UNIVERSITI TEKNOLOGI MARA

DEPARTMENT OF BUILDING SURVEYING

FACULTY OF ARCHITECTURE, PLANNING AND SURVEYING

UNIVERSITI TEKNOLOGI MARA

TITLE

THE INSTALLATION OF WATER RETICULATION AND DRAINAGE SYSTEM

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DIPLOMA IN BUILDING SURVEYING

PRACTICAL TRAINING REPORT

ABSTRACT

I have learned about theory and practical can be combined together in useful ways and how remarkable and enjoyable practical training could be during the four months of practical training at Perbadanan Kemajuan Iktisad Negeri Kelantan (PKINK). While deadlines and skills are highly demanded, creativity is not limited and true innovation occurs throughout my practical training at Engineering and Maintenance at Perbadanan Kemajuan Iktisad Negeri Kelanatn (PKINK). As a result, I gained more knowledge and learned new things and most importantly I experienced the real working environment all by myself. By having training here, I have mixed with a lot of people who is master in their field, no matter in maintenance or construction. Both fields are really related to the building and for sure to keep the building always in good condition.

The title for my practical report is “Water Reticulation System and Drainage System”, is really taught me a new thing in a construction industry. Water Reticulation System is basically the water distribution network and once the water has been collected and treated it needs to get to the consumer. Water is supplied today most commonly through an infrastructure of pipes. These pipes are most commonly constructed from plastic, metal (ferric) or concrete. Water is delivered by making use of the scientific principles of pressure and the energy created delivers the water to its destination. In addition Drainage system is system designed and built to drain water into the catchment area located at the lowest point. Good drainage and efficient to be highly beneficial especially to the process to control and prevent flooding. Good drainage and will facilitate the efficient flow of water and reduce the impact of pollution on water quality. It will also prevent natural disasters such as floods.

In term of relationship, I am so grateful to work with a group of enthusiastic and communicative people, who for whatever reason willing to share their knowledge and experience of what they are doing.

ACKNOWLEDGEMENT

In preparing this practical training report, with the deepest gratitude, I would like to thank every person who has come into my life and inspired, touched and illuminated me through their presence. First of all, I would like to thank my family for their unlimited support, not mentioning financial and transportation, speechless to express for their helping in completing my practical training. I'm very much grateful to have them around me through ups and downs upon completing this report. Working with the best team is very meaningful, priceless and definitely helping me in the real working environment in the future. The 4 months experience can never be compared with any other company that I have worked with.

I am grateful to my industrial supervisor, En Hassan Bin Abdul Rahman , for his advices, guidance, motivation, help, understanding, encouragement and friendship during my training in Binaraya PKINK. He is really helpful in assist all the thing that I needed and I didn't understand. We are really appreciated for his golden time because most of the time we are keep on seeing him anytime. He never say no to spend time with us for the sake to give the best on his student. I have benefited greatly from his willingness to discuss the problems occurred especially on terms used and problem handling method in medical/hospital environment. Without his help and support, this report would not have been successfully finished. As a supervisor, En Hassan Bin Abd Rahman_ shown a great depth of knowledge in civil engineering work and I have appreciated the skill and idea that he had taught especially on real situation in working environment.

I also want to thanks to assistant manager Pn. Noor Faarinie Bt Mat Noor for their cooperation during the completion of my practical training that had given me valuable information, cooperation, suggestions and guidance in the compilation and preparation for this final practical report. She always give a beneficial information and guidance in Water

Reticulation System and Drainage system. Besides that, his workers are also always giving a lot of help for us. Sometimes they taught us how to do their risk job, and for sure we were having a little experienced do their job, overally it is really difficult and need skills.

Secondly, I also extend my appreciation to Perbadanan Kemajuan Iktisad Negeri Kelantan (PKINK), for accepting me as one of the industrial trainee here. A lot of things and procedures I have learn here and i also involved in construction in order to conduct and finish the works that I have learned during my industrial training for four (4) months.

I would like to thank all lecturers and staffs of Faculty of Architecture, Planning and Surveying especially Pn. Zuraihana Bt Ahmad Zawawi as my supervisor in Practical Training for helping me in completing my report and also give guidance to make the best report. Also a big thanks to En. Faisal Baharuddin and Pn. Siti Zubaidah Bt.Hashim as Industrial Training Coordinator for helping me to arrange all things and procedures that involve with industrial training.

Last but not least, I express my gratitude and hearty appreciation to my family and all my friends for their full supports either in technical supports or morale support, for the stressful yet exciting brainstorming and knowledge sharing sessions and also others who involved directly and indirectly making this report a success. I thank my parents for their understanding and my friends for their help. I am thankful to my friends for giving me a lot of ideas in finishing my log book and report. They also share a lot of knowledge about works that we have done and also about every project we have gone through. Finally, not forgotten to any individual out there which have not been mentioned here, for their contribution in finishing this practical report. May Allah bless all of you.

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CHAPTER 1

INTRODUCTION

1.0 INTRODUCTION

Practical training is one of the conditions required for students majoring in Building Surveying. This is because it is one of the conditions required for students for the award of a certificate or diploma upon completion of a course taken at UiTM. Through this industrial training students were given exposure on all aspects in the areas studied.

Practical training also is the training provided by the organization or its related companies in their respective fields for the period prescribed for the actual experience to apply what they have learned in the University. All the students in program of Diploma in Building Surveying are cumpulsory to undergo his/her practical training whenever they are in the third year or semester six. The students are free to choose what companies or organisations they want to carry out their practical training as long as it is related to the fields that they have learned. The students who carried out the practical training is not only can exposed to the training but also they can expend the technical skills besides sharpen the talent and also will uncover the underlying interest.

The students can gain a lot of experiences and useful knowledges along the practical training period. It is also quite similar to the early exposure to the students before entering the working work after graduation. The most important is that is experience which can help the students to comprehend about how to use the theory they have learned and practice all the safety rules in the industry. To make it more effective, the skilled workers or staffs and experinced are not hesitate to give much of useful guidance to the tainee for the sake to be as productive worker. Indirectly, this will instill the responsibility attitude, discipline and be caution during working. Besides that, the students also are applied to the high work ethic and make the working environment of peace and happy.

Industry training not only allows students to explore various science related to what he took in university, students also learn something that may not be taught by their lecturers in the lecture. Usually in university students must follow the law and regulations enforced by the universities / institutions, the same way in the workplace. Students must demonstrate a good public image / IPT them to the firm where they undergo practical training. Students may also expand the association with community groups in the workplace and learn how to communicate and cultivate team spirit. It also enables the students to practice the theory learned in UiTM and industrial training. In addition, this exercise will also familiarize the students to face the working world soon.

Students are also required to make daily reports related to activities at workplace. They must submit a Daily Report once a week to the supervisor at the company to be inspected and signed. In addition, lecturers from the UiTM also visit the place where students will make training the industry to view their progress and meet with the manager or the officer concerned to understand the situation or work environment experienced by the students involved.

In a nutshell, UiTM will produce the high potectial and skilled students in all aspects include handling the responsibility on their task and rules set. When the practical training were done, the students must submit the official practical report individually.

1.1 OBJECTIVE OF PRACTICAL TRAINING

Practical training must be conducted by each student diploma Building Survey. All students also must pass industrial training prior to being awarded a diploma.

The main objective of undergo the practical training is, this training is intended to expose students to the real working world and gain knowledge in these areas. By this, students will be able to know and learn more about the real job of an engineer, a technician up to the office clerk. Students will learn how the way they do their job and find out about the job the better. This will enable students to adapt and meet the requirements of the job market after graduation. It is not impossible, if the students can work directly after the practical training as long he or she can satisfy the firm or company.

The second objective is apply the theory and practical knowledge acquired at university. In class, students are more exposed to the theory of a job. Students are more based on reference books and notes. With this industrial training students can see the actual relationship between the theoretical and practical. The disclosure of the actual working environment sometimes requires students to find solutions by adapting what they have learned the maximum possible. With this, students can practice the theory and practice that has been learned.

Besides that, the student can also instill a good sense of trust and responsibility given and able to work with other staff. All tasks assigned by supervisor should be implemented with a sense of trust and responsibility. This attitude is very important to ensure that all matters entrusted to the students is made possible by the work as well and it is actually more trustworthy train students regardless of whether the tasks assigned to the trust or trust over time.

By undergoing the practical training, students can learn how to interact with senior officers such as engineers, contractors and workers in training. In this exercise students also have the opportunity to interact with the higher-ups such as engineers, directors and consultants and others. With this opportunity, students will be able to mingle with them and talk them over closely. This opportunity will not come without the training industry. This opportunity should be used wisely by the students.

Furthernore, the students and staffs can familiarize themselves in the office or site while working. Good relationships among employees is important to ensure that work activities can be implemented properly without the event of any dispute. Effective and appropriate communication is very important to understand by students. Different backgrounds among all levels of employees need to adapt smart students and conduct effective communication thereby establishing a good relationship among employees.

And the last but not least, Can cultivate curiosity and interest in training. In the training industry, there are many new things which will be met by the students. This will lead to attitude to take cognizance of the student. In addition, sometimes the situation demands will make the student is asked not to be missed greeting field. Actual exposure to the areas studied by students also will raise students' interest towards the field.

1.2 IMPORTANCE OF PRACTICAL TRAINING

Practical training course provides many benefits to students. It gives the real experience while doing this practical and appropriate in accordance with their respective courses. Students are able to adapt on the job and how to communicate with the people involved.

The training is very important and useful to students. Therefore, the student must use this opportunity to maximize the gain valuable experience. The importance of industrial training are:

- Students can practice the actual work environment.
- Students will practice safety rules in the industry.
- Know the problems that arise and how to overcome them and solutions.
- Can add more experience in the field.
- Able to expand his dealings with employees.

Indeed, industrial training also teaches students to develop an individual personality and confidence. With this, students feel more confident to face the next people to motivate themselves into the working environment in the future. Industrial training shall be maintained so as to produce quality individuals later.

1.3 OBJECTIVES OF THE REPORT

When you are undergoing training for a period of 4 months, students must prepare a full report on the training run. The report shall describe about a specific topic related to the courses taken by students who have chosen themselves and which was received by the supervisor.

Upon completion of Industrial Training in a firm, each student is required to prepare a full report and in accordance with the standards set by the university. The aim was to evaluate the effectiveness of training undertaken by each student during the period specified.

This report must be made because it is an important document to be used as evidence of the training. This is a way to document all activities conducted during the training. It also can be used as a guide and reference for future interviews.

In addition, this report also describes in detail about the works or activities conducted by the students during their industrial training. The students must write in more detail about the activities carried out in this report card. Make a book report is a matter of industrial training for students of compulsory prior to approval or industrial training. If students fail to undergo industrial training well, students are required to repeat again. If successful, students will graduate and be entitled to a diploma.

The completed report will be submitted and reviewed by the relevant lecturer. The report has been prepared has to be understood by the lecturers who will make an assessment and referral to the report.

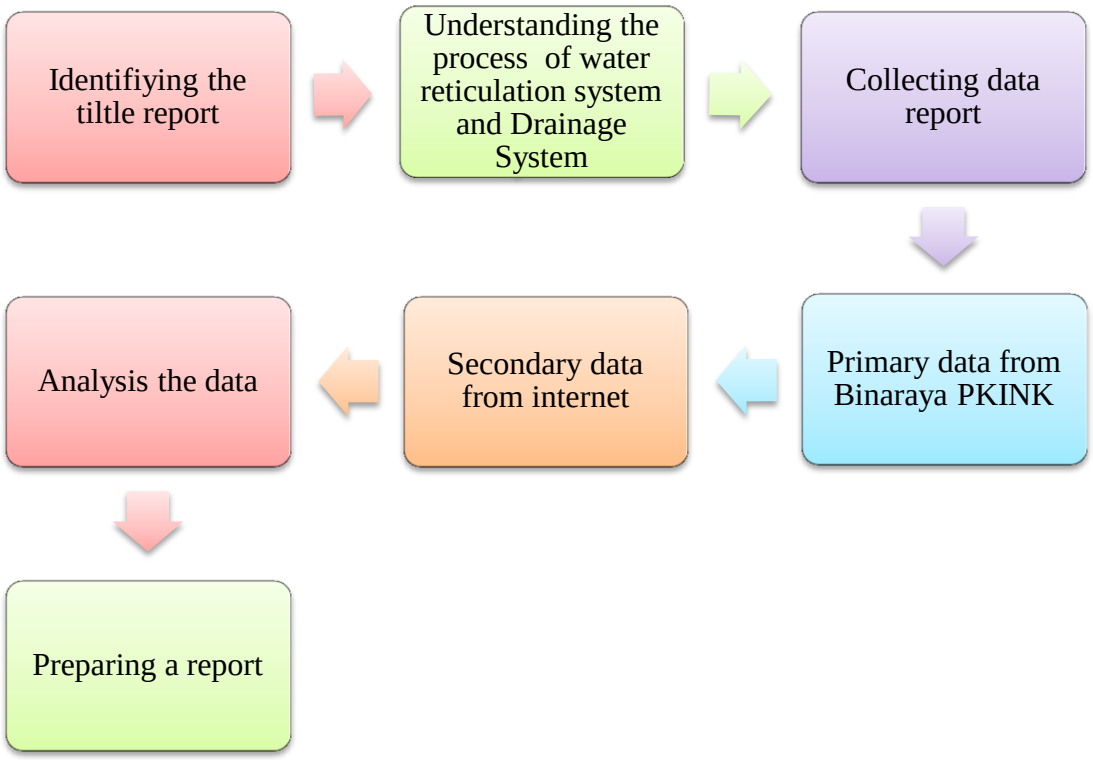
1.4 OVERVIEW

The practical training within 4 months almost every department I pursue. Among the department is civil department. For diploma students they will face practical training session at last semester. Every student will face their training follow the fixed schedule from university.

In general, the practical training is an activity of work and study This practical training is considered as learning semester where each student will take experiences from outside from the university. I have been stationed in the civil department. During the period, each student is protected by a firm where they make training. All students need to pass this practical training before they can get a graduation from the university.

Each student need to make a report about the practical training. A complete report need to pass up to the supervisor university two weeks after industrial training end. This industrial training will disclosed about the true job experiences. In other word, this practical training is for preparation to student to do a job after they get a graduation

1.5 METHODOLOGY OF REPORT



CHAPTER 2

COMPANY BACKGROUND OF BINARAYA PKINK

2.0 History of Binaraya PKINK

2.0 Perbadanan Iktisad Negeri Kelantan (PKINK)

BINARAYA at Lot 747, Jalan Abdul Kadir Adabi, Berek 12, Kota Bharu was launched by YB Dato Haji Ahmad bin Yacob, Deputy Chief Minister of of Kelantan on 29 1428H , December 9 2007.

BINARAYA make further strides and accelerate its efforts to be the leading premier property developer in the state of Kelantan in the new office from December 2005.

Beginning in February 1993, BINARAYA success aspirations in their own building called Building BINARAYA.

BINARAYA move operations on the 2nd floor SEDC Building in January 1990.

By covered under the the Agreement, BINARAYA continue its operations on the 4th floor of this building in Jalan Padang Garong, Kota Bharu (formerly Building PKB) in April 1988.

As a measure of self-reliance and for the comfort, BINARAYA moved to Lot 4374-F, Yusmah Building, Jalan Kebun Sultan, Kota Bharu in January 1983.

BINARAYA operation began in a modest office on the 2nd floor of this building in Jalan Maju, Kota Bharu (formerly Wisma Economic) since its inception on June 22, 1981.

2.1 Organization chart at Binaraya PKINK

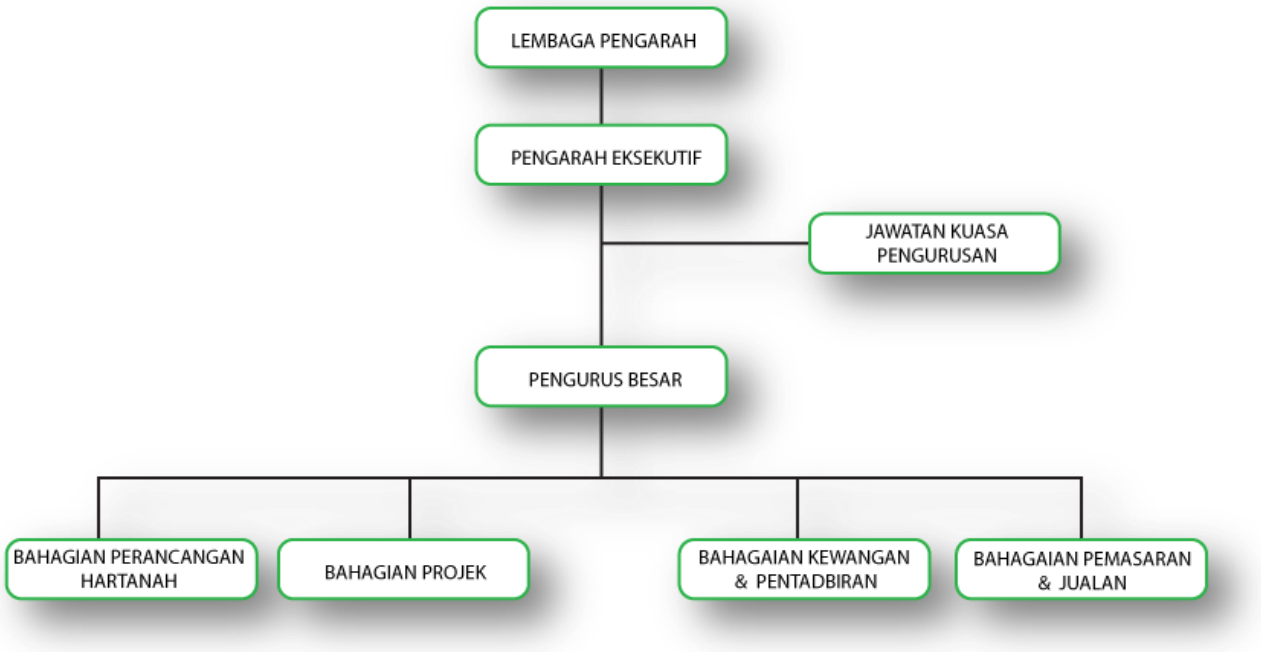


Figure 2.0 Organization chart at Binaraya PKINK

LEMBAGA PENGARAH

1. Y.B. Tuan Haji Hanifa Bin Haji Ahmad	**: Pengerusi**
2. Y.Brs. Tuan Haji Mohd. Sabri Bin Abdullah	: Pengarah Eksekutif
3. Y.B. Puan Hajah Rohani Binti Ibrahim	: Pengarah
4. Y.Brs. Rozi Bin Muhamad	: Pengarah
5. Y.B. Arifabillah @ Mohd. Asri Bin Ibrahim	: Pengarah
6. Y.Brs. Tuan Haji Mohd. Ezanee Bin Mohd. Adam	: Pengarah
7. Y.Brs. Encik Rusli @ Ab. Mulikul Mulki Bin Haji Mohd. Zain	: Pengarah
8. Y.Brs. Tuan Haji Zakaria Bin Yaacob	: Pengarah
9. Y.Brs Wan Zulkiflee Bin Wan Mohamed	: Pengarah

KUMPULAN PENGURUSAN

1.Tuan Haji Mohd Asri Bin Sulaiman	**Pengurus Besar**
2. En.Abdul Fatah Bin Mohamed	Pengurus Kanan Kewangan & Pentadbiran
3. En.Hasan Bin Abdul Rahman	Pengurus Projek
4. En.Mazlan Bin Zawawi	Pengurus Pemasaran & Jualan
5. En. Muhamad Najib Bin Ismail	Pengurus Perancangan Hartanah

2.2 Location Plan of Binaraya PKINK

2.3Key plan of Binaraya PKINK

2.4 Objectives of Department

- Provides residential space, offices and shop quality for government agencies, private and public
- To create a planned environment through the available layouts
- To ensure the growth and development of the company from time to time that the company is always in good condition
- Achieving the best returns to the company and shareholders
- Provides residential space, offices and shop quality for government agencies, private and public
- To create a planned environment through the available layouts

2.4.1 Binaraya PKINK mission and Vision

- **Vision**

  The main provider of affordable homes in Kelantan

- **Mission**

To build and develop residential sector through efficient and effective services to the professional management support towards providing quality residential and comfortable and provide the best service

2.4.2 Services

Binaraya PKINK act as a developer that is a multifaceted business, encompassing activities that range from the renovation and release of existing building to the purchase of raw land and the sale of improved land or parcels to others. Developers are the coordinators of the activities, converting ideas on paper into real property. The company will buy the land, finance the deal, and then will have the best builders build under bond at a fixed cost.

Binaraya PKINK is built on the solid experience and expertise of its management team. Its services are delivered by a workforce of team-oriented individuals who share the goal of exceeding their clients' expectations. The company prides itself with its workers which produces a diversity of ideas and creativity and expertise, ingrained at every level, outstanding landmarks for their clients.

2.4.3 The future organization

The Company will continue its mission to provide a comfortable homes and quality services to all segments of society

Management of the company at all times will continue to identify new sites that can be purchased and all the opportunities to enhance the company's ability to continue to grow and remain competitive in the real estate development in Kelantan Darul Naim

Current projects being implemented by BINARAYA in the year 2012 is as APPENDIX A

In addition, the strengthening of business, the company also purchased the land to be used as a land bank for future development. Latest company's land bank as Appendix B

LAMPIRAN A

KEDUDUKAN PROJEK SEMASA TAHUN 2012

A. Pojek Sambungan 2011

BIL	NAMA PROJEK	NILAI JUALAN (RM)
1	80 Unit Rumah Teres 1 tingkat Taman Kifayah Binaraya, (Fasa 2), JELI	7,790,600
2	16 Unit Rumah Banglo 2 Tingkat Taman Binaraya 3, Pasir Tumbuh , KOTA BHARU	6,037,000
3	16 Unit Rumah Banglo 1 Tingkat Taman Itqan Binaraya (Fasa 1), Bukit Marak, KOTA BHARU	4,674,000
	JUMLAH	18,501,600

B. Projek Tahun 2012

BIL	NAMA PROJEK	NILAI JUALAN
1	60 Unit Rumah Teres 1 Tingkat Taman Sri Mesa Binaraya (Fasa 2), PASIR MAS	8,564,500
2	4 Unit Rumah Banglo 1 Tingkat dan 2 Unit rumah berkembar 2 Tingkat, Taman Binaraya 2, Limbat , KOTA BHARU	1,956,000
3	10 Unit Rumah Teres 2Tingkat Perumahan PKINK Machang (Fasa 5c), MACHANG	2,720,000
4	45 Unit Rumah Teres 1 Tingkat Taman Kifayah Binaraya (Fasa 3) ,JELI	7,486,000
5	13 Unit Rumah Banglo 1 Tingkat & 3 Unit Rumah Banglo 2 Tingat Taman Cahaya Binaraya (Fasa 2B), TANAH MERAH	4,711,000
6	34 Unit Rumah Banglo 1 Tingkat & 14 Unit Rumah berkembar 1 Tingkat Desa Ar-Rahman Binaraya (Fasa 2) ,KUALA KRAI	13,705,250
	JUMLAH	39,142,500

C. Pengurusan Projek

PROFIL IMPIAN SDN.BHD		
BIL	NAMA PROJEK	NILAI JUALAN (RM)
1	6 Unit Rumah Berkmbar 2Tingkat & 1 Unit Rumah Banglo 2 Tingkat Taman Kurnia Jaya (Fasa 6) Pengkalan Chepa, KOTA BHARU	3,010,600
2	47 Unit Rumah Teres 2 Tingkat & 3 Unit Rumah Teres 21/2 Tingkat Taman Kurnia Jaya (Fasa 7) Pengkalan Chepa, KOTA BHARU	14,315,000
3	24 Unit Rumah Teres 2 Tingkat (Double Frontage) Taman Kurnia Jaya (Fasa 8) Pengkalan Chepa, KOTA BHARU	7,094,400
	JUMLAH	24,419,600
SINARA PANTAI TIMUR CONSORTIUM BHD		
BIL	NAMA PROJEK	NILAI JUALAN
1	28 Unit Kedai/ Pejabat 3 Tingkat & 2 Unit Kedai/ Pejabat 4 Tingkat Bandar Baru Rantau Panjang (Fasa 3), RANTAU PANJANG	24,357,000
	JUMLAH	24,357,000

BANK TANAH MILIK BINARAYA

BIL	NAMA PROJEK / LOKASI TANAH	KOMPONAN PEMBANGUNAN
1	Lot 31 Seksyen 8, Jalan Parit Dalam KOTA BHARU	5 Unit Rumah Kedai 4 Tingkat (Keluasan Tanah 301.5 depa)
2	Taman Itqan Binaraya (Fasa 2) PT 588-PT 595 (Lot Banglo) Kampung Bechah Gerda Mukim Badak Mati Daerah Banggu KOTA BHARU	8 Unit Banglo 1 Tingkat
3	PT 3585- PT 3798 Sg.Durian, Mukim Kenor Daerah Batu Mengkebang Jajahan Kuala Krai	• 134 Unit Rumah Teres • 65 Unit Rumah Banglo • 15 Unit Rumah Kedai
4	Desa Ar-Rahman Binaraya PT 7530-7678 Sg.Durian, Mukim Kenor Daerah Batu Mengkebang Jajahan KUALA KRAI	• 21 Unit Rumah Kedai • 10 Unit Rumah Teres 2 Tingkat • 62 Unit Banglo
5	Perumahan PKINK Jeli Mukim Jeli, Tepi Sungai JELI	• 40 Unit Rumah Teres 2 Tingkat(A) • 44 Unit Rumah Teres 2 Tingkat(B) • 13 Unit Rumah Kedai 2 Tingkat
6	Taman Cahaya Binaraya (Fasa 4) Kg.Jelatok Pasir Genda TANAH MERAH	• 10 Lot Rumah Banglo 1 Tingkat

7	Taman Binaraya 4 (Gated Community)Lot 3392, Kg Padang Belukar Pasir Tumbuh KOTA BHARU	20 Lot Rumah Banglo
8	Lot 4359 & 4485 Kg Machang Pasir Tumbuh KOTA BHARU	25 Lot Rumah Teres
9	PT 348-370& PT 395-407 Kg Hutan Pasir Mukim Badak Daerah Ketereh Jajahan KOTA BHARU	36 Lot Banglo

\

2.5 BUILDING DETAILS

Nama Syarikat	: Binaraya PKINK Sdn. Bhd.
Nombor Syarikat	: 72017-U
Diperbadankan pada	: 22 Jun 1981 (di bawah Akta Syarikat 1965)
Setiausaha Syarikat	: Che Soriati binti Yaacob
	(LS : 008266)
	: UB Consult Sdn. Bhd.
	Tingkat 4, Bangunan PKINK,
	Jalan Tengku Maharani Puteri,
	15000 Kota Bharu.
Juruaudit Luar	: Tetuan Khairuddin Hasyudeen & Razi
Bank-bank Utama	: Maybank Islamic Bank Berhad
	RHB Bank Berhad

	Bank Muamalat Malaysia Berhad
	Hong Leong Islamic Bank Berhad
Pejabat Berdaftar	: PT 747, Bangunan Binaraya,
	Jalan Abdul Kadir Adabi, Berek 12,
	15200 Kota Bharu,
	Kelantan.
Telefon	: (609) 741 4455 / 741 4465
Faksmili	: (609) 741 4450
Email	: marketing@binaraya.com.my

2.6 BUILDING BACKGROUND

Figure 2.4: Building of Perbanadan Kemajuan Iktisad Negeri Kelantan (PKINK)

Established on 22 Jun 1981, Binaraya PKINK SDN. BHD was operated at level 2, Jalan Maju Kota Bharu. The company is a developer company which offer proficiency in township developments and expertise in house residential development and commercial buildings.

On February 1993, Binaraya PKINK has moved on to its own building located at Jln Abdul Kadir Adabi. On December 2005, some renovation was made at Binaraya PKINK building to suit its image which is the most well-known developer in Kelantan.

2.6.1 BUILDING VIEW

Figure 2.5: Right View

Figure 2.6 :Rear View

Figure 2.7 : Front View

Figure 2.8 : Left View

Figure 2.9 : Lobby Area

Figure 2.10: Waiting Area

CHAPTER 3

LITERATURE REVIEW

3.0 CONSTRUCTION OF INFRASTRUCTURE

Building project management is not just focused on the structure and substructure of the building, but it covers a wider field including service and infrastructure work. Infrastructure is a key component in building projects. If the quality is not given sufficient emphasis, the odds will be very obvious flaws and give a negative impact on the outcome of the project and also the integrity of planning officials and staff supervision. Infrastructure building projects include land drainage works, drainage, planting grass, roads, drainage and water reticulation impurities.

3.1 INFRASTRUCTURE WORK

3.1.1 The excavation work

a) Drainage must be excavated by size, level and slope.

b) Drainage from the first exploration should be avoided, as this will result in unequal deposition when fill material is not suitable.

c) In accordance with normal practice, trenches dug 150mm less than desired. The balance will be excavated before sealing built.

3.1.2 INSTALLATION OF CONCRETE DRAIN

a) Standard drain must be installed according to the type, size and dimensions have been determined.

b) Concrete lining or sealing layer should be built up in accordance with a predetermined slope.

c) The slope of the concrete lining is to be reviewed to ensure the flow of 'inverse' and 'ponding' does not occur.

d) connections to be made straight and parallel to the water flow is not disrupted or blocked.

e) Spaces in between the drain must be properly compressed so that soil erosion and sedimentation can be reduced.

3.1.3 DRAINAGE SYSTEM

Drainage system designed and built to drain water into the catchment area located at the lowest point. Good drainage and efficient to be highly beneficial especially to the process to control and prevent flooding. Good drainage and will facilitate the efficient flow of water and reduce the impact of pollution on water quality. It will also prevent natural disasters such as floods.

Functioning drainage system to drain the surface runoff from the buildings, paved areas, the roads and other impervious area to a safe area such as a river, lake or sea. Good drainage is essential to protect the interests of economy, security and social fabric of the area. A good drainage system must be able to accommodate the amount of runoff received.

3.1.4 PURPOSE OF DRAINAGE SYSTEM

A drainage system was built has a specific purpose. Its main purpose is to manyalirkan all runoff into another place where most of the open space was transformed into a paved surface as a result of rapid development. When this happens changes the relationship between rainfall and the amount of surface runoff. Amount of surface runoff have increased while the flow time decreases surface runoff and peak flow rate increases. This problem can be overcome by the construction of the drainage system by means of:

• Intercept and collect runoff from areas close to the pavement from flowing into the pavement.

• To collect and drain the surface runoff from the pavement itself.

• To slow the flow of runoff from upland runoff velocity and increase in flat to prevent sedimentation.

3.1.5 TYPES OF DRAINAGE SYSTEM

There are different types of drainage systems in various forms, but the type of drainage system is divided into two basic systems of drainage and irrigation start the main drainage system.

i. Drainage System Beginner

Surface drainage system is a system that carries stormwater runoff from a specific area. For example, from residential or industrial runoff then be brought to the main drain and the main drainage of runoff draining into the catchment area such as rivers, lakes and seas. Drainage systems are usually designed for periods beginning repeated 2 or 5 years depending on land use planning. The beginning of the drainage system usually includes:

• Drains or roadside ditches

• Sewerage

• Water pipes run

• Other structures designed to carry runoff

i. The main drainage system

The most important municipal drainage system is the main drainage system in which the effectiveness of a drainage network is dependent on the planning and design of major drainage. The main purpose of the major drainage system is the amount of runoff collector system from the beginning of the drainage system to the river, lake or sea. Main salirtan system designed for repeated kalaan 100t year to reduce property damage and lives as a result of flooding. The system consists of:

- natural and man-made drainage
- Underground Drainage
- Drainage on the road
- Other drainage structures

3.2 DRAIN

Drain water discharge is drainage, as water and waste from the sink. The purpose of the drain is to prevent the drainage of stagnant water and facilitate the flow of water to flow out. Drains are usually built outside the house. There are various types of drains including a V-shaped gutter, half-round gutter and form U.

Drain installation is necessary to drain the water from the waste and sanitation equipment, stoves, water mains shower (RWDP) as well as a paved surface water to the public and the next pembentung to the waste and special treatment.

3.2.1 TYPES OF DRAIN

There are various types of drains in Malaysia adoption but usually through the use of types as given below drain type of concrete, gutter types of ceramics, PVC drain. In addition there is also Drain U-shape, V-shaped drains and half round gutter.

Concrete

V-shape

Clay (Tembikar)

PVC Drain

Materials to create gutter like cement, aggregate and sand. The steps for the installation of the drain are as follows:

Step 1	Prepare material and equipment
Step 2	Excavate soil
Step 3	Put the sand
Step 4	Installing and measured
Step 5	Connect bonding between drain

There are several tools to be used to install the drain like a hoe, excavator, spirit level is used to obtain uniformity, and yarn intended for straight alignment for a long distance.

Constructed drains should have the following characteristics:

• Drains should not easily leak

• Waste water and stool can not affect the drain.

•. Able to withstand the pressure of the ground and 'settlement building'

• Able to withstand heat and fluid flow.

3.2.2 METHOD OF DRAINAGE ISTALLATION

Regulations and requirements that need to be addressed in gutter installation is as follows:

Gradient	Slope drains should be given to the movement of water is not so slow and stuffy
Depth	Underground drains must be planted to a depth sufficient to avoid a leak or burst pipe caused by the load there is on it. Example: vehicle
Ventilation	Ventilation should be held in order to avoid unpleasant stench
Cover	Should be held to prevent foul odors into the building and not in the way

Route	Route / special room must be made available for inspection or cleaning if blocked drains
Connection	Connection should be held to avoid a leak or crack in the gutter
Material	Materials must be durable and not easily broken. This is to ensure that plumbing and drain-resistant and able to withstand the load and tensile
Retainer	To ensure the support and drain placement unbreakable
The size and volume of the load	Shall be in types of or shape drain.

3.3 THE IMPORTANCE OF DRAINAGE SYSTEM

A Rainwater Drainage System is very important to properly channel rainwater, which may damage your property in the long run. If the proper system is not installed, when there is heavy rainfall there may be problems such as water clogging and leaking in the roofs and so on. While constructing a house, the utmost importance must be given to its drainage system as well. Based on the style of your building, you could select from the many varieties of this systems available on the market. Drainage systems that will not lose the aesthetic value of the house are now available and will also serve the purpose and look good on your building as well.

You have both the contemporary style as well as the classically styled drainage systems from which to choose. Before selecting it, it's also important to analyze the building to find the areas where there are possibilities of water logging due to heavy rains. Rainwater, if clogged on your terrace and other open spaces, might moisten your building and cause heavy damage. The repair work for such reasons may cost you heavily.

Understanding the Rainwater drainage system is very important. You need to do the necessary plumbing work in order to install a perfect system. For this, you could get the opinion of your plumber who will suggest that you get the best systems that will suit your building style. Only when you understand the entire plumbing work of your house, will you be able to find the problematic spots during troubleshooting. The first important part of the drainage system is the gutters, which will channel the rainwater running onto your rooftops into the downspout pipes. Based on the size of your house, the gutters must be large enough to accumulate the water during heavy rains.

It is also important to check these gutters for any blocks or hurdles during the heavy rainy season. Gutter outlets, which are the part that connects the gutter to the downspout pipes, are available in various shapes. They are mostly used as connectors between the pipes on your rooftops. Nowadays, you can get even PVC pipes, which are much more durable when compared to conventional types of pipes. You will also get drainage pipes to suit your building style. Cast iron drainage pipes are also available that look neat and classy.

The importance of rainwater drainage system can never be over emphasized. Many people overlook this and do not pay much attention to the system in their houses. In fact, during the construction time itself, a proper plan for it must be designed so that they will form an integral part of the house plan. If it is not properly installed, then it will spoil the looks of your building due to water seepage and clogging. In the long run, you may have to spend more on repair work due to rainwater seepage. Based on your personal budget, you could select the right type of drainage system that will serve the purpose as well as not detract from the aesthetic value of your house.

3.4 DRAINAGE SYSTEM

a) Land Drainage

This is a temporary drainage and require regular maintenance. Construction costs are low when compared with other types.

b) Pour Concrete drains used

This type of drain used extensively. Cost of construction is simple and it only requires minimal maintenance, if designed properly.

c) Pour Concrete Drain In Britain

This type is usually used where unequal deposition is expected to occur as a drain on the slope stall.

d) Drain Stone Rubble

This drain is constructed from blocks - blocks of stone and also serves as a retaining wall.

e) Drain-Rise

Drain is constructed in which the slope is quite steep. Special Pehatian be given to the connection and the drain site. The power of water erosion is very strong and should not be in easy view.

3.5 THE EARTHWORK

Earthworks should be planned, implemented and monitored properly because failure to do so will result in higher costs when the mishap occurred as landslides and erosion. Repairs require expertise that would cost that may be saved if given careful consideration during the planning and implementation of earthworks.

3.6 CLEANING SITE

a) The area to be cleaned should be marked, so that cleaning is not entering the border area.

b) Sometimes there are trees, grasslands, etc. to be stored or kept in place. These trees shall be marked and grassy areas are held signs barricades so as not to be disturbed by construction activities.

c) If the project is in the region that have been developed, the direction of alignment of water pipes, underground mains and other services should be determined so that special attention be given when the work made cutting or digging close to the range.

d) It is very important that tree roots need to be dismantled out, especially on a building site. If tree roots left in the soil, it will eventually rot and cause soil deposition.

e) the original soil layer depth of 150mm can be reused for planting grass. Area to store on this land shall be identified in advance so that other construction activities undisturbed. The materials needed are not available in the upper soil layer of topsoil should be removed before it is stored.

3.7 GRASS PLANTING AND FIELD WORK

a) Field

i) During the work the soil, the surface should be formed so that it has a camber or slope that leads to a nearby drain. Slope of the field is in the range of 1:60 - 1:200.

ii) To ensure that this slope is obtained, the level of points to be taken or used for measuring camber board camber.

iii) If the condition of the field is wide and flat, the use of underground drainage may be used.

iv) The top layer of black or stored during earthworks can be used for lining the field.

b) Galvanised Grass

i) The size of the pieces of grass in PWD specification is 200mm square and is 50mm thick.

ii) The type of grass and specifications must be determined, especially if the technique hydro seeding "is used. Grass should be free from weeds.

iii) Piece of grass must be kept in damp conditions so that freshness is maintained.

c) Planting of Grass

Planting grass on slopes or banks should be implemented as soon as it is completed slopes or cliffs. This is to reduce the risk of soil erosion.

vi) Grass planted in closely-planted ', the space between the grass should not be visible while the distance between the sheets grass-grown patch' is 450mm center to center.

3.8 DRAINAGE WORK DIRTINESS

a) Drainage flow of dirt

i) Should be seamless Trench dug out of duct manhole and drain manhole in invertnya level should also be controlled so that the incident did not happen inverting flow.

ii) Trench have built stable and if there is soft ground or soft ground, the soil should be replaced with soil or sand quality selected.

b) Pipe type There are several types of impurities drain pipe commonly used

i) Polished porcelain pipe that meets the standards or BS539 BS65.

ii) Cast iron pipe used as drainage bare dirt or crossing the road.

iii) Non-plastic pipes polivinal chloride (UPVC).

iv) V.C.P pipe (extra strength).

c) Pipe Fittings

i) That have been excavated Trench should be checked before installing the drainage pipe impurities

ii) Are not supposed to roll pipe or dumped into trenches.

iii) The exterior and the pipeline must be cleared before the connection work done.

iv) The end of the pipe is not done should be closed to prevent the entry of land.

v) The pipe should be arranged with the socket bersoket inverting the flow direction to facilitate assembly.

vi) The distance between the manhole to manhole shall be limited to 45 meters to facilitate maintenance works.

d) Manhole-chamber to drain impurities.

i) Manhole-chamber is needed for the work of inspection and maintenance. Manhole-it depends on the level of manhole invert and drainage slope.

ii) Where the manhole is built on soft soil, mud pile foundation is usually held.

iii) All the angles on the inside should be made in a circular shape.

iv) The interior of the chamber and the exterior of the vulnerable must be plastered with cement mortar.

v) The manhole cover is made from cast iron medium firm should be provided.

vi) For manholes in excess of 1 meter in, children must be wrought iron staircase.

vii) test for impurities drain pipe should be carried out from manhole to manhole before buried trenches. Tests included tests of water where the water speed is measured in the last 30 minutes.

viii) In the event that water tests pass, trenches may be filled in with soil that is free of large rocks.

ix) The backfill should be in layers and each layer not exceeding 300mm thick and compacted.

e) Sewage System.

i) There are various types of sewage systems that are used in construction. Selection of a system that depends on factors of land, type of use, number of users and others.

ii) The sewage system commonly used are:

a. Septic tank (septic tank).

b. Septic tank with filter trenches.

c. Penghampar septic tank with a filter.

d. Imhof tank.

e. Central sewerage oxidation tank.

f. RBC system, Biofilter and others.

iii) sewage system requires constant maintenance. The effectiveness of a system can be evaluated from the sewage waste water quality is measured by BOD (Biological Oxygen Demand).

3.9 Prioritize Survey Sites

a) As a precautionary step in a project that will be implemented.

b) To obtain the physical properties as well as other pertinent the information.

c) Allow the designer choose the basic types as well as doing a good basic design, safe and economical.

d) It provides good insight into the potential problems that will be experienced during construction.

e) Knowing and taking about a peculiarity or differences that may arise in a site.

f) To identify the changes that may occur due to changes in original condition and also studying the possibility of what would happen due to the change.

Site Investigation Among the objectives as set out by the British Standard Code of Practice (CP 2001) 'is as follows:

a) Obtain information related to soil conditions diperbagai location and depth.

b) Calculate or obtain the location, thickness and strength of the order of each soil stratum including about the types of land itself, the structure and layer firmness.

c) Obtaining and it kind of foundation stone at a place next to their location, arrangement, size and hardness and thickness of the evidence of the stone itself in every layer.

d) Recovery of water levels and water pressures some disesuatu area.

e) Recovery of soil properties with one or a combination of ways that there are ways of testing.

3.10 MANHOLE

3.10.1 PROCESS OF SEWAGE

Also known as septic tank septic system is a small scale sewage treatment system , a sewage treatment tank commonly used in residential areas of individual homes. Generally terms for septic refers to the anaerobic bacterial environment that develops in the tank where the waste decomposes into the tank.

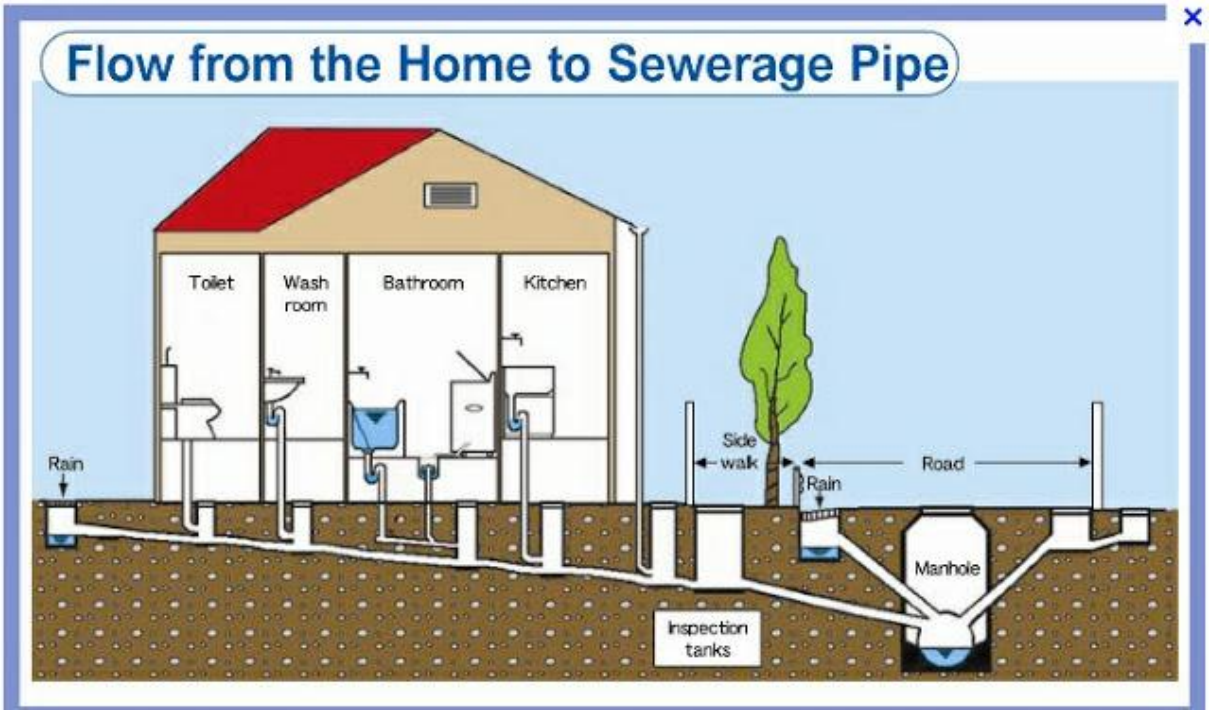
Septic tank construction materials are usually brick , concrete , fiber material (fiberglass) or plastic . Form for septic tank usually rectangular (built of concrete) or cylindrical (plastic or fiber material from) .

Waste will enter the first chamber tank and cause material to precipitate soluble solids and floating hull . Solid precipitate material will be broken down causing anaerobic solid material volume decreases. Liquid material will flow through the divider wall into the second chamber and solid material precipitated . Excess fluid from the second chamber from the outlet to drain out through the effluent pipe .

Wastes that are not decomposed by the anaerobic system will cause the septic tank is full. When this happens , the waste is removed manually using a vacuum pump .

Sewerage system which is widely available in Malaysia is individual septic tanks . Estimated that about 1.2 million premises have the individual septic tanks . Perfect individual septic tanks which according to Malaysian Standard - MS 1228 has 3 to 4 rectangular metal cover and typically located outside the premises either at the front, back or side of the premises . Sometimes the septic tank on the premises that have been modified . Sewage (feces) that flows into the septic tank does not undergo complete treatment and therefore the septic tank needs to be emptied on a regular basis about every two years to ensure that they function efficiently. IWK provides mandatory and extremely important for the government premises .

3.11 DRAIN PIPES



3.10 Figure show flow of sewerage pipe

Plumbing drain pipes are installed below ground and serves as a drain faeces and waste water and surface water from a building. Drain pipe system characteristics and different methods of installation of plumbing fixtures.

By reason buried in the ground, then drain pipes require materials resistant push and hold the pressure for constantly exposed to load, especially if there is a vehicle passed over it. Most of the desert a drain pipe in the ground all right for the draining of residual stool and consists of clay pipes and cast iron pipes.

3.11.1 TYPES OF PIPE

Clay Pipe

Cast Iron Pipe

Pvc Pipe

Concrete Pipe

U PVC Pipe

Pipes made of fiberglass, concrete and uPVC also used. This type of pipe is suitable for use as drain pipes, especially in acidic soils or acidic wastewater.

Characteristics:

1.Affordable price

2. corrosion resistant

3.Easily installed

4. Easily cut

5. Easily connected

Cast iron pipe is made of steel through the casting process at the factory. This type of pipe stronger than clay pipe, and have a stronger connection. Cast iron pipe suitable for use in an unstable clay but less seseuai used in the swampy land and contains a high sulfate.

3.11.2 PRINCIPLES OF PLUMBING DRAIN

1.Quality

Drain pipes used must have the characteristics of high strength and durability. Strenghness depends on the quality of the pipe material used. Quality pipe will produce a system of drain pipes durable. Apart from the depth is sufficient to prevent pipes being damaged if a heavy object on the ground. In addition to a possible connection to be perfect.

2. Watertight

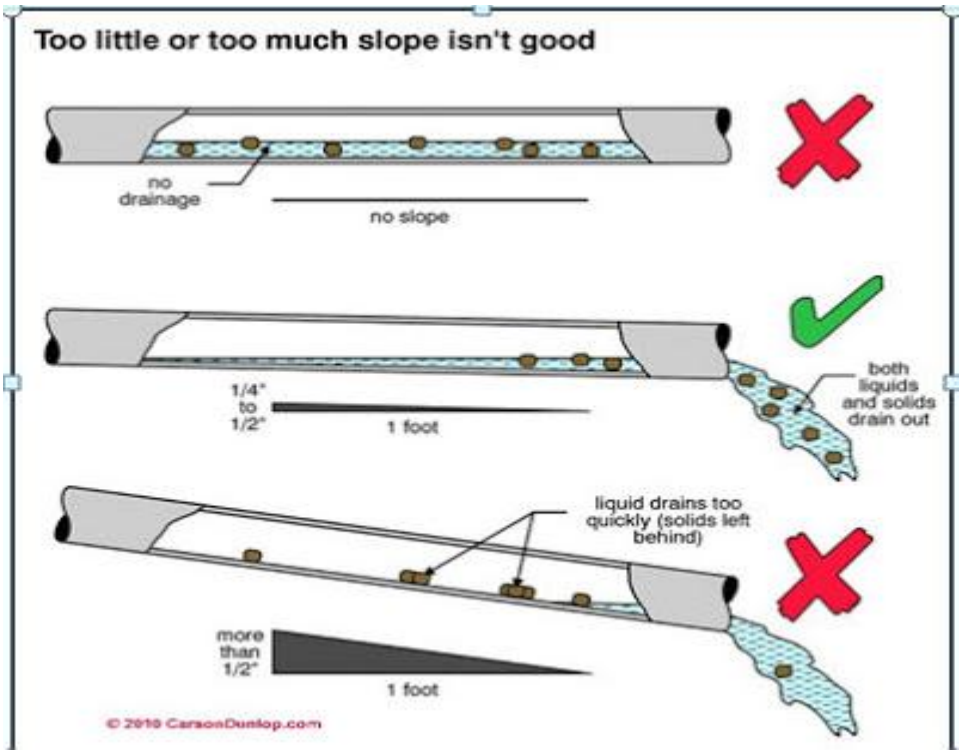
Drain pipe installation is considered to achieve a good level of quality if the drain pipe watertight condition. Watertight means water from the outside can not enter into the drain pipe. Faeces and waste water are not out dair drain pipes and contaminate the environment. Drain pipe shall be installed by skilled workers to ensure that the pipeline is in watertight.

3. Gradient

Gradients are important factors for pipe installers below ground because the treatment takes place in the drain pipe. The slope of the drain pipe must be in accordance with the standards recommended slope installation. The purpose is so that the sewage solids settle to the bottom, causing sewage pipe jammed or clogged pipes.

If pipe slope gradient , sewage will be drained slowly. Solids contained in the waste will be left at the bottom of the pipe.

Pipes also can not be installed too steep to avoid digging too deep when soil piping. Drain pipes will be eroded if built too steep speed due to sewage.



4. Straightness

Sewage draining more effective if the pipes are connected in a straight line from point to point to another one. A bend in the drain pipe should be minimized and only made in exceptional circumstances. Bends required when pipe to be bent to be connected to the drain pipe to another. Straight installation also reduces maintenance work.

5. The ventilation

Required ventilation in the drain pipes so that any resulting Gais not cumulative. The gas collects in the drain pipe will cause pressure rise and fall. To prevent it, the process is very effective ventilation is required. Ventilation of drain pipes is assured by installing vent stack must be less than 900 mm high on any windows or air vents of the building, as well as the distance of 3 m from any building eaves, window or air vent of the building.

The top of the vent pipe should be covered with wire ball to avoid waste into the plumbing.

CHAPTER 4

CASE STUDY

WATER RETICULATION AND DRAINAGE SYSTEM

4.1 INTRODUCTION OF POJECT

Figure 4.0 Terrace house Taman Kurnia Jaya

The project is located at Kemumin, Pengkalan Chepa, which is about 15km from main town, Kota Bharu and it takes 15 minutes to reach the main town from the site. At the site, it has two big on-going projects which are 50-units two-storey house and 24-units two-storey house. Both projects are in the same location. The 50-units and 24-units two-storey house are difference in terms of house design, area of the house and of course with difference price of selling. The 50-units two-storey terrace houses consists of four separated block which are Block A, Block B, Block C and Block D whereas the 24-units two-storey house consists of two separated block which are Block A and Block B. The project is in 70% progress to finish and it was expected to be finish in October 2013.

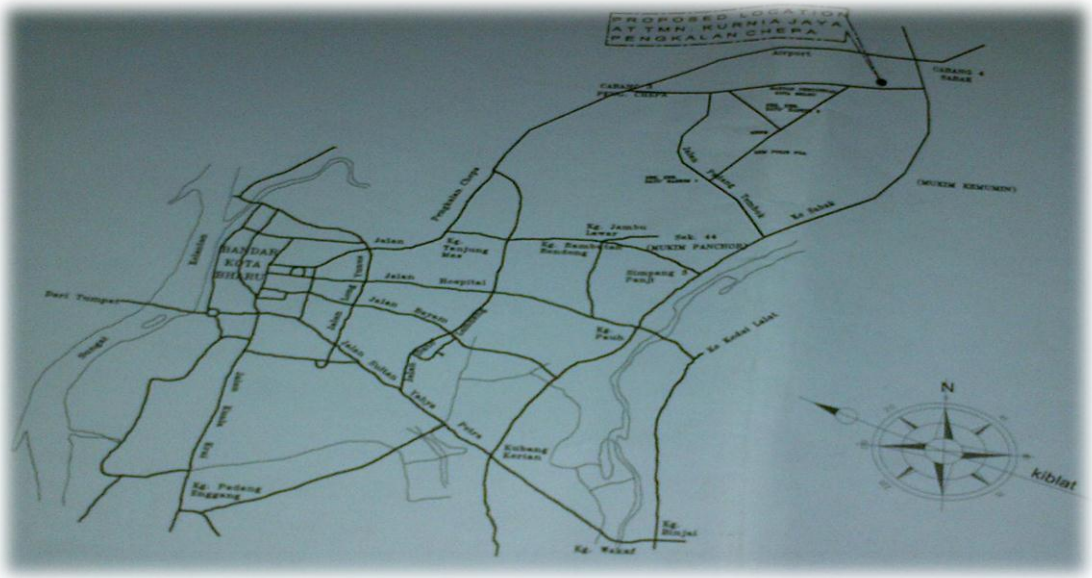


Figure 4.1: Location Plan

Figure 4.2: Site Plan

4.2 SCOPE OF WORKS

As a developer, Binaraya PKINK Sdn. Bhd. had applied the scope of work that consists of project management and site management/supervision. Project management is a set of comprehensive services, which includes the management and coordination of all design, procurement and construction activities on site. Site management or supervision during practical includes the monitoring and controlling, testing and dispute resolution. Mostly they more focus on supervision of construction activities, checking consultant/contractor doing the job according to their agreement, ensuring all the work done complies with the engineering drawings.

During my internship, 50 units terrace house project has cover up until 70% and they focus more on infrastructure works. For 24 units terrace house, the project has cover up until 60% before completed and they focus more on infrastructure works, wall structure, installation of house roof and ceiling.

4.3 CASE STUDY 1: WATER RETICULATION SYSTEM

4.3.1 Water Reticulation

During my internship, I had chance to supervise, understanding and take a look at a process to install water reticulation for the terrace houses. It was a new knowledge for me since in the theory class I did not get a chance to take a look at a practical process to install water reticulation. After the water is pumped into the local community reservoir it must be distributed through a network of pipelines to individual consumers. This is known as water reticulation.

It takes for about 5 days to complete the installation of water reticulation system along 50 units and 24 units terrace house which is the distance for pipe installation is 14 meter. I was involved to supervise the work from the beginning until the end. This water reticulation will be used for water distribution to every house. There are several components for installation of water reticulation such as type of pipe used is High-Density Polyethylene Pipe (HDPE pipe) and it size is 180mm diameter, electro fusion coupler with electro fusion control unit, flange fitting, Tee valve (blue), hydrant (yellow), bend 45º fitting and nuts.

Figure 4.3: HDPE pipe (blue line)

Figure 4.4: Electro fusion coupler

Figure 4.5: T-Valve/Gate Valve

Figure 4.6: Hydrant

Figure 4.7: Tee fitting

Figure 4.8: 45º bend fitting

Figure 4.9: Flange fitting

First of all, before starting the work, the soil was excavated by using backhoe for which depth is 1 meter (see Picture 4.10). While waiting for the excavating work to be done, some workers did attachment process for HDPE pipe. Before HDPE pipe lay on the excavated ground, it must be attach to one another first. To join the HDPE pipe, electro fusion coupler was used. For each joint section need one unit electro fusion coupler (see Picture 4.11).

Figure 4.10: Excavation work

Figure 4.11: Installation electro fusion coupler

After attach electro fusion coupler, plug in electro fusion plug into the coupler by using electro fusion control unit (see Picture 4.12). This is where the ends of two sections of pipe are melted and then pushed and held together, forming a single pipe. The electro fusion control unit is using electric volt to joining each pipe section. The amount of volt used was 40V for about 460 seconds.

Figure 4.12: Plug in process

Figure 4.13: Electro fusion control unit

After the finished joining the HDPE pipe, the HDPE pipe was laid onto excavated ground then the workers makes sure that the alignment of the pipe is in a straight manner. After that, Tee is attached at the centre line of the HDPE pipe (see Picture 4.14). Tee is attached to the pipe by using flange fitting and tight it with nuts. Then, T-Valve (blue) is attached to the Tee (see Picture 4.15), 45º bend fitting is attached to the T-Valve and lastly Hydrant is install to the 45º bend fitting (see Picture 4.16).

Figure 4.14: Installation Tee

Figure 4.15: Installation T-Valve/Gate Valve

Figure 4.16: Installation of Hydrant

4.4 WATER RETICULATION EQUIPMENTS

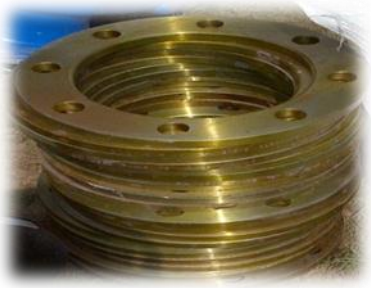
Equipments / Materials	Descriptions
 Figure 4.17: Flanged	A flange is an external or internal ridge, or rim (lip), for strength. Pipes with flanges can be assembled and disassembled easily
 Figure 4.18 :Air Valve Tee	Used to be joined with pipe HDPE(Blue Line).
 Figure 4.19 : Tee Valve	Used to be joined with Air Valve Tee and Pipe HDPE(Blue Line).

 Figure 4.20 :Saddle Plate	Saddle plate is used for HDPE pipe (Blue Line).
 Figure 4.21:Electrofusion control Unit	Electrofusion control unit is used for test joining coupler for 40volt.
 Figure 4.22: Generator	For the installation of electrofusion fittings in field applications, it will be necessary to have a reliable source of AC power for the Electrofusion Processor to work properly in supplying the fitting with the right amount of energy.
 Figure 4.23: HDPE pipe (blue line)	Pipe blue line is used for joining pipe .

 Figure 4.24 : Hydrant	Used for to enable firefighters to tap into the municipal water supply to assist in extinguishing a fire
 Figure 4.25 : Electrofusion Coupler	To close the gap between the pipe and the fitting and to build up interfacial pressures for the fusion process to take place.

4.5 ELECTROFUSION INSTALLATIONS

One of the most critical functions of the electrofusion process is to close the gap between the pipe and the fitting and to build up interfacial pressures for the fusion process to take place. If this gap is not closed and the interfacial pressures cannot be built up, there is no way for the electrofusion joint to effectively achieve the high level of fusion integrity for which it was designed. If a pipe is out-of-round the initial concern is that the surface area of the pipe may not adequately come in contact with the fusion zone of the electrofusion fitting. This could result in the electrofusion fittings cold zones, that are designed to contain the material generated in the melt pool, to simply allow the molten material to escape out of the fusion area without producing any melt penetration. This is a particularly important concern when installing tapping tees and branch saddles since they do not fully encircle the pipe as will an electrofusion coupling.

4.6 ELECTROFUSION POWER REQUIREMENTS

4.6.1 GENERATORS

For the installation of electrofusion fittings in field applications, it will be necessary to have a reliable source of AC power for the Electrofusion Processor to work properly in supplying the fitting with the right amount of energy. Generators used as an AC power source should conform to the following:

- Be well maintained and subjected to a periodic maintenance schedule
- Provide an output voltage in the range that meets the specifications of the applicableprocessor model
- Operate within a frequency range of 45 Hertz minimum to 75 Hertz maximum

4.7 ELECTROFUSION COUPLINGS

Figure 4.7.1 Eletrofusion Coupler

All Electrofusion Couplings (regardless of manufacturer) require the pipe to be restrained or sufficiently supported on each side of the pipe to

a) Restrict movement during the fusion and cooling process
b) Alleviate or eliminate sources of stress and/or strain until both the fusion cycle and the cooling cycle are completed.

Central Plastics recommends the use of some form of pipe restraint and/or support for the primary purpose of controlling and eliminating any movement of the fitting due to fusion pressures generated during the fusion process and/or any external forces exerted on the pipe or the fitting. The basis for using pipe restraint and/or support when joining two pieces of PE pipe with an electrofusion coupling is to:

- Minimize potential short-stab, mis-stab or binding situations
- Ensure proper cold-zone contact with the prepared fusion area so that sufficient interfacial pressure is built up.
- Eliminate unwanted loss of molten material from the fusion zone (resulting loss of interfacial pressure can be a source of voiding or a defective and unsatisfactory joint)

A properly prepared and assembled joint that is kept stationary and free from stresses and strains during the fusion process and recommended cooling time should have good joint integrity.

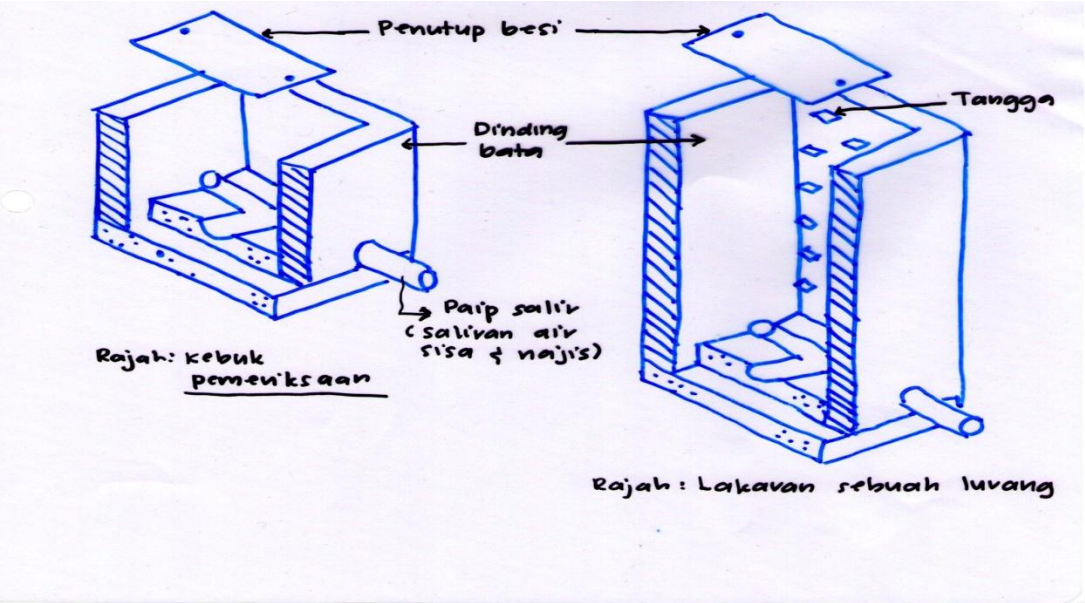
4.8 ELECTROFUSION SADDLES

Figure 4.8.1 Saddle Plate

Electrofusion Saddle fittings (Tapping Tees, Branch Saddles, Corp Saddles etc.) Installation of an electrofusion saddle requires the use of recommended restraint systems for the purpose of:

- Holding the fitting in place during the fusion process
- Eliminating fitting movement due to material expansion
- Ensuring proper cold-zone contact with the prepared fusion area so that sufficient interfacial pressure is built up.

4.9 CASE STUDY 2: INSTALLATION OF MANHOLE AND DRAINAGE



Inspection chamber inaccessible to the maintainer. Manholes and inspection chambers function is to facilitate the work of inspection, testing, cleaning and taking samples air.Manhole and chamber built on a systematic examination of several locations along the drain pipes or inspection of sewers. Manhole normally found in drain pipe system near house. It is because inspection chamber suitable for use in the drain pipe system installed in the shallow subsurface soil.

Manholes must be in good condition and not leaking and to prevent leakage, the surface of the inner wall plastered with cement mortar. Sometimes mixed with cement mortar air.Manhole resistant material can be constructed by using the brick, precast concrete or plastic. Manhole structure usually consists of a rectangular structure or manhole silinder. Floor built of concrete and walls or walls made of brick.

The size of manhole covers, usually depending on the depth manhole. Cover usually consists of materials such as sheet metal or precast concrete slabs. Must be air-tight lid so that the gas can not get out of the drain pipe. Drain pipes located above the manhole is usually of a kind pottery pipe semicircular (half round drain Glaze).

Known as the check hole, manhole construction is available at ground level. It was built to facilitate maintenance works in case of damage or a blockage in the drainage system. Building materials typically brick manholes or concrete. Manholes are also various forms, including a square, circular shape, the shape of "T" or "L" shape. Normally, a square shape that is commonly used. Each chamber is equipped with a cover made of steel, size 18 "x24".

Figure 4.9.1 Excavation Work

Figure 4.9.2 Pipe Installation Work

Figure 4.9.3 Brickwall Work

Figure 4.9.4

Test and Inspection Drainage

- After draining out and pre-filled back or laying concrete or granular material around the pipe, it must be tested with water or air.
- If there are leaks, broken pipes or connectors must be repaired & drainage retested.
- Test run between manholes / drainage Manhole & tested short branches along the main drainage system.
- Test before returning landfill must be conducted as soon as possible and pipes to be propped up to prevent any movement in the drain during the test.

Preliminary Code 8301, Building Drainage propose the following procedure in testing water:

- Drainage must be filled with water for pressure testing water is equivalent to 1.5m above the soffit (soffit) poor drainage. Very slope drainage must be tested in stages so that the water in the upper reaches of the lowest not more than 4 m.
- pipeline must be allowed to line for 2 hours and add water.
- After 2 hours, the loss of water from the tap water detention must be measured by taking the amount of water needed to maintain the upstream test for 30 minutes. Water drop in upright containers or pipes may be because one or more of the following:

1) Absorption by pipes or connectors

Absorption may start around 5% of the total weight of the pipeline.

2) Air trapped

This will occur at the connector & the amount will vary according to the type of connector, pipe diameter, the number of connectors & gradient. Eventually the air will be absorbed by the water but takes time.

3) Sweating pipes & connectors

Often pipes & connectors under pressure may sweat a little but this is not considered a reason to remove the pipeline.

4) leakage from pipes or connectors

Leaks from pipes or faulty connectors must be removed and replaced and the pipeline must be tested again.

5) Leakage from retaining

If leakage occurs, a new plug must be inserted. Sometimes a leak can occur broadly the threaded plug. All equipment used for the test must be checked thoroughly before being used and plug the rubbery surface must be clean from dust.

While bending and vertical pipes must be installed on drainage and a retainer mounted on the drain and a retainer mounted on the bottom.

Alternatively, the test can be done by means of a rubber tube connected to a container and retaining drainage.

4.10 METHOD OF DRAINAGE INSTALLATION

Figure 4.10.1 Drainage Installation

The construction of drains at 24 units and 50 terrace units uses half round drain types. Excavation work should be done before the base concrete made with 300mm thick grade 20/20. Size of half round concrete drain is 230mm with 50mm thick 100mm thick lean concrete and sand bedding.

Figure 4.10.2 Drainage Cover Work

Installation drain takes time for a week to be completed, work of making drain cover is made in project site, work of making drain cover requires material steely that having size 12mm, this iron type used for purpose to strengthen further concrete principal in drain cover.

Formwork is made before iron having size 12mm put into formwork. See picture 4.12 and 4.13.

Steel will be placed in each formwork made with wood like the picture 4:12. After steel size 12mm in place in every corner of the wood will be in a cast concrete into the box like a picture as 4.13. After 3days formwork open.

Figure 4.10.3 Drainage Cover

Drain construction will require the proper slope for drainage water flows right into a large drainage ditches and prevent the occurrence of stagnant water and cause clogged drains. For the purpose of construction of every drain in the house is to prevent the overflow of rain water into the house. The exact function of the drain is to the flow of rainwater into monsoon drain and eventually drains, streams, ocean and so on.

Drain that suitable to be used for terrace house is half round drain, this type drain suitable to be used because it does not require high costs for his installation. usually drain built up with gradient that is steep to ease water flow rapidly, if drain in build with surface that is flat it will cause water will be stagnant and water flow not fast it will bring about clogged drains.

CHAPTER 5

PROBLEMS AND RECOMMENDATIONS

5.0 PROBLEMS

During my practical training at the project site, I found a problem that often occurs is delayed until the material at the project site to complete the work causes disruption for example HDPE pipe (blue line) and electrofusion coupler until late in the project, if this situation occurs cause loss of time and delay the project will be completed on time and not set.

A little bit of changes on construction drawing by consultant. Thus, there is misunderstanding to the contractor to complete the project on time. Construction of drain near 50 units of terrace houses suffer when state drain constructed in accordance with construction drawing not cause a problem occurs as the size of the constructed drain too large and cause wiring cables can not be run.

Besides the problem of non-compliance with worker safety ethics also occur at the project site, the workers do not wear safety helmet during the construction work be done, besides do not wear safety boots cause accidents to occur.

5.1 RECOMMENDATIONS

The employees should be trained when they doing the installation work, this is to avoid any problem raised. In addition, maintenance staff should attend a seminar about maintenance refer to their particular position in maintenance department. It will help more to do all the high risk work and give a good performance for their work. Other than, the labours or employees will know how to handle the equipment of machine and others. Give a green card for the employees involves because they doing a dangerous work and must get a insurance to protect this person. Green Card produces by CIDB Malaysia.

Inform to the supplier and immediately action taken to reach a material at the site as soon as possible.

The dispute resolution had taken to more clearly for the progress project. They are discussing together and set a time to submit a right construction drawing.

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CHAPTER 6

CONCLUSION

6.0 CONCLUSION

The case study for this Practical Report was done on Binaraya PKINK Kelantan. Training industry in the past four months has been given to me to look for work experience and knowledge as much as possible to serve as a guideline in the future. This is because, I am exposed to the ways of working in the construction works.

Basically, this dissertation has achieved its main objectives, which are to learn on how to installation the water reticulation system and drainage system. Beside that identify material used and study the process of water reticulation system and study the process of intallation of drainage system for terrace house . In addition, to verify certain information that needed in used in selected of water reticulation and drainage system method and to get a data about the how it works and the use of a water reticulation system and drainage system method adopted.

Other objectives also have achieved when analysis the case study like the knowledge of materials, method of installation water reticulation system and drainage installation system and I also learn cost of material that used. Even though this study have been faced a few problems on the way to collect information from the outsources contractor responsible for installation of water reticulation system method , the problems were been successfully solved and produce a complete Practical report. The information has been got by questions and answers session with the conctractor, project manager and good skill workers is very important to produce and complete this Practical report.

6.1 REFERENCE

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