



**DEPARTMENT OF BUILDING  
UNIVERSITI TEKNOLOGI MARA  
(PERAK)**

**METHOD AND PROCEDURE FOR PILE LOAD TEST AT PTD 182919,  
BUKIT INDAH, ISKANDAR PUTERI,  
JOHOR**

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**(PERAK)**  
**DECEMBER 2019**

It is recommended that the report of this practical training provided

**By**

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**entitled**

**Method and Procedure of Pile Load Test in Ptd 182919, Bukit Indah, Iskandar Puteri  
Johor.**

Accepted in partial fulfillment of requirement has for obtaining Diploma In Building.

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**(PERAK)**

**DECEMBER 2019**

**STUDENT'S DECLARATION**

I hereby declare that this report is my own work, except for extract and summaries for which the original references stated herein, prepared during a practical training session that I underwent at Chuan Luck Piling Sdn. Bhd. for duration of 20 weeks starting from 5 August 2019 and ended on 13 December 2019. It is submitted as one of the prerequisite requirements of BGN310 and accepted as a partial fulfillment of the requirements for obtaining the Diploma in Building.

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Date :

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## **ABSTRACT**

Piles are designed to transfer any dead or live load of superstructure to the deepest state of soil. Reinforcement concrete piles or RC piles are one of the common pile use and design by many analyses and using many formulas. But due to the uncertainties of problem such as soil behaviour, these piles need to be tested using several tests such as maintain load test to identify the strength of the pile. A case study of maintain load test of RC piles is conducted and the data and result are collected through settlement curves. The main objective of this case study is to determine the method construction for maintaining load test, time taken to complete the test and to determine the hazard occur during the test conducted. The findings show a method of test pile is constructed and been observe the load.

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# CHAPTER 1.0

## INTRODUCTION

### 1.1 Background and Scope of Study

Piles are designed to transfer the load of the superstructure to the hardest state of soil strata. Therefore, the pile is very vital in the construction industry as it is the main element in construction as substructure which is mainly connected with the foundation. Reinforcement concrete piles are usually designed by many analyses and using many empirical formulas. But due to a great degree of prevailing uncertainties of subsoil behavior, variety of strata in the same site, diversity in the procedure of construction applied at the site, piles are needed to be tested to double or so of the design load obtained by static design calculation (Fatema Sultana, 2016).

There are two types of load test in the construction industry, which is a static load test or mainly call as maintained load test and dynamic load test. But due to highly criticize in some pile-design literature, pile dynamic load test will not really effective for the characteristic and the physicality of the soil. Therefore, the maintained load test is mainly used to determine the load bearing capacity in purpose site. It is loaded test which each increment or decrement of load is held constant either for a definite period of time or until the rate of settlement or rebound falls to a specified value. There are two types of static load test which is maintained load test and ultimate load test.

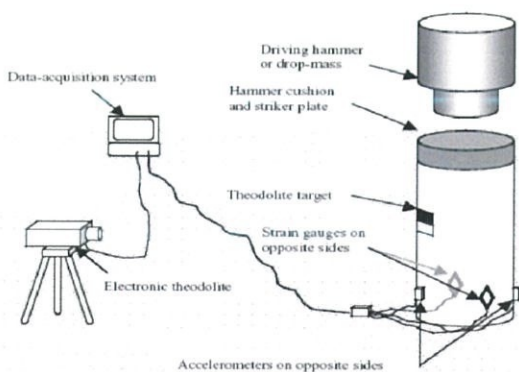


Figure 1.1 Dynamic Load test

Source: <https://www.semanticscholar.org>

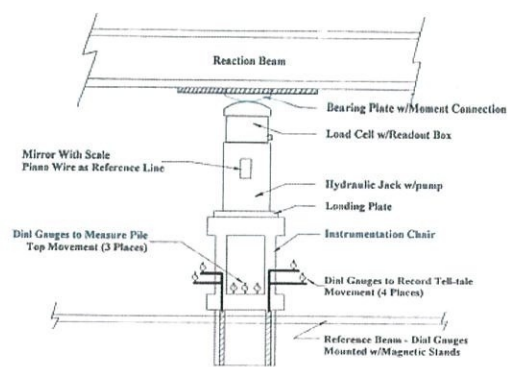


Figure 1.2 Static Load test

Source: <https://www.fhwa.dot.gov>

Since piles are usually installed in groups, it is important to know the behaviour of pile groups under axial loading (Nabil F. Ismael, 2011). This work is including the ultimate bearing capacity and it is important to know the settlement of pile groups compared to the single pile. But in some case, such as high rise building, some pile requires short space and short time to identify the bearing and load capacity of the pile and that is why maintained load test is used in most of the static load test in Malaysia construction technology. Maintain Load Test is necessary to ensure the pile that was driven could take the design load of the structure. During this test, load would be applied on the selected pile and the pile settlement under the acting load would be recorded.

The advantage of maintaining load test is this method is acceptable and convenience and also widely use in Malaysia construction industry. In order to establish this, the test is conducted under the direction of an experience and competent contractor's supervisor with approved test equipment and test procedure as specific hereinafter. One of the main components of maintaining load test is hydraulic jack and load measuring device. The load test usually applied by means of hydraulic jack and load measuring device mounted together. When preparing this load test, the work needs to be carried out in a safe manner and against any likely hazard.



Figure 1.3 Side view of Static Load test (Kentledge)

## **1.2 Objectives**

There are many types of pile load test, however, the main objective is to discover the method and procedure of maintain load test in Malaysia.

1. To determine method and procedure for pile's maintain load test
2. To identify types of equipment and machinery used for maintain load test
3. To identify hazards and purposed a risk control related to maintain load test work

## **1.3 Scope of Study**

In this report, the information contains the method statement of maintained load test, procedure and the hazard and risk assessment occur during the maintained load test construction located at PTD 182919, Bukit Indah, Iskandar Puteri, Mukim Pulai, Daerah Johor Bahru, Johor Darul Takzim. The site surrounded with all public facilities such as bank, restaurant, and petrol pump station. The planning in this report will also include items like below:

1. Equipment and Machineries used
2. Preparing and carrying out the construction works



## 1.4 Method of study

### i) Interview

Several interview had been made by project director, project manager, site supervisor, site surveyor and engineer on how to conduct and run the construction proses. Also interviewed them regarding the maintained load test while doing an inspection and observation. General worker also contributes in giving such information about the method statement of the work involved. This interview had been going on at the construction site, at the temporary office of the company. All the data had been stored in a noted book or computer for further task and assessment.

### ii) Observation

The observation had been going every day on the activity during practical. The observation involved the construction of maintaining load test and the data recording by the supervisor. Toolbox meeting is held on every Tuesday along with project directors and safety supervisor will give information about safety and health. All this activity is recorded by picture, videos and safety report for the advance use in company and the progress of the ongoing project.

### iii) Documents Review

Important documents such as daily report, piling summary and piling record form is copied and kept for further use. The literature studied also had done by using the construction drawing such as piling point plan and pile cap plan. Also include the maintaining load test sketches that were given by site supervisor. All of the data shows every detail of the element and measurement of the piling including the try pile for maintaining load test installation.



## CHAPTER 2.0

### COMPANY BACKGROUND

#### 2.1 Introduction of Company

Chuan Luck Sdn. Bhd formerly known as Chuan Luck Piling & Construction Sdn Bhd) has built a large legacy in the Southern Region of Peninsular Malaysia since 1980, providing service in piling & civil engineering works. This company located at PTD 102015, Jalan Seelong, 81400, Mukim Senai, Kulai, Johor and started their journey from 1995 until now. From only having 3 staff, Chuan Luck piling right now has tons of workers and projects done and ongoing in every Johor Bahru state. The project that has been done by Chuan Luck Piling Sdn. Bhd. were including the construction of substructure for school, residential, commercial buildings, high-rise buildings, bridges and government buildings. In recent years, ChuanLuck Sdn. Bhd. had been honoured to contributed to the development of Johore, especially in the Iskandar region.

Chuan Luck Sdn. Bhd. also has a business unit, which is C L Pile Sdn Bhd and both of the company provided service such as one stop service for piling works, competitively priced & extensive service portfolio and Customized service. This company is registered under the CIDB MALAYSIA and MOODY INTERNATONAL CERTIFICATION.



Figure 2.1 Chuan Luck Piling Sdn. Bhd Maps.

Source: Google Maps



Figure 2.2 CIDB MALAYSIA and MOODY INTERNATIONAL registration.  
Source: Chuan Luck Piling Sdn. Bhd.

C L pile Sdn. Bhd. is established to extend this company strength and experience in piling industry. C L pile Sdn. Bhd. manufacture Reinforce Concrete (RC) Square Piles to meet demands of the construction industry promptly, efficiently and economically. C L Piles are not only used in Malaysia but also exported to Singapore and Indonesia. The objective of both companies in the same unit is to offer highly efficient and reliable services to the customers as much as involved in a wide range of projects. Chuan Luck current project, which is ongoing is located at Bukit Indah, Johor (*Cadangan Pembangunan Berstrata Komersial Bercampur (Skytree)*). Not also for piling works, Chuan Luck also involved in civil engineering works.



Figure 2.3 C L Pile Qualification  
Source: Chuan Luck Piling Sdn. Bhd.



Figure 2.4 Chuan Luck Piling Sdn. Bhd Logo  
Source: Chuan Luck Piling Sdn. Bhd.

## 2.2 Company Profile

1.	Company name	Chuan Luck Piling Sdn. Bhd.
2.	Company address	PTD 102015, Jalan Seelong, 81400, Mukim Senai, Kulai, Johor.
3.	Year of establishment	1980
4.	Contact	Tel : (Hunting Line) Fax :
5.	CIDB registration number	0120021101-JH076798
6.	Scope of work	- Piling Construction - Pre boring Works - Civil Engineering Works - RC pile manufacturing
7.	Company vision	We committed to provide one stop service for piling works, competitively priced & extensive service portfolio and Customised for a better service
8.	Company mission	1. To ensure the evaluation of sub-contractor and supplier to our services at an average rate of not less than 90%.  2. Achieving minimum 85% client satisfaction in all Activities  3. Ensure “Zero” Client complaint / Government compound on Occupational Health & Safety issue per year

Table 2.2: Company Profile of Chuan Luck Sdn. Bhd

Source: Chuan Luck Piling Sdn. Bhd.

### **2.3 Organization Charts**

This organization charts shows the position of every staff contributes in Chuan Luck Piling Sdn. Bhd for centuries. The back bones in this company is Mr Tang Bong Kiek the chairman, Mr Tang Lee Chong the managing director, Mr Chung Teck Lun the project project director, Mr Chong Yoong Fat the machineries director.

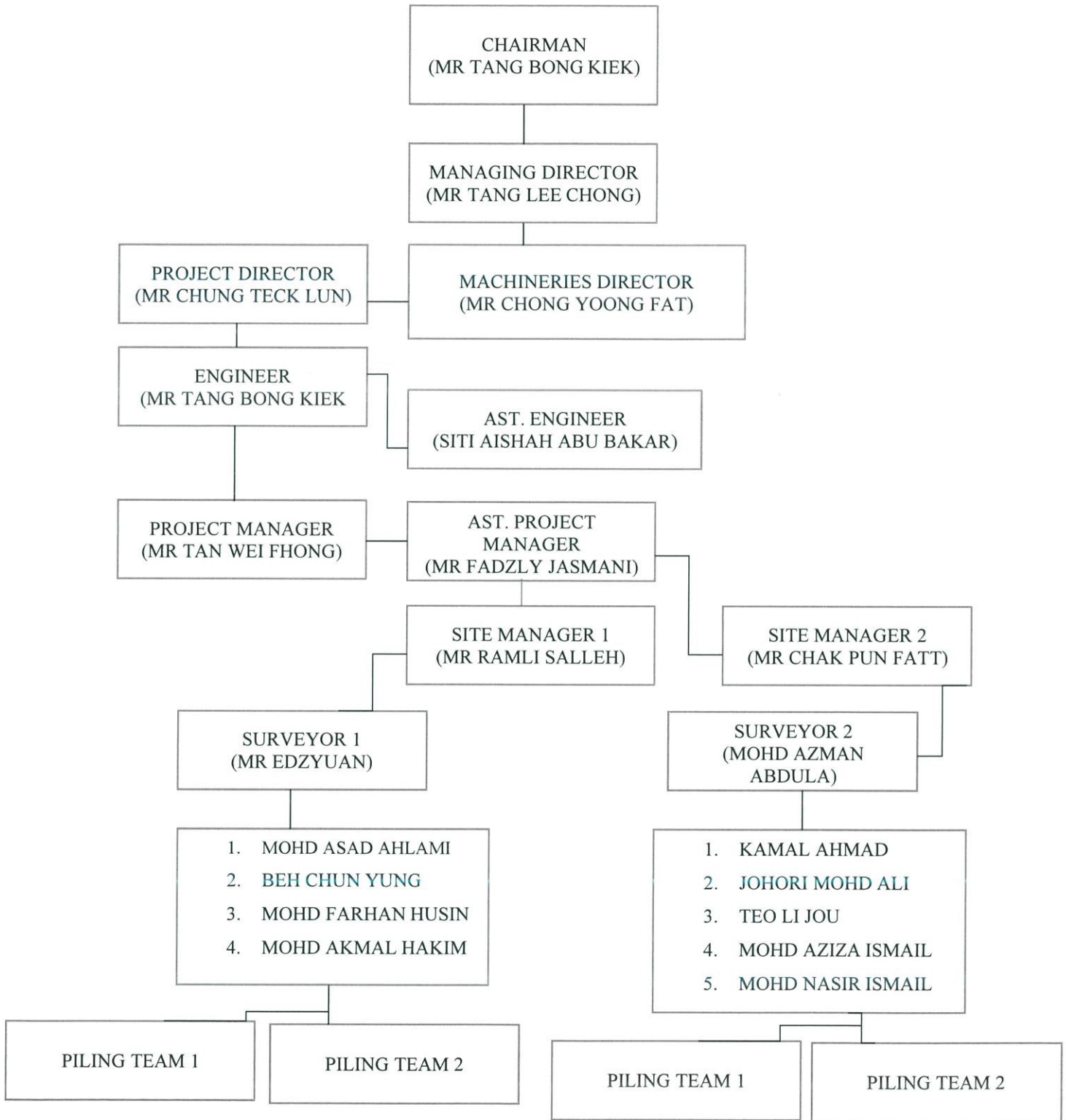
Followed by Chuan Luck Piling Sdn. Bhd Engineering team conducted by Ir. Soo Wee Siang, Assistant Engineer Cik Aishah Abu Bakar, Project Manager Mr Tan Wei Fhong, Assistant Project Maneger Mr Fadzly Jasmani, Site Manager Mr Ramli Salleh and Mr Chak Pun Fatt.

Chuan Luck Piling Sdn. Bhd supervisor team conducted by Ramli Salleh is consisting Mohd Asad Ahlami, Mohd Farhan Hussin, Beh Chun Yung and Mohd Akmal Hakim, and Surveyor Team by Mr Edzyuan and Chain Boy Mohd Syafiq Yahya.

Supervisor Team conducted by Chak Pun Fatt consisting of Kamal B. Ahmad, Johari B. Mohd Ali, Teo Lii Jou, Muhd Aziza Ismail and Mohd Nasir B. Ismail, and Surveyor Team by Mr Mohd Azman Abdula and Chain Boy Mohd Shafiq Abdula.



**Site Organization Chart of Chuan Luck Piling Sdn. Bhd.**





## 2.4 List of completed Projects

Year	Major Projects	Value of work done
2014	PROJECT: CADANGAN MEMBINA & MENYIAPKAN 225 UNIT RUMAH TERES 2 TINGKAT (TYPE C), 250 UNIT RUMAH TERES 2 TINGKAT (TYPE D) DAN 1 UNIT PENCAWANG ELEKTRIK BERKEMBAR SERTA KERJA-KERJA INFRASTRUKTUR BERKAITAN DI ATAS LOT PTD 206999 – PTD 207477, MUKIM PLENTONG, DAERAH JOHOR BAHRU, NEGERI JOHOR DARUL TAKZIM UNTUK TETUAN CAHAYA BUMIMAS SDN BHD	RM 1,200,000.00
2014	THE EXECUTION AND COMPLETION OF PILING WORKS AND RELATED ANCILLARY WORKS FOR 68 UNITS CLUSTER HOUSE, 30 UNITS TOWN HOUSE, AND 1 UNIT GUARDHOUSE AT LOT 141603, JALAN PERKASA 7, TAMAN UNGKU TUN AMINAH, MUKIM PULAI, DAERAH JOHOR BAHRU.	RM 1,600,000.00
2014	20 UNIT KILANG KLUSTER 3 TINGKAT @ PERMAS JAYA SDN BHD.	RM 1,500,000.00
2014	PILING WORKS FOR CADANGAN MEMBINA SEBUAH PEJABAT 2 TINGKAT (BLOK 1), SEBUAH KILANG SETINGKAT (BLOK 2), SEBUAH KILANG SETINGKAT DENGAN PEJABAT 2 TINGKAT (BLOK 3), SEBUAH BANGSAL TERBUKA SETINGKAT (BLOK 4), PONDOK PENGAWAL, KEBUK SAMPAH & RUMAH PAM DAN PENCAWANG ELEKTRIK DI ATAS PTD 204758 (PLO 738), JALAN PLATINUM UTAMA, ZON 12B, KAWASAN PERINDUSTRIAN PASIR GUDANG, MUKIM PLENTONG, DAERAH JOHOR BAHRU, JOHOR DARUL TAKZIM	RM 980,000.00
2014	CONSTRUCTION OF 113 UNITS OF TERRACE HOUSES TYPE AZALEA 1 & 2 AT TAMAN BUKIT TIRAM 3, JOHOR BAHRU, JOHOR.	RM 1,800,000.00
2014	PROPOSED CONSTRUCTION AND COMPLETION OF 76 UNITS DOUBLE STOREY CLUSTER HOUSES TYPE “A & A1”, 44 UNITS DOUBLE STOREY CLUSTER HOUSES TYPE “B & B1”, 6 UNITS DOUBLE STOREY SEMI DETACHED HOUSE TYPE “C” AND 4 UNITS DOUBLE STOREY SEMI DETACHED HOUSE TYPE “D” AT PHASE 3A3A & 3A3B, PARCEL 2, BANDAR PUTRA, MUKIM SENAI-KULAI, JOHOR DARUL TAKZIM.	RM 2,400,000.00

Source: Chuan Luck Piling Sdn. Bhd

### CHAPTER 3.0

## CONSTRUCTIN OF MAINTAINED LOAD TEST IN PTD182919, BUKIT INDAH

### 3.1 Project Background

The project that have been chosen was piling works for *Cadangan Pembangunan Berstrata Komersial Bercampur Skytree yang mengandungi*: -

- I. 1 Blok Pangsapuri Perkhidmatan – Blok A 19 Tingkat (228 Unit)
- II. 1 Blok Pangsapuri Perkhidmatan – Blok B 20 Tingkat (240 Unit)
- III. 5 Tingkat Podium yang melibatkan:
  - a) 2 Tingkat Tempat Letak Kereta Berserta 26 Unit Ruang Perniagaan
  - b) 2 Tingkat Tempat Letak Kereta Berserta Kemudahan Asas
  - c) 1 Tingkat Tempat Letak Kereta Berserta 12 Unit Pangsapuri Perkhidmatan dan Kemudahan

Di atas sebahagian PTD 182919, Bukit Indah, Iskandar Puteri, Mukim Pulai, Daerah Johor Bahru, Johor Daruk Takzim untuk tetuan Bukit Indah (JOHOR) SDN. BHD. The total cost for this piling works is Ringgit Malaysia Five Millions Eight Hundred Seventy Thousand Four Hundred and Seventy-Three (RM 5,870,473.00) only made by JUBM SDN. BHD as the chosen Quantity Surveyor company. The expected duration for this project to be done is 6 month starting from August 2019 and expected to be fully done by January 2020. Chuan Luck Piling Sdn. Bhd. is the Main Contractor for this huge commercial project followed by several participants involves as above: -

Table 3.1: Participant Involved for this project

NO	COMPANY	NAME
1	BUKIT INDAH (JOHOR) SDN. BHD	EN. AHMAD HAIRUL / EN. NOR IZZUDIN
2	JURUTERA JKR SDN. BHD	IR LEE WEI SHONG / MR TAM KIM KUN
3	SITE SUPERVISOR	EN. MOHD HAFIZ MOHD MAZLAM
4	JUBM SDN. BHD	MS. TAN PEI LING / MS. NOOR ZAWANI NORDIN
5	CHUAN LUCK PILING SDN. BHD	MR. CHUNG TECK LUN / MR TAN WEI FHONG

Source: Chuan Luck Piling Sdn. Bhd weekly report

KEY PLAN :

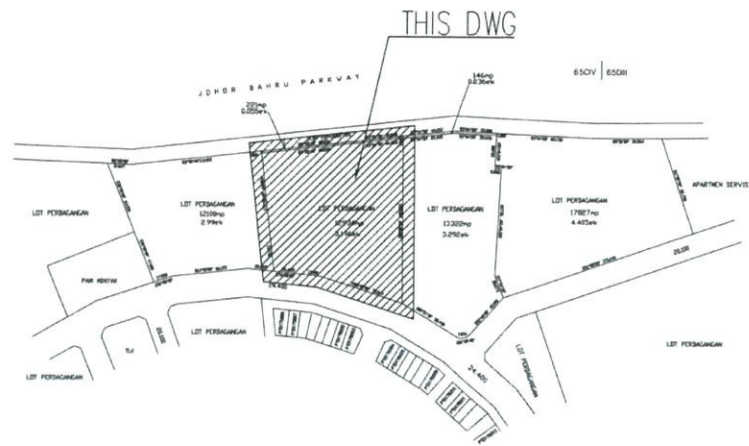


Figure 3.1: Site Key Plan

Source: Chuan Luck Piling Sdn. Bhd (2019)

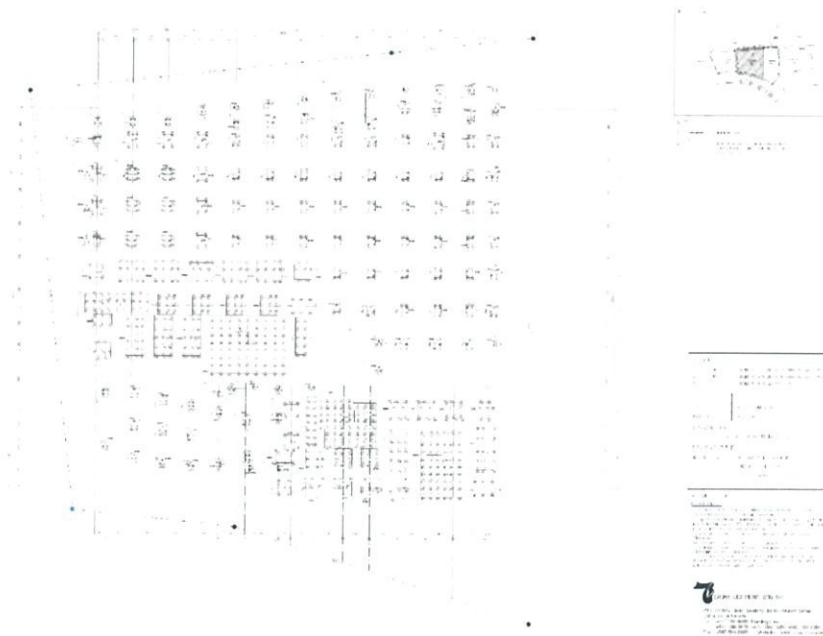


Figure 3.2: Pile Cap drawing Source:  
Chuan Luck Piling Sdn. Bhd (2019)



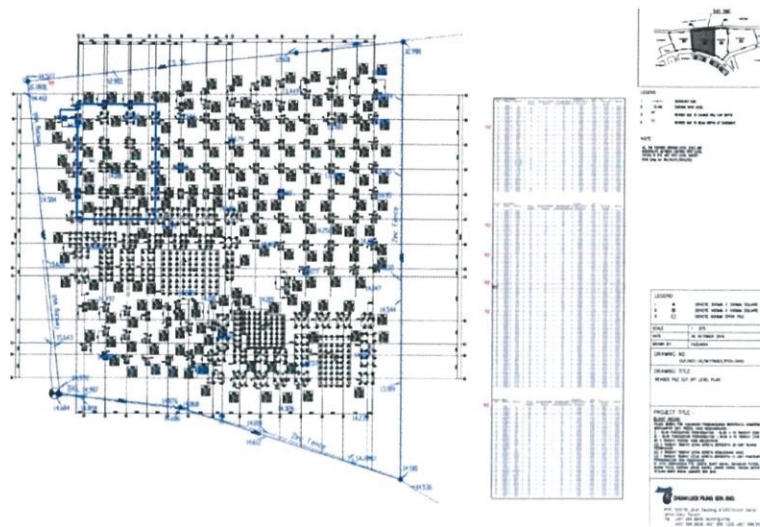
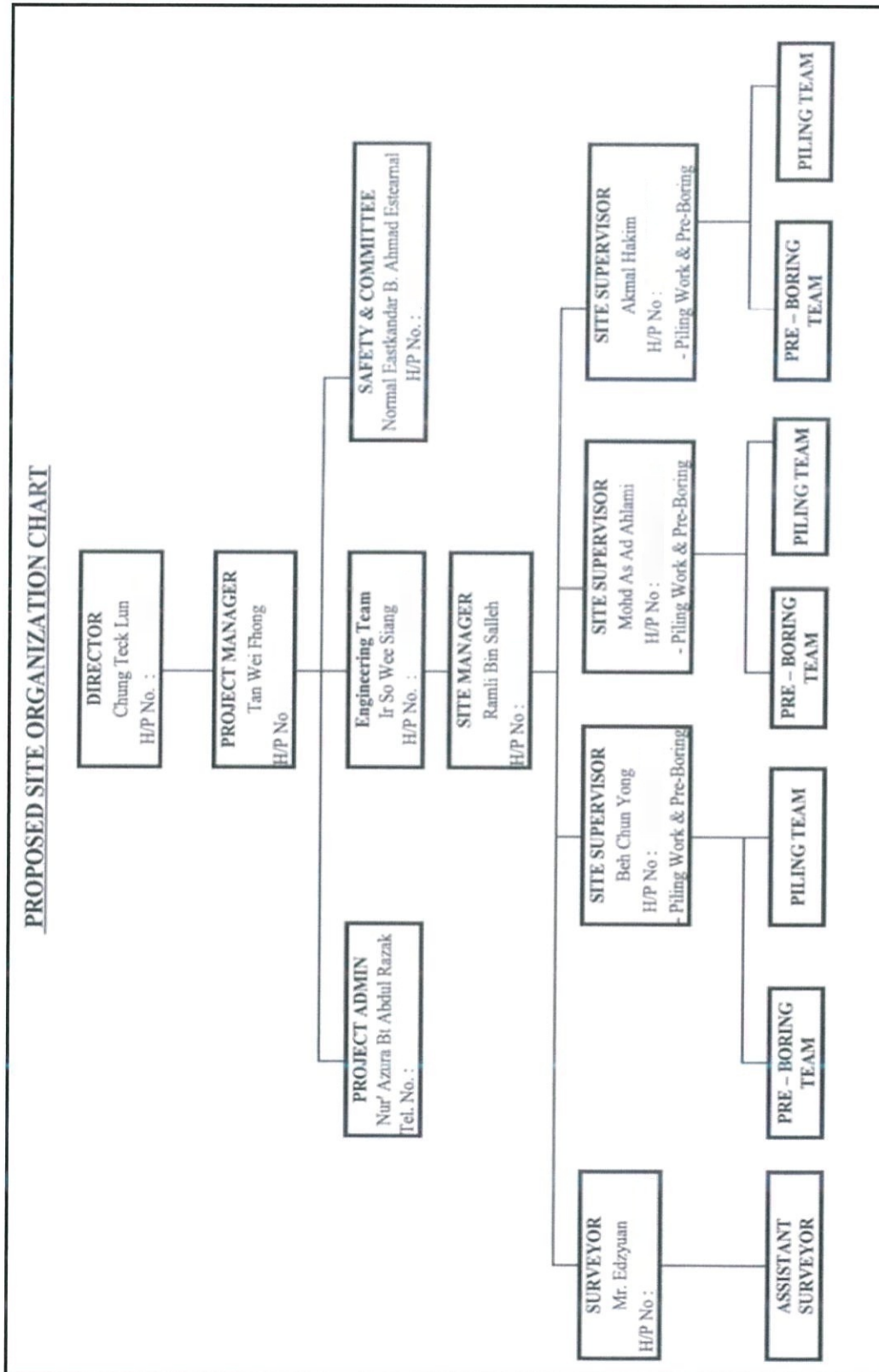


Figure 3.3: Pile Cut Off Level Plan

Source: Chuan Luck Piling Sdn. Bhd (2019)

This project consists of 981 piling points that has to be driven into the the ground. There are 552 nos of 600mm diameter spun pile, 314 nos of 400mm x 400mm square pile and 115 nos of 300mm x 300mm square pile. This project is to build a new home for the new generation mainly called as an apartment. The construction of this apartment includes a car park, a basement, and public facilities such as swimming pool, child playground and many more. In Chuan Luck Piling Sdn. Bhd, there are several people in charge for this mega project. The person is the project director Mr Chung Teck Lun, Mr Tan Wei Fhong as the project manager, Mr Ramli Salleh as the site manager, Project Administration Pn Azura Razak, Engineering Team by Ir Soo Wee Siang, Surveyor team by Mr Edzyuan, Safety & Committee by Mr Normal Eastkandar. Followed by site supervisor Beh Chun Yong, Mohd As' Ad Ahlami, and Akmal Hakim. This project also includes the piling team from Chuan Luck Piling Sdn. Bhd and the pre-boring team by SKL Piling and Construction Sdn. Bhd.

Figure 3.4: Site organization charts



Source: Chuan Luck Piling Sdn. Bhd (2019)



## 3.2 Case Study

### 3.2.1 Maintain Load Test

Referring to the title, there are two types of load test use in the construction of my project. The first one is Pile Drive Analysis and Maintain Load Test using kentledge. Throughout the whole project, the most highlighted test is Maintain Load test as to do the inspection together with the supervisor team and several general workers. There are 6 total number of load test that is done in the purpose site. All the load test is done by the categorizing such type consisting of 600mm diameter of Spun pile, 300mm x 300mm RC pile and 400mm x 400mm RC piles. I was given a chance to conduct the load test of the spun pile at point number 374.

Maintain Load test is mainly done by all the construction site to check the ability of the pile whether they are suitable for the required design. This is also a loading test in which increment and or decrement of load held constant either for a defined period of time or until the rate of settlement or rebound falls to a specific value. This are the one and only method that has been considering could achieve the best result according to **JKR Standard Specification For Building Works 2014 – section C: Foundation Works and Works Below Lowest Floor Level**. The test is done on a working spun pile, and the preparation this maintain load test is carried out in a safe manner to protect against likely hazard. On this test, the kentledge is use as the dead weight and reaction system in a loading test which to be the vital material in for the test procedure.

The kentledge have the adequate weight to resist load up to 1.1 times the maximum load test. This kentledge is supported on cribwork, beams or other supporting structure that dispose at the test pile, so its centre of gravity is on the axis of the pile. The kentledge also could not be directly on the test pile, and the distance from the edge of the test pile to the nearest part of the support to the kentledge stack in contact with the ground is not less to be less than 1.2m.



Figure 3.5: Kentledge

### 3.2.2 Setting out Pile point

The setting out pile point of the test and the whole project is done by Chuan Luck Piling Sdn. Bhd. Surveyor, Mr Edzyuan and his chain boy Mohd Syafiq Yahya. The tools use for the work is Total Station and Mini Prism. After Mr Edzyuan had gained the required point using the total station, Mohd Syafiq will mark the purpose point using a steel survey P.E.G. Later, the boring machine owned by the subcontractor of this project from SKL Piling and Construction Sdn. Bhd. will forwardly bore the point that has been set up at P.E.G using the pre-boring machine.



Figure 3.6: Setting out pile point using Total Station



Figure 3.7: Mini prism and steel survey P.E.G

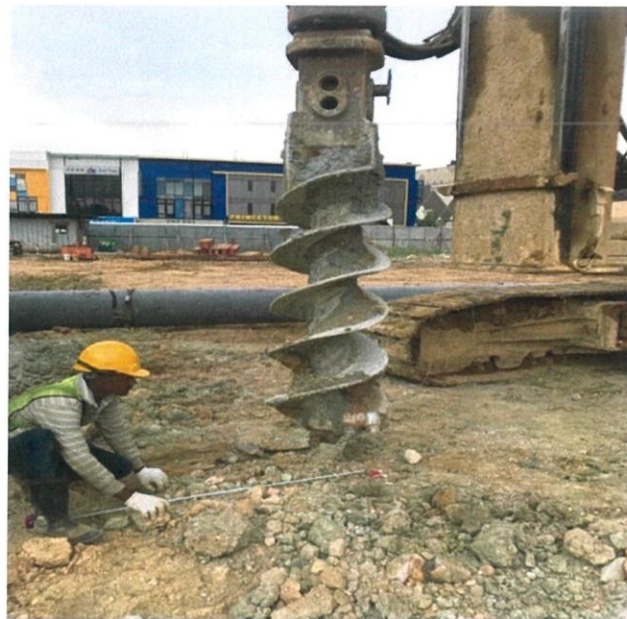


Figure 3.8: Pre-boring work by sub contractor SKL Piling & Construction Sdn. Bhd.



### 3.2.3 Test Pile Installation

The test pile use of this test is 600mm diameter spun pile at point number 374, using an extension pile in. It is installed and penetrated 17m into the soil and did not achieve the pre-boring, which is 23.7m depth to the ground. This pile is chosen to be tested to obtain whether it is safe to use only the extension pile for the upcoming pile installation consisting 72 points on the same pile cap. In other words, this test is to determine whether the pile is in adequate design for the proposed project. The test pile is installed using a Hydraulic Hammer piling machined owned by Chuan Luck Piling Sdn. Bhd on 28 august 2019. The specification of the Hydraulic Hammer Piling machine is described as below: -

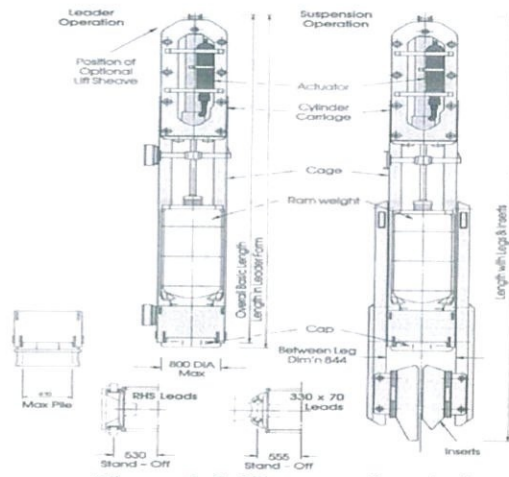


Figure 3.9: Hammer description

Source: Chuan Luck Piling Sdn. Bhd (2019)

357-SERIES HAMMERS			
Rated Size	tonne	3	5
Ram Weight - Standard segments from other segments can be supplied to special order	tonne	66.10	154.30
Ram Size	Metric	1000mm	1543mm
Maximum Potential Energy	Kj/m	3600	8400
	ft-lb	26420	61700
Blowrate of max stroke when powered by RSP Hydraulic	blow/m	46	40
Hydraulic oil pressure required	bar	160	210
Hydraulic oil flow rate required	lit/min	2000	3000
	imp gpm	54	80
Basic Hammer Weight	tonne	8.28	7.25
Shipping Cap Weight (Basic Full Form)	tonne	11.00	10.90
Overall Length Basic Hammer with full cap	Metric	6.30	6.80
Overall Width Basic Hammer	Metric	0.76	0.76
Overall Depth Basic Hammer	Metric	0.82	0.82
Compressed hose weight (full of oil)	Kg/Metric	10	10
Weight of Hammer Assembly (including hoses) on leader with basic full cap	tonne	6.30	6.80
Length of Hammer Assembly on leader	Metric	5.20	5.80
Weight of Hammer Assembly (including hoses) in suspended operation	tonne	11.00	11.00
Length of Hammer Assembly in suspended operation	Metric	7.00	7.50
Length of Fly Engagement in large & inserts when lifting	Metric	1.44	1.44

HYDRAULIC PUMP FOR 357-SERIES			
Dimensions	2.4 Metre long x 1.1 Metre wide x 1.9 Metre high		
Operating Pressure	2.07 MPa (300 psi)		
Variable flow of high output	100 l/min (26.4 US gal/min)		
Engine power - indirect	118 kw (158 HP)		
Engine (turbocharged diesel)	Deutz BF6M1213C		
Fuel tank Capacity nominal	230 litres (51 Imperial gallons)		
Hydraulic Oil Capacity nominal	300 litres (66 Imperial gallons)		
Hydraulic pump weight	Dry 2.0 tonne (4400 lb) Full 2.45 tonne (5400 lb)		

Dimensions of Basic machine			
Dimension	350S-BSM	D40S-90M	D60S-100M
A. Cap width	3900	3900	3900
B. Cap height	2800	2800	2800
C. Guide height (Maximum)	3150	3150	3150
D. Guide height (Minimum)	2700	2700	2700
E. Feet on height	140	140	140
F. Feet on center to basic attachment	1000	1000	1000
G. Feet on center to 5.75 attachment	1200	1200	1200
H. Feet on center to 6.30 attachment	1300	1300	1300
I. Guide clearance (Maximum)	800	800	800
J. Guide clearance (Minimum)	400	400	400
K. Cap width	3300	3300	3300
L. Cap height	2800	2800	2800
M. Cap width	3000	3000	3000
N. Cap height	2400	2400	2400
O. Cap center to basic attachment	1000	1000	1000
P. Cap center to 5.75 attachment	1200	1200	1200
Q. Cap center to 6.30 attachment	1300	1300	1300
R. Cap width	3000	3000	3000
S. Cap height	2400	2400	2400
T. Cap center to basic attachment	1000	1000	1000
U. Cap center to 5.75 attachment	1200	1200	1200
V. Cap center to 6.30 attachment	1300	1300	1300

Guide pipe center to swing center distance			
Dimension	350S-BSM	D40S-90M	D60S-100M
A. Cap width	3900	3900	3900
B. Cap height	2800	2800	2800
C. Guide height (Maximum)	3150	3150	3150
D. Guide height (Minimum)	2700	2700	2700
E. Feet on height	140	140	140
F. Feet on center to basic attachment	1000	1000	1000
G. Feet on center to 5.75 attachment	1200	1200	1200
H. Feet on center to 6.30 attachment	1300	1300	1300
I. Guide clearance (Maximum)	800	800	800
J. Guide clearance (Minimum)	400	400	400
K. Cap width	3300	3300	3300
L. Cap height	2800	2800	2800
M. Cap width	3000	3000	3000
N. Cap height	2400	2400	2400
O. Cap center to basic attachment	1000	1000	1000
P. Cap center to 5.75 attachment	1200	1200	1200
Q. Cap center to 6.30 attachment	1300	1300	1300
R. Cap width	3000	3000	3000
S. Cap height	2400	2400	2400
T. Cap center to basic attachment	1000	1000	1000
U. Cap center to 5.75 attachment	1200	1200	1200
V. Cap center to 6.30 attachment	1300	1300	1300

Available leader size and leader self-erection limit			
Model	350S-BSM	D40S-90M	D60S-100M
A. Cap width	3900	3900	3900
B. Cap height	2800	2800	2800
C. Guide height (Maximum)	3150	3150	3150
D. Guide height (Minimum)	2700	2700	2700
E. Feet on height	140	140	140
F. Feet on center to basic attachment	1000	1000	1000
G. Feet on center to 5.75 attachment	1200	1200	1200
H. Feet on center to 6.30 attachment	1300	1300	1300
I. Guide clearance (Maximum)	800	800	800
J. Guide clearance (Minimum)	400	400	400
K. Cap width	3300	3300	3300
L. Cap height	2800	2800	2800
M. Cap width	3000	3000	3000
N. Cap height	2400	2400	2400
O. Cap center to basic attachment	1000	1000	1000
P. Cap center to 5.75 attachment	1200	1200	1200
Q. Cap center to 6.30 attachment	1300	1300	1300
R. Cap width	3000	3000	3000
S. Cap height	2400	2400	2400
T. Cap center to basic attachment	1000	1000	1000
U. Cap center to 5.75 attachment	1200	1200	1200
V. Cap center to 6.30 attachment	1300	1300	1300

Figure 3.10: Piling machine description

Source: Chuan Luck Piling Sdn. Bhd (2019)



Figure 3.11: Pile installation at point number 374



Figure 3.12: Nitomortar is added to harden the pile surface

After the pile is successfully driven into the ground and if a test is required on the working pile, the contractor is needed to be prepare the pile for testing to the approval of the S.O (Order Management System). For each working pile which is to be tested, a detailed record for the driving pile is made and submitted also to the S.O before the next afternoon of a working day.



### 3.2.4 Setting out kentledge

The works are then continued with the preparation of the kentledge access to the test point. The kentledge is moved by using a mobile crane, operated by Mr Gunashegaran as the machine pilot. The kentledge use for this 600mm spun pile maintain load test is 4.5tons per block, as shown as below purpose drawing.



Figure 3.13: Block arrangement using crawler crane

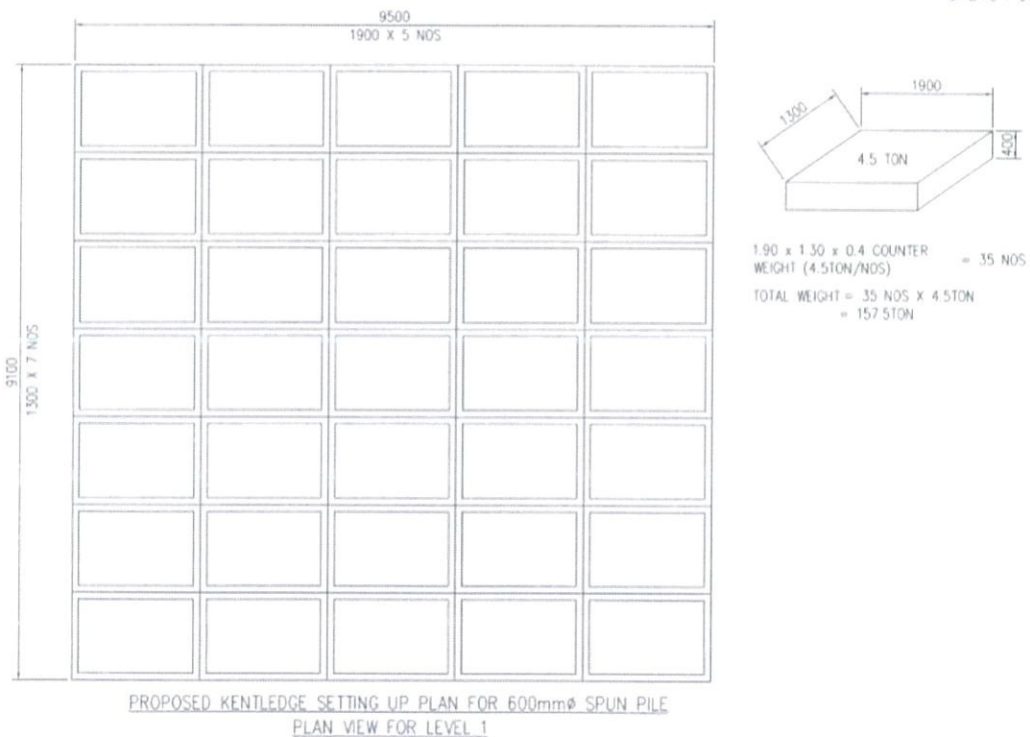


Figure 3.14: Setting-up kentledge drawing

Source: Chuan Luck Piling Sdn. Bhd (2019)

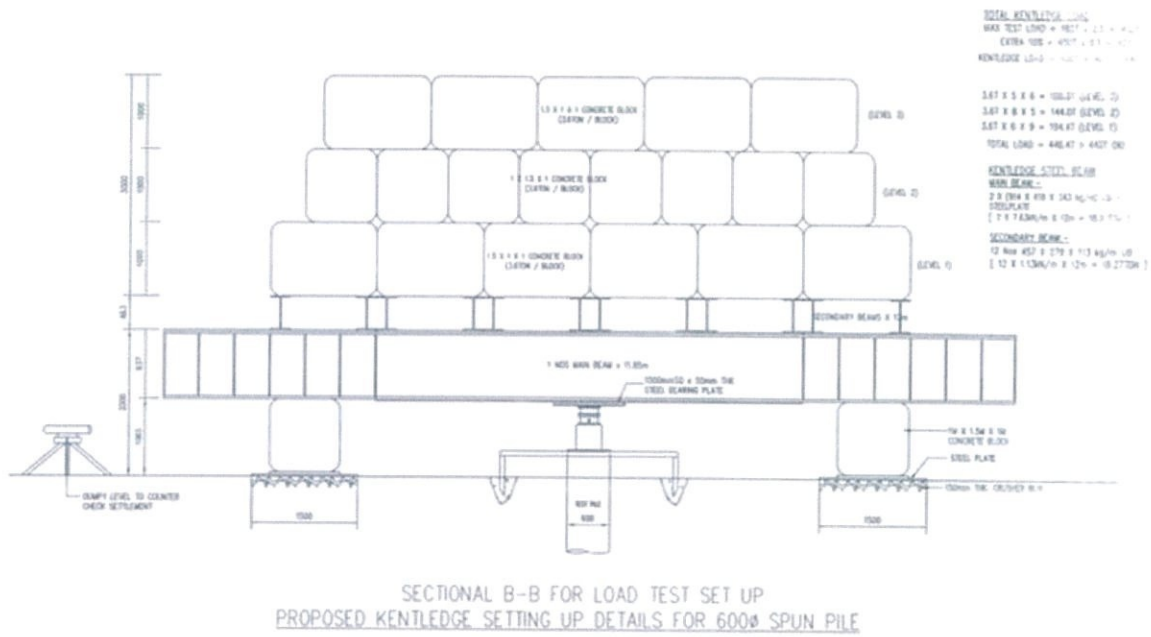


Figure 3.15: Sectional B-B for Load Test Set Up

Source: Chuan Luck Piling Sdn. Bhd (2019)

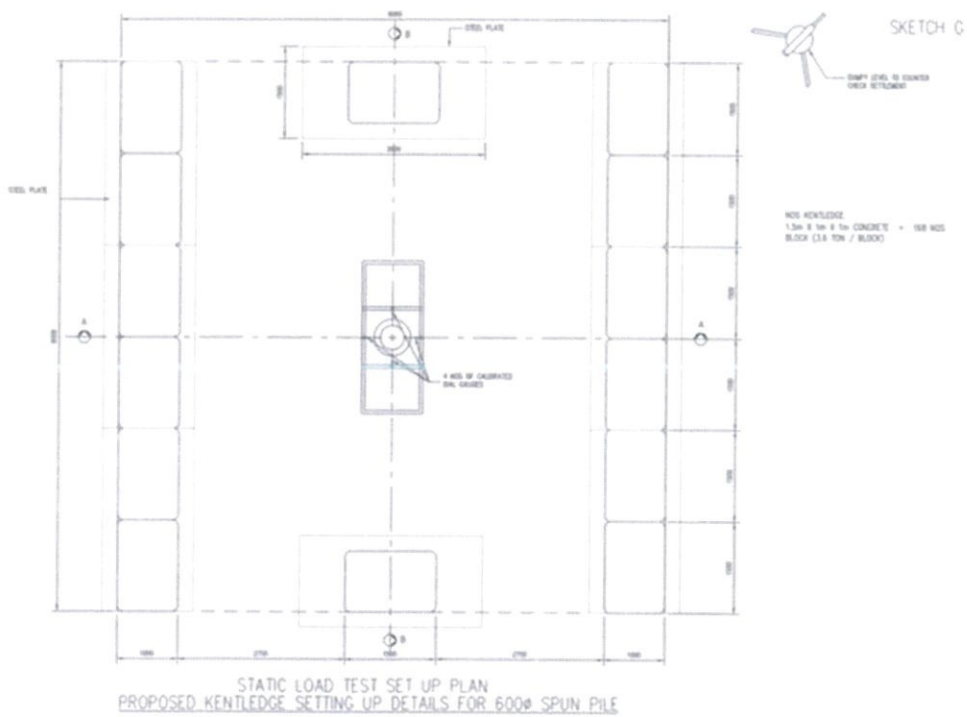


Figure 3.16: Static Load Test (Maintain) Set Up Plan

Source: Chuan Luck Piling Sdn. Bhd (2019)

### 3.2.5 Setting out kentledge

The setting-up equipment of the maintain load test is done by Muhd Erwan Fahmi, as the general worker with the supervision of supervisor Beh Chun Yung and Mohd As'Ad Ahlami. This process begins with the cleaning of the pile head surface using a wire brush followed by the access of 1 nos of reference frame and 1 nos of hydraulic jack. The hydraulic jack will be placed together with the 25mm steel bearing plate on the top surface of the test pile, below the I-beam.



Figure 3.17: Outlook from above I-beam



Figure 3.18: Hydraulic jack with steel bearing plate



Figure 3.19: Reference beam



All the equipment involved in this test is then being arranged. The contractor playing his role to ensure that when the hydraulic jack and the load measuring device are mounted on the pile heads, the whole system will be stable up to the maximum load to be applied. The test load is applied by means of a hydraulic jack, adequate capacity is fitted with a load measuring device. The hydraulic jack, pump, hoses, pipes and other apparatus involved in this maintain load test is designed to be capable of withstanding a test pressure equivalent up to 1.5 times the maximum test load without leakage. The rest equipment is setting out according to supervisor instruction.



Figure 3.20: Calibrated dial gauge is placed at every corner of reference beam



Figure 3.21: Hand Pump is connected by hose to hydraulic jack

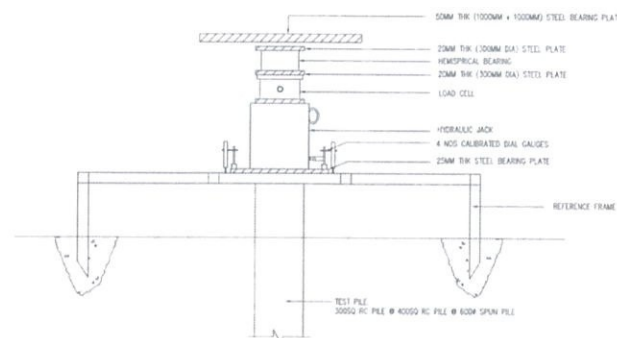


Figure 3.22: 2d drawing of setting out equipment



Lastly, the dumpy level is placed outside the site of the purposed load test to measured wether the settlement and the gauge reading is same. The setting and positioning of the dumpy level is done by Chuan Luck Piling Sdn. Bhd. Surveyor, Mr Edzyuan. There are 4 reading in total, including this dumpy level.



Figure 3.23: Setting out the dumpy level



Figure 3.24: Dumpy Level is succcefully set up

After all of the equipment is done for setting out, a computer is placed and design to stored the measurement of every settlement occur throughout the test duration. This load test will begin to start on 1.45pm for the first cycle of first working load. All the electrical is supplied using a generator owned by Chuan Luck Piling Sdn. Bhd. The test will be completed on the second cycle.



Figure 3.25: Setting up the computer to stored measurement data



Figure 3.26: Overall look of Maintain Load Test from outside

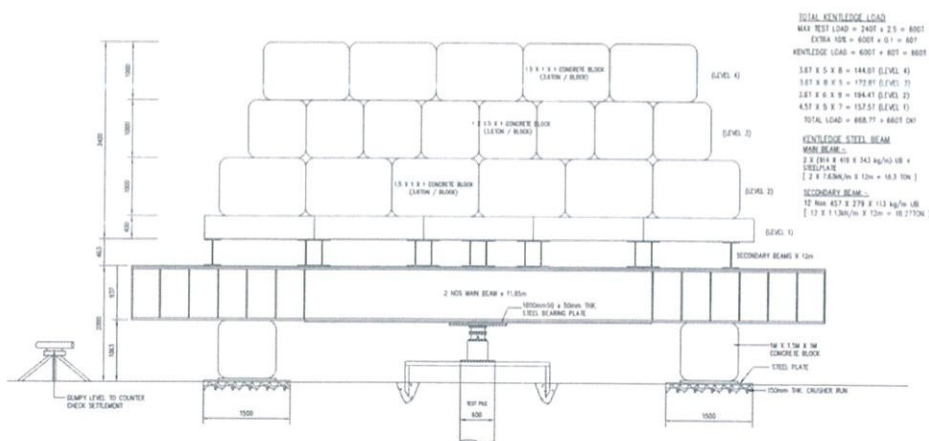


Figure 3.27: Cross section of Maintaing Load Test

Source: Chuan Luck Piling Sdn. Bhd (2019)

### 3.2.6 Procedure of Maintain Load Test

Throughout the test period of all equipment for measuring load and movement, it is all protected from other effects and weather. Construction equipment and person who are not involved is kept at a sufficient distance from the test to avoid disturbance to the measurement apparatus. For maintain load test, the procedure required is exactly for two working load (2WL) such as above table;

Table 3.2: Duration of maintain load test procedure for 600mm $\phi$

Load Percentage of Working Load	Time of Holding Load (minutes)
0.0	0
25.00	1 hour
50.00	1 hour
75.00	1 hour
100.00	12 hour
50.00	1 hour
0.00	6 hours
50.00	1 hour
100.00	1 hour
150.00	1 hour
200.00	24 hours
150.00	1 hour
100.00	1 hour
50.00	1 hour
0.00	6 hour
<b>TOTAL : 58 HOURS</b>	

For pile Maintain Load Test pile size 600mm diameter, the total of working load is 240 tons for the first cycle followed by 480 tons at the second cycle (maximum load applied). For the hydraulic jack, the cylinder effective area is 225.26 in<sup>2</sup>, cylinder capacity is 1000 tons. 1 tons is equal to 9.79 pound square inch (PSI). Total duration is 58 hours.



Cycle	% W.L	PSI	LOAD (Ton)	LOADING/RELEASE TIME	READING
1 <sup>st</sup>	0.00	0.00	0.00	0	Initial reading taken
	25.00	587.00	60.000	1 Hour	The reading of settlement is recorded at intervals 0 min, 15min, 30min, 45min, & 60mins.
	50.00	1,174.44	120.000	1 Hour	Ditto
	75.00	1761.66	180.000	1 Hour	Ditto
	100.00	2348.88	240.000	12 Hours	Maintained Load (reading settlement is recorded at intervals 0 min, 15 min, 30 mins, 45 mins, 60 mins, and hourly until 11 hours)
	50.00	1,174.44	120.000	1 Hour	Reading settlement is recorded at intervals 0 min, 15 min, 30 mins, 45 mins, 60 mins, and hourly until 11 hours
2 <sup>nd</sup>	0.00	0.00	0.000	6 Hours	Maintained Load (reading settlement is recorded at intervals 0 min, 15 min, 30 mins, 45 mins, 60 mins, and hourly until 5 hours)
	50.00	1,174.44	120.000	1 Hour	Reading settlement is recorded at intervals 0 min, 15 min, 30 mins, 45 mins, 60 mins
	100.00	2,348.88	240.000	1 Hour	Ditto
	150.00	3,523.32	360.000	1 Hour	Ditto
	200.00	4,697.76	480.000	24 Hours	Maintained Load (reading settlement is recorded at intervals 0 min, 15 min, 30 mins, 45 mins, 60 mins, and hourly until 23 hours)
	150.00	3,523.32	360.000	1 Hour	Reading settlement is recorded at intervals 0 min, 15 min, 30 mins, 45 mins, 60 mins
	100.00	2,348.88	240.000	1 Hour	Ditto
	50.00	1,1174.44	120.000	1 Hour	Ditto
	0.00	0.00	0.000	6 Hours	Maintained Load (reading settlement is recorded at intervals 0 min, 15 min, 30 mins, 45 mins, 60 mins, and hourly until 23 hours)

Table 3.3: Procedure of Maintain load test 600mm  $\phi$  (2019)

Source : Chuan Luck Piling Sdn. Bhd (2019)



### 3.2.7 Presentation of Results.

The result obtained is submitted as a signed summary in duplicate to the S.O immediately after the test and cycle is complete which required for each stage of loading, the period for which the load was held and the load and maximum settlement. There are also to be plotted as time-settlement graph and load-settlement graph.

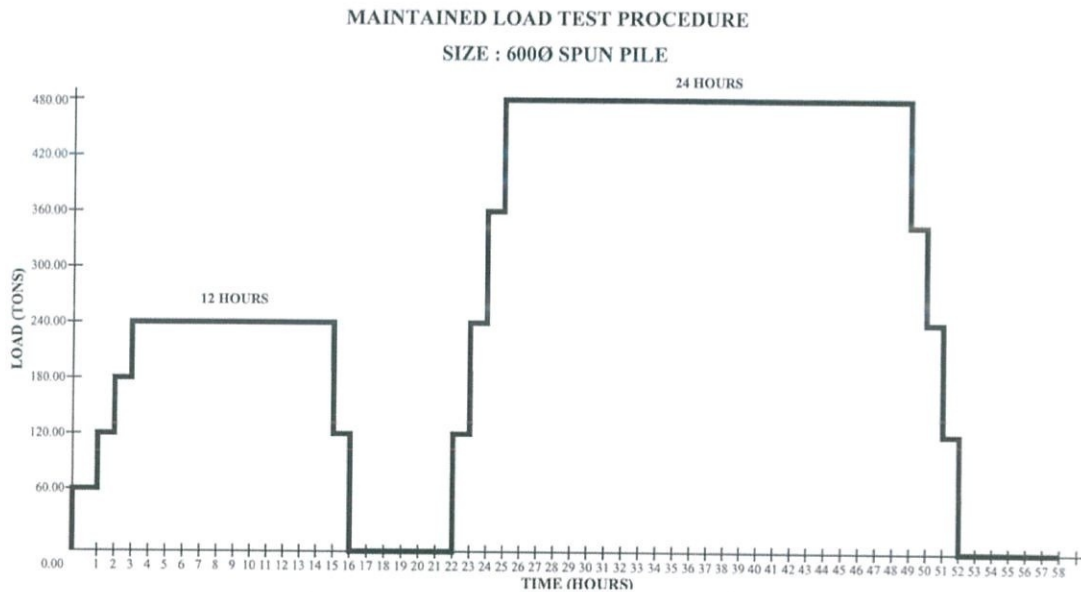


Figure 0.0: Load-Settlement Graph.

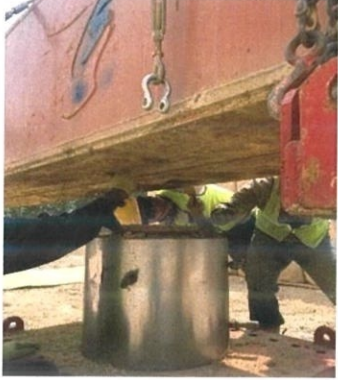


Source: Chuan Luck Piling Sdn. Bhd (2019)





After the result is obtained, the all the test equipment and measuring devices is dismantled, checked and either stored that they available for use in the upcoming load test or be removed from the site. As for the kentledge and the supporting structure, it will be removed using a mobile crane forthwith the site on completion of all tests.

To identify whether the load test is pass, the actual settlement must be below than 18mm in second cycle at of 480 tons (referring appendix 1). The data of this load test consisting of date, time, total time for recording, load applied (tonne), reading of every dial gauge classified as A, B, C and D (mm), average reading of dial gauge (mm), Actual Settlement (mm), and Remarks which consisting L1 (Ruler 1), L2 and L3 (ruler at angel bar) and L4 (dumpy level reading) in (mm). For an overall result, maintain load test at point number 374 is passed with actual settlement  $2.55\text{mm} < 18\text{mm}$  (refer appendix 1).

### 3.3 Equipment and Machinery Used

Below is the list of equipment of used in the purpose test: -

No	Equipments	Figures
1.	1 nos of hydraulic jack - To lift heavy load (kentledge) by applying force via hydraulic cylinder	
2.	4 nos of calibrated dial gauge - Measure the pile movement according to the reading show	
3.	1 nos of pressure gauge - To analysed applied pressure of the hydraulic jack.	



No	Equipments	Figures
4.	1 nos of steel hand pump - Supply pressure to the jack, gauge using hose.	
5.	1 nos of I- beam - To lift heavy load (kentledge) by applying force via hydraulic cylinder	
6.	1 nos of dumpy level - To check the settlement on the pile (backup)	
7.	1 nos of reference frame - Where the calibrated gauge and ruler is placed at each corner	




### 3.3 Hazard occurred, Risk and Control measure for Maintain Load Test

During the on-going work of Maintain Load Test, there are several hazard that can be clarified by Mr Normal Eastkandar as the Safety Officer. All the hazard is identified according to the job sequenced that is involved in maintained load test process. Along with hazard, Mr Normal also did some risk category together with the control measure to ensure all the load test process will be run smoothly and organized. Here are some of hazard example according to job sequences:

Table 3.4: Hazard, Risk and control measure

Job Sequence	Hazard	Risk	Control Measure
1. Arrival of material for load test by mobile crane 	<ul style="list-style-type: none"> <li>• Collide with other vehicles</li> <li>• Struck worker</li> <li>• Accident due to ground condition</li> <li>• Crane topple</li> </ul>	<ul style="list-style-type: none"> <li>• Body injury</li> <li>• Death, multiple death</li> </ul>	1) Valid driving licence for vehicles/trailer driver 2) Vehicles must be inspected and maintained. 3) Follow speed limit and signage.
2. Ground preparation for loading test 	<ul style="list-style-type: none"> <li>• Hit by crusher run</li> <li>• Cut by steel plate</li> <li>• Exposure to dust</li> </ul>	<ul style="list-style-type: none"> <li>• Body injury</li> <li>• Finger and hand injury</li> <li>• Respiratory tract irritation</li> </ul>	1) Barricade working area and post “Work in progress-no passing” 2) Appropriate PPE attired I.e helmet, safety shoes, hand gloves, face mask. 3) Use the tragline to control the load when lifting.



<p>3. Lifting and placing of main beam on the main block.</p> 	<ul style="list-style-type: none"> <li>• Cut by Sharpe edges</li> <li>• Swigging beam hits workers</li> <li>• Main beam falls onto worker</li> </ul>	<ul style="list-style-type: none"> <li>• Finger injury or hand injury</li> <li>• Body injury</li> <li>• Death</li> </ul>	<ol style="list-style-type: none"> <li>1) Sling inspection by competent person to meet its SWL and colour coded using “ Lifting Gear Inspection form”</li> <li>2) Competent operator to operate the crane</li> <li>3) Installation of sling done by trained rigger.</li> </ol>
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Source: Technical document of Purpose Project (2019)

## **CHAPTER 4.0**

### **CONCLUSION**

Maintain Load Test is actually very important in every construction project as it could determine the overall design for the concrete used. The purpose of this activity is because the impact of load bearing design in all types of soil in Malaysia, at the same time to investigate the strength of soil of every purpose site. Factors such as heavy rain can make the whole process of maintaining load test failed as the component is interrupted. Some individual that came across the construction process could also be the reason of this test fail and lost reading from the dumpy level. To make sure that this process is running safe and smoothly, the kentledge is covered using a humongous canvas to avoid from weather disturbance. The procedure applied to every test pile is also same, according to the pile classification. However, some hazard might occur during the process, and that is why the classification of hazard and risk assessment is classified to make all the work runs as planned and to get an adequate result.

## REFERENCES

### Books:

- I. Chow, Y K and Chew, S H (1997). Geotechnical Analysis of Statnamic Pile Load Test on Bored Pile No W47/5 For the Proposed Ampang Kuala Lumpur Elevated Highway, UK.
- II. Edward Lawson. (2018). ANALYSIS OF THE PILE LOAD TESTS AT THE US 68/KY 80 BRIDGE OVER KENTUCKY LAKE, Kentucky.
- III. G&P GEOTECHNICS (2005). Pile Testing Specification for Driven Piles, Malaysia.
- IV. Fatema Sultana (2016), Pile Load Testing & Determining Bearing Capacity of Cast in Situ Pile, USA.

### Web Site:

- I. Dynamic Load Test (2014). Available from:  
<https://www.semanticscholar.org>
- II. Static Load Test (2014). Available from:  
<https://www.fhwa.dot.gov>



## APPENDICES

# BUKIT INDAH

the address

Our Ref : B11/BJSB/CA/PIL-005/19-001  
Date : 18<sup>th</sup> July 2019

**JURUTERA JRK SDN.BHD.** ✓  
No. 7, Block C,  
Kompleks Austin Perdana,  
Jalan Austin Perdana 2,  
Taman Austin Perdana,  
81100 Johor Bahru,  
Johor DarulTakzim.

**ATTN: IR. LEE WEI SHIONG** ✓

Dear Sir,

**PILING WORKS FOR CADANGAN PEMBANGUNAN BERSTRATA KOMERSIAL  
BERCAMPUR (SKY TREES) YANG MENGANDUNGI :-**

- I) 1 BLOK PANGSAPURI PERKHIDMATAN - BLOK A 19 TINGKAT (228 UNIT)
- II) 1 BLOK PANGSAPURI PERKHIDMATAN - BLOK B 20 TINGKAT (240 UNIT)
- III) 5 TINGKAT PODIUM YANG MELIBATKAN :
  - (a) 2 TINGKAT TEMPAT LETAK KERETA BERSERTA 26 UNIT RUANG  
PERNIAGAAN
  - (b) 2 TINGKAT TEMPAT LETAK KERETA BERSERTA KEMUDAHAN ASAS
  - (c) 1 TINGKAT TEMPAT LETAK KERETA BERSERTA 12 UNIT PANGSAPURI  
PERKHIDMATAN DAN KEMUDAHAN

DI ATAS SEBAHAGIAN PTD 182919, BUKIT INDAH, ISKANDAR PUTERI, MUKIM  
PULAI, DAERAH JOHOR BAHRU, JOHOR DARUL TAKZIM FOR M/S BUKIT INDAH  
(JOHOR) SDN BHD

(CONTRACT NO. : B1JSB/PIL-19/C635) ✓


-Letter of Confirmation -

We are pleased to inform that the Tender submitted by Messrs. Chuan Luck Piling Sdn Bhd for the above-mentioned works for the sum of *Ringgit Malaysia : Five Million Eight Hundred Seventy Thousand Four Hundred and Seventy Three Only* (RMS,870,473.00) has been accepted subject to their acceptance of the following terms and conditions:-

1. That the accepted tender sum shall be derived as per **Attachment A**; ✓
2. That this Letter of Confirmation shall be read together with the Scope of Works and conditions as stipulated in the Tender Documents, all correspondences between the Client and the Contractor prior to the award of this Contract. ✓
3. That notwithstanding the above, all inconsistencies and unreasonable rates to be adjusted are to the Superintending Officer's or S.O. satisfaction provided that the accepted tender sum remains unchanged; ✓
4. That any discount shall be applied as a percentage adjustment to all the rates on the accepted tender sum, after deducting all Prime Cost Sums and Provisional Sums (including all adjusted / rationalized rates); ✓

BUKIT INDAH (JOHOR) SDN BHD (08708-19)  
Trojika Welcome Centre, Level 3A, No. 16, Jalan Setia Tropika 1/21, Taman Setia Tropika,  
81200 Kempas, Johor Bahru, Johor Darul Takzim, Malaysia.  
T 607 234 2233 F 607 233 9255 www.setia.com

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R/146

Our Ref : B11/B155/CA/PIL-005/19-001  
Date : 18<sup>th</sup> July 2019  
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5. That the accepted tender sum is on a Firm Basis and not subject to any price fluctuation;
6. That the accepted tender shall be based upon the basic tender as submitted by the Contractor;
7. That the Date of Commencement and possession of the site shall be on 1<sup>st</sup> August 2019;
8. That the Date for Completion shall be SIX (6) MONTHS from the date of site possession, which shall be inclusive of mobilization, site clearing, all Festivals, Public Holidays and wet weather. The date of completion for the whole of the works under this contract shall be on 31<sup>st</sup> January 2020;
9. That the Liquidated Damages of RM6,000.00 (Ringgit Malaysia : Eight Thousand Only) per calendar day shall be imposed in the event the Contractor is unable to complete the works within the time prescribed in Clause 8 above or within any extended time granted;
10. That the following conditions pertaining to the Contract shall be applicable:-
  - a) Period of Interim Certificate Monthly
  - b) Joint Site Measurement Date 1<sup>st</sup> of every month
  - c) Period of Honouring Certificate Thirty (30) days
  - d) Percentage of Certified Value Retained 10% of Gross Valuation
  - e) Limit of Retention Fund 5% of Contract Sums or Revised Contract Sums whichever is higher.
  - f) Defect Liability Period Twelve (12) months from the date of issuance of Certificate of Practical Completion

Failure in complying and / or submitting incomplete documentation will render in late certification and payment wherein the Employer shall not be liable thereof.

11. Interim certificate issued by Consultant / S.O. shall not be considered as conclusive evidence as to the sufficiency of any work, equipment, materials or goods to which it relates, nor shall it relieve the Contractor from his liability to amend and make good all defects, imperfections, shrinkages, or any other faults whatsoever. In any case, no certificate of Consultant / S.O. shall be final and binding in any dispute between the Employer and the Contractor if the dispute is brought whether before an arbitrator or in the courts.

 Setia



Our Ref : 811/BJSB/CA/PIL-005/19-001

Date : 18<sup>th</sup> July 2019

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12. That the performance bond amounting **5% of the Contract Sum, Ringgit Malaysia: Two Hundred Ninety Three Thousand Five Hundred Twenty Three and Cents Sixty Five Only (RM293,523.65)**, as required for this project shall be submitted in the approved format before the commencement of works on site; the Performance bond shall remain valid and effective until the issuance of the Certificate of Practical Completion by the S.O. In the event the Contractor does not submit the Performance Bond, the Employer reserves the right to withhold the value of the Performance Bond from progress payment certificate or any money due to the Contractor.
13. That no work shall commence on site until all required and approved insurance coverage have been taken, copies of cover notes shall submit within 7 days and proof of premium paid is submitted within 60 days; the original copy of the insurance policy and original receipt for premium paid shall be given to us for safekeeping. In the event such required insurances are not taken by such time as the S.O. thinks appropriate, the S.O. shall have the right but not the obligation to secure such insurances on such terms as the S.O. deem appropriate and all cost shall be borne by the Contractor. The insurance policies to be taken are:-
  - a) Contractor's All Risks Policy in respect of Insurance against Injury to persons, property, Employer Indemnity and Damage to the Works;
  - b) Workmen's Compensation Insurance;
  - c) Foreign Workers Compensation Scheme;
14. That the Contractor shall submit for the S.O.'s & Employer's comment within 2 weeks from date of site possession the following:-
  - a) a site management and supervisory personnel organization chart indicating the name, qualification, experience and position of each of the key personnel;
  - b) two copies of detailed Work Programme, consisting of Gantt charts with critical path analysis;
  - c) a schedule indicating when the various Nominated Sub-Contractors or Nominated Suppliers are expected to commence work or commence delivery of their goods;
  - d) a detailed work method statement including location plan for store, site office, etc;
  - e) the acknowledgement receipt of the application form for Construction Industry Development Board (CIDB) levy and to submit the receipt of payment of levy within 2 months upon date of commencement.
15. The Contractor shall ensure that the work, finishes and products for the project shall be the best, executed by experienced and skilled workers in their respective duties for which they are being employed. Decisions as to the quality of materials and workmanship in cases of disputes shall rest solely with the S.O. The Contractor shall also comply fully with all the requirements of the ISO 9000 Quality Management System. Should the Contractor fail to comply to this, the Employer reserves the right to arrange for making good all works not in compliance to the required quality standards and the cost of all such remedial works shall be borne by the Contractor and shall be deducted from any sum due or to become due to the Contractor (i.e. monthly progress payment);

  
Setia



Our Ref : B11/BE/5B/CA/PIL-005/19-001

Date : 18<sup>th</sup> July 2019

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16. That the Contractor shall apply and obtain for storage permits with the Ministry of Internal Trade and Consumer Affairs on controlled items, such as steel bars, cement and diesel, as and when required under the Control of Supplies Regulations Act 1974. Copies of such permits shall be forwarded to Developer for records. You shall indemnify the Employer in full against fines, penalties, any costs and expenses (including legal fees) incurred by the Employer for your failure to apply and obtain storage permits;
17. The Employer reserves the right to omit any of the items or works specified or part(s) thereof and the contract sum shall be adjusted accordingly. The Contractor shall not be entitled to any compensation for loss of profit and/or expenses on such items or works omitted.
18. The directors of the Contractor's company shall be fully involved during the execution of the Contract. If the Contractor should fail to comply with this requirement, the Employer reserves the right to determine the Contractor's employment under this Contract and the Contractor shall have no rights of claims pertaining to this termination except for the value of work done up to the date of termination only.
19. That the Contractor shall endeavor to maintain a high level of cleanliness and enforce proper safety and health regulations on the site at all times. Should the Contractor failed to comply to the above, the Employer reserves the right to arrange all necessary action to remedy the situation and all cost incurred shall be borne by the Contractor and to be deducted from any sum due or to become due to the Contractor (i.e. monthly progress payment).
20. The accuracy of setting out shall be entirely the Contractor's responsibility and that the Contractor shall make good at the Contractor's own expense any errors that may arise from any cause, and that upon completion of the Contract/Works, a licensed Land Surveyor to be engaged by the Contractor to conduct a final survey.
21. The Contractor shall make due allowance for sharing the site with other Contractors and that the Contractor will permit them to work within the same site as and when directed by us. This allowance, which is deemed to be included in the Contract Sum, shall be reflected in the work programme as and when requested.
22. The Contractor is deemed to have examined and inspected the site and shall take over the site as it is and shall be responsible to employ and use proper techniques and equipment in carrying out the Contract so as to complete the whole of the Contract on / before the Date of Completion. The Contractor hereby acknowledges that the possession of site may given in sections or in parts as stated in para 7 and subject to any others restrictions which may be imposed by the Employer. No claim by the Contractor for additional payment or extension of time will be allowed.

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23. The Contractor is to ensure that the Contractor's site representative and workers abide strictly by the rules set by us with regards to safety regulation, clearing and cleaning programme etc. The Contractor is to observe all rules and security regulation currently enforced on site by the relevant authorities. The Contractor's site activities shall be confined to within the designated area only. No trespassing into non-designated area is allowed. The Contractor shall be responsible and shall indemnify the Employer against all proceeding, fines imposed etc., should the Contractor fail to comply with the relevant rules and regulation.
24. The Contractor shall employ and maintain on site the personnel as listed in the Contractor's organization chart submitted to the Employer (as stated in **para 14.a**)) on a full time basis. The number of personnel listed therein shall be the minimum quantity required on the site throughout the duration of the Contract. A full time representative who is able to coordinate the work and make decision on behalf of the Contractor's organization shall at all time be stationed on site. The Contractor shall remove from site any such workman (or workmen), and / or personnel who is incompetent or has misbehaved or refused to receive our instructions and deemed unfit to work on the Contract / Works. Any person who has left and / or removed from the Works shall be immediately replaced with a competent substitute. If the Contractor fails to provide the personnel listed in the aforesaid document, we, and / or S.O. may engage suitable candidates on the Contractor's behalf and all expenses incurred thereof shall be borne solely by the Contractor.  
  
The Contractor is responsible for the strict observance of the prevailing and/or any new Labour Law that is in force or may be enforced in Malaysia and shall indemnify Employer against all claims.
25. All information, documents and transmittals issued or generated by **Bukit Indah (Johor) Sdn Bhd**, and / or its representative during the course of work shall not be transmitted to any third party without the prior written approval of **Bukit Indah (Johor) Sdn Bhd** and / or its representative.
26. The Contractor shall attend all the site meetings to be called by the S.O. for the purpose of monitoring and coordination of various Contractors' works. Attendance at these meeting is compulsory and shall be attended by personnel who are well versed with the Contract / Works and progress of Works and authorized to make decision on behalf of the Contractor's company. The Contractor shall inform Nominated sub-Contractor when their presence at the meeting is required.
27. S P Setia's "POLICY AND CODE OF CONDUCT GOVERNING CONTRACTORS DURING DEFECT LIABILITY PERIOD" shall form part of this Contract. All visible defects identified shall be rectified immediately, regardless if it is a minor defect. The Works will not be deemed practically completed and no CPC will be issued unless all defects including minor visible defects are rectified.

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## 28. Termination Clause

The Employer reserves the right to determine this Contract with the Contractor, if in its sole opinion, the Contractor fails to proceed regularly and diligently with the Works in any of the following manner:

- a) Failure to remedy the delay in the Contractor's Works progress when the delay is more than 20% measured by value or time, which ever is earlier;
- b) Failure to submit Contractor's Work Programme within 2 weeks of the Contractor's receipt of the Letter of Acceptance / Award;
- c) Failure to propose measures to overcome a delay of 10% or more of the Contractor's Work Programme upon issue of a notice by the Superintending Officer of such a delay;
- d) Refusing or persistently neglecting after notice in writing from the Consultant / S.O. requiring the Contractor to proceed with the works;
- e) Refusing or persistently neglecting after notice in writing from the S.O. requiring the Contractor to remove defective works or improper materials or goods and / or to carry out all necessary remedial works within reasonable time and by such refusal or neglect the works are materially affected.

Then the Superintending Officer may serve the Contractor notice by registered post or recorded delivery specifying the default and if the Contractor continues such default for seven (7) days after such notice or shall at any time thereafter repeat such default, the Employer may, without prejudice to any other rights or remedies, terminate the Contractor's employment under this Contract without further notice. In the event of such termination, no consequential loss of profit or expense or any loss and expense whatsoever shall be claimed against the Employer.

Upon the termination of this Contract, the Contractor shall forthwith redeliver to the Employer possession of the site and the Employer may, but without obligation allow any third party to complete the Works. In such event, the Contractor agrees not to make any claim against the Employer under this Contract or for any breach, nor raise any excuse, set off or defense with respect to any debt or claim made by the Employer against the Contractor.

29. Any dispute or differences arising out of or in connection with this Contract / Works or the implementation of any of the provisions of this Contract / Works which cannot be settled amicably shall be submitted to arbitration and the reference shall be to a single arbitrator to be jointly appointed by both parties.

If the parties do not concur in the appointment of the arbitrator, then the arbitrator shall be appointed by the President, for the time being, of the Regional Centre for Arbitration, Malaysia who shall have the like powers to act in the reference as if he had been appointed by consent of both parties to this agreement. The decision and award of the arbitrator shall be final and binding on both parties.

Save as provided above, the provisions of the Arbitration Act, 1952 (revised 1972) of Malaysia or any statutory modification or re-enactment thereof for the time being in force shall apply to such arbitration.

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30. Any notice, request or demand required to be served by either party hereto to the other under this Contract shall be in writing and shall be deemed to be sufficiently served:

- a) If it is sent by the party or his solicitors by registered post addressed to the other party's address herein before mentioned and in such case it shall be deemed to have been received upon the expiry of a period of five (5) days of posting of such registered letter; or
- b) If it is given by the party or his solicitors by hand to the other party or his solicitors.

Any change of address by either party shall be communicated to the other.

31. All as-built drawings to be submitted before the issuance of the Certificate of Practical Completion.

32. That the following issues were raised including deviations from the tender questionnaire prepared during tender interview shall constitute part of the amendments to the contract:-

- a. Any unpriced item or exclusion stated in Bill of Quantities is **NOT ACCEPTABLE**. It shall be deemed inclusive;
- b. The Clerk of Work's / Supervisory staff's overtime wages shall be borne by the Contractor;
- c. Stamp duty for Contract binding shall be borne by the Employer;
- d. No temporary worker's quarter is allowed to construct at or within the site;
- e. The Contractor is to comply with the requirement by CIDB that all skilled construction labours and supervisors, whether local or foreigners (exclude general workers) must obtain competency certificate (effective from 1<sup>st</sup> June 2016);
- f. The Contractor is required to submit all necessary As-built Drawings in 5 sets of hardcopy and softcopy in CD including photographs as described in the Contract Documents prior to issuance of Certificate of Practical Completion;
- g. No EOT shall be granted due to weather issues. Unless it is due to exceptionally inclement weather where the Contractor shall submit relevant published statistics from nearest Meteorological Station (or other approved reliable source close to the location of the Works) and an analysis to show that the condition of weather is classified as exceptionally inclement weather and shall subject to S.O. approval;
- h. The Contractor is required to construct and maintain new project signage;
- i. The Contractor is required to maintain the existing hoarding;

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- t. All alternative proposal (if any) shall be approved by the Consultants / Employer prior to tender submission. All alternative proposal by the Contractor shall be in Lump Sum and not subject to any re-measurement;
- u. The Contractor is to note that he will only be paid once for the cutting of pile heads to the required level even if it had taken him more than one operation to complete the task. Rates for all types of piling shall include:-
- Non-reusable cut-off lengths and removal from site.
  - Re-driving of heaved pile.
  - Penalty pile.
  - All necessary excavation, filling and removal of spoil incidental to piling.
  - Normal standing time.
  - Delay due to weather.
  - Preparation and submission of piling record and as-built drawings.
  - Wastage of piles. The average pile penetration length from existing ground level is estimated based on borehole results. Actual length is to be determined on site.
- v. C&S Consultant's Clarifications:-
- The Contractor is to cooperate and work closely with other contractors at the site;
  - The Contractor is required to submit the piling record in detail;
  - The Contractor shall submit the method statement for Maintain Load Test (Kentledge), dynamic pile test (POA) and prebore;
  - The Contractor is responsible to provide remedial proposal to the Engineer for approval if there is any defect, failure or eccentricity out of tolerance on the piling works. The remedial proposal shall be endorsed by professional engineer (PE);
  - The Contractor shall bear the cost for the enlargement of the pile cap and additional piles if the pile is deviated more than 75mm.
  - If there is any damages to neighbouring properties due to the works carry out at site, it is the responsibility of the Contractor to rectify or compensate the property owner. All complaints from adjacent property owner must be attended immediately and speedily;
  - The Contractor is to submit the source or the name of the supplier of concrete pile to be used including all relevant testing certificates;
  - The Contractor is required to submit the quality control certificates (SRIM) for all proposed construction materials for Engineer's approval prior to commencement of works;
  - The Contractor's full time site surveyor shall provide all pile points setting out and to be verified by Client prior to commencement of boring works;

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- j. The Contractor is required to construct and maintain wash trough. The Contractor shall, in particular, liaise with other Contractors on matters of shared access, common security, keeping roads, access way and drains free from debris and mud and protection of the Works including those by others. Co-ordinate all related works to minimize obstructions and hindrances. The Contractor is required to share the cost of maintenance of access roads to the site. Cost apportionment of these works shall be carried out by the Employer based on frequency of usage and Contract value; .
- k. The Contract price shall include all taxes (including but not limited to Sales & Service Tax) and import duties. No adjustment shall be made to the Contract Sum should there be any introduction of new taxes, fluctuation in the rates of the existing taxes, import duty, exchange rates and etc during the Contract period and its extended period; .
- l. All Pre-stressed piles deliver to the site must be at least of 28 days with the following strength :-
- I. RC Pile - 45N/mm<sup>2</sup>
  - II. SPUN Pile - 80N/mm<sup>2</sup>
- In the event that the Pre-stressed piles delivered are less than 28 days strength, the Client reserves the right to carry out additional core test to determine the strength. The cost for testing shall solely born by the Contractor;
- m. The Contractor shall carry out the coring test (minimum 3 samples) to ensure the piles delivered to site are in good quality and the testing is to be conducted by an independent lab and witnessed by Employer's representative and Engineer; .
- n. In the case the coring test fails, Engineer reserves the rights to reject the pile supplier. The Contractor is required to re-submit new supplier for Engineer's approval. Any delay due to this shall not be entitled for any extension of time; .
- o. The Contractor is fully responsible to double check the eccentricity of the boundary stones before commencement of the piling works; .
- p. The Contractor shall provide the counter to determine the number of blow (hydraulic hammer) and record in the piling sheet record; .
- q. The additional replacement piles for broken, tilted and unset piles due to piling contractor's fault are payable to 1 no of shortest pile; .
- r. All load test which failed due to ground conditions after verification that there is no problem with pile structure strength, pile inclination and deviation, and pile integrity (from PDA test results), shall be payable by the Client. However, where the scenarios are not due to the ground conditions shall be deemed not payable; .
- s. Proper traffic management plan shall be provided during the Contract period. Contractor shall submit the traffic management plan for Consultant's approval; .

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