



اَبُو سَيِّدِي تَيْكُونُو لَوِي كِي مَارَا  
UNIVERSITI  
TEKNOLOGI  
MARA

**DEPARTMENT OF BUILDING**

**FACULTY OF ARCHITECTURE, PLANNING AND SURVEYING**

**UNIVERSITI TEKNOLOGI MARA**

**( PERAK )**

**APRIL 2014**

It is recommended that the report of this practical training provided

**By**

**Nurul Syuhadah Atikah Bt Shamsuddin**

**2011535841**

**entitled**

**CONSTRUCTION METHOD OF SCAFFOLDING DESIGN**

accepted in partial fulfilment of the requirements has for obtaining a Diploma in  
Buildings.

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**APRIL 2014**

**STUDENT'S DECLARATION**

I hereby declare that this report is my own work, except for extract and summaries for which the original references stated herein, prepared during a practical training session that I underwent at Majlis Perbandaran Kuantan ( MPK ) for duration 5 months starting from 28 October 2013 until 17 March 2014. It is submitted as one of the prerequisite requirements of DBN 307 and accepted as a partial fulfilment of the requirements for obtaining the Diploma in Building.

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## **APPRECIATION**

First and foremost, I am grateful to Allah S.W.T. the Most Compassionate and the Most Merciful, by the grace and mercy, I have successfully completed the practical training report within the prescribed period. Over the past 5 months I went to the practical training at Majlis Perbandaran Kuantan in Special Projects Unit where the project site was at Lot 29, Seksyen 30, Jalan Tanah Putih, Kuantan Pahang Darul Makmur.

Secondly, I am very grateful to my mother, my father and my family because they always encouraged me and give a lots of moral support to continue this practical training. Problems and challenges have resolves because of the advice and guidance from them. Also to my lecturer supervisor, Mr. Naim Muhammad Mahyuddin extensive guidance and comments on the report of my practical training. Recommendations and advice given by him have helped me to complete my practical training report.

Last but not least, I would like to thank to all staff at my practical company for this 5months training. Especially to my supervisors, Mrs.Norkamawati Kamal in Building Department for 1 months and Mr. Helmy Mohamad Yatim in Special Project Unit for 4 months for all their guidance and knowledge shared by them to me about the job at the construction site. Besides that, I am also grateful to all the staff at the office and site office that explain and sharing about my title of practical report. Your kindness will be unforgettable.

## **ABSTRACT**

Practical training at the project site ‘ Cadangan Membina Kompleks Ibu Pejabat Majlis Perbandaran Kuantan (MPK), Di atas Lot 29, Seksyen 30, Jalan Tanah Putih, Kuantan, Pahang Darul Makmur under Majlis Perbandaran Kuantan (MPK) gave me a lots of useful information in preparing this project report. This report is regarding about the Method Scaffolding Design Construction to fulfil the requirements set by the Building Department to get Diploma in Buildings. This study produced by observation and my involvement in the construction world for 5 months beginning on 28 october 2013 until 17 march 2014. Explanation in this report is about design specification of scaffolding, types of scaffolding, scaffolding construction methods and the safety features regarding the use of scaffolding. As conclusion, this report will explain in more detail about scaffolding design in construction methods.

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## **LIST OF SHORT WORDS**

OSHA	-Occupational Safety and Health Administration	13
MPK	- Majlis Perbandaran Kuantan	13
YDP	- Yang DiPertua	14
SDN BHD	- Sendirian Berhad	16

# CHAPTER 1

## INTRODUCTION

### 1.1 Introduction

The construction business is growing rapidly and has a wide range of advanced technologies and the important components in the construction works. A responsible contractor is take care of the safety of the workers during the construction works. OSHA also requires that in each construction using scaffolding as a safety measure in the construction work. If the company not follow the predetermined act, OSHA reserves the right to take action against the company.

One of the important components in high rise buildings are set up scaffolding. Although this component are temporary but it can be used from beginning of the construction until the construction is complete. Scaffolding is a temporary building that serves to facilitate enable construction workers doing work such as bricks, plastering, installing ceiling and painting in high places safely. The functions of the scaffolding are platform for workers pathways and putting materials or tools while they are working. The most commonly materials that using in scaffolding are steel, aluminium and wood.

## **1.2 Objective of study**

Objective of the study is the goal or purpose of the study done by the writer in connection with the practical training. This report requires the writer to study and make detailed observations about what the writer learned and while the writer was at the construction site.

Objective of this report are as follows:

- i) Design specification in construction.
- ii) Types of scaffolding.
- iii) Method construction in constructing a scaffolding.
- iv) Safety features regarding the use of scaffolding.

## **1.3 Scope of study**

The scope of my study generally is related to building construction scaffolding technology. My research is based on observations made during the practical training for 5 months at the site. The scope study of my report is focused on the design of scaffolding.

**1.4 Method of research**

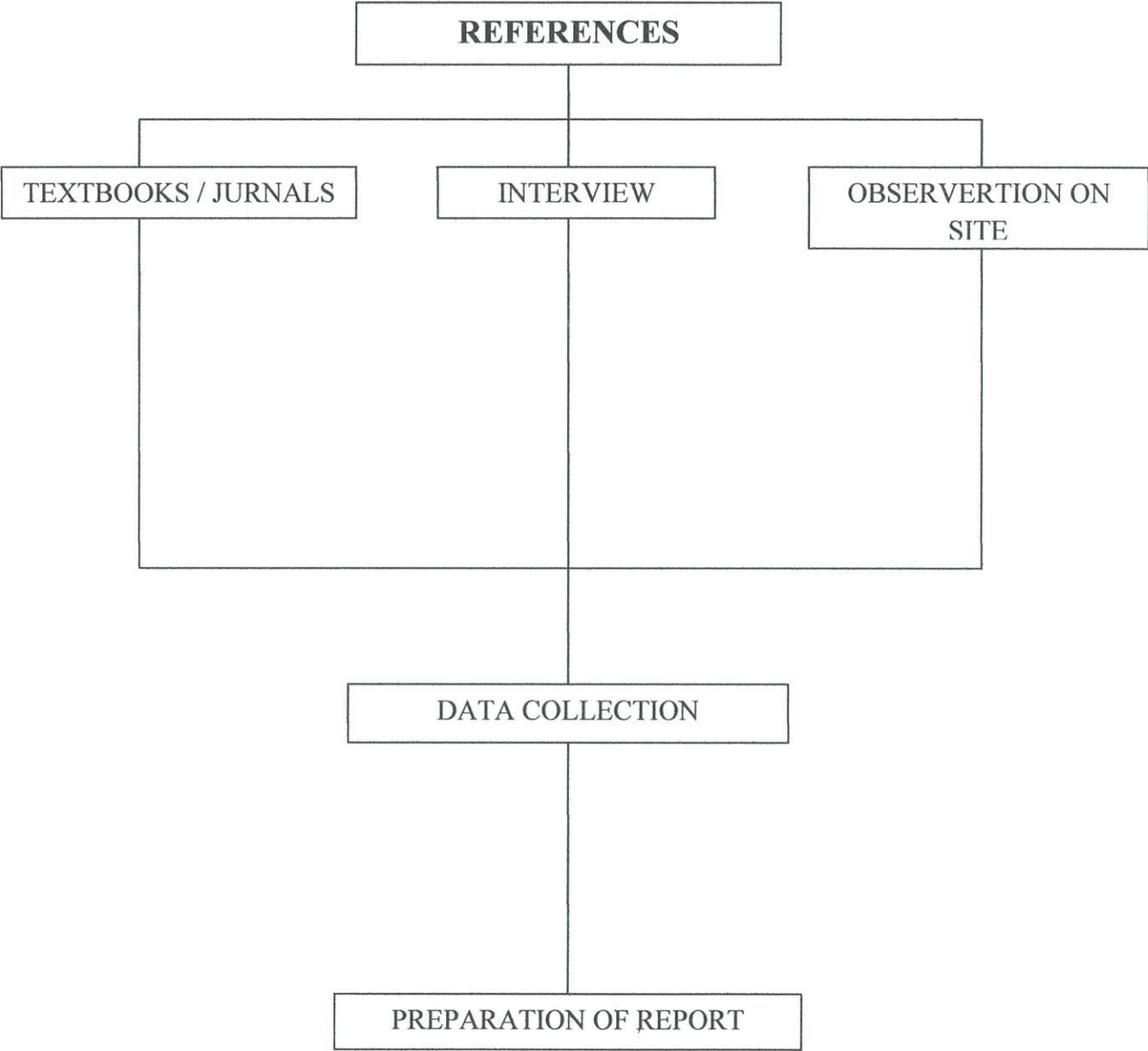


Figure 1 : Method of research

## **CHAPTER 2**

### **BACKGROUND OF THE COMPANY**

#### **2.1 Introduction of company**

Majlis Perbandaran Kuantan (MPK), located in Jalan Tanah Putih, 25100 Kuantan, Pahang. The vision of MPK is Kuantan as Key Growth Centre East Region The Prosperous 2014 and the mission of MPK are conducive urban development, complete infrastructure facilities and high quality, excellent Kuantan citizen development, preservation and conservation of a sustainable environment and the best administrative system, integrity and prudence.

The function of MPK are planning and development control kuantan, preparation and maintenance of public facilities, infrastructure and urban landscape, creating proportions assessment and collection of tax assessment, running enforcement program, manage and implement municipal services community development activities. The services that MPK provided for public are complaints tree services, assessment, payment counter services, service sports facilities, compound enquiry services, CFO approval conditions and commercial trash services charge.

## 2.2 The history of company

Local governing system was implemented in Kuantan on 1<sup>st</sup> August 1913, with the establishment of the Kuala Lumpur Sanitary Board which is responsible for the control of hygiene, health and development control.



Figure 2 : Administrative site plan.

Currently the administrative area MPK actual area is 2,065 square miles that includes Mukim Kuala Kuantan, Kuantan PLANE, Reuters Beserah and Mukim Sungai Karang. This area generally covers 10% of the actual area of Kuantan District of 2,453 square kilometers (1,410.4 sq mi)



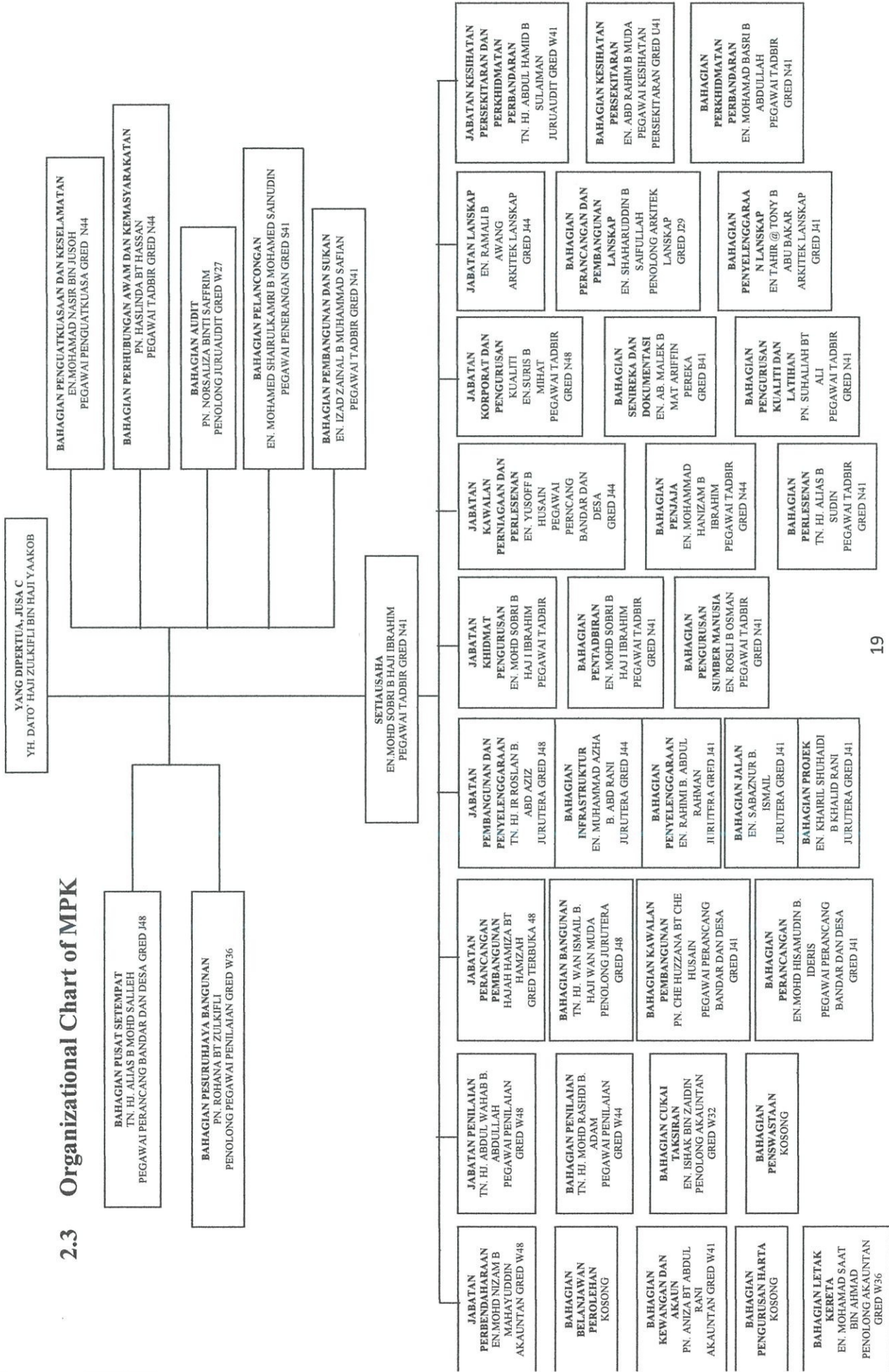
There are 9 people MPK President since its inception in 1979 until now, namely :

1. YH. Dato' Haji Abdul Rahim bin Abu Bakar DSAP., SMP., AMN.
2. YH. Dato' Haji Abdul Rashid bin Haji Abdul Rahman SIMP., DSAP., PJM., KMN., AMN., PPN., PJK.
3. YB. Dato' Seri Haji Mohd Najib bin Tun Haji Abdul Razak SSAP., SIMP., DPMS., DSAP., PNBS.
4. YB. Tan Sri Haji Mohd Khalil bin Yaakob SSAP., SIMP., PSM., DSAP., JSM., SMP.
5. Y.H Dato' Mohamad bin Saib DIMP., SMP., ASA., BKT.
6. Y.H Dato' Haji Hashim bin Abdul Wahab DIMP., SMP., KMN., AMP., PJK.
7. Y.H Dato' Muhammad Safian bin Ismail DIMP., AAP., AMP.
8. Y.H Dato' Azizan bin Ahmad DIMP., SMP.
9. Y.H Dato' Haji Zulkifli bin Haji Yaacob DSAP., DIMP., AAP., AMP.



Figure 3: Show the company logo of MPK.

### 2.3 Organizational Chart of MPK



## 2.4 List of projects

### 2.4.1 Projects that have been completed

No.	Project name	Start	End	Project cost
1.	Cadangan Membina Terminal Bas Bersepadu Di Indera Mahkota,Kuantan	15.06.2011	25.03.2013	RM 43,800,000.00
2.	Cadangan Penyelenggaraan Dan Pembinaan Tandas Serta Kerja Berkaitan Di Surau Nur Hidayah Balok Baru Kuantan	19.08.2013	11.11.2013	RM 95,910.00
3.	Cadangan Kerja Menyelenggara Asrama Atlit Serta Kerja Berkaitan Di Asrama Majlis Sukan Pahang,SUKPA Indera Mahkota	19.08.2013	15.11.2013	RM 354,700.00
4.	Cadangan Membina Dan Menyiapkan Dewan Serbaguna Di Kampong Peramu,Kuantan	24.09.2012	11.03.2013	RM 1,000,000.00
5.	Cadangan Membina Dan Menyiapkan Tambahan Ruang Makan Berbumbung Serta Kerja Berkaitan Di Anjung Selera Cenderawasih,Kuantan	10.12.2012	19.04.2013	RM 356,470.00
6.	Cadangan Membina Pusat Gym,Bilik Taklimat Dan Bilik Persalinan Di Gelanggang Bola Keranjang,Kubang Buaya,Kuantan	09.01.2013	31.07.2013	RM 399,393.30
7.	Cadangan Membina Gelanggang Terbuka Serta Kerja Berkaitan Di Bukit Rangin,Kuantan	02.12.2013	31.12.2013	RM 66,745.00

Table 1 : Projects that have been completed

### 2.4.2 The project under construction

No.	Project name	start	end	Project cost
1.	Cadangan Membina Dan Menyiapkan Pasar Ikan Dan Gerai Pelbagai Di Beserah,Kuantan	15.10.2012	10.03.2014	RM 3,929,418.00
2.	Cadangan Membina Pondok Bas Di Sungai Karang Darat 2 (Jln Kuantan-Bypass)	08.01.2014	05.02.2014	RM 19,908.00
3.	Cadangan Kerja Menaiktaraf Ruang Makan Berbumbung Serta Kerja Berkaitan Di Gerai Teluk Cempedak,Kuantan	18.11.2013	24.03.2013	RM 439,000.00
4.	Cadangan Membaikpulih Sistem Perparitan Di Taman Tas Ria,Taman Tas,Kuantan	19.08.2013		RM 1,722,230.00
5.	Cadangan Menaiktaraf Jalan Di Pusat Budaya Cherating Dan Kawasan Sekitar	08.01.2014		RM 19,930.00

Table 2 : The project under construction

## **CHAPTER 3**

### **CASE STUDY**

#### **3.1 Introduction**

Kuantan Municipal Council ( MPK ) now has new headquarters project module in which the project is to implement training practical writer . This project is for office use where the module has 11 floors with sub basement comes with a separate lobby , the counter-based (OSC ) , living room and office space YDP . other than that, the hall auditorium , main meeting hall and multi-purpose hall is also available.

This project has an area of 5.4 acres equal at KP 238.200 adjacent to the existing river Kuantan . There are 4 quarters old mansion was torn down and a water drainage pipe that have been removed . generality of this site is broken down into four parts, building area of 82,700 Kp ( 1.9 acres ) , an area of soft landscaping 65.300 Kp ( 1.5 acres ) , an area of hard landscaping 28.865 Kp ( 0.6 acres ) and an area of 59.335 Kp road or service ( 1.4 acres).

Client for this project is Majlis Perbandaran Kuantan itself. For consultants , Kining Exeton SDN BHD for architects ,Angkasa Jurutera Perunding for civil and structural, KS Consultant Engineering SDN BHD for mechanical and electrical, and lastly Perunding NFL SDN BHD for quantity surveyor.



Tarikh : 09 Jun 2010

Picture 1 : Illustration of MPK New Building

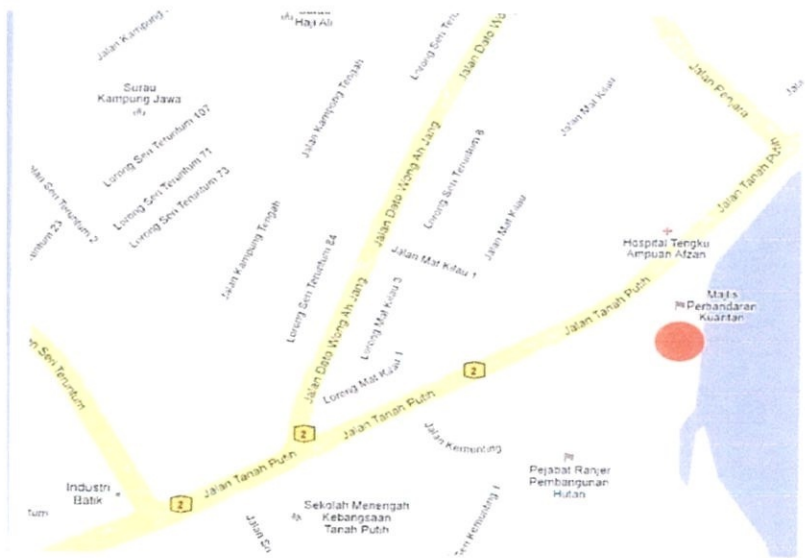
### 3.1.1 Background of Building Project

<b>Name of the project</b>	<b>Cadangan membina Kompleks Ibu Pejabat Majlis Perbandaran Kuantan (MPK) di atas Lot 29, Seksyen 30, Jalan Tanah Putih, Mukim Kuala Kuantan, Pahang Darul Makmur</b>
<b>Scope of work</b>	<p>Foundation and structural works.</p> <p>Offices block and specified facilities.</p> <p>Upgrading the security post gate for the safety of in and out.</p> <p>Other main components is the basic facilities and infrastructure, civil and structures works also mechanical and electrical works.</p>
<b>Owner</b>	Majlis Perbandaran Kuantan (MPK)
<b>Contractor</b>	Kining Exeton SDN. BHD.
<b>Inducted in</b>	13 July 2011
<b>Date of handover the site</b>	8 August 2011
<b>The contract period</b>	731 Days
<b>Cost of the contract</b>	RM 64,773,413.12
<b>Defect liability period</b>	18 Months

Table 3 : Background of Building Project



**KEY PLAN**



**LOCATION PLAN**

**Figure 4 : Key Plan & Location Plan**

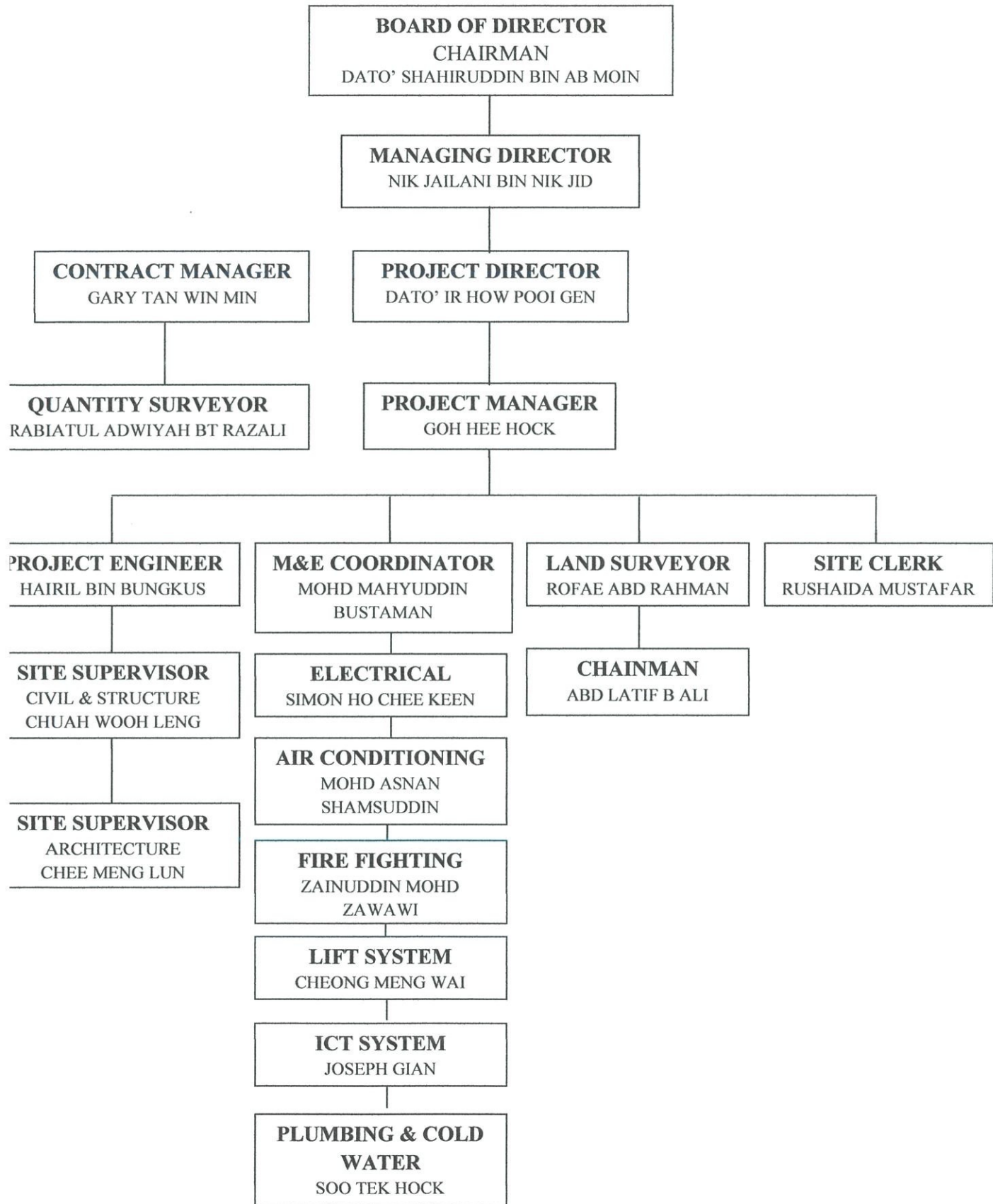


### 3.2 List of Contractors and Consultants involved

About	Address
<b>Contractor</b>	<b>Kining Exeton SDN. BHD.</b> B292, 1 <sup>st</sup> Floor, Jalan Lim Hoe Lek, Kuantan Pahang, Darul Makmur.
<b>Architect</b>	<b>SAM Arkitek Perunding</b> No.1, Jalan 8A, Ampang Jaya, 68000 Ampang, Selangor Darul Ehsan.
<b>Civil &amp; Structure Engineering</b>	<b>Angkasa Jurutera Perunding</b> No.40, 1st Floor, Jalan Mahkota, 25000 Kuantan, Pahang Darul Makmur.
<b>Mechanical &amp; Electrical Engineering</b>	<b>KS Consulting Engineers SDN. BHD.</b> No.8, Lorong Indera Mahkota 6/5, Bandar Indera Mahkota, 25000 Kuantan, Pahang Darul Makmur.
<b>Quantity Surveyor</b>	<b>Perunding NFL SDN. BHD.</b> No.90, Lorong Maarof, Taman Bangsar, 59000 Kuala Lumpur.

Table 4 : List of Contractors and Consultants involved

### 3.3 Organizational Chart of the Project



### **3.4 Introduction of scaffolding**

Scaffolds are temporary built-up frameworks or suspended platforms designed to support workers, materials, and equipment at elevated or otherwise inaccessible work locations. All scaffolds must be used and assembled in accordance with all local, state, and federal/OSHA laws and codes. They may be built up from the ground or suspended from a structure. Depending on their design, scaffolds are classified for light-duty, medium-duty, or heavy-duty use, meaning they can safely support loads up to 25, 50, or 75 pounds per square foot or 1.05, 2.1, or 3.15 kilograms per square meter, respectively. OSHA Standards 1926, Subpart L defines and governs the use of scaffolds. OSHA requires that the building, moving, or dismantling of all scaffolding be supervised by a competent person. A competent person is one who has the training, knowledge, and experience to identify hazards on the job site and the authority to eliminate them. Some general OSHA regulations pertaining to the use of scaffolds are:

All scaffolds must be able to support at least four times their maximum intended load and scaffold cable or rope must be able to support at least six times the rated load. Planking must be secured to the scaffold. It must also be of the proper grade and size for the load. A ladder or other safe means must be available for accessing the scaffold. Any scaffold that is 10 feet (3.04 meters) or more off the ground or surface (less in some states) must have guardrails, midrails, and toeboards made of lumber or other suitable material on all open sides and ends. The guardrail should be placed about 42 inches (106.7 cm) high. The midrail should be halfway between the guardrail and the toeboard, which should run along the base perimeter of the scaffold. The prescribed dimensions are 2 x 4 inches for guardrails, 1 x 6 inches for midrails, and at least 4 inches (10.16 cm) high for lap boards. If anyone must work or pass under the scaffold, the space between the guardrail and lap board should be covered with wire mesh to prevent tools or materials from falling below. Any scaffold between 4 and 10 feet (1.22 and 3.05 m) high and less than 45 inches (114.3 cm) long or wide must have guardrails on all open sides and ends. Any damaged scaffold must be repaired or replaced immediately.



Picture 2 : Scaffolding Frames

### 3.5 Types of scaffolding

#### a) Independent Tied Scaffold.

This scaffolding structure is most often used which consists of two rows of columns parallel to the building. The lines are combined by beam columns installed using perpendicular coupler. The main drive tied right to the ledge with putlog coupler or coupler tied to a pole with right angles. This structure must be braced with beams shot at each pair of columns in a cross. In addition, it should also be tied to the window surface using fasteners that have been mentioned. Normally, these types of scaffolding used five boards but for work inspection, two or three pieces for small width was adequate. Scaffolding platform for independent work may reach 30-40 meters in height from ground level. Therefore, routes for workers and materials should be carefully considered. The workers usually use a ladder to transport materials.

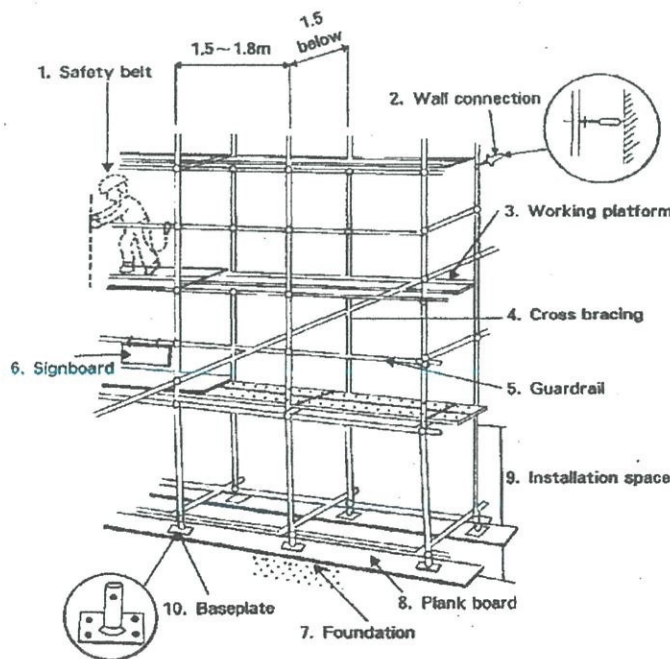


Figure 5 : Independent Tied Scaffold

## b) Putlog Scaffolding.

The putlog scaffolding is usually referred to as the outer wall Bricklayers and installation by a high brick floors are pervaded. This type of the scaffolding consists of a single line of poles with distance 1.2m - 1.3 m done parallel to the surface. Work platform placed consisting of four or five pieces of board and at the end of the work platform must be as closed with walls of buildings.

In putlog scaffolding structure, mounted on a pole lathe using perpendicular coupler. The putlog actually has to be compressed at the ends. The putlog must fully inserted into the connection between the layers of brick. If putlog hammer-on the existing brick walls, old putlog holes can be reused. If not, a new hole need to crushed and flattened tip putlog be inserted vertically.

Base plate and ironing site often used under each of the pillars . binder in hand it is the same as in the independent tied scaffold . 'Rembat' tip is also required at intervals not exceeding 30 meters .

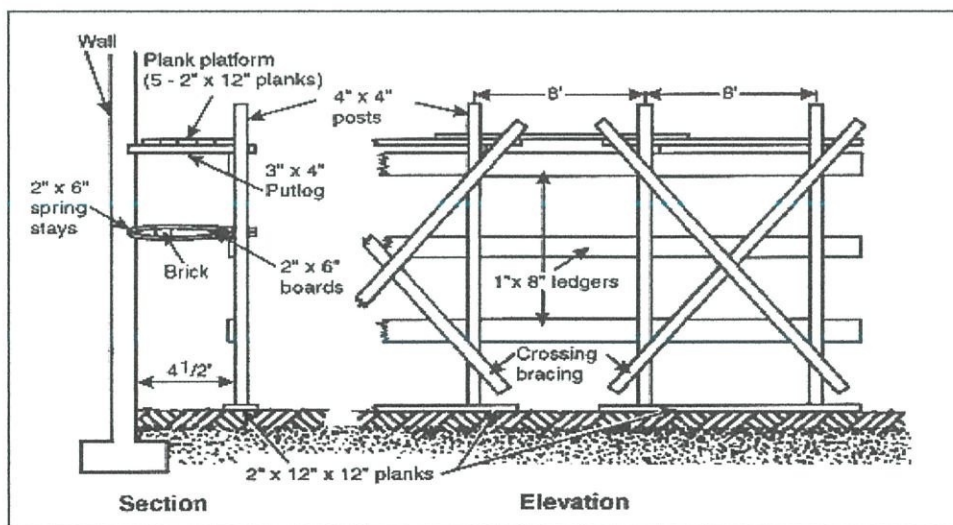


Figure 6 : Putlog Scaffolding

### c) Nest Scaffolding Access

Scaffolding nest looks like a bird cage. Usually it is used in the building to provide jobs for ceiling work, soffit and lighting. Small works can be implemented with scaffolding towers, but for larger projects involving the longer term, this nest scaffolding access is required.

Scaffolding is built using poles arranged in the same interval in a parallel line. The pole fastened to the ledge and square grid on each floor. on top of the elevator board pieces are placed as work platform.

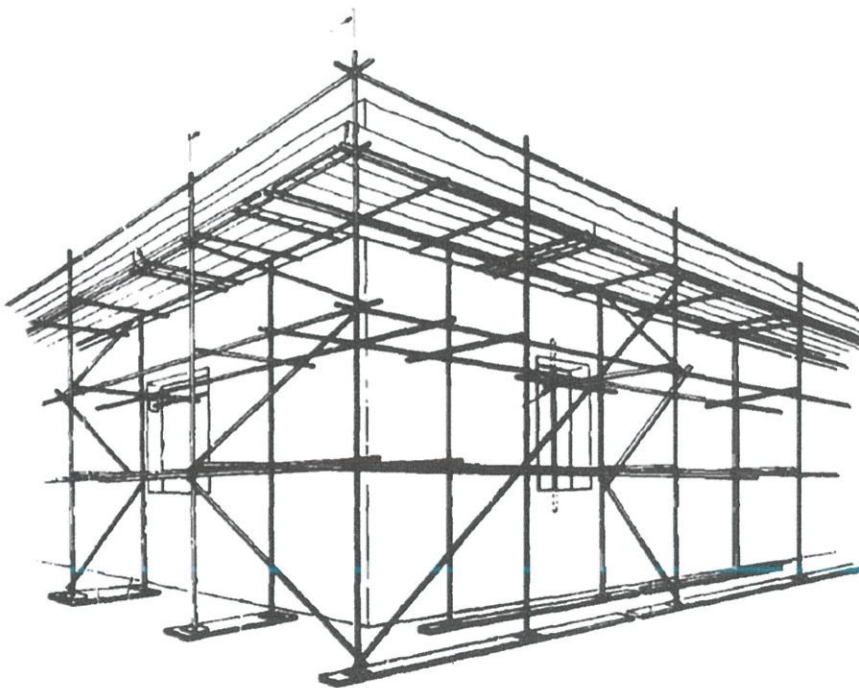


Figure 7 : Nest Scaffolding Access

#### d) Scaffolding Tower.

Scaffolding tower can be made whether to move or not move. Scaffolds are not moved a wheel under the posts . Such scaffolding structure to support a work platform that area does not exceed the area of the base. work platform is equipped with guard cells and boards under guard . Ladders used as a way to get to the work platform.

Structural scaffold towers are divided as follows :

##### a) Access Tower Task

This type of scaffolding used primarily for light work such as painting , easy maintenance and others. It will not support heavier loads than  $1.5\text{kN/m}^2$  . This equates to a load of two workers standing on an area of one square meter . Safe working load should be stated clearly in the work platform .

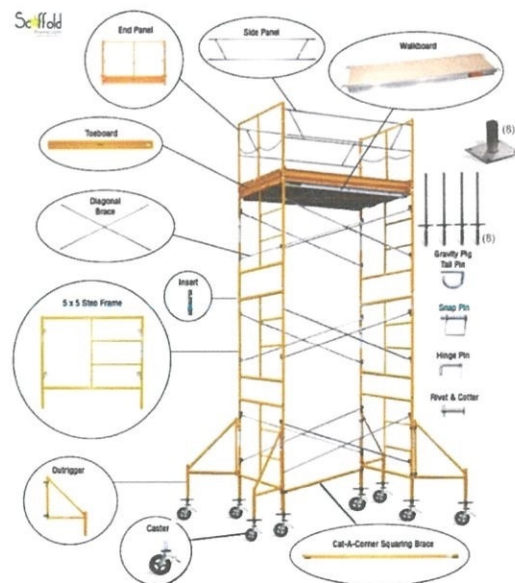


Figure 8 : Access Tower Task



### b) Fixed Scaffolding Tower

Tower is different from the tower to move in terms of movement. It is not moving and is more stable. Usually, it is higher than the tower moved and tied to be more stable.

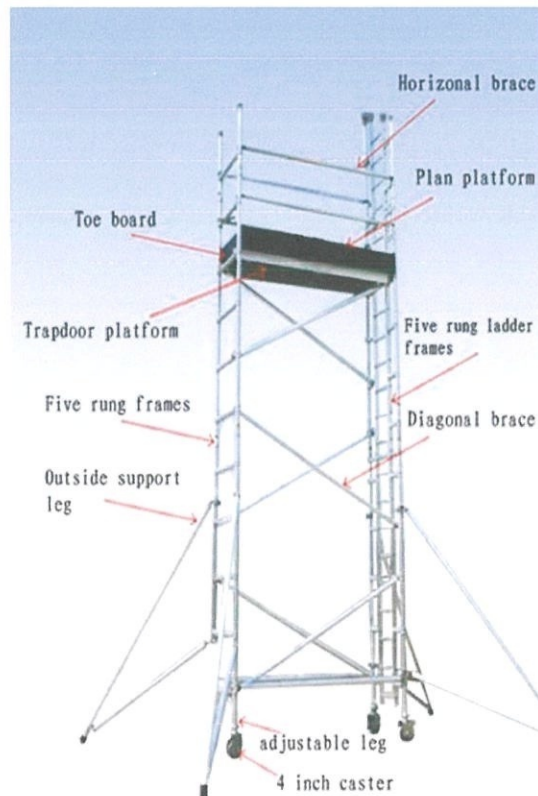


Figure 9 : Fixed Scaffolding Tower

### e) Prefabricated Scaffolding System

Scaffolding system can be described as an easy to use and can be installed by unskilled labor. There are a wide range of systems in the market that can fulfill the functions of light duty until heavy duty function. Each type of system has its own installation equipment such as wedges and pin lock. Thus, each system can only be installed using the elements of the system elements only and can not be changed by another system.

Therefore, specific instructions, training or installation manual supplied with the same very important. Users need to pay greater attention to the method of installation supplied by the manufacturer. This is because there is no parallel in the determination of the scaffolding system. Most of the scaffolding system consists of pole pole connector available with welded at intervals along the height. Ledge in pairs with proprietary clamping or use a wedge.



Figure 10 : Prefabricated Scaffolding System

f) 'Trestler & Ladder'

Scaffolds of this type are usually constructed of wood. It works perfect for mild and moderate exposures such as painting, installing ceiling and brick wall tie work no more than 4 meters in height and is used as a working platform height not exceeding 4.5 meters. Ladders are used as support for this scaffold should not exceed 1.5 meters between two supports and stair openings shall be not less than 35 degrees. The platform used is wood with a width of not less than 225 mm (9inci) for painting and not less 450mm for other work. But it is less used because of lack of strength.

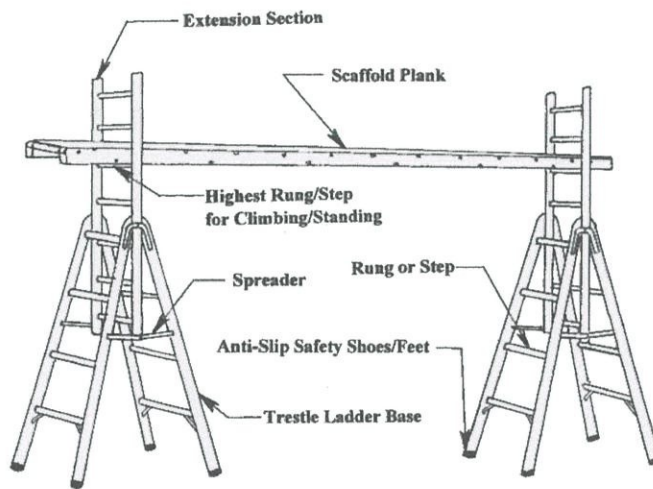


Figure 11 : 'Trestler & Ladder'

### **g) Frame scaffolding**

Scaffolds of this type is the easiest to install, open, transportable, and have a guaranteed strength than wood scaffolding. Scaffolding is used as a route to the upstairs floor as stairs stairs in the building has been constructed. In addition, it is also a place of work employees perform plaster work, painting and so on to put the board in the floor between the frame. Scaffolds of this type can also be used to support the concrete mold on it with an appropriate order, example support to mold the floor and beam.



Picture 3 : Frame scaffolding

### 3.6 Design specification in construction scaffolding

#### a. Dead Load ( 2 Lift )

Dead load of each column	Weight (kg)	Unit	Total weight (kg)
Open End Frame	15.6	2	31.2
Cross Brace	4.2	2	8.4
Pin	0.5	2	1.0
U-Head	5.5	2	11.0
Base Plate	4.9	2	9.8
Swivel Head	0.6	2	1.2
Timber 1.6 x 0.05 x 0.1	6.3	2	12.6
Loading from beam & slab	897	1	897
<b>Total load for each space</b>			<b>972.2kg</b>

Maximum load,  $72\text{kN} + 8.97\text{ kN} = 81\text{ kN}$  @ 8100kg at Beam Bridge.

#### b. Live Load

Weight of a scaffolding used as a retainer to the formwork at the beam, where to put the rig to work. The live load capacity of each room is 675kg / space.

**c. Wind Load ( BS 3 : Chapter v : Pt 2 : 1972 )**

$V$  = design wind speed in m/s

$V_s = V S^1 S^2 S^3$

$V$  = basic wind speed in m/s = 33 m/s\*<sup>1</sup>

$S^1$  = factor relating to topology = 0.9

$S^2$  = factor relating height above ground & wind breaking = 0.83

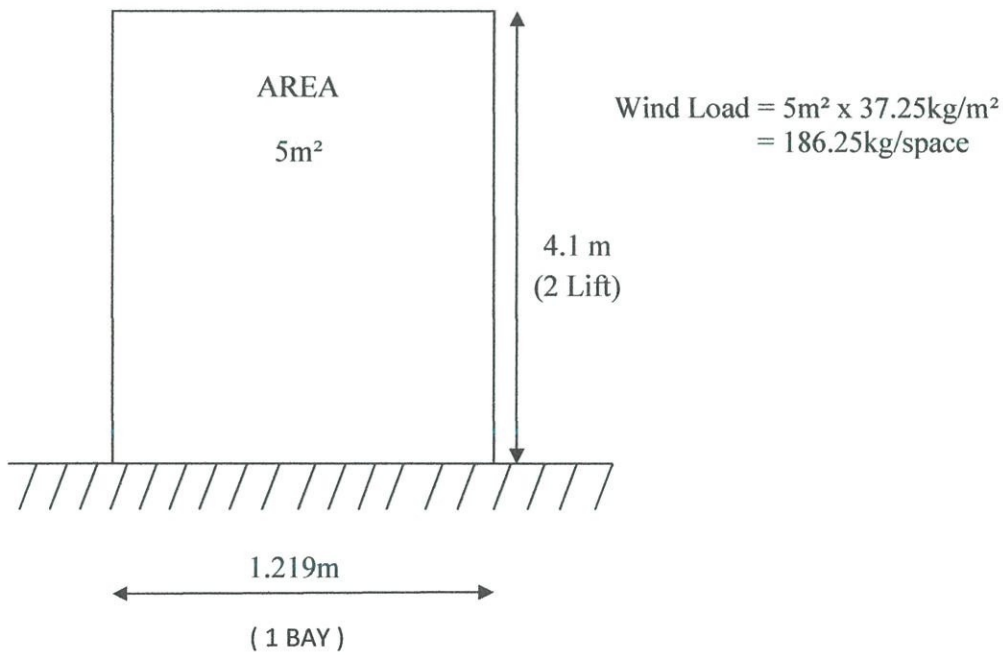
$S^3$  = factor relating to life of structure = 1

$W_k = K V_s^2$

$W_k = 0.613 ( 33 \times 0.9 \times 0.83 \times 1 )^2$

$W_k = 372.5 \text{ N/m}^2$

= 37.25 kg/m<sup>2</sup>



**Total Load / Space :**

$$\begin{aligned}\text{Total Load} &= \text{Dead Load} + \text{Live Load} + \text{Wind Load} \\ &= 1900\text{kg} + 675\text{kg/space} + 186.25\text{kg} \\ &= 2761.25 \text{ kg/space}\end{aligned}$$

**Liabilities of each foot of scaffolding :**

$$= \frac{2761.25}{4} = 690.3\text{kg}$$

**Factor of Safety 33%,**

$$\begin{aligned}&= 690.3\text{kg} \times 133\% \\ &= 918\text{kg}\end{aligned}$$

**Place every foot on the jack base is able to bear the load of 3000kg (3 tons), then**

$$= 918\text{kg} < 3000\text{kg}$$

**d. Extensive Calculations Packing Site**

Total load for one feet jack base = 918 kg @ 0.92 tonne.

Estimating of the ability of reinforced concrete floor is 6 tonne/m<sup>2</sup>,  
then the board yoke base is :

$$\begin{aligned} & \frac{\text{Total load}}{\text{The ability of reinforced concrete floor}} \\ &= \frac{0.92 \text{ tonne}}{6 \text{ tonne / m}^2} \\ &= 0.153 \text{ m}^2 \end{aligned}$$

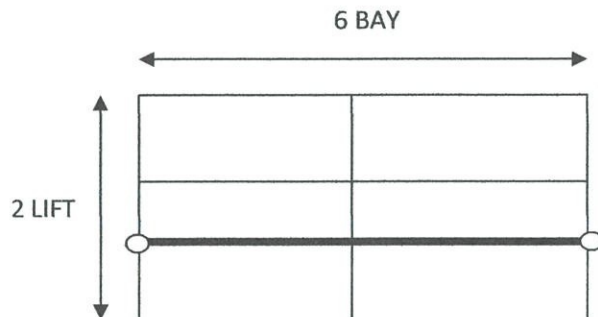
The minimum size of the board yoke base is :

$$\begin{aligned} &= 0.153\text{m}^2 / 0.1\text{m width} \\ &= 1.53\text{m} \\ &= 50 ( 2'' ) \times 100 ( 4'' ) \times 1.53\text{m} \end{aligned}$$

**So, the size of lap board is, 50 x 100 x 1.53m length.**



### e. Tie Back Calculations



Total of tie back = 6 nos

The ability of the tie back = 1 tonne / nos

So, = 6 nos x 1 tonne / nos  
= 6 tonne

Horizontal wind loading = 186.25 kg / space  
= 6 space x 186.25 kg / space  
= 1117.5 kg

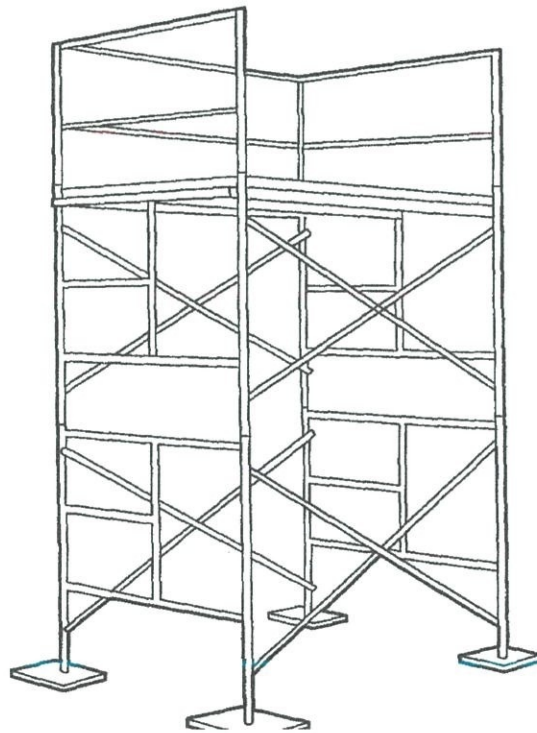
The ability to tie back horizontal load caused by the environmental load is 1117.5 kg (1:12 tonne) is small compared with the capacity of 6 tonnes tie back.

$$\ast \mathbf{1117.5 \text{ kg} < 6000 \text{ kg}}$$

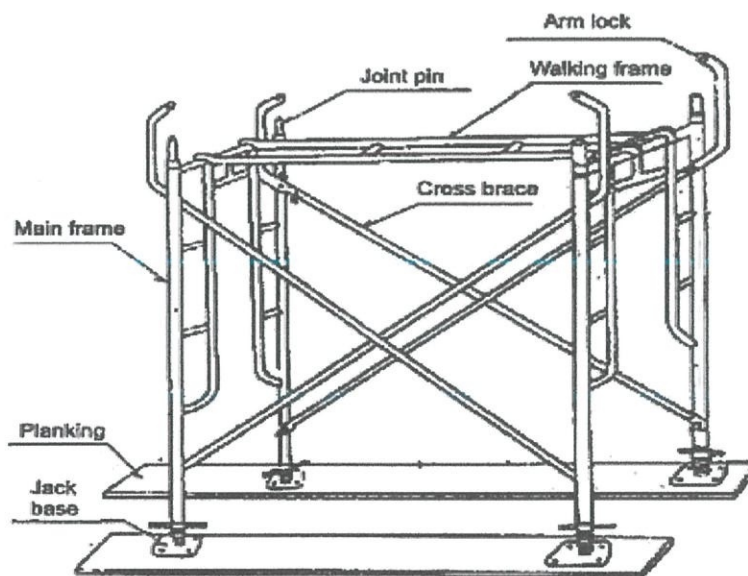
### 3.7 Method statement of constructing a scaffolding

scaffolding installation is a job that requires working in groups. to ensure the installation of scaffolding made with the proper procedures, advance an employee should know his role in the group, as well as confidence in the tasks assigned to him. in addition, the factor of safety and quality is always a priority.

- 1) The type of the scaffolding used in the construction is Frame Scaffolds.



- 2) Component that is often used is the main frame, yoke, 'rembat' crossbars, and pin connection.
- 3) The installation of the first frame to be given more attention because it will affect the strength of the scaffold.
- 4) Fixed yoke or yoke jack placed on the lap board base with the same distance measure used 'rembat' crossbar.
- 5) The main frame mounted on the yoke or yoke jack fixed and enforced by installing 'rembat' crossbar.
- 6) Fixed yoke or yoke jack nailed to the lap board base.
- 7) Cutting the main frame will be checked using a level equipment. Different sections can be corrected by turning the diff jack pad level.
- 8) Front row built frame further mounted with pin connection.
- 9) The board use as a platform must be properly fastened and supported in the framework.
- 10) Scaffolding must be inspected every seven days or after bad weather may have led to stability, position and strength of the scaffold is altered.



11) When using scaffolding, workers must wear safety helmets, safety belts and safety boots.



Picture 4 : Safety Helmets



Picture 5 : Safety Belt



Picture 6 : Safety Boots

### **3.8 Safety features regarding the use of scaffolding**

- a. Keeping themselves and other employees safety during installation scaffolding work must follow the characteristics below :
  - i. Wear safety shoes, safety helmet and safety belts.
  - ii. Each time lifting or lowering scaffolding equipment shall be done with care and caution so as not an accident.
  - iii. Install safety signs in the work area scaffolds.
  - iv. Check and make sure the equipment is in good conditions.
  - v. Comply with the instructions given by supervisors.
  - vi. Perform maintenance work on equipment and materials.
  - vii. Do not do any act that may damage equipment such as scaffolding or frame throwing from a high level or knock loudly framework and tools.
  
- b. It is prohibited install the scaffolding without supervision by Scaffolders Certified Installer or a Qualified Supervisor.



Picture 7 : Safety Tagging of Scaffolding

## CHAPTER 4

### CONCLUSION AND RECOMMENDATION

Result of the study and learn about the scaffolding, there are various types of scaffolding that is on the market with the appropriate uses than before. This is important because the construction is rapidly growing these days and everything should go smoothly.

A scaffolding installation must comply with the principles of design and construction set such as the selection of appropriate scaffolding, design loads can be borne, using quality materials and fitting scaffolding set. Although that, maintenance works must be passed from time to time to ensure the scaffolding structures are always in good condition and safe to use.

Other than that, the failure of the scaffolding structure at construction sites is often caused by human negligence and failure to follow the rules that have been set apart from other factors. The scaffolding structural failure may cause accidents and disturb other worker safety besides can cause higher losses. In addition, the project will be delayed due to the failure of these structure.

Lastly, the result of studies about how to build scaffolding and scaffolding performed found in IKBN Bachok, Kelantan that the often scaffolding structure used at construction sites are Circular Steel Tube Scaffolding and Steel Tube Frame Scaffolding because these scaffoldings are more practical than other types. Besides, it is also available at factories that have producing these scaffolds. Scaffolding is also safe to use because the materials is capable of heavily loaded components and elements that are more stable than before which is only use bamboo or wood with Raffia strips.

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- c) [http://www.search document.com/pdf/1/6/Perancah.html](http://www.search%20document.com/pdf/1/6/Perancah.html)
- d) <http://apps.polikk.edu.my/~awam/files-perancah.pdf>



**SCAFFOLDING  
DESIGN CALCULATION**

**FOR**

**CADANGAN MEMBINA KOMPLEKS IBU PEJABAT,  
MAJLIS PERBANDARAN KUANTAN (MPK),  
DI ATAS LOT 29, SEKSYEN 30  
JALAN TANAH PUTIH, KUANTAN  
PAHANG DARUL MAKMUR**

**LOADING PLATFORM**

TO,

TETUAN MAJLIS PERBANDARAN KUANTAN

For,

GLOBAL SEASON SDN. BHD.

Prepared By,

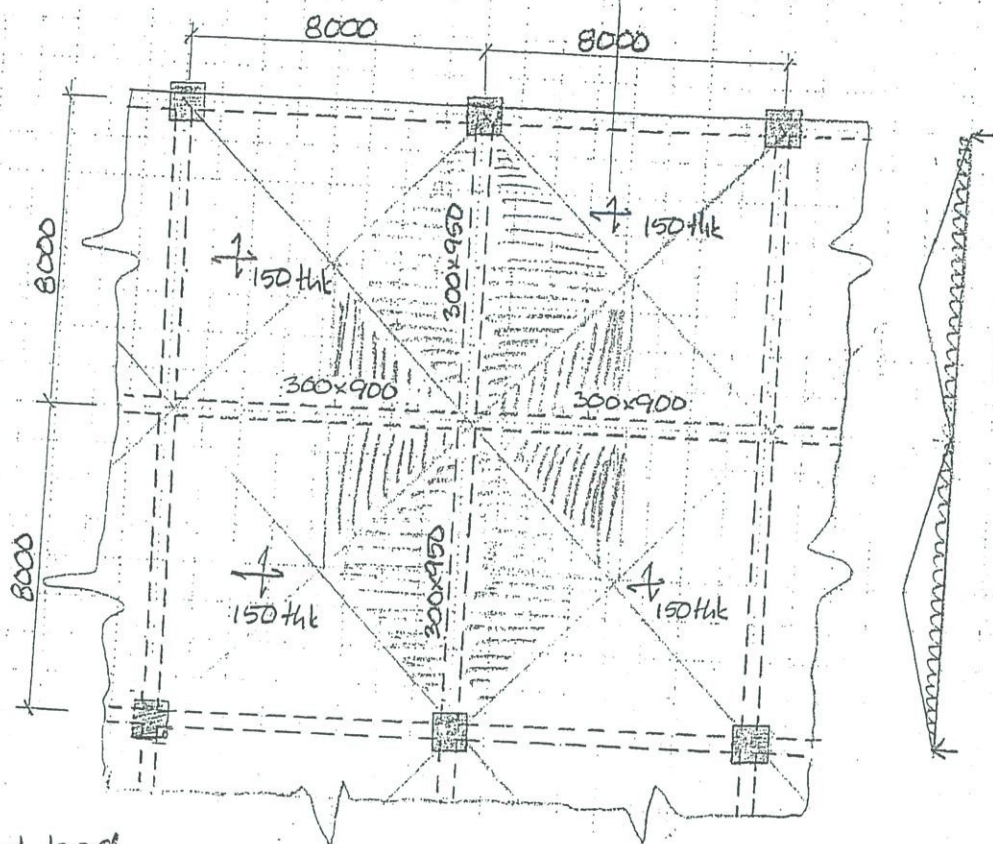
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Ir Rosmadi Bin Zamri



# ERAJU RUNDING

Job Ref No: TR/2012/11 Rev. Page  
 Prepared by: IRRE Sheet: 1 of 1  
 Checked by: Date: 6/8/2012  
 Location member: Loading.

Project:  
 Rancangan Membinga Kompleks Ibu Pejabat  
 Perbandaran Kuantan (MPK) di atas  
 Lot 29, Seksyen 30, Jalan Tanah Putih, Kuantan  
 untuk Tetuan Majlis Perbandaran Kuantan (MPK)



### Dead load

Slab 150mm thk  $\times 24 \text{ kN/m}^3 = 3.6 \text{ kN/m}^2 = 28.8 \text{ kN}$   
 slab are call similar) =  $0.5 \times 4 \times 4 = 8 \text{ m}^2$

### Beam

1. 300 x 950,  $h = 950 - 150$  ;  $0.3 \times 0.8 \times 8 \times 24 = 46.08 \text{ kN}$   
 $= 800 \text{ mm}$
2. 300 x 900,  $h = 900 - 150$  ;  $0.3 \times 0.75 \times 8 \times 24 = 42.24 \text{ kN}$   
 $= 750 \text{ mm}$

### Imposed load

Man (average) 80 kg = 0.8 kN  
 assume 10 person ;  $10 \times 0.8 = 8 \text{ kN}$

### Loading

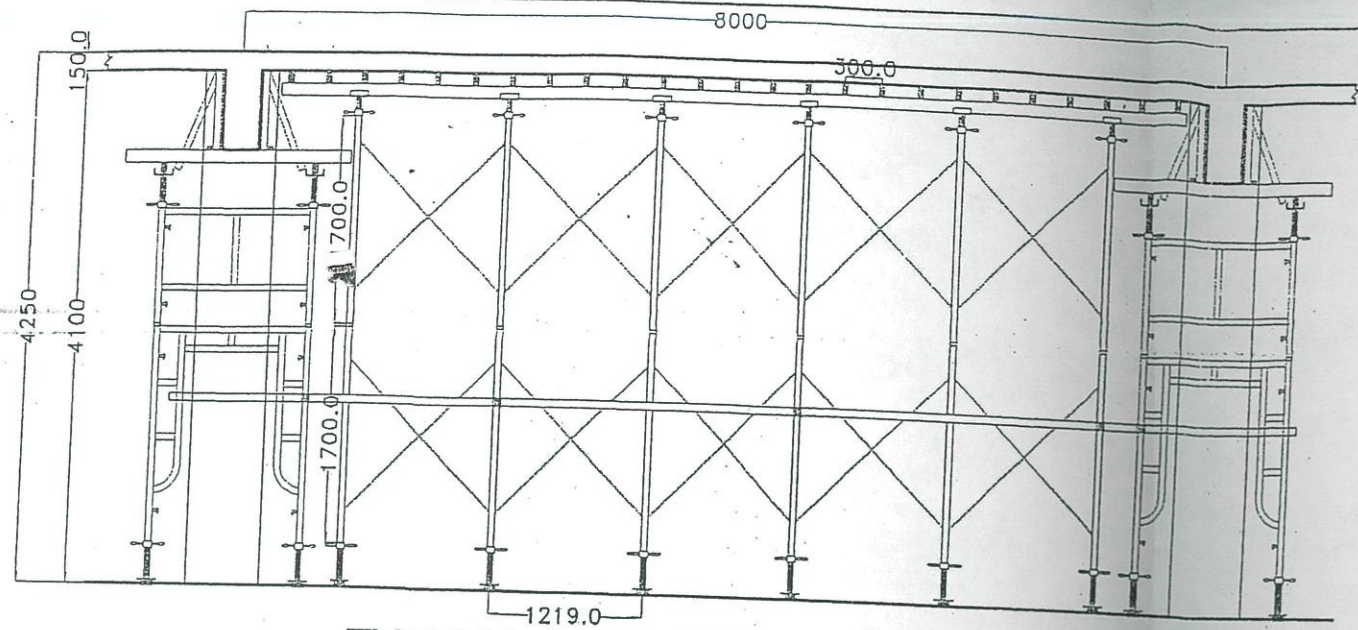
$$46.08 \text{ kN} + 28.8 \text{ kN} = 74.88 \text{ kN}$$

$$\text{per ruang } 1.219 \times 1.219 = \frac{74.88}{16 \times 0.3} \times 1.219$$

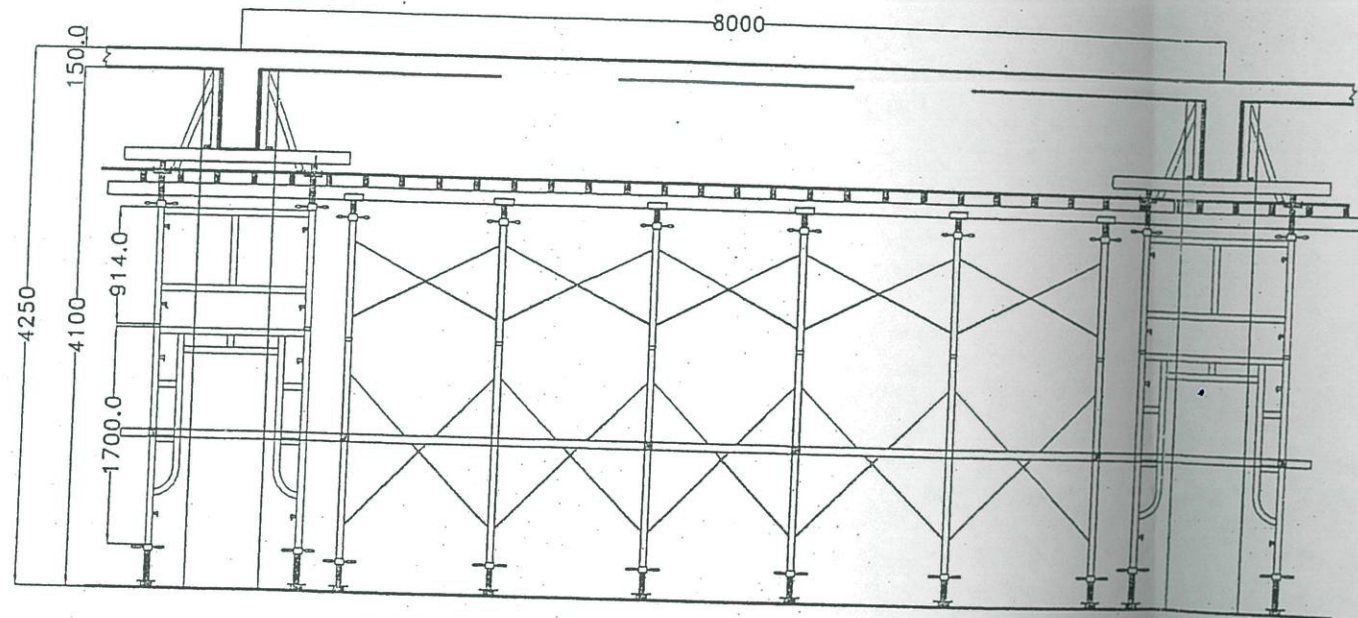
$$= 19 \text{ kN/ruang}$$

$$= 1900 \text{ kg/ruang}$$

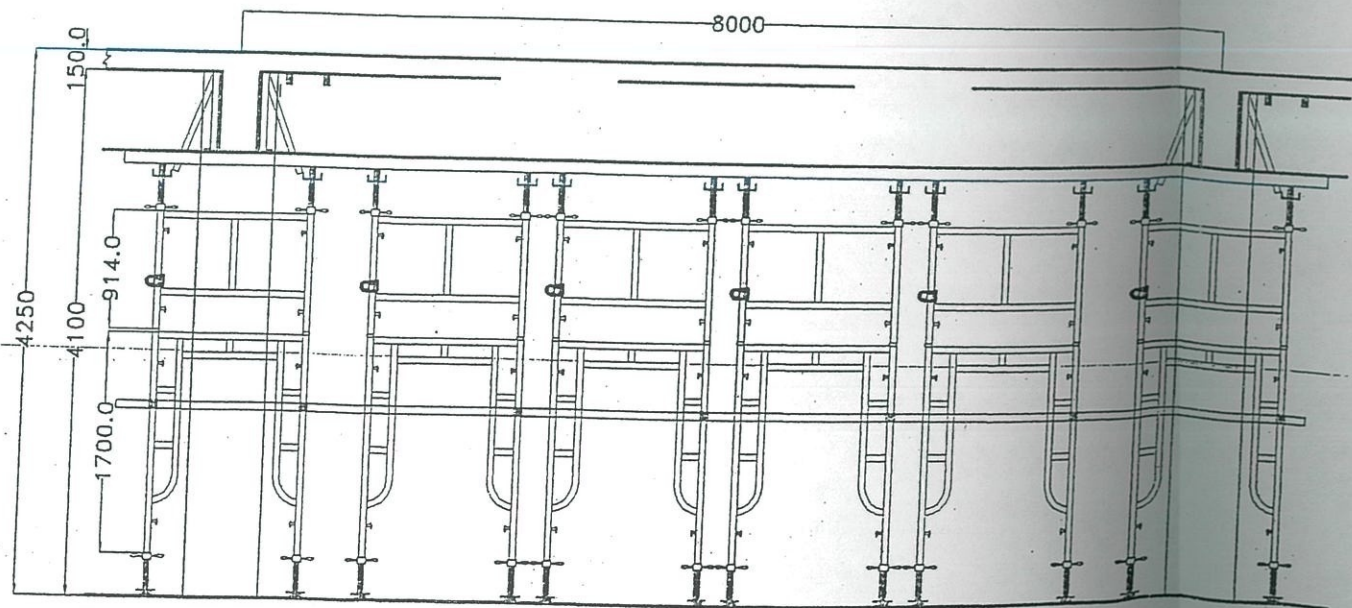




TYPICAL COMBINATION FOR SLABS



TYPICAL COMBINATION FOR BEAMS



TYPICAL COMBINATION FOR INTERMEDIATE BEAMS

EQUIPMENT	DESCRIPTION
	HT 101 Vertical frame
	HT 109Ht Adjustable frame
	HT 301E Cross brace
	HT 301F Cross brace
	HT 601 Jack base
	HT 602 U-head
	HT 514 B Staircase
	HT 406 C G.L pipe

Note :-  
All equipments used Hualtraco Scaffold System Sdn. Bhd. or equivalent

**PROFESIONAL**  
**AWAM**  
**ROSMADI B. ZAMRI**  
14047  
**MALAYSIA**

**JABATAN KESELAMATAN DAN KESIHATAN PERSEKUTUAN**  
HT 14047/2011/03  
Pahang

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PROJECT TITLE  
CADANGAN MEMBINA KOMPLEKS IBU PEJABAT  
MAJLIS PERBANDARAN KUANTAN (MPK)  
DI ATAS LOT 29, SEKSYEN 30, JALAN TANAH  
PUTIH, KUANTAN PAHANG DARUL MAKMUR  
UNTUK TETUAN  
MAJLIS PERBANDARAN KUANTAN (MPK)

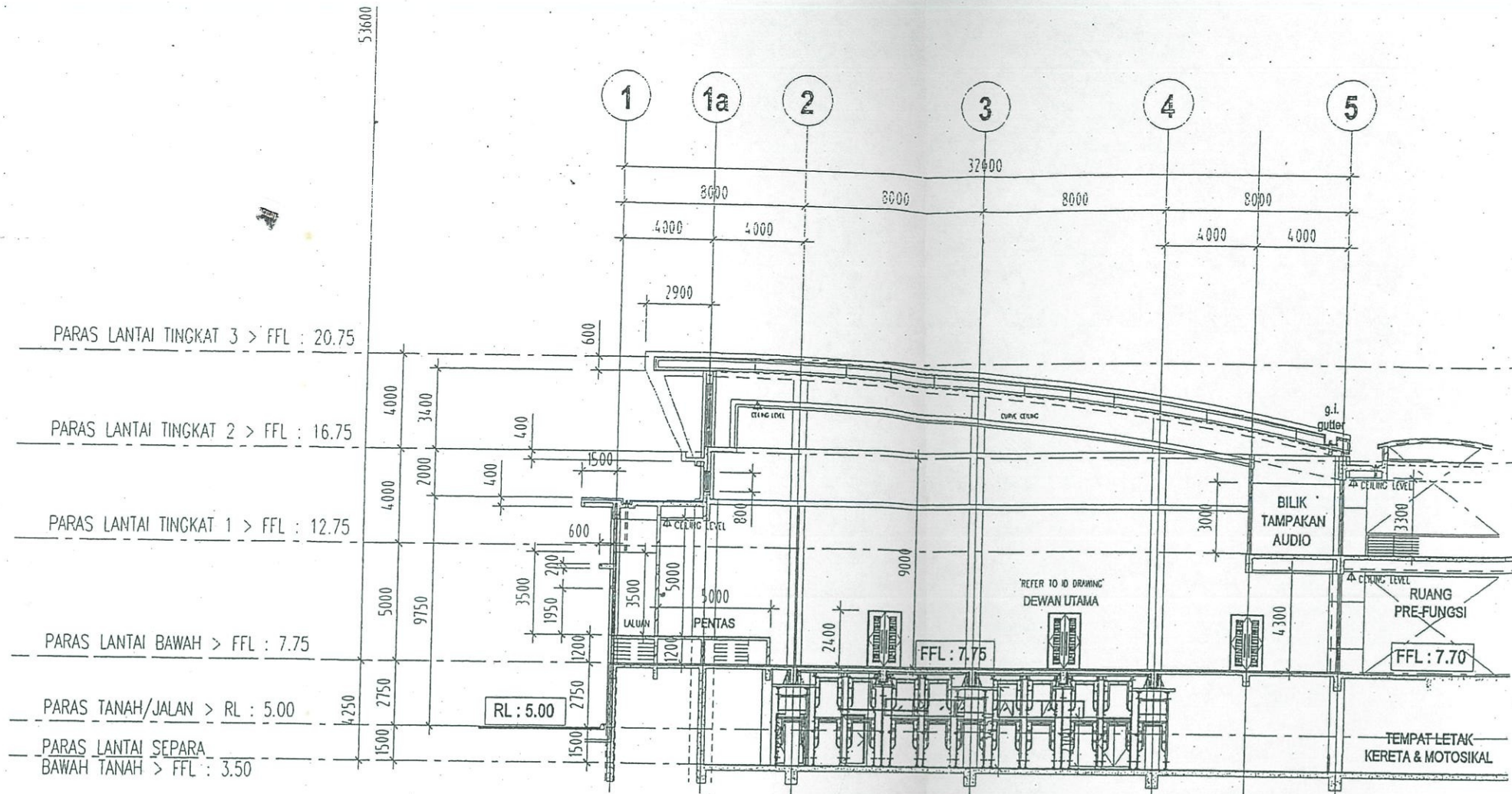
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LOADING SCAFFOLD  
TYPICAL SLABS  
TYPICAL BEAMS  
TYPICAL IMMEDIATE BEAMS

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CHECKED		APPROVED	

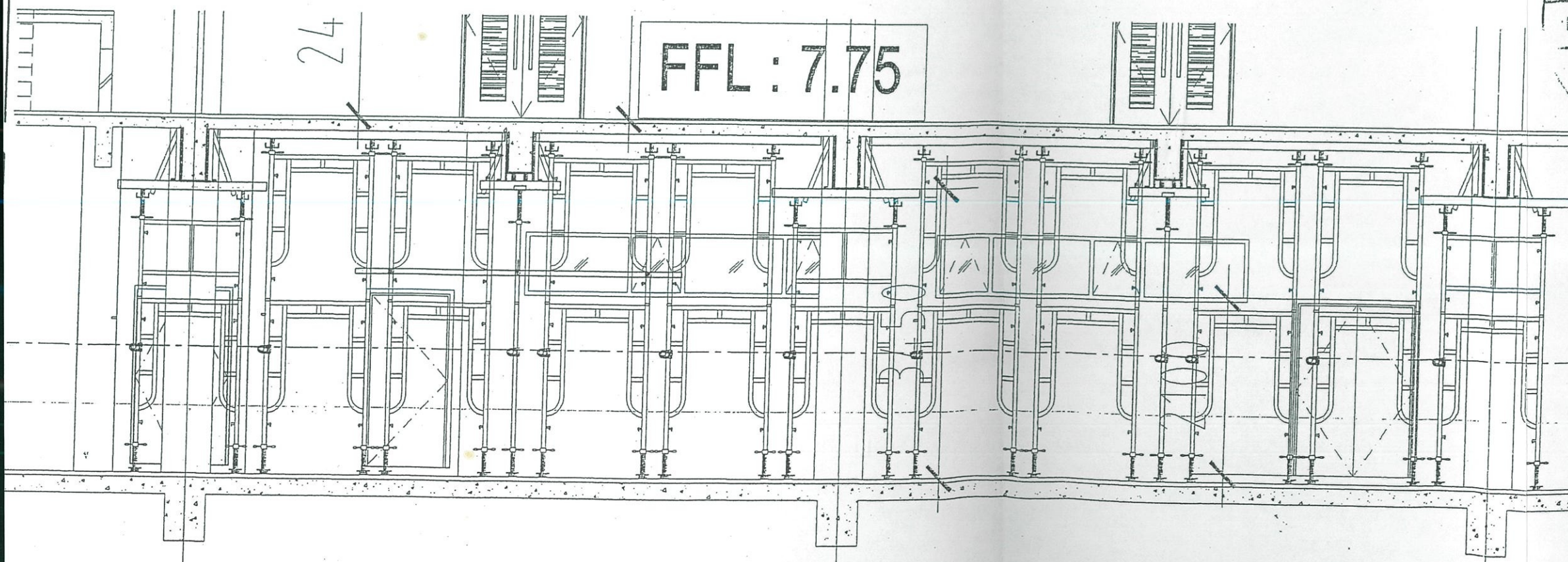
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REVISION	

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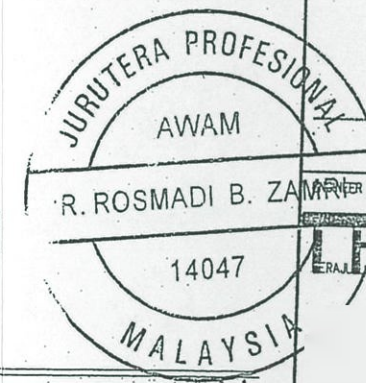
TYPICAL SECTION



TYPICAL SECTION



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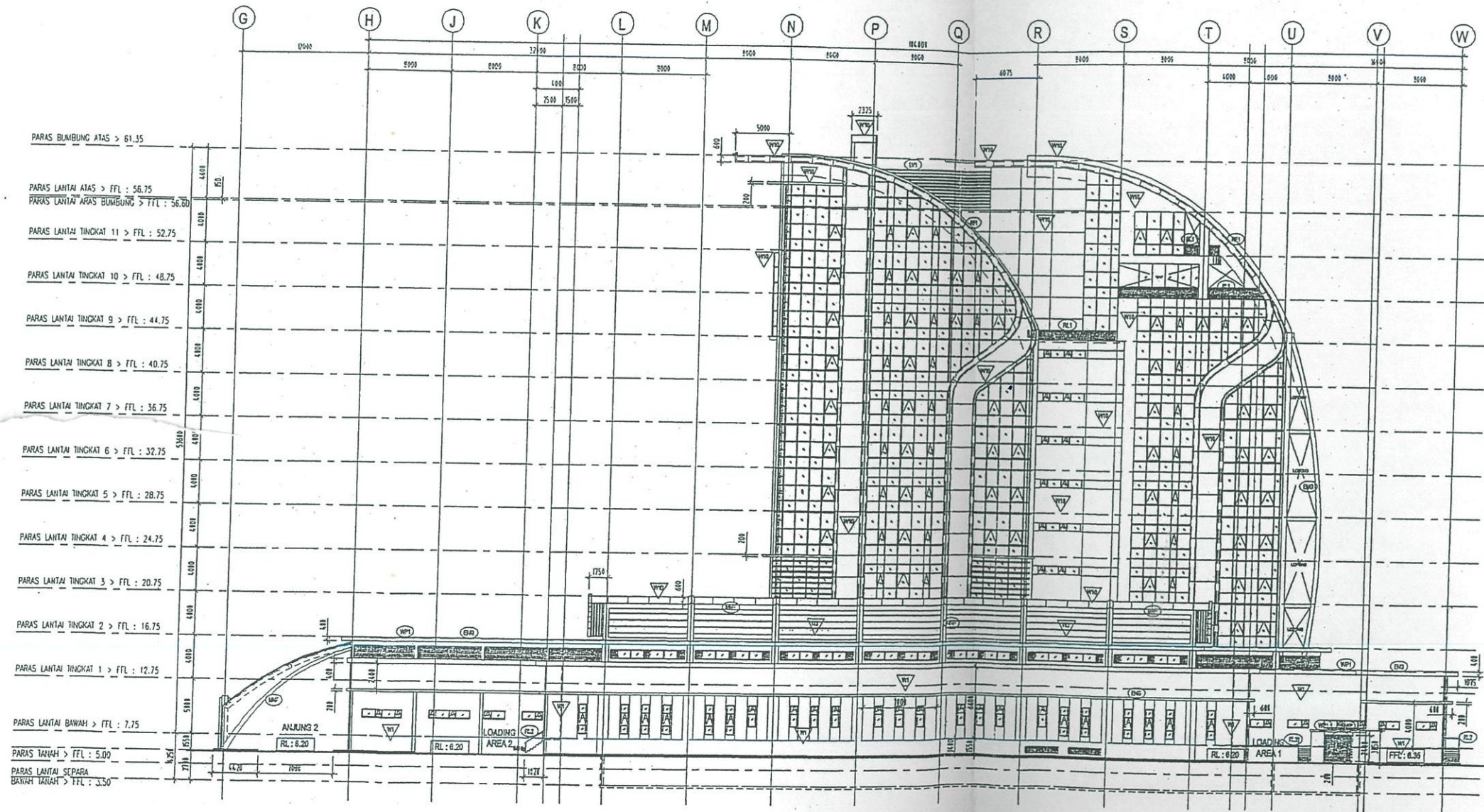
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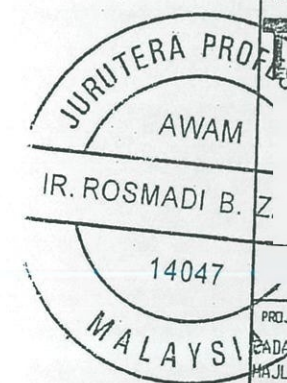


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