DEPARTMENT OF BUILDING

UNIVERSITI TEKNOLOGI MARA

(PERAK)

THE ADDITION OF ADMIXTURE INTO CONCRETE FOR THE CONSTRUCTION OF ROOF SLAB

Prepared by:

NUR AINI BINTI JAMALUDIN

2016458542

DEPARTMENT OF BUILDING

FACULTY OF ARCHITECTURE, PLANNING AND SURVEYING

UNIVERSITI TEKNOLOGI MARA

(PERAK)

DECEMBER 2018

It is recommended that the report of this practical training provided

by

Nur Aini binti Jamaludin

2016458542

entitled

THE ADDITION OF ADMIXTURE INTO CONCRETE FOR THE CONSTRUCTION OF ROOF SLAB

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

Report Supervisor	:	En. Muhammad Naim Bin Mahyuddin
Practical Training Coordinator	:	En. Muhammad Naim Bin Mahyuddin.
Programme Coordinator	:	Dr. Dzulkarnaen Bin Ismail.

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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 are stated herein, prepared during a practical training session that I underwent at Kenwingston Sdn Bhd for a duration of 14 weeks starting from 3 September 2018 and ended on 7 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 : NUR AINI BINTI JAMALUDIN

UiTM ID No : 2016458542

Date :

ACKNOWLEDGEMENT

Alhamdulillah, all praises to Allah as finally I'm able to finish the assignment that had been given to me. This task had been done with all afford by myself with some help by the people around me despite all the problem I faced. Luckily all the problems were resolved with tolerance and I am able to adapt properly and wisely.

Besides, I would like to address a big thank to my supervising lecturer and coordinator, Encik Muhammad Naim bin Mahyuddin because without his guidance this assignment couldn't be done properly like this. Thank you for all the guidance from the beginning till the very end regarding the assignment. On top of that, he always came out with brilliant idea in purpose to produce a good outcome from the study case that I had investigated.

Huge thank to my academic advisor, Dr. Asmat binti Ismail for the undying support and reminders for us to ensure the task can be completed on time.

On the other hand, huge thanks to my colleague in Kenwingston Square Garden for always encouraging me to excel in every task I was handed to in order to gain high marks especially to the project director, Mr Edward Lim and my supervisor Mr. Desmond Lai. Thank you for teaching me the meaning of professionalism in handling works and stresses.

To families and friends, always and forever, a very special thank you.

ABSTRACT

As one of the most important material in the construction industry, it is important to ensure that the concrete used is adequate to withstand loads and strong enough to resist any weather resistance. An investigation was carried to determine the characteristic and function of ready mix concrete in grade 40 special that is used for constructing roof slab in Kenwingston Square Garden located at Cyberjaya, Selangor. The investigation that has been made determined that the concrete in grade 40 uses superplasticizer and retarder to enhamce its strength and workability.

CONTENTS **PAGE NO**

Acknowledgements 5

Abstract 6

Contents 7

List of Tables 8

List of Figures 9

CHAPTER 1.0 INTRODUCTION

1.1 Background and Scope of Study 10

1.2 Objectives 13

1.3 Methods of Study 13

CHAPTER 2.0 COMPANY BACKGROUND

2.1 Introduction of Company 14

2.2 Company Profile 14

2.3 Organization Chart 15

2.4 List of Project 16

2.4.1 Completed Projects 16

2.4.2 Project in Progress 16

CHAPTER 3.0 CASE STUDY

3.1 Introduction to Case Study 19

3.2 Mix design of ready mix concrete 20

3.3 Identifying function of admixture used 23

3.4 Construction method of roof slab 27

3.5 Problems arise after concreting 33

CHAPTER 4.0 CONCLUSION

4.1 Conclusion 36

REFERENCES 37

LIST OF TABLES

Table 1.1	Types of concrete	10
Table 1.2	Company profile	14
Table 2.2	List of on-going project	16
Table 3.1	List of completed project	16
Table 3.2	Information of case study	17
Table 3.2	List of consultant	18
Table 3.2	Types of admixtures	21
Table 3.2	Temperature record at Cyberjaya	23
Table 3.2	Comparison of normal mix concrete & special mix concrete	26
Table 3.2	The advantages and disadvantages of flat roof	27

LIST OF FIGURES

Figure 1.1	Material to produce concrete	11
Figure 2.21	Organization chart of Kenwingston Sdn. Bhd	15
Figure 2.2	Board of directors of Kenwingston Sdn. Bhd.	15
Figure 3.5	Concrete mix design	22
Figure 3.7	Slump test	29
Figure 3.8	Installed formwork and shoring	30
Figure 3.9	Checking for formwork tightness	30
Figure 3.10	Insertion of spacer block and tying reinforcement bars	31
Figure 3.11	Compaction of concrete	32
Figure 3.12	Cracking in concrete	33
Figure 3.13	Dusting	34
Figure 3.14	Honeycomb in concrete	35

CHAPTER 1.0

INTRODUCTION

1.1 Background and Scope of Study

Concrete is defined as a composite with many variables, represented by numerous grading which indicate components, quality and manufacturing control. (R Chudley, 2008)

There are 3 different types of concrete which are:

Normal concrete	High compressive strength but low tensile strength
Reinforced concrete	Include a designed amount of steel bars in predetermined pattern to give concrete a reasonable tensile strength
Pre-stressed concrete	Pre-compression is induced into member to make full use of its own inherent compressive strength when loaded

Table 1.1 Types of concrete

There are four categories of concrete mix that consist of:

1. Standard mix – for minor works or in situations limited by available material and manufacturing data. Volume or weight batching is appropriate but no grade over G30 is recognized.
2. 2. Prescribed mix – components are predetermined to ensure strength requirements. Variation exists to allow the purchaser to specify particular aggregates, admixtures and colors. All grades are permitted.
3. 3. Designed mix – concrete is specified to an expected performance. Criteria can include characteristic strength, durability and workability to which a concrete manufacturer will design and supply an appropriate mix. All grades permitted.
4. 4. Designated mix – selected for specified applications. General graded from 0 to 4.

Concrete is a mixture of cement, fine aggregates, coarse aggregates and water.

Cement is powder produced from clay and chalk or limestone. In general, most concrete is made with ordinary Portland cement that is adequate for most purposes. The shape, surface texture and grading are factors which influence the workability and strength of a concrete mix. Fine aggregates are those materials which pass through a 5mm sieve.

Water in mixing concrete must be well calculated and be put in controlled volume as it may affect the quality or strength of the resultant concrete. Sea water should not be used as only water which is fit for drinking should be specified.
Water in concrete has two functions which are:

1. To start the chemical reaction which causes the mixtures to set into a solid mass.
2. Give the mix workability so that it can be placed and vibrated into the required position.

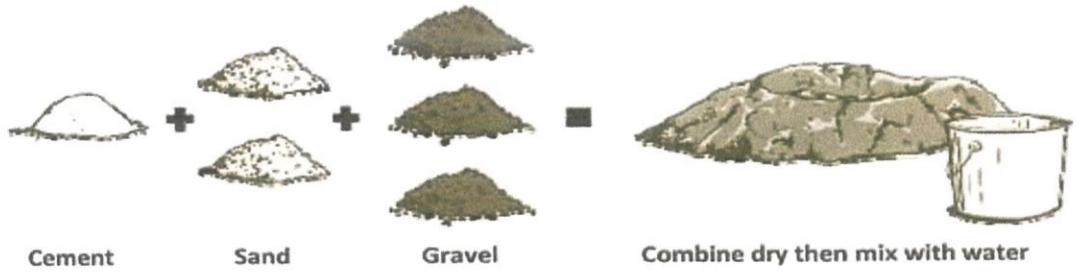


Figure 1.1 Material to produce concrete

Admixture such as superplasticizer or retarder can be added into concrete during the mixing process as it will enhance more function of the concrete.
At Kenwingston Square Garden, the type of concrete used is designed mix concrete in G40.

Roof is one of the building element that is meant to provide an adequate barrier to the penetration to the other elements. Besides, roof is proposed to maintain the internal environment by providing an adequate resistance to heat loss. There are two types of roof which are:

1. Flat roof, where the pitch is between 0° o 10°
2. 2. Pitch roof, where the pitch exceeds 10°

It is worth noting that for design purposes, roof pitches that exceeds 70° are classified as walls. (Wikipedia)

Roofs can be described in many different forms and in combinations of these forms some of which may be not suitable for domestic properties, consisting of:

1. Flat roof.
2. Lean to roof.
3. Mono-pitch roof.
4. Gable end roof.
5. Hipped end roof.
6. The mansard and gambrel roof.

Pitched roof is designed to safely resist all imposed loading such as snow and winds. It must be capable of accommodating thermal and moisture movements. Pitched roof is durable so as to give a satisfactory performance and reduce the maintenance to minimum. (J.E Gordon, 1978)

At Kenwingston Square Garden, the type of roof chosen is flat roof as it is a high-rise building.

Flat roof is seldom flat with a pitch of 0° but are considered to be flat if the pitch does not exceed 10°. The actual pitch chosen can be governed by the roof covering selected and by the required rate of rainwater discharge off the roof.

1.2 Objectives

1. To identify the mix design of superplasticizer and retarder for concrete roof slab.
2. To identify the function of superplasticizer and retarder.
3. To study the construction method of concrete roof slab using superplasticizer and retarder.

1.3 Scope of study

This study was conducted to study the admixture in concrete, including its characteristic, chemical composition, the amount required to be added into $1m^3$ of concrete and also the comparisons of the special concrete with normal concrete. This study focuses on the construction of roof top at Kenwingston Square Garden, Cyberjaya that uses the special mix concrete. This study also describe the problem that occurred at a construction site after the concreting process.

1.3 Method of study

1.4.1 Primary source

This study is carried out by looking for the primary source which is by observation and interview

Observation is done throughout my practical training at Kenwingston Square Garden. I was directly involved throughout the process with the help of my superior and the supervisor in charge. All the information gained was collected by jotting down the important remarks. The progress, equipment and machineries were photographed.

Interview was conducted to get more informative data instead of solely observing the process. Project director, project manager and the structural supervisor were interviewed for me to get extra information regarding the process.

1.4.2 Secondary source

Secondary source were used to support all the data that I gained from the primary source which are through books, brochures and internet.

Books that I referred to is used to obtain more information about the construction method of roof slab, and the composition of mixing concrete based on grades.

Brochures from Sika Kimia Sdn. Bhd is referred to make sure I had enough information about the admixtures used.

Additional information such as the history of flat roof was collected through internet.

CHAPTER 2.0

COMPANY BACKGROUND

2.1 Introduction of Company

Kenwingston started as a main contractor and now venturing into property development. Their expertise in property contruction have empowered them to build more high quality product to achieve more than client satisfaction.
Registered as a G7 contractor, Kenwingston had obtained a lot of project and is now focusing on their own development that took place all around Selangor. Directed by Dato' Lovis Lam Kong Tang as the managing director, Kenwingston Sdn. Bhd is supported by seven others director.

2.2 Company Profile

Owner	Dato' Lovis Lam Kong Tang
Vision	To achieve greater high as a reputable and reliable developer
Mission	To consistently deliver high quality product and service with reasonably priced to customer
Motto	Partnership, patience, passion
Logo	

Table 2.1 Company profile

2.3 Organization Chart

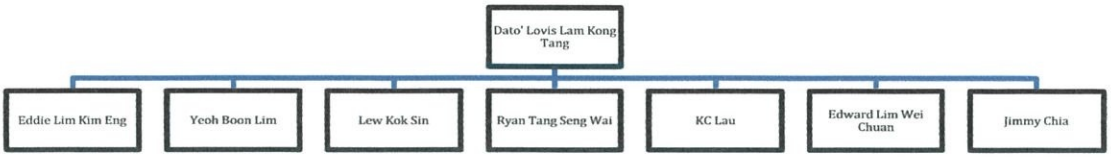


Figure 2.1 Organization chart of Kenwingston Sdn Bhd

Figure 2.2 Board of directors of Kenwingston Sdn Bhd

2.4 List of Project

The company had a paid-up capital of RM 16 million back in 2016, the total value of the completed projects stood at multi-billion ringgit comprising high-rise buildings, high ends shop offices and superlink houses.

No	Project	Amount
1	Kenwingston Square Garden, Cyberjaya.	RM 200 million.
2	Kenwingston Avenue, Sungai Besi.	RM 135 million.
3	The Societe,Desa Sri Hartamas.	RM 150 million.
4	The Havre, Bukit Jalil	RM 200 million.

Table 2.2 List of on-going project

No	Project
1	The Wharf Residence, Puchong
2	De Centrum
3	Almyra Residence Service Apartment
4	Seasons Garden Residence
5	Conexion, IOI Resort City, Putrajaya

Table 2.3 List of completed project

CHAPTER 3.0

3.0 Introduction to project

Kenwingston Square Garden sits within the thriving heart of Cyberjaya Flagship Zone (CFZ, a self-contained intelligent city complete with top-notch facilities. Here, visitors and residents can enjoy future-ready connectivity with world class IT infrastructure, well-planned commercial and residential landscapes, comprehensive amenities and various educational institutions. Accessibility is also ensured on all fronts with a wealth of connecting highways and upcoming MRT station in the vicinity.

This revolutionary project had incorporated business centre, retail boulevard and residencies unit within a well-integrated landscape.

Project	**CADANGAN MEMBINA DAN MENYIAPKAN PEMBANGUNAN YANG TERDIRI DARIPADA KOMPONEN BERIKUT:** **FASA 1**: BLOK B YANG MENGANDUNGI KEDAI, PEJABAT DAN TEMPAT LETAK KENDERAAN **FASA 2**: PODIUM TEMPAT LETAK KENDERAAN: TEMPAT LETAK KERETA, LOBI MENARA A&B, DEWAN SUKAN DAN GELANGGANG BADMINTON, KEMUDAHAN KOMUNITI/REKREASI/KELAB DAN PEJABAT PENGURUSAN, 2 UNIT PENCAWANG ELEKTRIK DAN KEMUDAHAN UTILITI, 1 BLOK MENARA A DIATAS PODIUM YANG MENGANDUNGI 456 UNIT SOHO DAN ROOF TOP GARDEN. **FASA 3**: 1 BLOK MENARA B DIATAS PODIUM YANG MENGANDUNGI 456 UNIT SOHO DAN ROOFTOP GARDEN DIATAS LOT PT48517 PERSIARAN BESTARI, CYBER 9,63000 CYBERJAYA, MUKIM DENGKIL, DAERAH SEPANG, SELANGOR DARUL EHSAN UNTUK TETUAN KENWINGSTON SEVEN UP SDN BHD.
Location	Kenwingston Square Garden, Lot PT48517 Persiaran Bestari, Cyber 9, 63000 Cyberjaya, Mukim Dengkil, Daerah Sepang, Selangor Darul Ehsan.
Duration	30 months
Contract sum	RM 292 million

Table 3.1 Information of case study

List of consultant

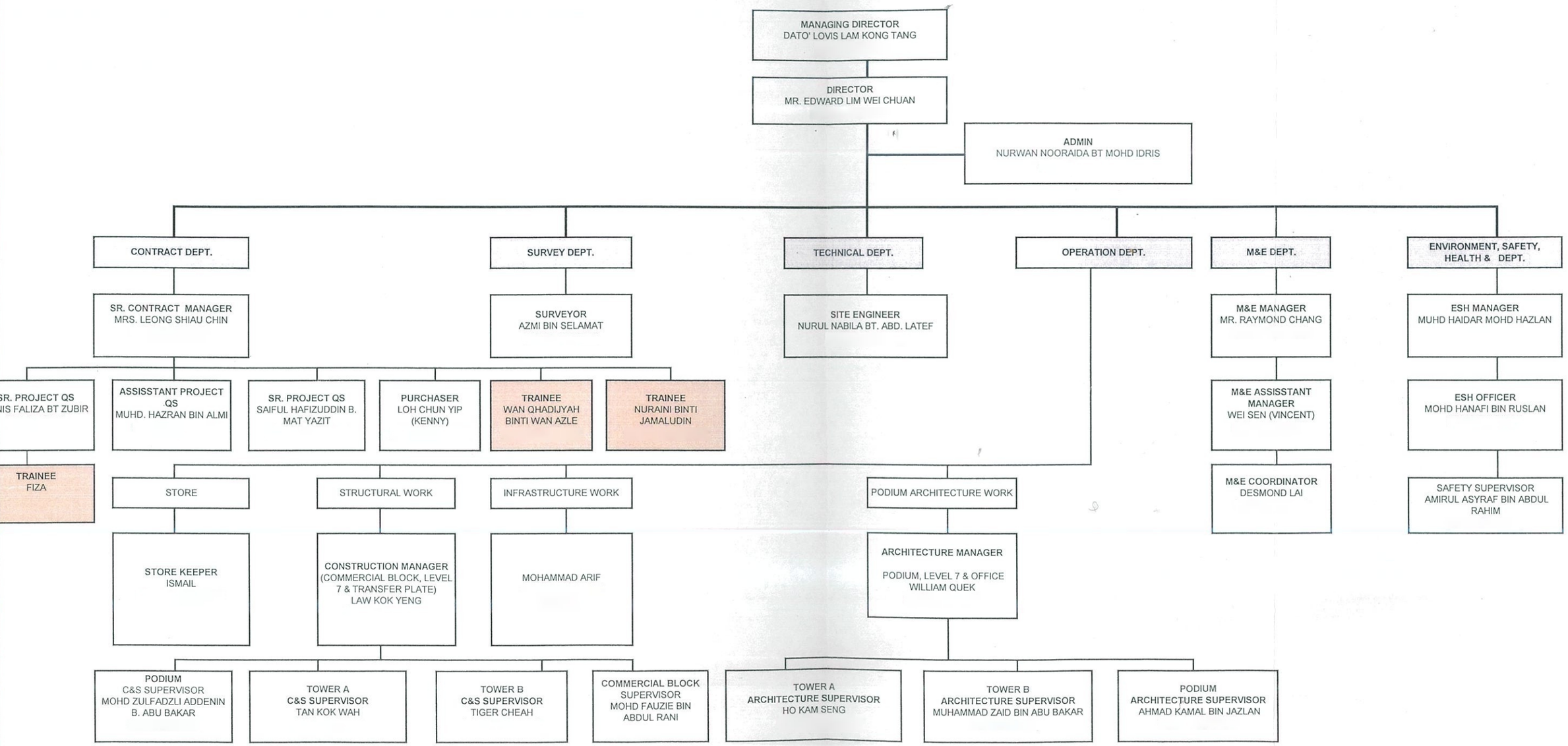
	Company Name	Contact No.	Person In Charge
Client	KENWINGSTON SDN. BHD.		Dato' Lovis Lam Kong Tang
Architect	KHASNOR ARCHITECT		Ar. Khasnor Abdul Karim
C&S Consultant	LTE ENGINEERS SDN BHD		Ir. Foong Kah Leong
M&E Consultant	D&O CONSULTANT SDN BHD		Mr. Ng Wai Mun
Quantity Surveyor	JURU KOS		Sr. Kuh Cho Sen
Landscape Consultant	SHAPAKAT CONSULTANT		Mr. WanMohd Hatta
Main Contractor	KENWINGSTON SDN BHD		Mr. Edward Lim Wei Chuan

Table 3.2 List of consultant

Site organization chart

ORGANIZATION CHART : KENWINGSTON SDN BHD

PROJECT : KENWINGSTON SQUARE GARDEN, CYBERJAYA



Admixture

Admixture are material other than cement, water and aggregates that is added to the concrete mix immediately before or during mixing in order to modify or improve one or more of the specific properties of concrete either in fresh or hardened state.

Admixture are purposely used for:
1. Improving the workability of fresh concrete.
2. Improving the durability by the entrainment of air.
3. Reducing the water required.
4. Accelerate the setting and hardening thus to produce high early strength.
5. To retard setting.
6. To aid curing.

There are 5 types of admixture which consist of:
1. Accelerator.
2. Retarders.
3. Water-reducing admixture.
4. Air-entraining admixture.
5. Accelerators water reducing.

Admixture	Function
Accelerator	Calcium chloride is the usual accelerator used in concrete work. This material is used to increase the rate of setting and hardening. Overdosing of accelerator in the mix causes corrosion to the reinforcement bar. This material is used in building structures where early removal of formwork is necessary in cold climate countries.
Retarders	To delay the setting time of initial solidification and it is able to delay the setting time up to one hour. Usually is used in hot climate country to overcome effects of high ambient temperature to concrete. It helps to reduce bleeding and shrinkage.
Water reducing admixtures	When the amount of water cement ratio used is low, the workability of concrete reduces, however the strength of concrete increases from 10% to 20%. This admixture is required to act as dispersing agent in concrete and increase the cohesiveness. It can maintain the desired workability of the mix even though the water cement ratio reduces.
Air entraining admixture	To trap air in concrete. This will improve the workability of concrete work without using much water. Normally used in cold climate country.
Accelerators water reducing	Used to increase workability with faster gain of strength.

Table 3.3 Types of admixture

The admixture used in producing Grade 40 special mix are:
1) Plastocrete R6.
2) Viscocrete 2199.

3.1 Mix design of ready mix concrete

The ready mix was aimed to achieve a characteristic strength of 40 N/mm² at 28 days. The type of cement used is ordinary Portland cement. The type of coarse aggregate used is granite with maximum size of 20mm. As for the fine aggregate, mining sand is used.

The characteristic slump for the specified concrete is 150±30 mm.

For 1m³ of ready mix concrete, 1,215 ml of retarder Viscocrete R6 is added into the concrete mix and 2,835 ml of superplasticizer Viscocrete 2199 also will be added together.

CONCRETE MIX DESIGN

CONTRACTOR Kenwingston Sdn Bhd

PROJECT Lot PT 48517, Cyber 9, Persiaran Bestari, Cyberjaya

GRADE G40S (early strength of 10N/mm2 in 12 hours)

DATE 13th December 2017

1.1	CHARACTERISTIC STRENGTH		(CS)	40	N/mm² at 28 days
	PROPORTION DEFECTIVE		(PD)	5	%
1.2	STANDARD DEVIATION		(SD)	4	N/mm²
1.3	MARGIN		1.64 X (SD) = (M)	7	N/mm²
1.4	TARGET MEAN STRENGTH		(CS)+(M)=(TMS)	47	N/mm²
1.5	CEMENT TYPE	(OPC/ PFA)		OPC	and PFA
1.6	AGG. TYPE	COARSE (GRADED/SINGLE SIZE)		GRANITE 20mm	
		FINE (ZONE 1 / ZONE 2)		MINING SAND	
1.7	WATER/CEMENT RATIO		(W/C)	0.407	
1.8	MAXIMUM W/C			-	
2.1	SLUMP			150+/-30	mm
2.2	MAX. AGG. SIZE			20	mm
2.3	WATER CONTENT		(W)	165	kg
2.4	DENSITY OF CEMENT		(A)	3150	kg/m³
2.5	DENSITY OF COARSE AGG.		(B)	2640	kg/m³
2.6	DENSITY OF FINE AGG.		(D)	2630	kg/m³
3.1	CEMENT CONTENT		(W) / (W/C) = (C)	405	kg
3.2	PROPORTION OF FINE AGG.		(E)	0.490	
3.3	PROPORTION OF COARSE AGG.		(F)	0.510	
	(BY ABSOLUTE VOLUME)				
4.1	CEMENT		(C) / 3150	0.129	m³
4.2	WATER		(W) / 1000	0.165	m³
4.3	AIR		1%	0.010	m³
			TOTAL (X)	0.304	m³
	TOTAL VOLUME OF COARSE/FINE AGG.		1 - (X) = (Y)	0.696	m³
4.4	WEIGHT OF FINE AGG.		(Y)x(D)x(E)=(G)	865	kg/m³
4.5	WEIGHT OF COARSE AGG.		(Y)x(B)x(F)=(H)	960	kg/m³
4.6	ADMIXTURE (R6)	(300ml/100 kg cement)	(C) x 3.0	1215	ml/m³
	(VC2199)	(700ml/100 kg cement)	(C) x 7.0	2835	ml/m³

SUMMARY	BATCH WEIGHT FOR ONE CUBIC METRE OF CONCRETE			
5.1	DESIGN CONCRETE DENSITY	(W)+(C)+(G)+(H)	2.395	kg/m³
5.2	CEMENT		405	kg/m³
5.3	WATER		165	kg/m³
5.4	FINE AGGREGATE		865	kg/m³
5.5	COARSE AGGREGATE		960	kg/m³
5.6	ADMIXTURE (R6)		1.215	ml/m³
	(VC2199)		2.835	ml/m³

Figure 3.5 concrete mix design

3.2 Identifying the function of admixture used in concrete

1. Retarder Plastocrete R6

Plastocrete R6 is a retarder admixture with plasticising effect. A substantial water reduction can be achieved without loss of workability.
Plastocrete reduced water by 6% of the actual amount.

Plastocrete is used in conditions with:

1. High temperature.
2. Long distance between batching plant and site.
3. Pre-stressed concrete.
4. Whenever high quality dense concrete is required.

1. Temperature

The average temperature at Cyberjaya is 32° celcius.

Date	Temperature
11/9/2018	32°
12/9/2018	32°
13/9/2018	32°
14/9/2018	31°
15/9/2018	33°
16/9/2018	33°
17/9/2018	32°

Table 3.4 Temperature record at Cyberjaya

2. Long distance between batching plant and site.

The journey from Eco Ready Mic batching plant located at Kampung Sungai Rasau, Pulau Meranti, Puchong to Kenwingston Square Garden took 14 minutes.

3. Pre-stressed concrete

Pre-stressed concrete is designed to achieve a balance of tensile and compressive forces so that the end result is a concrete member which is resisting only stresses which are compressive.

Pre-compression is induced into member to make full use of its own inherent compressive strength when loaded.

4. Whenever high quality dense concrete is required.

Radiation from sun creates substantial amount of neutron. Neutron must be caught to avoid their influences within concrete because it might produce heat in concrete and lead to structural issue.

Heavy weight aggregate is used to resist all type of radiation including barite, magnetite,limonite, goethite, and ilmenite.

The density for normal concrete is 240 kg/m^3 but the density of high dense concrete ranged between 3000 kg/m^3 to 4000 kg/m^3. The density of high dense concrete can be produced up to 5200 kg/m^3 using iron as coarse and fine aggregate

2. Superplasticizer Viscocrete 2199

Viscocrete 2199 is a superplasticizer that reduce the water content by 20%. The lower the amount of w/c ratio, the higher the durability.

Viscocrete 2199 can help to:

1. Improve durability with low capillary porosity.
2. Enhanced strength due to lower w/c ratio.
3. Surmount natural limit.

1. Improve durability with low capillary porosity.

As durability and sustainability of constructions become more important, these properties must be considered in design of concrete. The w/c ratio has a crucial influence on the impermeability of any any concrete matrix. Application of Sika Viscocrete 2199 can dramatically increase impermeability.

2. Enhanced strength due to lower w/c ratio.

W/c ratio and obtainable compressive strength in a materially factual relation. The w/c is therefore the decisive factor influencing strength gain,

Because of this relation, any strength increase in fresh concrete leads to reduced workability without addition of an admixture. On the other hand, targeting easy workability of fresh concrete through addition of water consequently reduces compressive strength, and risking the durability of the hardened concrete.

3. Surmount natural limit

By adding Viscocrete 2199, it is possible to produce concrete which reaches substantially higher strength classes by reducing the w/c ratio at a defined flowability.

Characteristic and advantages

1. High slump retention.
2. Improve workability without increasing water content.
3. Increase strength.
4. Reduce shrinkage and creep.
5. Improve surface finish

Comparisons between special mix concrete and normal mix concrete

3 sample of normal mix concrete (Grade 45 pump) and 3 sample of special mix concrete (Grade 40 special) is tested and the data was recorded into a concrete test report.

Location of test : Springcube Asia Sdn Bhd batching plant

	Grade 45 pump (normal mix)	Grade 40 special (special mix)
Characteristic strength at 28 days	45	40
Specified slump	100 ± 30	150 ± 30
Cement brand	Hume	Hume
Coarse aggregate type	20mm graded	20mm graded
Fine aggregate type	Wash mining sand	Wash mining sand
Admixture brand		SIKA
Location of concrete	GL: AB-AI/21-25	GL: AA-AJ/26-35
Date of cast	12/01/2018	12/01/2018
Date of testing	19/01/2018	19/01/2018
Age (days)	7	7
Slump (mm)	1: 120; 2: 120; 3: 120	4: 180; 5: 180; 6: 180
Density (Kg/m³)	1: 8.2; 2: 8.2; 3: 8.1	4: 8.2; 5: 8.2; 6: 8.2
Compressive strength (MPa)	1: 1190-52.8; 2: 1210-53.7; 3: 1160-51.5	4: 815-36.2; 5: 830-36.8; 6: 800-35.5
Average MPa for all samples	52.6	36.1

Table 3.5 Comparisons of normal mix concrete and special mix concrete

3.3 Construction method of concrete roof slab

Most high rise building have reinforced concrete roof slab. The beams that support the roof slab carry load from the floor and distribute it to the supports. Concrete has high compressive strength but low in tensile strength.(R.Chudley,2008) Therefore steel reinforcement is required to improve the tensile strength of concrete.

These roofs are very seldom flat with a pitch of 0° but are considered to be flat if the pitch does not exceed 10°. The actual pitch chosen can be governed by the roof covering selected and/or by the required rate of rainwater discharge off the roof. As a general rule the minimum pitch for smooth surfaces such as asphalt should be 1:80 or 0° - 43° and for sheet coverings with laps 1:60 or 0° - 57°.(Fiona Cobb, 2004)

Methods of Obtaining Falls for flat roof consist of:

1. Joist cut to falls – simple to fix but could be wasteful in terms of timber unless two joists are cut from one piece of timber.
2. Joist laid to falls – economic and simple but sloping soffit may not be acceptable but this could be hidden by a flat suspended ceiling.
3. Firrings with joist run – simple and effective but does not provide a means of natural cross ventilation. Usual method employed.
4. Firrings against joist run – simple and effective but uses more timber than firrings with joist run but does provide a means of natural cross ventilation.

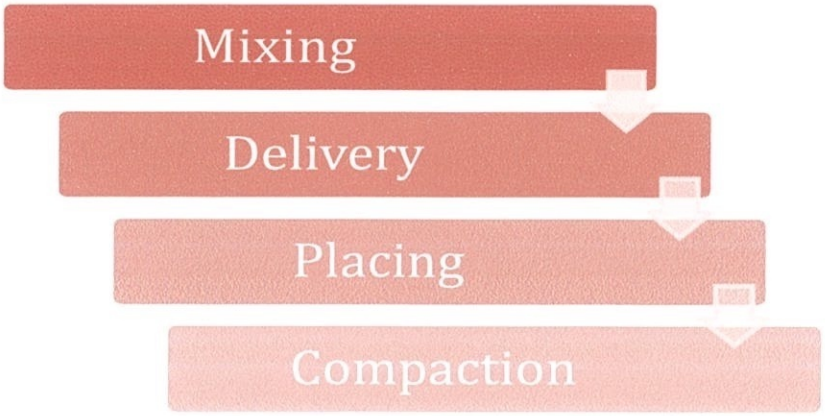
The advantages and disadvantages of flat roof are:

No.	Advantages	Disadvantages
1	The roof can be used as a terrace for playing or sleeping or for other domestic purposes.	A flat roof cannot be used for long spans without using columns and beams
2	Flat roof construction is very simple.	In the areas of heavy rainfall, flat roof are not suitable.
3	Provides better architectural appearance for the building.	Initial cost is more
4	Possesses good insulating properties.	Due to greater variations in the temperature, sometime cracks develop on the surface of the roof, which is difficult to repair.
5	pitched roof need more area of the roofing material than flat roof.	If the proper slope is not provided on the roof to drain off the water, pockets of water are formed on the surface of the roof which leads to tge leakage of roof.

Table 3.6 The advantages and disadvantages of flat roof

Concreting method of roof slab

Reinforced concrete roof slab require a simple concreting method



1. Mixing

The required grade of concrete used to cast a roof slab need to be added admixture into it, thus the mixing process is only done at the supplier's batching plant located at Eco Ready Mix Sdn. Bhd. Kampong Sungai Rasau, Puchong. The concrete will be delivered to site as per customer's order.

2. Delivery

The concrete that has arrived on site will be delivered to the required place as soon as slump test is done. At Kenwingston Square Garden, the concrete were transferred using pump to the chute that looks like a spider web at the rooftop. Chutes will transfer the concrete to a more specified place

Figure 3.7 Slump test

3. Placing.

Preparation:
1. Formworks will be examined for correct alignment and adequate rigidity to withstand the weight of concrete and also to ensure that the result will be in good condition

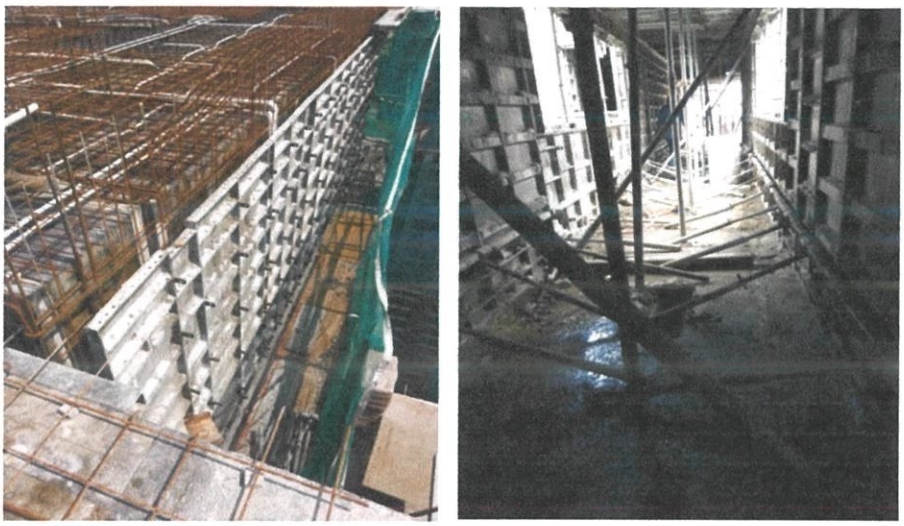


Figure 3.8 Installed formwork and shoring

2. The formwork must be checked for tightness. The lock must be ensure its tightness to make sure no leaking occur during the concreting process. Any loose lock will be tighten before pouring the concrete into the formwork

Figure 3.9 Checking for formwork tightness

3. The inside of forms must be cleaned and lubricated with oil to facilitate their removal when concrete is set.

4. Spacer block will be insert underneath the reinforcement bar. Spacer block with the thickness of 25mm must be located underneath the reinforcement bar to make sure the reinforcement bar will be located inside the concrete as soon as the concrete harden. On the same time, all under slab services should be install.

Figure 3.10 Insertion of spacer block and tying reinforcement bars

When placing the concrete be careful not to damage or move the formwork and reinforcement. Discharge concrete with less than 1.5 metres of vertical drop to avoid segregation of concrete. Place concrete from the lowest point to the final concrete level in one operation in horizontal layers.

5. Compacting

Concrete will be vibrated to avoid any air voids forming inside the concrete and producing honeycomb using vibrator. All the concrete is worked into the corners of the structural members.

Figure 3.11 compaction of concrete process

3.4 Problems arise after concreting

The main problems that arise after the concreting process is cracking, dusting and honeycomb.

1. Cracking

Cracking are mainly caused by uneven support by a poorly prepared sub-grade. Improper jointing and sealing may also lead to cracking.

Figure 3.12 cracking in concrete

Structural loading may also lead to cracking as the structure is unable to withstand the imposed load.

Cracking can be rectified by making sure that adequate grade of concrete is used to ensure that it can bear the loading.

The concrete should be placed at a moderate slump, make sure no excessive water is added.

2. Dusting

Dusting occurred due to overly wet mixes. Besides the existence of clay, organic materials or dirt in the aggregate may also lead to this problem.

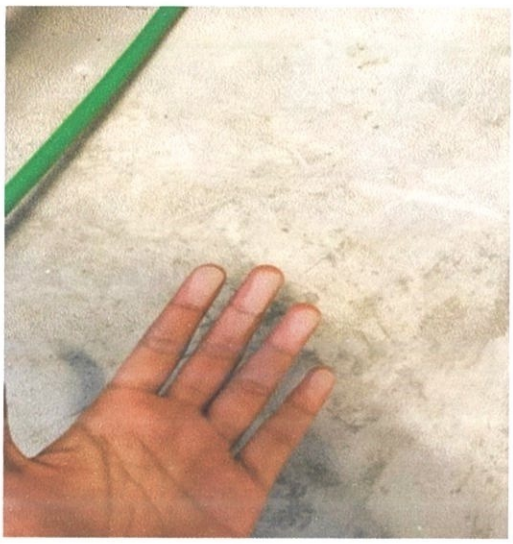


Figure 3.13 Dusting

Inadequate curing and inadequate protection of the fresh concrete from rain and drying wind may also lead to dusting.

Dusting can be rectified by using a high-pressure washer to remove the weak surface layer.

Dusting also can be eliminated by applying hardeners such as water glass, epoxy sealers or cement paint.

2. Honeycomb

Honeycombs are hollow spaces and cavities left in concrete mass on surface or inside the concrete mass where concrete could not reach. Honeycombs occur because of improper vibration during concrete and due to inadequate water in concrete that causes the concrete to be less workable.

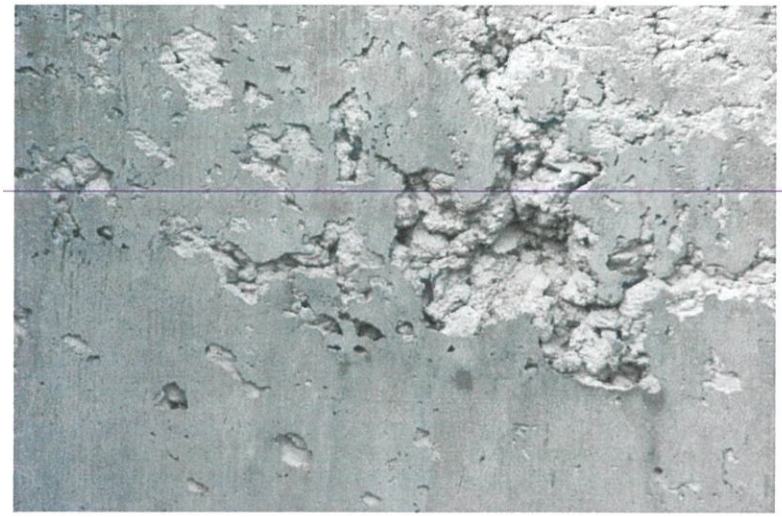


Figure 3.14 Honeycomb in concrete

Honeycomb can be rectified by applying pressure grouting with cement-based chemical into it.

The problem that occurred causes the construction progress to delay as it takes time to rectify all the problem and this will increase the cost. This is why the casting process is important as if it is done correctly, no problem will occur after the concrete has hardened. Therefore, admixture is added into concrete to optimize its function in resisting all the problem.

CHAPTER 4.0

CONCLUSION

As a conclusion, the admixtures added in concrete and their own specific purposes that is used at the chosen site, Kenwingston Square Garden had been figured out its characteristic, chemical composition and also the amount of both admixture added into one metre cube of concrete had been figured out. The opportunity to join the casting process at the rooftop that use special grade concrete together with the structural supervisor had been gained.

Besides, the problem that occur due to unsuitable grade of concrete used can be determined such as cracking, dusting and honeycomb that can be avoided by adding in admixtures into concrete to improve its strength, workability and reduce its water / cement ratio. The admixture that is obtained by supplier is proven to be effective as there is no problem such as dusting, cracking and honeycomb occur after the formwork had been dismantled.

In a nutshell, it is important to make sure that the concrete that is used is suitable for its various purposes. As the most used material in construction, concrete plays an important role to make sure the building can stand still for centuries.

REFERENCES

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7. www.kenwingston.com.my
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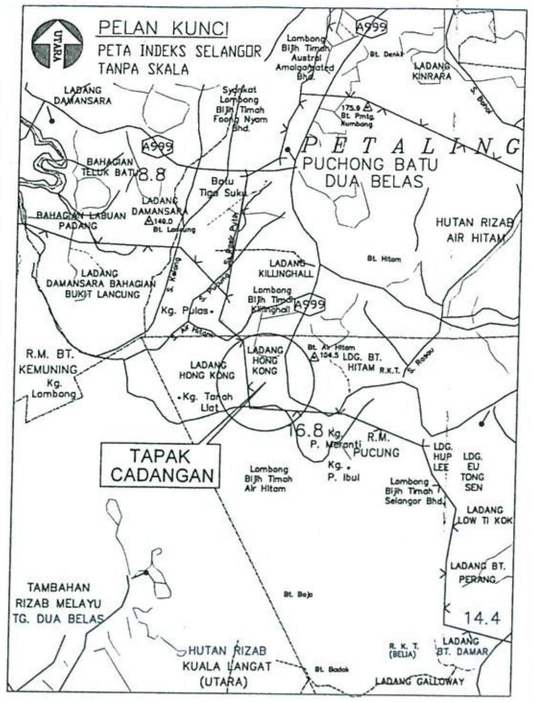
9. Structures: Or Why Things Don't Fall Down (J.E Gordon, 1978)

PELAN KUNCI
PETA INDEKS SELANGOR
TANPA SKALA



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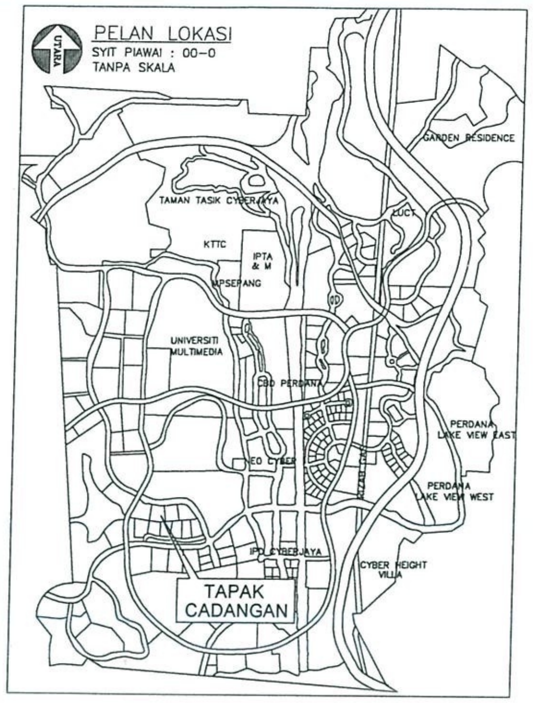
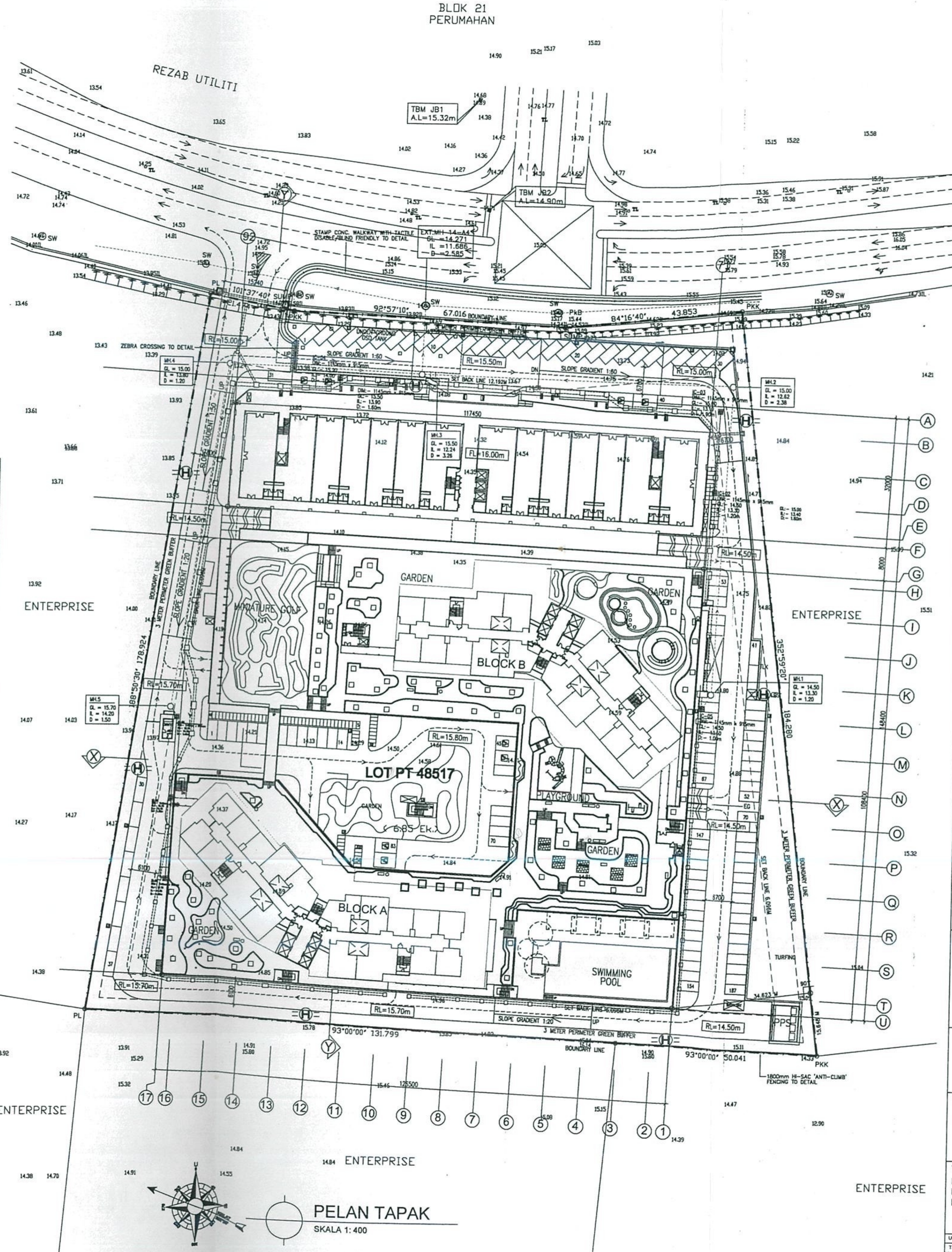
SYIT PIAWAI : 00-0
TANPA SKALA





PELAN TAPAK
SKALA 1: 400

TAJUK PROJEK :

Pelan Tapak:

Kehendak-Kehendak Am:

Kehendak-Kehendak Pasif

Kehendak-Kehendak Aktif

Peringatan

TANDATANGAN ARKITEK

Ar. KHASNOR BT ABDUL KARIM
ARKITEK PROFESIONAL
No Pendaftaran LAM AK.72

Saya mengesahkan bahawa butir-butir di dalam lukisan ini mengikut peraturan-peraturan Undang-Undang Kecil Bangunan Seragam 1984 dan saya bertanggungjawab sepenuhnya ke atas keselamatan bangunannya

PENGIRAAN PERANCANGAN BAGI KESELURUHAN CADANGAN PEMBANGUNAN

KELUASAN TAPAK = 6.85 EKAR (27,708.80 MP)

1. KEPERINCIAN KOMPONEN PEMBANGUNAN

KEGUNAAN JENIS BLOK	KELUASAN LANTAI (MP)	(MP)	%
A. PEJABAT (FASA 1 - BLOK PEJABAT)			
I. PEJABAT TERLETAK DI ARAS 3 - 10 (203 UNIT)	22,028.48		
II. M&E DAN SERVIS	1,816.00		
JUMLAH A.		23,844.48	28
B. KEDAI (FASA 1 - BLOK PEJABAT)			
I. KEDAI TERLETAK DI ARAS 1 DAN ARAS 2 (28 UNIT)	4,298.34		
II. M&E DAN SERVIS	319.86		
JUMLAH B.		4,618.20	6
C. 2 BLOK SOHO (FASA 2 DAN FASA 3)			
I. MENARA A - 28 TINGKAT (ARAS 8 - 35) - SOHO (456 UNIT)	23,394.96		
II. MENARA B - 28 TINGKAT (ARAS 8 - 35) - SOHO (456 UNIT)	23,394.96		
III. M&E DAN SERVIS	6,359.72		
JUMLAH C.		53,149.64	64
D. KEMUDAHAN KEMUDAHAN-KEMUDAHAN REKREASI / KOMUNITI	1,010.04		
JUMLAH D.		1,010.04	1
JUMLAH KESELURUHAN (JUMLAH A+B+C+D) (TIDAK TERMASUK RUANG PARKIR)		82,622.36	100
E. PODIUM PARKIR 7 TINGKAT PODIUM TEMPAT LETAK KENDERAAN		76,983.97	
JUMLAH KESELURUHAN (JUMLAH A+B+C+D+E) (TERMASUK RUANG PARKIR)		159,606.33	

2. PENGIRAAN PERATUSAN KAWASAN "PLINTH"

KELUASAN TAPAK PEMBANGUNAN = 27,708.80 MP
KELUASAN LITUPAN BANGUNAN = 18,168.00 MP
KAWASAN "PLINTH" = Keluasan Litupan Bangunan / Keluasan TAPAK Pembangunan x 100 %
= 18,168.00 MP / 27,708.80 MP x 100
= 64.73 %

3. PENGIRAAN NISBAH PLOT PEMBANGUNAN

JUMLAH RUANG LANTAI = 82,622.36 MP
KELUASAN TAPAK PEMBANGUNAN = 27,708.80 MP
NISBAH PLOT PEMBANGUNAN = Keluasan Bangunan / Keluasan TAPAK Pembangunan
= 82,622.36 MP / 27,708.80 MP
= 1:3

4. PENGIRAAN PERATUSAN PEJABAT ENTERPRISE

JENIS PEMBANGUNAN	RUANG LANTAI BERSIH (MP)	%
PEJABAT	22,028.48 MP	30.12
KEDAI (ARAS SATU DAN DUA)	4,298.34 MP	5.88
MENARA A & B	46,789.92 MP	63.99
JUMLAH	73,116.74 MP	100.00

5. PENGIRAAN TEMPAT LETAK KERETA DAN MOTORSIKAL

A) PENGIRAAN TEMPAT LETAK KERETA (TLK)

KEGUNAAN BANGUNAN	RUANG LANTAI (MP) @ UNIT	PIAWAIAN GARIS PANDUAN SELANGOR / RT MPSEPANG (PS)	TLK YANG DIPERLUKAN	TLK DISEDIAKAN
PEJABAT (ENTERPRISE)	23,844.48 MP	Ruang Lantai Kasar (GFA) / 37.16 MP (400 KP)	23,844.48 MP / 37.16 MP = 642	642
KEDAI	4,618.20 MP	Ruang Lantai Kasar (GFA) / 37.16 MP (400 KP)	4,618.20 MP / 37.16 MP = 124	124
2 BLOK SOHO (MENARA A & B)	480 UNIT (400 KP) / 432 UNIT (>400 KP)	1 TLK/UNIT + 20% PELAWAT / 2 TLK/UNIT + 20% PELAWAT	480 + 96 = 576 / 864 + 173 = 1,037	1,613
JUMLAH TLK			2,379 petak	2,379 petak

B) PENGIRAAN TLK ORANG KURANG UPAYA (OKU)

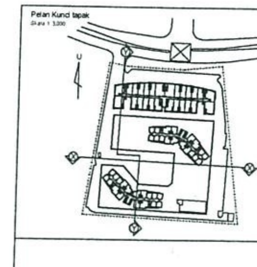
KEGUNAAN BANGUNAN	JUMLAH KESELURUHAN TLK DISEDIAKAN	TLK OKU YANG DIPERLUKAN	TLK OKU DISEDIAKAN
PEJABAT / KEDAI (ENTERPRISE)	2% x TLK yang diperlukan	2% x 2,379 = 48	48
SOHO (MENARA A & B)			
JUMLAH TLK OKU		48 petak	48 petak

C) PENGIRAAN TEMPAT LETAK MOTORSIKAL

KEGUNAAN BANGUNAN	PIAWAIAN GARIS PANDUAN SELANGOR	TLM YANG DIPERLUKAN	TLM DISEDIAKAN
PEJABAT (ENTERPRISE)	Ruang Lantai Kasar (GFA) / 84 MP (900 KP)	23,844.48 MP / 84 MP = 284	330
KEDAI	Ruang Lantai Kasar (GFA) / 84 MP (900 KP)	4,618.20 MP / 84 MP = 55	
SOHO (MENARA A & B)	20% x Jumlah TLK yang diperlukan	20% x 1,613 = 323	323
JUMLAH TLM YANG DISEDIAKAN		[illegible] petak	[illegible] petak

LEGEND	
BG	BREAK GLASS
FA	FIRE ALARM
DP	9 kg ABC DRY POWDER
CO_2	2.2 kg CO_2
	SMOKE DETECTOR
	EMERGENCY LIGHT
	'KELUAR' SIGN
	WET RISER/ HOSE REEL
	1 & 2 HOUR FIRE RATED DOOR
	FIREMAN INTERCOM
FM200	FM200 GAS DISCHARGE BY NOZZLE
CO_2	CO_2 GAS DISCHARGE BY NOZZLE
	HYDRANT

Pelan Kunci tapak



Tajuk Projek:

CADANGAN MEMBINA DAN MENYIAPKAN PEMBANGUNAN YANG TERDIRI DARI KOMPONEN BERIKUT:

FASA 1
A. 1 BLOK PEJABAT (ARAS 1 - ARAS 10) YANG MENGANDUNGI:-
i. KEDAI (ARAS 1 & ARAS 2)
ii. PEJABAT (ARAS 3 - ARAS 10)
iii. TEMPAT LETAK KENDERAAN (ARAS BAWAH TANAH)

FASA 2
A. PODIUM TEMPAT LETAK KENDERAAN (ARAS 1 - ARAS 7):-
i. TEMPAT LETAK KERETA (ARAS 1 - ARAS 6)
ii. LOBI MENARA A & B (ARAS 1)
iii. DEWAN SUKAN & GELANGGANG BADMINTON (SEBAHAGIAN ARAS 4 - ARAS 6)
iv. KEMUDAHAN KOMUNITI / REKREASI / KELAB DAN PEJABAT PENGURUSAN (ARAS 7)
v. 2 UNIT PENCAWANG ELEKTRIK DAN KEMUDAHAN UTILITI
B. 1 BLOK MENARA A DI ATAS PODIUM YANG MENGANDUNGI:-
i. 456 UNIT SOHO (450 KP - 815 KP) ARAS 8 - ARAS 35
ii. ROOF TOP GARDEN (SEBAHAGIAN ARAS 33)

FASA 3
A. 1 BLOK MENARA B DI ATAS PODIUM YANG MENGANDUNGI:-
i. 456 UNIT SOHO (450 KP - 815 KP) ARAS 8 - ARAS 35
ii. ROOF TOP GARDEN (SEBAHAGIAN ARAS 33)

DI ATAS LOT PT. 48517, PERSIARAN BESTARI, CYBER 9, 63000 CYBERJAYA, MUKIM DENGKIL, DAERAH SEPANG, SELANGOR DARUL EHSAN

UNTUK TETUAN: KENWINGSTON SEVEN UP SDN BHD

Kontraktor hendaklah mengikut dimensi yang ada di dalam rajah. Segala dimensi hendaklah diperiksa di tempat itu juga. Sebarang keraguan yang terdapat hendaklah diberitahu kepada Arkitek sebelum kerja pembinaan dijalankan.

Pemaju & Pemilik Tanah:

DATO' LAM KONG TANG (No. KP : 760719-02-5391)
PENGARAH
KENWINGSTON SEVEN UP SDN BHD
(1073736-H)
Wisma Kenwingston, No. 82, Jalan Wangsa Delima 6,
Pusat Bandar Wangsa Maju (KLSC),
Seksyen 5, Wangsa Maju, 53300 Kuala Lumpur
Tel:

Arkitek:
Saya mengesahkan bahawa butir-butir di dalam lukisan ini mengikut peraturan-peraturan Undang-Undang Kecil Bangunan Seragam 1984 dan saya bertanggungjawab sepenuhnya ke atas keselamatan bangunannya

Ar. KHASNOR BT ABDUL KARIM
ARKITEK PROFESIONAL
No Pendaftaran LAM A/K 72

KHASNOR ARCHITECT

Perunding C&S
Saya mengesahkan bahawa cadangan ini tidak menjejaskan kestabilan dan kekukuhan struktur bangunan yang sedia ada

LTE ENGINEERS SDN. BHD. (Co. No. 362581H)
3-3 Jalan SS 26/4, Mayang Plaza, Taman Mayang Jaya,
47301 Petaling Jaya, Selangor.
Tel:
e-mail: kmoong@lte.com.my

Perunding M&E
D&O KONSULTAN SDN. BHD. (Co. No. 671681-D)
37B Jalan Bukit Desa 5, Taman Bukit Desa,
Off Jalan Klang Lama,
58100 Kuala Lumpur.
Tel:
e-mail: dokSB08@gmail.com

Arkitek Landskap
SHAPAKAT CONSULTANTS
25-1, Jalan Opera D, U2/D,
Taman TTDI Jaya,
40150 Shah Alam, Selangor Darul Ehsan.
Tel:

Tajuk Lukisan:

PELAN KUNCI
PELAN LOKASI
PELAN TAPAK

Ukuran	1 : 400	Dilukis	Yusnizan	Dicetak Untuk:
Tarikh	JULAI 2016	Disemak	Ar. Khasnor	
Pindaan		No. Pindaan	10E	
No. Kerja	KA/15-336/KSG/BGN		Bilangan	1

CONSTRUCTION

KENWINGSTON SDN. BHD.

TECHNICAL SUBMISSION

CADANGAN MEMBINA DAN MENYIAPKAN PEMBANGUNAN YANG TERDIRI DARI KOMPONEN BERIKUT:

FASA 1

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- i. TEMPAT LETAK KERETA (ARAS BAWAH 1 - ARAS 6)
- ii. LOBI MENARA A& B (ARAS 1)
- iii. DEWAN SUKAN & GELANGGANG BADMINTON (SEBAHAGIAN ARAS 4 - ARAS 6) KEMUDAHAN KOMUNITI / REKREASI / KELAB DAN PEJABAT PENGURUSAN (ARAS 7) 2 UNIT PENCAWANG ELETRIK DAN KEMUDAHAN UTILITI

B 1 BLOK MENARA A DI ATAS PODIUM YANG MENGANDUNGI :
- i. 456 UNIT SOHO ARAS 8 - ARAS 35
- ii. ROOF TOP GARDEN (SEBAHAGIAN ARAS 33)

FASA 3

A. 1 BLOK MENARA B DI ATAS PODIUM YANG MENGANDUNGI :-
- i. 456 UNIT SOHO ARAS 8 - ARAS 35
- ii. ROOF TOP GARDEN (SEBAHAGIAN ARAS 33)

DI ATAS LOT PT 48517, PERSIARAN BESTARI CYBER 9, 63000 CYBERJAYA, MUKIM DENGKIL, DAERAH SEPANG, SELANGOR DARUL EHSAN UNTUK TETUAN KENWINGSTON SEVEN UP SDN BHD

SCOPE OF WORKS

- [ ] Architectural
- [x] Civil & Structural
- [ ] Mechanical & Electrical
- [ ] Landscaping
- [ ] Others:

PURPOSE OF SUBMISSION

- [ ] Material Sample for Approval
- [ ] Shop Drawing for Approval
- [ ] Work Merthod Statement for Approval
- [ ] Manufacturer's Literature for Approval
- [x] For Information / Record

REFERENCE

SB/LTEE/J156/TS-C&S/ TEST 021

ITEM DESCRIPTION

oncrete Cube Test (Trial Mix)
40 (S)

days

pplied by:
ringcube Asia Sdn Bhd

SPECIFICATION

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lume	

GRADE

ec.	
de	

LIST OF ENCLOSURE

1 Attached herewith Concrete Cube Test for
1. G40 S (7 days)

Submitted By:

nwingston Sdn. Bhd.

nature

ne : N. NABILA LATEF
JR SITE ENGINEER
KENWINGSTON SDN. BH.

e : 29/12/17.

Received By:

Consultant

Signature :

Name :

Date :

SPRINGCUBE ASIA SDN BHD
P14 JALAN PESONA
PESONA HIGH, BUKIT TINGGI
28750 BENTONG, PAHANG
TEL :

CONCRETE TEST REPORT

TO :

KENCHINGTON S/B
CYBERJAYA

No 12318

DATE : 28/12/2017

PLANT : .....

PROJECT : K.S.G. CYBERJAYA

JOB SITE : .....

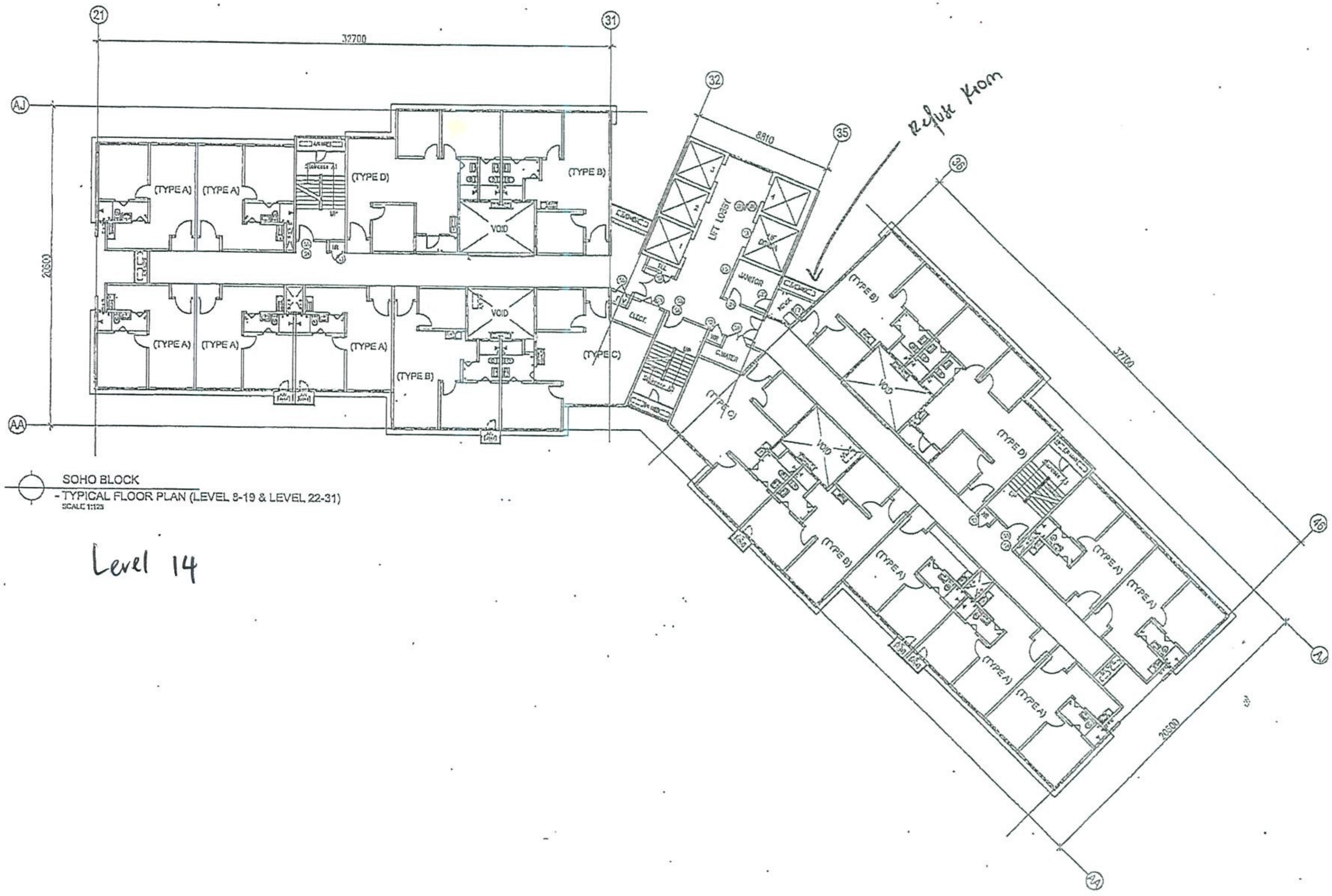
CHARACTERISTICE STRENGTH AT 28 DAYS 40 (S) MP a
SPECIFIED SLUMP 150 ± 30 mm
CEMENT BRAND HUME
COARSE AGGREGATE TYPE 20 MM GRADED
FINE AGGREFATE TYPE WASH MINING SAND
ADMIXTURE BRAND SIKA
LOCATION OF CONCRETE TRIAL MIX
DO/NO:- 1021420

CUBE MARK	DATE CAST	DATE TEST	AGE (days)	SLUMP (mm)	DENSITY (Kg/M³)	COMPRESSIVE STRENGTH (MPA)
04	21/12/17	28/12/17	7	180	8.1	860 - 38.2
05	21/12/17	28/12/17	7	180	8.1	840 - 37.3
06	21/12/17	28/12/17	7	180	8	810 - 36.0

AVERAGE MPA 37.1

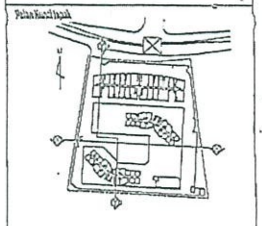
For Springcube Asia Sdn Bhd

Quality Controller



SOHO BLOCK
- TYPICAL FLOOR PLAN (LEVEL 8-19 & LEVEL 22-31)
SCALE 1:125

Level 14



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 iv. KEMUDAHAN KOMUNITI / REKREASI / KELAB DAN PEJABAT PENGURUSAN (ARAS 7)
 v. 2 UNIT PENCAWANG ELEKTRIK DAN KEMUDAHAN UTILITI
B. 1 BLOK MENARA A DI ATAS PODIUM YANG MENGANDUNGI:-
 i. 456 UNIT SOHO (450 KP - 815 KP) ARAS 8 - ARAS 35
 ii. ROOF TOP GARDEN (SEBAHAGIAN ARAS 33)

FASA 3
A. 1 BLOK MENARA B DI ATAS PODIUM YANG MENGANDUNGI:-
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 ii. ROOF TOP GARDEN (SEBAHAGIAN ARAS 33)

DI ATAS LOT PT. 48517, PERSIARAN BESTARI, CYBER 9, 63000 CYBERJAYA, MUKIM DENGKIL, DAERAH SEPANG, SELANGOR DARUL EHSAN

UNTUK TETUAN: KENWINGSTON SEVEN UP SDN BHD

Pemaju & Pemilik Tanah:

DATO' LAM KONG TANG (No. KP: 700715-02-5301)
PENGARAH

KENWINGSTON SEVEN UP SDN BHD

KHASNOR

Tajuk Lukisan:

SIGNAGES

SOHO BLOCK

- TYPICAL FLOOR PLAN
(LEVEL 8-19 & LEVEL 22-31)

Lukisan	Dilukis	Disahkan	Reka	Disahkan Lukisan
Tarikh	12 JAN 2018	Disemak	Ar. Khasnor	
Pindaan		No. Pindaan	10E	
No. Kerja	KA/15-336/KSG/SS			Bilangan 01