



اُنِيْوَرْسِيْٓتِيْ تِيْكَنُوْلُوْجِيْ مَآرَا
UNIVERSITI
TEKNOLOGI
MARA

BUILDING DEPARTMENT

FACULTY OF ARCHITECTURE, PLANNING AND SURVEYING

UNIVERSITI TEKNOLOGI MARA

(PERAK)

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It is recommended that the Practical Training Report is prepared

By

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PILING TEST

Accepted in partial fulfillment of the conditions for obtained a Diploma in Building

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FACULTY OF ARCHITECTURE, PLANNING AND SURVEYING
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(PERAK)

APRIL 2013

DECLARATION

It is with this, the work of writing this Practical Training Report was produced entirely by me except as expressed through practical training that I went through a period of 5 months from 12 November 2012 to 12 April 2013 in the Maarij Development.Sdn.Bhd. It is also one of the requirements to pass the course DBN307 and received in partial fulfillment of the requirements for obtaining a Diploma in Building.

Name : Nurul Nor Hidayah Binti Mat Zain

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Date : 12 April 2013

ACKNOWLEDGEMENT

Alhamdulillah, thanks to Allah SWT for His Blessing and Practical Training Report will be completed properly. Next unspoken gratitude and thanks goes to all individuals and all those who've taken time to provide some guidance, cooperation and beneficial to my comment in to complete this report in particular to Haji Zainudin Bin Ibrahim as Executive officers and company owners Maarij Development Sdn.Bhd. Limited, Haji Khairuddin Bin Ibrahim as construction project manager, En.Mazlan as a site architect, En.Noorazam bin Yahaya as Practical Training coordinator, Pn.Wan Nordiana binti Wan Ali as the student's supervisor, not least, to all the lecturers and Building Department also special for the following names of father and mother, friends and others whose names cannot be written here may Allah s.w.t alone can avenge his contributions and sacrifices.

Thank You.

ABSTRACT

This report briefly describes the methods and planning, equipment and materials involved in the piling test. It is produced based on the experience of a five-month construction project site located in an apartment building. This report is divided into sections and begins with the background and the background of the construction project. As a result of observations found piling test methods is quite uncomplicated. In construction work under the piling test involves several parties, such as engineers, site supervisors and skilled workers. This report is implemented using several methods of research such as observation, interviews, electronic media and reference materials. In this report, briefly explained the nature and equipment used in the construction. During the construction work is done, there are several problems associated with the piling test process has been identified and the report ended with some suggestions that felt able to solve problems that have been identified. The results of this report have been able to achieve the objectives of piling test process of this building. Finally, the report will explain in more detail for piling test process and method practice to the readers.

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ABBREVIATIONS

UBBL	Uniform Building By-Law
UiTM	Universiti Teknologi Mara
CIDB	Construction Industry Development Board
MDSB	Maarij Development Sdn.Bhd
PKK	Pusat Khidmat Kontraktor
SMM	Suruhanjaya Syarikat Malaysia
LPIPM	Lembaga Pembangunan Industri Pembinaan Malaysia
BS	Building Standard
OSHA	Occupational Safety and Health Act
UKB	Undang-Undang Kecil Bangunan
PMBK	Pertahanan Menteri Besar Kelantan
IPTA	Institut Pengajian Tinggi Awam
OPC	Ordinary Portland Cement
RC	Reinforcement Concrete
PDA	Pile Driving Analyzer

CHAPTER 1

INTRODUCTION

1.1 Introduction

Pile foundations are the part of a structure used to carry and transfer the load of the structure to the bearing ground located at some depth below ground surface. The main components of the foundation are the pile cap and the piles. Piles are long and slender members who transfer the load to deeper soil or rock of high bearing capacity avoiding shallow soil of low bearing capacity the main types of materials used for piles are wood, steel and concrete. Piles made from these materials are driven, drilled or jacked into the ground and connected to pile caps. Depending upon type of soil, pile material and load transmitting characteristic piles are classified accordingly. Piles can be made from various materials, like steel, timber, and concrete, each possessing different characteristics that should be considered. Pile also has various sizes and depend what type of piles. Generally used method for the installation of piles is a pile driver. These use the dropping weight technique in which an appropriate weight is hoisted at a suitable height in a sleeve, is released to hit the pile head, and this then drives the pile in the ground. The technique can be single-acting dropping weight or double-acting, driven by steam, compressed air, or hydraulically. In the double acting technique, compressed air is also used during the descending stroke of the weight.

1.2 Objectives Of Study

Objective of the study is to study and to know more detail about piling test process and procedure about piling test at the site of construction. Some of the objective of the study is:

- i) Identify the technique or procedure of the piling test process.
- ii) To explain the types of construction machinery and equipment used for the piling test process.
- iii) To determine the size of pile that has been use when the piling tests process at the site construction.

1.3 Scope Of Study

The scope includes the piling process for the project "Tunjong Pavilion" from the beginning until the PDA test for piling. The scope of this study also explains the things that must be well and a better understanding of piling process. The scope of the research explains:

- i) Piling process conducted by Sub Contractor which is Chuan Un Chye Sdn. Bhd
- ii) To decide what type and size of pile should use for this Tunjong Pavilion project.

1.4 Method Of The Study

Overall these reports are prepared using several methods of study as follows:

i) Interview

This method is implemented by interview or interviewed a number of individuals and parties involved as project engineer, project supervisors, project managers and workers on site.

ii) Observation

This method is implemented by making observations of the construction work on construction sites and in turn be able to know about the workings of a construction project.

iii) Electronic Media

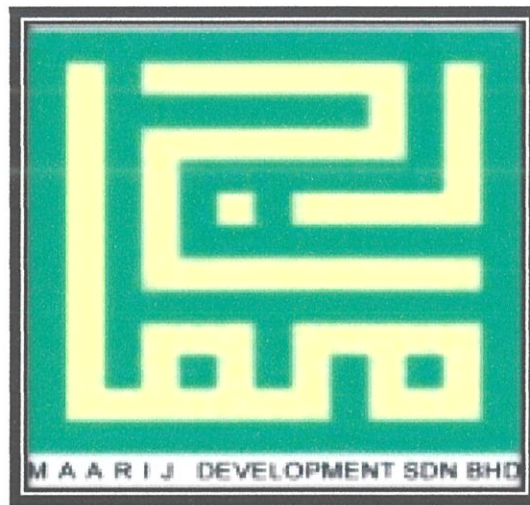
This method is implemented in a way to get relevant information from reliable sources, namely from the web or internet search.

iv) Reference

This method by collecting information from books, articles, magazines and other resources based on the construction industry. Reference in this way over the theoretical and what is contained in it depends on the facts.

CHAPTER 2

2.1 INTRODUCTION



MAARIJ DEVELOPMENT SDN BHD

Figure 2.1: Company logo

Sources: www.tunjong pavilion

Maarij is involved in the business of developing mixed properties which include rendering management services in connection with mixed property development, construction and related services. A Malaysian-based company, MDSB's real property development activities extend to marketing and management of residential, office retail and commercial space. The strength of Maarij is based on the Board of Directors, with a combined experience of more than 15 years in the property development and financing fields. Furthermore, the Board of Directors possess the expertise and experience to implement contemporary and integrated development projects which will provide attractive investment returns to real estate investors and

business potentials to property purchasers. MDSB business approaches include entering into joint ventures with reputable organizations.

2.1.1 COMPANY ESTABLISHMENT

Maarij Development Sdn Bhd (MDSB) was established on 30 March 2011, with the aspiration to become a prominent Property Development Company along the East Coast of Malaysia especially Kelantan and Terengganu, making commercial property development as their main objective.

Register address for Maarij Development Sdn.Bhd is Lot 507,Block P,Jalan Kuala Krai,Pusat Perniagaan Bandar Baru Tunjong,16010 Kota Bharu,Kelantan Darul Naim,Malaysia.Maarij Development Sdn.Bhd is subsidiary to Great Vision Sdn.Bhd and Maarij Development Sdn.Bhd is membership to Great Vision Sdn.Bhd which is that address at the Petaling Jaya,Kuala Lumpur.



Figure 2.2: Location plan of Maarij Development Sdn.Bhd

Sources: www.tunjongpavilion.com

Maarij Development Sdn.Bhd company which have been register at Pejabat Suruhanjaya Syarikat Malaysia (SSM) under company act 1965 which company number is (938497-M) at 2011. Maarij Development also register with Lembaga Pembangunan Industri Pembinaan Malaysia (LPIPM) or also was called *Construction Industry Development Board Malaysia (CIDB)*.

Haji Zainudin Bin Ibrahim, 48 years old , which executive officer at the Maarij Development. He was appointed to the board of the company on 20 December 2004 and held by 15% share capital. Mr.James was the share partner of the executive officer of Maarij Development. He also was appointed to the board as a director at the Maarij Development.

Mr.Chua,45 years old which is a person who served manager director of the Maarij Development Sdn.He was appointed to the board of the company on 15 April 2005. Haji Khairuddin also younger brother of the executive officer of the company and hold share of 35% of share capital.

Encik Asyraf bin Haji Zainudin was the the first officer of Maarij Development Sdn. He was appointed to the board as a secretary company at the Maarij Development

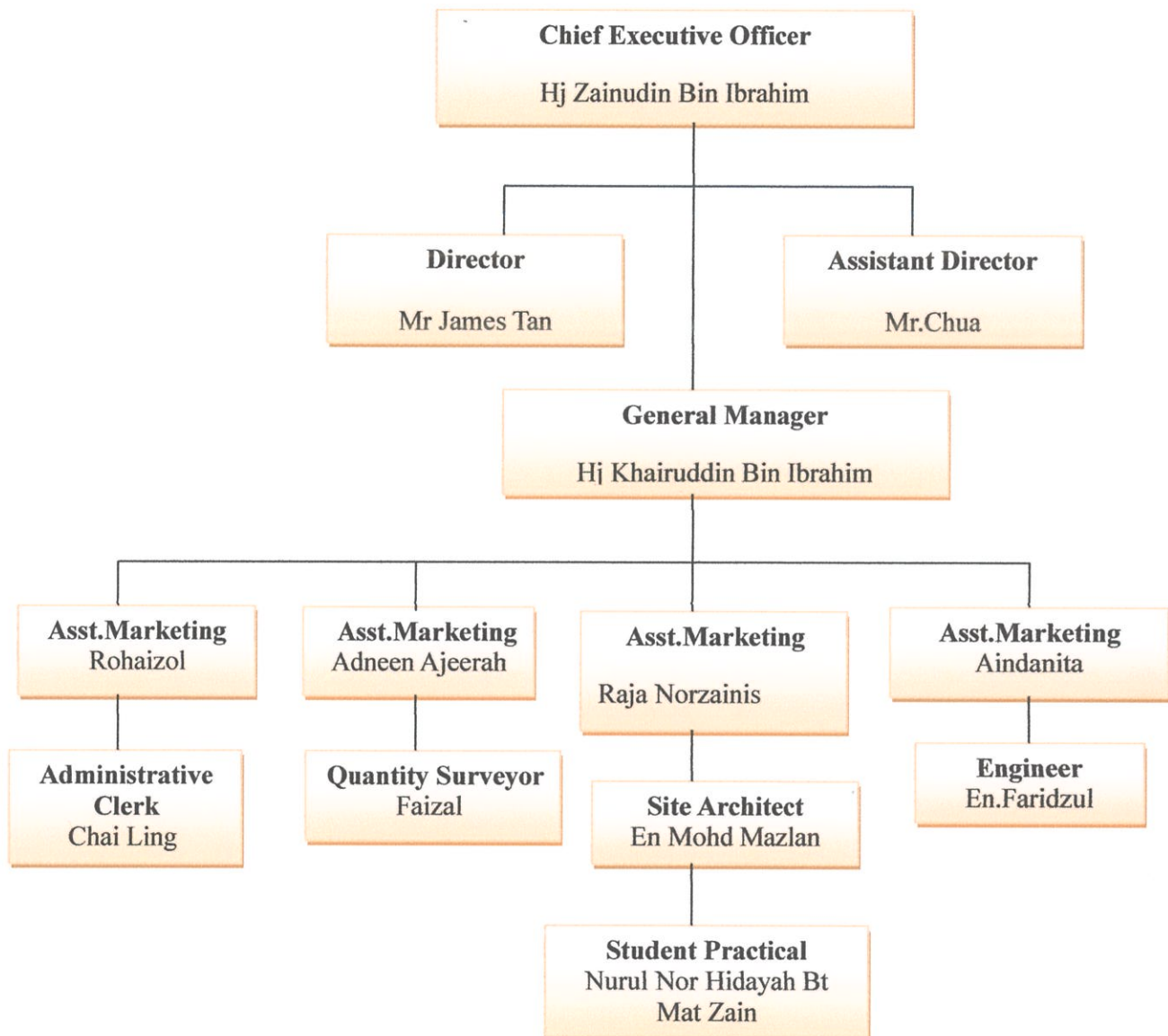
As a contractor and developer, Maarij Development will always give a strength commitment to the sub-contractor under which to achieve complete any project that receives.

2.2 COMPANY PROFILE

Table 2.1: Detail Of Maarij Development Sdn.Bhd.Company

Executive Officer	Hj.Zainudin bin Ibrahim
Director	Mr. James Tan
General Manager	Hj Khairudin bin HJ Ismail
Secretary Company	Steven Luu
Company Address	Great Vission Sdn.Bhd Unit 4.1.4 TH Floor Surian Tower,No 1,Jalan Pju 7/3,Mutiara Damansara,47810 Petaling Jaya Selangor Darul Ehsan Tel. Fax
Sales Gallery	Maarij Development Sdn.Bhd,Lot 507,Block P,Jalan Kuala Krai,Pusat Perniagaan Bandar Baru Tunjong,16010 Kota Bharu, Kelantan Darul Naim Malaysia. Tel Fax
Register Number	938497-M
Date Corporatized	10.3.2012
Type Of Business	Developer
Class	License A (PKK)
Paid Up-Capital	RM 1000,000,00

2.3 ORGANISATION CHART



2.4 LIST OF PROJECT

2.4.1 List of Current Project

Table 2.2: Current Of Project

PROJECT	INFORMATION
<p>TUNJONG PAVILION</p> 	<p>CADANGAN MEMBINA DAN MENYIAPKAN 3 TINGKAT BESERTA 1 TINGKAT BESMEN TEMPAT LETAK KERETA, TAMAN ATAS BUMBUNG DAN 2 BLOK PANGSAPURI SERVIS 13 DAN 15 TINGKAT.</p> <p>CONSTRUCTION COST : RM 91 MILLION</p> <p>STATUS : IN CONSTRUCTION</p> <p>PROJECT COMPONENT :</p> <p>3 TINGKAT BESERTA 1 TINGKAT BESMEN TEMPAT LETAK KERETA, TAMAN ATAS BUMBUNG DAN 2 BLOK PANGSAPURI 13 DAN 15 TINGKAT.</p> <p>DEVELOPER :</p> <p>MAARIJ DEVELOPMENT SDN.BHD</p>

CHAPTER 3

INTRODUCTION

3.1 Introduction

Pile foundation can be constructed depending on the stiffness of subsurface soil and ground water conditions and using a variety of construction techniques. The most common techniques are in-situ casting and pre-casting. Due to the extensive nature of the subsurface mass that it influences, the degree of uncertainty regarding the actual working capacity of a pile foundation is generally much higher than that of a shallow footing.

Pile load testing is the most definitive method of determining load capacity of a pile. Testing a pile for failure provides valuable information to the design engineer and is recommended for load tests performed prior to the foundation design. This method is applicable to all kinds of deep foundations that function in a manner similar to piles regardless of their method of installation. It does not specify a particular method to be used, but rather provides several optional methods. These tests involve the application of a load capable of displacing the foundation and determining its capacity from its response.

The capacity of the test piles was selected as the greater capacity defined by two failure criteria. The first criteria establishes the allowable design capacity as "50 percent of the applied test load which results in a net settlement of the top of the pile of up to 1.3 cm, after rebound, for a minimum of one hour at zero load." The second criterion uses Davisson's criteria as described.

3.2 BACKGROUND OF PROJECT

Proposed construction and completion of the development project Tunjong Pavilion containing complexes with one level and three level basement parking, a roof of garden and two blocks of service of apartment 13 and 15 storeys which contain:

- i Pavilion Boulevard
- ii Pavilion Garden Resort Suites I
- iii Pavilion Mall
- iv Pavilion City Resort Suites II
- v Basement & Multi-Storey Car parks (shared by the above components).

On land owned by the corporation chief minister of Kelantan, parishes of the city, country parishes kota and tiong, short district of Kota Bharu, Kelantan Darul Naim.



Figure 3.1: Model of Tunjong Pavilion project

Sources: www.tunjongpavilion.com

It is also aimed to be the new regional lifestyle haven equipped with modern infrastructures, facilities and amenities for family, social and businesses alike, which is in line with Perbadanan Menteri Besar Kelantan's (PMBK) ongoing effort to evolve BBT as the Satellite Commerce and Business in Kelantan for the State Government and Federal Government administration that encompass centre of transportation and ultimately to act as the showcase of contemporary living in this State.

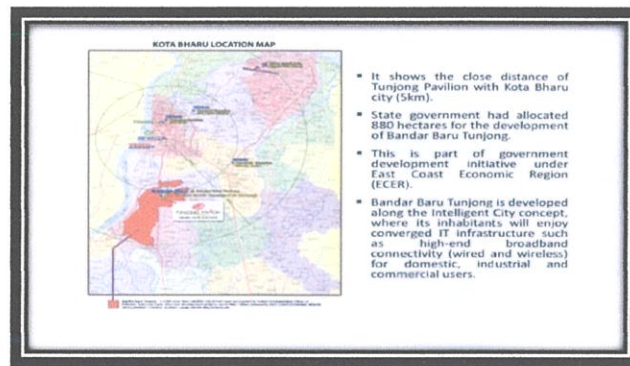


Figure 3.2: Location map

Location map for this project shows the close distance of Tunjong Pavilion with Kota Bharu city about 5km. State government had allocated 880 hectares for the development of Bandar Baru Tunjong. This is part of government development initiative under East Coast Economic Region (ECER). Bandar Baru Tunjong is developed along the intelligent City concept, where its inhabitants will enjoy converged IT infrastructure such as high-end broadband connectivity (wired and wireless) for domestic, industrial and commercial users.

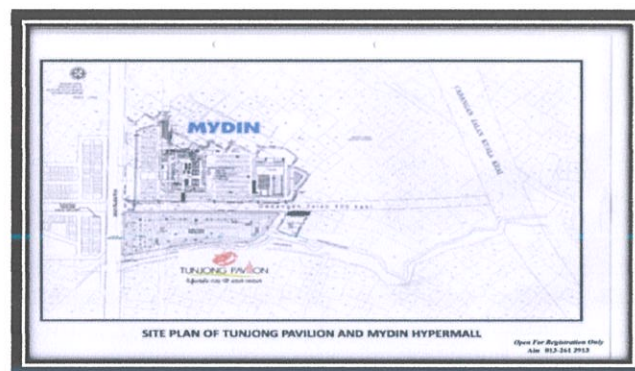


Figure 3.3: Site Plan

Site plan for Tunjong Pavilion project shows inside the site biggest Mydin Hypermall. Between Tunjong Pavilion and Mydin Hypermall have new main road. Tunjong Pavilion also will built sky bridge to connect with Mydin Hypermall.

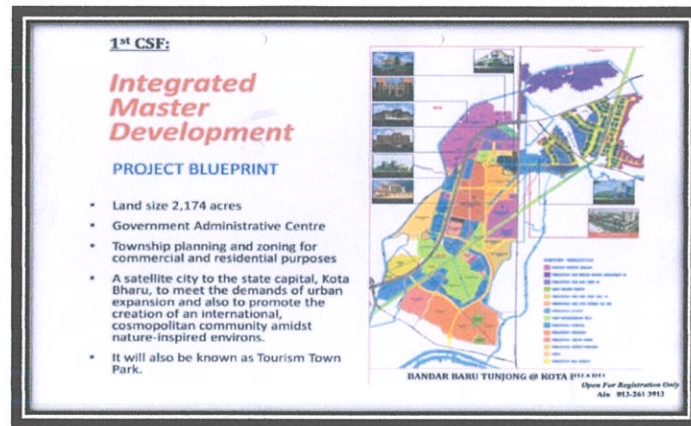


Figure 3.4: Master Plan

Based on master plan, the land size 2,176 actres. At there also is Government Administrative Centre. It is also township planning and zoning for commercial and residential purposes. A satellite city to the state capital, Kota Bharu, to meet the demands of urban expansion and also to promise the creation of an international, cosmopolitan community amidst nature-inspired environs. It will also be known as Tourism Park. In addition for this area will be built stadium negeri, masjid negeri, IPTA and others.

The construction cost for the project is estimated to apartment buildings amounted to about 91 million ringgit. Period for construction work of this apartment were taken five years to be completed and submitted to their respective owners.

Developers and owners of this apartment project is Maarij Development Sdn Bhd. Apart from being the developer and owner, Maarij Development Company also acts as the prime contractor for this project. Among the sub-contractors involved in the project are Chuan Un Chye (piling test), besides this company also involved the consultant in the project is ICON.

Tunjong Pavilion is the first project for the Maarij Development Company. The next construction around the area Tunjong Pavilion Project based on master plan is will be built is university, masjid negeri, stadium, and others. This project also nearest of site construction Mydin Hypermall. Mydin Hypermall is the largest in the Malaysia.

3.2.1 PAVILION & SUITES

As Bandar Baru Tunjong continues to develop, more businesses will be set-up and more accommodation as well as modern office facilities will be required. Tunjong Pavilion is built with 2 blocks of lifestyle suites to serve this requirement.


Be it for personal or business use, or as long-term investment, our Suites offer many great returns for investors and owners alike.

Equipped with Star-rated services and lifestyle living environment, our Suites come in fully as well as partly furnished types, where modern office designs, facilities and amenities are conveniently available.

3rd CSF:

“10 Unique *Lifestyle* Features”



Poised to channel traffic flow from all walks of life  to achieve the highest retail value and make Tunjong Pavilion a **success story** @ East Coast

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Figure 3.5: Special of Tunjong Pavilion

3.2.2 Lifestyle Development “10 Unique Features”

Poised to channel traffic flow from all walks of life 24/7 to achieve the highest retail value and make Tunjong Pavilion a success story @ East Coast.

3.2.3 1st Family Concept, Recreation & Entertainment

- i Rooftop Thematic Musolla (Surau)
- ii Kids' Zone & Child Care
- iii Children Splash Pool & Waterplay
- iv Rooftop Garden & Nursery
- v Rooftop Giant Screen for Sports Nights
- vi Family Karaoke concept
- vii 1st Cineplex in Kelantan

3.2.4 1st Regional Thematic F&B Avenue

- i 1st Hanging Garden Concept for Branded / Famous Restaurants
- ii Thematic Island Concept for Snacks & Beverage Outlets
- iii Thematic Rooftop Food Village promoting East Coast delicacies

3.2.5 1st Pavilion Community Program & i-Concierge

- i E-Solution base Membership
- ii Customer e-Loyalty Programs
- iii Wi-Fi / IP Phone

3.2.6 1st Wellness & Beauty Zone

- i Beauty Academy
- ii Gym & Fitness Centre
- iii Landscaped Jogging Track

3.2.7 1st Rooftop Plaza with M.I.C.E. Facilities

- i Multi-Purpose Events Hall
- ii Stage Shows & Mini Concerts
- iii Private & Wedding Functions
- iv Corporate Events & Annual Dinners
- v Exhibitions & Conventions
- vi Meeting & Seminars

3.2.8 Regional Outdoor & Indoor Launching Pad

- i Launching of New & Innovative Products / Services
- ii Stage Shows & Promotions

3.2.9 1st Tourism Hub in Kelantan

- i Lifestyle Shopping in Kelantan
- ii Tourist Information Centre
- iii Tour Planner & Organizer (to the famous islands /other places of attractions)
- iv Shuttle / Taxi Service
- v Traditional and Cultural Arts Performances
- vi Malaysian Handicrafts Promotion
- vii Food Village promoting East Coast delicacies
- viii Malaysia Festival Avenue
- ix East Coast Adventure (4WD trips / Beach ATV Convoy)

3.2.10 1st Sky Club in Kelantan (10,000 sq.ft.)

- i Opportunity Centre (Business networking supported by various associations)
- ii Sky Business Lounge
- iii Meeting Rooms & Business Corporate Services
- iv Sky Lounge / Dining
- v Sky Infinity Pool
- vi Sky Viewing Deck
- vii Sky Gym
- viii Sky Spa & Sauna

3.2.11 1st Kelantan Financial Centre

- i Corporate Services
- ii Consultancy & Financial Services
- iii New & latest financial investment Info / Seminars

3.2.12 Montessori Platform of Learning in a “*fun & practical* method”

- i Islamic Academy of Business & Economics
- ii ICT Learning & Experience
- iii Montessori & Child Care Centre
- iv Music & Arts Academy



Figure 3.6: Pavilion Garden Resort (Tower 1)

For the tower one or namely Pavilion Garden Resort have 16 level. Level one until level three is shop lot. At the level four is lobby and for the level five until sixteen is suite. Pavilion garden resort have by two management hotel.


For level five until level eleven manage by Pavilion Garden and for level twelve until level sixteen manage by Swiss Garden.

Built up area for this tower which level four until level 16 is 240 square foot until 493 square foot. For the selling price is RM 158 100 until RM282 500.

3rd CSF:

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For the tower one or namely Pavilion Garden Resort have 16 level. Level one until level three is shop lot. At the level four is lobby and for the level five until sixteen is suite. Pavilion garden resort have by two management hotel.

For level five until level eleven manage by Pavilion Garden and for level twelve until level sixteen manage by Swiss Garden.

Built up area for this tower which level four until level 16 is 240 square foot until 493 square foot. For the selling price is RM 158 100 until RM282 500.



Figure 3.7: Pavilion City Resort(Tower 2)

For the tower two or namely Pavilion City Resort have 16 level. Level one and level two is shop lot. Level three until level fourteen is suite and for the level fifteen and level sixteen is studio apartment

All level for this tower will be manage by Pavilion Garden except level fifteen and sixteen is prefer own use.

Built area for this tower which level three until level sixteen between 201 square foot until 464 square foot. For the selling price is RM 156 800 until RM 272 100.

3.2.13

EXAMPLE CALCULATION GUARANTEE RENTAL RETURN

<u>What is the Offer for Pavilion City Resort</u>			
* Booking Fee RM 1,000.00 Only * Free Legal Fees For SPA & Loan (our panel solicitors only) * Free Maintenance Fees * 15 years (3+3+3+3+3 years) GRR @ 7.00% P.A Based On SPA Price * Additional Bonus Up To 5.5% P.A Based On Occupancy Rate * Free 2 Pavilion City SKY Club Membership * 7 Days Free Stay Voucher And 14 Days 70% Discount Voucher Per Year			
Example (Parcel No PPCR -05-01)			
<u>For Non-Muslim</u>		<u>For Muslim</u>	
SPA price	RM156,800.00	SPA price	RM156,800.00
Downpayment 25%	RM39,200.00	Downpayment 25%	RM39,200.00
Bank Loan 75%	RM117,600.00	Bank Loan 70%	RM109,760.00
Monthly GRR	RM914.67	Monthly GRR	RM914.67
Monthly Installment	RM647.00 (25 Years)	Monthly Installment	RM603.87 (25 Years)
Surplus	<u>RM267.67</u>	Surplus	<u>RM310.80</u>
<u>Schedule of payment from the purchaser</u>			
1) Immediately upon the signing of this Agreement (10%)		RM15,680.00	
2) The foundation of the said Building (10%)		RM15,680.00	
3) The structural framework (5% Purchaser + 10% Bank)		RM7,840.00	(Step 1 to step 3 take about 4-6 months)
Occupancy Rate	GRR	Bonus	Total Return
Up to 55%	7%	0	RM 10,976.00
□ 55% to 60%	7%	0.50%	RM 11,760.00
□ 60% to 65%	7%	1.00%	RM 12,544.00
□ 65% to 70%	7%	1.50%	RM 13,481.00
□ 70% to 75%	7%	2.00%	RM 14,112.00
□ 75% to 80%	7%	2.50%	RM 14,896.00
□ 80% to 85%	7%	3.50%	RM 16,464.00
□ 85% to 90%	7%	4.50%	RM 18,032.00
□ 90%	7%	5.50%	RM 19,600.00

Guaranteed Rental Return

Pavilion Garden Resort is 6.5 percent per annum and for Pavilion City Resort is 7 percent per annum.



Figure 3.8: Pavilion Mall

Pavilion Mall is designed with ‘creativity’ and ‘customer needs’ in mind. It also promises to be a Goldmine for investors and retail business operators alike.

Pavilion Mall comprises 3 levels of lifestyle shopping, dining, family entertainment and lots of fun. It is created with a ‘Zoning’ concept, where visitors will find it easy to get what they want with a quick glance at the directory. Its rooftop is also not spared in its objective to fully utilize all available spaces.

Visitors’ cars will be kept away from rain or sun with our uniquely designed basement and multi-storey car park.

Pavilion Mall’s main advantage over its other competitors will be its management’s ability to create non-stop excitement for its retailers as well as customers. There will always be something new at Pavilion Mall.



Photo 3.1:Project signage for the parties involved

The figures above shows the parties involved in the construction project consisting of apartment project owners, designers buildings plans, structural engineers, mechanical and electrical engineers and contractor of the project.

3.3 CASE STUDY

Piling test use to see how the condition at the lower ground or to treat the soil before build the building. Piling test also to determine depth of which can excavate. Piling test is also very important to see the strange the soil for the carried the load. From the piling test, it can see or decide how much need to excavate the depth of the next pile cape which will use for real piling.

For this project the contractor choose 18 points for the pile test. 14 points for the tower one and only 4 points for the tower 2. Two type of pile used for the this piling test which type of spun pile and type of reinforce concrete pile. The depth which excavate is 48 meter. Every point the pile is planted as much four piece of pile

The type of hammer was use is hydraulic hammer. The different meter drop of hammer will use allow the size of pile. If the size of pile is big, the meter of drop also increase. It is because the big size of pile is not suitable if also used the small size drop of hammer

Every drop of hammer which drop on the pile should take the number of blow for to see how much the blow can drop every point. Every three meter number of blow will take.

3 . 3 . 1 FACTORS USING THE PILE

The use of piling as one important element in the construction of a structure have long started in the history of this world engineering. Piling used as supporters and a tool to transfer the load of the structure to the ground. The use of piles is caused by:

- i The existence of appropriate bearing layer is not available. The land under the structure doesn't work well or otherwise unable to bear the burden caused by the deep foundation structure when used.
- ii Maneuverability of land causing sedimentation compression large when shallow foundations use.
- iii Distribution of land under the ground level which are not uniform.
- iv For the purpose of preventing the thrust force action from bottom surface such as action hydrostatic.
- v To obtain a strong in excavation works.

3.3.2 DESIGN CRITERIA AND SELECTION OF FOUNDATION PILE

Selection and design of the system of piling should follow the conditions:

- i Have appropriate safety factor to the failure of the structure of the piling and also the land support system that pile.
- ii Total sedimentation and settling differences should not large so as not to affect the condition of service structures.
- iii Strength of the land piling and.

The security and stability of the structure near condition and service should be taken care of. However, there are three main factors in the design and selection of appropriate piles which are:

- i The situation underground.
- ii Site construction and type of structure.
- iii The resistance of piles.

3.3.3 THE SITUATION UNDERGROUND

As is known, the selection of the type of piling Foundation system subject to addition to underground conditions. The use of piling works for the underground situation is divided into 4 sections, which are:

- i Weak strata land above.
- ii Weak land on hard clay or soil granular.
- iii Hard clay or clay maneuverability compression.
- iv Weak land on a hard stone.

3.3.4 STRENGTH OF PILE

Steel piling has a long lifetime of durability in the most of the land if the pile is in the ground which is not interrupted. The steel piles should be protected from exposure to sea water, saltwater or soil that has a chemical reaction disorder. Piling sticks easily rot especially above the water level of the Earth. To stand still piling pour, it will not be able to withstand an aggressive thing because of the difficulty to forecast and find out its adequacy the concrete poured is enough compressed or not. Thus, this type of pile can be given by placing permanent concrete linings in coated with metal or plastic gauge

3.3.5 TYPE OF PILE

There are various types of piles used in construction. Every pile used must be in accordance with the specifications of the plan that has been prepared by consultants or public works department. Among them are:

- i Spun Pile.
- ii Sheet Pile.

RC Pile. basis of piles can be divided into several classifications depending on some condition. Classification of piling up can be divided into:

- i Installation method
- ii Bearing capacity
- iii Materials used

iv Function

v The Form Of Piling

3.3.6 SIZE AND GEOMETRY

Make sure the size and geometry are good. Pile must be upright and all pieces must be exactly 90 degrees.

3.3.7 MARKING

Spikes sign shall be carried out from the main grid line of the proposed structure. Before peg pile, pile position shall be marked with a pin, spikes can be detected.

3.3.8 POSITION

For the top position was cut at ground level or higher than the ground level, the maximum allowable deviation between the center point of the center of the pile as shown on the plan attached to and shall not exceed 75 mm in all directions.

3.3.9 QUALITY OF PILE

Cement used must be Ordinary Portland Cement (OPC). Molding must be made in one process. The test drop, compression factor and also test cubes should be made as usual. The pile can be removed from the mold box after 3 days. Moulding can continue sehingga 10 days and after 14 days, the pile may be lifted with use 'liftingholes' or 'togglees' provided and arranged in the right way so that the pile does not suffer damage while traveling to the site can only be cultivated construct .After a month with the aim of keep maturity of the pile.

3.3.10 INITIAL SET UP BEFORE DROP OF HAMMER

Before piling works are carried out, the initial setup should be performed. Among them include the following:

- i System to determine the position and level pile as there is in the painting work. Reference marks such as stone floors should be outside the work area to avoid any interference on it.
- ii Identify the type of plant and others equipment used for piling works as well as the methods and means of its use. For example hydraulic hammer should match heavy weight piles used. Whether past or hydraulic hammer used is subject to the scope, complexity and the nature of the ground. Diesel hammer is not appropriate for limestone area due to the difficulty to control the hammer drop when required.
- iii Determine the value set for 10 a shot hydraulic hammer to control how it piling works when it is planted based on it such as names appear in the drawing or document job.
- iv Provide boring data piling works. Relating to the position of piles, the arrangements number of blow drying yard it planted, weight and distance falls of hammer and other important information to be prepared properly.
- v Provide equipment to control the gradient and alignment of piles to be planted is composed of ' plum bob ' suspended sentence spirit level.

3.3.11

LIST OF MACHINERY USED IN PILING TEST

Table 3.0: List of equipment and machinery

Equipment/Machinery	Uses
Piling Machine	Use for drop the pile
Sprit Level	Sprit level use for straighten the pile at the every point
Paint	Paint use for painting the pile after connect the next pile to avoid the pile become rusty
Plate	Plate use the piling machine easy to move on if the site is not open space.
Mobile Crane	Mobile crane use for transfer the pile or lift from at the site to the nearest the point.
Backhoe	Backhoe use for clearance the site at want to do piling test and also excavate the certain point which want to do PDA test.
PDA test equipment	PDA test use for take the result the pile at underground condition

3.3.12 METHOD STATEMENT OF PILING TEST

Method statement for the piling test has ten steps

Step 1: Mark the point which will was piling test



Photo 3.2: Benchmark the point of piling

The point must be mark for more easy the work piling test. It is also to avoid from change the point which one need to pile. Mark the point use the temporary wood. At there also have what type pile will use and what size of pile. When do like this it can avoid change the size and type of pile. It is because not all point use same the type and size of pile.

Step 2: Clear the site use the backhoe which place wants to do piling test



Photo 3.3: Clearance at the point piling

Before do the process of piling, clearance the site use the backhoe. Clear the site intend to easy for piling machine move on. Piling machine need the open space for move. That's why the site need clear. If not the piling machine will hard to move to point to another point. This site no needs to clear all space because the site needs to excavate for do basement. Only certain space only to clear which space wants to do piling test

Step 3: Piling shall be mark with the size of the feet and metres



Photo 3.4: Marking the pile by using paint

The pile must be mark every three meter length use the paint. It is intended to easy for engineer to take the number of blow. Usually at the first pile, the pile easy to put inside underground because the surface of the soil is soft. So the engineer no needs to take the number of blow the pile.

Step 3: Use wood for lining to easy before blow the pile



Photo 3.5: Lining the wood at the piling machine

Before the piling machine use for drop the pile, it must lining with hard wood. The function this wood for layer to blow the pile. For example without the wood, the process of blow the pile will take a long time and become hard for this process. For this piling process, the worker uses three layer of wood. The layers of wood also depend on the size of pile.

Step 4: Piling machine is lifting the pile at the point which want to piling



Photo 3.6: Piling machine drop the pile

The pile was carried by piling machine and lifting at the point. At that time the worker cannot be near at their because possibility the pile will be fall of or busted. When the piling machine started blow the pile, assistant engineer must along take a number blow of pile. The number of blow this pile should take because wants to see how

much the number of blow every point. Number of blow is different at every point because it depends on condition of soil.

Step 5: Adjust the pile in order to located at the true point



Photo 3.7: Adjust the pile for to straight

After the pile lifting at the point, the worker should adjust the pile in order to straight a pile. To straight this pile must use the own equipment. For example, the worker should pull or push a pile according to straightness position the point of pile. At the same time the driver piling machine also should control the machine.

Step 6: The worker using the spirit level for straight the pile located at the second pile



Photo 3.8: Measure the pile use sprit level

After the pile at the straightness position, to more ensure the worker should use level gauge. Then work of piling can start which the piling machine can begin drop top the pile.

Step 7: Welding the pile for more stronger



Photo 3.9: Welding the pile for the connect

To connect the pile it must be connected using welding methods to strengthen for more strength condition the pile at the underground.

Step 8: Paint the pile for avoid rusty in the underground



Photo 3.10: Painting the pile

To avoid the pile become rusty at the lower ground the pile must be paint after do a welding process. Type of paint which use is anti-rust paint.

Step 9: Unidentified set the pile at the site



Photo 3.11: Take the set

Set is the final distance of penetration into the soil pile for every blow. Usually it is taken while last ten shots. The purpose of set to determine the ability to bear was taken is final(ultimate bearing capacity)pile. Pile type should be 'set' is kind does not need the kind of piling fricative. Set is taken to put on the graph paper and pencil is place pile horizontally in a straight and flat wood was support by two barrier. Each blow on the pile and put the pencil removed from right to left a lot of ten blow. Last dimension set for each pile shall be recorded whether have at transparency rate in inches for every ten piles that are required to produce 25 mm as transparency.

Step 10: The assistant engineer take number of blow

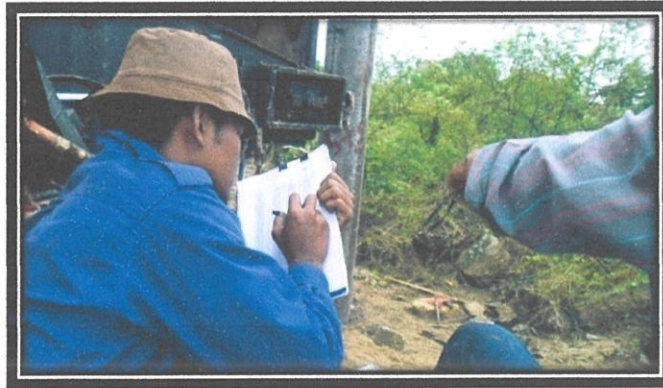


Photo 3.12: Take the number of blow every pile

Every single pile was a blow by the piling machine, the assistant engineer should take the number of blow. Only while do piling test just take number of blow because for see or to decide what type of pile and what size of pile want to use.



Photo 3.13: Pile at the site construction

Two types of pile will use at the site construction. The pile have many sizes and have two types which spun pile and reinforcement concrete pile. Length for every pile is 12 metres.



Photo 3.14: Reinforcement Concrete Pile

Usually high rise building not use a RC piles or have high pressure . The high rise building not suitable for use the RC piles. This piles also use as stone wall construction besides in the slopes. For this project, have three size was use for the piling test. First size is 250 x 250 square R.C pile, second size is 275 x 275 R.C pile and last one is 300 x 300 R.C pile..Every point the pile was plant four pile and length for every pile is 12 metres . The provisional lengths of pile shall be 48 metres or set. The concrete grade for the precast R.C piles shall be of grade 45.



Photo 3.15: Spun Pile

Spun Pile is another type of piling which has higher strength and able to carry more loads from any structure with fewer number of points. Most probably Spun piles are made of prestressed or spun concrete. Spun piles are constructed in round and hollow in cross section and have the lengths up to 12 metres. Spun Piles have a nominal bearing capacity in the range 1690 kN to 3500 kN.

Bridge construction is suitable use spun pile and usually use at the high rise building. It is because the spun pile is more strength compare the R.C pile. The spun pile need based on size or measure which was confirm by engineer and designer For this project use different size of spun pile and have three types of size. First sizes is 350mm, second is 400 mm and 450 mm..

Every point the pile was plant four pile and length for every pile is 12 metres . The provisional lengths of pile shall be 48 metres or set. The concrete grade for the spun piles shall be of grade 45.



Photo 3.16: Plate was use to easy move on

Plate was use at the site construction because the area not open space. Piling machine should open space for easy to move on to next point. In addition, the site is sloppy that's why plate is use at the site construction. Number of plate was use depend on condition at the site. For this project the plate was use is three. At the same time, the other worker also should control the place fall of plate. The plate should control slowly because it is very big so hard to control.



Photo 3.17:Metres blow drop of hammer

This figure show the meters at the machine piling for easier to see by the engineer to ensure metres drop of hammer is follow the request or not. It is because every point use different metres drop of hydraulic hammer.



Photo 3.18: Piling machine show drop of pile

The piling machine show has blow the pile at the site construction. The worker should control a piling machine.



Photo 3.19: Pile which was plant

Show the pile type of r.c pile and spun have been done plant at the site construction.

3.3.13 PDA TEST

The PDA system consists of two strain transducers and two accelerometers attached to opposite sides of the pile to measure the strain and acceleration in the pile. The force is computed by multiplying the measured signals from a pair of strain transducers attached near the top of the pile by the pile area and modulus. The velocity measurement is obtained by integrating signals from a pair of accelerometers also attached near the top of the pile.

PDA test is commonly used for the following purposes:

(i) Evaluation of driven pile capacity

Soil resistance along the shaft and at the pile toe generates wave reflection that travel to the top of the driven piles. The time the reflections arrive at the pile top is a function of their locations along the pile length. The measured force and velocity at the pile top thus provide necessary information to estimate soil resistance and its distribution.

(ii) Measurement of pile stress during driving

Compressive stress at pile top is measured directly from strain transducers.

(iii) Measurement of hammer energy delivered to the piles
the hammer energy delivered to the pile is directly computed as the work done on the pile from the integral of force times displacement and this can be calculated as force times velocity integrated over time.

(iv) Determine if pile damage has occurred.

Pile integrity can be checked by inspecting the measurements for early tension returns (caused by pile damage) before the reflection from the pile toe. The lack of such reflections assures a pile with no defects. There is a growing trend of using PDA test to check driven pile capacity instead of traditional static load test which is more expensive and time consuming. Some engineers may have reservation on the use of dynamic formula to evaluate driven pile capacity.

3.3.14 METHOD STATEMENT FOR PDA TEST

Step 1: The backhoe excavates the hole which wants to do PDA test.



Photo 3.20: Backhoe excavate the point

Every point which want to do PDA test should excavate depth six feet use the backhoe. For excavate should excavate at the right and left at the side of pile.

Step 2: The worker install equipment of PDA test



Photo 3.21: Equipment of PDA test was install

The worker install the equipment of the PDA test at the pile which want to do a PDA test. This equipment will be detect when piling machine drop on the pile and the engineer can see from the that.

Step 3: The worker measure the pile use spirit level



Photo 3.22: Measure the pile

Before the piling machine drop the pile, the other worker should measure the pile use level gauge to ensure the pile is having straight position or not. When the pile has straight position, the equipment of PDA test can detect the condition of that pile.

Step 4: The worker take a set when a pile was drop by piling machine



Photo 3.23: Take the set

After that, every pile should blow as 10 times of drop for to take the result as the PDA test. For the last blow the worker should the set use the graph paper.

Step 5: Take the result based on the result of PDA test



Photo 3.24: Engineer fill the result based on result PDA test

Lastly engineer will take the information or the result based on the equipment of PDA test. At there have all information about the condition of pile which have been done.

Then engineer decide, based on result from PDA test. This project will use pile type of spun pile which is size 350 diameters.

CHAPTER 4

CONCLUSION AND RECOMMENDATIONS

4.1 Introduction

This chapter is the last chapter in the study report. It aims to formulate and propose a result of information and data were obtained from the piling test process. At the end of chapter 4 is also put forward some suggestions for improvements that can be done.

4.2 Conclusion

As a conclusion, before start construct the building, piling test is very important because for to see the condition of soil at the site. Especially to build high rise building. From that, the engineer can decide how much depth to excavate for real piling.

In the whole process of piling work should be studied by every student building because it is very important and useful to know how piling properly planted. This is the basis for the construction of a large building requiring research, skills and expertise in doing this work. As a contractor, piling must be crushed weight to ensure quality and safety of buildings construct.

4.3 Recommendations

Piling works will require very tight security because it involves heavy machinery and work processes that endanger lives. From my observations, I found that there are a few who do not wear eye protection when handling the work especially when work piles merge starter to pile extension. This is very dangerous because of the concern during the merge will extension pile of dust splashed solder. This will cause the employee eyes can cause blindness or damaged.

In addition, the tools used are not stacked or stored properly. Area for litter piling with tools such as welding sets, hammer and spirit level placed next to the machine 'peeling machine' If an employee tripped or their feet stuck in the where equipment will be cause accidents. In my view, the safety aspects must be well again to work - other construction work that an accident or injury. In addition, the need to provide a tool box to keep all the equipment that was used to always be in place and not scattered.

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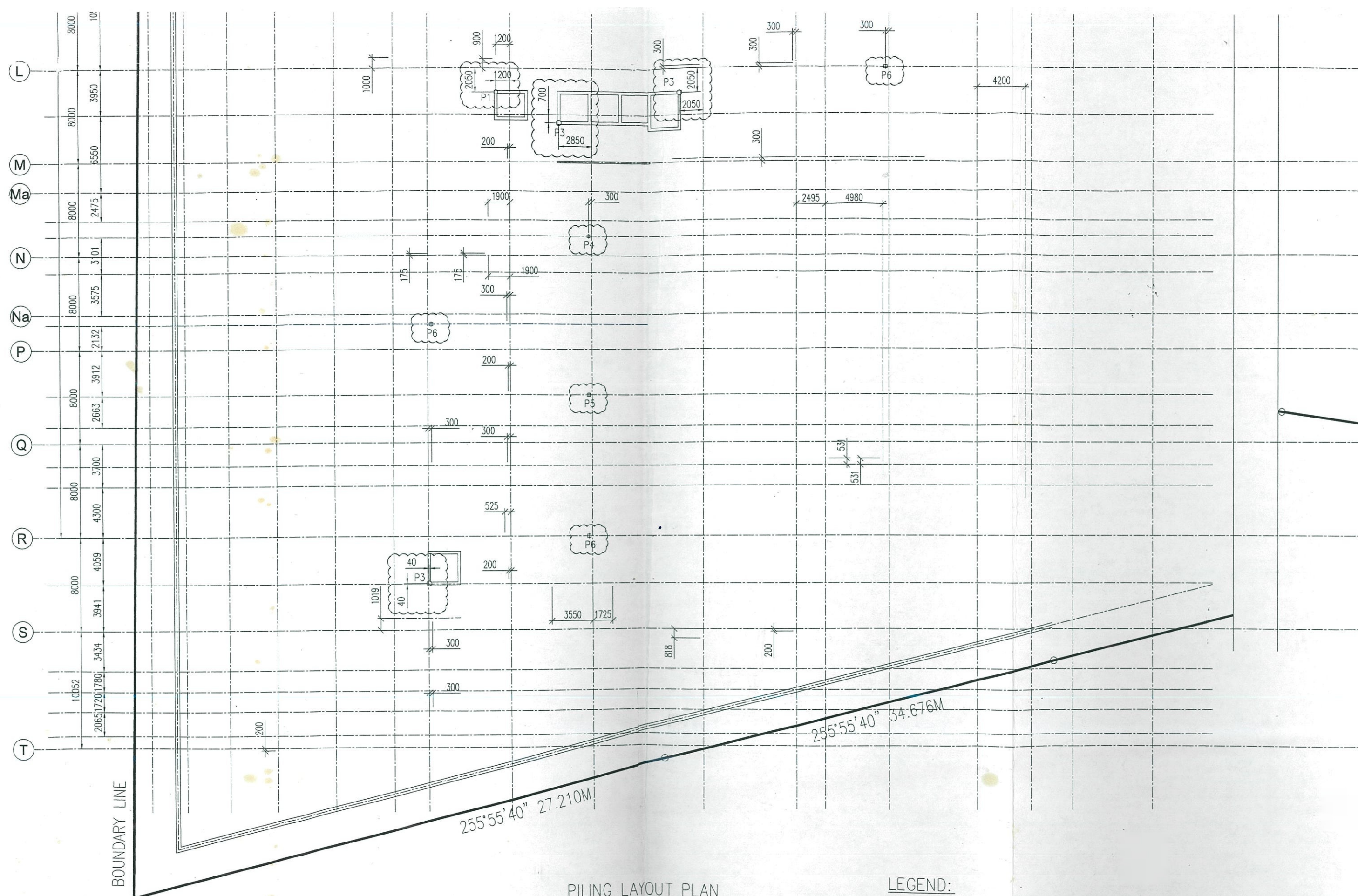
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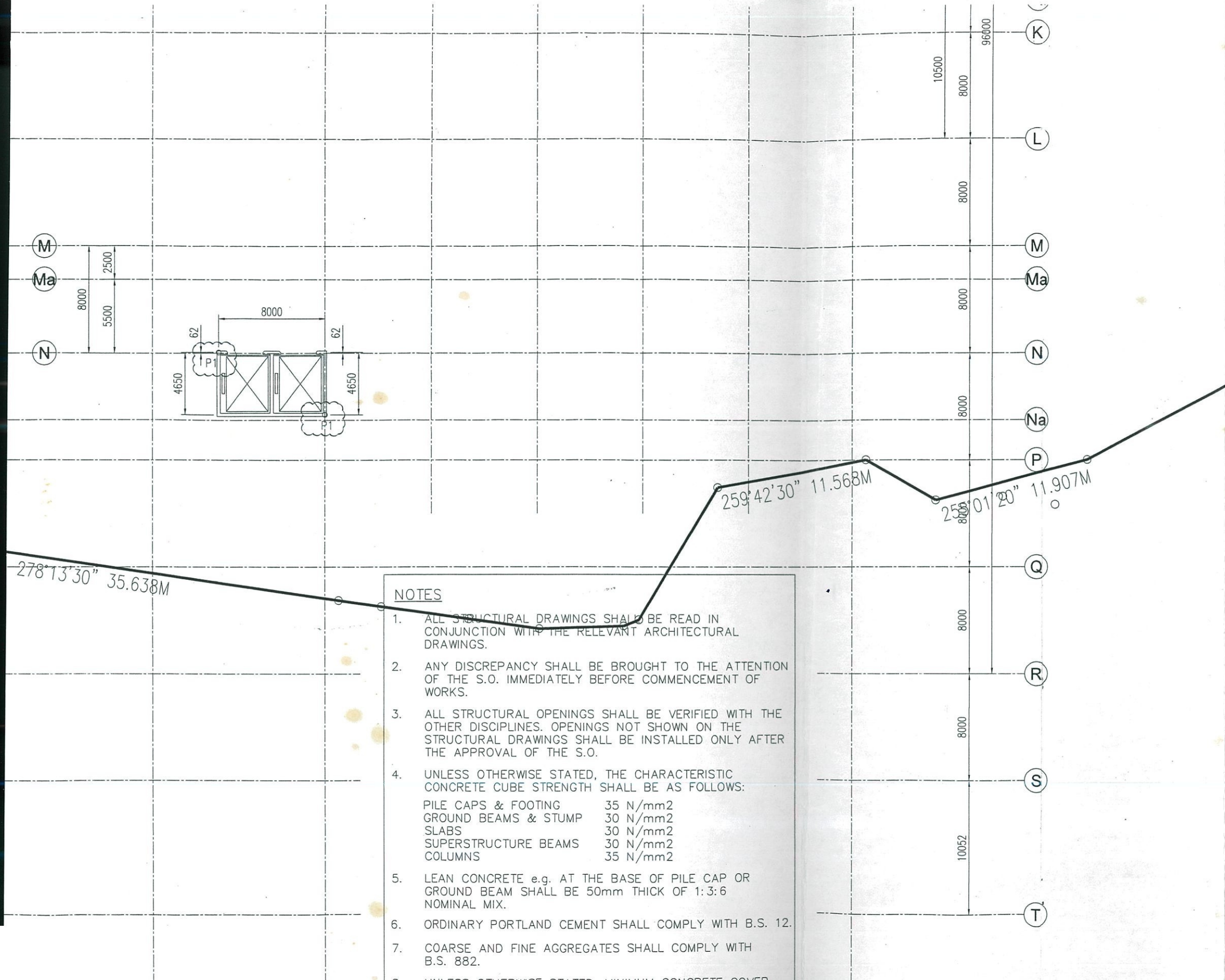
APPENDIX 1



PIILING LAYOUT PLAN
SCALE 1:300

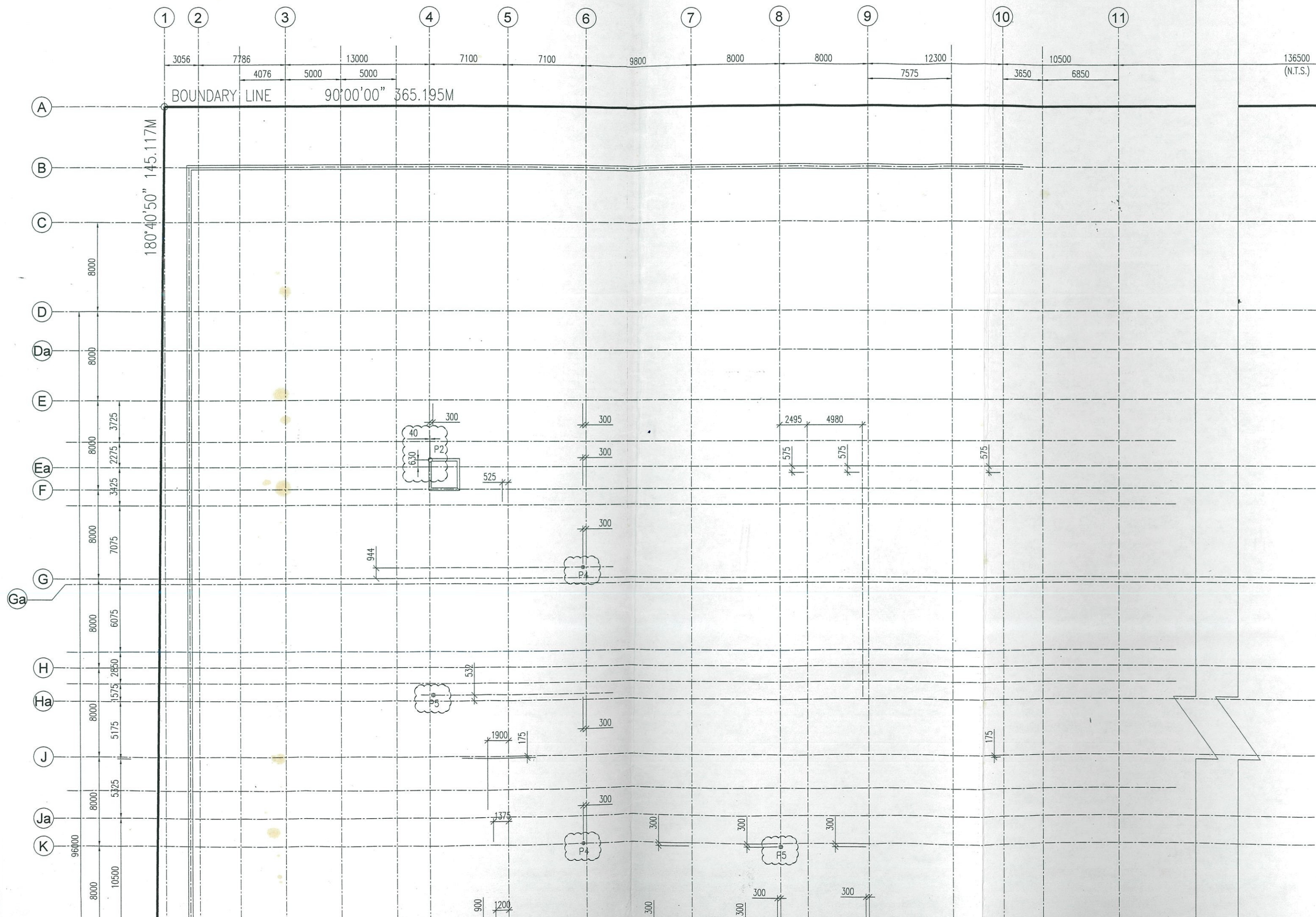
LEGEND:

- P1 - 350mm ϕ SPUN PILE
- P2 - 400mm ϕ SPUN PILE
- P3 - 450mm ϕ SPUN PILE
- P4 - 250 x 250 SQUARE R.C. PILE
- P5 - 275 x 275 SQUARE R.C. PILE
- P6 - 300 x 300 SQUARE R.C. PILE



- NOTES
1. ALL STRUCTURAL DRAWINGS SHALL BE READ IN CONJUNCTION WITH THE RELEVANT ARCHITECTURAL DRAWINGS.
 2. ANY DISCREPANCY SHALL BE BROUGHT TO THE ATTENTION OF THE S.O. IMMEDIATELY BEFORE COMMENCEMENT OF WORKS.
 3. ALL STRUCTURAL OPENINGS SHALL BE VERIFIED WITH THE OTHER DISCIPLINES. OPENINGS NOT SHOWN ON THE STRUCTURAL DRAWINGS SHALL BE INSTALLED ONLY AFTER THE APPROVAL OF THE S.O.
 4. UNLESS OTHERWISE STATED, THE CHARACTERISTIC CONCRETE CUBE STRENGTH SHALL BE AS FOLLOWS:
PILE CAPS & FOOTING 35 N/mm²
GROUND BEAMS & STUMP 30 N/mm²
SLABS 30 N/mm²
SUPERSTRUCTURE BEAMS 30 N/mm²
COLUMNS 35 N/mm²
 5. LEAN CONCRETE e.g. AT THE BASE OF PILE CAP OR GROUND BEAM SHALL BE 50mm THICK OF 1:3:6 NOMINAL MIX.
 6. ORDINARY PORTLAND CEMENT SHALL COMPLY WITH B.S. 12.
 7. COARSE AND FINE AGGREGATES SHALL COMPLY WITH B.S. 882.
 8. UNLESS OTHERWISE STATED, MINIMUM CONCRETE COVER TO THE MAIN BARS SHALL BE AS FOLLOWS:
PILE CAPS & FOOTING 50mm
GROUND BEAMS & STUMP 40mm
SLABS 25mm
SUPERSTRUCTURE BEAMS 25mm
COLUMNS 25mm
 9. ALL STEEL REINFORCEMENT FOR THE REINFORCED CONCRETE SHALL COMPLY WITH B.S. 4449. ALL HIGH YIELD REINFORCING STEEL (T) SHALL HAVE A MINIMUM YIELD STRENGTH $f_y=460$ N/mm². ALL MILD REINFORCING STEEL (R) SHALL HAVE A MINIMUM YIELD STRENGTH $f_y=250$ N/mm².
 10. UNLESS OTHERWISE STATED LAP LENGTHS OF

INDEX	AMENDMENT	DATE
DEVELOPER'S / OWNER'S SIGNATURE :		
ENGINEER'S SIGNATURE : " Saya memperakui bahawa perinci-perinci dalam pelan-pelan ini adalah menurut kehendak-kehendak Undang-undang Kecil Bangunan Seragam 1984 dan saya setuju terima tanggungjawab penuh dengan sewajarnya"		
ICON Consulting Engineers Sdn. Bhd. CIVIL . STRUCTURAL . GEOTECHNICAL (CO.852977-M) NO. 12B, JALAN KENARI 6, BANDAR PUCHONG JAYA, 47100 PUCHONG, SELANGOR DARUL EHSAN. EMAIL: iconcesb@yahoo.com		
JOB : CADANGAN MEMBINA DAN MENYIAPKAN BAGI PROJEK PEMBANGUNAN TUNJONG PAVILION YANG MENGANDUNGI KOMPLEKS PERNIAGAAN 3 TINGKAT BESERTA 1 TINGKAT BASEMEN TEMPAT LETAK KERETA (TLK), TAMAN ATAS BUMBUNG (RUANG MUSOLLA DAN RIADAH) DAN 2 BLOK PANGSAPURI SERVIS 13 DAN 15 TINGKAT, DI ATAS TANAH MILIK PERBADANAN MENTERI BESAR KELANTAN, MUKIM KOTA, DAERAH KOTA DAN MUKIM TIONG, DAERAH PENDEK, JAJAHAN KOTA BHARU, KELANTAN DARUL NAIM, UNTUK TETUAN PERBADANAN MENTERI BESAR KELANTAN.		
TITLE : (STRUCTURE) TEST PILE LAYOUT PLAN 1		
DRAWN BY : Zan	CHECKED BY : W.T.	



Contractor Must Check All Dimensions At Site.
Any Discrepancies Or Uncertainties Must Be Reported
Immediately To Engineer Before Commencement of Physical Works.

1. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND LEVELS ON SITE, AND RESOLVE ANY DISCREPANCY WITH THE ENGINEER BEFORE COMMENCEMENT OF ANY WORKS.
2. THE CONTRACTOR SHALL, BEFORE COMMENCEMENT OF PILING, SUBMIT FULL DETAILS OF PILE DRIVING EQUIPMENT COMPLETE WITH SET CRITERIA CALCULATIONS FOR THE APPROVAL BY THE ENGINEER.
3. PROVISIONAL LENGTHS OF PILE SHALL BE 48 METRES OR SET.
4. A FACTOR OF SAFETY OF AT LEAST TWO (2) ON THE DESIGN LOAD IS TO BE OBTAINED ON TEST LOADING
5. FOR LENGTHENING OF THE PILE, THE JOINT SHALL BE WELDED BY FULL WELDING OF THE M.S. PLATES AT THE PILE HEAD OF THE INITIAL PILE AND THE TOE OF THE EXTENSION PILE.
6. THE MAXIMUM DEVIATION OF PILES FROM THEIR POSITIONS SHALL NOT EXCEED 75mm.
7. THE CONCRETE GRADE FOR THE PRECAST R.C. PILES SHALL BE OF GRADE 45.
8. THE CONTRACTOR SHALL KEEP A RECORD SHOWING THE DEPTH OF EACH PILE FOR SUBMISSION TO THE ENGINEER AT WEEKLY INTERVALS.

THE CONTRACTOR SHALL ALSO DELIVER TO THE ENGINEER "AS BUILT" DRAWINGS IN REPRODUCIBLE FORM WITH DETAILS OF LENGTH OF PILE (FROM CUT-OFF LEVEL), THE FINAL SET AND THE ECCENTRICITY OF THE PILE AND ANY OTHER INFORMATION WHICH THE ENGINEER REQUIRES.

9. COVER TO MAIN REINFORCEMENT = 30mm TO 40mm.
10. CORNER RADIUS, R = 20mm
11. ALL DIMENSIONS ARE IN mm, UNLESS OTHERWISE STATED.

[illegible]

APPENDIX 2

CADANGAN MEMBINA DAN MENYIAPKAN BAGI PROJEK PEMBANGUNAN TUNJONG PAVILION YANG MENGANDUNGI KOMPLEKS PERNIAGAAN 3 TINGKAT BESERTA 1 TINGKAT BASEMENT TEMPAT LETAK KERETA, TAMAN ATAS BUMBUNG, DAN 2 BLOK PANGSAPURI SERVIS 13 DAN 15 TINGKAT DI ATAS TANAH MILIK PERBADANAN MENTERI BESAR KELANTAN, MUKIM KOTA, DAERAH KOTA DAN MUKIM TIONG, DAERAH PENDEK, JAJAHAN KOTA BHARU, KELANTAN

Hiley's Formula For Set Calculation Of 350mm dia Spun Pile

Type of pile	:	350mm spun pile	
Weight (pile) per m	:	160	kg/m
Working Load of pile	:	90	tonnes
Estimated Pile Penetration	:	48	meter
Proposed Pile Combination (12m x 4 nos)	:	48	meter
Driving Hammer	:	Hydraulic Hammer	
Weight of Ram, W	:	7.0	tonnes
Weight of pile, P	:	7.7	tonnes
Drop height, H	:	18.8	inch 470 mm
Coeff. of Restitution, N	:	0.25	
Temp. compression, C	:	0.56	inch

EFFICIENCY FACTOR

$$f = \frac{W + (P \times N \times N)}{W + P}$$

0.5095

ULTIMATE RESISTANCE

$$R = \frac{W \times H \times f}{S + C/2}$$

Using factor of safety = 2 times working load of pile

required R = 180 tonnes

$$S = \frac{W \times H \times f}{R} - \frac{C}{2}$$

S = 0.372528 - 0.28

S = 0.0925 inch

set/10 blow required = 0.925 inch or 24 mm

CADANGAN MEMBINA DAN MENYIAPKAN BAGI PROJEK PEMBANGUNAN TUNJONG PAVILION YANG MENGANDUNGI KOMPLEKS PERNIAGAAN 3 TINGKAT BESERTA 1 TINGKAT BASEMENT TEMPAT LETAK KERETA, TAMAN ATAS BUMBUNG, DAN 2 BLOK PANGSAPURI SERVIS 13 DAN 15 TINGKAT DI ATAS TANAH MILIK PERBADANAN MENTERI BESAR KELANTAN, MUKIM KOTA, DAERAH KOTA DAN MUKIM TIONG, DAERAH PENDEK, JAJAHAN KOTA BHARU, KELANTAN

Hiley's Formula For Set Calculation Of 400mm dia Spun Pile

Type of pile	:	400mm spun pile
Weight (pile) per m	:	209 kg/m
Working Load of pile	:	100 tonnes
Estimated Pile Penetration	:	48 meter
Proposed Pile Combination (12m x 4 nos)	:	48 meter
Driving Hammer	:	Hydraulic Hammer
Weight of Ram, W	:	7.0 tonnes
Weight of pile, P	:	10.0 tonnes
Drop height, H	:	24 inch 600 mm
Coeff. of Restitution, N	:	0.25
Temp. compression, C	:	0.56 inch

EFFICIENCY FACTOR

$$f = \frac{W + (P \times N \times N)}{W + P}$$

0.4478

ULTIMATE RESISTANCE

$$R = \frac{W \times H \times f}{S + C/2}$$

Using factor of safety = 2 times working load of pile

required R = 200 tonnes

$$S = \frac{W \times H \times f}{R} - \frac{C}{2}$$

S = 0.376155 - 0.28

S = 0.0962 inch

set/10 blow required = 0.962 inch or 24 mm

PROJECT: CADANGAN MEMBINA DAN MENYIAPKAN BAGI PROJEK PEMBANGUNAN TUNJONG PAVILLION YANG MENGANDUNGI KOMPLEKS PERNIAGAAN 3 TINGKAT BESERTA 1 TINGKAT BESMEN TEMPAT LETAK KERETA (TLK), TAMAN ATAS BUMBUNG (RUANG MUSOLLA DAN RIADAH) DAN 2 BLOK PANGSAPURI SERVIS 13 DAN 15 TINGKAT, DIATAS TANAH MILIK PERBADANAN MENTERI BESAR KELANTAN, MUKIM KOTA, DAERAH KOTA DAN MUKIM TIONG, DAERAH PENDEK, JAJAHAN KOTA BHARU, KELANTAN DARUL NAIM.

Hiley's Formula For Set Calculation Of 300mm x 300mm R.C Pile

Type of pile : 300mm x 300mm Reinforced concrete pile
 Weight (pile) per m : 216 kg/m
 Working Load of pile : 90 tonnes
 Estimated Pile Length : 48 meter
 Proposed Pile Combination (12m x 4Nos) : 48 meter
 Driving Hammer : Hydraulic Hammer
 Weight of Ram, W : 7.0 tonnes
 Weight of pile, P : 10.368 tonnes
 Drop height, H : 27.56 inch 700 mm
 Coefficient of Restitution, N : 0.25
 Temporary Compression, C : 0.75 inch

EFFICIENCY FACTOR

$$f = \frac{W + (P \times N \times N)}{W + P}$$

0.4404

ULTIMATE RESISTANCE

$$R = \frac{W \times H \times f}{S + C/2}$$

Using factor of safety = 2 times working load of pile

required R = 180 tonnes

$$S = \frac{W \times H \times f}{R} - \frac{C}{2}$$

S = 0.471957 - 0.375

S = 0.0970 inch

set/10 blow required = 0.970 inch or 25 mm

PROJECT: CADANGAN MEMBINA DAN MENYIAPKAN BAGI PROJEK PEMBANGUNAN TUNJOI PAVILLION YANG MENGANDUNGI KOMPLEKS PERNIAGAAN 3 TINGKAT BESERTA 1 TINGKAT BESMEN TEMPAT LETAK KERETA (TLK), TAMAN ATAS BUMBUNG (RUANG MUSOLLA DAN RIADAH) DAN 2 BLOK PANGSAPURI SERVIS 13 DAN 15 TINGKAT, DIATAS TANAH MILIK PERBADANAN MENTERI BESAR KELANTAN, MUKIM KOTA, DAERAH KOTA DAN MUKIM TIONG, DAERAH PENDEK, JAJAHAN KOTA BHARU, KELANTAN DARUL NAIM.

Hiley's Formula For Set Calculation Of 250mm x 250mm R.C Pile

Type of pile : 250mm x 250mm Reinforced concrete pile

Weight (pile) per m : 150 kg/m

Working Load of pile : 70 tonnes

Estimated Pile Length : 48 meter

Proposed Pile Combination (12m x 4m) : 48 meter

Driving Hammer : Hydraulic Hammer

Weight of Ram, W : 7.0 tonnes

Weight of pile, P : 7.2 tonnes

Drop height, H : 18 inch 450 mm

Coefficient of Restitution, N : 0.25

Temporary Compression, C : 0.75 inch

EFFICIENCY FACTOR

$$f = \frac{W + (P \times N \times N)}{W + P}$$

0.5246

ULTIMATE RESISTANCE

$$R = \frac{W \times H \times f}{S + C/2}$$

Using factor of safety = 2 times working load of pile

required R = 140 tonnes

$$S = \frac{W \times H \times f}{R} - \frac{C}{2}$$

$$S = 0.472183 - 0.375$$

$$S = 0.0972 \text{ inch}$$

set/10 blow required = 0.972 inch or 25 mm

CADANGAN MEMBINA DAN MENYIAPKAN BAGI PROJEK PEMBANGUNAN TUNJONG PAVILION YANG MENGANDUNGI KOMPLEKS PERNIAGAAN 3 TINGKAT BESERTA 1 TINGKAT BASEMENT TEMPAT LETAK KERETA, TAMAN ATAS BUMBUNG, DAN 2 BLOK PANGSAPURI SERVIS 13 DAN 15 TINGKAT DI ATAS TANAH MILIK PERBADANAN MENTERI BESAR KELANTAN, MUKIM KOTA, DAERAH KOTA DAN MUKIM TIONG, DAERAH PENDEK, JAJAHAN KOTA BHARU, KELANTAN

Hiley's Formula For Set Calculation Of 450mm dia Spun Pile

Type of pile	:	450mm spun pile	
Weight (pile) per m	:	242	kg/m
Working Load of pile	:	110	tonnes
Estimated Pile Length	:	48	meter
Proposed Pile Combination (12m x 4 nos)	:	48	meter
Driving Hammer	:	Hydraulic Hammer	
Weight of Ram, W	:	7.0	tonnes
Weight of pile, P	:	11.6	tonnes
Drop height, H	:	28	inch 700 mm
Coeff. of Restitution, N	:	0.25	
Temp. compression, C	:	0.56	inch

EFFICIENCY FACTOR

$$f = \frac{W + (P \times N \times N)}{W + P}$$

0.4150

ULTIMATE RESISTANCE

$$R = \frac{W \times H \times f}{S + C/2}$$

Using factor of safety = 2 times working load of pile

required R = 220 tonnes

$$S = \frac{W \times H \times f}{R} - \frac{C}{2}$$

S = 0.369745 0.28

S = 0.0897 inch

set/10 blow required = 0.897 inch or 23 mm

APPENDIX 3

CHUAN UN CHYE (M) SDN. BERHAD. (COMPANY NO: 614892-W)

Date: 22/11/12 Day: Thursday Time: 11.20 AM
 Location: Tanjung Pauh Station Consultant:
 Type of pile: 275 mm x 275 mm Weight of hammer: 71
 Drop of hammer: 560 mm Pile ref no: K/S (P5)
 Length of starter pile: 12 m Extension pile: 12e + 12e + 12e
 Penetration below ground level: No. of joints: 1 + 1 + 1

Depth (Metre)	No of blows	Depth (Metre)	No of blows	Depth (Metre)	No of blows	Depth (Metre)	No of blows
0.00-0.30		15.00-15.30	2	30.00-30.30	10	45.00-45.30	20
0.30-0.60		15.30-15.60	2	30.30-30.60	7	45.30-45.60	20
0.60-0.90		15.60-15.90	2	30.60-30.90	7	45.60-45.90	20
0.90-1.20		15.90-16.20	2	30.90-31.20	7	45.90-46.20	30
1.20-1.50		16.20-16.50	2	31.20-31.50	10	46.20-46.50	40
1.50-1.80	1	16.50-16.80	3	31.50-31.80	12	46.50-46.80	40
1.80-2.10	2	16.80-17.10	3	31.80-32.10	8	46.80-47.10	40
2.10-2.40	3	17.10-17.40	3	32.10-32.40	6	47.10-47.40	35/474m
2.40-2.70	3	17.40-17.70	3	32.40-32.70	7	47.40-47.70	10
2.70-3.00	5	17.70-18.00	3	32.70-33.00	7	47.70-48.00	
3.00-3.30	9	18.00-18.30	3	33.00-33.30	7	48.00-48.30	
3.30-3.60	5	18.30-18.60	2	33.30-33.60	7	48.30-48.60	
3.60-3.90	5	18.60-18.90	2	33.60-33.90	6	48.60-48.90	
3.90-4.20	6	18.90-19.20	2	33.90-34.20	6	48.90-49.20	
4.20-4.50	6	19.20-19.50	2	34.20-34.50	6	49.20-49.50	
4.50-4.80	6	19.50-19.80	3	34.50-34.80	6	49.50-49.80	
4.80-5.10	6	19.80-20.10	3	34.80-35.10	6	49.80-50.10	
5.10-5.40	6	20.10-20.40	3	35.10-35.40	6	50.10-50.40	
5.40-5.70	6	20.40-20.70	3	35.40-35.70	6	50.40-50.70	
5.70-6.00	5	20.70-21.00	3	35.70-36.00	6	50.70-51.00	
6.00-6.30	4	21.00-21.30	3	36.00-36.30	6	51.00-51.30	
6.30-6.60	4	21.30-21.60	3	36.30-36.60	6	51.30-51.60	
6.60-6.90	4	21.60-21.90	4	36.60-36.90	6	51.60-51.90	
6.90-7.20	3	21.90-22.20	4	36.90-37.20	6	51.90-52.20	
7.20-7.50	3	22.20-22.50	3	37.20-37.50	6	52.20-52.50	
7.50-7.80	3	22.50-22.80	3	37.50-37.80	6	52.50-52.80	
7.80-8.10	3	22.80-23.10	3	37.80-38.10	6	52.80-53.10	
8.10-8.40	3	23.10-23.40	6	38.10-38.40	6	53.10-53.40	
8.40-8.70	3	23.40-23.70	7	38.40-38.70	6	53.40-53.70	
8.70-9.00	3	23.70-24.00	14	38.70-39.00	6	53.70-54.00	
9.00-9.30	3	24.00-24.30	14	39.00-39.30	5	54.00-54.30	
9.30-9.60	3	24.30-24.60	14	39.30-39.60	5	54.30-54.60	
9.60-9.90	3	24.60-24.90	14	39.60-39.90	5	54.60-54.90	
9.90-10.20	2	24.90-25.20	13	39.90-40.20	5	54.90-55.20	
10.20-10.50	2	25.20-25.50	13	40.20-40.50	5	55.20-55.50	
10.50-10.80	3	25.50-25.80	13	40.50-40.80	5	55.50-55.80	
10.80-11.10	3	25.80-26.10	13	40.80-41.10	5	55.80-56.10	
11.10-11.40	3	26.10-26.40	13	41.10-41.40	13	56.10-56.40	
11.40-11.70	3	26.40-26.70	10	41.40-41.70	20	56.40-56.70	
11.70-12.00	3	26.70-27.00	10	41.70-42.00	20	56.70-57.00	
12.00-12.30	3	27.00-27.30	10	42.00-42.30	26	57.00-57.30	
12.30-12.60	2	27.30-27.60	12	42.30-42.60	26	57.30-57.60	
12.60-12.90	2	27.60-27.90	12	42.60-42.90	26	57.60-57.90	
12.90-13.20	2	27.90-28.20	12	42.90-43.20	26	57.90-58.20	
13.20-13.50	2	28.20-28.50	12	43.20-43.50	26	58.20-58.50	
13.50-13.80	2	28.50-28.80	12	43.50-43.80	18	58.50-58.80	
13.80-14.10	2	28.80-29.10	10	43.80-44.10	18	58.80-59.10	
14.10-14.40	2	29.10-29.40	10	44.10-44.40	26	59.10-59.40	
14.40-14.70	3	29.40-29.70	10	44.40-44.70	20	59.40-59.70	
14.70-15.00	2	29.70-30.00	10	44.70-45.00	20	59.70-60.00	

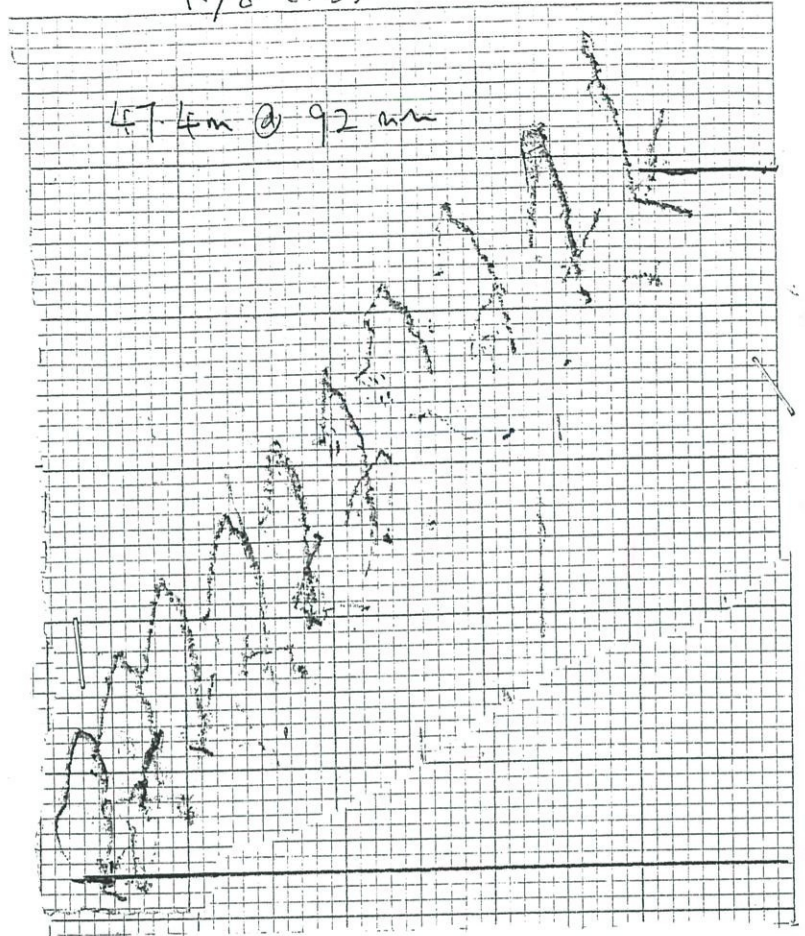
Final mset per 10 blows: 92 mm

Remarks:

92 mm

K/8 (P5)

47.4m @ 92 mm



APPENDIX 4

PDA TEST POINTS:

1. Ea/4 (P2)

2. G/6 (P4)

3. L/5 (P1)

4. L/7 (P3)

5. Na/4 (P6)


6. P/6 (P5)

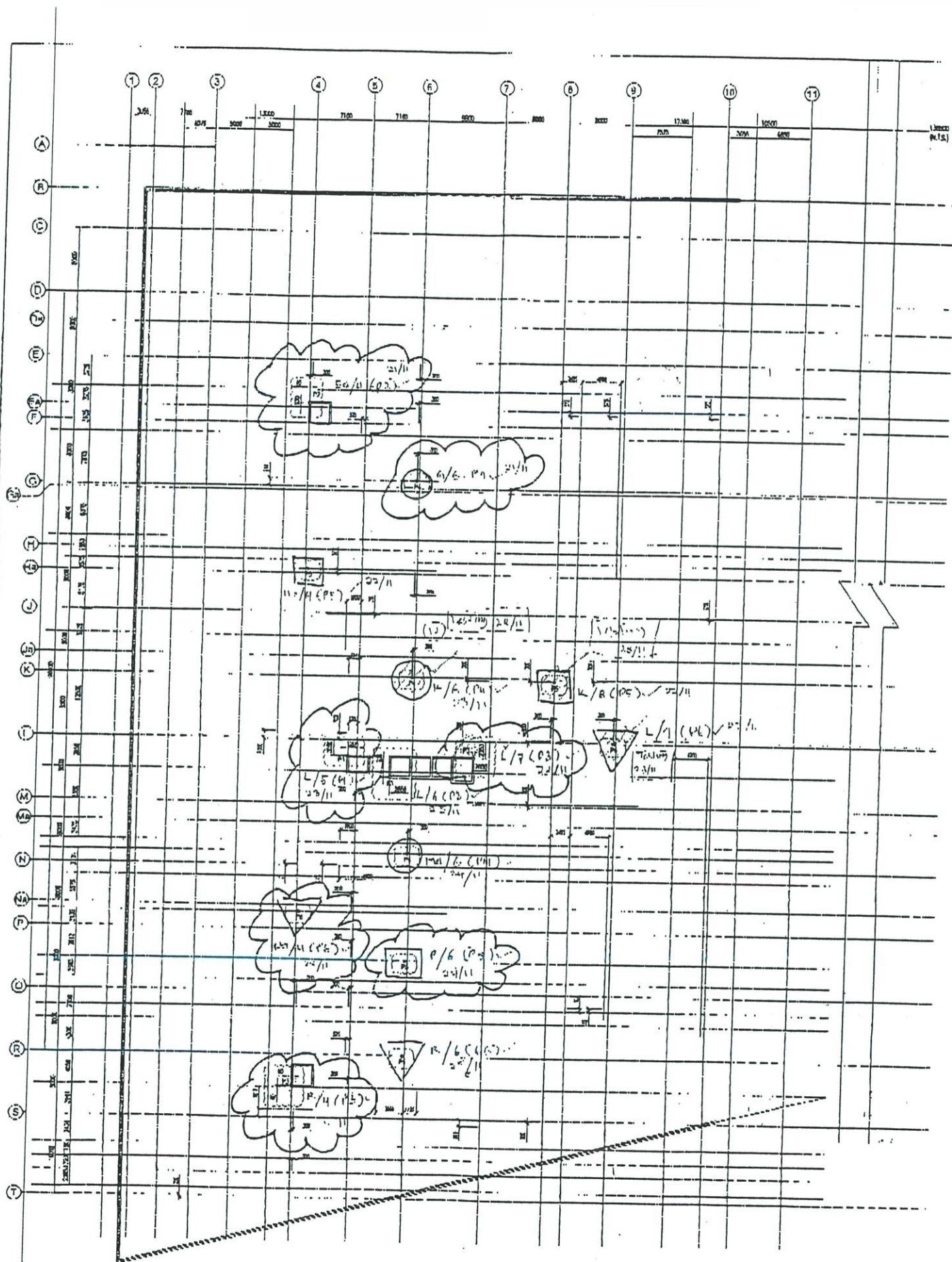
7. R/4 (P3)

8. Ea/28 (P2)

9. E/30 (P2)

10. Na/25 (P1)

 - PDA POINTS



PILING LAYOUT PLAN

LEGEND:

- P1 24" x 24" x 10' 0" pile
- P2 48" x 48" x 10' 0" pile
- P3 120" x 120" x 10' 0" pile
- P4 24" x 24" x 10' 0" pile
- P5 48" x 48" x 10' 0" pile
- P6 120" x 120" x 10' 0" pile
- P7 24" x 24" x 10' 0" pile
- P8 48" x 48" x 10' 0" pile
- P9 120" x 120" x 10' 0" pile
- P10 24" x 24" x 10' 0" pile
- P11 48" x 48" x 10' 0" pile

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NOTES ON PRECAST R.C. PILE AND PILING

1. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND LEVELS ON SITE AND RESOLVE ANY DISCREPANCY WITH THE ENGINEER BEFORE COMMENCEMENT OF ANY WORK.
2. THE CONTRACTOR SHALL, BEFORE COMMENCEMENT OF PILING, SUBMIT FULL DETAILS OF PILE DRIVING EQUIPMENT COMPLETE WITH SET CRITERIA CALCULATIONS FOR THE APPROVAL BY THE ENGINEER.
3. MINIMUM LENGTH OF PILE SHALL BE AS NOTED ON SET.
4. A FACTOR OF SAFETY OF AT LEAST TWO (2) ON THE DESIGN LOAD IS TO BE OBTAINED FOR THAT PILING.
5. THE (CONTINUITY) OF THE PILE LINE JOIN SHALL BE DEFINED BY FULL RECORDING OF THE PILE PLATES AT THE PILE HEAD UP THE PILE AND THE TOP OF THE EXTENSION PILE.
6. THE MAXIMUM DEVIATION OF PILES FROM THEIR POSITIONS SHALL NOT EXCEED 75mm.
7. THE ALLOWABLE SLIDE FOR THE PRECAST R.C. PILES SHALL BE AT GRADE +0.
8. THE CONTRACTOR SHALL KEEP A RECORD SHOWING THE DEPTH OF EACH PILE FOR SUBMISSION TO THE ENGINEER AT WEEKLY INTERVALS.
9. UPON COMPLETION OF ALL PILING WORKS, THE CONTRACTOR SHALL SUBMIT TO THE ENGINEER THE COMPLETE PILING RECORD (2 SETS) PROPERLY BOUND AND TILED.
10. THE CONTRACTOR SHALL ALSO DELIVER TO THE ENGINEER "AS BUILT" DRAWINGS IN RETRIEVABLE FORM WITH DETAILS OF LENGTH OF PILE (FROM C.U.I.-OFF LEVEL), THE FINAL SET AND THE ECCENTRICITY OF THE PILE AND ANY OTHER INFORMATION WHICH THE ENGINEER REQUIRES.
11. COVER TO MAIN REINFORCEMENT = 20mm TO 40mm.
12. CURVED RADIUS, R = 20mm.
13. ALL DIMENSIONS ARE IN MM, UNLESS OTHERWISE STATED.

- ### NOTES
1. ALL STRUCTURAL DRAWINGS SHALL BE READ IN CONJUNCTION WITH THE RELEVANT ARCHITECTURAL DRAWINGS.
 2. ANY DISCREPANCY SHALL BE BROUGHT TO THE ATTENTION OF THE S.E. IMMEDIATELY BEFORE COMMENCEMENT OF WORKS.
 3. ALL STRUCTURAL OPENINGS SHALL BE VERIFIED WITH THE OTHER DISCIPLINES. OPENINGS NOT SHOWN ON THE STRUCTURAL DRAWINGS SHALL BE INSTALLED ONLY AFTER THE APPROVAL OF THE S.E.
 4. UNLESS OTHERWISE STATED, THE CHARACTERISTIC CONCRETE CUBE STRENGTH SHALL BE AS FOLLOWS:
 PILE CAPS & FOOTING 35 N/mm²
 GROUND BEAMS & STUMP 30 N/mm²
 SLABS 30 N/mm²
 SUPERSTRUCTURE BEAMS 30 N/mm²
 COLUMNS 35 N/mm²
 5. IF AN ELEVATION e.g. AT THE BASE OF PILE CAP OR GROUND BEAM SHALL BE 30mm THICK OF U.C.G.
 6. ORDINARY PORTLAND CEMENT SHALL COMPLY WITH B.S. 12.
 7. CEMENT AND THE AGGREGATE SHALL COMPLY WITH B.S. 882.
 8. UNLESS OTHERWISE STATED, MINIMUM CONCRETE COVER TO THE MAIN BARS SHALL BE AS FOLLOWS:
 PILE CAPS & FOOTING 50mm
 GROUND BEAMS & STUMP 40mm
 SLABS 25mm
 SUPERSTRUCTURE BEAMS 25mm
 COLUMNS 30mm
 9. ALL STEEL REINFORCEMENT FOR THE REINFORCED CONCRETE SHALL COMPLY WITH B.S. 4449. ALL HIGH YIELD REINFORCING STEEL (1) SHALL HAVE A MINIMUM YIELD STRENGTH $f_y = 460$ N/mm². ALL WELD REINFORCING STEEL (2) SHALL HAVE A MINIMUM YIELD STRENGTH $f_y = 250$ N/mm².
 10. UNLESS OTHERWISE STATED, LAP LENGTHS OF REINFORCEMENT SHALL BE AS FOLLOWS:
 TENSION 44 DIAMETER
 COMPRESSION 44 DIAMETER

DIRECTOR'S SIGNATURE:
 I hereby certify that the design and construction of the project conform to the requirements of the relevant codes and standards and that the design is safe and sound.

Consulting Engineers Sdn. Bhd.
 CIVIL, STRUCTURAL, GEOTECHNICAL
 (S.S. 25777-M)
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 47100 Puchong, Selangor Darul Ehsan, Malaysia.
 Tel : 03-8921 1111 Fax : 03-8921 1112
 Email : info@puchong1.com.my

NOTES:
 1. CADANGAN MEMBINA DAN MELAKSANAKAN PROJEK PELAKSANAAN TUKANG PANGKAP YANG MENYANDUNG KOMPLEKS PERKOTAAN 1 THOKAT BERGITA 1 THOKAT BARAHEN TEMPAT LETAK KERETA (ILUK) TANAH ATAS BUNYUNG BUKIT MURCI 1 A DAN BUKIT 1 DAN 2 BLOK PANGKAPUR SERVE 13 DAN 15 THOKAT, DI ATAS TANAH MILIK PERBADANAN MPVETRI BESAR KELANTAN, MUKIM KOTA, DAERAH KOTA DAN KANTON TONG, DAERAH PENDEK, JAJARAN KOTA PAUWU, KAJANGAN (PAUWU) NAMA UTUK
 TETUAN PERBADANAN MENTERI BESAR KAJANTAN

REF : 17/14/100
17-81 PILE LAYOUT PLAN 1
 DESIGNED BY : S.E.
 DATE : 14 OCTOBER 2012
 SCALE : 1:500
 SHEET NO. : 1131/ST/PLP/1
 TOTAL SHEETS : 1

APPENDIX 5



FIELD SHEET FOR PDA TESTING

PROJECT	TUNJONG PAVILLION, KELANTAN
CLIENT	CHUAN UN CHYE S/B

PILE DETAILS

Identification #	Ea/28
Location	
Driven/ Casted Date	27/11/2012
Pile Type	SPUN PILE
Grade	80
Pile Size (mm)	400x80
Total Length (m)	36.0
Combination (top-bottom)	12+12+12

HAMMER DETAILS

Hammer Type	HYD
Ram Weight (tonne)	7.0T

LOAD DETAILS

Working Load (tonne)	100T
Test Load (tonne)	200T

TRANSDUCER DETAILS

Gauges	F1	F2	A1	A2
Serial #	H801	H815	26910	25389
Calibration	92	92	930	935

PDA DETAILS

PAK/ PAL Serial #	3284L
Pilename, PN	Ea/28
Length Below Gauge (m), LE	35.6
Length of Penetration (m), LP	35.4
Area (cm ²), AR	804.25
Density (T/m ³), SP	2.60
Modulus (T/cm ²), EM	513
Wave Speed (m/s), WS	4400
CASE Damping Factor, Jc	0.5
Type of Testing	(RES) EOD/ MON

PDA FIELD RESULTS

* RMX is indicative only. The data shall be subjected to CAPWAP analysis for final capacity.

BLOW #	RMX (tonne)	FMX (tonne)	CSX (MPa)	EMX (tonne-m)	VMX (m/s)	DFN (mm)	SET (mm)			Drop Ht (m)	Integrity
9	201	143	17.5	2.30	2.36	1mm	18mm	10blow		0.7	BTA=100%
12	219	164	20.0	2.94	2.68	2mm				1.0	BTA=100%

REMARKS:

For Analysis:
DATA VERIFIED

Yes

Remarks:

** Integrity - O.K., Damaged, Broken or for further analysis

CLIENT'S REPRESENTATIVE

WITNESSED BY

For DYNAMIC PILE TESTING SDN BHD

(Certified that the test has been conducted satisfactorily)

Signature

Signature

Signature

Name: MOHD FARIDZUL

Name:

Date: 06/02/2013

Position: Supervisor

Consultant/ Others:

Time:

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