**DEPARTMENT OF BUILDING**

**UNIVERSITI TEKNOLOGI MARA**

**(PERAK)**

# MANAGEMENT AND SUPERVISING OF MECHANICAL AND ELECTRICAL WORK AT PHASE 2 THE HAVRE BUKIT JALIL

**Prepared by:**

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**DECEMBER 2018**

**By**

**AZAD BUKHARI BIN AZIZ**

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

| | | |
|---|---|---|
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## 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 Kenwingston Sdn. Bhd for duration of 14 weeks starting from 3 September 2018 and ended on 9 December 2018. It is submitted as one of the prerequisite requirements of DBG307 and accepted as a partial fulfillment of the requirements for obtaining the Diploma in Building.

Name: Azad Bukhari bin Aziz

UiTM ID No: 2016458536

Date: 18 December 2018

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I am really grateful to Kenwingston Sdn. Bhd. For giving me an opportunity and successfully arranging the internship program to me. I also thank to Ms. Koh from Kenwingston human resources department for recruit me as a trainee in this grateful company.

I would like to thanks to my Project Director Mr. Lew Kok Sin for treating like a staff during the internship and teach me to be an extraordinary employer. The way he treats their staff every day is the same way he treats me every day.

I also thanks to my Project Manager Mr. Fakhruddin for teach me how to settle the problem in using a big machinery on site during peak hour.

In my internship here, I was mentored by two persons which is my Assistant Mechanical and Electrical Manager Mr. Muhamad Najmi as my department manager also teach me in handling the big task on site. Next, I want to thank to my mechanical and electrical supervisor Mr. Hamidi Saiful Haq for teaching me in handling six sub-contractor under my department and show me the routine of our department every day. I feel really lucky to be able to work under their direction.

Another thanks to Mr. Koo from architect and operation department for teaching me the standard operation procedure in their area in charge. This will be the great knowledge I have got during my internship because I learn scope of work of two departments. This will help me in improving my knowledge in other work.

I also take this opportunity to express a deep sense of gratitude to all the employees of Kenwingston Sdn. Bhd. For presenting me such amazing experience. They are all really wonderful people, and I will never forget these days of mine at Kenwingston.

## ABSTRACT

Supervising and management is the important planning work on site, therefore this report will discuss about the supervising and management of mechanical and electrical work which is plumbing work, electrical work, ventilation work, firefighting work, and elevation work at Phase Two the Havre Bukit Jalil. As a main contractor, the mechanical and electrical work on site is too many and need a good planning to conduct the work. There are different work and material with different contractor doing the different work. The objective of this report is to carry out the sub-contractor outstanding work which are not completed yet. Second is to ensure the sub-contractors follow the standard operating procedure based on the flow of a residences project. Third, to solve their problem during the progress or installing work. Forth, is to inspect their completed work and report for reinstall if necessary. In conclusion, this report will describe the way to supervise the mechanical and electrical work progress on-site.

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# CHAPTER 1.0

# INTRODUCTION

## 1.0 Background and Scope of Study

This study focuses on management and supervising of mechanical electrical work in high rise building type of residences. The process of managing work will be focus for this research. For the information, this work will be seen along the construction progress. Starting before concreting work until the finishing work is done. The scope of study for this report is to understand then method of supervising of mechanical and electrical work according to the Uniform Building by Law.

Management and supervising work of mechanical and electrical work of The Havre Bukit Jalil. The project worth of RM 357, 500, 000.00 is starting from 2nd May 2017 until 4 March 2019. In addition, this study aims to describe the mechanical work which need to inspect on site. The problems that occurred during the installation. This study involve the planning and management skill to control the sub-contractor and their issues to run the project properly with minimize the problems

## 1.2 Aim

To study the management and supervising of mechanical and electrical work at Phase 2 The Havre Bukit Jalil

## 1.3 Objective

This report is developed based on a few objectives. The objectives are as follow:

1. To investigate the sub-contractor outstanding. The main contractor has given the schedule for their reference and target to complete the work.
2. To inspect their problem during the progress when the work is collided with different party.
3. To inspect their completed work during the progress time for reinstall if necessary.

## 1.4 Method of Study

The research of case study about supervising work of the building has been carried out by using all of these methods.

### 1.4.1 Primary

1. Observation

   The method of identifying problems is observing the sub-contractor's outstanding around the site area. Walking around the site area such as sub-con's store, their workplace and their material. The inspection will be more accurate if we know the material belongs to who and the inspection done twice.

2. Interviews

   The interview has been carried out with a supervisor (m&e) of the company and sub-contractors. There are lot of information will get in the meeting helping to solve the problem

### 1.4.2 Secondary

3. Internet

   Internet is a faster and easier way to collect data and knowledge to support the deficiency of data

4. Books

   Books also can be referred to obtain knowledge and understanding of the operating system for the supervisor

# CHAPTER 2.0

# COMPANY BACKGROUND

## 2.1 Introduction of Company

Kenwingston Sdn. Bhd. is a private sector of construction in Malaysia. Established in September 2015 operates as contractor in construction field of private sector.

### 2.1.1 Organization structure

Kenwingston Sdn. Bhd. leaded by a Managing Director Dato' Lovis Lam Kong Tang. The headquarters of the organization is in Jalan Wangsa Delima 6, Pusat Bandar Wangsa Maju (KLSC), Seksyen 5, Wangsa Maju, 53300 Kuala Lumpur. And their projects are located in many state around Kuala Lumpur and Selangor.

Kenwingston was leaded by seven director below the Managing Director. Every director leads every project with their supporting staff to ensure the projects complete on time. They has a profession in finishing work quality make them got one of the best quality workmanship contractor.

### 2.1.2 Kenwingston Sdn. Bhd. Strategic Plan

Kenwingston has decided to move from construction to development. It is because the construction is their expert and they want to give more with development to build more quality product to achieve higher level of customer satisfaction.

Since the year 2018, kenwingston is the property developer and the construction is the main area of business. The first develop project is services apartment at Sg. Besi. Since they become a developer, they can bring the luxuries characteristic in their idea to fulfill the needs of customer in Kuala Lumpur property.

Previously, their take a project with a client Aset Kayamas as a selective tender. Their first project is at Parkhill Bukit Jalil. Then Kenwingston take an advantage to continue the contract with the same client at The Havre Bukit Jalil.

## 2.2 Company Profile


**Figure 2.1 Kenwingston Sdn. Bhd.**

**Source: google images/kenwingston**

| | |
|---|---|
| Address | : No. 82 Jalan Wangsa Delima 6,<br>Pusat Bandar Wangsa Maju (KLSC),<br>Seksyen 5, Wangsa Maju,<br>53300 Kuala Lumpur. |
| CIDB registration | : 0120120912 – WP145307 |
| Telephone no. | : |
| Fax | : |
| Email | : Kenwingston.my@gmail.com |

### 2.3.1 Organization Chart

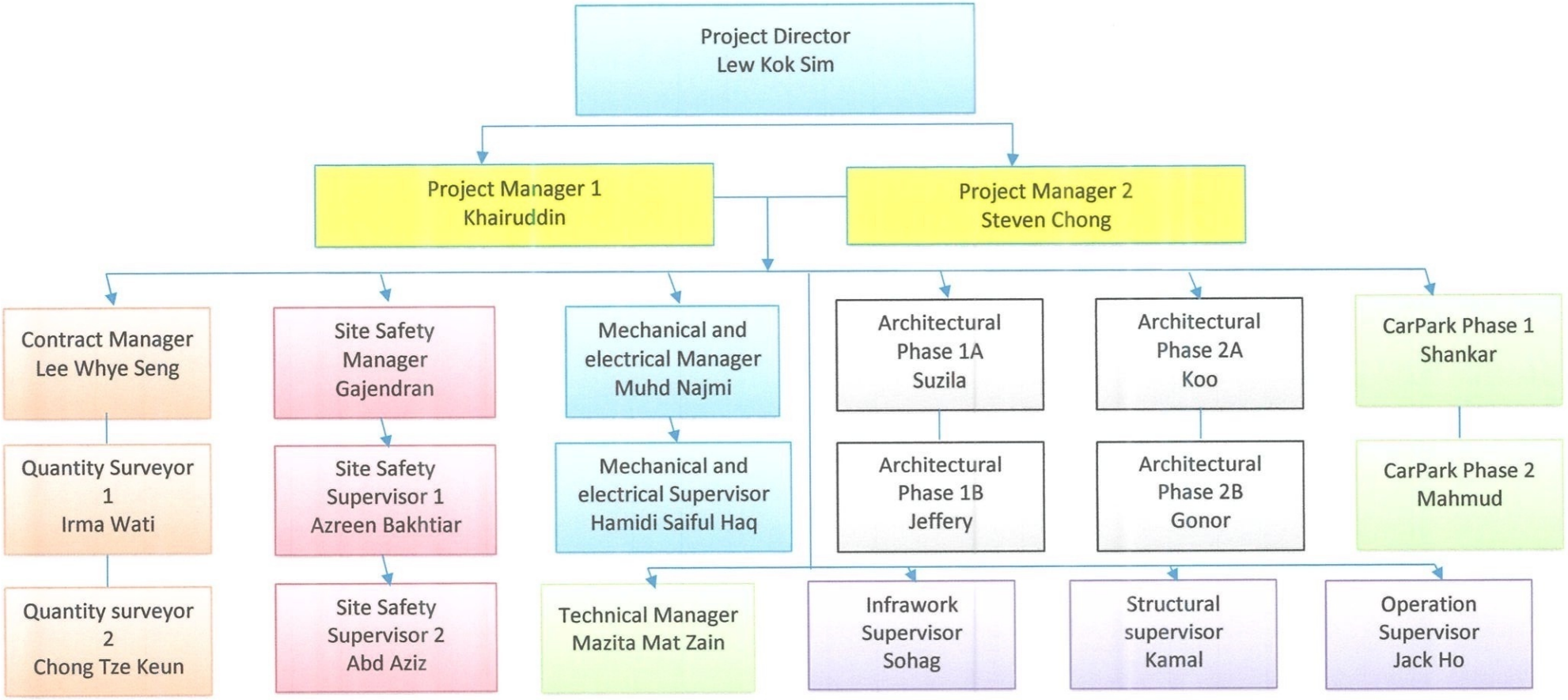



**Figure 2.3 The Organization Chart of The Havre Kenwingston**
**Source: Contract department**

### 2.3.2 Organization chart for Mechanical and Electrical Department

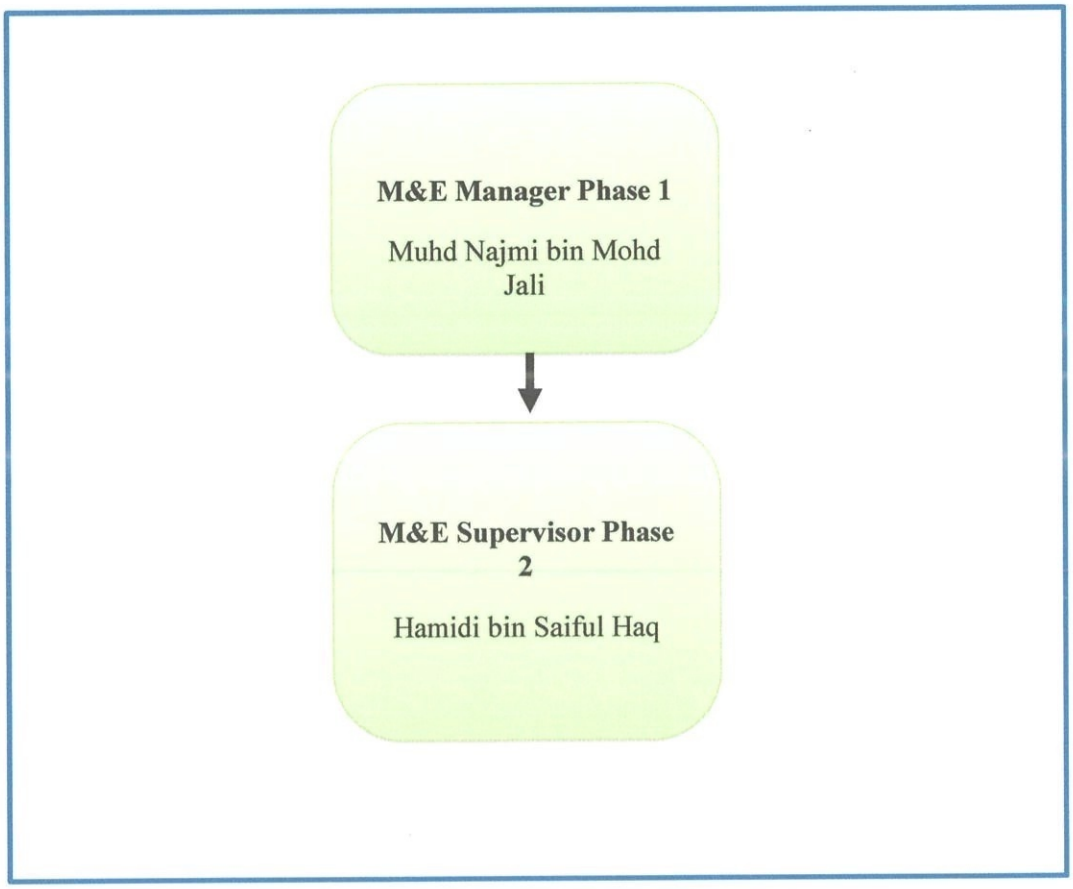



**Figure 2.4 The Chart Department of Mechanical and Electrical**
**Source: Contract Department Kenwingston**

## 2.4 List of Project

### 2.4.1 Completed Project

**Table 2.1: List of Completed Project**

| No | Project title | Building type | Address | Contract price |
|---|---|---|---|---|
| 1 | The Wharf Residence | Serviced Apartment | Puchong, Selangor | RM69 million |
| 2 | De Centrum | Mix Development | Sepang, Selangor | RM80 million |
| 3 | Almyra Residence | Mix Development | Bangi,Selangor | RM24 million |
| 4 | Season garden | Serviced Apartment | Wangsa Maju, Kuala Lumpur | RM60 million |
| 5 | Conexion | Apartment | Sepang, Selangor | RM 87 million |

### 2.4.2 On Going Project

**Table 2.2: List of On Going Project**

| No | Project title | Building type | Address | Contract price |
|---|---|---|---|---|
| 1 | The Havre | Serviced Apartment | Bukit Jalil | RM 357 million |
| 2 | Square Garden | Serviced Apartment | Cyberjaya, Selangor | RM 295 million |
| 3 | De Centrum | Serviced Apartment | Sungai Besi, Kuala Lumpur | RM 135 million |
| 4 | Season garden | Serviced Apartment | Sri Hartamas, Kuala Lumpur | RM 150 million |

# CHAPTER 3.0

## Introduction to Case Study

### 3.1 Introduction of Project

The construction project of private on 'Cadangan Pembinaan 2102 Unit Yang Mengandung Fasa 1: 2 Blok Pangsapuri Mampu Milik dan Fasa 2: 2 Blok Pangsapuri di Daerah Bukit Jalil. A case study of management and supervising of mechanical and electrical work.

This project lead by Kenwingston Sdn Bhd as main contractor for the Sinerjuta Sdn Bhd as their client with the contract number. The project date of possession is on 2 May 2017 duration. The contract price of this project is RM 357, 500, 000.00. Mechanical and electrical is Jurutera Perunding WTA Sdn Bhd and the nominated sub-contractor (M&E) is Kejuruteraan Asastera Berhad, Kok Wee Sdn Bhd, Boon Wah Engineering, KMChia Sdn Bhd, Sigma Elevator Malaysia and Commutech Sdn Bhd.


**Figure 3.1 The Signboard of Site Project**

**Source: Site Project**

### 3.1.1 Scope of Works

**Table 3.1 Scope of Works**

| No. | Scope of Works |
|---|---|
| 1. | **Fitting works**<br><br>1. Sky Garden<br>The level 40 floor that have public toilet, planter box, water tanks, and hall that has many facilities here<br><br>  <br>**Figure 3.2 Sky Garden**<br>**Source: Sky garden site project**<br><br>2. Driveway/ramp<br>The place where the pipe for electric cable, manhole and sanitary waste is located. The ramp is from Phase 2 block A to Block B<br><br>  <br>**Figure 3.3 Podium Ramp** |

**Source: Podium site project**

3.House unit

The unit has to check the fitting and electrical work. One block has 35 floor and every floor has 15 unit.

**Figure 3.4 house unit**

**Source: house unit site project**

4.Lift Motor Room

The machine that hold lift car. One block has six nos of lift. Located at level 43 from ground.

**Figure 3.5 Lift motor room**

**Source: lift motor room site project**

## 1.2 Location of Project

'Cadangan Pembinaan 2102 Unit Yang Mengandung Fasa 1: 2 Blok Pangsapuri Mampu Milik dan Fasa 2: 2 Blok Pangsapuri di Daerah Bukit Jalil is a two type of building that provide a shelter for people in Bukit Jalil and surrounding. With the low cost type of residences provide by government which is 'rumawip' may help those people with less amount of salary to have a house with safe and comfort place while the luxury condominium one provide many facilities to fulfill the needs of the rich.

The location of the site project is 4.1km or 6 minutes from 'Stadium Bukit Jalil' near to the residential area and 'Lebuhraya Bukit Jalil'. Thus the acces road has two which is from the residential area and "Lebuhraya Bukit Jalil'. The two access road may ease the supplier to send the material through small road and highway.


**Figure 3.6 The Location of Site project**

**Source: Google Map Satellite**

### 3.1.3 Case Study

This project using the 'Jurutera Perunding WTA sdn bhd' for the mechanical plan in the building and the services of nominated sub-contractor for mechanical and electrical work. With six sub-contractor, all the services are done by them except the material provide by main contractor.

The sub-contractor of elevator, electrical, firefighting, and mechanical ventilation, use one company each but the piping work use two different company. This is the best strategy taken by main-contractor to prevent from lack of work progress and lack of material supply. Because of the fitting work in this type of building is many.

The element such as rain water down pipe, sanitary appliances, and fitting provide by one company and the rest by another one company. The quality is inspected by architect teams from the main contractor three times before the clerk of work from the client inspected. The quality is very important in keep the price of the unit worth.

### 3.1.4 Complete Material Inspection

The following checks and activities shall be carried out during the supervising works.

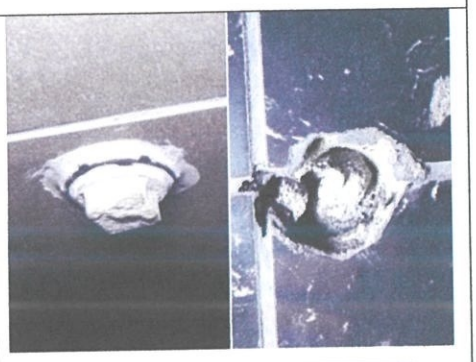
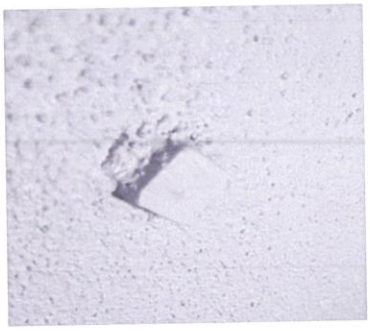
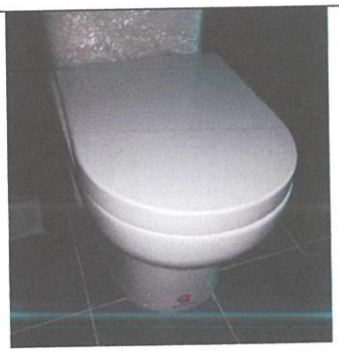
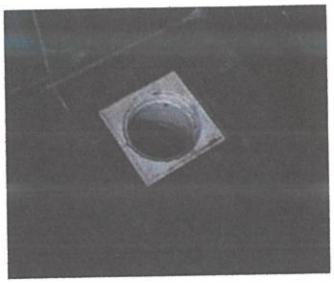
**Table 3.3.1 material inspection list**

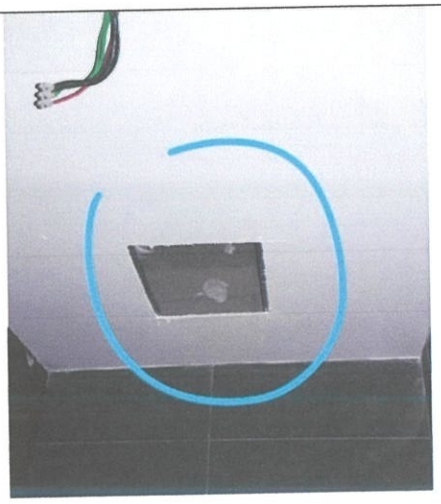
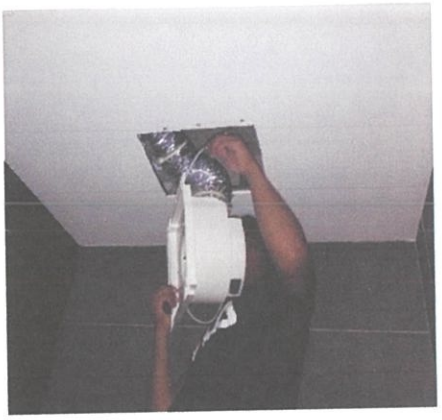
| No. | Work |
|---|---|
| 1 | Piping work<br>1) Cold water point<br>2) Sanitary ware and floor trap<br>3) Sanitary fitting<br>4) Balcony rain pipe<br>5) Yard pipe<br>6) Rain water pipe and dome<br>7) Water tank installation<br>8) Clerk of work inspection<br>I. Pressure test<br>II. Flow test |
| 2 | Electrical work<br>1) Switches<br>2) Cable connector<br>3) Distribution board<br>4) Firefighting<br>5) Clerk of work inspection<br>I. Meggar test<br>II. Fiber optic test |
| 3 | Another work<br>1) Quality installation (piping and electrical)<br>2) Lift inspection<br>3) Mechanical ventilation<br>4) Broken material |

## 3.2 The supervising of mechanical and electrical work

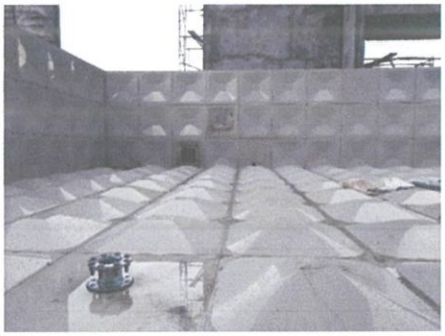
### 3.2.1 The piping work

**Table 3.3.2 Piping work and appliances**

| NO | WORK | DIAGRAM |
|---|---|---|
| 1 | Cold water point<br>• The cold water is not allowed to install over the wall tile level like the Figure<br>• Also when the cap is sink in the wall tile level<br>• It must be in same level like third Figure |  <br>  <br>Figure 3.7 Cold water point |
| 2 | Sanitary ware and floor trap<br>• Related for units<br>• The water closet and basin must have a layer of protection<br>• To keep the quality of material and thrusworthy of customer<br>• Floor trap must be closed to prevent cement and trash turn inside |  <br>Figure 3.8 water closet<br>  <br>Figure 3.9 floor trap |

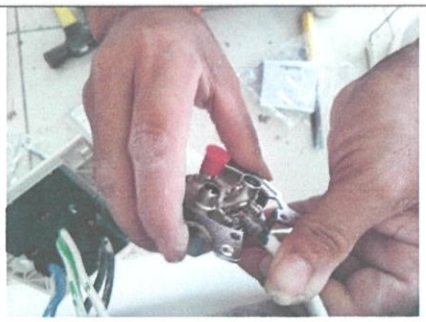
| | | |
|---|---|---|
| 3 | Ventilation ware<br>• Only for toilet with no window<br>• Check the opening and dimension first<br>• Inform sub-contractor to install the exhaust fan |  <br>Figure 3.10 opening ceiling<br>  <br>Figure 3.11 Exhaust fan |
| 4 | Yard pipe<br>• Check the wall render and paint finish first one day<br>• Check the wall skirting for not use the pipe opening<br>• Install the pipe<br><br>Balcony rain pipe<br>• Check the wall render finish first with one day<br>• Check the balcony tile, cut to size of pipe done<br>• Install the pipe |  <br>Figure 3.12 floor pipe opening |

| | | |
|---|---|---|
| | |  <br>Figure 3.13 installing pipe |
| 5 | Rain water pipe and dome<br>• Check the wall render finish first<br>• Install the corridor floor trap during the common area tiles progress<br>• Install the pipe by floor<br>• At top floor, make sure the dome area is free from trash |  <br>Figure 3.14 corrior floor trap and rain water down pipe<br>  <br>Figure 3.15 locating dome |

| | | |
|---|---|---|
| 6 | Water tank installation<br>• Move all the tank to side of plinth<br>• Ensure the plinth surface is level<br>• The plinth area is zero from other material<br>• Install the tank wall |  <br>Figure 3.16 transfer water tank<br>  <br>Figure 3.17 install water tank |
| 7 | Clerk of work inspection<br>Pressure test<br>• Close the cold water point in units<br>• Install the gas meter at meter room<br>• Pump gas 100 psi to every unit with meter<br>• After a day check the pressure, fall 20 psi is allowed |  <br>Figure 3.18 pressure test |

| | | |
|---|---|---|
| | Flow test<br>• Give water to discharge pipe below the basin in kitchen and toilet<br>• Make sure the water flow seen in the floor trap |  <br>Figure 3.19 flow test |

### 3.2.2 The electrical work

| NO | WORK | DIAGRAM |
|---|---|---|
| 1 | Switches<br>• Only in units<br>• Make sure the units finish the painting work<br>• Including yard area<br>• Install the switches |  <br>Figure 3.20 television socket<br>  <br>Figure 3.21 plug point installation |

| | | |
|---|---|---|
| 2 | Cable connector<br>• Install before first coat wall<br>• Must have to prevent broken cable<br>• Location at toilet, dining room, kitchen, bedroom, yard. |  <br>Figure 3.22 cable coonnector |
| 3 | Distribution board<br>• Install before the skim coat<br>• Make sure the area is free from big material<br>• Check the wall quality<br>• Install the distribution board |  <br>Figure 3.23 distribution board |
| 4 | Firefighting<br>• Alarm bell corridor, 3 set every floor, 2 wings and one lobby<br>• After the skim coat and corridor paint<br>• Install 2 floor one times |  <br>Figure 3.24 alarm bell |

| | | |
|---|---|---|
| 5 | TNB room inspection<br>• The area and inside is clean and clear from water and leakage<br>• Part involve is main-contractor supervisor, TNB Officer and their staff, related sub-contractor supervisor, Clerk of work<br>• To check the air pressure inside the room for burning purpose<br>• Closed all the opening at door leaf slit and exhaust fan with masking tape<br>• The portable door is installed and the fan is open to give pressure |  <br>  <br>  <br>Figure 3.25 TNB pressure inspection |
| 6 | Clerk of work inspection<br><br>Meggar Test<br>• To check all the cable is function and no shot<br>• The meggar box is inspect first before apply on site | |

- First check the 1000W cable, it has 3 nos. It is from riser to unit
- Second check the 600W cable that connect to every plug and switches in unit
- If the needle move a bit, the reading is accepted, if the needle move fast, there has short wire
- The short caused by wire rolling or sink in the wall

Figure 3.26 Meggar test

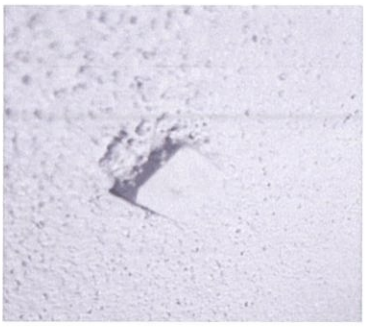
Fiber Optic Test/Continuity Test

- To make sure the fiber cable is in good condition without bend in the pipeline.
- Worker torch the laser light in the unit
- Inspector stand at ELV Riser that connect to all units
- The good condition is the cable at riser will be light up

Figure 3.27 continuity test

### 3.2.3 Another work

**Table 3.2.3 Method study for another work**

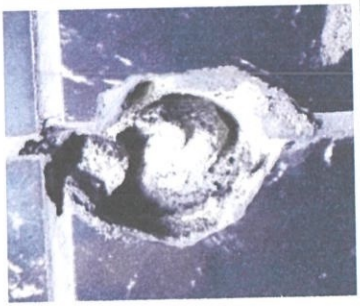
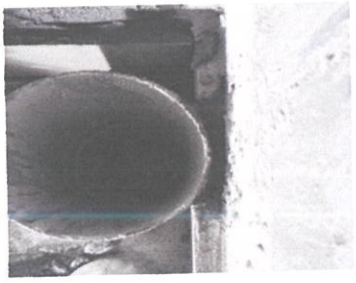
| NO | WORK | DIAGRAM |
|---|---|---|
| 1 | Quality installation (piping and electrical)<br>• Check after the installation<br>• The peeling of paint will repair with skim coat<br>• The condition of pipe must be 100% perfect |  <br>Figure 3.28 paint defect<br>  <br>Figure 3.29 correct water point |
| 2 | Lift inspection<br>• Inspect by JKKP<br>• The lift motor room must be clean and dry from watermark and water pond<br>• Check the room, car speed, car top, lift pit, the button accuracy, door leaf speed |  <br>Figure 3.30 Lift Motor Room<br>  <br>Figure 3.31 Button and Car top |

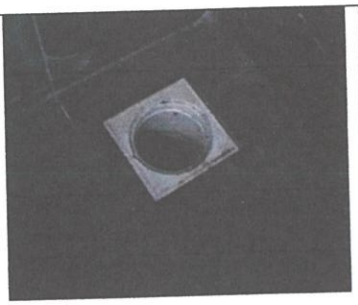
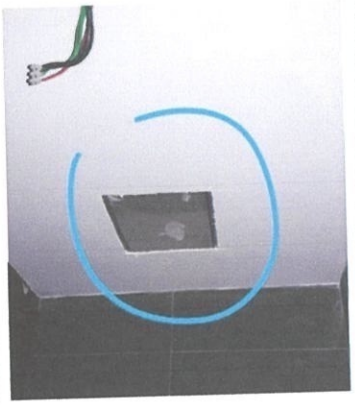
| | | |
|---|---|---|
| **3** | Ventilation appliances<br>• The exhaust fan installed at level 5 podium<br>• To give pressure to closed type stairs and lift lobby<br>• Confirmed the concrete ceiling have no leakage and watermark.<br>• Inform sub-contractor to install fan<br>• Check the valve at lift lobby either it is installed or not<br>• Inform to sub-contractor to install it. |  <br>Figure 3.32 exhaust fan for stairs<br>  <br>Figure 3.33 Valve for air pressure |
| **5** | Transfer material<br>• Ask supervisor where to place<br>• Place worker to supervise material downstairs and upstairs<br>• Inform both signalman to transfer material |  <br>Figure 3.34 transfer water tank |
| **6** | Housekeeping for inspection<br>• For TNB and lift inspection<br>• Provide clean and dry area for incoming officer<br>• To give well expectation before the inspection |  <br>Figure 3.35 condition before |

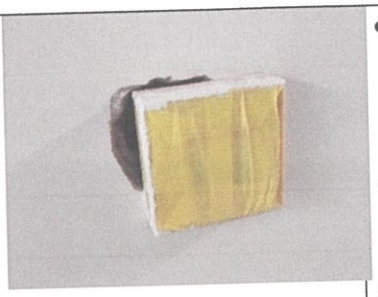
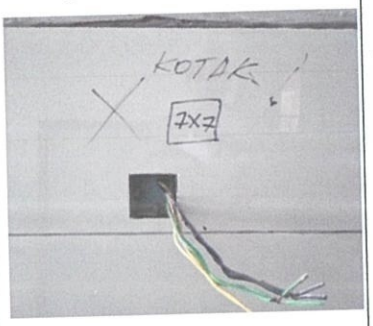
| | | |
|---|---|---|
| | • Ask the staff which responsible at that place<br>• Supervise the worker from begin to finish |  <br>Figure 3.36 condition after<br>  <br>Figure 3.37 after housekeeping |
| 7 | Piping material in structure<br>• Structure staff will leave the element without formwork<br>• Including slab, planter box and column<br>• Check where the pipe location need to connect<br>• Ask the sub-contractor to connect the pipe<br>• Once done, inform the structure staff to proceed pour concrete |  <br>Figure 3.38 slab before concreting<br>  <br>Figure 3.39 column to install conduit |

### 3.3.1 Management of sub-contractor's issue

**Table 3.3.1 Method for manage the problems**

| NO | PROBLEMS & SOLUTION | DIAGRAM | PARTY INVOLVE |
|---|---|---|---|
| 1 | Piping work<br>1) Ask permission from architect department to repair the point if the tile broke with proper information<br>2) Inform to sub-contractor to repair the point in given date<br>3) After finish, inform to architect department to repair the finish.<br><br>1) When the skirting disturb the pipe area, ask the tiler to cut and customize the size<br>2) Then ask the plumber to install the pipe |  <br>Figure 3.40 cold water point<br>  <br>Figure 3.41 cold water point<br>  <br>Figure 3.42 yard skirting tiles | • Mechanical and electrical department<br>• Architect department<br>• 1 plumber/work<br>• 1 tiler |

| | | | |
|---|---|---|---|
| 2 | Sanitary appliances<br>1) The floor trap must be closed anytime<br>2) Ask the tiler to give closer to floor trap |  <br>Figure 3.43 floor trap | • Mechanical and electrical department<br>• Architect department<br>• 1 plumber for protection<br>• 1 tiler for floor trap<br>• 1 worker for ceiling<br>• 1 installer exhaust fan |
| | 1) The sanitary ware must have the protection<br>2) Ask the related sub-contractor to give protection to the material with proper place information |  <br>Figure 3.44 water closet | |
| | 1) The opening for exhaust fan must be accurate with the dimension 275mm x 275mm<br>2) The steel for hang the fan must be on it<br>3) When the dimension is false and no have the steel<br>4) Ask the architect staff and sub-contractor from their party to install and repair it.<br>5) Once done, tell the s to install it. |  <br>Figure 3.45 ceiling opening | |

| | | | |
|---|---|---|---|
| 3 | Electrical work<br>1) The area around the switches break, cause of plaster or installer<br>2) Inform to architect staff to sent the worker to repair the broken wall without touch the swithes<br><br>1) The back box and conduit break cause of wall hacked.<br>2) Architect staff will inform the broken material<br>3) Check and inform to the sub-contractor related<br><br>1) The sub-con supervisor will mark the mistake at wall<br>2) Find the mark and inform to architect staff to break the tiles and make a new proper holes |  <br>Figure 3.46 wall break<br>  <br>Figure 3.47 mistake cutting position | • Mechanical and electrical department<br>• Architect department<br>• 1 sub-cons worker<br>• 1 plasterer<br>• 1 tiler |
| 4 | Operation procedure<br>1) The render work will start first before anyone take place<br>2) Once render finish, either pipe or paint can start work<br>3) Inform to plumber to break the pipe and give way to renderer run their work<br>4) Once finish a day, the pipe may install |  <br>Figure 3.48 yard pipe<br>  <br>Figure 3.49 yard pipe | • Mechanical and electrical department<br>• Architect department<br>• 1 sub-cons worker<br>• 1 renderer |

| | | | |
|---|---|---|---|
| **5** | Water leaking in lift shaft<br>1) The water come from planter box outside the wall<br>2) It has 4 place that leaking happened<br>3) Ask for PU Inject team from director<br>4) Bring them to that place<br>5) Once finish, clean the overhead<br>6) Then apply one layer of mortar |  <br>Figure 3.51 leaking wall<br>  <br>Figure 3.52 leaking wall | • Mechanical and electrical department<br>• 2 PU Inject worker<br>• 1 plasterer |
| **6** | House keeping<br>1) Once for inspection day only<br>2) Ask permission with operation staff to provide worker<br>3) Supervise the worker until finish |  <br>Figure 3.53 condition before<br>  <br>Figure 3.54 condition after<br>  <br>Figure 3.55 condition after | • Mechanical and electrical department<br>• Operation department<br>• 6 worker for housekeeping |

# CHAPTER 4

# CONCLUSION

Overall after involvement in the construction field at 'Cadangan Pembinaan 2102 Unit Yang Mengandung Fasa 1: 2 Blok Pangsapuri Mampu Milik dan Fasa 2: 2 Blok Pangsapuri di Daerah Bukit Jalil, mechanical and electrical work is the main element in all building project.

The mechanical product such as pipe, elevator, and electrical should be inspect and it is the most important things that should be taken care. As example, the observation and inspection by client of installation is received. To ensure the quality of the finishes of mechanical work will not harm the condition surrounding.

In completing this report, the way to handling and solving the mechanical work is explained in detail by using the well management worker arrangement and communicate with related party to solve the problem. This task give the best experience and knowledge for student practical. This way create the curiosity to learn new knowledge and develop skills in making good management in construction site.

The result after the supervisory, will give the best installation without any big problem that can bring damage for other material. Then, the quality of finishes will give high expectation to the client and the customer which considered to purchase the unit and comment the material inside units.

After the handover, defects will be found and need to be repaired. The supervising work before may decrease the amount of defect of mechanical material. The proper installation will not damage other material also contribute the less wastage to the defect cost to the company.

To conclude, all the mechanical and electrical work should be confirm the quality of work achieve the high standard level of quality.

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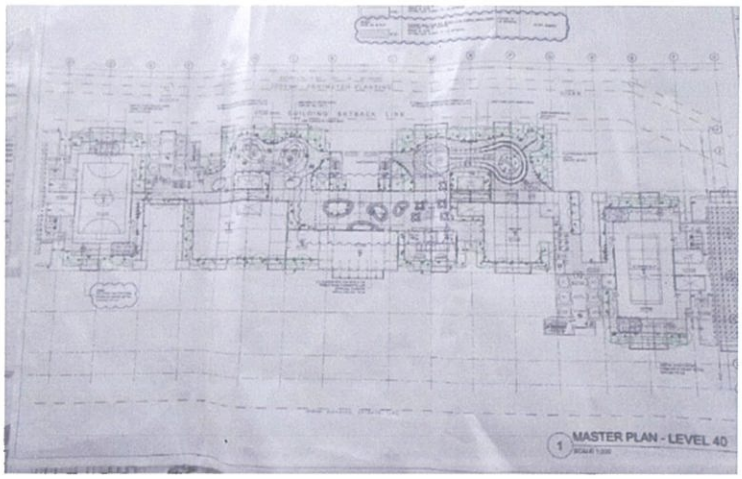
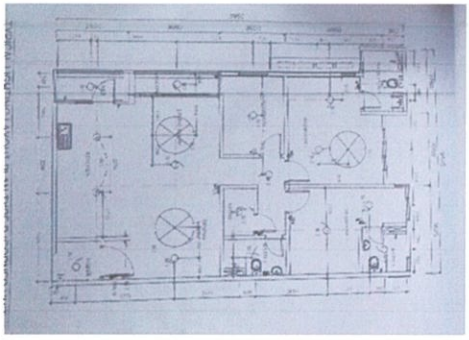
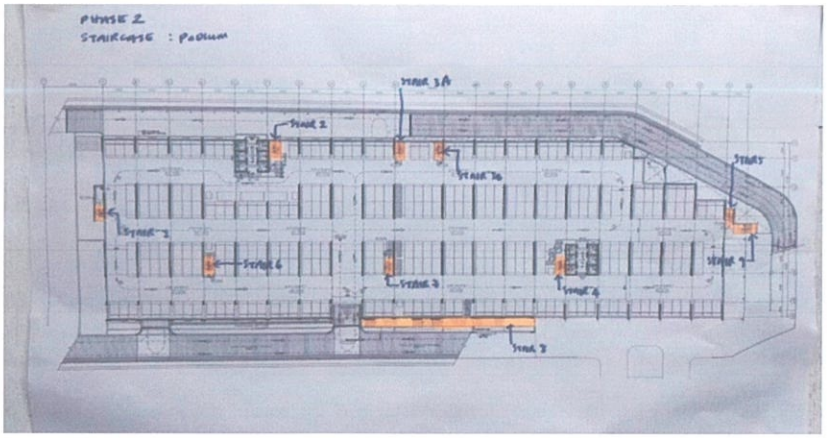
## APPENDICES




**Appendix 1: Master plan level 40**
**Source: Technical Department Havre project**



**Appendix 2: Floor plan Phase 2 Block A and Block B Units**
**Source: Technical Department Havre project**




**Appendix 3: Floor plan Phase 2 Block A and Block B Podium**
**Source: Technical Department Havre project**