DEPARTMENT OF BUILDING SURVEY

FACULTY OF ARCHITECTURE, PLANNING AND SURVEYING

UNIVERSITY OF TECHNOLOGY MARA

SUBSTRUCTURE WORK

FOR PROJECT OF

SINGLE STOREY TERRACED HOUSES AT MUKIM ROMPIN, DAERAH ROMPIN, PAHANG.

JUNE 2015 – OCTOBER 2015

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PREPARED FOR : PN. SITI ZUBAIDAH HASHIM

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ACKNOWLEDGEMENT

Alhamdulillah, all praises to Allah for the strengths and His blessing in completing this report Substructure Work for the project 'Single Storey Terraced Houses At Mukim Rompin, Daerah Rompin, Pahang. According to the schedule set successfully. On this occasion, I wish to express my gratitude goes to Encik Mohd Nazeri B. Mohammad for giving me the opportunity to undergo industrial training at the Company Kota Sutera Sdn. Bhd. and thanks also to my supervisor, Rahman Shah Bin Kamarudeen for giving me the opportunity to learn by practical at construction sites, and invaluable experience as knowledge to me in the construction work. This gratitude also goes to my supervisor lecturer, Puan Siti Zubaidah Hashim, who is willing to provide guidance and tutoring during the process of preparing this report. To friends who were willing to help and inspire as well as to the parties involved, directly or indirectly, thousands of thanks for giving me encouragement throughout the learning process is to realize that in this report. Lastly, before withdrawing, I hope that my work can provide a useful guide to me and bring benefits to the judge.

CHAPTER 1

COMPANY BACKGROUND

CHAPTER 1 COMPANY BACKGROUND

1.1 INTRODUCTION

Kota Sutera Sdn Bhd or known as KSSB has been incorporated in Malaysia for more than five years. The company is working closely with the state government of Johor Darul Takzim in developing a piece of land in the district of Mersing.

Kota Sutera Sdn Bhd is planning of building and developing a new residential and commercial area. This area compromising of 22 commercial shop lots, 77 low cost houses, 11 low medium cost houses and 147 medium cost single and double storey houses on lot 108, 1539 and 5023 in Mukim Padang Endau. KSSB's units will be balance safety, cutting edge future and a positive atmosphere for all tenants. This sale will be provided with unmatched levels of customer service and attention. Sales are projected to be about RM 12 million for the first phase and growing for the next phases.

This project will be launch and put under operation by Kota Sutera Sdn Bhd itself which is 100% bumiputera owned. Under the company close observation and operation, this project had been projected to be ready in three to four years' time.

KSSB will target three distinct customer segments. The largest segment that they will service fishermen settlement around the area. This segment is growing and will be set as the company main potential customers. This segment especially attractive

since most of the local properties that are geared towards local community are run down and poor quality units. The second segment would be middle to low income bumiputera since we have a lot for bumiputera reserve.

KSSB will initially focus their effort on selling and developing the future properties. Once the properties are purchased each unit would be provided with quality finishing and safety measures will be implemented ensuring a cutting edge, safe environment. This course of action will be initially pursued as a way to efficiently capital and establish a reputation within the community. Future projects may include custom builds outs.

1.2 COMPANY BACKGROUND

Kota Sutera Sdn Bhd is spearheaded by the Group Executive Chairman, Dato' Hasan bin Arifin. Though 20 years of it's chairman excellent leadership and dynamic entrepreneur skills, this company has moved into a new paradigm and has excelled significantly on housing development and the construction business.

The optimum position that the company sees for its future is to be nationally recognized as a highly successful and professionally respected company that delivers on its promises, and work towards improvement in all its undertakings. In doing this, it does its part as a respectable business corporation towards improving the standards in housing development to the community and the nation as a whole.

Kota Sutera mission and vision is to make the company a model organization in housing development renowned for the quality and beauty it delivers in every housing developed to its clients.

In essence the vision of the company is to establish itself a highly credible, respected and premier corporation in the field of housing development. Its mission is to attain success as a socially responsible Malaysian Corporation which excels in all its professional business ventures.

In Kota Sutera we are committed to providing superior customer service with the highest standards and professionalism. In delivering the highest quality service, we are committed to the following principles:

• respond to your needs
• treat you with friendliness, care, respect, and integrity
• provide you with timely and reliable service
• provide you with clear and accurate information
• make it convenient for you to do business with us

The Value that guides our work is:
• We uphold quality as our first priority
• We are customer-focused
• We are effective and efficient at our tasks

• We practice continuous improvement
• We provide reliable and timely service
• We embrace Information and Communication Technology (ICT)
• We are also profit-orientated

The Value that guide our culture is:
• We are team
• We are a caring employer
• We are mindful of our social responsibilities
• We believe in integrity
• We approach our tasks with professionalism
• We emphasize staff development and growth
• We trust, support and respect each other
• We take pride in our work
• We practice two way effective communication

1.3 PRODUCT AND SERVICE OFFERED HOUSING DEVELOPMENT

Any developer who intends to carry out a project is required to obtain a housing developer's licence from the Kementerian Perumahan before he commences construction of the housing project.

Developers can only sell housing units after obtaining a Permit Iklan dan Jualan (Akta Pemajuan Perumahan (Kawalan dan Perlesenan) 1966 (Peraturan 5 (4)) Peraturan-peraturan Pemajuan Perumahan) and Building Plan approval from local authority.

Licensed developers are required to use the standard form of Option to Purchase and Sale & Purchase Agreement in the sale of housing units.

Licensed developers are required to deposit monies paid by purchasers into Housing Development Account (HDA) for the housing project. Withdrawals from the Housing Development Account can only be made for purposes related to the housing project.

A licensed housing developer undertaking a housing project is required to open and maintain a Housing Development Account for the housing project with a bank or financial institution. Types of monies to be deposited into and withdrawn from the Project Account are stated in the Housing Development Account (HDA) Rules.
The licensed housing developer must deposit into the Housing Development Account (HDA)

- all monies paid by a purchaser (including the booking fee) towards the purchase of a unit
- all progress claim obtained for the construction of the housing project (Architect Certificate is required)
- Monies in the Housing Development Account can only be withdrawn by the licensed housing developer for purposes related to the housing project.

1.4 COMPANY PROFILE

Company Name	: Kota Sutera Sdn Bhd
Registration no	: 193537-A
Date of incorporation	: 14 July 1995
Place of incorporation	: Johor,Malaysia
Regist red office address	: 24,Jalan Sulam,Taman Sentosa,80150 Johor Bahru, Johor Darul Takzim
Telephone / Fax No	: 07-7945199
Board of directors	: Dato' Hasan Bin Arifin Fahrizal bin Dato' Hasan Mohd Nazeri B. Mohammad
Share Holders	: Dato' Hasan Bin Arifin Fahrizal bin Dato' Hasan Mohd Nazeri B. Mohammad
Authorized capital	: RM 1,000,000.00
Paid up capital	: RM 825,002.00
Company secretary	: T J Wang
Principal bankers	: Public Bank Berhad 812, Jalan Aman, Taman Bahagia, 86900 Endau, Johor Darul Takzim CIMB Bank Berhad No 4, Jalan Ismail, 86800 Mersing, Johor Darul Takzim
Auditors	: H.L Lim & Co 24, Jalan Sulam, Taman Sentosa, 80150 Johor Bahru, Johor Darul Takzim

Company Secretary	: T.J. Wang Accounting Management Sdn Bhd 24, Jalan Sulam, Taman Sentosa, 80150 Johor Bahru, Johor Darul Takzim
Solicitors	: Syarikat Rodziah No 66, First Floor, Jalan Ismail, 86800 Mersing, Johor Darul Takzim

1.5 LIST OF PROJECT

1.5.1 Complete Project

No	Project Name	Start Date	Actual Complete Date
1	Cadangan Pembinaan Dewan Serbaguna Untuk Orang Ramai Di Atas Lot 3270, Mukim Padang Endau Daerah Mersing, Johor Darul Takzim	5 Mei 2011	15 Mei 2012
2	Cadangan Pembinaan Taman Markisa Fasa 3 Yang Mengandungi 21 Unit Rumah Teres Kos Sederhanan Setingkat Di Atas Lot Ptd 5023 Mukim Padang Endau, Daerah Mersing, Johor Darul Takzim. (PTD 539-5401, PTD 5402-5411, PTD 5412-5422**)**	20 January 2013	24 March 2014

3	Cadangan Pembinaan Taman Sutera Merah Yang Menngandungi 66 Unit Rumah Teres Kos Sederhana Setingkat Di Atas Lot 600 Mukim Mersing, Daerah Mersing, Johor Darul Takzim. (PTD 19230-PTD 19244, PTD 19245-PTD 19257, PTD 19270, PTD 19271- PTD 19283, PTD 19284-PTD 19295)	1 June 2012	23 September 2014
4	Cadangan Pembinaan Taman Markisa Fasa 3 Yang Mengandungi 10 Unit Rumah Teres Kos Sederhana Setingkat Di Atas Lot PTD 5023 Mukim Padang Endau, Daerah Mersing, Johor Darul Takzim. (PTD 5381- PTD 5390)	22 April 2014	22 April 2015

Table 1.5.1 : List Of complete Project

Source KSSB 2015

1.5.2 Project In Progress

No	Project Name	Start Date	Actual Complete Date
1	Cadngan Pembangunan Di Atas Lot 5209 (Lot Asal 608) MUKIM Rompin Daerah Rompin, Pahang . 8 Units 2 Tingkat Rumah Teres 24'x 80' I. 17 Unit 1 Tingkat Rumah Teres 24'x 70' II. 4 Unit 1 Tingkat Rumah Berkembar 40'x 70' V. 1 Unit Pencawang Elektrik Di Atas Lot 5209 (Lot Asal 608 Pm (172), Mukim Rompin, Daerah Rompin, Pahang Darul Makmur	July 2015	In progress
2	Kerja- Kerja Membekal Dan Memasang Pagar Keselamatan Anti Climb & Anti Cut Berukuran 9' Tinggi Beserta 2 Gulung Razor Barbed Wire Di Kawasan Operasi Empangan Pontian (Tebing Kanan) Daerah Rompin, Pahang Darul Makmur	June 2015	In progress

Table 1.5.2 : Project in progress

Source KSSB 2015

CHAPTER 2

LITERATURE REVIEW

(substructure work)

CHAPTER 2 LITERATURE REVIEW (substructure construction)

2.1 INTRODUCTION

Groundwork and Substructure Explained

Groundwork and subsurface works form an essential part of any build, whether it be a private dwelling, railway line or new road. Most groundwork and substructure works are undertaken to prepare the site for the proposed structure and to create foundations necessary for its support.

Before the structure can be built it is considered good practice and a legal requirement of most local authorities in the UK to conduct a ground investigation at the site, once planning permission has been granted. Ground investigations, also referred to as site investigations, enable geotechnical data to be gathered for foundation design purposes to allow cost effective and efficient development of the site. They can also identify the presence of any voids or abandoned mine workings beneath the site. Various intrusive drilling techniques, such as shell and auger and rotary drilling, are used to recover and test the underlying soil and rock at the site. Once recovered soil and rock samples are subjected to laboratory based geotechnical tests to further aid foundation design parameters.

Planning permission is also likely to stipulate that contamination testing be undertaken, prior to development, to ensure the health of future residents is not put at risk from historical contaminants at the site. Contamination tests can be conducted on the soil samples obtained during the ground investigation. If contamination testing is specified a desk study of the site and its surrounding area should be undertaken, prior to the ground investigation, to help identify the past land usages of the site. This will help to ascertain the likelihood and location of any potential contamination at the site, which should be followed up during the site investigation. A geo environmental

site investigation is designed to assess both contamination and geotechnical properties present at the site.

Foundations

Based on the information contained within the ground investigation report a structural engineer will finalize the foundation requirements for the proposed structure. Foundation solutions chosen are dependent on the ground conditions identified at the site, which should be detailed within the site investigation report. Shallow concrete foundations, such as strip footings and pad foundations are likely to be used where underlying soils are relatively stable and are able to offer limited settlement. Where soft or unstable soils are present a reinforced concrete raft foundation may be considered for lightly loaded buildings. Ground improvement solutions, such as vibrio compaction, can be used to compact underlying loose sands and gravels and increase their bearing capacity. For large buildings with high loadings a deep foundation solution will be necessary to support the weight of the building and ensure limited settlement. Deep foundation solutions require piles to be sunk in to more stable ground beneath the structure. Other deep foundation types, such as caissons are used for the construction of bridge foundations. A number of different pile types and pilling techniques can be used to create deep foundations, depending on the type of structure being built. A pilling contractor will recommend pile types and can be employed to sink the required number roof piles at the site.

The pilling specialist may use continuous flight augured piles, also known as CFA piles, which can be installed within most soil types and weak rock. First a hole is formed by the helical auger of the drilling rig. On completion the hole is filled with high slump concrete and a steel reinforcement cage is added to increase the cured strength of the concrete. Rotary bored piles, or rotary piles, may be utilized in stable soils and rock. The soil or rock is removed section by section, instead of continuously in the CFA piling process. Once the hole is complete a reinforcement cage is inserted and the hole is filled with concrete to create the pile.

Alternatively the driven piling technique may be used, commonly where soft soils overlie more stable soils or rock. The process involves driving pre-cast concrete piles or steel tubular piles in to the ground with a hydraulic hammer or drop weight till they offer the required resistance. Driven piles are a form of displacement pilling as the soil is displaced by the side of the pile as it is driven in to the ground. No soil is removed from the hole during the installation process.

A pilling contractor may need to use a mini piling rig, sometimes called a micro piling rig, where there is limited access to a site. These piling rigs are small and are suited to house extension projects, at the rear of properties. Mini piles are also used for underpinning subsiding house foundations.
Following installation pile testing should be undertaken to ensure piles are capable of supporting the intended structure foundation

www.slidesharesubstructurework.com

2.2 INTRODUCTION TO FOUNDATION

A building will be constructed on a foundation. The elements of foundations in the building are located at the bottom of the building and its role is to transfer all loads to the subsoil of the building. This element is in direct contact with the ground and is usually located below ground level. With this, the foundation of the building must take into account not only the load bearing but also on soil conditions.

Since the foundation is in the ground, it should be strong and able to work. This means that the principle should not require any repairs over the life of the building. Therefore, the principle should be built with sturdy and durable even in the land base is likely to contain water and chemicals. Any failure will affect the basic structure of the building.

http://environment.uwe.ac.uk/geocal/foundations/Fountype.htm

2.3 FUNCTION OF FOUNDATION

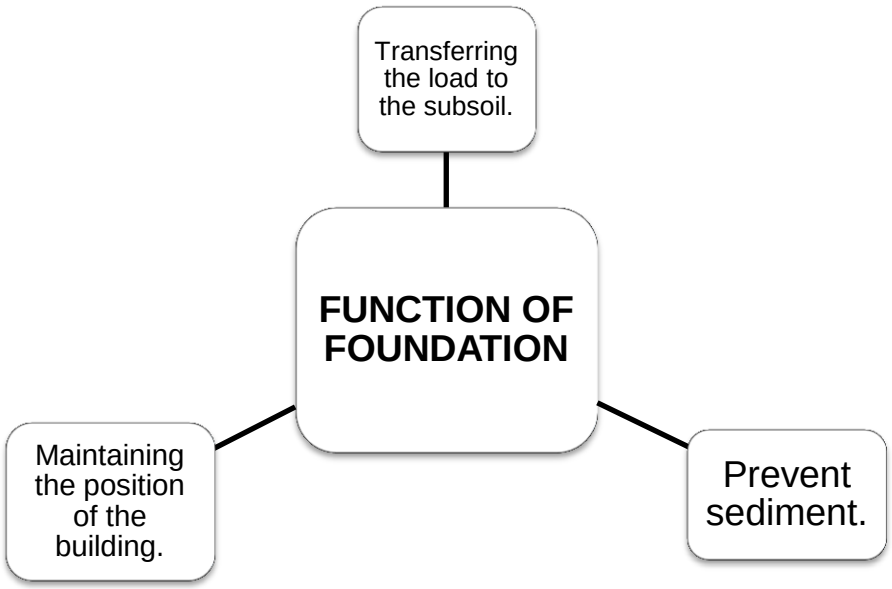


Chart2.3: Function of foundation

There are several functions of the foundation as on the Chart :

1. To maintain the position of the building. This is important for building skyscrapers may suffer as a result of changes in the position of strong wind. The foundation acts as a binder to keep the building in a state remains unchanged from its original position. This can be done by defining the types of foundation that are compatible with sufficient depth by height of the building and also depends on site conditions. For high-rise building, the foundation will be built with deeper. The use of pile foundation can help improve the ability to maintain the position of the building because the piles are most like roots that gripped the earth.

2. Deposition of the foundation should not happen if the results of design is appropriate. Structural parts of the building will be fractured if the deposition occurs on the foundation. Larger cracks will be occur if the deposition is occurring on a large foundation. These cracks cause other structural defects in buildings. The best way is to determine the surface area of the base with sufficient load bearing capacity of the soil so that it can be moved and spread to the ground safely without any sediment.

3. The most function of the foundation is to transfer the load to the building structure. The surface area of the base can be obtained from:

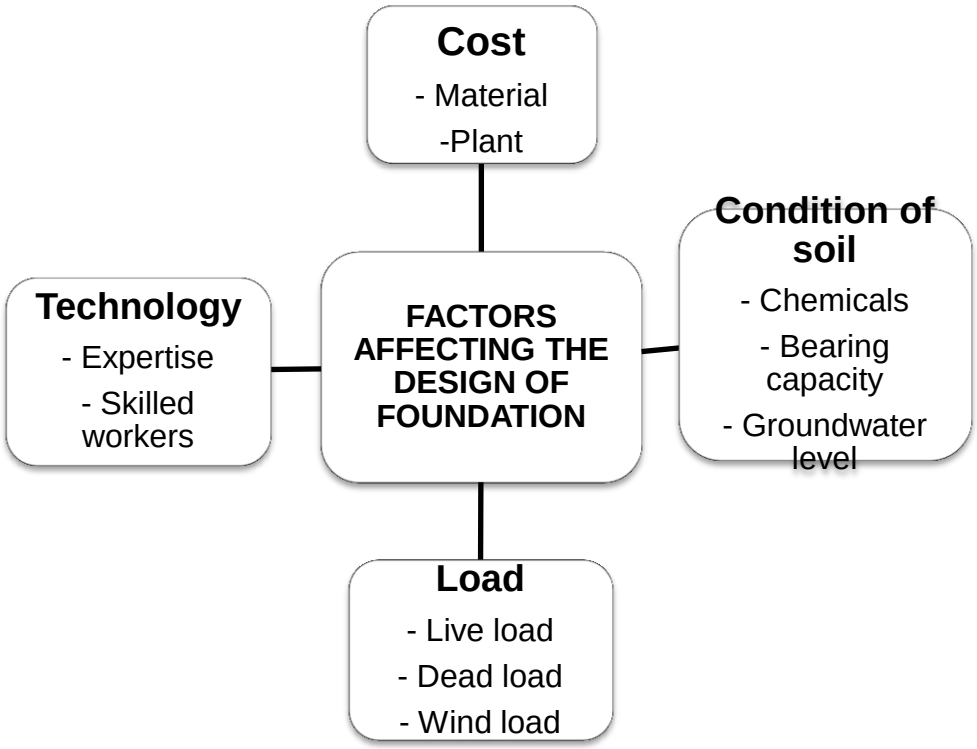
Load/ Bearing Capacity

If the surface area of a foundation is larger, then increased thickness. When this situation occurs, the weight of the foundation it becomes a burden. In addition, the cost required for construction are also getting higher.

http://environment.uwe.ac.uk/geocal/foundations/Fountype.htm

2.4 FACTORS AFFECTING THE DESIGN

The most factors that affecting the design of the foundation are the load on the building structure and the condition of site. Other than that, the factors affecting the design of foundation are technology and costing.



Char2.4 Factor affecting the design of foundation

1. **Cost**

   High quality building materials require large capital. The costs required to purchase building materials, machinery hire and pay worker salaries. The main material needed in foundation construction is cement, aggregate and sand as well as the use of machinery.

i. High quality concrete requires materials of high quality as well as quality control material. So it is with the size and basic design can affect costs.

ii. Costs can determine the type of concrete, materials and equipment used.

2. **Condition of soil**

Soil conditions can be known in detail by conducting site investigations at the building erected. Load bearing capacity, ground water and the chemicals contained in the soil can be determined through a survey conducted soil.

i. The load bearing capacity depends on the soil structure itself. Rocky soils usually stronger than sand and clay. The actual load bearing capacity should be determined through some tests were conducted on that land excavation methods and geophysical methods. This test is very important to build a building higher and bigger. The complete soil test report can be used as a guide in providing the design of foundation.

ii. Ground water also affects the soil bearing capacity. The water content will also add to the weight of the soil itself if excess water, it will leave a bad impression which can rust the reinforcement in the concrete foundation and cause the strength of foundation did not last long. This will result in soil bearing capacity will decrease.

iii. Chemicals in the soil should also be taken into account in the design of foundation. For example, calcium sulphate, magnesium sulphate and sodium sulphate are found in many types of soil that can react with structural elements in the soil.

3. **Technology**

Technology depending on the area and can affect the basic design. The main factor is the expertise that can be acquired to build a foundation.

i. Skilled labour is also equally important in dealing with changes in technology.

ii. Therefore, the preparation of the design should be taken into account that there is technological expertise in an area.

4. **Load**

The load imposed on a building structure is made up of dead load, live load and wind load.

i. Dead load is the weight of the building itself, which includes columns, beams, floors, roofs, packaging and building facilities available in the building.

ii. Live load consists of objects that are placed in the building, including human or residents who use the building, equipment, furniture and others.

iii. Wind load also affects the basic design. This can be shown on a high building and exposed to strong winds. Therefore, the principle should be designed so as to bind the position of the switch position building.
http://www.fhwa.dot.gov/publications/research/infrastructure/geotechnical/05159/chapter4.cfm)

2.5 TYPES OF FOUNDATION

Among the types of building foundation are Shallow foundation and deep foundation. Foundation that provided under shallow foundation are strip foundation, raft foundation and pad foundation while the foundation of deep foundation is pile foundation.

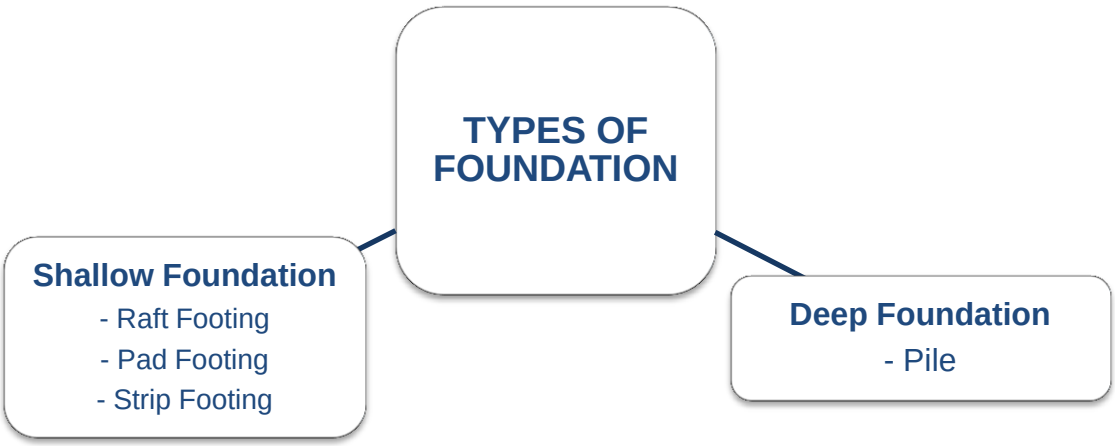


Chart 2.5: Types of foundation

2.6 PAD FOOTING (Shallow foundation)

For framed buildings, all expenses incurred by the poster distributed to the pad foundation. Pad footing is built separately to accept the burden of the structure and move it to the ground below.

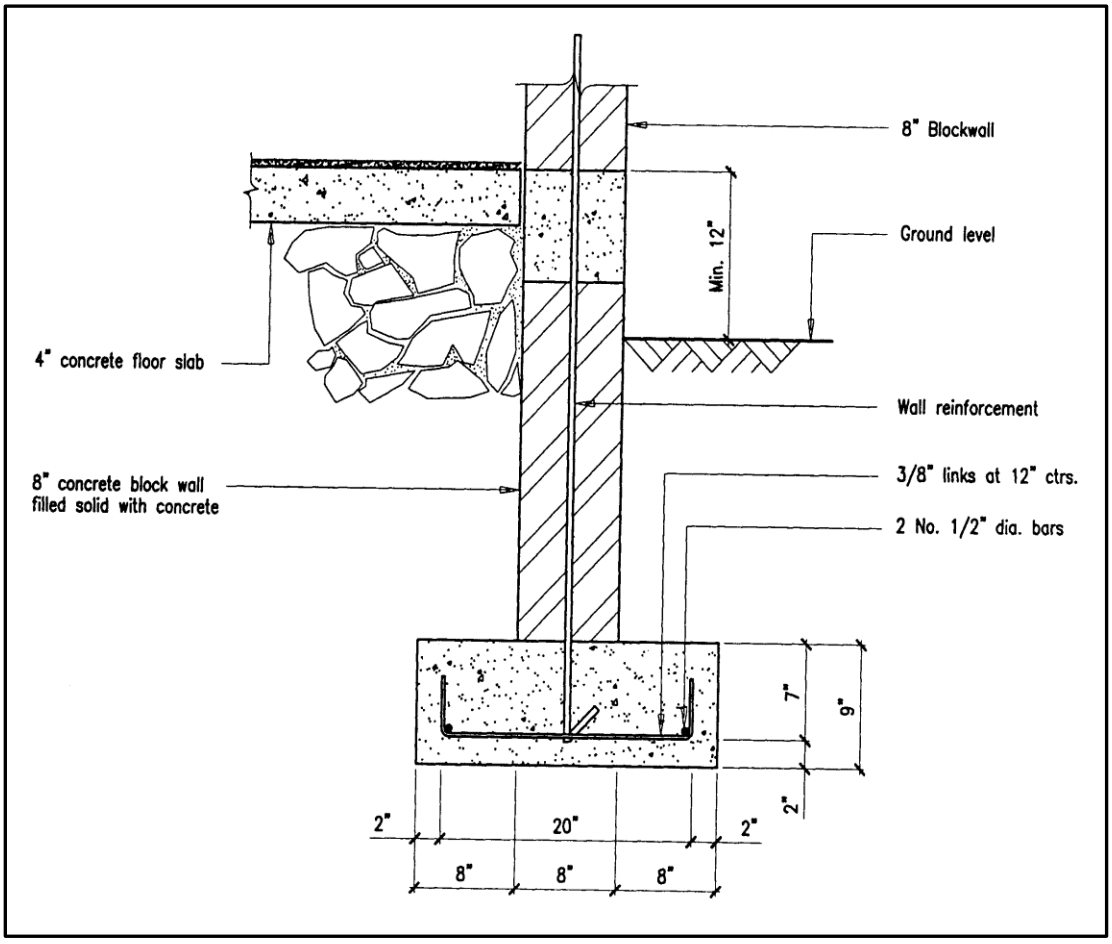


Figure 2.6.1: Pad footing

This foundation is the most widely used for building a house or 1-storey building. This is because the building is built of frame constructed of concrete, steel or timber. For buildings with large loads, foundation pad is not suitable for use. Therefore the use of pile foundation that can bear a greater burden.

Pad foundation depending on the amount of expenses incurred. A large amount of weight requires a larger surface area also. In other cases, if the bearing capacity is higher, the smaller the area of the base. The thickness of the pad is increased by the increase in area.

Reinforcement is used for strengthening the pad foundation to carry the load of the building and also can reduce the size of the pad is used. Type of reinforcement used consists of high tension reinforcement.

At certain times, the pad foundation constructed to include the position of two adjacent columns. This combination of foundation built to facilitate the work done and can reduce construction costs. Furthermore, the pad foundation is also connected with strip foundation.

http://environment.uwe.ac.uk/geocal/foundations/Fountype.htm

CHAPTER 3

CASE STUDY

(SUBTRUCTURE RAFT FOUNDATION)

CHAPTER 3 CASE STUDY

3.1 SUBTRUCTURE

Sub-structure or Foundation is the lower portion of the building, usually located below the ground level, which transmits the loads of the super-structure to the supporting soil. A foundation is therefore that part of the structure which is in direct contact with the ground to which the loads are transmitted.

3. 2 RAFT FOUNDATION (MAT FOUNDATION)

Raft foundations (sometimes known as Mat Foundations) are a large concrete slab which can support a number of columns and walls.

The slab is spread out under the entire building or at least a large part of it which lowers the contact pressure compared to the traditionally used strip or trench footings.

Because of the speed and volume of houses required after the Second World War, the raft foundation was widely used. The raft foundation was cheaper, easier to install and most importantly, did not require as much excavation as the usual strip foundations.

When the Building Regulations were introduced in 1965 there were no generic rules for raft foundations as there were for strip foundations.

This meant that to use a raft foundation, it had to be designed and approved by Building Control. This made the entire operation much more difficult and time consuming so raft foundations became less widely used almost overnight.

Rafts are most often used these days when the strata is unstable or (because of this) a normal strip foundation would cover more than 50% of the ground area beneath the building. There are also situations (usually in areas where mining has occurred) where there may be areas of movement in the strata.

They are much more commonly used in the construction of commercial building in the UK that they are for domestic homes, but can be used very successful in both

situations. To understand when it is better to use raft foundations, you need to understand how they work.

A raft foundation spreads the weight of the building over the whole ground floor area of that building. The raft is laid on a hardcore or scalping bed and usually thickened at the edges, especially in very poor ground. Rafts are most suitable when the ground is of good load bearing capacity and little work is required to get a solid foundation.

Raft Foundations are built is this following steps:

1. The soil removed down to correct depth
2. The foundation bed is then compacted by ramming
3. Lay reinforcement on spacers over the foundation bed
4. Pour the concrete over the reinforcement

A raft foundation is usually preferred under a number of circumstances:

- it is used for large loads, which is why they are so common in commercial building which tend to be much larger, and therefore heavier, than domestic homes
- The soil has a low bearing capacity so the weight of the building needs to be spread out over a large area to create a stable foundation
- The ratio of individual footings to total floor space is high. Typically if the footings would cover over half of the construction area then raft foundation would be used
- If the walls of the building are so close that it would cause the individual footings to overlap, then raft foundations should be used

3.3 OBJECTIVE

Among the objectives of the case study Of Taman Puteri Indah,Kuala Rompin, Pahang Darul Makmur are:

a) To study the project progress in building construction.

b) To study the elements of substructure in the building.

c) To study the selection types of foundation based on site condition

d) To identify the problem solving method in a construction site.

3.3.1 Method of Study

In the making of this report, I have adopted several method during making this report. Among are through:

3.3.2 Primary data

i.Site visit

By using this site visit method, it's helped me a lot in making observation on how the real situation on-site. Therefore, I can carry out the observation on site while visiting the site. For example, I can take pictures and related data at the site.

ii. Question and Answer (Q&A)

Interviews people in order to get more information about their types and installations, procedures, materials used, and many more from the supervisor or even the skilled and unskilled workers that always there at the construction site which always helpful to give more guides and helps.

3.3.3 Secondary data

i.Reference of the book

By using this method, I can quote the professionalism writing about substructure (raft foundation) so it will give an ideas to complete this report. Besides that, research by author also can related with this report for additional knowledge.

ii. Mass media and electronic media

The widely usage of mass media and electronic media as one of the searching tools and sharing information at a fast rate have been commonly used by the researcher since then. It is therefore also one of the applications that attribute in come out with this report.

3.4 INTRODUCTION TO PROJECT

Photo 3.4.1: Signboard of Project

Source KSSB 2015

Until today, many constructions that we can see in Malaysia have constructed under government or private sector. It also gives advantages to increase economic for other people and to produce a good generation for the future. This construction has constructed properly and a several problem that we have to make sure it must be conduct properly.

While, the project provide is to ‘Cadangan Pembinaan Taman Puteri Indah, Mukim Rompin,Pahang Darul Makmur’ and it consists of five blocks of the building where there are Single Storey Terraced House, Double Storey Terraced House, Single Storey Semi D House, TNB Substation. Is near to the Sekolah Menengah Kebangsaan Sungai Puteri and station pump ‘Caltex’. Total area of site is 3 acres. Cost of the construction is 5.9 million.

Kota Sutera Sdn. Bhd. award this project to Setia Wajar Sdn. Bhd. There are five Blocks of the building, all block using raft foundation.

3.4.1 Location

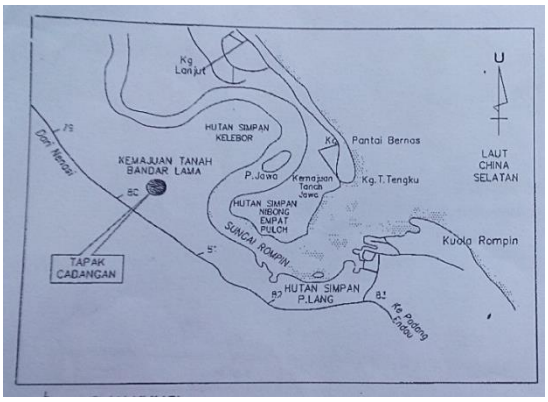


Photo 3.4.1.1: Key Plan

Source KSSB 2015

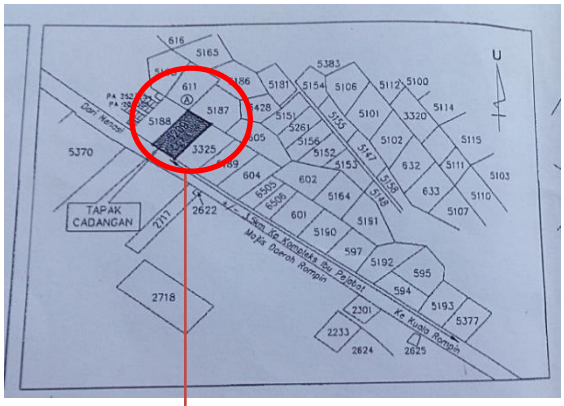


Photo 3.4.1.2: location Plan

Source KSSB 2015

Photo 3.4.1.3: Site Plan

Source KSSB 2015

3.4.2 Site Boundaries

Photo 3.4.2.1: S.M.K. Sg. Puteri

Source: Ernie Nurlela, 2015

Photo 3.4.2.2: Kolej Komuniti Rompin

Source: Ernie Nurlela, 2015

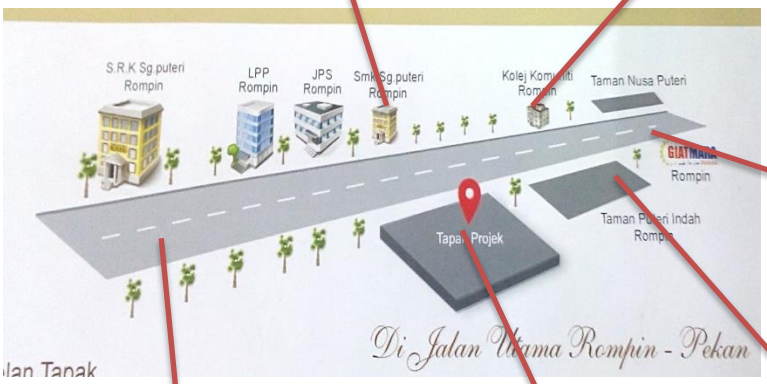


Photo 3.4.2.3: Road from Kuantan, Pahang

Source: Google maps, 2015

Photo 3.4.2.4: Road From Endau, Johor

Source: Google maps, 2015

Photo 3.4.2.5: Site Construction

Source: Ernie Nurlela, 2015

Photo 3.4.2.6: Shop House

Source: Ernie Nurlela, 2015

3.4.3 Site Layout

Photo 3.4.3.1: shop house

Source: Ernie Nurlela, 2015

Photo 3.4.3.2: worker house

Source: Ernie Nurlela, 2015

Photo 3.4.3.3: pump station (CALTEX)

Source: Ernie Nurlela, 2015

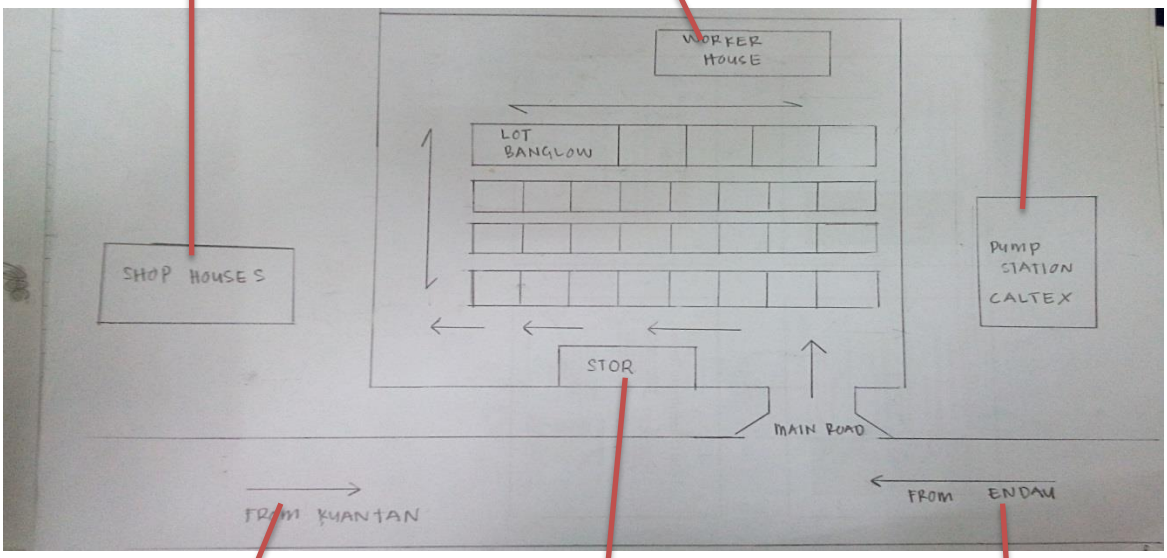


Photo 3.4.3.4: road from Kuantan, Pahang

Source: Google maps, 2015

Photo 3.4.3.5: Stor

Source: Ernie Nurlela, 2015

Photo 3.4.3.6: road from Endau, Johor

Source: Google maps, 2015

3.4.4 Site Safety

Security

The loss of construction equipment from theft being one of the major source a causes of construction project to be more expensive and may also result in the delay of production whilst waiting for new equipment as well as paper work of said stolen equipment.

3.4.5 Equipment

NO	EQUIPMENT	EXPLANATION
1	 Figure 3.4.5.1: safety helmet Source: Google images, 2015	Head protection function to provide from the sun, rain, and against impact damage to the head. A regular safety helmet has a life span of 3 years but can be shortened by prolonged exposure to ultraviolet light and repeated minor and major impact damage.
2	 Figure 3.4.5.2: gloves Source: Google images, 2015	Gloves carefully selected on consideration of causes and hazard likely to be encountered by wearer in order to ensure compatibility with field of construction.

3	 Figure 3.4.5.3: foot wear Source: Google images, 2015	Footwear – provides protection for feet especially for the toes, if the material should drop onto them. Also provides protection against penetration for beneath the sole of the foot, be reasonably waterproof, provides good grip and designed to comfort.

Photo 3.4.5.4. Road Work

Soure: Ernie Nurlela, 2015

Photo 3.4.5.5: Road Work

Soure: Ernie Nurlela, 2015

Photo 3.4.5.6: Road Work

Soure: Ernie Nurlela, 2015

Road work - Tracffic management plan is an important aspect at a construction site and should be included in every project safety plan. With main acsess and egress point to the site, there needs to be good visibility where ever possible as at it important to keep pedestrian footwayand vechiles path physically seperated.

3.4.6 SITE MACHINERY

Photo 3.4.6.1: backhoe loader

Soure: Ernie Nurlela, 2015

Backhoe Loaders - provide superior digging, trenching, back-filling and material handling capability and can be used for many applications, including but not limited to, general construction, demolitions and excavations, landscaping and breaking asphalt and paving.

Photo 3.4.6.2: rebar cutter bend

Soure: Ernie Nurlela, 2015

Rebar cutter bend - Tools are handling reinforcement bars. For example when the bar needs to shape, the bender play an important role on it. Cutting the bar to ideal length.

Photo 3.4.6.3: water pump

Soure: Ernie Nurlela, 2015

Water pump - the pump in the cooling system of an automobile that cause the water to circulate

3.5 PROJECT CONSULTANT:

Architecture: KASHNOR ARCHITECT

Main contractor: Kota Sutera Sdn.Bhd.

Subcontractor: Setia Wajar Sdn.Bhd.

Consulting engineering: AZANIK CONSULTANT

No	Table Type Of House	Area Of House	No Of Unit
1	Double Storey Terraced House	24'x 80'	8
2	Single Storey Terraced House	24'x 70'	17
3	Single Storey Semi D House (Type A X 2 Unit)	40'x 70'	2
4	Single Storey Semi D House (Type B X 2 Unit)	40'x 70'	2
		Total	29

Table 3.5.1: Type of House Taman Puteri Indah, Kuala Rompin

Source: KSSB 2015

The building blocks of Taman Puteri Indah consists of five blocks of buildings and building features are as follows:

NO	BLOCK/ BUILDING	STOREY
1	Block A/ double storey terraced houses	2 Storey
2	Block B/ single storey terraced houses	1 Storey
3	Block C/ single storey terraced houses	1 Storey
4	Block D/ SemiD Houses	1 Storey
5	Block E/ TNB substation	1 Storey

Table 3.5.2: BLOCK/ BUILDING (Single Storey Terraced House)

NO	SPACE	AREA (SQM)
1	Car porch	40.94
2	Living hall	14.40
3	Dining area	11.46
4	kitchen	21.42
5	Master bedroom	20.06
6	Bedroom 2	10.80
7	Bedroom 3	10.80
8	Bedroom 4	7.74
9	Bath1	3.47
10	Bath 2	3.47

Table 3.5.3: area for 1 unit house (Single Storey Terraced House)

Source KSSB, 2015

3.6 PROCESS OF CONSTRUCTION SUBSTRUCTURE

3.6.1 Excavation Work for Taman Puteri Indah

Photo 3.6.1.1: site construction

Source: Ernie Nurlela, 2015

Excavation work generally means work involving the removal of soil or rock from a site to form an open face, hole or cavity using tools, machinery or explosives.

Any construction work (including any work connected with an ‘excavation’) that is carried out in or near a shaft or trench with an excavated depth greater than 1.5 metres. For a start, remove the trees and the hedge that are found within the boundary of the site. Then excavate for the ground beams.

3.6.2 Installation Formwork Ground beam (single storey terraced houses 24'X 70')

Photo 3.6.2.2: formwork ground beam (block B)

Source: Ernie Nurlela, 2015

Photo 3.6.2.3: formwork ground beam (block B)

Source: Ernie Nurlela, 2015

Photo 3.6.2.4: formwork ground beam (block B)

Source: Ernie Nurlela, 2015

A fast and efficient way to produce a clean lined excavation in either normal or contaminated land, ready to accept the pre-fabricated reinforcement cage. This work start 30 June 2015 (Tuesday) and finish installation 1 July 2015 (Wednesday). The height of ground beam is 150 mm thk. Formwork used and designed for cast in place concrete. Reinforcing steel for walls, piers, columns, and similar vertical structures must be adequately supported to prevent overturning and collapse.

3.6.3 Laying Hardcore

Photo 3.6.3.1: laying hard core (block B)

Source: Ernie Nurlela 2015

Photo 3.6.3.2: laying hard core (block B)

Source: Ernie Nurlela 2015

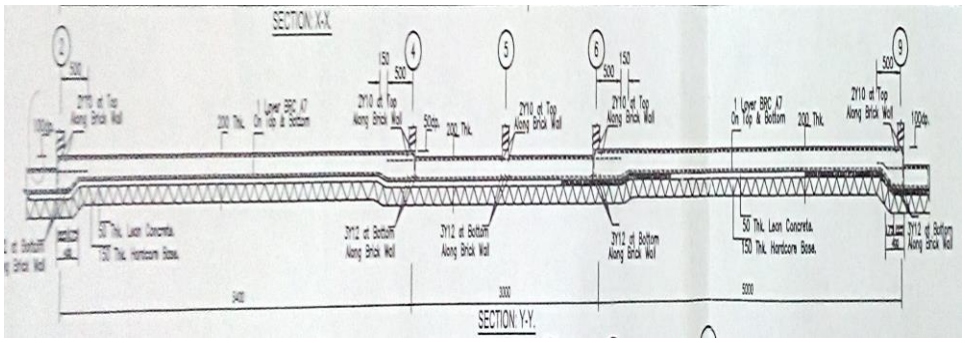


Photo 3.6.3.3.: cross section laying hard core (block B)

Source: KSSB 2015

This work start at 2 July 2015 (Thursday) and finish installation 6 July 2015 (Monday). The thickness of hardcore is 150 mm thk.

3.6.4 Anti-Termite Treatment

Photo 3.6.4.1.: spray anti-termite (block B)

Source: Ernie Nurlela 2015

The purpose of spreading anti termite is to prevent the termite from degrading the surface of the structure • usually the anti-termite are spread to the reinforcement and the base formwork.

3.6.5 Slab structure

Photo 3.6.5.1.: installation plastic layer (block B)

Source: Ernie Nurlela 2015

The plastic layer is to prevent the water seepage from rise toward the slab and slowly reduce the strength of concrete and re

3.6.6 Installation BRC A7

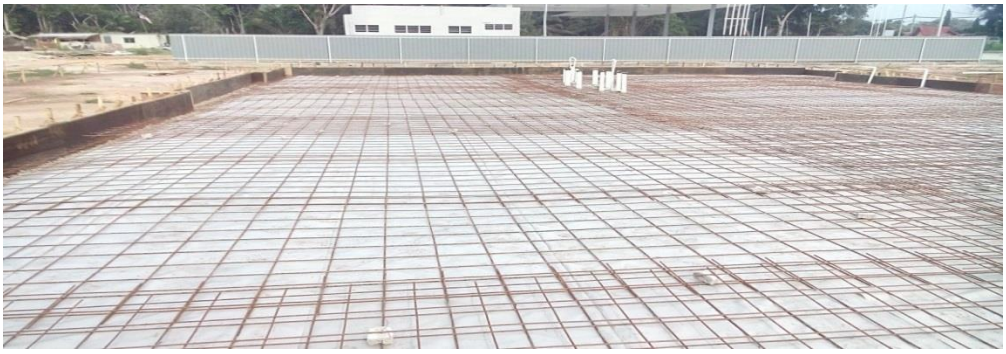


Photo 3.6.6.1: Installation BRC A7 at Block B (left elevation)

Source: Ernie Nurlela, 2015

Photo 3.6.6.2: Installation BRC A7 at Block B (right elevation)

Source: Ernie Nurlela, 2015

Photo 3.6.6.3: BRC A7

Source: Ernie Nurlela, 2015

This work starting at 7 july 2015 (Tuesday) and finish installation on that day. Installation BRC A7 just using 1 layer for all area block B. As reinforcement inside the ground beam set before, they are tied with extended reinforcement bar for a better connection to the ground floor slabs. Such extended reinforcements are called starter bars. A new reinforcement mesh is then places between the ground beams and is tied to the starter bars of the ground beams. Similar process is repeated, where the concrete is poured into the reinforcements which are surrounded by the plywood formwork. Ground floor slab will usually have damp proof property. This is very useful in withstanding the forces of the slab and to prevent green grow underneath them.

3.6.7 installation column stump

Photo 3.6.7.1: installation column stump steel

Source: Ernie Nurlela, 2015

Photo 3.6.7.2: installation column stump steel

Source: Ernie Nurlela, 2015

Photo 3.6.7.3: Installation Column Stump steel

Source: Ernie Nurlela, 2015

Placing column stump after laying hard core work finish. This work starting 8 July 2015 (Wednesday).Column Stump is a column that considered as lower structure because it is located in the ground below the waterproof layer at ground floor slab. The position is vertical above the foundation. The function of the column stump is to transfer load of building to the foundation. Column stump will receive load from ground beam, column and then will transfer the load to the foundation. The columns can be made from steel tube, pre-cast concrete or treated timber these need to be designed by an engineer for correct sizing.

3.6.8 CONCRETE WORK

Photo 3.6.8.1: concrete work

Source: Ernie Nurlela, 2015

Photo 3.6.8.2: laying concrete

Source: Ernie Nurlela, 2015

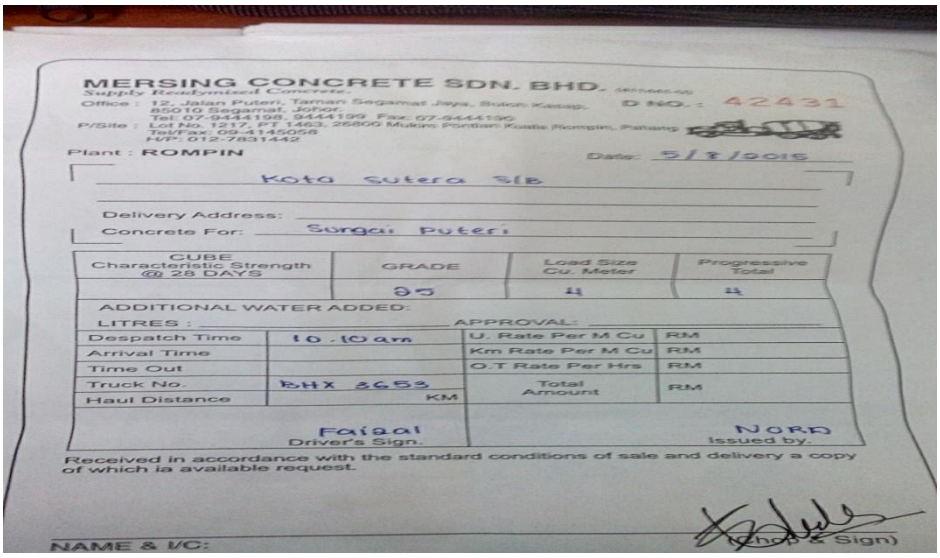
Photo 3.6.8.3: laying concrete

Source: Ernie Nurlela, 2015

Photo 3.6.8.4: concrete hardens

Source: Ernie Nurlela, 2015

Concrete work for block B (single storey terraced houses) starting from 13 July 2015 (Monday). Concrete is poured to form the ground beams and concrete slabs and steel mesh are placed in between the slabs. Once the foundation is done, column and wall can be erected. This construction foundation using pre-cast concrete. Using delivery order (D.O) for concrete work.



MERSING CONCRETE SDN. BHD.
Supply Readymixed Concrete
Office : 12, Jalan Puteri, Taman Segamat Jaya, Bukit Katap, 85010 Segamat, Johor.
Tel: 07-9444198, 9444199 Fax: 07-9444196
P/Site : Lot No. 1217, PT 1453, 25800 Mukim Pontian Kuala Rompin, Pahang
Tel/Fax: 09-4145058
H/P: 012-7831442

D NO. : 42431

Plant : ROMPIN

Date: 5/8/2015

Kota Sutera Sdn

Delivery Address:

Concrete For: Surga: Puteri

CUBE Characteristic Strength @ 28 DAYS	GRADE	Load Size Cu. Meter	Progressive Total
	35	11	11

ADDITIONAL WATER ADDED:
LITRES : APPROVAL:

Despatch Time	10.10 am	U. Rate Per M Cu	RM
Arrival Time		Km Rate Per M Cu	RM
Time Out		O.T Rate Per Hrs	RM
Truck No.	BHX 2653	Total Amount	RM
Haul Distance	KM		

Faisal
Driver's Sign.

NORD
Issued by:

Received in accordance with the standard conditions of sale and delivery a copy of which is available request.

NAME & I/C:

(Chop & Sign)

Photo 3.6.8.5: Example Delivery Order (D.O) For Concrete

Source: Ernie Nurlela, 2015

3.7 PROCESS CONSTRUCTION PAD FOOTING (PORCH)

Photo 3.7.1: excavation work

Source: Ernie Nurlela, 2015

Photo 3.7.2: formwork for pad footing

Source: Ernie Nurlela, 2015

Photo 3.7.3: concrete in-situ for lean conrete

Source: Ernie Nurlela, 2015

Photo 3.7.4: laying concrete

Source: Ernie Nurlela, 2015

Photo 3.7.5: installation column stump steel

Source: Ernie Nurlela, 2015

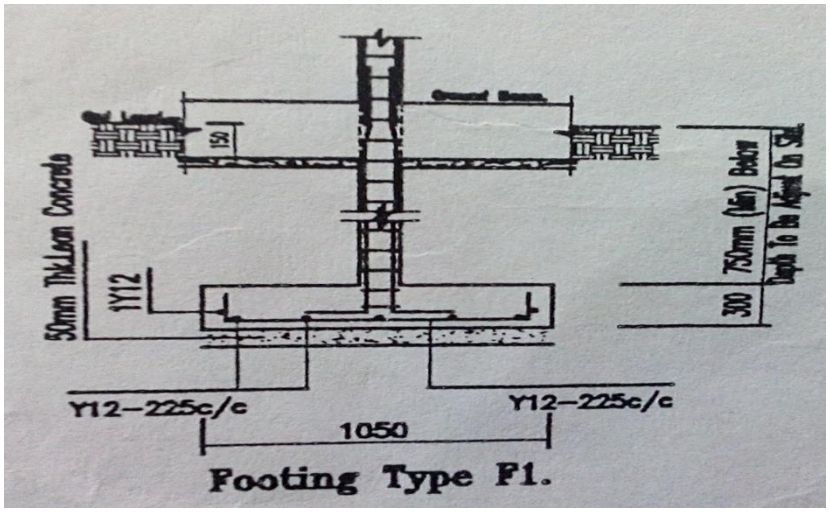


Photo 3.7.6: pad footing

Source: KSSB, 2015

Photo 3.7.7: concrete work (pre-cast)

Source: Ernie Nurlela, 2015

Photo 3.7.8: laying concrete

Source: Ernie Nurlela, 2015

Photo 3.7.9: Hardens Pad Footing

Method construction of pad footing started with excavation in 1100 mm depth. After excavation work, holes are dug for the pad footing and formwork is set up so that the concrete can be mold.50 mm thk. Lean concrete. Reinforced cage are installed. Reinforcement for column stump is installed. Pad footing is left till the concrete hardens and formwork are removed. This work starts 28 July 2015 (Tuesday). For lean concrete using in-situ concrete and for pad footing concrete using pre-cast concrete.

3.8 Summary

Raft foundation consisting of a thick R.C.C slab covering the whole area. This type of foundation is useful for public buildings, office buildings, school buildings, residential quarters etc., where the ground conditions are very poor and bearing power of the soil is so low that individual spread footing cannot be provided.

CHAPTER 4

PROBLEM AND RECOMMENDATION

CHAPTER 4 PROBLEM AND RECOMMENDATION

4.1 INTRODUCTION

Management of the work is an important things to ensuring a project runs without any problems. This matter should be given due consideration by all parties to complete the project in time interrupt the project completed in a timely manner. But so often exist many problems that can interfere the project can also be caused the contractor suffered losses in terms of money or time. These problems are usually caused by a variety of things, whether caused by human negligence or even environmental factors.

In this project, there are problems which only occur in the survey works and works of substructure.

4.2 PROBLEMS ON CASE STUDY

Among the problems faced and how to overcome these problems by contractors during the preparation of setting the point of building and piles and also the problem of construction on sub-structure is as follows:

NO	PROBLEM	CAUSES	SOLUTION
1	Workers did not concern on the safety at the construction site. Based on the observation, 80% of workers are not concerned with the safety that have been required while in the construction sites.	They are not wearing a safety boot, gloves, and an eye protection.	The party involve should do their responsibilities by taking an action against the contractors who are ignore the safety measures at the construction site from time to time. In addition, the contractor must also provide awareness for staff to ensure safety at construction sites to be more secure.
2	During the survey work there is a problem faced where there are an errors during the marking point pad on site.	Take too long to doing construction after finish site clearance work.	Doing construction work on time.

Table 4.2.1: problem on case study

Source: Ernie Nurlela, 2015

CHAPTER 5

CONCLUSION

CHAPTER 5 CONCLUSION

After completing this report, the authors were able to obtain a wide range of knowledge and experience related to the work of a construction project. The work of underground structures built in a building, the commencement of earthworks such as site survey and site clearance is done in advance. Preparation of layouts built after the earthworks completed. It plays a role in determining the situation orderly, safe and easy to construction work. One of the main layouts is storage of materials and equipment's so that it can control the quality of the materials and the equipment's. Management of construction works shall be done by preferably by contractors for construction progressing well.

The work of substructures shall be given full attention in terms of construction, materials and so on to avoid any of problems occur on the substructure. The quality of the structural elements shall be maintained to allow buildings to last forever without facing any problems. Concrete reinforcement needs to be controlled from the beginning. The selection and design of foundations have been established to enable the building to distribute the load to a structure and would then be distributed to the ground. In addition, the author can also recognize the technique of workers in construction sites, so that the author has learned the good experience and skills based on the observation on site. It is very important to refer to manual so that the work can be completed, accurate and correct. At the same time it can also help contractors in terms of saving construction.

In addition, communication between all parties involved is also very important to ensure that the work can be done as well. A good monitoring and supervision should need in the way to prevent any of problems while doing the construction work.

Therefore, the construction works of substructures is need of care and preferably need good supervision and inspection to produce high quality based on the skills and the use of technology.

REFERENCES

En. Mohd Nazeri Bin Mohammad, Owner, KSSB

En. Rahman Shah Bin Kamarudeen, Supervisor, KSSB

R. Chudley (1989). Building site works: substructure and plant. English: publisher, Longman.

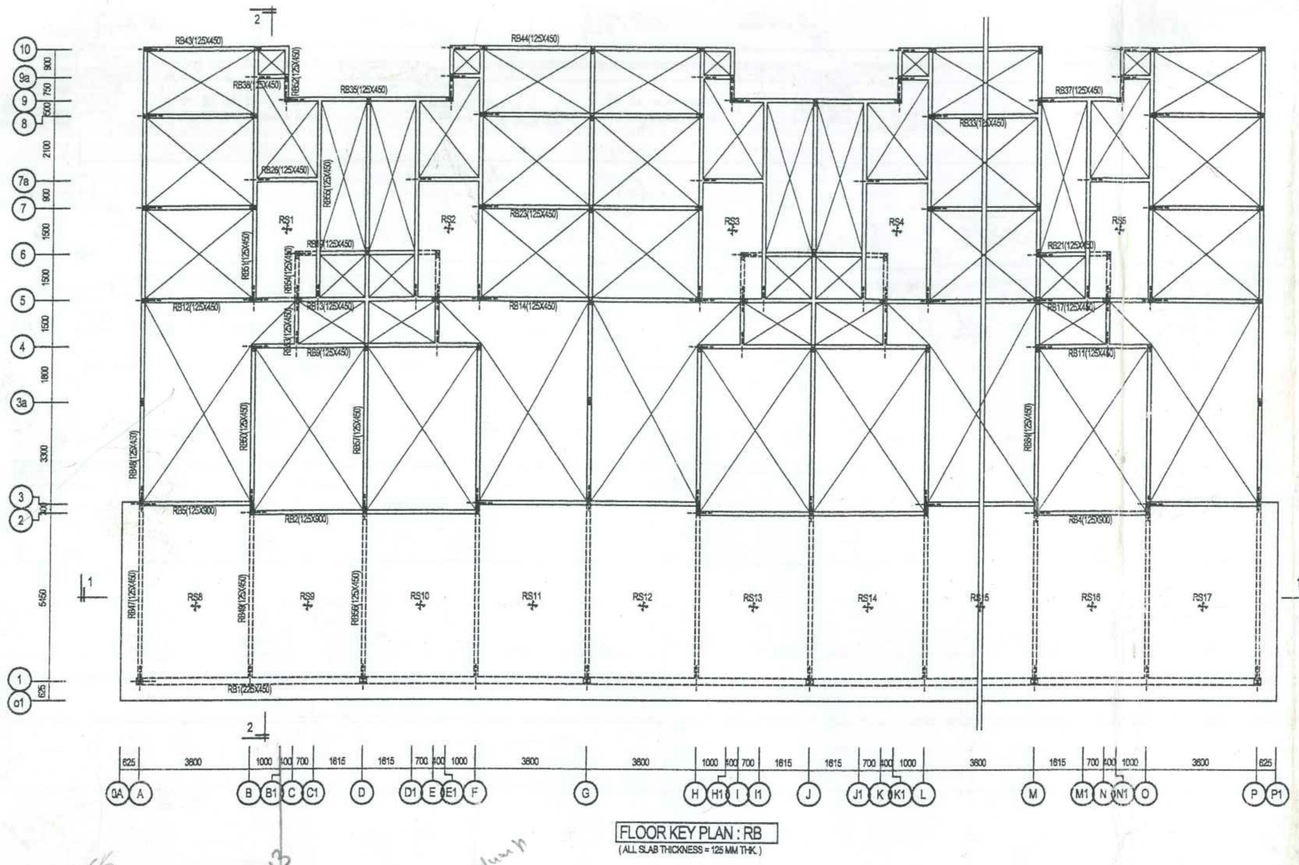
http://environment.uwe.ac.uk/geocal/foundations/Fountype.htm

http://www.fhwa.dot.gov/publications/research/infrastructure/geotechnical/05159/chapter4.cfm)

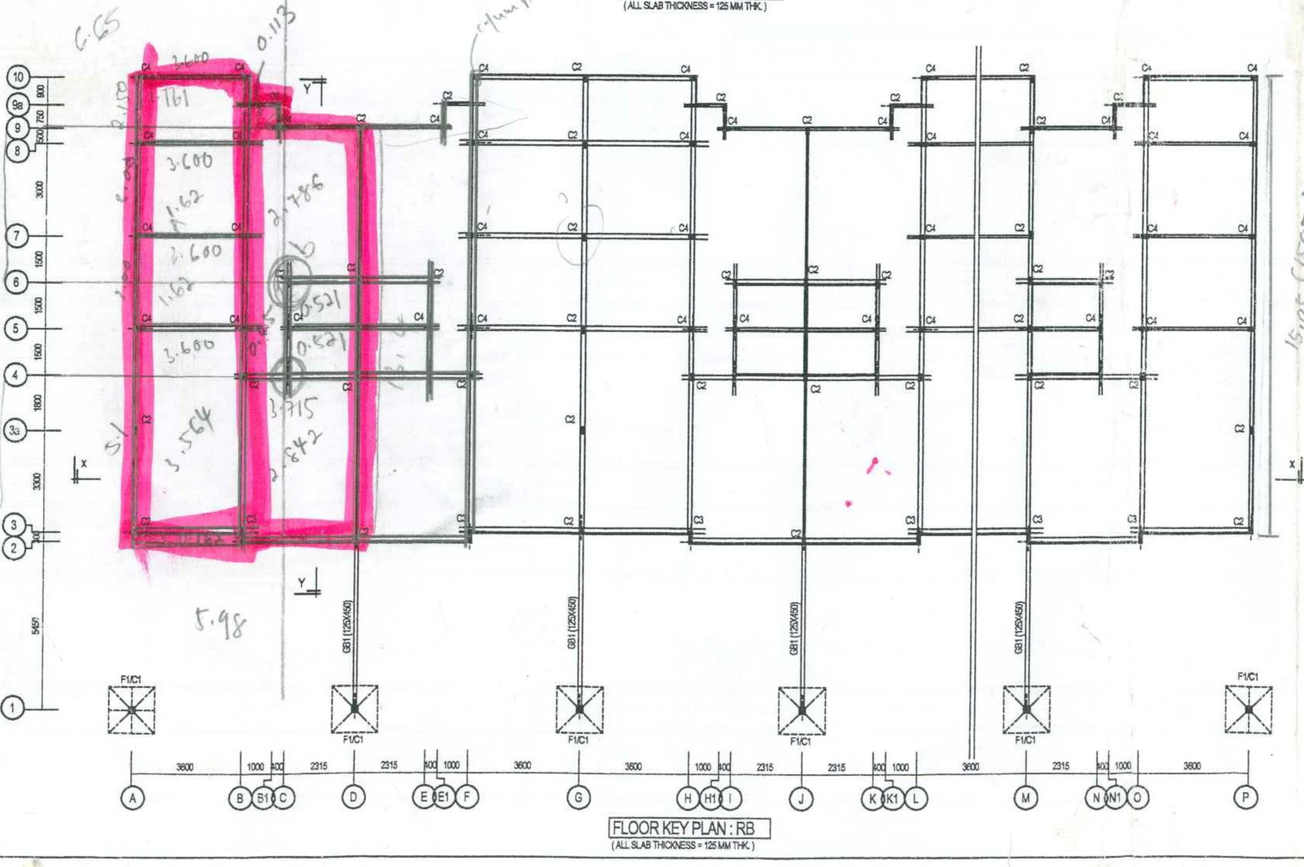
http://www.crawley.gov.uk/pub_livx/groups/operational/documents/plappother/pub178726.pdf

www.slidesharesubstructurework.com

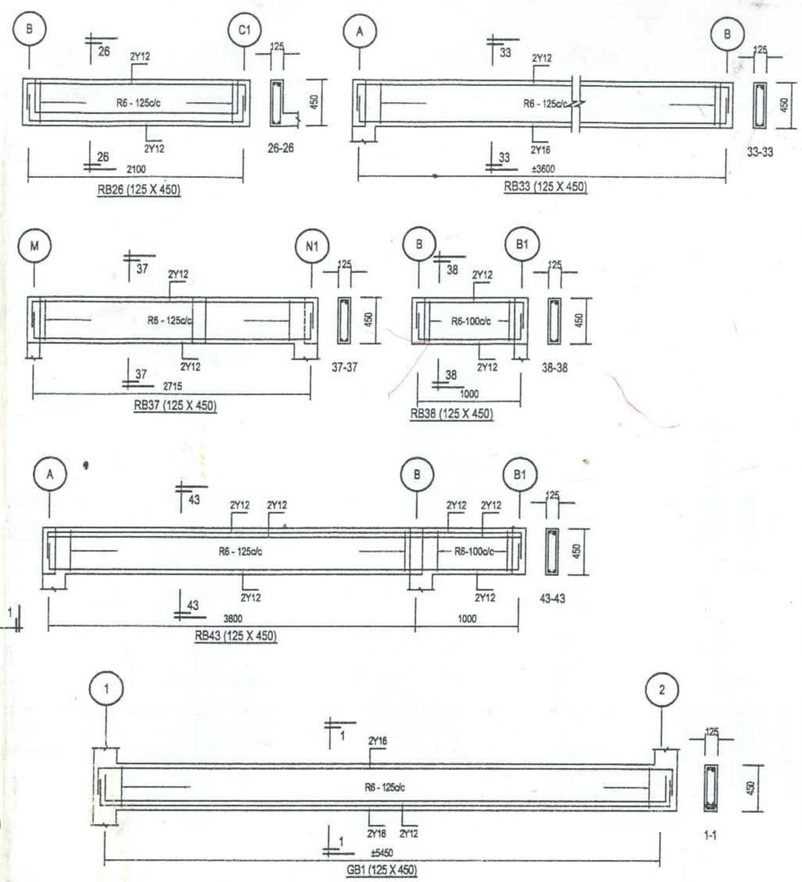
APPENDIX

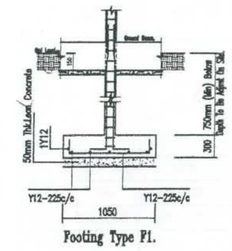


FLOOR KEY PLAN : RB
(ALL SLAB THICKNESS = 125 MM THK.)



FLOOR KEY PLAN : RB
(ALL SLAB THICKNESS = 125 MM THK.)





Footing Type F1.

FOUNDATION REINFORCEMENT SCHEDULE

PAD FOOTING	PAD FOOTING DIMENSIONS			REINFORCEMENT		
MARK	B,mm	L,mm	H,mm	REBAR,a	REBAR,b	TIES
F1	1050	1050	300	Y12 - 225c/c	Y12 - 225c/c	1Y12

NOTES:

1) THESE STRUCTURAL DETAILS ARE TO BE READ IN CONJUNCTION WITH ARCHITECTURAL, M&E AND OTHER RELEVEN DRAWINGS.
2) ANY DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF THE ARCHITECT/ENGINEER BEFORE PROCEEDING WITH THE WORK.
3) CONCRETE GRADE 30 SHALL BE USED (UNLESS OTHERWISE) AND COMPLIANCE TO B.S 8110 1985
4) A MIN. DEPTH OF 50mm (2") LEAN CONCRETE SHALL BE PROVIDE TO ALL STRUCTURES IN CONTACT WITH THE GROUND, I.E AT SOFFIT OF FOOTINGS, PILE CAP,GROUND BEAM, GROUND SLAB, ETC. WHETHER OR NOT SHOWN IN THE DRAWINGS
5) 125mm X 225mm (5" X 9") LINTOL BEAM (REINF. 2Y12 TOP & BOTTOM,LINKS R6-200c/c) TO BE PROVIDE OVER WINDOW/DOOR FOR SPAN UP TO 2.4 METRE (8'-0") LONG.
6) ALL DIMENSIONS IN mm UNLESS SPECIFIED OTHERWISE.
7) CONCRETE CLEAR COVER :
   a) PILE CAPS/FOOTING :50mm
   b) GROUND BEAMS :25mm
   c) STUMPS & COLUMNS :25mm
   d) SUPERSTRUCTURAL BEAMS :25mm
      :15mm
8) BRC SHALL BE USED FOR ALL SLAB REINFORCEMENT (fy = 460N/mm2)
9) THE YIELD STRESSES FOR REINFORCEMENT STEEL SHALL BE AS FOLLOW:
   - HIGH YIELD STEEL (Y) : 410 N/mm^2
   - MILD YIELD STEEL (R) : 250 N/mm^2
   : 485 N/mm^2
10) ALL LOADBEARING WALLS TO BE POSITIONED CENTRALLY ON BEAMS
11) FOR SETTINGOUT TO REFER ARCHITECTURE
12) ALL BRICKWALL TO BE 114mm THK. EXCEPT PARTY WALL IS 225mm THK.
13) ALL BRICKWORK MUST HAVE A MIN. CRUSHING STRENGTH OF 20N/mm2 with 1:1:6 CEMENT-LIME-SAND MORTAR MIX.
14) ALL DIMENSION SHOULD REFER TO ARCHITECTURAL DRAWING.

PROJECT:

CADANGAN PEMBANGUNAN DIATAS
LOT 5209 (Lot Asal 608)
MUKIM ROMPIN,
DAERAH ROMPIN,
PAHANG DARUL MAKMUR.

Rumah Teres 1 Tingkat.

DETAIL :

ROOF BEAM(RB)DETAILS.
ROOF LAYOUT PLAN.
GROUND BEAM(GB)DETAILS.
GROUND LAYOUT PLAN.
FOOTINGS SCHEDULE.
RAFT FOUNDATION PLAN.

OWNER :

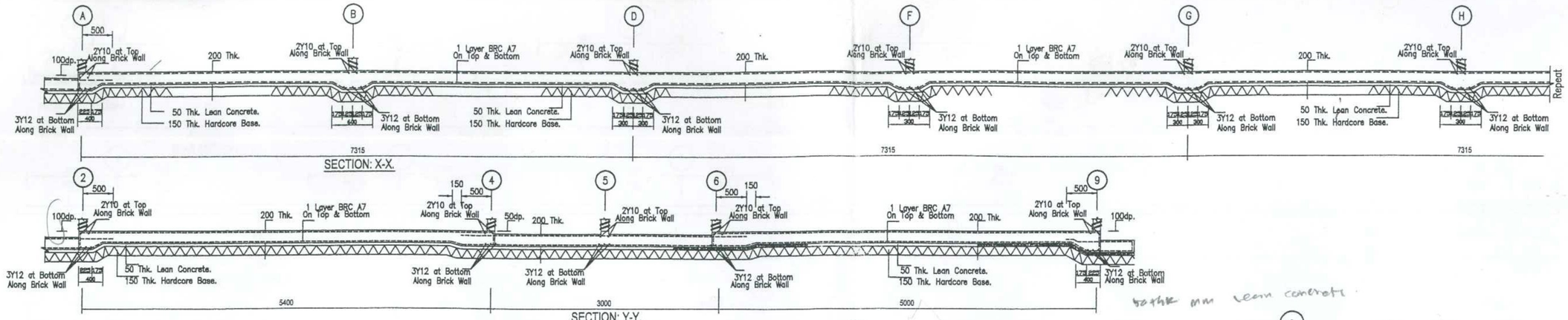
KOTA SUTERA SDN. BHD
(No.Syarikat 19537-A)
810-1, JALAN AMAN, TAMAN BAHAGIA,
86900 ENDAU,
JOHOR DARUL TAKZIM.

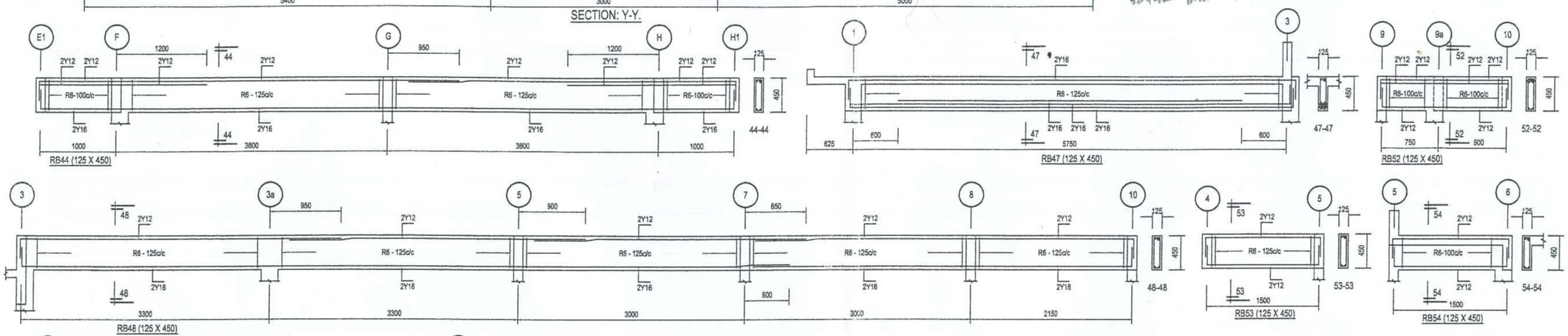
ENGINEER SIGNATURE :

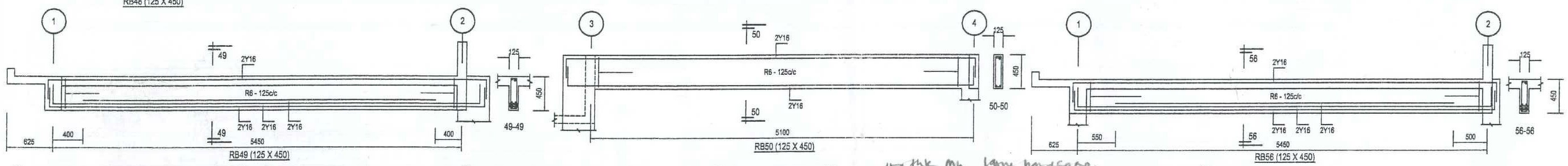
I HEREBY CERTIFY THAT THESE WORKS HAS BEEN DESIGNED BY ME IN ACCORDANCE WITH SOUND ENGINEERING PRACTICE AND THAT I TAKE FULL RESPONSIBILITY FOR THE DESIGN AND PROPER PERFORMANCE OF THE SAME.

CONSULTING ENGINEERS :

SCALE : 1:100 & 1:30	PROJECT NO.
DATE : April 2015	
DRW. NO. : 1/3	







COLUMN REINFORCEMENT SCHEDULE

COLUMN		C1	C2	C3	C4
FL.: GB - FL.: RB					
	MAIN BAR	4Y16	4Y12	8Y12	4Y12
	TIES	R10-175	R6-125	R6-125	R6-125
	COL. SIZE	225 X 225	125 X 225	125 X 425	225 X 125
STUMP					
	MAIN BAR	4Y16	4Y12	8Y12	4Y12
	TIES	R10-175	R6-125	R6-125	R6-125
	COL. SIZE	225 X 225	125 X 225	125 X 425	225 X 125

225
3600
125 x 225
2(125 + 225)
700mm x
3570

150thk mm Lean concrete.

125
225

PROJECT:

CADANGAN PEMBANGUNAN DIATAS
LOT 5209 (Lot Asal 608)
MUKIM ROMPIN,
DAERAH ROMPIN,
PAHANG DARUL MAKMUR.

Rumah Teres 1 Tingkat.

DETAIL :

ROOF BEAM(RB)DETAILS.
COLUMNS SCHEDULE.
R.C RAFT FOUNDATION SECTIONS.

OWNER :

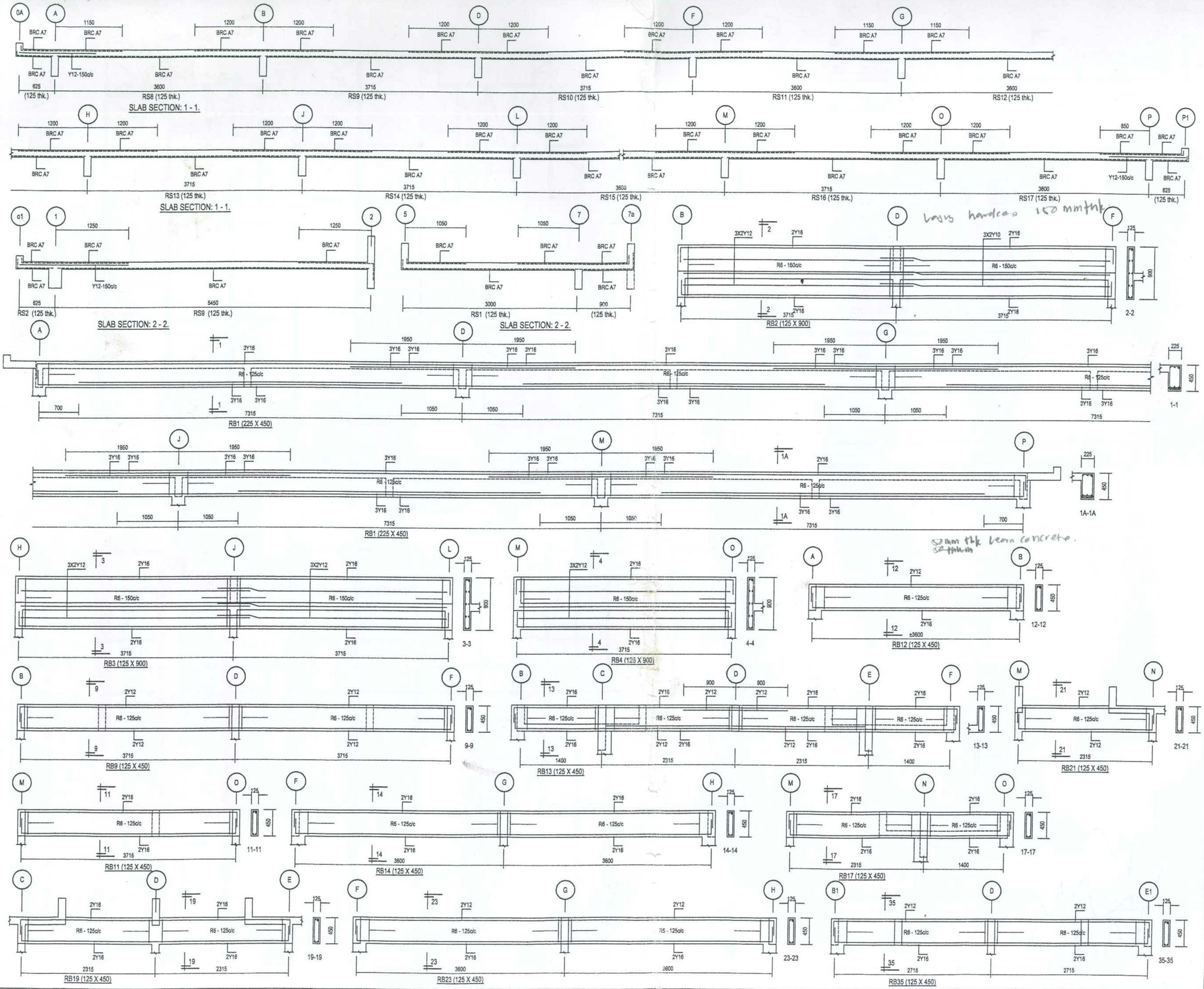
KOTA SUTERA SDN. BHD
(No.Syarikat 19537-A)
810-1, JALAN AMAN, TAMAN BAHAGIA,
86900 ENDAU,
JOHOR DARUL TAKZIM.

ENGINEER SIGNATURE :

I HEREBY CERTIFY THAT THESE WORKS HAS BEEN DESIGNED BY ME IN ACCORDANCE WITH SOUND ENGINEERING PRACTICE AND THAT I TAKE FULL RESPONSIBILITY FOR THE DESIGN AND PROPER PERFORMANCE OF THE SAME.

CONSULTING ENGINEERS :

SCALE : 1:100 & 1:30
PROJECT NO.
DATE : April 2015
DRW. NO. : 2/3



PROJECT :

CADANGAN PEMBANGUNAN DIATAS
LOT 5209 (Lot Asal 608)
MUKIM ROMPIN,
DAERAH ROMPIN,
PAHANG DARUL MAKMUR.

Rumah Teres 1 Tingkat.

DETAIL :

R.C SLAB SECTION DETAILS.
ROOF BEAM(RB)DETAILS.

OWNER :

KOTA SUTERA SDN. BHD
(No.Syarikat 19537-A)
810-1, JALAN AMAN, TAMAN BAHAGIA,
86900 ENDAU,
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CONSULTING ENGINEERS :

SCALE : 1:100 & 1:30	PROJECT NO.
DATE : April 2015	
DRW. NO. : 3/3	