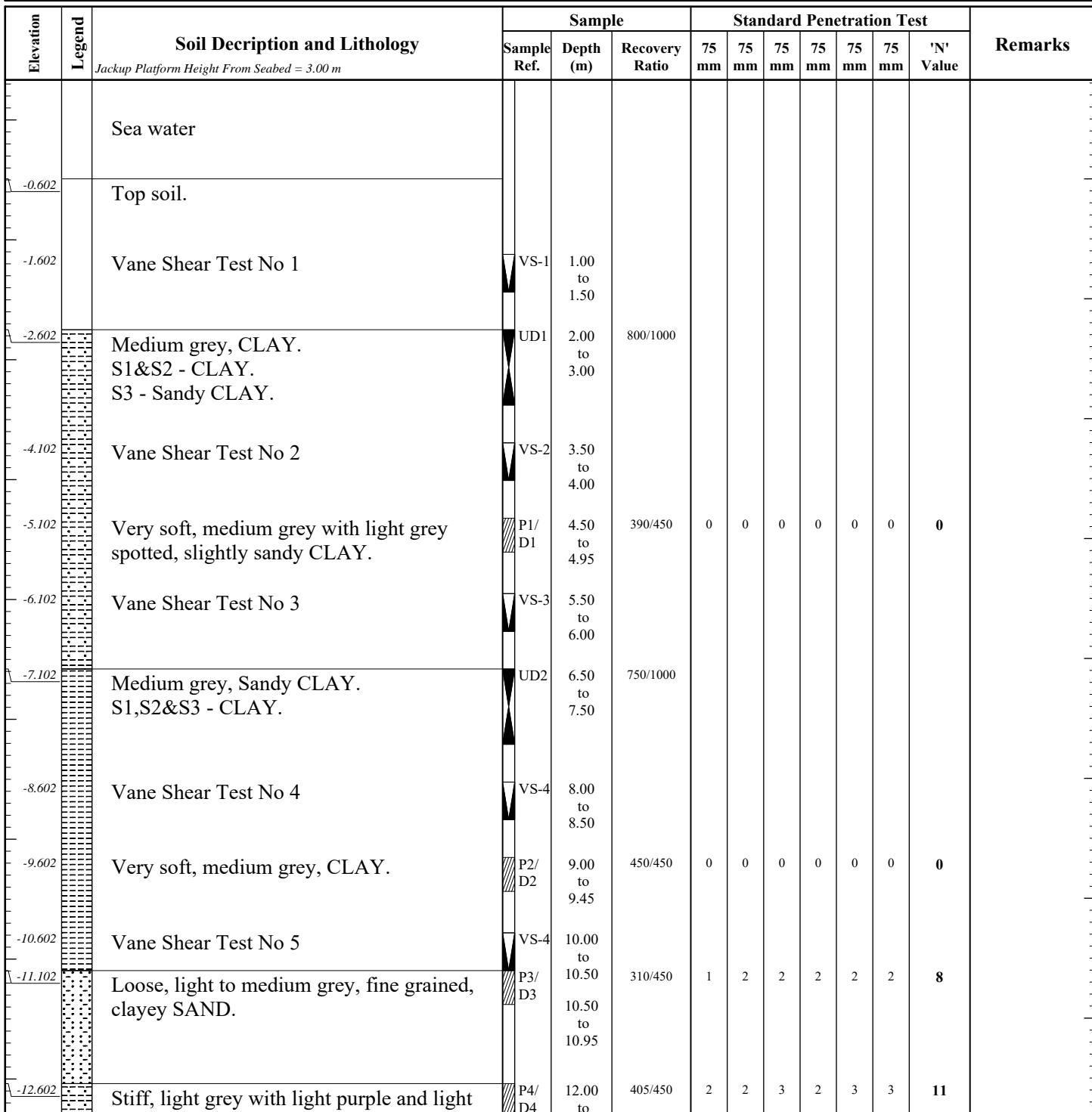
Legend	
: Wash Boring	D : Disturbed Sample
: Split Spoon Sample	UD : Undisturbed Sample
: Thin Wall Tube Sample (UD)	CL : Cored Length
: Piston Sample (Ps)	TCR : Total Cored Recovery
: Maizer Sample (M)	RQD : Rock Quality Designation
: Rock Corer Sample	V : Vane Shear Test
: Water Level (WL)	Pm : Permeability Test
P : Standard Penetration Test	Pr : Pressuremeter Test



Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang. Borehole No. : BH8  
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Pages 1 of 4

Customer : <b>Messrs. PLB Engineering Sdn. Bhd.</b>		Job No. : <b>GLSB/SI/3971-155/2022</b>
Date Started : 12/02/2023	Coordinate, E : -2378.888	N: -3657.462 Seawater Level (m) : 1.30 m
Date Completed : 17/02/2023	Platform Elevation	: 2.398 mRL Boring Diameter : 75mm to 125mm
Final Depth : 52.80 m	Seabed Elevation	: -0.602 mRL Type of Boring : Rotary Wash Boring



<b>Water Observation</b>				
Date	Time	Depth	Casing	Sea W.L.

Scale of Strength			
Cohesive Soil		Non-Cohesive	
0 - 2	Very soft	0 - 4	Very loose
2 - 4	Soft	4 - 10	Loose
4 - 8	Firm	10 - 30	Medium dense
8 - 15	Stiff	30 - 50	Dense
15 - 30	Very stiff	> 50	Very dense
> 30	Hard		

<u><b>Legend</b></u>	
D	: Disturbed Sample
UD	: Undisturbed Sample
(UD)	CL : Cored Length
	TCR : Total Cored Recovery
	RQD : Rock Quality Designation
	V : Vane Shear Test
	Pm : Permeability Test
est	Pr : Pressuremeter Test



Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang. Borehole No. : BH8  
Pages 2 of 4

Pages 2 of 4

Customer : <b>Messrs. PLB Engineering Sdn. Bhd.</b>		Job No. : <b>GLSB/SI/3971-155/2022</b>
Date Started : 12/02/2023	Coordinate, E: -2378.888	N: -3657.462 Seawater Level (m) : 1.30 m
Date Completed : 17/02/2023	Platform Elevation	: 2.398 mRL Boring Diameter : 75mm to 125mm
Final Depth : 52.80 m	Seabed Elevation	: -0.602 mRL Type of Boring : Rotary Wash Boring

Elevation	Legend	Soil Description and Lithology <small>Jackup Platform Height From Seabed = 3.00 m</small>	Sample			Standard Penetration Test								Remarks
			Sample Ref.	Depth (m)	Recovery Ratio	75 mm	75 mm	75 mm	75 mm	75 mm	75 mm	75 mm	'N' Value	
-14.102		brown spotted, Sandy CLAY of Low Plasticity.		12.45										
-14.102		Medium dense, light grey with light red and light brown mottled, fine grained, clayey SAND.	P5/ D5	13.50 to 13.95	380/450	3	4	3	3	3	3	3	12	
-15.602		Stiff, light to medium red with light grey and light brown mottled, Sandy CLAY of Intermediate Plasticity.	P6/ D6	15.00 to 15.45	415/450	4	2	3	3	3	4	4	13	
-17.102		Medium dense, light grey, fine grained, clayey SAND.	P7/ D7	16.50 to 16.95	360/450	3	3	3	4	4	5	5	16	
-18.602		Medium dense, light grey with medium brown spotted, fine to medium grained, clayey SAND.	P8/ D8	18.00 to 18.45	370/450	3	3	3	4	4	3	3	14	
-20.102		Medium dense, light grey with medium brown spotted, fine to medium grained, clayey SAND.	P9/ D9	19.50 to 19.95	360/450	3	3	3	3	3	3	3	12	
-21.602		Loose to medium dense, light grey with medium brown spotted, Very Silty/Clayey SANDS.	P10/ D10	21.00 to 21.45	450/450	2	2	2	2	3	3	3	10	
-23.102		Very loose, light grey, fine grained, clayey SAND.	P11/ D11	22.50 to 22.95	450/450	0	0	0	0	0	0	0	0	0
-24.602		Loose to medium dense, light grey, fine to medium grained, SAND.	P12/ D12	24.00 to 24.45	380/450	2	2	2	3	2	3	3	10	
-26.102		Medium dense, light grey with medium brown spotted, fine grained, clayey SAND.	P13/ D13	25.50 to 25.95	330/450	3	2	3	4	4	4	4	15	

## **Water Observation**

Water Observation				
Date	Time	Depth	Casing	Sea W.L.

Scale of Strength

Soil Strength		Soil Type	
Cohesive Soil		Non-Cohesive	
0 - 2	Very soft	0 - 4	Very loose
2 - 4	Soft	4 - 10	Loose
4 - 8	Firm	10 - 30	Medium dense
8 - 15	Stiff	30 - 50	Dense
15 - 30	Very stiff	> 50	Very dense
> 30	Hard		

Legend

	: Wash Boring	D	: Disturbed Sample
	: Split Spoon Sample	UD	: Undisturbed Sample
	: Thin Wall Tube Sample (UD)	CL	: Cored Length
	: Piston Sample (Ps)	TCR	: Total Cored Recovery
	: Maizer Sample (M)	RQD	: Rock Quality Designation
	: Rock Core Sample	V	: Vane Shear Test
	: Water Level (WL)	Pm	: Permeability Test
P	: Standard Penetration Test	Pr	: Pressuremeter Test



Project : <b>Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.</b>								Borehole No. : <b>BH8</b>				
Pages 3 of 4												
Customer : <b>Messrs. PLB Engineering Sdn. Bhd.</b>						Job No. : <b>GLSB/SI/3971-155/2022</b>						
Date Started : 12/02/2023	Coordinate, E: -2378.888 N: -3657.462			Seawater Level (m) : 1.30 m								
Date Completed : 17/02/2023	Platform Elevation : 2.398 mRL			Boring Diameter : 75mm to 125mm								
Final Depth : 52.80 m	Seabed Elevation : -0.602 mRL			Type of Boring : Rotary Wash Boring								
Elevation	Legend	Soil Description and Lithology <i>Jackup Platform Height From Seabed = 3.00 m</i>	Sample			Standard Penetration Test						Remarks
			Sample Ref.	Depth (m)	Recovery Ratio	75 mm	75 mm	75 mm	75 mm	75 mm	75 mm	
-27.602		Very stiff, light grey, sandy CLAY.	P14/ D14	27.00 to 27.45	350/450	4	5	5	6	6	5	<b>22</b>
-29.102		Stiff, light grey, sandy CLAY.	P15/ D15	28.50 to 28.95	450/450	2	3	4	3	3	4	<b>14</b>
-30.602		Very stiff, light grey, Sandy CLAY of Intermediate Plasticity.	P16/ D16	30.00 to 30.45	360/450	4	4	4	4	5	5	<b>18</b>
-32.102		Stiff, light grey, sandy CLAY.	P17/ D17	31.50 to 31.95	415/450	3	2	3	3	3	3	<b>12</b>
-33.602		Medium dense, light grey, medium grained, clayey SAND.	P18/ D18	33.00 to 33.45	320/450	3	4	4	5	5	6	<b>20</b>
-35.102		Medium dense, light grey, fine to medium grained, clayey SAND.	P19/ D19	34.50 to 34.95	370/4500	4	5	5	6	6	6	<b>22</b>
-36.602		Stiff, light grey with light brown spotted, sandy CLAY.	P20/ D20	36.00 to 36.45	290/450	2	2	3	3	4	3	<b>13</b>
-38.102		Very stiff, light grey with light brown spotted, Sandy CLAY of Low Plasticity.	P21/ D21	37.50 to 37.95	300/450	3	4	4	5	5	4	<b>18</b>
-39.602		Loose, light grey, fine to medium grained, clayey SAND.	P22/ D22	39.00 to 39.45	310/450	2	3	2	2	3	2	<b>9</b>
Water Observation					Scale of Strength				Legend			
Date	Time	Depth	Casing	Sea W.L	Cohesive Soil	Non-Cohesive						
					0 - 2 2 - 4 4 - 8 8 - 15 15 - 30 > 30	Very soft Soft Firm Stiff Very stiff Hard	0 - 4 4 - 10 10 - 30 30 - 50 > 50	Very loose Loose Medium dense Dense Very dense	: Wash Boring : Split Spoon Sample : Thin Wall Tube Sample (UD) : Piston Sample (Ps) : Maizer Sample (M) : Rock Corer Sample : Water Level (WL) P : Standard Penetration Test	D : Disturbed Sample UD : Undisturbed Sample CL : Cored Length TCR : Total Cored Recovery RQD : Rock Quality Designation V : Vane Shear Test Pm : Permeability Test Pr : Pressuremeter Test		



Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.										Borehole No. : BH8				
										Pages 4 of 4				
Customer : Messrs. PLB Engineering Sdn. Bhd.										Job No. : GLSB/SI/3971-155/2022				
Date Started : 12/02/2023	Coordinate, E: -2378.888 N: -3657.462					Seawater Level (m) : 1.30 m								
Date Completed : 17/02/2023	Platform Elevation : 2.398 mRL					Boring Diameter : 75mm to 125mm								
Final Depth : 52.80 m	Seabed Elevation : -0.602 mRL					Type of Boring : Rotary Wash Boring								
Elevation	Legend	Soil Description and Lithology <i>Jackup Platform Height From Seabed = 3.00 m</i>			Sample Ref.	Depth (m)	Recovery Ratio	75 mm	75 mm	75 mm	75 mm	75 mm	'N' Value	Remarks
-41.102		Medium dense, light grey, fine grained, clayey SAND.			P23/D23	40.50 to 40.95	360/450	3	3	3	4	4	4	15
-42.602		Medium dense, light to medium grey, Very Silty/Clayey SANDS.			P24/D24	42.00 to 42.45	330/450	4	4	4	4	4	4	16
-44.102		Medium dense, light brownish grey, fine grained, clayey SAND.			P25/D25	43.50 to 43.95	295/450	3	4	4	3	4	3	14
-45.602		Very stiff, light grey, CLAY of Intermediate Plasticity.			P26/D26	45.00 to 45.45	335/450	3	2	4	3	4	6	17
-47.102		Very stiff, light to medium grey, sandy SILT.			P27/D27	46.50 to 46.95	190/450	3	3	5	4	5	7	21
-48.602		Hard, light to medium grey, sandy SILT.			P28/D28	48.00 to 48.14	135/135	25/70mm	50/65mm					50/65mm
-50.102		Hard, light grey, sandy SILT.			P29/D29	49.50 to 49.64	110/135	25/70mm	50/65mm					50/65mm
-50.402		Moderately strong, light grey with dark grey and light orange mottled, moderately weathered, highly fractured, GRANITE.			C1	49.80 to 51.30	CL=1.50m TCR=100% RQD=17%							
-51.902		Strong to very strong, light grey with dark grey spotted, slightly weathered, slightly fractured, GRANITE.			C2	51.30 to 52.80	CL=1.50m TCR=100% RQD=79%							
-53.402		END OF BH8 AT 52.80 m												
Water Observation					Scale of Strength						Legend			
Date	Time	Depth	Casing	Sea W.L.	Cohesive Soil		Non-Cohesive				D	Disturbed Sample		
					0 - 2	Very soft	0 - 4	Very loose			UD	Undisturbed Sample		
					2 - 4	Soft	4 - 10	Loose			CL	Cored Length		
					4 - 8	Firm	10 - 30	Medium dense			TCR	Total Cored Recovery		
					8 - 15	Stiff	30 - 50	Dense			RQD	Rock Quality Designation		
					15 - 30	Very stiff	> 50	Very dense			V	Vane Shear Test		
					> 30	Hard					Pm	Permeability Test		
											Pr	Pressuremeter Test		



Project : <b>Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.</b>		Borehole No. : <b>BH9</b>											
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Customer : <b>Messrs. PLB Engineering Sdn. Bhd.</b>		Job No. : <b>GLSB/SI/3971-155/2022</b>											
Date Started : 18/02/2023	Coordinate, E: -1644.653 N: -3188.772	Seawater Level (m) : 14.40 m											
Date Completed : 23/02/2023	Platform Elevation : 2.309 mRL												
Final Depth : 60.45 m	Seabed Elevation : -14.191 mRL	Type of Boring : Rotary Wash Boring											
Elevation	Legend	Soil Description and Lithology <i>Jackup Platform Height From Seabed = 16.50 m</i>	Sample Ref.	Depth (m)	Recovery Ratio	75 mm	75 mm	75 mm	75 mm	75 mm	75 mm	'N' Value	Remarks
-14.191		Sea water											
-14.191		Top soil.											
-15.691		Very soft, medium to dark grey, Sandy SILTS/CLAYS.	P1/D1	1.50 to 1.95	260/450	0	0	0	0	1	0	1	
-17.191		Medium dense, light to medium grey, fine to coarse grained, clayey SAND.	P2/D2	3.00 to 3.45	430/450	3	2	2	3	4	4	13	
-18.691		Medium dense, light grey, fine to medium grained, slightly clayey SAND.	P3/D3	4.50 to 4.95	380/450	3	2	3	4	4	3	14	
-20.191		Loose, light grey, fine to medium grained, clayey SAND.	P4/D4	6.00 to 6.45	320/450	2	1	2	3	2	2	9	
-21.691		Light grey, fine grained, Sandy CLAY of Intermediate Plasticity. S1 - Sandy CLAY of Intermediate Plasticity. S2&S3 - Sandy CLAY of Low Plasticity.	UD1	7.50 to 8.50	860/1000								
-23.191		Loose to medium dense, light grey, fine to medium grained, clayey SAND.	P5/D5	9.00 to 9.45	360/450	3	3	2	3	2	3	10	
-24.691		Medium dense, light grey, fine to medium grained, clayey SAND.	P6/D6	10.50 to 10.95	370/450	3	3	4	4	4	4	16	
Water Observation			Scale of Strength			Legend							
Date	Time	Depth	Casing	Sea W.L.		Cohesive Soil	Non-Cohesive						
						0 - 2 2 - 4 4 - 8 8 - 15 15 - 30 > 30	Very soft Soft Firm Stiff Very stiff Hard	0 - 4 4 - 10 10 - 30 30 - 50 > 50	Very loose Loose Medium dense Dense Very dense				



Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang. Borehole No. : BH9  
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Customer : <b>Messrs. PLB Engineering Sdn. Bhd.</b>		Job No. : <b>GLSB/SI/3971-155/2022</b>
Date Started : 18/02/2023	Coordinate, E : -1644.653	N : -3188.772 Seawater Level (m) : 14.40 m
Date Completed : 23/02/2023	Platform Elevation	: 2.309 mRL Boring Diameter : 75mm to 125mm
Final Depth : 60.45 m	Seabed Elevation	: -14.191 mRL Type of Boring : Rotary Wash Boring

Elevation	Legend	Soil Description and Lithology Jackup Platform Height From Seabed = 16.50 m	Sample			Standard Penetration Test								Remarks
			Sample Ref.	Depth (m)	Recovery Ratio	75 mm	75 mm	75 mm	75 mm	75 mm	75 mm	75 mm	'N' Value	
-26.191		Medium dense, light grey, fine to medium grained, clayey SAND.	P7/ D7	12.00 to 12.45	380/450	3	4	6	4	5	6		21	
-27.691		Medium dense, light grey, fine to medium grained, clayey SAND.	P8/ D8	13.50 to 13.95	370/450	4	4	4	5	4	5		18	
-29.191		Medium dense, light grey, Sandy CLAY of Low Plasticity.	P9/ D9	15.00 to 15.45	390/450	4	6	7	6	7	7		27	
-30.691		Medium dense, light to medium grey, fine to medium grained, clayey SAND.	P10/ D10	16.50 to 16.95	390/450	3	4	5	5	7	7		24	
-32.191		Medium dense, light to medium grey, fine to medium grained, clayey SAND.	P11/ D11	18.00 to 18.45	350/450	4	4	6	5	5	6		22	
-33.691		Medium dense, light grey, fine to medium grained, clayey SAND.	P12/ D12	19.50 to 19.95	430/450	3	4	4	4	5	6		19	
-35.191		Medium dense, light grey, fine to medium grained, clayey SAND.	P13/ D13	21.00 to 21.45	365/450	3	3	3	4	4	4		15	
-36.691		Stiff, light grey, Sandy CLAY of Intermediate Plasticity.	P14/ D14	22.50 to 22.95	380/450	3	4	3	3	3	3		12	
-38.191		Medium dense, light to medium grey, fine grained, clayey SAND.	P15/ D15	24.00 to 24.45	340/450	4	3	4	4	3	4		15	

<u>Water Observation</u>				
Date	Time	Depth	Casing	Sea W.L

Scale of Strength			
Cohesive Soil		Non-Cohesive	
0 - 2	Very soft	0 - 4	Very loose
2 - 4	Soft	4 - 10	Loose
4 - 8	Firm	10 - 30	Medium dense
8 - 15	Stiff	30 - 50	Dense
15 - 30	Very stiff	> 50	Very dense
> 30	Hard		

<u>Legend</u>		
D	:	Disturbed Sample
UD	:	Undisturbed Sample
c (UD)	CL	: Cored Length
	TCR	: Total Cored Recovery
	RQD	: Rock Quality Designation
	V	: Vane Shear Test
	Pm	: Permeability Test
est	Pr	: Pressuremeter Test



Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang. Borehole No. : BH9  
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Customer : <b>Messrs. PLB Engineering Sdn. Bhd.</b>		Job No. : <b>GLSB/SI/3971-155/2022</b>
Date Started : 18/02/2023	Coordinate, E: -1644.653 N: -3188.772	Seawater Level (m) : 14.40 m
Date Completed : 23/02/2023	Platform Elevation : 2.309 mRL	Boring Diameter : 75mm to 125mm
Final Depth : 60.45 m	Seabed Elevation : -14.191 mRL	Type of Boring : Rotary Wash Boring

Elevation	Legend	Soil Description and Lithology <i>Jackup Platform Height From Seabed = 16.50 m</i>	Sample			Standard Penetration Test								Remarks
			Sample Ref.	Depth (m)	Recovery Ratio	75 mm	75 mm	75 mm	75 mm	75 mm	75 mm	75 mm	'N' Value	
-39.691		Medium dense, light to medium grey, fine grained, clayey SAND.	P16/D16	25.50 to 25.95	320/450	3	4	4	5	3	4		16	
-41.191		Medium dense, light to medium grey, fine grained, clayey SAND.	P17/D17	27.00 to 27.45	300/450	3	3	3	4	3	4		14	
-42.691		Medium dense, light grey, fine grained, clayey SAND.	P18/D18	28.50 to 28.95	320/450	4	4	4	3	4	3		14	
-44.191		Very stiff, light grey with dark grey spotted, Sandy CLAY of Intermediate Plasticity.	P19/D19	30.00 to 30.45	280/450	4	5	4	5	5	5		19	
-45.691		Medium dense, light grey, fine grained, clayey SAND.	P20/D20	31.50 to 31.95	305/450	4	4	3	4	4	4		15	
-47.191		Medium dense, light grey, Very Silty/Clayey SANDS.	P21/D21	33.00 to 33.45	290/450	4	5	5	6	6	6		23	
-48.691		Stiff, light grey, sandy SILT.	P22/D22	34.50 to 34.95	265/450	3	3	3	3	4	4		14	
-50.191		Very stiff, light grey with light brown spotted, sandy SILT.	P23/D23	36.00 to 36.45	300/450	4	3	5	3	4	4		16	
-51.691		Medium dense, light grey, Very Clayey SAND of Low Plasticity.	P24/D24	37.50 to 37.95	300/450	4	4	4	5	5	6		20	

## **Water Observation**

Date	Time	Depth	Casing	Sea W.L.

### Scale of Strength

Cohesive Soil	Non-Cohesive
0 - 2	Very soft
2 - 4	Soft
4 - 8	Firm
8 - 15	Stiff
15 - 30	Very stiff
> 30	Hard
0 - 4	Very loose
4 - 10	Loose
10 - 30	Medium dense
30 - 50	Dense
> 50	Very dense

### Legend

	: Wash Boring	D	: Disturbed Sample
	: Split Spoon Sample	UD	: Undisturbed Sample
	: Thin Wall Tube Sample (UD)	CL	: Cored Length
	: Piston Sample (Ps)	TCR	: Total Cored Recovery
	: Maizer Sample (M)	RQD	: Rock Quality Designation
	: Rock Core Sample	V	: Vane Shear Test
	: Water Level (WL)	Pm	: Permeability Test
P	: Standard Penetration Test	Pr	: Pressuremeter Test



Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang. Borehole No. : BH9  
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Customer : <b>Messrs. PLB Engineering Sdn. Bhd.</b>		Job No. : <b>GLSB/SI/3971-155/2022</b>
Date Started : 18/02/2023	Coordinate, E : -1644.653	N: -3188.772 Seawater Level (m) : 14.40 m
Date Completed : 23/02/2023	Platform Elevation	: 2.309 mRL Boring Diameter : 75mm to 125mm
Final Depth : 60.45 m	Seabed Elevation	: -14.191 mRL Type of Boring : Rotary Wash Boring

Elevation	Legend	Soil Description and Lithology Jackup Platform Height From Seabed = 16.50 m	Sample			Standard Penetration Test								Remarks
			Sample Ref.	Depth (m)	Recovery Ratio	75 mm	75 mm	75 mm	75 mm	75 mm	75 mm	75 mm	'N' Value	
-53.191		Very stiff, light grey, sandy SILT.	P25/ D25	39.00 to 39.45	250/450	5	4	5	5	6	6	6	22	
-54.691		Medium dense, light grey, fine grained, SAND.	P26/ D26	40.50 to 40.95	300/450	5	4	4	5	6	6	6	21	
-56.191		Medium dense to dense, light grey, fine grained, SAND.	P27/ D27	42.00 to 42.45	255/450	6	6	7	7	7	9	30		
-57.691		Medium dense, light grey, fine grained, SAND.	P28/ D28	43.50 to 43.95	295/450	3	4	4	3	4	3	14		
-59.191		Dense, light grey, fine grained, SAND.	P29/ D29	45.00 to 45.45	320/450	6	7	7	11	8	8	8	34	
-60.691		Medium dense, light grey, Silty/Clayey SAND.	P30/ D30	46.50 to 46.95	380/450	6	6	7	6	6	7	7	26	
-62.191		Dense, light to medium grey, fine to medium grained, SAND.	P31/ D31	48.00 to 48.45	345/450	7	8	7	7	9	8	8	31	
-63.691		Medium dense, light grey with light brown spotted, fine to medium grained, SAND.	P32/ D32	49.50 to 49.95	350/450	6	5	5	6	6	7	7	24	
-65.191		Medium dense, light brownish grey, fine grained, SAND.	P33/ D33	51.00 to 51.45	300/450	5	6	5	6	6	8	8	25	

## **Water Observation**

Water Observation				
Date	Time	Depth	Casing	Sea W.L.

Scale of Strength

Scale of Strength	
Cohesive Soil	Non-Cohesive
0 - 2	Very soft
2 - 4	Soft
4 - 8	Firm
8 - 15	Stiff
15 - 30	Very stiff
> 30	Hard
0 - 4	Very loose
4 - 10	Loose
10 - 30	Medium dense
30 - 50	Dense
> 50	Very dense

Legend

	: Wash Boring	D	: Disturbed Sample
	: Split Spoon Sample	UD	: Undisturbed Sample
	: Thin Wall Tube Sample (UD)	CL	: Cored Length
	: Piston Sample (Ps)	TCR	: Total Cored Recovery
	: Maizer Sample (M)	RQD	: Rock Quality Designation
	: Rock Core Sample	V	: Vane Shear Test
	: Water Level (WL)	Pm	: Permeability Test
P	: Standard Penetration Test	Pr	: Pressuremeter Test



Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang. Borehole No. : BH9  
*Pages 5 of 5*

Customer : <b>Messrs. PLB Engineering Sdn. Bhd.</b>		Job No. : <b>GLSB/SI/3971-155/2022</b>
Date Started : 18/02/2023	Coordinate, E : -1644.653	N: -3188.772 Seawater Level (m) : 14.40 m
Date Completed : 23/02/2023	Platform Elevation	: 2.309 mRL Boring Diameter : 75mm to 125mm
Final Depth : 60.45 m	Seabed Elevation	: -14.191 mRL Type of Boring : Rotary Wash Boring



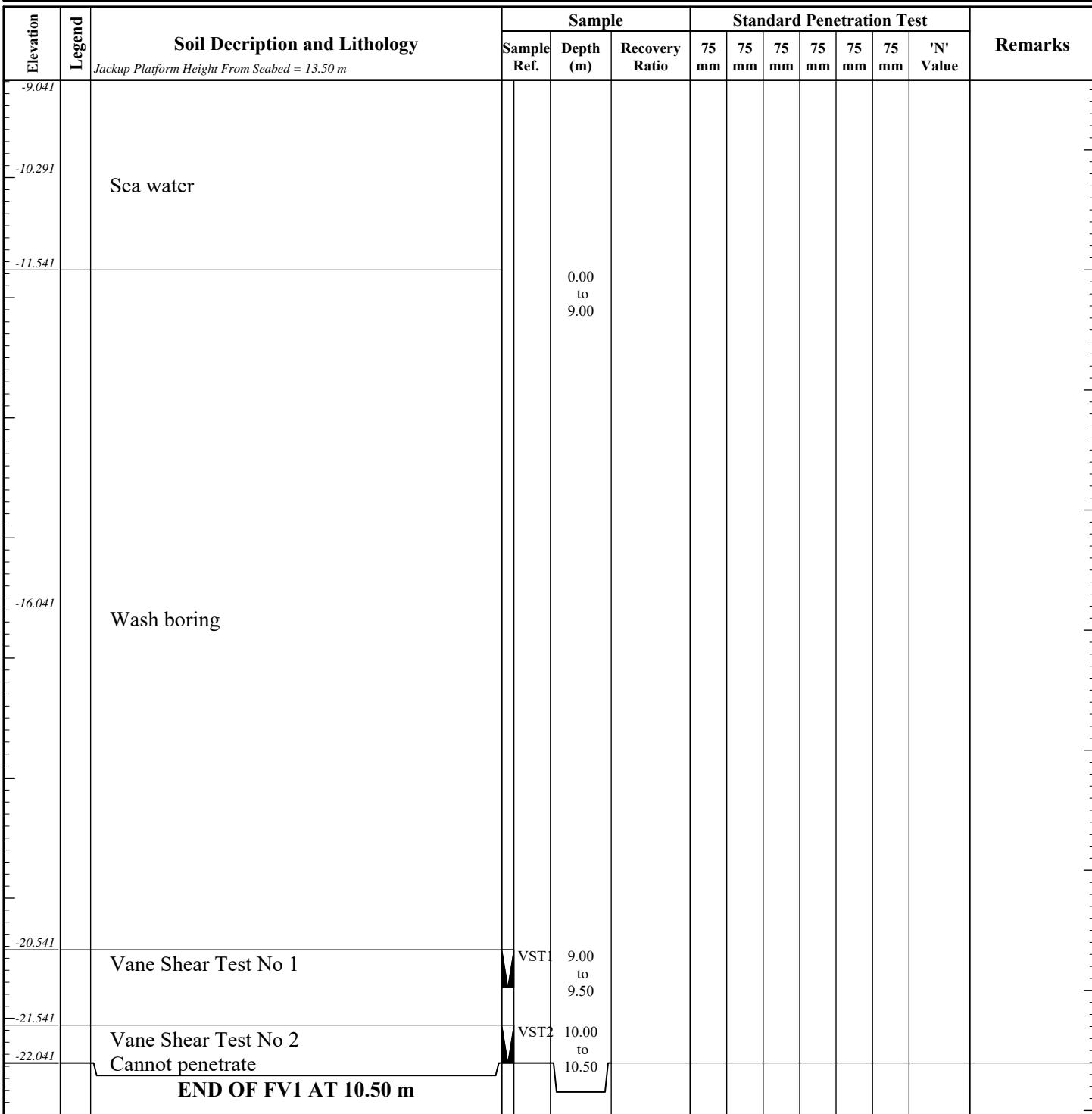
## Vane Shear



Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang. Borehole No. : FV1

Pages 1 of 1

Customer : <b>Messrs. PLB Engineering Sdn. Bhd.</b>		Job No. : <b>GLSB/SI/3971-155/2022</b>
Date Started : 28/12/2022	Coordinate, E: -1415.874	N: -2642.123 Seawater depth (m) : 11.50 m
Date Completed : 28/12/2022	Platform Elevation	: 1.959 mRL Boring Diameter : 75mm to 125mm
Final Depth : 10.50 m	Seabed Elevation	: -11.541 mRL Type of Boring : Rotary Wash Boring



<u>Water Observation</u>				
Date	Time	Depth	Casing	Sea W.L.

Scale of Strength			
Cohesive Soil		Non-Cohesive	
0 - 2	Very soft	0 - 4	Very loose
2 - 4	Soft	4 - 10	Loose
4 - 8	Firm	10 - 30	Medium dense
8 - 15	Stiff	30 - 50	Dense
15 - 30	Very stiff	> 50	Very dense
> 30	Hard		

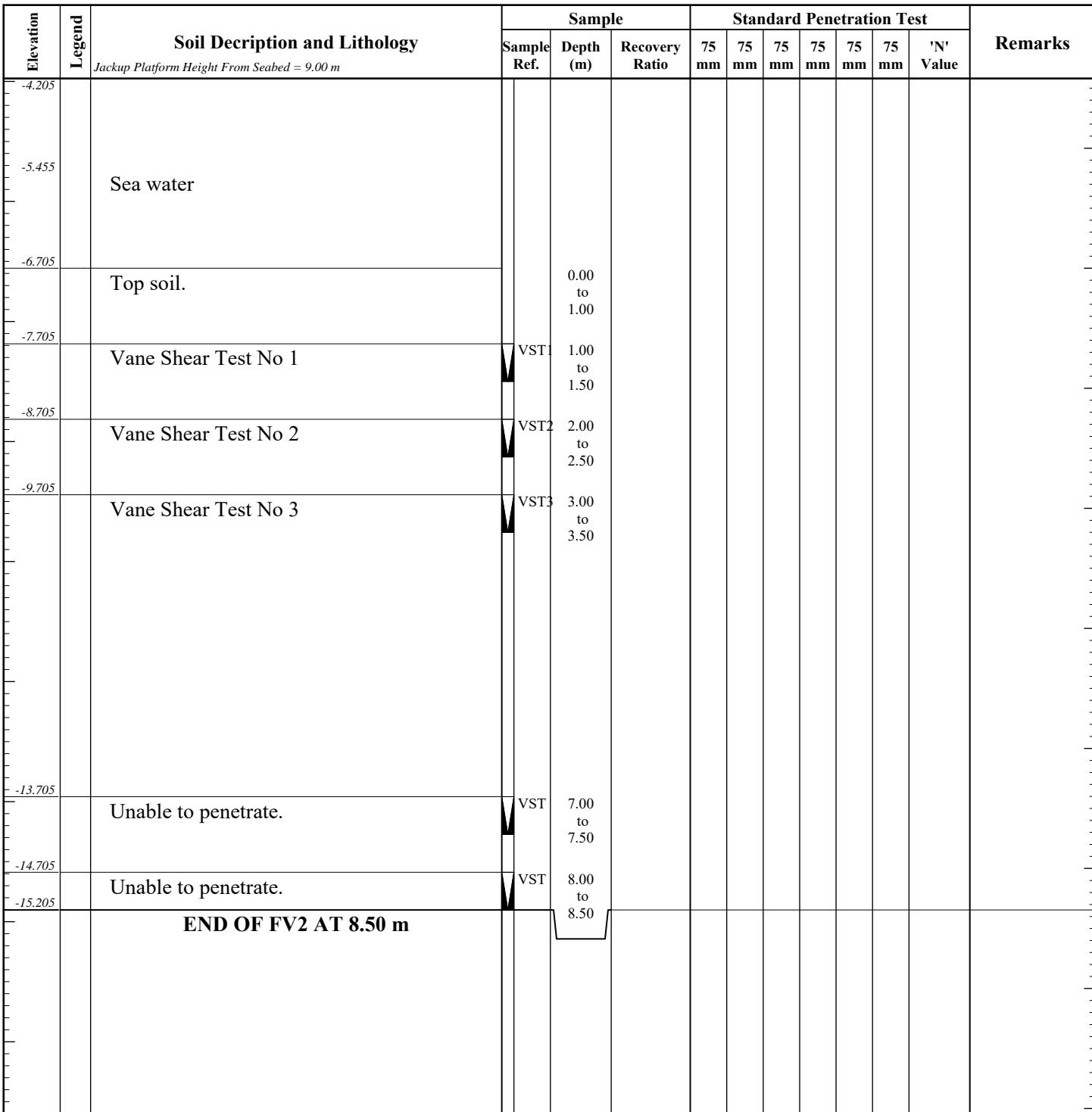
<u>Legend</u>	
D	: Disturbed Sample
UD	: Undisturbed Sample
(UD)	: Cored Length
TCR	: Total Cored Recovery
RQD	: Rock Quality Designation
V	: Vane Shear Test
Pm	: Permeability Test
Pr	: Pressuremeter Test



Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang. Borehole No. : FV2  
Pages 1 of 1

Customer : **Messrs. PLB Engineering Sdn. Bhd.** Job No. : **GLSB/SI/3971-155/2022**

Date Started	: 05/01/2023	Coordinate, E	-1671.703	N: -2827.365	Seawater depth (m)	: 6.15 m
Date Completed	: 05/01/2023	Platform Elevation	: 2.295 mRL	Boring Diameter	: 75mm to 125mm	
Final Depth	: 8.50 m	Seabed Elevation	: -6.705 mRL	Type of Boring	: Rotary Wash Boring	



<u>Water Observation</u>				
Date	Time	Depth	Casing	Sea W.L.

Scale of Strength			
Cohesive Soil		Non-Cohesive	
0 - 2	Very soft	0 - 4	Very loose
2 - 4	Soft	4 - 10	Loose
4 - 8	Firm	10 - 30	Medium dense
8 - 15	Stiff	30 - 50	Dense
15 - 30	Very stiff	> 50	Very dense
> 30	Hard		

<u>Legend</u>		
D	:	Disturbed Sample
UD	:	Undisturbed Sample
c (UD)	:	Cored Length
TCR	:	Total Cored Recovery
RQD	:	Rock Quality Designation
V	:	Vane Shear Test
Pm	:	Permeability Test
est	:	Pressuremeter Test



Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.		Borehole No. : FV3													
Pages 1 of 1															
Customer : Messrs. PLB Engineering Sdn. Bhd.		Job No. : GLSB/SI/3971-155/2022													
Date Started : 24/02/2023	Coordinate, E: -1870.047 N: -3119.975	Seawater depth (m) : 1.05 m													
Date Completed : 24/02/2023	Platform Elevation : 2.283 mRL	Boring Diameter : 75mm to 125mm													
Final Depth : 7.50 m	Seabed Elevation : -7.267 mRL	Type of Boring : Rotary Wash Boring													
Elevation	Legend	Soil Description and Lithology <i>Jackup Platform Height From Seabed = 9.55 m</i>	Sample			Standard Penetration Test								Remarks	
			Sample Ref.	Depth (m)	Recovery Ratio	75 mm	75 mm	75 mm	75 mm	75 mm	75 mm	'N' Value			
-6.267															
-6.767		Sea water.		0.00 to 1.00											
-7.267		Top soil.	VST1	1.00 to 1.50											
-8.267		Vane Shear Test No 1	VST2	2.00 to 2.50											
-9.267		Vane Shear Test No 2	VST3	3.00 to 3.50											
-10.267		Vane Shear Test No 3	VST4	4.00 to 4.50											
-11.267		Vane Shear Test No 4	VST5	5.00 to 5.50											
-12.267		Vane Shear Test No 5	VST6	6.00 to 6.50											
-13.267		Vane Shear Test No 6	VST	7.00 to 7.50											
-14.267		Unable to penetrate													
-14.767		<b>END OF FV3 AT 7.50 m</b>													
Water Observation					Scale of Strength					Legend					
Date	Time	Depth	Casing	Sea W.L.	Cohesive Soil	Non-Cohesive				Wash Boring	Disturbed Sample				
					0 - 2	Very soft	0 - 4	Very loose		Split Spoon Sample	Undisturbed Sample				
					2 - 4	Soft	4 - 10	Loose		Thin Wall Tube Sample (UD)	Cored Length				
					4 - 8	Firm	10 - 30	Medium dense		Piston Sample (Ps)	Total Cored Recovery				
					8 - 15	Stiff	30 - 50	Dense		Maizer Sample (M)	Rock Quality Designation				
					15 - 30	Very stiff	> 50	Very dense		Rock Corer Sample	Vane Shear Test				
					> 30	Hard				Water Level (WL)	Permeability Test				
										Standard Penetration Test	Pressuremeter Test				



Project : <b>Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.</b>		Borehole No. : <b>FV4</b>												
Pages 1 of 1														
Customer : <b>Messrs. PLB Engineering Sdn. Bhd.</b>		Job No. : <b>GLSB/SI/3971-155/2022</b>												
Date Started : 07/12/2022	Coordinate, E: -1680.156 N: -3190.795	Seawater depth (m) : 13.50 m												
Date Completed : 07/12/2022	Platform Elevation : 2.906 mRL	Boring Diameter : 75mm to 125mm												
Final Depth : 2.50 m	Seabed Elevation : -12.744 mRL	Type of Boring : Rotary Wash Boring												
Elevation	Legend	Soil Description and Lithology <i>Jackup Platform Height From Seabed = 15.65 m</i>	Sample			Standard Penetration Test								Remarks
			Sample Ref.	Depth (m)	Recovery Ratio	75 mm	75 mm	75 mm	75 mm	75 mm	75 mm	'N' Value		
-10.244														
-11.494		Seawater												
-12.744		Top soil	0.00 to 1.00											
-13.744		No recovery.	V1/D	1.00 to 1.45	NIL/450	1	1	1	0	0	0	1	Soil sampling as field vane shear failed to penetrate at selected depth.	
-14.744		Loose to medium dense, light brown, medium SAND.	V2/D1	2.00 to 2.45	300/450	1	2	2	3	3	3	10		
-15.244														
<b>END OF FV4 AT 2.50 m</b>														
Water Observation					Scale of Strength								Legend	
Date	Time	Depth	Casing	Sea W.L	Cohesive Soil	Non-Cohesive								
					0 - 2 Very soft	0 - 4 Very loose								
					2 - 4 Soft	4 - 10 Loose								
					4 - 8 Firm	10 - 30 Medium dense								
					8 - 15 Stiff	30 - 50 Dense								
					15 - 30 Very stiff	> 50 Very dense								
					> 30 Hard									

Water Observation				
Date	Time	Depth	Casing	Sea W.L

Scale of Strength				
Cohesive Soil	Non-Cohesive			
0 - 2 Very soft	0 - 4 Very loose			
2 - 4 Soft	4 - 10 Loose			
4 - 8 Firm	10 - 30 Medium dense			
8 - 15 Stiff	30 - 50 Dense			
15 - 30 Very stiff	> 50 Very dense			
> 30 Hard				

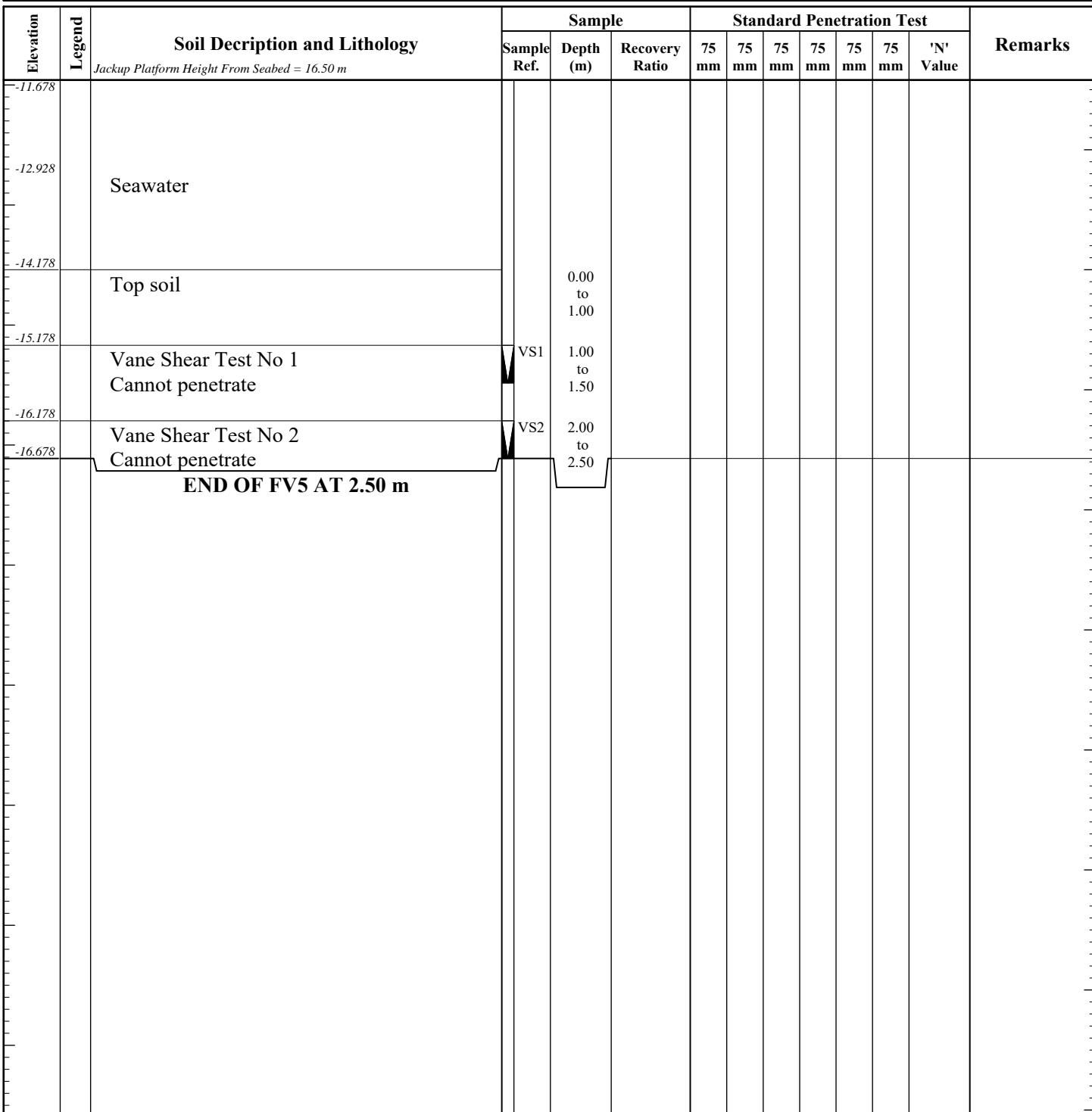
	: Wash Boring		: Disturbed Sample
	: Split Spoon Sample		: Undisturbed Sample
	: Thin Wall Tube Sample (UD)		: Cored Length
	: Piston Sample (Ps)		: Total Cored Recovery
	: Maizer Sample (M)		: Rock Quality Designation
	: Rock Corer Sample		: Vane Shear Test
	: Water Level (WL)		: Permeability Test
P	: Standard Penetration Test	Pr	: Pressuremeter Test



Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang. Borehole No. : FV5  
Pages 1 of 1

Pages 1 of 1

Customer : <b>Messrs. PLB Engineering Sdn. Bhd.</b>		Job No. : <b>GLSB/SI/3971-155/2022</b>
Date Started : 03/02/2023	Coordinate, E: -1806.291 N: -3341.921	Seawater depth (m) : 14.00 m
Date Completed : 03/02/2023	Platform Elevation : 2.322 mRL	Boring Diameter : 75mm to 125mm
Final Depth : 2.50 m	Seabed Elevation : -14.178 mRL	Type of Boring : Rotary Wash Boring



<u>Water Observation</u>				
Date	Time	Depth	Casing	Sea W.L.

Scale of Strength			
Cohesive Soil	Non-Cohesive		
0 - 2	Very soft	0 - 4	Very loose
2 - 4	Soft	4 - 10	Loose
4 - 8	Firm	10 - 30	Medium dense
8 - 15	Stiff	30 - 50	Dense
15 - 30	Very stiff	> 50	Very dense
> 30	Hard		

<u><b>Legend</b></u>	
D	: Disturbed Sample
UD	: Undisturbed Sample
(UD)	: Cored Length
TCR	: Total Cored Recovery
RQD	: Rock Quality Designation
V	: Vane Shear Test
Pm	: Permeability Test
Pr	: Pressuremeter Test



Project : <b>Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.</b>		Borehole No. : <b>FV6</b>												
Pages 1 of 1														
Customer : <b>Messrs. PLB Engineering Sdn. Bhd.</b>		Job No. : <b>GLSB/SI/3971-155/2022</b>												
Date Started : 10/02/2023	Coordinate, E: -1938.575 N: -3650.660	Seawater depth (m) : 11.05 m												
Date Completed : 10/02/2023	Platform Elevation : 2.241 mRL	Boring Diameter : 75mm to 125mm												
Final Depth : 2.50 m	Seabed Elevation : -11.259 mRL	Type of Boring : Rotary Wash Boring												
Elevation	Legend	Soil Description and Lithology <i>Jackup Platform Height From Seabed = 13.50 m</i>	Sample			Standard Penetration Test								Remarks
			Sample Ref.	Depth (m)	Recovery Ratio	75 mm	75 mm	75 mm	75 mm	75 mm	75 mm	'N' Value		
-8.759														
-10.009		Seawater												
-11.259		Top soil		0.00 to 1.00										
-12.259		Vane Shear Test No 1 Cannot penetrate	VS1	1.00 to 1.50										
-13.259		Vane Shear Test No 2 Cannot penetrate	VS2	2.00 to 2.50										
		<b>END OF FV6 AT 2.50 m</b>												
Water Observation					Scale of Strength					Legend				
Date	Time	Depth	Casing	Sea W.L.	Cohesive Soil	Non-Cohesive				Wash Boring	Disturbed Sample			
					0 - 2	Very soft	0 - 4	Very loose		Split Spoon Sample	Undisturbed Sample			
					2 - 4	Soft	4 - 10	Loose		Thin Wall Tube Sample (UD)	Cored Length			
					4 - 8	Firm	10 - 30	Medium dense		Piston Sample (Ps)	Total Cored Recovery			
					8 - 15	Stiff	30 - 50	Dense		Maizer Sample (M)	Rock Quality Designation			
					15 - 30	Very stiff	> 50	Very dense		Rock Corr Sample	Vane Shear Test			
					> 30	Hard				Water Level (WL)	Permeability Test			
										Standard Penetration Test	Pressuremeter Test			



## APPENDIX C

### *Vane Shear Test Results*



GEOLAB (M) SDN. BHD.

## SUMMARY OF VANE SHEAR TEST RESULTS

Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation  
at Jelutong, Penang.

## BOREHOLE VANE SHEAR

BH2/BVS1			
VS No	Shear Strength (kN/m <sup>2</sup> )		Sensitivity
	N	R	
Cannot penetrate due to presence of coarse material. (Sand)			

BH3/BVS2			
VS No	Shear Strength (kN/m <sup>2</sup> )		Sensitivity
	N	R	
Cannot penetrate due to presence of coarse material. (Sand)			

BH4/BVS3			
VS No	Shear Strength (kN/m <sup>2</sup> )		Sensitivity
	N	R	
Cannot penetrate due to presence of coarse material. (Sand)			

BH5/BVS4			
VS No	Shear Strength (kN/m <sup>2</sup> )		Sensitivity
	N	R	
VST1	3.8	2.2	1.7
VS2T	5.0	1.7	2.9
VST3	5.6	2.4	2.3

BH8/BVS5			
VS No	Shear Strength (kN/m <sup>2</sup> )		Sensitivity
	N	R	
VST1	10.2	4.3	2.4
VST2	15.2	10.7	1.4
VST3	11.2	6.5	1.7
VST4	6.0	3.2	1.9

## FIELD VANE SHEAR

FV1			
VS No	Shear Strength (kN/m <sup>2</sup> )		Sensitivity
	N	R	
VST1	37.5	6.5	5.8

FV2			
VS No	Shear Strength (kN/m <sup>2</sup> )		Sensitivity
	N	R	
VST1	5.6	3.8	1.5
VST2	6.0	5.6	1.1
VST3	5.6	4.3	1.3

FV3			
VS No	Shear Strength (kN/m <sup>2</sup> )		Sensitivity
	N	R	
VST1	15.7	4.8	3.3
VST2	12.4	5.2	2.4
VST3	17.3	4.3	4.0
VST4	5.2	3.2	1.6
VST5	5.4	5.0	1.1
VST6	6.8	5.2	1.3

FV4			
VS No	Shear Strength (kN/m <sup>2</sup> )		Sensitivity
	N	R	
Cannot penetrate due to presence of coarse material. (Sand)			

FV5			
VS No	Shear Strength (kN/m <sup>2</sup> )		Sensitivity
	N	R	
Cannot penetrate due to presence of coarse material. (Sand)			

FV6			
VS No	Shear Strength (kN/m <sup>2</sup> )		Sensitivity
	N	R	
VST1	24.6	6.0	4.1

Note:      N: Natural  
              R: Remoulded



## Borehole Vane Shear



GEOLAB (M) SDN. BHD.

Foundation, Soil &amp; Concrete Specialists

## FIELD VANE SHEAR

Test Method : BS 1377 : Part 9: 1990

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.

Customer : Messrs. PLB Engineering Sdn. Bhd.

Job No. : GLSB/SI /3971 - 155 /2022

Equipment Type : Geonor H-10

Equipment Serial No. :

2589

Vane Size, D : 65

VS No. : BH5/BVS4

Depth Test : 2.50m - 3.00m

Coordinate E : -1979.957

Date : 19/01/2023

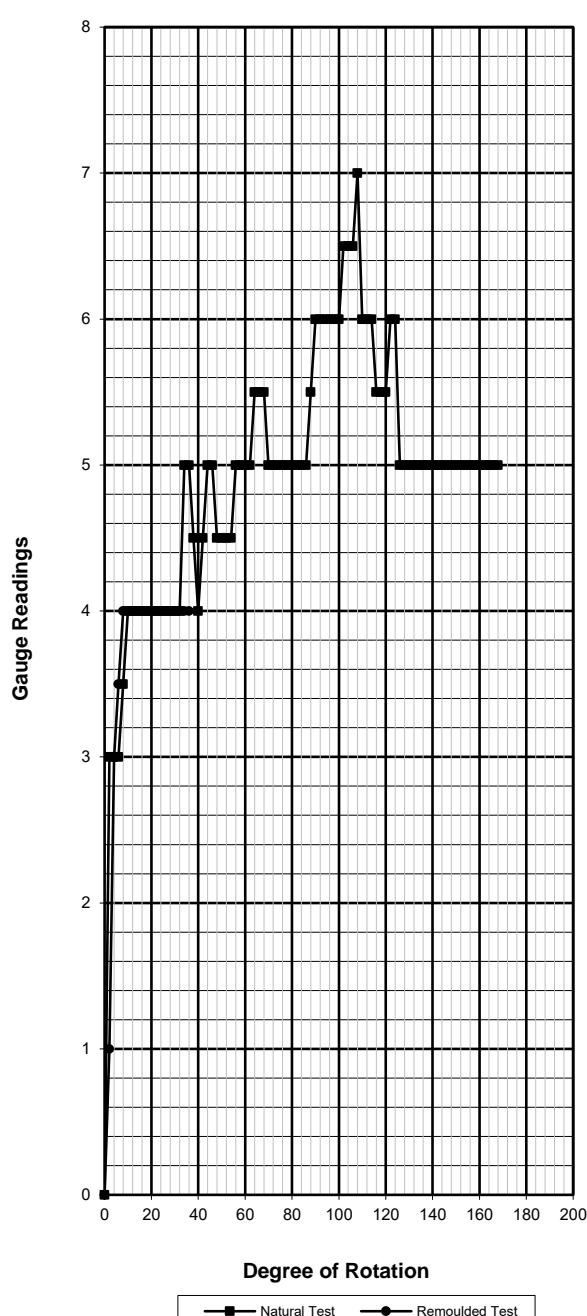
Test No. : VST1

R. Level : 2.257

N : -3136.463

Chainage :

Natural Test				Remoulded Test			
Degree of Rotation	Gauge Readings						
2	3.0	102	6.5	202		2	1.0
4	3.0	104	6.5	204		4	3.0
6	3.0	106	6.5	206		6	3.5
8	3.5	108	7.0	208		8	4.0
10	4.0	110	6.0	210		10	4.0
12	4.0	112	6.0	212		12	4.0
14	4.0	114	6.0	214		14	4.0
16	4.0	116	5.5	216		16	4.0
18	4.0	118	5.5	218		18	4.0
20	4.0	120	5.5	220		20	4.0
22	4.0	122	6.0	222		22	4.0
24	4.0	124	6.0	224		24	4.0
26	4.0	126	5.0	226		26	4.0
28	4.0	128	5.0	228		28	4.0
30	4.0	130	5.0	230		30	4.0
32	4.0	132	5.0	232		32	4.0
34	5.0	134	5.0	234		34	4.0
36	5.0	136	5.0	236		36	4.0
38	4.5	138	5.0	238		38	138
40	4.0	140	5.0	240		40	140
42	4.5	142	5.0	242		42	142
44	5.0	144	5.0	244		44	144
46	5.0	146	5.0	246		46	146
48	4.5	148	5.0	248		48	148
50	4.5	150	5.0	250		50	150
52	4.5	152	5.0	252		52	152
54	4.5	154	5.0	254		54	154
56	5.0	156	5.0	256		56	156
58	5.0	158	5.0	258		58	158
60	5.0	160	5.0	260		60	160
62	5.0	162	5.0	262		62	162
64	5.5	164	5.0	264		64	164
66	5.5	166	5.0	266		66	166
68	5.5	168	5.0	268		68	168
70	5.0	170		270		70	170
72	5.0	172		272		72	172
74	5.0	174		274		74	174
76	5.0	176		276		76	176
78	5.0	178		278		78	178
80	5.0	180		280		80	180
82	5.0	182		282		82	182
84	5.0	184		284		84	184
86	5.0	186		286		86	186
88	5.5	188		288		88	188
90	6.0	190		290		90	190
92	6.0	192		292		92	192
94	6.0	194		294		94	194
96	6.0	196		296		96	196
98	6.0	198		298		98	198
100	6.0	200		300		100	200



## SHEAR STRENGTH COMPUTATION

Gauge Reading	Shear Strength kN/m <sup>2</sup>
Natural	7.0
Remoulded	4.0
Sensitivity	1.7



GEOLAB (M) SDN. BHD.

Foundation, Soil &amp; Concrete Specialists

## FIELD VANE SHEAR

Test Method : BS 1377 : Part 9: 1990

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.

Customer : Messrs. PLB Engineering Sdn. Bhd.

Job No. : GLSB/SI /3971 - 155 /2022

Equipment Type : Geonor H-10

Equipment Serial No. :

2589

Vane Size, D : 65

VS No. : BH5/BVS4

Depth Test : 5.00m - 5.50m

Coordinate E : -1979.957

R. Level : 2.257

Date : 19/01/2023

Test No. : VST2

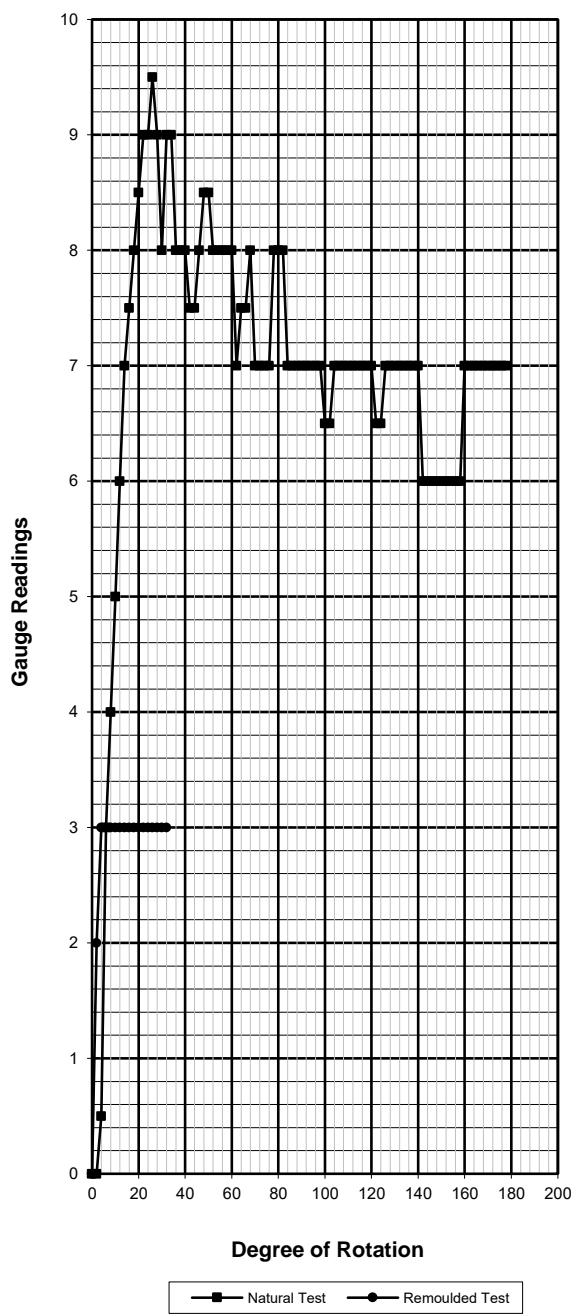
N : -3136.463

Chainage :

## Natural Test

## Remoulded Test

Degree of Rotation	Gauge Readings						
2	0.0	102	6.5	202		2	2.0
4	0.5	104	7.0	204		4	3.0
6	3.0	106	7.0	206		6	3.0
8	4.0	108	7.0	208		8	3.0
10	5.0	110	7.0	210		10	3.0
12	6.0	112	7.0	212		12	3.0
14	7.0	114	7.0	214		14	3.0
16	7.5	116	7.0	216		16	3.0
18	8.0	118	7.0	218		18	3.0
20	8.5	120	7.0	220		20	3.0
22	9.0	122	6.5	222		22	3.0
24	9.0	124	6.5	224		24	3.0
26	9.5	126	7.0	226		26	3.0
28	9.0	128	7.0	228		28	3.0
30	8.0	130	7.0	230		30	3.0
32	9.0	132	7.0	232		32	3.0
34	9.0	134	7.0	234		34	
36	8.0	136	7.0	236		36	
38	8.0	138	7.0	238		38	
40	8.0	140	7.0	240		40	
42	7.5	142	6.0	242		42	
44	7.5	144	6.0	244		44	
46	8.0	146	6.0	246		46	
48	8.5	148	6.0	248		48	
50	8.5	150	6.0	250		50	
52	8.0	152	6.0	252		52	
54	8.0	154	6.0	254		54	
56	8.0	156	6.0	256		56	
58	8.0	158	6.0	258		58	
60	8.0	160	7.0	260		60	
62	7.0	162	7.0	262		62	
64	7.5	164	7.0	264		64	
66	7.5	166	7.0	266		66	
68	8.0	168	7.0	268		68	
70	7.0	170	7.0	270		70	
72	7.0	172	7.0	272		72	
74	7.0	174	7.0	274		74	
76	7.0	176	7.0	276		76	
78	8.0	178	7.0	278		78	
80	8.0	180		280		80	
82	8.0	182		282		82	
84	7.0	184		284		84	
86	7.0	186		286		86	
88	7.0	188		288		88	
90	7.0	190		290		90	
92	7.0	192		292		92	
94	7.0	194		294		94	
96	7.0	196		296		96	
98	7.0	198		298		98	
100	6.5	200		300		100	
						200	



## SHEAR STRENGTH COMPUTATION

	Gauge Reading	Shear Strength kN/m <sup>2</sup>
Natural	9.5	5.0
Remoulded	3.0	1.7
Sensitivity		2.9



Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.

Customer : Messrs. PLB Engineering Sdn. Bhd.

Job No. : GLSB/SI /3971 - 155 /2022

Equipment Type : Geonor H-10

Equipment Serial No. :

2589

Vane Size, D : 65

VS No. : BH5/BVS4

Depth Test : 7.00m - 7.50m

Coordinate E : -1979.957

R. Level : 2.257

Date : 19/01/2023

Test No. : VST3

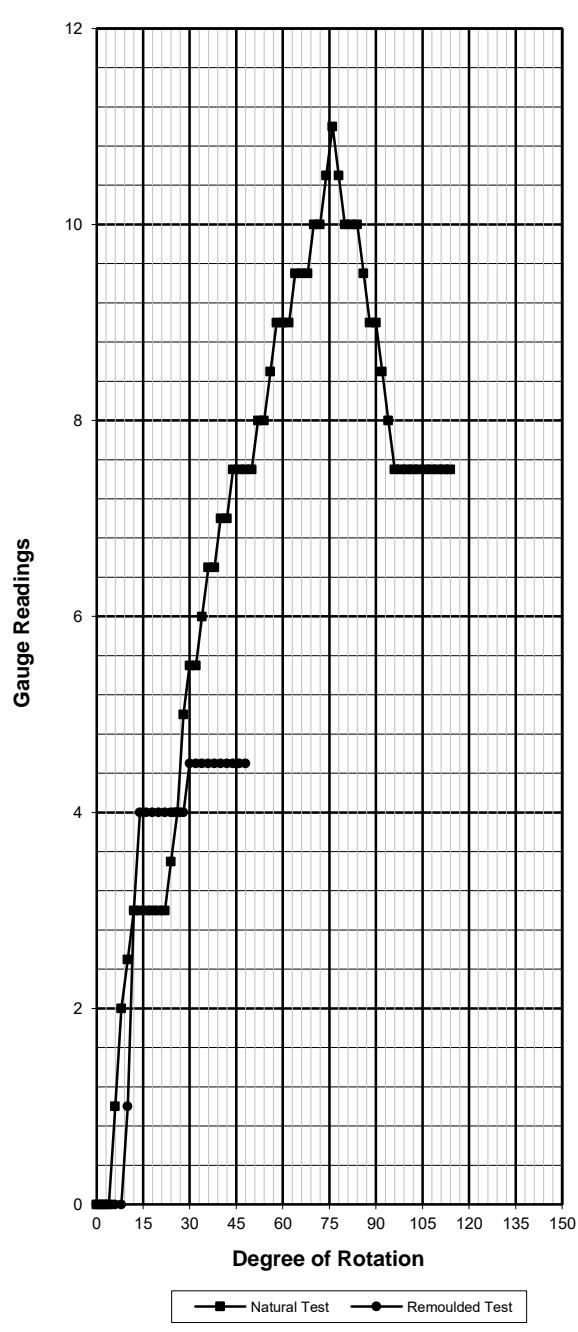
N : -3136.463

Chainage :

## Natural Test

## Remoulded Test

Degree of Rotation	Gauge Readings						
2	0.0	102	7.5	202		2	0.0
4	0.0	104	7.5	204		4	0.0
6	1.0	106	7.5	206		6	0.0
8	2.0	108	7.5	208		8	0.0
10	2.5	110	7.5	210		10	1.0
12	3.0	112	7.5	212		12	3.0
14	3.0	114	7.5	214		14	4.0
16	3.0	116		216		16	4.0
18	3.0	118		218		18	4.0
20	3.0	120		220		20	4.0
22	3.0	122		222		22	4.0
24	3.5	124		224		24	4.0
26	4.0	126		226		26	4.0
28	5.0	128		228		28	4.0
30	5.5	130		230		30	4.5
32	5.5	132		232		32	4.5
34	6.0	134		234		34	4.5
36	6.5	136		236		36	4.5
38	6.5	138		238		38	4.5
40	7.0	140		240		40	4.5
42	7.0	142		242		42	4.5
44	7.5	144		244		44	4.5
46	7.5	146		246		46	4.5
48	7.5	148		248		48	4.5
50	7.5	150		250		50	150
52	8.0	152		252		52	152
54	8.0	154		254		54	154
56	8.5	156		256		56	156
58	9.0	158		258		58	158
60	9.0	160		260		60	160
62	9.0	162		262		62	162
64	9.5	164		264		64	164
66	9.5	166		266		66	166
68	9.5	168		268		68	168
70	10.0	170		270		70	170
72	10.0	172		272		72	172
74	10.5	174		274		74	174
76	11.0	176		276		76	176
78	10.5	178		278		78	178
80	10.0	180		280		80	180
82	10.0	182		282		82	182
84	10.0	184		284		84	184
86	9.5	186		286		86	186
88	9.0	188		288		88	188
90	9.0	190		290		90	190
92	8.5	192		292		92	192
94	8.0	194		294		94	194
96	7.5	196		296		96	196
98	7.5	198		298		98	198
100	7.5	200		300		100	200



## SHEAR STRENGTH COMPUTATION

	Gauge Reading	Shear Strength kN/m <sup>2</sup>
Natural	11.0	5.6
Remoulded	4.5	2.4
Sensitivity		2.3



Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.

Customer : Messrs. PLB Engineering Sdn. Bhd.

Job No. : GLSB/SI /3971 - 155 /2022

Equipment Type : Geonor H-10

Equipment Serial No. :

2589

Vane Size, D : 65

VS No. : BH8/BVS5

Depth Test : 1.00m - 1.50m

Coordinate E : -2378.883

R. Level : 2.398

Date : 12/02/2023

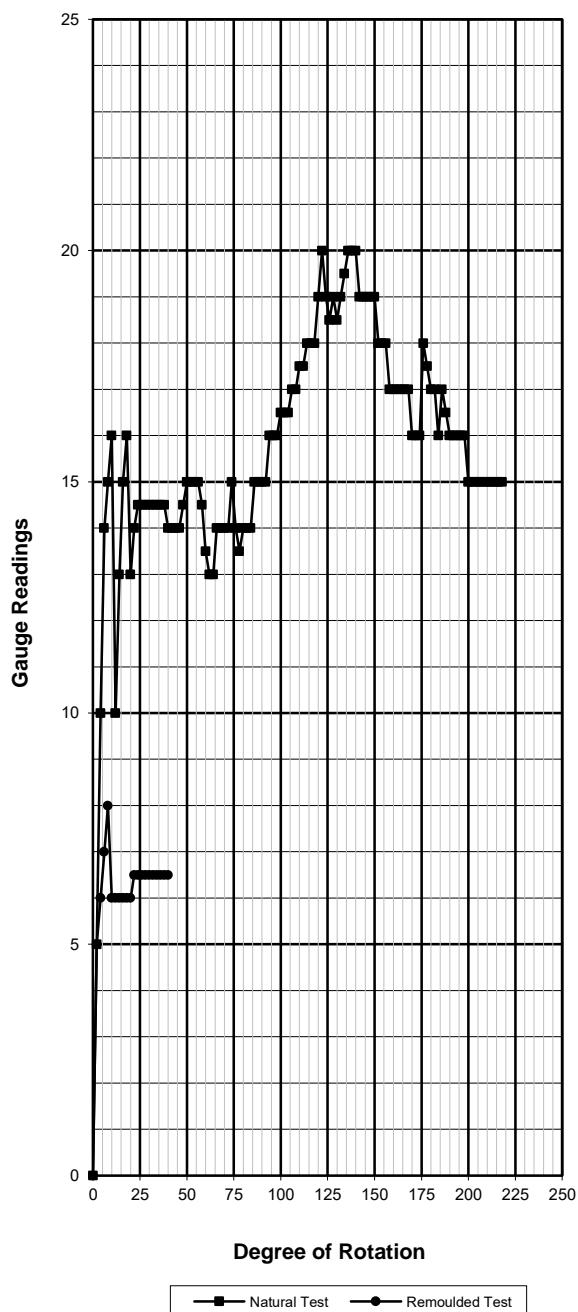
Test No. : VST1

N : -3657.462

Chainage :

**Natural Test****Remoulded Test**

Degree of Rotation	Gauge Readings								
2	5.0	102	16.5	202	15	2	5.0	102	
4	10.0	104	16.5	204	15	4	6.0	104	
6	14.0	106	17.0	206	15	6	7.0	106	
8	15.0	108	17.0	208	15	8	8.0	108	
10	16.0	110	17.5	210	15	10	6.0	110	
12	10.0	112	17.5	212	15	12	6.0	112	
14	13.0	114	18.0	214	15	14	6.0	114	
16	15.0	116	18.0	216	15	16	6.0	116	
18	16.0	118	18.0	218	15	18	6.0	118	
20	13.0	120	19.0	220		20	6.0	120	
22	14.0	122	20.0	222		22	6.5	122	
24	14.5	124	19.0	224		24	6.5	124	
26	14.5	126	18.5	226		26	6.5	126	
28	14.5	128	19.0	228		28	6.5	128	
30	14.5	130	18.5	230		30	6.5	130	
32	14.5	132	19.0	232		32	6.5	132	
34	14.5	134	19.5	234		34	6.5	134	
36	14.5	136	20.0	236		36	6.5	136	
38	14.5	138	20.0	238		38	6.5	138	
40	14.0	140	20.0	240		40	6.5	140	
42	14.0	142	19.0	242		42		142	
44	14.0	144	19.0	244		44		144	
46	14.0	146	19.0	246		46		146	
48	14.5	148	19.0	248		48		148	
50	15.0	150	19.0	250		50		150	
52	15.0	152	18.0	252		52		152	
54	15.0	154	18.0	254		54		154	
56	15.0	156	18.0	256		56		156	
58	14.5	158	17.0	258		58		158	
60	13.5	160	17.0	260		60		160	
62	13.0	162	17.0	262		62		162	
64	13.0	164	17.0	264		64		164	
66	14.0	166	17.0	266		66		166	
68	14.0	168	17.0	268		68		168	
70	14.0	170	16.0	270		70		170	
72	14.0	172	16.0	272		72		172	
74	15.0	174	16.0	274		74		174	
76	14.0	176	18.0	276		76		176	
78	13.5	178	17.5	278		78		178	
80	14.0	180	17.0	280		80		180	
82	14.0	182	17.0	282		82		182	
84	14.0	184	16.0	284		84		184	
86	15.0	186	17.0	286		86		186	
88	15.0	188	16.5	288		88		188	
90	15.0	190	16.0	290		90		190	
92	15.0	192	16.0	292		92		192	
94	16.0	194	16.0	294		94		194	
96	16.0	196	16.0	296		96		196	
98	16.0	198	16.0	298		98		198	
100	16.5	200	15.0	300		100		200	

**SHEAR STRENGTH COMPUTATION**

Gauge Reading	Shear Strength kN/m <sup>2</sup>
Natural	20.0
Remoulded	8.0
Sensitivity	2.4



Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.

Customer : Messrs. PLB Engineering Sdn. Bhd.

Job No. : GLSB/SI /3971 - 155 /2022

Equipment Type : Geonor H-10

Equipment Serial No. :

2589

Vane Size, D : 65

VS No. : BH8/BVS5

Depth Test : 3.50m - 4.00m

Coordinate E : -2378.883

R. Level : 2.398

Date : 12/02/2023

Test No. : VST2

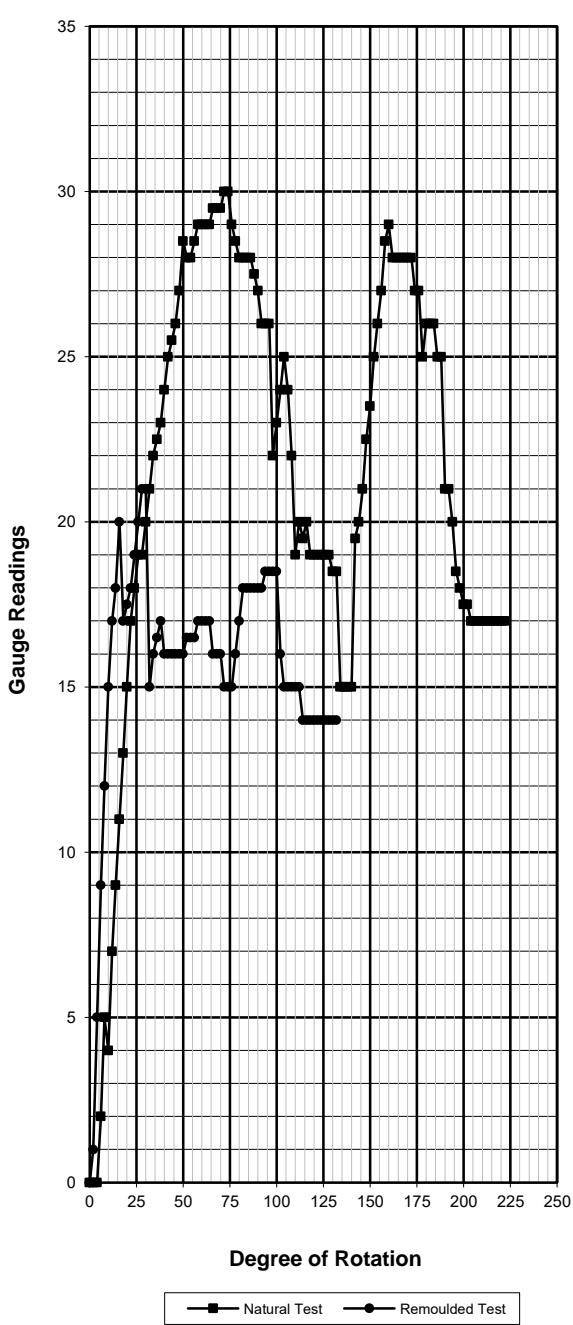
N : -3657.462

Chainage :

## Natural Test

## Remoulded Test

Degree of Rotation	Gauge Readings								
2	0.0	102	24.0	202	17.5	2	1.0	102	16.0
4	0.0	104	25.0	204	17	4	5.0	104	15.0
6	2.0	106	24.0	206	17	6	9.0	106	15.0
8	5.0	108	22.0	208	17	8	12.0	108	15.0
10	4.0	110	19.0	210	17	10	15.0	110	15.0
12	7.0	112	20.0	212	17	12	17.0	112	15.0
14	9.0	114	19.5	214	17	14	18.0	114	14.0
16	11.0	116	20.0	216	17	16	20.0	116	14.0
18	13.0	118	19.0	218	17	18	17.0	118	14.0
20	15.0	120	19.0	220	17	20	17.5	120	14.0
22	17.0	122	19.0	222	17	22	18.0	122	14.0
24	18.0	124	19.0	224		24	19.0	124	14.0
26	19.0	126	19.0	226		26	20.0	126	14.0
28	19.0	128	19.0	228		28	21.0	128	14.0
30	20.0	130	18.5	230		30	21.0	130	14.0
32	21.0	132	18.5	232		32	15.0	132	14.0
34	22.0	134	15.0	234		34	16.0	134	
36	22.5	136	15.0	236		36	16.5	136	
38	23.0	138	15.0	238		38	17.0	138	
40	24.0	140	15.0	240		40	16.0	140	
42	25.0	142	19.5	242		42	16.0	142	
44	25.5	144	20.0	244		44	16.0	144	
46	26.0	146	21.0	246		46	16.0	146	
48	27.0	148	22.5	248		48	16.0	148	
50	28.5	150	23.5	250		50	16.0	150	
52	28.0	152	25.0	252		52	16.5	152	
54	28.0	154	26.0	254		54	16.5	154	
56	28.5	156	27.0	256		56	16.5	156	
58	29.0	158	28.5	258		58	17.0	158	
60	29.0	160	29.0	260		60	17.0	160	
62	29.0	162	28.0	262		62	17.0	162	
64	29.0	164	28.0	264		64	17.0	164	
66	29.5	166	28.0	266		66	16.0	166	
68	29.5	168	28.0	268		68	16.0	168	
70	29.5	170	28.0	270		70	16.0	170	
72	30.0	172	28.0	272		72	15.0	172	
74	30.0	174	27.0	274		74	15.0	174	
76	29.0	176	27.0	276		76	15.0	176	
78	28.5	178	25.0	278		78	16.0	178	
80	28.0	180	26.0	280		80	17.0	180	
82	28.0	182	26.0	282		82	18.0	182	
84	28.0	184	26.0	284		84	18.0	184	
86	28.0	186	25.0	286		86	18.0	186	
88	27.5	188	25.0	288		88	18.0	188	
90	27.0	190	21.0	290		90	18.0	190	
92	26.0	192	21.0	292		92	18.0	192	
94	26.0	194	20.0	294		94	18.5	194	
96	26.0	196	18.5	296		96	18.5	196	
98	22.0	198	18.0	298		98	18.5	198	
100	23.0	200	17.5	300		100	18.5	200	



## SHEAR STRENGTH COMPUTATION

Gauge Reading	Shear Strength kN/m <sup>2</sup>
Natural	30.0
Remoulded	21.0
Sensitivity	1.4



Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.

Customer : Messrs. PLB Engineering Sdn. Bhd.

Job No. : GLSB/SI /3971 - 155 /2022

Equipment Type : Geonor H-10

Equipment Serial No. :

2589

Vane Size, D : 65

VS No. : BH8/BVS5

Depth Test : 5.50m - 6.00m

Coordinate E : -2378.883

R. Level : 2.398

Date : 12/02/2023

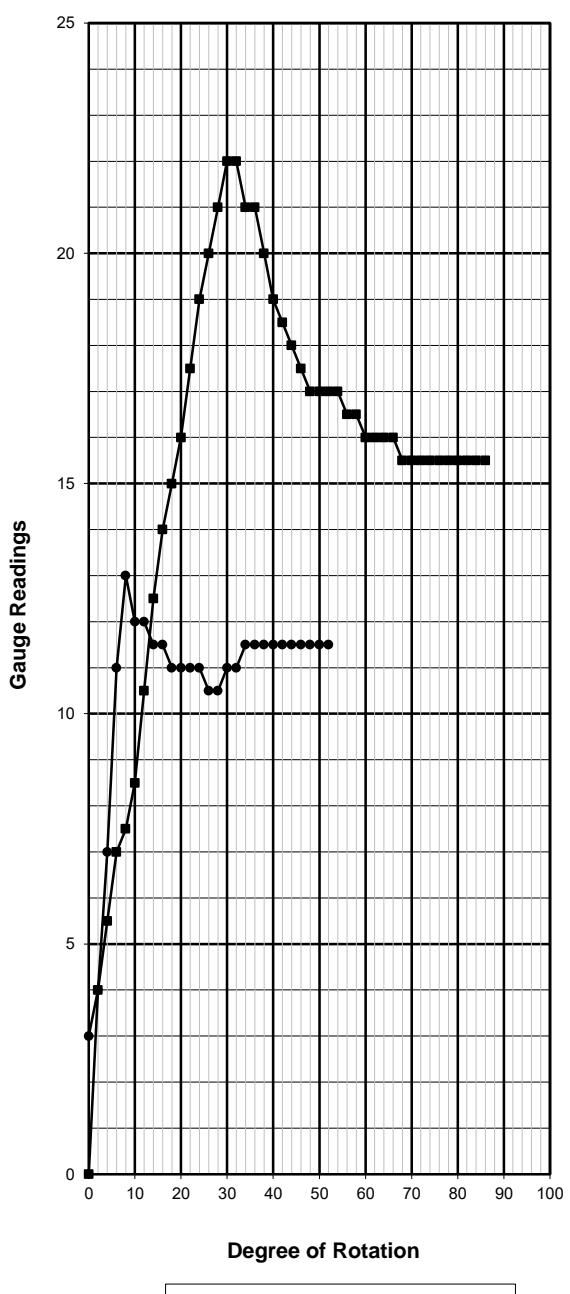
Test No. : VST3

N : -3657.462

Chainage :

**Natural Test****Remoulded Test**

Degree of Rotation	Gauge Readings						
2	4.0	102		202		2	4.0
4	5.5	104		204		4	7.0
6	7.0	106		206		6	11.0
8	7.5	108		208		8	13.0
10	8.5	110		210		10	12.0
12	10.5	112		212		12	12.0
14	12.5	114		214		14	11.5
16	14.0	116		216		16	11.5
18	15.0	118		218		18	11.0
20	16.0	120		220		20	11.0
22	17.5	122		222		22	11.0
24	19.0	124		224		24	11.0
26	20.0	126		226		26	10.5
28	21.0	128		228		28	10.5
30	22.0	130		230		30	11.0
32	22.0	132		232		32	11.0
34	21.0	134		234		34	11.5
36	21.0	136		236		36	11.5
38	20.0	138		238		38	11.5
40	19.0	140		240		40	11.5
42	18.5	142		242		42	11.5
44	18.0	144		244		44	11.5
46	17.5	146		246		46	11.5
48	17.0	148		248		48	11.5
50	17.0	150		250		50	11.5
52	17.0	152		252		52	11.5
54	17.0	154		254		54	
56	16.5	156		256		56	
58	16.5	158		258		58	
60	16.0	160		260		60	
62	16.0	162		262		62	
64	16.0	164		264		64	
66	16.0	166		266		66	
68	15.5	168		268		68	
70	15.5	170		270		70	
72	15.5	172		272		72	
74	15.5	174		274		74	
76	15.5	176		276		76	
78	15.5	178		278		78	
80	15.5	180		280		80	
82	15.5	182		282		82	
84	15.5	184		284		84	
86	15.5	186		286		86	
88		188		288		88	
90		190		290		90	
92		192		292		92	
94		194		294		94	
96		196		296		96	
98		198		298		98	
100		200		300		100	

**SHEAR STRENGTH COMPUTATION**

Gauge Reading	Shear Strength kN/m <sup>2</sup>
Natural	22.0
Remoulded	13.0
Sensitivity	1.7



Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.

Customer : Messrs. PLB Engineering Sdn. Bhd.

Job No. : GLSB/SI /3971 - 155 /2022

Equipment Type : Geonor H-10

Equipment Serial No. :

2589

Vane Size, D : 65

VS No. : BH8/BVS5

Depth Test : 8.00m - 8.50m

Coordinate E : -2378.883

R. Level : 2.398

Date : 12/02/2023

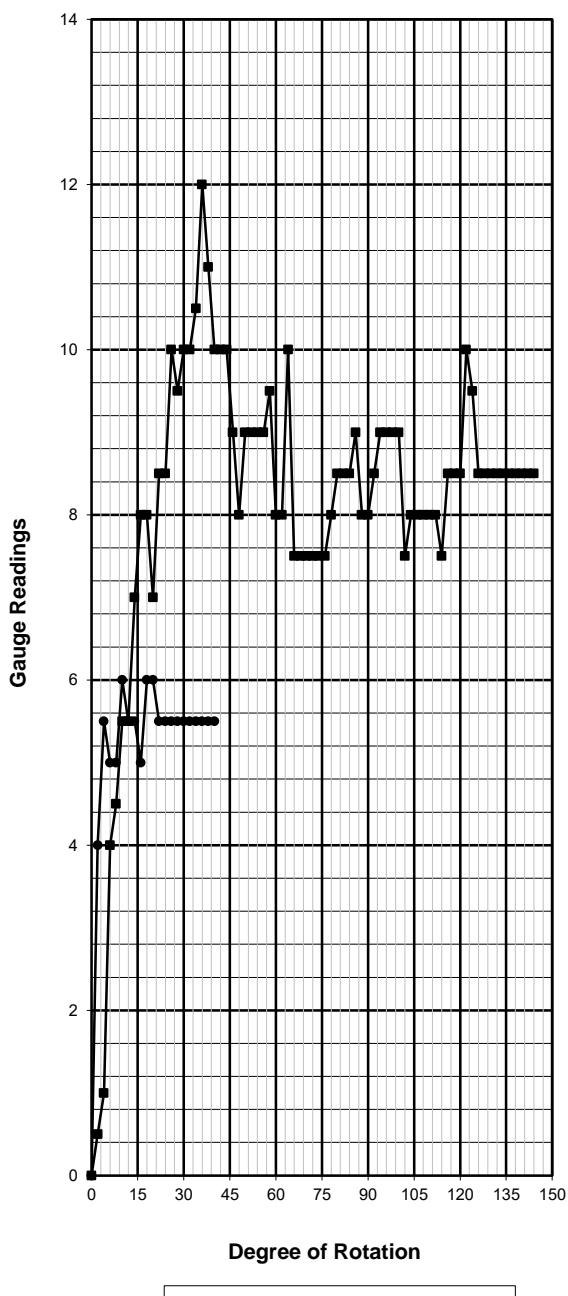
Test No. : VST4

N : -3657.462

Chainage :

**Natural Test****Remoulded Test**

Degree of Rotation	Gauge Readings						
2	0.5	102	7.5	202		2	4.0
4	1.0	104	8.0	204		4	5.5
6	4.0	106	8.0	206		6	5.0
8	4.5	108	8.0	208		8	5.0
10	5.5	110	8.0	210		10	6.0
12	5.5	112	8.0	212		12	5.5
14	7.0	114	7.5	214		14	5.5
16	8.0	116	8.5	216		16	5.0
18	8.0	118	8.5	218		18	6.0
20	7.0	120	8.5	220		20	6.0
22	8.5	122	10.0	222		22	5.5
24	8.5	124	9.5	224		24	5.5
26	10.0	126	8.5	226		26	5.5
28	9.5	128	8.5	228		28	5.5
30	10.0	130	8.5	230		30	5.5
32	10.0	132	8.5	232		32	5.5
34	10.5	134	8.5	234		34	5.5
36	12.0	136	8.5	236		36	5.5
38	11.0	138	8.5	238		38	5.5
40	10.0	140	8.5	240		40	5.5
42	10.0	142	8.5	242		42	
44	10.0	144	8.5	244		44	
46	9.0	146		246		46	
48	8.0	148		248		48	
50	9.0	150		250		50	
52	9.0	152		252		52	
54	9.0	154		254		54	
56	9.0	156		256		56	
58	9.5	158		258		58	
60	8.0	160		260		60	
62	8.0	162		262		62	
64	10.0	164		264		64	
66	7.5	166		266		66	
68	7.5	168		268		68	
70	7.5	170		270		70	
72	7.5	172		272		72	
74	7.5	174		274		74	
76	7.5	176		276		76	
78	8.0	178		278		78	
80	8.5	180		280		80	
82	8.5	182		282		82	
84	8.5	184		284		84	
86	9.0	186		286		86	
88	8.0	188		288		88	
90	8.0	190		290		90	
92	8.5	192		292		92	
94	9.0	194		294		94	
96	9.0	196		296		96	
98	9.0	198		298		98	
100	9.0	200		300		100	

**SHEAR STRENGTH COMPUTATION**

	Gauge Reading	Shear Strength kN/m <sup>2</sup>
Natural	12.0	6.0
Remoulded	6.0	3.2
Sensitivity		1.9



## Field Vane Shear



GEOLAB (M) SDN. BHD.

Foundation, Soil &amp; Concrete Specialists

## FIELD VANE SHEAR

Test Method : BS 1377 : Part 9: 1990

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.

Customer : Messrs. PLB Engineering Sdn. Bhd.

Job No. : GLSB/SI /3971 - 155 /2022

Equipment Type : Geonor H-10

Equipment Serial No. :

2589

Vane Size, D : 65

VS No. : FV-1

Depth Test : 9.00m - 9.50m

Coordinate E : -1415.874

R. Level : 1.959

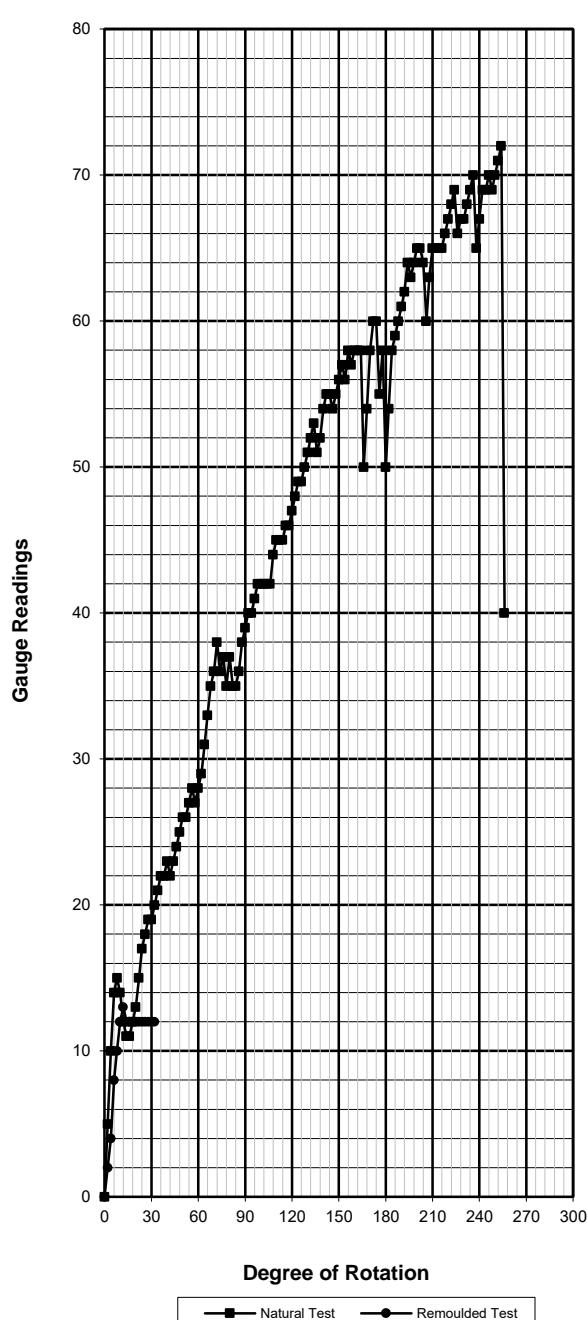
Date : 20/12/2022

Test No. : VST1

N : -2642.123

Chainage :

Natural Test			Remoulded Test		
Degree of Rotation	Gauge Readings	Degree of Rotation	Gauge Readings	Degree of Rotation	Gauge Readings
2	5.0	102	42.0	202	65.0
4	10.0	104	42.0	204	64.0
6	14.0	106	42.0	206	60.0
8	15.0	108	44.0	208	63.0
10	14.0	110	45.0	210	65.0
12	12.0	112	45.0	212	65.0
14	11.0	114	45.0	214	65.0
16	11.0	116	46.0	216	65.0
18	12.0	118	46.0	218	66.0
20	13.0	120	47.0	220	67.0
22	15.0	122	48.0	222	68.0
24	17.0	124	49.0	224	69.0
26	18.0	126	49.0	226	66.0
28	19.0	128	50.0	228	67.0
30	19.0	130	51.0	230	67.0
32	20.0	132	52.0	232	68.0
34	21.0	134	53.0	234	69.0
36	22.0	136	51.0	236	70.0
38	22.0	138	52.0	238	65.0
40	23.0	140	54.0	240	67.0
42	22.0	142	55.0	242	69.0
44	23.0	144	55.0	244	69.0
46	24.0	146	54.0	246	70.0
48	25.0	148	55.0	248	69.0
50	26.0	150	56.0	250	70.0
52	26.0	152	57.0	252	71.0
54	27.0	154	56.0	254	72.0
56	28.0	156	58.0	256	40.0
58	27.0	158	57.0	258	58
60	28.0	160	58.0	260	60
62	29.0	162	58.0	262	62
64	31.0	164	58.0	264	64
66	33.0	166	50.0	266	66
68	35.0	168	54.0	268	68
70	36.0	170	58.0	270	70
72	38.0	172	60.0	272	72
74	36.0	174	60.0	274	74
76	37.0	176	55.0	276	76
78	35.0	178	58.0	278	78
80	37.0	180	50.0	280	80
82	35.0	182	54.0	282	82
84	35.0	184	58.0	284	84
86	36.0	186	59.0	286	86
88	38.0	188	60.0	288	88
90	39.0	190	61.0	290	90
92	40.0	192	62.0	292	92
94	40.0	194	64.0	294	94
96	41.0	196	63.0	296	96
98	42.0	198	64.0	298	98
100	42.0	200	65.0	300	100



## SHEAR STRENGTH COMPUTATION

	Gauge Reading	Shear Strength kN/m <sup>2</sup>
Natural	72.0	37.5
Remoulded	13.0	6.5
Sensitivity		5.8



GEOLAB (M) SDN. BHD.

Foundation, Soil &amp; Concrete Specialists

## FIELD VANE SHEAR

Test Method : BS 1377 : Part 9: 1990

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.

Customer : Messrs. PLB Engineering Sdn. Bhd.

Job No. : GLSB/SI /3971 - 155 /2022

Equipment Type : Geonor H-10

Equipment Serial No. :

2589

Vane Size, D : 65

VS No. : FV-2

Depth Test : 1.00m - 1.50m

Coordinate E : -1671.703

R. Level : 2.295

Date : 05/01/2023

Test No. : VST1

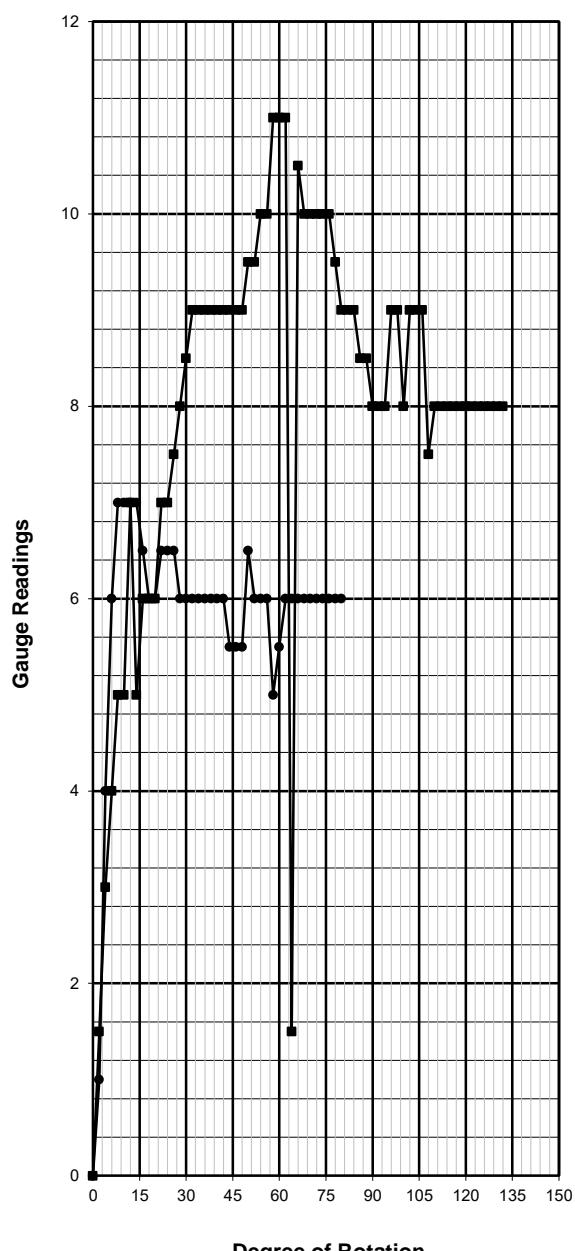
N : -2827.365

Chainage :

## Natural Test

## Remoulded Test

Degree of Rotation	Gauge Readings						
2	1.5	102	9.0	202		2	1.0
4	3.0	104	9.0	204		4	4.0
6	4.0	106	9.0	206		6	6.0
8	5.0	108	7.5	208		8	7.0
10	5.0	110	8.0	210		10	7.0
12	7.0	112	8.0	212		12	7.0
14	5.0	114	8.0	214		14	7.0
16	6.0	116	8.0	216		16	6.5
18	6.0	118	8.0	218		18	6.0
20	6.0	120	8.0	220		20	6.0
22	7.0	122	8.0	222		22	6.5
24	7.0	124	8.0	224		24	6.5
26	7.5	126	8.0	226		26	6.5
28	8.0	128	8.0	228		28	6.0
30	8.5	130	8.0	230		30	6.0
32	9.0	132	8.0	232		32	6.0
34	9.0	134		234		34	6.0
36	9.0	136		236		36	6.0
38	9.0	138		238		38	6.0
40	9.0	140		240		40	6.0
42	9.0	142		242		42	6.0
44	9.0	144		244		44	5.5
46	9.0	146		246		46	5.5
48	9.0	148		248		48	5.5
50	9.5	150		250		50	6.5
52	9.5	152		252		52	6.0
54	10.0	154		254		54	6.0
56	10.0	156		256		56	6.0
58	11.0	158		258		58	5.0
60	11.0	160		260		60	5.5
62	11.0	162		262		62	6.0
64	1.5	164		264		64	6.0
66	10.5	166		266		66	6.0
68	10.0	168		268		68	6.0
70	10.0	170		270		70	6.0
72	10.0	172		272		72	6.0
74	10.0	174		274		74	6.0
76	10.0	176		276		76	6.0
78	9.5	178		278		78	6.0
80	9.0	180		280		80	6.0
82	9.0	182		282		82	182
84	9.0	184		284		84	184
86	8.5	186		286		86	186
88	8.5	188		288		88	188
90	8.0	190		290		90	190
92	8.0	192		292		92	192
94	8.0	194		294		94	194
96	9.0	196		296		96	196
98	9.0	198		298		98	198
100	8.0	200		300		100	200



## SHEAR STRENGTH COMPUTATION

Gauge Reading	Shear Strength kN/m <sup>2</sup>
Natural	11.0
Remoulded	7.0
Sensitivity	1.5



GEOLAB (M) SDN. BHD.

Foundation, Soil &amp; Concrete Specialists

## FIELD VANE SHEAR

Test Method : BS 1377 : Part 9: 1990

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.

Customer : Messrs. PLB Engineering Sdn. Bhd.

Job No. : GLSB/SI /3971 - 155 /2022

Equipment Type : Geonor H-10

Equipment Serial No. :

2589

Vane Size, D : 65

VS No. : FV-2

Depth Test : 2.00m - 2.50m

Coordinate E : -1671.703

R. Level : 2.295

Date : 05/01/2023

Test No. : VST2

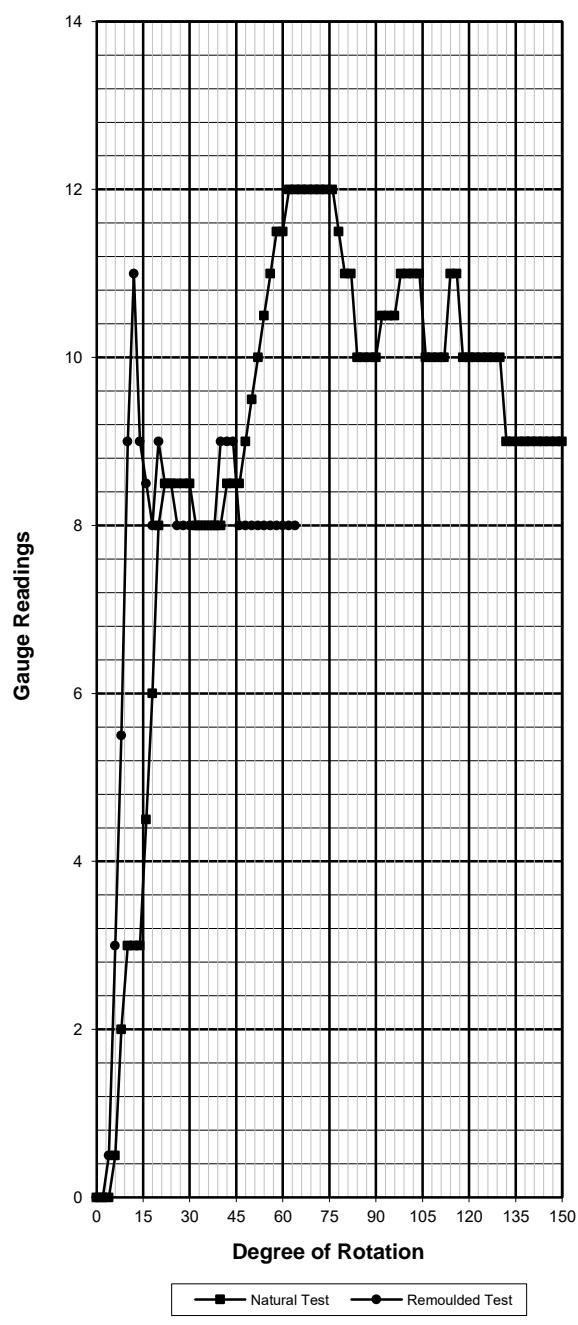
N : -2827.365

Chainage :

## Natural Test

## Remoulded Test

Degree of Rotation	Gauge Readings						
2	0.0	102	11.0	202		2	0.0
4	0.0	104	11.0	204		4	0.5
6	0.5	106	10.0	206		6	3.0
8	2.0	108	10.0	208		8	5.5
10	3.0	110	10.0	210		10	9.0
12	3.0	112	10.0	212		12	11.0
14	3.0	114	11.0	214		14	9.0
16	4.5	116	11.0	216		16	8.5
18	6.0	118	10.0	218		18	8.0
20	8.0	120	10.0	220		20	9.0
22	8.5	122	10.0	222		22	8.5
24	8.5	124	10.0	224		24	8.5
26	8.5	126	10.0	226		26	8.0
28	8.5	128	10.0	228		28	8.0
30	8.5	130	10.0	230		30	8.0
32	8.0	132	9.0	232		32	8.0
34	8.0	134	9.0	234		34	8.0
36	8.0	136	9.0	236		36	8.0
38	8.0	138	9.0	238		38	8.0
40	8.0	140	9.0	240		40	9.0
42	8.5	142	9.0	242		42	9.0
44	8.5	144	9.0	244		44	9.0
46	8.5	146	9.0	246		46	8.0
48	9.0	148	9.0	248		48	8.0
50	9.5	150	9.0	250		50	8.0
52	10.0	152		252		52	8.0
54	10.5	154		254		54	8.0
56	11.0	156		256		56	8.0
58	11.5	158		258		58	8.0
60	11.5	160		260		60	8.0
62	12.0	162		262		62	8.0
64	12.0	164		264		64	8.0
66	12.0	166		266		66	166
68	12.0	168		268		68	168
70	12.0	170		270		70	170
72	12.0	172		272		72	172
74	12.0	174		274		74	174
76	12.0	176		276		76	176
78	11.5	178		278		78	178
80	11.0	180		280		80	180
82	11.0	182		282		82	182
84	10.0	184		284		84	184
86	10.0	186		286		86	186
88	10.0	188		288		88	188
90	10.0	190		290		90	190
92	10.5	192		292		92	192
94	10.5	194		294		94	194
96	10.5	196		296		96	196
98	11.0	198		298		98	198
100	11.0	200		300		100	200



## SHEAR STRENGTH COMPUTATION

Gauge Reading	Shear Strength kN/m <sup>2</sup>
Natural	12.0
Remoulded	11.0
Sensitivity	1.1



GEOLAB (M) SDN. BHD.

Foundation, Soil &amp; Concrete Specialists

## FIELD VANE SHEAR

Test Method : BS 1377 : Part 9: 1990

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.

Customer : Messrs. PLB Engineering Sdn. Bhd.

Job No. : GLSB/SI /3971 - 155 /2022

Equipment Type : Geonor H-10

Equipment Serial No. :

2589

Vane Size, D : 65

VS No. : FV-2

Depth Test : 3.00m - 3.50m

Coordinate E : -1671.703

R. Level : 2.295

Date : 05/01/2023

Test No. : VST3

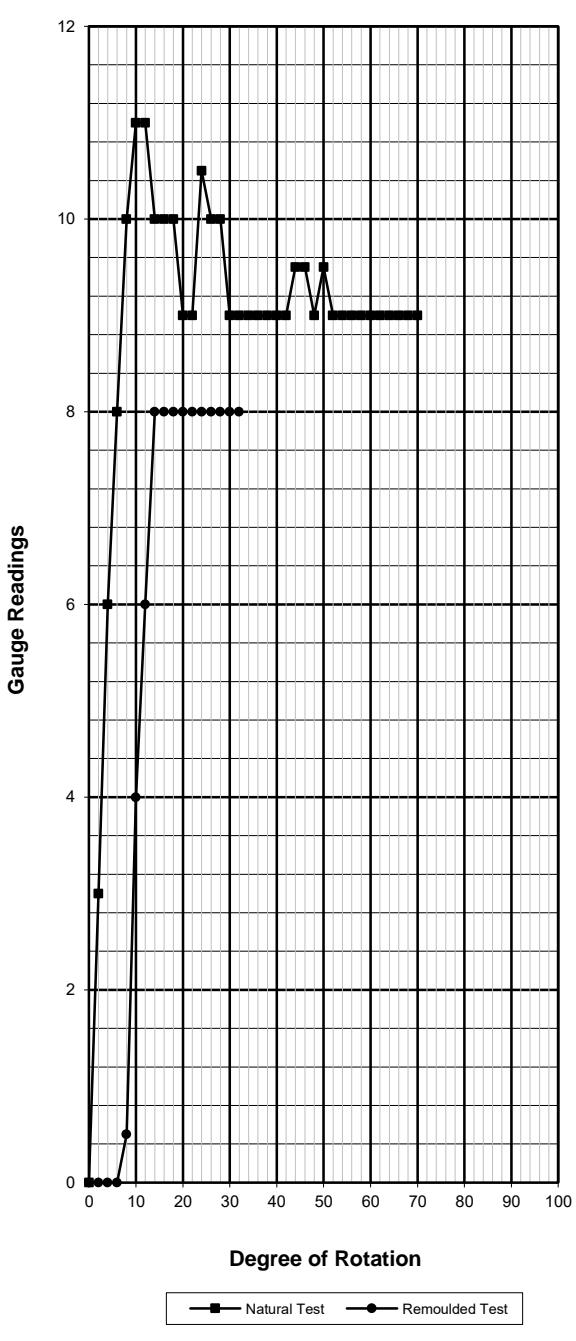
N : -2827.365

Chainage :

## Natural Test

## Remoulded Test

Degree of Rotation	Gauge Readings						
2	3.0	102		202		2	0.0
4	6.0	104		204		4	0.0
6	8.0	106		206		6	0.0
8	10.0	108		208		8	0.5
10	11.0	110		210		10	4.0
12	11.0	112		212		12	6.0
14	10.0	114		214		14	8.0
16	10.0	116		216		16	8.0
18	10.0	118		218		18	8.0
20	9.0	120		220		20	8.0
22	9.0	122		222		22	8.0
24	10.5	124		224		24	8.0
26	10.0	126		226		26	8.0
28	10.0	128		228		28	8.0
30	9.0	130		230		30	8.0
32	9.0	132		232		32	8.0
34	9.0	134		234		34	
36	9.0	136		236		36	
38	9.0	138		238		38	
40	9.0	140		240		40	
42	9.0	142		242		42	
44	9.5	144		244		44	
46	9.5	146		246		46	
48	9.0	148		248		48	
50	9.5	150		250		50	
52	9.0	152		252		52	
54	9.0	154		254		54	
56	9.0	156		256		56	
58	9.0	158		258		58	
60	9.0	160		260		60	
62	9.0	162		262		62	
64	9.0	164		264		64	
66	9.0	166		266		66	
68	9.0	168		268		68	
70	9.0	170		270		70	
72		172		272		72	
74		174		274		74	
76		176		276		76	
78		178		278		78	
80		180		280		80	
82		182		282		82	
84		184		284		84	
86		186		286		86	
88		188		288		88	
90		190		290		90	
92		192		292		92	
94		194		294		94	
96		196		296		96	
98		198		298		98	
100		200		300		100	



## SHEAR STRENGTH COMPUTATION

	Gauge Reading	Shear Strength kN/m <sup>2</sup>
Natural	11.0	5.6
Remoulded	8.0	4.3
Sensitivity		1.3



Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.

Customer : Messrs. PLB Engineering Sdn. Bhd.

Job No. : GLSB/SI /3971 - 155 /2022

Equipment Type : Geonor H-10

Equipment Serial No. :

2589

Vane Size, D : 65

VS No. : FV-3

Depth Test : 1.00m - 1.50m

Coordinate E : -1871.047

R. Level : 2.283

Date : 24/02/2023

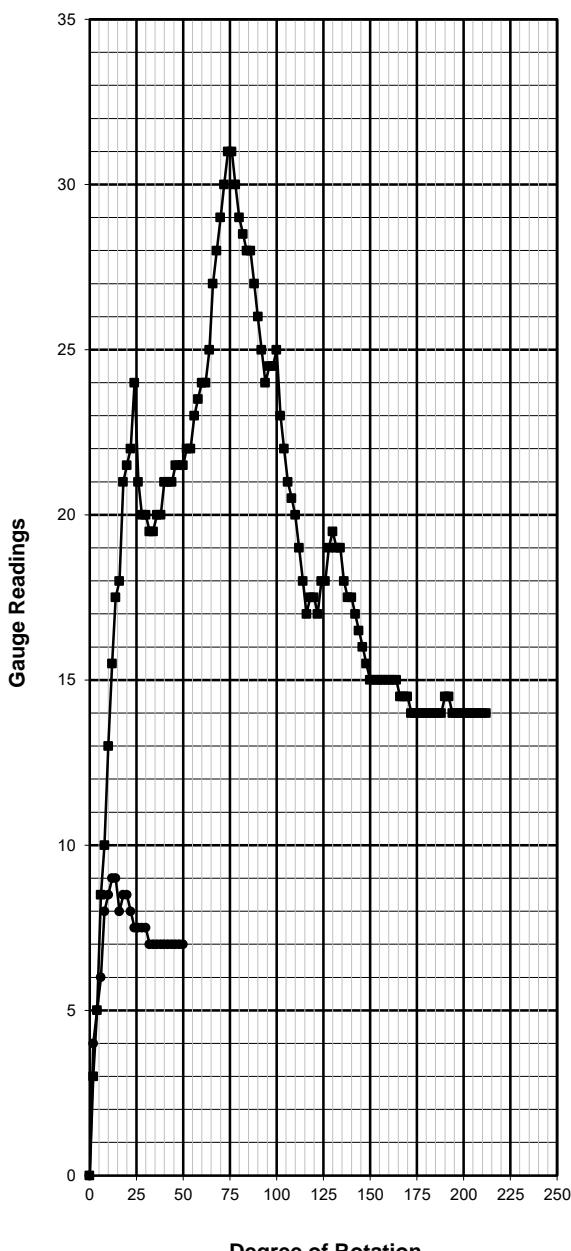
Test No. : VST1

N : -3119.975

Chainage :

**Natural Test****Remoulded Test**

Degree of Rotation	Gauge Readings								
2	3.0	102	23.0	202	14	2	4.0	102	
4	5.0	104	22.0	204	14	4	5.0	104	
6	8.5	106	21.0	206	14	6	6.0	106	
8	10.0	108	20.5	208	14	8	8.0	108	
10	13.0	110	20.0	210	14	10	8.5	110	
12	15.5	112	19.0	212	14	12	9.0	112	
14	17.5	114	18.0	214		14	9.0	114	
16	18.0	116	17.0	216		16	8.0	116	
18	21.0	118	17.5	218		18	8.5	118	
20	21.5	120	17.5	220		20	8.5	120	
22	22.0	122	17.0	222		22	8.0	122	
24	24.0	124	18.0	224		24	7.5	124	
26	21.0	126	18.0	226		26	7.5	126	
28	20.0	128	19.0	228		28	7.5	128	
30	20.0	130	19.5	230		30	7.5	130	
32	19.5	132	19.0	232		32	7.0	132	
34	19.5	134	19.0	234		34	7.0	134	
36	20.0	136	18.0	236		36	7.0	136	
38	20.0	138	17.5	238		38	7.0	138	
40	21.0	140	17.5	240		40	7.0	140	
42	21.0	142	17.0	242		42	7.0	142	
44	21.0	144	16.5	244		44	7.0	144	
46	21.5	146	16.0	246		46	7.0	146	
48	21.5	148	15.5	248		48	7.0	148	
50	21.5	150	15.0	250		50	7.0	150	
52	22.0	152	15.0	252		52		152	
54	22.0	154	15.0	254		54		154	
56	23.0	156	15.0	256		56		156	
58	23.5	158	15.0	258		58		158	
60	24.0	160	15.0	260		60		160	
62	24.0	162	15.0	262		62		162	
64	25.0	164	15.0	264		64		164	
66	27.0	166	14.5	266		66		166	
68	28.0	168	14.5	268		68		168	
70	29.0	170	14.5	270		70		170	
72	30.0	172	14.0	272		72		172	
74	31.0	174	14.0	274		74		174	
76	31.0	176	14.0	276		76		176	
78	30.0	178	14.0	278		78		178	
80	29.0	180	14.0	280		80		180	
82	28.5	182	14.0	282		82		182	
84	28.0	184	14.0	284		84		184	
86	28.0	186	14.0	286		86		186	
88	27.0	188	14.0	288		88		188	
90	26.0	190	14.5	290		90		190	
92	25.0	192	14.5	292		92		192	
94	24.0	194	14.0	294		94		194	
96	24.5	196	14.0	296		96		196	
98	24.5	198	14.0	298		98		198	
100	25.0	200	14.0	300		100		200	

**SHEAR STRENGTH COMPUTATION**

Gauge Reading	Shear Strength kN/m <sup>2</sup>
Natural	31.0
Remoulded	9.0
Sensitivity	3.3



Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.

Customer : Messrs. PLB Engineering Sdn. Bhd.

Job No. : GLSB/SI /3971 - 155 /2022

Equipment Type : Geonor H-10

Equipment Serial No. :

2589

Vane Size, D : 65

VS No. : FV-3

Depth Test : 2.00m - 2.50m

Coordinate E : -1871.047

R. Level : 2.283

Date : 24/02/2023

Test No. : VST2

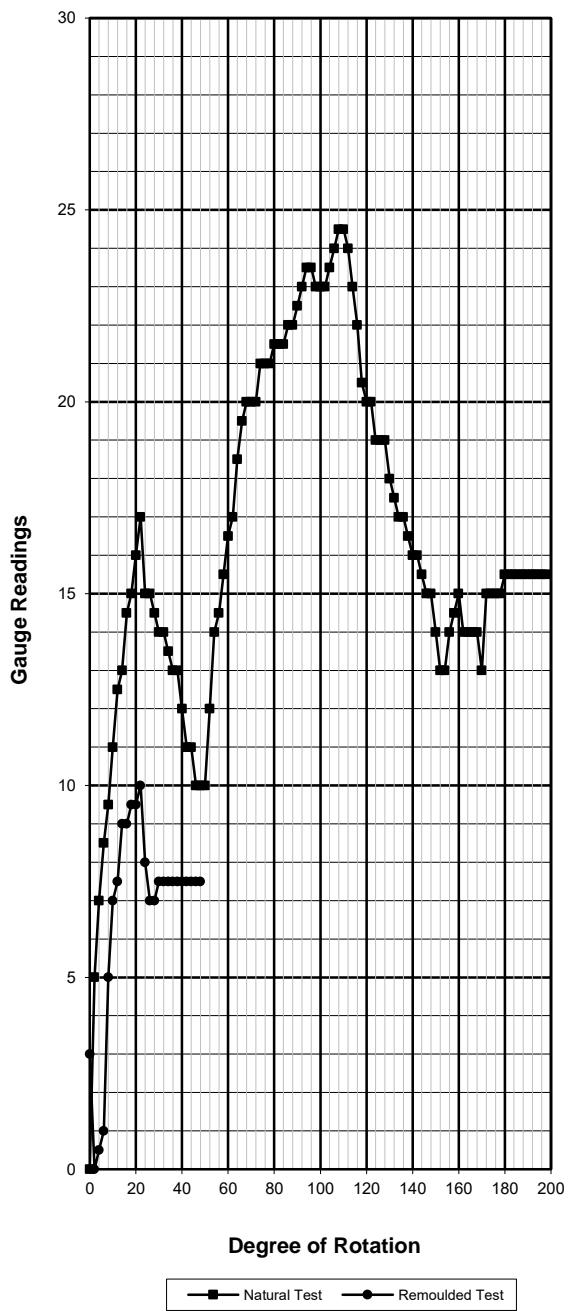
N : -3119.975

Chainage :

## Natural Test

## Remoulded Test

Degree of Rotation	Gauge Readings						
2	5.0	102	23.0	202		2	0.0
4	7.0	104	23.5	204		4	0.5
6	8.5	106	24.0	206		6	1.0
8	9.5	108	24.5	208		8	5.0
10	11.0	110	24.5	210		10	7.0
12	12.5	112	24.0	212		12	7.5
14	13.0	114	23.0	214		14	9.0
16	14.5	116	22.0	216		16	9.0
18	15.0	118	20.5	218		18	9.5
20	16.0	120	20.0	220		20	9.5
22	17.0	122	20.0	222		22	10.0
24	15.0	124	19.0	224		24	8.0
26	15.0	126	19.0	226		26	7.0
28	14.5	128	19.0	228		28	7.0
30	14.0	130	18.0	230		30	7.5
32	14.0	132	17.5	232		32	7.5
34	13.5	134	17.0	234		34	7.5
36	13.0	136	17.0	236		36	7.5
38	13.0	138	16.5	238		38	7.5
40	12.0	140	16.0	240		40	7.5
42	11.0	142	16.0	242		42	7.5
44	11.0	144	15.5	244		44	7.5
46	10.0	146	15.0	246		46	7.5
48	10.0	148	15.0	248		48	7.5
50	10.0	150	14.0	250		50	15.0
52	12.0	152	13.0	252		52	152
54	14.0	154	13.0	254		54	154
56	14.5	156	14.0	256		56	156
58	15.5	158	14.5	258		58	158
60	16.5	160	15.0	260		60	160
62	17.0	162	14.0	262		62	162
64	18.5	164	14.0	264		64	164
66	19.5	166	14.0	266		66	166
68	20.0	168	14.0	268		68	168
70	20.0	170	13.0	270		70	170
72	20.0	172	15.0	272		72	172
74	21.0	174	15.0	274		74	174
76	21.0	176	15.0	276		76	176
78	21.0	178	15.0	278		78	178
80	21.5	180	15.5	280		80	180
82	21.5	182	15.5	282		82	182
84	21.5	184	15.5	284		84	184
86	22.0	186	15.5	286		86	186
88	22.0	188	15.5	288		88	188
90	22.5	190	15.5	290		90	190
92	23.0	192	15.5	292		92	192
94	23.5	194	15.5	294		94	194
96	23.5	196	15.5	296		96	196
98	23.0	198	15.5	298		98	198
100	23.0	200		300		100	200



## SHEAR STRENGTH COMPUTATION

	Gauge Reading	Shear Strength kN/m <sup>2</sup>
Natural	24.5	12.4
Remoulded	10.0	5.2
Sensitivity		2.4



Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.

Customer : Messrs. PLB Engineering Sdn. Bhd.

Job No. : GLSB/SI /3971 - 155 /2022

Equipment Type : Geonor H-10

Equipment Serial No. :

2589

Vane Size, D : 65

VS No. : FV-3

Depth Test : 3.00m - 3.50m

Coordinate E : -1871.047

R. Level : 2.283

Date : 24/02/2023

Test No. : VST3

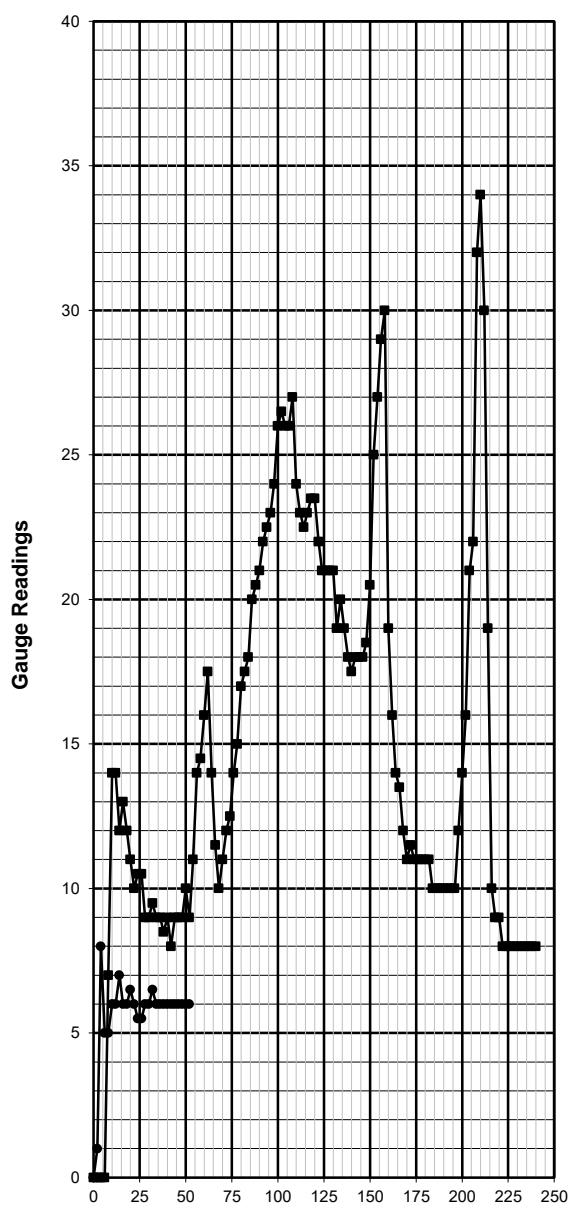
N : -3119.975

Chainage :

## Natural Test

## Remoulded Test

Degree of Rotation	Gauge Readings								
2	0.0	102	26.5	202	16.0	2	1.0	102	
4	0.0	104	26.0	204	21.0	4	8.0	104	
6	0.0	106	26.0	206	22.0	6	5.0	106	
8	7.0	108	27.0	208	32.0	8	5.0	108	
10	14.0	110	24.0	210	34.0	10	6.0	110	
12	14.0	112	23.0	212	30.0	12	6.0	112	
14	12.0	114	22.5	214	19.0	14	7.0	114	
16	13.0	116	23.0	216	10.0	16	6.0	116	
18	12.0	118	23.5	218	9.0	18	6.0	118	
20	11.0	120	23.5	220	9.0	20	6.5	120	
22	10.0	122	22.0	222	8.0	22	6.0	122	
24	10.5	124	21.0	224	8.0	24	5.5	124	
26	10.5	126	21.0	226	8.0	26	5.5	126	
28	9.0	128	21.0	228	8.0	28	6.0	128	
30	9.0	130	21.0	230	8.0	30	6.0	130	
32	9.5	132	19.0	232	8.0	32	6.5	132	
34	9.0	134	20.0	234	8.0	34	6.0	134	
36	9.0	136	19.0	236	8.0	36	6.0	136	
38	8.5	138	18.0	238	8.0	38	6.0	138	
40	9.0	140	17.5	240	8.0	40	6.0	140	
42	8.0	142	18.0	242		42	6.0	142	
44	9.0	144	18.0	244		44	6.0	144	
46	9.0	146	18.0	246		46	6.0	146	
48	9.0	148	18.5	248		48	6.0	148	
50	10.0	150	20.5	250		50	6.0	150	
52	9.0	152	25.0	252		52	6.0	152	
54	11.0	154	27.0	254		54		154	
56	14.0	156	29.0	256		56		156	
58	14.5	158	30.0	258		58		158	
60	16.0	160	19.0	260		60		160	
62	17.5	162	16.0	262		62		162	
64	14.0	164	14.0	264		64		164	
66	11.5	166	13.5	266		66		166	
68	10.0	168	12.0	268		68		168	
70	11.0	170	11.0	270		70		170	
72	12.0	172	11.5	272		72		172	
74	12.5	174	11.0	274		74		174	
76	14.0	176	11.0	276		76		176	
78	15.0	178	11.0	278		78		178	
80	17.0	180	11.0	280		80		180	
82	17.5	182	11.0	282		82		182	
84	18.0	184	10.0	284		84		184	
86	20.0	186	10.0	286		86		186	
88	20.5	188	10.0	288		88		188	
90	21.0	190	10.0	290		90		190	
92	22.0	192	10.0	292		92		192	
94	22.5	194	10.0	294		94		194	
96	23.0	196	10.0	296		96		196	
98	24.0	198	12.0	298		98		198	
100	26.0	200	14.0	300		100		200	



## SHEAR STRENGTH COMPUTATION

Gauge Reading	Shear Strength kN/m <sup>2</sup>
Natural	34.0
Remoulded	8.0
Sensitivity	4.0



Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.

Customer : Messrs. PLB Engineering Sdn. Bhd.

Job No. : GLSB/SI /3971 - 155 /2022

Equipment Type : Geonor H-10

Equipment Serial No. :

2589

Vane Size, D : 65

VS No. : FV-3

Depth Test : 4.00m - 4.5

Coordinate E : -1871.047

R. Level : 2.283

Date : 24/02/2023

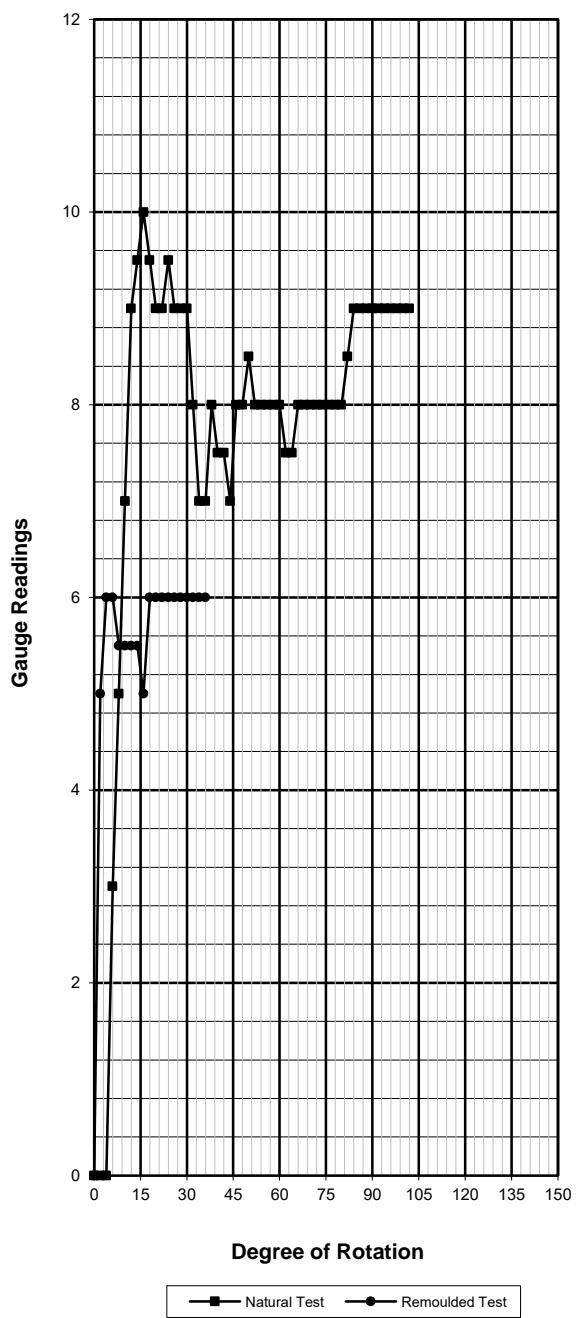
Test No. : VST4

N : -3119.975

Chainage :

**Natural Test****Remoulded Test**

Degree of Rotation	Gauge Readings						
2	0.0	102	9.0	202		2	5.0
4	0.0	104		204		4	6.0
6	3.0	106		206		6	6.0
8	5.0	108		208		8	5.5
10	7.0	110		210		10	5.5
12	9.0	112		212		12	5.5
14	9.5	114		214		14	5.5
16	10.0	116		216		16	5.0
18	9.5	118		218		18	6.0
20	9.0	120		220		20	6.0
22	9.0	122		222		22	6.0
24	9.5	124		224		24	6.0
26	9.0	126		226		26	6.0
28	9.0	128		228		28	6.0
30	9.0	130		230		30	6.0
32	8.0	132		232		32	6.0
34	7.0	134		234		34	6.0
36	7.0	136		236		36	6.0
38	8.0	138		238		38	138
40	7.5	140		240		40	140
42	7.5	142		242		42	142
44	7.0	144		244		44	144
46	8.0	146		246		46	146
48	8.0	148		248		48	148
50	8.5	150		250		50	150
52	8.0	152		252		52	152
54	8.0	154		254		54	154
56	8.0	156		256		56	156
58	8.0	158		258		58	158
60	8.0	160		260		60	160
62	7.5	162		262		62	162
64	7.5	164		264		64	164
66	8.0	166		266		66	166
68	8.0	168		268		68	168
70	8.0	170		270		70	170
72	8.0	172		272		72	172
74	8.0	174		274		74	174
76	8.0	176		276		76	176
78	8.0	178		278		78	178
80	8.0	180		280		80	180
82	8.5	182		282		82	182
84	9.0	184		284		84	184
86	9.0	186		286		86	186
88	9.0	188		288		88	188
90	9.0	190		290		90	190
92	9.0	192		292		92	192
94	9.0	194		294		94	194
96	9.0	196		296		96	196
98	9.0	198		298		98	198
100	9.0	200		300		100	200

**SHEAR STRENGTH COMPUTATION**

	Gauge Reading	Shear Strength kN/m <sup>2</sup>
Natural	10.0	5.2
Remoulded	6.0	3.2
Sensitivity		1.6



GEOLAB (M) SDN. BHD.

Foundation, Soil &amp; Concrete Specialists

## FIELD VANE SHEAR

Test Method : BS 1377 : Part 9: 1990

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.

Customer : Messrs. PLB Engineering Sdn. Bhd.

Job No. : GLSB/SI /3971 - 155 /2022

Equipment Type : Geonor H-10

Equipment Serial No. :

2589

Vane Size, D : 65

VS No. : FV-3

Depth Test : 5.00m - 5.5

Coordinate E : -1871.047

R. Level : 2.283

Date : 24/02/2023

Test No. : VST5

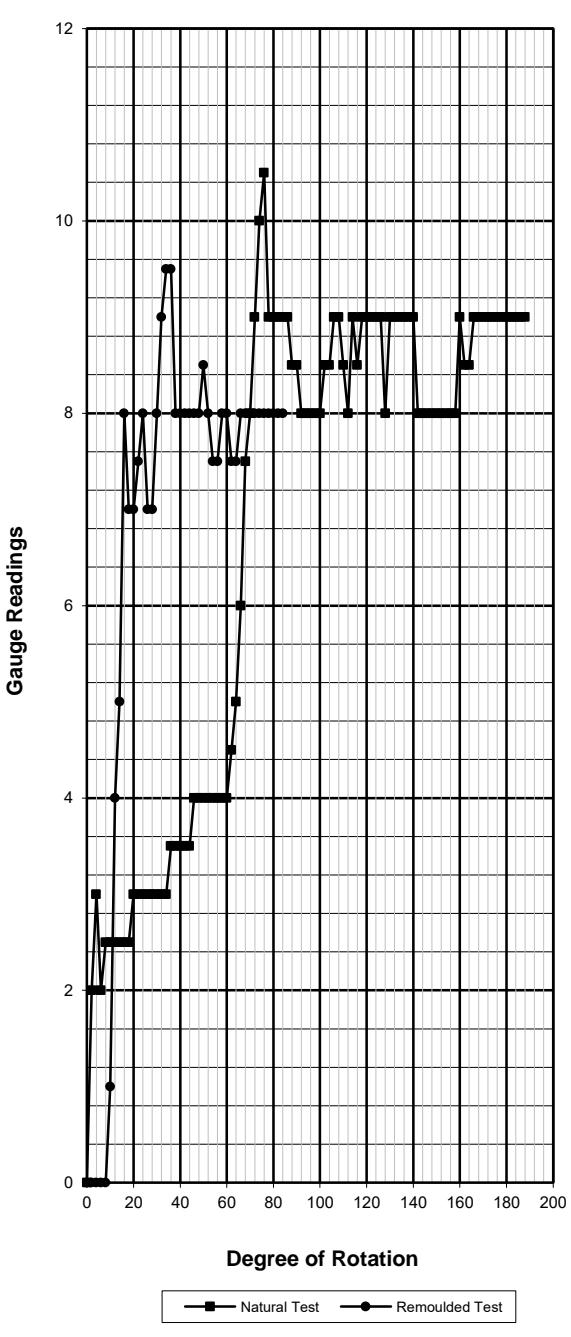
N : -3119.975

Chainage :

## Natural Test

## Remoulded Test

Degree of Rotation	Gauge Readings						
2	2.0	102	8.5	202		2	0.0
4	3.0	104	8.5	204		4	0.0
6	2.0	106	9.0	206		6	0.0
8	2.5	108	9.0	208		8	0.0
10	2.5	110	8.5	210		10	1.0
12	2.5	112	8.0	212		12	4.0
14	2.5	114	9.0	214		14	5.0
16	2.5	116	8.5	216		16	8.0
18	2.5	118	9.0	218		18	7.0
20	3.0	120	9.0	220		20	7.0
22	3.0	122	9.0	222		22	7.5
24	3.0	124	9.0	224		24	8.0
26	3.0	126	9.0	226		26	7.0
28	3.0	128	8.0	228		28	7.0
30	3.0	130	9.0	230		30	8.0
32	3.0	132	9.0	232		32	9.0
34	3.0	134	9.0	234		34	9.5
36	3.5	136	9.0	236		36	9.5
38	3.5	138	9.0	238		38	8.0
40	3.5	140	9.0	240		40	8.0
42	3.5	142	8.0	242		42	8.0
44	3.5	144	8.0	244		44	8.0
46	4.0	146	8.0	246		46	8.0
48	4.0	148	8.0	248		48	8.0
50	4.0	150	8.0	250		50	8.5
52	4.0	152	8.0	252		52	8.0
54	4.0	154	8.0	254		54	7.5
56	4.0	156	8.0	256		56	7.5
58	4.0	158	8.0	258		58	8.0
60	4.0	160	9.0	260		60	8.0
62	4.5	162	8.5	262		62	7.5
64	5.0	164	8.5	264		64	7.5
66	6.0	166	9.0	266		66	8.0
68	7.5	168	9.0	268		68	8.0
70	8.0	170	9.0	270		70	8.0
72	9.0	172	9.0	272		72	8.0
74	10.0	174	9.0	274		74	8.0
76	10.5	176	9.0	276		76	8.0
78	9.0	178	9.0	278		78	8.0
80	9.0	180	9.0	280		80	8.0
82	9.0	182	9.0	282		82	8.0
84	9.0	184	9.0	284		84	8.0
86	9.0	186	9.0	286		86	186
88	8.5	188	9.0	288		88	188
90	8.5	190		290		90	190
92	8.0	192		292		92	192
94	8.0	194		294		94	194
96	8.0	196		296		96	196
98	8.0	198		298		98	198
100	8.0	200		300		100	200



## SHEAR STRENGTH COMPUTATION

	Gauge Reading	Shear Strength kN/m <sup>2</sup>
Natural	10.5	5.4
Remoulded	9.5	5.0
Sensitivity		1.1



GEOLAB (M) SDN. BHD.

Foundation, Soil &amp; Concrete Specialists

## FIELD VANE SHEAR

Test Method : BS 1377 : Part 9: 1990

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.

Customer : Messrs. PLB Engineering Sdn. Bhd.

Job No. : GLSB/SI /3971 - 155 /2022

Equipment Type : Geonor H-10

Equipment Serial No. :

2589

Vane Size, D : 65

VS No. : FV-3

Depth Test : 6.00m - 6.5

Coordinate E : -1871.047

R. Level : 2.283

Date : 24/02/2023

Test No. : VST6

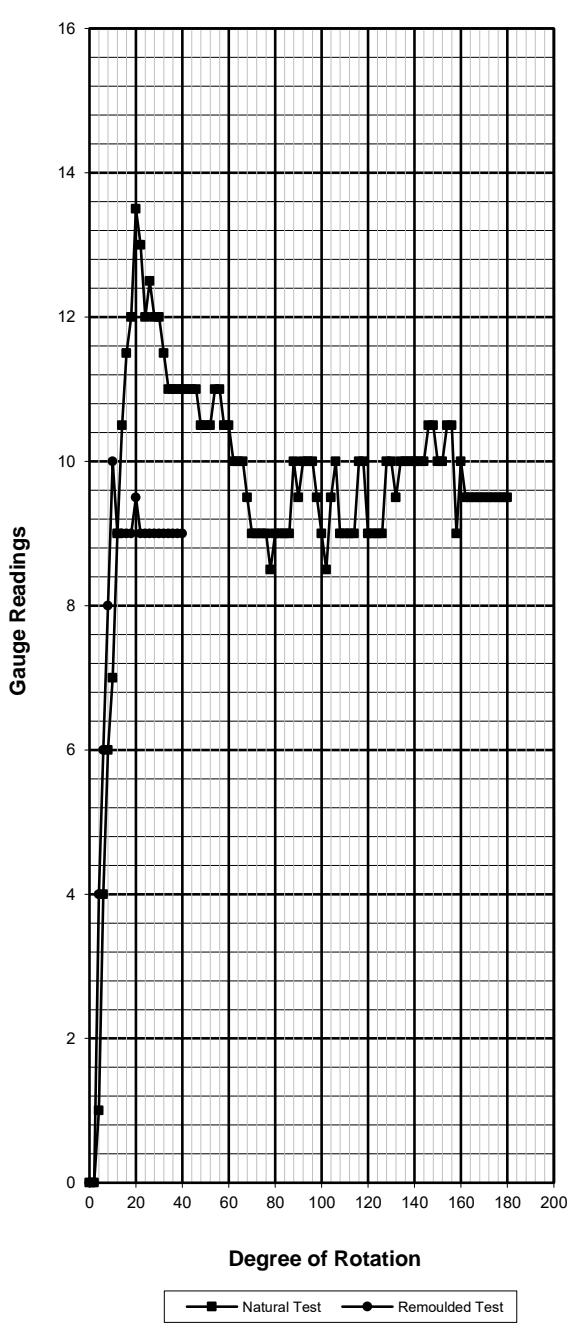
N : -3119.975

Chainage :

## Natural Test

## Remoulded Test

Degree of Rotation	Gauge Readings						
2	0.0	102	8.5	202		2	0.0
4	1.0	104	9.5	204		4	4.0
6	4.0	106	10.0	206		6	6.0
8	6.0	108	9.0	208		8	8.0
10	7.0	110	9.0	210		10	10.0
12	9.0	112	9.0	212		12	9.0
14	10.5	114	9.0	214		14	9.0
16	11.5	116	10.0	216		16	9.0
18	12.0	118	10.0	218		18	9.0
20	13.5	120	9.0	220		20	9.5
22	13.0	122	9.0	222		22	9.0
24	12.0	124	9.0	224		24	9.0
26	12.5	126	9.0	226		26	9.0
28	12.0	128	10.0	228		28	9.0
30	12.0	130	10.0	230		30	9.0
32	11.5	132	9.5	232		32	9.0
34	11.0	134	10.0	234		34	9.0
36	11.0	136	10.0	236		36	9.0
38	11.0	138	10.0	238		38	9.0
40	11.0	140	10.0	240		40	9.0
42	11.0	142	10.0	242		42	
44	11.0	144	10.0	244		44	
46	11.0	146	10.5	246		46	
48	10.5	148	10.5	248		48	
50	10.5	150	10.0	250		50	
52	10.5	152	10.0	252		52	
54	11.0	154	10.5	254		54	
56	11.0	156	10.5	256		56	
58	10.5	158	9.0	258		58	
60	10.5	160	10.0	260		60	
62	10.0	162	9.5	262		62	
64	10.0	164	9.5	264		64	
66	10.0	166	9.5	266		66	
68	9.5	168	9.5	268		68	
70	9.0	170	9.5	270		70	
72	9.0	172	9.5	272		72	
74	9.0	174	9.5	274		74	
76	9.0	176	9.5	276		76	
78	8.5	178	9.5	278		78	
80	9.0	180	9.5	280		80	
82	9.0	182		282		82	
84	9.0	184		284		84	
86	9.0	186		286		86	
88	10.0	188		288		88	
90	9.5	190		290		90	
92	10.0	192		292		92	
94	10.0	194		294		94	
96	10.0	196		296		96	
98	9.5	198		298		98	
100	9.0	200		300		100	



## SHEAR STRENGTH COMPUTATION

Gauge Reading	Shear Strength kN/m <sup>2</sup>
Natural	13.5
Remoulded	10.0
Sensitivity	1.3



Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.

Customer : Messrs. PLB Engineering Sdn. Bhd.

Job No. : GLSB/SI /3971 - 155 /2022

Equipment Type : Geonor H-10

Equipment Serial No. :

2589

Vane Size, D : 65

VS No. : FV-6

Depth Test : 1.00m - 1.50m

Coordinate E : -1938.575

R. Level : 2.241m

Date : 10/02/2023

Test No. : VST1

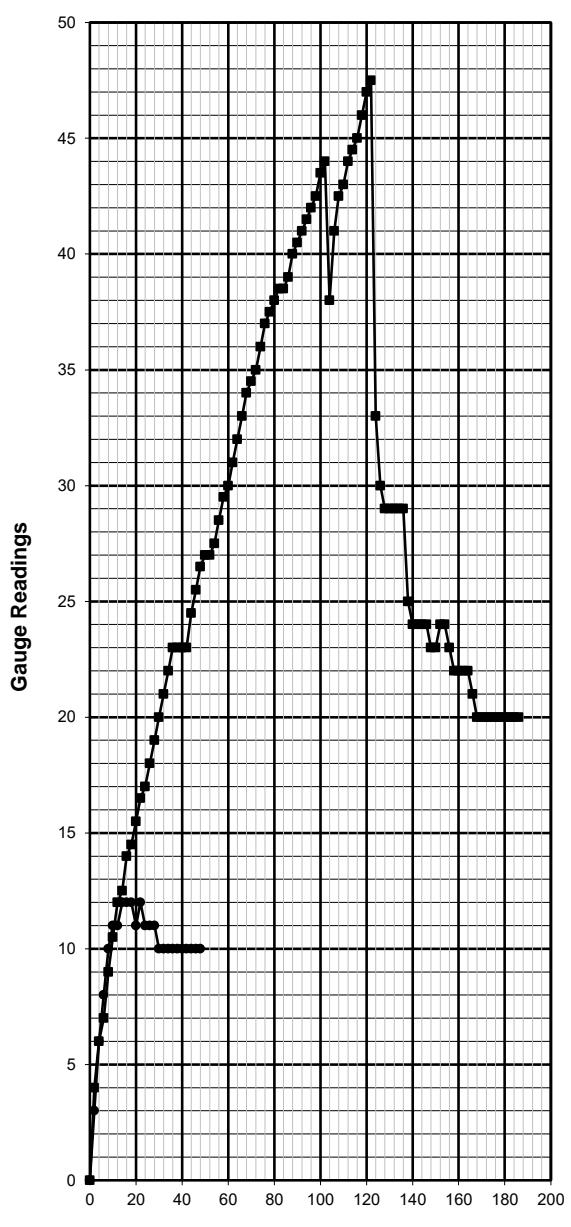
N : -3650.66

Chainage :

## Natural Test

## Remoulded Test

Degree of Rotation	Gauge Readings						
2	4.0	102	44.0	202		2	3.0
4	6.0	104	38.0	204		4	6.0
6	7.0	106	41.0	206		6	8.0
8	9.0	108	42.5	208		8	10.0
10	10.5	110	43.0	210		10	11.0
12	12.0	112	44.0	212		12	11.0
14	12.5	114	44.5	214		14	12.0
16	14.0	116	45.0	216		16	12.0
18	14.5	118	46.0	218		18	12.0
20	15.5	120	47.0	220		20	11.0
22	16.5	122	47.5	222		22	12.0
24	17.0	124	33.0	224		24	11.0
26	18.0	126	30.0	226		26	11.0
28	19.0	128	29.0	228		28	11.0
30	20.0	130	29.0	230		30	10.0
32	21.0	132	29.0	232		32	10.0
34	22.0	134	29.0	234		34	10.0
36	23.0	136	29.0	236		36	10.0
38	23.0	138	25.0	238		38	10.0
40	23.0	140	24.0	240		40	10.0
42	23.0	142	24.0	242		42	10.0
44	24.5	144	24.0	244		44	10.0
46	25.5	146	24.0	246		46	10.0
48	26.5	148	23.0	248		48	10.0
50	27.0	150	23.0	250		50	
52	27.0	152	24.0	252		52	152
54	27.5	154	24.0	254		54	154
56	28.5	156	23.0	256		56	156
58	29.5	158	22.0	258		58	158
60	30.0	160	22.0	260		60	160
62	31.0	162	22.0	262		62	162
64	32.0	164	22.0	264		64	164
66	33.0	166	21.0	266		66	166
68	34.0	168	20.0	268		68	168
70	34.5	170	20.0	270		70	170
72	35.0	172	20.0	272		72	172
74	36.0	174	20.0	274		74	174
76	37.0	176	20.0	276		76	176
78	37.5	178	20.0	278		78	178
80	38.0	180	20.0	280		80	180
82	38.5	182	20.0	282		82	182
84	38.5	184	20.0	284		84	184
86	39.0	186	20.0	286		86	186
88	40.0	188		288		88	188
90	40.5	190		290		90	190
92	41.0	192		292		92	192
94	41.5	194		294		94	194
96	42.0	196		296		96	196
98	42.5	198		298		98	198
100	43.5	200		300		100	200



## SHEAR STRENGTH COMPUTATION

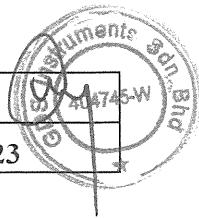
Gauge Reading	Shear Strength kN/m <sup>2</sup>
Natural	47.5
Remoulded	6.0
Sensitivity	4.1



# Calibration Certificate



Instrument no : 2589	Calibration by : K. K. Yoong
Calibration date : 12 September 2022	Recommended Due Date : 12 September 2023



Torque,  $T = 35 \times \text{load}$

$$\text{Shear Stress, } \tau = \frac{6T}{7\pi D^3}$$

Vane diameter,  $D = 55\text{mm}$  or  $65\text{mm}$

Vane height,  $H = 2 \times D$

Load (N)	T (Nm)	Tau (kPa)		Instrument readings					
		D= 55mm	D= 65mm	load	unload	reload	unload	average	
0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	70	1.15	0.70	1.00	1.50	1.50	1.50	1.25	
4	140	2.30	1.39	2.00	3.00	3.00	3.00	2.50	
6	210	3.44	2.09	3.50	4.50	4.00	4.50	3.75	
8	280	4.59	2.78	5.00	6.00	5.50	6.00	5.25	
10	350	5.74	3.48	6.00	7.00	7.00	7.00	6.50	
12	420	6.89	4.17	7.50	8.50	8.00	9.00	7.75	
14	490	8.04	4.87	9.00	10.50	9.50	10.50	9.25	
16	560	9.18	5.56	11.00	11.50	11.00	11.50	11.00	
18	630	10.33	6.26	12.50	13.00	12.50	13.00	12.50	
20	700	11.50	6.95	14.00	-	13.50	-	13.75	

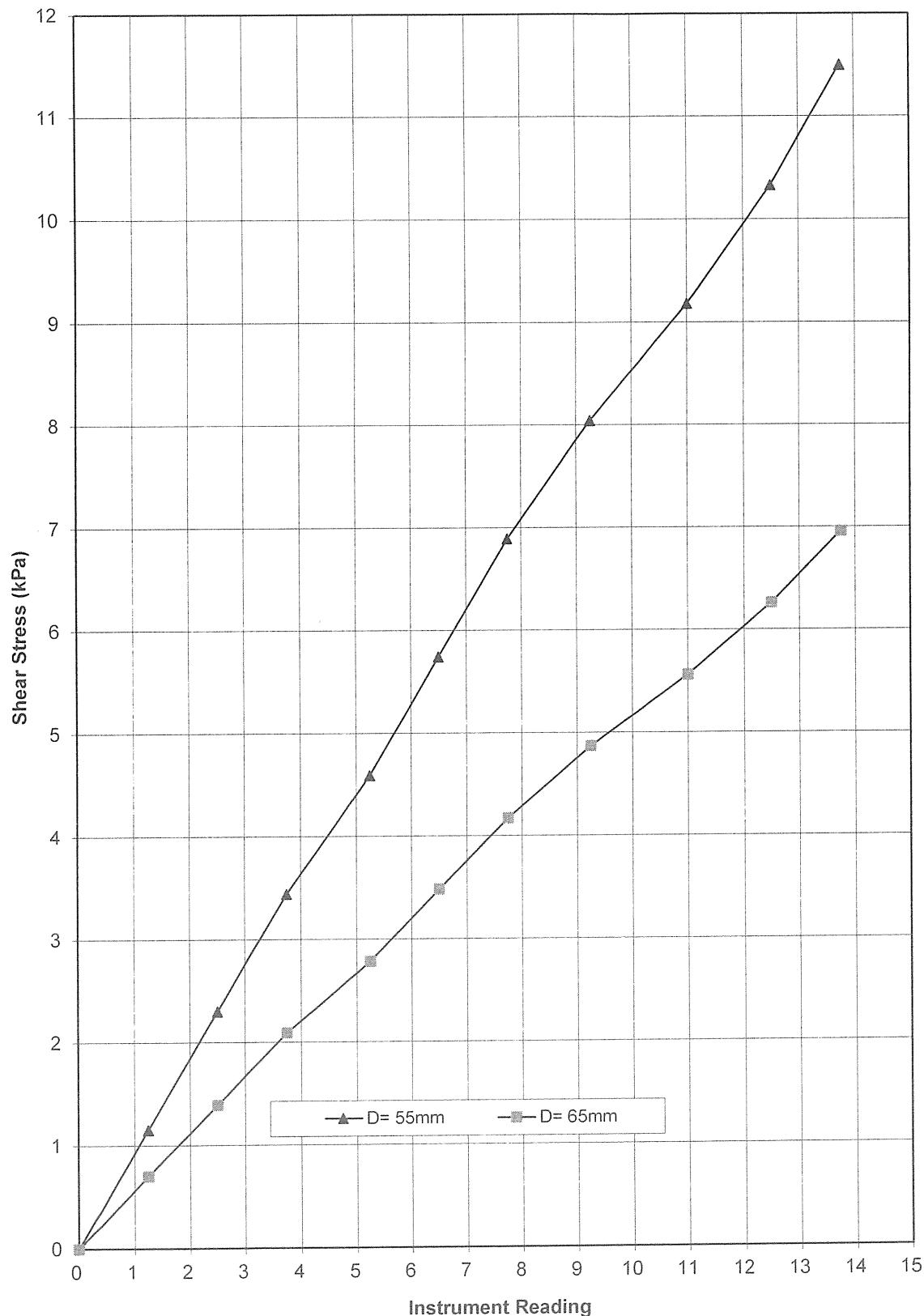
Remark :  $0.1^\circ/\text{sec/rev}$  for instruments with serial number below 1500

$0.2^\circ/\text{sec/rev}$  for instruments with serial number above 1500

#### Client:

Geolab (M) Sdn.Bhd.  
380-380A, Jalan Simbang,  
Taman Perling ,  
81200 Johor Bahru.

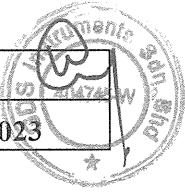
129466





124 Jalan Kapar 27/89, Seksyen 27, Taman Alam Megah, 40400 Shah Alam, Malaysia

Instrument no : 2589	Calibration by : K. K. Yoong
Calibration date : 12 September 2022	Recommenended Due Date : 12 September 2023



Torque, T = 35 x load

$$\text{Shear Stress , } \tau = \frac{6T}{7\pi D^3}$$

Vane diameter , D = 55mm or 65mm

Vane height, H = 2 x D

Load	T	Tau (kPa)		Instrument readings					
		(N)	(Ncm)	D= 55mm	D= 65mm	load	unload	reload	unload
0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20	700	11.50	7.00	13.50	14.00	13.00	14.00	13.25	
40	1400	23.00	13.90	27.00	27.50	27.00	28.00	27.00	
60	2100	34.40	20.90	40.00	41.00	40.00	41.00	40.00	
80	2800	45.90	27.80	52.00	55.00	52.50	55.00	52.25	
100	3500	57.40	34.80	66.00	67.00	66.00	66.50	66.00	
120	4200	68.90	41.70	78.00	79.00	78.00	79.00	78.00	
140	4900	80.40	48.70	90.00	91.00	89.50	91.50	89.75	
160	5600	91.80	55.70	102.00	104.00	102.00	103.00	102.00	
180	6300	103.30	62.60	113.00	-	113.00	-	113.00	

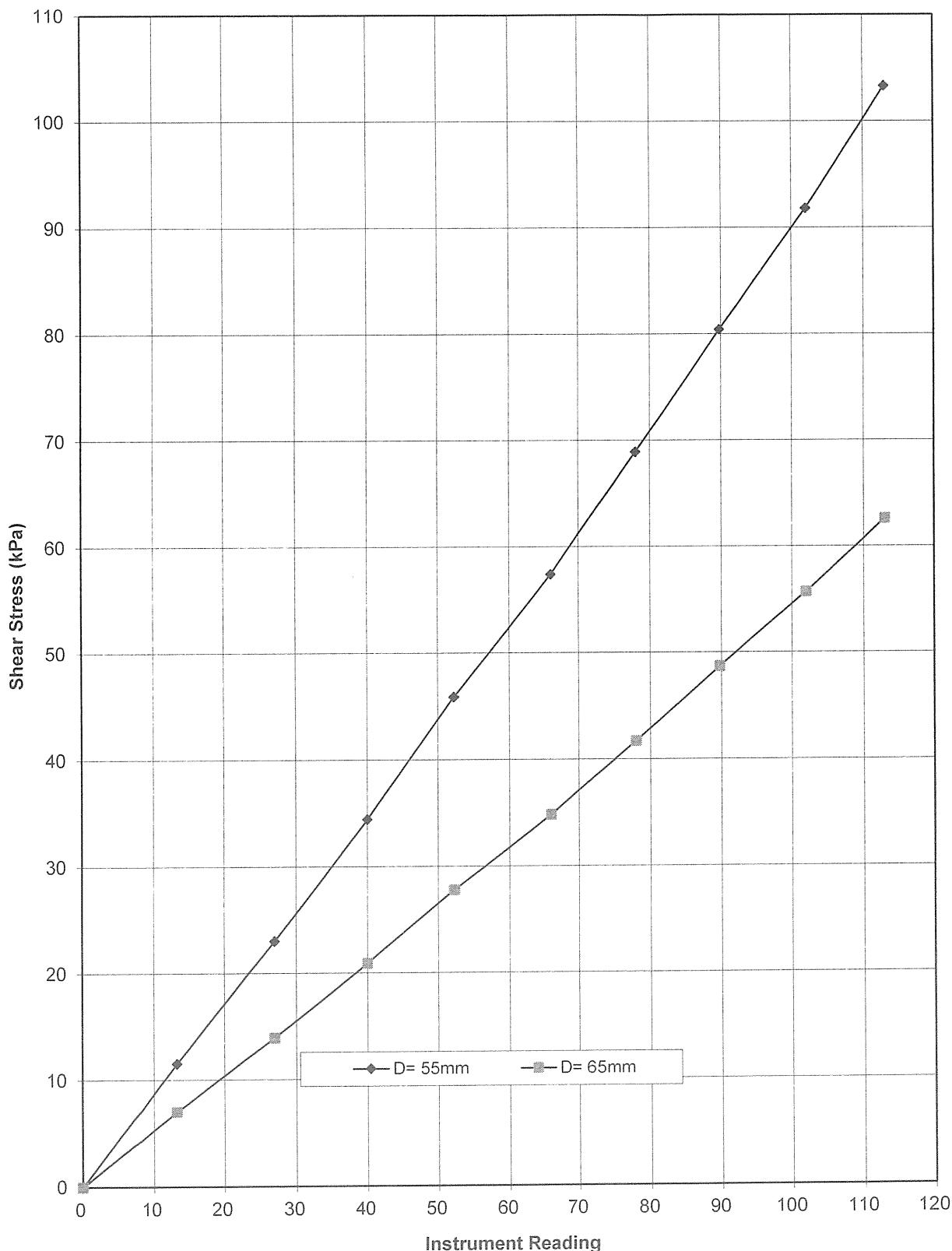
Remark : 0.1° /sec/rev for instruments with serial number below 1500

0.2° /sec/rev for instruments with serial number above 1500

**Client:**

Geolab (M) Sdn.Bhd.  
380-380A, Jalan Simbang,  
Taman Perling ,  
81200 Johor Bahru.

I29466





## APPENDIX D

*Cone Penetration Test Report*

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# CONE PENETRATION TEST REPORT FOR JELUTONG REHABILITATION AND RECLAMATION AT JELUTONG, PENANG

**CLIENT: MESSRS. PLB ENGINEERING SDN. BHD.**

## **1. INTRODUCTION**

Following a request from **Messrs. PLB Engineering Sdn. Bhd.**, Soil Investigation Work comprised 3 numbers of Cone Penetration Tests was carried out by **Geolab (M) Sdn. Bhd.**

This report represents the draft results of Cone Penetration Tests & Dissipation Tests for **Jelutong Rehabilitation and Reclamation at Jelutong, Penang.** Total **3 numbers of Cone Penetration Tests and 5 numbers of Dissipation Test results** are presented in this report. Please refer to Item 4.0 for Summary of Cone Penetration Tests and Dissipation Tests.

The field work was carried out in accordance with the instruction given by the Personnel of **Messrs. PLB Engineering Sdn. Bhd.** The site investigation works was carried out in accordance with the British Standard Code of Practice BS 1377: Part 9: 1990 and the International Reference Test Procedure for Cone Penetration Test (CPT).

Field testing program was conducted during the period of **09-12-2022 to 12-12-2022**. This program was supervised by our personnel from our office who was responsible for Cone Penetration Test.

## **2. SCOPE OF WORKS**

The scope of works involved in this investigation includes the following: -

- 2.1 To carry out Cone Penetration Test to determine the Engineering Parameters of the existing soil for design purpose.



### **3. DESCRIPTION OF THE CONE PENETRATION TEST**

#### **3.1 Equipment**

The equipment used for the piezocone test follows the British Standard Code of Practice BS 1377: Part 9: 1990 and the International Reference Test Procedure for the Cone Penetration Test (CPT).

The cone has transducers to measure cone resistance, local friction, water pressure and unaxial inclination. Cones are calibrated by manufacturer. A filter element (Polypropylene) with diameter 35mm one size located in the cylindrical extension above the base of the cone allows the pore water pressure generated during the penetration to be measured by means of a pressure transducer located in the piezometer tip ( $u_2$  type cone). In order to ensure that pore pressure measurements are not affected by the presence of air in the measuring transducer, a de-airing procedure is carried out as required. The filters are saturated by de-aired silicon or glycerin. A new filter is recommended for each sounding location. Please note that following the initial de-airing procedure, it will only be repeated if the cone is removed from the water into air, or at the beginning of each working day, whichever is first.

The data acquisition system is Geomil's GME 500 acquisition system. Signals from the cone are transmitted to the GME 500 system via a cable threaded through the sounding tubes. Depth registration is provided by an event marker activated via the action of the hydraulic rams. The equipment provides:

- a. A continuous listing (10 mm interval) of all measured parameters (cone resistance, local friction, pore water pressure and inclination) recorded inside computer memory.
- b. Graphical presentation of measured parameters at any scale required.
- c. Resolution of the measured parameter is: -

Cone resistance	:	0.01 Mpa
Local friction	:	0.1 kPa
Pore water pressure	:	1 kPa
Inclination	:	0.1 degree

The jacking unit is a 100 KN twin cylinder hydraulic ram with 120 KN upward forces. The jacks, data acquisition and all accessories are mounted on a self-propelled crawler chassis. The total weight of the unit is approximately 3ton, additional reaction can be provided by screw anchors installed using a hydraulic turning device.



### 3.2 Method of Statement

#### **Cone Penetration Test**

The method of carrying out the penetration test follows the British Standard Code of Practice BS 1377: Part 9: 1990 and the International Reference Test Procedure for the Cone Penetration Test (CPT) as follows: -

- a. The crawler is set up with the jack's vertical.
- b. The cone is connected to the GME 500 data acquisition and the whole system allowed warming up for approximately 10 minutes during which time the cone is placed in a water bath at constant temperature.
- c. Once warming up is completed and readings are steady, baseline (zero load value) is recorded and penetration started.
- d. The piezocone is advanced into the ground at a rate of 20 mm/s while the measured parameters are recorded every 10 mm.

#### **Dissipation Test**

- d.1 Dissipation test will be carried out at Consultant or Client Representative's specified depth.
- d.2 Dissipation test will be carried out by stopping penetration at specified depth and record the in-situ pore pressure and time taken (This recording will be automatically carried out by the GME 500 data acquisition system's program). During the dissipation test process, the rods will be clamped.
- d.3 When the pore pressure dissipation reaches more than 75% on as specified by the consultant/client representative the dissipation test will be terminated by continuing penetration (Continuing CPT).
- e. The test is terminated either at the limit of the equipment or at a specified depth, after which the cone is pulled out of the ground and a final baseline recorded.



**The following criteria will be adopted to define termination of each CPT:**

- 1) Reaching a specified depth specified by the Employer, or
- 2) Reaching the maximum thrust capacity of the system, or
- 3) Reaching a cone resistance of 20 MPa or
- 4) The cone reaching a maximum deviation of 10 degrees and/or an increase in deviation of over 3 degrees per meter, or
- 5) If the ground no longer withstands the trust applied, or
- 6) Buckling of the sounding rods is imminent, or
- 7) At the discretion of the CPT operator if it is in his opinion, it is unsafe to continue either in terms of safety of personnel or potential loss/damage to the equipment whichever come first.

**The following criteria will be adopted to define termination of each DSSP:**

- 1) Reaching a specified time specified percent dissipation by the Employer, or
- 2) Reaching or over the 50% normalized pore water pressure dissipation, or
- 3) Reaching overnight, or
- 4) If the rods are slipping down, or
- 5) At the discretion of the CPT operator if it is in his opinion, it is unsafe to continue either in terms of safety of personnel or potential loss/damage to the equipment whichever come first.





## **5. REMARKS**

Total **3** numbers of Cone Penetration Tests and **5** numbers of Dissipation Tests were successfully completed at the **Jelutong Rehabilitation and Reclamation at Jelutong, Penang**, on 12-12-2022. The tests results are presented in Appendix – C.

Should there be any queries about our works and our test results, please do not hesitate to contact us.

**Geolab (M) Sdn. Bhd**



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## **6. APPENDICES**

### **6.1 Appendix A: Details of FOX-100 Stand-Alone CPT System**

## **APPENDIX A**

### **DETAILS OF FOX-100 STAND-ALONE CPT SYSTEM**



The Geomil Equipment Fox-100 stand-alone CPT system is a versatile unit designed to be used in a wide range of applications. Detachable mounting supports allow the system to be placed on any base.

Main characteristics of the Fox-100:

- maximum 100 kN thrust capacity
- maximum 140 kN pulling capacity
- two vertical hydraulic cylinders, stroke 1 175 mm
- solid bridge connecting the cylinders, suitable for mechanical push/pull clamp
- hydraulic control unit, mounted on a console next to the cylinders
- 15-25 mm/s calibrated speed for CPT testing
- two loose anchoring beams with attachments for 2 screw anchors each
- dimensions: 1 170 x 750 x 650 mm (H x W x D)
- weight(operational): 300 kg

The Fox-100 provides a trolley set for easy manoeuvring by hand. The Fox-100 can be fixed to the ground by means of two (or more) anchor beams and soil anchors.

The Fox-100 is hydraulically powered by a separate power pack, driven by a petrol, diesel, or electrical engine.

Main characteristics of the 100kN power pack:

Petrol

- air cooled 1-cylinder Honda engine 8.0 kW
- battery 12 Vdc and electrical starter
- hydraulic oil tank of 65 liters
- dimensions: 1 505 x 820 x 875 mm (L x W x H)
- weight (w/o fuel): 185 kg

Diesel

- air cooled 1-cylinder HATZ 4-stroke engine 8.7 kW
- battery 12 Vdc and electrical starter
- hydraulic oil tank of 65 liters
- dimensions: 1 505 x 820 x 875 mm (L x W x H)
- weight (w/o fuel): 190 kg

Electrical

- electric motor 380-440 VAC-3 ph, 7.5 kW
- hydraulic oil tank of 65 liters
- dimensions: 1 505 x 820 x 875 mm (L x W x H)
- weight (w/o fuel): 170 kg

Push frame and power-pack are connected by a set of flexible hydraulic hoses with flat-face quick-couplings.

For more technical information or a quotation based on your specific requirements please contact [sales@geomil.com](mailto:sales@geomil.com) or call us at +31 172 427 800.





## **6.2 Appendix B: Cone Specification**

**APPENDIX B**

**CONE**

**SPECIFICATIONS**

# GME 500

## Data Acquisition System for CPT(U) & add-on probes

For conducting electrical or electrical-mechanical Cone Penetration Testing (CPT) a reliable data acquisition system is required. The GME 500 is Geomil's latest generation system, the result of continuous research & development and useful improvements.

The system combines all features required for testing: it powers the connected cone and/or measuring device, logs and A/D converts the various measuring channels, synchronizes the depth reading and finally transfers the data in real-time via RS 232 interface to the acquisition software on the PC.

The GME 500 is compatible with all Geomil electrical cones (both compression and subtraction type), electrical-mechanical measuring devices and environmental probes (see separate data sheets) and Geomil's CPTTest<sup>®</sup> acquisition software on Windows PC's with 32 bit or higher operation systems.



Two versions of the GME 500 are available. An industrial 19" built-in unit for CPT trucks and cabin crawlers, powered by 110 - 230 Vac, and a portable IP65 unit for outdoor use (e.g. stand alone pushers, Boomer or LWC 100 and LWC 200). The IP65 version can be powered by both, 110 -230 Vac and 12 - 24 Vdc.

The GME 500 provides a 10 and a 16 lead analogue input for the various analogue channels, plus digital inputs for the depth registration. Altogether 8 analogue and 4 digital channels can be processed simultaneously.

Possible data channels and parameters are:

- Cone resistance
- Inclination
- Electric conductivity
- Time
- Local sleeve friction
- Penetration depth
- Electric permittivity
- Penetration speed
- Pore pressure
- Temperature
- Total force

For electrical-mechanical CPT the effective forces are detected with a measuring device coming with electric load cells and an analogue output to the GME 500 (see separate data sheet).

The depth encoder is mounted on the static penetrometer and records the down- and upward travelling of the pushing bridge. The system works bi-directional in order to compensate for the rebound of the rods.

The communication with the cones is provided by a Geomil polyurethane coated cable with waterproof Lemo connectors. The unisex Geomil cable connectors fit all cone types and allow for extending cables without special adaptors.



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[info@geomil.com](mailto:info@geomil.com) - [www.geomil.com](http://www.geomil.com)

Bank Rabobank - Account no. 1350.49.229  
IBAN NL78 RABO 0135 0492 29 - BIC RABONL2U  
VAT no. NL812396212B01 - Chamber of Commerce no. 24353053  
All business transacted is subject to METAALUNIE\* conditions

GENERAL SPECIFICATIONS			
Model:	For 19" computer rack or in splash proof (IP65) housing	LCD read-out: (19" version only)	4.5 digits
Operating temp.:	0 ... +60°C	Output port:	RS 232
Storage temp.:	-30 ... +85°C	Vibration resistance:	<500 Hz at 1.0 G (in op.)
Humidity:	5 ... 85%	Shock resistance:	10 G peak (10 ms duration)
Power supply: (19" version)	110 ... 230 Vac.		
Power supply: (IP65 version)	12 ... 24 Vdc or 110 ... 230 Vac.		

TECHNICAL SPECIFICATIONS			
INPUT	SIGNAL PROCESSING & OUTPUT		
Analogue signal input:	8 channels	A/D conversion:	Dual slope
Digital signal input:	4 channels	Digital Resolution:	16 bits
Cone power supply:	± 15 VDC, 25 mA max	Calibration Accuracy:	50 ppm ± 1 count
Input Protection:	70 V (peak to peak)	Long term Drift:	20 ppm / 1000 hours
Input Impedance:	80 k parallel 10 nF	Temperature Drift:	50 ppm / °C
Analogue signal input:	± 10 VDC		
Sampling Rate:	10 ms / channel		

ORDER REFERENCE			
P.N.	Description	P.N.	Description
0086011001	GME 500, 19" rack model	9920000050	CPTTest logging software for Windows
0086011002	GME 500, IP65 model	9920000060	CPTTask interpr. software for Windows
0065012019	Cable adapter for socket connector	npn	Depth registration system (optical encoder, junction box, cables, etc.)
0065011022	Cable 2 m		
0065011023	Cable 10 m		
0065011024	Cable 30 m		
0065011025	Cable 50 m		
0065013014	Coupling sleeve (to join two cables)		

Geomil Equipment reserves the right to make any changes in the specifications of its products without prior notice.

# Electrical CPT(U)

Electrical cones



World's first manufacturer  
of CPT equipment



Geomil Equipment electrical CPT(U) cones, compression or subtraction design, is the measuring method for Cone Penetration Testing. Quality load cells and high precision calibration make all electrical cones complying to EN ISO 22476-1 standards.

The electric cone measures the cone resistance ( $q_c$ ) and local sleeve friction ( $f_s$ ), using strain gauged measuring bodies. In addition, (excess) pore water pressure ( $u$ ) is measured by a piezo element and the inclination ( $i$ ) by accelerometers. Geomil uses an inclination sensor for x- and y- deviation.

Standard measuring ranges are 100 or 50 MPa for  $q_c$  and 1 or 0.5 MPa for ( $f_s$ ).

Standard available:

AC10CFIIP.100.1000.15.15.20  
AC10CFII.100.1000.15.15  
AS10CFIIP.100.1000.15.15.20  
AS10CFII.100.1000.15.15  
AC15CFIIP.100.1000.15.15.20  
AC15CFII.100.1000.15.15  
AS15CFIIP100.1000.15.15.20  
AS15CFII.100.1000.15.15

Explanation cone codes:

C-100 = ( $q_c$ ) max. 100 MPa  
F-1000 = ( $f_s$ ) max. 1000 kPa  
I- 15 = max. 15 degrees inclination  
P-20= max. 20 bar



0060\_02

The load cell signals are amplified and transmitted up-hole as a voltage signal via cable and converted to a 16 bit digital signal in the GME 500 data acquisition system.

The cones can also be provided with a temperature (T) sensor and environmental or seismic adapters.

A typical Geomil electrical CPT system comprises:

- Electrical compression or subtraction cone with 10 cm<sup>2</sup> or 15 cm<sup>2</sup> cross-sectional area, supplied in portable protection case.
- CPT cable, available in standard lengths of 2, 10, 30 and 50 m or customized length on request.
- Push-/pull clamp 3655 with a proximity switch for triggering the depth recording.
- Depth encoder, providing incremental digital pulses.
- Data acquisition system GME 500 for A/D conversion and data synchronization.
- CPT tubes and cross-over adapter.
- Windows computer for automatic recording of the CPT data.
- Windows based CPTTest acquisition and CPTTask presentation and interpretation software.

For more technical information or a quotation based on your specific demands please contact [sales@geomil.com](mailto:sales@geomil.com) or call us at 0031 (0) 172 427800.

[www.geomil.com](http://www.geomil.com)



### **6.3 Appendix C: Cone Penetration & Dissipation Test Results (Graphs)**

## **APPENDIX C**

### **CONE PENETRATION & DISSIPATION TEST RESULTS (GRAPHS)**

JELUTONG REHABILITATION AND RECLAMATION AT JELUTONG, PENANG



**Geolab**

MESSRS. PLB ENGINEERING SDN. BHD.

**Period From:** 09-12-22      **to**      12-12-22

Job Number / Report Ref : GLSB/SI/3971-155/2022

## Mobilisation Trip :

3 nos

5 nos

2.87 hr

\* Termination criteria for CPT & Dissipation Test

- 1) Reaching a specified depth specified by the Employer, or
  - 2) Reaching the maximum thrust capacity of the system, or
  - 3) Reaching or over cone resistance value of 20 Mpa, or
  - 4) Reaching or over skin friction value of 500 kPa, or
  - 5) Reaching or over inclination of 15 Degree
  - 6) Reaching or over 50% of dissipation
  - 7) Reaching or over 2 hour of total time for dissipation
  - 8) Dissipation termination as per instructed by client

From 09-12-22 To 12-12-22

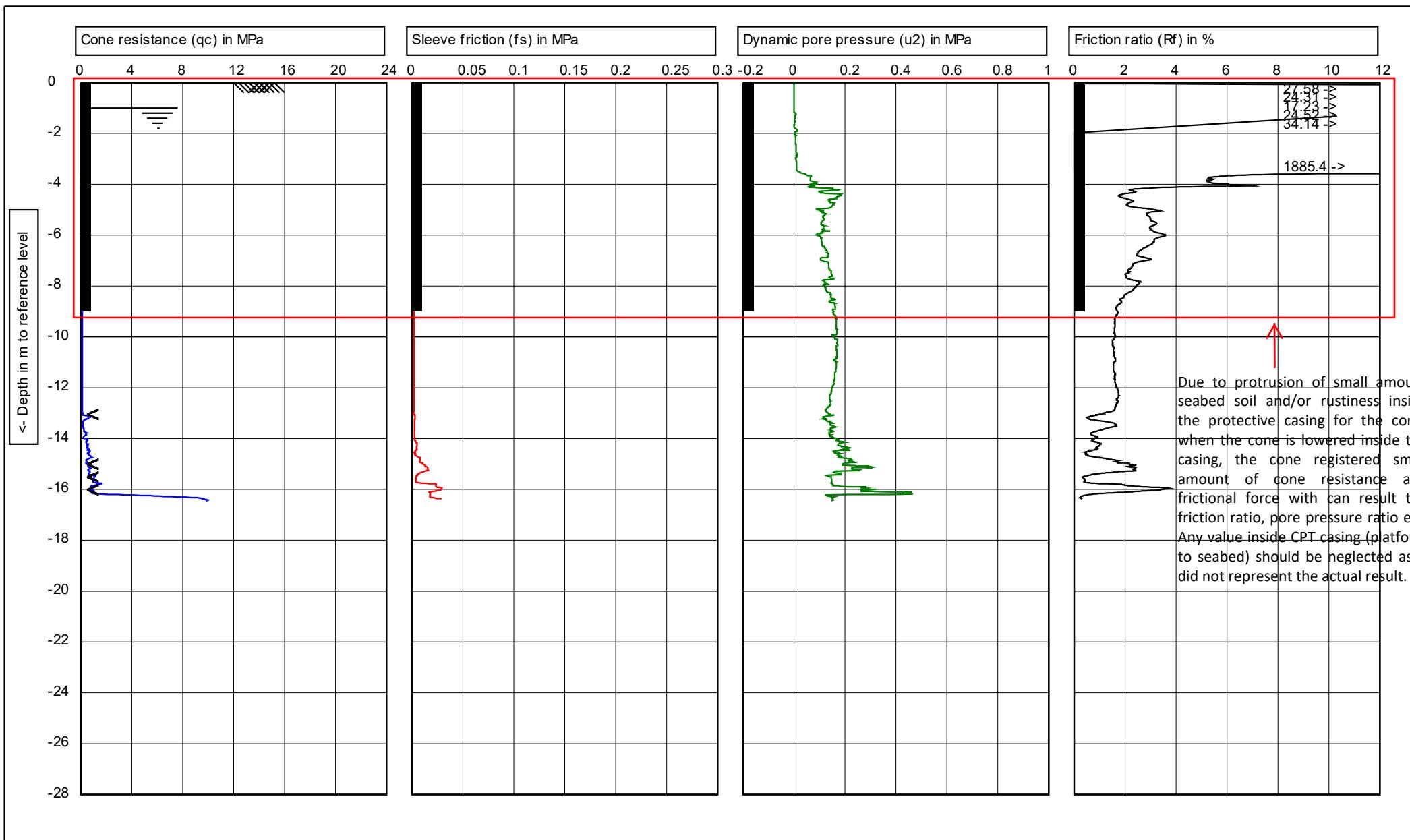
Number of Mobilisation :

### Shifting and Setting Up : 3 nos

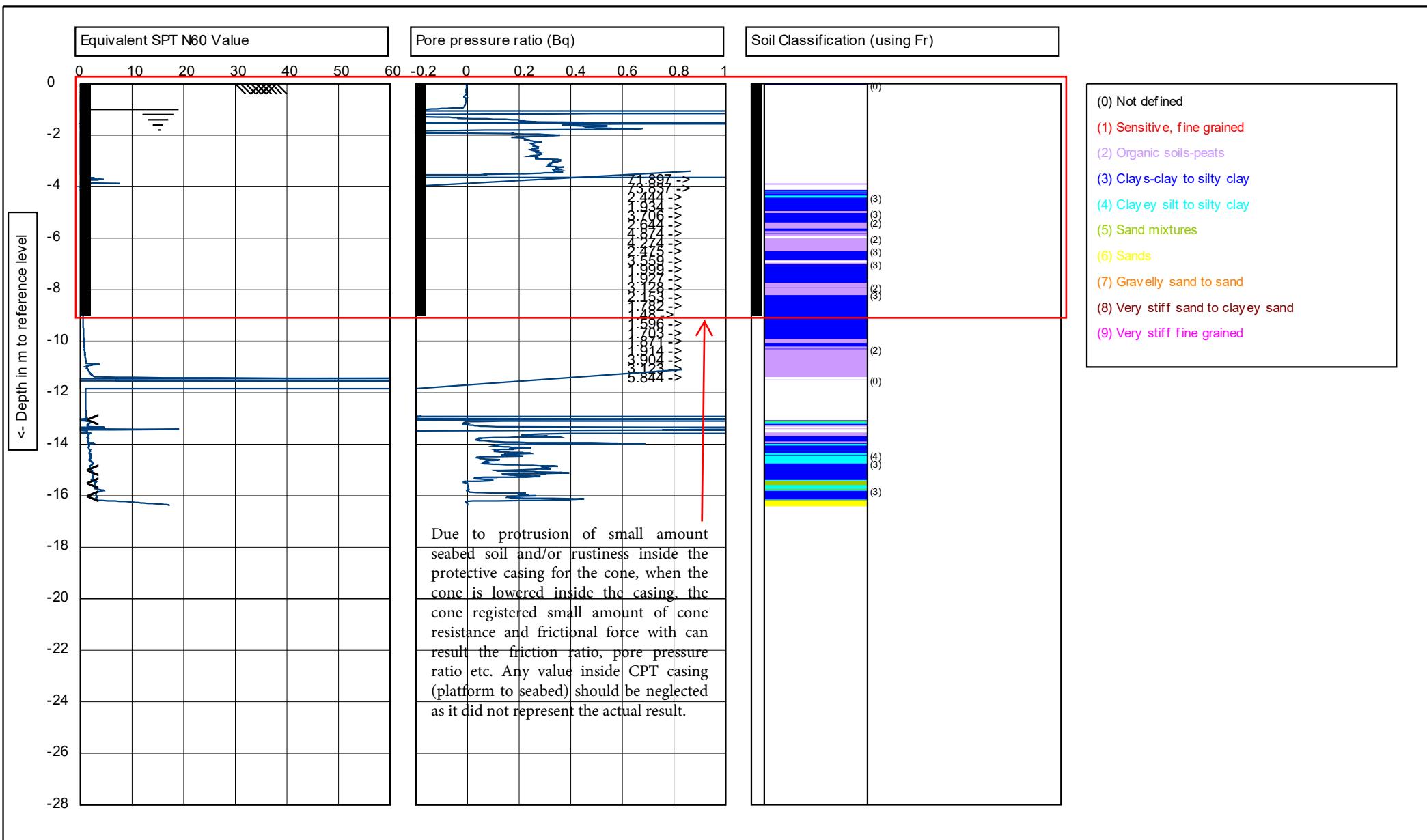
Number of CPT : 3 nos

Number of dissipation tests : 5 nos

Duration for Dissipation : 2.87 h



 $\frac{r_{u2}}{L = 150 \text{ cm}^2}$ $10 \text{ cm}^2$	Test according to: BS EN ISO 22476-1-2012 TE2 AC1		Predrill:	9.00 m Platform to Seabed
	S.L.: -6.16 m RL	W.L.: -1.00 m	Date:	12-Dec-22
Project:	<b>JELUTONG REHABILITATION AND RECLAMATION</b>		Cone no.:	<b>C10CFIIP.C14521</b>
Location:	<b>JELUTONG</b>		Project no.:	<b>GLSB/SI/3971-155/2022</b>
Position:	<b>-1971.222, -2751.898 m</b>		CPT no.:	<b>PZ-01</b>
				1/2



Test according to: BS EN ISO 22476-1-2012 TE2 AC1

Predrill: 9.00 m Platform to Seabed

S.L.: -6.16 m RL      W.L.: -1.00 m

Date: 12-Dec-22

Project: JELUTONG REHABILITATION AND RECLAMATION

Cone no.: C10CFIIP.C14521

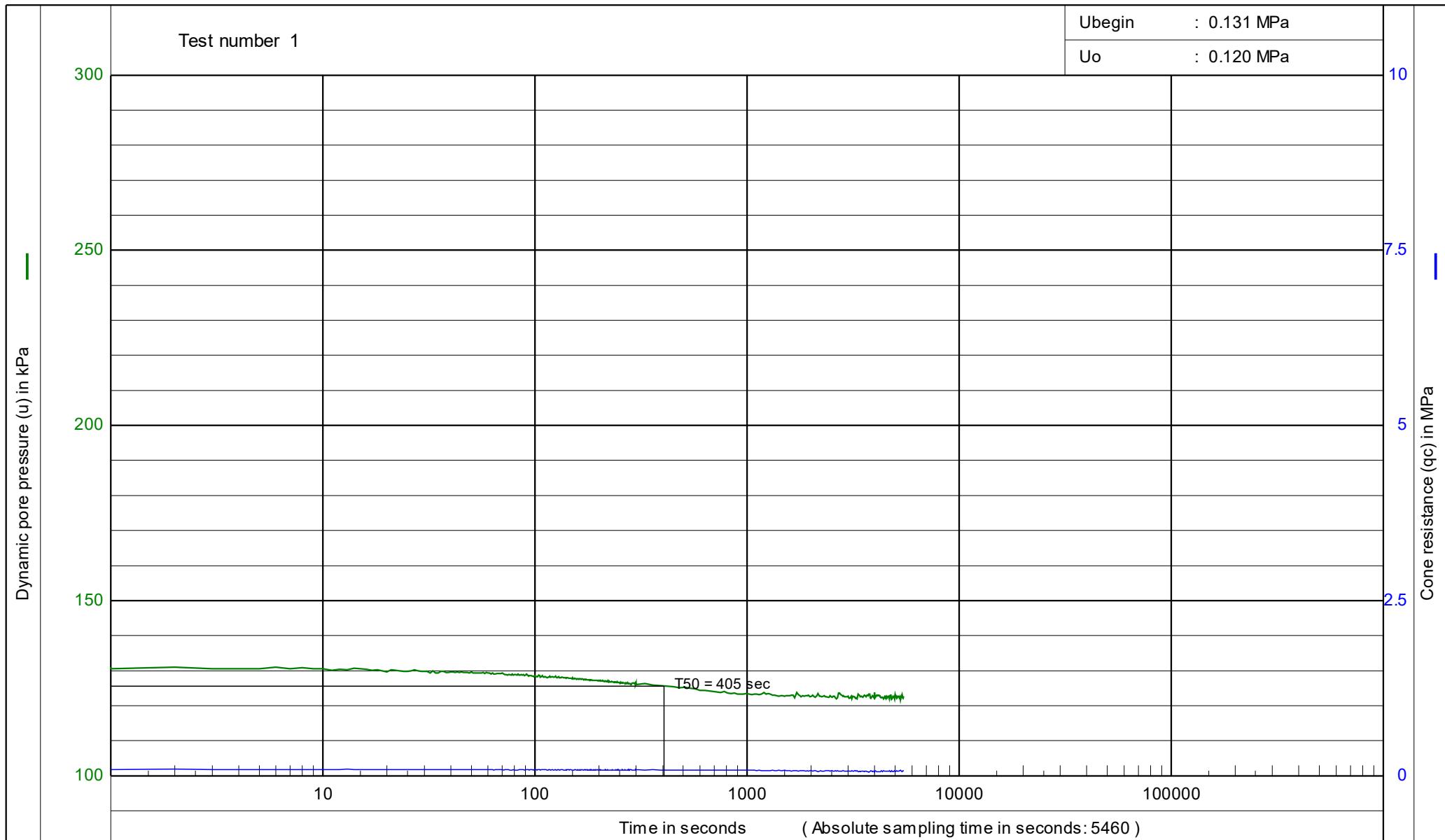
Location: JELUTONG

Project no.: GLSB/SI/3971-155/2022

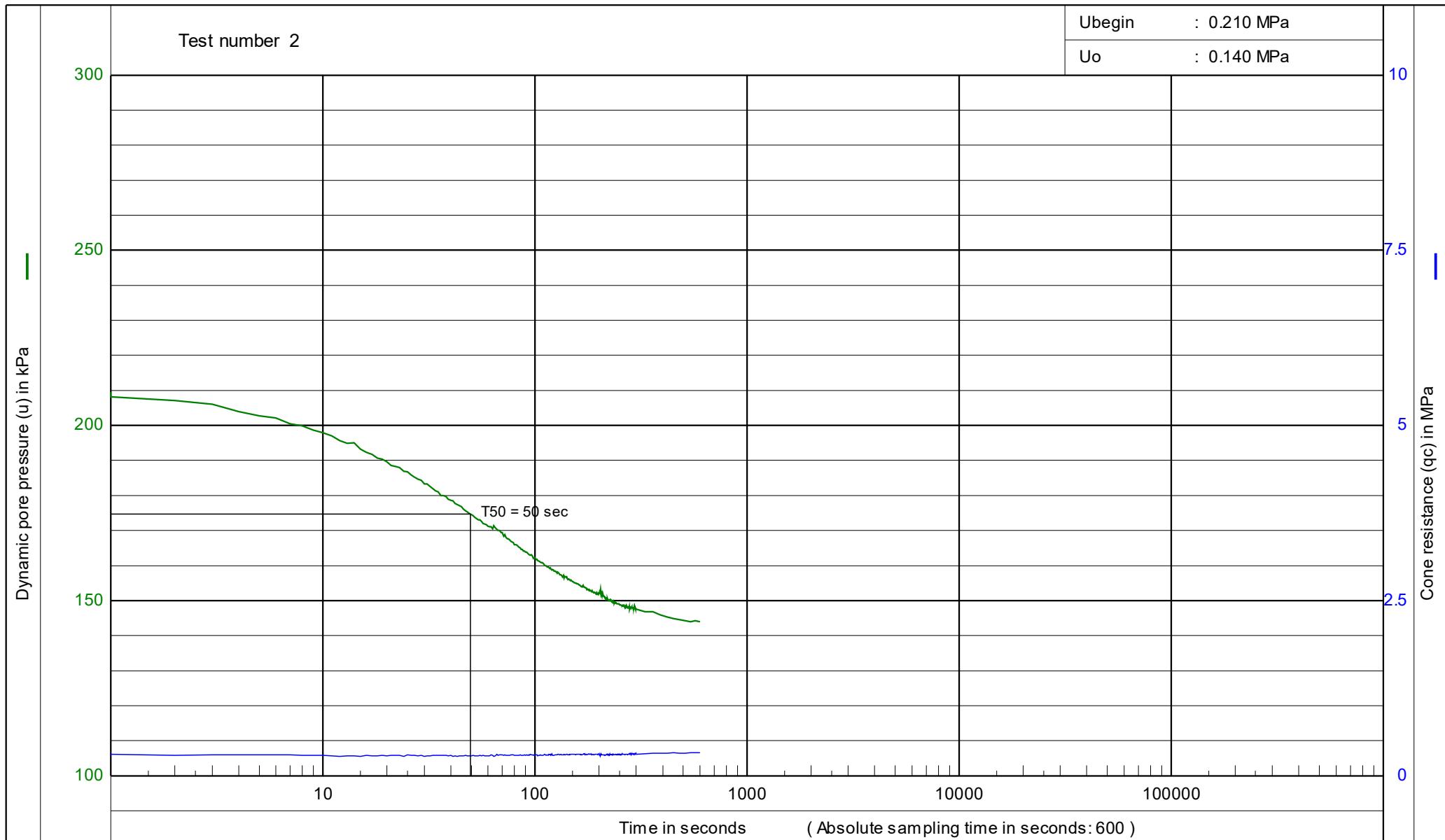
Position: -1971.222, -2751.898 m

CPT no.: PZ-01

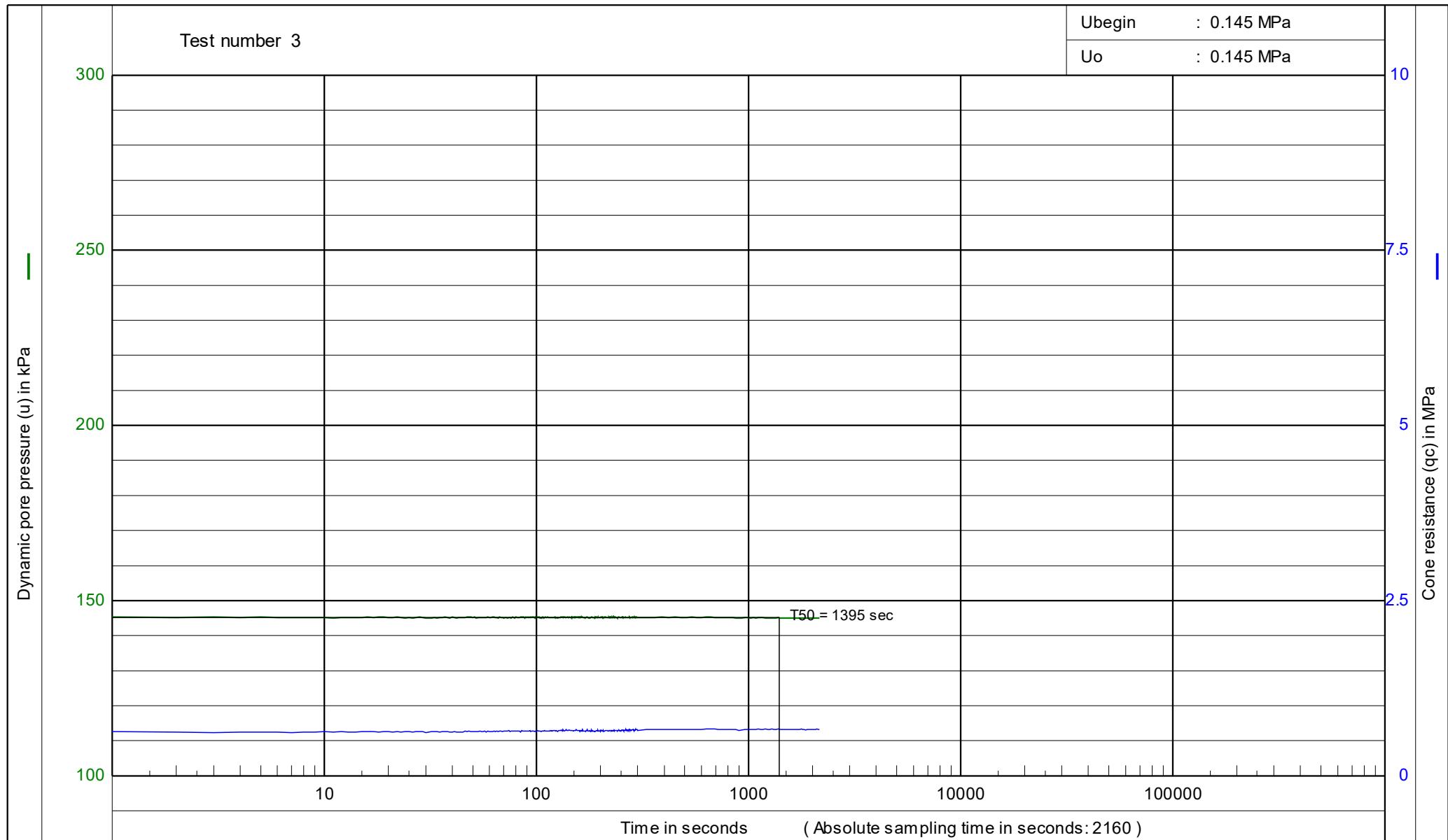
Page: 2/2



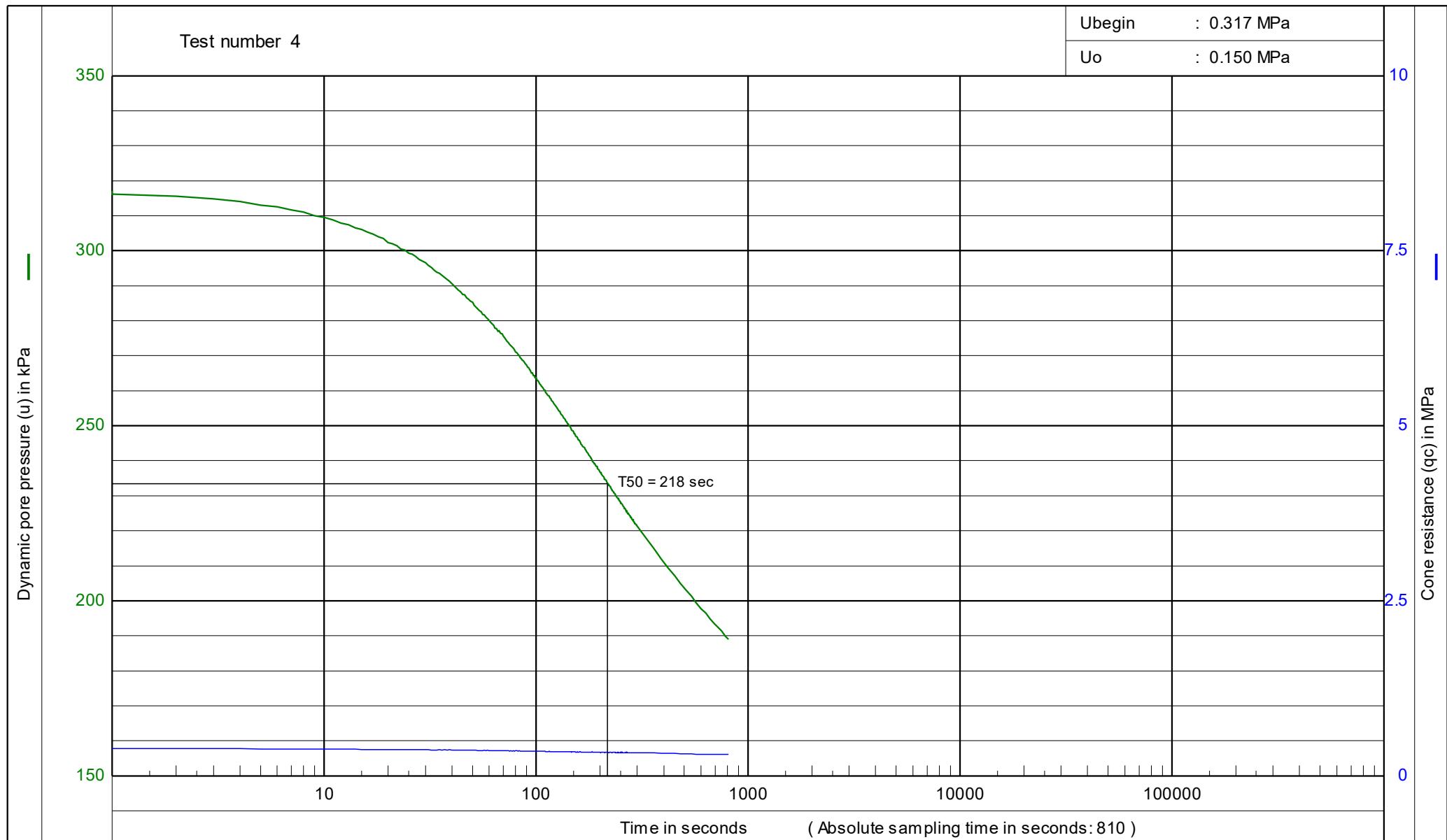
	Test according to: BS EN ISO 22476-1-2012 TE2 AC1		Date : 12-Dec-22
	Project : JELUTONG REHABILITATION AND RECLAMATION		Project no. : GLSB/SI/3971-155/2022
	Location : JELUTONG		CPT no. : PZ-01
			Test depth : 13.03 [m]-P.L.
			Water level : 1.00 [m]-P.L.



	Test according to: BS EN ISO 22476-1-2012 TE2 AC1		Date : 12-Dec-22
	Project : JELUTONG REHABILITATION AND RECLAMATION		Project no. : GLSB/SI/3971-155/2022
	Location : JELUTONG		CPT no. : PZ-01
			Test depth : 15.00 [m] - P.L.
			Water level : 1.00 [m] - P.L.



	Test according to: BS EN ISO 22476-1-2012 TE2 AC1		Date : 12-Dec-22
	Project : JELUTONG REHABILITATION AND RECLAMATION		Project no. : GLSB/SI/3971-155/2022
	Location : JELUTONG		CPT no. : PZ-01
			Test depth : 15.50 [m] - P.L.
			Water level : 1.00 [m] - P.L.



Test according to: BS EN ISO 22476-1-2012 TE2 AC1

## Project : JELUTONG REHABILITATION AND RECLAMATION

Location : JELUTONG

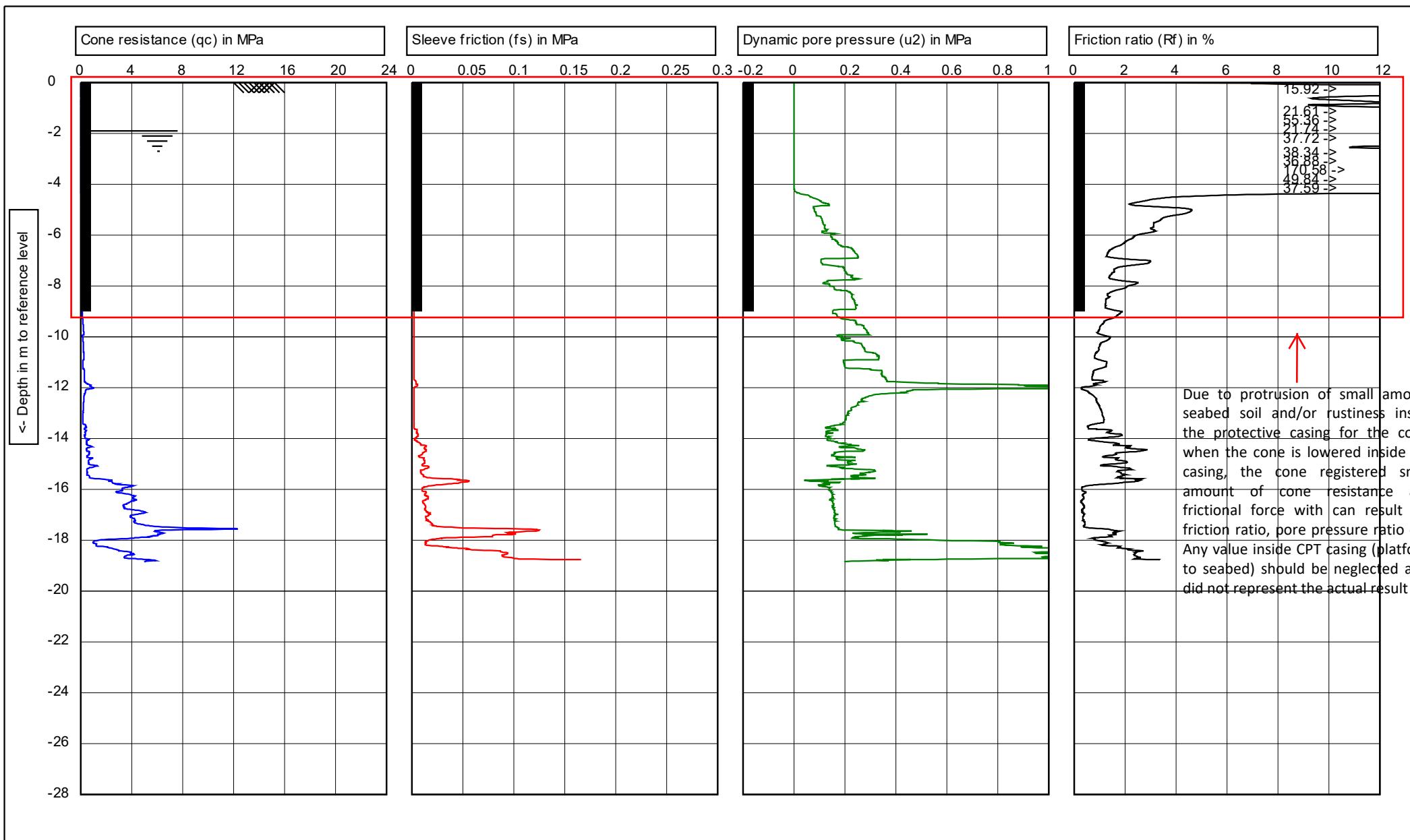
Date : 12-Dec-22

Project no. : GLSB/SI/3971-155/2022

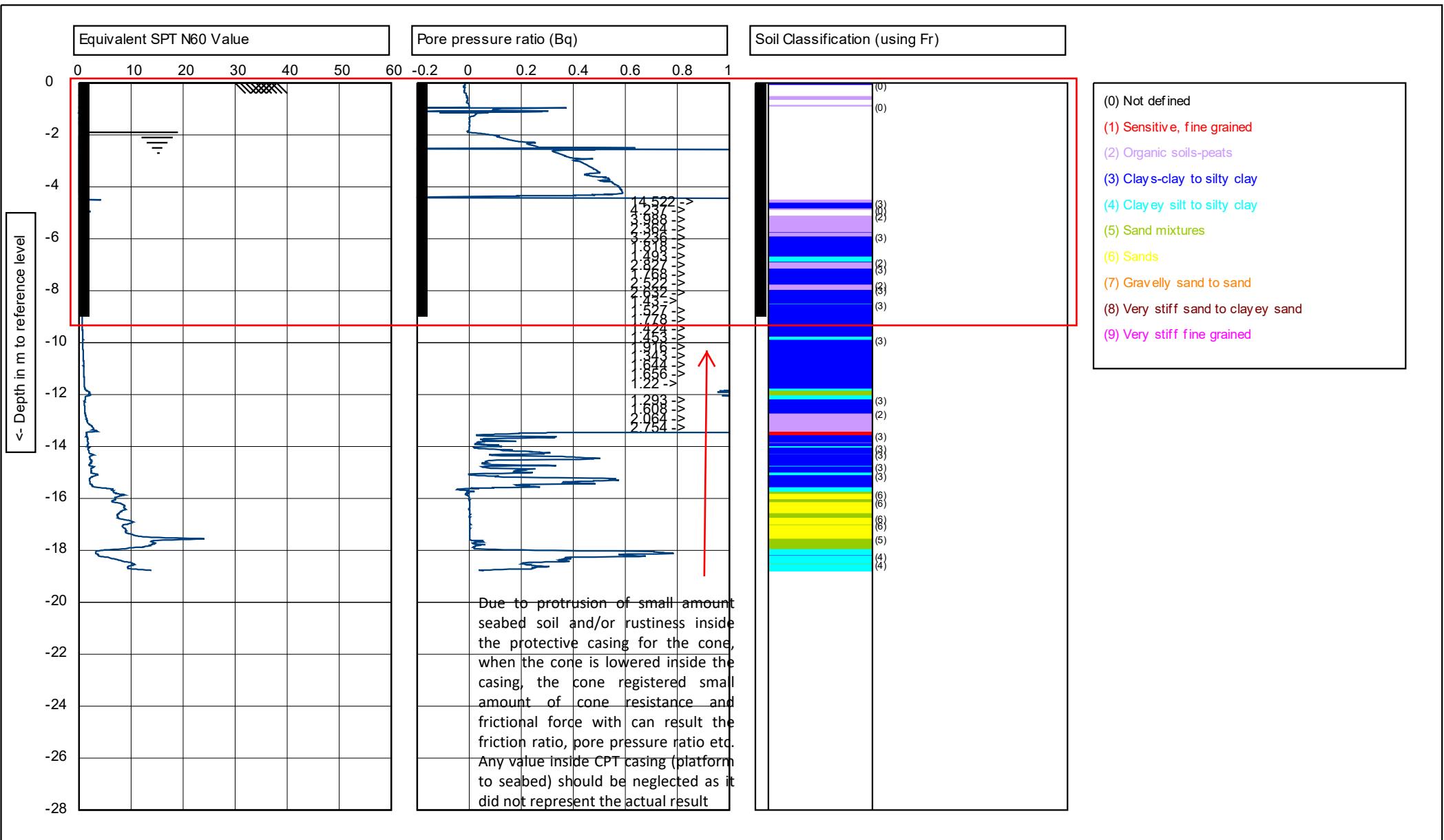
CPT no. : PZ-01

Test depth : 16.00 [m]- P.L.

Water level : 1.00 [m] - P.L.



 	Test according to: BS EN ISO 22476-1-2012 TE2 AC1		Predrill: 9.00 m Platform to Seabed
	S.L.: -6.48 m RL	W.L.: -1.90 m	Date: 10-Dec-22
Project: JELUTONG REHABILITATION AND RECLAMATION		Cone no.: C10CFIIP.C14521	
Location: JELUTONG		Project no.: GLSB/SI/3971-155/2022	
Position: -1836.729, -2985.466 m		CPT no.: PZ-03	1/2



Test according to: BS EN ISO 22476-1-2012 TE2 AC1

Predrill: 9.00 m Platform to Seabed

S.L.: -6.48 m RL      W.L.: -1.90 m

Date: 10-Dec-22

Project: JELUTONG REHABILITATION AND RECLAMATION

Cone no.: C10CFIIP.C14521

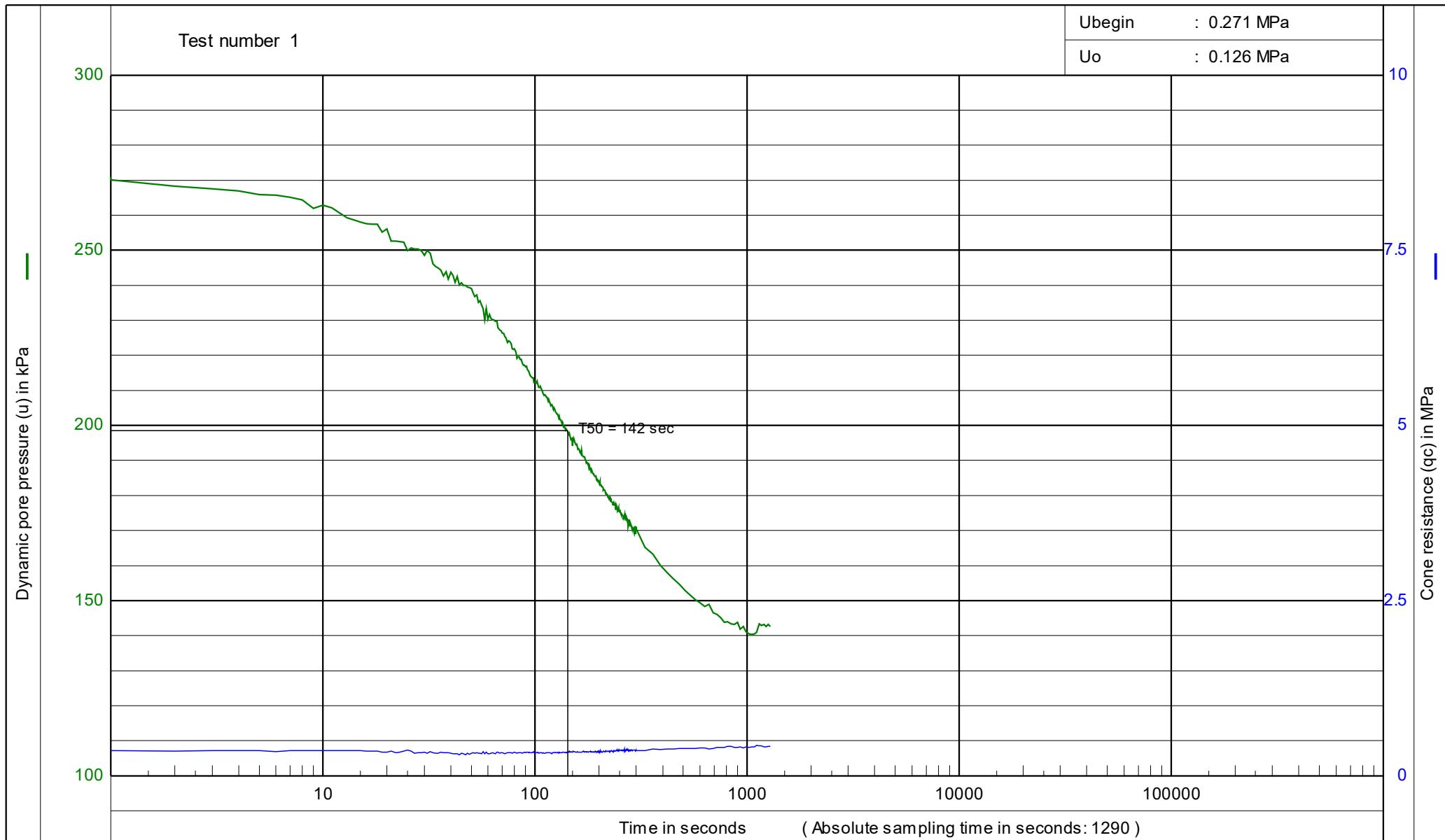
Location: JELUTONG

Project no.: GLSB/SI/3971-155/2022

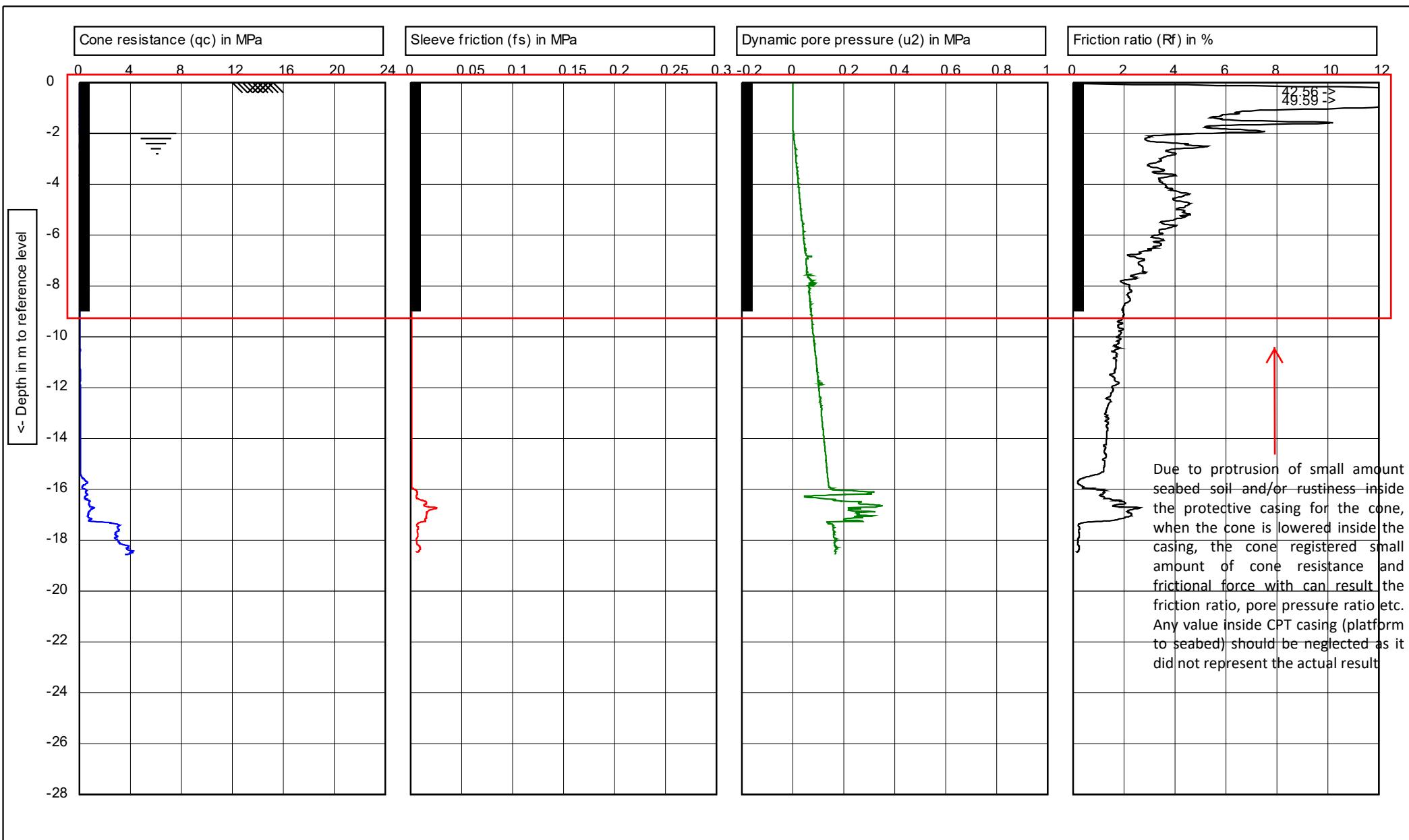
Position: -1836.729, -2985.466 m

CPT no.: PZ-03

Page: 2/2

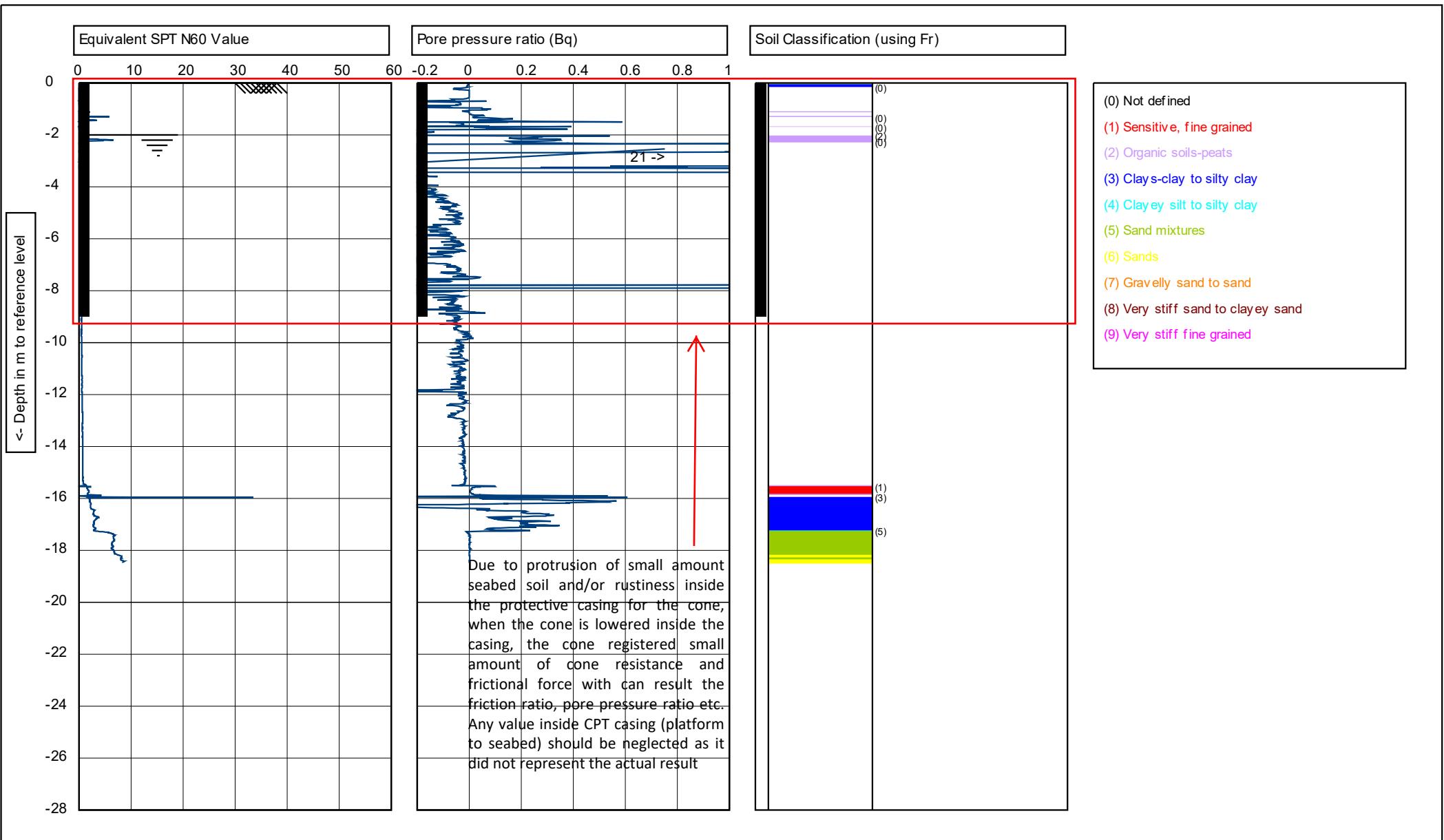


	Test according to: BS EN ISO 22476-1-2012 TE2 AC1		Date : 10-Dec-22
	Project :	JELUTONG REHABILITATION AND RECLAMATION	Project no. : GLSB/SI/3971-155/2022
	Location :	JELUTONG	CPT no. : PZ-03
			Test depth : 14.50 [m] - P.L.
			Water level : 1.90 [m] - P.L.



1:49

 <u>L</u> <u>G</u>	 $r_{u2}$ $L = 150 \text{ cm}^2$ $10 \text{ cm}^2$	Test according to: BS EN ISO 22476-1-2012 TE2 AC1		Predrill: 9.00 m Platform to Seabed
		S.L.: -13.28 m RL	W.L.: -2.00 m	Date: 09-Dec-22
Project: JELUTONG REHABILITATION AND RECLAMATION				Cone no.: C10CFIIP.C14521
Location: JELUTONG				Project no.: GLSB/SI/3971-155/2022
Position: -1681.407, -3208.341 m				CPT no.: PZ-04
				1/2



Test according to: BS EN ISO 22476-1-2012 TE2 AC1

Predrill: 9.00 m Platform to Seabed

S.L.: -13.28 m RL      W.L.: -2.00 m

Date: 09-Dec-22

Project: JELUTONG REHABILITATION AND RECLAMATION

Cone no.: C10CFIIP.C14521

Location: JELUTONG

Project no.: GLSB/SI/3971-155/2022

Position: -1681.407, -3208.341 m

CPT no.: PZ-04

Page: 2/2

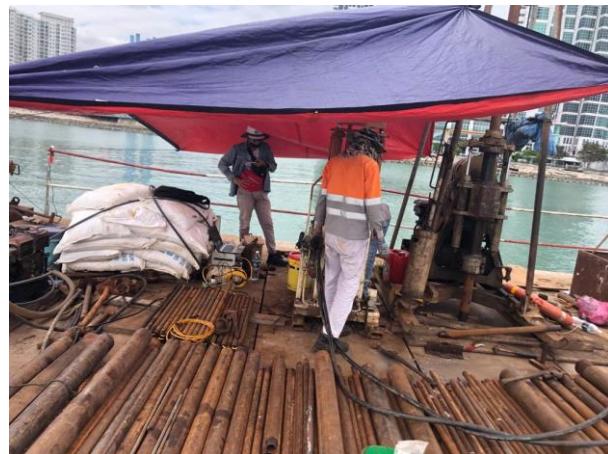


#### **6.4 Appendix D: Site Photograph**

**APPENDIX D**  
**SITE PHOTOGRAPHS**

## CONE PENETRATION TEST

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**Photo 1: PZ-01**



**Photo 2: PZ-03**



**Photo 3: PZ-04**



## APPENDIX E

*Summary and Results of Laboratory Test*



**GEOLAB (M) SDN. BHD.** (Reg. No.210351-V)

Foundation, Soil & Concrete Specialists

## **SUMMARY OF LABORATORY TEST RESULTS**

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.

**Customer :** M/S PLB Engineering Sdn. Bhd.

**Job No** : GLSB/SI/3971-155/2022

Date : 17-Mar-23

NOTE: NP = NON-PLASTIC

~~NES - NOT ENOUGH SAMPLE~~

NA : NOT APPLICABLE

\* TESTING IN PROGRESS

Prepared By:

(Tay Keng Hui)  
*Lab Manager*

Checked By:

(Norlazihal Hamadun)  
Eng. Geologist



**GEOLAB (M) SDN. BHD.** (Reg. No.210351-V)

Foundation, Soil & Concrete Specialists

## **SUMMARY OF LABORATORY TEST RESULTS**

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.

**Customer :** M/S PLB Engineering Sdn. Bhd.

**Job No** : GLSB/SI/3971-155/2022

Date : 17-Mar-23

NOTE: NP : NON-PLASTIC

NES : NOT ENOUGH SAMPLE

NA : NOT APPLICABLE

\* TESTING IN PROGRESS

Prepared By :

(Tay Keng Hui)  
*Lab Manager*

Checked By:

(Norfazliah Hamadun)  
Eng. Geologist

**GEOLAB (M) SDN. BHD.**

(Reg. No.210351-V)

Foundation. Soil &amp; Concrete Specialists

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.

**SUMMARY OF LABORATORY TEST RESULTS**

Customer : M/S PLB Engineering Sdn. Bhd.

Job No : GLSB/SI/3971-155/2022

Date : 17-Mar-23

MARKING			CLASSIFICATION TEST									SOIL STRENGTH TEST				COMPRESSIBILITY TEST			ROCK TEST		CHEMICAL TEST											
Borehole No.	Sample No.	Depth	Moisture Content	Bulk Density	Dry Density	Specific Gravity	Particle Size Distribution			Atterberg Limit			Triaxial Compression Test			Direct Shear Test	I-D Consolidation Test			Uniaxial Compression Test	Point Load Test, $L_{5(5)}$	pH	Total Sulphate Content	Organic Content	Chloride Content	Carbonate Content						
			%	Mg/m <sup>3</sup>	Mg/m <sup>3</sup>	Mg/m <sup>3</sup>	%	%	%	%	Gravel	Sand	Silt	Clay	Liquid Limit	Plastic Limit	Plastic Index	$C_u$	$\phi$	$C'_u$	$\phi'_u$	$q_u$	$C'$	$\phi'$	$e$	$P_e$	$C_c$					
		metre	%	Mg/m <sup>3</sup>	Mg/m <sup>3</sup>	Mg/m <sup>3</sup>	%	%	%	%					kN/m <sup>2</sup>	deg.	kN/m <sup>2</sup>	deg.	kN/m <sup>2</sup>	kN/m <sup>2</sup>	deg.			kN/m <sup>2</sup>		MPa	MPa	%	%	%		
BH 3	P1/D1	1.50						3	20	64	13	94	40	54																		
	UD1	3.00	179	1.17	0.42			2	27	48	23	108	41	67	TOO SOFT													7.9	0.15	4.0	2.40	0.11
	P2/D2	4.50						14	69	17		NP	NP	NP																		
	UD2		25	1.89	1.51			7	76	17		NP	NP	NP																		
	UD2-S1	8.50	21	1.98	1.64			20	64	16		NP	NP	NP																		
	UD2-S2		19	1.97	1.66			32	55	13		NP	NP	NP																		
	UD2-S3		20	2.00	1.67			23	62	15		NP	NP	NP																		
	P10/D9	18.00						2	48	47	3	31	18	13																		
	P15/D14	25.50						13	50	37		35	19	16																		
	P20/D19	33.00						27	50	23		NP	NP	NP																		
	P25/D24	40.50						2	16	50	32	37	17	20																		
	P30/D29	48.00						0	71	29		NP	NP	NP																		
	P35/D34	55.50						37	52	11		NP	NP	NP																		

NOTE: NP : NON-PLASTIC

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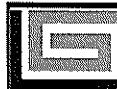
\* TESTING IN PROGRESS

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Checked By:

(Norizah Hamadun)  
Eng. Geologist



**GEOLAB (M) SDN. BHD.** (Reg. No.210351-V)

Foundation, Soil & Concrete Specialists

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.

## SUMMARY OF LABORATORY TEST RESULTS

Customer : M/S PLB Engineering Sdn. Bhd.

Job No : GLSB/SI/3971-155/2022

Date : 17-Mar-23

MARKING			CLASSIFICATION TEST									SOIL STRENGTH TEST			COMPRESSIBILITY TEST			ROCK TEST		CHEMICAL TEST										
Borehole No.	Sample No.	Depth	Moisture Content	Bulk Density	Dry Density	Specific Gravity	Particle Size Distribution			Atterberg Limit			Triaxial Compression Test			Direct Shear Test		1-D Consolidation Test			Uniaxial Compression Test	Point Load Test, $L_{50}$	pH	Total Sulphate Content	Organic Content	Chloride Content	Carbonate Content			
							Gravel	Sand	Silt	Clay	Liquid Limit	Plastic Limit	Plastic Index	$C_u$	$\phi$	$C'_u$	$\phi'_u$	$q_u$	$C'$	$\phi'$	$e$	$P_c$	$C_c$							
		metre	%	Mg/m <sup>3</sup>	Mg/m <sup>3</sup>	Mg/m <sup>3</sup>	%	%	%	%	%	%	%	kN/m <sup>2</sup>	deg.	kN/m <sup>2</sup>	deg.	kN/m <sup>2</sup>	kN/m <sup>2</sup>	deg.			MPa	MPa	%	%	%			
BH 4	P1/D1	1.50					13	51	36		33	17	16																	
	P5/D5	7.50					15	44	39	2	28	16	12																	
	UD1	11.50	27	1.89	1.49		7	45	44	4	40	21	19													4.9	0.14	0.1	0.11	<0.01
	UD1-S1		29	1.96	1.52		1	30	53	16	40	22	18																	
	UD1-S2		28	1.98	1.55		2	38	54	6	43	23	20																	
	UD1-S3		27	1.99	1.56		2	47	48	3	36	18	18																	
	P11/D11	18.00					18	50	32		27	13	14																	
	P15/D15	21.00					29	53	18		NP	NP	NP																	
	P19/D19	30.00					4	50	43	3	34	18	16																	
	P22/D22	34.50					4	23	48	25	41	20	21																	
	P23/D23	36.00					4	33	58	5	39	20	19																	
	P29/D29	45.00					0	74	26		NP	NP	NP																	
	P36/D35	55.50					19	64	17		NP	NP	NP																	

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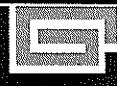
\* TESTING IN PROGRESS

Prepared By :

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Lab Manager

Checked By:

(Norfazliah Hamadun)  
Eng. Geologist



**GEOLAB (M) SDN. BHD.** (Reg. No.210351-V)

Foundation, Soil & Concrete Specialists

## SUMMARY OF LABORATORY TEST RESULTS

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.

**Customer :** M/S PLB Engineering Sdn. Bhd.

**Job No** : GLSB/SI/3971-155/2022

Date : 17-Mar-23

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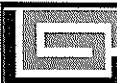
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Foundation. Soil & Concrete Specialists

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.

## SUMMARY OF LABORATORY TEST RESULTS

Customer : M/S PLB Engineering Sdn. Bhd.

Job No : GLSB/SI/3971-155/2022

Date : 17-Mar-23

MARKING			CLASSIFICATION TEST									SOIL STRENGTH TEST				COMPRESSIBILITY TEST			ROCK TEST		CHEMICAL TEST											
Borehole No.	Sample No.	Depth	Moisture Content %	Bulk Density Mg/m <sup>3</sup>	Dry Density Mg/m <sup>3</sup>	Specific Gravity	Particle Size Distribution			Atterberg Limit			Triaxial Compression Test			Direct Shear Test		I-D Consolidation Test			Uniaxial Compression Test	Point Load Test, L <sub>50</sub>	pH	Total Sulphate Content	Organic Content	Chloride Content	Carbonate Content					
							Gravel	Sand	Silt	Clay	Liquid Limit	Plastic Limit	Plastic Index	UU	CU	UCT	C' <sub>u</sub>	ϕ'	q <sub>u</sub>	C'	ϕ'	c	P <sub>e</sub>	̄C <sub>c</sub>								
		metre	%	Mg/m <sup>3</sup>	Mg/m <sup>3</sup>		%	%	%	%	%	%	%	kN/m <sup>2</sup>	deg.	kN/m <sup>2</sup>	deg.	kN/m <sup>2</sup>	deg.	kN/m <sup>2</sup>	deg.		MPa	MPa	%	%	%	%				
BH 7	UD1	3.00	74	1.46	0.84		0	11	55	34	87	33	54																			
	UD1-S1		64	1.57	0.96		2	17	71	10	77	34	43	28	0													7.8	0.14	2.1	0.45 <0.01	
	UD1-S2		40	1.70	1.21		2	24	50	24	67	33	34																			
	UD1-S3		59	1.83	1.16		1	18	57	24	70	34	36																			
	UD2	6.00	32	1.74	1.32		20	42	36	2	46	26	20															1.020	79	0.207		
	UD2-UCT		20	1.89	1.58		16	50	31	3	39	23	16								9											
	P8/D8	15.00					16	51	31	2	35	22	13																			
	P11/D11	19.50					7	43	45	5	31	21	10																			
	P19/D19	31.50					7	52	39	2	28	18	10																			
	P22/D22	36.00					28	41	31		27	17	10																			
	P26/D26	42.00					0	52	48		32	21	11																			
	P30/D30	48.00					0	59	41		30	20	10																			
	P33/D33	52.50					8	74	18		NP	NP	NP																			
	P35/D35	57.00					57	37	6		NP	NP	NP																			

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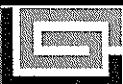
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## SUMMARY OF LABORATORY TEST RESULTS

Customer : M/S PLB Engineering Sdn. Bhd.

Job No : GLSB/SI/3971-155/2022

Date : 17-Mar-23

MARKING			CLASSIFICATION TEST										SOIL STRENGTH TEST				COMPRESSIBILITY TEST			ROCK TEST		CHEMICAL TEST									
Borehole No.	Sample No.	Depth	Moisture Content %	Bulk Density Mg/m <sup>3</sup>	Dry Density Mg/m <sup>3</sup>	Specific Gravity	Particle Size Distribution			Atterberg Limit			Triaxial Compression Test				Direct Shear Test		1-D Consolidation Test			Uniaxial Compression Test	Point Load Test, L <sub>50</sub>	pH	Total Sulphate Content	Organic Content	Chloride Content	Carbonate Content			
							Gravel	Sand	Silt	Clay	Liquid Limit	Plastic Limit	Plastic Index	C <sub>u</sub>	ϕ	C <sub>u'</sub>	ϕ <sub>u'</sub>	q <sub>u</sub>	C' <sub>c</sub>	ϕ'	e	P <sub>c</sub>	C <sub>c</sub>								
metre		metre	%	Mg/m <sup>3</sup>	Mg/m <sup>3</sup>	%	%	%	%	%	%	%	%	kN/m <sup>2</sup>	deg.	kN/m <sup>2</sup>	deg.	kN/m <sup>2</sup>	kN/m <sup>2</sup>	deg.		kN/m <sup>2</sup>		MPa	MPa	%	%	%			
BH 8	UD1	2.00	148	1.24	0.50		2	32	60	6	121	45	76	2	0	NES	4.028	14	1.554			7.7	0.13	5.2	2.10	0.08					
	UD1-S1		131	1.30	0.56		0	24	65	11	120	45	75																		
	UD1-S2		129	1.39	0.60		0	31	61	8	122	45	77																		
	UD1-S3		128	1.39	0.61		0	37	52	11	122	43	79																		
	UD2	6.50	141	1.37	0.57		0	48	50	2	124	45	79	3	0	NES	4.028	14	1.554			7.7	0.13	5.2	2.10	0.08					
	UD2-S1		136	1.34	0.57		0	2	59	39	122	44	78																		
	UD2-S2		131	1.34	0.58		0	25	57	18	126	44	82																		
	UD2-S3		129	1.35	0.59		0	25	64	11	114	43	71																		
	P4/D4	12.00					17	47	32	4	30	17	13																		
	P6/D6	15.00					6	45	44	5	35	20	15																		
	P10/D10	21.00					22	52	26		NP	NP	NP																		
	P16/D16	30.00					1	50	45	4	37	20	17																		
	P21/D21	37.50					4	56	40		32	16	16																		
	P24/D24	42.00					19	56	25		NP	NP	NP																		
	P26/D26	45.00					8	10	51	31	35	20	15																		
	C1	49.80																													
	C2	51.30																													

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(Tay Keng Hui)  
Lab Manager

Checked By:

(Norfazliah Hamadun)  
Eng. Geologist



**GEOLAB (M) SDN. BHD.** (Reg. No.210351-V)

Foundation, Soil & Concrete Specialists

## SUMMARY OF LABORATORY TEST RESULTS

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.

**Customer :** M/S PLB Engineering Sdn. Bhd

**Job No** : GLSB/SI/3971-155/2022

Date : 17-Mar-23

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*Lab Manager*

Checked By:

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Eng. Geologist



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Foundation, Soil & Concrete Specialists.  
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MS ISO/IEC17025  
TESTING  
SAMM NO. 254

Our Ref. : GLSB / SI / 3971-155 / 2022

Date : 17<sup>th</sup> March 2023  
Page

## TEST REPORT

(This report is issued subject to the conditions set out overleaf)

**Subject Matter**

- : Determination of Moisture Content, Atterberg Limit, Particle Size Distribution for Coarse Grained and Fine Grained, Unconfined Compressive Strength, Unconsolidated Undrained Shear Strength, Consolidated Undrained Shear Strength and One Dimensional Consolidation on soil sample submitted.

**Tested For**

- : M/S PLB ENGINEERING SDN. BHD.

**Customer**

- : M/S PLB ENGINEERING SDN. BHD.  
1320, Jalan Baru, Taman Chai Leng,  
13700 Perai, Pulau Pinang.

**Test Methods**

**Reference Method/Tests**

- |   |
|---|
| BS 1377 : Part 2 : 1990 : Clause 3 : Moisture Content                             |
| BS 1377 : Part 2 : 1990 : Clause 4 : Liquid Limit                                 |
| BS 1377 : Part 2 : 1990 : Clause 5 : Plastic Limit and Plasticity Index           |
| BS 1377 : Part 2 : 1990 : Clause 9 : Particle Size Distribution                   |
| BS 1377 : Part 5 : 1990 : Clause 3 : One Dimensional Consolidation                |
| BS 1377 : Part 7 : 1990 : Clause 7 : Unconfined Compressive Strength              |
| BS 1377 : Part 7 : 1990 : Clause 8,9 : Unconsolidated Undrained Triaxial Strength |
| BS 1377 : Part 8 : 1990 : Clause 4,5,6,7:Consolidated Undrained Triaxial Strength |

**Project**

- : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.

**Date Sample Received**

- : Refer to individual sample's test reports.

**Sample Description**

- : Refer to individual sample's test reports.

**Conditions of Receipts**

- : Refer to individual sample's test reports.

**Results**

- : Refer to individual sample's test reports.

**Authorized Signatories:**

Tay Keng Hui  
Lab Manager

Ir. Koo Kean Siang  
Professional Engineer  
B.Tech (Civil), M. Eng (Geotech)  
MIEM P. Eng. (Malaysia)

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# Classification Test



**BH 1**

	Client: M/S PLB Engineering Sdn. Bhd.	Borehole No.: BH 1
	Location Jelutong Rehabilitation & Reclamation At Jelutong, Penang	Sample No.: Refer Below
	Report No.: GLSB/SI/3971-155/2022	Depth: Refer Below
	Test Name: MC&BD	Date of test: 12/01/23

## Determination of Moisture Content (BS 1377 : Part 2 : 1990 # 3)

Sample No.:	UD1		UD2			
Depth (m)	4.50		14.50			
Container No.	ZU14	X53	32E	49F		
Mass of wet soil + can (g)	287.72	262.60	269.12	204.22		
Mass of dry soil + can (g)	247.92	225.04	229.16	174.40		
Mass of Container (g)	38.08	38.52	37.36	37.70		
Mass of Water (g)	39.80	37.56	39.96	29.82		
Mass of Dry Soil (g)	209.84	186.52	191.80	136.70		
Water Content (%)	18.97	20.14	20.83	21.81		
Average Water Content (%)	20		21			

## Determination of Density (BS 1377 : Part 2 : 1990 # 7)

Sample length (mm)	20	20	
Sample Diameter (mm)	50	50	
Sample Weight (g)	77.29	80.7	
Bulk Density (Mg/m <sup>3</sup> )	1.97	2.06	
Dry Density (Mg/m <sup>3</sup> )	1.64	1.70	

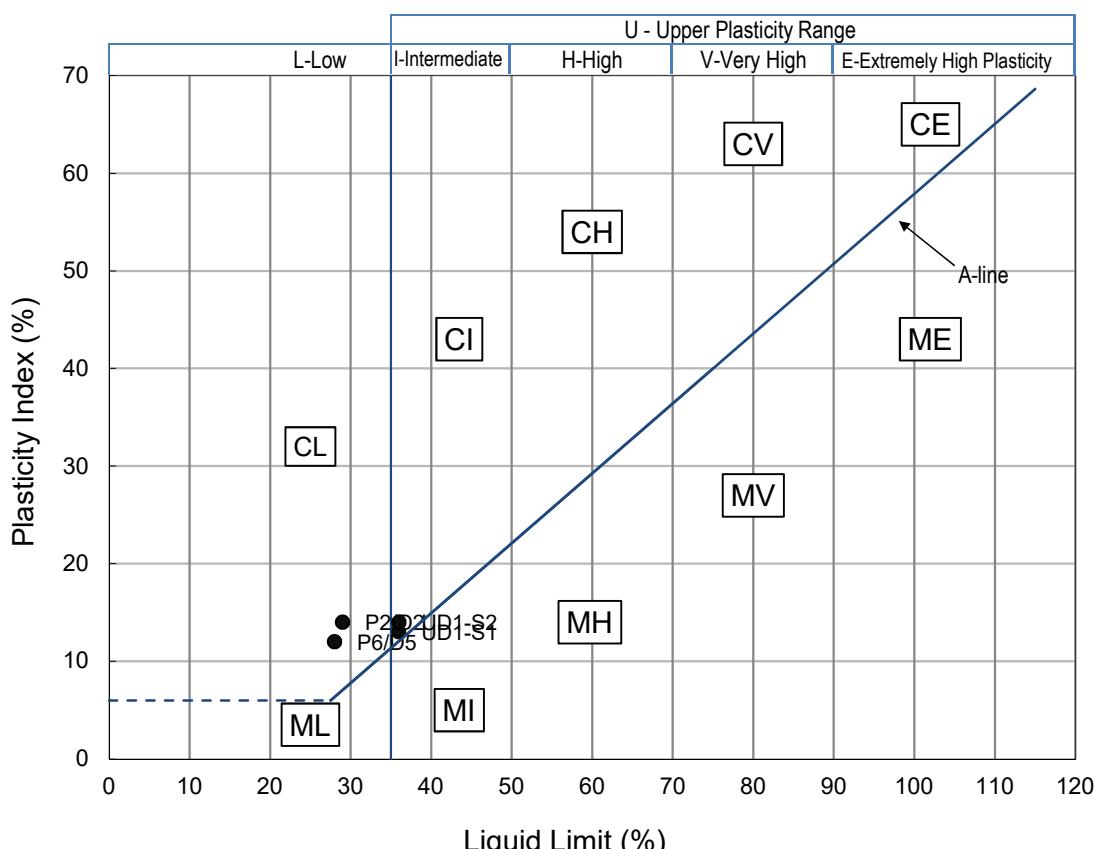
	Client: M/S PLB Engineering Sdn. Bhd.	Borehole No.: BH 1
	Location: Jelutong Rehabilitation & Reclamation At Jelutong, Penang	Sample No.: Refer Below
		Depth: Refer Below
	Report No.: GLSB/SI/3971-155/2022	Test Name: AL Date of test: 17/01/23

## Liquid Limit (Cone Penetrometer) and Plastic Limit

BS 1377 : Part 2: 1990: # 4.4 / 5

Sample No.	Description:	Dark grey with medium brown mottled, Very Clayey SAND of Low Plasticity.		
P2/D2 3.00m	HISTORY OF SAMPLE Natural State	LIQUID LIMIT (%)	29	
		PLASTIC LIMIT (%)	15	
		PLASTICITY INDEX (%)	14	
Sample No.	Description:	- Light brown, Very Silty/Clayey SANDS. Very Clayey SAND of Intermediate Plasticity.		
UD1-S1 4.50m	HISTORY OF SAMPLE Natural State	LIQUID LIMIT (%)	36	
		PLASTIC LIMIT (%)	23	
		PLASTICITY INDEX (%)	13	
Sample No.	Description:	- Light brown, Very Silty/Clayey SANDS. Very Clayey SAND of Intermediate Plasticity.		
UD1-S2 4.50m	HISTORY OF SAMPLE Natural State	LIQUID LIMIT (%)	36	
		PLASTIC LIMIT (%)	22	
		PLASTICITY INDEX (%)	14	
Sample No.	Description:	- Light brown, Very Clayey SAND of Low Plasticity.		
P6/D5 10.50m	HISTORY OF SAMPLE Natural State	LIQUID LIMIT (%)	28	
		PLASTIC LIMIT (%)	16	
		PLASTICITY INDEX (%)	12	

### PLASTICITY CHART



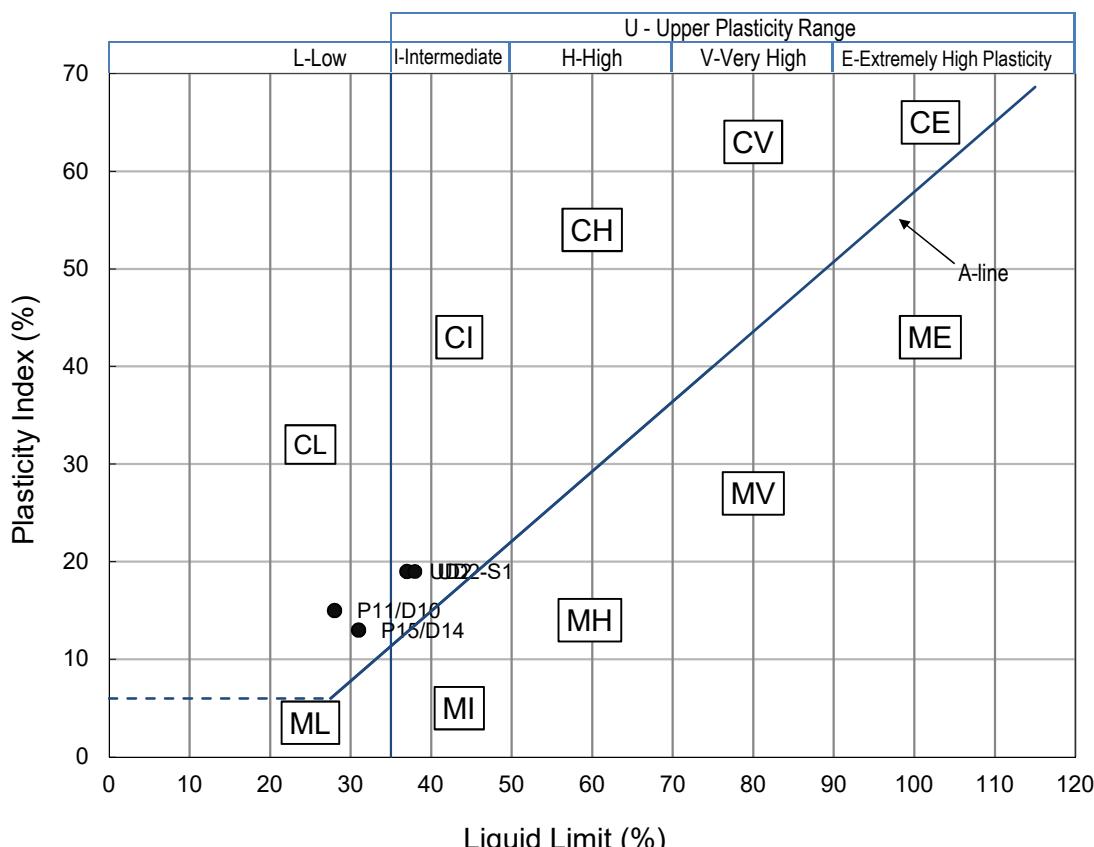
	Client: M/S PLB Engineering Sdn. Bhd.	Borehole No.: BH 1
	Location: Jelutong Rehabilitation & Reclamation At Jelutong, Penang	Sample No.: Refer Below
		Depth: Refer Below
	Report No.: GLSB/SI/3971-155/2022	Test Name: AL Date of test: 17/01/23

## Liquid Limit (Cone Penetrometer) and Plastic Limit

BS 1377 : Part 2: 1990: # 4.4 / 5

Sample No.	Description: - Pale brown, Sandy Clay of Intermediate Plasticity.		
UD2 14.50m	HISTORY OF SAMPLE Natural State	LIQUID LIMIT (%) PLASTIC LIMIT (%) PLASTICITY INDEX (%)	37 18 19
Sample No.	Description: - Pale brown, Sandy Clay of Intermediate Plasticity.		
UD2-S1 14.50m	HISTORY OF SAMPLE Natural State	LIQUID LIMIT (%) PLASTIC LIMIT (%) PLASTICITY INDEX (%)	38 19 19
Sample No.	Description: - Light brown, Sandy CLAY of Low Plasticity.		
P11/D10 18.00m	HISTORY OF SAMPLE Natural State	LIQUID LIMIT (%) PLASTIC LIMIT (%) PLASTICITY INDEX (%)	28 13 15
Sample No.	Description: - Light brown, Sandy CLAY of Low Plasticity.		
P15/D14 24.00m	HISTORY OF SAMPLE Natural State	LIQUID LIMIT (%) PLASTIC LIMIT (%) PLASTICITY INDEX (%)	31 18 13

### PLASTICITY CHART



	Client: M/S PLB Engineering Sdn. Bhd.	Borehole No.: BH 1
	Location: Jelutong Rehabilitation & Reclamation At Jelutong, Penang	Sample No.: Refer Below
		Depth: Refer Below
	Report No.: GLSB/SI/3971-155/2022	Test Name: AL Date of test: 17/01/23

## Liquid Limit (Cone Penetrometer) and Plastic Limit

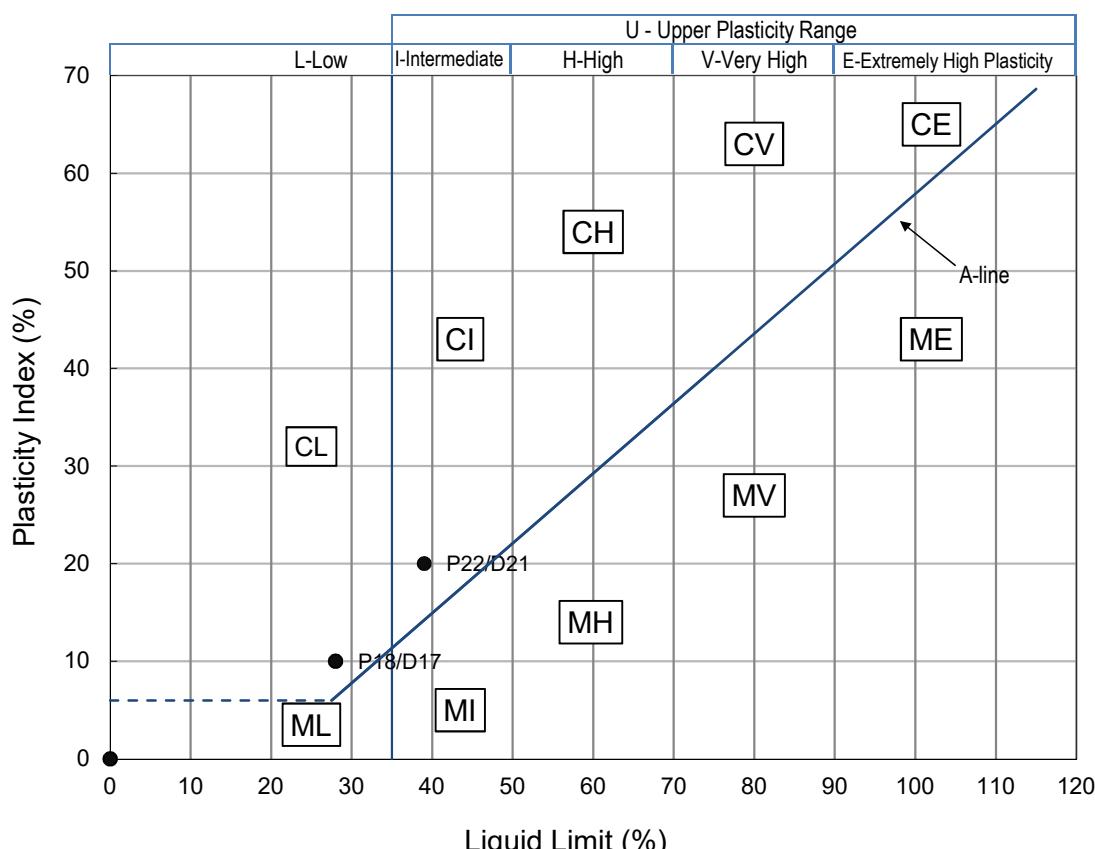
BS 1377 : Part 2: 1990: # 4.4 / 5

Sample No.	Description:	- Light brown, Very Clayey SAND of Low Plasticity.		
P18/D17 28.50m	HISTORY OF SAMPLE Natural State	LIQUID LIMIT (%)	28	
		PLASTIC LIMIT (%)	18	
		PLASTICITY INDEX (%)	10	

Sample No.	Description:	- Pale to light brown, Sandy CLAY of Intermediate Plasticity.		
P22/D21 34.50m	HISTORY OF SAMPLE Natural State	LIQUID LIMIT (%)	39	
		PLASTIC LIMIT (%)	19	
		PLASTICITY INDEX (%)	20	



PLASTICITY CHART





Client: M/S PLB Engineering Sdn. Bhd.	Borehole No.: BH 1
Location: Jelutong Rehabilitation & Reclamation At Jelutong, Penang	Sample No.: Refer below
Report No.: GLSB/SI/3971-155/2022	Depth: Refer below
Test Name: PS & HYD	Date of test: 14/01/23

## Particle Size Distribution

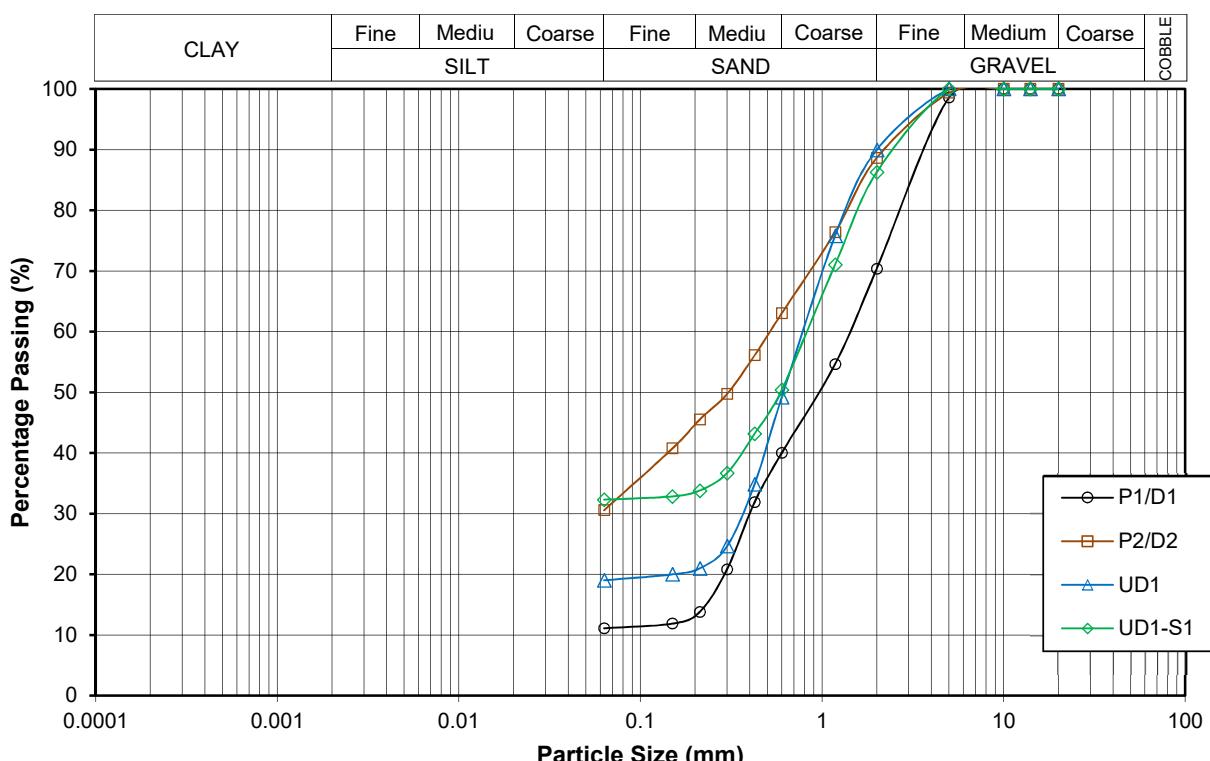
BS 1377 : Part 2 : 1990 # 9.2, 9.3 & 9.5

Sample No.	Description:	- Light brown, Silty/Clayey SAND.		
P1/D1	Gravel	Sand	Silt	Clay
1.50m	30	59	11	

Sample No.	Description:	- Dark grey with medium brown mottled, Very Clayey SAND of Low Plasticity.		
P2/D2	Gravel	Sand	Silt	Clay
3.00m	11	58	31	

Sample No.	Description:	- Light brown, Very Silty/Clayey SANDS.		
UD1	Gravel	Sand	Silt	Clay
4.50m	10	71	19	

Sample No.	Description:	- Light brown, Very Clayey SAND of Intermediate Plasticity.		
UD1-S1	Gravel	Sand	Silt	Clay
4.50m	14	54	32	





Client: M/S PLB Engineering Sdn. Bhd.	Borehole No.: BH 1
Location: Jelutong Rehabilitation & Reclamation At Jelutong, Penang	Sample No.: Refer below
Report No.: GLSB/SI/3971-155/2022	Depth: Refer below
Test Name: PS & HYD	Date of test: 14/01/23

## Particle Size Distribution

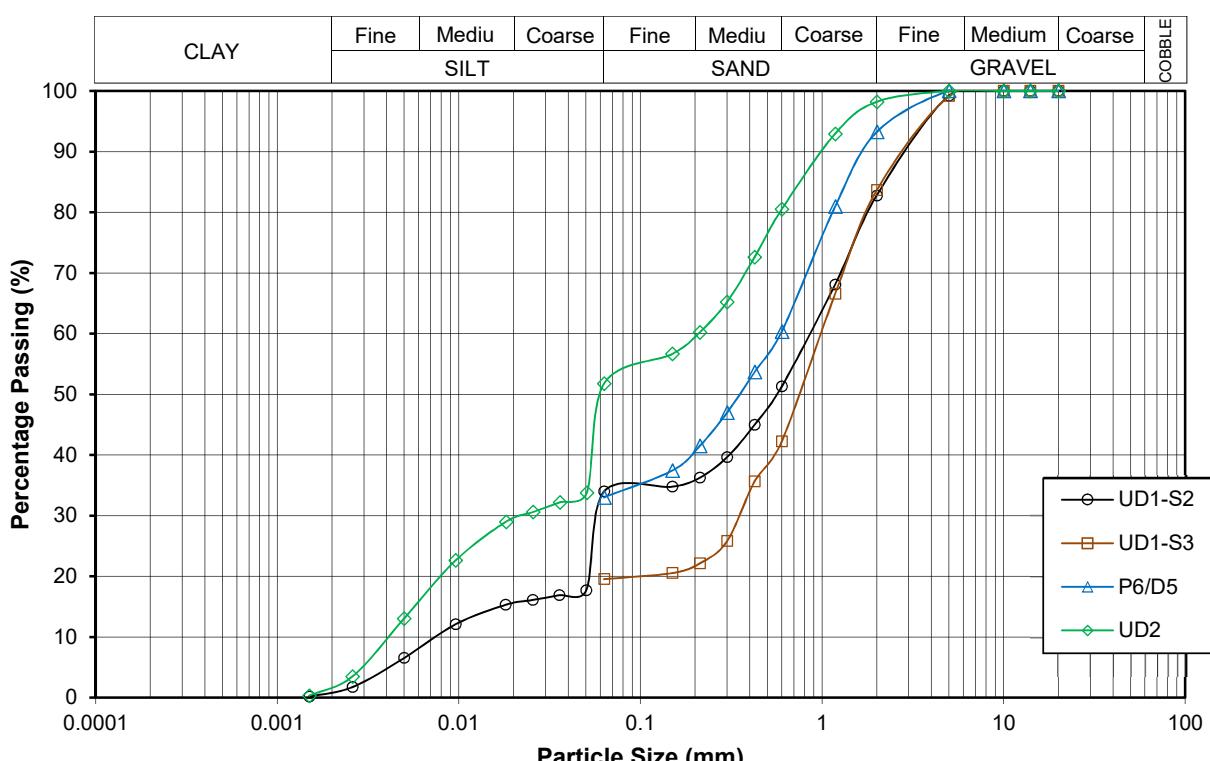
BS 1377 : Part 2 : 1990 # 9.2, 9.3 & 9.5

Sample No.	Description:	- Light brown, Very Clayey SAND of Intermediate Plasticity.			
UD1-S2	Gravel	Sand	Silt	Clay	
4.50m	17	49	32	2	

Sample No.	Description:	- Light brown, Very Silty/Clayey SANDS.			
UD1-S3	Gravel	Sand	Silt	Clay	
4.50m	16	64	20		

Sample No.	Description:	- Light brown, Very Clayey SAND of Low Plasticity.			
P6/D5	Gravel	Sand	Silt	Clay	
10.50m	7	60	33		

Sample No.	Description:	- Pale brown, Sandy CLAY of Intermediate Plasticity.			
UD2	Gravel	Sand	Silt	Clay	
14.50m	2	46	49	3	





Client:	M/S PLB Engineering Sdn. Bhd.	Borehole No.:	BH 1
Location:	Jelutong Rehabilitation & Reclamation At Jelutong, Penang	Sample No.:	Refer below
Report No.:	GLSB/SI/3971-155/2022	Depth:	Refer below
		Test Name:	PS & HYD
		Date of test:	14/01/23

## Particle Size Distribution

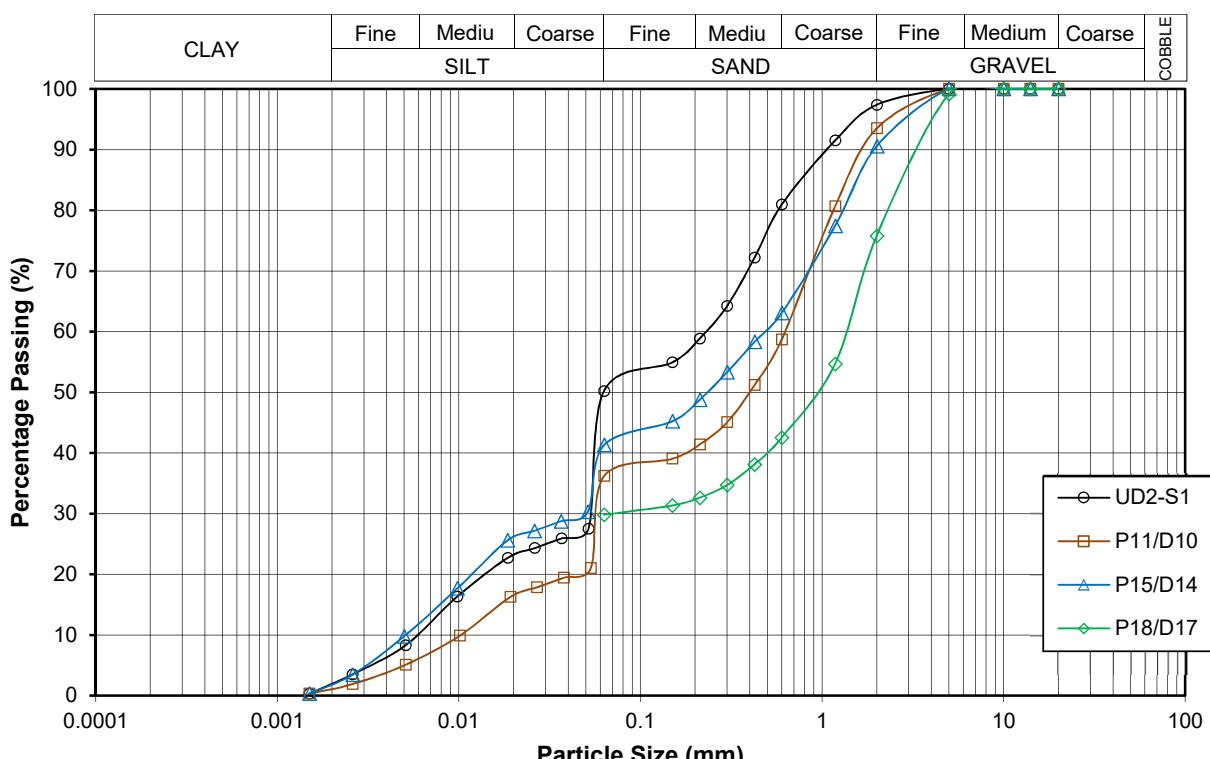
BS 1377 : Part 2 : 1990 # 9.2, 9.3 & 9.5

Sample No.	Description:	- Pale brown, Sandy CLAY of Intermediate Plasticity.		
UD2-S1	Gravel	Sand	Silt	Clay
14.50m	3	47	47	3

Sample No.	Description:	- Light brown, Sandy CLAY of Low Plasticity.		
P11/D10	Gravel	Sand	Silt	Clay
18.00m	7	57	34	2

Sample No.	Description:	- Light brown, Sandy CLAY of Low Plasticity.		
P15/D14	Gravel	Sand	Silt	Clay
24.00m	9	49	39	3

Sample No.	Description:	- Light brown, Very Clayey SAND of Low Plasticity.		
P18/D17	Gravel	Sand	Silt	Clay
28.50m	24	46	30	





Client:	M/S PLB Engineering Sdn. Bhd.	Borehole No.:	BH 1
Location:	Jelutong Rehabilitation & Reclamation At Jelutong, Penang	Sample No.:	Refer below
Report No.:	GLSB/SI/3971-155/2022	Depth:	Refer below
		Test Name:	PS & HYD
		Date of test:	14/01/23

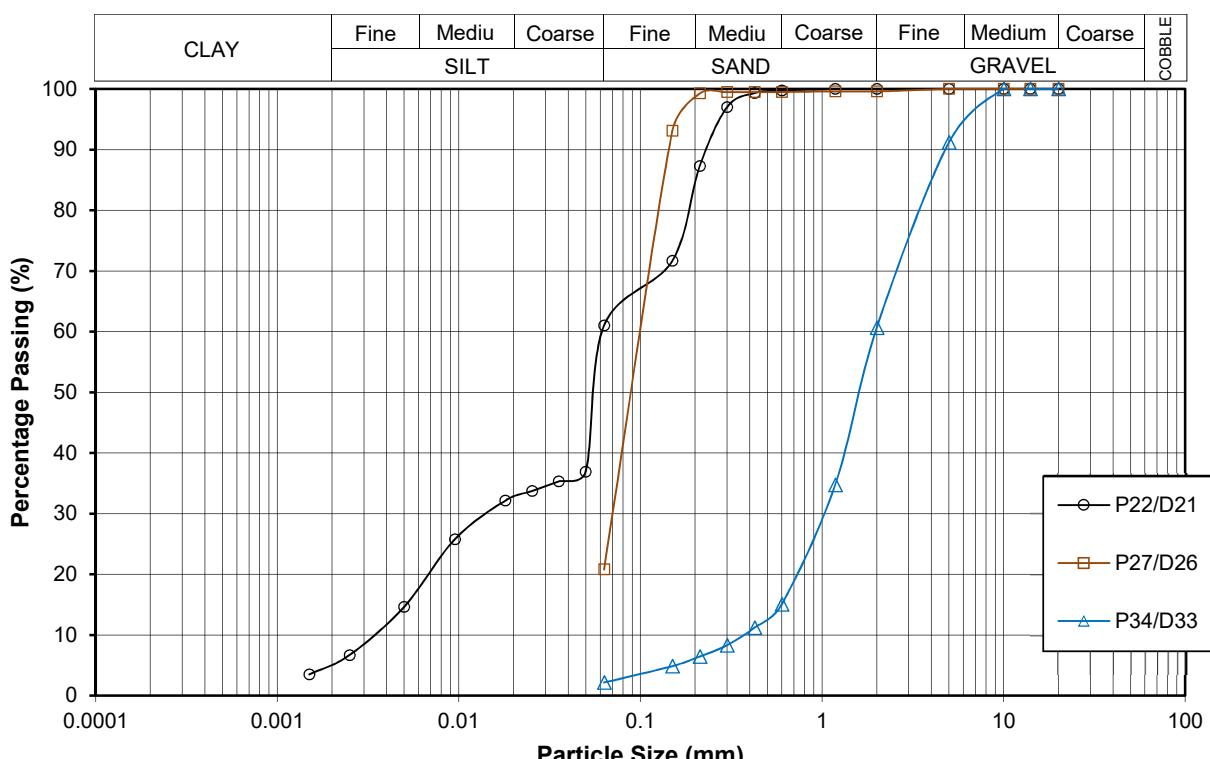
## Particle Size Distribution

BS 1377 : Part 2 : 1990 # 9.2, 9.3 & 9.5

Sample No.	Description:	- Pale to light brown, Sandy CLAY of Intermediate Plasticity.		
P22/D21	Gravel	Sand	Silt	Clay
34.50m	0	39	56	5

Sample No.	Description:	- Pale to light grey, Very Silty/Clayey SANDS.		
P27/D26	Gravel	Sand	Silt	Clay
42.00m	0	79	21	

Sample No.	Description:	- Pale to light brown , Slightly Silty/Clayey SANDS.		
P34/D33	Gravel	Sand	Silt	Clay
52.50m	39	59	2	



**BH 2**

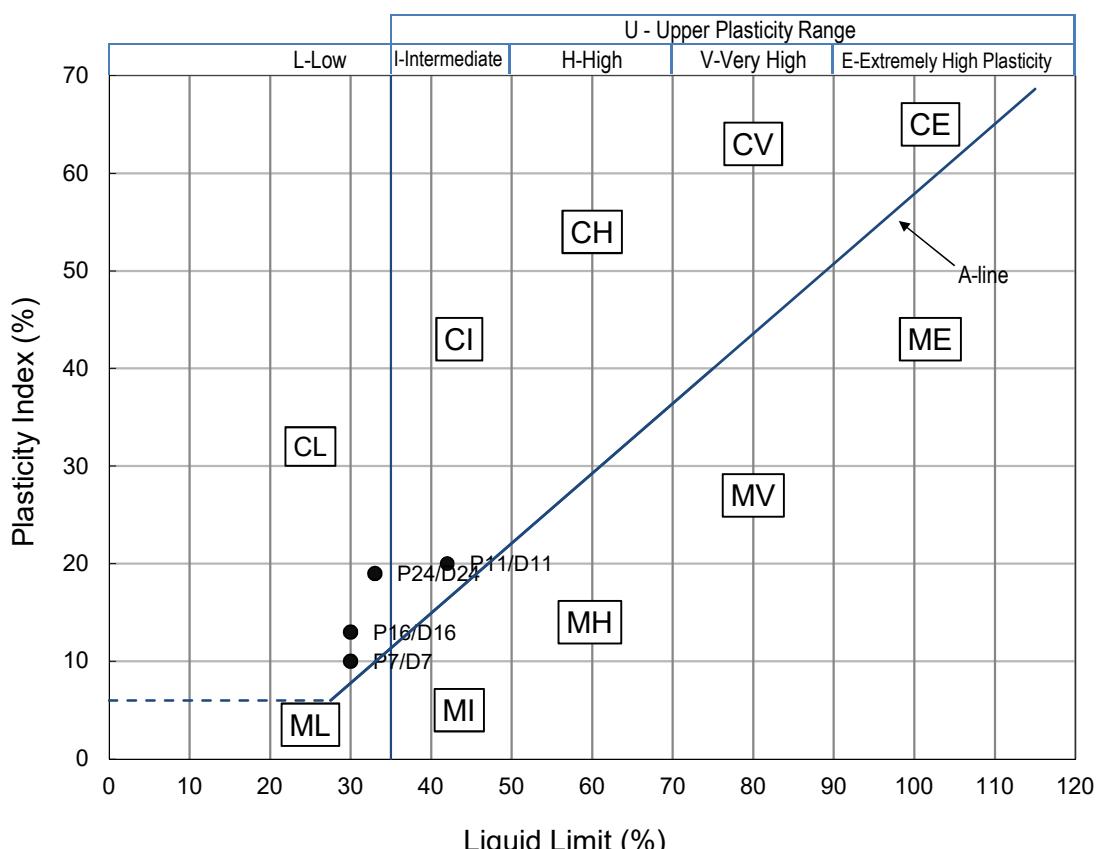
	Client: M/S PLB Engineering Sdn. Bhd.	Borehole No.: BH 2
	Location: Jelutong Rehabilitation & Reclamation At Jelutong, Penang	Sample No.: Refer Below
		Depth: Refer Below
	Report No.: GLSB/SI/3971-155/2022	Test Name: AL Date of test: 18/01/23

## Liquid Limit (Cone Penetrometer) and Plastic Limit

BS 1377 : Part 2: 1990: # 4.4 / 5

Sample No.	Description: - Light grey, Sandy CLAY of Low Plasticity.	
P7/D7 10.50m	HISTORY OF SAMPLE Natural State	LIQUID LIMIT (%) 30 PLASTIC LIMIT (%) 20 PLASTICITY INDEX (%) 10
Sample No.	Description: - Light brown, Sandy CLAY of Intermediate Plasticity.	
P11/D11 16.50m	HISTORY OF SAMPLE Natural State	LIQUID LIMIT (%) 42 PLASTIC LIMIT (%) 22 PLASTICITY INDEX (%) 20
Sample No.	Description: - Light brown, Sandy CLAY of Intermediate Plasticity.	
P16/D16 24.00m	HISTORY OF SAMPLE Natural State	LIQUID LIMIT (%) 30 PLASTIC LIMIT (%) 17 PLASTICITY INDEX (%) 13
Sample No.	Description: - Light brown, CLAY of Low Plasticity.	
P24/D24 37.50m	HISTORY OF SAMPLE Natural State	LIQUID LIMIT (%) 33 PLASTIC LIMIT (%) 14 PLASTICITY INDEX (%) 19

### PLASTICITY CHART



	Client: M/S PLB Engineering Sdn. Bhd.	Borehole No.: BH 2
	Location: Jelutong Rehabilitation & Reclamation At Jelutong, Penang	Sample No.: Refer Below
	Report No.: GLSB/SI/3971-155/2022	Depth: Refer Below
	Test Name: AL	Date of test: 18/01/23

## Liquid Limit (Cone Penetrometer) and Plastic Limit

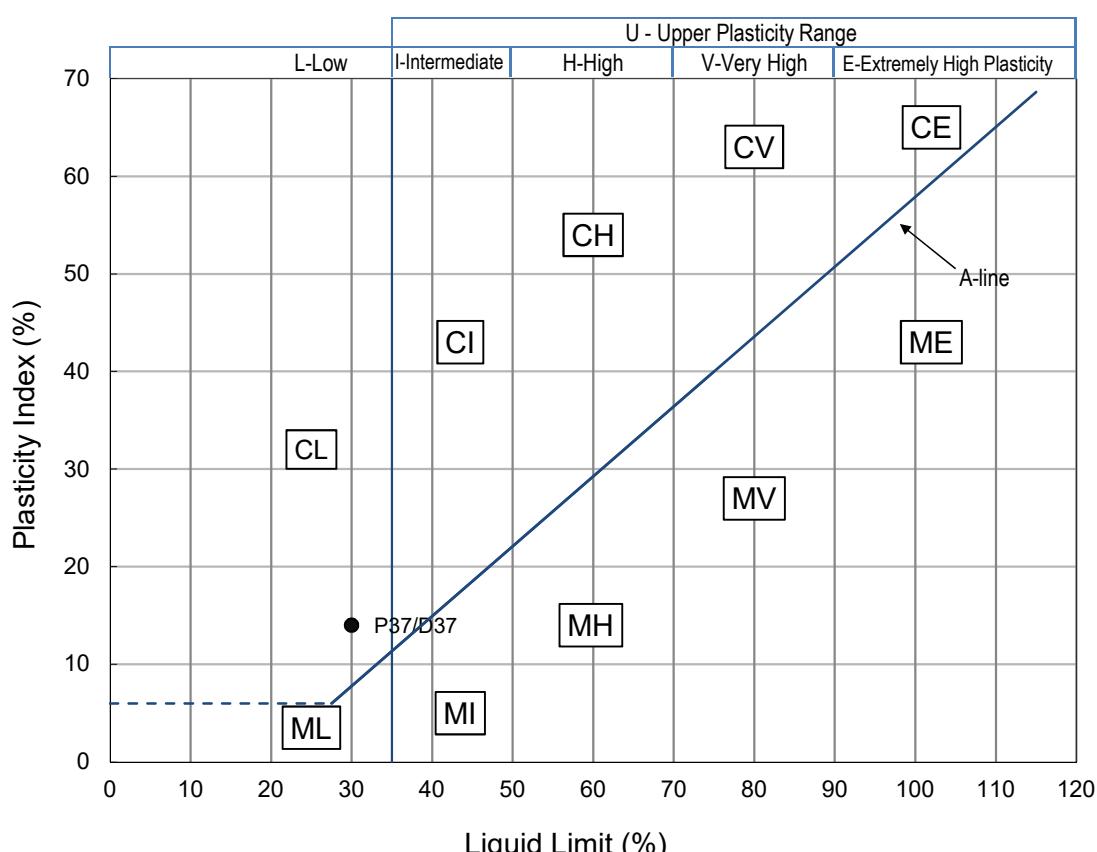
BS 1377 : Part 2: 1990: # 4.4 / 5

Sample No.	Description:	- Light brown, Sandy CLAY of Low Plasticity.		
P37/D37 57.00m	HISTORY OF SAMPLE Natural State	LIQUID LIMIT (%)	30	PLASTIC LIMIT (%)

PLASTICITY INDEX (%) 16  
14




PLASTICITY CHART





Client: M/S PLB Engineering Sdn. Bhd.	Borehole No.: BH 2
Location: Jelutong Rehabilitation & Reclamation At Jelutong, Penang	Sample No.: Refer below
Report No.: GLSB/SI/3971-155/2022	Depth: Refer below
Test Name: PS & HYD	Date of test: 14/01/23

## Particle Size Distribution

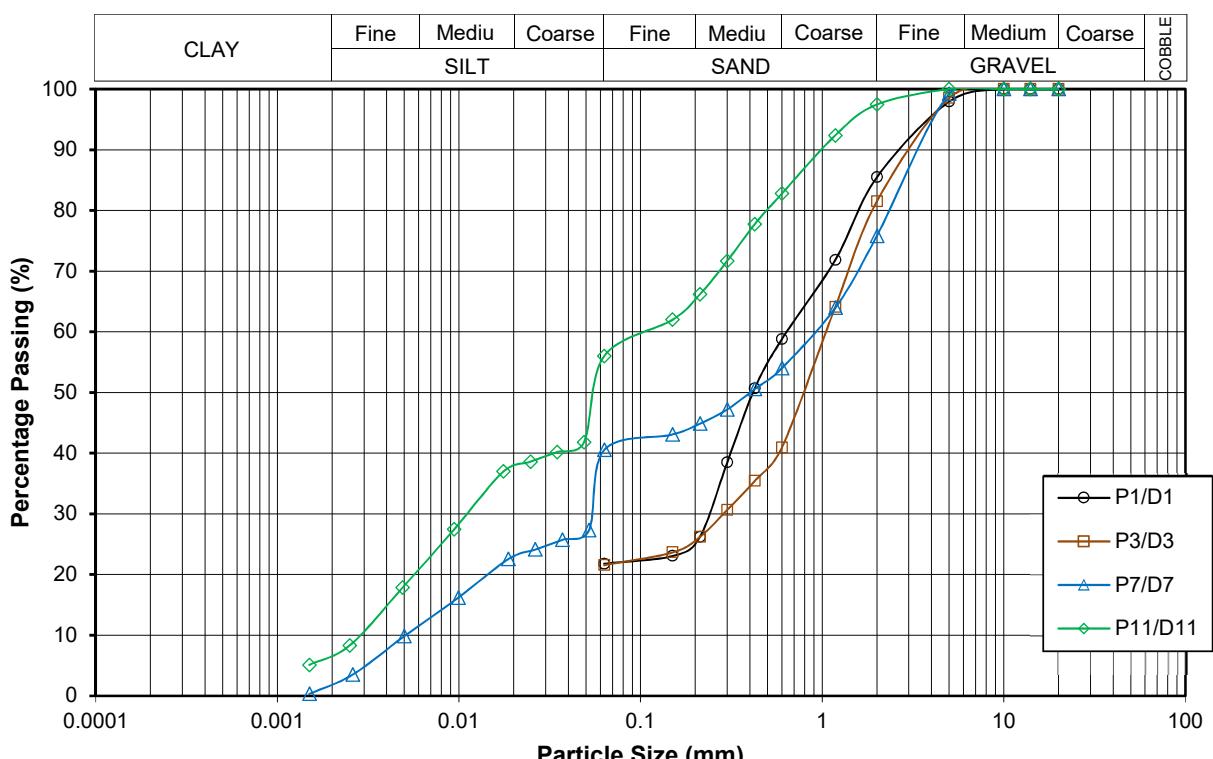
BS 1377 : Part 2 : 1990 # 9.2, 9.3 & 9.5

Sample No.	Description:	- Light grey, Very Silty/Clayey SANDS.		
P1/D1	Gravel	Sand	Silt	Clay
1.50m	15	63	22	

Sample No.	Description:	- Medium brown with light grey mottled, Very Silty/Clayey SAND.		
P3/D3	Gravel	Sand	Silt	Clay
4.50m	19	59	22	

Sample No.	Description:	- Light grey, Sandy CLAY of Low Plasticity.		
P7/D7	Gravel	Sand	Silt	Clay
10.50m	24	35	38	3

Sample No.	Description:	- Light brown, Sandy CLAY of Intermediate Plasticity.		
P11/D11	Gravel	Sand	Silt	Clay
16.50m	3	41	50	6





Client:	M/S PLB Engineering Sdn. Bhd.	Borehole No.:	BH 2
Location:	Jelutong Rehabilitation & Reclamation At Jelutong, Penang	Sample No.:	Refer below
Report No.:	GLSB/SI/3971-155/2022	Depth:	Refer below
		Test Name:	PS & HYD
		Date of test:	14/01/23

## Particle Size Distribution

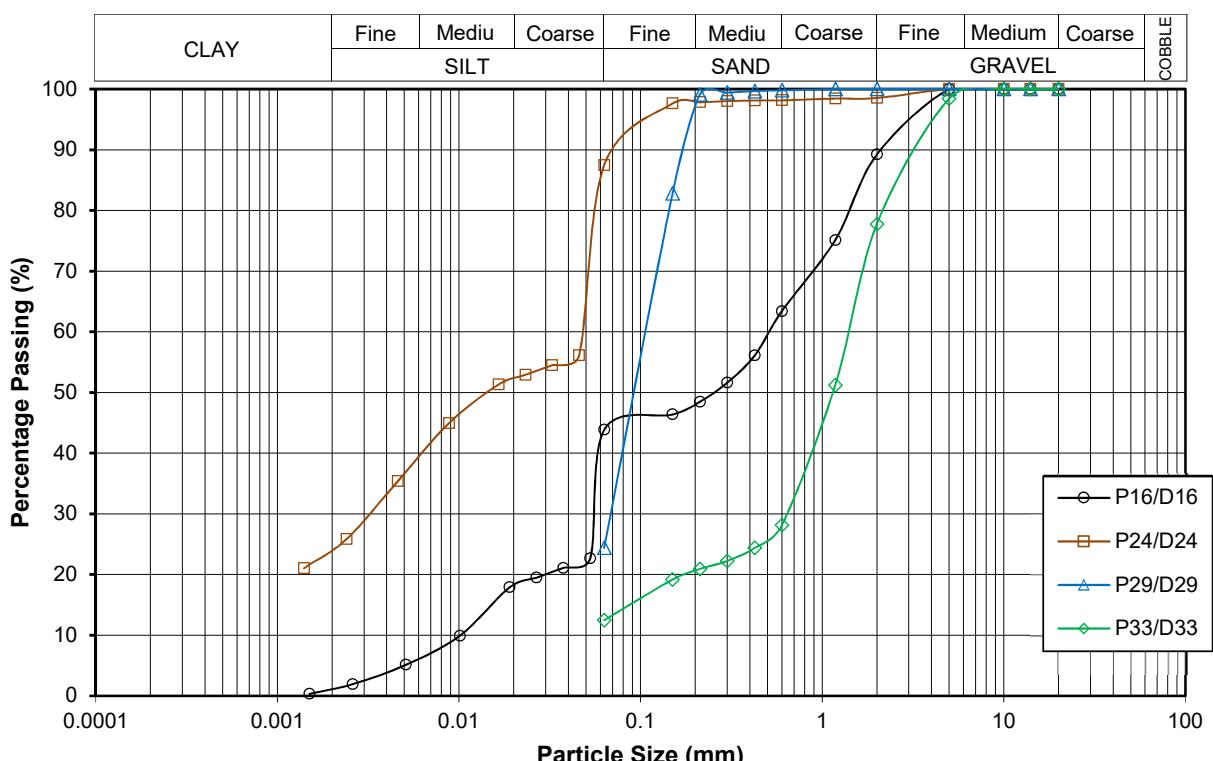
BS 1377 : Part 2 : 1990 # 9.2, 9.3 & 9.5

Sample No.	Description:	- Light brown, Sandy CLAY of Low Plasticity.		
P16/D16	Gravel	Sand	Silt	Clay
24.00m	11	45	42	2

Sample No.	Description:	- Light brown, CLAY of Low Plasticity.		
P24/D24	Gravel	Sand	Silt	Clay
37.50m	1	11	64	24

Sample No.	Description:	- Light brown, Very Silty/Clayey SANDS.		
P29/D29	Gravel	Sand	Silt	Clay
45.00m	0	76	24	

Sample No.	Description:	- Pale grey, Silty/Clayey SAND.		
P33/D33	Gravel	Sand	Silt	Clay
51.00m	22	66	12	





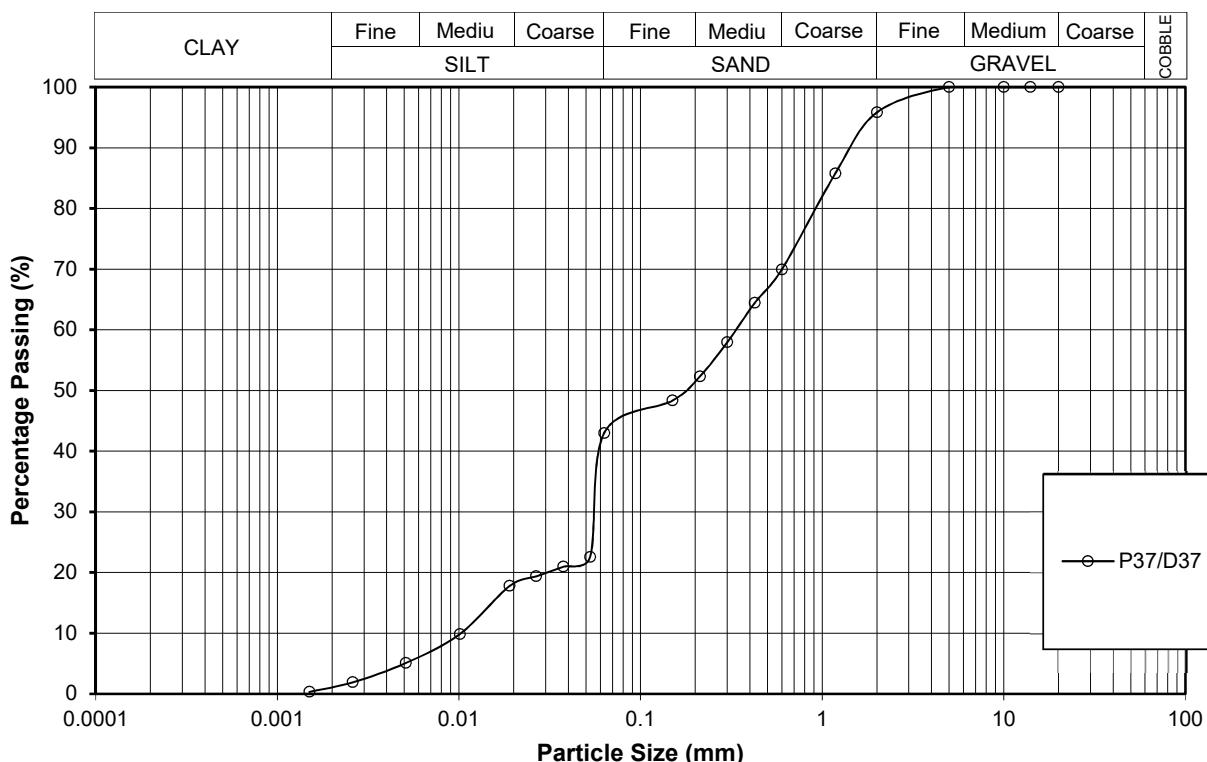
Client:	M/S PLB Engineering Sdn. Bhd.	Borehole No.:	BH 2
Location:	Jelutong Rehabilitation & Reclamation At Jelutong, Penang	Sample No.:	Refer below
Report No.:	GLSB/SI/3971-155/2022	Depth:	Refer below
		Test Name:	PS & HYD
		Date of test:	14/01/23

## Particle Size Distribution

BS 1377 : Part 2 : 1990 # 9.2, 9.3 & 9.5

Sample No.	Description:	- Light brown, Sandy CLAY of Low Plasticity.		
P37/D37	Gravel	Sand	Silt	Clay
57.00m	4	53	41	2





## BH 3

	Client: M/S PLB Engineering Sdn. Bhd.	Borehole No.: BH 3
	Location Jelutong Rehabilitation & Reclamation At Jelutong, Penang	Sample No.: Refer Below
		Depth: Refer Below
	Report No.: GLSB/SI/3971-155/2022 Test Name: MC&BD	Date of test: 12/01/23

## Determination of Moisture Content (BS 1377 : Part 2 : 1990 # 3)

Sample No.:	UD1		UD2			
Depth (m)	3.00		8.50			
Container No.	FM75	ZU61	18F	FM49		
Mass of wet soil + can (g)	212.32	172.34	280.84	245.36		
Mass of dry soil + can (g)	100.12	85.94	229.36	205.56		
Mass of Container (g)	37.88	37.40	38.24	36.80		
Mass of Water (g)	112.20	86.40	51.48	39.80		
Mass of Dry Soil (g)	62.24	48.54	191.12	168.76		
Water Content (%)	180.27	178.00	26.94	23.58		
Average Water Content (%)	179		25			

## Determination of Density (BS 1377 : Part 2 : 1990 # 7)

Sample length (mm)	20	20	
Sample Diameter (mm)	50	50	
Sample Weight (g)	46.01	74.21	
Bulk Density (Mg/m <sup>3</sup> )	1.17	1.89	
Dry Density (Mg/m <sup>3</sup> )	0.42	1.51	

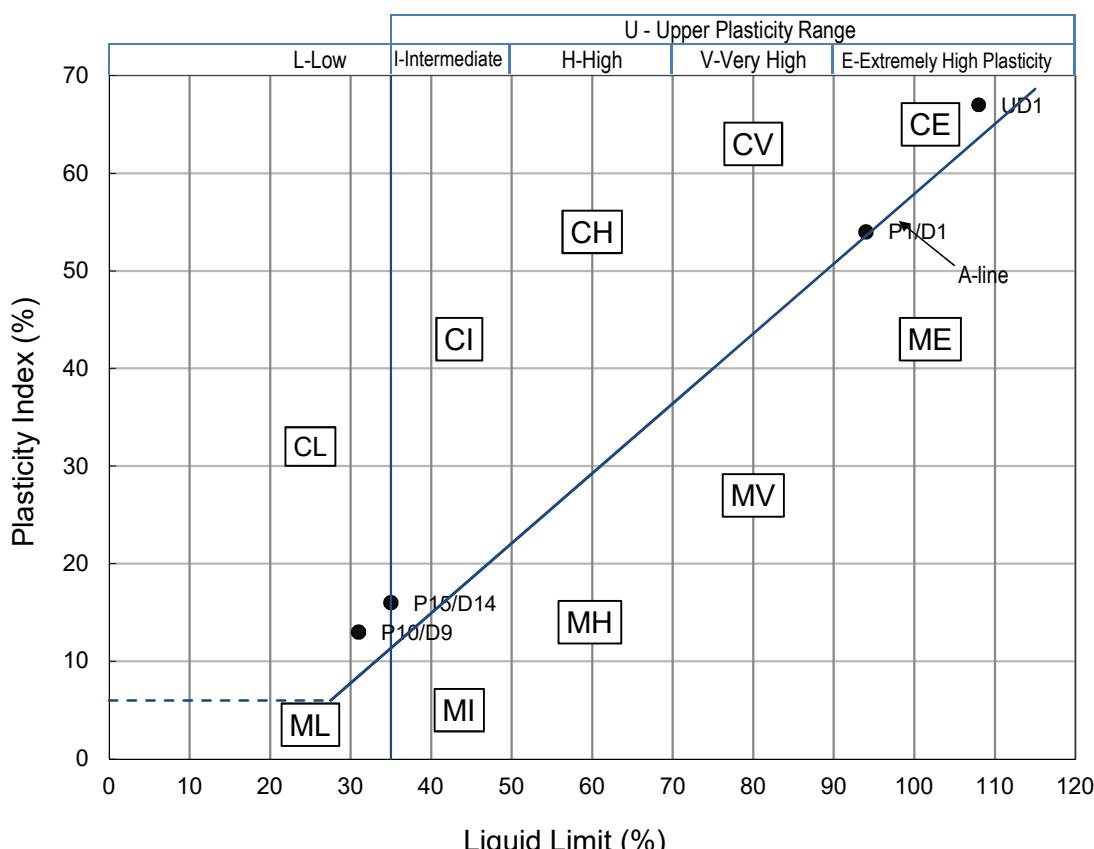
	Client: M/S PLB Engineering Sdn. Bhd.	Borehole No.: BH 3
	Location: Jelutong Rehabilitation & Reclamation At Jelutong, Penang	Sample No.: Refer Below
		Depth: Refer Below
	Report No.: GLSB/SI/3971-155/2022	Test Name: AL Date of test: 18/01/23

## Liquid Limit (Cone Penetrometer) and Plastic Limit

BS 1377 : Part 2: 1990: # 4.4 / 5

Sample No.	Description: - Medium grey, SILT of Extremely High Plasticity.		
P1/D1 1.50m	HISTORY OF SAMPLE Natural State	LIQUID LIMIT (%) 94	PLASTIC LIMIT (%) 40
		PLASTICITY INDEX (%) 54	
Sample No.	Description: - Medium grey, CLAY.		
UD1 3.00m	HISTORY OF SAMPLE Natural State	LIQUID LIMIT (%) 108	PLASTIC LIMIT (%) 41
		PLASTICITY INDEX (%) 67	
Sample No.	Description: - Light grey, fine grained, Clayey SAND.		
P10/D9 18.00m	HISTORY OF SAMPLE Natural State	LIQUID LIMIT (%) 31	PLASTIC LIMIT (%) 18
		PLASTICITY INDEX (%) 13	
Sample No.	Description: - Light grey with pale brown spotted, Sandy CLAY of Intermediate Plasticity.		
P15/D14 25.50m	HISTORY OF SAMPLE Natural State	LIQUID LIMIT (%) 35	PLASTIC LIMIT (%) 19
		PLASTICITY INDEX (%) 16	

### PLASTICITY CHART



	Client: M/S PLB Engineering Sdn. Bhd.	Borehole No.: BH 3
	Location: Jelutong Rehabilitation & Reclamation At Jelutong, Penang	Sample No.: Refer Below
		Depth: Refer Below
	Report No.: GLSB/SI/3971-155/2022	Test Name: AL Date of test: 18/01/23

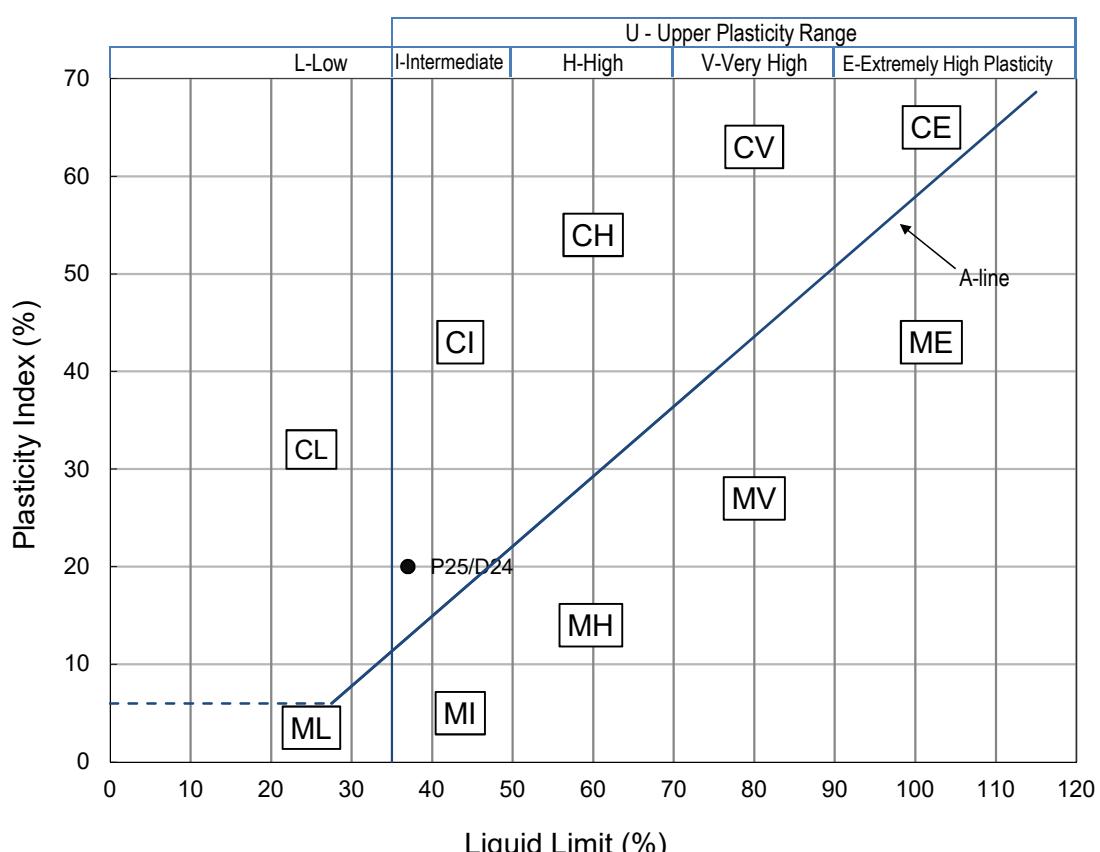
## Liquid Limit (Cone Penetrometer) and Plastic Limit

BS 1377 : Part 2: 1990: # 4.4 / 5

Sample No.	Description:	- Light grey, fine to medium grained, Clayey SAND.
P25/D24 40.50m	HISTORY OF SAMPLE Natural State	LIQUID LIMIT (%) 37 PLASTIC LIMIT (%) 17 PLASTICITY INDEX (%) 20




PLASTICITY CHART





Client: M/S PLB Engineering Sdn. Bhd.	Borehole No.: BH 3
Location: Jelutong Rehabilitation & Reclamation At Jelutong, Penang	Sample No.: Refer below
Report No.: GLSB/SI/3971-155/2022	Depth: Refer below
Test Name: PS & HYD	Date of test: 14/01/23

## Particle Size Distribution

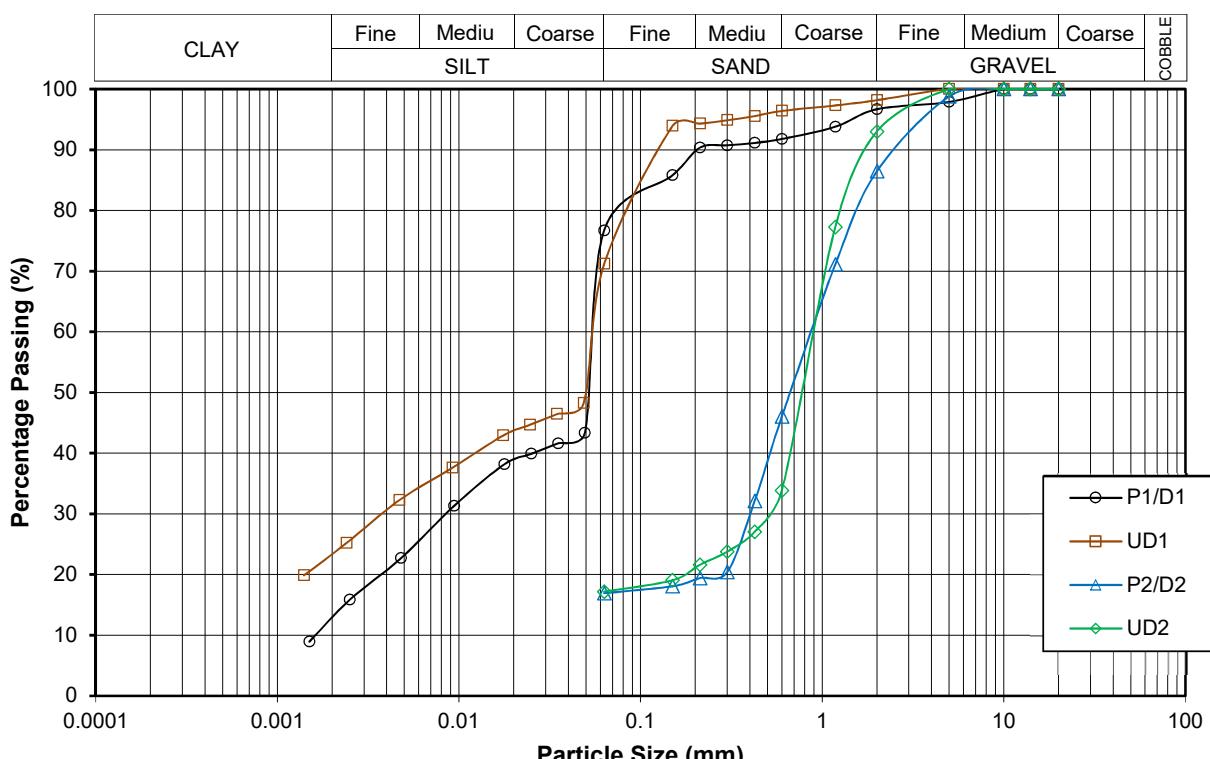
BS 1377 : Part 2 : 1990 # 9.2, 9.3 & 9.5

Sample No.	Description:	- Medium grey, SILT of Extremely High Plasticity.			
P1/D1	Gravel	Sand	Silt	Clay	
1.50m	3	20	64	13	

Sample No.	Description:	- Medium grey, CLAY.			
UD1	Gravel	Sand	Silt	Clay	
3.00m	2	27	48	23	

Sample No.	Description:	- Medium grey, fine grained, Very Silty/Clayey SANDS.			
P2/D2	Gravel	Sand	Silt	Clay	
4.50m	14	69	17		

Sample No.	Description:	- Light grey with light brown spotted, Very Silty/Clayey SANDS.			
UD2	Gravel	Sand	Silt	Clay	
8.50m	7	76	17		





Client: M/S PLB Engineering Sdn. Bhd.	Borehole No.: BH 3
Location: Jelutong Rehabilitation & Reclamation At Jelutong, Penang	Sample No.: Refer below
Report No.: GLSB/SI/3971-155/2022	Depth: Refer below
Test Name: PS & HYD	Date of test: 14/01/23

## Particle Size Distribution

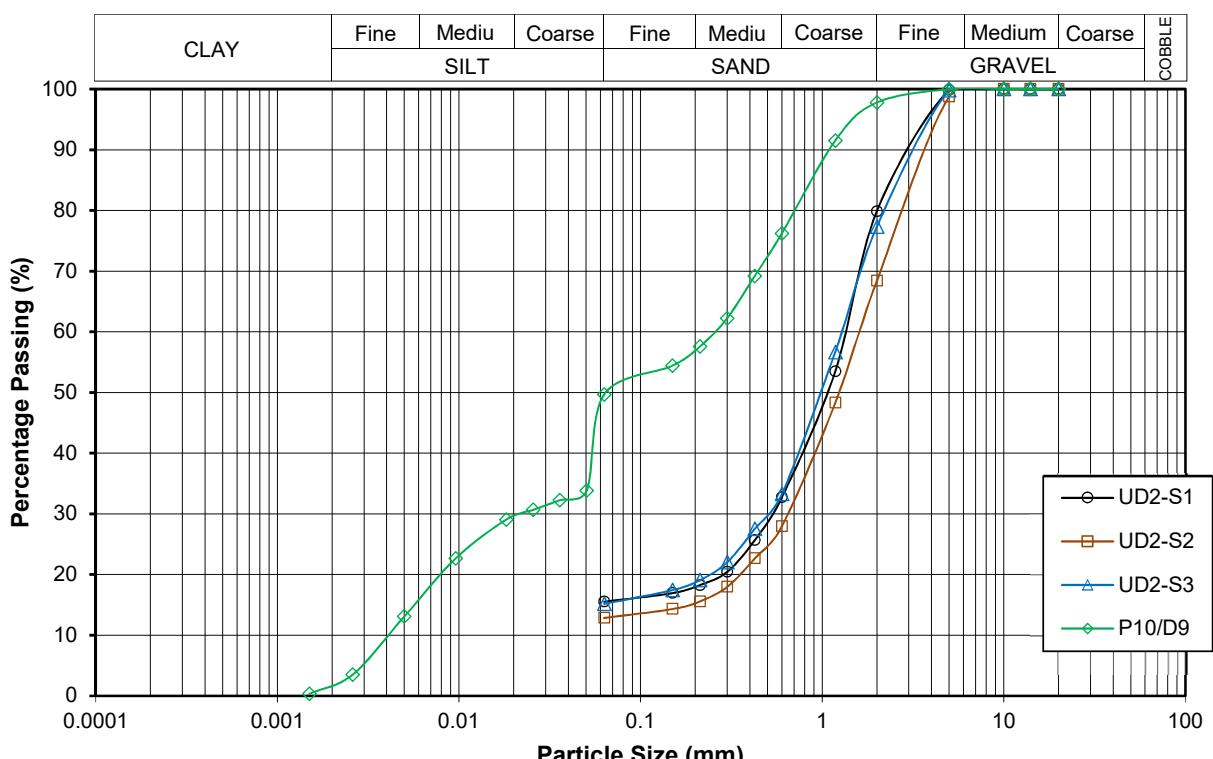
BS 1377 : Part 2 : 1990 # 9.2, 9.3 & 9.5

Sample No.	Description:	- Light grey with light brown spotted, Very Silty/Clayey SANDS.		
UD2-S1	Gravel	Sand	Silt	Clay
8.50m	20	64	16	

Sample No.	Description:	- Light grey with light brown spotted, Silty/Clayey SANDS.		
UD2-S2	Gravel	Sand	Silt	Clay
8.50m	32	55	13	

Sample No.	Description:	- Light grey with light brown spotted, Very Silty/Clayey SANDS.		
UD2-S3	Gravel	Sand	Silt	Clay
8.50m	23	62	15	

Sample No.	Description:	- Light grey, fine grained, Sandy CLAY of Low Plasticity.		
P10/D9	Gravel	Sand	Silt	Clay
18.00m	2	48	47	3





Client: M/S PLB Engineering Sdn. Bhd.  
Location: Jelutong Rehabilitation & Reclamation At Jelutong, Penang  
Report No.: GLSB/SI/3971-155/2022

Borehole No.: BH 3  
Sample No.: Refer below  
Depth: Refer below

Test Name: PS & HYD

Date of test: 14/01/23

## Particle Size Distribution

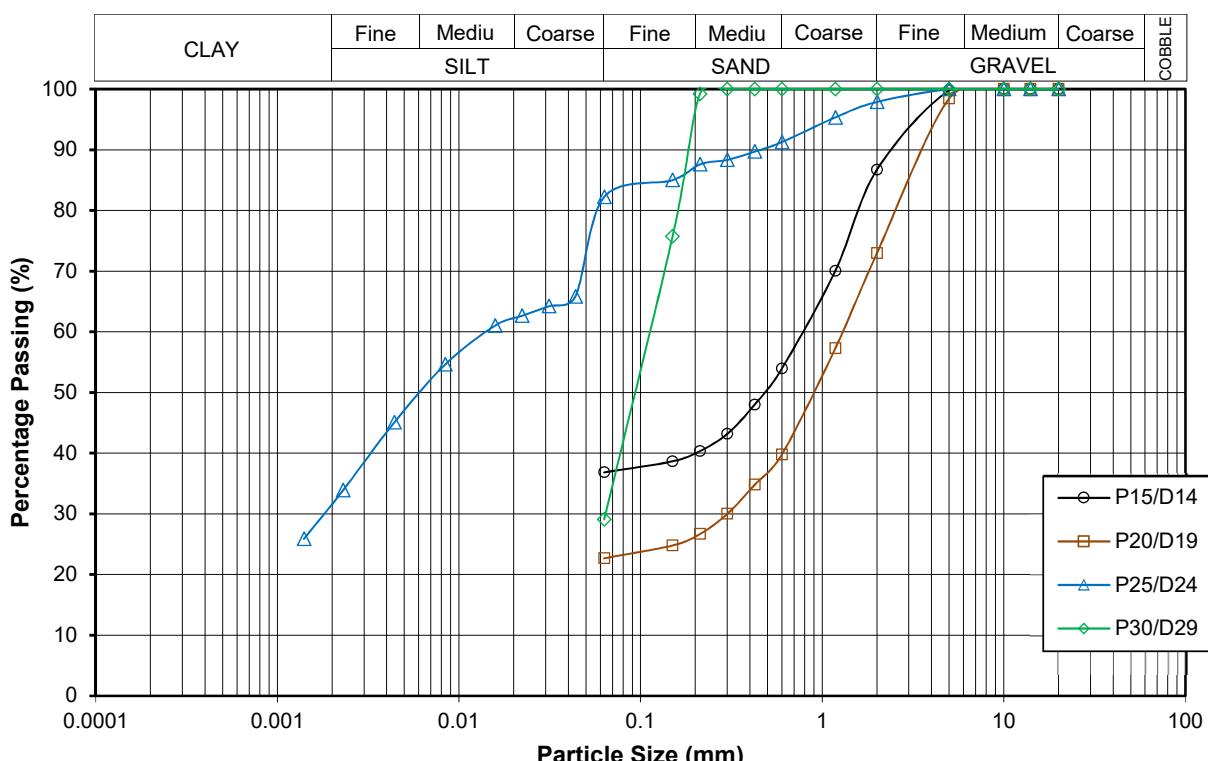
BS 1377 : Part 2 : 1990 # 9.2, 9.3 & 9.5

Sample No.	Description:	- Light grey with pale brown spotted, Sandy CLAY of Intermediate Plasticity.		
P15/D14	Gravel	Sand	Silt	Clay
25.50m	13	50	37	0

Sample No.	Description:	- Light grey, fine to medium grained, Very Silty/Clayey SANDS.		
P20/D19	Gravel	Sand	Silt	Clay
33.00m	27	50	23	

Sample No.	Description:	- Light grey, CLAY of Intermediate Plasticity.		
P25/D24	Gravel	Sand	Silt	Clay
40.50m	2	16	50	32

Sample No.	Description:	- Light grey, Very Silty/ Clayey SANDS.		
P30/D29	Gravel	Sand	Silt	Clay
48.00m	0	71	29	





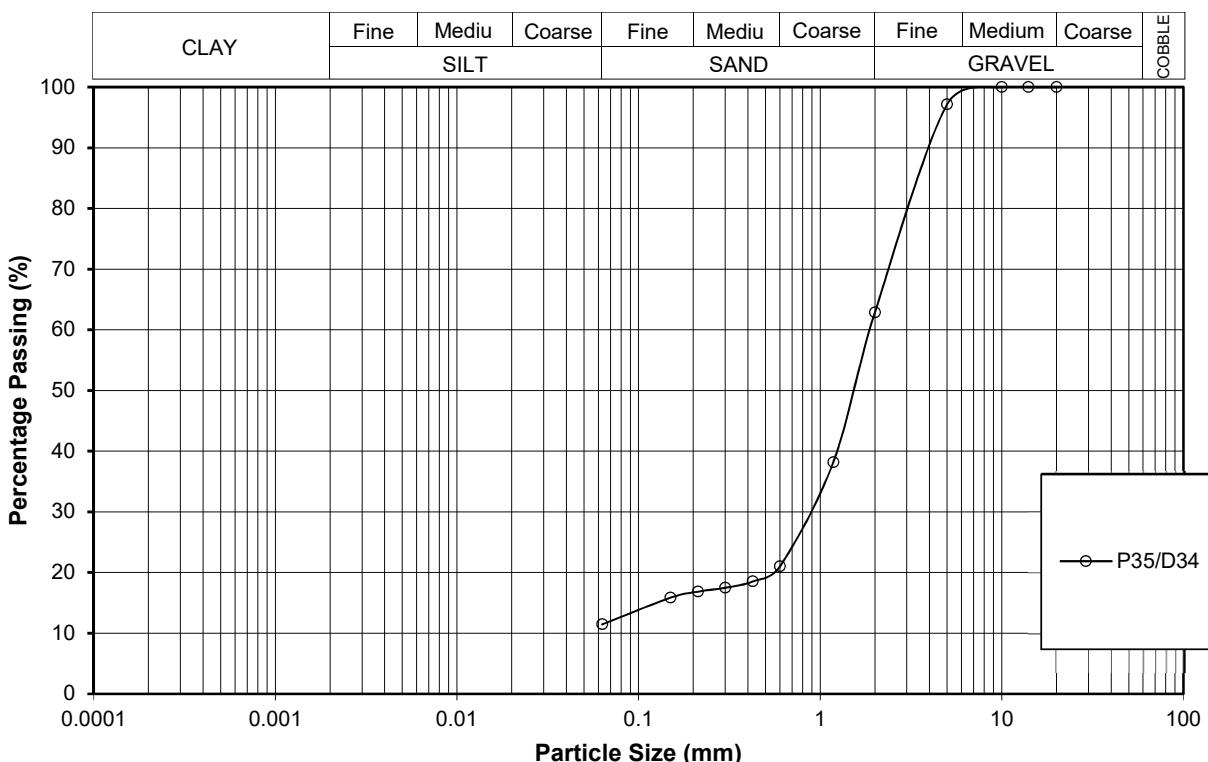
Client:	M/S PLB Engineering Sdn. Bhd.	Borehole No.:	BH 3
Location:	Jelutong Rehabilitation & Reclamation At Jelutong, Penang	Sample No.:	Refer below
Report No.:	GLSB/SI/3971-155/2022	Depth:	Refer below
		Test Name:	PS & HYD
		Date of test:	14/01/23

## Particle Size Distribution

BS 1377 : Part 2 : 1990 # 9.2, 9.3 & 9.5

Sample No.	Description:	- Light grey, Silty/Clayey SAND.		
P35/D34	Gravel	Sand	Silt	Clay
55.50m	37	52	11	





## BH 4

	Client: M/S PLB Engineering Sdn. Bhd.	Borehole No.: BH 4
	Location Jelutong Rehabilitation & Reclamation At Jelutong, Penang	Sample No.: Refer Below
		Depth: Refer Below
	Report No.: GLSB/SI/3971-155/2022 Test Name: MC&BD	Date of test: 30/01/23

## Determination of Moisture Content (BS 1377 : Part 2 : 1990 # 3)

Sample No.:	UD1					
Depth (m)	11.50					
Container No.	X26	FM26				
Mass of wet soil + can (g)	241.80	204.92				
Mass of dry soil + can (g)	199.06	168.28				
Mass of Container (g)	38.68	37.64				
Mass of Water (g)	42.74	36.64				
Mass of Dry Soil (g)	160.38	130.64				
Water Content (%)	26.65	28.05				
Average Water Content (%)	27					

## Determination of Density (BS 1377 : Part 2 : 1990 # 7)

Sample length (mm)	20			
Sample Diameter (mm)	50			
Sample Weight (g)	74.12			
Bulk Density (Mg/m <sup>3</sup> )	1.89			
Dry Density (Mg/m <sup>3</sup> )	1.49			

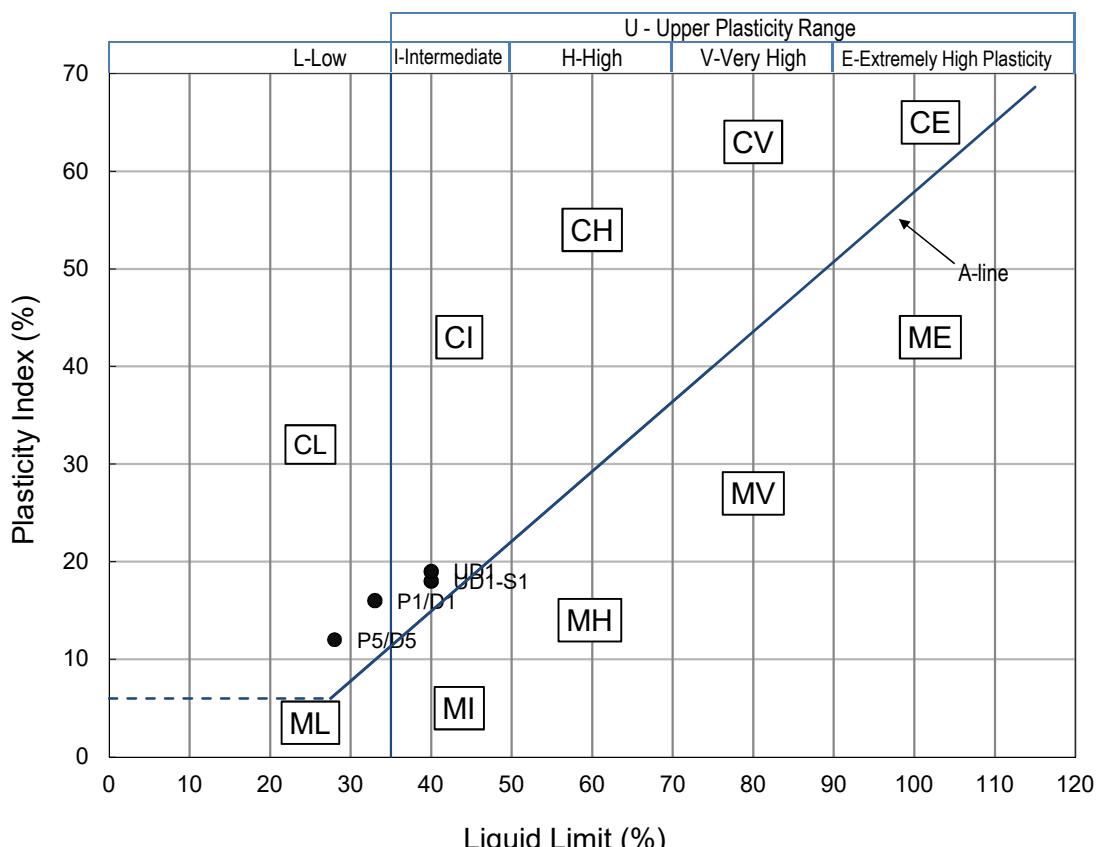
	Client: M/S PLB Engineering Sdn. Bhd.	Borehole No.: BH 4
	Location: Jelutong Rehabilitation & Reclamation At Jelutong, Penang	Sample No.: Refer Below
		Depth: Refer Below
	Report No.: GLSB/SI/3971-155/2022	Test Name: AL Date of test: 04/02/23

## Liquid Limit (Cone Penetrometer) and Plastic Limit

BS 1377 : Part 2: 1990: # 4.4 / 5

Sample No.	Description: - Light grey, Sandy CLAY with Low Plasticity.		
P1/D1 1.50m	HISTORY OF SAMPLE Natural State	LIQUID LIMIT (%) PLASTIC LIMIT (%) PLASTICITY INDEX (%)	33 17 16
P5/D5 7.50m	HISTORY OF SAMPLE Natural State	LIQUID LIMIT (%) PLASTIC LIMIT (%) PLASTICITY INDEX (%)	28 16 12
Sample No.	Description: - Light brownish grey, Sandy CLAY of Intermediate Plasticity.		
UD1 11.50m	HISTORY OF SAMPLE Natural State	LIQUID LIMIT (%) PLASTIC LIMIT (%) PLASTICITY INDEX (%)	40 21 19
Sample No.	Description: - Light brownish grey, CLAY of Intermediate Plasticity.		
UD1-S1 11.50m	HISTORY OF SAMPLE Natural State	LIQUID LIMIT (%) PLASTIC LIMIT (%) PLASTICITY INDEX (%)	40 22 18

### PLASTICITY CHART



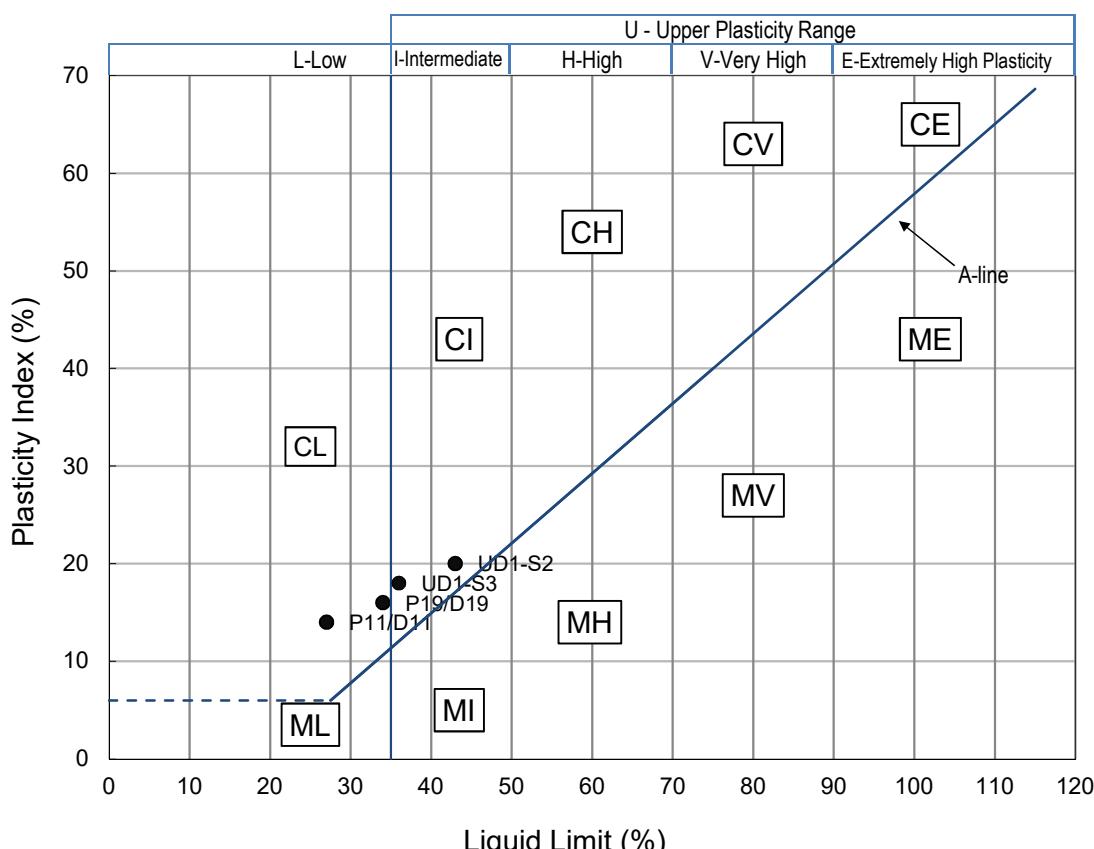
	Client: M/S PLB Engineering Sdn. Bhd.	Borehole No.: BH 4
	Location: Jelutong Rehabilitation & Reclamation At Jelutong, Penang	Sample No.: Refer Below
		Depth: Refer Below
	Report No.: GLSB/SI/3971-155/2022	Test Name: AL Date of test: 04/02/23

## Liquid Limit (Cone Penetrometer) and Plastic Limit

BS 1377 : Part 2: 1990: # 4.4 / 5

Sample No.	Description: - Light Brownish grey, Sandy CLAY of Intermediate Plasticity.	
UD1-S2 11.50m	HISTORY OF SAMPLE Natural State	LIQUID LIMIT (%) 43 PLASTIC LIMIT (%) 23 PLASTICITY INDEX (%) 20
Sample No.	Description: - Light Brownish grey, Sandy CLAY of Intermediate Plasticity.	
UD1-S3 11.50m	HISTORY OF SAMPLE Natural State	LIQUID LIMIT (%) 36 PLASTIC LIMIT (%) 18 PLASTICITY INDEX (%) 18
Sample No.	Description: - Light to medium brownish grey, fine to medium grained, Very Clayey SAND of Low Plasticity.	
P11/D11 18.00m	HISTORY OF SAMPLE Natural State	LIQUID LIMIT (%) 27 PLASTIC LIMIT (%) 13 PLASTICITY INDEX (%) 14
Sample No.	Description: - Light brown, Sandy CLAY of Low Plasticity.	
P19/D19 30.00m	HISTORY OF SAMPLE Natural State	LIQUID LIMIT (%) 34 PLASTIC LIMIT (%) 18 PLASTICITY INDEX (%) 16

### PLASTICITY CHART



	Client: M/S PLB Engineering Sdn. Bhd.	Borehole No.: BH 4
	Location: Jelutong Rehabilitation & Reclamation At Jelutong, Penang	Sample No.: Refer Below
	Report No.: GLSB/SI/3971-155/2022	Depth: Refer Below
	Test Name: AL	Date of test: 04/02/23

## Liquid Limit (Cone Penetrometer) and Plastic Limit

BS 1377 : Part 2: 1990: # 4.4 / 5

Sample No.	Description:	- Light Grey with light brown spotted, Clay of Intermediate Plasticity.		
P22/D22 34.50m	HISTORY OF SAMPLE Natural State	LIQUID LIMIT (%)	41	PLASTIC LIMIT (%)

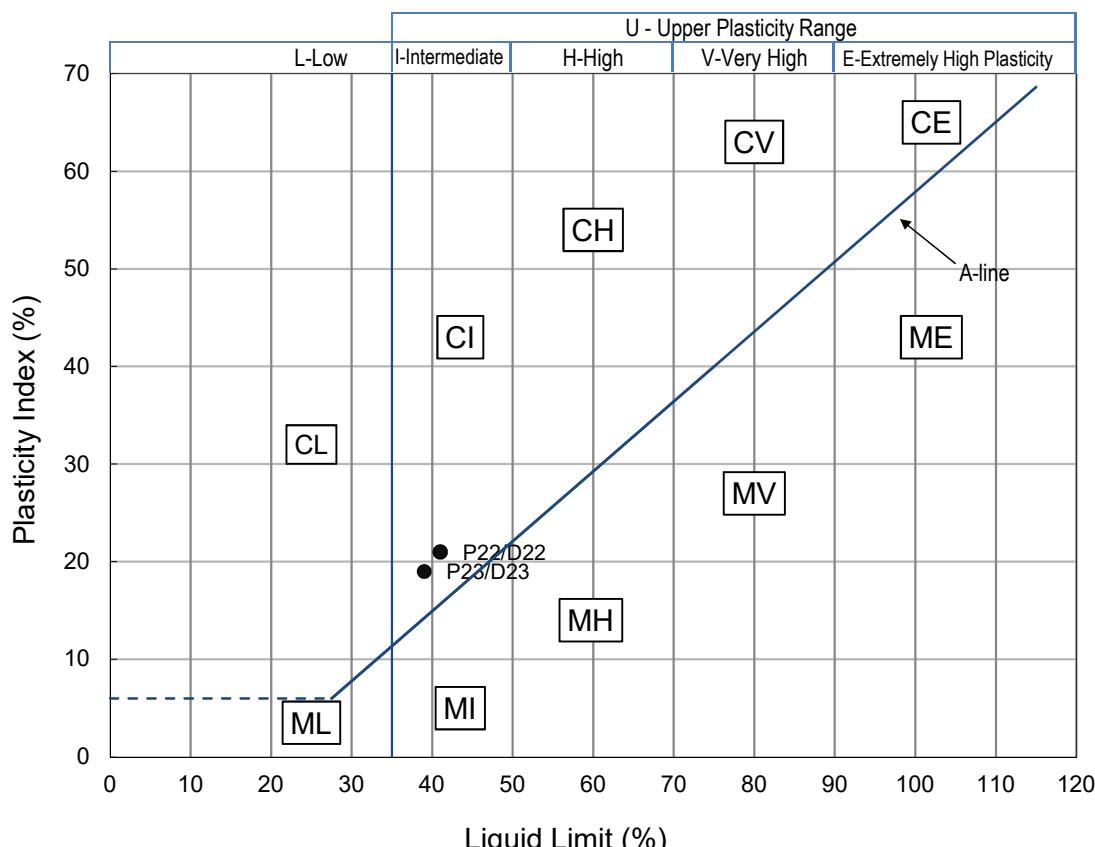
PLASTICITY INDEX (%) 21

Sample No.	Description:	- Light Grey with light brown spotted, Sandy Clay of Intermediate Plasticity.		
P23/D23 36.00m	HISTORY OF SAMPLE Natural State	LIQUID LIMIT (%)	39	PLASTIC LIMIT (%)

PLASTICITY INDEX (%) 19



### PLASTICITY CHART





Client: M/S PLB Engineering Sdn. Bhd.	Borehole No.: BH 4
Location: Jelutong Rehabilitation & Reclamation At Jelutong, Penang	Sample No.: Refer below
Report No.: GLSB/SI/3971-155/2022	Depth: Refer below
Test Name: PS & HYD	Date of test: 01/02/23

## Particle Size Distribution

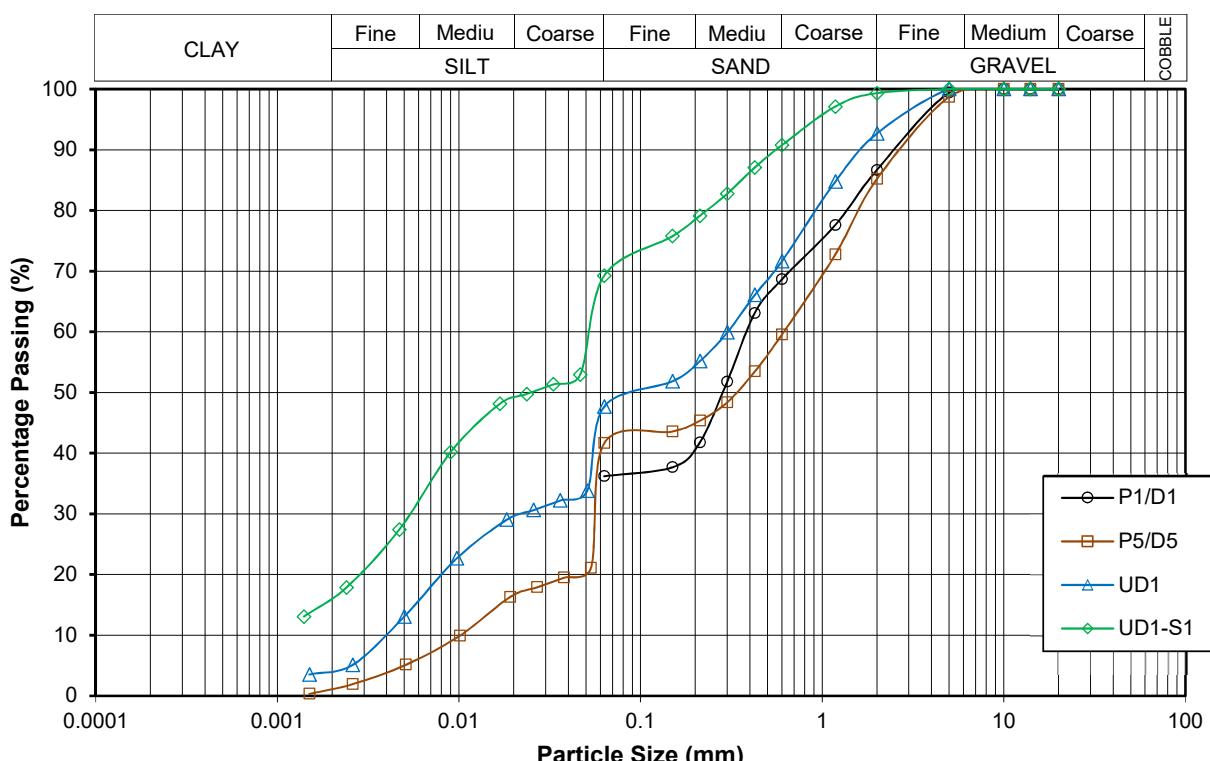
BS 1377 : Part 2 : 1990 # 9.2, 9.3 & 9.5

Sample No.	Description:	- Light grey, Sandy CLAY with Low Plasticity.		
P1/D1	Gravel	Sand	Silt	Clay
1.50m	13	51	36	

Sample No.	Description:	- Light brownish grey, sandy CLAY with Low Plasticity.		
P5/D5	Gravel	Sand	Silt	Clay
7.50m	15	44	39	2

Sample No.	Description:	- Light Brownish grey, Sandy CLAY of Intermediate Plasticity.		
UD1	Gravel	Sand	Silt	Clay
11.50m	7	45	44	4

Sample No.	Description:	- Light Brownish grey, CLAY of Intermediate Plasticity.		
UD1-S1	Gravel	Sand	Silt	Clay
11.50m	1	30	53	16





Client: M/S PLB Engineering Sdn. Bhd.	Borehole No.: BH 4
Location: Jelutong Rehabilitation & Reclamation At Jelutong, Penang	Sample No.: Refer below
Report No.: GLSB/SI/3971-155/2022	Depth: Refer below
Test Name: PS & HYD	Date of test: 01/02/23

## Particle Size Distribution

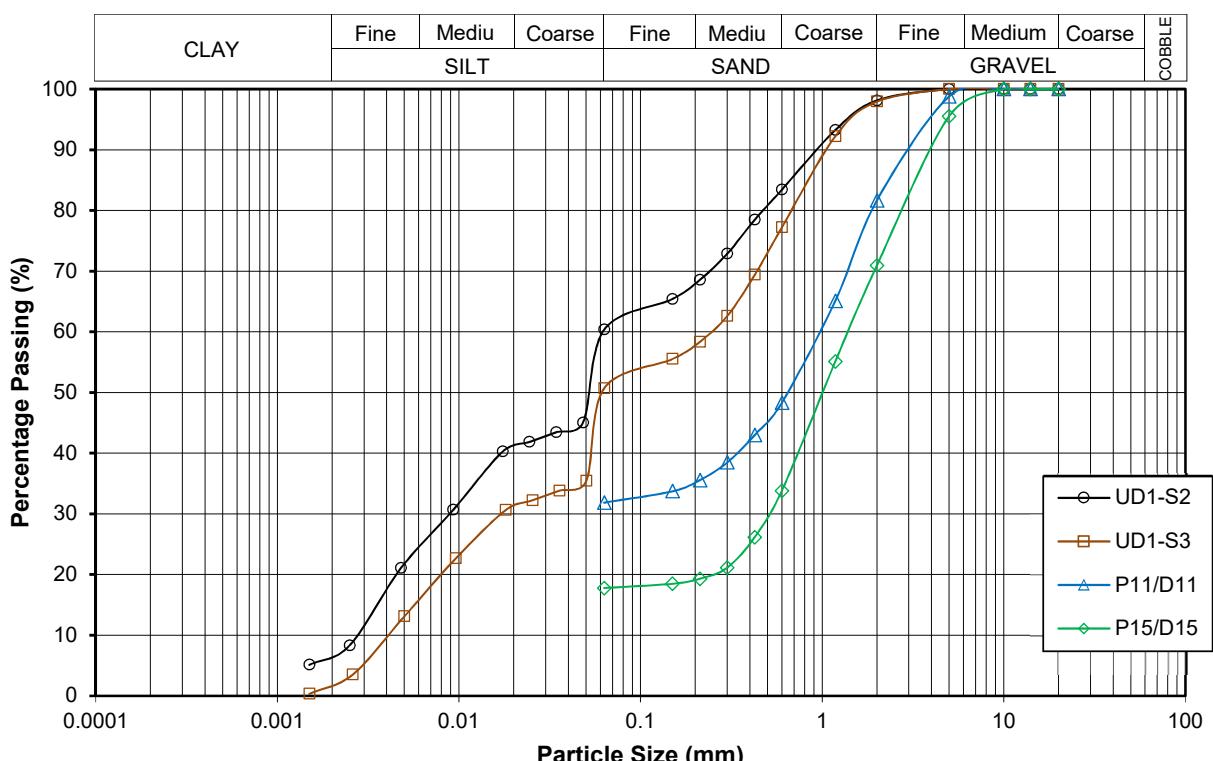
BS 1377 : Part 2 : 1990 # 9.2, 9.3 & 9.5

Sample No.	Description:	- Light Brownish grey, Sandy CLAY of Intermediate Plasticity.		
UD1-S2	Gravel	Sand	Silt	Clay
11.50m	2	38	54	6

Sample No.	Description:	- Light Brownish grey, Sandy CLAY of Intermediate Plasticity.		
UD1-S3	Gravel	Sand	Silt	Clay
11.50m	2	47	48	3

Sample No.	Description:	- Light to medium brownish grey, fine to medium grained, Very Clayey SAND of Low Plasticity.		
P11/D11	Gravel	Sand	Silt	Clay
18.00m	18	50	32	

Sample No.	Description:	- Light grey, fine to medium grained, Clayey SAND.		
P15/D15	Gravel	Sand	Silt	Clay
21.00m	29	53	18	





Client: M/S PLB Engineering Sdn. Bhd.	Borehole No.: BH 4
Location: Jelutong Rehabilitation & Reclamation At Jelutong, Penang	Sample No.: Refer below
Report No.: GLSB/SI/3971-155/2022	Depth: Refer below
Test Name: PS & HYD	Date of test: 01/02/23

## Particle Size Distribution

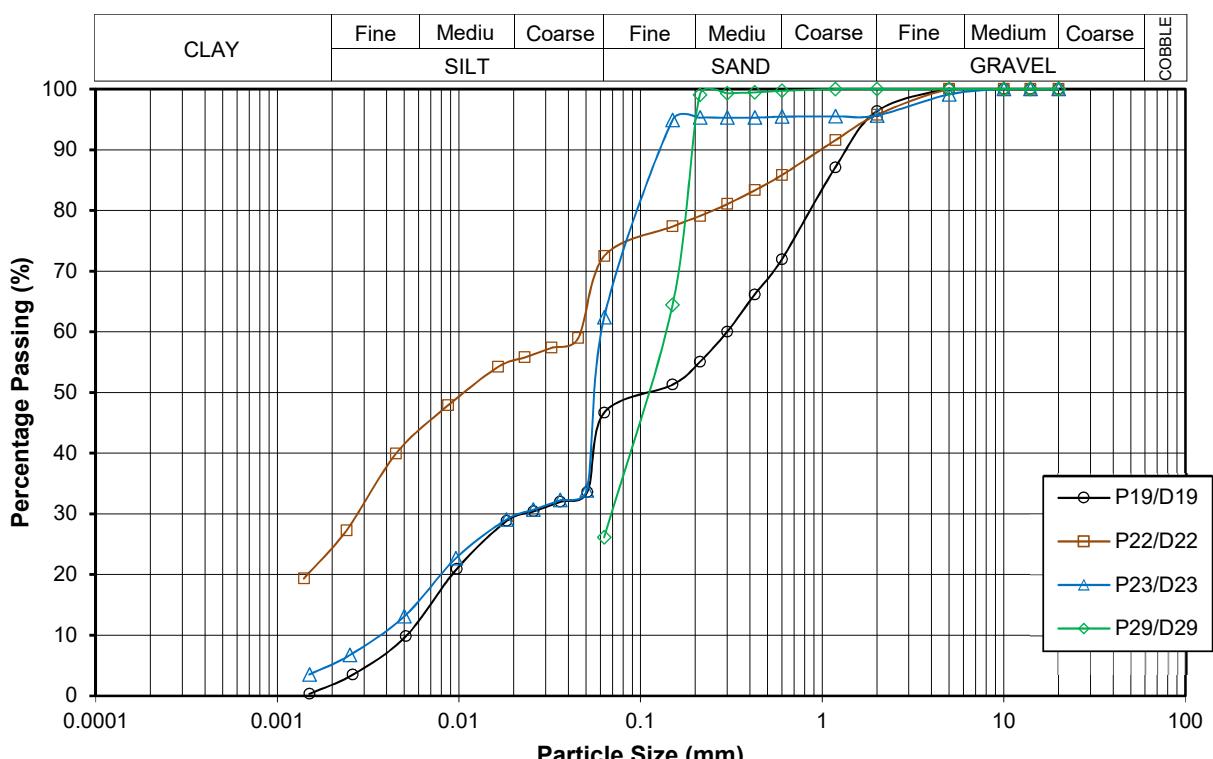
BS 1377 : Part 2 : 1990 # 9.2, 9.3 & 9.5

Sample No.	Description:	- Light brown, Sandy CLAY of Low Plasticity.			
P19/D19	Gravel	Sand	Silt	Clay	
30.00m	4	50	43	3	

Sample No.	Description:	- Light grey with light brown spotted, CLAY of Intermediate Plasticity.			
P22/D22	Gravel	Sand	Silt	Clay	
34.50m	4	23	48	25	

Sample No.	Description:	- Light grey with light brown spotted, CLAY of Intermediate Plasticity.			
P23/D23	Gravel	Sand	Silt	Clay	
36.00m	4	33	58	5	

Sample No.	Description:	- Light grey with light brown spotted, Very Silty/Clayey SANDS.			
P29/D29	Gravel	Sand	Silt	Clay	
45.00m	0	74	26		





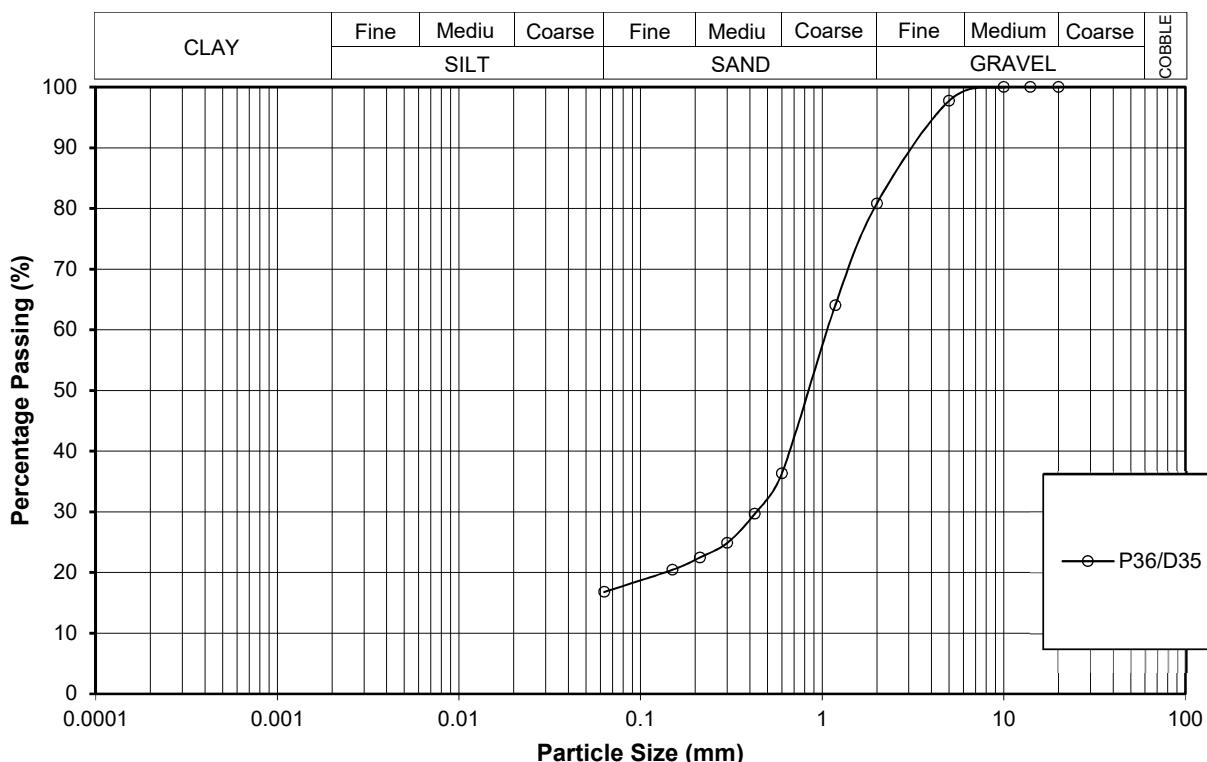
Client:	M/S PLB Engineering Sdn. Bhd.	Borehole No.:	BH 4
Location:	Jelutong Rehabilitation & Reclamation At Jelutong, Penang	Sample No.:	Refer below
Report No.:	GLSB/SI/3971-155/2022	Depth:	Refer below
		Test Name:	PS & HYD
		Date of test:	01/02/23

## Particle Size Distribution

BS 1377 : Part 2 : 1990 # 9.2, 9.3 & 9.5

Sample No.	Description:	- Light grey, Very Silty/Clayey SANDS.		
P36/D35	Gravel	Sand	Silt	Clay
55.50m	19	64	17	





**BH 5**

	Client: M/S PLB Engineering Sdn. Bhd.	Borehole No.: BH 5
	Location Jelutong Rehabilitation & Reclamation At Jelutong, Penang	Sample No.: Refer Below
		Depth: Refer Below
	Report No.: GLSB/SI/3971-155/2022 Test Name: MC&BD	Date of test: 08/02/23

## Determination of Moisture Content (BS 1377 : Part 2 : 1990 # 3)

Sample No.:	UD1		UD2			
Depth (m)	3.50		9.00			
Container No.	FM49	ZU13	ZU67	X48		
Mass of wet soil + can (g)	148.14	153.42	166.28	168.76		
Mass of dry soil + can (g)	78.14	82.00	88.94	90.94		
Mass of Container (g)	36.76	38.58	37.84	38.34		
Mass of Water (g)	70.00	71.42	77.34	77.82		
Mass of Dry Soil (g)	41.38	43.42	51.10	52.60		
Water Content (%)	169.16	164.49	151.35	147.95		
Average Water Content (%)	167		150			

## Determination of Density (BS 1377 : Part 2 : 1990 # 7)

Sample length (mm)	20	20	
Sample Diameter (mm)	50	50	
Sample Weight (g)	40.39	43.77	
Bulk Density (Mg/m <sup>3</sup> )	1.03	1.11	
Dry Density (Mg/m <sup>3</sup> )	0.39	0.44	

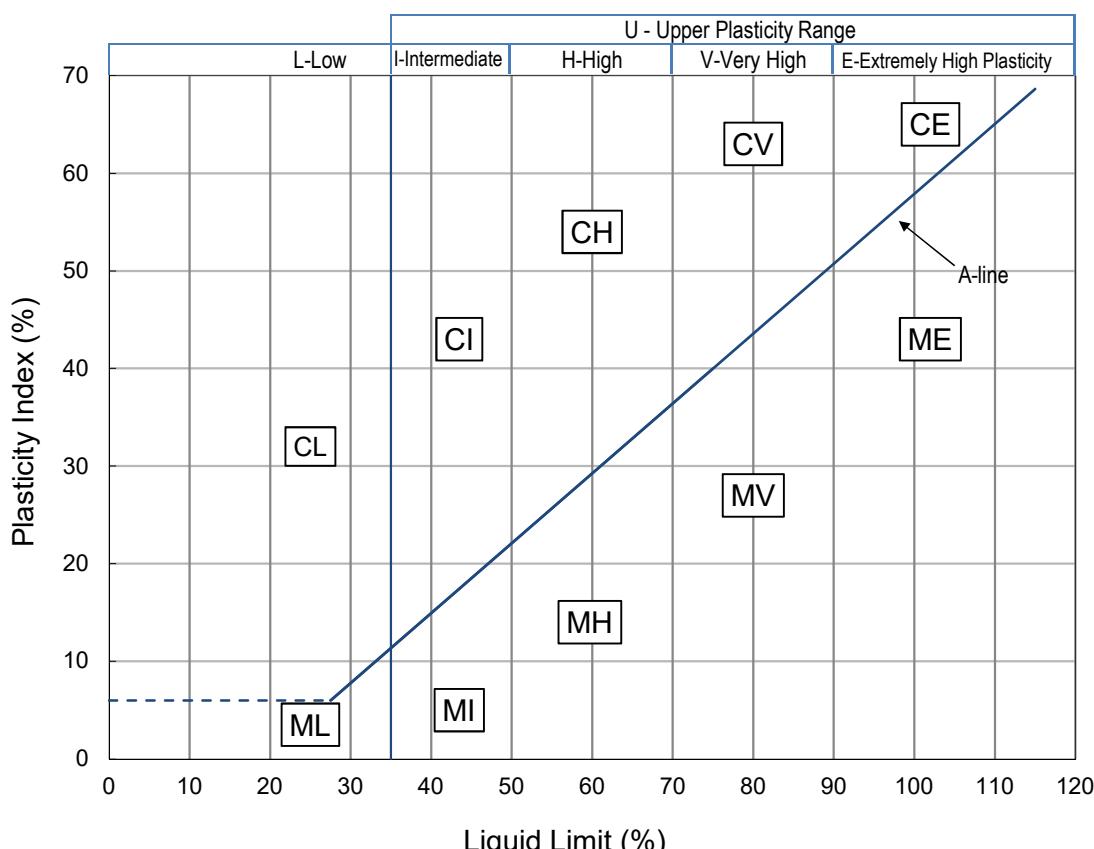
	Client: M/S PLB Engineering Sdn. Bhd.	Borehole No.: BH 5
	Location: Jelutong Rehabilitation & Reclamation At Jelutong, Penang	Sample No.: Refer Below
		Depth: Refer Below
	Report No.: GLSB/SI/3971-155/2022	Test Name: AL Date of test: 27/02/23

## Liquid Limit (Cone Penetrometer) and Plastic Limit

BS 1377 : Part 2: 1990: # 4.4 / 5

Sample No.	Description: - Medium grey, CLAY.			
UD1 3.50m	HISTORY OF SAMPLE Natural State	LIQUID LIMIT (%) PLASTIC LIMIT (%) PLASTICITY INDEX (%)	135 46 89	
UD2 9.00m	HISTORY OF SAMPLE Natural State	LIQUID LIMIT (%) PLASTIC LIMIT (%) PLASTICITY INDEX (%)	136 44 92	
Sample No.	Description: - Medium grey, CLAY			
UD2-S1 9.00m	HISTORY OF SAMPLE Natural State	LIQUID LIMIT (%) PLASTIC LIMIT (%) PLASTICITY INDEX (%)	118 41 77	
Sample No.	Description: - Medium grey, CLAY			
UD2-S2 9.00m	HISTORY OF SAMPLE Natural State	LIQUID LIMIT (%) PLASTIC LIMIT (%) PLASTICITY INDEX (%)	120 41 79	

### PLASTICITY CHART



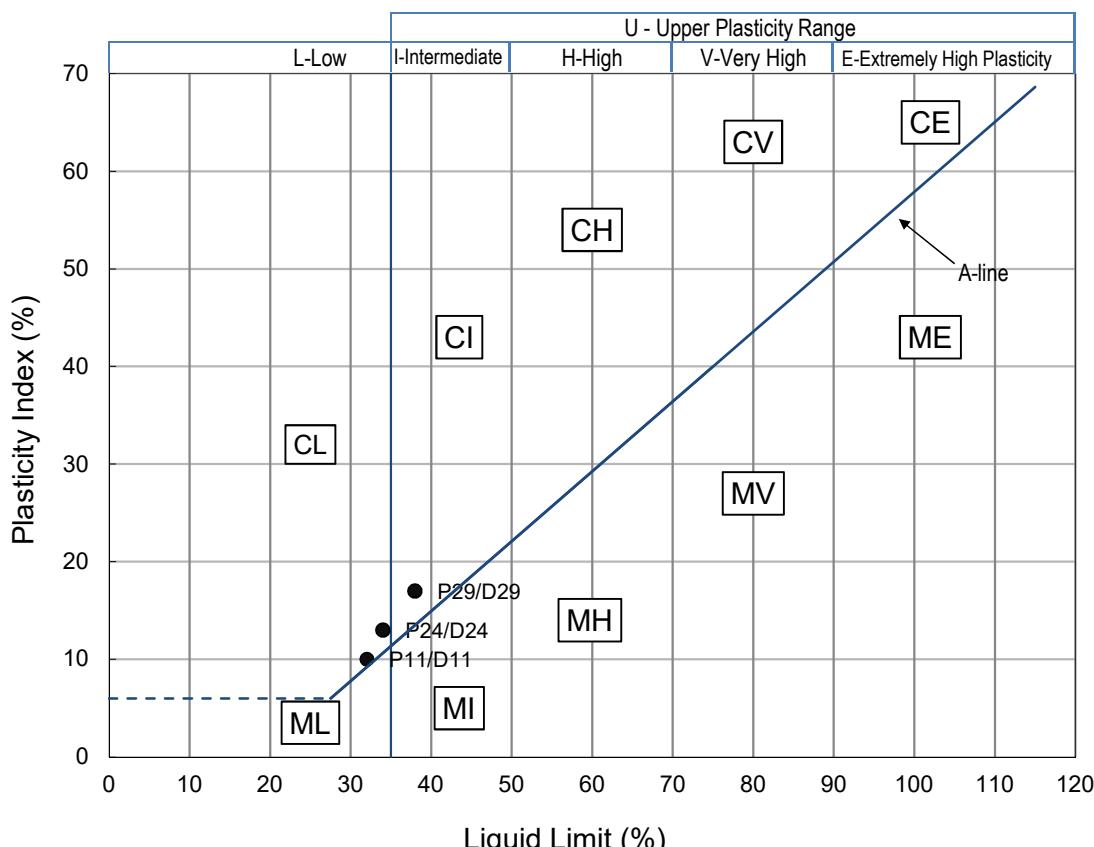
	Client: M/S PLB Engineering Sdn. Bhd.	Borehole No.: BH 5
	Location: Jelutong Rehabilitation & Reclamation At Jelutong, Penang	Sample No.: Refer Below
		Depth: Refer Below
	Report No.: GLSB/SI/3971-155/2022	Test Name: AL Date of test: 27/02/23

## Liquid Limit (Cone Penetrometer) and Plastic Limit

BS 1377 : Part 2: 1990: # 4.4 / 5

Sample No.	Description: - Medium grey, CLAY			
UD2-S3 9.00m	HISTORY OF SAMPLE Natural State	LIQUID LIMIT (%) PLASTIC LIMIT (%) PLASTICITY INDEX (%)	124 43 81	
P11/D11 21.00m	HISTORY OF SAMPLE Natural State	LIQUID LIMIT (%) PLASTIC LIMIT (%) PLASTICITY INDEX (%)	32 22 10	
Sample No.	Description: - Light grey, Sandy CLAY of Low Plasticity.			
P24/D24 40.50m	HISTORY OF SAMPLE Natural State	LIQUID LIMIT (%) PLASTIC LIMIT (%) PLASTICITY INDEX (%)	34 21 13	
Sample No.	Description: - Light grey with light brown spotted, Sandy CLAY of Low Plasticity.			
P29/D29 48.00m	HISTORY OF SAMPLE Natural State	LIQUID LIMIT (%) PLASTIC LIMIT (%) PLASTICITY INDEX (%)	38 21 17	

### PLASTICITY CHART





Client:	M/S PLB Engineering Sdn. Bhd.	Borehole No.:	BH 5
Location:	Jelutong Rehabilitation & Reclamation At Jelutong, Penang	Sample No.:	Refer below
Report No.:	GLSB/SI/3971-155/2022	Depth:	Refer below
		Test Name:	PS & HYD
		Date of test:	09/02/23

## Particle Size Distribution

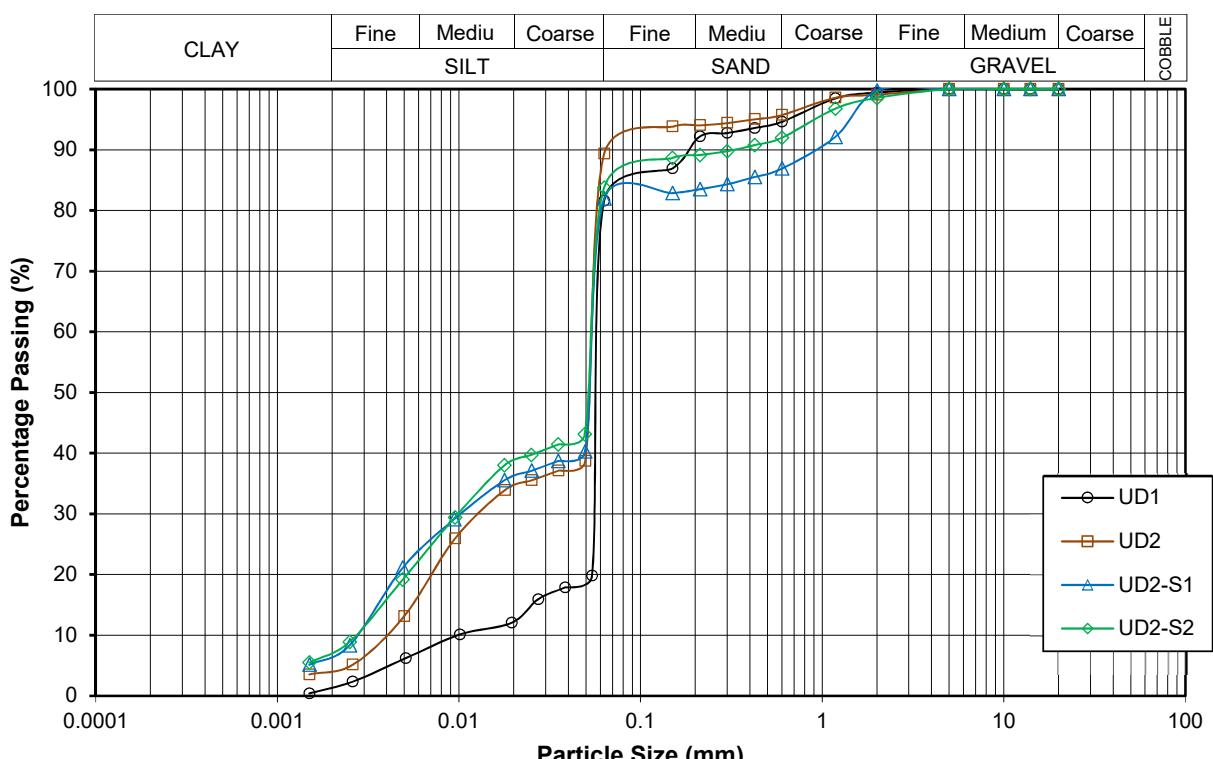
BS 1377 : Part 2 : 1990 # 9.2, 9.3 & 9.5

Sample No.	Description:	- Medium grey, CLAY.		
UD1	Gravel	Sand	Silt	Clay
3.50m	1	18	79	2

Sample No.	Description:	- Medium grey, CLAY.		
UD2	Gravel	Sand	Silt	Clay
9.00m	1	10	85	4

Sample No.	Description:	- Medium grey, CLAY.		
UD2-S1	Gravel	Sand	Silt	Clay
9.00m	0	18	75	7

Sample No.	Description:	- Medium grey, CLAY.		
UD2-S2	Gravel	Sand	Silt	Clay
9.00m	1	15	77	7





Client: M/S PLB Engineering Sdn. Bhd.	Borehole No.: BH 5
Location: Jelutong Rehabilitation & Reclamation At Jelutong, Penang	Sample No.: Refer below
Report No.: GLSB/SI/3971-155/2022	Depth: Refer below
Test Name: PS & HYD	Date of test: 09/02/23

## Particle Size Distribution

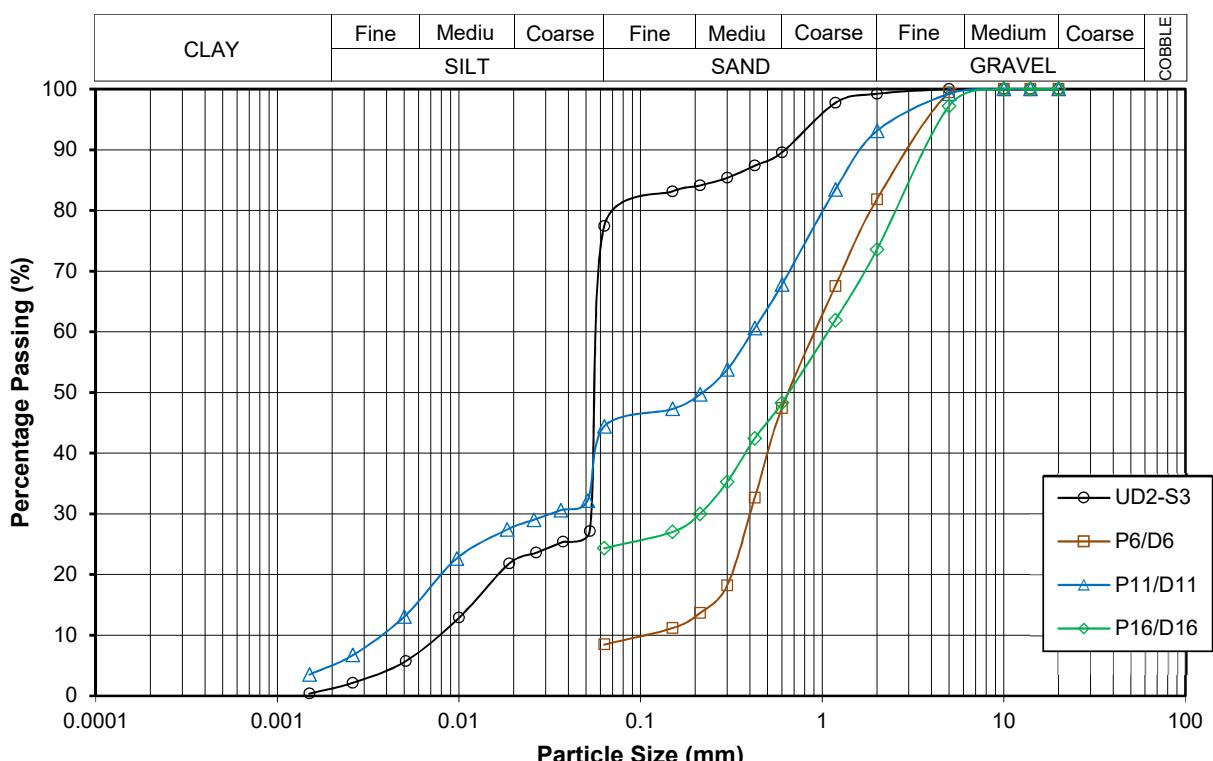
BS 1377 : Part 2 : 1990 # 9.2, 9.3 & 9.5

Sample No.	Description:	- Medium grey, CLAY.		
UD2-S3	Gravel	Sand	Silt	Clay
9.00m	1	22	75	2

Sample No.	Description:	- Pale to light grey, fine to medium grained, Silty/Clayey SAND.		
P6/D6	Gravel	Sand	Silt	Clay
13.50m	18	74	8	

Sample No.	Description:	- Light grey, Sandy CLAY of Low Plasticity.		
P11/D11	Gravel	Sand	Silt	Clay
21.00m	7	49	39	5

Sample No.	Description:	- Light grey, fine to medium grained, Very Silty/Clayey SANDS.		
P16/D16	Gravel	Sand	Silt	Clay
28.50m	26	50	24	





Client: M/S PLB Engineering Sdn. Bhd.	Borehole No.: BH 5
Location: Jelutong Rehabilitation & Reclamation At Jelutong, Penang	Sample No.: Refer below
Report No.: GLSB/SI/3971-155/2022	Depth: Refer below
Test Name: PS & HYD	Date of test: 09/02/23

## Particle Size Distribution

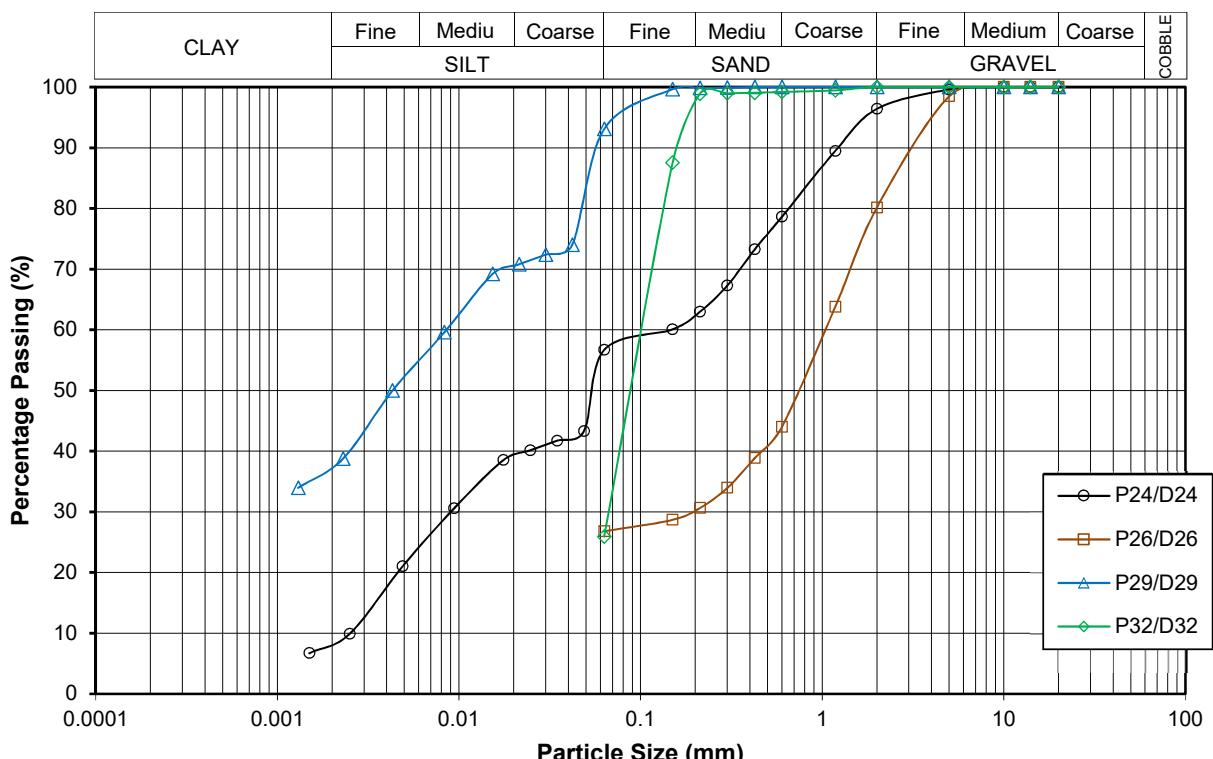
BS 1377 : Part 2 : 1990 # 9.2, 9.3 & 9.5

Sample No.	Description:	- Light grey with light brown spotted, Sandy CLAY of Intermediate Plasticity.			
P24/D24	Gravel	Sand	Silt	Clay	
40.50m	4	40	48	8	

Sample No.	Description:	- Light grey with light to medium brown spotted, medium to coarse grained, Very Silty/Clayey SAND.			
P26/D26	Gravel	Sand	Silt	Clay	
43.50m	20	53	27		

Sample No.	Description:	- Light grey with light brown spotted, CLAY of Intermediate Plasticity.			
P29/D29	Gravel	Sand	Silt	Clay	
48.00m	0	7	55	38	

Sample No.	Description:	- Light grey , Ver Silty/Clayey SANDS.			
P32/D32	Gravel	Sand	Silt	Clay	
52.50m	0	74	26		





## **ВН 6**

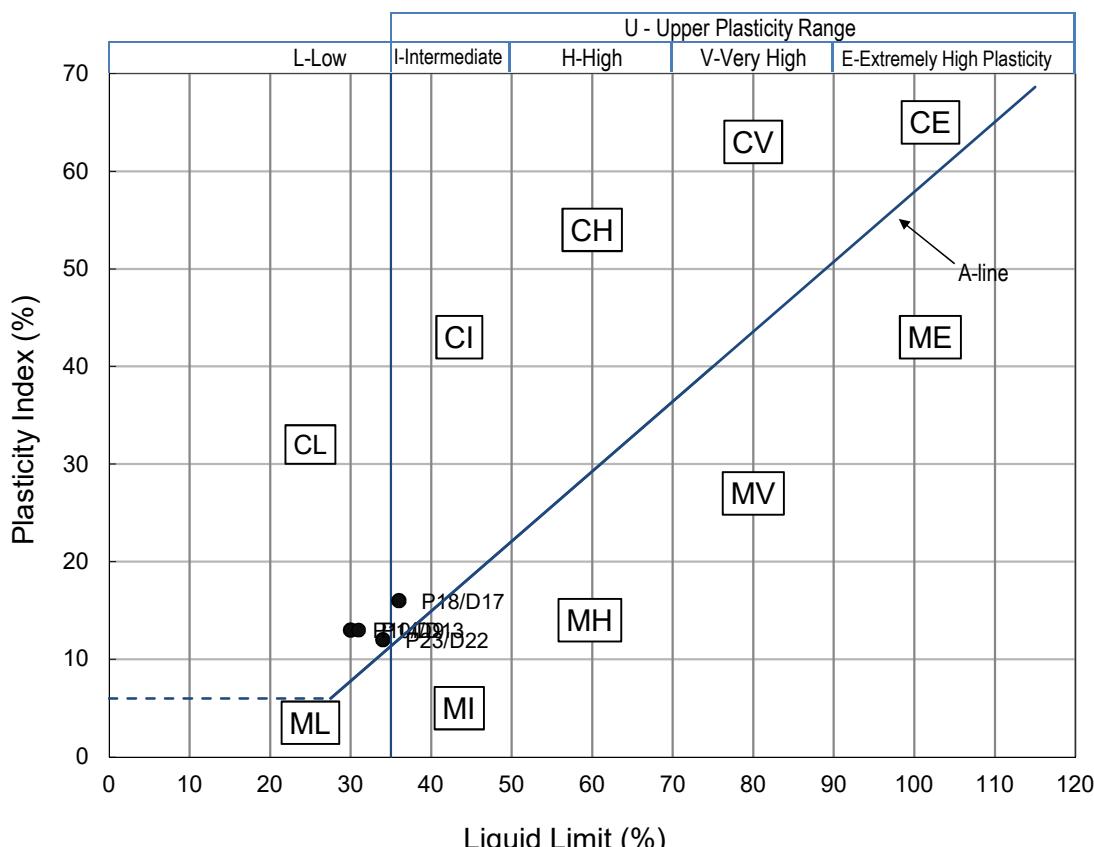
	Client: M/S PLB Engineering Sdn. Bhd.	Borehole No.: BH 6
	Location: Jelutong Rehabilitation & Reclamation At Jelutong, Penang	Sample No.: Refer Below
		Depth: Refer Below
	Report No.: GLSB/SI/3971-155/2022	Test Name: AL Date of test: 01/03/23

## Liquid Limit (Cone Penetrometer) and Plastic Limit

BS 1377 : Part 2: 1990: # 4.4 / 5

Sample No.	Description: - Light grey, Sandy CLAY of Low Plasticity.			
P10/D9 15.00m	HISTORY OF SAMPLE Natural State	LIQUID LIMIT (%) PLASTIC LIMIT (%) PLASTICITY INDEX (%)	30 17 13	
P14/D13 21.00m	HISTORY OF SAMPLE Natural State	LIQUID LIMIT (%) PLASTIC LIMIT (%) PLASTICITY INDEX (%)	31 18 13	
Sample No.	Description: - Light grey, Sandy CLAY of Intermediate Plasticity.			
P18/D17 27.00m	HISTORY OF SAMPLE Natural State	LIQUID LIMIT (%) PLASTIC LIMIT (%) PLASTICITY INDEX (%)	36 20 16	
Sample No.	Description: - Light grey, Sandy CLAY of Low Plasticity.			
P23/D22 34.50m	HISTORY OF SAMPLE Natural State	LIQUID LIMIT (%) PLASTIC LIMIT (%) PLASTICITY INDEX (%)	34 22 12	

### PLASTICITY CHART



	Client: M/S PLB Engineering Sdn. Bhd.	Borehole No.: BH 6
	Location: Jelutong Rehabilitation & Reclamation At Jelutong, Penang	Sample No.: Refer Below
		Depth: Refer Below
	Report No.: GLSB/SI/3971-155/2022	Test Name: AL Date of test: 01/03/23

## Liquid Limit (Cone Penetrometer) and Plastic Limit

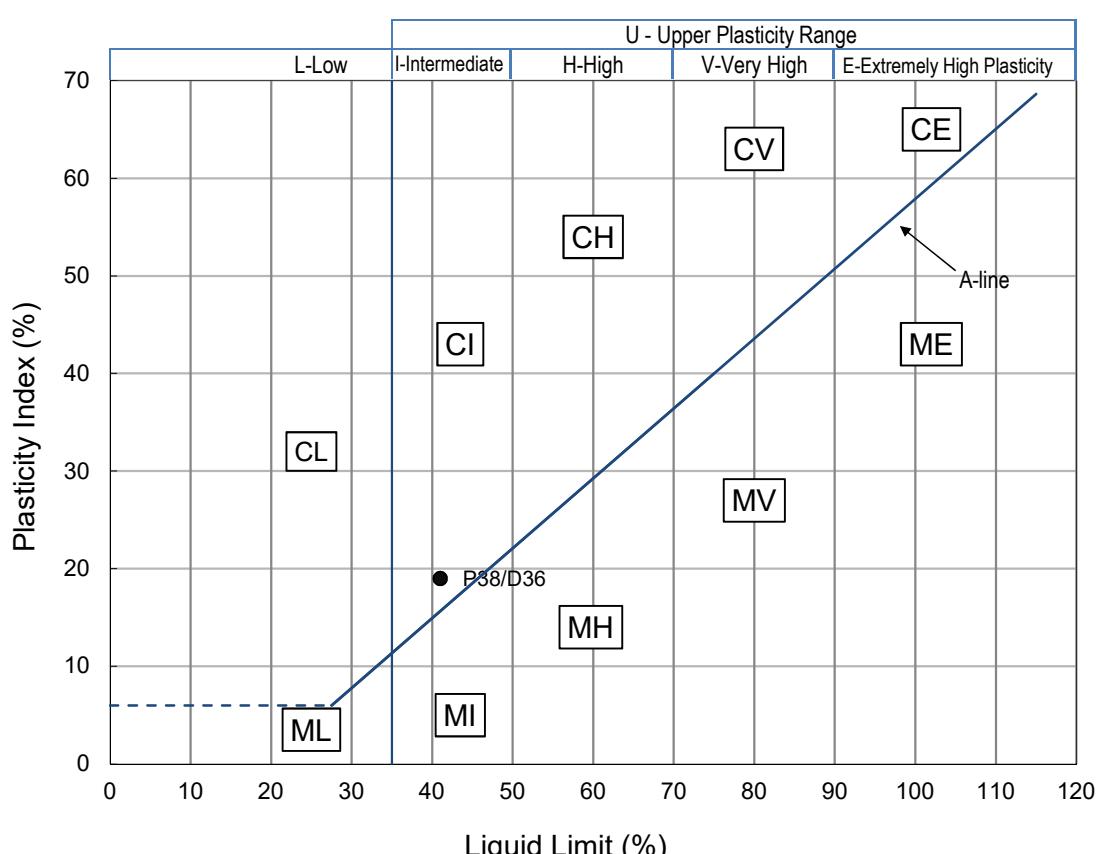
BS 1377 : Part 2: 1990: # 4.4 / 5

Sample No.	Description:	- Light to medium grey, Sandy CLAY of Intermediate Plasticity.		
P38/D36 57.00m	HISTORY OF SAMPLE Natural State	LIQUID LIMIT (%)	41	PLASTIC LIMIT (%)

PLASTICITY INDEX (%) 19  
22




PLASTICITY CHART





Client:	M/S PLB Engineering Sdn. Bhd.	Borehole No.:	BH 6
Location:	Jelutong Rehabilitation & Reclamation At Jelutong, Penang	Sample No.:	Refer below
Report No.:	GLSB/SI/3971-155/2022	Depth:	Refer below
		Test Name:	PS & HYD
		Date of test:	13/02/23

## Particle Size Distribution

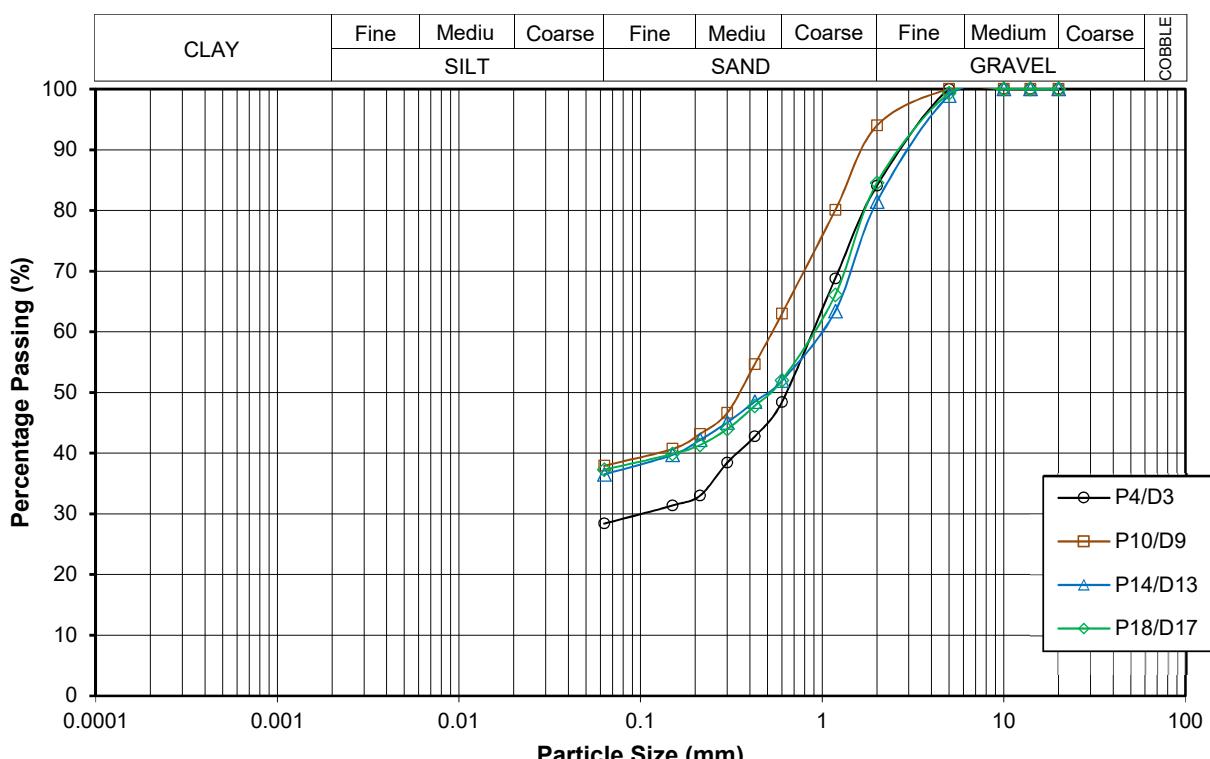
BS 1377 : Part 2 : 1990 # 9.2, 9.3 & 9.5

Sample No.	Description:	- Light grey, fine to medium grained, Very Silty/Clayey SAND.		
P4/D3	Gravel	Sand	Silt	Clay
6.00m	16	56	28	

Sample No.	Description:	- Light grey, Sandy CLAY of Low Plasticity.		
P10/D9	Gravel	Sand	Silt	Clay
15.00m	6	56	38	

Sample No.	Description:	- Light grey, Sandy CLAY of Low Plasticity.		
P14/D13	Gravel	Sand	Silt	Clay
21.00m	19	45	36	

Sample No.	Description:	- Light grey, Sandy CLAY of Intermediate Plasticity.		
P18/D17	Gravel	Sand	Silt	Clay
27.00m	15	48	37	





Client: M/S PLB Engineering Sdn. Bhd.	Borehole No.: BH 6
Location: Jelutong Rehabilitation & Reclamation At Jelutong, Penang	Sample No.: Refer below
Report No.: GLSB/SI/3971-155/2022	Depth: Refer below
Test Name: PS & HYD	Date of test: 13/02/23

## Particle Size Distribution

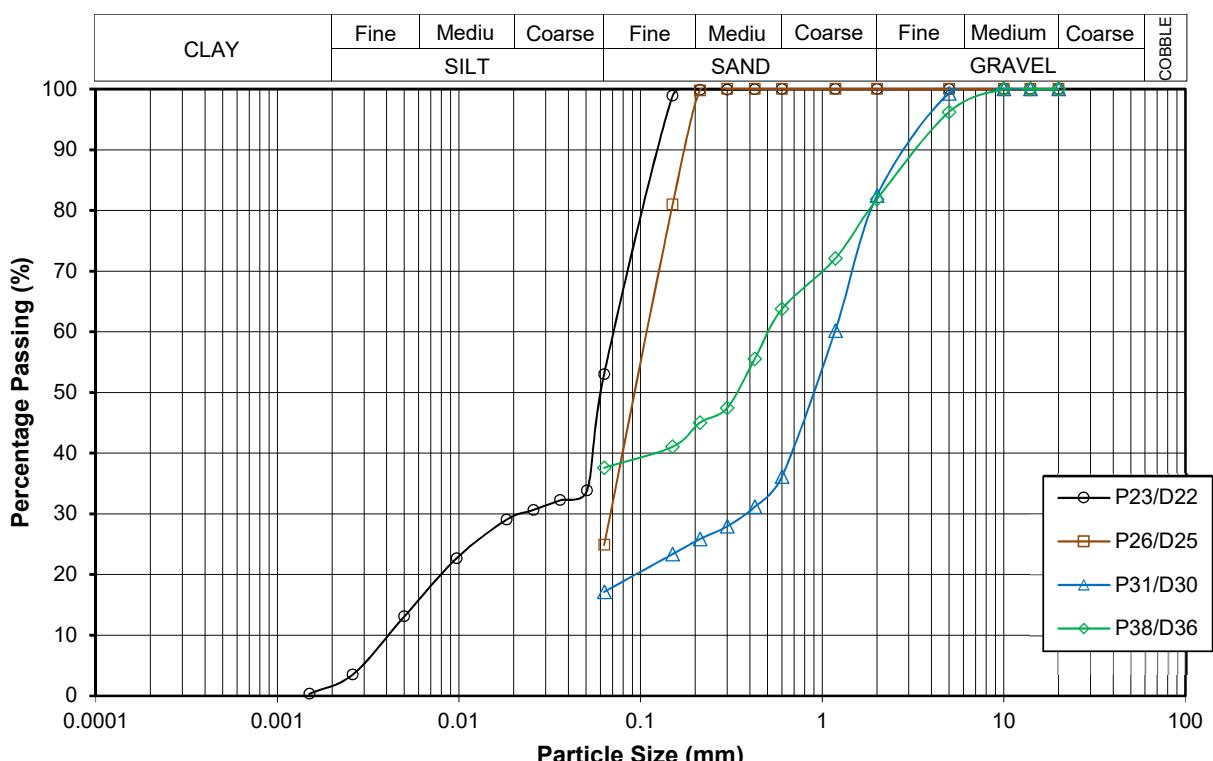
BS 1377 : Part 2 : 1990 # 9.2, 9.3 & 9.5

Sample No.	Description:	- Light grey, Sandy CLAY of Low Plasticity.		
P23/D22	Gravel	Sand	Silt	Clay
34.50m	0	47	50	3

Sample No.	Description:	- Light grey, Very Silty/Clayey SANDS.		
P26/D25	Gravel	Sand	Silt	Clay
39.00m	0	75	25	

Sample No.	Description:	- Light grey, Very Silty/Clayey SANDS.		
P31/D30	Gravel	Sand	Silt	Clay
46.50m	18	65		17

Sample No.	Description:	- Light to medium grey, Sandy CLAY of Intermediate Plasticity.		
P38/D36	Gravel	Sand	Silt	Clay
57.00m	18	44		38





## BH 7

	Client: M/S PLB Engineering Sdn. Bhd.	Borehole No.: BH 7
	Location Jelutong Rehabilitation & Reclamation At Jelutong, Penang	Sample No.: Refer Below
		Depth: Refer Below
	Report No.: GLSB/SI/3971-155/2022 Test Name: MC&BD	Date of test: 28/02/23

## Determination of Moisture Content (BS 1377 : Part 2 : 1990 # 3)

Sample No.:	UD1		UD2			
Depth (m)	3.00		6.00			
Container No.	S8	ZU34	XF1	X30		
Mass of wet soil + can (g)	196.36	182.84	226.08	235.96		
Mass of dry soil + can (g)	127.12	122.74	182.00	187.68		
Mass of Container (g)	36.50	38.80	38.76	38.40		
Mass of Water (g)	69.24	60.10	44.08	48.28		
Mass of Dry Soil (g)	90.62	83.94	143.24	149.28		
Water Content (%)	76.41	71.60	30.77	32.34		
Average Water Content (%)	74		32			

## Determination of Density (BS 1377 : Part 2 : 1990 # 7)

Sample length (mm)	20	20	
Sample Diameter (mm)	50	50	
Sample Weight (g)	57.52	68.38	
Bulk Density (Mg/m <sup>3</sup> )	1.46	1.74	
Dry Density (Mg/m <sup>3</sup> )	0.84	1.32	

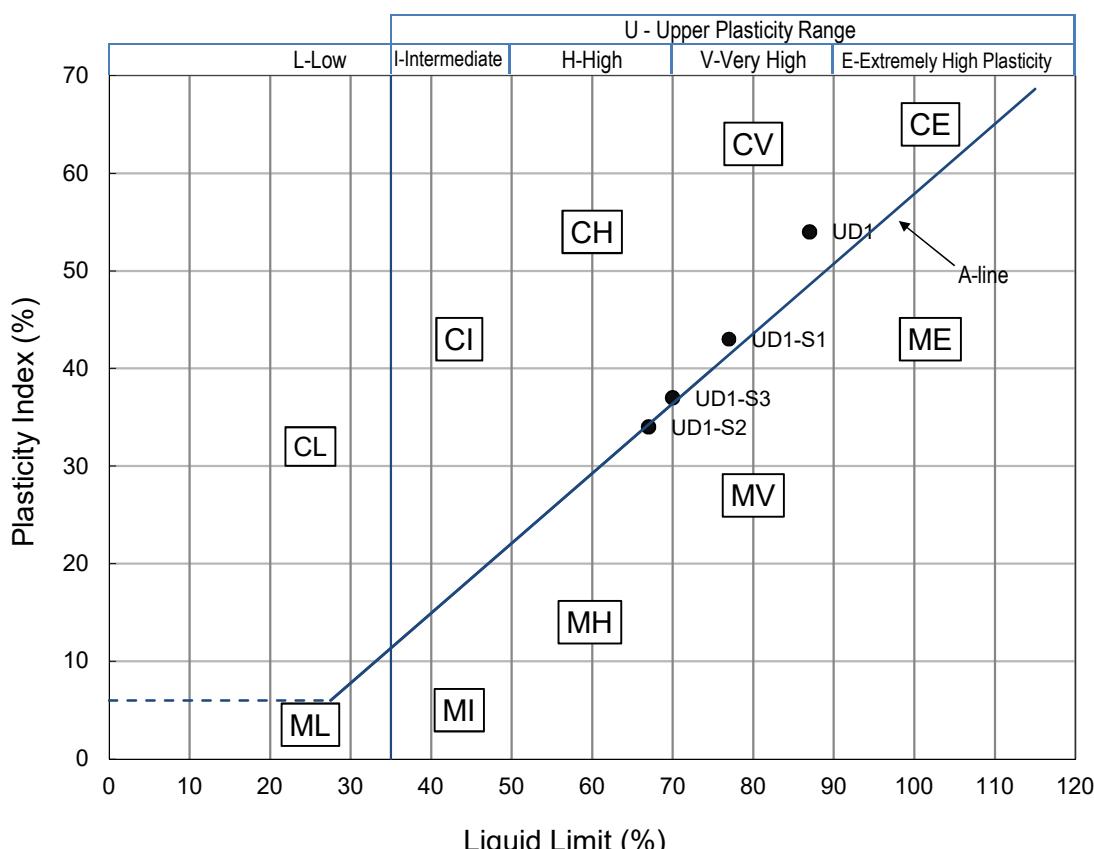
	Client: M/S PLB Engineering Sdn. Bhd.	Borehole No.: BH 7
	Location: Jelutong Rehabilitation & Reclamation At Jelutong, Penang	Sample No.: Refer Below
		Depth: Refer Below
	Report No.: GLSB/SI/3971-155/2022	Test Name: AL Date of test: 06/03/23

## Liquid Limit (Cone Penetrometer) and Plastic Limit

BS 1377 : Part 2: 1990: # 4.4 / 5

Sample No.	Description: - Medium grey, CLAY of Very High Plasticity.		
UD1	HISTORY OF SAMPLE Natural State	LIQUID LIMIT (%)	87
3.00m		PLASTIC LIMIT (%)	33
		PLASTICITY INDEX (%)	54
Sample No.	Description: - Medium grey, CLAY of Very High Plasticity.		
UD1-S1	HISTORY OF SAMPLE Natural State	LIQUID LIMIT (%)	77
3.00m		PLASTIC LIMIT (%)	34
		PLASTICITY INDEX (%)	43
Sample No.	Description: - Medium grey, SILT of High Plasticity.		
UD1-S2	HISTORY OF SAMPLE Natural State	LIQUID LIMIT (%)	67
3.00m		PLASTIC LIMIT (%)	33
		PLASTICITY INDEX (%)	34
Sample No.	Description: - Medium grey, SILT of Very High Plasticity.		
UD1-S3	HISTORY OF SAMPLE Natural State	LIQUID LIMIT (%)	70
3.00m		PLASTIC LIMIT (%)	34
		PLASTICITY INDEX (%)	37

PLASTICITY CHART



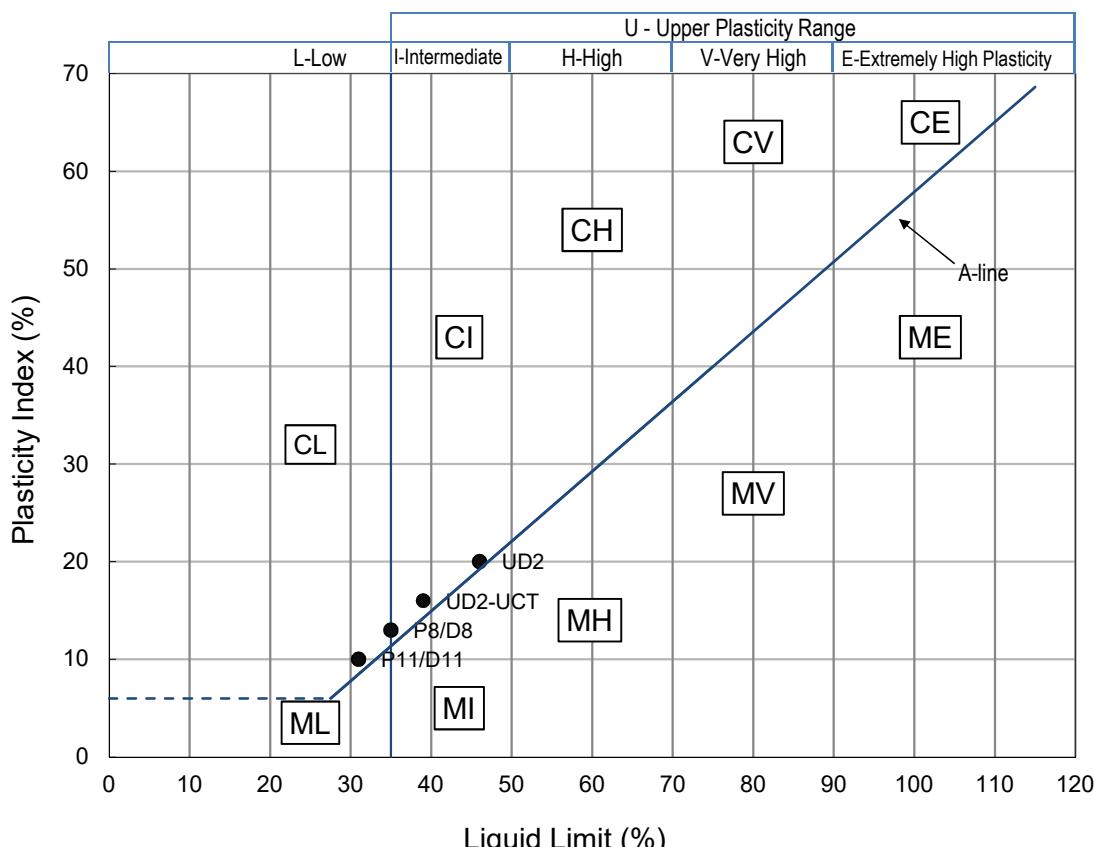
	Client: M/S PLB Engineering Sdn. Bhd.	Borehole No.: BH 7
	Location: Jelutong Rehabilitation & Reclamation At Jelutong, Penang	Sample No.: Refer Below
		Depth: Refer Below
	Report No.: GLSB/SI/3971-155/2022	Test Name: AL Date of test: 06/03/23

## Liquid Limit (Cone Penetrometer) and Plastic Limit

BS 1377 : Part 2: 1990: # 4.4 / 5

Sample No.	Description:	- Medium grey, Sandy CLAY of Intermediate Plasticity.		
UD2 6.00m	HISTORY OF SAMPLE Natural State	LIQUID LIMIT (%)	46	
		PLASTIC LIMIT (%)	26	
		PLASTICITY INDEX (%)	20	
Sample No.	Description:	- Medium grey, Very Clayey SAND of Intermediate Plasticity.		
UD2-UCT 6.00m	HISTORY OF SAMPLE Natural State	LIQUID LIMIT (%)	39	
		PLASTIC LIMIT (%)	23	
		PLASTICITY INDEX (%)	16	
Sample No.	Description:	- Light grey with light brown spotted, Very Clayey SAND of Intermediate Plasticity.		
P8/D8 15.00m	HISTORY OF SAMPLE Natural State	LIQUID LIMIT (%)	35	
		PLASTIC LIMIT (%)	22	
		PLASTICITY INDEX (%)	13	
Sample No.	Description:	- Light grey, Sandy CLAY of Low Plasticity.		
P11/D11 19.50m	HISTORY OF SAMPLE Natural State	LIQUID LIMIT (%)	31	
		PLASTIC LIMIT (%)	21	
		PLASTICITY INDEX (%)	10	

### PLASTICITY CHART



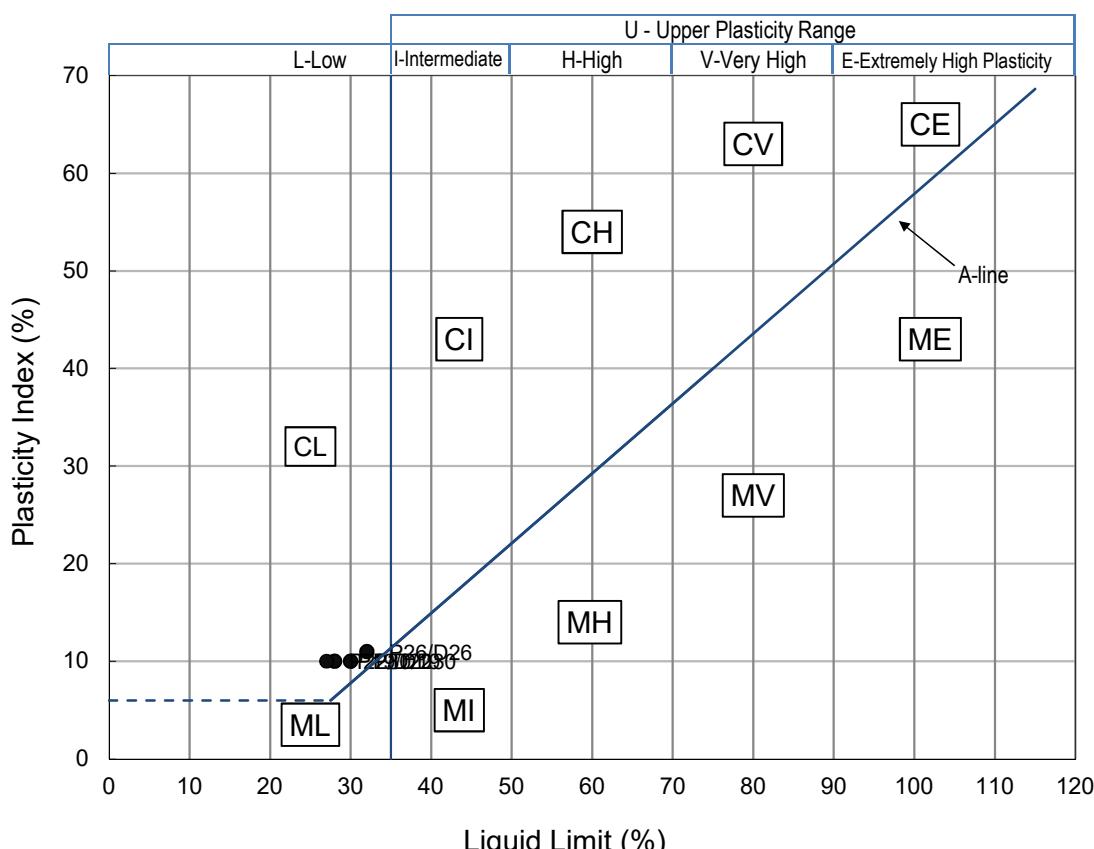
	Client: M/S PLB Engineering Sdn. Bhd.	Borehole No.: BH 7
	Location: Jelutong Rehabilitation & Reclamation At Jelutong, Penang	Sample No.: Refer Below
		Depth: Refer Below
	Report No.: GLSB/SI/3971-155/2022	Test Name: AL Date of test: 06/03/23

## Liquid Limit (Cone Penetrometer) and Plastic Limit

BS 1377 : Part 2: 1990: # 4.4 / 5

Sample No.	Description: - Light grey, Sandy CLAY of Low Plasticity.			
P19/D19 31.50m	HISTORY OF SAMPLE Natural State	LIQUID LIMIT (%) PLASTIC LIMIT (%) PLASTICITY INDEX (%)	28 18 10	
P22/D22 36.00m	HISTORY OF SAMPLE Natural State	LIQUID LIMIT (%) PLASTIC LIMIT (%) PLASTICITY INDEX (%)	27 17 10	
P26/D26 42.00m	HISTORY OF SAMPLE Natural State	LIQUID LIMIT (%) PLASTIC LIMIT (%) PLASTICITY INDEX (%)	32 21 11	
P30/D30 48.00m	HISTORY OF SAMPLE Natural State	LIQUID LIMIT (%) PLASTIC LIMIT (%) PLASTICITY INDEX (%)	30 20 10	

### PLASTICITY CHART





Client:	M/S PLB Engineering Sdn. Bhd.	Borehole No.:	BH 7
Location:	Jelutong Rehabilitation & Reclamation At Jelutong, Penang	Sample No.:	Refer below
Report No.:	GLSB/SI/3971-155/2022	Depth:	Refer below
		Test Name:	PS & HYD
		Date of test:	01/03/23

## Particle Size Distribution

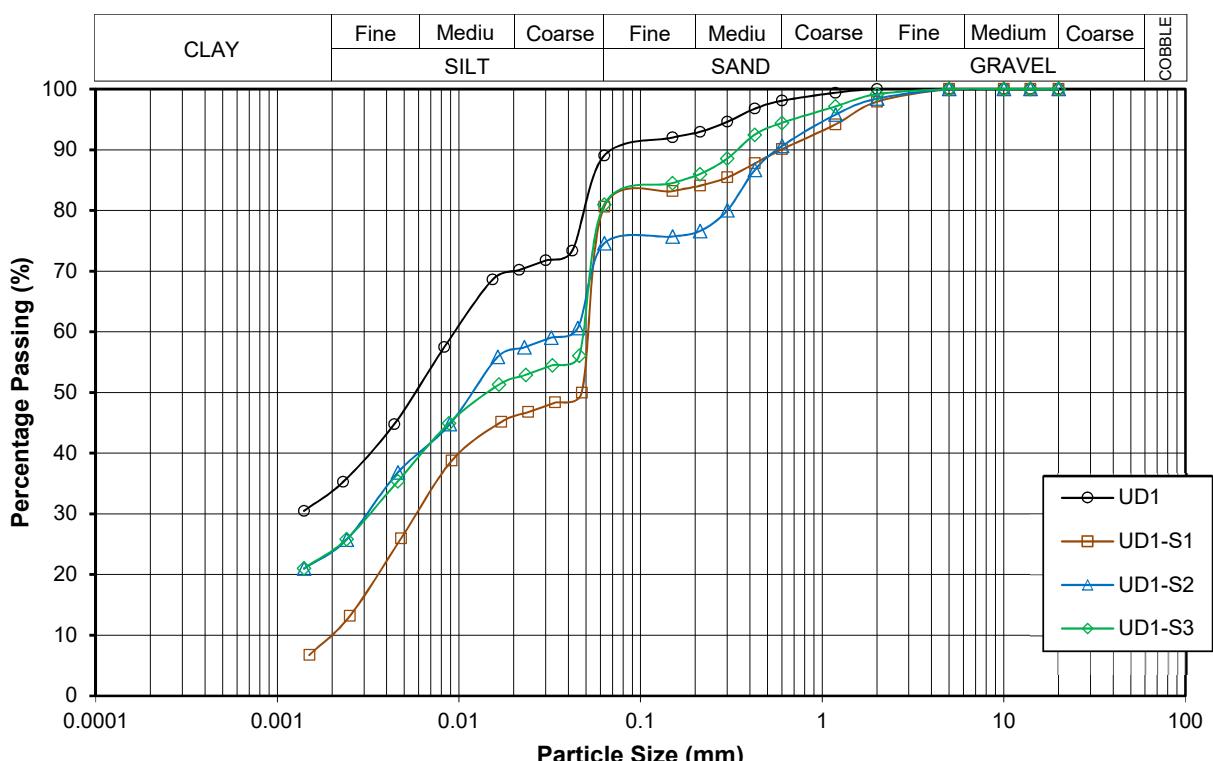
BS 1377 : Part 2 : 1990 # 9.2, 9.3 & 9.5

Sample No.	Description:	- Medium grey, CLAY of Very High Plasticity.		
UD1	Gravel	Sand	Silt	Clay
3.00m	0	11	55	34

Sample No.	Description:	- Medium grey, CLAY of Very High Plasticity.		
UD1-S1	Gravel	Sand	Silt	Clay
3.00m	2	17	71	10

Sample No.	Description:	- Medium grey, SILT of High Plasticity.		
UD1-S2	Gravel	Sand	Silt	Clay
3.00m	2	24	50	24

Sample No.	Description:	- Medium grey, SILT of Very High Plasticity.		
UD1-S3	Gravel	Sand	Silt	Clay
3.00m	1	18	57	24





Client:	M/S PLB Engineering Sdn. Bhd.	Borehole No.:	BH 7
Location:	Jelutong Rehabilitation & Reclamation At Jelutong, Penang	Sample No.:	Refer below
Report No.:	GLSB/SI/3971-155/2022	Depth:	Refer below
		Test Name:	PS & HYD
		Date of test:	01/03/23

## Particle Size Distribution

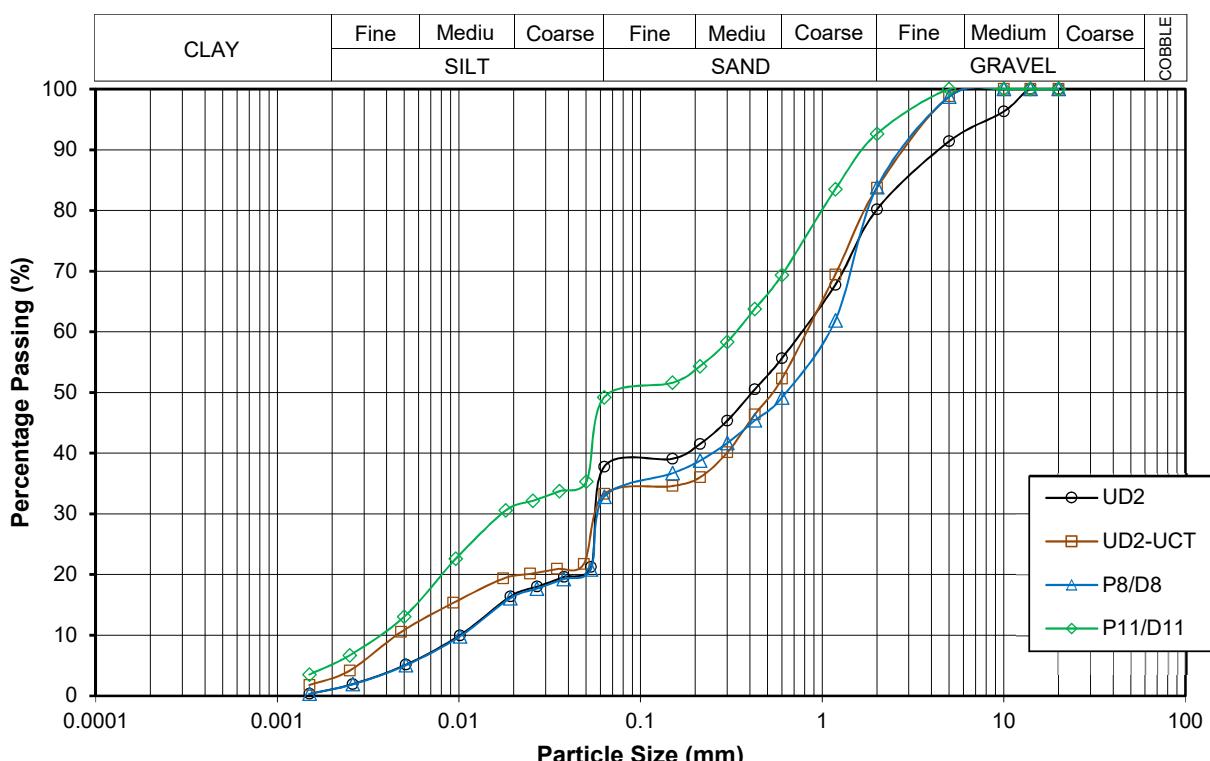
BS 1377 : Part 2 : 1990 # 9.2, 9.3 & 9.5

Sample No.	Description:	- Medium grey, Sandy CLAY of Intermediate Plasticity.		
UD2	Gravel	Sand	Silt	Clay
6.00m	20	42	36	2

Sample No.	Description:	- Medium grey, Very Clayey SAND of Intermediate Plasticity.		
UD2-UCT	Gravel	Sand	Silt	Clay
6.00m	16	50	31	3

Sample No.	Description:	- Light grey with light brown spotted, Very Clayey SAND of Intermediate Plasticity.		
P8/D8	Gravel	Sand	Silt	Clay
15.00m	16	51	31	2

Sample No.	Description:	- Light grey, Sandy CLAY of Low Plasticity.		
P11/D11	Gravel	Sand	Silt	Clay
19.50m	7	43	45	5





Client:	M/S PLB Engineering Sdn. Bhd.	Borehole No.:	BH 7
Location:	Jelutong Rehabilitation & Reclamation At Jelutong, Penang	Sample No.:	Refer below
Report No.:	GLSB/SI/3971-155/2022	Depth:	Refer below
		Test Name:	PS & HYD
		Date of test:	01/03/23

## Particle Size Distribution

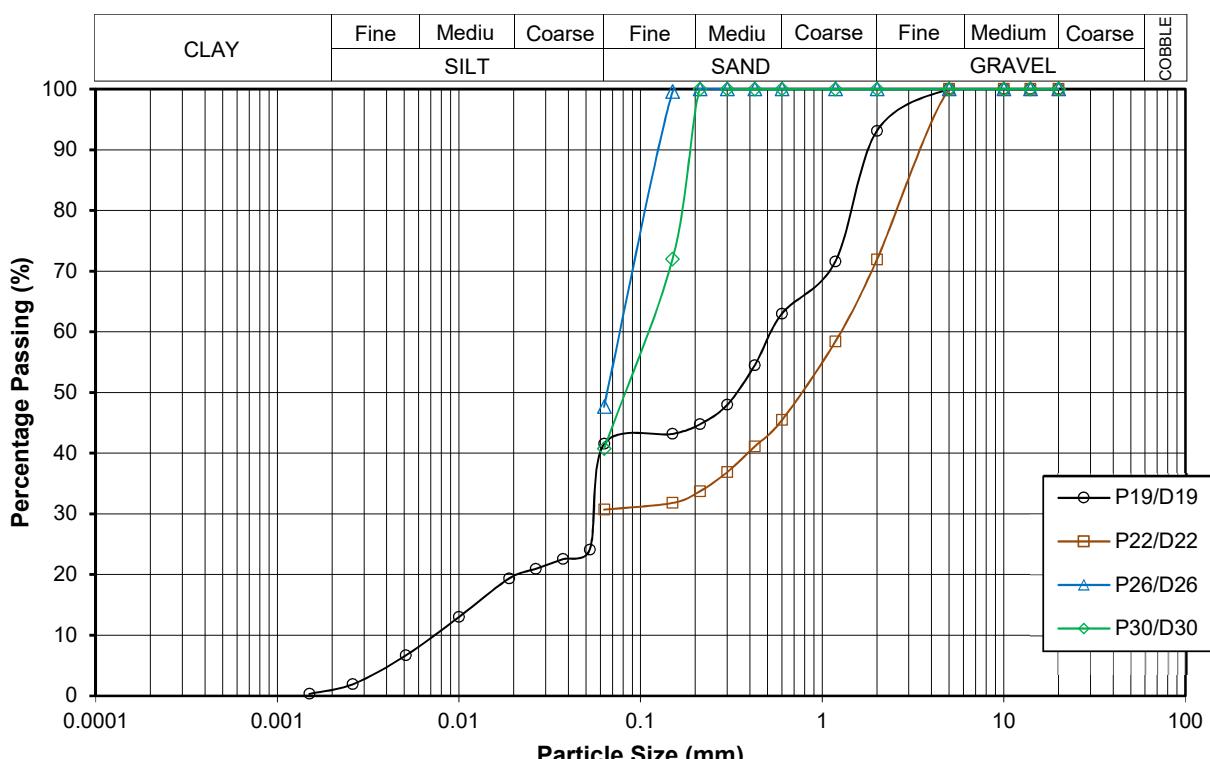
BS 1377 : Part 2 : 1990 # 9.2, 9.3 & 9.5

Sample No.	Description:	- Light grey, Sandy CLAY of Low Plasticity.		
P19/D19	Gravel	Sand	Silt	Clay
31.50m	7	52	39	2

Sample No.	Description:	- Light grey, Very Clayey SAND of Intermediate Plasticity.		
P22/D22	Gravel	Sand	Silt	Clay
36.00m	28	41	31	

Sample No.	Description:	- Light grey, Sandy CLAY of Low Plasticity.		
P26/D26	Gravel	Sand	Silt	Clay
42.00m	0	52	48	

Sample No.	Description:	- light grey, Sandy CALY of Low Plasticity.		
P30/D30	Gravel	Sand	Silt	Clay
48.00m	0	59	41	





Client:	M/S PLB Engineering Sdn. Bhd.	Borehole No.:	BH 7
Location:	Jelutong Rehabilitation & Reclamation At Jelutong, Penang	Sample No.:	Refer below
Report No.:	GLSB/SI/3971-155/2022	Depth:	Refer below
	Test Name: PS & HYD	Date of test:	01/03/23

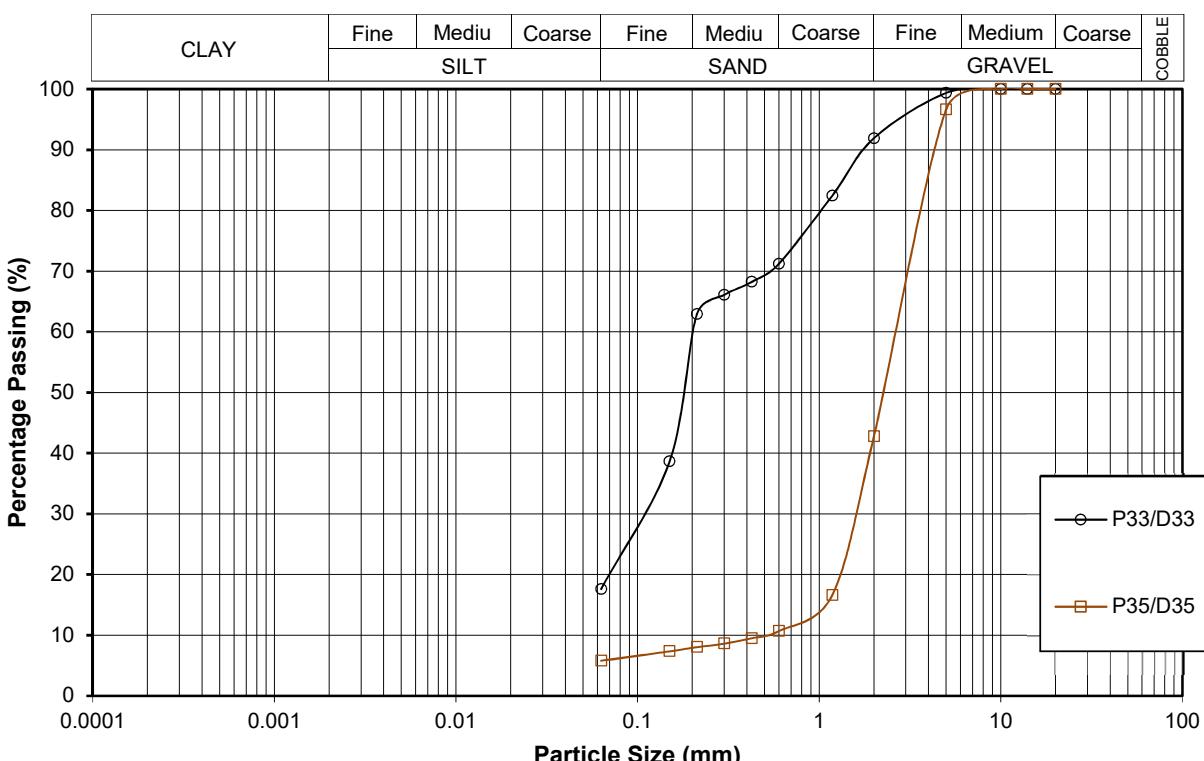
## Particle Size Distribution

BS 1377 : Part 2 : 1990 # 9.2, 9.3 & 9.5

Sample No.	Description:	- Light grey, Very Silty/Clayey SANDS.		
P33/D33	Gravel	Sand	Silt	Clay
52.50m	8	74	18	

Sample No.	Description:	- Light grey, fine grained, Silty SAND.		
P35/D35	Gravel	Sand	Silt	Clay
57.00m	57	37	6	







**BH 8**

	Client: M/S PLB Engineering Sdn. Bhd.	Borehole No.: BH 8
	Location Jelutong Rehabilitation & Reclamation At Jelutong, Penang	Sample No.: Refer Below
		Depth: Refer Below
	Report No.: GLSB/SI/3971-155/2022 Test Name: MC&BD	Date of test: 04/03/23

## Determination of Moisture Content (BS 1377 : Part 2 : 1990 # 3)

Sample No.:	UD1		UD2			
Depth (m)	2.00		6.50			
Container No.	31E	33E	ZU15	24E		
Mass of wet soil + can (g)	160.74	140.44	167.60	145.90		
Mass of dry soil + can (g)	87.80	79.60	92.06	82.92		
Mass of Container (g)	38.36	38.36	38.34	38.42		
Mass of Water (g)	72.94	60.84	75.54	62.98		
Mass of Dry Soil (g)	49.44	41.24	53.72	44.50		
Water Content (%)	147.53	147.53	140.62	141.53		
Average Water Content (%)	148		141			

## Determination of Density (BS 1377 : Part 2 : 1990 # 7)

Sample length (mm)	20	20	
Sample Diameter (mm)	50	50	
Sample Weight (g)	48.53	53.8	
Bulk Density (Mg/m <sup>3</sup> )	1.24	1.37	
Dry Density (Mg/m <sup>3</sup> )	0.50	0.57	

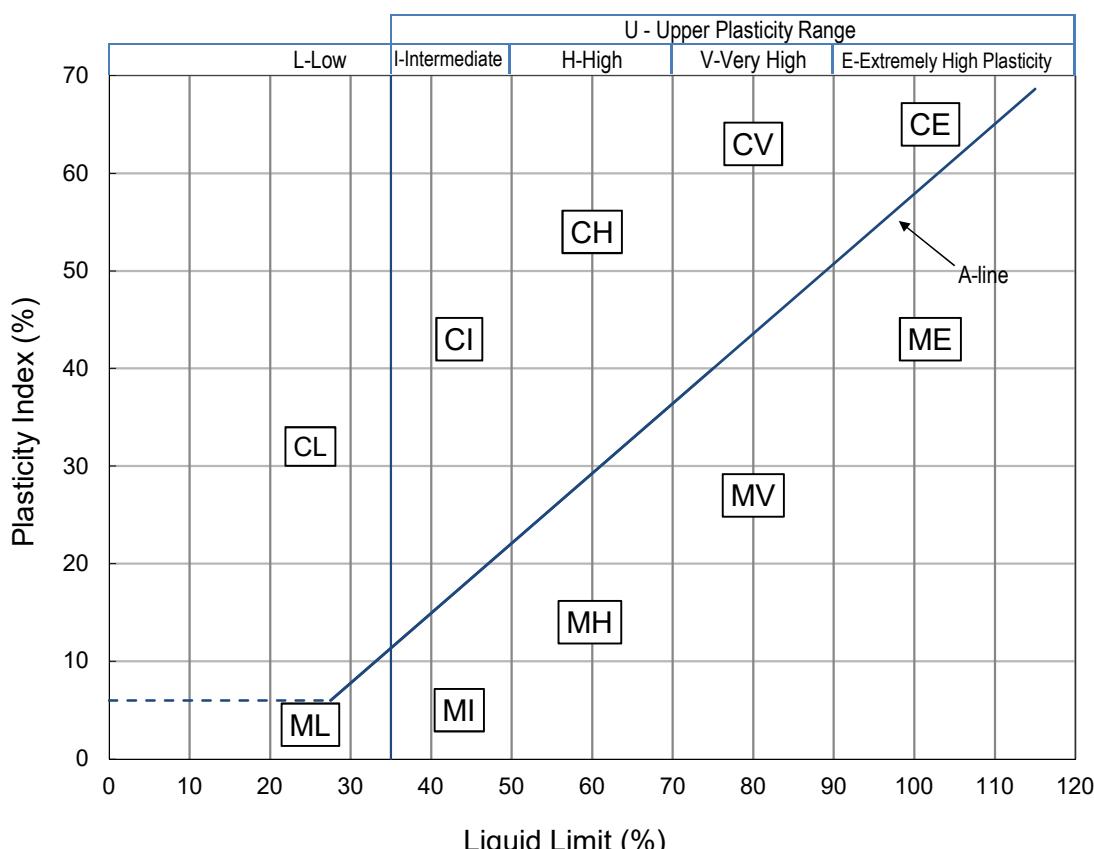
	Client: M/S PLB Engineering Sdn. Bhd.	Borehole No.: BH 8
	Location: Jelutong Rehabilitation & Reclamation At Jelutong, Penang	Sample No.: Refer Below
		Depth: Refer Below
	Report No.: GLSB/SI/3971-155/2022	Test Name: AL Date of test: 11/03/23

## Liquid Limit (Cone Penetrometer) and Plastic Limit

BS 1377 : Part 2: 1990: # 4.4 / 5

Sample No.	Description: - Medium grey, CLAY.			
UD1 2.00m	HISTORY OF SAMPLE Natural State	LIQUID LIMIT (%) PLASTIC LIMIT (%) PLASTICITY INDEX (%)	121 45 76	
UD1-S1 2.00m	HISTORY OF SAMPLE Natural State	LIQUID LIMIT (%) PLASTIC LIMIT (%) PLASTICITY INDEX (%)	120 45 75	
UD1-S2 2.00m	HISTORY OF SAMPLE Natural State	LIQUID LIMIT (%) PLASTIC LIMIT (%) PLASTICITY INDEX (%)	122 45 77	
UD1-S3 2.00m	HISTORY OF SAMPLE Natural State	LIQUID LIMIT (%) PLASTIC LIMIT (%) PLASTICITY INDEX (%)	122 43 79	

### PLASTICITY CHART



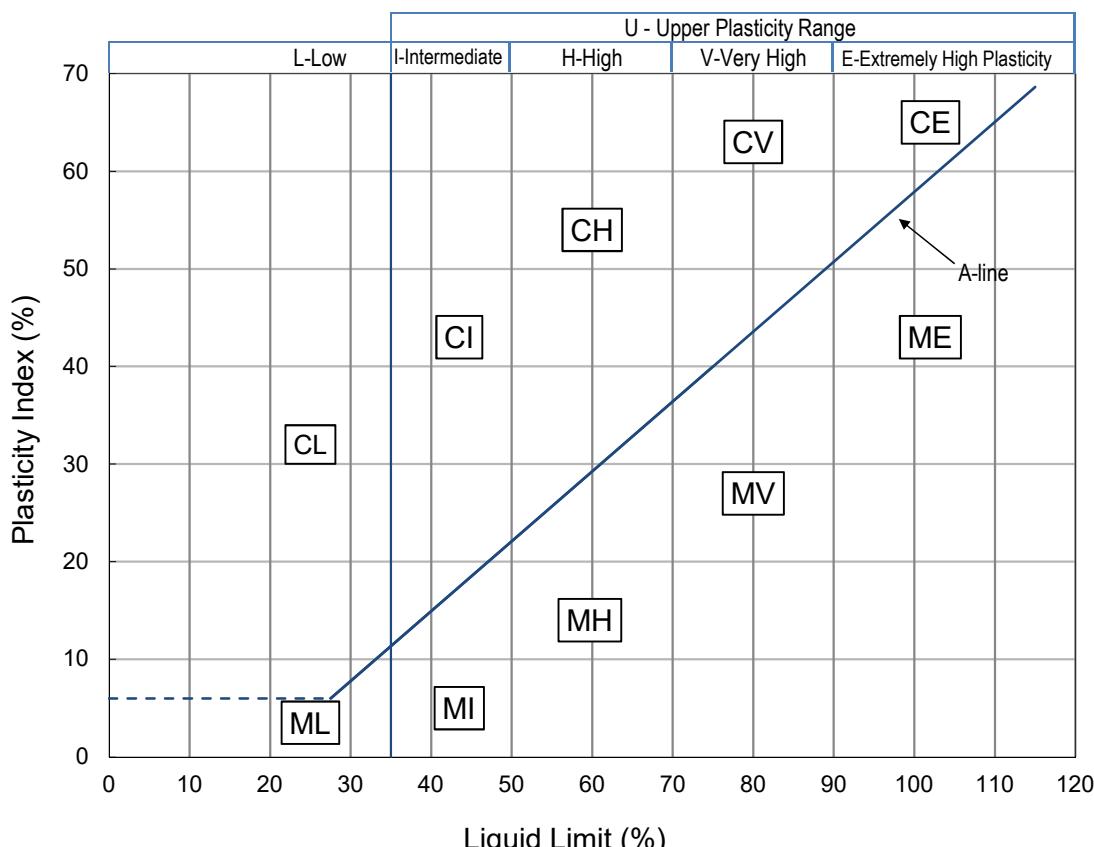
	Client: M/S PLB Engineering Sdn. Bhd.	Borehole No.: BH 8
	Location: Jelutong Rehabilitation & Reclamation At Jelutong, Penang	Sample No.: Refer Below
		Depth: Refer Below
	Report No.: GLSB/SI/3971-155/2022	Test Name: AL Date of test: 11/03/23

## Liquid Limit (Cone Penetrometer) and Plastic Limit

BS 1377 : Part 2: 1990: # 4.4 / 5

Sample No.	Description: - Medium grey, Sandy CLAY.			
UD2 6.50m	HISTORY OF SAMPLE Natural State	LIQUID LIMIT (%)	124	
		PLASTIC LIMIT (%)	45	
		PLASTICITY INDEX (%)	79	
Sample No.	Description: - Medium grey, CLAY.			
UD2-S1 6.50m	HISTORY OF SAMPLE Natural State	LIQUID LIMIT (%)	122	
		PLASTIC LIMIT (%)	44	
		PLASTICITY INDEX (%)	78	
Sample No.	Description: - Medium grey, CLAY.			
UD2-S2 6.50m	HISTORY OF SAMPLE Natural State	LIQUID LIMIT (%)	126	
		PLASTIC LIMIT (%)	44	
		PLASTICITY INDEX (%)	82	
Sample No.	Description: - Medium grey, CLAY.			
UD2-S3 6.50m	HISTORY OF SAMPLE Natural State	LIQUID LIMIT (%)	114	
		PLASTIC LIMIT (%)	43	
		PLASTICITY INDEX (%)	71	

### PLASTICITY CHART



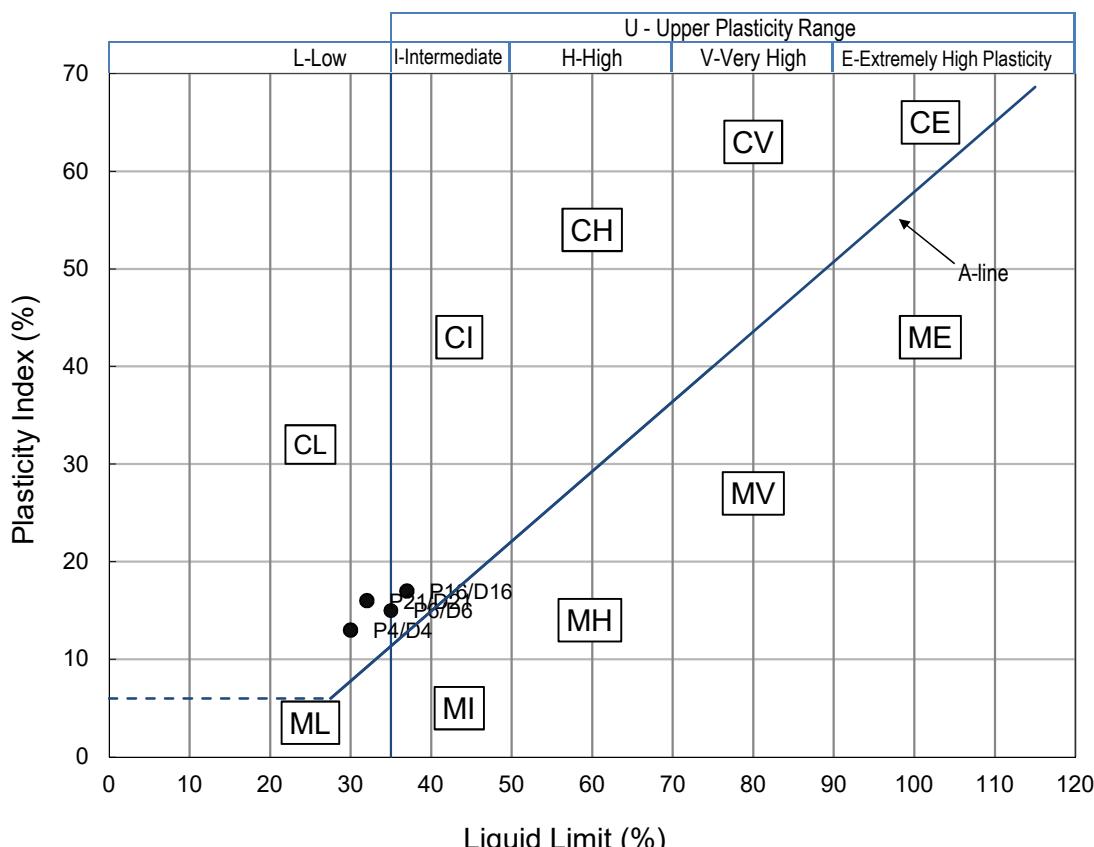
	Client: M/S PLB Engineering Sdn. Bhd.	Borehole No.: BH 8
	Location: Jelutong Rehabilitation & Reclamation At Jelutong, Penang	Sample No.: Refer Below
		Depth: Refer Below
	Report No.: GLSB/SI/3971-155/2022	Test Name: AL Date of test: 11/03/23

## Liquid Limit (Cone Penetrometer) and Plastic Limit

BS 1377 : Part 2: 1990: # 4.4 / 5

Sample No.	Description:	- Light grey with light purple and light brown spotted, Sandy CLAY of Low Plasticity.		
P4/D4 12.00m	HISTORY OF SAMPLE Natural State	LIQUID LIMIT (%)	30	
		PLASTIC LIMIT (%)	17	
		PLASTICITY INDEX (%)	13	
Sample No.	Description:- Light to medium red with light grey and light brown mottled, Sandy CLAY of Intermediate Plasticity			
P6/D6 15.00m	HISTORY OF SAMPLE Natural State	LIQUID LIMIT (%)	35	
		PLASTIC LIMIT (%)	20	
		PLASTICITY INDEX (%)	15	
Sample No.	Description: - Light grey, Sandy CLAY of Intermediate Plasticity.			
P16/D16 30.00m	HISTORY OF SAMPLE Natural State	LIQUID LIMIT (%)	37	
		PLASTIC LIMIT (%)	20	
		PLASTICITY INDEX (%)	17	
Sample No.	Description: - Light grey with light brown spotted, Sandy CLAY of Low Plasticity.			
P21/D21 37.50m	HISTORY OF SAMPLE Natural State	LIQUID LIMIT (%)	32	
		PLASTIC LIMIT (%)	16	
		PLASTICITY INDEX (%)	16	

### PLASTICITY CHART



	Client: M/S PLB Engineering Sdn. Bhd.	Borehole No.: BH 8
	Location: Jelutong Rehabilitation & Reclamation At Jelutong, Penang	Sample No.: Refer Below
		Depth: Refer Below
	Report No.: GLSB/SI/3971-155/2022	Test Name: AL Date of test: 11/03/23

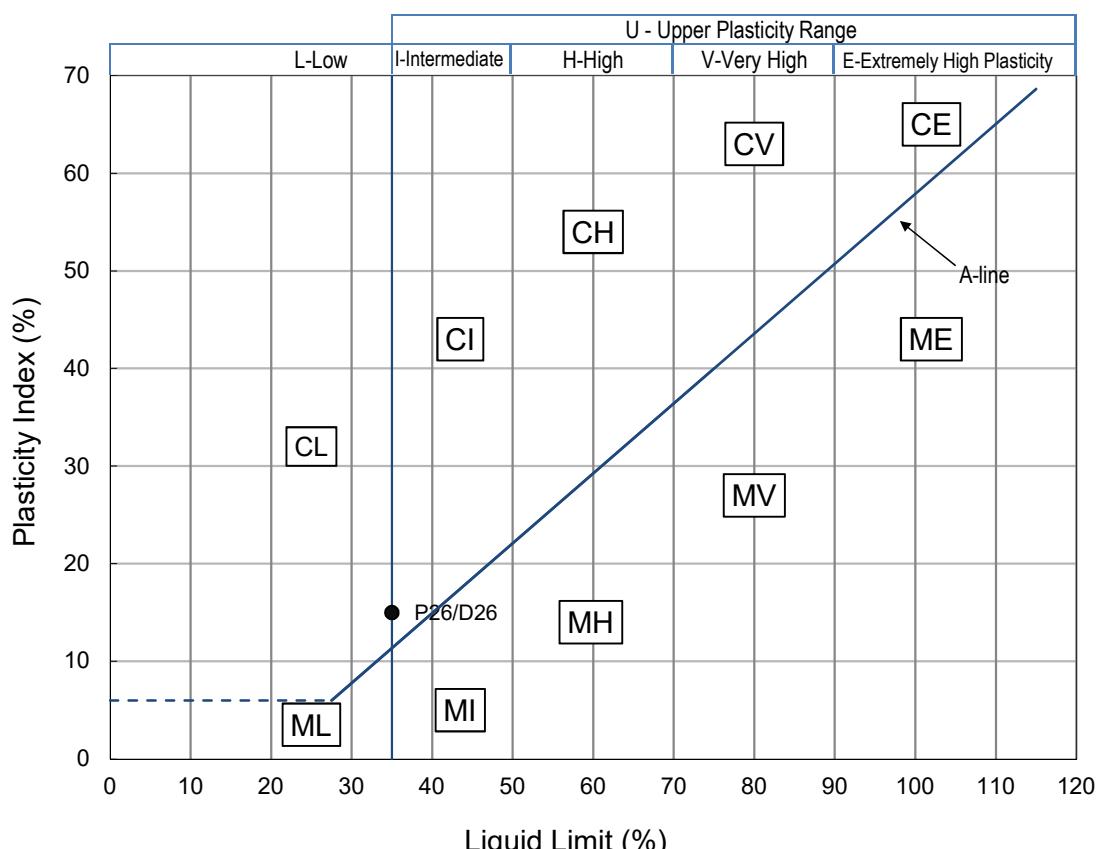
## Liquid Limit (Cone Penetrometer) and Plastic Limit

BS 1377 : Part 2: 1990: # 4.4 / 5

Sample No.	Description:	- Light grey, CLAY of Intermediate Plasticity.
P26/D26 45.00m	HISTORY OF SAMPLE Natural State	LIQUID LIMIT (%) 35 PLASTIC LIMIT (%) 20 PLASTICITY INDEX (%) 15




PLASTICITY CHART





Client: M/S PLB Engineering Sdn. Bhd.	Borehole No.: BH 8
Location: Jelutong Rehabilitation & Reclamation At Jelutong, Penang	Sample No.: Refer below
Report No.: GLSB/SI/3971-155/2022	Depth: Refer below
Test Name: PS & HYD	Date of test: 07/03/23

## Particle Size Distribution

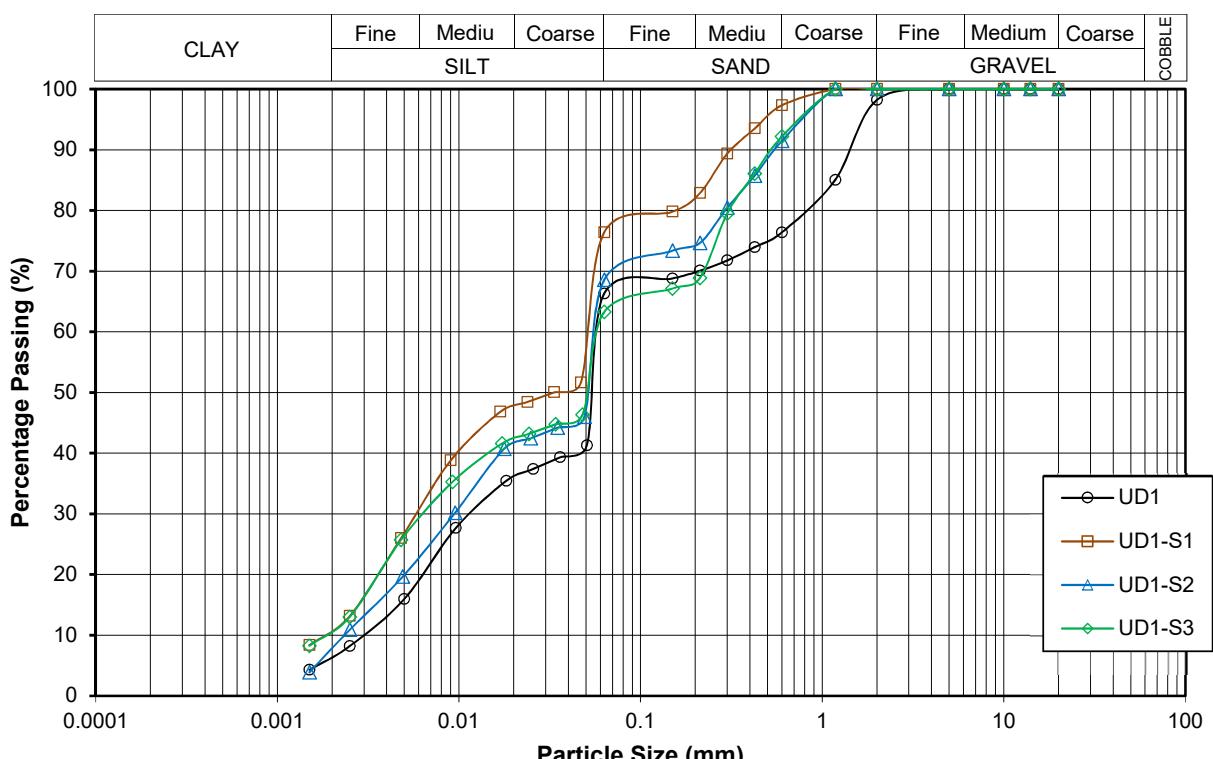
BS 1377 : Part 2 : 1990 # 9.2, 9.3 & 9.5

Sample No.	Description:	- Medium grey, CLAY.		
UD1	Gravel	Sand	Silt	Clay
2.00m	2	32	60	6

Sample No.	Description:	- Medium grey, CLAY.		
UD1-S1	Gravel	Sand	Silt	Clay
2.00m	0	24	65	11

Sample No.	Description:	- Medium grey, CLAY.		
UD1-S2	Gravel	Sand	Silt	Clay
2.00m	0	31	61	8

Sample No.	Description:	- Medium grey, Sandy CLAY.		
UD1-S3	Gravel	Sand	Silt	Clay
2.00m	0	37	52	11





Client:	M/S PLB Engineering Sdn. Bhd.	Borehole No.:	BH 8
Location:	Jelutong Rehabilitation & Reclamation At Jelutong, Penang	Sample No.:	Refer below
Report No.:	GLSB/SI/3971-155/2022	Depth:	Refer below
		Test Name:	PS & HYD
		Date of test:	07/03/23

## Particle Size Distribution

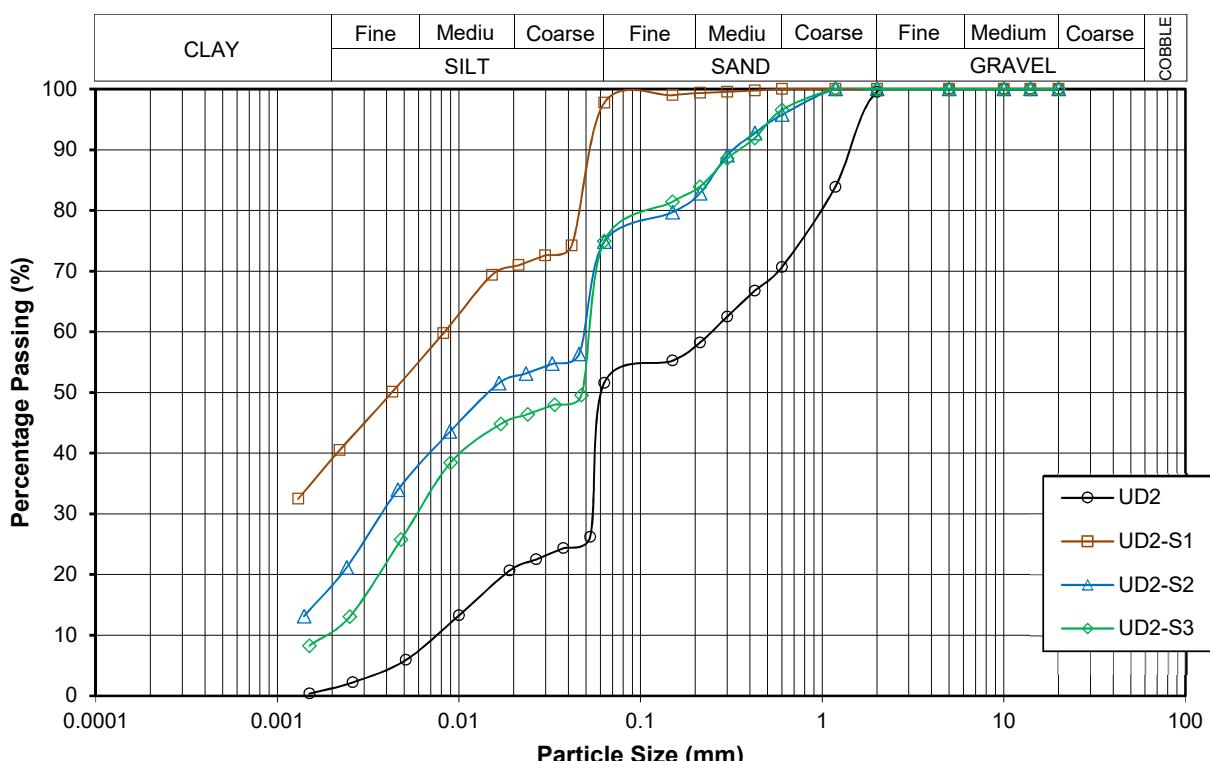
BS 1377 : Part 2 : 1990 # 9.2, 9.3 & 9.5

Sample No.	Description:	- Medium grey, Sandy CLAY.		
UD2	Gravel	Sand	Silt	Clay
6.50m	0	48	50	2

Sample No.	Description:	- Medium grey, CLAY.		
UD2-S1	Gravel	Sand	Silt	Clay
6.50m	0	2	59	39

Sample No.	Description:	- Medium grey, CLAY.		
UD2-S2	Gravel	Sand	Silt	Clay
6.50m	0	25	57	18

Sample No.	Description:	- Medium grey, CLAY.		
UD2-S3	Gravel	Sand	Silt	Clay
6.50m	0	25	64	11





Client: M/S PLB Engineering Sdn. Bhd.	Borehole No.: BH 8
Location: Jelutong Rehabilitation & Reclamation At Jelutong, Penang	Sample No.: Refer below
Report No.: GLSB/SI/3971-155/2022	Depth: Refer below
Test Name: PS & HYD	Date of test: 07/03/23

## Particle Size Distribution

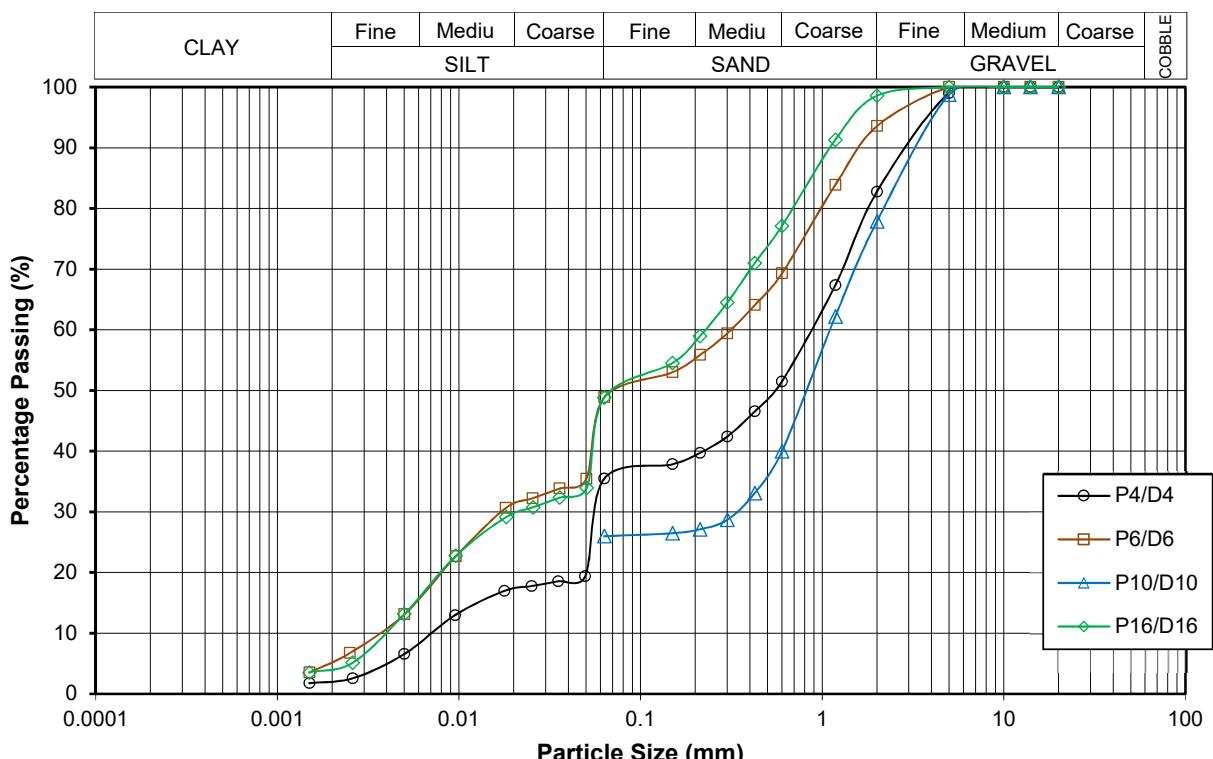
BS 1377 : Part 2 : 1990 # 9.2, 9.3 & 9.5

Sample No.	Description:	- Light grey with light purple and light brown spotted, Sandy CLAY of Low Plasticity.			
P4/D4	Gravel	Sand	Silt	Clay	
12.00m	17	47	32	4	

Sample No.	Description:	- Light to medium red with light grey and light brown mottled, Sandy CLAY of Intermediate Plasticity			
P6/D6	Gravel	Sand	Silt	Clay	
15.00m	6	45	44	5	

Sample No.	Description:	- Light grey with medium brown spotted, Very Silty/Clayey SANDS.			
P10/D10	Gravel	Sand	Silt	Clay	
21.00m	22	52		26	

Sample No.	Description:	- Light grey, Sandy Clay of Intermediate Plasticity.			
P16/D16	Gravel	Sand	Silt	Clay	
30.00m	1	50	45	4	





Client:	M/S PLB Engineering Sdn. Bhd.	Borehole No.:	BH 8
Location:	Jelutong Rehabilitation & Reclamation At Jelutong, Penang	Sample No.:	Refer below
Report No.:	GLSB/SI/3971-155/2022	Depth:	Refer below
		Test Name:	PS & HYD
		Date of test:	07/03/23

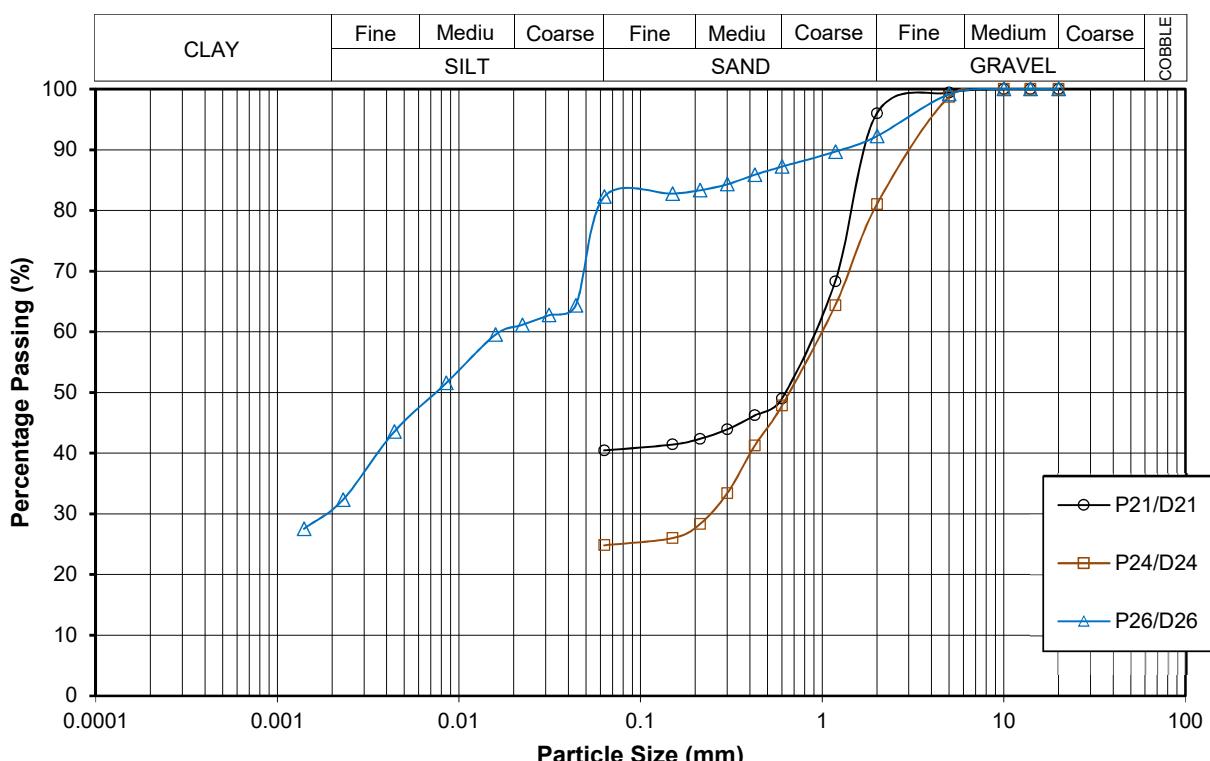
## Particle Size Distribution

BS 1377 : Part 2 : 1990 # 9.2, 9.3 & 9.5

Sample No.	Description:	- Light grey with light brown spotted, Sandy Clay of Low Plasticity.		
P21/D21	Gravel	Sand	Silt	Clay
37.50m	4	56	40	

Sample No.	Description:	- Light to medium grey, Very Silty/Clayey SANDS.		
P24/D24	Gravel	Sand	Silt	Clay
42.00m	19	56	25	

Sample No.	Description:	- Light grey, CLAY of Intermediate Plasticity.		
P26/D26	Gravel	Sand	Silt	Clay
45.00m	8	10	51	31



**BH 9**

	Client: M/S PLB Engineering Sdn. Bhd.	Borehole No.: BH 9
	Location Jelutong Rehabilitation & Reclamation At Jelutong, Penang	Sample No.: Refer Below
		Depth: Refer Below
	Report No.: GLSB/SI/3971-155/2022 Test Name: MC&BD	Date of test: 08/03/23

## Determination of Moisture Content (BS 1377 : Part 2 : 1990 # 3)

Sample No.:	UD1					
Depth (m)	7.50					
Container No.	ZU61	130				
Mass of wet soil + can (g)	250.06	218.66				
Mass of dry soil + can (g)	218.10	192.18				
Mass of Container (g)	37.16	38.62				
Mass of Water (g)	31.96	26.48				
Mass of Dry Soil (g)	180.94	153.56				
Water Content (%)	17.66	17.24				
Average Water Content (%)	17					

## Determination of Density (BS 1377 : Part 2 : 1990 # 7)

Sample length (mm)	20			
Sample Diameter (mm)	50			
Sample Weight (g)	78.28			
Bulk Density (Mg/m <sup>3</sup> )	1.99			
Dry Density (Mg/m <sup>3</sup> )	1.70			

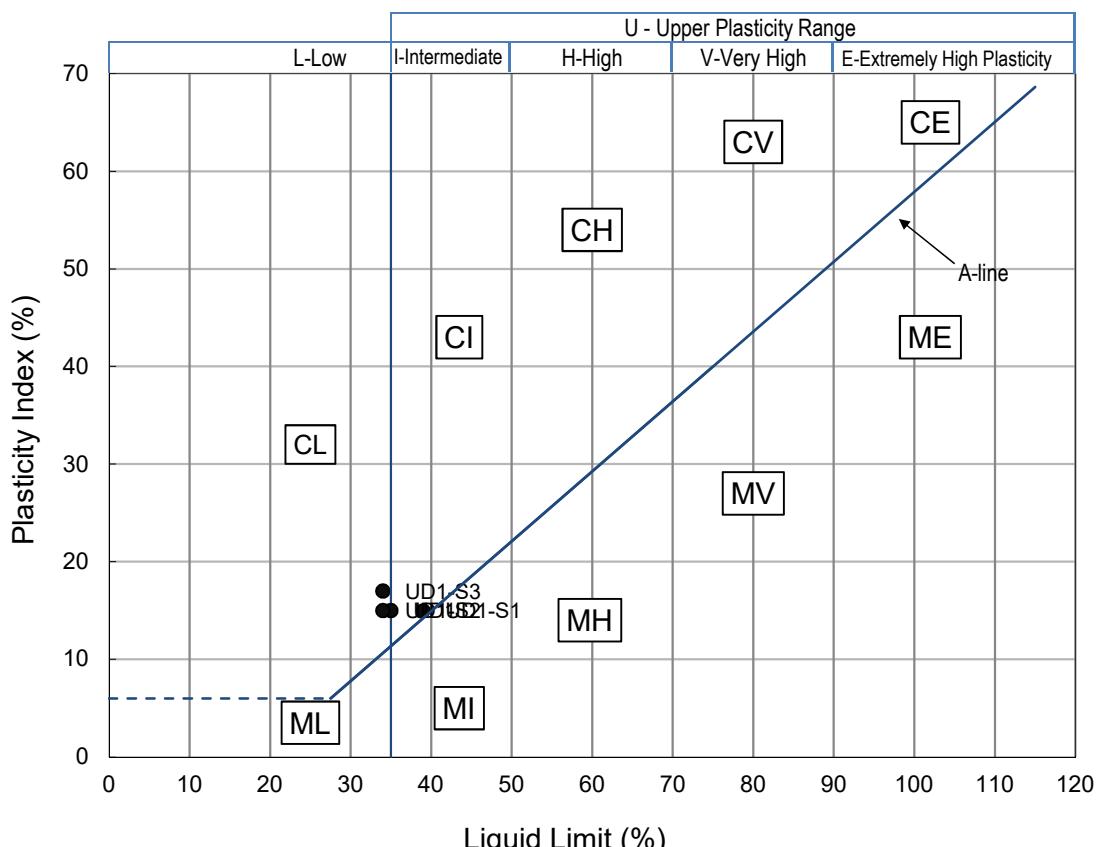
	Client: M/S PLB Engineering Sdn. Bhd.	Borehole No.: BH 9
	Location: Jelutong Rehabilitation & Reclamation At Jelutong, Penang	Sample No.: Refer Below
		Depth: Refer Below
	Report No.: GLSB/SI/3971-155/2022	Test Name: AL Date of test: 11/03/23

## Liquid Limit (Cone Penetrometer) and Plastic Limit

BS 1377 : Part 2: 1990: # 4.4 / 5

Sample No.	Description: - Light grey, fine grained, Sandy CLAY of Intermediate Plasticity.	
UD1 7.50m	HISTORY OF SAMPLE Natural State	LIQUID LIMIT (%) 35 PLASTIC LIMIT (%) 20 PLASTICITY INDEX (%) 15
Sample No.	Description: - Light grey, fine grained, Sandy CLAY of Intermediate Plasticity.	
UD1-S1 7.50m	HISTORY OF SAMPLE Natural State	LIQUID LIMIT (%) 39 PLASTIC LIMIT (%) 24 PLASTICITY INDEX (%) 15
Sample No.	Description: - Light grey, fine grained, Sandy CLAY of Low Plasticity.	
UD1-S2 7.50m	HISTORY OF SAMPLE Natural State	LIQUID LIMIT (%) 34 PLASTIC LIMIT (%) 19 PLASTICITY INDEX (%) 15
Sample No.	Description: - Light grey, fine grained, Sandy CLAY of Low Plasticity.	
UD1-S3 7.50m	HISTORY OF SAMPLE Natural State	LIQUID LIMIT (%) 34 PLASTIC LIMIT (%) 17 PLASTICITY INDEX (%) 17

### PLASTICITY CHART



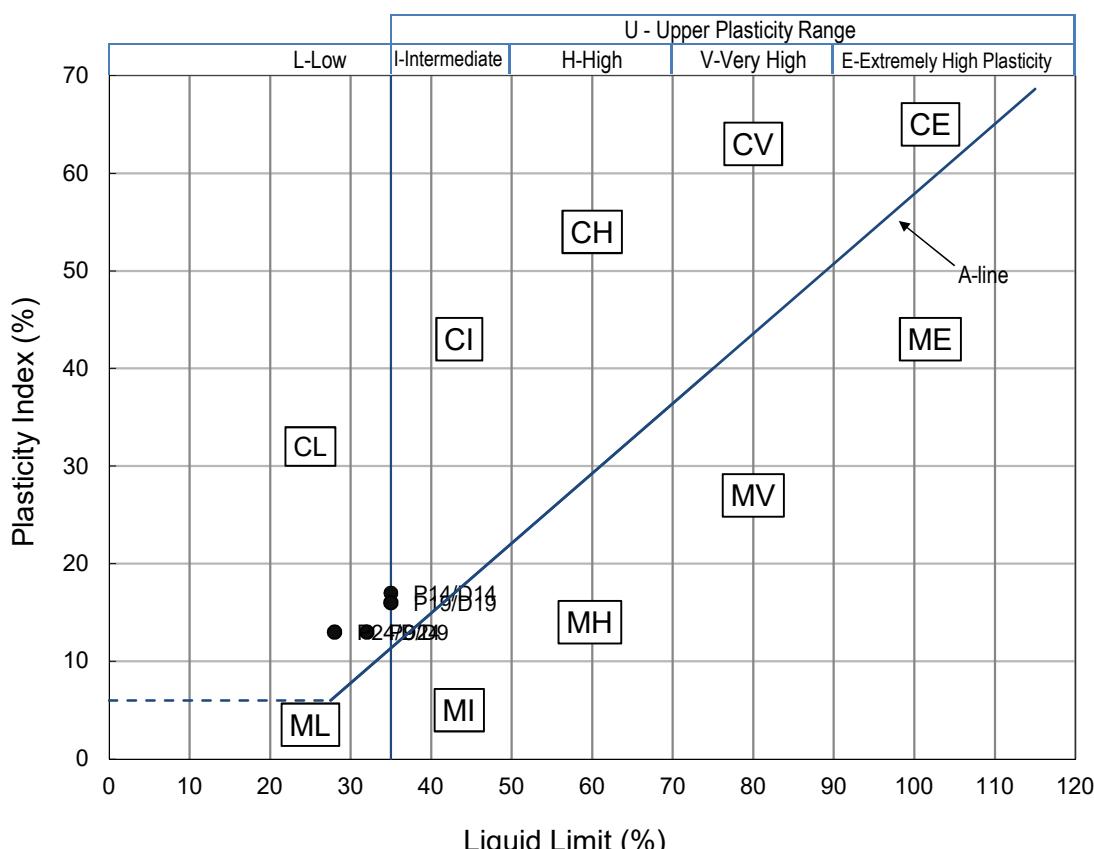
	Client: M/S PLB Engineering Sdn. Bhd.	Borehole No.: BH 9
	Location: Jelutong Rehabilitation & Reclamation At Jelutong, Penang	Sample No.: Refer Below
		Depth: Refer Below
	Report No.: GLSB/SI/3971-155/2022	Test Name: AL Date of test: 11/03/23

## Liquid Limit (Cone Penetrometer) and Plastic Limit

BS 1377 : Part 2: 1990: # 4.4 / 5

Sample No.	Description: - Light grey, Sandy CLAY of Low Plasticity.			
P9/D9 15.00m	HISTORY OF SAMPLE Natural State	LIQUID LIMIT (%) PLASTIC LIMIT (%) PLASTICITY INDEX (%)	32 19 13	
P14/D14 22.50m	HISTORY OF SAMPLE Natural State	LIQUID LIMIT (%) PLASTIC LIMIT (%) PLASTICITY INDEX (%)	35 18 17	
Sample No.	Description: - Light grey with dark grey spotted, Sandy CLAY of Intermediate Plasticity.			
P19/D19 30.00m	HISTORY OF SAMPLE Natural State	LIQUID LIMIT (%) PLASTIC LIMIT (%) PLASTICITY INDEX (%)	35 19 16	
Sample No.	Description: - Light grey, Very Clayey SAND of Low Plasticity.			
P24/D24 37.50m	HISTORY OF SAMPLE Natural State	LIQUID LIMIT (%) PLASTIC LIMIT (%) PLASTICITY INDEX (%)	28 15 13	

### PLASTICITY CHART





Client: M/S PLB Engineering Sdn. Bhd.	Borehole No.: BH 9
Location: Jelutong Rehabilitation & Reclamation At Jelutong, Penang	Sample No.: Refer below
Report No.: GLSB/SI/3971-155/2022	Depth: Refer below
Test Name: PS & HYD	Date of test: 10/03/23

## Particle Size Distribution

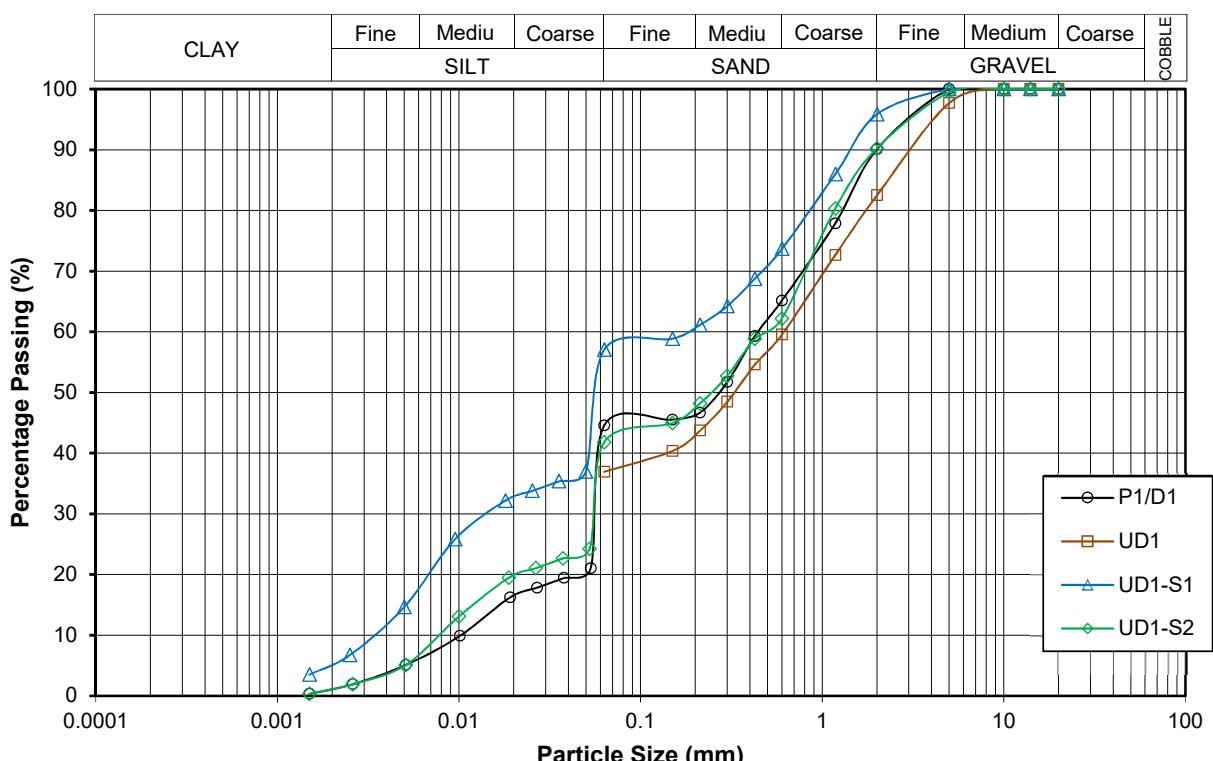
BS 1377 : Part 2 : 1990 # 9.2, 9.3 & 9.5

Sample No.	Description:	- Medium to dark grey, Sandy SILTS/CLAYS			
P1/D1	Gravel	Sand	Silt	Clay	
1.50m	10	46	42	2	

Sample No.	Description:	- Light grey, fine grained, Sandy CLAY of Intermediate Plasticity.			
UD1	Gravel	Sand	Silt	Clay	
7.50m	18	45	37		

Sample No.	Description:	- Light grey, fine grained, Sandy CLAY of Intermediate Plasticity.			
UD1-S1	Gravel	Sand	Silt	Clay	
7.50m	4	39	52	5	

Sample No.	Description:	- Light grey, fine grained, Sandy CLAY of Low Plasticity.			
UD1-S2	Gravel	Sand	Silt	Clay	
7.50m	10	48	40	2	





Client: M/S PLB Engineering Sdn. Bhd.	Borehole No.: BH 9
Location: Jelutong Rehabilitation & Reclamation At Jelutong, Penang	Sample No.: Refer below
Report No.: GLSB/SI/3971-155/2022	Depth: Refer below
Test Name: PS & HYD	Date of test: 10/03/23

## Particle Size Distribution

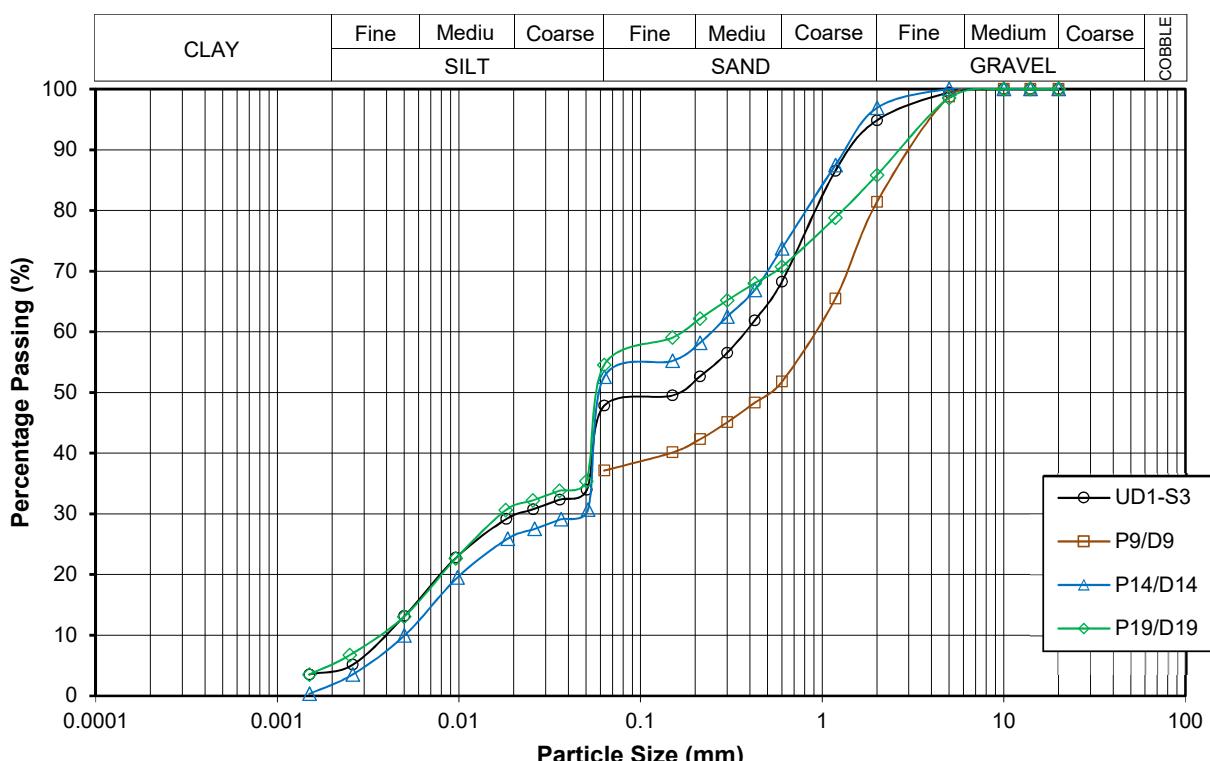
BS 1377 : Part 2 : 1990 # 9.2, 9.3 & 9.5

Sample No.	Description:	- Light grey, fine grained, Sandy CLAY of Low Plasticity.			
UD1-S3	Gravel	Sand		Silt	Clay
7.50m	5	47		44	4

Sample No.	Description:	- Light grey, Sandy CLAY of Low Plasticity.			
P9/D9	Gravel	Sand		Silt	Clay
15.00m	19	44		37	

Sample No.	Description:	- Light grey, Sandy CLAY of Intermediate Plasticity.			
P14/D14	Gravel	Sand		Silt	Clay
22.50m	3	44		50	3

Sample No.	Description:	- Light grey with dark grey spotted, Sandy CLAY of Intermediate Plasticity.			
P19/D19	Gravel	Sand		Silt	Clay
30.00m	14	31		50	5





Client:	M/S PLB Engineering Sdn. Bhd.	Borehole No.:	BH 9
Location:	Jelutong Rehabilitation & Reclamation At Jelutong, Penang	Sample No.:	Refer below
Report No.:	GLSB/SI/3971-155/2022	Depth:	Refer below
		Test Name:	PS & HYD
		Date of test:	10/03/23

## Particle Size Distribution

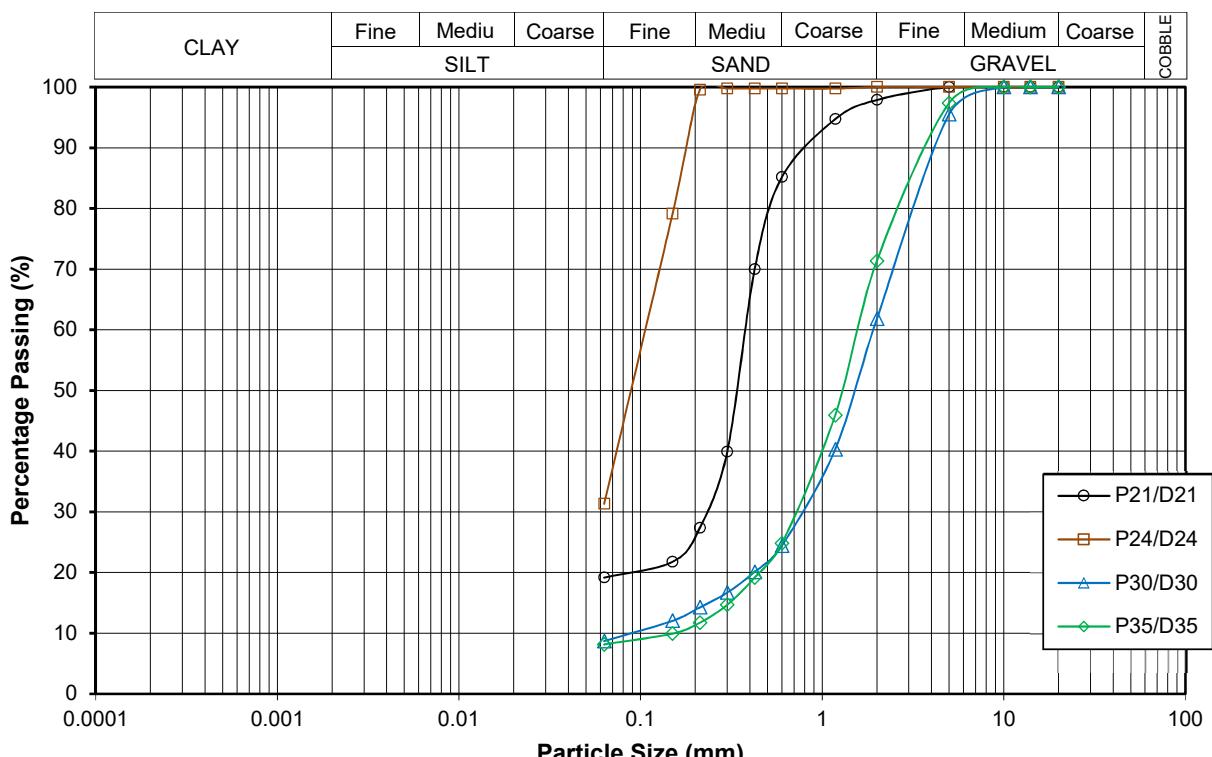
BS 1377 : Part 2 : 1990 # 9.2, 9.3 & 9.5

Sample No.	Description:	-Light grey, Very Silty/Clayey SANDS.		
P21/D21	Gravel	Sand	Silt	Clay
33.00m	2	79	19	

Sample No.	Description:	- Light grey, Very Clayey Sand of Low Plasticity.		
P24/D24	Gravel	Sand	Silt	Clay
37.50m	0	69	31	

Sample No.	Description:	- Light grey, Silty/Clayey SAND.		
P30/D30	Gravel	Sand	Silt	Clay
46.50m	38	53	9	

Sample No.	Description:	- Light brown, Silty Clayey SAND.		
P35/D35	Gravel	Sand	Silt	Clay
54.00m	29	63	8	





# **Unconfined Compression Strength Test**



Client: M/S PLB Engineering Sdn. Bhd.

Borehole No.: BH 1

Location: Jelutong Rehabilitation &amp; Reclamation At Jelutong, Penang

Sample No.: UD2

Job File No.: GLSB/SI/3971-155/2022

Depth: 14.50-15.50m

Test Name: UCT 1

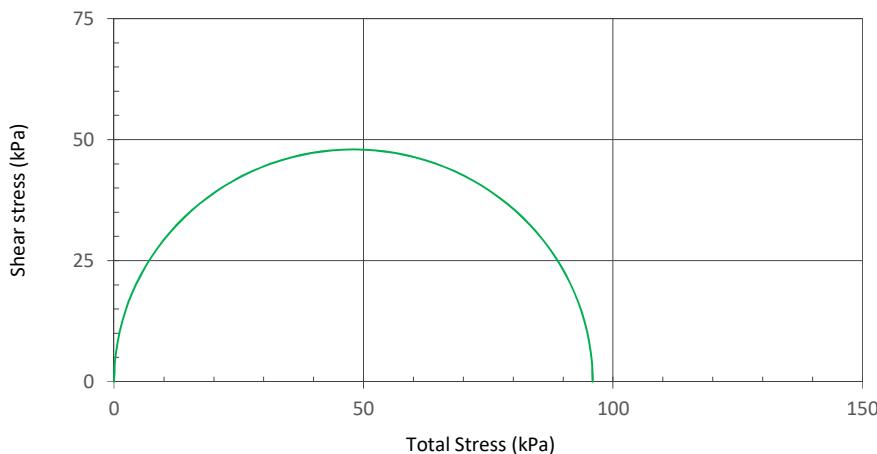
Date of test: 17/01/23

## Total Stress Shear Strength Test

### Unconfined Compressive Strength

(BS 1377-7:1990 # 7.1 &amp; 7.2)

Summary Report &amp; Shear Plot



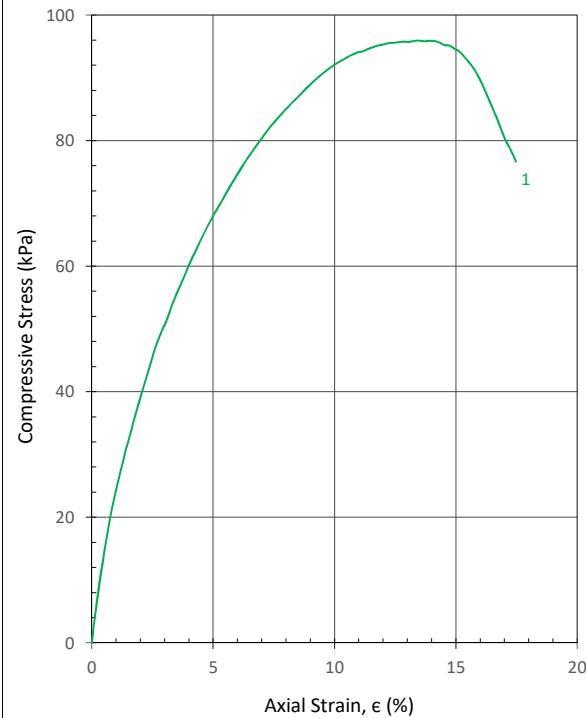
#### Sample Details

Test Depth : 14.50-15.50m      Sample Type : Undisturbed  
Description : Pale brown, Sandy Clay of Intermediate Plasticity.

Specimen: 1  
Length,  $L_o$  : (mm) 150.0  
Diameter,  $D_o$  : (mm) 72.0  
Weight,  $W_o$  : (g) 1307.6  
Particle Density,  $\rho_s$  (measured) ( $Mg/m^3$ ) 2.65

#### Initial Conditions

Average Room Temp,  $t$  : ( $^{\circ}C$ ) 25.5  
Moisture Content,  $\omega_i$  : (%) 20  
Bulk Density,  $\rho_i$  : ( $Mg/m^3$ ) 2.14  
Dry Density,  $\rho_{di}$  : ( $Mg/m^3$ ) 1.79  
Void Ratio,  $e_i$  : . 0.48  
Degree of Saturation,  $S_i$  : (%) 100  
  
Displacement Input,  $L_{IP}$  : (mm) U1-Strain  
Load Input,  $N_{IP}$  : (N) U1-Load  
Pressure Input,  $P_{IP}$  : (kPa) -  
  
Strain Rate,  $d_r$  : (%/min) 1.0  
Membrane Thickness,  $m_b$  : (mm) NIL



#### Final Conditions

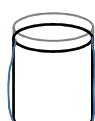
Moisture Content,  $\omega_f$  : (%) 18.0  
Bulk Density,  $\rho_f$  : ( $Mg/m^3$ ) 2.14  
Dry Density,  $\rho_{df}$  : ( $Mg/m^3$ ) 1.81  
Void Ratio,  $e_f$  : . 0.46  
Degree of Saturation,  $S_f$  : (%) 100

#### Failure Conditions

Failure Criteria at Maximum Compressive Stress  
Membrane Corr.,  $m_c$  : (kPa) 0.00  
Axial Strain,  $\epsilon_f$  : (%) 13.47  
Compressive Strength,  $q_u$  : (kPa) 95.93

#### Test Results

$q_u = 96$  (kPa)



Notes :

Tested by: Hamzah

Checked by: Zalipah

Approved by: Tay KH



Client: M/S PLB Engineering Sdn. Bhd.

Borehole No.: BH 7

Location: Jelutong Rehabilitation and Reclamation at Jelutong, Penang.

Sample No.: UD2

Job File No.: GLSB/SI/3971-155/2022

Depth: 6.00m

Test Name: UCT 2

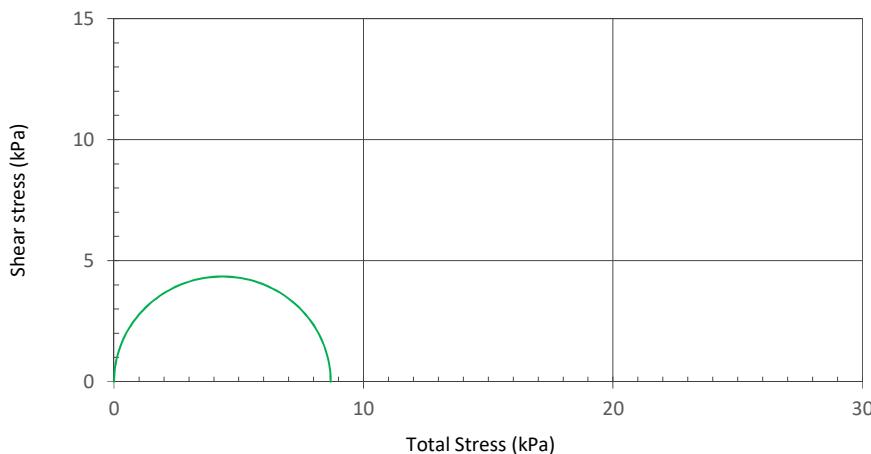
Date of test: 06/03/23

## Total Stress Shear Strength Test

### Unconfined Compressive Strength

(BS 1377-7:1990 # 7.1 &amp; 7.2)

Summary Report &amp; Shear Plot



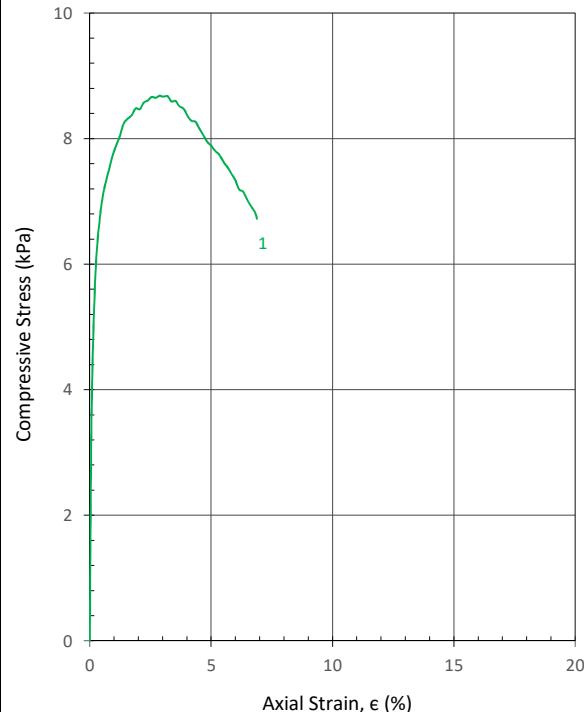
#### Sample Details

Test Depth : 6.00m      Sample Type : Undisturbed  
Description : Medium grey, Sandy Clay of Intermediate Plasticity.

Specimen: 1  
Length,  $L_o$  : (mm) 150.0  
Diameter,  $D_o$  : (mm) 72.0  
Weight,  $W_o$  : (g) 1155.4  
Particle Density,  $\rho_s$  (measured) ( $Mg/m^3$ ) 2.65

#### Initial Conditions

Average Room Temp,  $t$  : ( $^{\circ}C$ ) 25.5  
Moisture Content,  $\omega_i$  : (%) 20  
Bulk Density,  $\rho_i$  : ( $Mg/m^3$ ) 1.89  
Dry Density,  $\rho_{di}$  : ( $Mg/m^3$ ) 1.58  
Void Ratio,  $e_i$  : . 0.68  
Degree of Saturation,  $S_i$  : (%) 77  
  
Displacement Input,  $L_{IP}$  : (mm) U1-Strain  
Load Input,  $N_{IP}$  : (N) U1-Load  
Pressure Input,  $P_{IP}$  : (kPa) -  
  
Strain Rate,  $d_r$  : (%/min) 1.0  
Membrane Thickness,  $m_b$  : (mm) NIL



#### Final Conditions

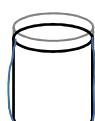
Moisture Content,  $\omega_f$  : (%) 18.0  
Bulk Density,  $\rho_f$  : ( $Mg/m^3$ ) 1.89  
Dry Density,  $\rho_{df}$  : ( $Mg/m^3$ ) 1.60  
Void Ratio,  $e_f$  : . 0.65  
Degree of Saturation,  $S_f$  : (%) 73

#### Failure Conditions

Failure Criteria at Maximum Compressive Stress  
Membrane Corr.,  $m_c$  : (kPa) 0.00  
Axial Strain,  $\epsilon_f$  : (%) 2.88  
Compressive Strength,  $q_u$  : (kPa) 8.68

#### Test Results

$q_u = 9$  (kPa)



Notes :

Tested by: Hamzah

Checked by: Zalipah

Approved by: Tay KH



# **Unconsolidated Undrained Triaxial Compression Strength Test**

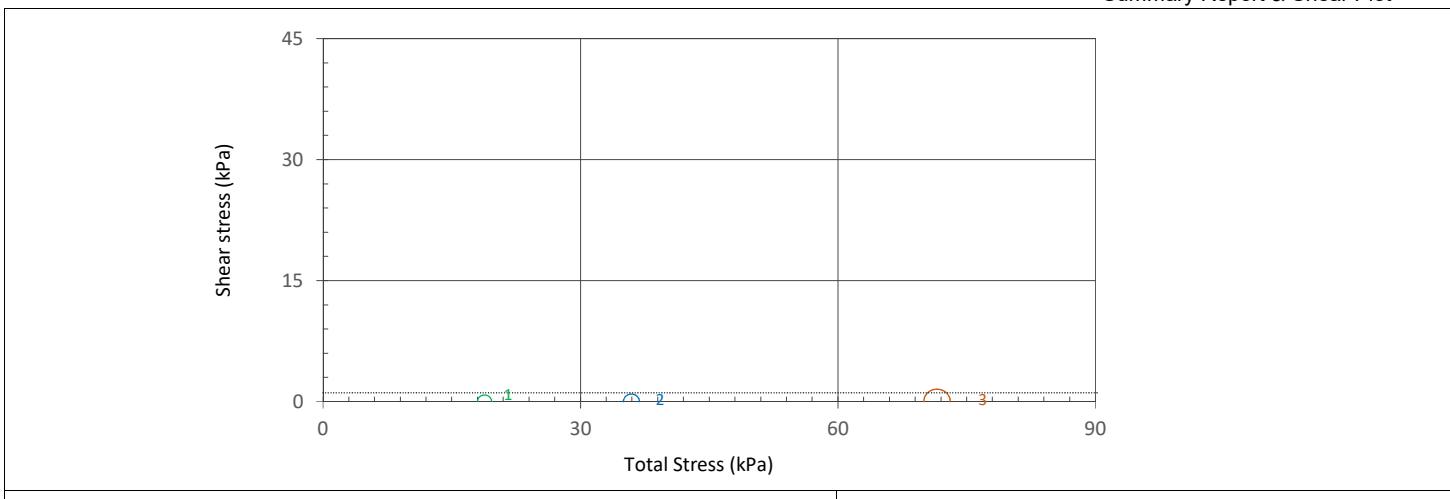
	Client: M/S PLB Engineering Sdn. Bhd.	Borehole No.: BH5
	Location: Jelutong Rehabilitation and Reclamation at Jelutong, Penang.	Sample No.: UD2
	Job File No.: GLSB/SI/3971-155/2022	Depth: 9.00m
	Test Name: UU	Date of test: 14/02/23

## Total Stress Shear Strength Test

### Unconsolidated Undrained Triaxial Compression without PWP Measurement

(BS 1377-7:1990 # 8)

Summary Report & Shear Plot



#### Sample Details

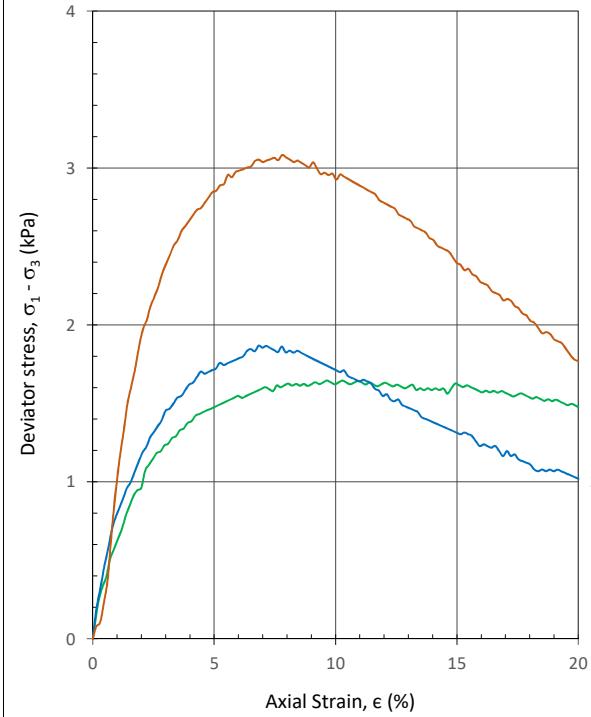
Test Depth : 9.00m      Sample Type : Undisturbed

Description : S1,S,S3 - Medium grey, CLAY

Specimen:	1	2	3	
Length, $L_o$ :	(mm)	150.0	150.0	150.0
Diameter, $D_o$ :	(mm)	70.0	70.0	70.0
Weight, $W_o$ :	(g)	724.8	759.5	761.1
Particle Density, $\rho_s$ (Assumed)	(Mg/m <sup>3</sup> )	2.65	2.65	2.65

#### Initial Conditions

Average Room Temp, $t$ :	(°C)	26	26	26
Moisture Content, $\omega_i$ :	(%)	113	125	102
Bulk Density, $\rho_i$ :	(Mg/m <sup>3</sup> )	1.26	1.32	1.32
Dry Density, $\rho_{di}$ :	(Mg/m <sup>3</sup> )	0.59	0.59	0.65
Void Ratio, $e_i$ :	.	3.50	3.53	3.06
Degree of Saturation, $S_i$ :	(%)	86	94	88
Displacement Input, $L_{IP}$	(mm)	U1-Strain	U1-Strain	U1-Strain
Load Input, $N_{IP}$	(N)	U1-Load	U1-Load	U1-Load
Pressure Input, $P_{IP}$	(kPa)	U1-CP	U1-CP	U1-CP
Cell Pressure, $\sigma_{3i}$	(kPa)	18	35	70
Rate of Strain, $d_r$	(%/min)	0.76	0.76	0.76
Membrane Thickness, $m_b$	(mm)	0.2	0.2	0.2



#### Final Conditions

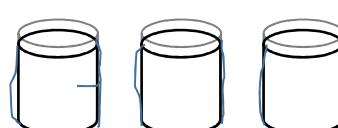
Moisture Content, $\omega_f$ :	(%)	150	157	154
Bulk Density, $\rho_f$ :	(Mg/m <sup>3</sup> )	1.25	1.31	1.32
Dry Density, $\rho_{df}$ :	(Mg/m <sup>3</sup> )	0.5	0.51	0.52
Void Ratio, $e_f$ :	.	4.28	4.17	4.1
Degree of Saturation, $S_f$ :	(%)	93.0	99.6	99.3

#### Failure Conditions

Failure Criteria	Max. Dev. Stress	Max. Dev. Stress	Max. Dev. Stress	
Axial Strain, $\epsilon_f$	(%)	9.65	6.83	7.80
Corr. Dev. Stress, $(\sigma_1 - \sigma_3)_f$	(kPa)	1.65	1.87	3.08
Membrane Corr., $m_c$	(kPa)	0.92	0.54	0.56
Shear Strength, $c_u$	(kPa)	0.82	0.93	1.54

#### Test Results

$c_u = 1$  (kPa)  $\phi = 0$



Notes :

Tested by: Hamzah	Checked by: Zalipah	Approved by: Tay KH
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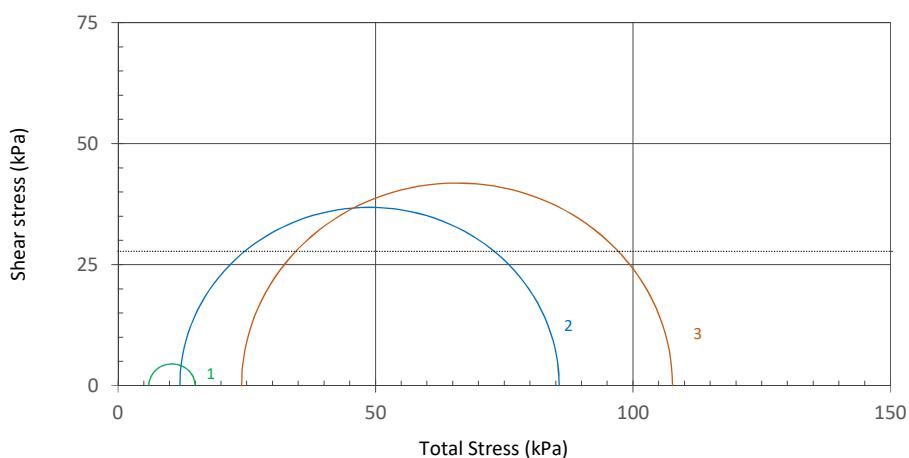
	Client: M/S PLB Engineering Sdn. Bhd.	Borehole No.: BH 7
	Location: Jelutong Rehabilitation and Reclamation at Jelutong, Penang.	Sample No.: UD1
	Job File No.: GLSB/SI/3971-155/2022	Depth: 3.00m
	Test Name: UU2	Date of test: 06/03/23

## Total Stress Shear Strength Test

### Unconsolidated Undrained Triaxial Compression without PWP Measurement

(BS 1377-7:1990 # 8)

Summary Report & Shear Plot

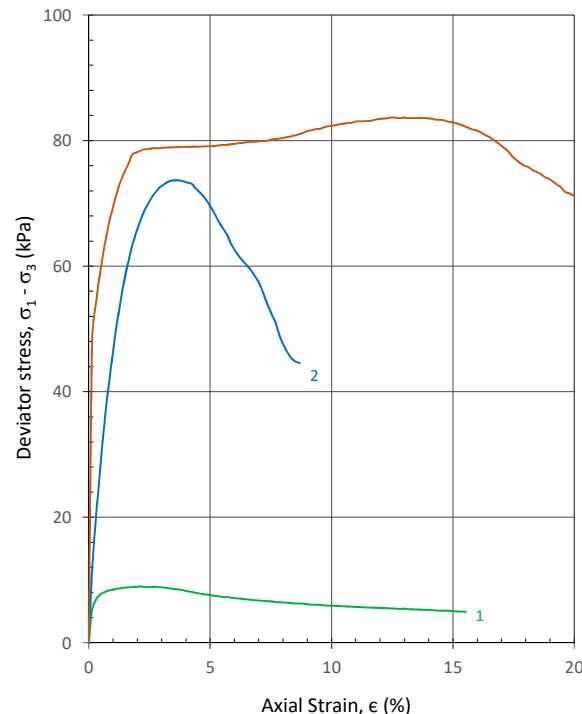


#### Sample Details

Test Depth :	3.00m	Sample Type :	Undisturbed	
Description :	S1-Medium Grey, Clay of Very High Plasticity, S2- SILT of High Plasticity, S3-SILT of Very High Plasticity			
Specimen:	1	2	3	
Length, $L_o$ :	(mm)	150.0	150.0	150.0
Diameter, $D_o$ :	(mm)	72.0	72.0	72.0
Weight, $W_o$ :	(g)	956.6	1035.9	1120.5
Particle Density, $\rho_s$ (Assumed)	(Mg/m <sup>3</sup> )	2.65	2.65	2.65

#### Initial Conditions

Average Room Temp, $t$ :	(°C)	26	26	26
Moisture Content, $\omega_i$ :	(%)	64	40	59
Bulk Density, $\rho_i$ :	(Mg/m <sup>3</sup> )	1.57	1.70	1.83
Dry Density, $\rho_{di}$ :	(Mg/m <sup>3</sup> )	0.96	1.21	1.16
Void Ratio, $e_i$ :	.	1.77	1.19	1.29
Degree of Saturation, $S_i$ :	(%)	96	89	100
Displacement Input, $L_{IP}$	(mm)	U1-Strain	U1-Strain	U1-Strain
Load Input, $N_{IP}$	(N)	U1-Load	U1-Load	U1-Load
Pressure Input, $P_{IP}$	(kPa)	U1-CP	U1-CP	U1-CP
Cell Pressure, $\sigma_{3i}$	(kPa)	6	12	24
Rate of Strain, $d_r$	(%/min)	1.00	1.00	1.00
Membrane Thickness, $m_b$	(mm)	0.2	0.2	0.2



#### Final Conditions

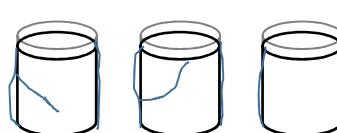
Moisture Content, $\omega_f$ :	(%)	75	59	64
Bulk Density, $\rho_f$ :	(Mg/m <sup>3</sup> )	1.58	1.70	1.84
Dry Density, $\rho_{df}$ :	(Mg/m <sup>3</sup> )	0.9	1.07	1.12
Void Ratio, $e_f$ :	.	1.96	1.48	1.37
Degree of Saturation, $S_f$ :	(%)	100.0	100.0	100.0

#### Failure Conditions

Failure Criteria	Max. Dev. Stress	Max. Dev. Stress	Max. Dev. Stress
Axial Strain, $\epsilon_f$	(%)	2.10	3.58
Corr. Dev. Stress, $(\sigma_1 - \sigma_3)_f$	(kPa)	8.97	73.67
Membrane Corr., $m_c$	(kPa)	0.16	0.75
Shear Strength, $c_u$	(kPa)	4.49	36.83
			41.84

#### Test Results

$c_u = 28$  (kPa)  $\phi = 0$



Notes :

Tested by: Hamzah

Checked by: Zalipah

Zalipah

Approved by: Tay KH

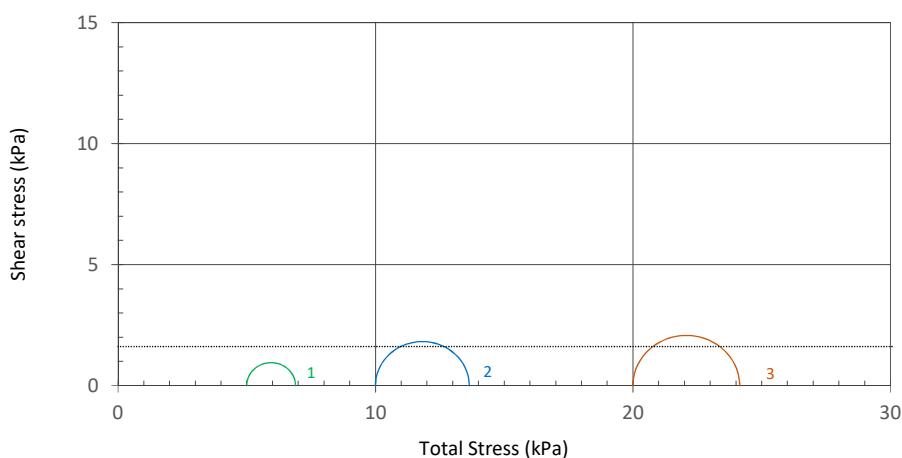
	Client: M/S PLB Engineering Sdn. Bhd.	Borehole No.: BH8
	Location: Jelutong Rehabilitation and Reclamation at Jelutong, Penang.	Sample No.: UD1
	Job File No.: GLSB/SI/3971-155/2022	Depth: 2.00m
	Test Name: UU3	Date of test: 10/03/23

## Total Stress Shear Strength Test

### Unconsolidated Undrained Triaxial Compression without PWP Measurement

(BS 1377-7:1990 # 8)

Summary Report & Shear Plot



#### Sample Details

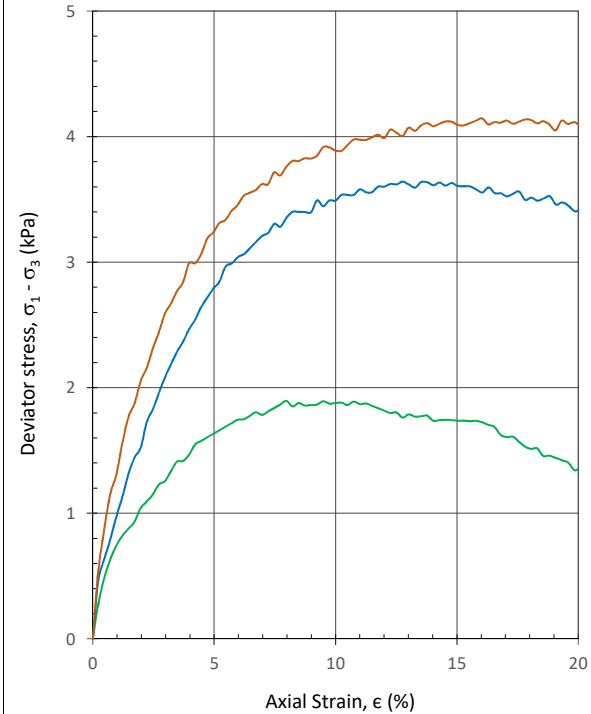
Test Depth : 2.00m      Sample Type : Undisturbed

Description : S1,S2 - Medium grey, CLAY, S3-Sandy CLAY

Specimen:	1	2	3	
Length, $L_o$ :	(mm)	150.0	150.0	150.0
Diameter, $D_o$ :	(mm)	70.0	70.0	70.0
Weight, $W_o$ :	(g)	750.2	800.7	802.5
Particle Density, $\rho_s$ (Assumed)	(Mg/m <sup>3</sup> )	2.65	2.65	2.65

#### Initial Conditions

Average Room Temp, $t$ :	(°C)	26	26	26
Moisture Content, $\omega_i$ :	(%)	131	129	128
Bulk Density, $\rho_i$ :	(Mg/m <sup>3</sup> )	1.30	1.39	1.39
Dry Density, $\rho_{di}$ :	(Mg/m <sup>3</sup> )	0.56	0.60	0.61
Void Ratio, $e_i$ :	.	3.72	3.38	3.35
Degree of Saturation, $S_i$ :	(%)	94	100	100
Displacement Input, $L_{IP}$	(mm)	U1-Strain	U1-Strain	U1-Strain
Load Input, $N_{IP}$	(N)	U1-Load	U1-Load	U1-Load
Pressure Input, $P_{IP}$	(kPa)	U1-CP	U1-CP	U1-CP
Cell Pressure, $\sigma_{3i}$	(kPa)	5	10	20
Rate of Strain, $d_r$	(%/min)	0.76	0.76	0.76
Membrane Thickness, $m_b$	(mm)	0.2	0.2	0.2



#### Final Conditions

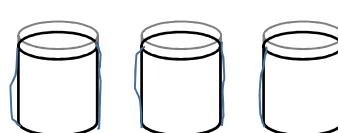
Moisture Content, $\omega_f$ :	(%)	124	125	124
Bulk Density, $\rho_f$ :	(Mg/m <sup>3</sup> )	1.30	1.40	1.39
Dry Density, $\rho_{df}$ :	(Mg/m <sup>3</sup> )	0.58	0.62	0.62
Void Ratio, $e_f$ :	.	3.58	3.30	3.28
Degree of Saturation, $S_f$ :	(%)	92.2	100.0	100.0

#### Failure Conditions

Failure Criteria	Max. Dev. Stress	Max. Dev. Stress	Max. Dev. Stress	
Axial Strain, $\epsilon_f$	(%)	7.98	12.77	16.04
Corr. Dev. Stress, $(\sigma_1 - \sigma_3)_f$	(kPa)	1.89	3.64	4.14
Membrane Corr., $m_c$	(kPa)	0.75	0.91	1.04
Shear Strength, $c_u$	(kPa)	0.95	1.82	2.07

#### Test Results

$c_u = 2$  (kPa)  $\phi = 0$



Notes :

Tested by: Hamzah

Checked by: Zalipah

Zalipah

Approved by: Tay KH

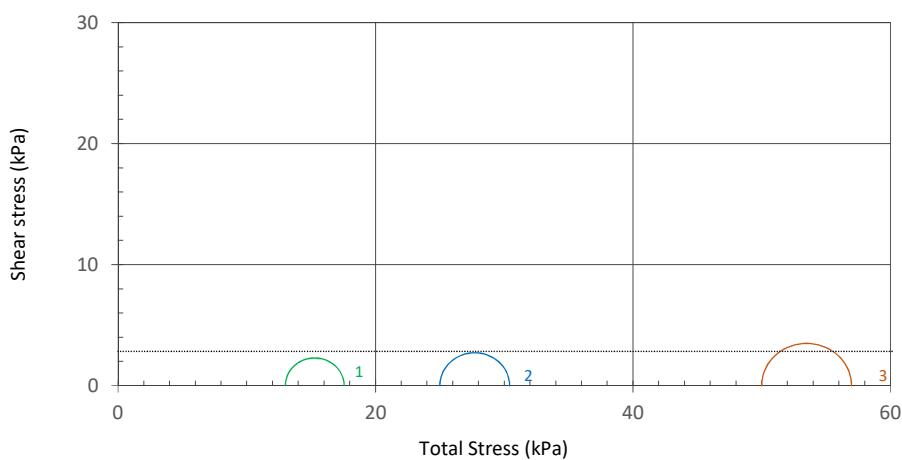
	Client: M/S PLB Engineering Sdn. Bhd.	Borehole No.: BH8
	Location: Jelutong Rehabilitation and Reclamation at Jelutong, Penang.	Sample No.: UD2
	Job File No.: GLSB/SI/3971-155/2022	Depth: 6.50m
	Test Name: UU4	Date of test: 10/03/23

## Total Stress Shear Strength Test

### Unconsolidated Undrained Triaxial Compression without PWP Measurement

(BS 1377-7:1990 # 8)

Summary Report & Shear Plot



#### Sample Details

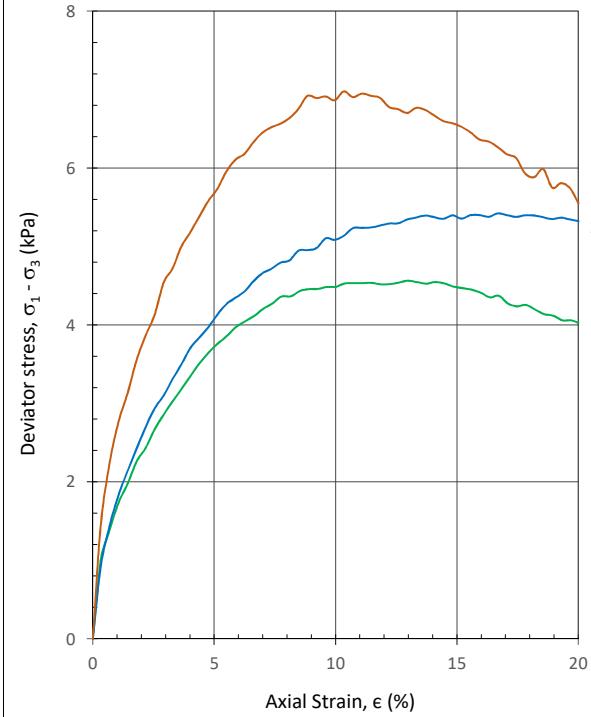
Test Depth : 6.00 m      Sample Type : Undisturbed

Description : S1,S2,S3 -Medium grey, CLAY

Specimen:	1	2	3	
Length, $L_o$ :	(mm)	150.0	150.0	150.0
Diameter, $D_o$ :	(mm)	70.0	70.0	70.0
Weight, $W_o$ :	(g)	771.7	773.5	781.4
Particle Density, $\rho_s$ (Assumed)	(Mg/m <sup>3</sup> )	2.65	2.65	2.65

#### Initial Conditions

Average Room Temp, $t$ :	(°C)	26	26	26
Moisture Content, $\omega_i$ :	(%)	136	131	129
Bulk Density, $\rho_i$ :	(Mg/m <sup>3</sup> )	1.34	1.34	1.35
Dry Density, $\rho_{di}$ :	(Mg/m <sup>3</sup> )	0.57	0.58	0.59
Void Ratio, $e_i$ :	.	3.68	3.57	3.47
Degree of Saturation, $S_i$ :	(%)	98	97	98
Displacement Input, $L_{IP}$	(mm)	U1-Strain	U1-Strain	U1-Strain
Load Input, $N_{IP}$	(N)	U1-Load	U1-Load	U1-Load
Pressure Input, $P_{IP}$	(kPa)	U1-CP	U1-CP	U1-CP
Cell Pressure, $\sigma_{3i}$	(kPa)	13	25	50
Rate of Strain, $d_r$	(%/min)	1.50	1.50	1.50
Membrane Thickness, $m_b$	(mm)	0.2	0.2	0.2



#### Final Conditions

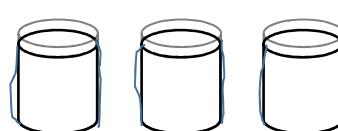
Moisture Content, $\omega_f$ :	(%)	107	115	114
Bulk Density, $\rho_f$ :	(Mg/m <sup>3</sup> )	1.35	1.33	1.35
Dry Density, $\rho_{df}$ :	(Mg/m <sup>3</sup> )	0.65	0.62	0.63
Void Ratio, $e_f$ :	.	3.10	3.26	3.19
Degree of Saturation, $S_f$ :	(%)	91.3	93.8	94.7

#### Failure Conditions

Failure Criteria	Max. Dev. Stress	Max. Dev. Stress	Max. Dev. Stress
Axial Strain, $\epsilon_f$ (%)	12.99	16.69	10.34
Corr. Dev. Stress, $(\sigma_1 - \sigma_3)_f$ (kPa)	4.56	5.42	6.98
Membrane Corr., $m_c$ (kPa)	0.82	1.00	0.67
Shear Strength, $c_u$ (kPa)	2.28	2.71	3.49

#### Test Results

$c_u = 3$  (kPa)  $\phi = 0$



Notes :

Tested by: Hamzah

Checked by: Zalipah

Zalipah

Approved by: Tay KH



# **Consolidated Undrained Triaxial Compression Strength Test**



Client: M/S PLB Engineering Sdn. Bhd.

Borehole No.: BH1

Location: Jelutong Rehabilitation &amp; Reclamantion At Jelutong, Penang

Sample No.: UD1

Job File No.: GLSB/SI/3971-155/2022

Depth: 4.50-5.50m

Test Name: SCU1

Date of test: 15/1/2023

## Effective Stress Triaxial Compression Test

### Consolidated Undrained with Pore Pressure Measurement

(BS 1377-8:1990 # 4, 5, 6 &amp; 7)

Summary Report

#### Sample Details

Test Depth :	4.70-5.20m		
Description :	SP1&SP2-Very Clayey SAND of Intermediate Plasticity; SP3-Very Silty/Clayey SAND		
Sample Type	Undisturbed		
Specimen:	1	2	3
Length, $L_o$ :	(mm)	150.0	150.0
Diameter, $D_o$ :	(mm)	72.0	72.0
Weight, $W_o$ :	(g)	1214.8	1256.0
Particle Density, $\rho_s$ : (assumed)	(Mg/m <sup>3</sup> )	2.65	2.65

#### Initial Conditions

Average Room Temp, $t$ :	(°C)	25.0	25.0	25.0
Moisture Content, $\omega_i$ :	(%)	25	23	23
Bulk Density, $\rho_i$ :	(Mg/m <sup>3</sup> )	1.99	2.06	2.06
Dry Density, $\rho_{di}$ :	(Mg/m <sup>3</sup> )	1.59	1.68	1.67
Void Ratio, $e_i$ :	.	0.672	0.582	0.586
Degree of Saturation, $S_i$ :	(%)	100.0	100.0	100.0
Displacement Input, $L_{IP}$	(mm)	TS16-Strain	TS14-Strain	TS13-Strain
Load Input, $N_{IP}$	(N)	TS16-Load	TS14-Load	TS13-Load
Pore Pressure Input, $u_{IP}$	(kPa)	TS16-PWP	TS14-PWP	TS13-PWP
Cell Pressure Input, $CP_{IP}$	(kPa)	TS16-CP	TS14-CP	TS13-CP
Back Pressure Input, $BP_{IP}$	(kPa)	TS16-BP	TS14-BP	TS13-BP
Volume Input, $V_{IP}$	(cm <sup>3</sup> )	TS16-VC	TS14-VC	TS13-VC
Cell Pressure, $\sigma_{3i}$	(kPa)	322.5	345	390
Back Pressure, $u_{bi}$	(kPa)	300	300	300
Pore Pressure, $u_i$	(kPa)	300	300	300
Strain Rate, $d_r$	(mm/min)	0.04026	0.060	0.060
Membrane Thickness, $m_b$	(mm)	0.20	0.20	0.20
B Value, B	.	0.99	0.97	0.97

#### Final Conditions

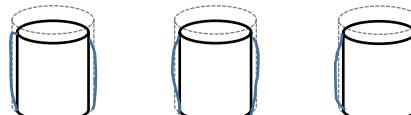
Moisture Content, $\omega_f$ :	(%)	23	22	18
Bulk Density, $\rho_f$ :	(Mg/m <sup>3</sup> )	1.99	2.06	2.08
Dry Density, $\rho_{df}$ :	(Mg/m <sup>3</sup> )	1.62	1.69	1.76
Void Ratio, $e_f$ :	.	0.636	0.568	0.509
Degree of Saturation, $S_f$ :	(%)	97.3	100	95.2

#### Failure Conditions

Failure Criteria		Max. Deviator Stress	Max. Deviator Stress	Max. Deviator Stress
Axial Strain, $\epsilon_f$	(%)	19.65	18.06	19.01
Corr. Deviator Stress, $(\sigma_1 - \sigma_3)_f$	(kPa)	46.8	81.5	130.0
Minor Principal Stresses, $\sigma'_3 f$	(kPa)	20.4	29.6	52.8
Major Principal Stresses, $\sigma'_1 f$	(kPa)	67.2	111.1	182.8
Pore Pressure, $u_f$	(kPa)	302.1	315.4	337.2
Principal Stress Ratio, $(\sigma'_1 / \sigma'_3)_f$	.	3.295	3.754	3.463
Pore Pressure Coefficient, A	.	0.045	0.189	0.286

#### Test Results

$C' = 5$  kPa       $a' = 4$  kPa  
 $\phi' = 30^\circ$        $\alpha' = 27^\circ$



Notes :

Tested by: Myint Tun

Checked by: Zalipah

Approved by: Tay KH

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	Client: M/S PLB Engineering Sdn. Bhd.	Borehole No.: BH1
	Location: Jelutong Rehabilitation & Reclamantion At Jelutong, Penang	Sample No.: UD1
	Job File No.: GLSB/SI/3971-155/2022	Depth: 4.50-5.50m
	Test Name: SCU1	Date of test: 15/01/23

## Effective Stress Triaxial Compression Test

### Consolidated Undrained with Pore Pressure Measurement

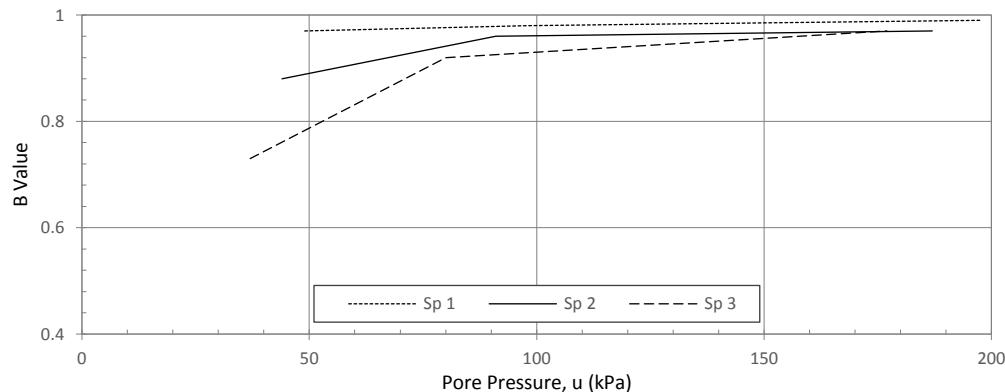
(BS 1377-8:1990 # 4, 5, 6 & 7)

Saturation & Consolidation Plots

#### Saturation Stage

Specimen:	1	2	3
Method: a) Cell & Back Pressure	Stepped	Stepped	Stepped
Final Cell Pressure, $\sigma_f$ (kPa)	200	200	200
Final Pore Pressure, $u_f$ (kPa)	198	187	177

B Value, B . 0.99 0.97 0.97

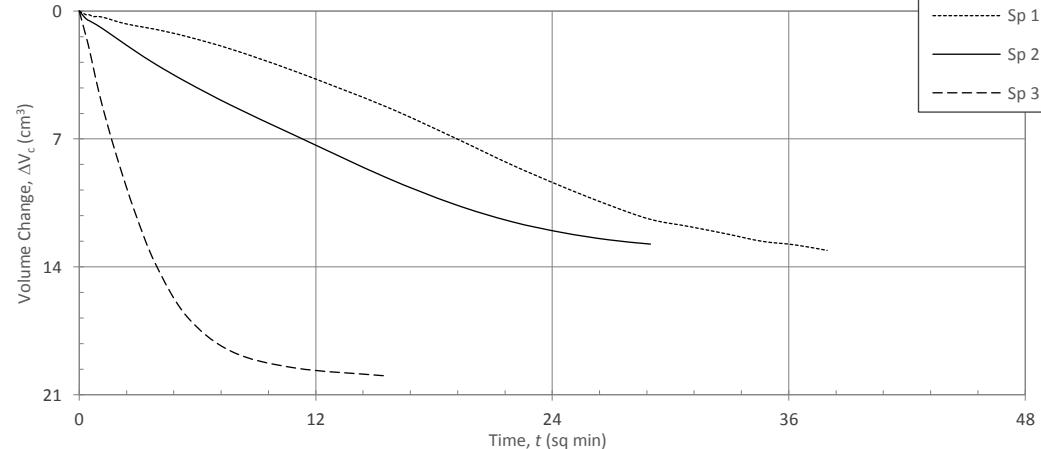


#### Consolidation Stage

Initial Conditions	Drainage Method:	From one end		
	Cell Pressure, $\sigma_{3i}$ (kPa)	322.5	345	390
	Back Pressure, $u_{bi}$ (kPa)	300	300	300
	Pore Pressure, $u_{pwp}$ (kPa)	319	331	366
Final Conditions	Degree of Consolidation, U (%)	100	100	100
	Volumetric Strain, $\epsilon_v$ (%)	2.14	2.09	3.27
	Corrected Length, $L_c$ (mm)	148.9	149.0	148.4
	Corrected Area, $A_c$ ( $\text{mm}^2$ )	40.13	40.15	39.83
	Corrected Volume, $V_c$ ( $\text{cm}^3$ )	597.626	597.976	590.763
	Time to Failure, $t_{100}$ (min)	1167.57	373.02	20.82
	Coefficient of Consolidation, $c_{vi}$ ( $\text{m}^2/\text{yr}$ )	7.335	22.958	411.334
	Coefficient of Compressibility, $m_{vi}$ ( $\text{m}^2/\text{MN}$ )	1.007	0.586	0.415
	Estimated Strain at Failure, $\epsilon_f$ (%)	20	20	20

Testing Time,  $t_f$  (h:m:s) 10:18:48 3:17:42 2:00:00

Rate of Axial Displacement,  $d_r$  (mm/min) 0.04813 0.15069 0.24728



Tested by: Myint Tun

Checked by: Zalipah

Approved by: Tay KH

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Client: M/S PLB Engineering Sdn. Bhd.

Borehole No.: BH1

Location: Jelutong Rehabilitation &amp; Reclamation At Jelutong, Penang

Sample No.: UD1

Job File No.: GLSB/SI/3971-155/2022

Depth: 4.50-5.50m

Test Name: SCU1

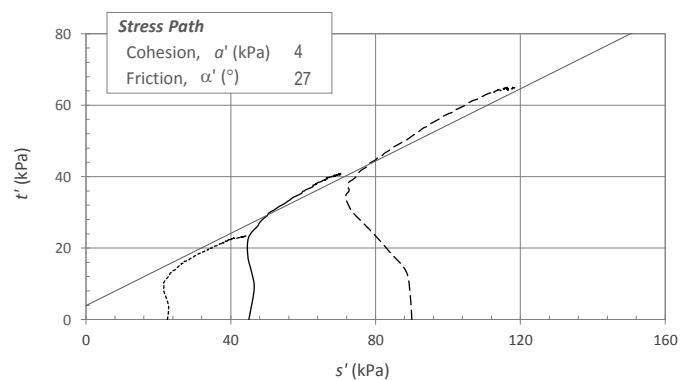
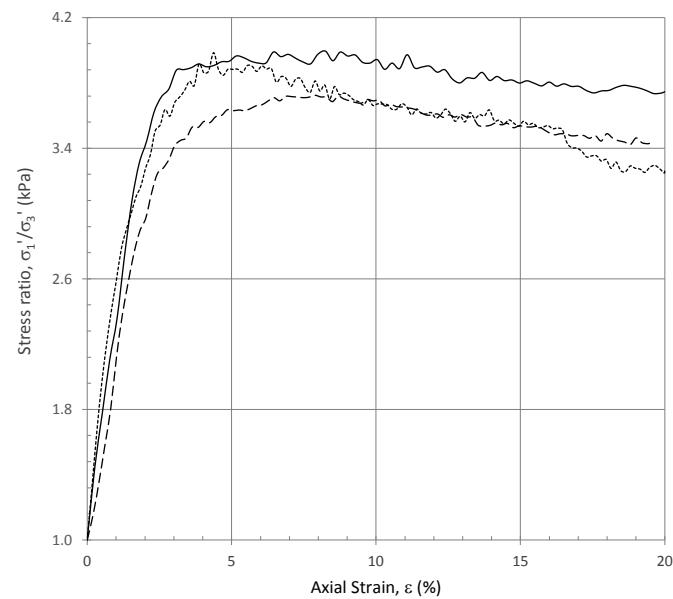
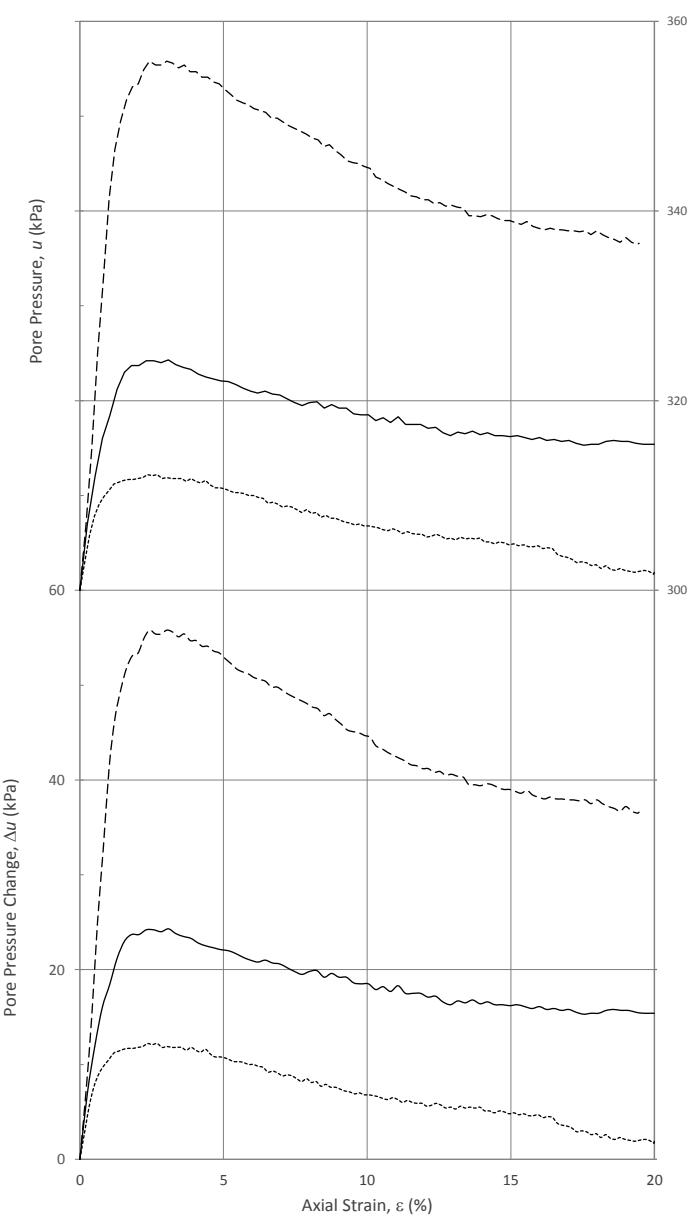
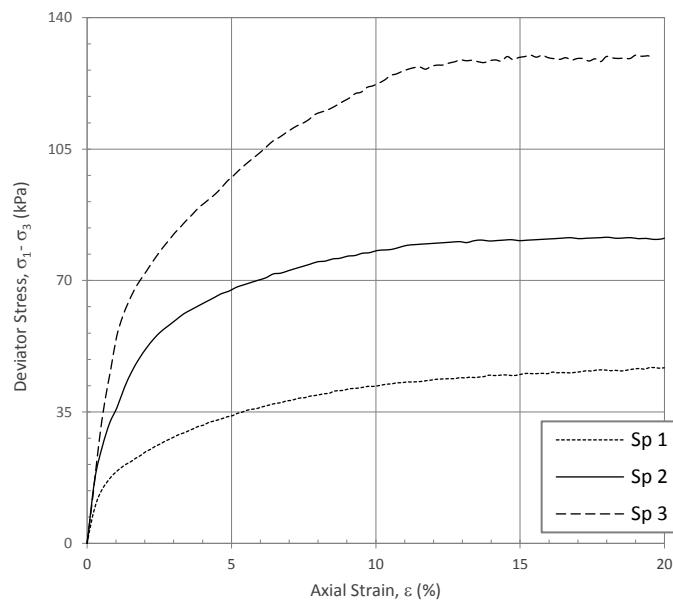
Date of test: 15/01/23

## Effective Stress Triaxial Compression Test

### Consolidated Undrained with Pore Pressure Measurement

(BS 1377-8:1990 # 4, 5, 6 &amp; 7)

Shear Plots



Tested by: Myint Tun

Checked by: Zalipah

Approved by: Tay KH

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Client: M/S PLB Engineering Sdn. Bhd.

Borehole No.: BH3

Location: Jelutong Rehabilitation &amp; Reclamation At Jelutong, Penang

Sample No.: UD2

Job File No.: GLSB/SI/3971-155/2022

Depth: 8.50-9.50m

Test Name: SCU2

Date of test: 14/1/2023

## Effective Stress Triaxial Compression Test

### Consolidated Undrained with Pore Pressure Measurement

(BS 1377-8:1990 # 4, 5, 6 &amp; 7)

Summary Report

#### Sample Details

Test Depth :	8.70-9.20m		
Description :	SP1&SP3-Very Silty/Clayey SANDS; SP2-Silty/Clayey SANDS		
Sample Type	Undisturbed		
Specimen:	1	2	3
Length, $L_o$ :	(mm)	150.0	150.0
Diameter, $D_o$ :	(mm)	72.0	72.0
Weight, $W_o$ :	(g)	1208.8	1204.1
Particle Density, $\rho_s$ : (assumed)	(Mg/m <sup>3</sup> )	2.65	2.65

#### Initial Conditions

Average Room Temp, $t$ :	(°C)	25.0	25.0	25.0
Moisture Content, $\omega_i$ :	(%)	21	19	20
Bulk Density, $\rho_i$ :	(Mg/m <sup>3</sup> )	1.98	1.97	2.00
Dry Density, $\rho_{di}$ :	(Mg/m <sup>3</sup> )	1.64	1.66	1.67
Void Ratio, $e_i$ :	.	0.620	0.594	0.588
Degree of Saturation, $S_i$ :	(%)	90.0	83.0	91.0
Displacement Input, $L_{IP}$	(mm)	TS13-Strain	TS15-Strain	TS14-Strain
Load Input, $N_{IP}$	(N)	TS13-Load	TS15-Load	TS14-Load
Pore Pressure Input, $u_{IP}$	(kPa)	TS13-PWP	TS15-PWP	TS14-PWP
Cell Pressure Input, $CP_{IP}$	(kPa)	TS13-CP	TS15-CP	TS14-CP
Back Pressure Input, $BP_{IP}$	(kPa)	TS13-BP	TS15-BP	TS14-BP
Volume Input, $V_{IP}$	(cm <sup>3</sup> )	TS13-VC	TS15-VC	TS14-VC
Cell Pressure, $\sigma_{3i}$	(kPa)	542.5	685	770
Back Pressure, $u_{bi}$	(kPa)	500	600	600
Pore Pressure, $u_i$	(kPa)	500	600	600
Strain Rate, $d_r$	(mm/min)	0.060	0.060	0.060
Membrane Thickness, $m_b$	(mm)	0.20	0.20	0.20
B Value, B	.	0.96	0.95	0.95

#### Final Conditions

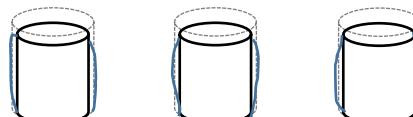
Moisture Content, $\omega_f$ :	(%)	28	21	21
Bulk Density, $\rho_f$ :	(Mg/m <sup>3</sup> )	2.00	2.00	2.06
Dry Density, $\rho_{df}$ :	(Mg/m <sup>3</sup> )	1.56	1.65	1.70
Void Ratio, $e_f$ :	.	0.701	0.602	0.562
Degree of Saturation, $S_f$ :	(%)	100	93.2	98.5

#### Failure Conditions

Failure Criteria		Max. Deviator Stress	Max. Deviator Stress	Max. Deviator Stress
Axial Strain, $\epsilon_f$	(%)	19.35	19.61	18.05
Corr. Deviator Stress, $(\sigma_1 - \sigma_3)_f$	(kPa)	112.3	189.4	247.7
Minor Principal Stresses, $\sigma'_3 f$	(kPa)	52.2	82.0	105.7
Major Principal Stresses, $\sigma'_1 f$	(kPa)	164.5	271.4	353.4
Pore Pressure, $u_f$	(kPa)	490.3	603.0	664.3
Principal Stress Ratio, $(\sigma'_1 / \sigma'_3)_f$	.	3.152	3.309	3.344
Pore Pressure Coefficient, A	.	-0.086	0.016	0.260

#### Test Results

$C' = 4$  kPa       $a' = 3$  kPa  
 $\phi' = 31^\circ$        $\alpha' = 27^\circ$



Notes :

Tested by: Myint Tun

Checked by: Zalipah

Approved by: Tay KH

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Client: M/S PLB Engineering Sdn. Bhd.

Borehole No.: BH3

Location: Jelutong Rehabilitation &amp; Reclamation At Jelutong, Penang

Sample No.: UD2

Job File No.: GLSB/SI/3971-155/2022

Depth: 8.50-9.50m

Test Name: SCU2

Date of test: 14/01/23

## Effective Stress Triaxial Compression Test

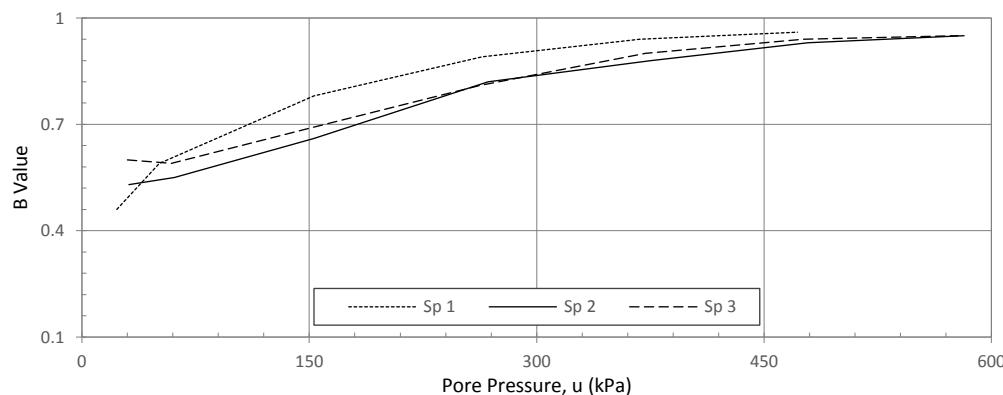
### Consolidated Undrained with Pore Pressure Measurement

(BS 1377-8:1990 # 4, 5, 6 &amp; 7)

Saturation &amp; Consolidation Plots

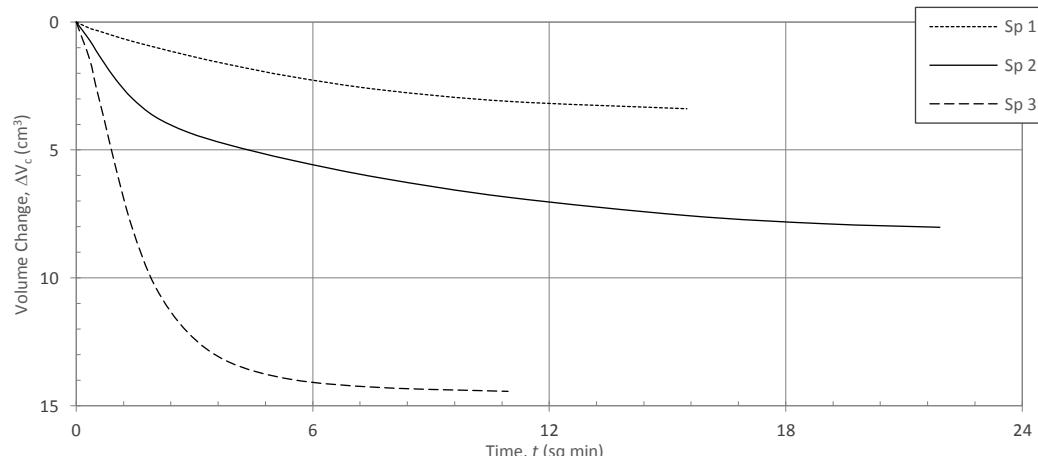
#### Saturation Stage

Specimen:	1	2	3
Method: a) Cell & Back Pressure	Stepped	Stepped	Stepped
Final Cell Pressure, $\sigma_f$ (kPa)	500	600	600
Final Pore Pressure, $u_f$ (kPa)	472	582	578
B Value, B	.96	0.95	0.95



#### Consolidation Stage

Initial Conditions	Drainage Method:	From one end		
	Cell Pressure, $\sigma_{3i}$ (kPa)	542.5	685	770
	Back Pressure, $u_{bi}$ (kPa)	500	600	600
	Pore Pressure, $u_{pwp}$ (kPa)	513	662	741
Final Conditions	Degree of Consolidation, U (%)	96.0	99.5	100
	Volumetric Strain, $\epsilon_v$ (%)	0.55	1.31	2.36
	Corrected Length, $L_c$ (mm)	149.7	149.3	148.8
	Corrected Area, $A_c$ ( $\text{mm}^2$ )	40.56	40.36	40.07
	Corrected Volume, $V_c$ ( $\text{cm}^3$ )	607.337	602.699	596.288
	Time to Failure, $t_{100}$ (min)	54.35	15.50	5.58
	Coefficient of Consolidation, $c_{vi}$ ( $\text{m}^2/\text{yr}$ )	157.561	552.600	1535.641
	Coefficient of Compressibility, $m_{vi}$ ( $\text{m}^2/\text{MN}$ )	0.459	0.213	0.159
	Estimated Strain at Failure, $\epsilon_f$ (%)	20	20	20



Tested by: Myint Tun

Checked by: Zalipah

Approved by: Tay KH

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Client: M/S PLB Engineering Sdn. Bhd.

Borehole No.: BH3

Location: Jelutong Rehabilitation &amp; Reclamation At Jelutong, Penang

Sample No.: UD2

Job File No.: GLSB/SI/3971-155/2022

Depth: 8.50-9.50m

Test Name: SCU2

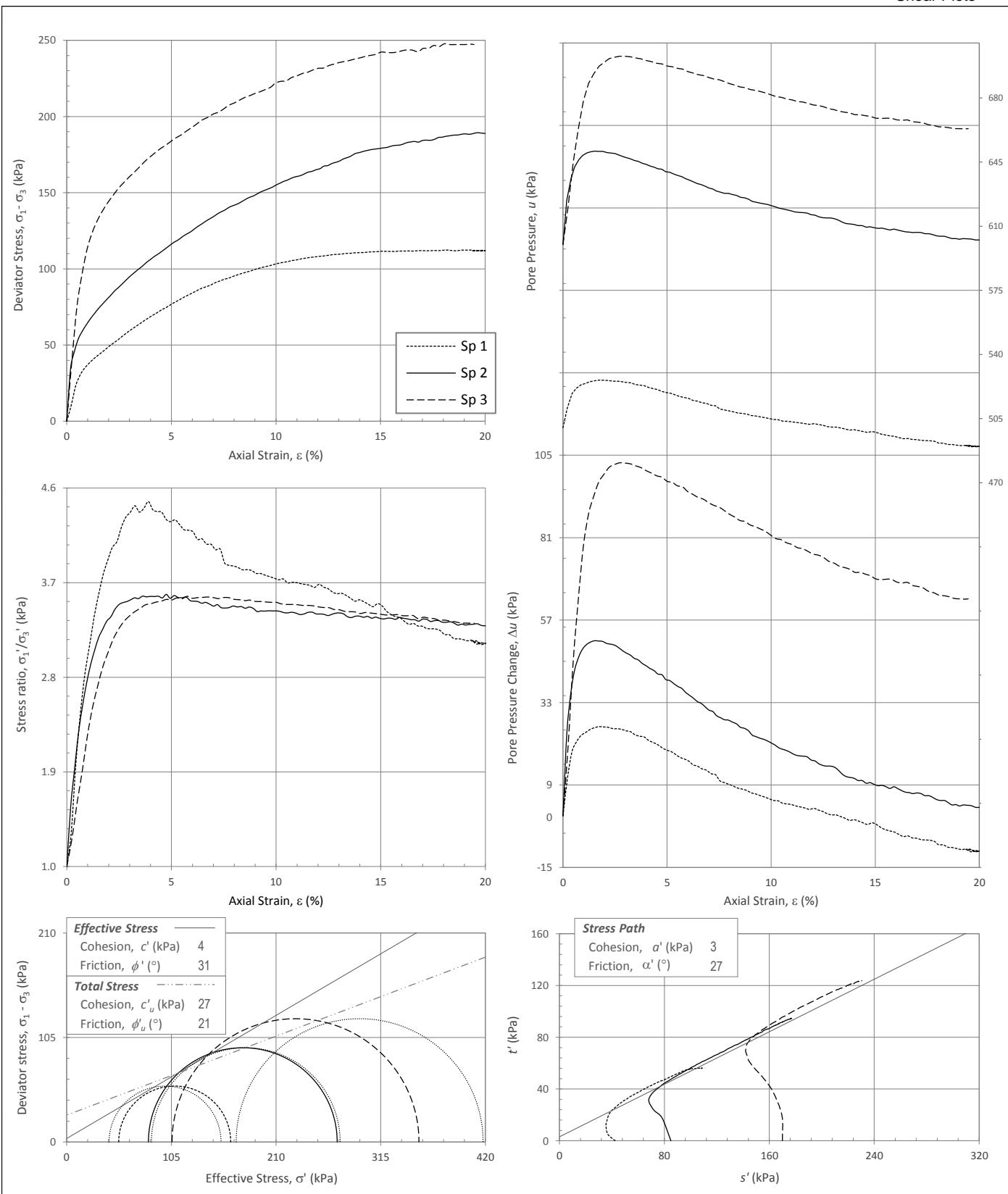
Date of test: 14/01/23

## Effective Stress Triaxial Compression Test

### Consolidated Undrained with Pore Pressure Measurement

(BS 1377-8:1990 # 4, 5, 6 &amp; 7)

Shear Plots



Tested by: Myint Tun

Checked by: Zalipah

Approved by: Tay KH

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Client: M/S PLB Engineering Sdn. Bhd.

Borehole No.: BH4

Location: Jelutong Rehabilitation &amp; Reclamation At Jelutong, Penang

Sample No.: UD1

Job File No.: GLSB/SI/3971-155/2022

Depth: 11.50-12.50m

Test Name: SCU3

Date of test: 29/1/2023

## Effective Stress Triaxial Compression Test

### Consolidated Undrained with Pore Pressure Measurement

(BS 1377-8:1990 # 4, 5, 6 &amp; 7)

Summary Report

#### Sample Details

Test Depth :	11.70-12.20m		
Description :	SP1-CLAY of Intermediate Plasticity; SP2&SP3-Sandy CLAY of Intermediate Plasticity		
Sample Type	Undisturbed		
Specimen:	1	2	3
Length, $L_o$ :	(mm)	150.0	150.0
Diameter, $D_o$ :	(mm)	73.0	73.0
Weight, $W_o$ :	(g)	1230.6	1243.9
Particle Density, $\rho_s$ : (assumed)	(Mg/m <sup>3</sup> )	2.65	2.65

#### Initial Conditions

Average Room Temp, $t$ :	(°C)	25.0	25.0	25.0
Moisture Content, $\omega_i$ :	(%)	29	28	27
Bulk Density, $\rho_i$ :	(Mg/m <sup>3</sup> )	1.96	1.98	1.99
Dry Density, $\rho_{di}$ :	(Mg/m <sup>3</sup> )	1.52	1.55	1.56
Void Ratio, $e_i$ :	.	0.739	0.711	0.695
Degree of Saturation, $S_i$ :	(%)	100	100	100
Displacement Input, $L_{IP}$	(mm)	TS13-Strain	TS15-Strain	TS14-Strain
Load Input, $N_{IP}$	(N)	TS13-Load	TS15-Load	TS14-Load
Pore Pressure Input, $u_{IP}$	(kPa)	TS13-PWP	TS15-PWP	TS14-PWP
Cell Pressure Input, $CP_{IP}$	(kPa)	TS13-CP	TS15-CP	TS14-CP
Back Pressure Input, $BP_{IP}$	(kPa)	TS13-BP	TS15-BP	TS14-BP
Volume Input, $V_{IP}$	(cm <sup>3</sup> )	TS13-VC	TS15-VC	TS14-VC
Cell Pressure, $\sigma_{3i}$	(kPa)	458	615	530
Back Pressure, $u_{bi}$	(kPa)	400	500	300
Pore Pressure, $u_i$	(kPa)	400	500	300
Strain Rate, $d_r$	(mm/min)	0.060	0.05343	0.060
Membrane Thickness, $m_b$	(mm)	0.20	0.20	0.20
B Value, B	.	0.96	0.96	0.95

#### Final Conditions

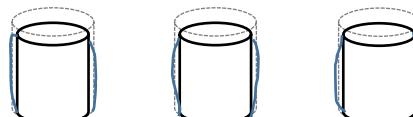
Moisture Content, $\omega_f$ :	(%)	21	25	28
Bulk Density, $\rho_f$ :	(Mg/m <sup>3</sup> )	1.96	1.99	2.01
Dry Density, $\rho_{df}$ :	(Mg/m <sup>3</sup> )	1.62	1.59	1.57
Void Ratio, $e_f$ :	.	0.638	0.670	0.685
Degree of Saturation, $S_f$ :	(%)	88.2	100	100

#### Failure Conditions

Failure Criteria		Max. Deviator Stress	Max. Deviator Stress	Max. Deviator Stress
Axial Strain, $\epsilon_f$	(%)	14.13	8.41	12.30
Corr. Deviator Stress, $(\sigma_1 - \sigma_3)_f$	(kPa)	118.4	155.0	229.8
Minor Principal Stresses, $\sigma'_3 f$	(kPa)	61.9	82.0	125.4
Major Principal Stresses, $\sigma'_1 f$	(kPa)	180.3	237.0	355.2
Pore Pressure, $u_f$	(kPa)	395.6	533.0	404.6
Principal Stress Ratio, $(\sigma'_1 / \sigma'_3)_f$	.	2.913	2.890	2.833
Pore Pressure Coefficient, A	.	-0.037	0.213	0.455

#### Test Results

$C' = 4$  kPa       $a' = 3$  kPa  
 $\phi' = 28^\circ$        $\alpha' = 25^\circ$



Notes :

Tested by: Myint Tun

Checked by: Zalipah

Approved by: Tay KH

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	Client: M/S PLB Engineering Sdn. Bhd.	Borehole No.: BH4
	Location: Jelutong Rehabilitation & Reclamation At Jelutong, Penang	Sample No.: UD1
	Job File No.: GLSB/SI/3971-155/2022	Depth: 11.50-12.50m
	Test Name: SCU3	Date of test: 29/01/23

## Effective Stress Triaxial Compression Test

### Consolidated Undrained with Pore Pressure Measurement

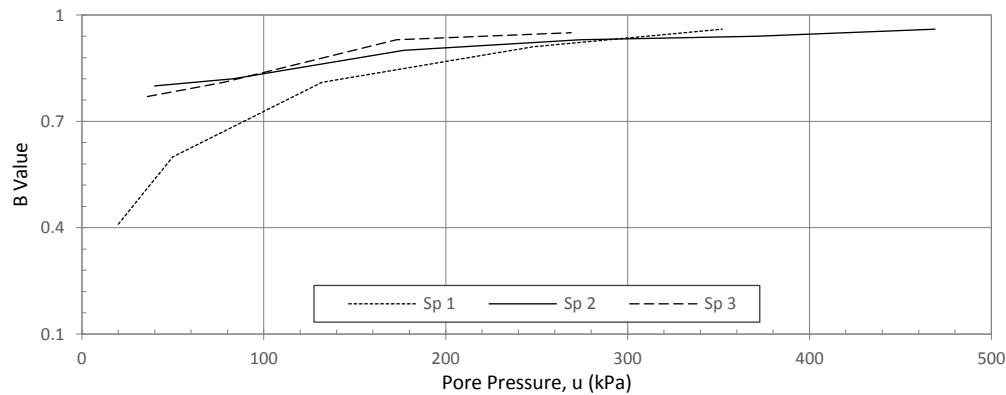
(BS 1377-8:1990 # 4, 5, 6 & 7)

Saturation & Consolidation Plots

#### Saturation Stage

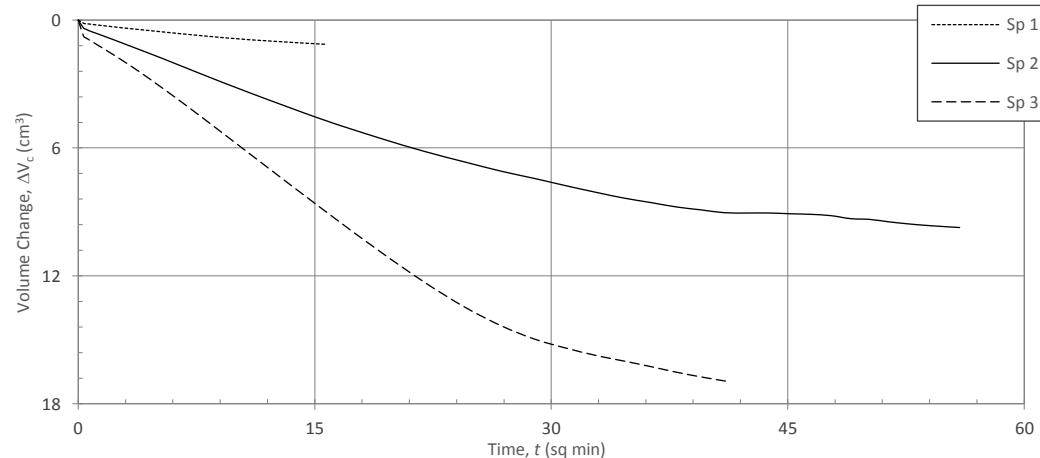
Specimen:	1	2	3
Method: a) Cell & Back Pressure	Stepped	Stepped	Stepped
Final Cell Pressure, $\sigma_f$ (kPa)	400	500	300
Final Pore Pressure, $u_f$ (kPa)	352	469	269

B Value, B . 0.96 0.96 0.95



#### Consolidation Stage

Initial Conditions	Drainage Method:	From one end		
	Cell Pressure, $\sigma_{3i}$ (kPa)	457.5	615	530
	Back Pressure, $u_{bi}$ (kPa)	400	500	300
	Pore Pressure, $u_{pwp}$ (kPa)	444	582	495
Final Conditions	Degree of Consolidation, U (%)	97.7	95.1	96.4
	Volumetric Strain, $\epsilon_v$ (%)	0.18	1.55	2.70
	Corrected Length, $L_c$ (mm)	149.9	149.2	148.7
	Corrected Area, $A_c$ ( $\text{mm}^2$ )	41.80	41.42	41.10
	Corrected Volume, $V_c$ ( $\text{cm}^3$ )	626.672	618.076	610.872
	Time to Failure, $t_{100}$ (min)	100.41	1053.96	882.26
	Coefficient of Consolidation, $c_{vi}$ ( $\text{m}^2/\text{yr}$ )	87.675	8.353	9.978
	Coefficient of Compressibility, $m_{vi}$ ( $\text{m}^2/\text{MN}$ )	0.042	0.198	0.143
	Estimated Strain at Failure, $\epsilon_f$ (%)	20	20	20



Tested by: Myint Tun

Checked by: Zalipah

Approved by: Tay KH

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2 of 3



Client: M/S PLB Engineering Sdn. Bhd.

Borehole No.: BH4

Location: Jelutong Rehabilitation &amp; Reclamation At Jelutong, Penang

Sample No.: UD1

Job File No.: GLSB/SI/3971-155/2022

Depth: 11.50-12.50m

Test Name: SCU3

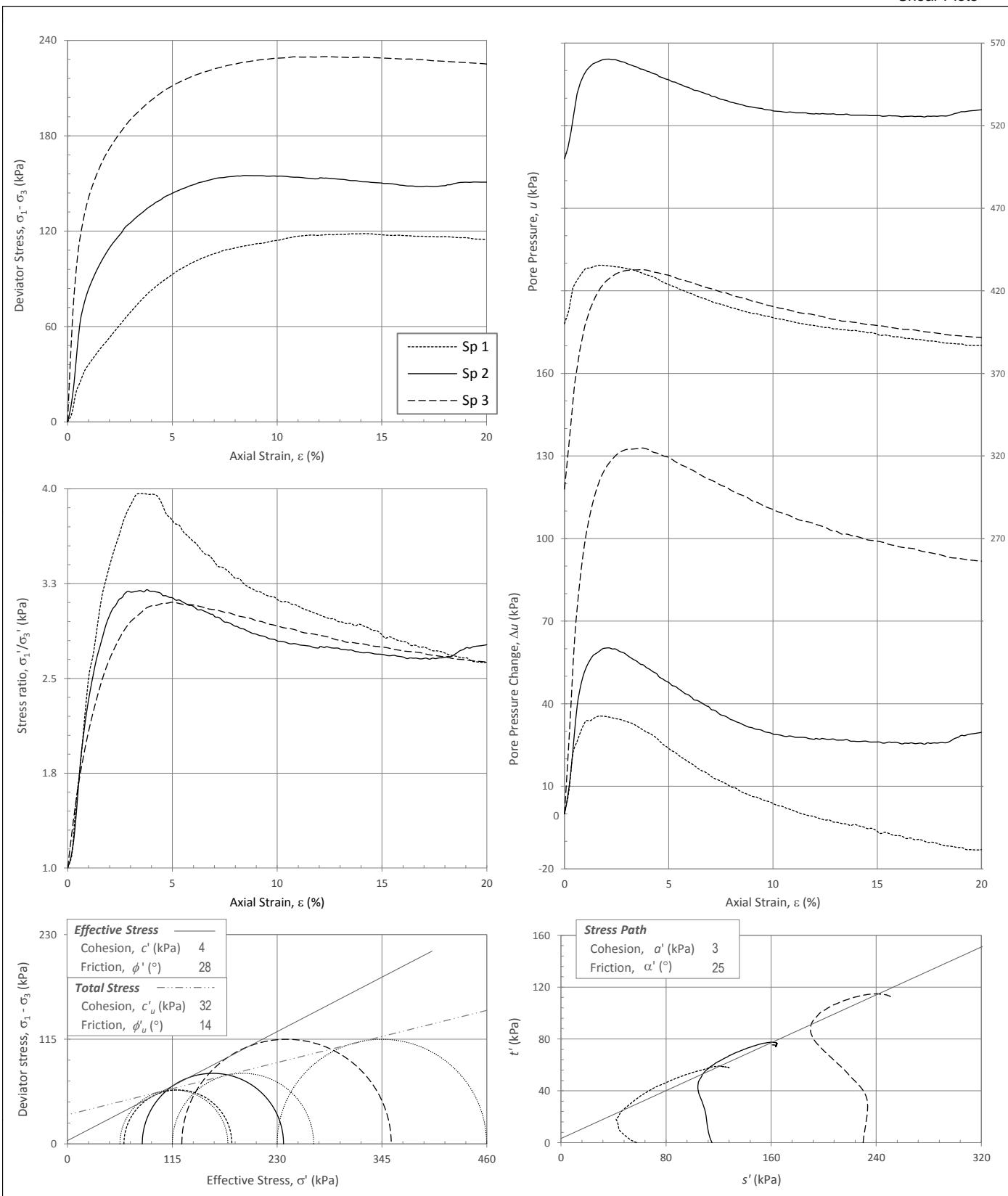
Date of test: 29/01/23

## Effective Stress Triaxial Compression Test

### Consolidated Undrained with Pore Pressure Measurement

(BS 1377-8:1990 # 4, 5, 6 &amp; 7)

Shear Plots



Tested by: Myint Tun

Checked by: Zalipah

Approved by: Tay KH

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Client: M/S PLB Engineering Sdn. Bhd.

Borehole No.: BH9

Location: Jelutong Rehabilitation &amp; Reclamation At Jelutong, Penang

Sample No.: UD1

Job File No.: GLSB/SI/3971-155/2022

Depth: 7.50-8.50m

Test Name: SCU4

Date of test: 11/3/2023

## Effective Stress Triaxial Compression Test

### Consolidated Undrained with Pore Pressure Measurement

(BS 1377-8:1990 # 4, 5, 6 &amp; 7)

Summary Report

#### Sample Details

Test Depth :	7.70-8.20m		
Description :	SP1-Sandy CLAY of Intermediate Plasticity; SP2&SP3-Sandy CLAY of Low Plasticity		
Sample Type	Undisturbed		
Specimen:	1	2	3
Length, $L_o$ :	(mm)	150.0	150.0
Diameter, $D_o$ :	(mm)	72.0	72.0
Weight, $W_o$ :	(g)	1267.4	1291.8
Particle Density, $\rho_s$ : (assumed)	(Mg/m <sup>3</sup> )	2.65	2.65

#### Initial Conditions

Average Room Temp, $t$ :	(°C)	25.0	25.0	25.0
Moisture Content, $\omega_i$ :	(%)	24	23	22
Bulk Density, $\rho_i$ :	(Mg/m <sup>3</sup> )	2.08	2.12	2.15
Dry Density, $\rho_{di}$ :	(Mg/m <sup>3</sup> )	1.67	1.71	1.76
Void Ratio, $e_i$ :	.	0.586	0.546	0.507
Degree of Saturation, $S_i$ :	(%)	100	100	100
Displacement Input, $L_{IP}$	(mm)	TS14-Strain	TS15-Strain	TS14-Strain
Load Input, $N_{IP}$	(N)	TS14-Load	TS15-Load	TS14-Load
Pore Pressure Input, $u_{IP}$	(kPa)	TS14-PWP	TS15-PWP	TS14-PWP
Cell Pressure Input, $CP_{IP}$	(kPa)	TS14-CP	TS15-CP	TS14-CP
Back Pressure Input, $BP_{IP}$	(kPa)	TS14-BP	TS15-BP	TS14-BP
Volume Input, $V_{IP}$	(cm <sup>3</sup> )	TS14-VC	TS15-VC	TS14-VC
Cell Pressure, $\sigma_{3i}$	(kPa)	438	375	550
Back Pressure, $u_{bi}$	(kPa)	400	300	400
Pore Pressure, $u_i$	(kPa)	400	300	400
Strain Rate, $d_r$	(mm/min)	0.060	0.060	0.060
Membrane Thickness, $m_b$	(mm)	0.20	0.20	0.20
B Value, B	.	0.96	0.95	0.95

#### Final Conditions

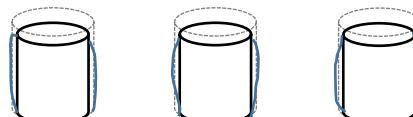
Moisture Content, $\omega_f$ :	(%)	23	22	22
Bulk Density, $\rho_f$ :	(Mg/m <sup>3</sup> )	2.07	2.15	2.16
Dry Density, $\rho_{df}$ :	(Mg/m <sup>3</sup> )	1.68	1.76	1.77
Void Ratio, $e_f$ :	.	0.579	0.509	0.494
Degree of Saturation, $S_f$ :	(%)	100	100	100

#### Failure Conditions

Failure Criteria		Max. Deviator Stress	Max. Deviator Stress	Deviator Stress
Axial Strain, $\epsilon_f$	(%)	9.85	19.99	20.00
Corr. Deviator Stress, $(\sigma_1 - \sigma_3)_f$	(kPa)	151.2	168.5	202.1
Minor Principal Stresses, $\sigma'_3 f$	(kPa)	56.6	64.4	79.2
Major Principal Stresses, $\sigma'_1 f$	(kPa)	207.8	232.8	281.3
Pore Pressure, $u_f$	(kPa)	380.9	310.6	470.8
Principal Stress Ratio, $(\sigma'_1 / \sigma'_3)_f$	.	3.672	3.617	3.552
Pore Pressure Coefficient, A	.	-0.126	0.063	0.350

#### Test Results

$$C' = 7 \text{ kPa} \quad a' = 6 \text{ kPa} \\ \phi' = 32^\circ \quad \alpha' = 28^\circ$$



Notes :

Tested by: Myint Tun

Checked by: Zalipah

Approved by: Tay KH

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Client: M/S PLB Engineering Sdn. Bhd.

Borehole No.: BH9

Location: Jelutong Rehabilitation &amp; Reclamation At Jelutong, Penang

Sample No.: UD1

Job File No.: GLSB/SI/3971-155/2022

Depth: 7.50-8.50m

Test Name: SCU4

Date of test: 11/03/23

## Effective Stress Triaxial Compression Test

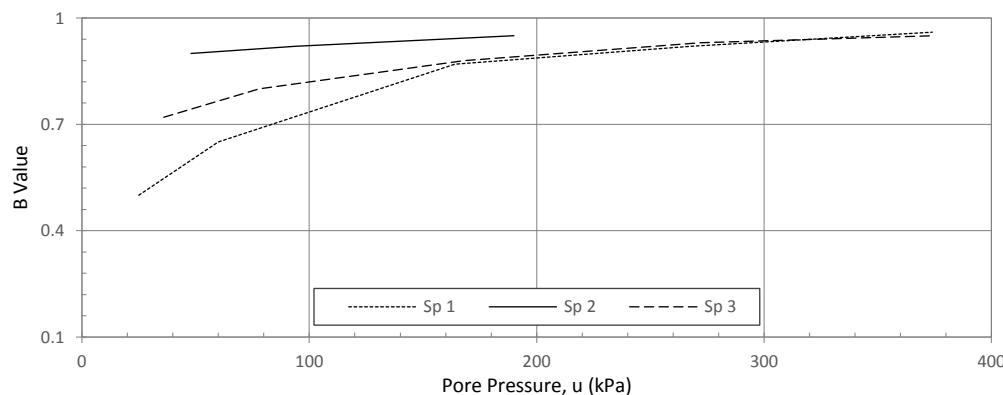
### Consolidated Undrained with Pore Pressure Measurement

(BS 1377-8:1990 # 4, 5, 6 &amp; 7)

Saturation &amp; Consolidation Plots

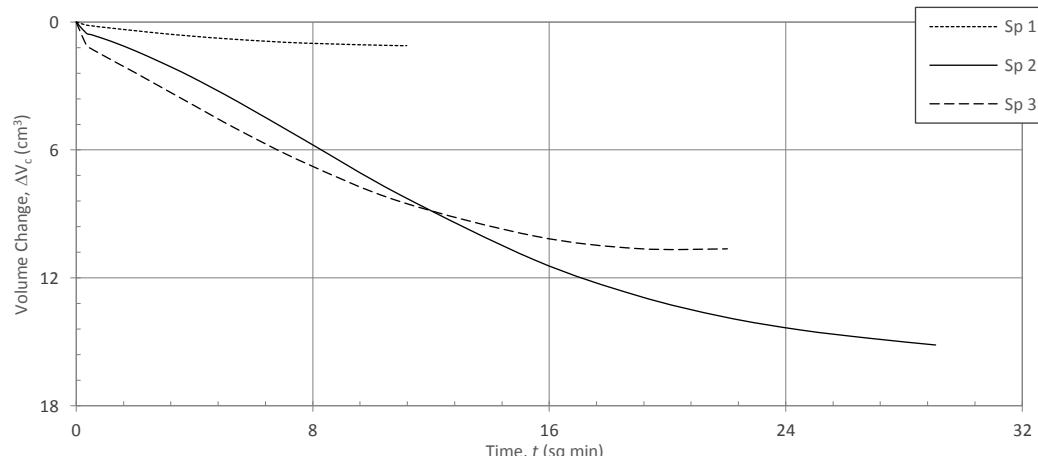
#### Saturation Stage

Specimen:	1	2	3
Method: a) Cell & Back Pressure	Stepped	Stepped	Stepped
Final Cell Pressure, $\sigma_f$ (kPa)	400	200	400
Final Pore Pressure, $u_f$ (kPa)	374	190	375
B Value, B	.96	0.95	0.95



#### Consolidation Stage

Initial Conditions	Drainage Method:	From one end		
	Cell Pressure, $\sigma_{3i}$ (kPa)	438	375	550
	Back Pressure, $u_{bi}$ (kPa)	400	300	399
	Pore Pressure, $u_{pwp}$ (kPa)	411	364	521
Final Conditions	Degree of Consolidation, U (%)	100	95.2	100
	Volumetric Strain, $\epsilon_v$ (%)	0.18	2.48	1.74
	Corrected Length, $L_c$ (mm)	149.9	148.8	149.1
	Corrected Area, $A_c$ ( $\text{mm}^2$ )	40.67	40.04	40.24
	Corrected Volume, $V_c$ ( $\text{cm}^3$ )	609.622	595.577	600.088
	Time to Failure, $t_{100}$ (min)	33.97	392.13	158.64
	Coefficient of Consolidation, $c_{vi}$ ( $\text{m}^2/\text{yr}$ )	252.119	21.840	53.984
	Coefficient of Compressibility, $m_{vi}$ ( $\text{m}^2/\text{MN}$ )	0.109	0.405	0.138
	Estimated Strain at Failure, $\epsilon_f$ (%)	20	20	20



Tested by: Myint Tun

Checked by: Zalipah

Approved by: Tay KH

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Client: M/S PLB Engineering Sdn. Bhd.

Borehole No.: BH9

Location: Jelutong Rehabilitation &amp; Reclamation At Jelutong, Penang

Sample No.: UD1

Job File No.: GLSB/SI/3971-155/2022

Depth: 7.50-8.50m

Test Name: SCU4

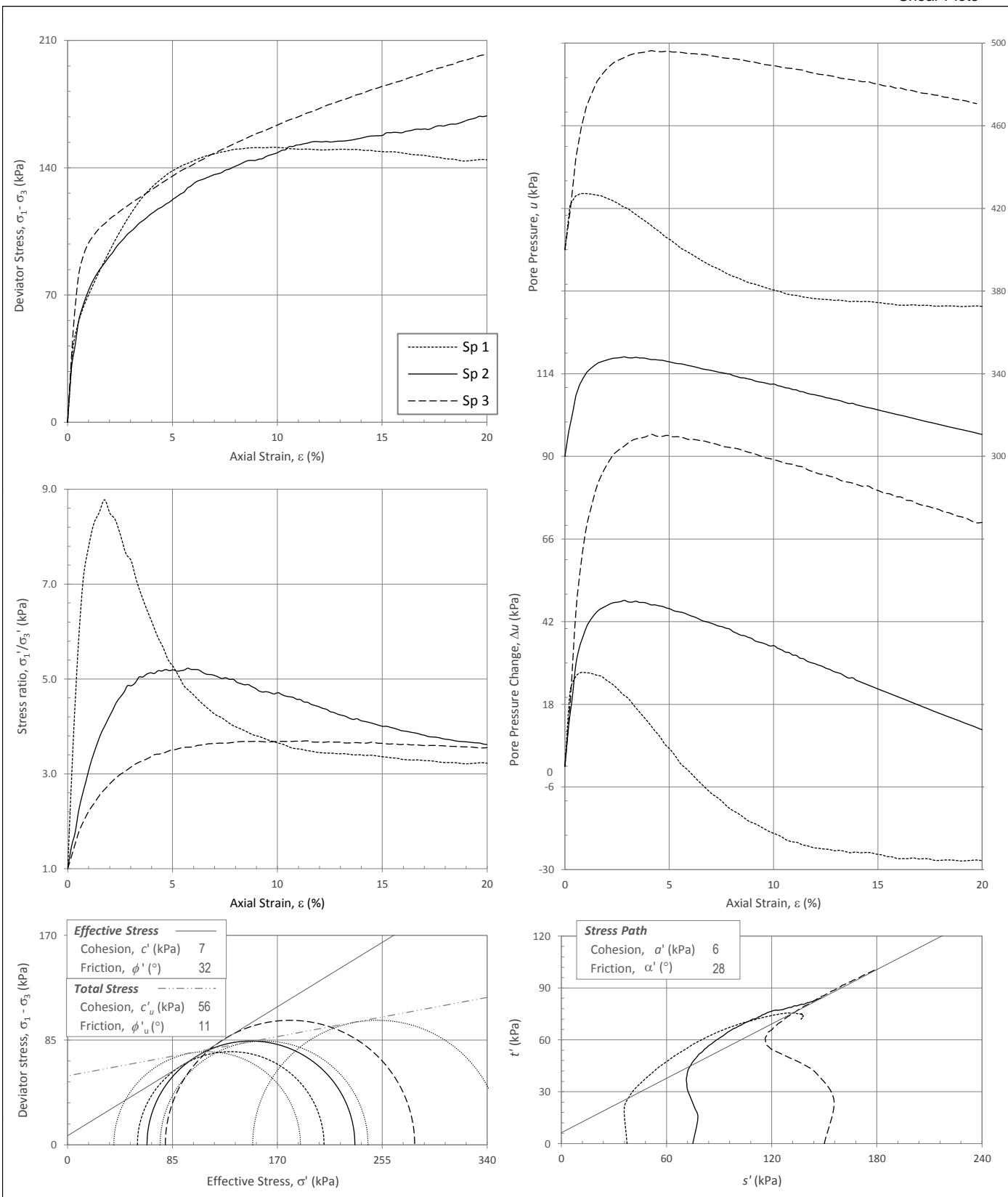
Date of test: 11/03/23

## Effective Stress Triaxial Compression Test

### Consolidated Undrained with Pore Pressure Measurement

(BS 1377-8:1990 # 4, 5, 6 &amp; 7)

Shear Plots



Tested by: Myint Tun

Checked by: Zalipah

Approved by: Tay KH

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# **Consolidated Drained Direct Shear Box**



Client: M/S PLB Engineering Sdn. Bhd.

Borehole No.: BH2

Location: Jelutong Rehabilitation &amp; Reclamation At Jelutong, Penang

Sample No.: P3/D3

Job File No.: GLSB/SI/3971-155/2022

Depth: 4.50-5.20m

Test Name: DSB 1

Date of test: 15/01/2023

## Total Stress Shear Strength

(BS 1377-4:1990 #4)

### Direct Shear Test (Small Shearbox)

Summary Report &amp; Shear Plot

#### Sample Details

Test Depth : - Sample Type : Remoulded

Description : Very Silty/Clayey SANDS

Specimen:	1
Length, $L_o$ :	(mm) 60 60 60
Width, $W_o$ :	(mm) 60 60 60
Height, $D_o$ :	(mm) 24.0 24.0 24.0
Weight, $W_o$ :	(g) 170.3 170.8 171.2
Particle Density, $\rho_s$ (Assumed)	(Mg/m <sup>3</sup> ) 2.65 2.65 2.65

#### Initial Conditions

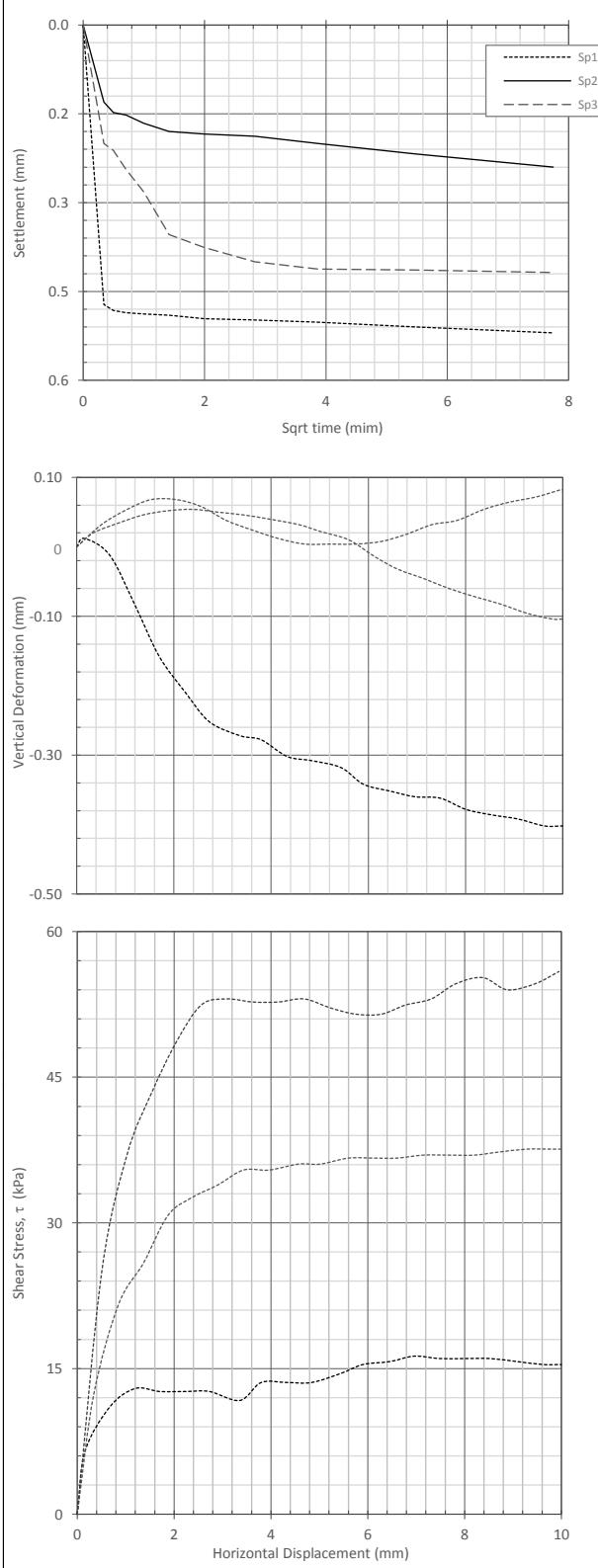
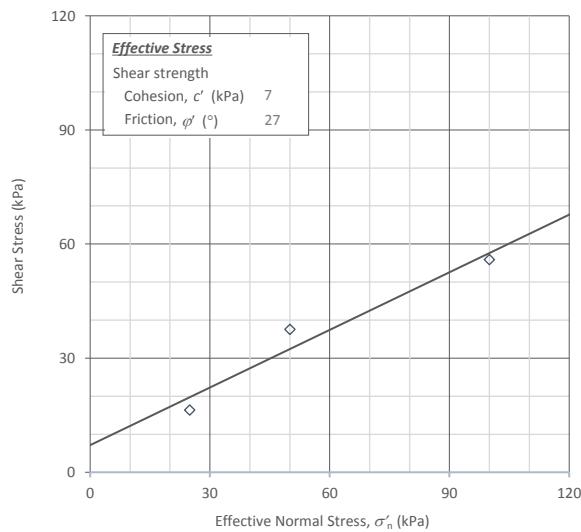
Average Room Temp, $t$ :	(°C) 26.0
Moisture Content, $\omega_i$ :	(%) 13.9 13.7 11.9
Bulk Density, $\rho_b$ :	(Mg/m <sup>3</sup> ) 1.97 1.98 1.98
Dry Density, $\rho_d$ :	(Mg/m <sup>3</sup> ) 1.73 1.74 1.77
Void Ratio, $e_i$ :	. 0.53 0.52 0.50
Degree of Saturation, $S_i$ :	(%) 69.4 69.1 63.5
Hor. Disp. Input, L HIP	(mm) SB1-Hor SB2-Hor SB3-Hor
Ver. Disp. Input, L VIP	(mm) SB1-Ver SB2-Ver SB3-Ver
Load Input, N <sub>IP</sub>	(N) SB1-Load SB2-Load SB3-Load
Normal Stress, $\sigma_n$	(kPa) 25 50 100
Rate of Horizontal Disp., $d_r$	(mm/min) 0.35 0.35 0.35

#### Final Conditions

Weight, $m_f$ :	(g) 174.4 175.1 176.6
Moisture Content, $\omega_f$ :	(%) 16.6 16.6 15.4
Dry Density, $\rho_d$ :	(Mg/m <sup>3</sup> ) 1.73 1.74 1.77
Void Ratio, $e_f$ :	. 0.53 0.52 0.50
Degree of Saturation, $S_f$ :	(%) 83.0 83.7 82.3

#### Failure Conditions

Horizontal Relative Disp., $S_h$	(mm) 6.96 9.28 9.95
Vertical Displacement, $S_v$	(mm) -0.36 -0.10 0.08
Shear Stress, $\tau_f$	(kPa) 16.3 37.6 55.9



Notes:

Tested by: Mintun

Checked by: Zalipah

Approved by: Tay KH



Client: M/S PLB Engineering Sdn. Bhd.

Borehole No.: BH6

Location: Jelutong Rehabilitation &amp; Reclamation At Jelutong, Penang

Sample No.: P4/D3

Job File No.: GLSB/SI/3971-155/2022

Depth: 6.00-7.00m

Test Name: DSB 2

Date of test: 19/02/2023

## Total Stress Shear Strength

(BS 1377-4:1990 #4)

### Direct Shear Test (Small Shearbox)

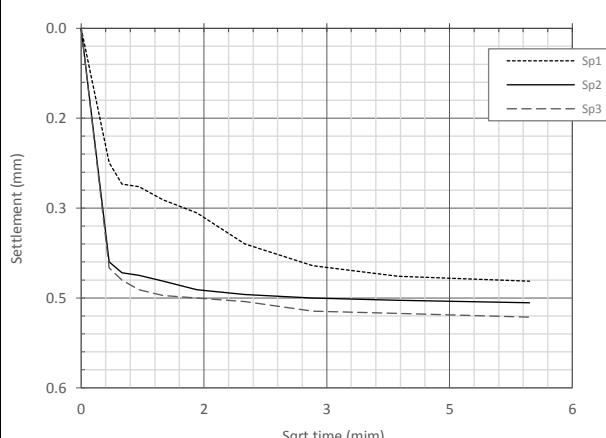
Summary Report &amp; Shear Plot

#### Sample Details

Test Depth : - Sample Type : Remoulded

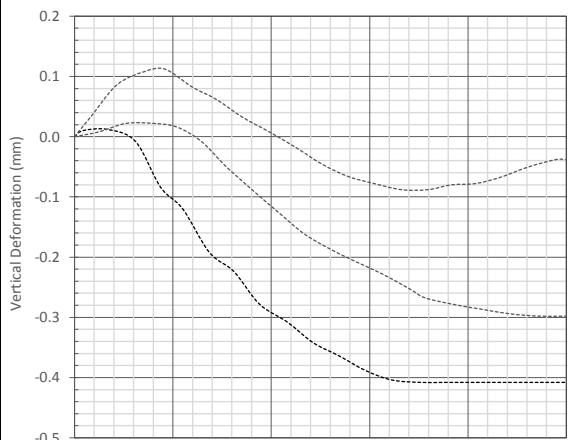
Description : Very Silty/Clayey SANDS

Specimen:	1
Length, $L_o$ :	(mm) 60 60 60
Width, $W_o$ :	(mm) 60 60 60
Height, $D_o$ :	(mm) 24.0 24.0 24.0
Weight, $W_o$ :	(g) 175.3 175.7 176.8
Particle Density, $\rho_s$ (Assumed)	(Mg/m <sup>3</sup> ) 2.65 2.65 2.65



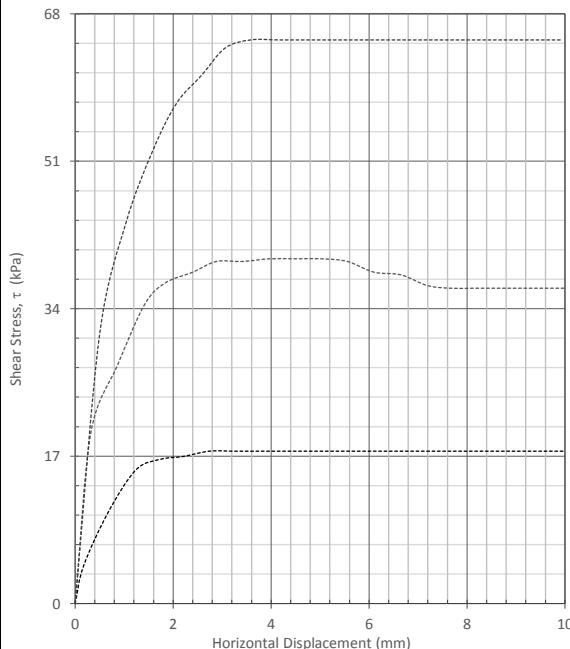
#### Initial Conditions

Average Room Temp, $t$ :	(°C) 26.0
Moisture Content, $\omega_i$ :	(%) 15.2 17.4 16.7
Bulk Density, $\rho_b$ :	(Mg/m <sup>3</sup> ) 2.03 2.03 2.05
Dry Density, $\rho_d$ :	(Mg/m <sup>3</sup> ) 1.76 1.73 1.75
Void Ratio, $e_i$ :	. 0.50 0.53 0.51
Degree of Saturation, $S_i$ :	(%) 79.8 86.9 86.4
Hor. Disp. Input, L HIP	(mm) SB1-Hor SB2-Hor SB3-Hor
Ver. Disp. Input, L VIP	(mm) SB1-Ver SB2-Ver SB3-Ver
Load Input, N <sub>IP</sub>	(N) SB1-Load SB2-Load SB3-Load
Normal Stress, $\sigma_n$	(kPa) 25 50 100
Rate of Horizontal Disp., $d_r$	(mm/min) 0.35 0.35 0.35



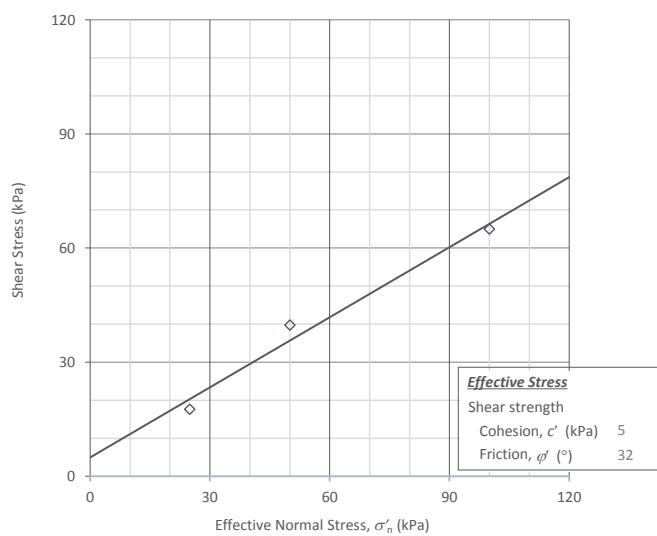
#### Final Conditions

Weight, $m_f$ :	(g) 177.4 175.9 175.8
Moisture Content, $\omega_f$ :	(%) 16.6 17.5 16.0
Dry Density, $\rho_d$ :	(Mg/m <sup>3</sup> ) 1.76 1.73 1.75
Void Ratio, $e_f$ :	. 0.50 0.53 0.51
Degree of Saturation, $S_f$ :	(%) 87.1 87.6 83.1



#### Failure Conditions

Horizontal Relative Disp., $S_h$	(mm) 10.00 5.04 10.00
Vertical Displacement, $S_v$	(mm) -0.41 -0.05 -0.30
Shear Stress, $\tau_f$	(kPa) 17.6 39.8 65.0



Notes:

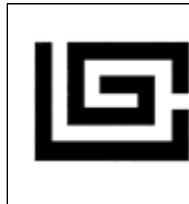
Tested by: Mintun

Checked by: Zalipah

Approved by: Tay KH



# **One Dimensional Consolidation Test**



Client: M/s. PLB Engineering Sdn. Bhd.

Location: Jelutong Rehabilitation &amp; Reclamation At Jelutong, Penang

Report No.: GLSB/SI/3971-155/2022

Borehole No.: BH 1

Sample No.: UD1

Depth: 4.50-5.50m

Tested by: Hamzah

Checked by: Zalipah

Approved by: Tay KH

## One-Dimensional Consolidation Properties of Soil

(BS 1377-5:1990 #3)

Summary

<b>Sample Details</b>		<b>Initial Conditions</b>				<b>Final Conditions</b>			
Test Depth :		Moisture Content, $w_o$ (%) :				Moisture Content, $w_f$ (%) :			
Description :		Bulk Density, $\rho$ (Mg/m <sup>3</sup> ) :				Bulk Density, $\rho_f$ (Mg/m <sup>3</sup> ) :			
Height, $H_o$ (mm) :		Dry Density, $P_d$ (Mg/m <sup>3</sup> ) :				Dry Density, $P_{df}$ (Mg/m <sup>3</sup> ) :			
Diameter, $D_o$ (mm) :		Void Ratio, $e_o$ :				Void Ratio, $e_f$ :			
Weight, $W_o$ (g) :		Deg. of Saturation, $S_o$ (%) :				Deg. of Saturation, $S_f$ (%) :			
Particle Density, $\rho_s$ (Mg/m <sup>3</sup> ) :		Room Temperature, $t$ (°C) :				Settlement (mm) :			
Type of Sample :		<b>Test Results</b>				Pre-Consolidation Pressure, $P_c'$ (kPa) : <b>44</b>			
Machine Channel :						Compression Index, $C_c$ : <b>0.064</b>			

Inc. No.	Applied Pressure (kPa)	Settlement Reading (mm)	Deformation Correction (mm)	Mean Temp. (°C)	Void Ratio (e)	Strain (%)	$m_v$ (m <sup>2</sup> /MN)	Square Root Time Curve Fitting Method				Logarithm Time Curve Fitting Method				
								$t_{90}$ (min)	$C_v$ (m <sup>2</sup> /yr)	$C_v$ (20°C) (m <sup>2</sup> /yr)	$K_v$ (20°C) (10 <sup>-9</sup> m/s)	$t_{50}$ (min)	$C_v$ (m <sup>2</sup> /yr)	$C_v$ (20°C) (m <sup>2</sup> /yr)	$K_v$ (20°C) (10 <sup>-9</sup> m/s)	$C_a$ (10 <sup>-3</sup> m/s)
	0	0	0	27.8	0.545	0	-	-	-	-	-	-	-	-	-	
1	6.25	0.105	0.015	26.9	0.538	0.45	0.724	4.775	9.164	7.821	1.755	3.823	2.681	2.288	0.514	0.3
2	12.5	0.176	0.033	27.7	0.534	0.72	0.428	3.692	11.768	9.867	1.309	3.108	3.274	2.745	0.364	0.3
3	25	0.286	0.057	26.9	0.527	1.15	0.348	2.035	21.199	18.093	1.952	7.542	1.340	1.144	0.123	0.5
4	50	0.484	0.096	27.5	0.515	1.95	0.323	1.294	32.927	27.730	2.777	1.407	7.093	5.973	0.598	1.0
5	100	0.756	0.144	27.3	0.497	3.08	0.230	1.378	30.316	25.644	1.828	1.454	6.730	5.693	0.406	0.8
6	200	1.057	0.192	27.5	0.478	4.35	0.131	1.294	31.497	26.526	1.077	0.752	12.695	10.691	0.434	1.3
7	50	0.964	0.140	27.6	0.481	4.14	0.014									
8	6.25	0.818	0.083	28.1	0.488	3.69	0.107									



Client: M/s. PLB Engineering Sdn. Bhd.

Borehole No.: BH 1

Location: Jelutong Rehabilitation &amp; Reclamation At Jelutong, Penang

Sample No.: UD1

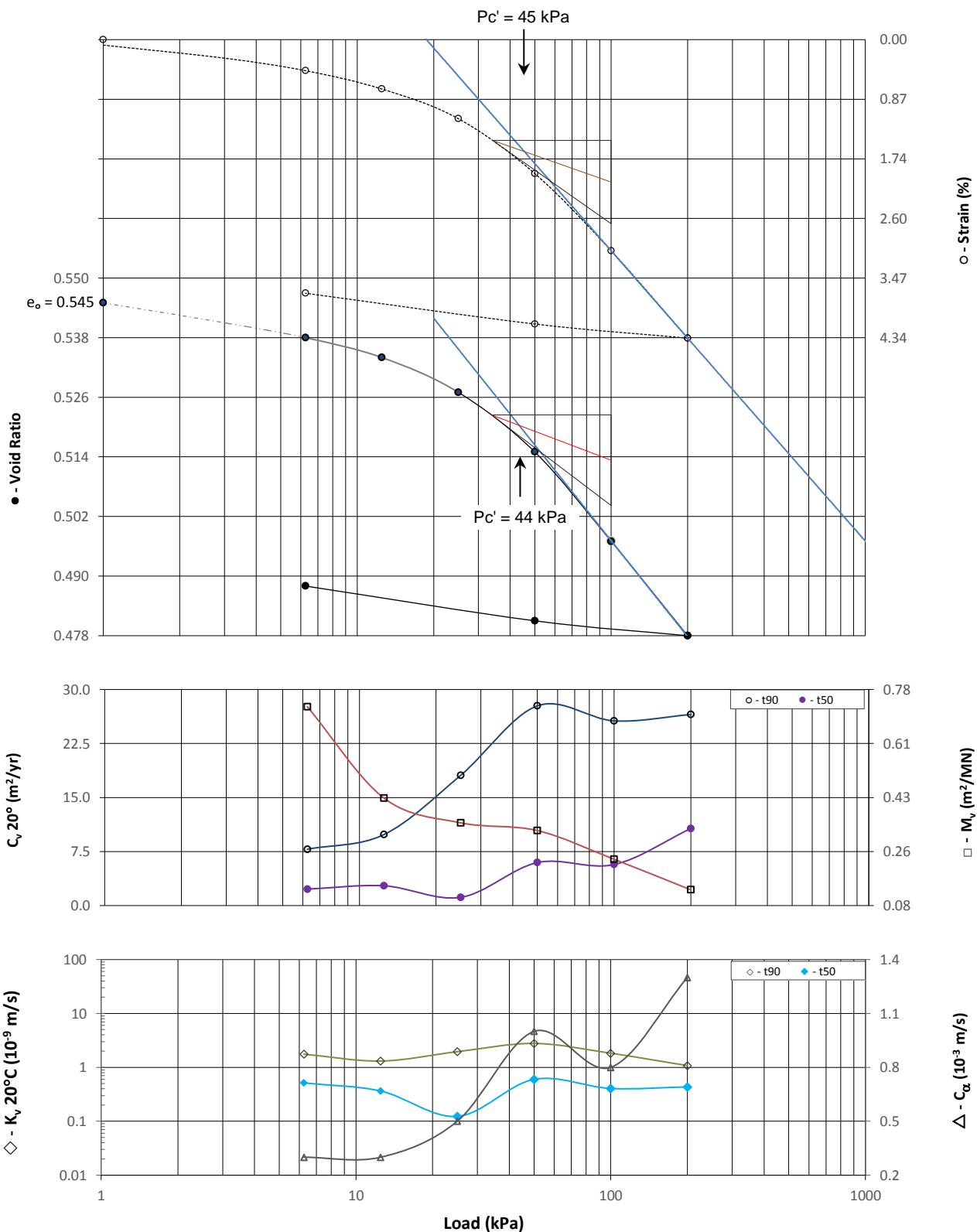
Report No.: GLSB/SI/3971-155/2022

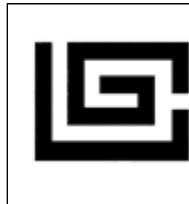
Depth: 4.50-5.50m

Test Name: Ode 1

Date of test: 11/1/2023

## One-Dimensional Consolidation Properties of Soil (BS 1377-5:1990 #3)





Client: M/s. PLB Engineering Sdn. Bhd.

Location: Jelutong Rehabilitation &amp; Reclamation At Jelutong, Penang

Report No.: GLSB/SI/3971-155/2022

Borehole No.: BH 1

Sample No.: UD2

Depth: 14.50-14.95m

Tested by: Hamzah

Checked by: Zalipah

Approved by: Tay KH

## One-Dimensional Consolidation Properties of Soil

(BS 1377-5:1990 #3)

Summary

<b>Sample Details</b>		<b>Initial Conditions</b>				<b>Final Conditions</b>			
Test Depth :	14.85m	Moisture Content, $w_o$ (%) :	20.0			Moisture Content, $w_f$ (%) :	17.1		
Description :	Sandy CLAY of Intermediate Plasticity	Bulk Density, $\rho$ (Mg/m <sup>3</sup> ) :	2.045			Bulk Density, $\rho_f$ (Mg/m <sup>3</sup> ) :	2.055		
Height, $H_o$ (mm) :	19.9	Dry Density, $P_d$ (Mg/m <sup>3</sup> ) :	1.704			Dry Density, $P_{df}$ (Mg/m <sup>3</sup> ) :	1.755		
Diameter, $D_o$ (mm) :	50.0	Void Ratio, $e_o$ :	0.555			Void Ratio, $e_f$ :	0.510		
Weight, $W_o$ (g) :	79.9	Deg. of Saturation, $S_o$ (%) :	95.5			Deg. of Saturation, $S_f$ (%) :	88.9		
Particle Density, $\rho_s$ (Mg/m <sup>3</sup> ) :	2.65 (Assumed)	Room Temperature, $t$ (°C) :	27.7			Settlement (mm) :	0.791		
Type of Sample :	Undisturbed	<b>Test Results</b>				Pre-Consolidation Pressure, $P'_c$ (kPa) :	192	Compression Index, $C_c$ :	0.076
Machine Channel :	A17								

Inc. No.	Applied Pressure (kPa)	Settlement Reading (mm)	Deformation Correction (mm)	Mean Temp. (°C)	Void Ratio (e)	Strain (%)	$m_v$ (m <sup>2</sup> /MN)	Square Root Time Curve Fitting Method				Logarithm Time Curve Fitting Method				
								$t_{90}$ (min)	$C_v$ (m <sup>2</sup> /yr)	$C_v$ (20°C) (m <sup>2</sup> /yr)	$K_v$ (20°C) (10 <sup>-9</sup> m/s)	$t_{50}$ (min)	$C_v$ (m <sup>2</sup> /yr)	$C_v$ (20°C) (m <sup>2</sup> /yr)	$K_v$ (20°C) (10 <sup>-9</sup> m/s)	$C_a$ (10 <sup>-3</sup> m/s)
	0	0	0	27.7	0.555	0	-	-	-	-	-	-	-	-	-	
1	25	0.111	0.084	26.8	0.553	0.14	0.054	0.719	61.057	52.227	0.874	-	-	-	-	
2	50	0.175	0.122	27.3	0.551	0.27	0.052	0.718	60.976	51.580	0.831	-	-	-	-	
3	100	0.285	0.168	27.5	0.546	0.59	0.064	0.846	51.516	43.385	0.861	-	No $t_{50}$ fitting due to pore pressure dissipation occurred rapidly			
4	200	0.465	0.224	27.4	0.536	1.21	0.063	0.781	55.275	46.654	0.911	-	-	-	-	-
5	400	0.790	0.285	27.9	0.516	2.54	0.067	0.984	43.013	35.906	0.746	-	-	-	-	-
6	800	1.143	0.352	27.5	0.493	3.98	0.037	0.914	45.012	37.907	0.435	-	-	-	-	-
7	200	1.007	0.291	27.9	0.499	3.60	0.007									
8	25	0.787	0.189	27.8	0.508	3.01	0.035									



Client: M/s. PLB Engineering Sdn. Bhd.

Borehole No.: BH 1

Location: Jelutong Rehabilitation &amp; Reclamation At Jelutong, Penang

Sample No.: UD2

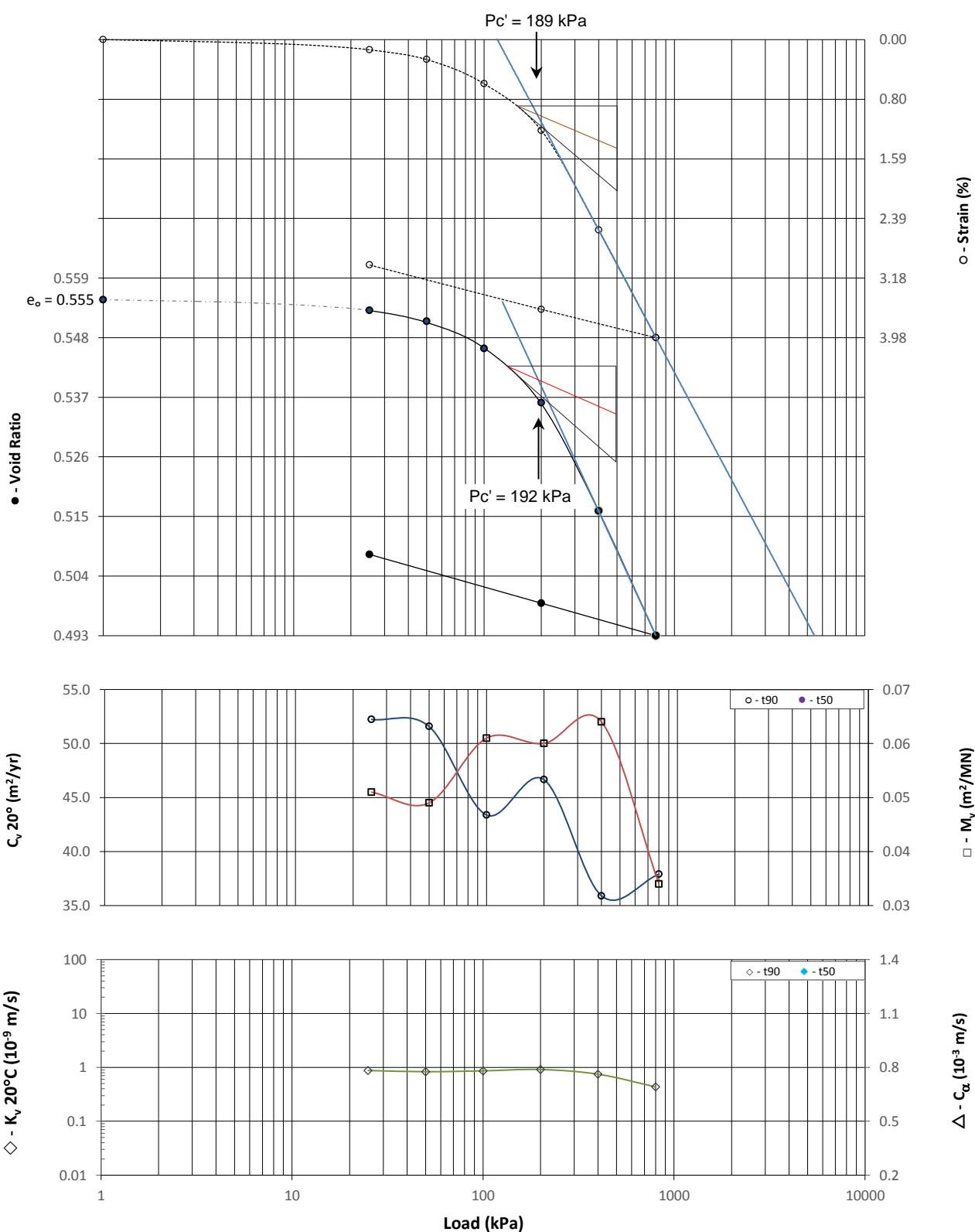
Report No.: GLSB/SI/3971-155/2022

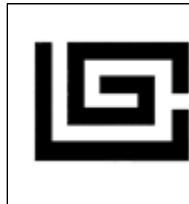
Depth: 14.50-14.95m

Test Name: Ode 2

Date of test: 11/1/2023

## One-Dimensional Consolidation Properties of Soil (BS 1377-5:1990 #3)





Client: M/s. PLB Engineering Sdn. Bhd.

Location: Jelutong Rehabilitation &amp; Reclamation At Jelutong, Penang

Report No.: GLSB/SI/3971-155/2022

Borehole No.: BH 3

Sample No.: UD1

Depth: 3.00-4.00m

Tested by: Hamzah

Checked by: Zalipah

Approved by: Tay KH

## One-Dimensional Consolidation Properties of Soil

(BS 1377-5:1990 #3)

Summary

<b>Sample Details</b>		<b>Initial Conditions</b>		<b>Final Conditions</b>	
Test Depth :	3.90m	Moisture Content, $w_o$ (%) :	165.7	Moisture Content, $w_f$ (%) :	80.6
Description :	CLAY	Bulk Density, $\rho$ (Mg/m <sup>3</sup> ) :	1.286	Bulk Density, $\rho_f$ (Mg/m <sup>3</sup> ) :	1.341
Height, $H_o$ (mm) :	20.0	Dry Density, $P_d$ (Mg/m <sup>3</sup> ) :	0.484	Dry Density, $P_{df}$ (Mg/m <sup>3</sup> ) :	0.743
Diameter, $D_o$ (mm) :	50.0	Void Ratio, $e_o$ :	4.475	Void Ratio, $e_f$ :	2.567
Weight, $W_o$ (g) :	50.5	Deg. of Saturation, $S_o$ (%) :	98.1	Deg. of Saturation, $S_f$ (%) :	83.2
Particle Density, $\rho_s$ (Mg/m <sup>3</sup> ) :	2.65 (Assumed)	Room Temperature, $t$ (°C) :	27.8	Settlement (mm) :	7.766
Type of Sample :	Undisturbed	<b>Test Results</b>		Pre-Consolidation Pressure, $P'_c$ (kPa) :	10
Machine Channel :	A18			Compression Index, $C_c$ :	1.535

Inc. No.	Applied Pressure (kPa)	Settlement Reading (mm)	Deformation Correction (mm)	Mean Temp. (°C)	Void Ratio (e)	Strain (%)	$m_v$ (m <sup>2</sup> /MN)	Square Root Time Curve Fitting Method				Logarithm Time Curve Fitting Method				
								$t_{90}$ (min)	$C_v$ (m <sup>2</sup> /yr)	$C_v$ (20°C) (m <sup>2</sup> /yr)	$K_v$ (20°C) (10 <sup>-9</sup> m/s)	$t_{50}$ (min)	$C_v$ (m <sup>2</sup> /yr)	$C_v$ (20°C) (m <sup>2</sup> /yr)	$K_v$ (20°C) (10 <sup>-9</sup> m/s)	$C_a$ (10 <sup>-3</sup> m/s)
	0	0	0	27.8	4.475	0	-	-	-	-	-	-	-	-	-	
1	6.25	1.492	0.017	27.3	4.071	7.38	11.800	121.509	0.339	0.287	1.050	33.087	0.292	0.247	0.904	7.5
2	12.5	2.933	0.035	27.9	3.682	14.49	12.290	3.140	11.218	9.364	35.676	1.584	5.209	4.348	16.565	0.6
3	25	4.544	0.058	26.8	3.247	22.43	7.428	65.638	0.450	0.385	0.887	22.588	0.306	0.262	0.603	15.5
4	50	6.209	0.091	27.7	2.800	30.59	4.208	36.256	0.661	0.554	0.723	12.930	0.434	0.364	0.475	12.8
5	100	7.897	0.131	27.5	2.349	38.83	2.374	30.630	0.618	0.520	0.383	11.386	0.389	0.328	0.241	9.3
6	25	7.512	0.114	27.6	2.450	36.99	0.401									
7	6.25	7.057	0.095	27.3	2.569	34.81	1.845									



Client: M/s. PLB Engineering Sdn. Bhd.

Borehole No.: BH 3

Location: Jelutong Rehabilitation &amp; Reclamation At Jelutong, Penang

Sample No.: UD1

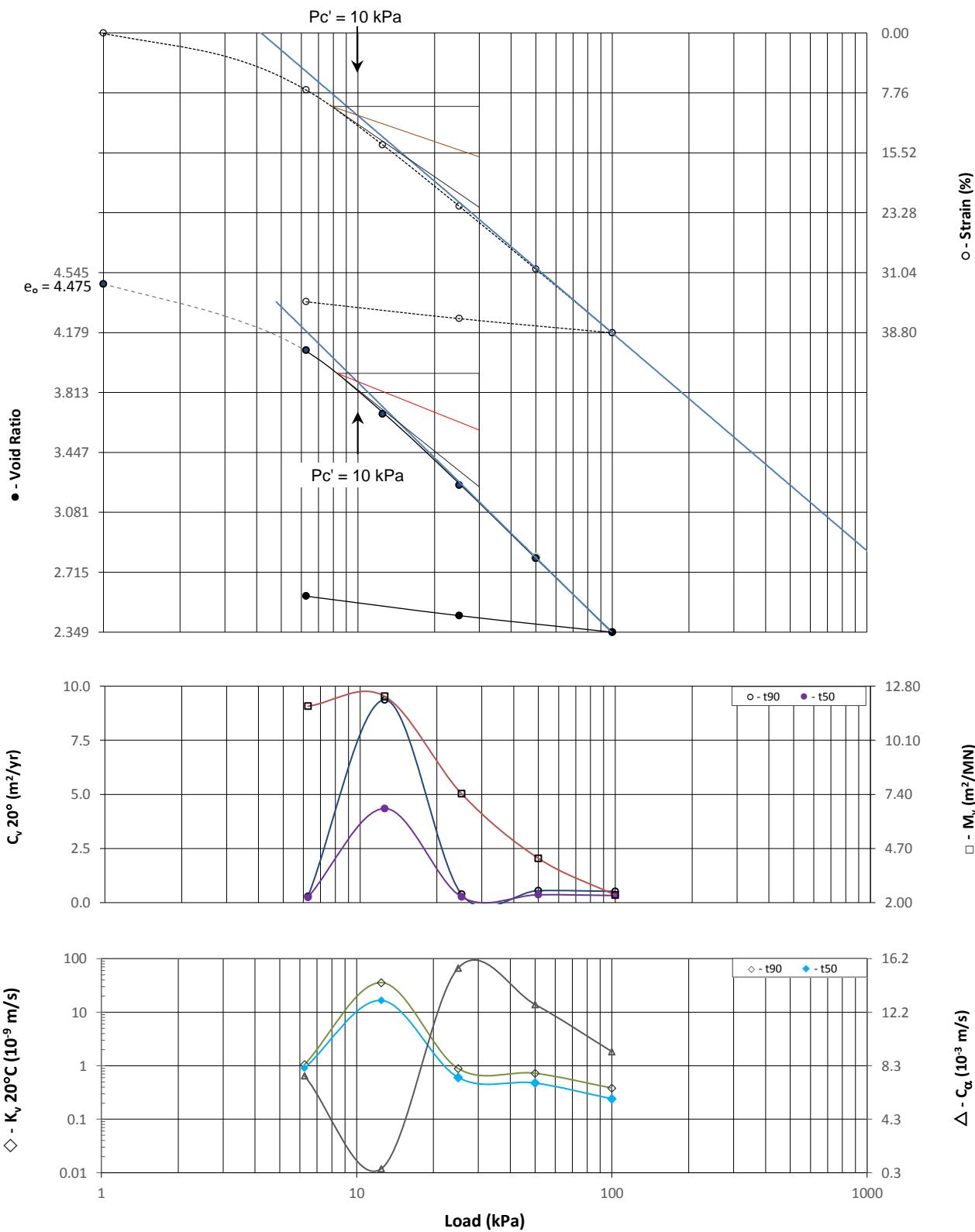
Report No.: GLSB/SI/3971-155/2022

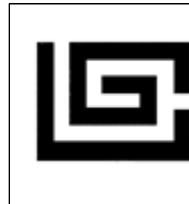
Depth: 3.00-4.00m

Test Name: Ode 3

Date of test: 11/1/2023

## One-Dimensional Consolidation Properties of Soil (BS 1377-5:1990 #3)





Client: M/s. PLB Engineering Sdn. Bhd.

Borehole No.: BH 4

Tested by: Hamzah

Location: Jelutong Rehabilitation &amp; Reclamation At Jelutong, Penang

Sample No.: UD1

Checked by: Zalipah

Report No.: GLSB/SI/3971-155/2022

Depth: 11.50-12.50m

Approved by: Tay KH

Test Name: Ode 4

Date of test: 28/1/2023

## One-Dimensional Consolidation Properties of Soil

(BS 1377-5:1990 #3)

Summary

Sample Details							Initial Conditions				Final Conditions			
Test Depth :	12.40m						Moisture Content, $w_o$ (%) :	26.0			Moisture Content, $w_f$ (%) :	21.9		
Description :	Sandy CLAY	of Intermediate Plasticity					Bulk Density, $\rho$ (Mg/m <sup>3</sup> ) :	1.989			Bulk Density, $\rho_f$ (Mg/m <sup>3</sup> ) :	2.051		
Height, $H_o$ (mm) :	20.0						Dry Density, $P_d$ (Mg/m <sup>3</sup> ) :	1.579			Dry Density, $P_{df}$ (Mg/m <sup>3</sup> ) :	1.683		
Diameter, $D_o$ (mm) :	50.0						Void Ratio, $e_o$ :	0.678			Void Ratio, $e_f$ :	0.575		
Weight, $W_o$ (g) :	78.1						Deg. of Saturation, $S_o$ (%) :	100.0			Deg. of Saturation, $S_f$ (%) :	100.0		
Particle Density, $\rho_s$ (Mg/m <sup>3</sup> ) :	2.65	(Assumed)					Room Temperature, $t$ (°C) :	27.8			Settlement (mm) :	1.535		
Type of Sample :	Undisturbed						Test Results							
Machine Channel :	A13						Pre-Consolidation Pressure, $P_c'$ (kPa) :	185			Compression Index, $C_c$ :	0.113		

Inc. No.	Applied Pressure (kPa)	Settlement Reading (mm)	Deformation Correction (mm)	Mean Temp. (°C)	Void Ratio (e)	Strain (%)	$m_v$ (m <sup>2</sup> /MN)	Square Root Time Curve Fitting Method				Logarithm Time Curve Fitting Method			
								$t_{90}$ (min)	$C_v$ (m <sup>2</sup> /yr)	$C_v$ (20°C) (m <sup>2</sup> /yr)	$K_v$ (20°C) (10 <sup>-9</sup> m/s)	$t_{50}$ (min)	$C_v$ (m <sup>2</sup> /yr)	$C_v$ (20°C) (m <sup>2</sup> /yr)	$K_v$ (20°C) (10 <sup>-9</sup> m/s)
	0	0	0	27.8	0.678	0	-	-	-	-	-	-	-	-	-
1	25	0.295	0.041	26.9	0.657	1.27	0.508	0.721	60.802	51.893	8.172	-	-	-	-
2	50	0.434	0.059	27.5	0.647	1.88	0.245	2.251	19.110	16.094	1.222	0.822	12.258	10.323	0.784
3	100	0.606	0.079	26.6	0.634	2.64	0.155	1.380	30.739	26.411	1.269	0.592	16.784	14.421	0.693
4	200	0.851	0.101	27.4	0.615	3.75	0.115	2.039	20.408	17.225	0.614	0.688	14.167	11.957	0.426
5	400	1.258	0.125	26.9	0.583	5.67	0.099	1.137	35.462	30.266	0.929	0.473	19.967	17.041	0.523
6	800	1.687	0.152	27.3	0.549	7.68	0.053	1.741	22.214	18.791	0.309	0.588	15.406	13.032	0.214
7	200	1.543	0.123	27.5	0.559	7.10	0.010								
8	25	1.312	0.081	27.7	0.575	6.16	0.058								



Client: M/s. PLB Engineering Sdn. Bhd.

Borehole No.: BH 4

Location: Jelutong Rehabilitation &amp; Reclamation At Jelutong, Penang

Sample No.: UD1

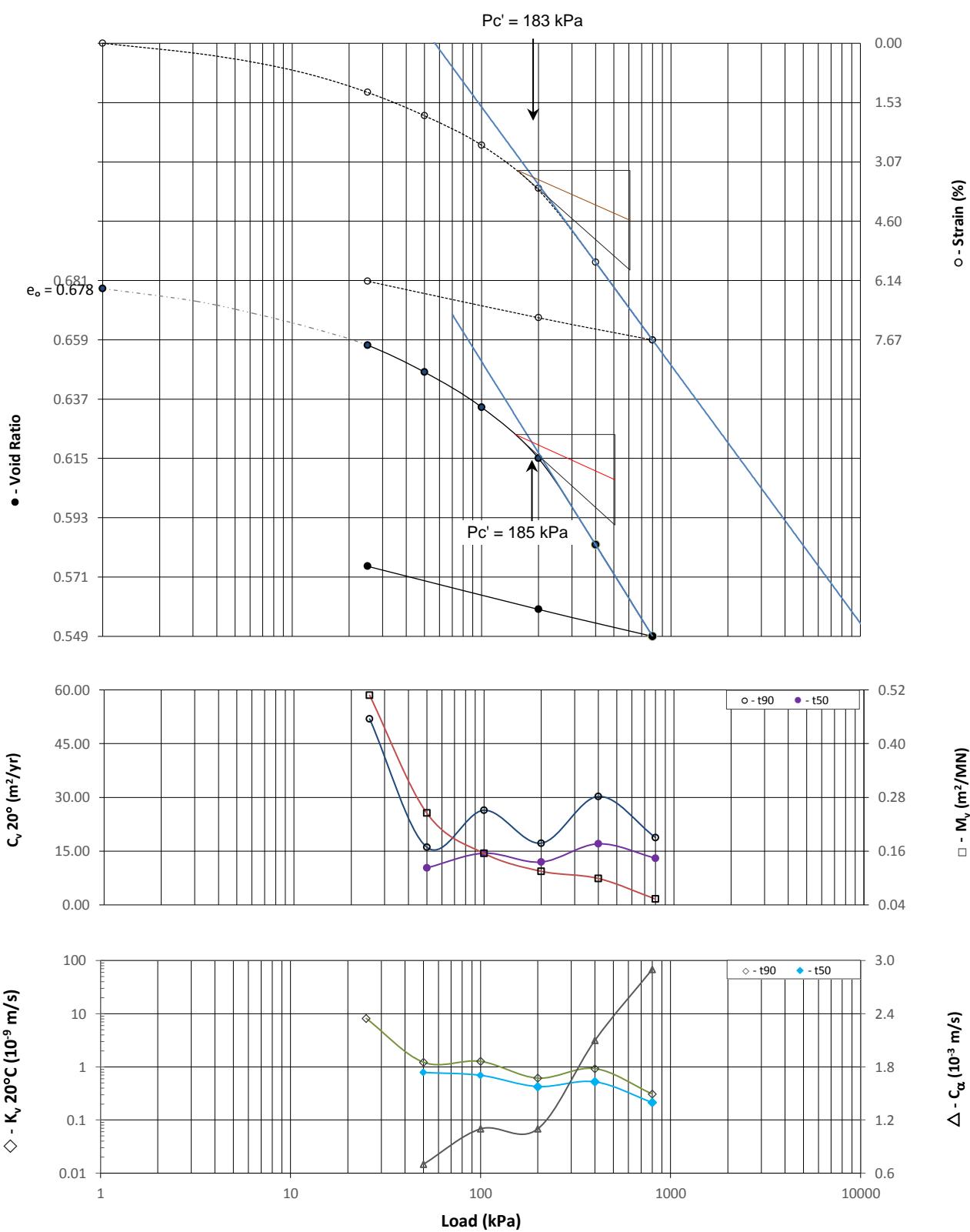
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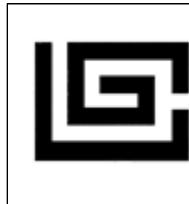
Depth: 11.50-12.50m

Test Name: Ode 4

Date of test: 28/1/2023

## One-Dimensional Consolidation Properties of Soil (BS 1377-5:1990 #3)





Client: M/s. PLB Engineering Sdn. Bhd.

Location: Jelutong Rehabilitation &amp; Reclamation At Jelutong, Penang

Report No.: GLSB/SI/3971-155/2022

Borehole No.: BH 5

Sample No.: UD1

Depth: 3.50-4.50m

Tested by: Hamzah

Checked by: Zalipah

Approved by: Tay KH

## One-Dimensional Consolidation Properties of Soil

(BS 1377-5:1990 #3)

Summary

<b>Sample Details</b>		<b>Initial Conditions</b>				<b>Final Conditions</b>			
Test Depth :	4.40m	Moisture Content, $w_o$ (%) :	168.9			Moisture Content, $w_f$ (%) :	77.5		
Description :	CLAY	Bulk Density, $\rho$ (Mg/m <sup>3</sup> ) :	1.286			Bulk Density, $\rho_f$ (Mg/m <sup>3</sup> ) :	1.312		
Height, $H_o$ (mm) :	20.0	Dry Density, $P_d$ (Mg/m <sup>3</sup> ) :	0.478			Dry Density, $P_{df}$ (Mg/m <sup>3</sup> ) :	0.739		
Diameter, $D_o$ (mm) :	50.0	Void Ratio, $e_o$ :	4.544			Void Ratio, $e_f$ :	2.586		
Weight, $W_o$ (g) :	50.5	Deg. of Saturation, $S_o$ (%) :	98.5			Deg. of Saturation, $S_f$ (%) :	79.4		
Particle Density, $\rho_s$ (Mg/m <sup>3</sup> ) :	2.65 (Assumed)	Room Temperature, $t$ (°C) :	27.6			Settlement (mm) :	7.900		
Type of Sample :	Undisturbed	<b>Test Results</b>				Pre-Consolidation Pressure, $P'_c$ (kPa) :	19	Compression Index, $C_c$ :	1.558
Machine Channel :	A14								

Inc. No.	Applied Pressure (kPa)	Settlement Reading (mm)	Deformation Correction (mm)	Mean Temp. (°C)	Void Ratio (e)	Strain (%)	$m_v$ (m <sup>2</sup> /MN)	Square Root Time Curve Fitting Method				Logarithm Time Curve Fitting Method				
								$t_{90}$ (min)	$C_v$ (m <sup>2</sup> /yr)	$C_v$ (20°C) (m <sup>2</sup> /yr)	$K_v$ (20°C) (10 <sup>-9</sup> m/s)	$t_{50}$ (min)	$C_v$ (m <sup>2</sup> /yr)	$C_v$ (20°C) (m <sup>2</sup> /yr)	$K_v$ (20°C) (10 <sup>-9</sup> m/s)	$C_a$ (10 <sup>-3</sup> m/s)
	0	0	0	27.6	4.544	0	-	-	-	-	-	-	-	-	-	-
1	6.25	2.226	0.012	26.1	3.930	11.07	17.712	97.667	0.406	0.353	1.938	31.934	0.291	0.253	1.389	11.2
2	12.5	3.375	0.025	27.3	3.615	16.75	10.219	64.347	0.511	0.432	1.369	19.837	0.389	0.329	1.042	3.0
3	25	4.634	0.040	25.1	3.271	22.97	5.977	189.944	0.150	0.133	0.246	43.481	0.154	0.137	0.254	14.4
4	50	6.268	0.057	26.6	2.822	31.06	4.198	53.475	0.442	0.380	0.495	19.953	0.278	0.239	0.311	9.8
5	100	7.976	0.076	27.4	2.354	39.50	2.450	34.227	0.543	0.458	0.348	11.414	0.382	0.322	0.245	11.6
6	25	7.579	0.052	26.8	2.458	37.64	0.411									
7	6.25	7.084	0.030	26.5	2.589	35.27	2.023									



Client: M/s. PLB Engineering Sdn. Bhd.

Borehole No.: BH 5

Location: Jelutong Rehabilitation &amp; Reclamation At Jelutong, Penang

Sample No.: UD1

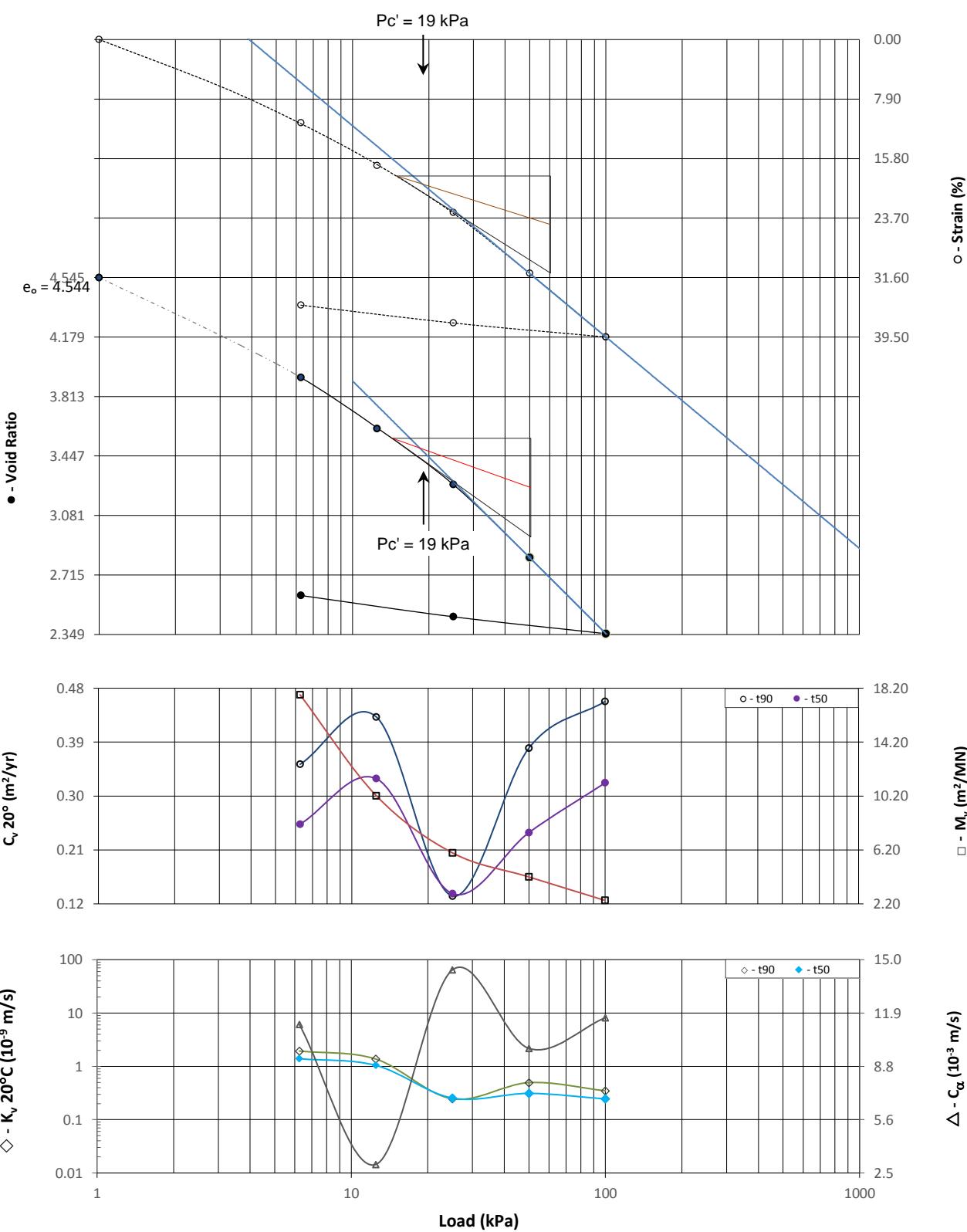
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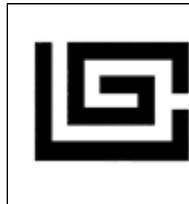
Depth: 3.50-4.50m

Test Name: Ode 5

Date of test: 7/2/2023

## One-Dimensional Consolidation Properties of Soil (BS 1377-5:1990 #3)





Client: M/s. PLB Engineering Sdn. Bhd.

Borehole No.: BH 5

Tested by: Hamzah

Location: Jelutong Rehabilitation &amp; Reclamation At Jelutong, Penang

Sample No.: UD2

Checked by: Zalipah

Report No.: GLSB/SI/3971-155/2022

Depth: 9.00-10.00m

Approved by: Tay KH

Test Name: Ode 6

Date of test: 7/2/2023

## One-Dimensional Consolidation Properties of Soil

(BS 1377-5:1990 #3)

Summary

Sample Details		Initial Conditions				Final Conditions			
Test Depth :		Moisture Content, $w_o$ (%) :				Moisture Content, $w_f$ (%) :			
Description :		150.7				66.8			
Height, $H_o$ (mm) :		Bulk Density, $\rho$ (Mg/m <sup>3</sup> ) :				1.314			
Diameter, $D_o$ (mm) :		Dry Density, $P_d$ (Mg/m <sup>3</sup> ) :				1.365			
Weight, $W_o$ (g) :		Void Ratio, $e_o$ :				0.524			
Particle Density, $\rho_s$ (Mg/m <sup>3</sup> ) :		Deg. of Saturation, $S_o$ (%) :				2.240			
Type of Sample :		Room Temperature, $t$ (°C) :				98.4			
Machine Channel :		Settlement (mm) :				79.0			
						8.514			
Test Results									
		Pre-Consolidation Pressure, $P_c'$ (kPa) :				22			
		Compression Index, $C_c$ :				1.283			

Inc. No.	Applied Pressure (kPa)	Settlement Reading (mm)	Deformation Correction (mm)	Mean Temp. (°C)	Void Ratio (e)	Strain (%)	$m_v$ (m <sup>2</sup> /MN)	Square Root Time Curve Fitting Method				Logarithm Time Curve Fitting Method				
								$t_{90}$ (min)	$C_v$ (m <sup>2</sup> /yr)	$C_v$ (20°C) (m <sup>2</sup> /yr)	$K_v$ (20°C) (10 <sup>-9</sup> m/s)	$t_{50}$ (min)	$C_v$ (m <sup>2</sup> /yr)	$C_v$ (20°C) (m <sup>2</sup> /yr)	$K_v$ (20°C) (10 <sup>-9</sup> m/s)	$C_a$ (10 <sup>-3</sup> m/s)
	0	0	0	26.1	4.057	0	-	-	-	-	-	-	-	-	-	
1	6.25	1.849	0.015	27.3	3.598	9.08	14.527	125.096	0.330	0.279	1.256	32.170	0.301	0.255	1.148	8.8
2	12.5	2.972	0.033	26.8	3.321	14.55	9.626	95.520	0.369	0.316	0.943	33.288	0.248	0.212	0.633	8.1
3	25	4.181	0.057	27.8	3.025	20.42	5.492	383.751	0.080	0.067	0.114	88.482	0.082	0.069	0.117	9.9
4	50	5.545	0.096	26.5	2.693	26.98	3.297	59.900	0.440	0.379	0.387	21.439	0.288	0.248	0.253	8.3
5	100	7.115	0.144	26.9	2.312	34.51	2.064	38.032	0.571	0.487	0.312	13.721	0.371	0.317	0.203	10.3
6	200	8.706	0.192	27.4	1.926	42.15	1.166	29.300	0.588	0.496	0.179	10.223	0.395	0.333	0.120	8.5
7	50	8.258	0.140	26.3	2.025	40.19	0.226									
8	6.25	7.348	0.083	27.2	2.238	35.97	1.614									



Client: M/s. PLB Engineering Sdn. Bhd.

Borehole No.: BH 5

Location: Jelutong Rehabilitation &amp; Reclamation At Jelutong, Penang

Sample No.: UD2

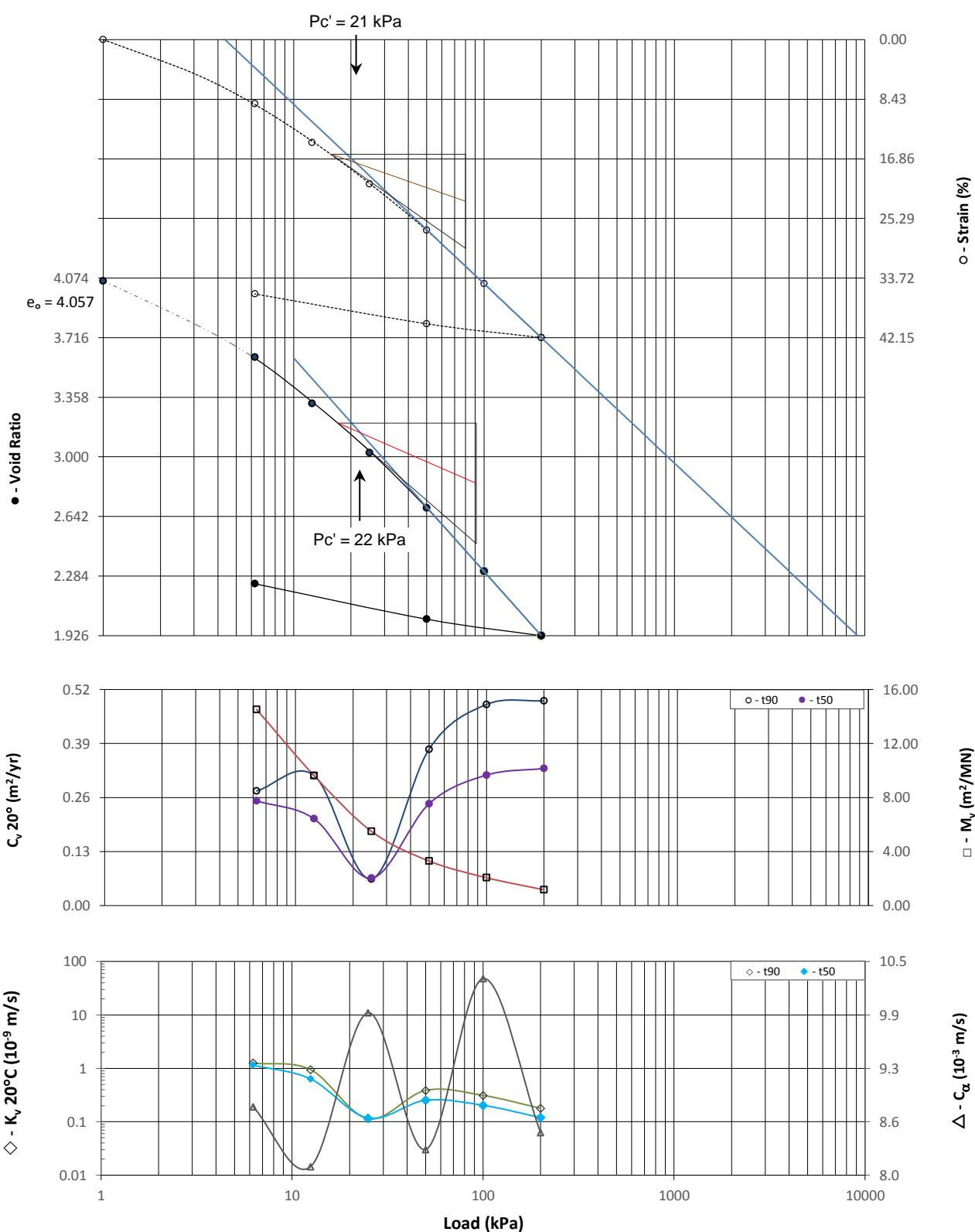
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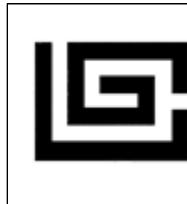
Depth: 9.00-10.00m

Test Name: Ode 6

Date of test: 7/2/2023

## One-Dimensional Consolidation Properties of Soil (BS 1377-5:1990 #3)





Client: M/s. PLB Engineering Sdn. Bhd.

Location: Jelutong Rehabilitation &amp; Reclamation At Jelutong, Penang

Report No.: GLSB/SI/3971-155/2022

Borehole No.: BH 7

Sample No.: UD1

Depth: 3.00-4.00m

Tested by: Hamzah

Checked by: Zalipah

Approved by: Tay KH

## One-Dimensional Consolidation Properties of Soil

(BS 1377-5:1990 #3)

Summary

<b>Sample Details</b>		<b>Initial Conditions</b>	<b>Final Conditions</b>
Test Depth :	3.90m	Moisture Content, $w_o$ (%) :	34.6
Description :	CLAY of Very High Plasticity	Bulk Density, $\rho$ (Mg/m <sup>3</sup> ) :	1.948
Height, $H_o$ (mm) :	20.0	Dry Density, $P_d$ (Mg/m <sup>3</sup> ) :	1.447
Diameter, $D_o$ (mm) :	50.0	Void Ratio, $e_o$ :	0.831
Weight, $W_o$ (g) :	76.5	Deg. of Saturation, $S_o$ (%) :	100.0
Particle Density, $\rho_s$ (Mg/m <sup>3</sup> ) :	2.65 (Assumed)	Room Temperature, $t$ (°C) :	26.6
Type of Sample :	Undisturbed	<b>Test Results</b>	
Machine Channel :	A13	Pre-Consolidation Pressure, $P'_c$ (kPa) :	37
		Compression Index, $C_c$ :	<b>0.083</b>

Inc. No.	Applied Pressure (kPa)	Settlement Reading (mm)	Deformation Correction (mm)	Mean Temp. (°C)	Void Ratio (e)	Strain (%)	$m_v$ (m <sup>2</sup> /MN)	Square Root Time Curve Fitting Method				Logarithm Time Curve Fitting Method			
								$t_{90}$ (min)	$C_v$ (m <sup>2</sup> /yr)	$C_v$ (20°C) (m <sup>2</sup> /yr)	$K_v$ (20°C) (10 <sup>-9</sup> m/s)	$t_{50}$ (min)	$C_v$ (m <sup>2</sup> /yr)	$C_v$ (20°C) (m <sup>2</sup> /yr)	$K_v$ (20°C) (10 <sup>-9</sup> m/s)
	0	0	0	26.6	0.831	0	-	-	-	-	-	-	-	-	-
1	6.25	0.113	0.016	27.1	0.822	0.49	0.776	1.727	25.586	21.740	5.230	-	-	-	-
2	12.5	0.191	0.027	27.4	0.816	0.82	0.539	2.925	14.983	12.646	2.113	-	-	-	-
3	25	0.311	0.041	27.8	0.806	1.35	0.428	8.825	4.923	4.119	0.547	-	-	-	-
4	50	0.492	0.059	26.8	0.791	2.17	0.330	3.439	12.462	10.660	1.091	-	-	-	-
5	100	0.779	0.079	27.4	0.767	3.50	0.273	3.994	10.496	8.859	0.750	-	-	-	-
6	200	1.074	0.101	26.2	0.742	4.87	0.141	3.307	12.327	10.687	0.467	-	-	-	-
7	50	0.972	0.079	26.8	0.749	4.47	0.028					No t50 fitting due to pore pressure			
8	6.25	0.795	0.048	26.3	0.763	3.74	0.175								



Client: M/s. PLB Engineering Sdn. Bhd.

Borehole No.: BH 7

Location: Jelutong Rehabilitation &amp; Reclamation At Jelutong, Penang

Sample No.: UD1

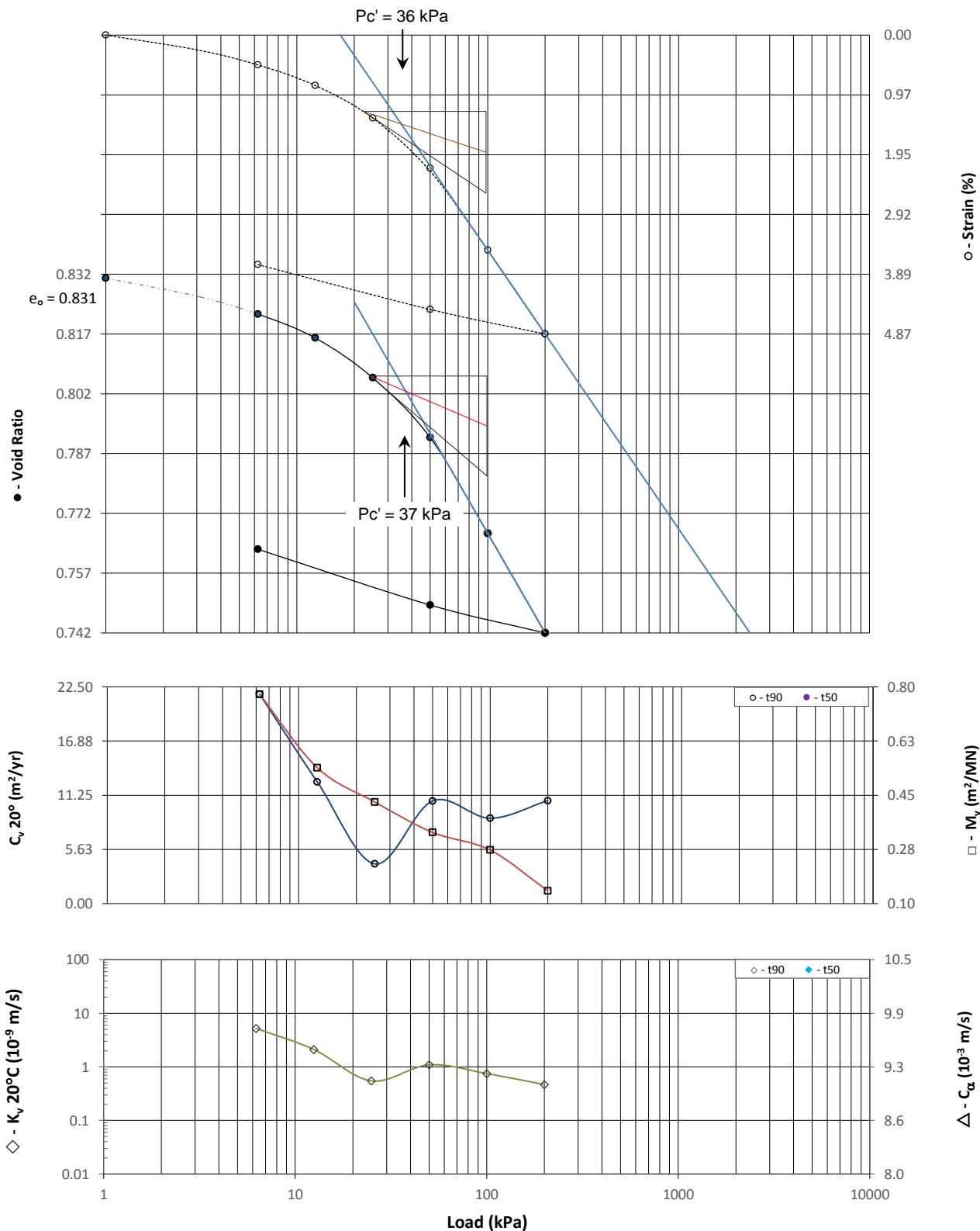
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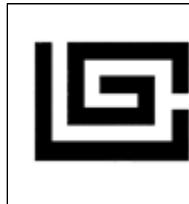
Depth: 3.00-4.00m

Test Name: Ode 7

Date of test: 27/2/2023

## One-Dimensional Consolidation Properties of Soil (BS 1377-5:1990 #3)





Client: M/s. PLB Engineering Sdn. Bhd.

Location: Jelutong Rehabilitation &amp; Reclamation At Jelutong, Penang

Report No.: GLSB/SI/3971-155/2022

Borehole No.: BH 7

Sample No.: UD2

Depth: 6.00-7.00m

Tested by: Hamzah

Checked by: Zalipah

Approved by: Tay KH

## One-Dimensional Consolidation Properties of Soil

(BS 1377-5:1990 #3)

Summary

<b>Sample Details</b>		<b>Initial Conditions</b>				<b>Final Conditions</b>			
Test Depth :		Moisture Content, $w_o$ (%) :				Moisture Content, $w_f$ (%) :			
Description :		Bulk Density, $\rho$ (Mg/m <sup>3</sup> ) :				Bulk Density, $\rho_f$ (Mg/m <sup>3</sup> ) :			
Height, $H_o$ (mm) :		Dry Density, $P_d$ (Mg/m <sup>3</sup> ) :				Dry Density, $P_{df}$ (Mg/m <sup>3</sup> ) :			
Diameter, $D_o$ (mm) :		Void Ratio, $e_o$ :				Void Ratio, $e_f$ :			
Weight, $W_o$ (g) :		Deg. of Saturation, $S_o$ (%) :				Deg. of Saturation, $S_f$ (%) :			
Particle Density, $\rho_s$ (Mg/m <sup>3</sup> ) :		Room Temperature, $t$ (°C) :				Settlement (mm) :			
Type of Sample :		<b>Test Results</b>				Pre-Consolidation Pressure, $P_c'$ (kPa) : <b>79</b>			
Machine Channel :		Compression Index, $C_c$ : <b>0.207</b>							

Inc. No.	Applied Pressure (kPa)	Settlement Reading (mm)	Deformation Correction (mm)	Mean Temp. (°C)	Void Ratio (e)	Strain (%)	$m_v$ (m <sup>2</sup> /MN)	Square Root Time Curve Fitting Method				Logarithm Time Curve Fitting Method				
								$t_{90}$ (min)	$C_v$ (m <sup>2</sup> /yr)	$C_v$ (20°C) (m <sup>2</sup> /yr)	$K_v$ (20°C) (10 <sup>-9</sup> m/s)	$t_{50}$ (min)	$C_v$ (m <sup>2</sup> /yr)	$C_v$ (20°C) (m <sup>2</sup> /yr)	$K_v$ (20°C) (10 <sup>-9</sup> m/s)	$C_a$ (10 <sup>-3</sup> m/s)
	0	0	0	27.7	1.020	0	-	-	-	-	-	-	-	-	-	
1	12.5	0.316	0.035	26.4	0.992	1.41	1.124	3.320	13.187	11.381	3.966	0.721	14.223	12.276	4.277	1.1
2	25	0.511	0.058	26.2	0.974	2.27	0.698	15.611	2.741	2.376	0.514	1.893	5.294	4.590	0.993	1.5
3	50	0.926	0.091	26.4	0.936	4.18	0.782	15.328	2.713	2.342	0.568	3.013	3.233	2.790	0.676	2.4
4	100	1.555	0.131	27.1	0.876	7.12	0.615	15.898	2.486	2.112	0.403	3.403	2.721	2.312	0.441	3.3
5	200	2.372	0.170	26.8	0.798	11.01	0.419	9.078	4.044	3.459	0.449	2.764	3.111	2.661	0.346	4.5
6	400	3.352	0.211	26.3	0.703	15.71	0.264	8.861	3.762	3.254	0.266	2.731	2.859	2.473	0.202	4.9
7	100	3.130	0.192	27.2	0.723	14.69	0.040									
8	12.5	2.565	0.155	26.5	0.777	12.05	0.354									



Client: M/s. PLB Engineering Sdn. Bhd.

Borehole No.: BH 7

Location: Jelutong Rehabilitation &amp; Reclamation At Jelutong, Penang

Sample No.: UD2

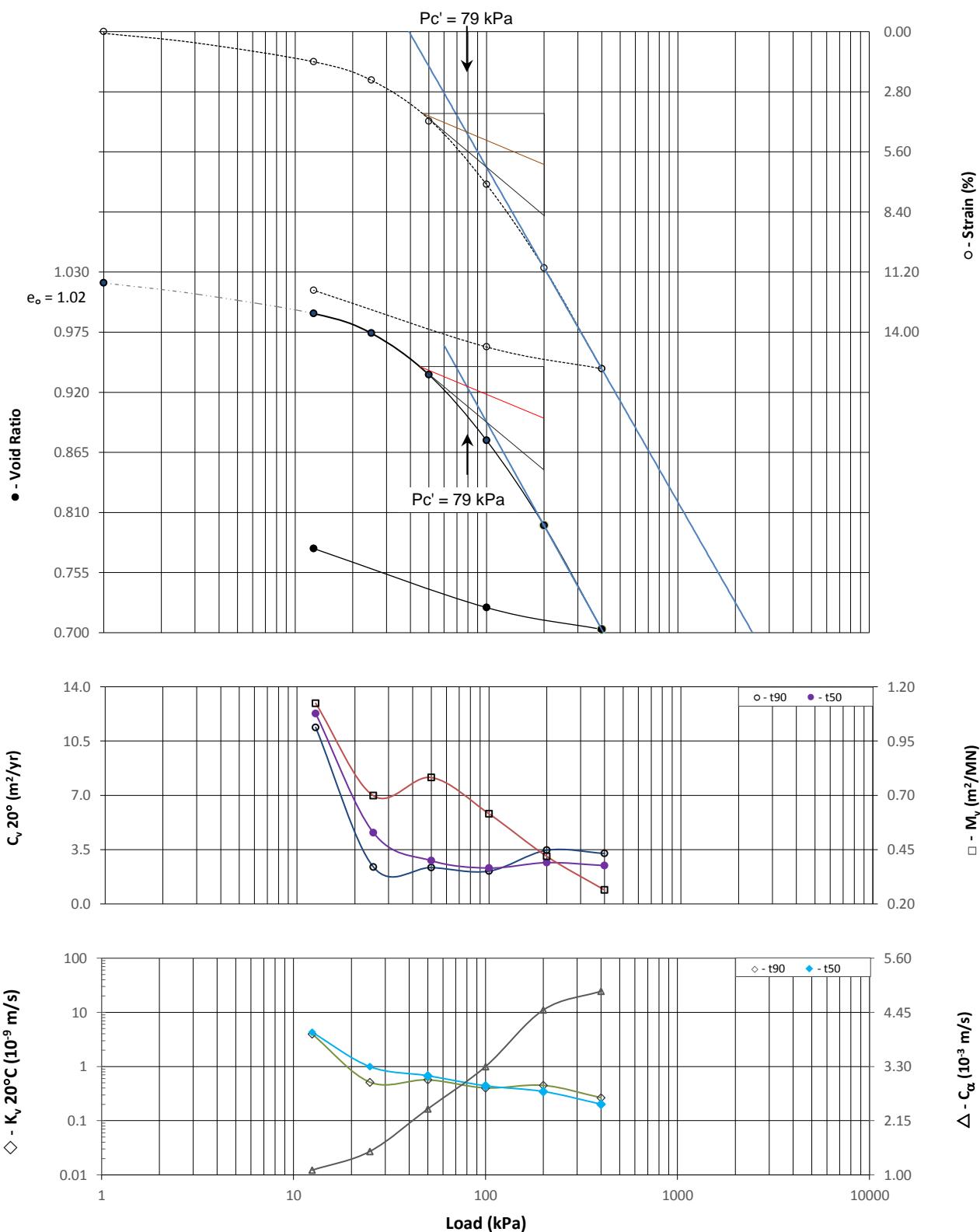
Report No.: GLSB/SI/3971-155/2022

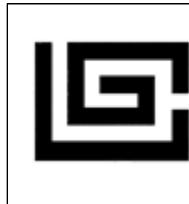
Depth: 6.00-7.00m

Test Name: Ode 8

Date of test: 27/2/2023

## One-Dimensional Consolidation Properties of Soil (BS 1377-5:1990 #3)





Client: M/s. PLB Engineering Sdn. Bhd.

Location: Jelutong Rehabilitation &amp; Reclamation At Jelutong, Penang

Report No.: GLSB/SI/3971-155/2022

Borehole No.: BH 8

Sample No.: UD1

Depth: 2.00-3.00m

Test Name: Ode 9

Date of test: 3/3/2023

Tested by: Hamzah

Checked by: Zalipah

Approved by: Tay KH

## One-Dimensional Consolidation Properties of Soil

(BS 1377-5:1990 #3)

Summary

Sample Details		Initial Conditions				Final Conditions			
Test Depth :	3.90m	Moisture Content, $w_o$ (%) :	149.1			Moisture Content, $w_f$ (%) :	91.2		
Description :	CLAY	Bulk Density, $\rho$ (Mg/m <sup>3</sup> ) :	1.345			Bulk Density, $\rho_f$ (Mg/m <sup>3</sup> ) :	1.486		
Height, $H_o$ (mm) :	20.0	Dry Density, $P_d$ (Mg/m <sup>3</sup> ) :	0.540			Dry Density, $P_{df}$ (Mg/m <sup>3</sup> ) :	0.777		
Diameter, $D_o$ (mm) :	50.0	Void Ratio, $e_o$ :	3.907			Void Ratio, $e_f$ :	2.411		
Weight, $W_o$ (g) :	52.8	Deg. of Saturation, $S_o$ (%) :	100.0			Deg. of Saturation, $S_f$ (%) :	100.0		
Particle Density, $\rho_s$ (Mg/m <sup>3</sup> ) :	2.65 (Assumed)	Room Temperature, $t$ (°C) :	26.2			Settlement (mm) :	6.982		
Type of Sample :	Undisturbed	Test Results							
Machine Channel :	A14	Pre-Consolidation Pressure, $P_c'$ (kPa) :	14			Compression Index, $C_c$ :	1.351		

Inc. No.	Applied Pressure (kPa)	Settlement Reading (mm)	Deformation Correction (mm)	Mean Temp. (°C)	Void Ratio (e)	Strain (%)	$m_v$ (m <sup>2</sup> /MN)	Square Root Time Curve Fitting Method				Logarithm Time Curve Fitting Method				
								$t_{90}$ (min)	$C_v$ (m <sup>2</sup> /yr)	$C_v$ (20°C) (m <sup>2</sup> /yr)	$K_v$ (20°C) (10 <sup>-9</sup> m/s)	$t_{50}$ (min)	$C_v$ (m <sup>2</sup> /yr)	$C_v$ (20°C) (m <sup>2</sup> /yr)	$K_v$ (20°C) (10 <sup>-9</sup> m/s)	$C_a$ (10 <sup>-3</sup> m/s)
	0	0	0	26.2	3.907	0	-	-	-	-	-	-	-	-	-	-
1	6.25	1.247	0.012	26.1	3.604	6.18	9.880	75.585	0.552	0.480	1.470	16.936	0.577	0.501	1.534	8.2
2	12.5	2.326	0.025	27.1	3.342	11.51	9.089	130.636	0.282	0.240	0.676	21.695	0.398	0.338	0.952	13.0
3	25	3.743	0.040	26.5	2.998	18.52	6.337	124.654	0.257	0.221	0.434	20.188	0.372	0.320	0.629	12.8
4	50	5.381	0.057	25.8	2.601	26.62	3.979	111.242	0.239	0.209	0.258	16.290	0.383	0.335	0.413	11.8
5	100	7.058	0.076	26.6	2.194	34.91	2.259	113.112	0.188	0.162	0.113	13.400	0.372	0.320	0.224	11.9
6	25	6.665	0.052	27.3	2.285	33.07	0.378									
7	6.25	6.146	0.030	26.4	2.406	30.58	1.980									



Client: M/s. PLB Engineering Sdn. Bhd.

Borehole No.: BH 8

Location: Jelutong Rehabilitation &amp; Reclamation At Jelutong, Penang

Sample No.: UD1

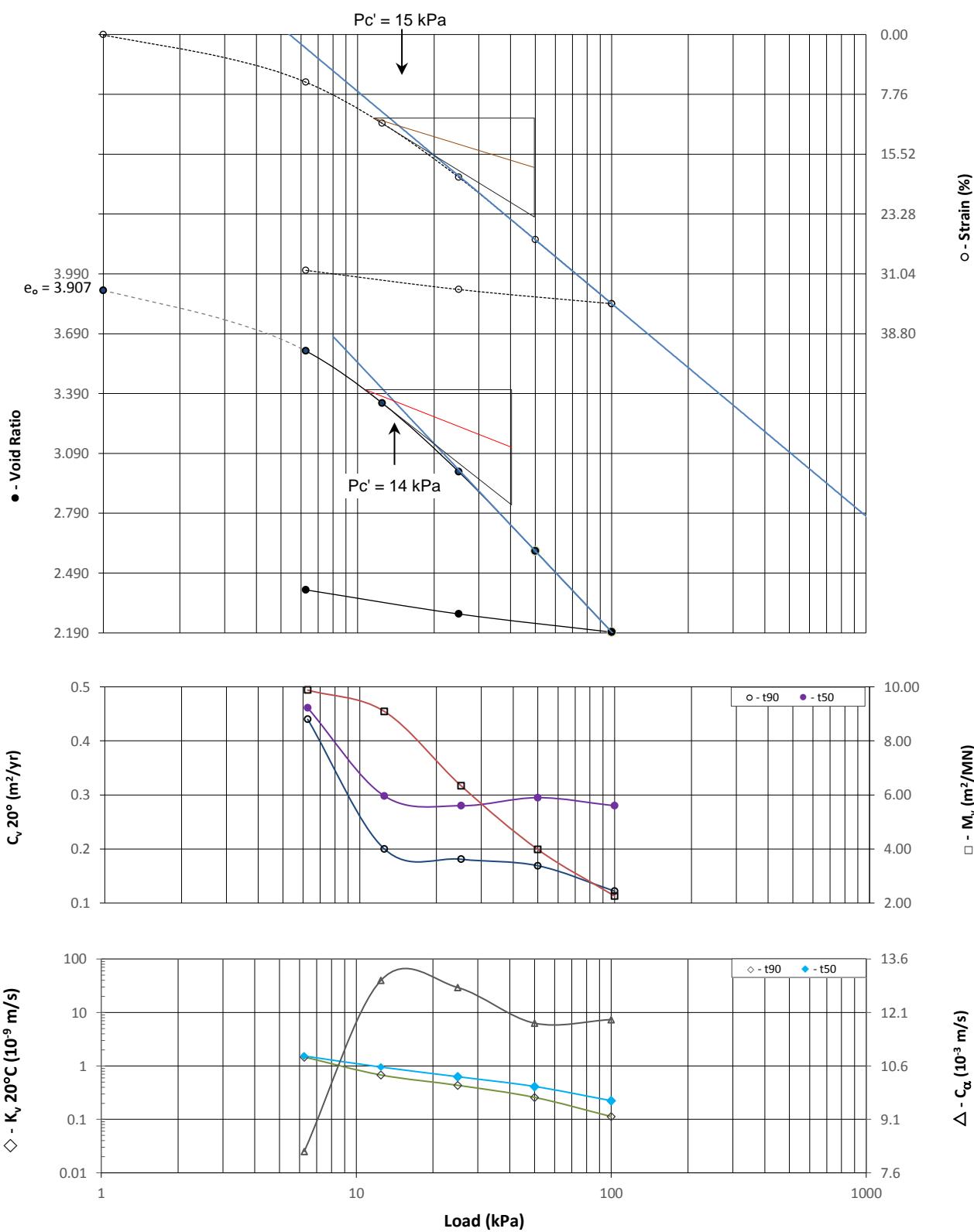
Report No.: GLSB/SI/3971-155/2022

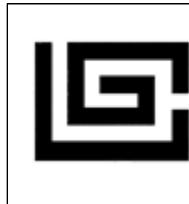
Depth: 2.00-3.00m

Test Name: Ode 9

Date of test: 3/3/2023

## One-Dimensional Consolidation Properties of Soil (BS 1377-5:1990 #3)





Client: M/s. PLB Engineering Sdn. Bhd.

Location: Jelutong Rehabilitation &amp; Reclamation At Jelutong, Penang

Report No.: GLSB/SI/3971-155/2022

Borehole No.: BH 8

Sample No.: UD2

Depth: 6.50-7.50m

Tested by: Hamzah

Checked by: Zalipah

Approved by: Tay KH

## One-Dimensional Consolidation Properties of Soil

(BS 1377-5:1990 #3)

Summary

<b>Sample Details</b>	
Test Depth :	7.40m
Description :	Sandy CLAY
Height, $H_o$ (mm) :	20.0
Diameter, $D_o$ (mm) :	50.0
Weight, $W_o$ (g) :	53.3
Particle Density, $\rho_s$ (Mg/m <sup>3</sup> ) :	2.65 (Assumed)
Type of Sample :	Undisturbed
Machine Channel :	A16

<b>Initial Conditions</b>		<b>Final Conditions</b>	
Moisture Content, $w_o$ (%) :	157.3	Moisture Content, $w_f$ (%) :	89.5
Bulk Density, $\rho$ (Mg/m <sup>3</sup> ) :	1.357	Bulk Density, $\rho_f$ (Mg/m <sup>3</sup> ) :	1.397
Dry Density, $P_d$ (Mg/m <sup>3</sup> ) :	0.527	Dry Density, $P_{df}$ (Mg/m <sup>3</sup> ) :	0.737
Void Ratio, $e_o$ :	4.028	Void Ratio, $e_f$ :	2.596
Deg. of Saturation, $S_o$ (%) :	100.0	Deg. of Saturation, $S_f$ (%) :	91.4
Room Temperature, $t$ (°C) :	26.2	Settlement (mm) :	7.119
<b>Test Results</b>			
Pre-Consolidation Pressure, $P_c'$ (kPa) :		14	Compression Index, $C_c$ :
			1.554

Inc. No.	Applied Pressure (kPa)	Settlement Reading (mm)	Deformation Correction (mm)	Mean Temp. (°C)	Void Ratio (e)	Strain (%)	$m_v$ (m <sup>2</sup> /MN)	Square Root Time Curve Fitting Method				Logarithm Time Curve Fitting Method				
								$t_{90}$ (min)	$C_v$ (m <sup>2</sup> /yr)	$C_v$ (20°C) (m <sup>2</sup> /yr)	$K_v$ (20°C) (10 <sup>-9</sup> m/s)	$t_{50}$ (min)	$C_v$ (m <sup>2</sup> /yr)	$C_v$ (20°C) (m <sup>2</sup> /yr)	$K_v$ (20°C) (10 <sup>-9</sup> m/s)	$C_a$ (10 <sup>-3</sup> m/s)
	0	0	0	26.2	4.028	0	-	-	-	-	-	-	-	-	-	
1	6.25	0.748	0.015	27.1	3.844	3.67	5.864	118.599	0.361	0.307	0.558	14.974	0.669	0.568	1.033	4.9
2	12.5	1.920	0.033	26.8	3.554	9.44	9.583	249.754	0.155	0.133	0.395	32.130	0.283	0.242	0.719	16.4
3	25	3.563	0.057	25.8	3.147	17.53	7.151	129.442	0.257	0.225	0.499	26.547	0.293	0.256	0.568	15.1
4	50	5.464	0.096	26.1	2.678	26.84	4.516	118.600	0.227	0.197	0.276	20.989	0.300	0.261	0.365	10.2
5	100	7.263	0.144	26.5	2.238	35.60	2.393	114.774	0.183	0.158	0.117	16.115	0.305	0.263	0.195	11.7
6	25	6.412	0.099	27.3	2.441	31.57	0.834									
7	6.25	5.754	0.070	27.1	2.599	28.42	2.451									



Client: M/s. PLB Engineering Sdn. Bhd.

Borehole No.: BH 8

Location: Jelutong Rehabilitation &amp; Reclamation At Jelutong, Penang

Sample No.: UD2

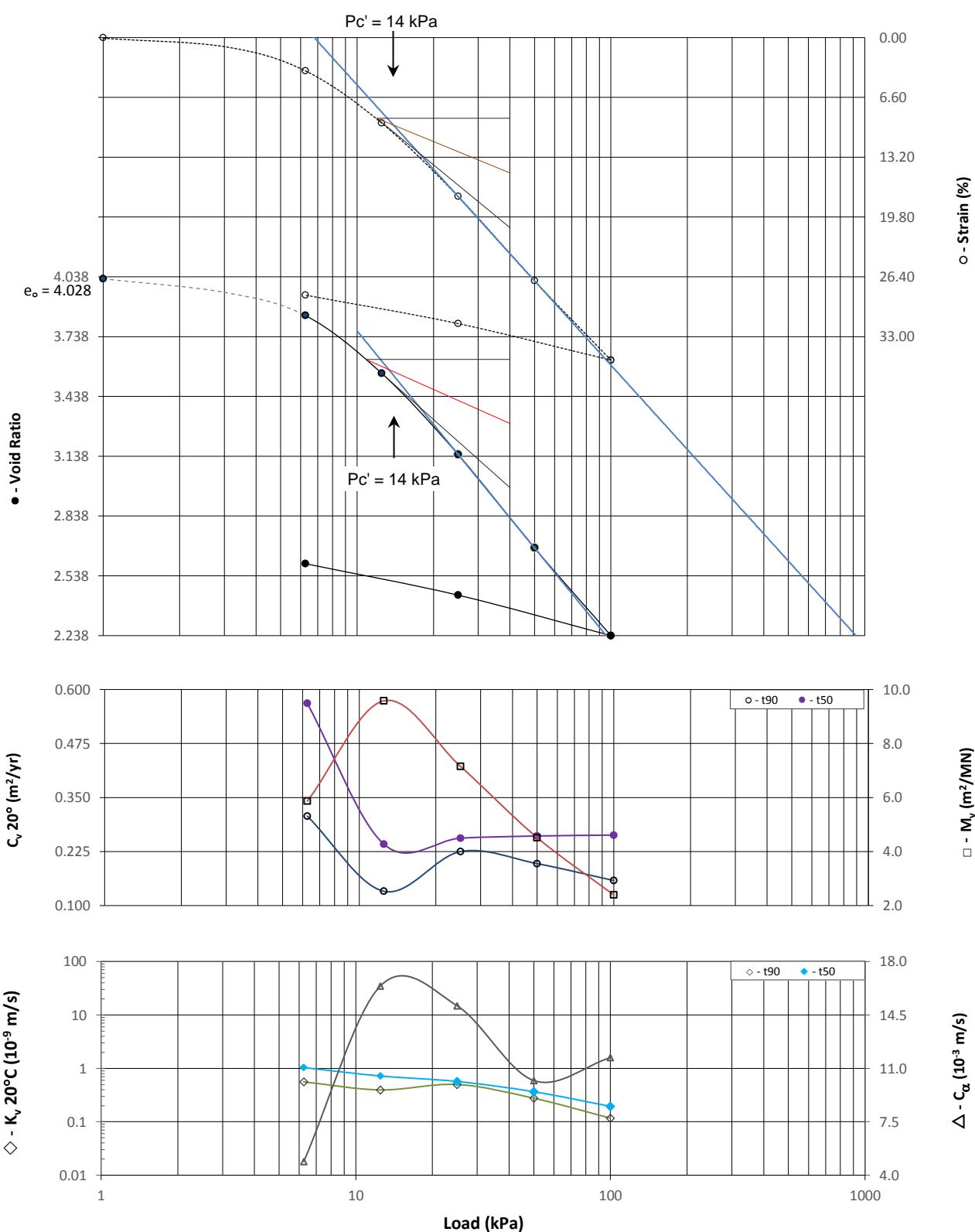
Report No.: GLSB/SI/3971-155/2022

Depth: 6.50-7.50m

Test Name: Ode 10

Date of test: 3/3/2023

## One-Dimensional Consolidation Properties of Soil (BS 1377-5:1990 #3)





## Point Load Test

	Client: M/S PLB Engineering Sdn. Bhd.		Borepile No.: BH 8
	Location: Jelutong Rehabilitation and Reclamation at Jelutong, Penang.		Sample No.: Refer below
	Report No.: GLSB/SI/3971-155/2022	Test Name: PLT	Depth: Refer below
Tested : Zaini	Checked : Zalipah	Date of test: 13/03/23	

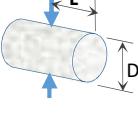
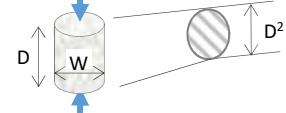
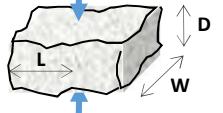
## Point Load Strength Test (ISRM - RTH 325 — 89)

**TEST 1:**

Core Run	Core Depth (m)	Test Depth (m)	Length, W (mm)	Diameter, D (mm)	De <sup>2</sup> (mm <sup>2</sup> )	De (mm)	Test Type	Test Orientation	Moisture Condition	Moisture Content	
C1	49.80-51.30	49.80-49.90	65.3	45.7	3800	61.6	Irregular	Unknown	-	-	
Failure Load, P (kN)			30.40	Uncorrected Point Load Strength Index, I <sub>s</sub> (MPa)				8.00	Conversion to UCS, C <sub>a</sub> (Mpa)		
Size Correction Factor, F			1.099	Corrected Point Load Strength Index, I <sub>s(50)</sub> (MPa)				8.79	193		
Sample Description :		-									

**TEST 2:**

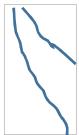
C2	51.30-52.80	51.82-51.9	47.8	51.7	2671	-	Diametral	Perpendicular	-	-	
Failure Load, P (kN)			31.80	Uncorrected Point Load Strength Index, I <sub>s</sub> (MPa)				11.91	Conversion to UCS, C <sub>a</sub> (Mpa)		
Size Correction Factor, F			1.015	Corrected Point Load Strength Index, I <sub>s(50)</sub> (MPa)				12.08	266		
Sample Description :		-									

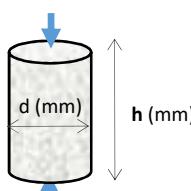
Diametral test	Axial test	Irregular/Block test	Calculation:
Length/diameter ratio = > 1.0	Length/diameter ratio = 0.3 – 1.0	Diameter/Width ratio = 0.3 – 1.0	Size Correction Factor, F = (D/50) <sup>0.45</sup>
			Uncorrected Point Load Strength Index, I <sub>s</sub> (MPa) = P/D <sup>2</sup>
Point Load Strength Index, I <sub>s</sub> (Mpa)	< 0.03	> 0.03 < 0.1	Corrected Point Load Strength Index, I <sub>s(50)</sub> (MPa) = F x I <sub>s</sub>
Strength Designation	Extremely Low	Very Low	Estimated UCS, C <sub>a</sub> (MPa) = I <sub>s(50)</sub> x 22



# **Uniaxial Compression Strength Test on Rock**

	Client: M/S PLB Engineering Sdn. Bhd.				Borepile No.: BH 8
	Location: Jelutong Rehabilitation and Reclamation at Jelutong, Penang.				Sample No.: Refer below
	Report No.: GLSB/SI/3971-155/2022		Test Name: UCS		Depth: Refer below
	Tested by: Zaini		Checked : Zalipah		Date of test: 13/03/12

<b>Uniaxial Compressive Strength of Rock Materials</b> (ISRM - Part 1)								
<b>TEST 1:</b>								
Core run	Core depth (m)	Test depth (m)	Height (mm)	Diameter (mm)	Weight (g)	H:D ratios	Loading rate (mm/min)	
C2	51.30-52.80	51.92-52.07	105.44	51.75	578.6	2.04	0.5	
Water Content (%)	-	-	Sample Description :				<u>Mode of failure</u> 	
Bulk Density (Mg/m³)	2.61		-					
Compression Force, F (kN)	76.40		Observation Remark (Before Test) :					
UCS, C (MPa)	36.3		-					
Corrected UCS, C <sub>cor</sub> (MPa)	<b>36.4</b>							

<u>Cylindrical test</u> Height/diameter ratio 2.5 – 3.0		<u>Calculation</u>
		$\text{Uniaxial Compressive Strength, } C(\text{Pa}) = \frac{P}{A}$ $\text{H:D (2:1) ratio corrected UCS, } C_{\text{cor}}(\text{Pa}) = \frac{C}{0.88 + \left(0.24 \frac{d}{h}\right)}$



## Chemical Test



# GEOLAB (M) SDN. BHD. (210351-V)

Foundation, Soil & Concrete Specialists.  
380-380A, Jalan Simbang, Taman Perleng,  
81200 Johor Bahru, Johor, Malaysia.  
Tel: 07-236 4932 / 237 9814 Fax: 07-236 4931 / 235 9353  
Email: geolab@geolab-sdn-bhd.com  
Website: www.geolab-sdn-bhd.com



MS ISO/IEC17025  
TESTING  
SAMM NO. 254

Our Ref. : GLSB/CH/SI/3971-155/2022

Date : 11 May 2023  
Page 1 of 2

## TEST REPORT

(This report is issued subject to the conditions set out overleaf)

**Subject Matter** : Determination of pH Value, Total Sulphate, Chloride Content, Carbonate and Organic Content on SEVEN samples submitted.

**Tested For** : M/S PLB ENGINEERING SDN. BHD.

**Customer** : M/S PLB ENGINEERING SDN. BHD.  
1320, Jalan Baru, Taman Chai Leng, 13700 Perai, Pulau Pinang.

Test Methods	Tests	Reference Methods
	pH Value	BS 1377 : Part 3 : 1990 : Clause 9
	Total Sulphate	BS 1377 : Part 3 : 1990 : Clause 5
	Organic Content	BS 1377 : Part 3 : 1990 : Clause 3
	Chloride Content	BS 1377 : Part 3 : 1990 : Clause 7
	Carbonate*	In House Method

\*Not Under SAMM Scope of Accreditation

**Project** : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.

**Date Received** : 12 January 2023 & 8 March 2023

**Samples Description** : Refer to Table 1: Samples Description and Results of Analysis

**Conditions of Receipts** : Seven samples of soil weighing approximately 500g each were received.

**Results** : Refer to Table 1: Samples Description and Results of Analysis

### Authorized Signatory:

Nurul Akmaliah Binti Hussin  
Chemist (L/2500/7467/16)  
MSc, BSc (Hons.) Chemistry, LMIC

### Branch Offices :

Kuala Lumpur : No. 6, Lot 25, Jalan Udang Harimau 1, Medan Niaga Keppong, 51200 Kuala Lumpur. Tel: +603-6243 4715 / 6242 8230 Fax: +603-6242 6496 Email: info@geonomics.com.my  
Negeri Sembilan : No. 531, Jalan Seremban Tiga 15, Seremban Tiga, 70300 Seremban, Negeri Sembilan Darul Khusus. Tel: +606-631 1130 Fax: +606-631 1129 Email: abdulholedishak@yahoo.com.my  
Melaka : No. 42B, Jalan IMJ2, Taman Industri Malim Jaya, 75250 Melaka. Tel: +606-336 5743 Fax: +606-334 4341 Email: getarangemilang@yahoo.com  
Pulau Penang : No. 30, Lorong Nagasari 3, Taman Nagasari, 13600 Prai, Pulau Penang. Tel: +604-399 1124 Fax: +604-399 6975 E-mail: geolab1@yahoo.com / geolabnorth@gmail.com  
Sarawak : No. CJ 206 Batu Kawah New Township, Jalan Batu Kawa, 93250 Kuching Sarawak. Tel: +608-257 8206 / 248 3454 H/P: +6016-723 6491 Fax: +608-2458 476 Email: ckeekwok@yahoo.com  
Singapore : 21, Woodlands Industrial Park E1 #04-05 Singapore 757720 Tel: +65 6893 6913 Fax: +65 6894 1913 Email: sales@geonomics.com.sg Website : www.geonomics.com.sg

Our Ref. : GLSB/CH/SI/3971-155/2022

 Date 11 May 2023  
 Page 2 of 2

**Result:**
*Table 1: Samples Description and Results of Analysis*

Samples Description	pH Value	RESULTS				
		Total Sulphate %	Organic Content %	Chloride Content %	Carbonate* %	Passing 2mm* %
1) BH1/UD1/4.50	6.7	0.07	0.8	0.22	0.03	78
2) BH3/UD1/3.00	7.9	0.15	4.0	2.40	0.11	100
3) BH4/UD1/11.50	4.9	0.14	0.1	0.11	<0.01	91
4) BH5/UD1/3.50	7.2	0.13	5.6	2.71	0.09	100
5) BH7/UD1/3.00	7.8	0.14	2.1	0.45	<0.01	100
6) BH8/UD2/6.50	7.7	0.13	5.2	2.10	0.08	100
7) BH9/UD1/7.50	4.4	0.09	0.1	0.08	<0.01	90

*\*Not Under SAMM Scope of Accreditation*




## APPENDIX F

*Site Photographs*



**BH1**

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.



Photo 1 : Deep Boring Location at BH1

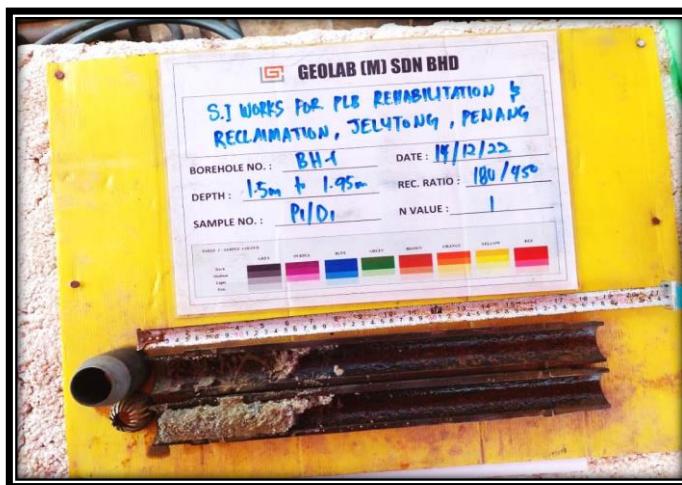


Photo 2 : Disturbed sample of BH1 at 1.50m

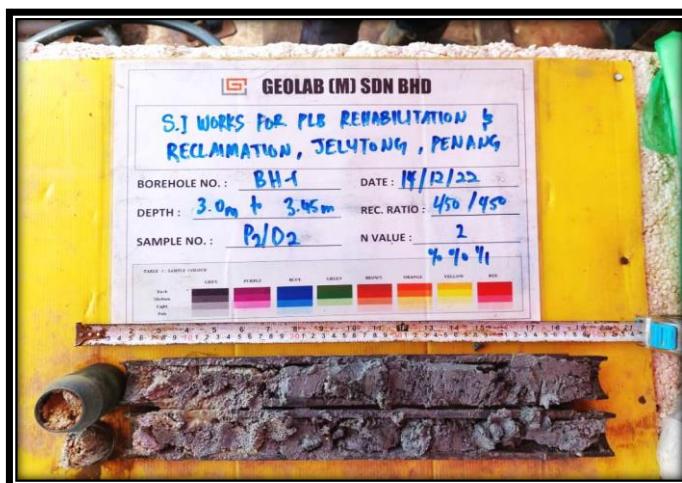


Photo 3 : Disturbed sample of BH1 at 3.00m

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.



Photo 4 : Disturbed sample of BH1 at 6.00m



Photo 5 : Disturbed sample of BH1 at 7.50m



Photo 6 : Disturbed sample of BH1 at 9.00m

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.



Photo 7 : Disturbed sample of BH1 at 10.50m



Photo 8 : Disturbed sample of BH1 at 12.00m



Photo 9 : Disturbed sample of BH1 at 13.50m

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.



Photo 10 : Disturbed sample of BH1 at 15.00m



Photo 11 : Disturbed sample of BH1 at 16.50m



Photo 12 : Disturbed sample of BH1 at 18.00m

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.



Photo 13 : Disturbed sample of BH1 at 19.50m

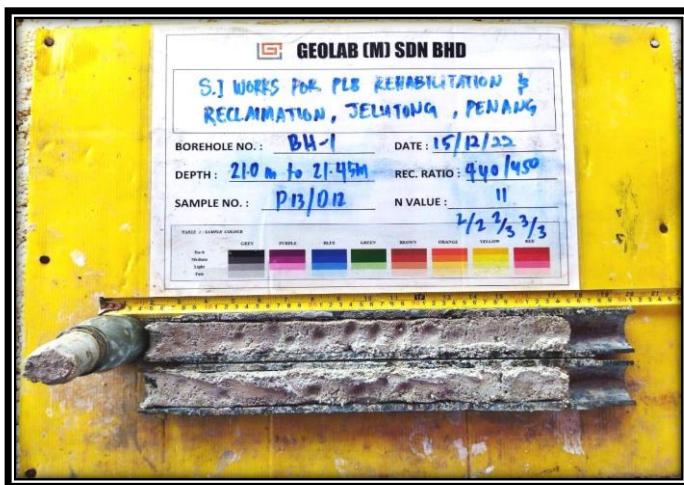


Photo 14 : Disturbed sample of BH1 at 21.00m



Photo 15 : Disturbed sample of BH1 at 22.50m

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.



Photo 16 : Disturbed sample of BH1 at 24.00m

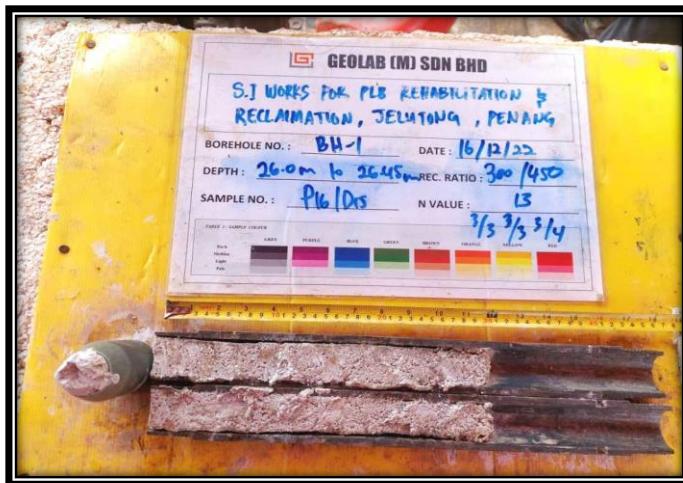


Photo 17 : Disturbed sample of BH1 at 26.00m



Photo 18 : Disturbed sample of BH1 at 27.00m

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.



Photo 19 : Disturbed sample of BH1 at 28.50m



Photo 20 : Disturbed sample of BH1 at 30.00m

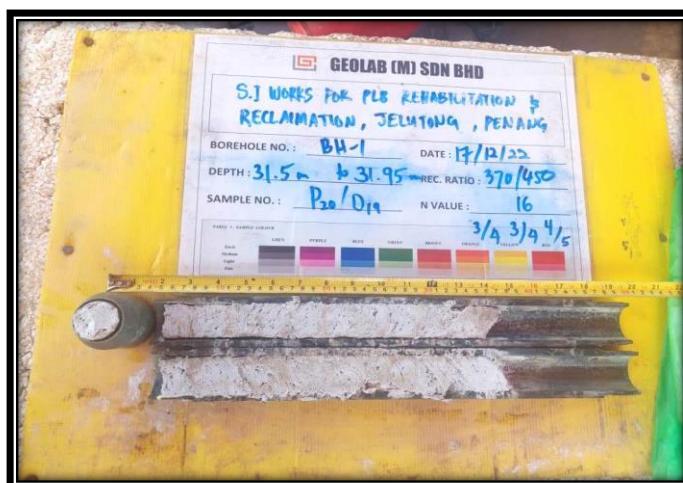


Photo 21 : Disturbed sample of BH1 at 31.50m

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.

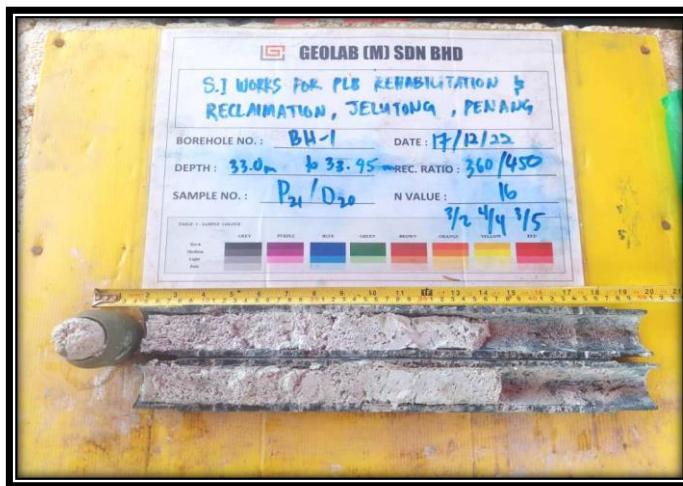


Photo 22 : Disturbed sample of BH1 at 33.00m



Photo 23 : Disturbed sample of BH1 at 34.50m



Photo 24 : Disturbed sample of BH1 at 36.00m

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.



Photo 25 : Disturbed sample of BH1 at 37.50m



Photo 26 : Disturbed sample of BH1 at 39.00m



Photo 27 : Disturbed sample of BH1 at 40.50m

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.



Photo 28 : Disturbed sample of BH1 at 42.00m



Photo 29 : Disturbed sample of BH1 at 43.50m



Photo 30 : Disturbed sample of BH1 at 45.00m

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.



Photo 31 : Disturbed sample of BH1 at 46.50m



Photo 32 : Disturbed sample of BH1 at 48.00m



Photo 33 : Disturbed sample of BH1 at 49.50m

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.



Photo 34 : Disturbed sample of BH1 at 51.00m



Photo 35 : Disturbed sample of BH1 at 52.50m



Photo 36 : Disturbed sample of BH1 at 54.00m

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.



Photo 37 : Disturbed sample of BH1 at 55.50m



Photo 38 : Disturbed sample of BH1 at 57.00m

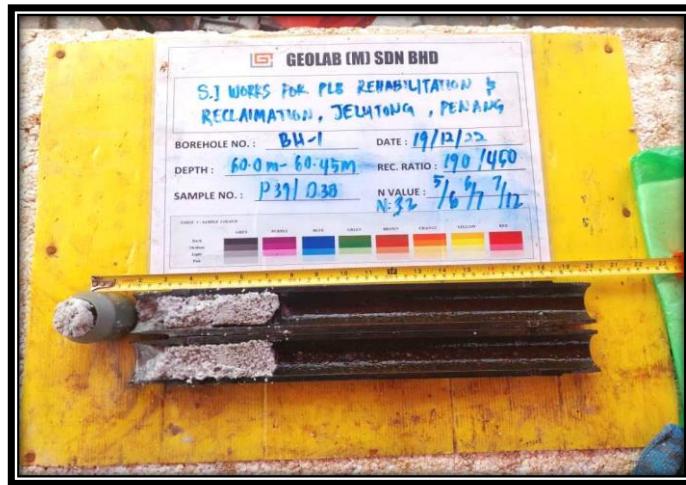


Photo 39 : Disturbed sample of BH1 at 58.50m

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.





**BH2**

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.



Photo 1 : Deep Boring Location at BH2

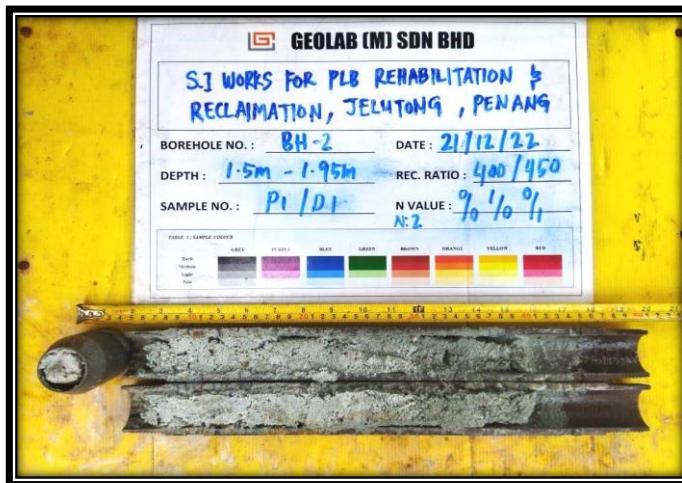


Photo 2 : Disturbed sample of BH2 at 1.50m



Photo 3 : Disturbed sample of BH2 at 3.00m

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.



Photo 4 : Disturbed sample of BH2 at 4.50m



Photo 5 : Disturbed sample of BH2 at 6.00m

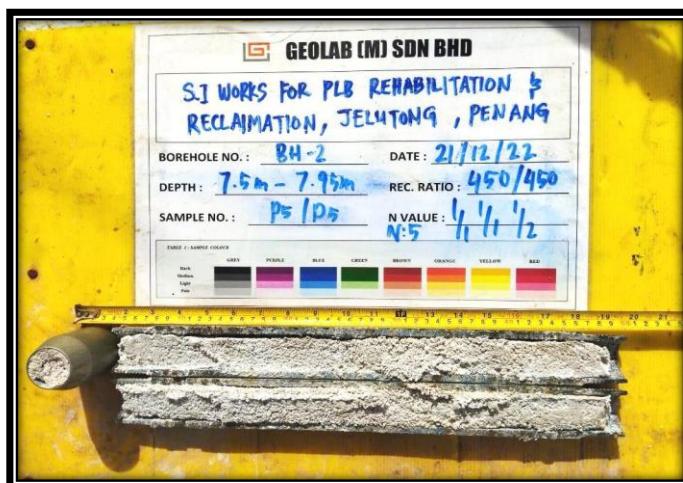


Photo 6 : Disturbed sample of BH2 at 7.50m

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.



Photo 7 : Disturbed sample of BH2 at 9.00m



Photo 8 : Disturbed sample of BH2 at 10.50m

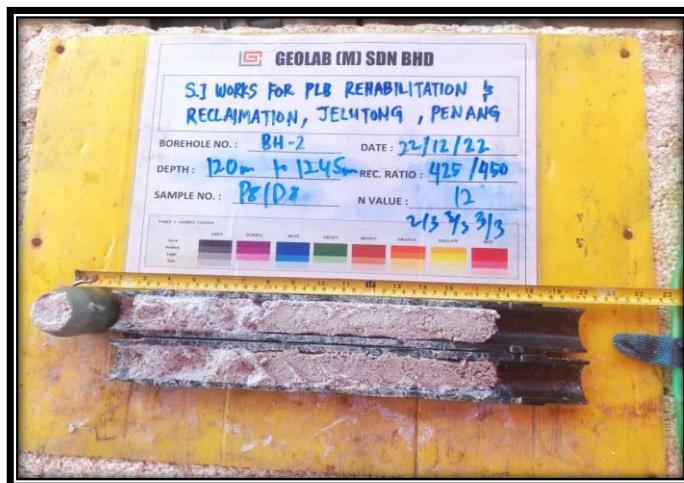


Photo 9 : Disturbed sample of BH2 at 12.00m

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.

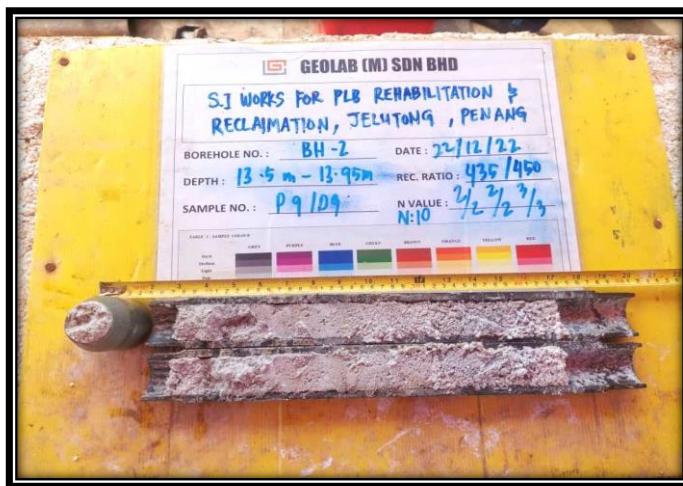


Photo 10 : Disturbed sample of BH2 at 13.50m



Photo 11 : Disturbed sample of BH2 at 15.00m



Photo 12 : Disturbed sample of BH2 at 16.50m

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.

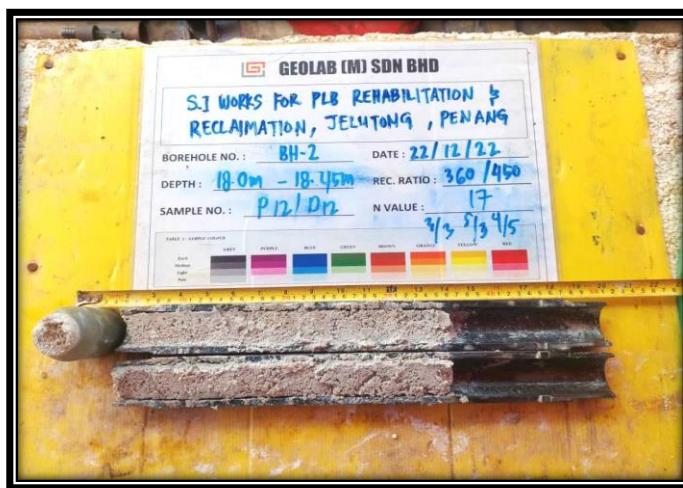


Photo 13 : Disturbed sample of BH2 at 18.00m



Photo 14 : Disturbed sample of BH2 at 19.50m



Photo 15 : Disturbed sample of BH2 at 21.00m

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.



Photo 16 : Disturbed sample of BH2 at 22.50m



Photo 17 : Disturbed sample of BH2 at 24.00m



Photo 18 : Disturbed sample of BH2 at 27.00m

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.



Photo 19 : Disturbed sample of BH2 at 28.50m

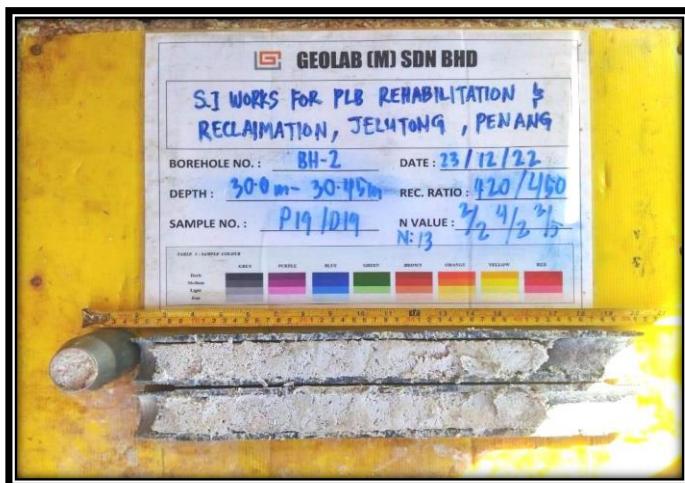


Photo 20 : Disturbed sample of BH2 at 30.00m

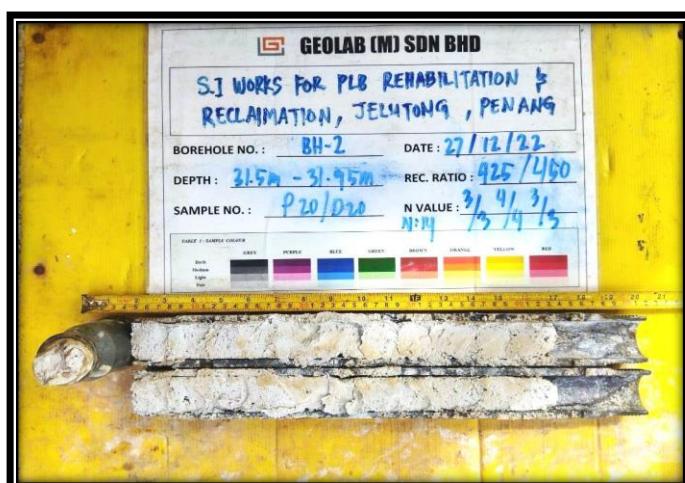


Photo 21 : Disturbed sample of BH2 at 31.50m

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.

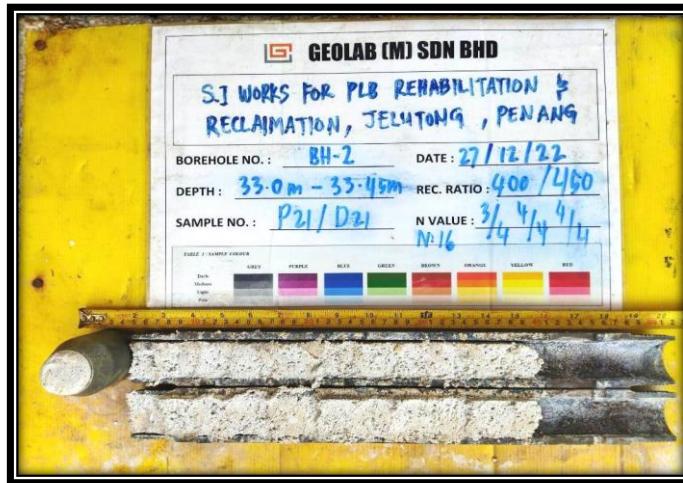


Photo 22 : Disturbed sample of BH2 at 33.00m



Photo 23 : Disturbed sample of BH2 at 34.50m



Photo 24 : Disturbed sample of BH2 at 36.00m

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.



Photo 25 : Disturbed sample of BH2 at 37.50m

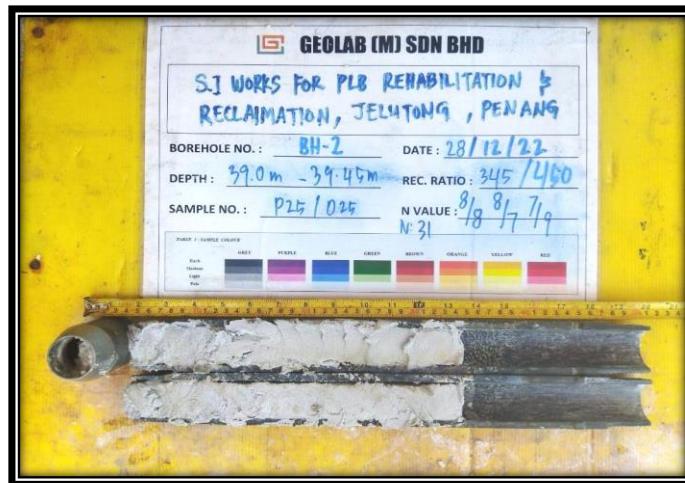


Photo 26 : Disturbed sample of BH2 at 39.00m



Photo 27 : Disturbed sample of BH2 at 40.50m

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.



Photo 28 : Disturbed sample of BH2 at 42.00m



Photo 29 : Disturbed sample of BH2 at 43.50m



Photo 30 : Disturbed sample of BH2 at 45.00m

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.



Photo 31 : Disturbed sample of BH2 at 46.50m

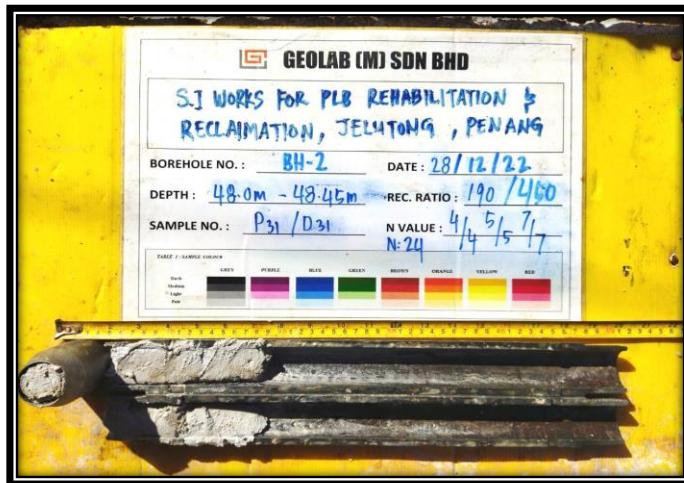


Photo 32 : Disturbed sample of BH2 at 48.00m

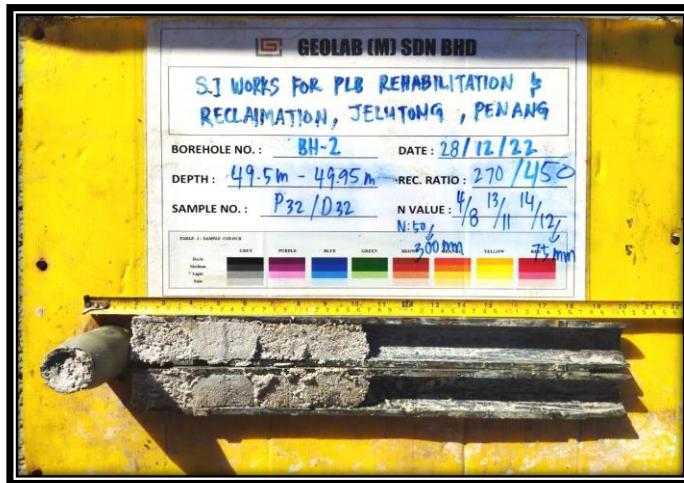


Photo 33 : Disturbed sample of BH2 at 49.50m

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.



Photo 34 : Disturbed sample of BH2 at 51.00m



Photo 35 : Disturbed sample of BH2 at 52.50m

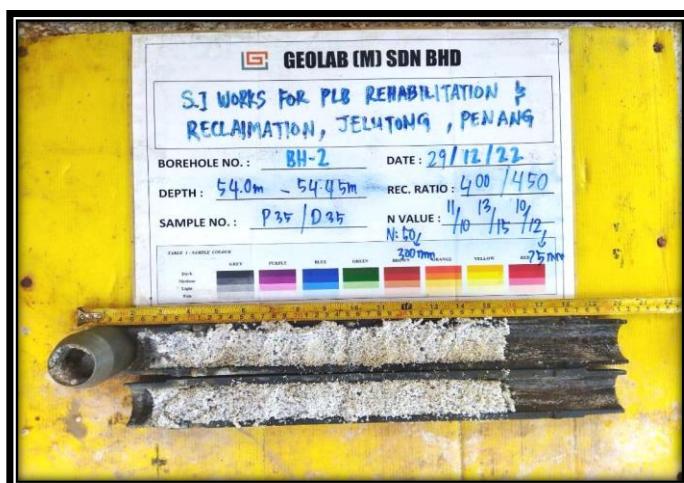


Photo 36 : Disturbed sample of BH2 at 54.00m

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.



Photo 37 : Disturbed sample of BH2 at 55.50m

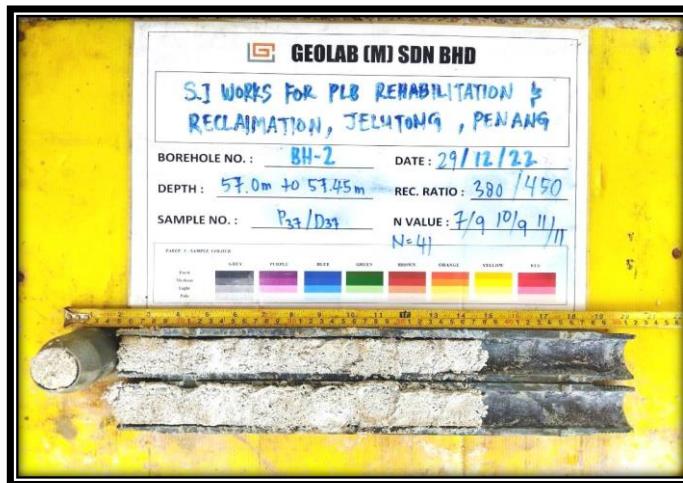


Photo 38 : Disturbed sample of BH2 at 57.00m



Photo 39 : Disturbed sample of BH2 at 58.50m

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.



Photo 40 : Disturbed sample of BH2 at 60.00m



# BH3

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.

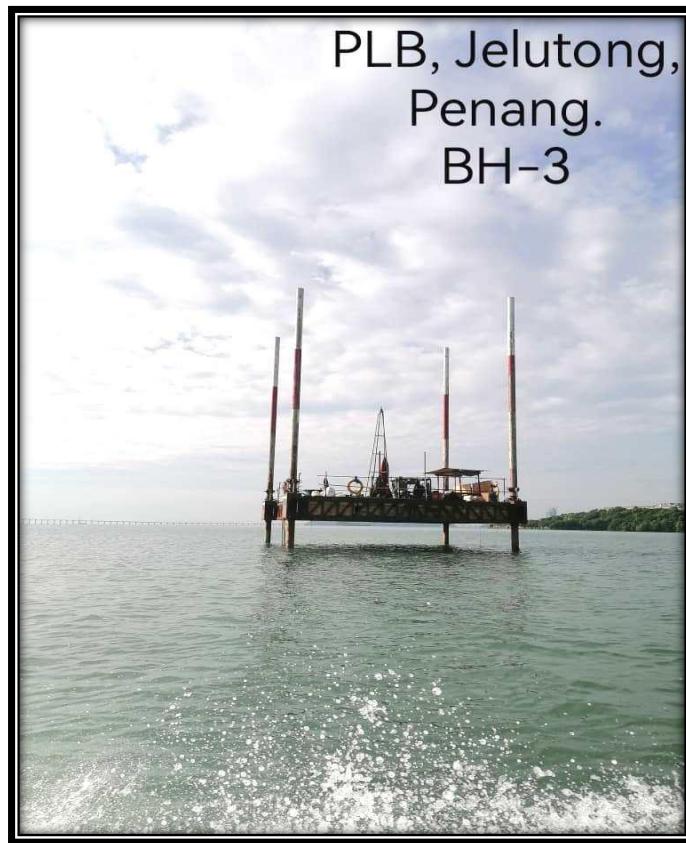


Photo 1 : Deep Boring Location at BH3



Photo 2 : Disturbed sample of BH3 at 1.50m

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.



Photo 3 : Disturbed sample of BH3 at 4.50m

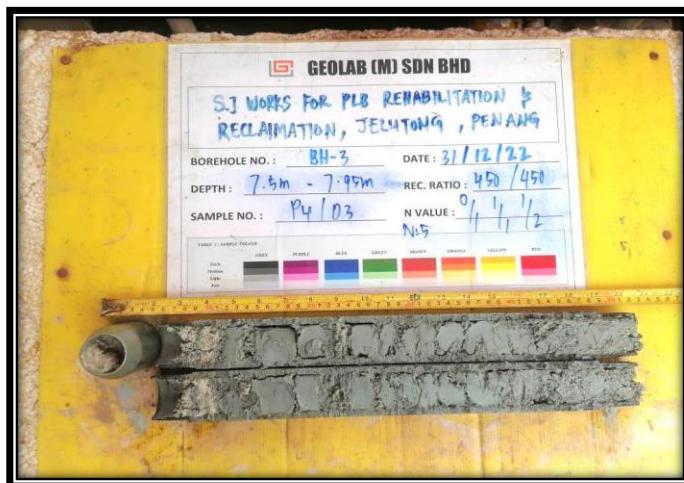


Photo 4 : Disturbed sample of BH3 at 7.50m

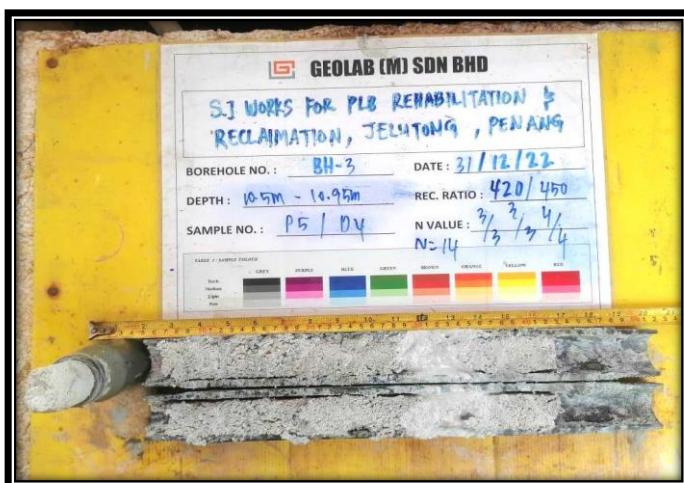


Photo 5 : Disturbed sample of BH3 at 10.50m

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.

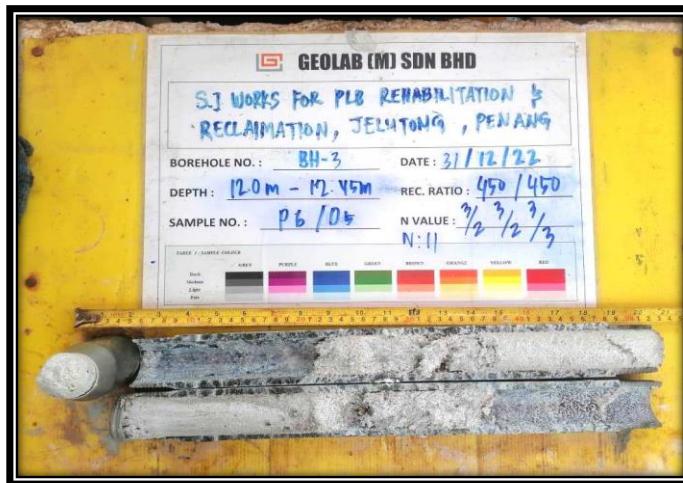


Photo 6 : Disturbed sample of BH3 at 12.00m



Photo 7 : Disturbed sample of BH3 at 13.50m



Photo 8 : Disturbed sample of BH3 at 15.00m

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.



Photo 9 : Disturbed sample of BH3 at 16.50m

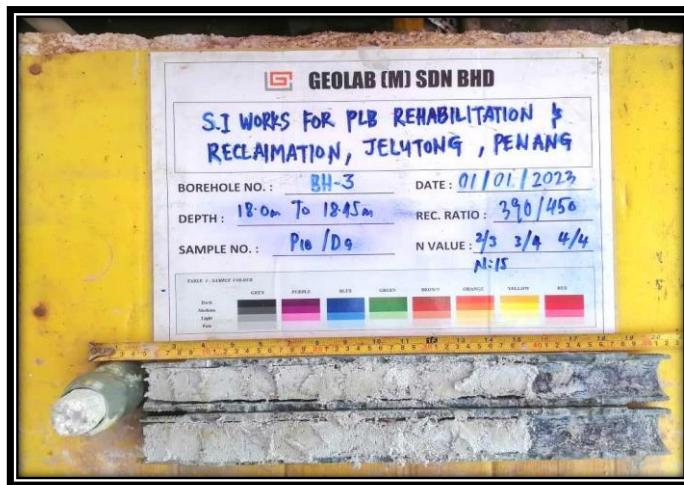


Photo 10 : Disturbed sample of BH3 at 18.00m



Photo 11 : Disturbed sample of BH3 at 19.50m

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.



Photo 12 : Disturbed sample of BH3 at 21.00m

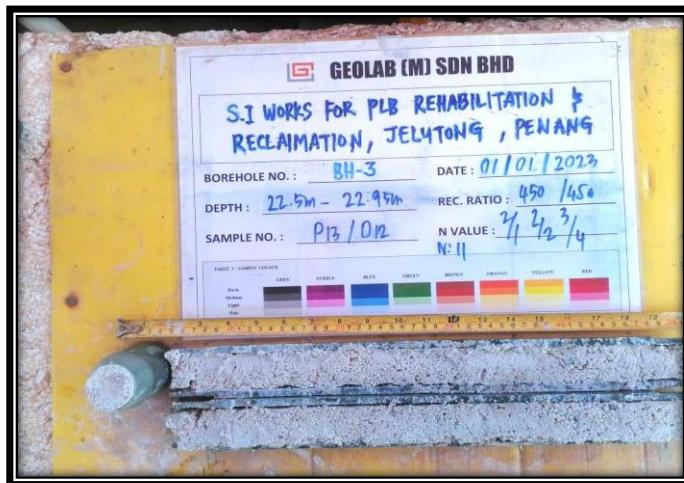


Photo 13 : Disturbed sample of BH3 at 22.50m

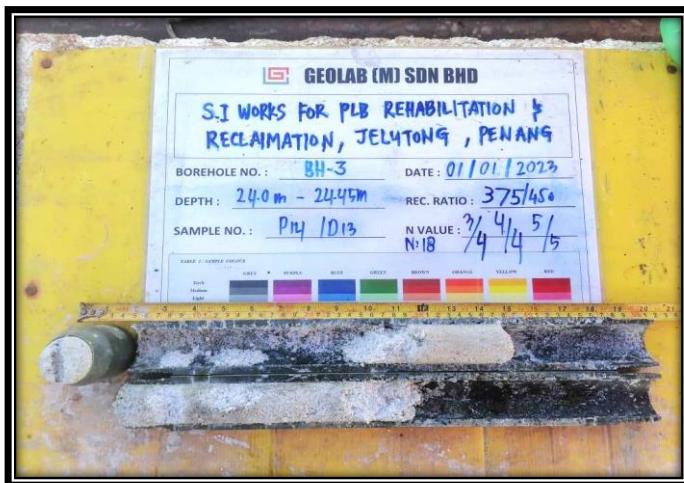


Photo 14 : Disturbed sample of BH3 at 24.00m

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.



Photo 15 : Disturbed sample of BH3 at 25.50m

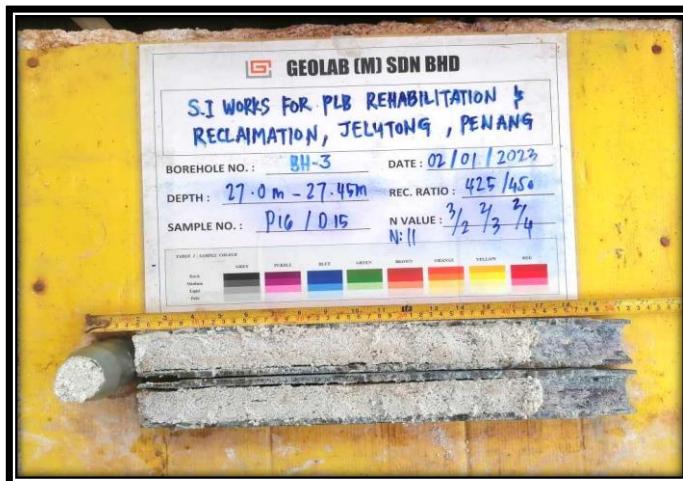


Photo 16 : Disturbed sample of BH3 at 27.00m

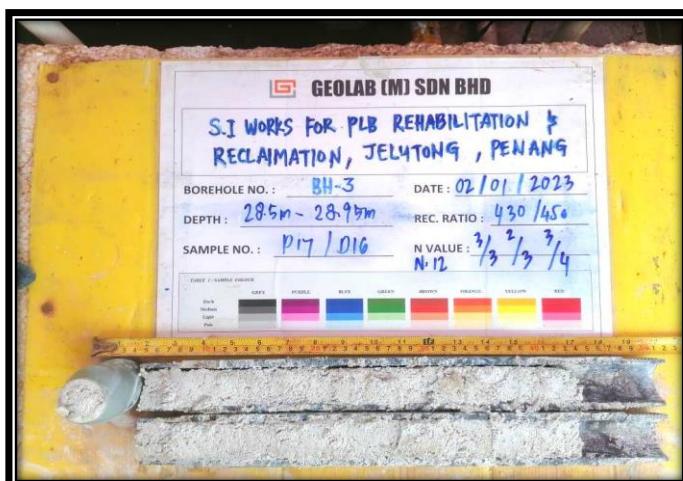


Photo 17 : Disturbed sample of BH3 at 28.50m

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.



Photo 18 : Disturbed sample of BH3 at 30.00m

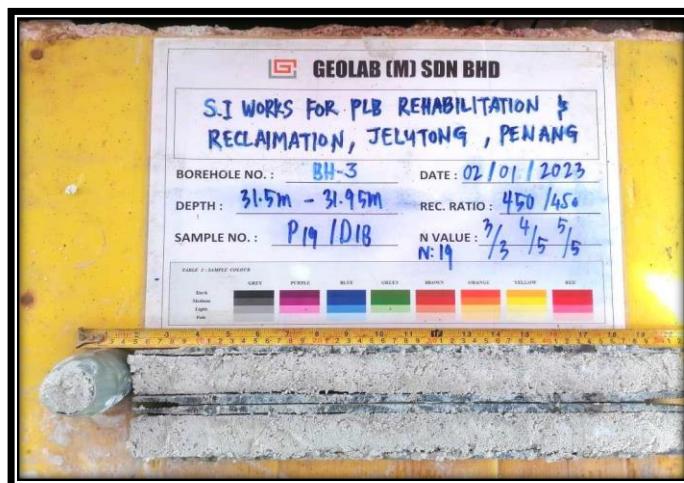


Photo 19 : Disturbed sample of BH3 at 31.50m

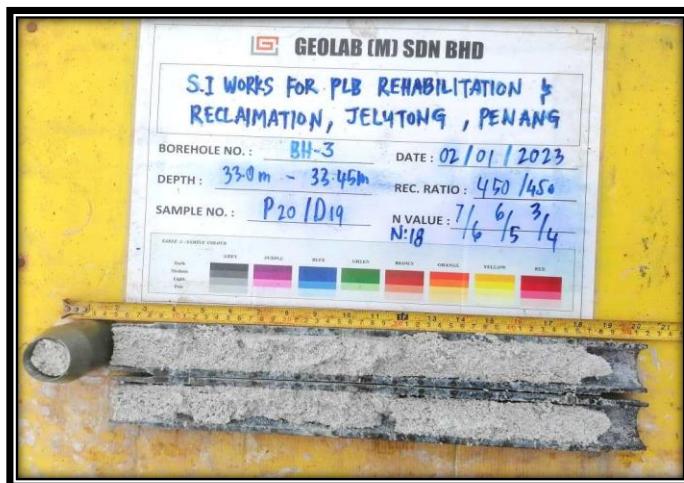


Photo 20 : Disturbed sample of BH3 at 33.00m

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.

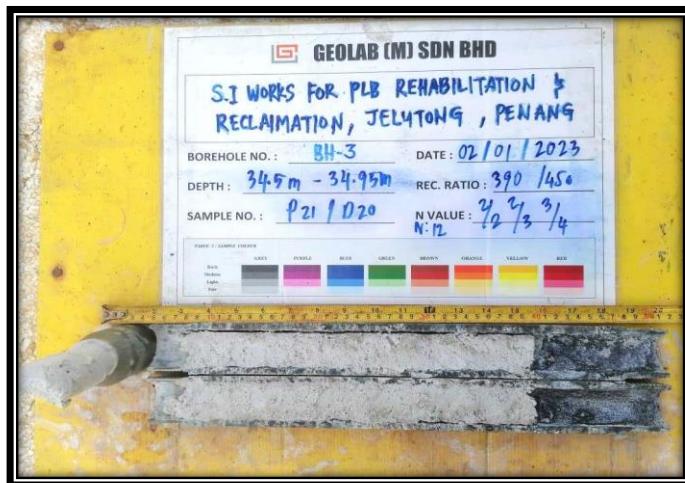


Photo 21 : Disturbed sample of BH3 at 34.50m

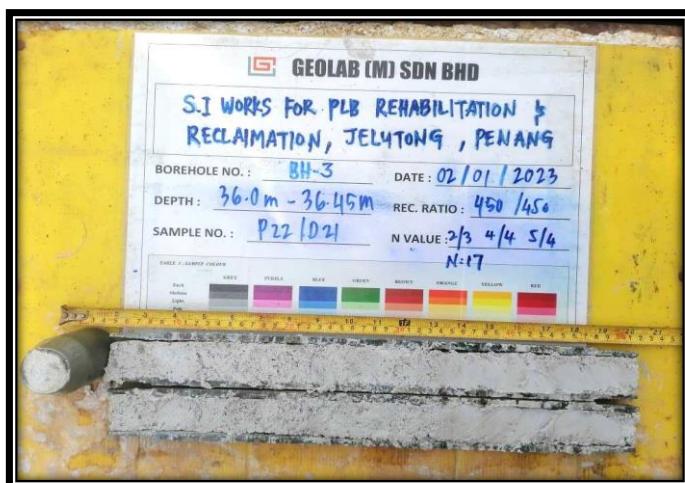


Photo 22 : Disturbed sample of BH3 at 36.00m

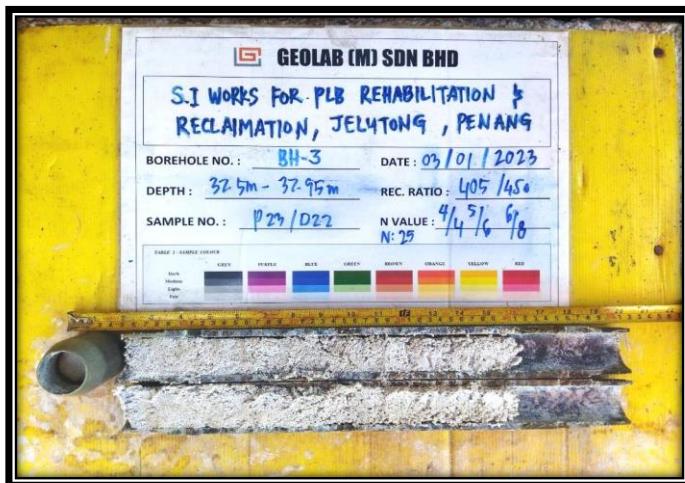


Photo 23 : Disturbed sample of BH3 at 37.50m

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.

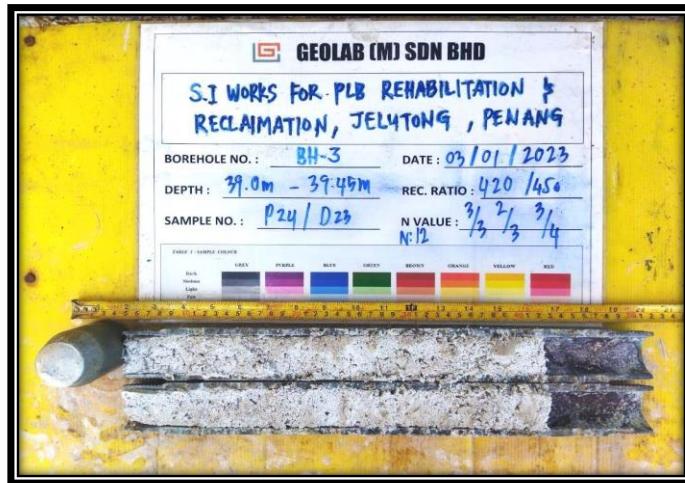


Photo 24 : Disturbed sample of BH3 at 39.00m

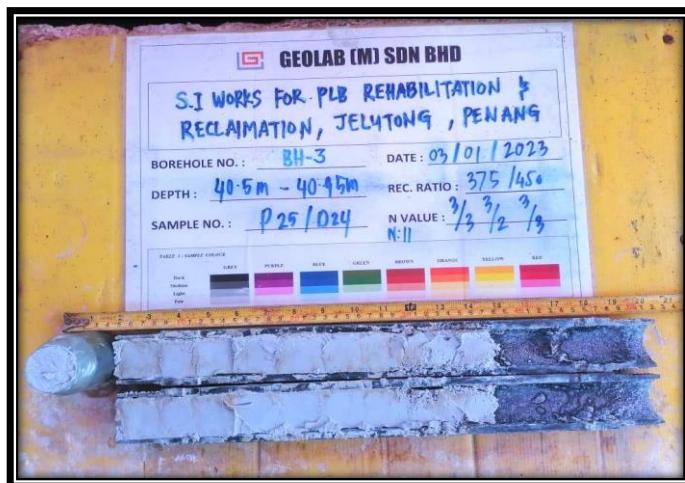


Photo 25 : Disturbed sample of BH3 at 40.50m



Photo 26 : Disturbed sample of BH3 at 42.00m

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.

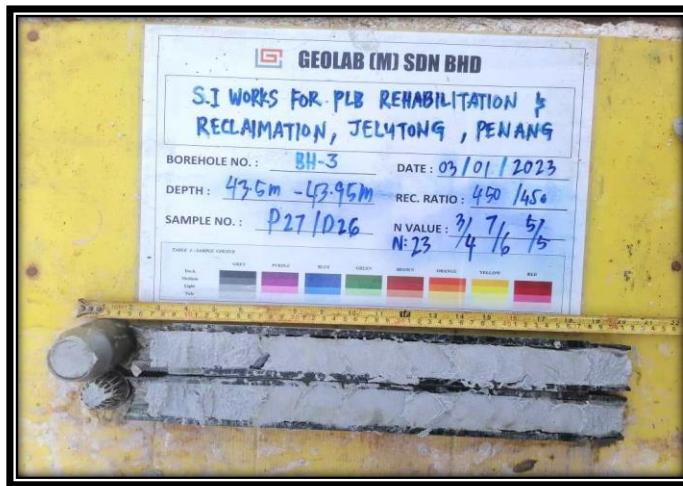


Photo 27 : Disturbed sample of BH3 at 43.50m

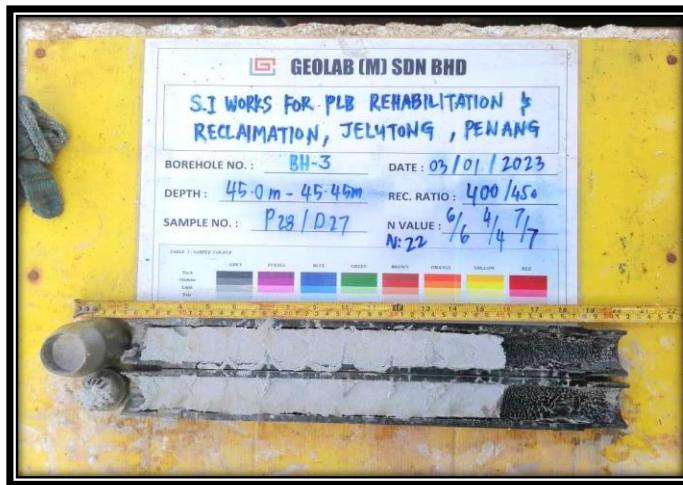


Photo 28 : Disturbed sample of BH3 at 45.00m



Photo 29 : Disturbed sample of BH3 at 46.50m

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.

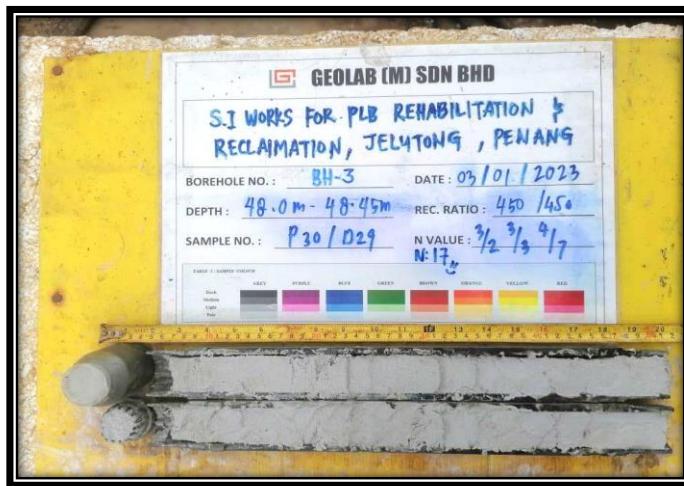


Photo 30 : Disturbed sample of BH3 at 48.00m

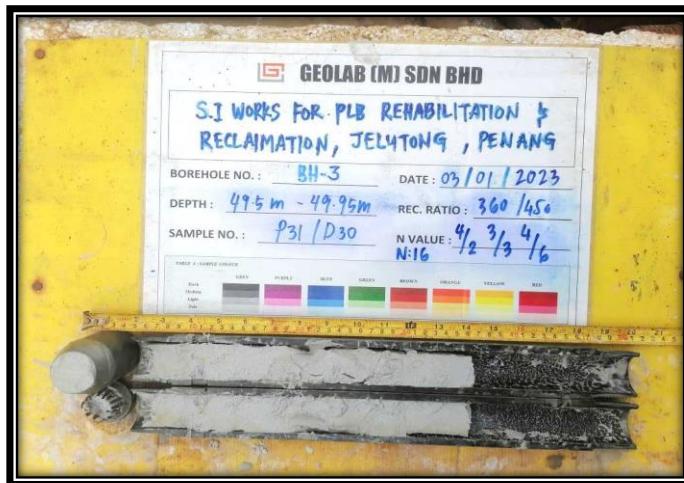


Photo 31 : Disturbed sample of BH3 at 49.50m

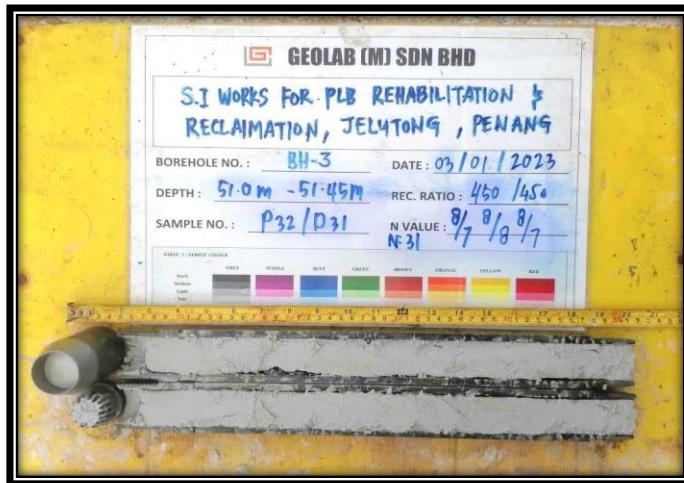


Photo 32 : Disturbed sample of BH3 at 51.00m

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.

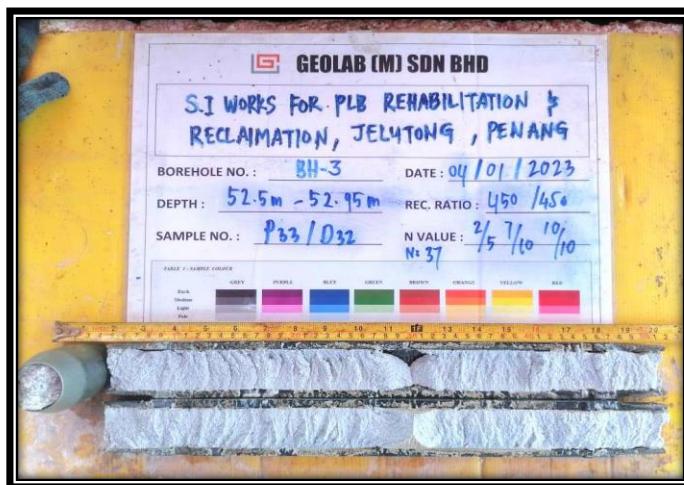


Photo 33 : Disturbed sample of BH3 at 52.50m



Photo 34 : Disturbed sample of BH3 at 54.00m

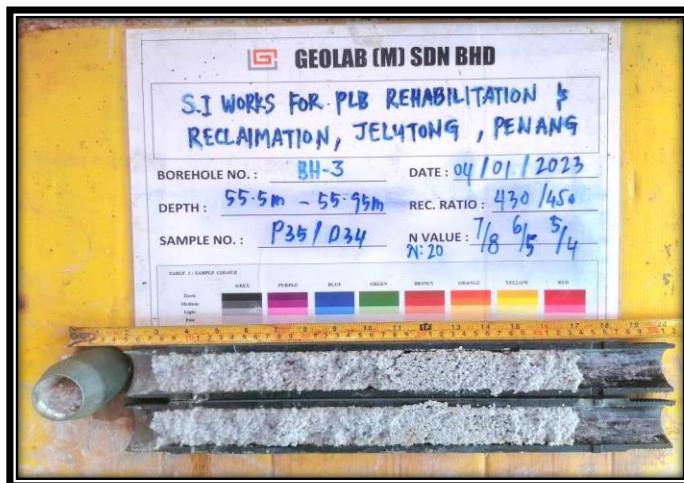


Photo 35 : Disturbed sample of BH3 at 55.50m

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.

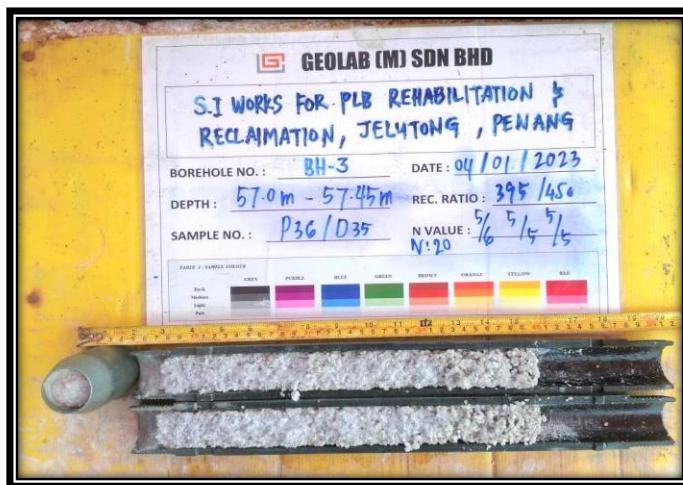


Photo 36 : Disturbed sample of BH3 at 57.00m



Photo 37 : Disturbed sample of BH3 at 58.50m

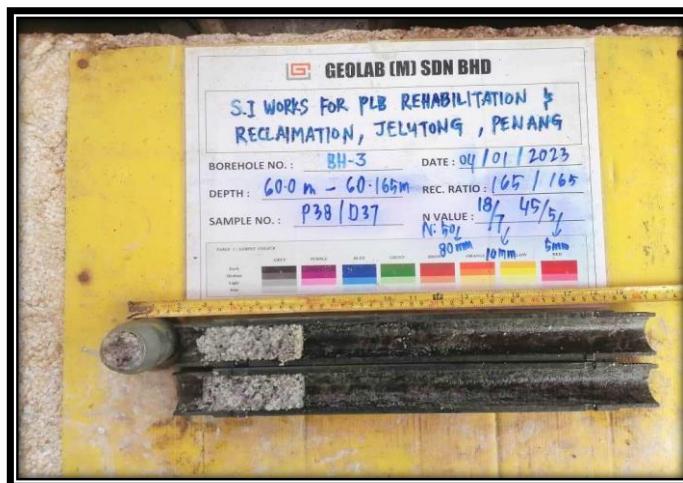


Photo 38 : Disturbed sample of BH3 at 60.00m



**BH4**

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.



Photo 1 : Deep Boring Location at BH4



Photo 2 : Disturbed sample of BH4 at 1.50m

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.



Photo 3 : Disturbed sample of BH4 at 3.00m



Photo 4 : Disturbed sample of BH4 at 4.50m

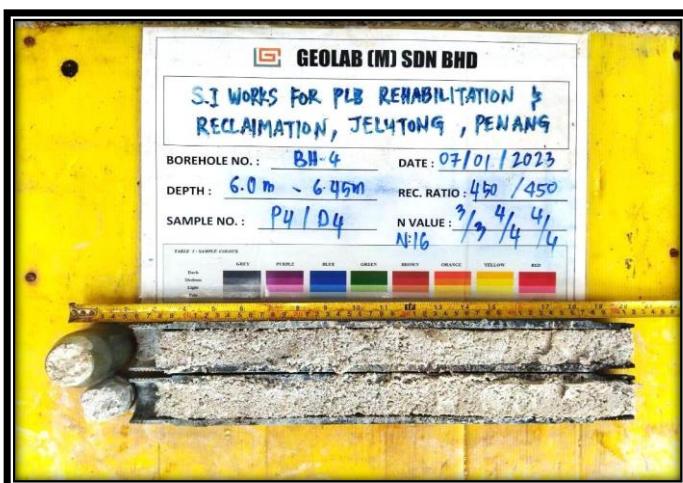


Photo 5 : Disturbed sample of BH4 at 6.00m

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.

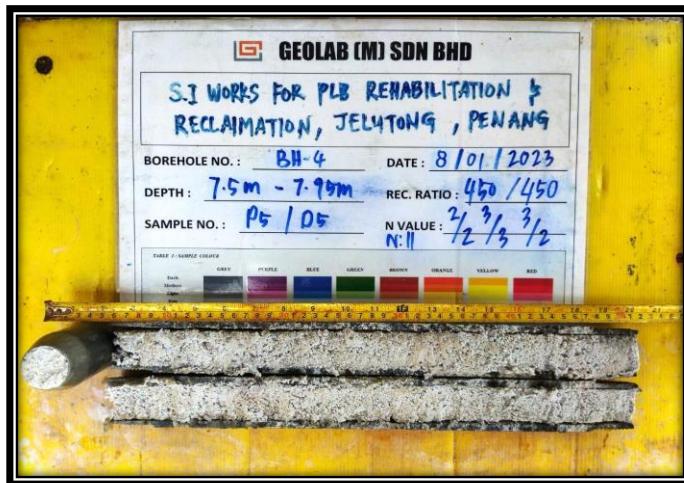


Photo 6 : Disturbed sample of BH4 at 7.50m

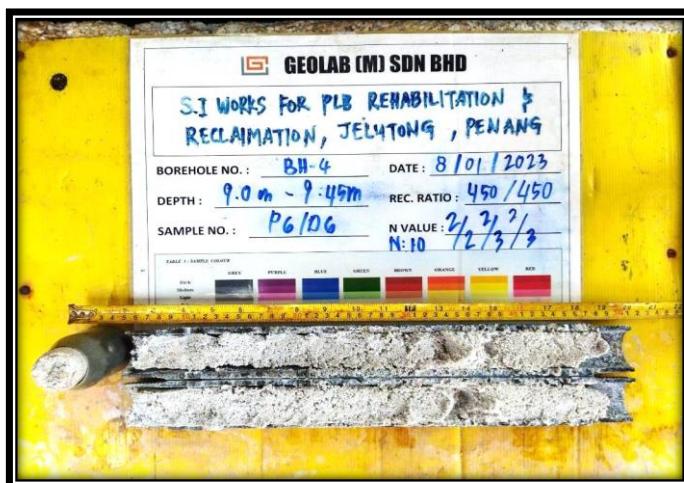


Photo 7 : Disturbed sample of BH4 at 9.00m

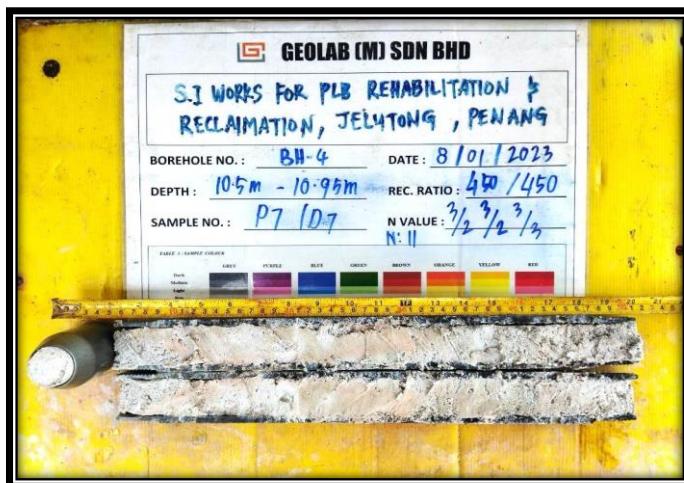


Photo 8 : Disturbed sample of BH4 at 10.50m

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.

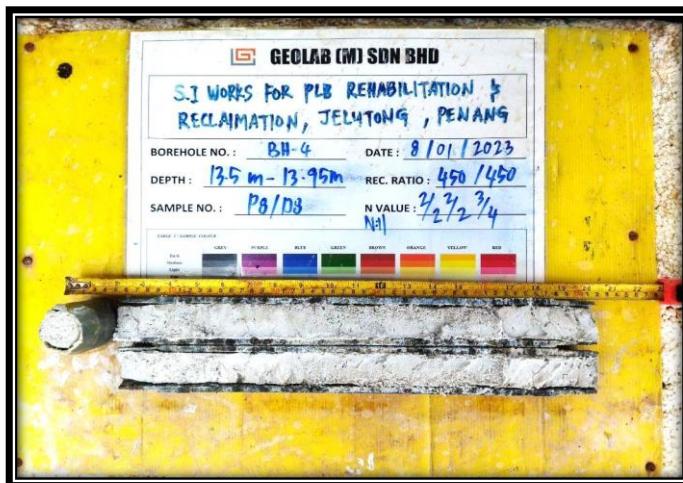


Photo 9 : Disturbed sample of BH4 at 13.50m

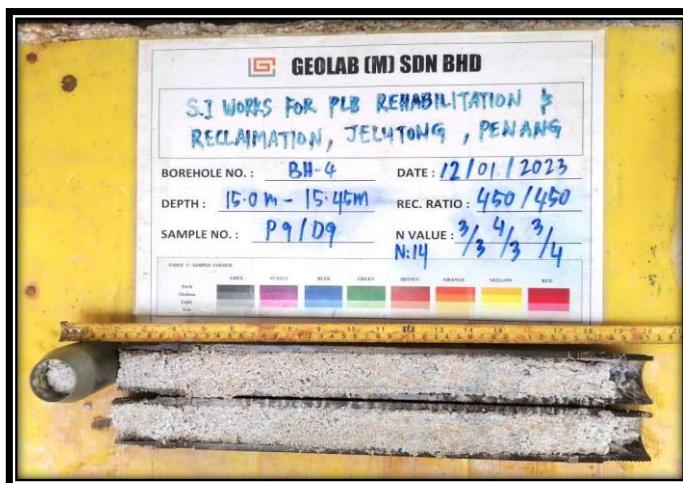


Photo 10 : Disturbed sample of BH4 at 15.00m

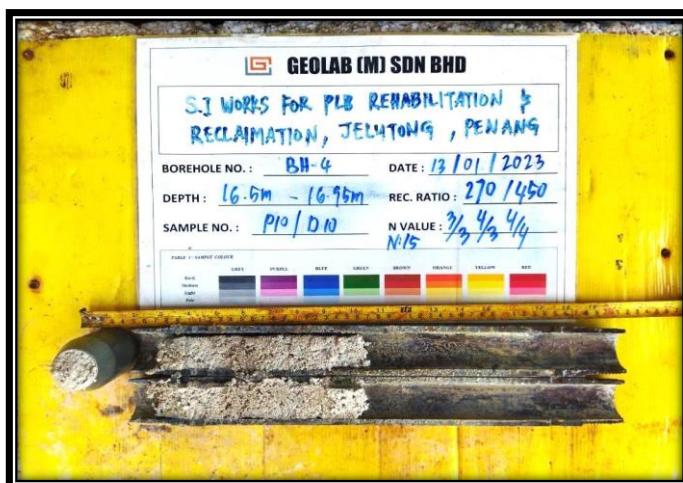


Photo 11 : Disturbed sample of BH4 at 16.50m

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.



Photo 12 : Disturbed sample of BH4 at 18.00m

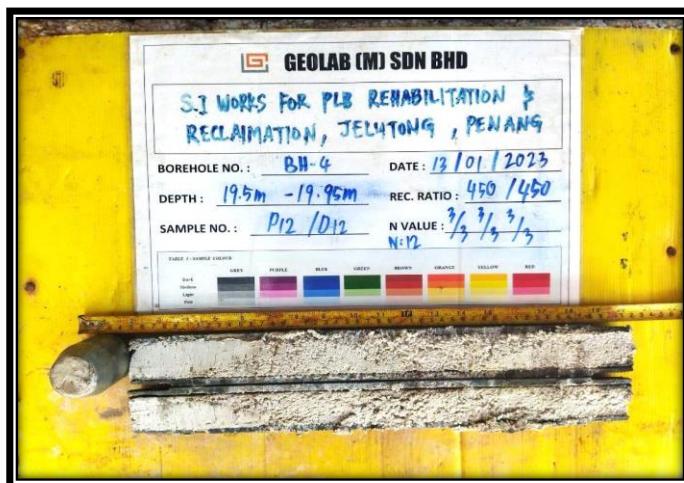


Photo 13 : Disturbed sample of BH4 at 19.50m



Photo 14 : Disturbed sample of BH4 at 21.00m

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.

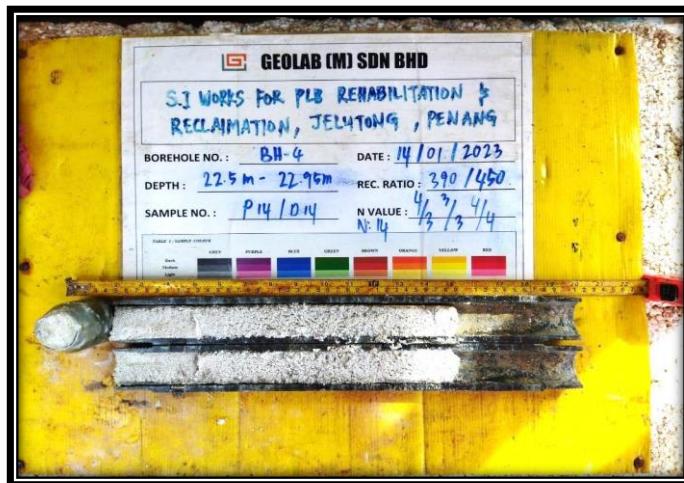


Photo 15 : Disturbed sample of BH4 at 22.50m

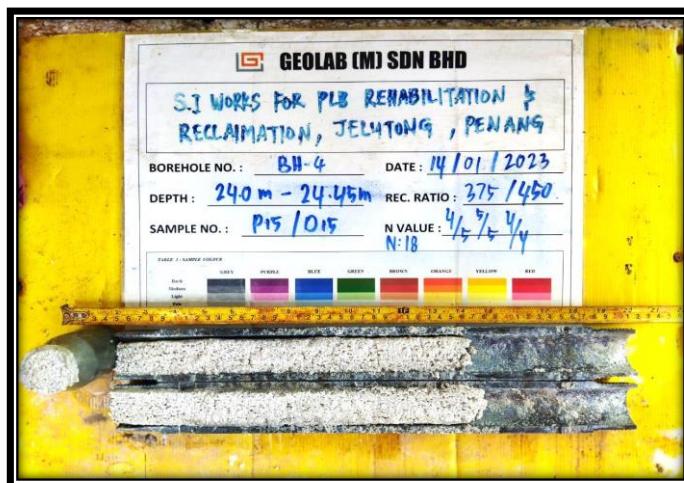


Photo 16 : Disturbed sample of BH4 at 24.00m

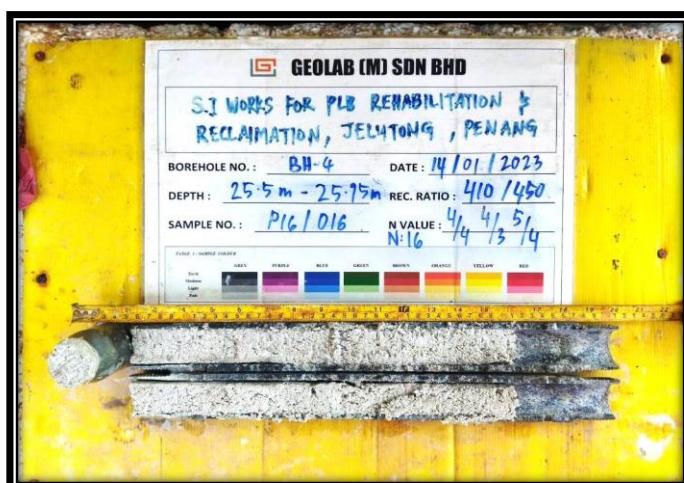


Photo 17 : Disturbed sample of BH4 at 25.50m

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.

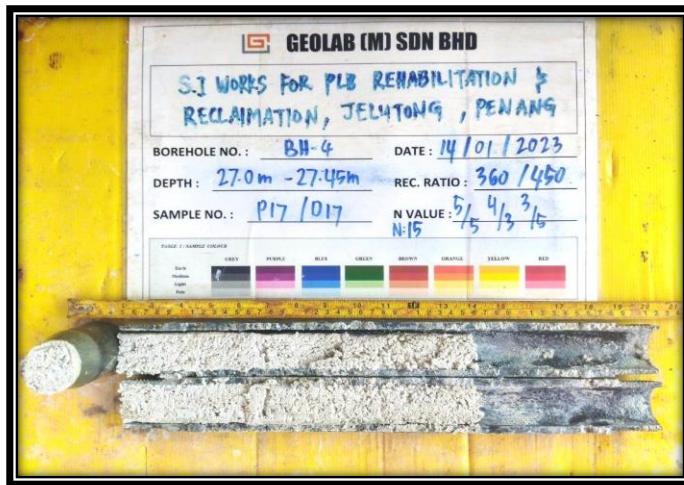


Photo 18 : Disturbed sample of BH4 at 27.00m



Photo 19 : Disturbed sample of BH4 at 28.50m

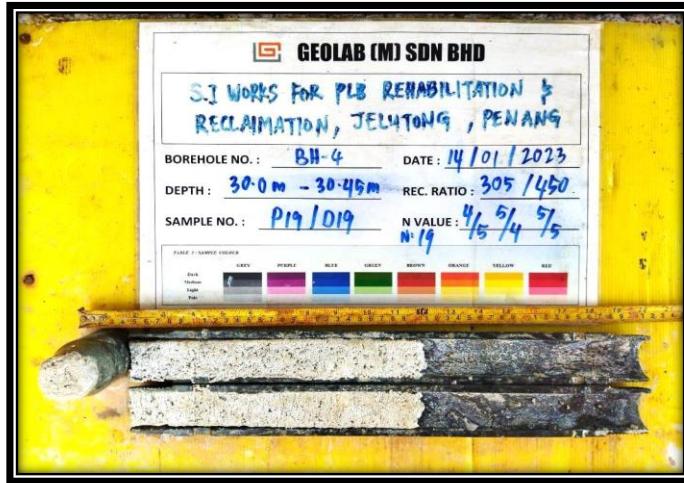


Photo 20 : Disturbed sample of BH4 at 30.00m

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.

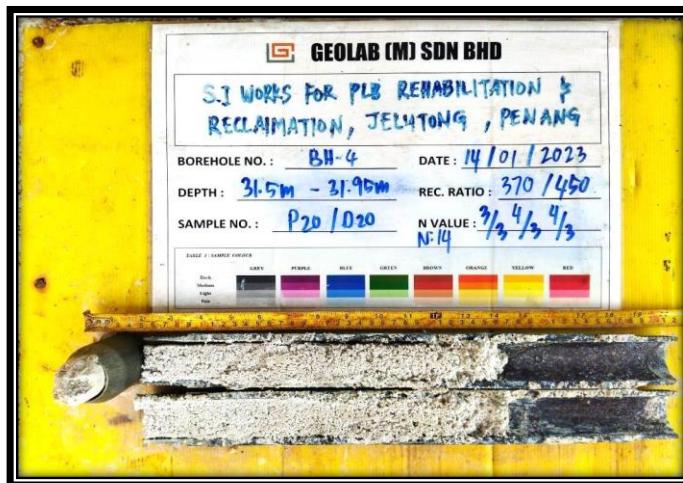


Photo 21 : Disturbed sample of BH4 at 31.50m



Photo 22 : Disturbed sample of BH4 at 33.00m



Photo 23 : Disturbed sample of BH4 at 34.50m

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.



Photo 24 : Disturbed sample of BH4 at 36.00m



Photo 25 : Disturbed sample of BH4 at 37.50m



Photo 26 : Disturbed sample of BH4 at 39.00m

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.

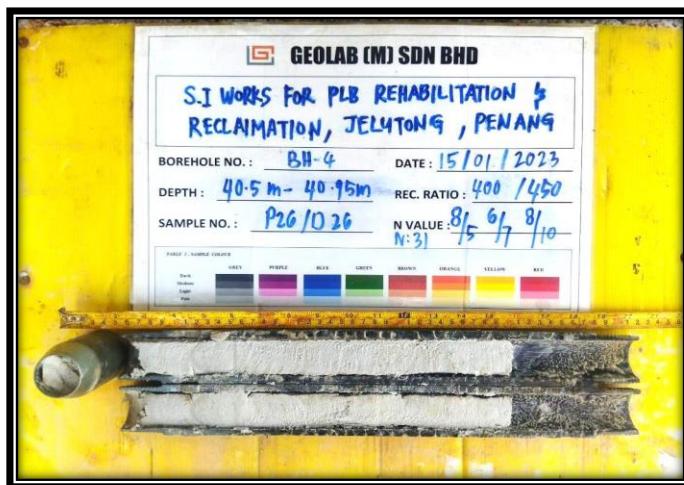


Photo 27 : Disturbed sample of BH4 at 40.50m



Photo 28 : Disturbed sample of BH4 at 42.00m

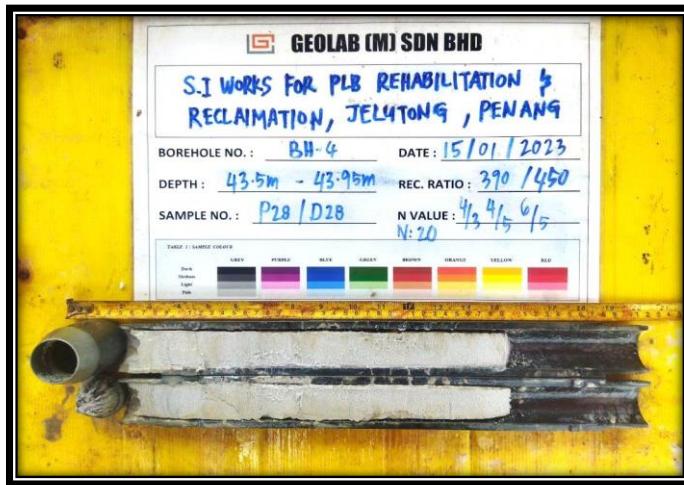


Photo 29 : Disturbed sample of BH4 at 43.50m

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.



Photo 30 : Disturbed sample of BH4 at 45.00m



Photo 31 : Disturbed sample of BH4 at 46.50m



Photo 32 : Disturbed sample of BH4 at 48.00m

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.

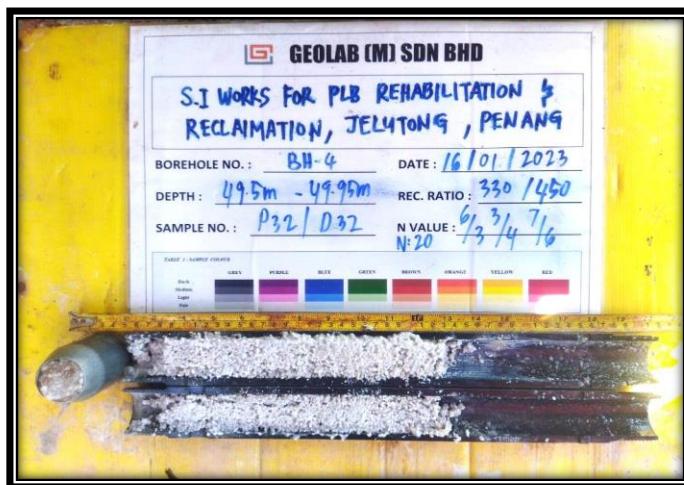


Photo 33 : Disturbed sample of BH4 at 49.50m



Photo 34 : Disturbed sample of BH4 at 51.00m

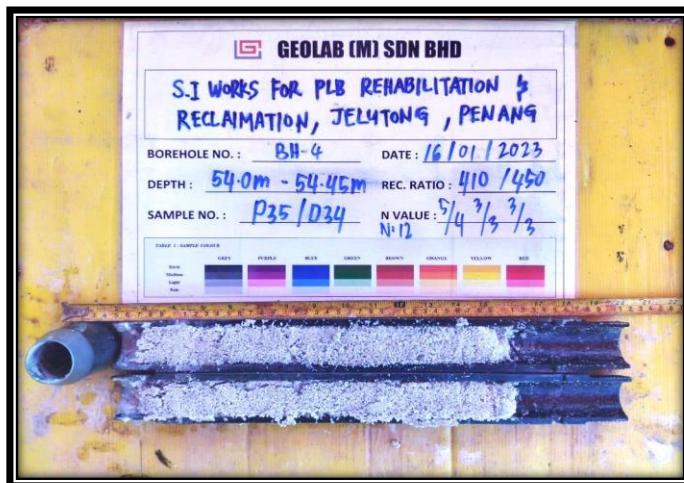


Photo 35 : Disturbed sample of BH4 at 54.00m

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.

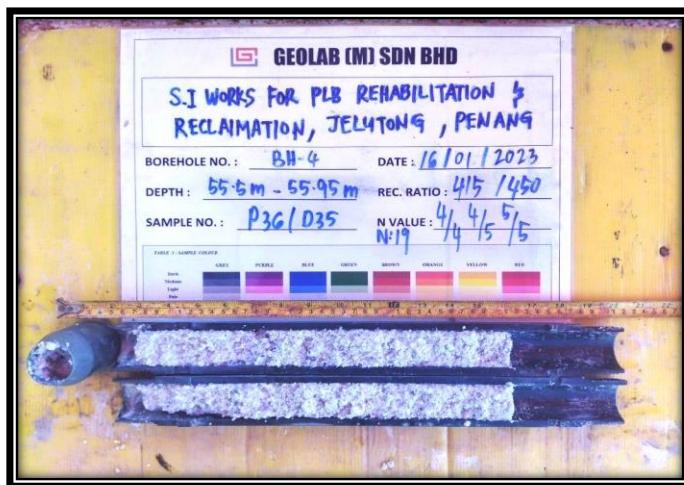


Photo 36 : Disturbed sample of BH4 at 55.50m



Photo 37 : Disturbed sample of BH4 at 57.00m



Photo 38 : Disturbed sample of BH4 at 58.50m

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.



Photo 39 : Disturbed sample of BH4 at 60.00m



**BH5**

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.



Photo 1 : Deep Boring Location at BH5



Photo 2 : Disturbed sample of BH5 at 1.50m

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.



Photo 3 : Disturbed sample of BH5 at 6.00m

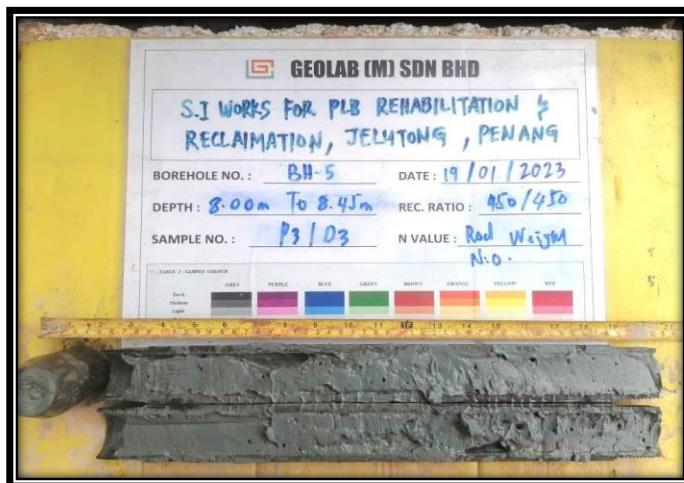


Photo 4 : Disturbed sample of BH5 at 8.00m



Photo 5 : Disturbed sample of BH5 at 10.50m

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.

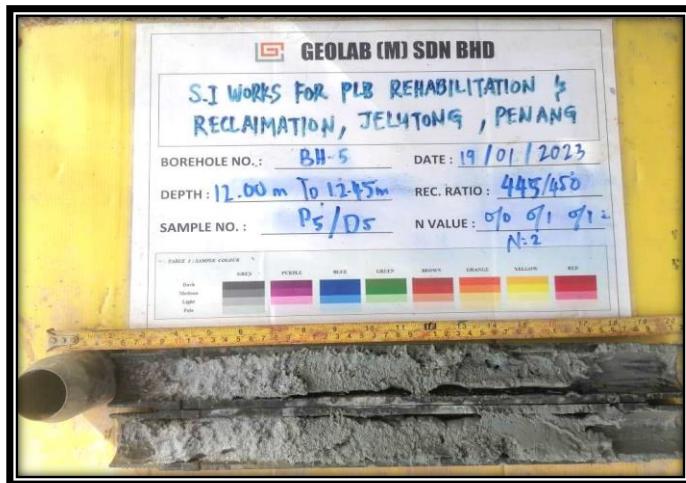


Photo 6 : Disturbed sample of BH5 at 12.00m

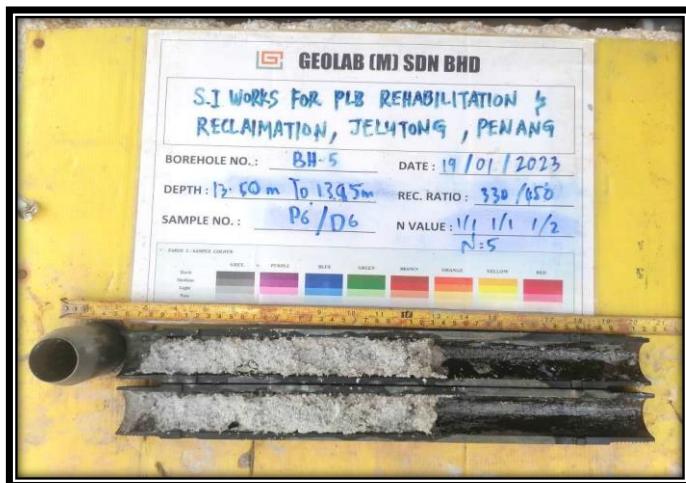


Photo 7 : Disturbed sample of BH5 at 13.50m



Photo 8 : Disturbed sample of BH5 at 15.00m

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.

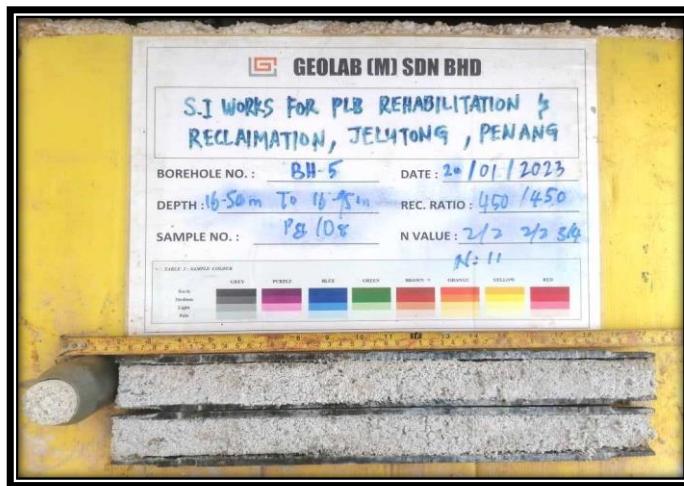


Photo 9 : Disturbed sample of BH5 at 16.50m

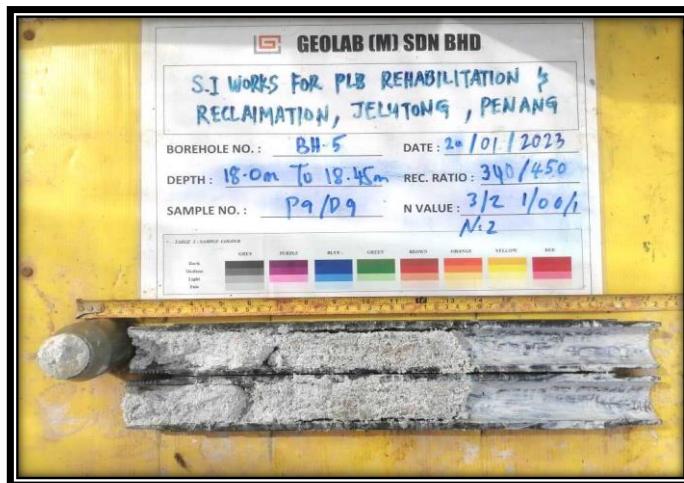


Photo 10 : Disturbed sample of BH5 at 18.00m



Photo 11 : Disturbed sample of BH5 at 19.50m

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.

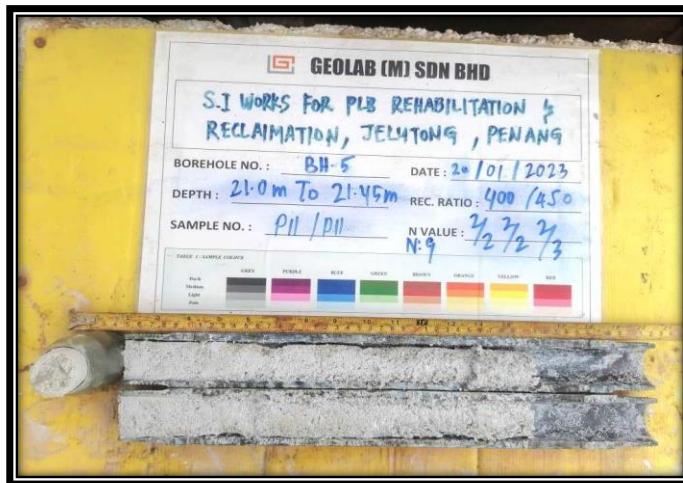


Photo 12 : Disturbed sample of BH5 at 21.00m

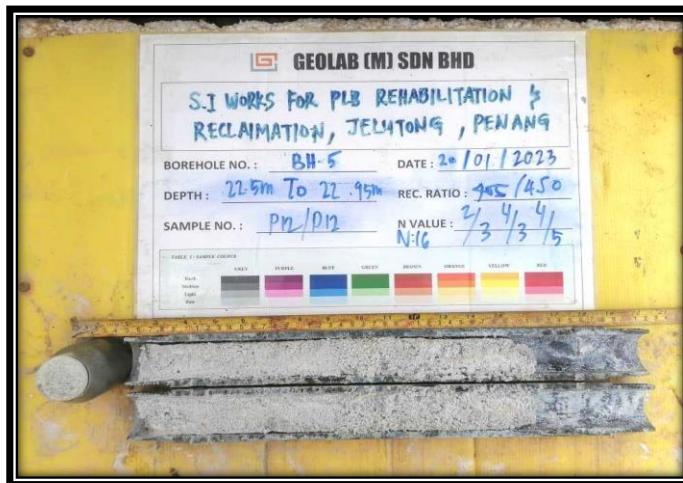


Photo 13 : Disturbed sample of BH5 at 22.50m

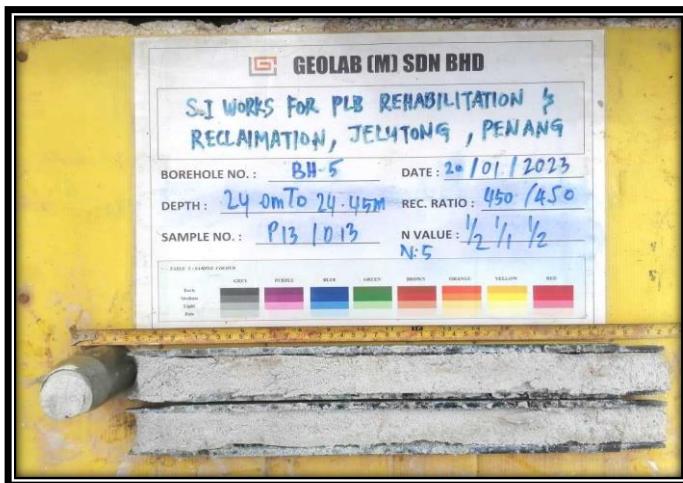


Photo 14 : Disturbed sample of BH5 at 24.00m

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.



Photo 15 : Disturbed sample of BH5 at 25.50m



Photo 16 : Disturbed sample of BH5 at 27.00m



Photo 17 : Disturbed sample of BH5 at 28.50m

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.



Photo 18 : Disturbed sample of BH5 at 30.00m

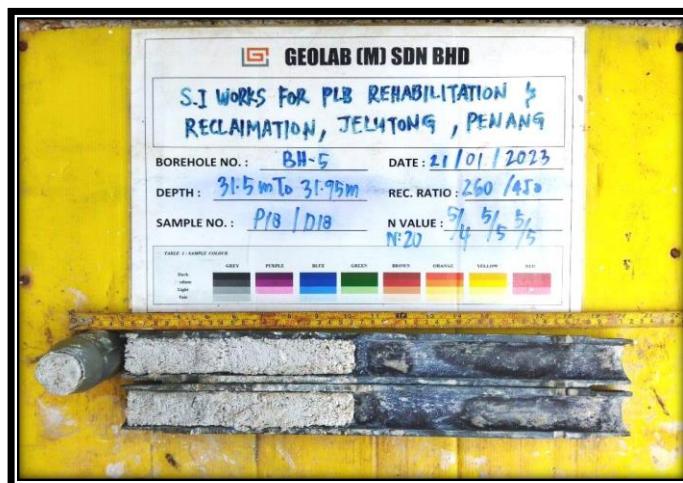


Photo 19 : Disturbed sample of BH5 at 31.50m

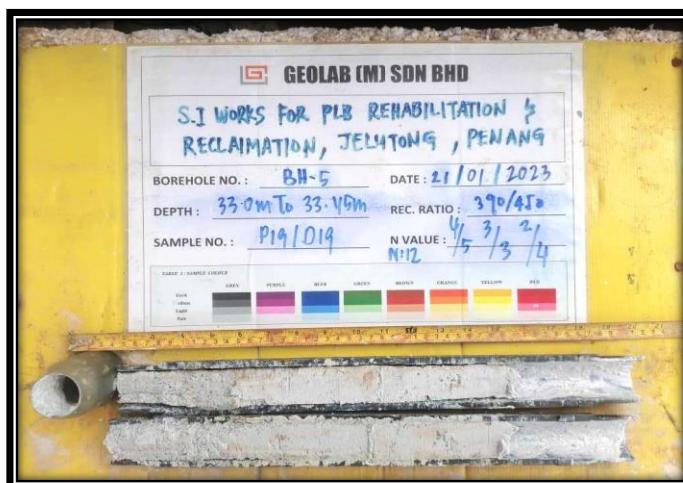


Photo 20 : Disturbed sample of BH5 at 33.00m

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.



Photo 21 : Disturbed sample of BH5 at 34.50m



Photo 22 : Disturbed sample of BH5 at 36.00m



Photo 23 : Disturbed sample of BH5 at 37.50m

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.



Photo 24 : Disturbed sample of BH5 at 39.00m



Photo 25 : Disturbed sample of BH5 at 40.50m



Photo 26 : Disturbed sample of BH5 at 42.00m

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.



Photo 27 : Disturbed sample of BH5 at 43.50m



Photo 28 : Disturbed sample of BH5 at 45.00m



Photo 29 : Disturbed sample of BH5 at 46.50m

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.



Photo 30 : Disturbed sample of BH5 at 48.00m

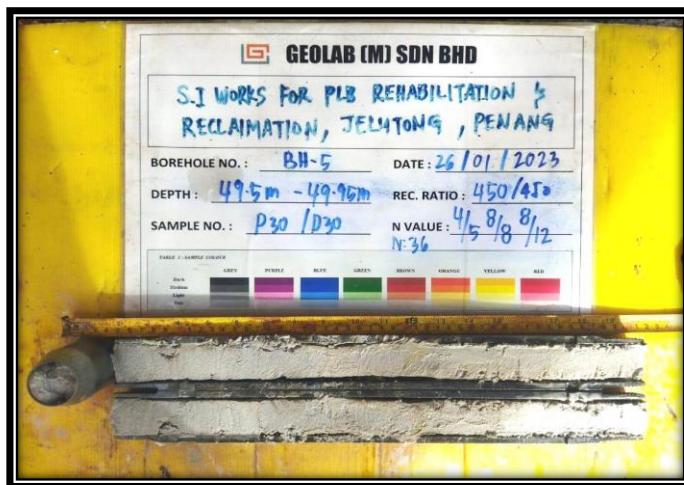


Photo 31 : Disturbed sample of BH5 at 49.50m



Photo 32 : Disturbed sample of BH5 at 51.00m

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.



Photo 33 : Disturbed sample of BH5 at 52.50m



Photo 34 : Disturbed sample of BH5 at 54.00m



Photo 35 : Disturbed sample of BH5 at 55.50m

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.



Photo 36 : Disturbed sample of BH5 at 57.00m

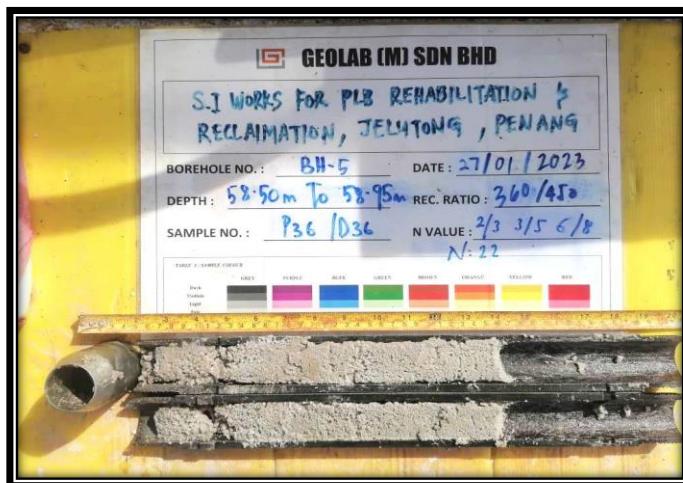


Photo 37 : Disturbed sample of BH5 at 58.50m

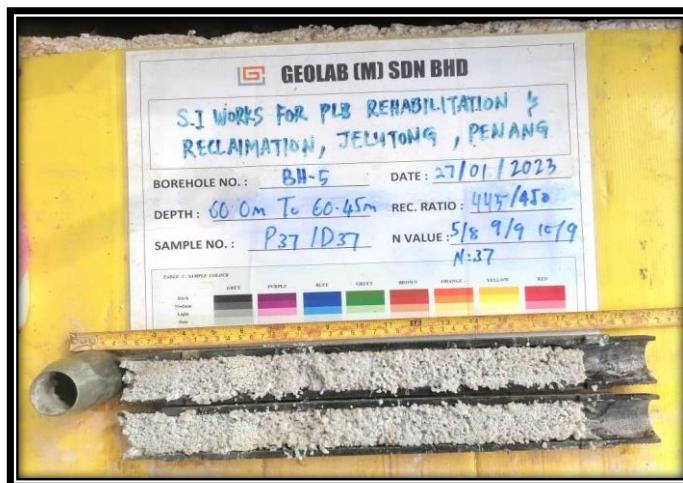


Photo 38 : Disturbed sample of BH5 at 60.00m



**BH6**

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.



Photo 1 : Deep Boring Location at BH6



Photo 2 : Disturbed sample of BH6 at 3.00m

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.

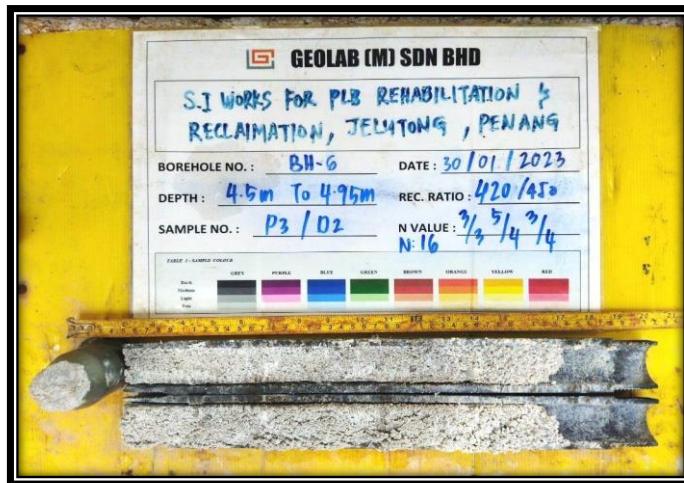


Photo 3 : Disturbed sample of BH6 at 4.50m

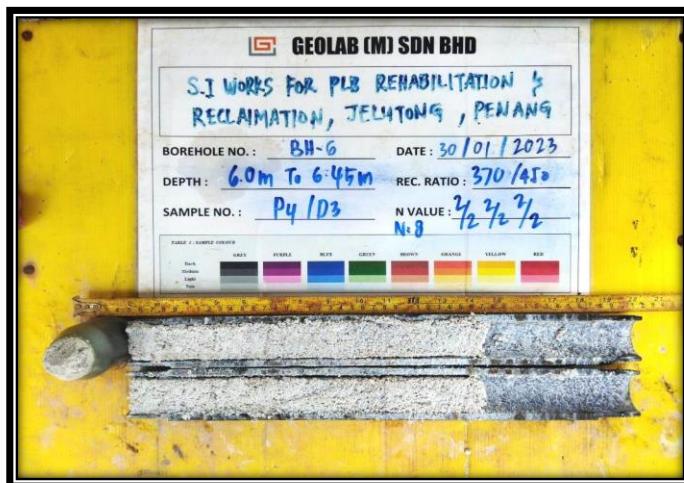


Photo 4 : Disturbed sample of BH6 at 6.00m

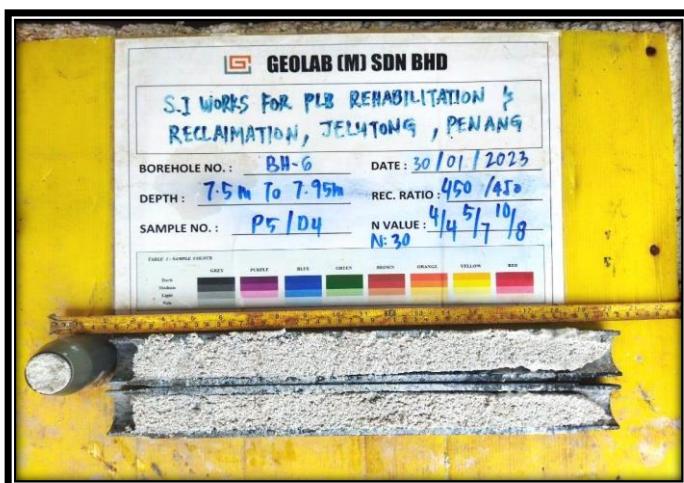


Photo 5 : Disturbed sample of BH6 at 7.50m

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.

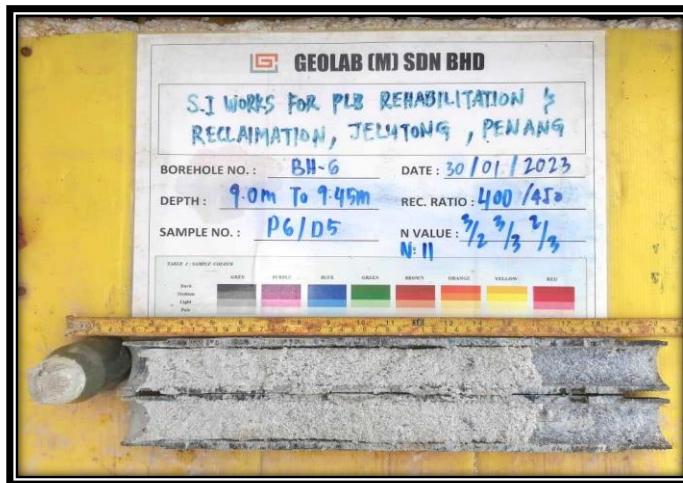


Photo 6 : Disturbed sample of BH6 at 9.00m



Photo 7 : Disturbed sample of BH6 at 10.50m



Photo 8 : Disturbed sample of BH6 at 12.00m

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.

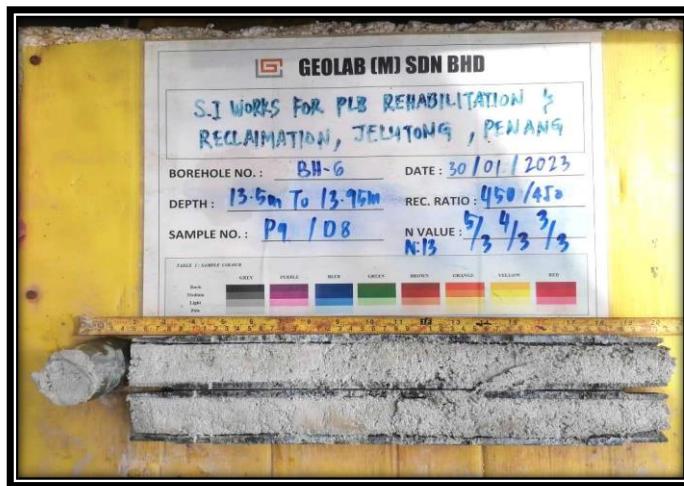


Photo 9 : Disturbed sample of BH6 at 13.50m



Photo 10 : Disturbed sample of BH6 at 15.00m



Photo 11 : Disturbed sample of BH6 at 16.50m

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.



Photo 12 : Disturbed sample of BH6 at 18.00m



Photo 13 : Disturbed sample of BH6 at 19.50m

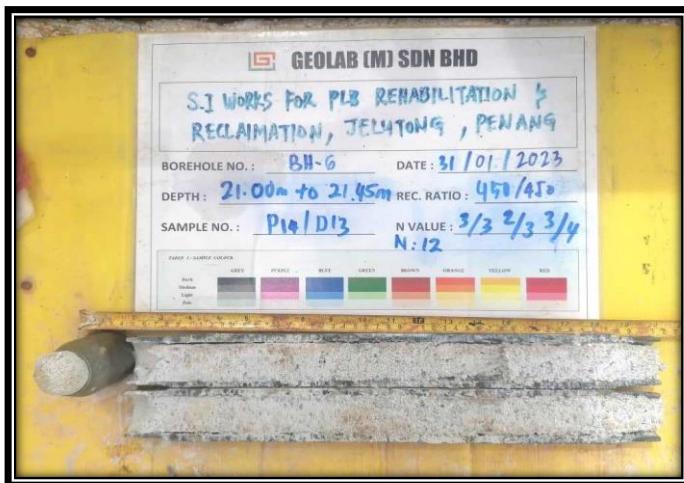


Photo 14 : Disturbed sample of BH6 at 21.00m

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.

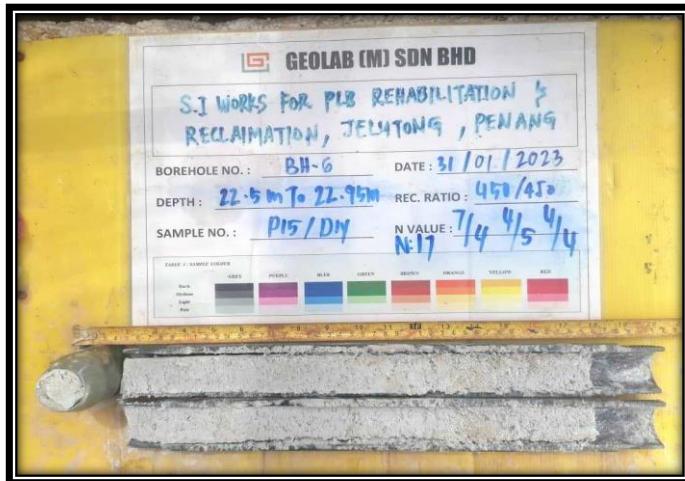


Photo 15 : Disturbed sample of BH6 at 22.50m



Photo 16 : Disturbed sample of BH6 at 24.00m

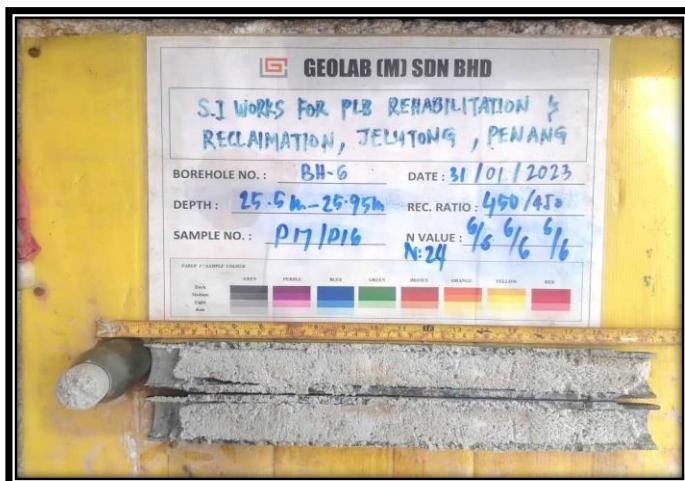


Photo 17 : Disturbed sample of BH6 at 25.50m

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.

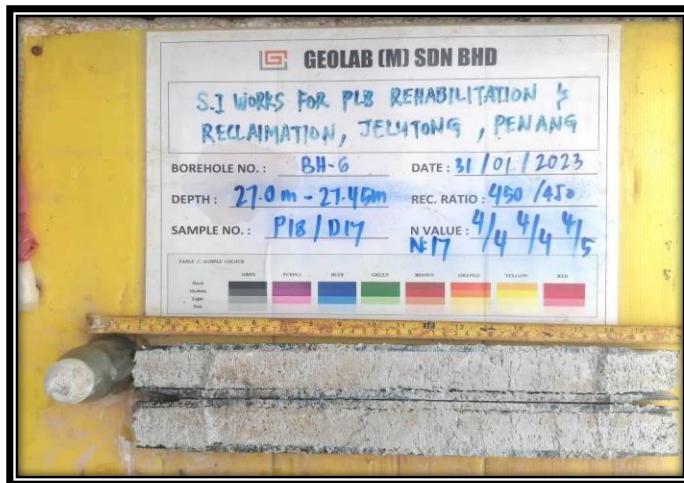


Photo 18 : Disturbed sample of BH6 at 27.00m



Photo 19 : Disturbed sample of BH6 at 28.50m

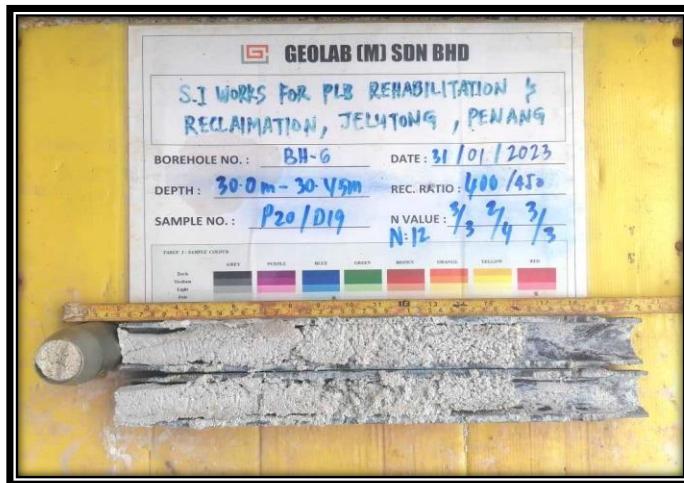


Photo 20 : Disturbed sample of BH6 at 30.00m

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.



Photo 21 : Disturbed sample of BH6 at 31.50m



Photo 22 : Disturbed sample of BH6 at 33.00m

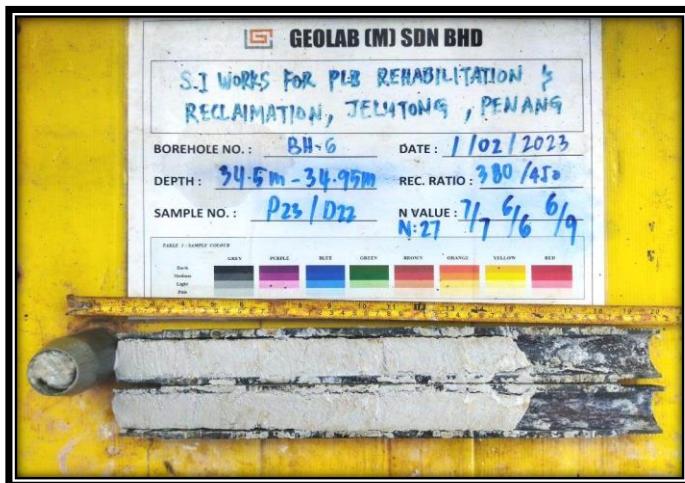


Photo 23 : Disturbed sample of BH6 at 34.50m

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.

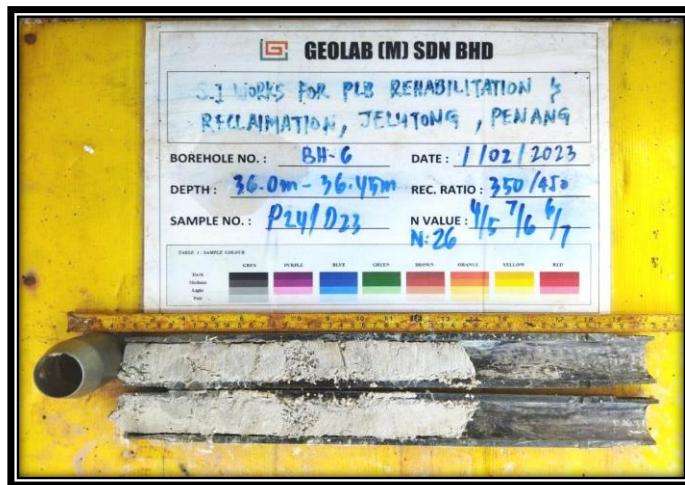


Photo 24 : Disturbed sample of BH6 at 36.00m



Photo 25 : Disturbed sample of BH6 at 37.50m

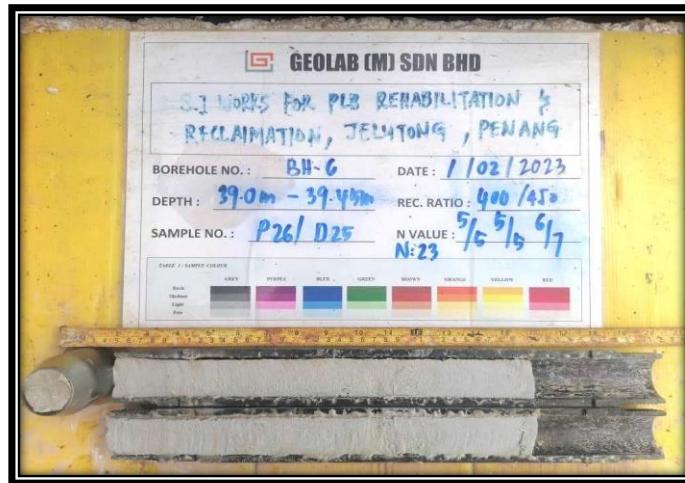


Photo 26 : Disturbed sample of BH6 at 39.00m

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.

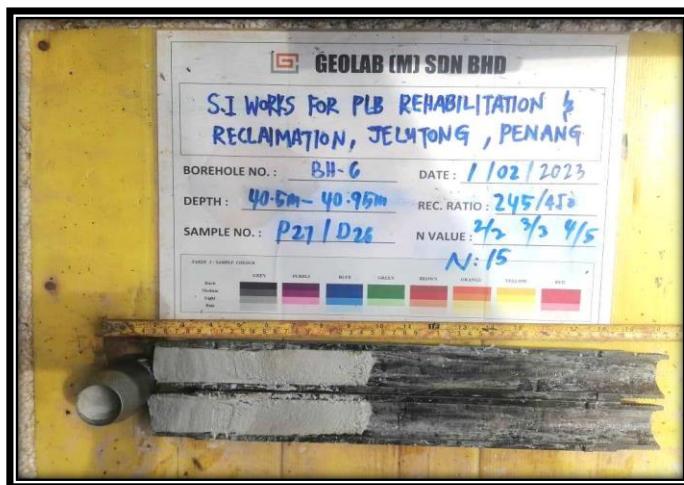


Photo 27 : Disturbed sample of BH6 at 40.50m

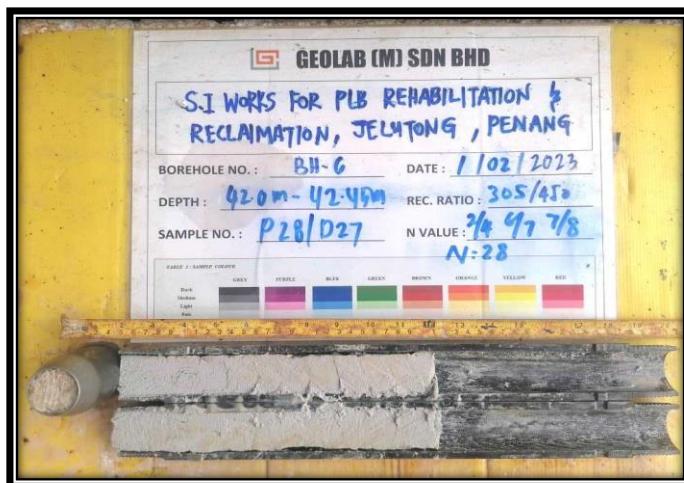


Photo 28 : Disturbed sample of BH6 at 42.00m

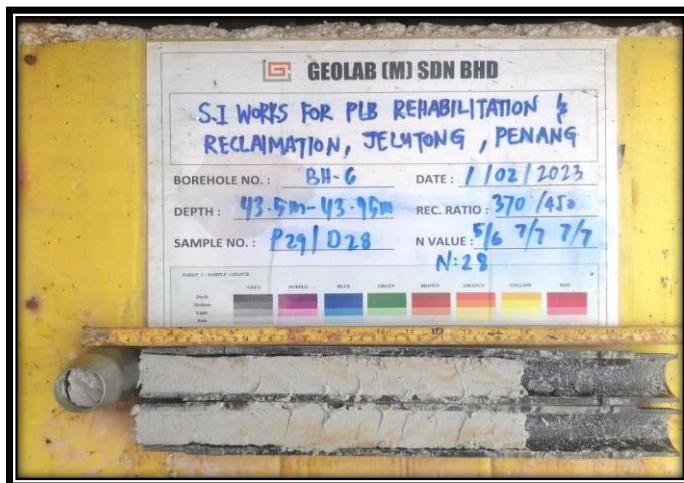


Photo 29 : Disturbed sample of BH6 at 43.50m

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.

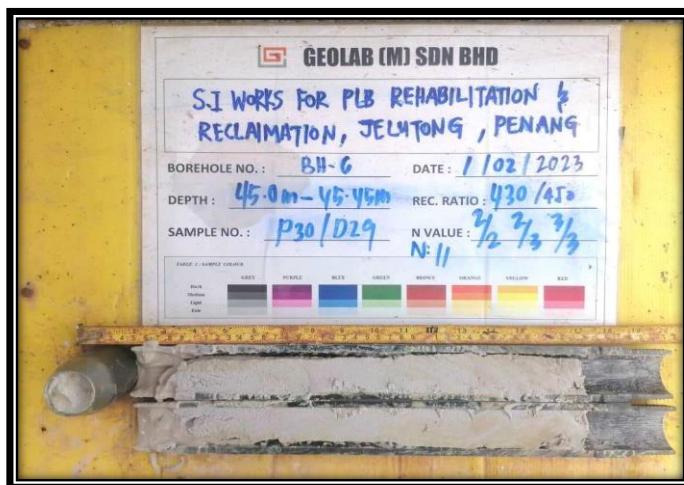


Photo 30 : Disturbed sample of BH6 at 45.00m

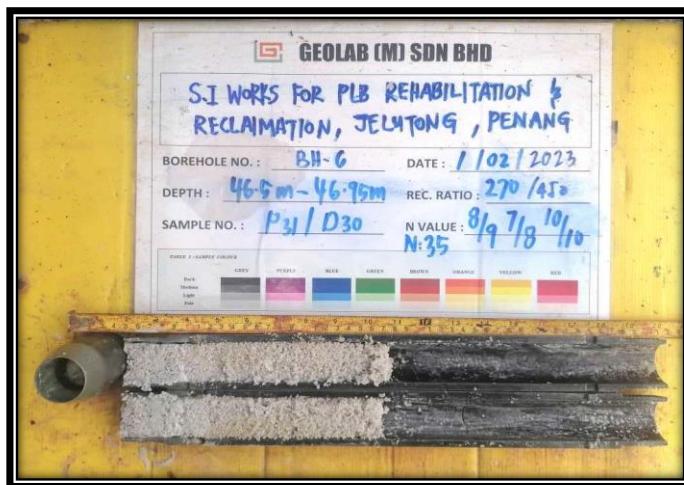


Photo 31 : Disturbed sample of BH6 at 46.50m

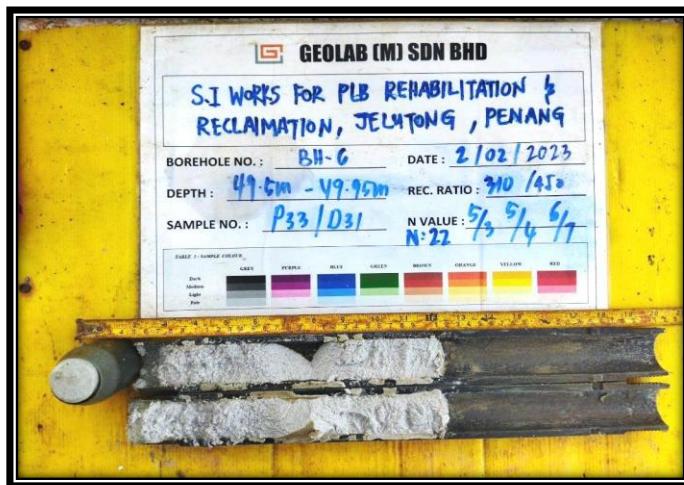


Photo 32 : Disturbed sample of BH6 at 49.50m

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.

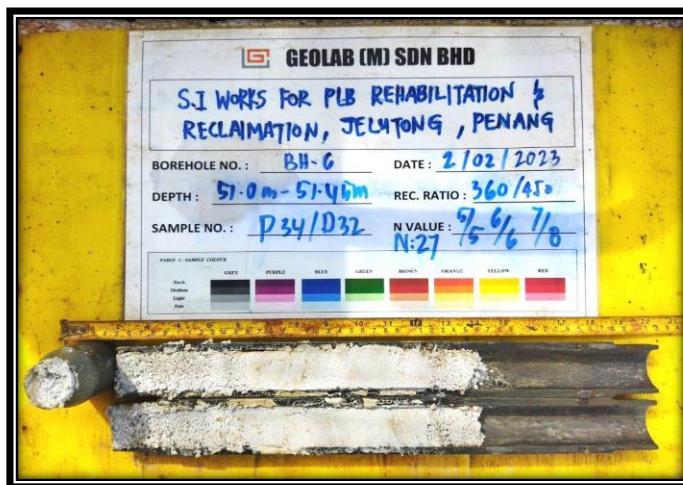


Photo 33 : Disturbed sample of BH6 at 51.00m

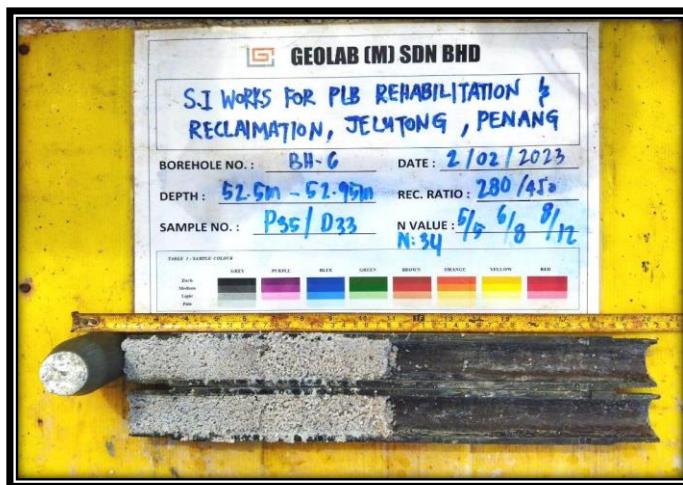


Photo 34 : Disturbed sample of BH6 at 52.50m

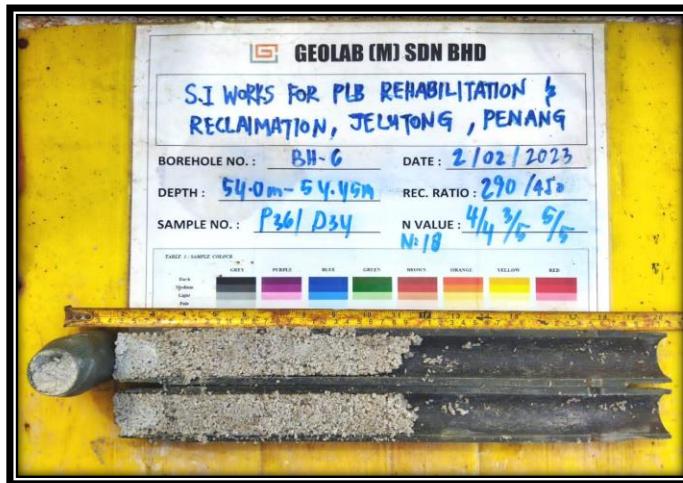


Photo 35 : Disturbed sample of BH6 at 54.00m

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.

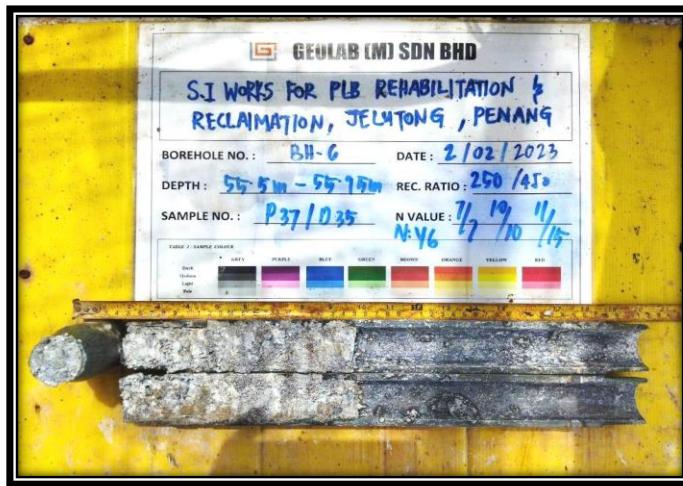


Photo 36 : Disturbed sample of BH6 at 55.50m

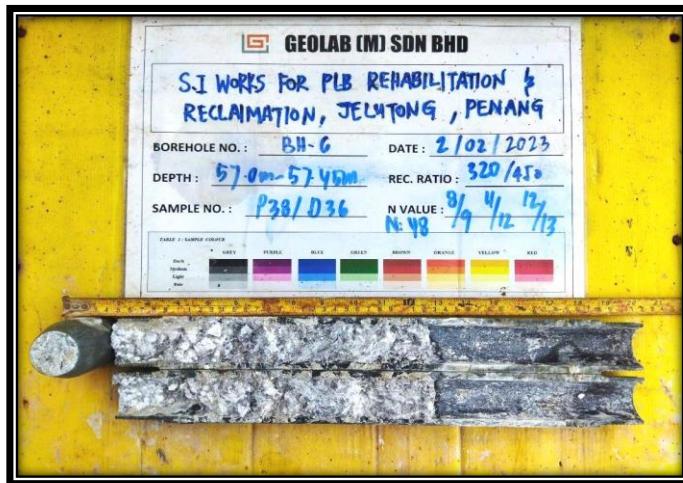


Photo 37 : Disturbed sample of BH6 at 57.00m

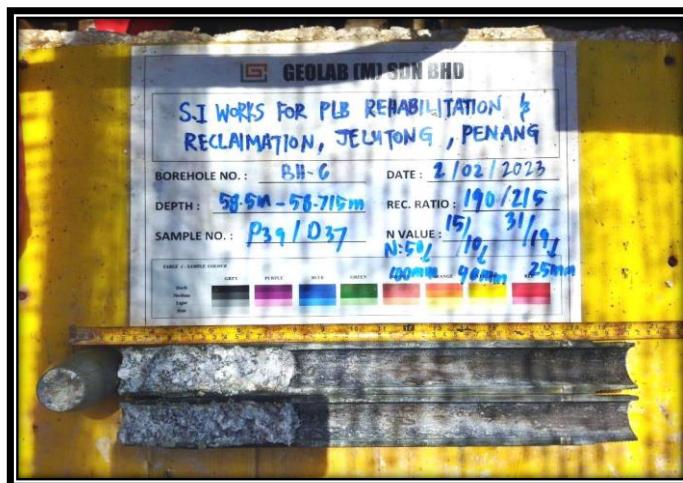


Photo 38 : Disturbed sample of BH6 at 58.50m

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.



Photo 39 : Disturbed sample of BH6 at 60.00m



**BH7**

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.



Photo 1 : Deep Boring Location at BH7



Photo 2 : Disturbed sample of BH7 at 1.50m



Photo 3 : Disturbed sample of BH7 at 4.50m

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.

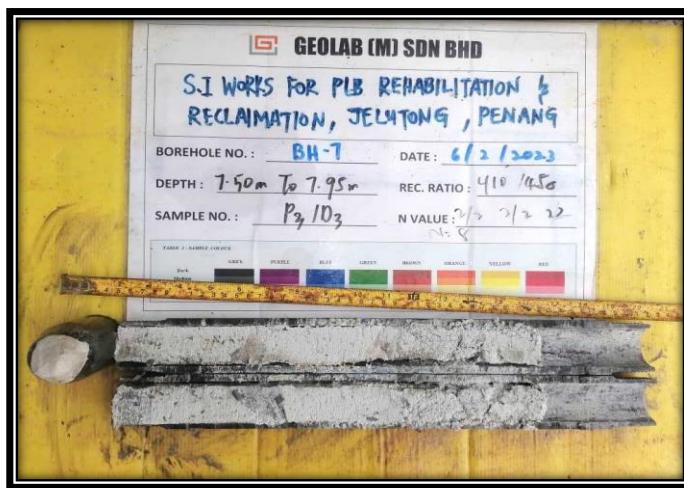


Photo 4 : Disturbed sample of BH7 at 7.50m



Photo 5 : Disturbed sample of BH7 at 9.00m

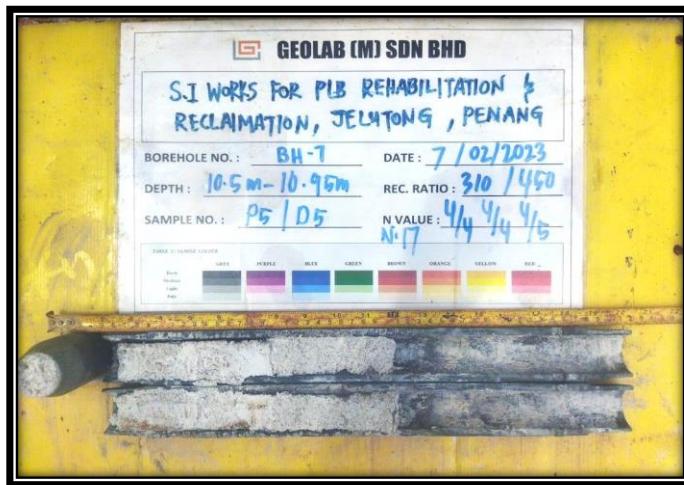


Photo 6 : Disturbed sample of BH7 at 10.50m

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.

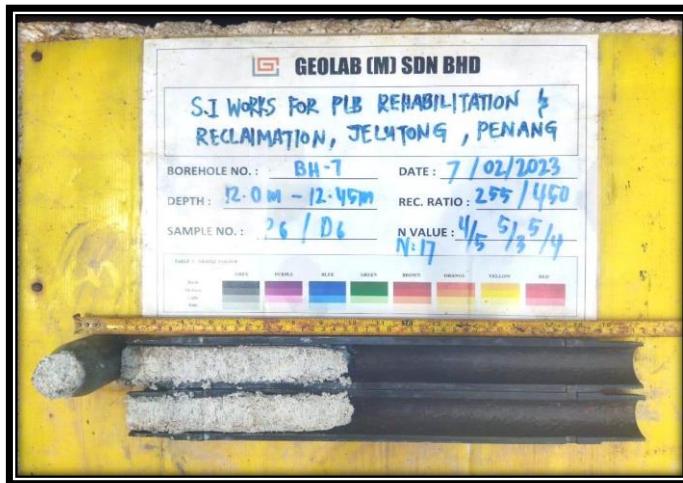


Photo 7 : Disturbed sample of BH7 at 12.00m



Photo 8 : Disturbed sample of BH7 at 13.50m



Photo 9 : Disturbed sample of BH7 at 15.00m

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.

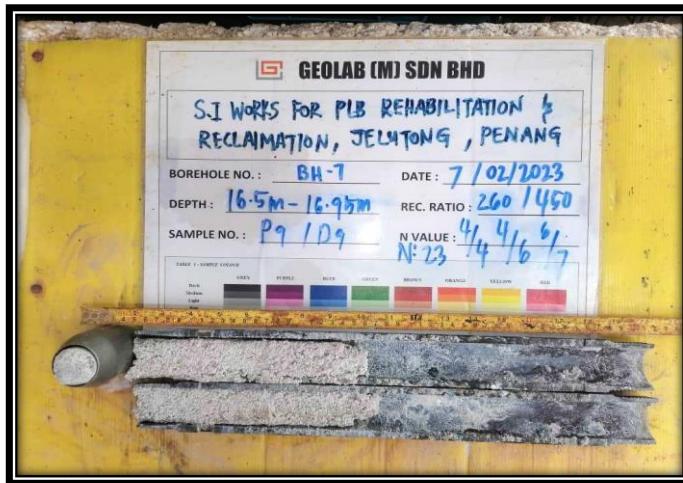


Photo 10 : Disturbed sample of BH7 at 16.50m

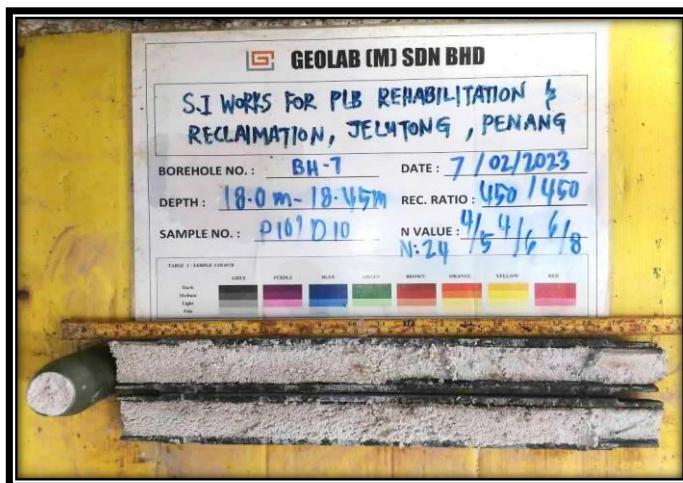


Photo 11 : Disturbed sample of BH7 at 18.00m

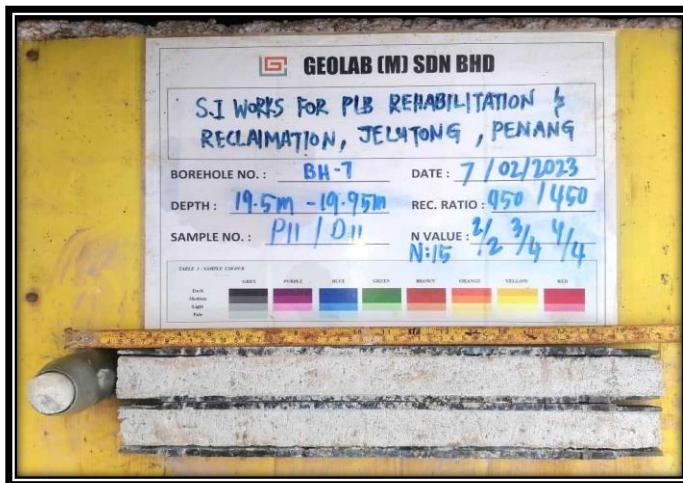


Photo 12 : Disturbed sample of BH7 at 19.50m

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.



Photo 13 : Disturbed sample of BH7 at 21.00m



Photo 14 : Disturbed sample of BH7 at 22.50m



Photo 15 : Disturbed sample of BH7 at 24.00m

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.

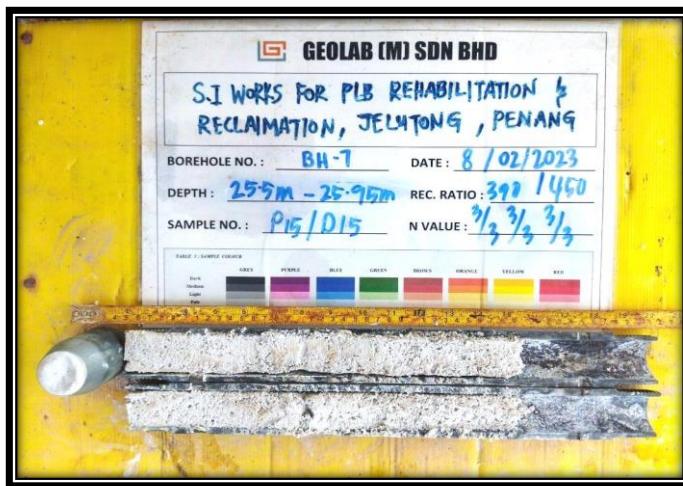


Photo 16 : Disturbed sample of BH7 at 25.50m



Photo 17 : Disturbed sample of BH7 at 27.00m



Photo 18 : Disturbed sample of BH7 at 28.50m

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.

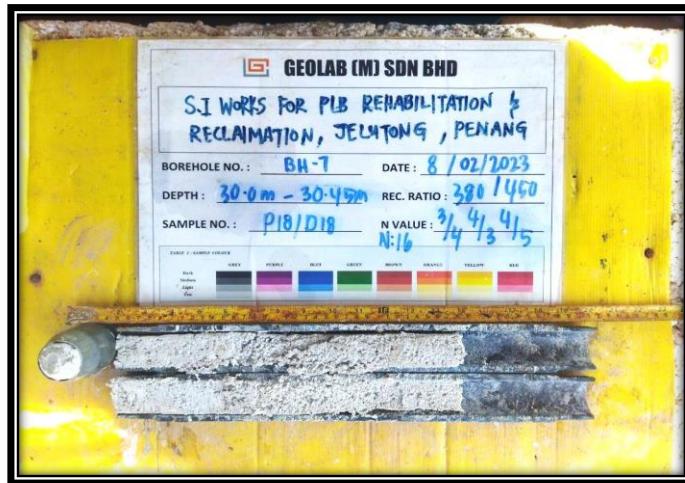


Photo 19 : Disturbed sample of BH7 at 30.00m



Photo 20 : Disturbed sample of BH7 at 31.50m

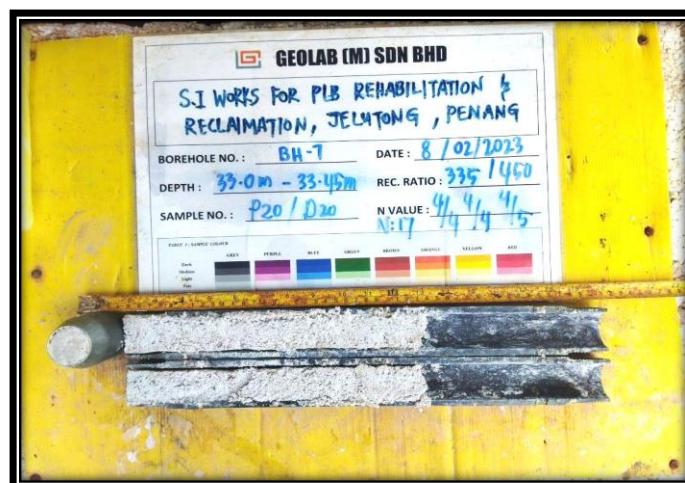


Photo 21 : Disturbed sample of BH7 at 33.00m

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.



Photo 22 : Disturbed sample of BH7 at 34.50m



Photo 23 : Disturbed sample of BH7 at 36.00m

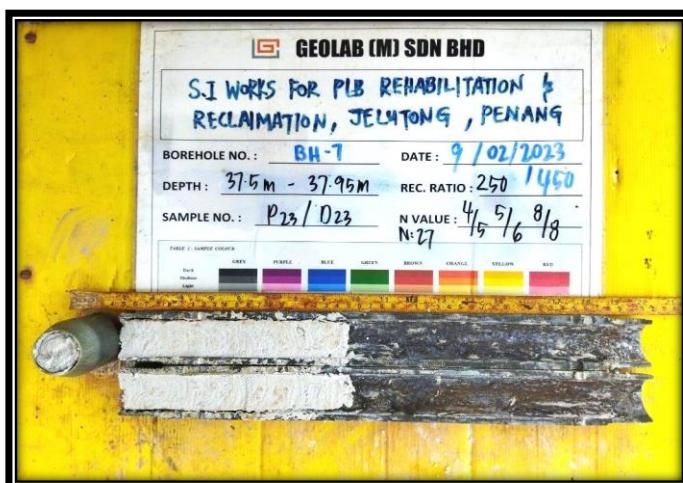


Photo 24 : Disturbed sample of BH7 at 37.50m

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.



Photo 25 : Disturbed sample of BH7 at 39.00m

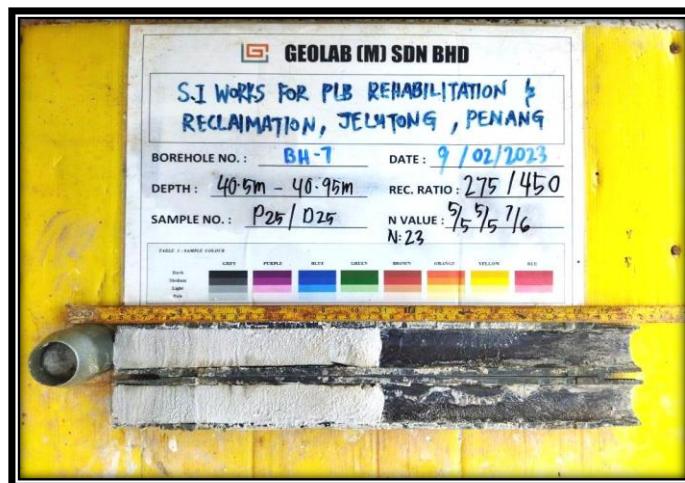


Photo 26 : Disturbed sample of BH7 at 40.50m

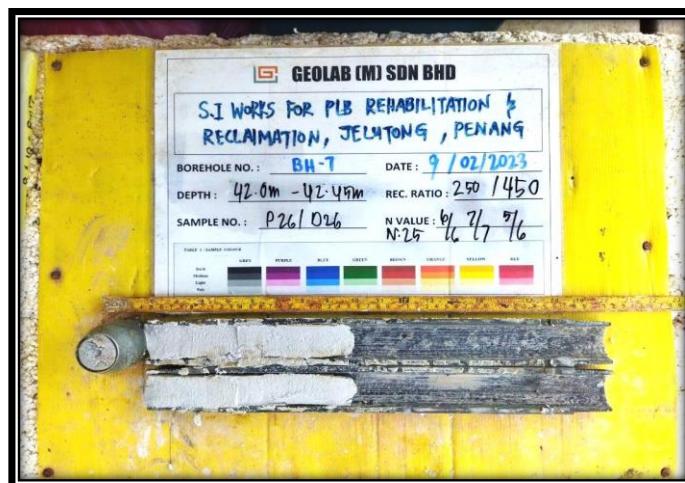


Photo 27 : Disturbed sample of BH7 at 42.00m

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.



Photo 28 : Disturbed sample of BH7 at 43.50m



Photo 29 : Disturbed sample of BH7 at 45.00m

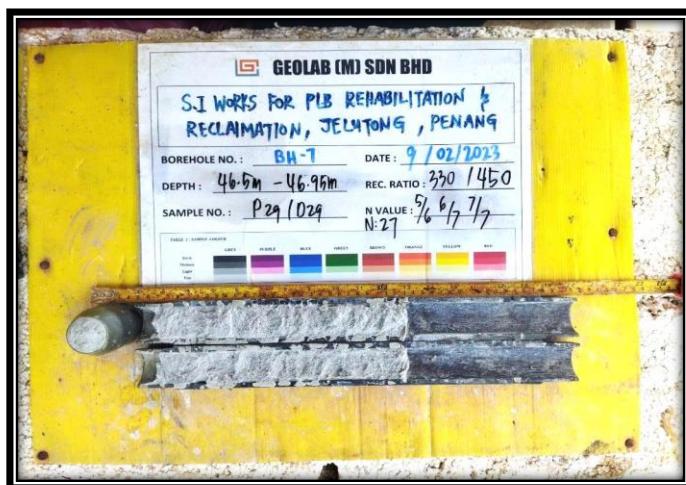


Photo 30 : Disturbed sample of BH7 at 46.50m

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.



Photo 31 : Disturbed sample of BH7 at 48.00m



Photo 32 : Disturbed sample of BH7 at 49.50m



Photo 33 : Disturbed sample of BH7 at 51.00m

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.



Photo 34 : Disturbed sample of BH7 at 52.50m

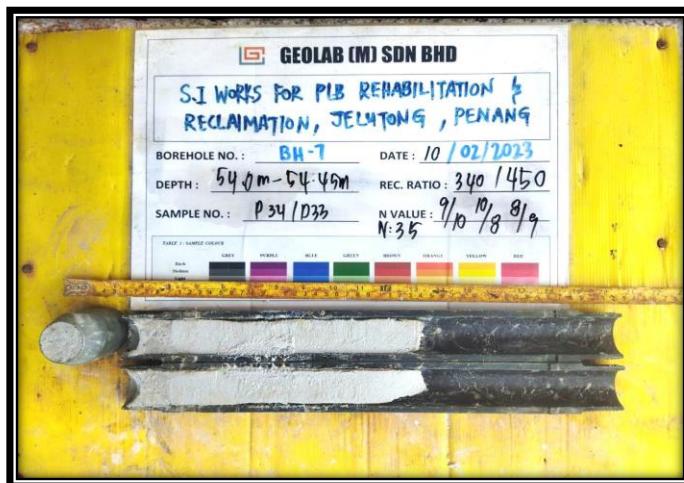


Photo 35 : Disturbed sample of BH7 at 54.00m

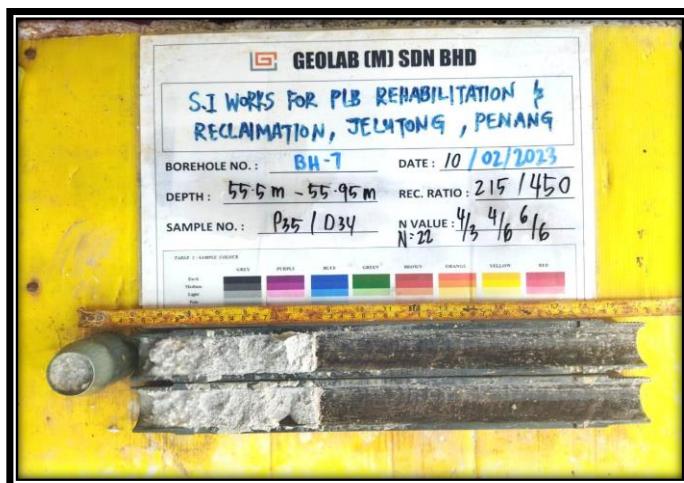


Photo 36 : Disturbed sample of BH7 at 55.50m

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.



Photo 37 : Disturbed sample of BH7 at 57.00m



Photo 38 : Disturbed sample of BH7 at 58.50m



Photo 39 : Disturbed sample of BH7 at 60.00m



**BH8**

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.

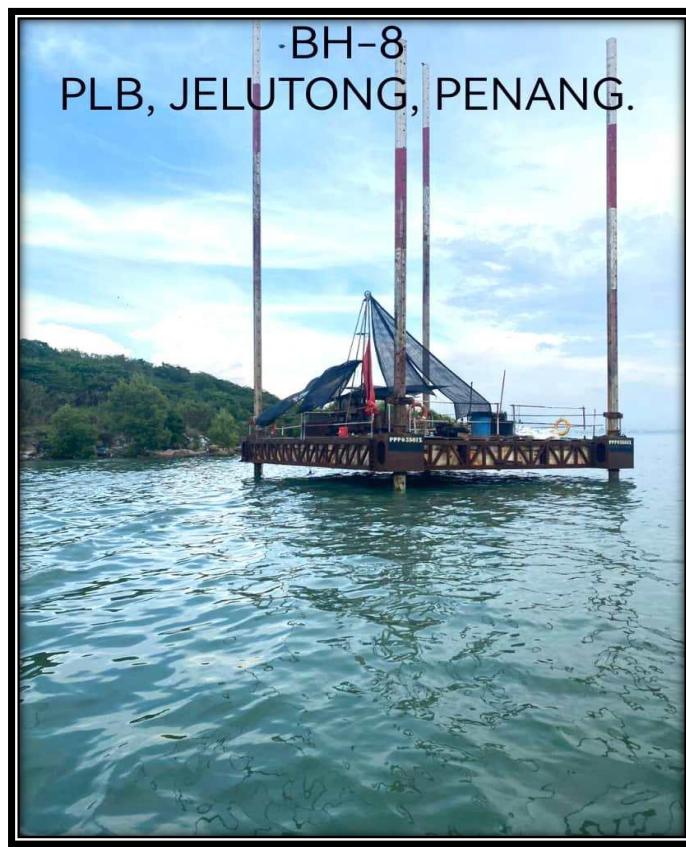


Photo 1 : Deep Boring Location at BH8

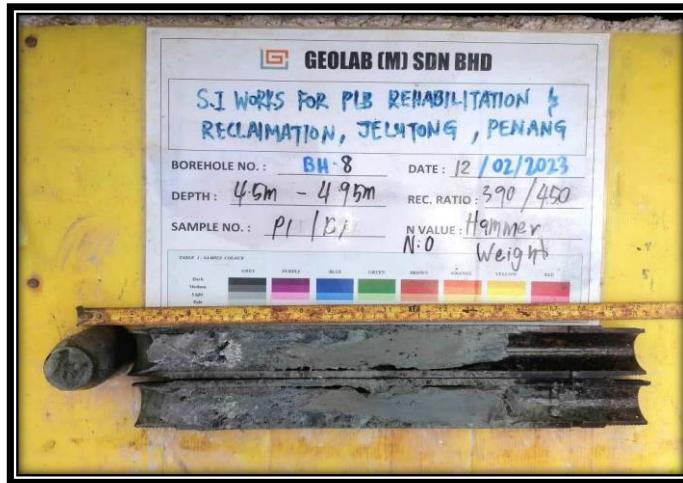


Photo 2 : Disturbed sample of BH8 at 4.50m

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.



Photo 3 : Disturbed sample of BH8 at 9.00m



Photo 4 : Disturbed sample of BH8 at 10.50m



Photo 5 : Disturbed sample of BH8 at 12.00m

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.



Photo 6 : Disturbed sample of BH8 at 13.50m



Photo 7 : Disturbed sample of BH8 at 15.00m

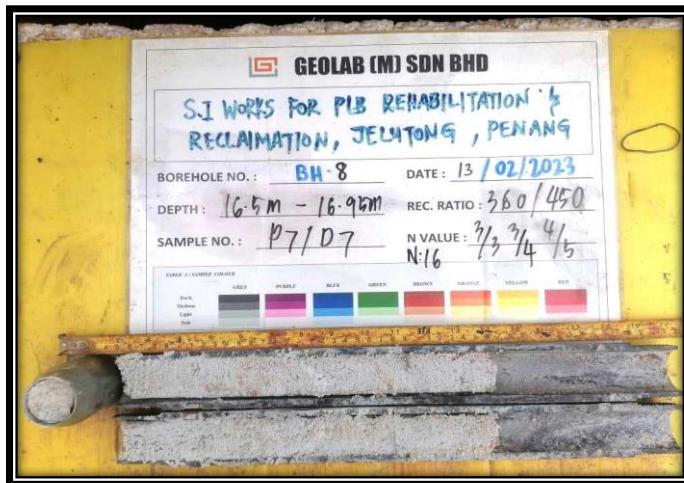


Photo 8 : Disturbed sample of BH8 at 16.50m

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.

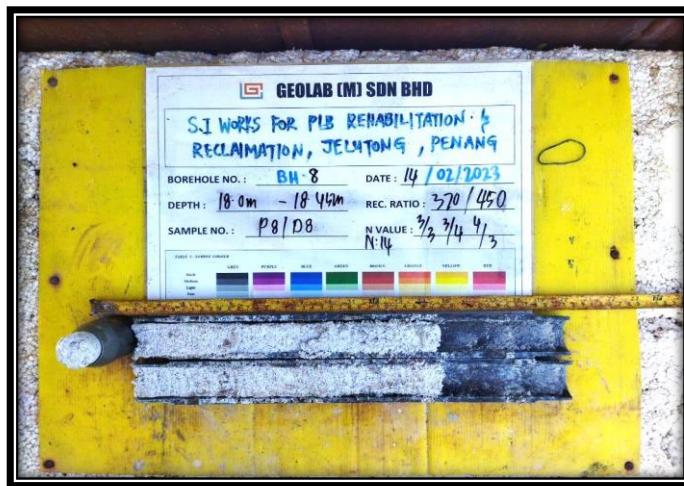


Photo 9 : Disturbed sample of BH8 at 18.00m



Photo 10 : Disturbed sample of BH8 at 19.50m



Photo 11 : Disturbed sample of BH8 at 21.00m

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.



Photo 12 : Disturbed sample of BH8 at 22.50m

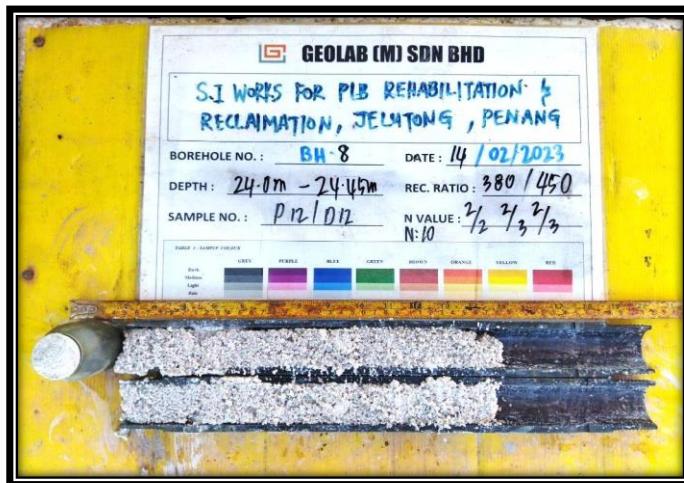


Photo 13 : Disturbed sample of BH8 at 24.00m



Photo 14 : Disturbed sample of BH8 at 25.50m

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.



Photo 15 : Disturbed sample of BH8 at 27.00m

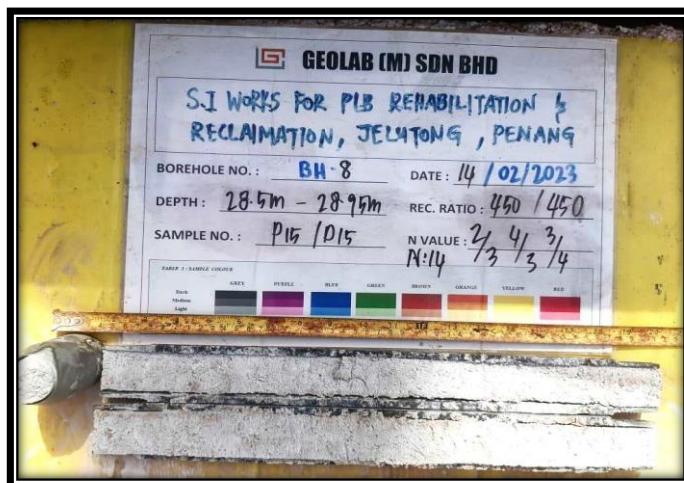


Photo 16 : Disturbed sample of BH8 at 28.50m



Photo 17 : Disturbed sample of BH8 at 30.00m

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.

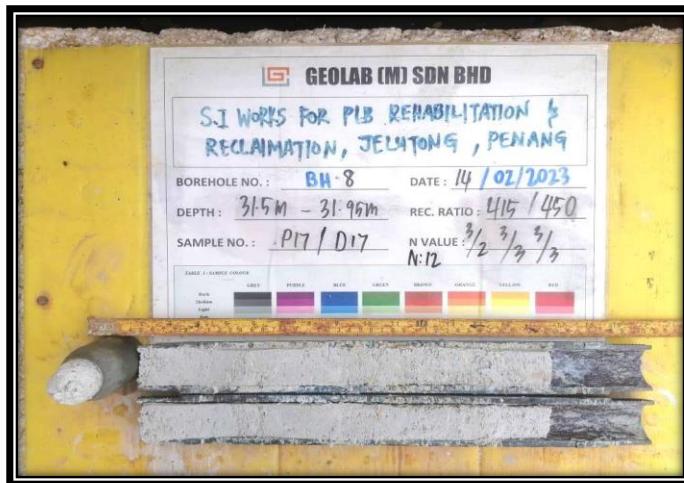


Photo 18 : Disturbed sample of BH8 at 31.50m



Photo 19 : Disturbed sample of BH8 at 33.00m



Photo 20 : Disturbed sample of BH8 at 34.50m

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.



Photo 21 : Disturbed sample of BH8 at 36.00m



Photo 22 : Disturbed sample of BH8 at 37.50m



Photo 23 : Disturbed sample of BH8 at 39.00m

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.



Photo 24 : Disturbed sample of BH8 at 40.50m

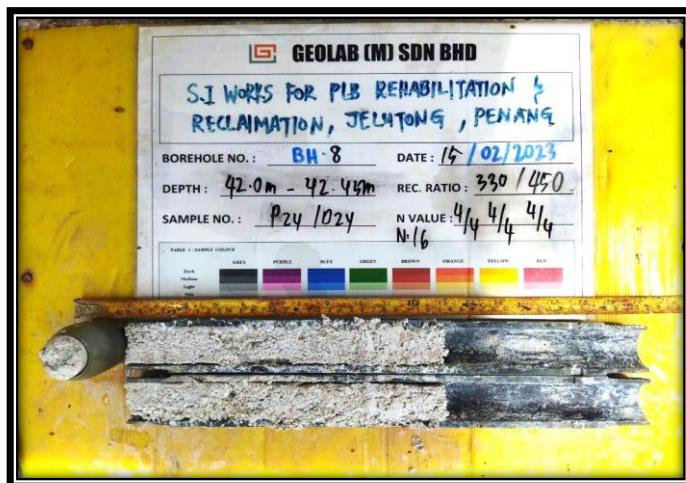


Photo 25 : Disturbed sample of BH8 at 42.00m



Photo 26 : Disturbed sample of BH8 at 43.50m

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.



Photo 27 : Disturbed sample of BH8 at 45.00m

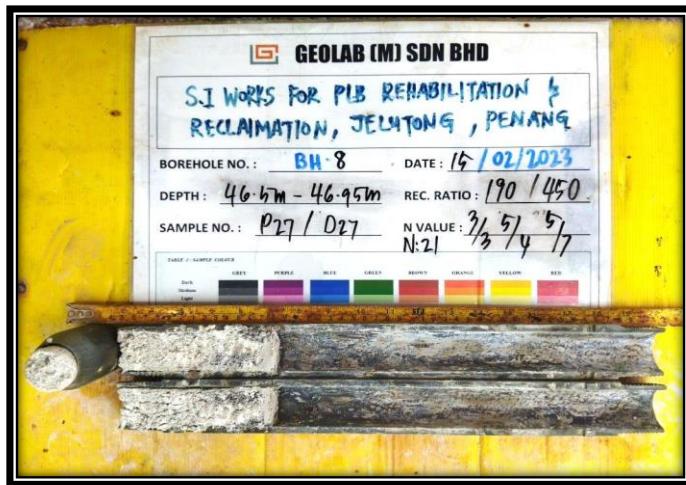


Photo 28 : Disturbed sample of BH8 at 46.50m



Photo 29 : Disturbed sample of BH8 at 48.00m

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.



Photo 30 : Disturbed sample of BH8 at 49.50m



Photo 31 : Rock sample for BH8 at depth 49.80m to 52.80m (C1-C2)



**BH9**

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.



Photo 1 : Deep Boring Location at BH9



Photo 2 : Disturbed sample of BH9 at 3.00m

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.

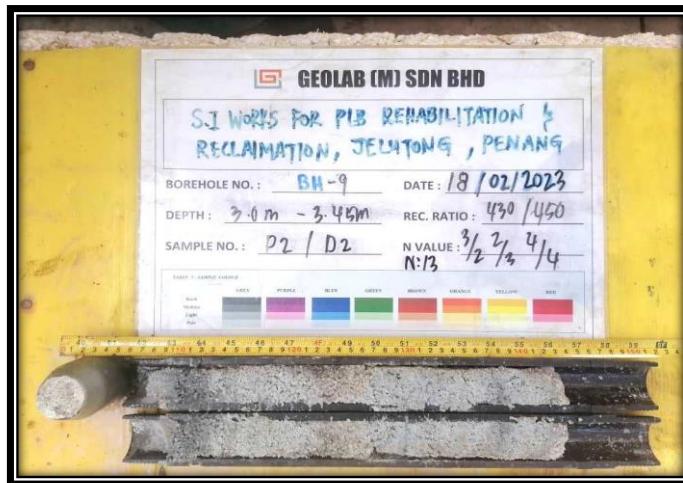


Photo 3 : Disturbed sample of BH9 at 3.00m

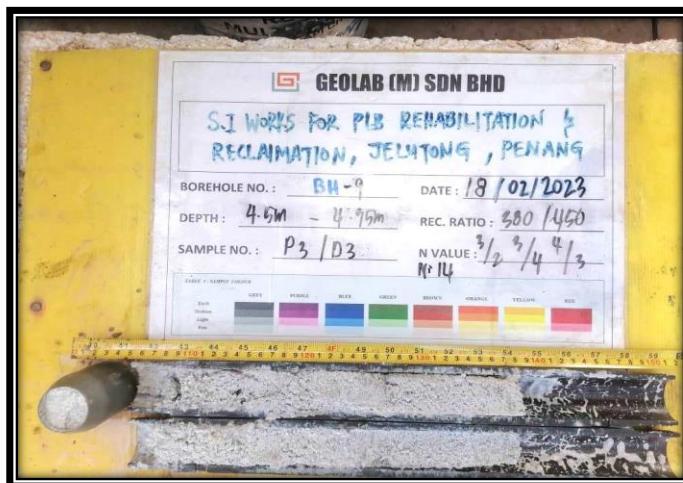


Photo 4 : Disturbed sample of BH9 at 4.50m



Photo 5 : Disturbed sample of BH9 at 6.00m

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.



Photo 6 : Disturbed sample of BH9 at 9.00m



Photo 7 : Disturbed sample of BH9 at 10.50m



Photo 8 : Disturbed sample of BH9 at 12.00m

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.



Photo 9 : Disturbed sample of BH9 at 13.50m

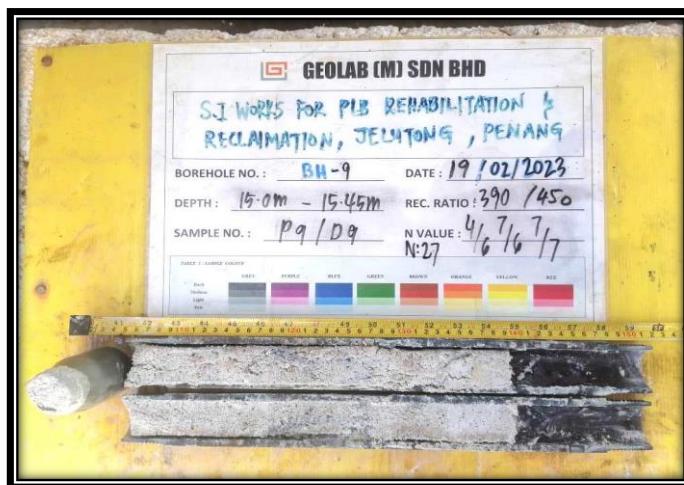


Photo 10 : Disturbed sample of BH9 at 15.00m

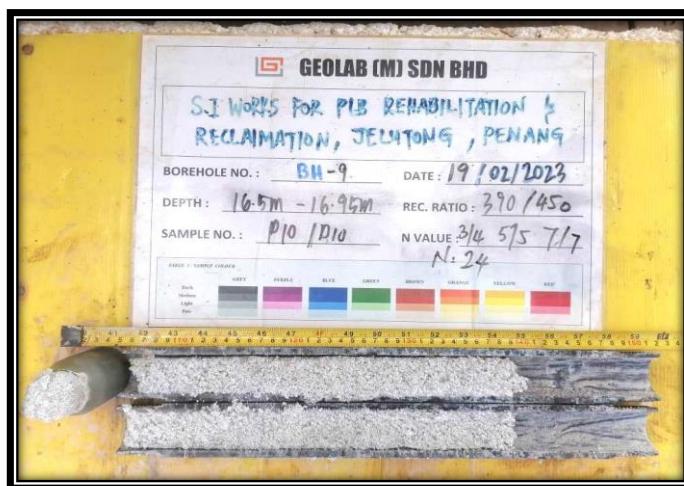


Photo 11 : Disturbed sample of BH9 at 16.50m

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.



Photo 12 : Disturbed sample of BH9 at 18.00m



Photo 13 : Disturbed sample of BH9 at 19.50m



Photo 14 : Disturbed sample of BH9 at 21.00m

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.



Photo 15 : Disturbed sample of BH9 at 22.50m



Photo 16 : Disturbed sample of BH9 at 24.00m



Photo 17 : Disturbed sample of BH9 at 25.50m

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.



Photo 18 : Disturbed sample of BH9 at 27.00m



Photo 19 : Disturbed sample of BH9 at 28.50m



Photo 20 : Disturbed sample of BH9 at 30.00m

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.



Photo 21 : Disturbed sample of BH9 at 31.50m



Photo 22 : Disturbed sample of BH9 at 33.00m

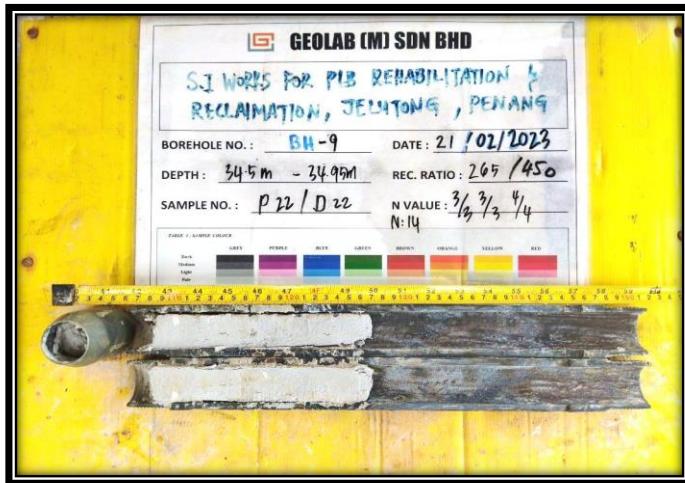


Photo 23 : Disturbed sample of BH9 at 34.50m

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.



Photo 24 : Disturbed sample of BH9 at 36.00m



Photo 25 : Disturbed sample of BH9 at 37.50m



Photo 26 : Disturbed sample of BH9 at 39.00m

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.



Photo 27 : Disturbed sample of BH9 at 40.50m



Photo 28 : Disturbed sample of BH9 at 42.00m



Photo 29 : Disturbed sample of BH9 at 43.50m

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.



Photo 30 : Disturbed sample of BH9 at 45.00m



Photo 31 : Disturbed sample of BH9 at 46.50m



Photo 32 : Disturbed sample of BH9 at 48.00m

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.

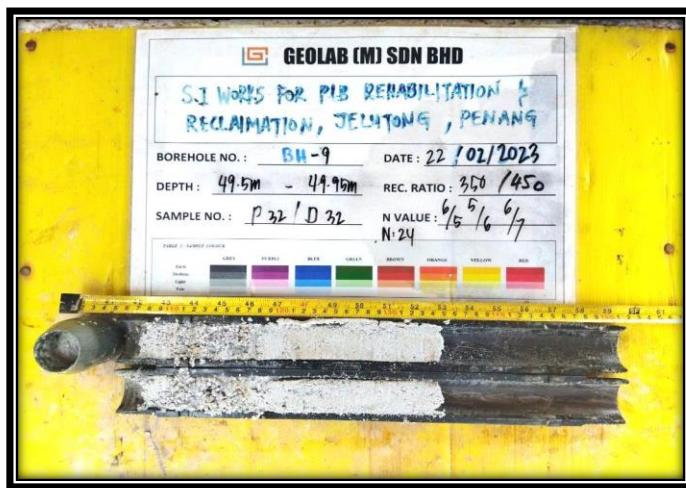


Photo 33 : Disturbed sample of BH9 at 49.50m



Photo 34 : Disturbed sample of BH9 at 51.00m



Photo 35 : Disturbed sample of BH9 at 52.50m

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.



Photo 36 : Disturbed sample of BH9 at 54.00m



Photo 37 : Disturbed sample of BH9 at 55.50m

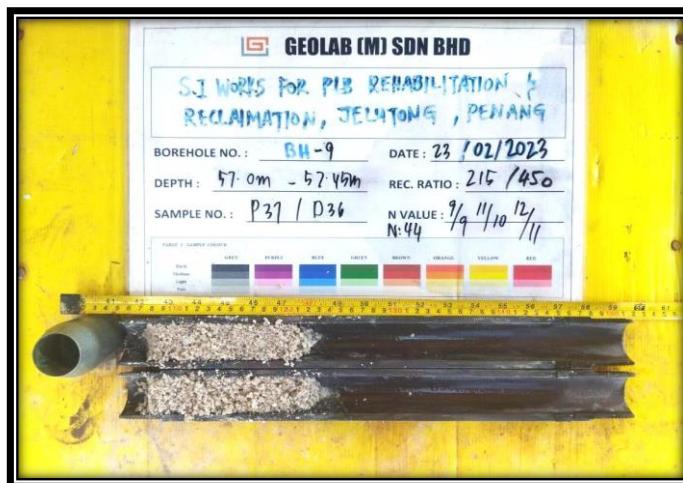


Photo 38 : Disturbed sample of BH9 at 57.00m

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.



Photo 39 : Disturbed sample of BH9 at 58.50m



Photo 40 : Disturbed sample of BH9 at 60.00m



## APPENDIX G

*Laboratory Testing Photographs*

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.

### Extruded photo for Undisturbed Samples



Photo 1 : Extruded photo for BH-1 -UD1 (4.50m)



Photo 2 : Extruded photo for BH-1 -UD2 (14.50m)



Photo 3 : Extruded photo for BH-3 -UD1 (3.00m)

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.

#### Extruded photo for Undisturbed Samples



Photo 4 : Extruded photo for BH-3 -UD2 (8.50m)



Photo 5 : Extruded photo for BH-4 -UD1 (11.50m)



Photo 6 : Extruded photo for BH-5 -UD1 (3.50m)

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.

### Extruded photo for Undisturbed Samples



Photo 7 : Extruded photo for BH-5 -UD2 (9.00m)



Photo 8 : Extruded photo for BH-7 -UD1 (3.00m)

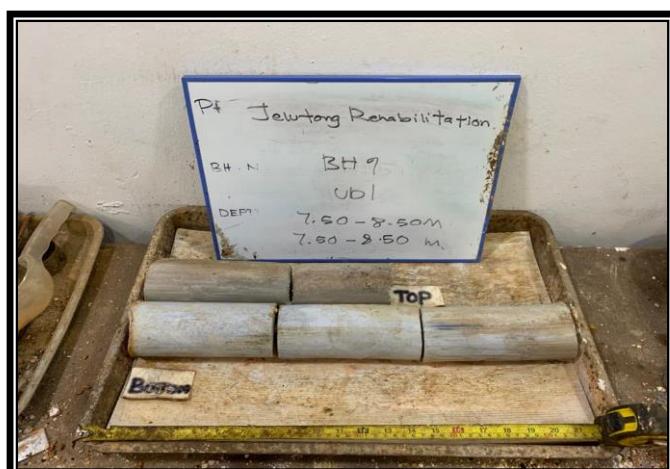


Photo 9 : Extruded photo for BH-7 -UD2 (6.00m)

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.

### Extruded photo for Undisturbed Samples



Photo 10 : Extruded photo for BH-8 -UD1 (2.00m)



Photo 11 : Extruded photo for BH-8 -UD2 (6.50m)



Photo 12 : Extruded photo for BH-9 -UD1 (7.50m)

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.

### Consolidated Undrained

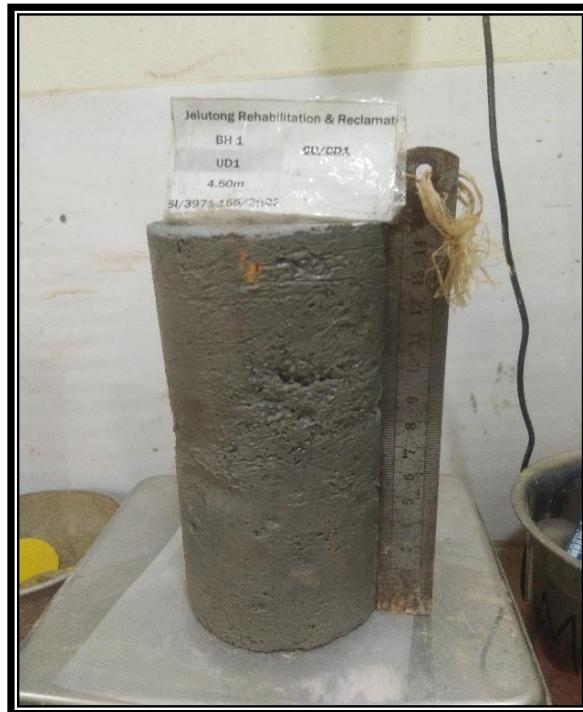


Photo 1 : CU test of BH1 for UD1-S1 (Before)



Photo 2 : CU test of BH1 for UD1-S1 (After)

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.

### Consolidated Undrained

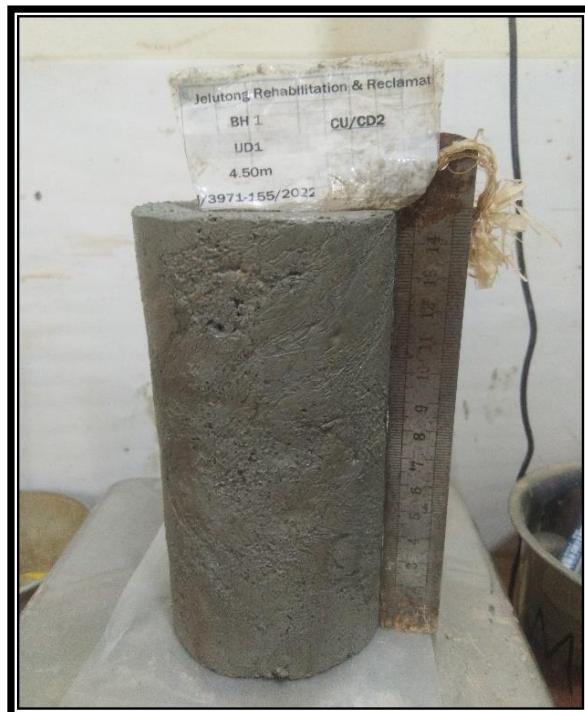


Photo 3 : CU test of BH1 for UD1-S2 (Before)

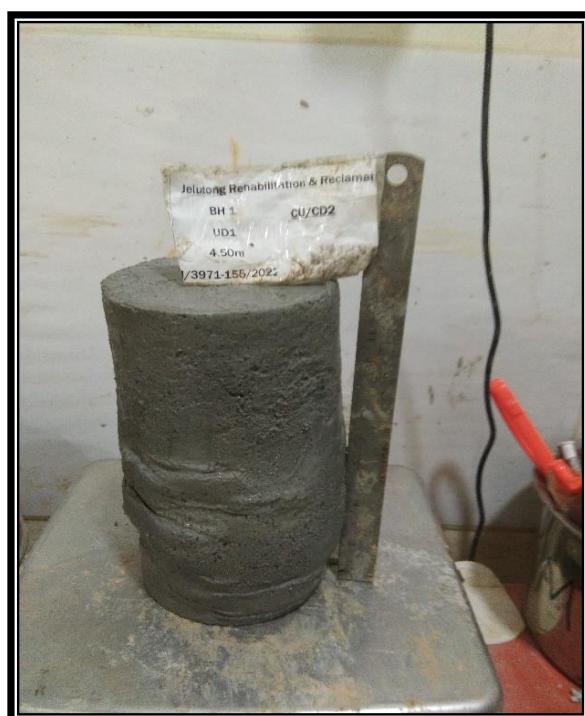


Photo 4 : CU test of BH1 for UD1-S2 (After)

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.

### Consolidated Undrained

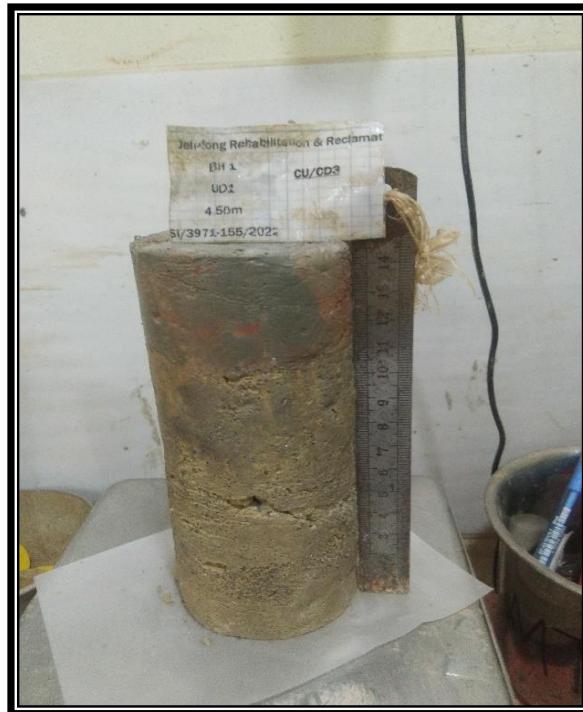


Photo 5 : CU test of BH1 for UD1-S3 (Before)



Photo 6 : CU test of BH1 for UD1-S3 (After)

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.

### Consolidated Undrained



Photo 7 : CU test of BH3 for UD2-S1 (Before)



Photo 8 : CU test of BH3 for UD2-S1 (After)

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.

### Consolidated Undrained



Photo 9 : CU test of BH3 for UD1-S2 (Before)

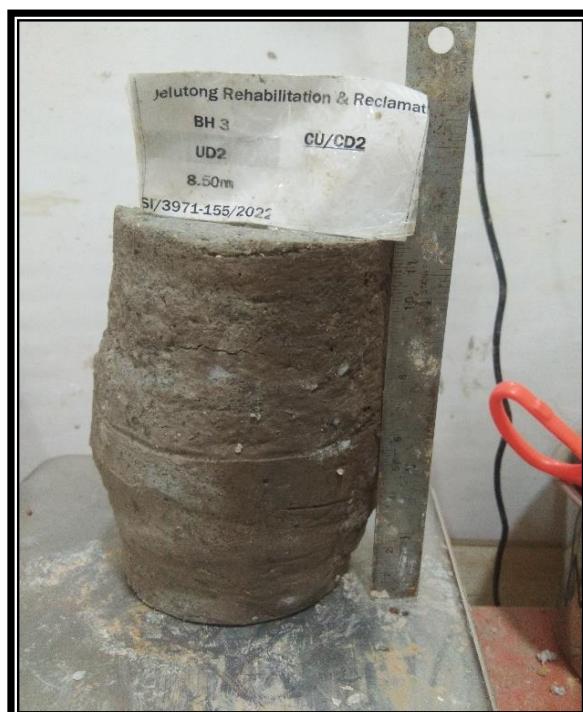


Photo 10 : CU test of BH3 for UD2-S2 (After)

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.

### Consolidated Undrained

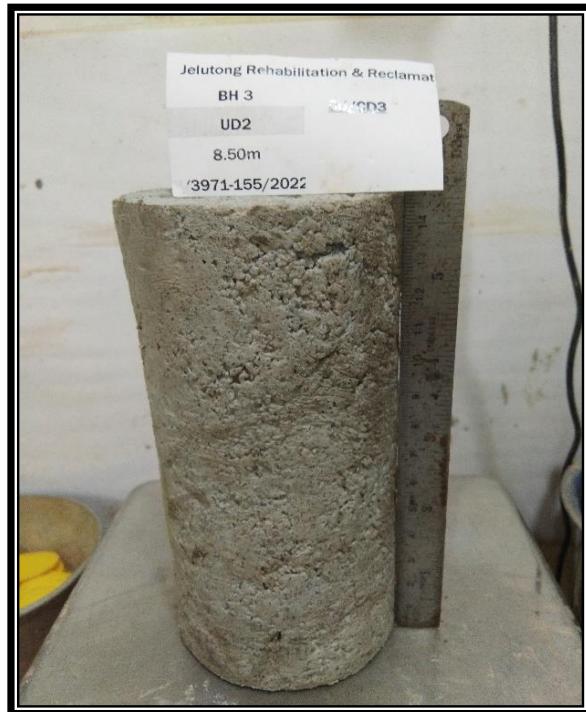


Photo 11 : CU test of BH3 for UD2-S3 (Before)

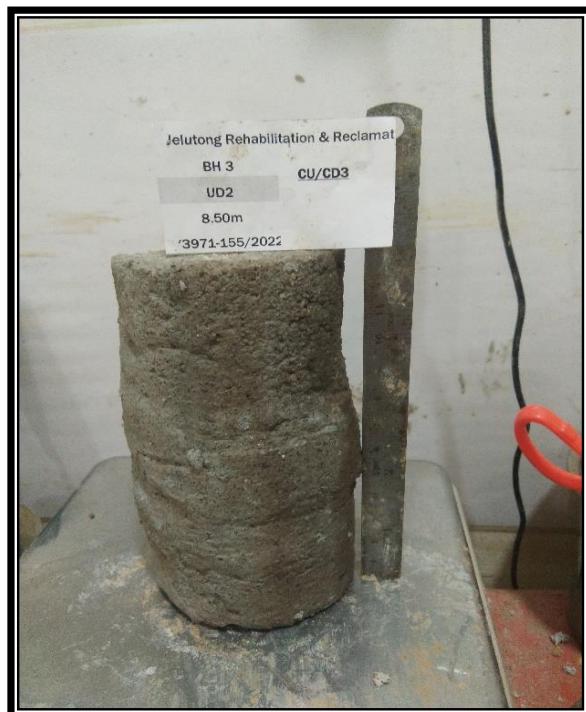


Photo 12 : CU test of BH3 for UD2-S3 (After)

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.

### Consolidated Undrained



Photo 13 : CU test of BH4 for UD1-S1 (Before)



Photo 14 : CU test of BH4 for UD1-S1 (After)

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.

### Consolidated Undrained



Photo 15 : CU test of BH4 for UD1-S2 (Before)



Photo 16 : CU test of BH4 for UD1-S2 (After)

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.

### Consolidated Undrained



Photo 17 : CU test of BH4 for UD1-S3 (Before)

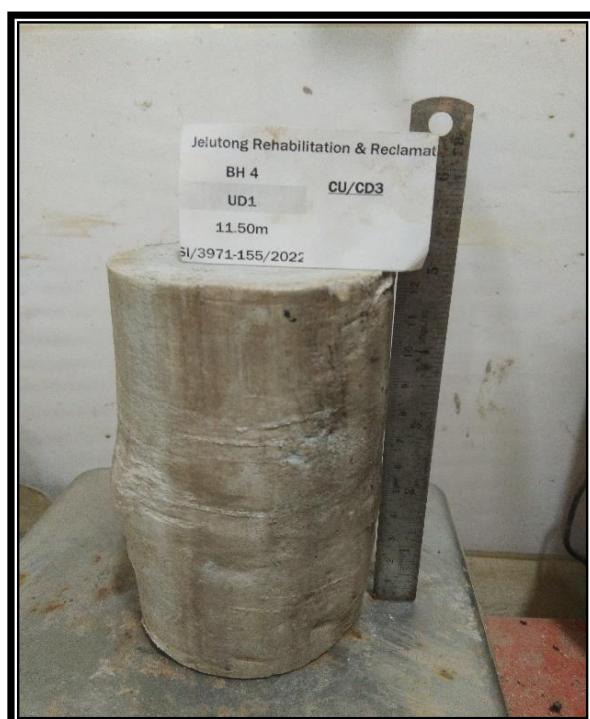


Photo 18 : CU test of BH4 for UD1-S3 (After)

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.

### Consolidated Undrained



Photo 19 : CU test of BH9 for UD1-S1 (Before)



Photo 20 : CU test of BH9 for UD1-S1 (After)

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.

### Consolidated Undrained

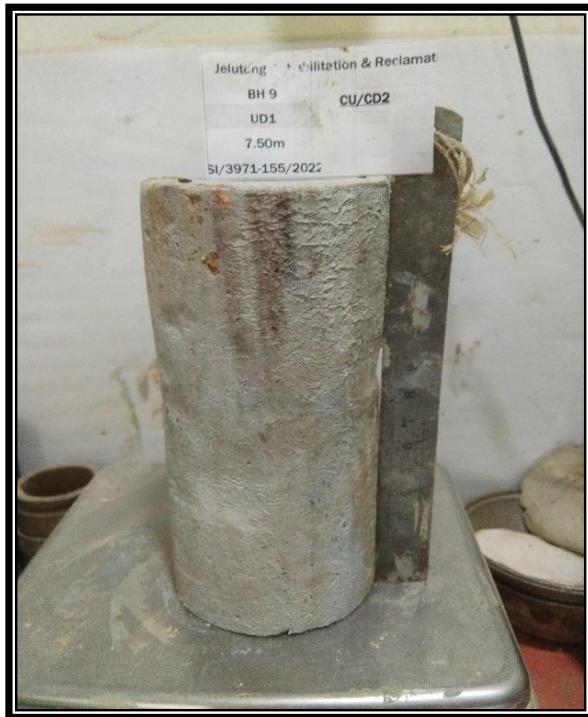


Photo 21 : CU test of BH9 for UD1-S2 (Before)



Photo 22 : CU test of BH9 for UD1-S2 (After)

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.

### Consolidated Undrained

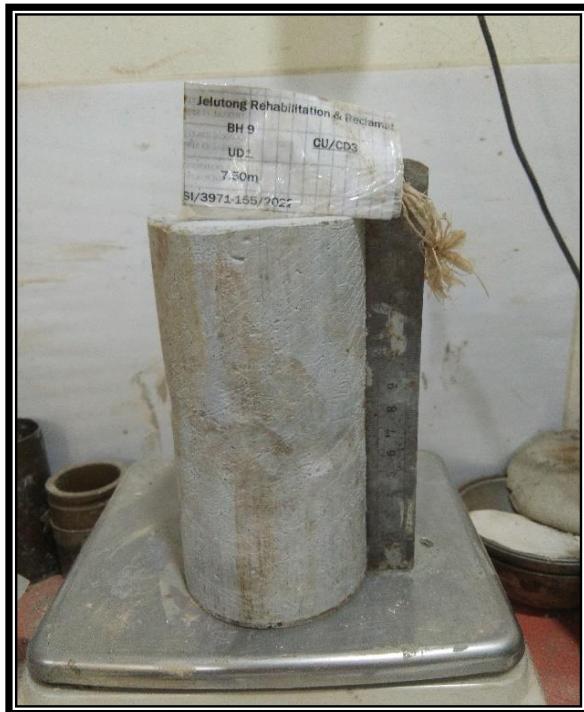


Photo 23 : CU test of BH9 for UD1-S3 (Before)



Photo 24 : CU test of BH9 for UD1-S3 (After)

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.

### Consolidated Undrained



Photo 1 : UU test of BH5 for UD2-S1 (Before)



Photo 2 : UU test of BH5 for UD2-S1 (After)

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.

### Consolidated Undrained

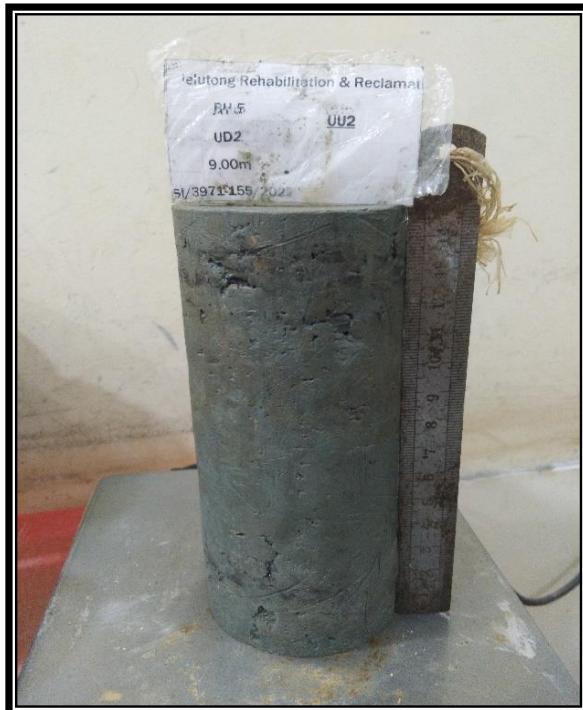


Photo 3 : UU test of BH5 for UD2-S2 (Before)



Photo 4 : UU test of BH5 for UD2-S2 (After)

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.

### Consolidated Undrained

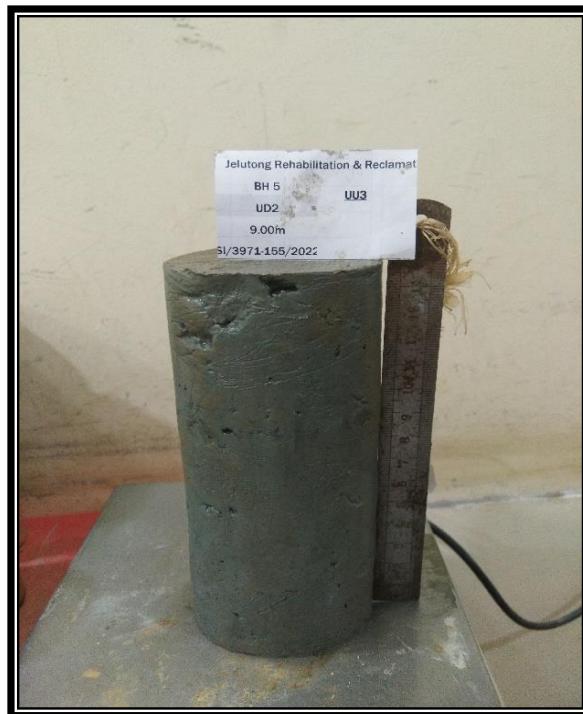


Photo 5 : UU test of BH5 for UD2-S3 (Before)



Photo 6 : UU test of BH5 for UD2-S3 (After)

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.

### Consolidated Undrained

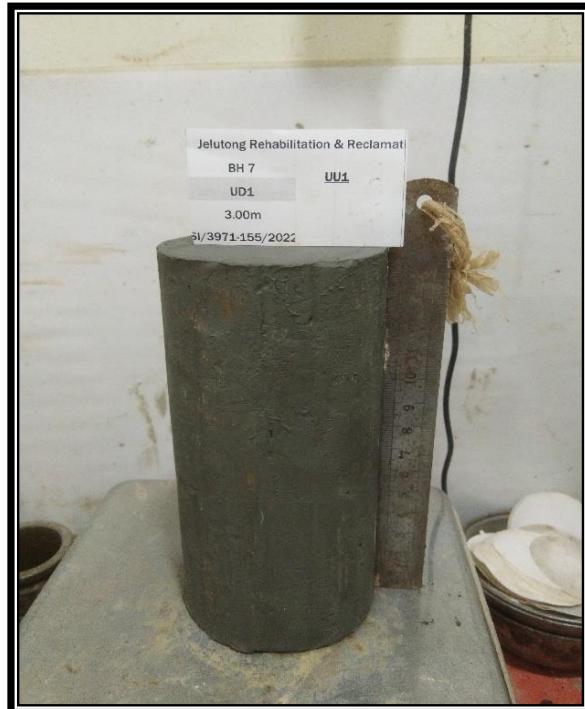


Photo 7 : UU test of BH7 for UD1-S1 (Before)



Photo 8 : UU test of BH7 for UD1-S1 (After)

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.

### Consolidated Undrained

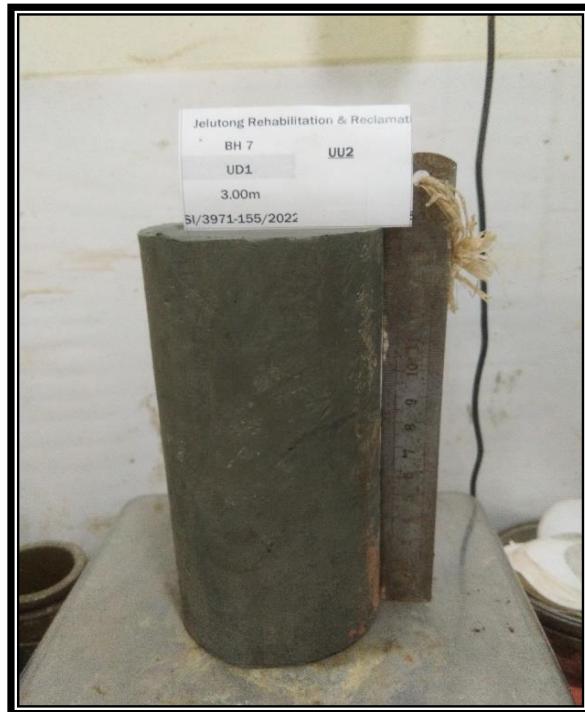


Photo 9 : UU test of BH7 for UD1-S2 (Before)

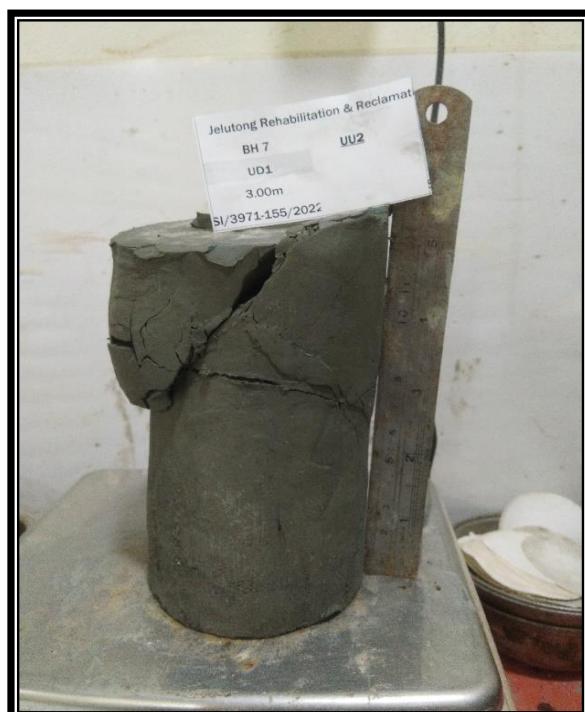


Photo 10 : UU test of BH7 for UD1-S2 (After)

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.

### Consolidated Undrained

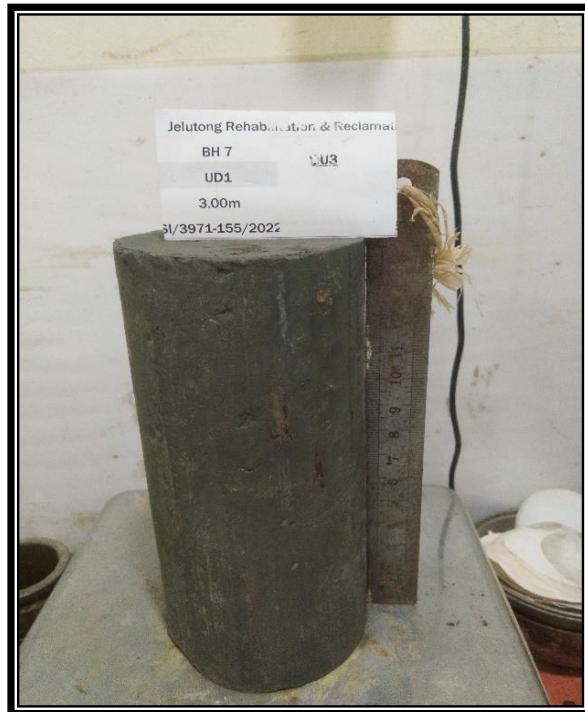


Photo 11 : UU test of BH7 for UD1-S3 (Before)



Photo 12 : UU test of BH7 for UD1-S3 (After)

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.

### Consolidated Undrained



Photo 13 : UU test of BH8 for UD1-S1 (Before)



Photo 14 : UU test of BH8 for UD1-S1 (After)

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.

### Consolidated Undrained



Photo 15 : UU test of BH8 for UD1-S2 (Before)



Photo 16 : UU test of BH8 for UD1-S2 (After)

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.

### Consolidated Undrained



Photo 17 : UU test of BH8 for UD1-S3 (Before)

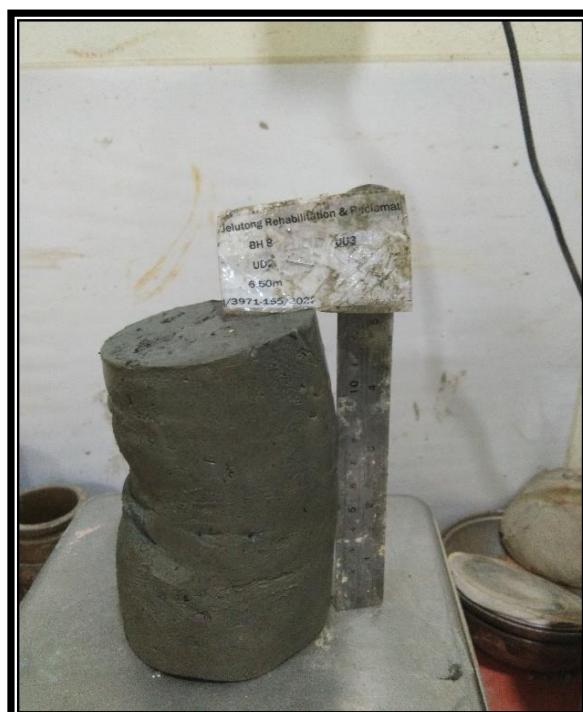


Photo 18 : UU test of BH8 for UD1-S3 (After)

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.

### Consolidated Undrained



Photo 19 : UU test of BH8 for UD2-S1 (Before)



Photo 20 : UU test of BH8 for UD2-S1 (After)

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.

### Consolidated Undrained

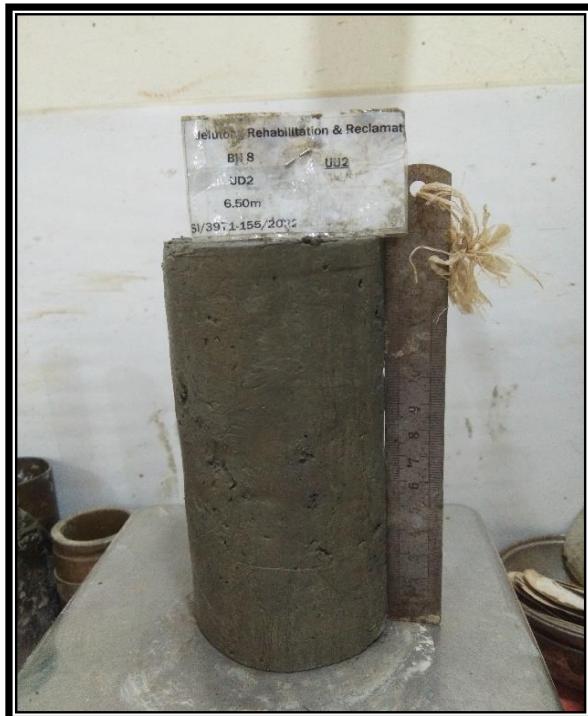


Photo 21 : UU test of BH8 for UD2-S2 (Before)

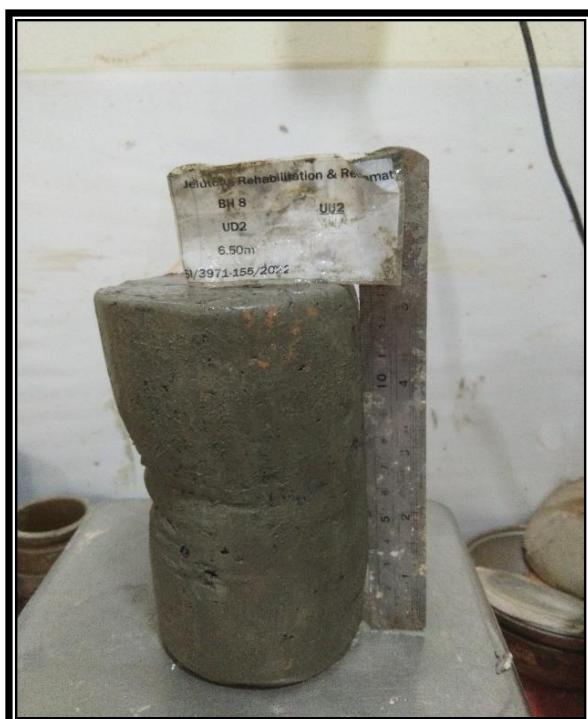


Photo 22 : UU test of BH8 for UD2-S2 (After)

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.

### Consolidated Undrained

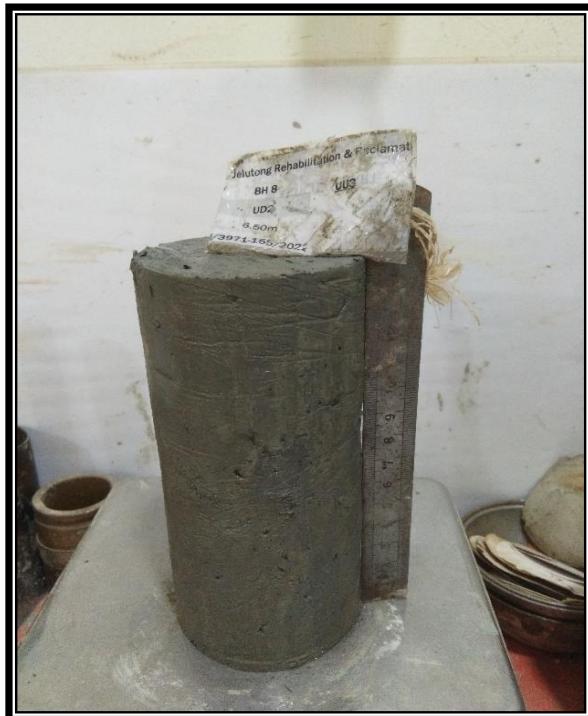


Photo 23 : UU test of BH8 for UD2-S3 (Before)



Photo 24 : UU test of BH8 for UD2-S3 (After)

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.

### Unconfined Compression Strength Test



Photo 1 : UCT test of BH1 for UD2 (Before)



Photo 2 : UCT test of BH1 for UD2 (After)

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.

### Unconfined Compression Strength Test

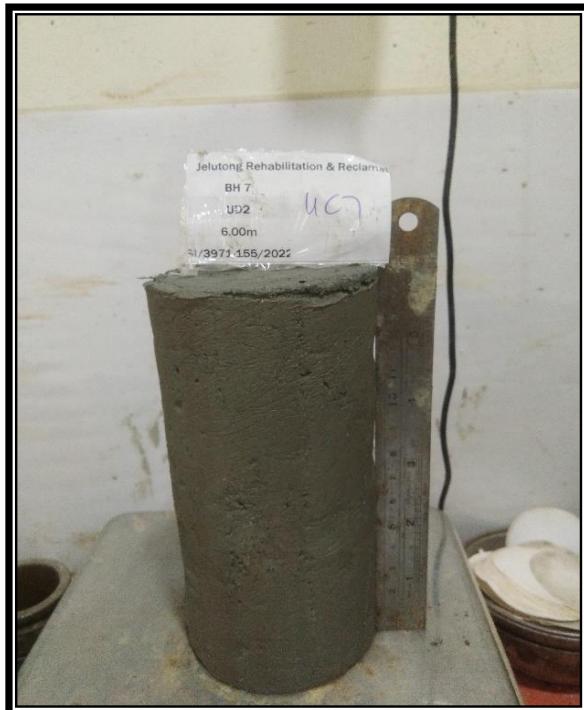


Photo 3 : UCT test of BH7 for UD2 (Before)

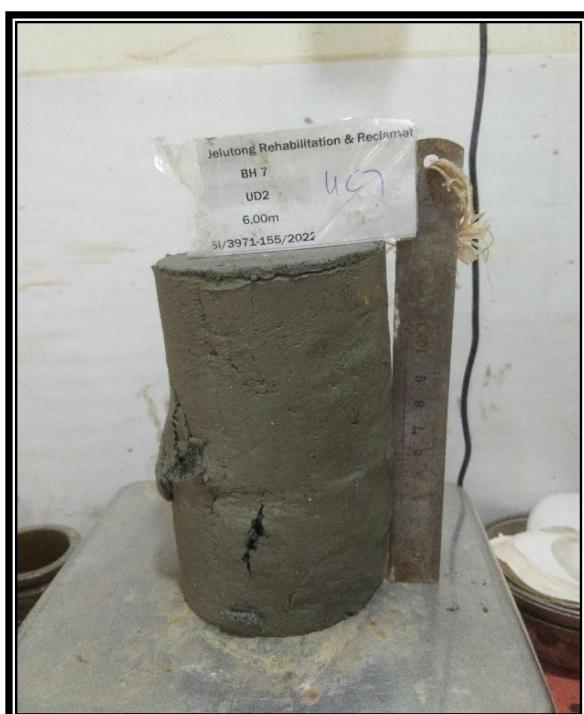


Photo 4 : UCT test of BH7 for UD2 (After)

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.

### One Dimensional Consolidation

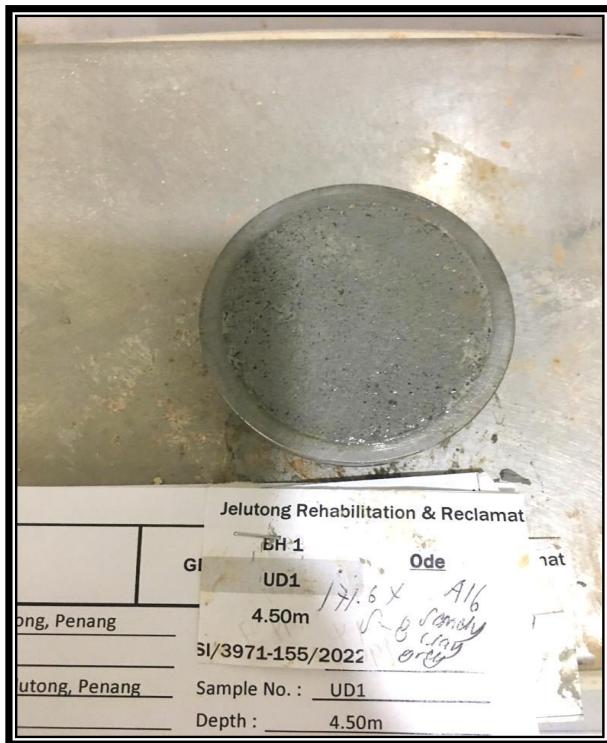


Photo 1 : BH1 - UD1 at depth 4.50m



Photo 2 : BH1 - UD2 at depth 14.50m

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.

### One Dimensional Consolidation



Photo 3 : BH3 - UD1 at depth 3.00m

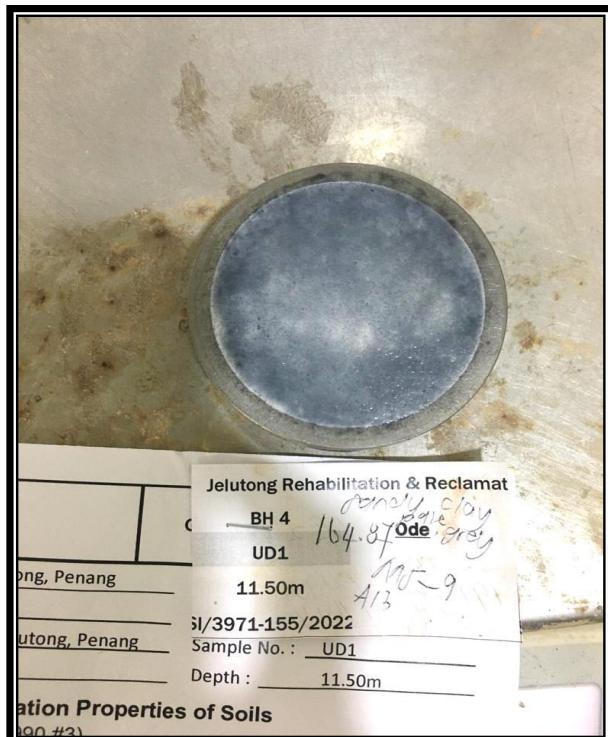


Photo 4 : BH4 - UD1 at depth 11.50m

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.

### One Dimensional Consolidation

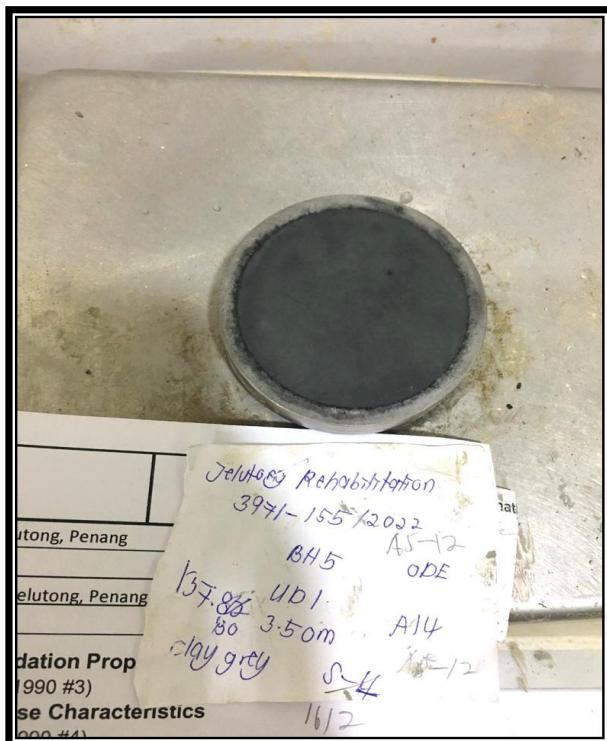


Photo 5 : BH5 - UD1 at depth 3.50m

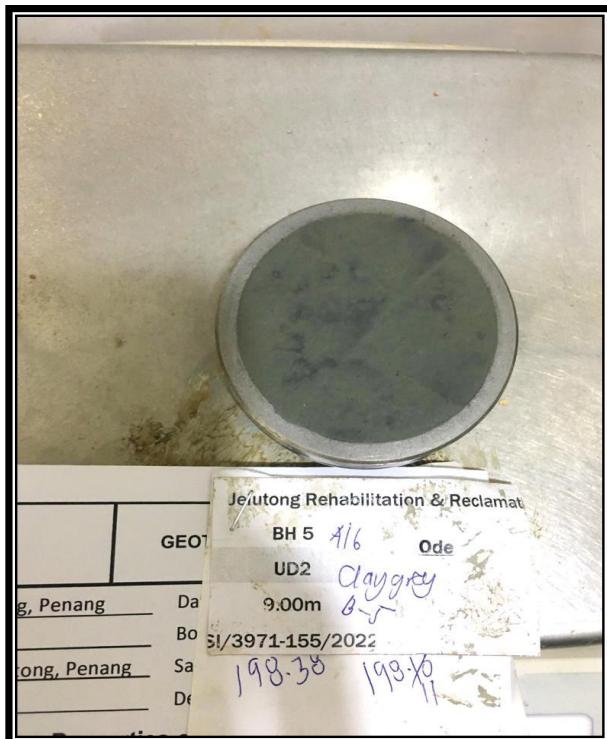


Photo 6 : BH5 - UD2 at depth 9.00m

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



Customer : Messrs. PLB Engineering Sdn. Bhd.

### One Dimensional Consolidation

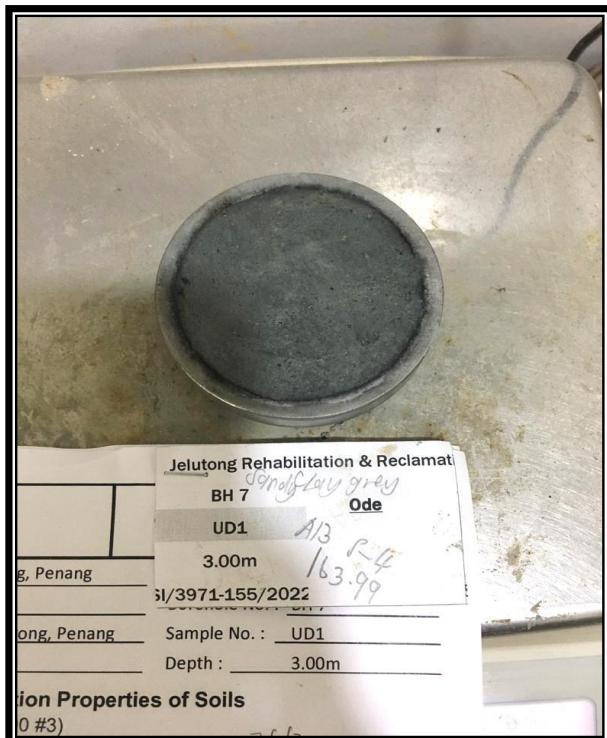


Photo 7 : BH7 - UD1 at depth 3.00m

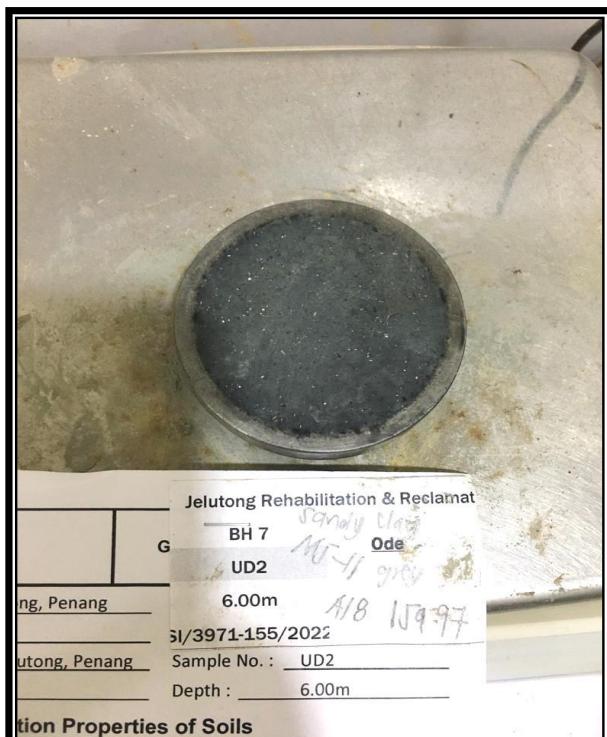


Photo 8 : BH7 - UD2 at depth 6.00m

Project : Subsurface Investigation Works for Jelutong Rehabilitation and Reclamation at Jelutong, Penang.



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### One Dimensional Consolidation

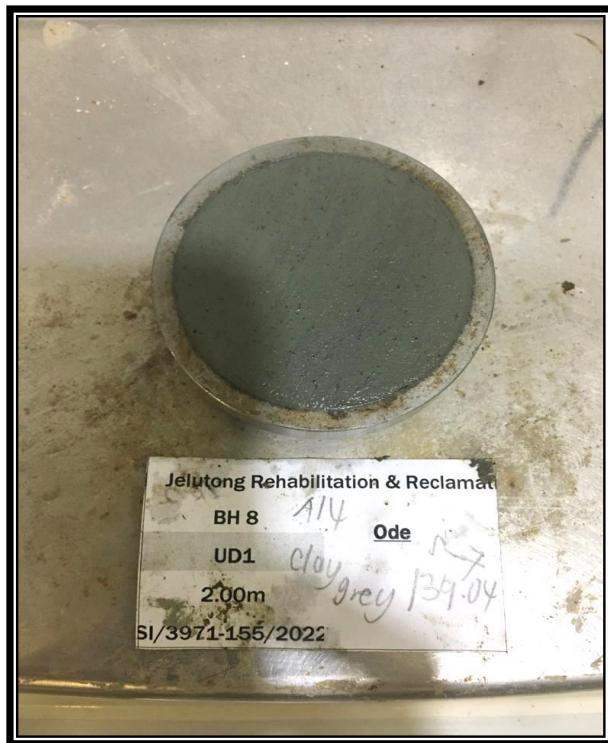


Photo 9 : BH8 - UD1 at depth 2.00m

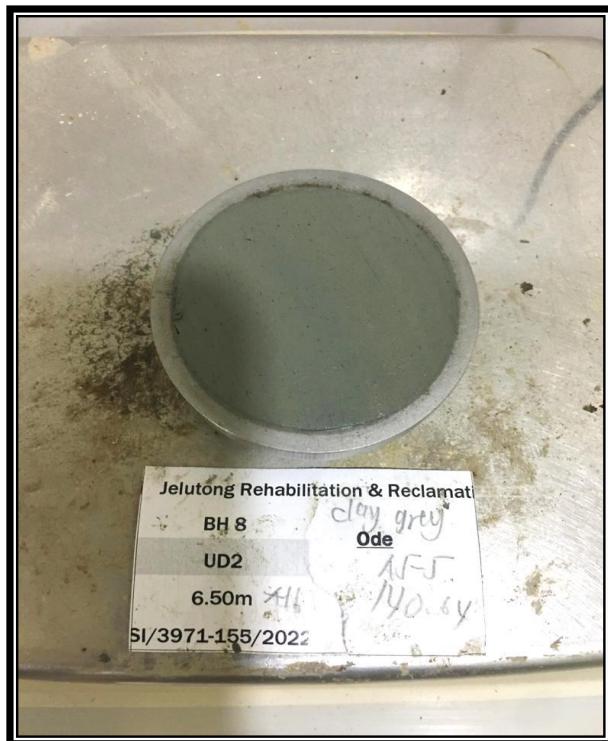


Photo 10 : BH8 - UD2 at depth 6.50m