



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

**PRACTICAL REPORT TITLE
PUMP HOUSE CONSTRUCTION WORK IN KUALA
KEDAH, KEDAH**

**Prepared by:
MUHAMMAD ARASH BIN RIZWAN SALMEE
UiTM ID NO:
2019686974**



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

Report Supervisor : Dr. Nor Asma Hafizah Binti Hadzaman

Practical Training Coordinator : Dr. Nor Asma Hafizah Binti Hadzaman

Programme Coordinator : Dr. Dzulkarnaen Bin Ismael

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STUDENT'S DECLARATION

I hereby declare that this report is my own work, with the exception of the extracts and summaries for which the original references are given, and that it was prepared during a 20-week practical training session at Gading PC that began on August 23, 2021 and ended on January 7, 2022. It is submitted as one of the prerequisite requirements for BGN310 and accepted as part of the requirements for obtaining the Diploma in Building.

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Name : Muhammad Arash Bin Rizwan Salmee
UiTM ID No : 2019686974
Date : 10 January 2022

ACKNOWLEDGEMENT

Assalamualaikum warahmatullahi wabarakatuh. Alhamdulillah, praise to Allah, the Most Merciful, the Most Graceful. I am so grateful because I managed to complete my report practical which is called “Pump House Construction Work In Kuala Kedah” within the time that given by our lecturer, lecturer Dr Nor Asma Hafizah Binti Hadzaman. First of all, I would like to thank the supreme power the Almighty God, Allah swt who is obviously the one has always guided me to work on the right path of life. Next, I would like to thank to my beloved parent for always give me advices, support me and believe in me. I also would like to extend my gratitude to my lecturer, Dr Nor Asma Hafizah Binti Hadzaman for her guidance during the process of completing the practical report. Without her helped and guidance, I will definitely could not finish or complete my practical report. This practical report also could not be completed or done without the effort and guidance from my supervisor, Ms Siti Fatimah Binti Azman and second supervisor Mrs. Farhana Binti Omar. I also would like to thank to my site manager Mr. Mohammad Zakuan Bin Abdul Dhani for being a humble person and always ready to help and guide me during my internship. I have no valuable words to express my thanks, but my heart is still full of the favours received by from every person.



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ABSTRACT

A pump house, also known as a pumping station, is a machine that can carry water from one location to another without the participation of humans or animals. These devices are capable of supplying water to canals, circulating water in treatment systems, and even draining low-lying water. Pumping water from a river, raising water (high quantity, low pressure) from a well, pumping water into an elevated water tank or water tower, and increasing pressure are all examples of pumping houses. The aim of this is to discover the construction of Pump House in Kuala Kedah, Kedah Darul Aman. The main objectives of making this practical report is to investigate the method of making beam as place to put FRP water tank for pump house. Other than that, it is to investigate the cost/duration for this project and to analyze the types of material that are used for the water tank. The method that has been done was observation by taking some pictures using a smartphone. Other than that, method that has been done was interview some workers such as supervisor and reviews some document such as construction drawing plan. To conclude this, pump house are important to allow transport of water in a piped water distribution system and increases water pressure where it is required.

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CHAPTER 1.0

INTRODUCTION

Construction, also known as building construction, refers to the techniques and industry involved in the assembly and erection of structures, most notably those used to provide shelter. Construction is a very old human activity. It all started with a purely functional need for a controlled environment to mitigate the effects of climate change. Constructed shelters were one way that humans were able to adapt to a wide range of climates and become a global species. *(Alfred Swenson, 1999)*

A number of trends can be found in the history of construction. One example is the increasing durability of materials used. Early building materials, such as leaves, branches, and animal hides, were perishable. Later, more durable natural materials like clay, stone, and timber were used, followed by synthetic materials like brick, concrete, metals, and plastics. The current state of construction is intricate. There is a diverse range of building products and systems that are primarily aimed at specific building types or markets. Building design is a highly organized process that involves research institutions that study material properties and performance, code officials who adopt and enforce safety standards, and design professionals who determine user needs and design a building to meet those needs. *(Alfred Swenson, 1999)*

Construction is now an important part of industrial culture, a manifestation of its diversity and complexity, as well as a measure of its mastery of natural forces, capable of producing a diverse built environment to meet the diverse needs of society. *(Alfred Swenson, 1999)*

1.1 Background of Study

Pump house or also known as pumping station is a machine that can be used to transport water from one facility to another without direct human or animal intervention. These devices can supply water to canals, circulate water in treatment systems, and even drain low-lying water. Pump House or Pumping Station are very similar design to Lift Station but has a different function. The lift station are designed specifically for pumping of sewage material to a higher elevation while Pump house are designed to raise water, not sewage, to a higher elevation. So, in this project they build pump house. The advantages is it allows transport of water in a piped water distribution system and increases water pressure where it is required.

Pump House can be grouped as pumping water from a water source such as river, lifting water (high quantity, low pressure) from a well, pumping water into elevated water tank or water tower and increase pressure. As for this project, they build pump house that pumping water into water tank which called FRP Tank. The aim of this is to discover the construction of Pump House in Kuala Kedah, Kedah.

1.2 Objectives

The aim of this report is to identify the construction process of the pump house in Kuala Kedah, Kedah. In order to achieve the research aim, the following research objectives are established.

- i) To identify the pump house construction process involved in the Kuala Kedah project.
- ii) To investigate the cost/duration for this project.
- iii) To explore the suitable materials for the pump house construction project.

1.3 Scope of Study

The Pump House Construction Project is carried out at Taman Seri Putra, Kuala Kedah, Kedah Darul Aman. This scope of study is focused on beam making method as place to put water tank on it. Other than that, this scope of study also focused on cost/duration on this project. I would like to discover how much are this project cost and how long does it took to complete the project. Last but definitely not least, this scope of study focused on types of material that are used for the water tank.



Figure 1: View of the site taken from drone

1.4 Method of Study

i) Observation

For this method of study which is observation, the proses to construct the beam to put the water tank for pump house was what I observed. Apparently, it took me about 34 days for me to observe the proses to make the beam and that was the time where the beam is fully completed. The way I keep all the information and what I have learned is that I wrote it down in my note book by simplify it in order to make it easier for me to understand. Other than that, I took some pictures on my phone so that I can make it as a reference instead of imagine it in my head which is much easier. Lastly, I also recorded it on my phone because I can see it in different angle just by one video.

ii) Interview

For this method of study which is interview, I did interview with couple of people at the construction site. The person that I did interview them was my supervisor and labor who was working on that construction site. I also prepared all the questions before I ask them one day before the interview happened. After that, when I have further questions or new questions, I asked them right on the spot. For instance, questions that I asked to them was how long it does usually took to complete the work and how many labors are required to construct it. It took me around 15 to 20 minutes for the interview.

The way I keep the information that I got and what I have learned is that I wrote it down on my note book and also simplify it so that I can understand and memorize it more easily. I also recorded while I'm doing the interview proses and after that I listened to the audio again and wrote it down the important information on my note book as usual.

iii) Document reviews

For this method of study which is document reviews, the document that I refer was construction drawing plan and I usually refer it on the pdf drawings just like picture in figure 1.4.

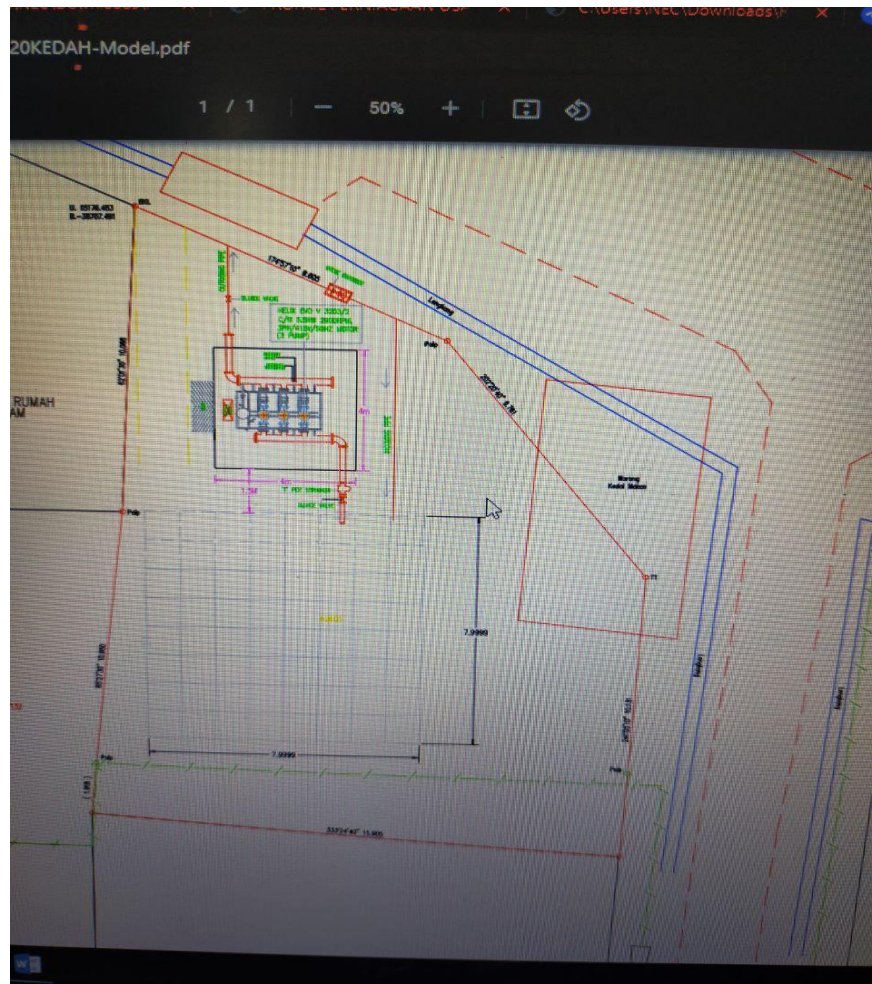


Figure 2: Drawing plan of Pump House

CHAPTER 2.0

COMPANY BACKGROUND

2.1 Introduction of Company

Gading Pc Enterprise was founded in year 2006 by Anwar Bin Mahmud which is the CEO of the company. He also has a wife named Farhana who was also work with him together in the company. The company has been operated for more than a decades doing construction works. Gading Pc Enterprise has almost 30 people workers working on the company. The company are located at No. 957, Tingkat 1, Kompleks Peruda Baru, Jalan Sultan Badlidshah, 05000 Alor Setar, Kedah Darul Aman. Gading Pc Enterprise used to be located at Lot 5014, Taman PKNK, 05100, Alor Setar Kedah Darul Aman but the CEO of the company which is Mr. Anwar decided to change the location of the company and move to a much better place.

2.2 Company Profile

Gading Pc Enterprise offer construction service such as house construction, school construction, renovation and etc. The company has a mission which is becoming the best construction service as it give the best experience for client. Other than that, the company also has a vision which is becoming the most known and trusted in construction industry and our workers proud to work for. Gading Pc Enterprise known as a sub-contractor which means is a person hired by the main contractor to accomplish a specific job as part of the overall project, and who is generally compensated for services rendered to the project by the originating general contractor.

2.3 Company Organization Chart

This company organizational chart are divided in two section which is Office Division and Site Division. Both of section is under by the director himself, Mr. Anwar. In office division, they are responsible for preparation of tenders, bill of quantities, salaries, dealing with clients and etc. Next, in site division they are responsible for handling the project, do inspection on site and etc. They the one who will make sure everything is done according to the plan.

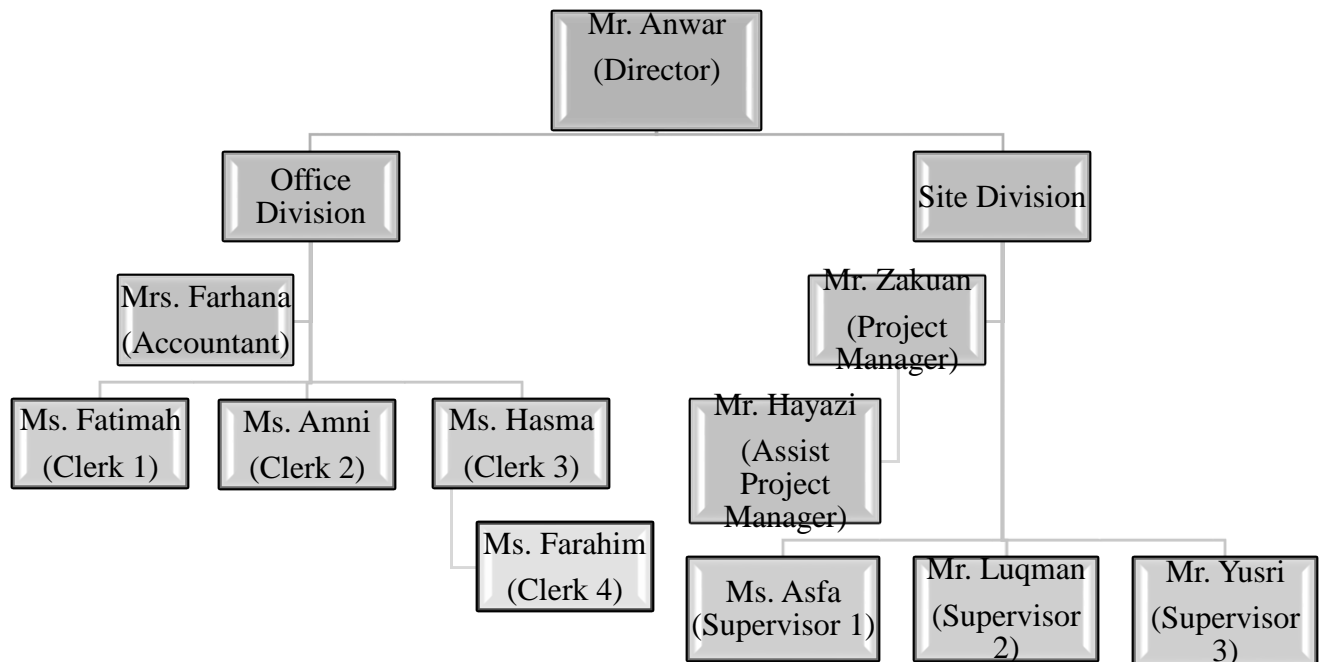


Figure 3: Organizational Chart

2.4 List of Project

2.4.1 Completed Project

No.	Project Title	Project Value	Start Date	Completion Date	Project Duration	Client
1.	Proposal to upgrade roads and drainage systems in the Mergong Barrage area, Alor Setar, Kedah.	RM 3,983,822.80	15/03/2016	10/10/2016	30 Weeks	Ikhtisas Mulia Sdn Bhd.
2.	Construct 3 storey school building blocks and other related work in Sekolah Menengah Kebangsaan Padang Terap, Padang Terap, Kedah Darul Aman.	RM 2,241,054.00	22/10/2016	23/10/2017	53 Weeks	Ikhtisas Mulia Sdn Bhd.
3.	Design and build a control structure to replace Tandop "C" in Terusan Alor Changileh Wilayah II, Mada, Jitra, Kedah.	RM 3,768,250.00	18/11/2016	08/01/2017	8 Weeks	Ikhtisas Mulia Sdn Bhd.
4.	Proposal to build and complete a life skills workshop in Sekolah Menengah Agama Hidayah Islamiah, Batu 10, Alor Biak Sungai Korok Changlih, Ayer Hitam, Kedah Darul Aman.	RM 179,057.60	07/04/2018	28/07/2018	16 Weeks	Ikhtisas Mulia Sdn Bhd.

No.	Project Title	Project Value	Start Date	Completion Date	Project Duration	Client
5.	Proposal to build and complete the Banggol Berangan Bridge in Kuala Ketil, Daerah Baling, Kedah Darul Aman.	RM 1,408,964.00	07/08/2018	01/06/2019	43 Weeks	Ikhtisas Mulia Sdn Bhd.

2.4.2 Project in Progress

No.	Project Title	Project Value	Start Date	Completion Date	Project Duration	Client
1.	Construction of useful halls in Pokok Sena, Kedah.	RM 3,465,404.00	07/04/2021	05/04/2022	52 Weeks	MIQ Sedia Bina Sdn. Bhd.
2.	Pump House Construction Work	RM 936,954.00	20/09/2021	24/03/2022	27 Weeks	Syarikat Air Darul Aman Sdn. Bhd. (SADA)
3.	Full replacement project of 1 BD Preschool and supply of equipment and other facilities in SK Padang Chicak, Sik, Kedah Darul Aman.	RM 732,462.00	22/03/2021	25/01/2022	44 Weeks	Ikhtias Mulia Sdb Bhd.

CHAPTER 3.0

CASE STUDY

3.1 Introduction to Case Study

The case study of this report is regarding construction of pump house. The construction project is been carried out at Taman Seri Putra, Kuala Kedah, Kedah Darul Aman. It was estimated that the duration for this construction is 27 Weeks which is from 20 September 2021 until 24 March 2022. In quotation, the value for this project is almost a million which is RM 936,954.00. There are 5 labors that are required to complete this project and more than that are not encouraged. This is because the location of this project are literally in conjunction area. It is beside road and near to pre-school and stalls. There are not much places for workers since the size of construction site is only 17m x 15m. The project was been carry out by other contractor before Gading Pc took over it but it only for half slab and that even not finish yet so Gading Pc pursuit it.



Figure 4: View of pump house construction site from infront

3.2 To identify the pump house construction process involved in the Kuala Kedah project.

Firstly, beam are required to build. In order to build beam it need to has slab first. There are a few steps for making slab which is well compact subgrade, well compact hardcore, place DPM, and reinforcement. So for the first layer, they used backhoe loader for well compact subgrade proses which they use soil. The proses took almost two hours to finish.



Figure 5: Backhoe loader digging and pouring soil in slab area

Next, for the second layer which is well compact hardcore, they used crusher run for it. Initially they used man power to place the crusher run but after that, they used backhoe loader in order to complete this proses more quickly. It took about two hours to complete the proses.



Figure 6: Backhoe loader pouring crusher run in slab area

For the third layer, usually sand are used before placing DPM in order to prevent scratch on DPM but for this project they skipped and placed the DPM (blue plastic) on crusher run. After well compacted hardcore proses has been completed, they made BRC steel for slab and placed it on DPM. The proses took about two to three days to complete.



Figure 7: BRC Steel for slab

When BRC steel has been placed on it, they poured concrete in it. For this method, in order to complete this much quickly, they used crane to pour the concrete and the proses took more than 10 hours to finish. They waited for 7 days to continue build beam.



Figure 8: Concrete slab

After that, in order to make beam, they made formwork and plinth steel. For formwork it only took eight hours to complete it but for plinth steel it took four to five days because there are 9 beams. Two workers are required for making plinth steel.



Figure 9: Formwork and plinth beam

At the same time, formwork for pump house are also made by them. It required two workers to do the formwork.



Figure 10: Pump house formwork

Lastly, they closed the formwork and started to pour the concrete using crane. The crane weight is 16 Ton and the proses took more than 8 hours. After that, they waited for seven days and removed the formwork. The beam finally completed.



Figure 11: Pouring concrete using crane



Figure 12: Dried concrete

After the concrete dried, FRP water tank are installed and pump house are made starting by its structure.



Figure 13: Installing FRP Water Tank



Figure 14: Pump House Structure



Figure 15: Almost completed Pump House

3.3 The cost and duration for the project

The total cost for this project is RM 936,954.00 (nine hundred thirty six thousand nine hundred and fifty four only). The duration for making slab was around 15 days. Next, it took about 14 days for making beam as place to put FRP water tank for pump house. Other than that, for pump house it took about 4 days to complete the structure. Lastly, it took around 6 days to install fence around pump house area. The total duration for completing this project is 27 weeks. The reason why it took so longer to finish is because it is included for site reconnaissance, proses to remove obstacle such as big rock and tree, waiting for material approval form and etc.



Figure 16: Picture taken from Google Map before the construction started

3.4 To explore the suitable materials for the pump house construction project.

The type of material that are used for the water tank is HDG (hot dipped galvanized) 65mm 1.9mm thickness. There is a lot of benefits of using hot dipped galvanized for instance it has lower cost. Galvanize is, on average, less expensive than several other routinely specified corrosion protection coatings for steel, and it also has a lower long-term cost. Other than that, it extremely long life. Galvanized steel coatings can persist for more than 50 years, shielding steel from corrosive environments. Next, it is also has less maintenance required. Hot dip galvanized coatings are self-maintaining, thicker, and last longer than other choices, resulting in decreased maintenance expenses for these steel goods. (Korvest, 2013)

In addition, hot dipped galvanized has tougher coating. They develop a metallurgical link with the steel, unlike any other steel coating choice, which provides them exceptional resistance to physical harm. Moreover, hot dipped galvanized are faster to install and full coating can also be applied quickly. Lastly, the benefit of hot dipped galvanized is ease of inspection. Visual inspection of galvanized coatings is simple, if they appear sound and continuous, they are. (Korvest, 2013)



Figure 17: Proses of installing HDG

Meanwhile for pump house, the material that are used is zinc. There are also some of benefits using zinc. For example, zinc can be easily shaped. Zinc increases the ductility and malleability of a metal panel when added to an alloy, allowing it to be moulded into various and unique shapes for a beautiful and unique roofline. Zinc may be used to create vaults and curves, and it is a popular choice among modern architects. The durability of zinc is unaffected by its shape. *(Dr. Bunkerhill, 2021)*

Other than that, it is less expensive to transport. Zinc is made of incredibly lightweight materials. This makes travelling more manageable, affordable, and environmentally friendly. Because of its minimal weight and durability, it is also a simpler material to install. Lastly, zinc is environmentally friendly. Zinc is a green building material that has numerous environmental benefits. It all starts with the manufacture of zinc, which takes less energy than other metals due to its lower melting point. *(Dr. Bunkerhill, 2021)*



Figure 18: Zinc Material

CHAPTER 4.0

CONCLUSION

To conclude this practical report, construction of pump house which are located at Taman Seri Putra, Kuala Kedah, Kedah Darul Aman is valued RM 936,954.00. It was estimated that the duration for this construction is 27 Weeks which is from 20 September 2021 until 24 March 2022. The method of making beam is make a slab first and then make a formwork and place plinth steel inside the formwork and lastly concrete. The type of material that are used for the water tank is HDG (hot dipped galvanized) 65mm 1.9mm thickness. It is extremely long life. This is because galvanized steel coatings can persist for more than 50 years, shielding steel from corrosive environments. Last but definitely not least, hot dipped galvanized also has tougher coating. They develop a metallurgical link with the steel, unlike any other steel coating choice, which provides them exceptional resistance to physical harm.

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