

**PERFORMANCE COMPARISON AND LIFE CYCLE ANALYSIS FOR
CONSTANTS SPEED CHILLER AND VARIABLE SPEED CHILLER**

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**A project report submitted in partial fulfilment of the
requirements for the award of Master of Engineering
(Mechanical)**

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April 2017

DECLARATION

I hereby declare that this project report is based on my original work except for citations and quotations which have been duly acknowledged. I also declare that it has not been previously and concurrently submitted for any other degree or award at UTAR or other institutions.

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PERFORMANCE COMPARISON AND LIFE CYCLE ANALYSIS FOR CONSTANTS SPEED CHILLER AND VARIABLE SPEED CHILLER

ABSTRACT

Air-conditioning system is required in a building to maintain thermal comfort, especially for tropical countries like Malaysia. However, the energy crisis has increased public awareness towards energy availability and its operation cost. In this research, heat load calculation which is important for optimization air-conditioning system and capacity was introduced. The optimizing capacity should be sufficient to cool down the entire building, while not over sizing and increasing the capital equipment cost of the system. In the study, the comparison between the existing constant speed water cooled chiller installed at UTAR Sungai Long Campus and the proposed variable speed water cooled chiller in terms of electricity consumption, equipment cost and return of investment was conducted. The capacity control methods for the both chillers were inlet guide vane and variable speed drive (VSD). The motor for the constant speed chiller was operated at the constant motor rotational speed and inlet guide vane reduced refrigerant to flow into the compressor by reducing the opening to decrease the cooling load. However, the VSD chiller had an additional inverter installed on the chiller to change the motor rotational speed. According to the Affinity Law, the power input is reduced exponentially as the rotation speed reduces. An estimated reduction of 80% of rotational speed was able to reduce half of the electricity consumption. A heat load calculation software from Carrier, E-20, was applied in this study to measure the heat load profile. Building survey for UTAR was performed to identify the building orientation, usage, construction and etc. to obtain the accurate heat load profile. Technical data from the both chillers were used to calculate the electricity consumption as per the heat load profile from E-20, and followed by the comparison between both chillers on the operation cost. The estimated electricity saving for VSD chiller was 7% which was an operation cost saving of RM 133,803.89 per annual. However, the high capital

cost of RM 4,000,000.00 for VSD chiller led to a payback period of 30 years which was not feasible in view of economic scale, although there was energy saving.

TABLE OF CONTENTS

DECLARATION	II
APPROVAL FOR SUBMISSION	III
ABSTRACT	V
TABLE OF CONTENTS	VII
LIST OF TABLES	IX
LIST OF FIGURES	XI
LIST OF SYMBOLS / ABBREVIATIONS	XIII

CHAPTER

1	INTRODUCTION	1
	1.1 Background	1
	1.2 Problem Statement	2
	1.3 Aim and Objectives	4
	1.4 Structure of Thesis	4
2	LITERATURE REVIEW	6
	2.1 Introduction	6
	2.2 Refrigerant Cycle	7
	2.3 Chilled Water Plant	8
	2.3.1 Multiple Chiller Sequencer Control	9
	2.3.2 Variable Speed Drive Chiller	10
	2.3.3 Thermal Storage System	12
	2.4 Variable Flow Refrigerant	15
	2.5 Heat Load Calculation	17

3	METHODOLOGY	18
3.1	Introduction	18
3.2	Heat Load Calculation	18
3.2.1	Building Orientation& Space Usage	19
3.2.2	Construction Material	21
3.3	HVAC System Design	24
3.4	Payback Period Calculation	27
4	RESULTS AND DISCUSSION	28
4.1	Capacity Control for Chiller	28
4.1.1	Inlet Guide Vane(IGV)	28
4.1.2	Variable Speed Drive	29
4.2	Heat Load Estimation	30
4.3	Heat Load Profiles	44
4.4	Electricity Consumption and Operation Cost	45
5	CONCLUSIONS AND RECOMMENDATIONS	56
5.1	Conclusions	56
	REFERENCES	58

LIST OF TABLES

TABLE	TITLE	PAGE
Table 1.1	Regional electricity generation in Malaysia, 2012 (TNB)	3
Table 1.2	Regional and sector electricity consumption in Malaysia, 2012 (TNB)	3
Table 2.1	Economic analysis for chill water storage system	13
Table 3.1	Solar heat gain data from E-20	20
Table 3.2	Thermal conductivity for different construction materials	22
Table 3.3	<i>U</i> -value calculation	23
Table 3.4	Summary of <i>U</i> -values for KB Block	24
Table 3.5	Existing chiller part load performance	25
Table 3.6	Proposed chiller part load performance from 59% to 100%	25
Table 3.7	Proposed chiller part load performance from 31% to 58%	26
Table 4.1	Maximum heat load estimation for each floor of UTAR KB Block	39
Table 4.2	Electricity cost comparison between existing chiller and proposed chiller	47
Table 4.3	Electricity consumption for existing chiller on 20 th March	48
Table 4.4	Electricity consumption for proposed chiller on 20 th March	49
Table 4.5	Electricity consumption for existing chiller on 20 th June	50

Table 4.6	Electricity consumption for proposed chiller on 20 th June	51
Table 4.7	Electricity consumption for existing chiller on 22 nd September	52
Table 4.8	Electricity consumption for proposed chiller on 22 nd September	53
Table 4.9	Electricity consumption for existing chiller on 21 st December	54
Table 4.10	Electricity consumption for existing proposed on 21 st December	55

LIST OF FIGURES

FIGURE	TITLE	PAGE
Figure 1.1	Total energy consumption by all equipments and breakdown for the UKM Chandelling building	2
Figure 2.1	Basic refrigeration cycle	7
Figure 2.2	Schematic diagram of chilled water plant	9
Figure 2.3	Hong Kong International Airport cooling capacity	10
Figure 2.4	Schematic diagram of constant flow system	11
Figure 2.5	Schematic diagram of primary-secondary variable flow system	11
Figure 2.6	Schematic diagram of thermal storage system	12
Figure 2.7	Comparison on electricity consumption between the chiller with and without cold water storage	13
Figure 2.8	Hourly cooling production for Centre for Speech and Audio Therapy building	14
Figure 2.9	Schematic diagram of VRF system	15
Figure 2.10	Comparison between chilled water plant and VRF system	16
Figure 2.11	Plant room comparison between chilled water plant and VRF system	16
Figure 3.1	Solstice & Equinox	19
Figure 3.2	Building Orientation of KB Block at UTAR Sungai Long Campus	20
Figure 3.3	<i>U</i> -value for glass window	23
Figure 3.4	<i>U</i> -value for glass window from Sanshiba Japan	24

Figure 4.1	Constant speed chiller inlet guide vane (Daikin)	29
Figure 4.2	The relationships between the rotational pump speed with pressure, flow rate and power according to the Affinity Law	30
Figure 4.3	Daily heat load for January and February	32
Figure 4.4	Daily heat load for March and April	33
Figure 4.5	Daily heat load for May and June	34
Figure 4.6	Daily heat load for July and August	35
Figure 4.7	Daily heat load for September and October	36
Figure 4.8	Daily heat load for November and December	37
Figure 4.9	Hourly heat load on 11 st May	40
Figure 4.10	Hourly heat load on 11 th May from Ground to Third Floor	41
Figure 4.11	Hourly heat load on 11 th May from Fourth to Seventh Floor	42
Figure 4.12	Hourly heat load on 11 th May from Eighth to Tenth Floor	43
Figure 4.13	Heat load on 20 th March	44
Figure 4.14	Heat load profile on 20 th June	44
Figure 4.15	Heat load profile on 22 nd September	45
Figure 4.16	Heat load profile on 21 st December	45

LIST OF SYMBOLS / ABBREVIATIONS

<i>P</i>	pressure
<i>V</i>	volume
<i>n</i>	quantity of gas, moles
<i>R</i>	universal gas constant
<i>T</i>	temperature
<i>Q</i>	thermal energy / heat
<i>U</i>	coefficient of thermal transmittance, W/m ² K
<i>A</i>	area
ΔT	temperature differences
<i>R</i>	thermal resistance, m ² K/W
<i>BHP</i>	brake horse power
<i>N</i>	rotational speed
HVAC	heating, ventilation and air-conditioning
COP	coefficient of performance
VRF	variable refrigerant flow
AHU	air handling unit
VSD	variable speed drive
IGV	inlet guide vane

CHAPTER 1

INTRODUCTION

1.1 Background

Energy demand in the urban cities climbs steadily in the developing countries. The main factors attributing to the increasing demand in energy are population growth, global warming, need for better comfort and longer duration of stay within a building. The faster growth rate of the energy demand than that of the energy production will lead to the energy crisis. Thus, energy conservation is a topic extensively discussed around the world.

To maximise the profit, building owners seek for more economical and efficient heating, ventilation and air-conditioning (HVAC) system for a building, especially in the rise of electricity tariff. Additionally, certain building owners are in the desire to improve the HVAC system in the building to reduce global warming and energy depletion as a contribution to corporate social responsibility.

Inefficient HVAC system design will consume more unnecessary energy consumption, leading to higher emissions of greenhouse gas, especially from power plants in Malaysia which are highly dependent on the combustion of coal and natural gas. Therefore, it is vital to improve the efficiency of HVAC system to reduce its negative impact on the environment.

1.2 Problem Statement

Table 1.1 shows that the electricity consumption in Peninsular Malaysia is 102,174 GWh. The available capacity is 21,044 MW, while the peak demand load is 15,826 MW. In developing countries such as Malaysia, the energy demand is increasing in conjunction with the economic growth. However, the increment of energy production may not adapt with the trend of exponential growing of energy demand due to lack of supply, resulting in an unfavourable impact on Malaysia economy.

Table 1.2 shows that commercial and residential buildings consumed a sum of 54% of the total energy in Malaysia. A study from University Kebangsaan Malaysia (UKM) also found that energy consumption for the UKM Chandelling building consumed 58% of the total electricity consumption in the building (Figure 1.1). It should be highlighted that the overall HVAC energy consumption in Malaysia is 2.0123×10^{10} kWh for commercial buildings and 1.249×10^{10} kWh for residential buildings. Based on Tenaga Nasional Berhad (TNB) electricity tariff of RM0.218 per kWh for residential building and RM0.234 per kWh for commercial building, the total HVAC system consumption cost is estimated to be RM 7,309,474,000.00. The operational cost spending on the HVAC is extremely huge and it is crucial for the building owners to increase the energy efficiency for HVAC for cost saving. In addition, improving the energy consumption will prevent future shortage of electricity supply during peak demand.

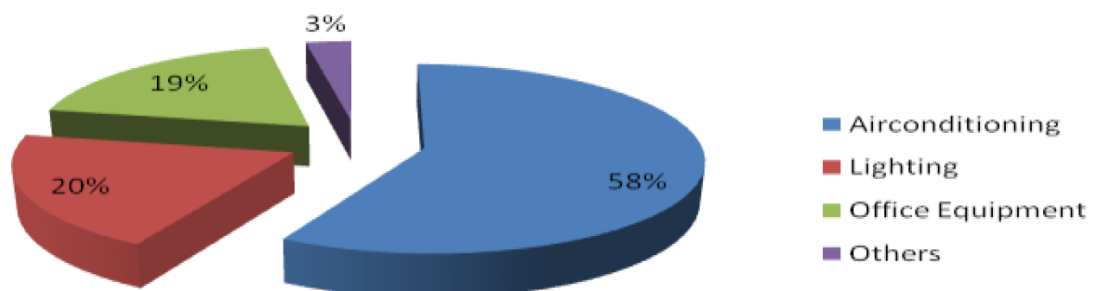


Figure 1.1 Total energy consumption by all equipments and breakdown for the UKM Chandelling building

Table 1.1 Regional electricity generation in Malaysia, 2012 (TNB)

REGION	ELECTRICITY GROSS GENERATION		ELECTRICITY CONSUMPTION		AVAILABLE CAPACITY	PEAK DEMAND	
	GWh	%	GWh	%	MW	MW	%
PENINSULAR MALAYSIA	117,797	87.7	102,174	87.7	21,044	15,826	33.0
SARAWAK	10,824	8.0	9,237	7.9	2,265	1,161	95.1
SABAH*	5,754	4.3	4,943	4.3	1,091	828	31.8
TOTAL	134,375	100.0	116,354	100.0	24,400		

Table 1.2 Regional and sector electricity consumption in Malaysia, 2012 (TNB)

REGION	INDUSTRY GWh	COMMERCIAL GWh	RESIDENTIAL GWh	TRANSPORTATION GWh	AGRICULTURE GWh	TOTAL GWh
PENINSULAR MALAYSIA	45,357	34,696	21,536	241	344	102,174
SHARE (%)	44%	34%	21%	0%	0%	100%
SARAWAK	5,554	2,026	1,657	-	-	9,237
SHARE (%)	60%	22%	18%	0%	0%	100%
SABAH	1,504	1,923	1,516	-	-	4,943
SHARE (%)	30%	39%	31%	0%	0%	100%
TOTAL	52,414	38,645	24,709	241	344	116,353
SHARE (%)	45%	33%	21%	0%	0%	100%

1.3 Aim and Objectives

The aim of this study was to analyse and compare between constant speed chiller and variable speed drive chiller in a building in terms of energy consumption, capital, installation and operating cost. The air conditioning system was assumed to maintain the indoor temperature at $24^{\circ}\text{C} \pm 1^{\circ}\text{C}$.

The followings were the objectives of this study:

1. To calculate heat load using a commercial computer software;
2. To compare electricity consumption between constant speed chiller system and variable speed drive chiller system; and
3. To compare capital, installation and operating cost analysis for both systems.

1.4 Structure of Thesis

The overview of the chapter is as follows:

Chapter 1 covered the introduction of the project, problem statement, aim and objectives and structure of thesis.

Chapter 2 was the literature review on the HVAC and the basic of refrigerant cycle. It also included the advantages and disadvantages on the industry applications of various water cooled chillers and variable refrigerant flow (VRF) system.

Chapter 3 introduced the heat load calculation software E-20 and the important of the heat load for HVAC designer. It also discussed the parameters required by E-20 that affect the accuracy of the results. Further, this chapter discussed the head load on particular date to be utilised for electricity consumption and operation cost analysis.

Chapter 4 verified the heat load result with the existing chilled water plant at the KB Block of Universiti Tunku Abdul Rahman, Sungai Long Campus (UTAR). It

followed by a calculation of the operation cost for the existing constant speed chiller and the new proposed variable speed drive (VSD) chiller. From the operation cost of both systems, the annual cost saving was determined and the payback period was calculated if the proposed VSD chilled is to be installed at UTAR.

Last but not least, the final chapter concluded the findings of this study and recommendations on improvement for further study.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

HVAC, in general, is the control of temperature, humidity, heat radiation, air movement and air cleanliness, or with mechanical means, to achieve the human thermal comfort. HVAC systems can be categorised according to the means by which the controllable cooling is accomplished in the conditioned space. They are further segregated to achieve specific purposes with special equipment arrangement.

Currently, the influences of thermal climate of buildings and systems on occupants are undergoing a critical examination and international standards for thermal parameters have been established. In selecting a suitable HVAC system for a particular application, the following factors of system constraints, architectural constraints and financial constraints should be taken into consideration.

- System constraints: Cooling load, ventilation and zoning requirements
- Architectural constraints: Size and appearance of terminal devices and available space of house equipment
- Financial constraints: Capital cost, operating cost and installation cost

It is important to understand the project requirement such as type of applications, site conditions and etc. to decide which air conditioning system to be implemented in the particular project. Furthermore, it is essential to evaluate the

difference in systems criteria and develop the most feasible solution according to the project requirement. The aspects to influence the system designer's decision to select air conditioning system include life cycle cost analysis, space availability and etc. In this chapter, the air-conditioning on the basic refrigerant cycle, chilled water plant and VRF system will be discussed briefly

2.2 Refrigerant Cycle

Figure 2.1 shows the operation of the basic refrigeration cycle in a HVAC system to cool down the building. The First Law of Thermodynamic defines that the heat is kind of energy and cannot be eliminated. It can only be removed or transferred. As per Second Law of Thermodynamic, the heat is transferred from high temperature to low temperature. Therefore, the heat in the indoor is absorbed at the evaporator to lower temperature refrigerant and the heat is rejected to outdoor at the condenser from the higher temperature refrigerant.

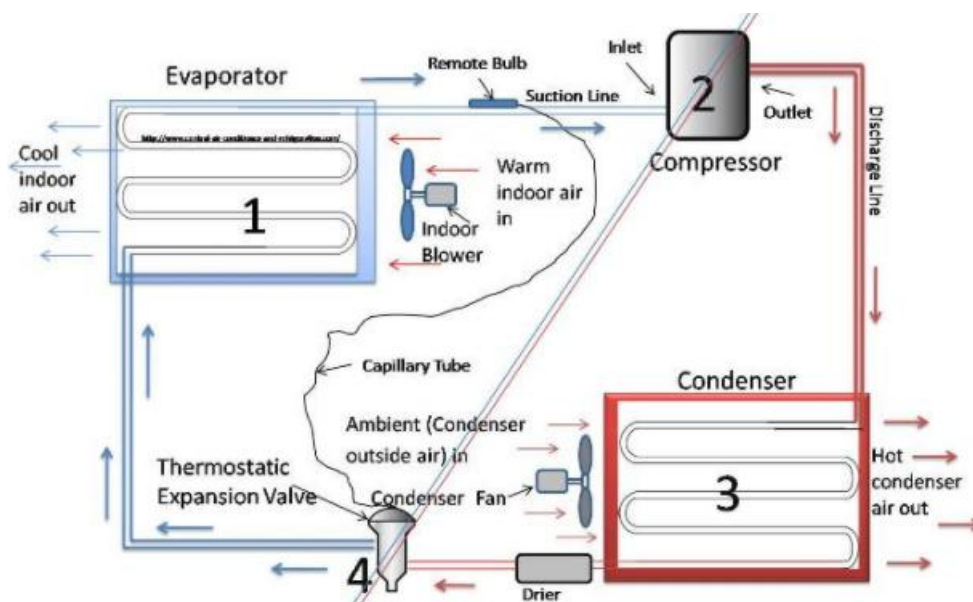


Figure 2.1 Basic refrigeration cycle

From the Ideal Gas Equation (Eq. 2.1):

$$PV = nRT \quad (2.1)$$

where :
 P : pressure
 V : volume
 n : quantity of gas (moles)
 R : universal gas constant
 T : temperature

Refrigerant flowing in the piping is fixed volume and quantity in closed system piping. Therefore, Eq. 2.1 is expressed to

$$\frac{P_1V_1}{T_1} = \frac{P_2V_2}{T_2} \quad (2.2)$$

As refrigerant is constant in closed piping, Eq.2.2 is expressed to

$$P \propto T \quad (2.3)$$

Eq. 2.3 shows that the temperature increases when pressure increases, and vice versa. Refrigerant flows through the expansion valve, the pressure of the refrigerant reduces, and the temperature also decreases as shown in Eq. 2.3. Blower in the evaporator blows the warm air and heat is absorbed by refrigerant and cool air flows into the indoor to cool the room. Refrigerant is compressed in the compressor and temperature rises higher than outdoor temperature. Heat rejection is carried out by a fan blower at the condenser.

2.3 Chilled Water Plant

The chilled water system consists of 4 major components, which are chiller, cooling tower, air handling unit (AHU), condenser water pump and chilled water pump, in the whole system as illustrated in Figure 2.2. Refrigerant in the chiller is compressed and heat is rejected to the water in condenser. Subsequently, water is cooled in cooling tower by ambient temperature. Refrigerant is expanded through the

expansion valve and chills the water in evaporator to produce chilled water to supply to AHU. Fan in the AHU supplies the cold air to cool down the designated space for human comfort.

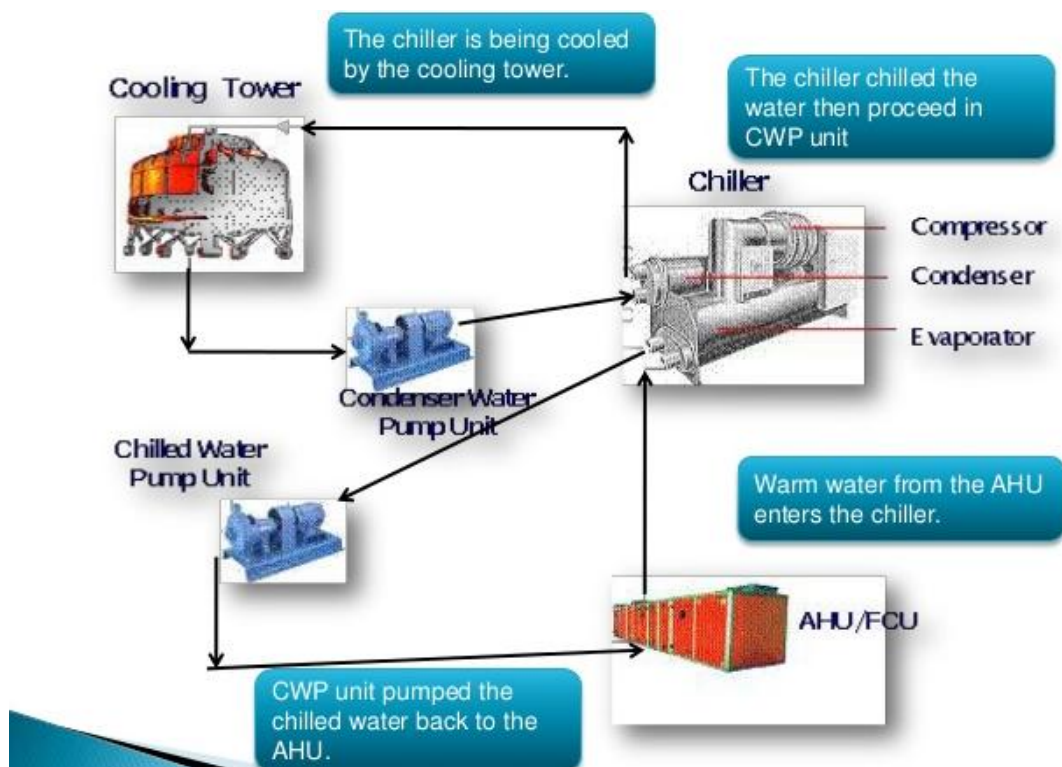


Figure 2.2 Schematic diagram of chilled water plant

2.3.1 Multiple Chiller Sequencer Control

The limitation of the constant speed chiller is running at the peak operations although indoor space requires partial load only. Therefore, multiple chillers with equal or different capacities of chillers have the flexibility to match variable part load. Switching on or off sequentially according to actual load demand will meet the load.

Hong Kong International Airport (Yong Jun Sun et al., 2013) had relocated and integrated the chiller for Terminal 1 and Transportation Centre to save energy consumption on chilled water plant. Initially, there were 6 numbers of 3500 RT chillers to serve Terminal 1 and 3 numbers of 600 RT to serve Ground Transportation Centre for peak load as shown in Figure 2.3. After the additional of 1000 RT chiller and integration of the chillers, it was sufficient to meet the part load

and this optimisation of the chilled water plant has reduced energy consumption of 4.7M kWh annually.

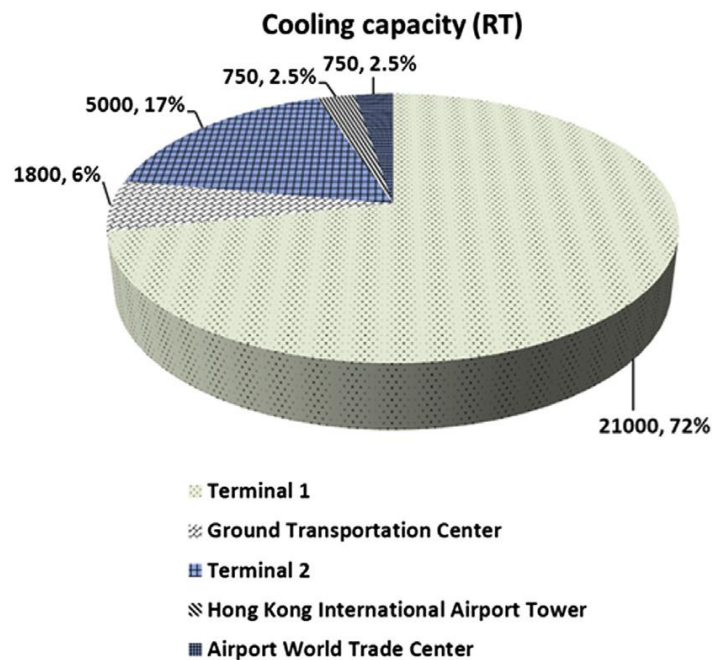


Figure 2.3 Hong Kong International Airport cooling capacity

2.3.2 Variable Speed Drive Chiller

Constant speed chiller schematic diagram in Figure 2.4 shows an arrangement of a constant flow system. Multiple of chiller and constant speed pump are arranged to achieve part load to save energy. The disadvantage of constant flow is that the chill water flows at a single flow rate only.

Few studies (Syed A. Tirmizi et al., 2013) showed that constant flow system can be improved with an additional distribution pumping loop as depicted in Figure 2.5. A bypass is required from the primary loop to secondary loop to ensure chill water returns in a constant flow rate. Chiller manufacturers recommend a constant chilled water flow rate to evaporator to prolong the life span of the chiller. The bypass causes a low temperature syndrome in the chilled water plant and reduces the COP.

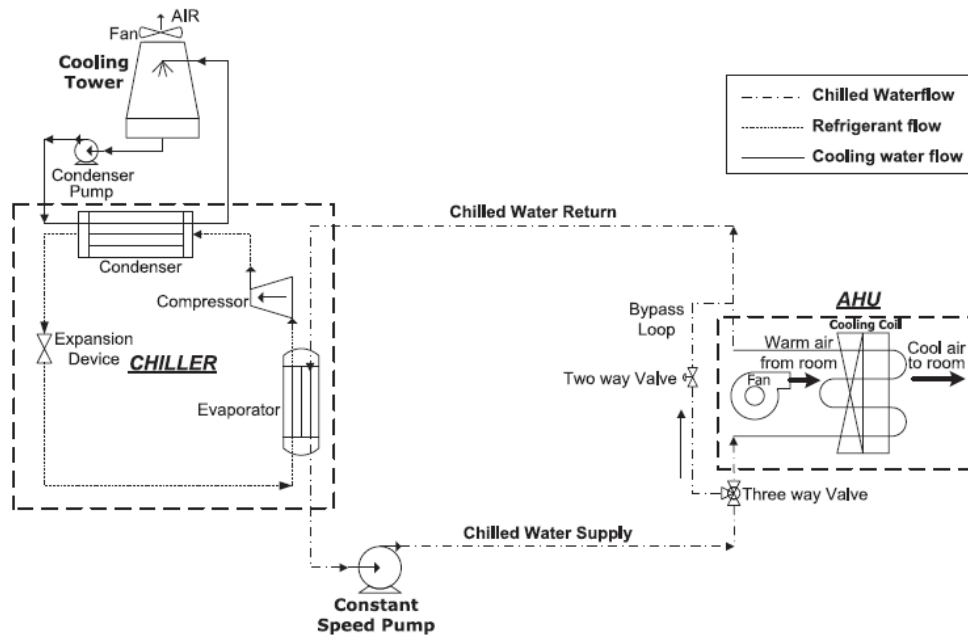


Figure 2.4 Schematic diagram of constant flow system

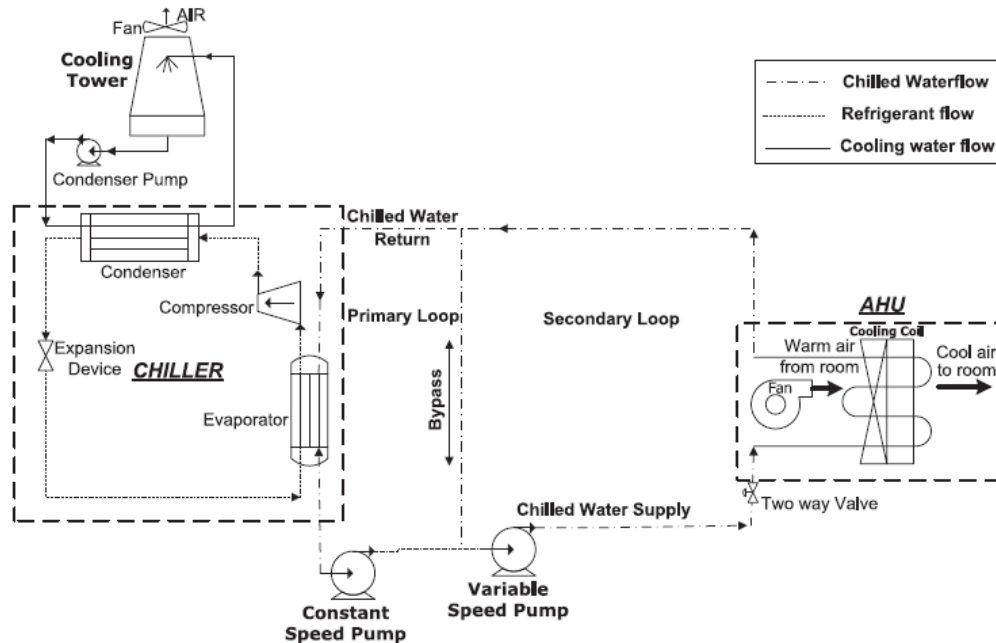


Figure 2.5 Schematic diagram of primary-secondary variable flow system

Chilled water pump energy consumption is minimal compared to chiller. This is not a feasible solution as there is least saving and it also raises another issue to the system. Therefore, Yu and Chan (2007) studied all variable speed drive chilled water plants. With the comments and cost reduction of variable speed drive, major chiller manufacturers have launched their variable speed chillers. Variable speed drive

allows chiller to run at minimum cooling load to save energy. Unlike constant speed chiller, system designer uses multiple of chiller to have flexibility cooling load. It reduces the number of chiller, leading to space and cost savings. In addition, the cost analysis also proved that variable speed drive is more cost effective than constant speed. Although there is a 10% increase in capital cost, the payback period is only 2.4 years.

2.3.3 Thermal Storage System

Thermal storage system (Figure 2.6) added to chilled water plant can increase the efficiency of the chilled water plant. The chiller is operated at night and stores energy in a chilled water tank and discharges during the peak period during day time.

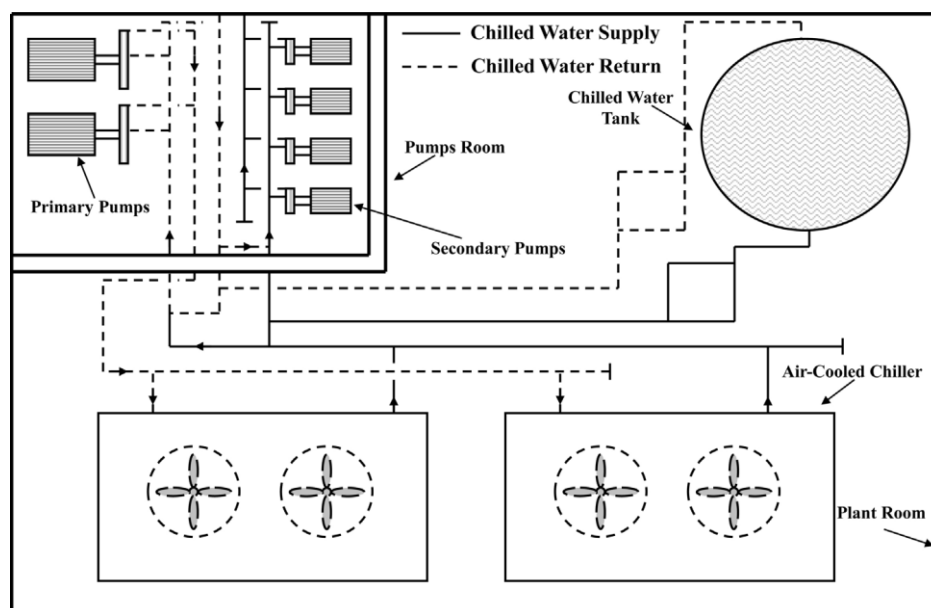


Figure 2.6 Schematic diagram of thermal storage system

King Mongkut's University of Technology North Bangkok (Somkiat Boonnasa, Pichai Namprakai, 2008) cools their building with air cooled split. Somkiat Boonnasa developed chilled water plant with and without thermal storage system and simulated the performance compared to existing air conditioning system. The comparison in power consumption of the chiller with and without cold water storage is presented in Figure 2.7. A detailed cash flow analysis has been carried out and found that the chilled water plant without cold water storage improved the

efficiency cost effectively. Economic analysis (Table 2.1) on cold water storage has a payback period of 10 years instead of 25.8 years for chilled water plant without cold water storage.

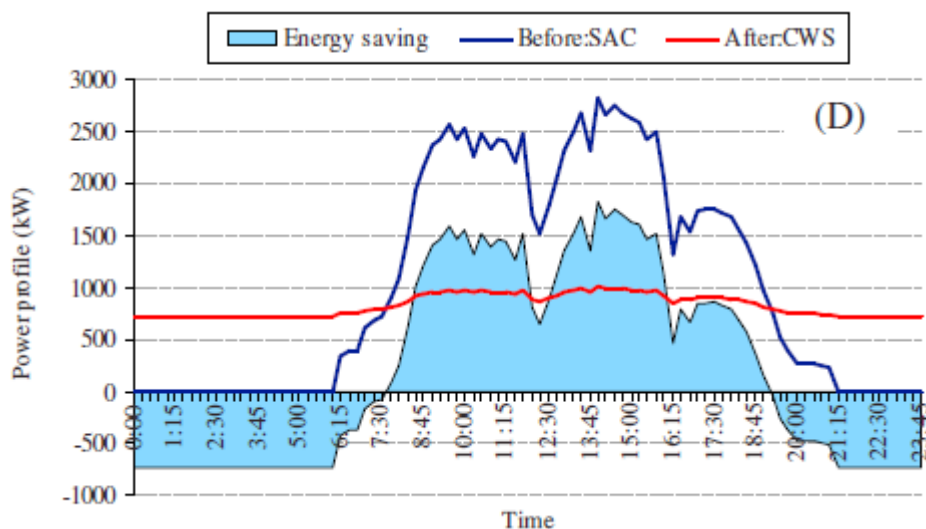


Figure 2.7 Comparison on electricity consumption between the chiller with and without cold water storage

Table 2.1 Economic analysis for chill water storage system

Descriptions	Unit	Existing	No CWS	CWS
Energy and makeup water cost	US\$/y	1,463,940	1,385,198	1,224,301
Saving for fire safety water tank	US\$	—	—	144,958
Total capital cost	US\$	—	2,074,576	2,417,397
Annual O&M costs	US\$/y	30,000	28,246	28,032
Annual benefit	US\$/y	—	108,742	269,639
Total (Profit)	US\$/y	—	80,496	241,606
Payback period	y	—	25.8	10.0
IRR	%	—	11%	21%
NPV	US\$	—	-419,729	834,411

The electricity supply in Kuwait (M.J. Sebzali et al., 2010) does not cope with the increasing peak power demand. The Ministry of Electricity and Water made a huge investment for generating energy. One of the feasible solutions was to apply thermal energy storage. It shifted the power consumption for chilled water plant to night time. A case study on Centre for Speech and Audio Therapy building showed that thermal energy storage system reduced the peak power demand of AC system for design day condition by 36.7% to 87.5% and annual energy consumption was

between 4.5% and 6.9% compared to conventional design. The thermal storage system enables chiller to work at optimum efficiency and run at constant generating load as shown in the Figure 2.8. It shall prolong the equipment life span.

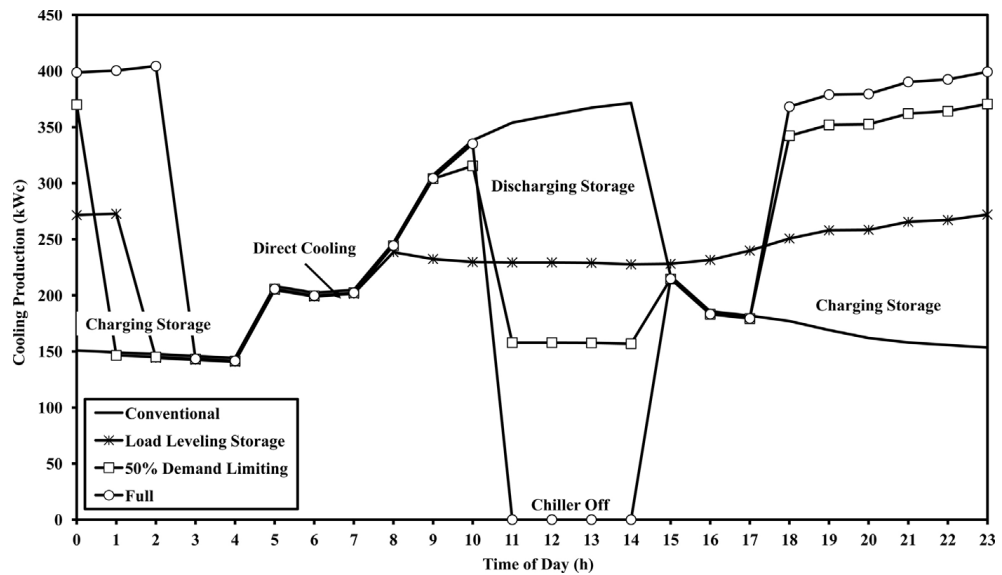


Figure 2.8 Hourly cooling production for Centre for Speech and Audio Therapy building

Chillers for a group of pharmaceutical building in southern Germany (Gregor P. Henze et al., 2007) did not meet the growth of cooling. Feasibility study and cost effectiveness for additional chiller and thermal energy storage had been carried out. The group of chillers consists of high and low efficiency chillers. With an additional chiller, low efficiency was required to operate to meet the cooling load and energy wasted. Therefore, additional thermal storage system was introduced to chilled water plant. High efficiency chiller charged the storage tank at night, whilst it released the energy during the peak load, resulting in no additional chiller required as well as cost saving.

In Sarawak, Malaysia, Sarawak Electric Supply Corporation offers lower tariff at night. Mohammad Omar Abdullah from University Malaysia Sarawak researched on the district cooling system within the campus. Ice thermal storage system shifted the power consumption of the peak period to night time. It reduced electricity charges where tariff is lower at night. A cost saving of RM 162,614.91 to RM 314,142.23 was estimated for University Sarawak Malaysia.

2.4 Variable Flow Refrigerant

Variable flow refrigerant (VRF) in refrigeration terminology is centralised air-conditioning system with one or more outdoors units connected to many different capacities indoor units with the refrigerant piping network as shown in Figure 2.9 (William Goetzler, 2007).



Figure 2.9 Schematic diagram of VRF system

The advantages of the VRF system are energy saving during the part load and space saving as shown in Figure 2.10. The VRF consists of two or three of which one is the variable drive compressor that enables the VRF to operate at required load. The chilled water plant is operated at full capacity, while the cooling is not required and it causes energy wastage. However, VRF does not have much benefit if the cooling loads are less diversified. Comparing the equipment of the VRF with the chilled water plant, the VRF requires smaller plant room and maximises the space available in a building as shown in Figure 2.11.

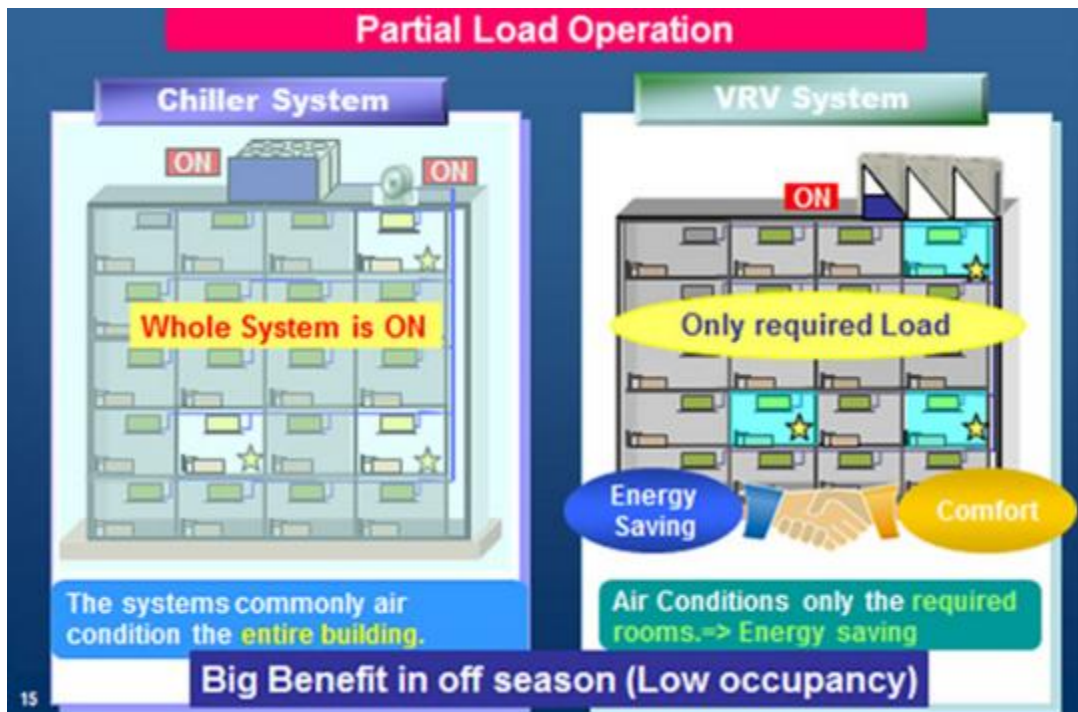


Figure 2.10 Comparison between chilled water plant and VRF system



Figure 2.11 Plant room comparison between chilled water plant and VRF system

2.5 Heat Load Calculation

Generally, measuring either the partial load or actual peak in any given space and area is almost impossible. These loads must be estimated and assumed. Load estimating usually begins with the establishment of the peak load for a building. Peak load is the maximum that the entire building will experience, and occurs only one time during the year. The peak load is typically used to size the air conditioning equipment.

Peak load of the building must be estimated and calculated before designing the air conditioning for the building. It is important that a survey be carried out and an extensive understanding of the component sources to ensure accurate evaluation of the load components. With an accurate study on the building facilities and actual instantaneous load within a given mass of the building conducted, an economical equipment selection and the best system design can guarantee smooth and defect-free performance for the building owner.

CHAPTER 3

METHODOLOGY

3.1 Introduction

This section explains building characteristics, approaches used to estimate heat load, data collection, water cooled chilled plant used at UTAR and its requirements to provide a thermally comfortable environment.

Air-conditioning system maintains thermal comfort within a building by removing the heat energy. Thus, the heat load calculation is vital for the selection of water cooled chiller to avoid any over sizing or under sizing problem. An over sizing chiller will lead to high initial equipment cost and operation cost, whilst an under sizing chiller will not generate the sufficient and required cooling capacity and defeat the purpose of installing air-conditioning system.

3.2 Heat Load Calculation

The results of building characteristics survey on the specifications and requirements, such as human load, construction material, building orientation and electrical heat load, were tabulated and transferred into a computer program, called Carrier E-20 for heat load calculation. Heat load results on the 20th March, 20th June, 22nd September and 21st December were analyzed to finalize the air conditioning equipment capacity to be used.

Figure 3.1 shows the location of the Earth in relation to the Sun. During the summer solstice, the North Pole tilted to the sun receives longer daylight and the weather changes to summer. The winter solstice is the first day of lesser sunlight where the winter begins. The equinox means 'equal' which is the position of the Earth with equal day and night. The above mentioned four dates in a calendar year used to analyse the heat load is assumed to leverage heat load at the season.

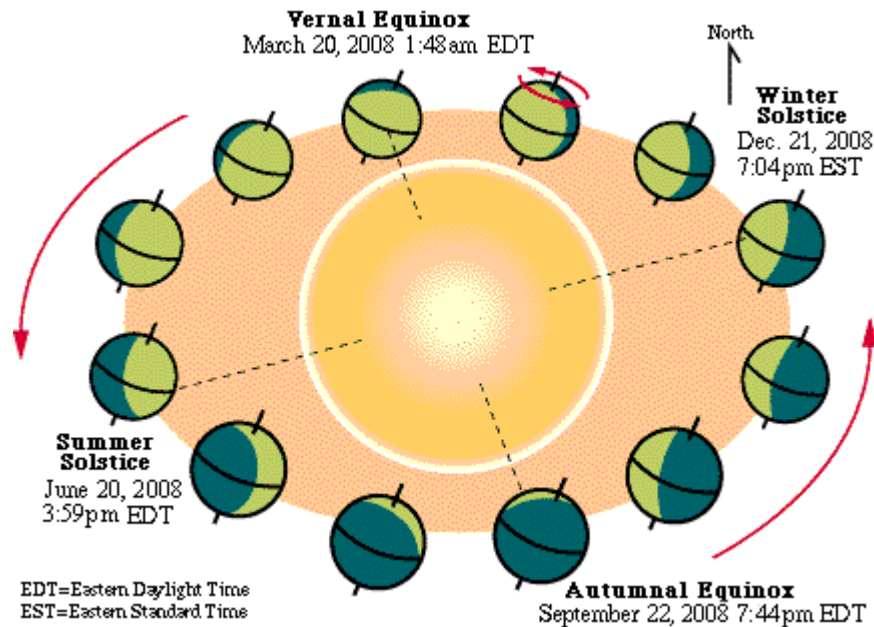


Figure 3.1 Solstice & Equinox

3.2.1 Building Orientation & Space Usage

UTAR Sungai Long Campus is located in the vicinity of the city centre of Kuala Lumpur, Malaysia. As such, the weather location was set at Kuala Lumpur. There are two buildings on the campus, i.e., KA and KB Blocks. KB Block was selected to be studied in this research. The main entrance of KB Block faces North-East as shown in Figure 3.2. KB Block with trapezium shape has ten levels, consisting of labs, lecture halls, tutorial rooms, staff rooms, library, sport club, toilets, mechanical and electrical rooms and etc. Each of the air-conditioned rooms was measured with space area, room height and external wall or window to outdoor. The area and direction of the walls and window glasses were identified since the daylight throughout the year would have different solar heat gain values according to the direction as shown in Figure 3.3.

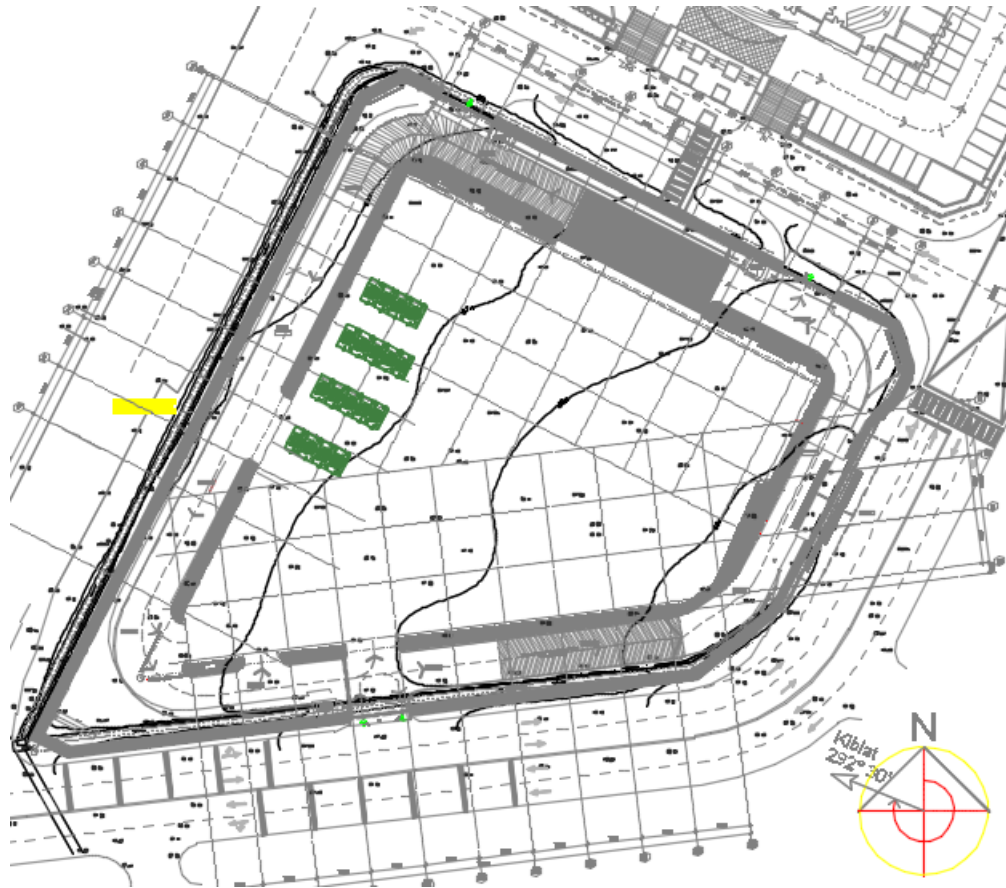


Figure 3.2 Building Orientation of KB Block at UTAR Sungai Long Campus

Table 3.1 Solar heat gain data from E-20

Design Day Maximum Solar Heat Gains W/m²

Month	Multiplier	N	NNE	NE	ENE	E	ESE	SE	SSE	S
Jan	1.00	106.2	106.2	252.3	540.1	726.2	799.9	749.4	601.8	429
Feb	1.00	110.8	110.8	392.2	630.9	765.6	781.8	676.6	469.9	261
Mar	1.00	119.1	247.9	518.8	693.5	762.2	713.5	556.0	299.2	129
Apr	1.00	182.6	404.2	602.0	705.1	701.7	592.6	389.0	133.1	120
May	1.00	306.0	492.9	642.5	696.8	646.3	500.0	267.2	118.4	118
Jun	1.00	359.6	519.8	647.8	684.1	617.6	459.8	222.1	119.0	119
Jul	1.00	315.3	488.9	629.6	681.6	631.1	487.4	260.8	120.8	120
Aug	1.00	195.9	402.1	587.8	683.5	676.8	568.9	371.9	129.0	125
Sept	1.00	123.1	238.5	491.9	656.7	722.2	678.3	532.5	293.2	134
Oct	1.00	112.3	114.3	379.9	592.4	723.9	745.8	654.1	459.8	255
Nov	1.00	106.3	106.3	260.0	515.8	702.8	783.3	742.9	589.0	421
Dec	1.00	103.2	103.2	204.7	489.9	698.1	797.2	772.6	639.5	488

3.2.2 Construction Material

The floor was designed to comply with local authority's requirements. The wall was installed with 110mm common brick-wall with both sides being plastered with 20mm thickness and full glass double glazing 3mm glass window with 6mm air gap.

The heat conduction (Q) through wall can be expressed as Eq. 3.1:

$$Q = U \times A \times \Delta T \quad (3.1)$$

where U : coefficient of thermal transmittance (W/m^2K)

A : area of the surface

ΔT : temperature differences across the surface

The U -value is heat gain (W) through a unit area (m^2) of a construction material for every temperature difference (K) between the inside and the outside of a building.

$$U = 1 / R \quad (3.2)$$

where R : thermal resistance (m^2K/W)

R -value is the thermal resistance of a construction material which restricts the heat transfer. The magnitude of the thermal resistance depends on the thickness and the conductivity of the building material.

Building Regulations 2011 Technical Guidance Document L Conservation of Fuel Energy - Dwellings recommends the conductivity value for construction material as listed in Table 3.1. The thermal conductivities (W/mK) of the wall consisting of 110mm common brick and 20mm mortar for both internal and external at UTAR were obtained from Table 3.2

Table 3.2 Thermal conductivity for different construction materials

Material	Density (kg/m ³)	Thermal Conductivity (W/mK)
General Building Materials		
Clay brickwork (outer leaf)	1,700	0.77
Clay brickwork (inner leaf)	1,700	0.56
Concrete block (heavyweight)	2,000	1.33
Concrete block (medium weight)	1,400	0.57
Concrete block (autoclaved aerated)	700	0.20
Concrete block (autoclaved aerated)	500	0.15
Concrete block (hollow)	1800	0.835
Cast concrete, high density	2,400	2.00
Cast concrete, medium density	1,800	1.15
Aerated concrete slab	500	0.16
Concrete screed	1,200	0.41
Reinforced concrete (1% steel)	2,300	2.30
Reinforced concrete (2% steel)	2,400	2.50
Wall ties, stainless steel	7,900	17.00
Wall ties, galvanised steel	7,800	50.00
Mortar (protected)	1,750	0.88
Mortar (exposed)	1,750	0.94
External rendering (cement sand)	1,800	1.00
Plaster (gypsum lightweight)	600	0.18
Plaster (gypsum)	1,200	0.43
Plasterboard	900	0.25
Natural slate	2,500	2.20
Concrete tiles	2,100	1.50
Clay tiles	2,000	1.00
Fibre cement slates	1,800	0.45
Ceramic/Porcelain tiles	2,300	1.30
Plastic tiles	1,000	0.20
Asphalt	2,100	0.70
Felt bitumen layers	1,100	0.23
Timber, softwood	500	0.13
Timber, hardwood	700	0.18
Wood wool slab	500	0.10
Wood-based panels (plywood, chipboard, etc.)	500	0.13

Therefore, the *R*-value for KB Block of UTAR wall is tabulated in Table 3.3.

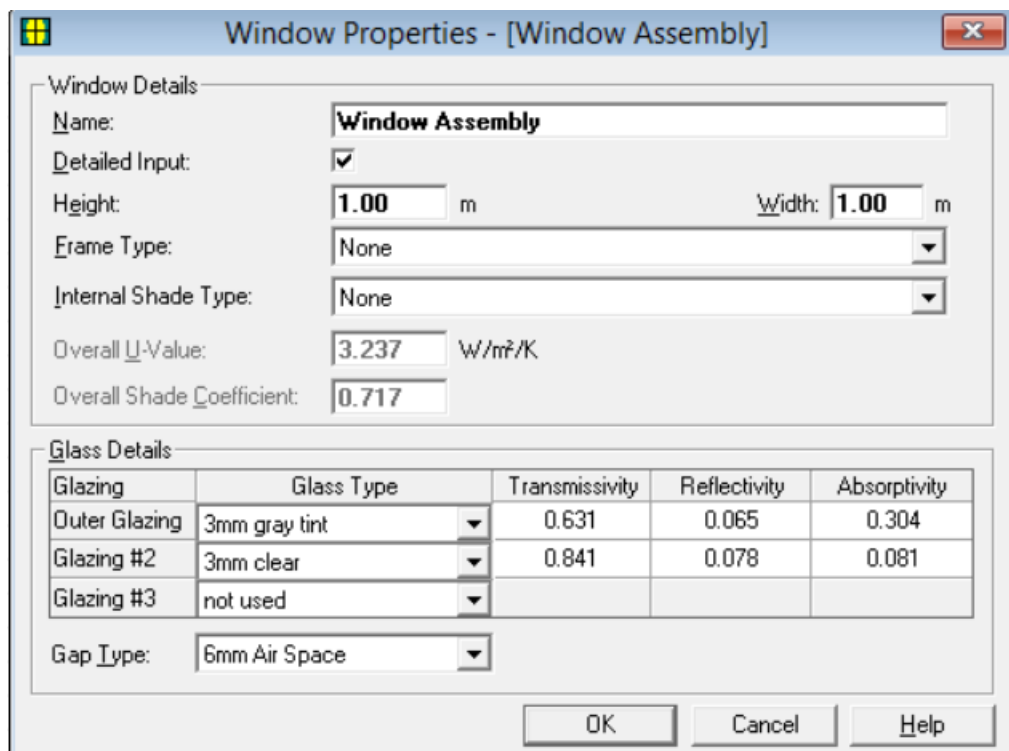
Table 3.3 U -value calculation

Layers	Thickness (m)	Density (kg/m ³)	Conductivity (W/mK)	Resistance (m ² K/W)
Inside surface				0.12064
Internal Plaster	0.002	1,200	0.43	0.00465
Common brick	0.110	1,700	0.77	0.14286
External cement render	0.002	1,800	1.00	0.00200
Outside surface				0.05864
Total :				0.32879

The total U -value for the wall was:

$$\begin{aligned}
 U &= 1/R \\
 &= 1/0.32879 \\
 &= 3.04147 \text{ W/m}^2\text{K}
 \end{aligned}$$

Figure 3.4 shows the U -value for glass window in the E-20 heat load software. In Figure 3.5, the glass supplier Sanshiba Japan proved that the U -value was valid.

Figure 3.3 U -value for glass window

Glazing Type	U-Value (W/m ² K)
a single sheet of glass (3mm)	6.0
a double glazed unit (3mm +A 6mm +3mm)	3.4
a double glazed unit (3mm +A 12mm +3mm)	2.9
a Low-E double glazed unit (solar heat control type) (Low-E 3mm +A 6mm +3mm)	2.5
a Low-E double glazed unit (high thermal insulation type) (3mm +A 12mm +Low-E 3mm)	1.7~1.9

Figure 3.4 *U*-value for glass window from Sanshiba Japan

Therefore, the *U*-values adopted in this study for the window glass and wall are shown in Table 3.4.

Table 3.4 Summary of *U*-values for KB Block

Material	<i>U</i> -Value (W/m ² K)
Glass Window	3.237
Wall	3.041

3.3 HVAC System Design

Electricity consumption for the chiller were rated in the factory and tabulated in graph in the equipment catalogue. The energy consumption of the chiller obtained from the graph and head load calculation was on hourly basis. The part load performance of the existing chiller was only shown in 10% interval (Table 3.5). Thus, the other values of the part load performance were determined by interpolation. Tables 3.6 and 3.7 present the part load performance from 31% to 100% in 1% interval for the proposed chiller.

Table 3.5 Existing chiller part load performance

Input Power [kW]		Part Load [%]								
Cooling Water Inlet Temp.	degF(degC)	20	30	40	50	60	70	80	90	100
	60.8 (16.0)	135.7	147.0	164.6	184.1	205.4	230.4	256.7	285.9	316.5
	68.0 (20.0)	151.6	160.1	178.5	198.8	221.0	245.9	272.5	301.9	333.3
	75.2 (24.0)	168.2	173.6	192.9	214.1	237.2	261.9	288.8	318.3	350.7
	82.4 (28.0)	187.4	189.0	209.3	231.4	255.4	279.5	307.2	336.8	370.2
87.0 (30.6)	211.6	207.7	228.9	252.0	276.9	299.9	328.3	357.7	392.1	

Table 3.6 Proposed chiller part load performance from 59% to 100%

RTHD C1D5E4 Tag: CRTHD-1

Part Load Performance

% Load	Cap.	LWT Evap	EWT Evap	Flow Evap	WPD Evap	EWT Cond	LWT Cond	Flow Cond	WPD Cond	Kw	Eff
100	185.00	44.00	54.00	442.63	9.36	87.00	96.33	555.00	10.03	121.98	0.6593
99	183.15	44.00	53.90	442.63	9.36	87.00	96.23	555.00	10.03	120.53	0.6581
98	181.30	44.00	53.80	442.63	9.36	87.00	96.14	555.00	10.03	119.08	0.6568
97	179.45	44.00	53.70	442.63	9.36	87.00	96.04	555.00	10.03	117.64	0.6556
96	177.60	44.00	53.60	442.63	9.36	87.00	95.95	555.00	10.03	116.20	0.6543
95	175.75	44.00	53.50	442.63	9.36	87.00	95.85	555.00	10.04	114.77	0.6530
94	173.90	44.00	53.40	442.63	9.37	87.00	95.76	555.00	10.04	113.35	0.6518
93	172.05	44.00	53.30	442.63	9.37	87.00	95.66	555.00	10.04	111.93	0.6505
92	170.20	44.00	53.20	442.63	9.37	87.00	95.57	555.00	10.04	110.51	0.6493
91	168.35	44.00	53.10	442.63	9.37	87.00	95.47	555.00	10.04	109.04	0.6477
90	166.50	44.00	53.00	442.63	9.37	87.00	95.38	555.00	10.04	107.59	0.6462
89	164.65	44.00	52.90	442.63	9.37	87.00	95.28	555.00	10.04	106.14	0.6446
88	162.80	44.00	52.80	442.63	9.37	87.00	95.18	555.00	10.04	104.69	0.6431
87	160.95	44.00	52.70	442.63	9.37	87.00	95.09	555.00	10.04	103.25	0.6415
86	159.10	44.00	52.60	442.63	9.37	87.00	94.99	555.00	10.05	101.82	0.6400
85	157.25	44.00	52.50	442.63	9.38	87.00	94.90	555.00	10.05	100.39	0.6384
84	155.40	44.00	52.40	442.63	9.38	87.00	94.80	555.00	10.05	98.97	0.6369
83	153.55	44.00	52.30	442.63	9.38	87.00	94.71	555.00	10.05	97.56	0.6354
82	151.70	44.00	52.20	442.63	9.38	87.00	94.62	555.00	10.05	96.15	0.6338
81	149.85	44.00	52.10	442.63	9.38	87.00	94.52	555.00	10.05	94.75	0.6323
80	148.00	44.00	52.00	442.63	9.38	87.00	94.43	555.00	10.05	93.35	0.6308
79	146.15	44.00	51.90	442.63	9.38	87.00	94.33	555.00	10.05	91.96	0.6292
78	144.30	44.00	51.80	442.63	9.38	87.00	94.24	555.00	10.05	90.58	0.6277
77	142.45	44.00	51.70	442.63	9.38	87.00	94.14	555.00	10.06	89.20	0.6262
76	140.60	44.00	51.60	442.63	9.39	87.00	94.05	555.00	10.06	87.83	0.6247
75	138.75	44.00	51.50	442.63	9.39	87.00	93.95	555.00	10.06	86.46	0.6231
74	136.90	44.00	51.40	442.63	9.39	87.00	93.86	555.00	10.06	85.10	0.6216
73	135.05	44.00	51.30	442.63	9.39	87.00	93.77	555.00	10.06	83.74	0.6201
72	133.20	44.00	51.20	442.63	9.39	87.00	93.67	555.00	10.06	82.39	0.6186
71	131.35	44.00	51.10	442.63	9.39	87.00	93.58	555.00	10.06	81.05	0.6171
70	129.50	44.00	51.00	442.63	9.39	87.00	93.49	555.00	10.06	79.81	0.6163
69	127.65	44.00	50.90	442.63	9.39	87.00	93.39	555.00	10.06	78.74	0.6168
68	125.80	44.00	50.80	442.63	9.40	87.00	93.30	555.00	10.07	77.67	0.6174
67	123.95	44.00	50.70	442.63	9.40	87.00	93.21	555.00	10.07	76.61	0.6181
66	122.10	44.00	50.60	442.63	9.40	87.00	93.12	555.00	10.07	75.56	0.6188
65	120.25	44.00	50.50	442.63	9.40	87.00	93.03	555.00	10.07	74.50	0.6196
64	118.40	44.00	50.40	442.63	9.40	87.00	92.94	555.00	10.07	73.46	0.6204
63	116.55	44.00	50.30	442.63	9.40	87.00	92.85	555.00	10.07	72.41	0.6213
62	114.70	44.00	50.20	442.63	9.40	87.00	92.76	555.00	10.07	71.37	0.6222
61	112.85	44.00	50.10	442.63	9.40	87.00	92.67	555.00	10.07	70.33	0.6233
60	111.00	44.00	50.00	442.63	9.40	87.00	92.58	555.00	10.07	69.30	0.6243
59	109.15	44.00	49.90	442.63	9.41	87.00	92.49	555.00	10.07	68.27	0.6255

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Version: 198.0

April 15, 2017

TRANE Water-Cooled Series R(TM) Chiller

Page: 1 of 2

Table 3.7 Proposed chiller part load performance from 31% to 58%

RTHD C1D5E4 Tag: CRTHD-1**Part Load Performance**

% Load	Cap.	LWT Evap	EWT Evap	Flow Evap	WPD Evap	EWT Cond	LWT Cond	Flow Cond	WPD Cond	Kw	Eff
58	107.30	44.00	49.80	442.63	9.41	87.00	92.40	555.00	10.08	67.25	0.6267
57	105.45	44.00	49.70	442.63	9.41	87.00	92.31	555.00	10.08	66.23	0.6280
56	103.60	44.00	49.60	442.63	9.41	87.00	92.22	555.00	10.08	65.15	0.6289
55	101.75	44.00	49.50	442.63	9.41	87.00	92.13	555.00	10.08	63.99	0.6289
54	99.90	44.00	49.40	442.63	9.41	87.00	92.04	555.00	10.08	62.84	0.6290
53	98.05	44.00	49.30	442.63	9.41	87.00	91.95	555.00	10.08	61.69	0.6292
52	96.20	44.00	49.20	442.63	9.41	87.00	91.86	555.00	10.08	60.55	0.6294
51	94.35	44.00	49.10	442.63	9.41	87.00	91.77	555.00	10.08	59.42	0.6298
50	92.50	44.00	49.00	442.63	9.42	87.00	91.68	555.00	10.08	58.30	0.6302
49	90.65	44.00	48.90	442.63	9.42	87.00	91.59	555.00	10.09	57.18	0.6308
48	88.80	44.00	48.80	442.63	9.42	87.00	91.49	555.00	10.09	56.07	0.6314
47	86.95	44.00	48.70	442.63	9.42	87.00	91.40	555.00	10.09	54.97	0.6322
46	85.10	44.00	48.60	442.63	9.42	87.00	91.31	555.00	10.09	53.87	0.6330
45	83.25	44.00	48.50	442.63	9.42	87.00	91.22	555.00	10.09	52.78	0.6340
44	81.40	44.00	48.40	442.63	9.42	87.00	91.13	555.00	10.09	51.70	0.6351
43	79.55	44.00	48.30	442.63	9.42	87.00	91.04	555.00	10.09	50.64	0.6366
42	77.70	44.00	48.20	442.63	9.43	87.00	90.95	555.00	10.09	49.62	0.6386
41	75.85	44.00	48.10	442.63	9.43	87.00	90.86	555.00	10.09	48.61	0.6409
40	74.00	44.00	48.00	442.63	9.43	87.00	90.77	555.00	10.09	47.60	0.6433
39	72.15	44.00	47.90	442.63	9.43	87.00	90.68	555.00	10.10	46.56	0.6454
38	70.30	44.00	47.80	442.63	9.43	87.00	90.59	555.00	10.10	45.51	0.6473
37	68.45	44.00	47.70	442.63	9.43	87.00	90.50	555.00	10.10	44.45	0.6494
36	66.60	44.00	47.60	442.63	9.43	87.00	90.41	555.00	10.10	43.40	0.6516
35	64.75	44.00	47.50	442.63	9.43	87.00	90.32	555.00	10.10	42.34	0.6539
34	62.90	44.00	47.40	442.63	9.43	87.00	90.23	555.00	10.10	41.29	0.6564
33	61.05	44.00	47.30	442.63	9.44	87.00	90.14	555.00	10.10	40.23	0.6590
32	59.20	44.00	47.20	442.63	9.44	87.00	90.05	555.00	10.10	39.17	0.6617
31	57.35	44.00	47.10	442.63	9.44	87.00	89.97	555.00	10.10	38.51	0.6716

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Version: 198.0

April 15, 2017

TRANE Water-Cooled Series R(TM) Chiller

Page: 2 of 2

3.4 Payback Period Calculation

Economic analysis was also performed on the constant speed chiller system and variable speed chiller system in order to justify the system selection to be the most cost and energy efficient system. Payback period calculation was used to justify the investment of the proposed chiller.

CHAPTER 4

RESULTS AND DISCUSSION

4.1 Capacity Control for Chiller

Capacity control of water cooled chiller can be divided to two different methods, which are inlet guide vane (IGV) with constant speed motor and variable speed drive (VSD) motor.

4.1.1 Inlet Guide Vane(IGV)

Inlet guide vane (IGV) is installed in front of the impeller (Figure 4.1) to control the flow rate of the refrigerant to compressor for capacity control of the chiller without modifying the rotational speed of the motor. Changing the angle of the inlet guide vane limits the flow rate of the refrigerant into the impeller.

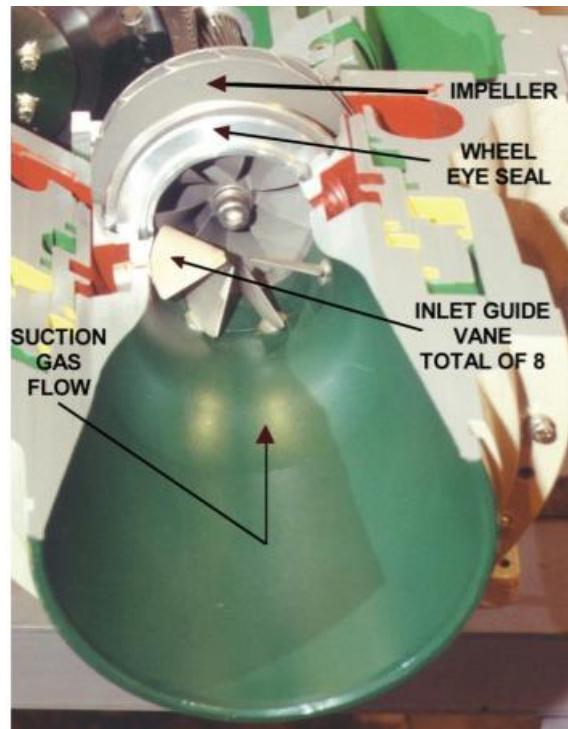


Figure 4.1 Constant speed chiller inlet guide vane (Daikin)

4.1.2 Variable Speed Drive

Variable speed drive (VSD) centrifugal chiller can reduce the capacity or part load by reducing motor speed, and degrade the full-load efficiency of the chiller. According to the Affinity Law and given the same diameter of the propeller, we conclude that:

$$\frac{Q_1}{Q_2} = \frac{N_1}{N_2} \quad (4.1)$$

$$\frac{H_1}{H_2} = \left(\frac{N_1}{N_2}\right)^2 \quad (4.2)$$

$$\frac{BHP_1}{BHP_2} = \left(\frac{N_1}{N_2}\right)^3 \quad (4.3)$$

where Q : flow rate

H : head

BHP : brake horse power

N : rotational speed

From Eqs. 4.1-4.3, we can infer the following relationships between the rotational pump speed with pressure, flow rate and power. Their relationships are illustrated in Figure 4.2.

$$\begin{aligned} \text{flow} &\propto \text{rotational pump speed} \\ \text{head} &\propto (\text{rotational pump speed})^2 \\ \text{power} &\propto (\text{rotational pump speed})^3 \end{aligned}$$

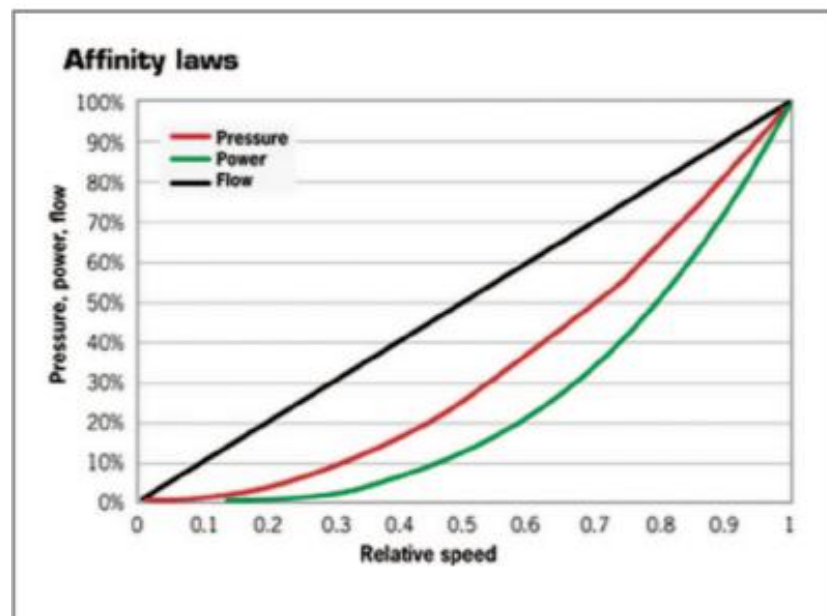


Figure 4.2 The relationships between the rotational pump speed with pressure, flow rate and power according to the Affinity Law

Figure 4.2 suggests that if the rotational motor speed reduces to 80%, the electrical consumption reduces to nearly half according to the Affinity Law. It showed that the energy saving comparison using the two methods for capacity control proved that the VSD could save more energy during part load compared to the IGV.

4.2 Heat Load Estimation

Heat load calculation was carried out using Carrier E-20 (Hourly Analysis Program v4.8) program to analyse and produce the cooling load required for the areas that required air conditioning. Load profile was computed for four design cooling days which were 20th March, 20th June, 22nd September and 21st December. Design weather data used 1% of design temperature data, clear sky solar radiation conditions

and coincident humidity level. The variation of internal heat gains was represented by the design day operating schedules for design cooling conditions. The Transfer Function load method provides true and accurate estimates of building loads considering the transient nature of heat transfer processes in the building. By using simulation weather data, operating schedules for different days of the weeks, and the ASHRAE endorsed the Transfer Function method, the loads were computed for all 8,760 hours in the year. The operating schedules assist to define how heat gains vary on different days of the week.

Figures 4.3-4.8 show the daily heat load for the months from January to December. The average heat load was below 55,000 tons throughout the year, except for April, May and June. Malaysia is located near the Equatorial line that almost perpendicularly faces the Sun at the mentioned months. As such, Malaysia receive the most sunlight and heat load profiles were generally high in April, May and June compared to those in other months. Referring to Figure 3.1, Malaysia should also theoretically receive the same amount of sunlight in September, October and November.. However, there was monsoon raining season in these three months and the ambient temperature was greatly reduced. Therefore, the heat load profiles for the three months were to be similar with those for the remaining months.

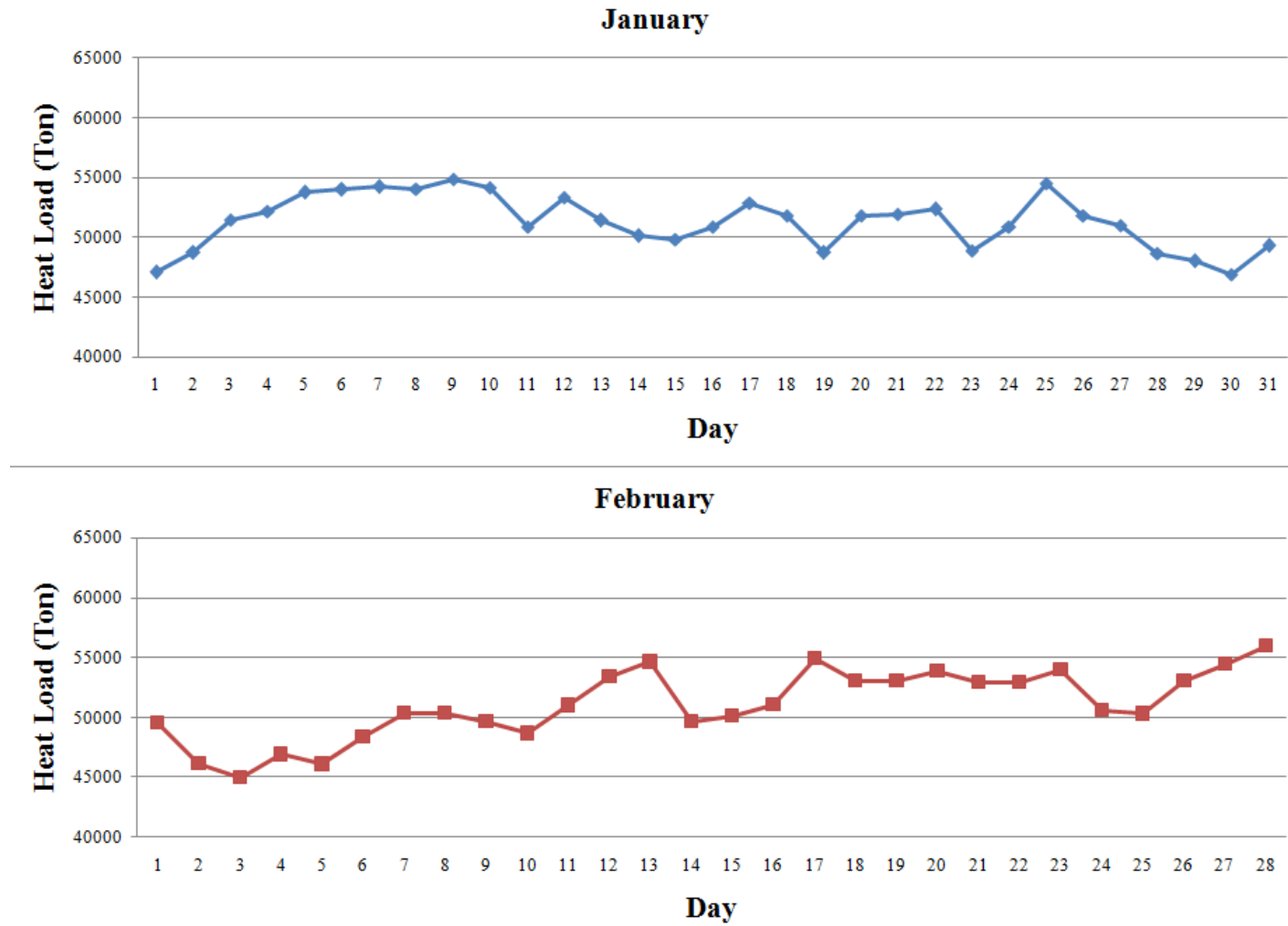


Figure 4.3 Daily heat load for January and February

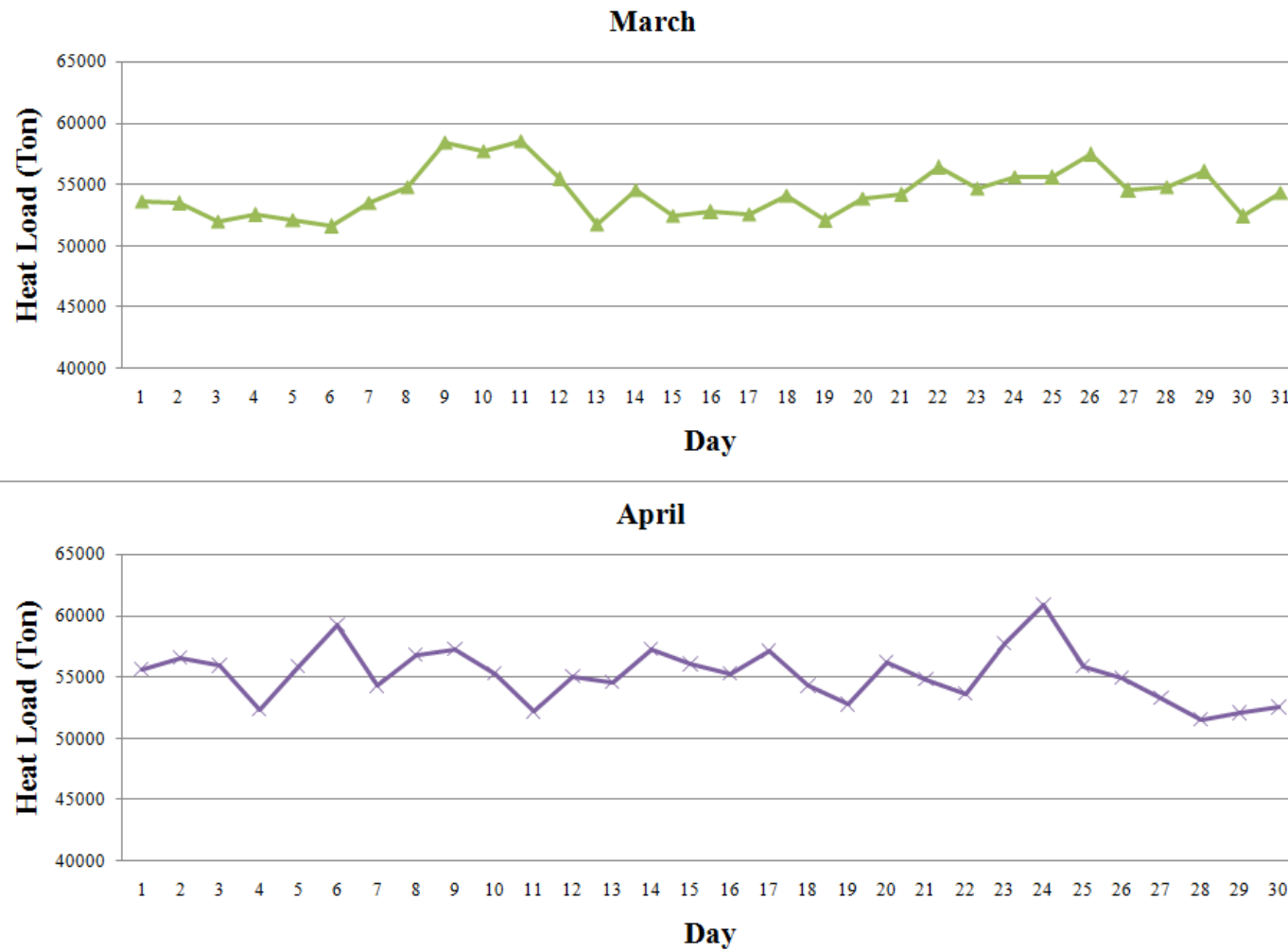


Figure 4.4 Daily heat load for March and April

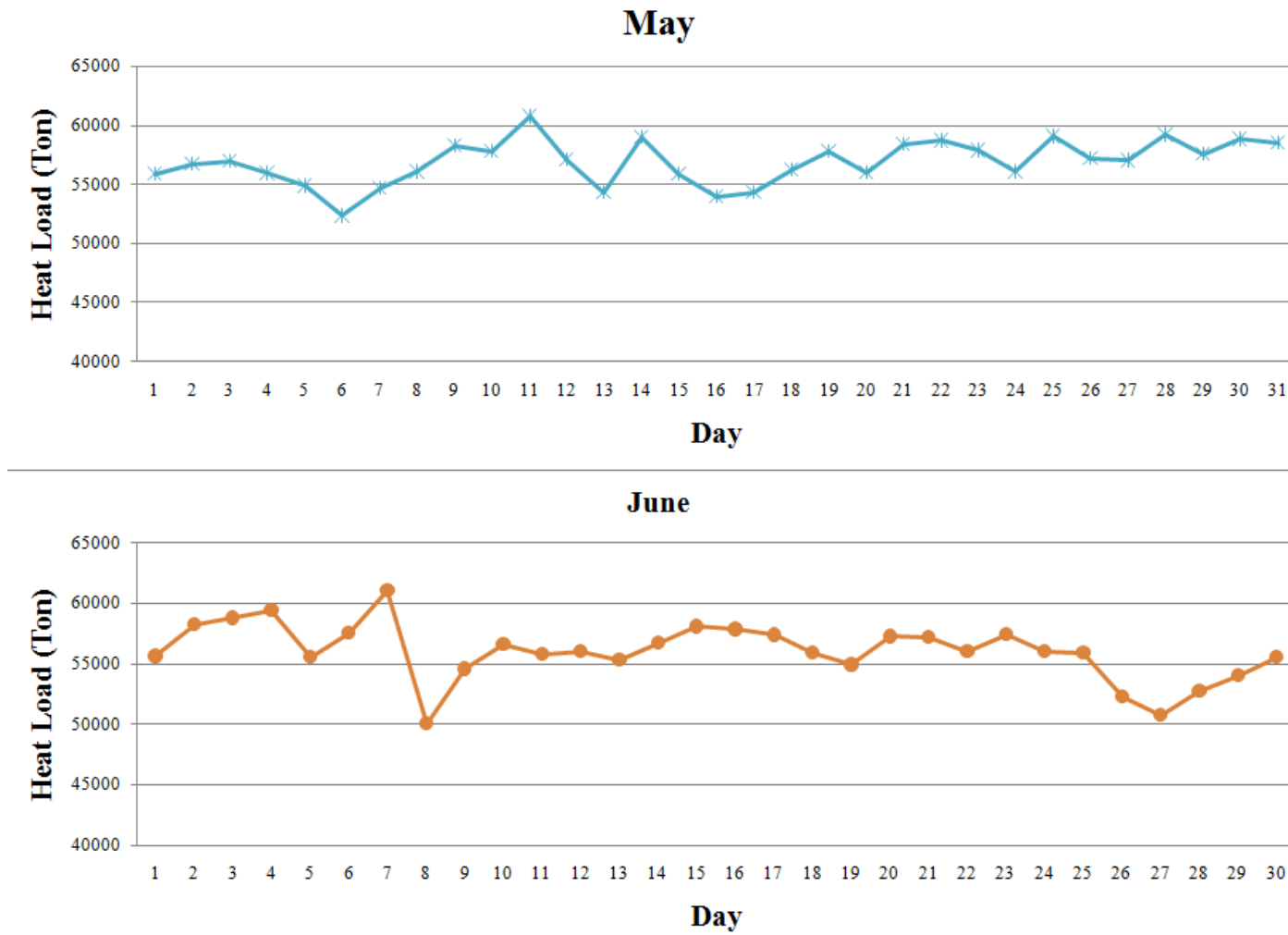


Figure 4.5 Daily heat load for May and June

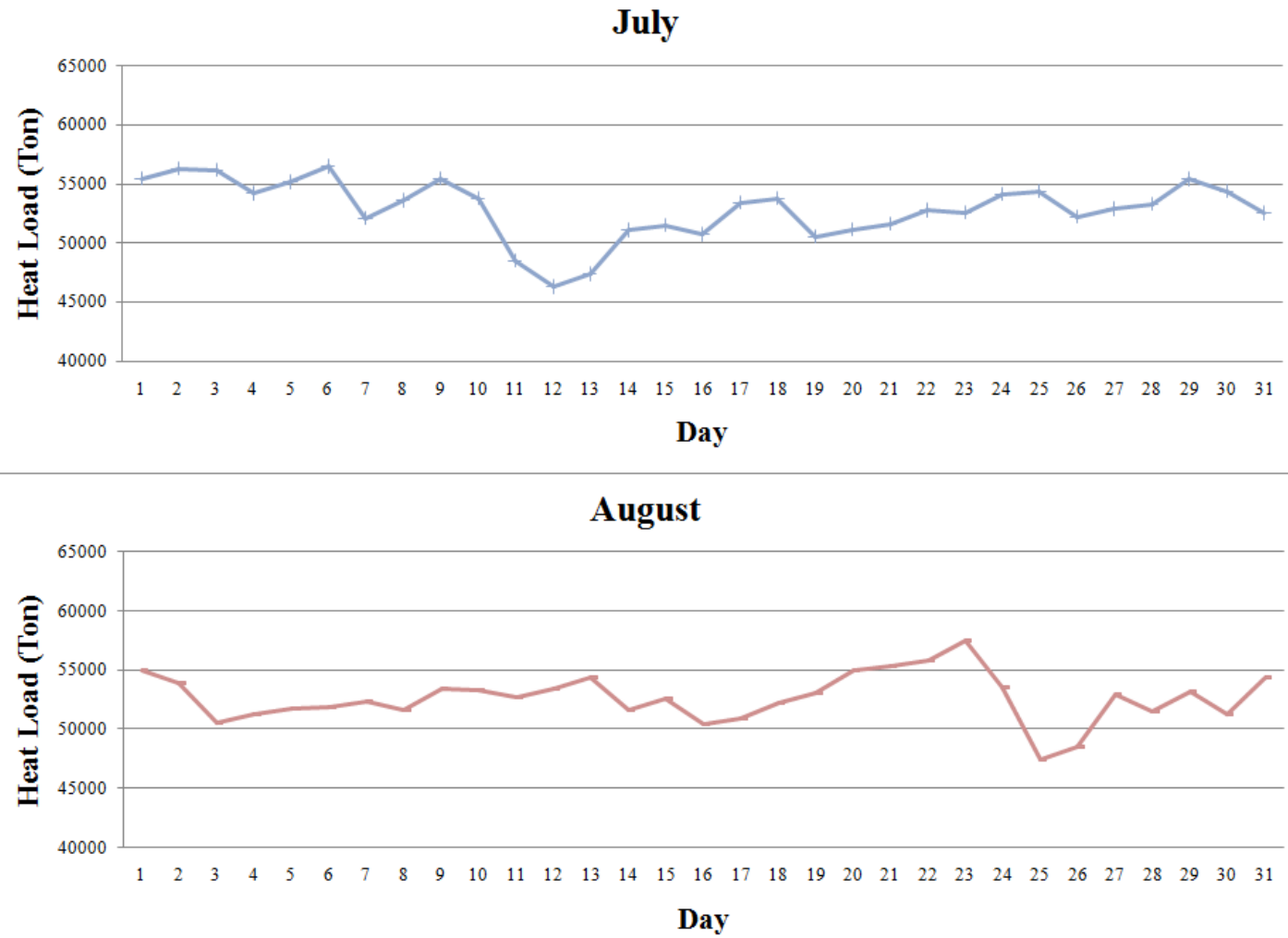


Figure 4.6 Daily heat load for July and August

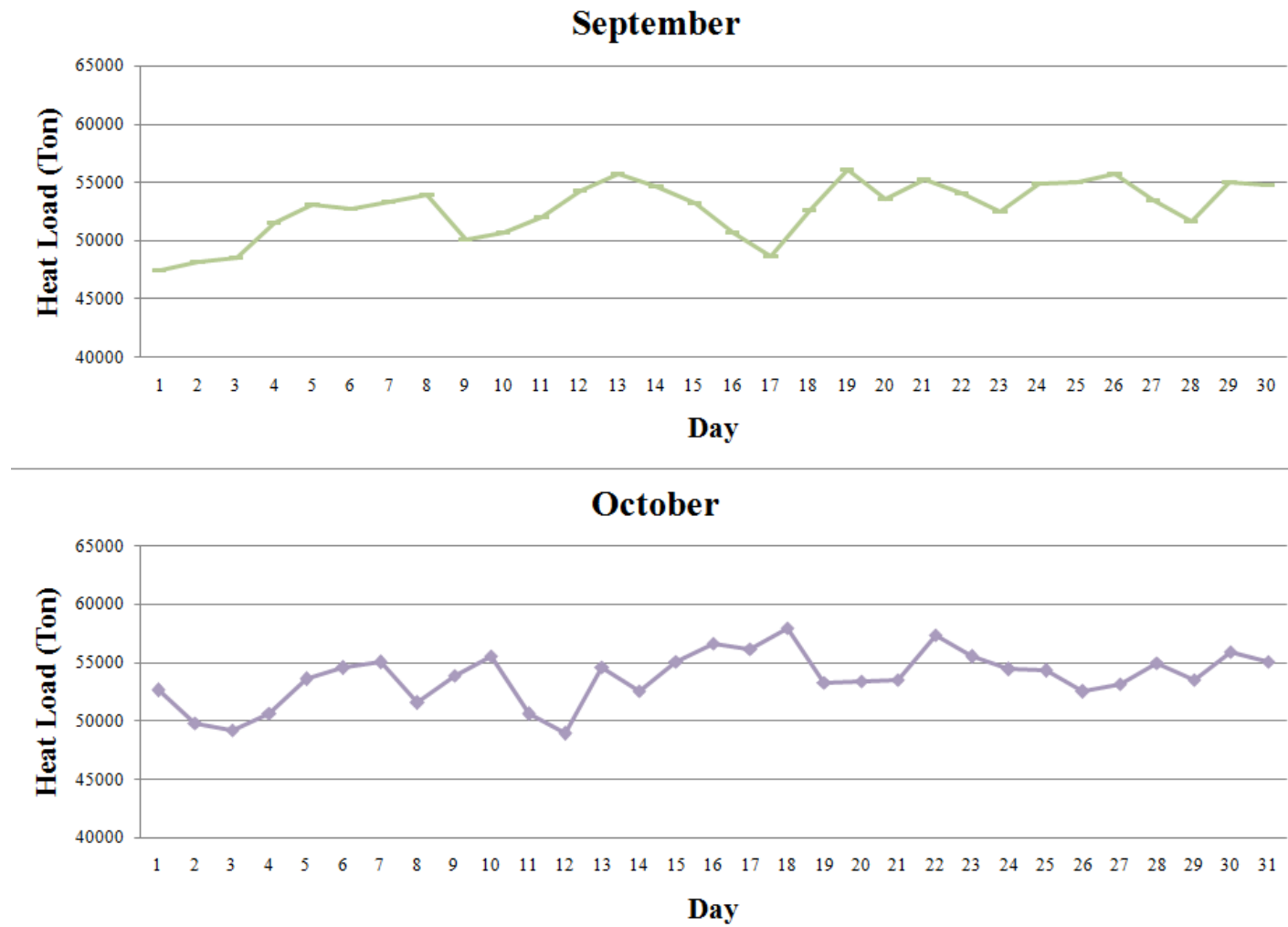


Figure 4.7 Daily heat load for September and October

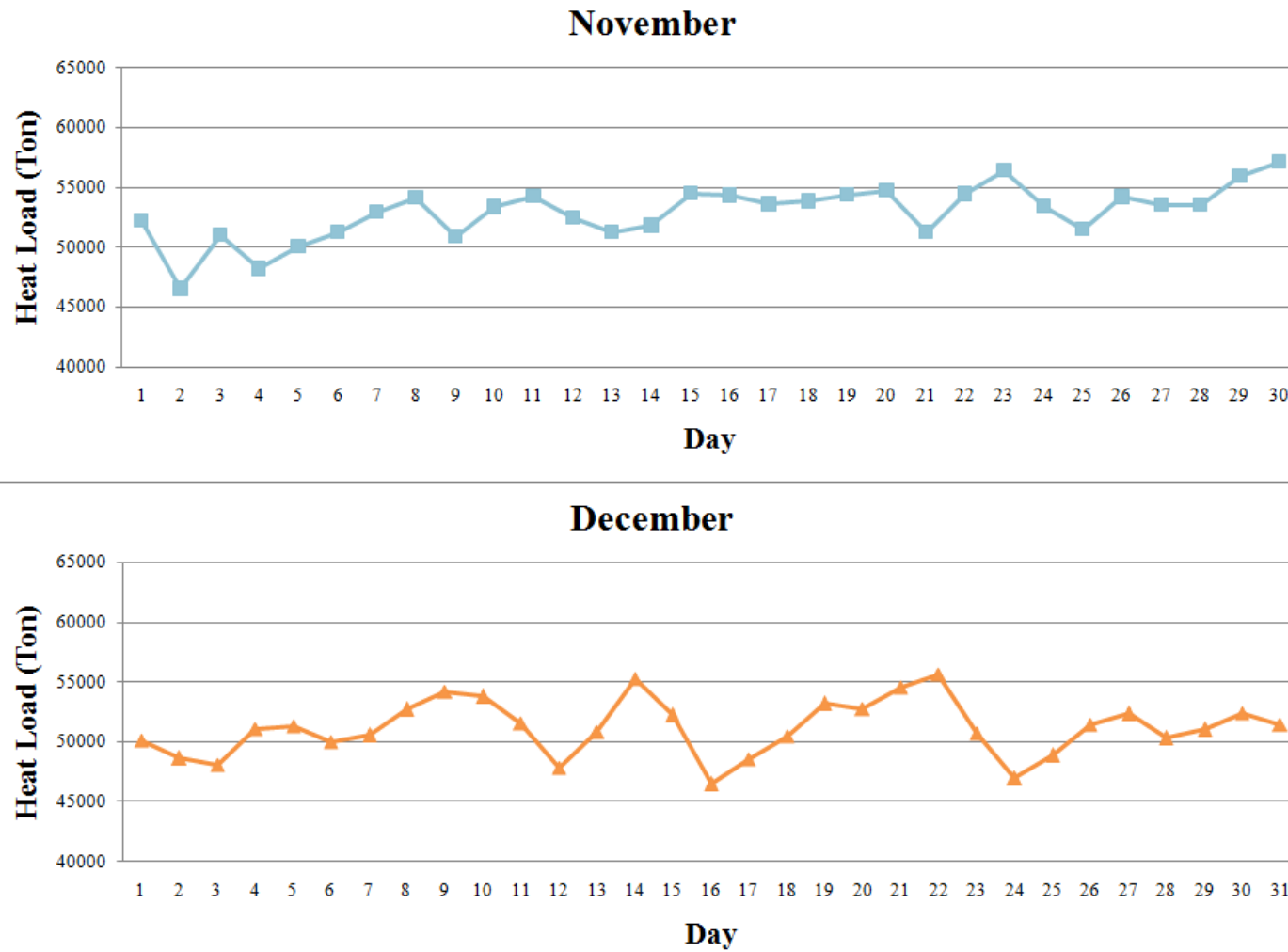


Figure 4.8 Daily heat load for November and December

From Figures 4.3-4.8, the highest heat load day fell on 11st May instead of summer solstice. The North Pole is tilted to the Sun and more sunlight is shot on the Northern Hemisphere and not on Malaysia which is located near the equatorial line. It was also noticed that in April and May, the heat load was higher than average throughout the year. The equatorial line receives direct sunlight in April and May as shown in Figure 3.1. The opposite direction of April and May should have the similar heat gain. However, from October to December, the monsoon raining season reduces the ambient temperature and heat load.

As the highest heat gain fell on the 11st May, the chiller peak load was calculated based on the 11st May. Figure 4.9 shows the hourly heat load on 11st May for the entire KB Block. The peak heat load of 3,093 tons fell at Hour 1300 which is the period that receives the most sunlight in Malaysia. However, the peak load did not fall on the same time for each floor. From Figures 4.10-4.12, it was noticed that the peak loads for ground floor, second floor and tenth floor fell at Hour 1400, while the remaining at Hour 1300. The peak load of each floor is tabulated in Table 4.1 for chiller capacity selection. The total heat load for entire building was 3,100 tons. The selection of chillers was performed based on this calculated load.

Table 4.1 shows the maximum heat load for each floor. It should be highlighted that 15% diversity factor was applied to the total heat load. Based on the total heat load of 3,100 tons, the system consisting of 4 units of water cooled chiller of 700 tons each (3 on duty, 1 on standby) and 1 unit of 185 tons screw chiller shall be designed and installed at Chiller Room.

Table 4.1 Maximum heat load estimation for each floor of UTAR KB Block

Floor	kWh	Btu/h	ton	Area (m²)	Area (sqft)	btuh/sqft)
GF	1,541	5,259,883	438	3,026	32,681	161
1	734	2,506,852	209	2,980	32,184	78
2	1,023	3,493,614	291	3,455	37,314	94
3	1,077	3,675,602	306	3,783	40,856	90
4	1,166	3,980,849	332	3,790	40,932	97
5	983	3,355,672	280	3,106	33,545	100
6	1,037	3,540,050	295	3,189	34,441	103
7	920	3,139,541	262	3,344	36,115	87
8	815	2,783,419	232	3,149	34,009	82
9	844	2,880,729	240	3,149	34,009	85
10	755	2,578,555	215	2,862	30,910	83
Total Ton:			3,100			

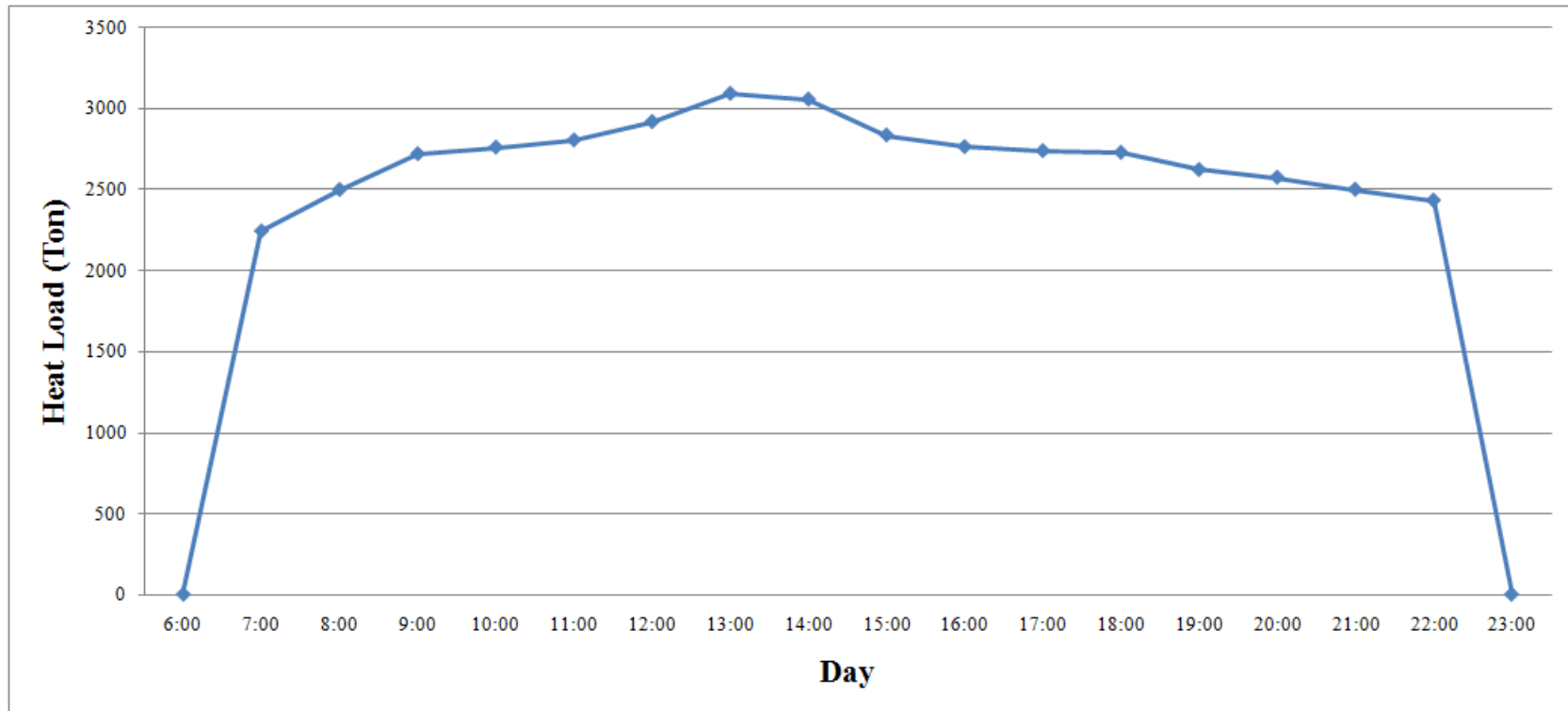


Figure 4.9 Hourly heat load on 11st May

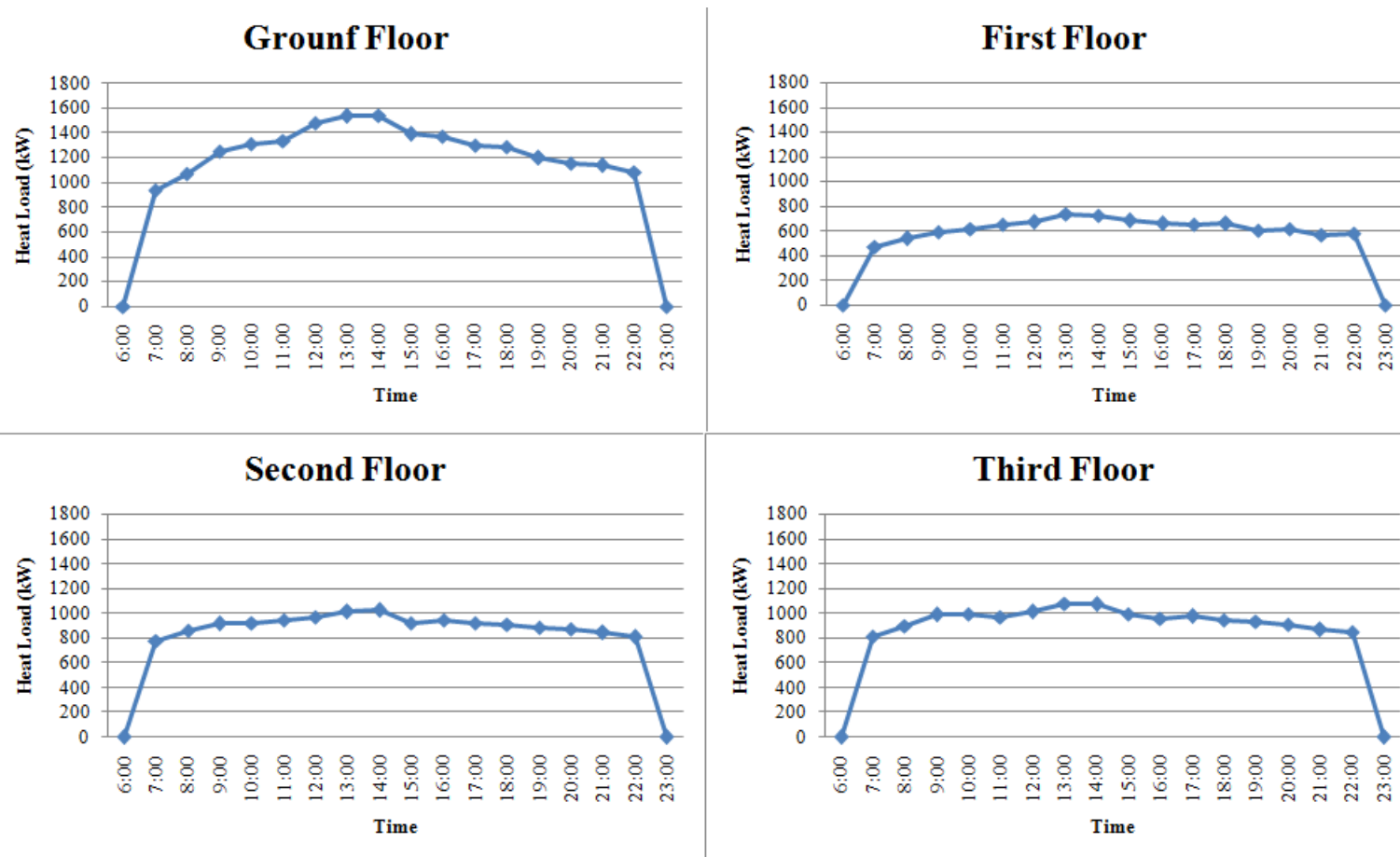


Figure 4.10 Hourly heat load on 11th May from Ground to Third Floor

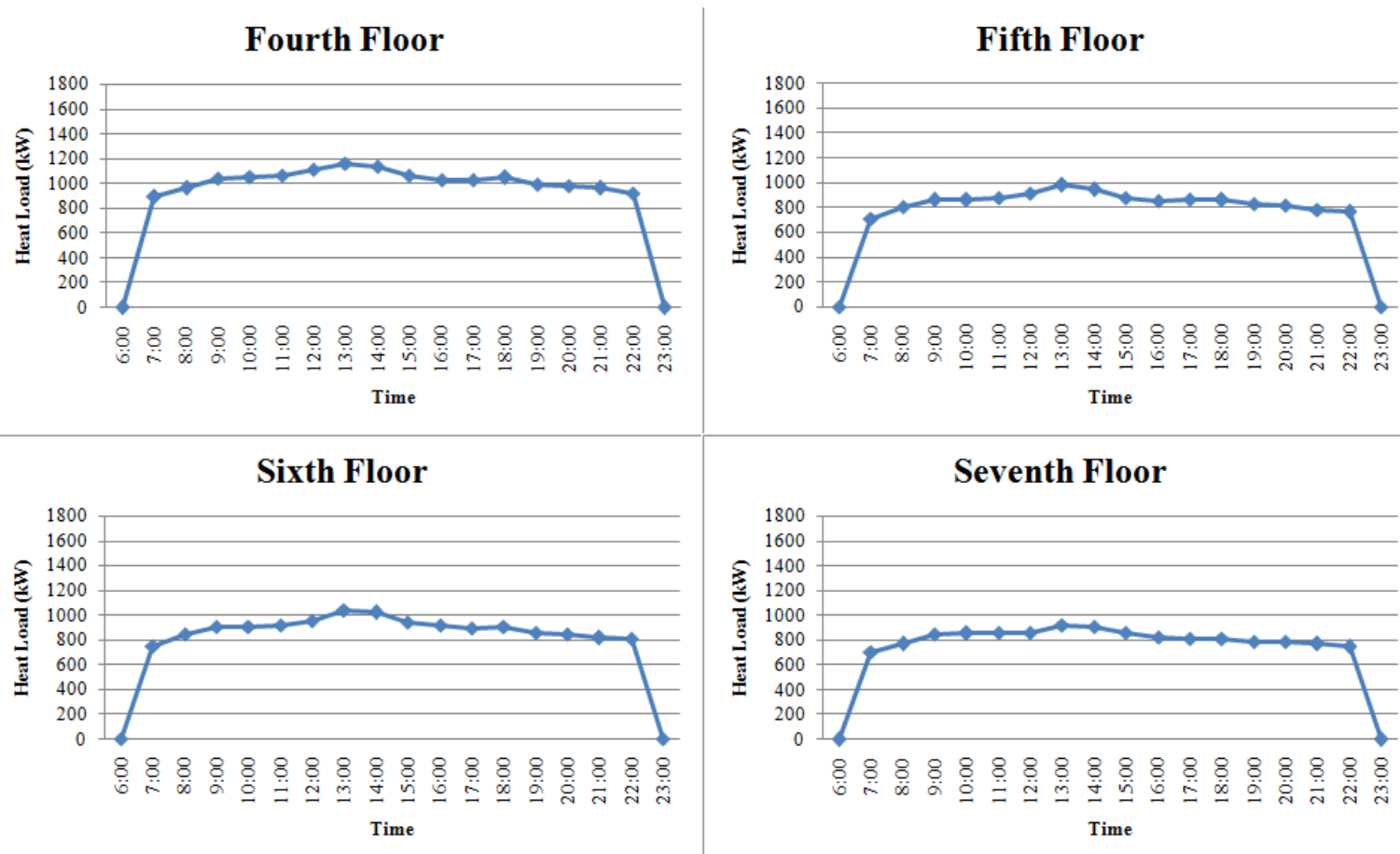


Figure 4.11 Hourly heat load on 11th May from Fourth to Seventh Floor

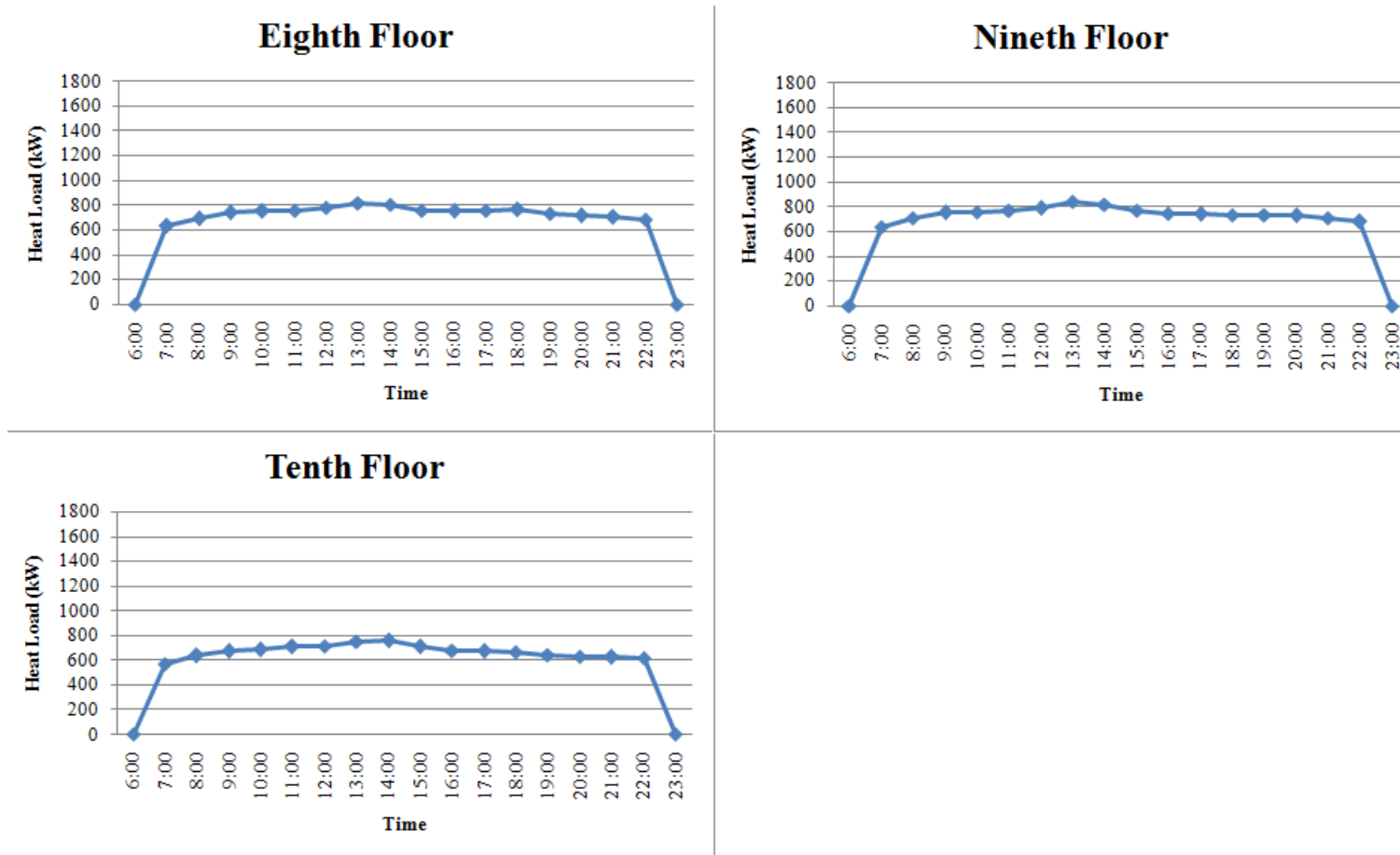


Figure 4.12 Hourly heat load on 11th May from Eighth to Tenth Floor

4.3 Heat Load Profiles

Heat load profiles for 20thMarch, 20thJune, 22ndSeptember and 21stDecember were plotted in Figures 4.13 to 4.16to calculate the annual electricity consumption and operation cost.

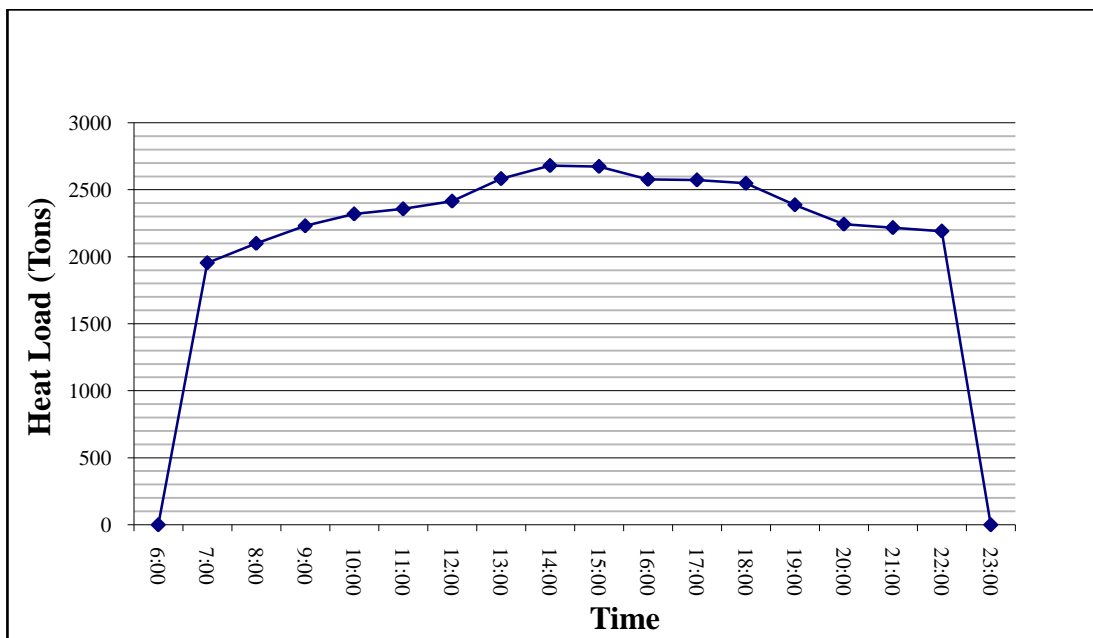


Figure 4.13 Heat load on 20thMarch

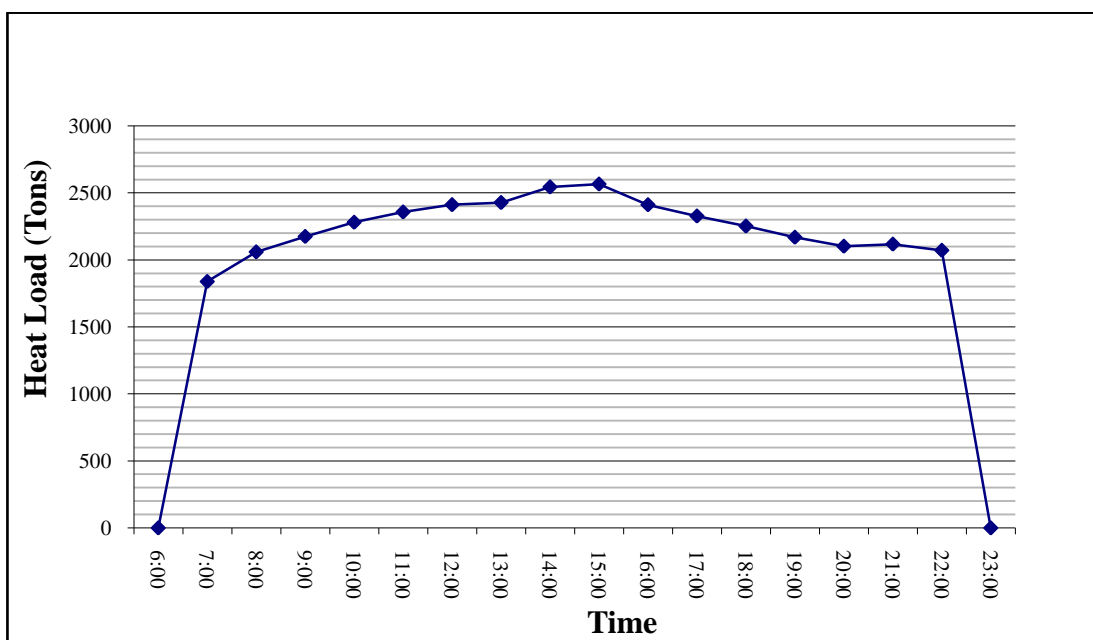


Figure 4.14 Heat load profile on 20thJune

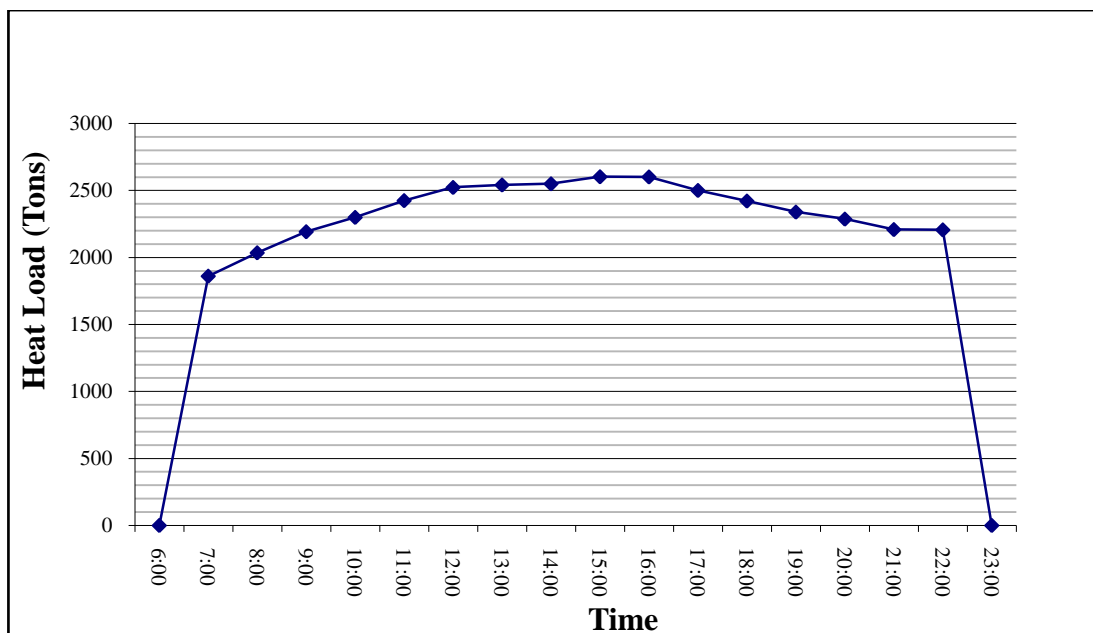


Figure 4.15 Heat load profile on 22nd September

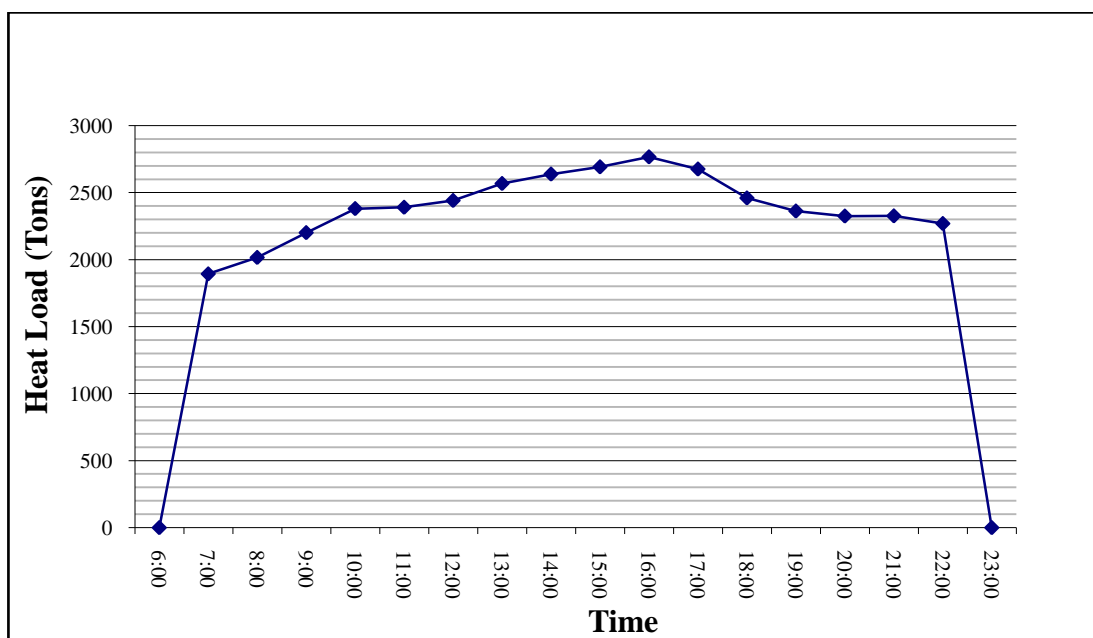


Figure 4.16 Heat load profile on 21st December

4.4 Electricity Consumption and Operation Cost

The technical specifications of the chiller in Tables 3.5-3.7 list the electrical consumption for the existing and proposed chillers. Based on the 4 load profiles in Figures 4.13-16, the comparisons of the operation cost are presented in Tables 4.3-

4.10 for both existing and proposed chillers 20th March, 20th June, 22nd September and 21st December. The C1 tariff from TNB is RM 0.234 per kWh.

Table 4.2 summarizes the electricity consumption and operating costs for existing and proposed chillers. The cost saving was also calculated on daily and seasonal basis. In Table 4.2, the cost saving per annum was estimated to be RM133,803.89. With the estimated cost for installation and equipment cost of RM4,000,000.00, the required payback period was 30 years. Obviously, this is not a feasible solution although the energy saving is approximately 1,500 kWh (equivalent to 7% of electricity saving compared to total HVAC electricity consumption) and above, the chiller has a life span shorter than the payback period.

Table 4.2 Electricity cost comparison between existing chiller and proposed chiller

	Electricity Consumption (kWh)		Operation Cost (RM)		Electricity Saving per day		Cost Saving (RM)	
	Existing	Proposed	Existing	Proposed	(kWh)	(%)	Per day	Per season
20 th Mar	21,616	20,110	5,058.11	4,705.81	1,506	7%	352.30	32,147.37
20 th Jun	23,304	21,725	5,453.17	5,083.69	1,579	7%	369.48	33,715.10
22 nd Sept	21,421	19,876	5,012.53	4,650.88	1,545	7%	361.65	33,000.58
21 st Dec	21,864	20,227	5,116.10	4,733.19	1,637	7%	382.91	34,940.84

Table 4.3 Electricity consumption for existing chiller on 20th March

Chiller (Existing) Evaporator 44/54 F, Condenser 87/97F																		
Building Load			% Part Load per CH	700 CH1	% Part Load per CH	700 CH2	% Part Load per CH	700 CH3	% Part Load per CH	700 CH4	% Part Load per CH	185 CH5	CH					
Time	Time	TR											Running TR	Total kW	700 CH1	700 CH2	700 CH3	700 CH4
0:00	1:00	0											0	0				
1:00	2:00	0											0	0				
2:00	3:00	0											0	0				
3:00	4:00	0											0	0				
4:00	5:00	0											0	0				
5:00	6:00	0											0	0				
6:00	7:00	0											0	0				
7:00	8:00	1954	93%	651	93%	651	93%	651					1,953	1104	0.565	0.565	0.565	
8:00	9:00	2099	100%	700	100%	700	100%	700					2,100	1176	0.560	0.560	0.560	
9:00	10:00	2231	98%	686	98%	686	98%	686			98%	181	2,239	1268	0.562	0.562	0.562	0.62
10:00	11:00	2319	83%	581	83%	581	83%	581	83%	581			2,324	1348	0.580	0.580	0.580	0.580
11:00	12:00	2357	84%	588	84%	588	84%	588	84%	588			2,352	1360	0.578	0.578	0.578	0.578
12:00	13:00	2415	86%	602	86%	602	86%	602	86%	602			2,408	1384	0.575	0.575	0.575	0.575
13:00	14:00	2582	92%	644	92%	644	92%	644	92%	644			2,576	1458	0.566	0.566	0.566	0.566
14:00	15:00	2680	96%	672	96%	672	96%	672	96%	672			2,688	1513	0.563	0.563	0.563	0.563
15:00	16:00	2673	95%	665	95%	665	95%	665	95%	665			2,660	1500	0.564	0.564	0.564	0.564
16:00	17:00	2576	92%	644	92%	644	92%	644	92%	644			2,576	1458	0.566	0.566	0.566	0.566
17:00	18:00	2573	92%	644	92%	644	92%	644	92%	644			2,576	1458	0.566	0.566	0.566	0.566
18:00	19:00	2547	91%	637	91%	637	91%	637	91%	637			2,548	1445	0.567	0.567	0.567	0.567
19:00	20:00	2387	85%	595	85%	595	85%	595	85%	595			2,380	1372	0.576	0.576	0.576	0.576
20:00	21:00	2243	98%	686	98%	686	98%	686			98%	181	2,239	1268	0.562	0.562	0.562	0.62
21:00	22:00	2217	97%	679	97%	679	97%	679			97%	179	2,216	1257	0.562	0.562	0.562	0.62
22:00	23:00	2191	96%	672	96%	672	96%	672			96%	178	2,194	1245	0.563	0.563	0.563	0.62
23:00	0:00	0																
		38045												21616				

Table 4.4 Electricity consumption for proposed chiller on 20th March

Chiller (New) Evaporator 44/54 F, Condenser 87/97F																			
Building Load			% Part Load per CH	700 CH1	% Part Load per CH	700 CH2	% Part Load per CH	700 CH3	% Part Load per CH	700 CH4	% Part Load per CH	185 CH5	CH						
Time	Time	TR											Running TR	Total kW	700 CH1	700 CH2	700 CH3	700 CH4	185 CH5
0:00	1:00	0											0	0					
1:00	2:00	0											0	0					
2:00	3:00	0											0	0					
3:00	4:00	0											0	0					
4:00	5:00	0											0	0					
5:00	6:00	0											0	0					
6:00	7:00	0											0	0					
7:00	8:00	1954	93%	651	93%	651	93%	651					1,953	1026	0.526	0.526	0.526		
8:00	9:00	2099	100%	700	100%	700	100%	700					2,100	1119	0.533	0.533	0.533		
9:00	10:00	2231	98%	686	98%	686	98%	686			98%	181	2,239	1211	0.530	0.530	0.530		0.66
10:00	11:00	2319	83%	581	83%	581	83%	581	83%	581			2,324	1215	0.523	0.523	0.523	0.523	
11:00	12:00	2357	84%	588	84%	588	84%	588	84%	588			2,352	1230	0.523	0.523	0.523	0.523	
12:00	13:00	2415	86%	602	86%	602	86%	602	86%	602			2,408	1260	0.523	0.523	0.523	0.523	
13:00	14:00	2582	92%	644	92%	644	92%	644	92%	644			2,576	1353	0.525	0.525	0.525	0.525	
14:00	15:00	2680	96%	672	96%	672	96%	672	96%	672			2,688	1419	0.528	0.528	0.528	0.528	
15:00	16:00	2673	95%	665	95%	665	95%	665	95%	665			2,660	1401	0.527	0.527	0.527	0.527	
16:00	17:00	2576	92%	644	92%	644	92%	644	92%	644			2,576	1353	0.525	0.525	0.525	0.525	
17:00	18:00	2573	92%	644	92%	644	92%	644	92%	644			2,576	1353	0.525	0.525	0.525	0.525	
18:00	19:00	2547	91%	637	91%	637	91%	637	91%	637			2,548	1337	0.525	0.525	0.525	0.525	
19:00	20:00	2387	85%	595	85%	595	85%	595	85%	595			2,380	1245	0.523	0.523	0.523	0.523	
20:00	21:00	2243	98%	686	98%	686	98%	686			98%	181	2,239	1211	0.530	0.530	0.530		0.66
21:00	22:00	2217	97%	679	97%	679	97%	679			97%	179	2,216	1196	0.529	0.529	0.529		0.66
22:00	23:00	2191	96%	672	96%	672	96%	672			96%	178	2,194	1181	0.528	0.528	0.528		0.65
23:00	0:00	0																	
		38045												20110					

Table 4.5 Electricity consumption for existing chiller on 20th June

Chiller (Existing) Evaporator 44/54 F, Condenser 87/97F																			
Building Load			% Part Load per CH	700 CH1	% Part Load per CH	700 CH2	% Part Load per CH	700 CH3	% Part Load per CH	700 CH4	% Part Load per CH	185 CH5	CH						
Time	Time	TR											Running TR	Total kW	700 CH1	700 CH2	700 CH3	700 CH4	185 CH5
0:00	1:00	0											0	0					
1:00	2:00	0											0	0					
2:00	3:00	0											0	0					
3:00	4:00	0											0	0					
4:00	5:00	0											0	0					
5:00	6:00	0											0	0					
6:00	7:00	0											0	0					
7:00	8:00	2009	96%	672	96%	672	96%	672					2,016	1135	0.563	0.563	0.563		
8:00	9:00	2218	97%	679	97%	679	97%	679			97%	179	2,216	1257	0.562	0.562	0.562		0.62
9:00	10:00	2376	85%	595	85%	595	85%	595	85%	595			2,380	1372	0.576	0.576	0.576	0.576	
10:00	11:00	2482	89%	623	89%	623	89%	623	89%	623			2,492	1419	0.569	0.569	0.569	0.569	
11:00	12:00	2589	92%	644	92%	644	92%	644	92%	644			2,576	1458	0.566	0.566	0.566	0.566	
12:00	13:00	2655	95%	665	95%	665	95%	665	95%	665			2,660	1500	0.564	0.564	0.564	0.564	
13:00	14:00	2769	99%	693	99%	693	99%	693	99%	693			2,772	1555	0.561	0.561	0.561	0.561	
14:00	15:00	2851	96%	672	96%	672	96%	672	96%	672	96%	178	2,866	1624	0.563	0.563	0.563	0.563	0.62
15:00	16:00	2836	95%	665	95%	665	95%	665	95%	665	95%	176	2,836	1608	0.564	0.564	0.564	0.564	0.62
16:00	17:00	2857	96%	672	96%	672	96%	672	96%	672	96%	178	2,866	1624	0.563	0.563	0.563	0.563	0.62
17:00	18:00	2837	95%	665	95%	665	95%	665	95%	665	95%	176	2,836	1608	0.564	0.564	0.564	0.564	0.62
18:00	19:00	2692	96%	672	96%	672	96%	672	96%	672			2,688	1513	0.563	0.563	0.563	0.563	
19:00	20:00	2560	91%	637	91%	637	91%	637	91%	637			2,548	1445	0.567	0.567	0.567	0.567	
20:00	21:00	2488	89%	623	89%	623	89%	623	89%	623			2,492	1419	0.569	0.569	0.569	0.569	
21:00	22:00	2408	86%	602	86%	602	86%	602	86%	602			2,408	1384	0.575	0.575	0.575	0.575	
22:00	23:00	2398	86%	602	86%	602	86%	602	86%	602			2,408	1384	0.575	0.575	0.575	0.575	
23:00	0:00	0																	
		41025												23304					

Table 4.6 Electricity consumption for proposed chiller on 20th June

Chiller (New) Evaporator 44/54 F, Condenser 87/97F																			
Building Load			% Part Load per CH	700 CH1	% Part Load per CH	700 CH2	% Part Load per CH	700 CH3	% Part Load per CH	700 CH4	% Part Load per CH	185 CH5	CH						
Time	Time	TR											Running TR	Total kW	700 CH1	700 CH2	700 CH3	700 CH4	185 CH5
0:00	1:00	0											0	0					
1:00	2:00	0											0	0					
2:00	3:00	0											0	0					
3:00	4:00	0											0	0					
4:00	5:00	0											0	0					
5:00	6:00	0											0	0					
6:00	7:00	0											0	0					
7:00	8:00	2009	96%	672	96%	672	96%	672					2,016	1064	0.528	0.528	0.528		
8:00	9:00	2218	97%	679	97%	679	97%	679			97%	179	2,216	1196	0.529	0.529	0.529		0.66
9:00	10:00	2376	85%	595	85%	595	85%	595	85%	595			2,380	1245	0.523	0.523	0.523	0.523	
10:00	11:00	2482	89%	623	89%	623	89%	623	89%	623			2,492	1306	0.524	0.524	0.524	0.524	
11:00	12:00	2589	92%	644	92%	644	92%	644	92%	644			2,576	1353	0.525	0.525	0.525	0.525	
12:00	13:00	2655	95%	665	95%	665	95%	665	95%	665			2,660	1401	0.527	0.527	0.527	0.527	
13:00	14:00	2769	99%	693	99%	693	99%	693	99%	693			2,772	1474	0.532	0.532	0.532	0.532	
14:00	15:00	2851	96%	672	96%	672	96%	672	96%	672	96%	178	2,866	1535	0.528	0.528	0.528	0.528	0.65
15:00	16:00	2836	95%	665	95%	665	95%	665	95%	665	95%	176	2,836	1516	0.527	0.527	0.527	0.527	0.65
16:00	17:00	2857	96%	672	96%	672	96%	672	96%	672	96%	178	2,866	1535	0.528	0.528	0.528	0.528	0.65
17:00	18:00	2837	95%	665	95%	665	95%	665	95%	665	95%	176	2,836	1516	0.527	0.527	0.527	0.527	0.65
18:00	19:00	2692	96%	672	96%	672	96%	672	96%	672			2,688	1419	0.528	0.528	0.528	0.528	
19:00	20:00	2560	91%	637	91%	637	91%	637	91%	637			2,548	1337	0.525	0.525	0.525	0.525	
20:00	21:00	2488	89%	623	89%	623	89%	623	89%	623			2,492	1306	0.524	0.524	0.524	0.524	
21:00	22:00	2408	86%	602	86%	602	86%	602	86%	602			2,408	1260	0.523	0.523	0.523	0.523	
22:00	23:00	2398	86%	602	86%	602	86%	602	86%	602			2,408	1260	0.523	0.523	0.523	0.523	
23:00	0:00	0																	
		41025												21725					

Table 4.7 Electricity consumption for existing chiller on 22nd September

Chiller (Existing) Evaporator 44/54 F, Condenser 87/97F																			
Building Load			% Part Load per CH	700 CH1	% Part Load per CH	700 CH2	% Part Load per CH	700 CH3	% Part Load per CH	700 CH4	% Part Load per CH	185 CH5	CH						
Time	Time	TR											Running TR	Total kW	700 CH1	700 CH2	700 CH3	700 CH4	185 CH5
0:00	1:00	0											0	0					
1:00	2:00	0											0	0					
2:00	3:00	0											0	0					
3:00	4:00	0											0	0					
4:00	5:00	0											0	0					
5:00	6:00	0											0	0					
6:00	7:00	0											0	0					
7:00	8:00	1861	89%	623	89%	623	89%	623					1,869	1064	0.569	0.569	0.569		
8:00	9:00	2035	97%	679	97%	679	97%	679					2,037	1145	0.562	0.562	0.562		
9:00	10:00	2192	96%	672	96%	672	96%	672			96%	178	2,194	1245	0.563	0.563	0.563		0.62
10:00	11:00	2299	82%	574	82%	574	82%	574	82%	574			2,296	1337	0.582	0.582	0.582	0.582	
11:00	12:00	2424	87%	609	87%	609	87%	609	87%	609			2,436	1396	0.573	0.573	0.573	0.573	
12:00	13:00	2523	90%	630	90%	630	90%	630	90%	630			2,520	1431	0.568	0.568	0.568	0.568	
13:00	14:00	2541	91%	637	91%	637	91%	637	91%	637			2,548	1445	0.567	0.567	0.567	0.567	
14:00	15:00	2550	91%	637	91%	637	91%	637	91%	637			2,548	1445	0.567	0.567	0.567	0.567	
15:00	16:00	2602	93%	651	93%	651	93%	651	93%	651			2,604	1472	0.565	0.565	0.565	0.565	
16:00	17:00	2601	93%	651	93%	651	93%	651	93%	651			2,604	1472	0.565	0.565	0.565	0.565	
17:00	18:00	2500	89%	623	89%	623	89%	623	89%	623			2,492	1419	0.569	0.569	0.569	0.569	
18:00	19:00	2421	86%	602	86%	602	86%	602	86%	602			2,408	1384	0.575	0.575	0.575	0.575	
19:00	20:00	2339	84%	588	84%	588	84%	588	84%	588			2,352	1360	0.578	0.578	0.578	0.578	
20:00	21:00	2286	100%	700	100%	700	100%	700			100%	185	2,285	1293	0.560	0.560	0.560		0.63
21:00	22:00	2209	97%	679	97%	679	97%	679			97%	179	2,216	1257	0.562	0.562	0.562		0.62
22:00	23:00	2206	97%	679	97%	679	97%	679			97%	179	2,216	1257	0.562	0.562	0.562		0.62
23:00	0:00	0																	
		37591												21421					

Table 4.8 Electricity consumption for proposed chiller on 22nd September

Chiller (New) Evaporator 44/54 F, Condenser 87/97F																			
Building Load			% Part Load per CH	700 CH1	% Part Load per CH	700 CH2	% Part Load per CH	700 CH3	% Part Load per CH	700 CH4	% Part Load per CH	185 CH5	CH						
Time	Time	TR											Running TR	Total kW	700 CH1	700 CH2	700 CH3	700 CH4	185 CH5
0:00	1:00	0											0	0					
1:00	2:00	0											0	0					
2:00	3:00	0											0	0					
3:00	4:00	0											0	0					
4:00	5:00	0											0	0					
5:00	6:00	0											0	0					
6:00	7:00	0											0	0					
7:00	8:00	1861	89%	623	89%	623	89%	623					1,869	980	0.524	0.524	0.524		
8:00	9:00	2035	97%	679	97%	679	97%	679					2,037	1078	0.529	0.529	0.529		
9:00	10:00	2192	96%	672	96%	672	96%	672			96%	178	2,194	1181	0.528	0.528	0.528		0.65
10:00	11:00	2299	82%	574	82%	574	82%	574	82%	574			2,296	1200	0.523	0.523	0.523	0.523	
11:00	12:00	2424	87%	609	87%	609	87%	609	87%	609			2,436	1275	0.524	0.524	0.524	0.524	
12:00	13:00	2523	90%	630	90%	630	90%	630	90%	630			2,520	1322	0.525	0.525	0.525	0.525	
13:00	14:00	2541	91%	637	91%	637	91%	637	91%	637			2,548	1337	0.525	0.525	0.525	0.525	
14:00	15:00	2550	91%	637	91%	637	91%	637	91%	637			2,548	1337	0.525	0.525	0.525	0.525	
15:00	16:00	2602	93%	651	93%	651	93%	651	93%	651			2,604	1369	0.526	0.526	0.526	0.526	
16:00	17:00	2601	93%	651	93%	651	93%	651	93%	651			2,604	1369	0.526	0.526	0.526	0.526	
17:00	18:00	2500	89%	623	89%	623	89%	623	89%	623			2,492	1306	0.524	0.524	0.524	0.524	
18:00	19:00	2421	86%	602	86%	602	86%	602	86%	602			2,408	1260	0.523	0.523	0.523	0.523	
19:00	20:00	2339	84%	588	84%	588	84%	588	84%	588			2,352	1230	0.523	0.523	0.523	0.523	
20:00	21:00	2286	100%	700	100%	700	100%	700			100%	185	2,285	1241	0.533	0.533	0.533		0.66
21:00	22:00	2209	97%	679	97%	679	97%	679			97%	179	2,216	1196	0.529	0.529	0.529		0.66
22:00	23:00	2206	97%	679	97%	679	97%	679			97%	179	2,216	1196	0.529	0.529	0.529		0.66
23:00	0:00	0																	
		37591												19876					

Table 4.9 Electricity consumption for existing chiller on 21st December

Chiller (Existing) Evaporator 44/54 F, Condenser 87/97F																				
Building Load			% Part Load	700	% Part Load	700	% Part Load	700	% Part Load	700	% Part Load	185	Oper	CH						
Time	Time	TR	per CH	CH1	per CH	CH2	per CH	CH3	per CH	CH4	per CH	CH5	Nos.	Running TR	Total kW	700 CH1	700 CH2	700 CH3	700 CH4	185 CH5
0:00	1:00	0												0	0					
1:00	2:00	0												0	0					
2:00	3:00	0												0	0					
3:00	4:00	0												0	0					
4:00	5:00	0												0	0					
5:00	6:00	0												0	0					
6:00	7:00	0												0	0					
7:00	8:00	1893	90%	630	90%	630	90%	630						1,890	1073	0.568	0.568	0.568		
8:00	9:00	2015	96%	672	96%	672	96%	672						2,016	1135	0.563	0.563	0.563		
9:00	10:00	2200	96%	672	96%	672	96%	672			96%	178	1	2,194	1245	0.563	0.563	0.563		0.62
10:00	11:00	2380	85%	595	85%	595	85%	595	85%	595				2,380	1372	0.576	0.576	0.576	0.576	
11:00	12:00	2389	85%	595	85%	595	85%	595	85%	595				2,380	1372	0.576	0.576	0.576	0.576	
12:00	13:00	2440	87%	609	87%	609	87%	609	87%	609				2,436	1396	0.573	0.573	0.573	0.573	
13:00	14:00	2567	92%	644	92%	644	92%	644	92%	644				2,576	1458	0.566	0.566	0.566	0.566	
14:00	15:00	2637	94%	658	94%	658	94%	658	94%	658				2,632	1486	0.565	0.565	0.565	0.565	
15:00	16:00	2691	96%	672	96%	672	96%	672	96%	672				2,688	1513	0.563	0.563	0.563	0.563	
16:00	17:00	2765	99%	693	99%	693	99%	693	99%	693				2,772	1555	0.561	0.561	0.561	0.561	
17:00	18:00	2675	96%	672	96%	672	96%	672	96%	672				2,688	1513	0.563	0.563	0.563	0.563	
18:00	19:00	2459	88%	616	88%	616	88%	616	88%	616				2,464	1407	0.571	0.571	0.571	0.571	
19:00	20:00	2361	84%	588	84%	588	84%	588	84%	588				2,352	1360	0.578	0.578	0.578	0.578	
20:00	21:00	2324	83%	581	83%	581	83%	581	83%	581				2,324	1348	0.580	0.580	0.580	0.580	
21:00	22:00	2325	83%	581	83%	581	83%	581	83%	581				2,324	1348	0.580	0.580	0.580	0.580	
22:00	23:00	2268	99%	693	99%	693	99%	693			99%	183	1	2,262	1281	0.561	0.561	0.561		0.63
23:00	0:00	0																		
		38389													21864					

Table 4.10 Electricity consumption for existing proposed on 21st December

Chiller (New) Evaporator 44/54 F, Condenser 87/97F																				
Building Load			% Part Load	700	% Part Load	700	% Part Load	700	% Part Load	700	% Part Load	185	Oper	CH						
Time	Time	TR	per CH	CH1	per CH	CH2	per CH	CH3	per CH	CH4	per CH	CH5	Nos.	Running TR	Total kW	700 CH1	700 CH2	700 CH3	700 CH4	185 CH5
0:00	1:00	0												0	0					
1:00	2:00	0												0	0					
2:00	3:00	0												0	0					
3:00	4:00	0												0	0					
4:00	5:00	0												0	0					
5:00	6:00	0												0	0					
6:00	7:00	0												0	0					
7:00	8:00	1893	90%	630	90%	630	90%	630						1,890	991	0.525	0.525	0.525		
8:00	9:00	2015	96%	672	96%	672	96%	672						2,016	1064	0.528	0.528	0.528		
9:00	10:00	2200	96%	672	96%	672	96%	672			96%	178	1	2,194	1181	0.528	0.528	0.528		0.65
10:00	11:00	2380	85%	595	85%	595	85%	595	85%	595				2,380	1245	0.523	0.523	0.523	0.523	
11:00	12:00	2389	85%	595	85%	595	85%	595	85%	595				2,380	1245	0.523	0.523	0.523	0.523	
12:00	13:00	2440	87%	609	87%	609	87%	609	87%	609				2,436	1275	0.524	0.524	0.524	0.524	
13:00	14:00	2567	92%	644	92%	644	92%	644	92%	644				2,576	1353	0.525	0.525	0.525	0.525	
14:00	15:00	2637	94%	658	94%	658	94%	658	94%	658				2,632	1384	0.526	0.526	0.526	0.526	
15:00	16:00	2691	96%	672	96%	672	96%	672	96%	672				2,688	1419	0.528	0.528	0.528	0.528	
16:00	17:00	2765	99%	693	99%	693	99%	693	99%	693				2,772	1474	0.532	0.532	0.532	0.532	
17:00	18:00	2675	96%	672	96%	672	96%	672	96%	672				2,688	1419	0.528	0.528	0.528	0.528	
18:00	19:00	2459	88%	616	88%	616	88%	616	88%	616				2,464	1291	0.524	0.524	0.524	0.524	
19:00	20:00	2361	84%	588	84%	588	84%	588	84%	588				2,352	1230	0.523	0.523	0.523	0.523	
20:00	21:00	2324	83%	581	83%	581	83%	581	83%	581				2,324	1215	0.523	0.523	0.523	0.523	
21:00	22:00	2325	83%	581	83%	581	83%	581	83%	581				2,324	1215	0.523	0.523	0.523	0.523	
22:00	23:00	2268	99%	693	99%	693	99%	693			99%	183	1	2,262	1226	0.532	0.532	0.532		0.66
23:00	0:00	0																		
		38389													20227					

CHAPTER 5

CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

The proposed VSD water cooled chiller plant was designed for the KB Block of UTAR Sungai Long Campus. The heat load calculation results showed that air a conditioning load of 3,100 tons of refrigerant was required for the entire building. The available capacity required 3 chillers on duty and 1 chiller on standby. However, based on the heat load calculation, it was noticed that 4 numbers of chillers were operated most of the time. In the event of any chiller breakdown, there will be insufficient cooling load to cool down the entire KB Block.

Based on the return of investment calculation, the investment of the proposed chiller water plant was not feasible due to long payback period of 30 years as a result of high capital cost of RM 4,000,000.00, although it led to 7% of electricity saving compared to the total electricity consumption.

To reduce overall electrical consumption for the water cooled chiller plant, an additional VSD for all the cooling towers is a better proposal. The proven Affinity Law has showed that much electrical consumption can be saved on motor power when the rotational pump speed is reduced.

5.2 Recommendations

To further improve the heat load calculation, the heat load calculation has to take semester break into consideration. During the semester break, most of the space is unoccupied and the demand on air-conditioning is much lower.

The accuracy of the heat load calculation is vital for building designer for equipment selection. It enables the building designer to avoid any over sizing or under sizing design of the water cooled chiller plant for cost optimisation. To further improve the accuracy of the heat load calculation, energy audit is recommended. Data logger can be installed at the chiller and can be used to monitor electricity consumption at real time.

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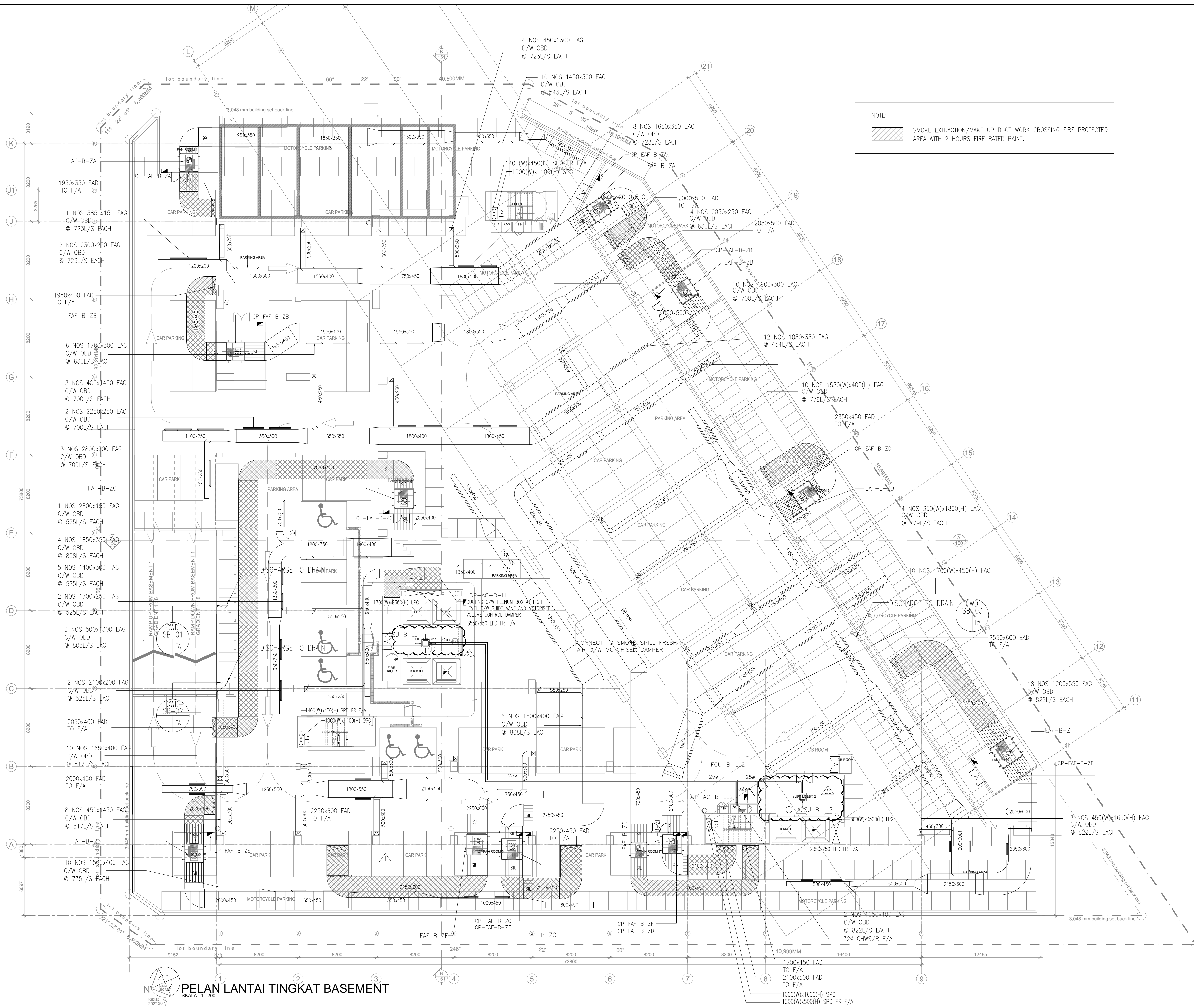
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NOTE:
 SMOKE EXTRACTION/MAKE UP DUCT WORK CROSSING FIRE PROTECTED AREA WITH 2 HOURS FIRE RATED PAINT.

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 SKALA 1:200

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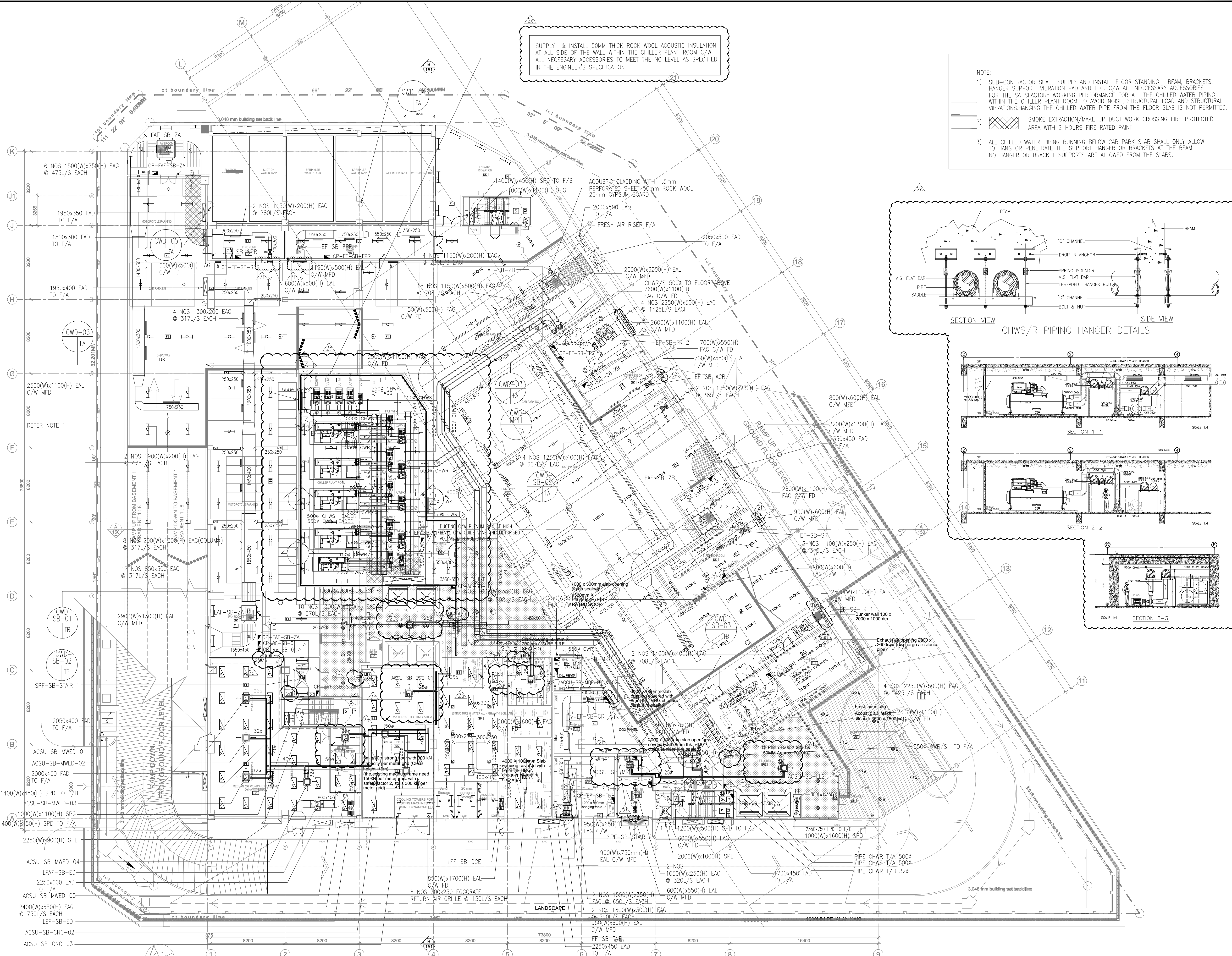
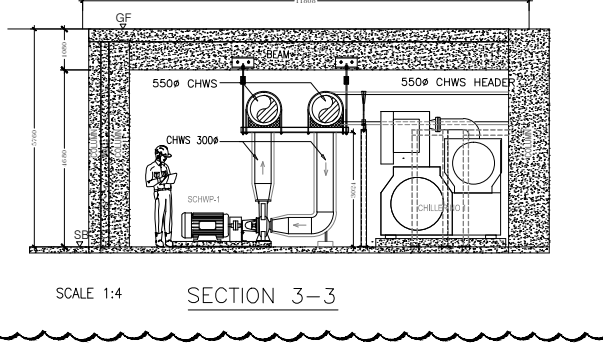
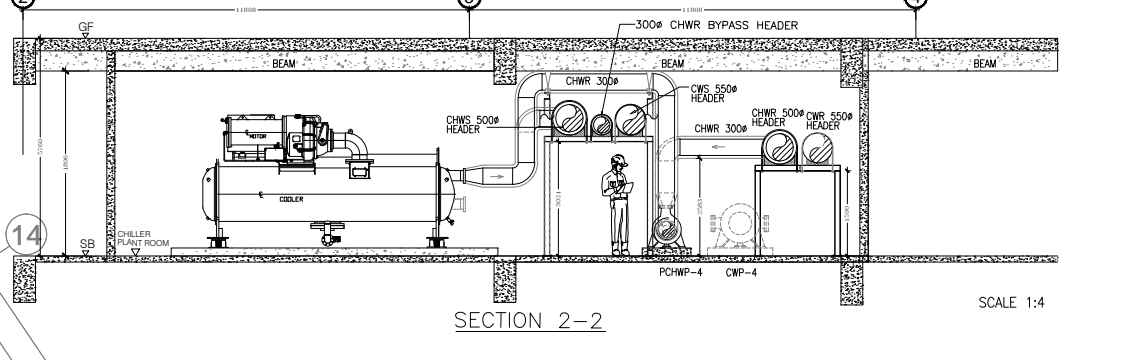
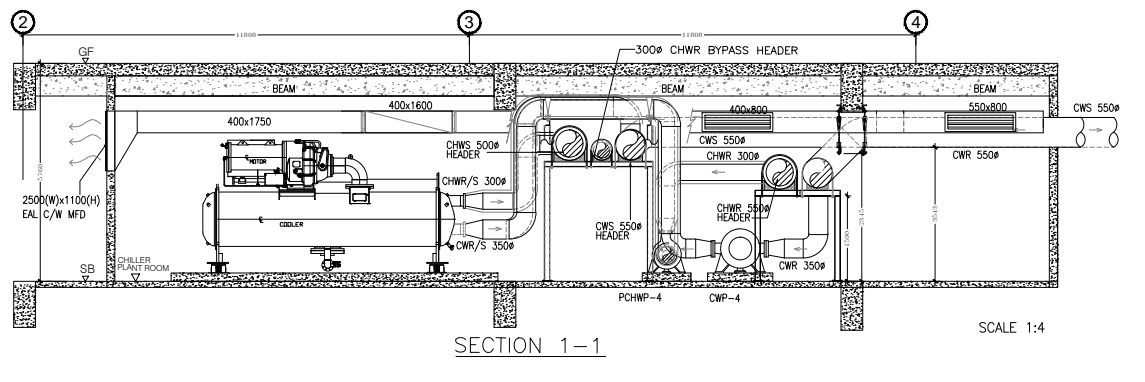
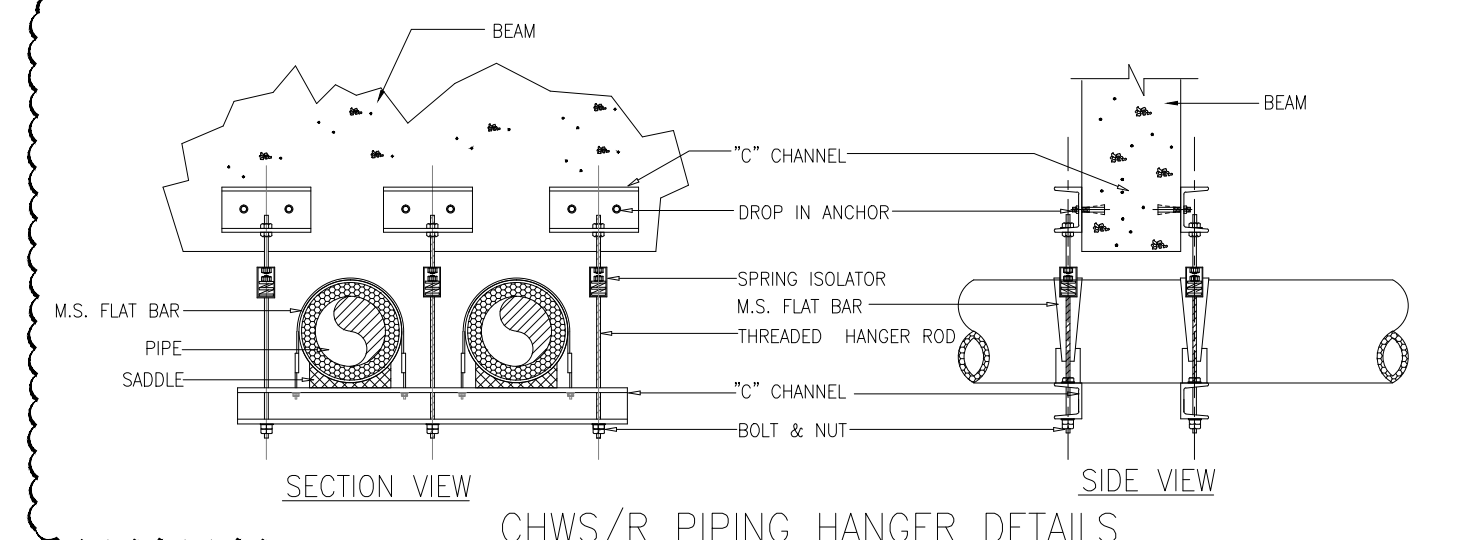
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 SATU TINGKAT BASEMENT TEMPAT LETAK KERETA,
 TIGA (3) BUAH PONDOK PENGAWAL
 DI ATAS LOT PT 21145, JALAN PERSIARAN SG. LONG 1,
 BANDAR SG. LONG, MUKIM CHERAS,
 DAERAH HULU LANGAT, SELANGOR DARUL EHSAN
 UNTUK TETAPAN :
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**AIR CONDITIONING & MECHANICAL
 VENTILATION SERVICES
 BASEMENT PLAN**

SUPPLY & INSTALL 50MM THICK ROCK WOOL ACOUSTIC INSULATION AT ALL SIDE OF THE WALL WITHIN THE CHILLER PLANT ROOM C/W ALL NECESSARY ACCESSORIES TO MEET THE NC LEVEL AS SPECIFIED IN THE ENGINEER'S SPECIFICATION.

- NOTE:
- SUB-CONTRACTOR SHALL SUPPLY AND INSTALL FLOOR STANDING I-BEAM, BRACKETS, HANGER SUPPORT, VIBRATION PAD AND ETC. C/W ALL NECESSARY ACCESSORIES FOR THE SATISFACTORY WORKING PERFORMANCE FOR ALL THE CHILLED WATER PIPING WITHIN THE CHILLER PLANT ROOM TO AVOID NOISE. STRUCTURAL LOAD AND STRUCTURAL VIBRATIONS. HANGING THE CHILLED WATER PIPE FROM THE FLOOR SLAB IS NOT PERMITTED.
 - SMOKE EXTRACTION/MAKE UP DUCT WORK CROSSING FIRE PROTECTED AREA WITH 2 HOURS FIRE RATED PAINT.
 - ALL CHILLED WATER PIPING RUNNING BELOW CAR PARK SLAB SHALL ONLY ALLOW TO HANG OR PENETRATE THE SUPPORT HANGER OR BRACKETS AT THE BEAM. NO HANGER OR BRACKET SUPPORTS ARE ALLOWED FROM THE SLABS.



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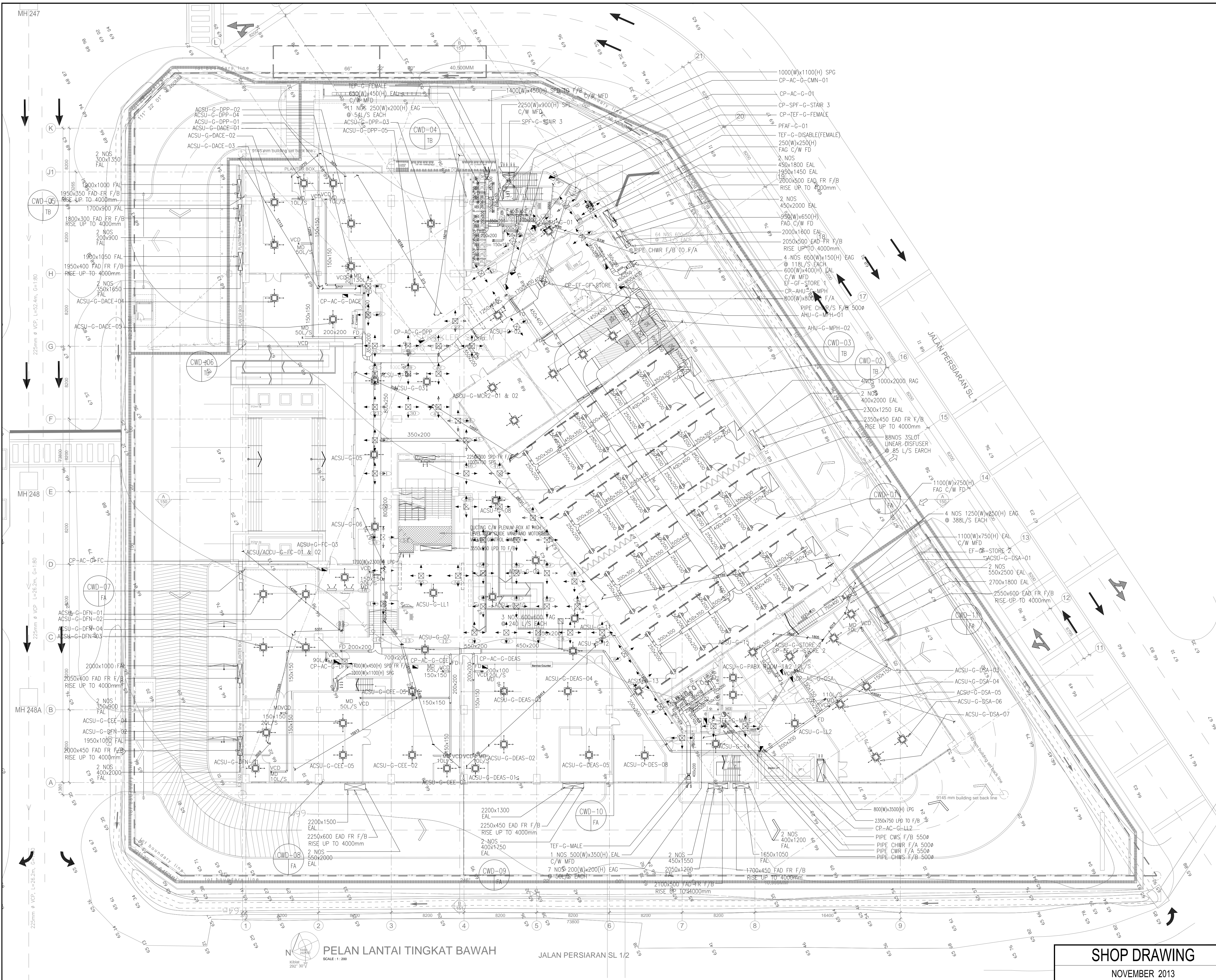
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SKALA: 1:200

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 Facsimile : (603) 8943333
 E-Mail : em@sspbd.com.my
 Web Site : www.sspbd.com

MS ISO 9001 REG. NO. AR 1616

MAIN CONTRACTOR:-
ASSOCIATED BUILDERS AND CONTRACTORS SDN. BHD
 (Co. Reg. No. 7746-W)
 No. 58, JALAN GHAZALI JAWI, (OPPOSITE PERAK STADIUM),
 31400 IPOH, PERAK D. R.
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 FAX: 605 - 548 8606
 E-mail: abcipoh@yahoo.com

ACMV CONTRACTOR (NSC):-
HSB HEROSS SDN. BHD. (155135-X)
 No. 17, Jalan Daya 11, Taman Daya,
 52100 Kepong, Selangor Darul Ehsan, Malaysia
 Tel: 603 - 6276 2928, 6276 2930, 62761516
 Fax: 603 - 6274 2360
 E-mail : herosshd@yahoo.com

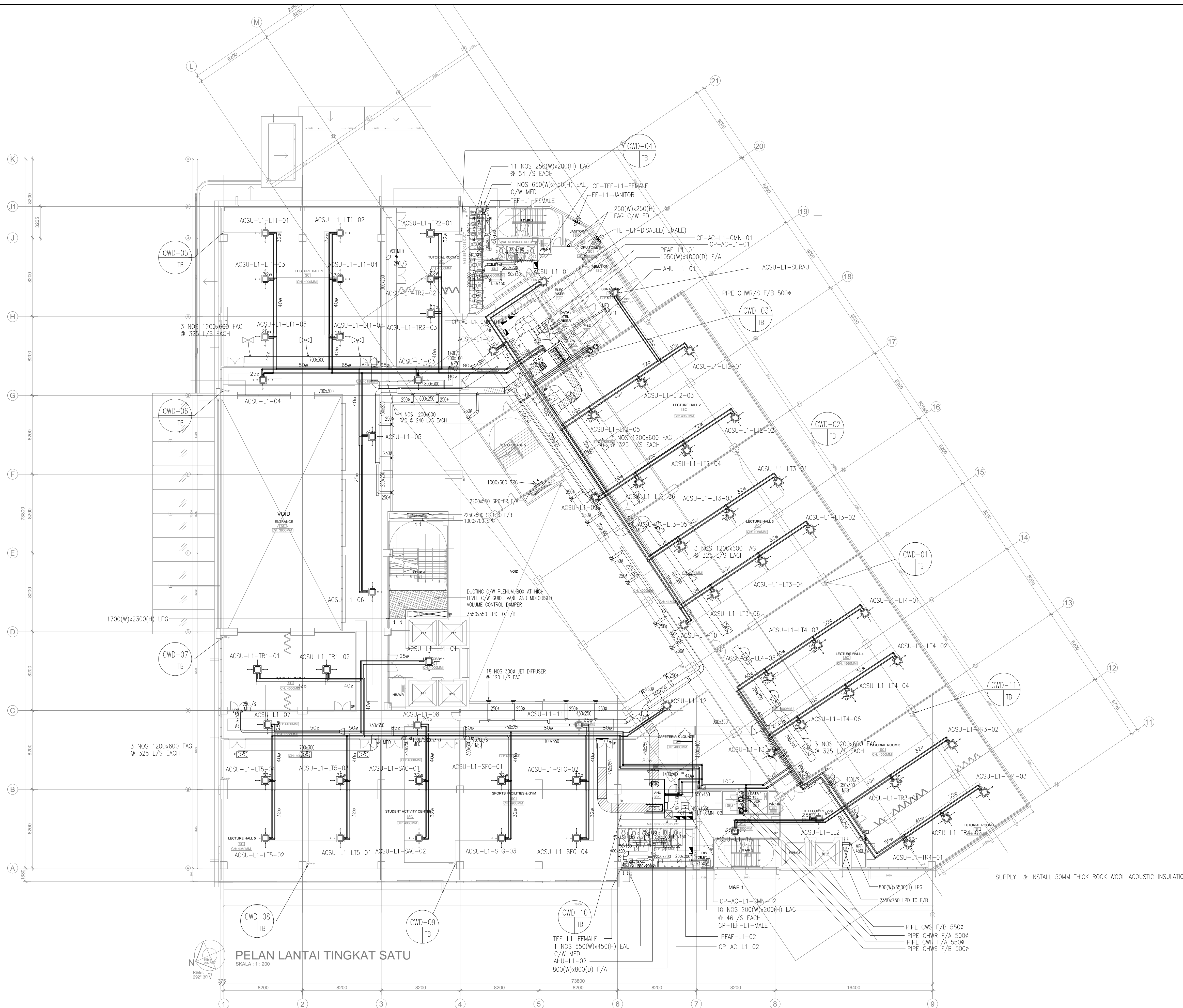
PROJECT:-
 CADANGAN PEMBANGUNAN SATU BLOK BANGUNAN
 PERNIAGAAN 12 TINGKAT (UNIVERSITI TUNKU ABDUL
 RAHMAN-UTAR) DENGAN SEPARA BASEMENT SERTA
 SATU TINGKAT BASEMENT TEMPAT LETAK KERETA,
 TIGA (3) BUAH PONDOK PENGAWAL
 DI ATAS LOT PT 21145, JALAN PERSIARAN SG. LONG 1,
 BANDAR SG. LONG, MUKIM CHERAS,
 DAERAH HULU LANGAT, SELANGOR DARUL EHSAN
 UNTUK TETUAN :
 UTAR EDUCATION FOUNDATION

DRAWING TITLE :-
**AIR CONDITIONING & MECHANICAL
 VENTILATION SERVICES
 GROUND FLOOR PLAN**

Drawn : JW/JS/GCS Date : NOV '2014 Job No. : 14213	Checked : Date : Scale : 1:200 Rev
--	---

DRAWING NO. : HSB/UTSLC/ACMV/ 4012

SHOP DRAWING
 NOVEMBER 2013



PELAN LANTAI TINGKAT SATU

SKALA: 1 : 200

CWD-10 TB

TEF-L1-FEMALE
1 NOS 550(W)x450(H) EAL
C/W MFD
AHU-L1-02
800(W)x800(D) F/A

SUPPLY & INSTALL 50MM THICK ROCK WOOL ACOUSTIC INSULATION

SHOP DRAWING
NOVEMBER 2013

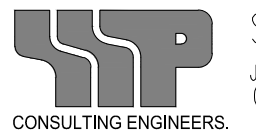
REV. NO.	DESCRIPTION	DRAWN	CHK.	REV. DATE


DATUK LEONG TANG CHONG
DIRECTOR/TRUSTEE
UTAR EDUCATION FOUNDATION
(CO NO: 578227-M)



No. 13, Jalan 13/6,
46200 Petaling Jaya,
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Fax : 603-79581923
Homepage : http://www.utar.edu.my

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M & E CONSULTING ENGINEERS.
 **SSP (E&M) SDN. BHD.** (208897-1)
JURUTERA PERUNDING ELEKTRIK DAN JENTERA
(CONSULTING ELECTRICAL & MECHANICAL ENGINEERS)



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E-Mail : em@sspb.com.my
Web Site : www.sspb.com

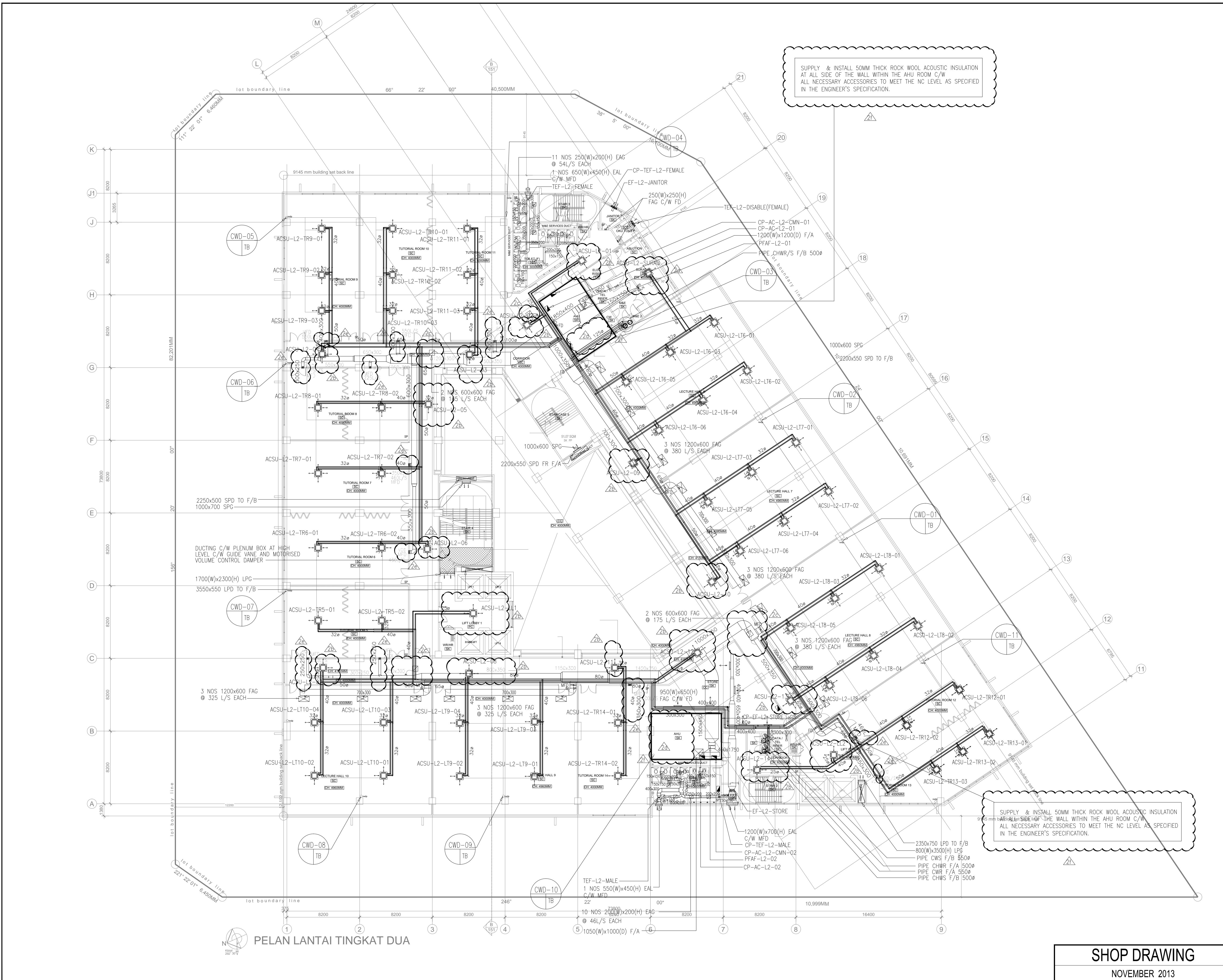
MAIN CONTRACTOR:-
ASSOCIATED BUILDERS AND CONTRACTORS SDN. BHD
(Co. Reg. No. 7746-W)
No. 58, JALAN GHAZALI JAWI, (OPPOSITE PERAK STADIUM),
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E-mail: abcipoh@yahoo.com

AC/MV CONTRACTOR (NSC):-
HSB HEROSS SDN. BHD. (155135-X)
No. 17, Jalan Daya 11, Taman Daya,
52100 Kepong, Selangor Darul Ehsan, Malaysia
Tel: 603 - 6276 2928, 6276 2930, 62761516
Fax: 603 - 6274 2360
E-mail : herossbhd@yahoo.com

PROJECT:
CADANGAN PEMBANGUNAN SATU BLOK BANGUNAN
PERNIAGAAN 12 TINGKAT (UNIVERSITI TUNKU ABU
RAHMAN-UTAR) DENGAN SEPARA BASEMENT SERTA
SATU TINGKAT BASEMENT TEMPAT LETAK KERETA,
TIGA (3) BUAH PONDOK PENGAWAL
DI ATAS LOT PT 21145, JALAN PERSIARAN SG. LONG 1,
BANDAR SG. LONG, MUKIM CHERAS,
DAERAH HULU LANGAT, SELANGOR DARUL EHSAN
UNTUK TIJUAN :
UTAR EDUCATION FOUNDATION


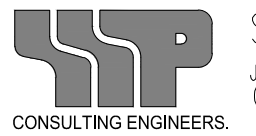

DRAWING TITLE :
AIR CONDITIONING & MECHANICAL
VENTILATION SERVICES
LEVEL 1 PLAN

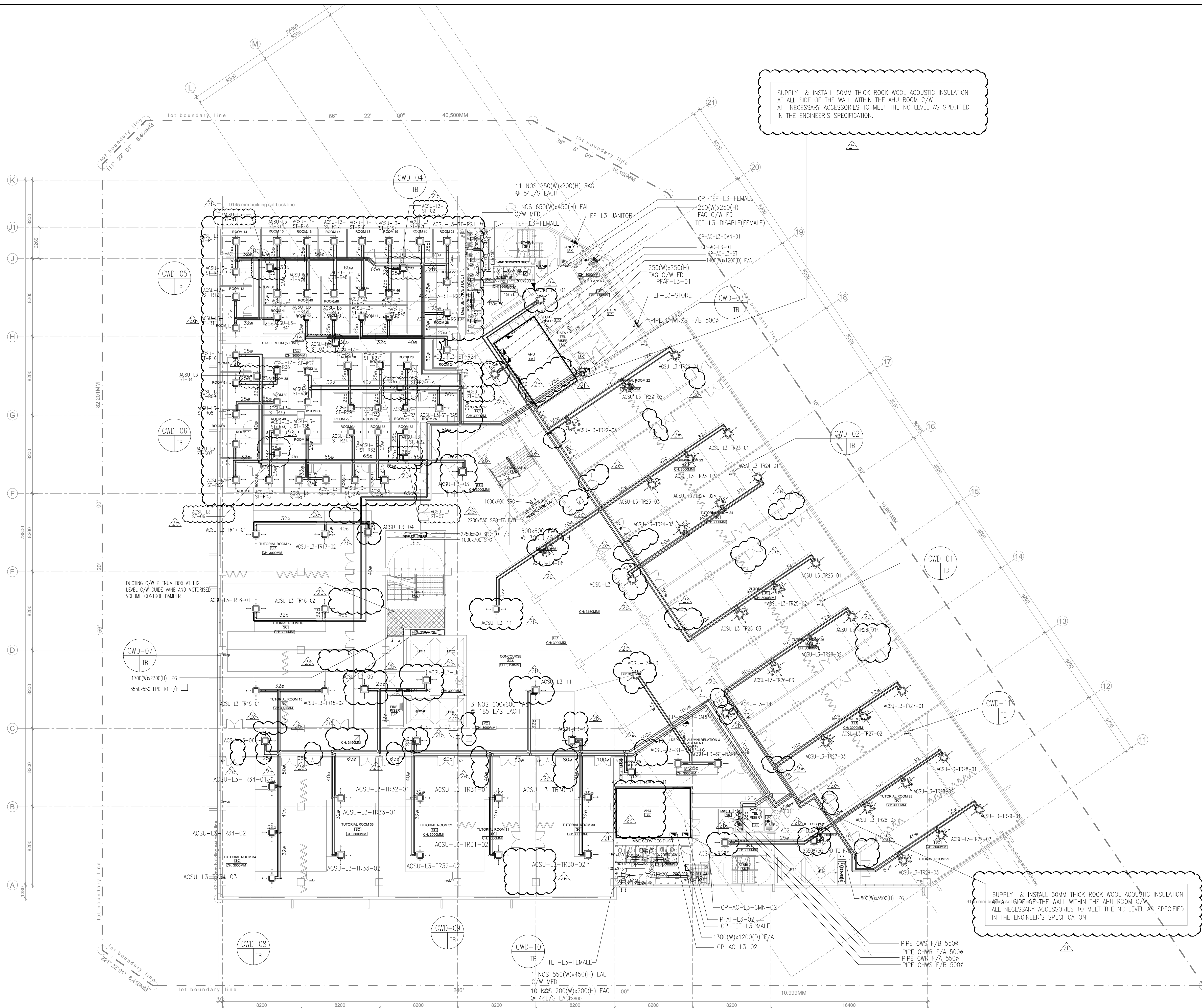
Drawn : JW/JS/GCS	Checked :
Date : NOV '2014	Date :
Job No. : 41213	Scale : 1:200
DRAWING NO.: HSB/UTSLC/ACMV/4013	Rev



PELAN LANTAI TINGKAT DUA

SHOP DRAWING
NOVEMBER 2013

REV. NO.	DESCRIPTION	DRAWN	CHK.	REV. DATE
<p>DATUK LEONG TANG CHONG DIRECTOR/TRUSTEE UTAR EDUCATION FOUNDATION (CO NO. 578227-M)</p>				
				
<p>No. 13, Jalan 13/6, 46200 Petaling Jaya, Selangor Darul Ehsan, Tel. : 603-79562628 Fax. : 603-79561923 Homepage : http://www.utar.edu.my</p>				
<p>ARCHITECT :- S N LOW & ASSOCIATES SDN. BHD. No. 63 & 65, JALAN SS 15/4B, 47500 SUBANG JAYA, SELANGOR TEL : 603 - 5633 7252 FAX : 603 - 5633 2755</p>				
<p>M & E CONSULTING ENGINEERS.</p>  <p>SSP (E&M) SDN. BHD. (208897-1) JURUTERA PERUNDING ELEKTRIK DAN JENTERA (CONSULTING ELECTRICAL & MECHANICAL ENGINEERS)</p>				
 <p>Level 7 No. 1, Jalan SR 8/3 43000 Seri Kembangan Selangor Darul Ehsan Malaysia Telephone : (603) 8943366 (HL) Facsimile : (603) 8943333 E-Mail : em@sspb.com.my Web Site : www.sspb.com.my</p>				
<p>MIS ISO 9001 REG. NO. AR 1616</p>				
<p>MAIN CONTRACTOR:- ASSOCIATED BUILDERS AND CONTRACTORS SDN. BHD (Co. Reg. No. 7746-W) No. 58, JALAN GHAZALI JAWI, (OPPOSITE PERAK STADIUM), 31400 IPOH, PERAK D. R. TEL: 605 - 548 2219 (Hunting Line), 548 2950, 548 8739 FAX: 605 - 548 8606 E-mail: abcipoh@yahoo.com</p>				
<p>ACMV CONTRACTOR (NSC):- HSB HEROSS SDN. BHD. (155135-X) No. 17, Jalan Daya 11, Taman Daya, 52100 Kepong, Selangor Darul Ehsan, Malaysia Tel: 603 - 6274 2928, 6276 2930, 62761516 Fax: 603 - 6274 2360 E-mail : herosshd@yahoo.com</p>				
<p>PROJECT: CADANGAN PEMBANGUNAN SATU BLOK BANGUNAN PERNIAGAAN 12 TINGKAT (UNIVERSITI TUNKU ABU RAHMAN-UTAR) DENGAN SEPARA BASEMENT SERTA SATU TINGKAT BASEMENT TEMPAT LETAK KERETA, TIGA (3) BUAH PONDOK PENGAWAL DI ATAS LOT PT 21145, JALAN PERSIARAN SG. LONG 1, BANDAR SG. LONG, MUKIM CHERAS, DAERAH HULU LANGAT, SELANGOR DARUL EHSAN UNTUK TETUAN : UTAR EDUCATION FOUNDATION</p>				
<p>DRAWING TITLE : AIR CONDITIONING & MECHANICAL VENTILATION SERVICES LEVEL 2 PLAN</p>				
Drawn	JW/JS/GCS	Checked		
Date	NOV '2014	Date		
Job No.	1:41213	Scale	1:200	Rev
DRAWING NO.: HSB/UTSLC/ACMV/4014				



PELAN LANTAI TINGKAT TIGA
SKALA: 1 : 200

SHOP DRAWING
NOVEMBER 2013

REV. NO.	DESCRIPTION	DRAWN	CHK.	REV. DATE

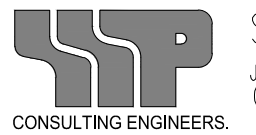
DATUK LEONG TANG CHONG
DIRECTOR/TRUSTEE
UTAR EDUCATION FOUNDATION
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M & E CONSULTING ENGINEERS.



SSP (E&M) SDN. BHD. (208897-1)
JURUTERA PERUNDING ELEKTRIK DAN JENTERA
(CONSULTING ELECTRICAL & MECHANICAL ENGINEERS)



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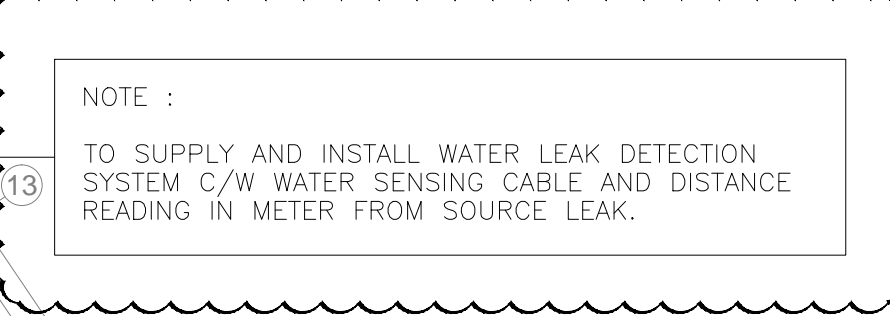
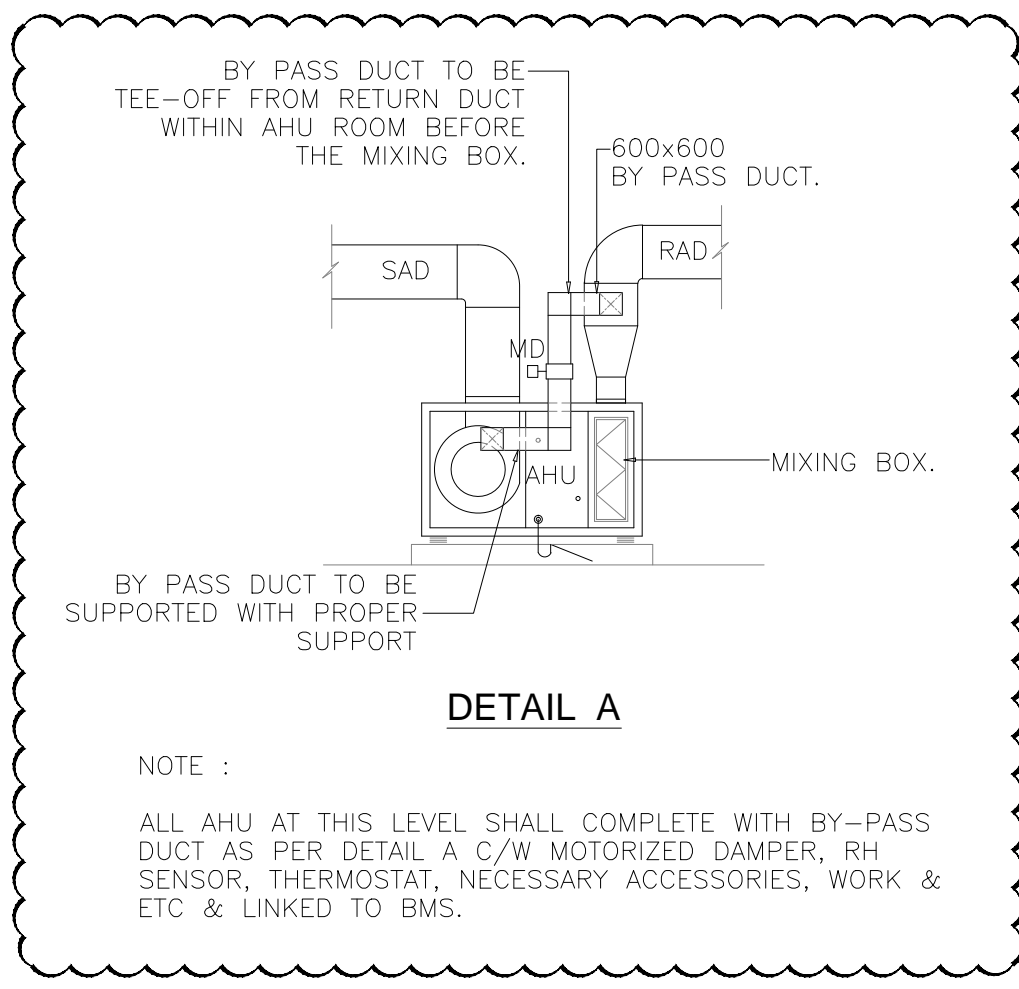
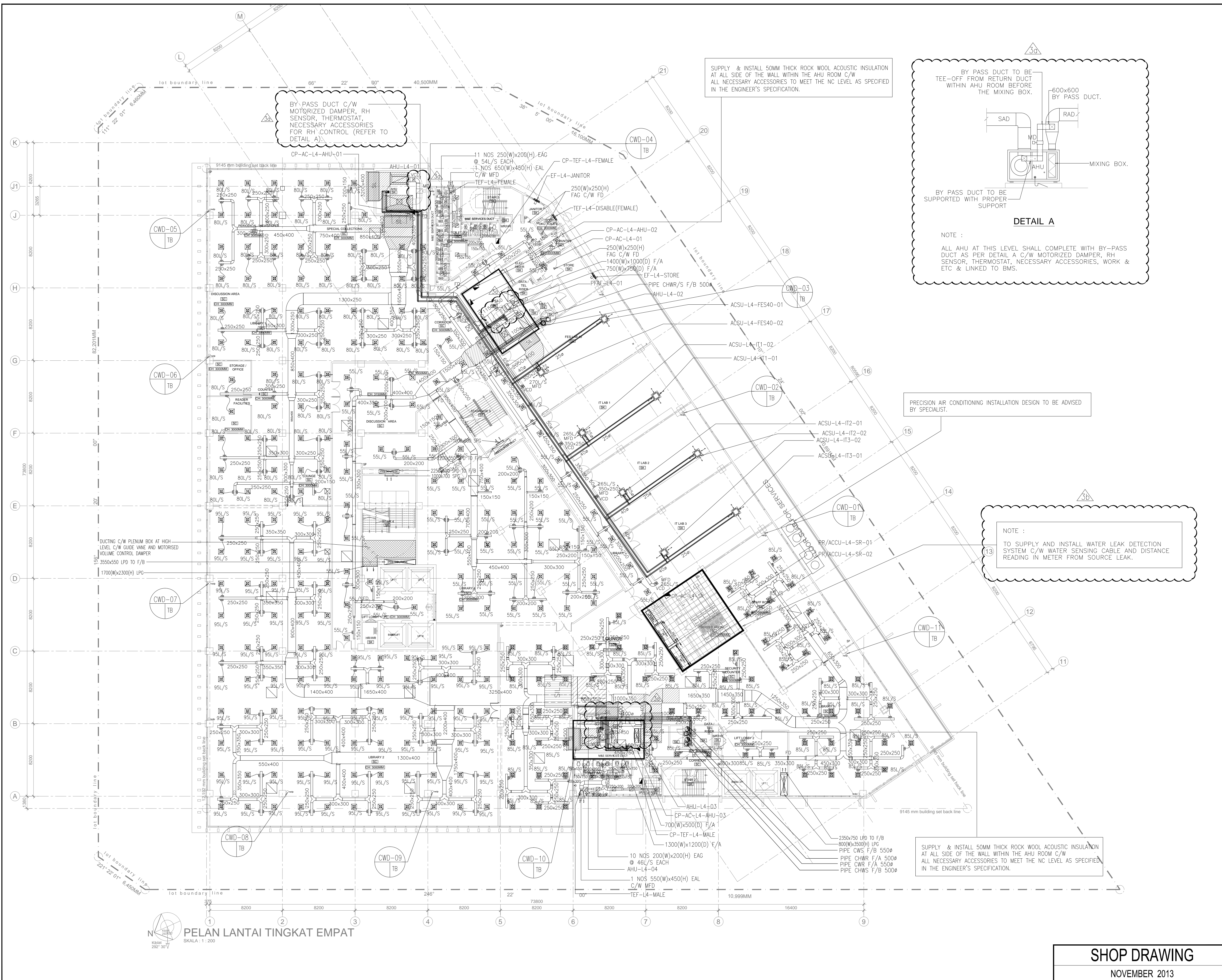
MAIN CONTRACTOR:-
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Tel: 603 - 6276 2928, 6276 2930, 62761516
Fax: 603 - 6274 2360
E-mail : herosshd@yahoo.com

PROJECT:-
CADANGAN PEMBANGUNAN SATU BLOK BANGUNAN
PERNIAGAAN 12 TINGKAT (UNIVERSITI TUNKU ABU
RAHMAN-UTAR) DENGAN SEPARA BASEMENT SERTA
SATU TINGKAT BASEMENT TEMPAT LETAK KERETA,
TIGA (3) BUAH PONDOK PENGAWAL
DI ATAS LOT PT 21145, JALAN PERSIARAN SG. LONG 1,
BANDAR SG. LONG, MUKIM CHERAS,
DAERAH HULU LANGAT, SELANGOR DARUL EHSAN
UNTUK TUJUAN :
UTAR EDUCATION FOUNDATION

DRAWING TITLE :-
AIR CONDITIONING & MECHANICAL
VENTILATION SERVICES
LEVEL 3 PLAN

Drawn : JW/JS/GCS	Checked :
Date : NOV '2014	Date :
Job No. : 41213	Scale : 1:200
DRAWING NO. : HSB/UTSLC/ACMV/ 4015	Rev

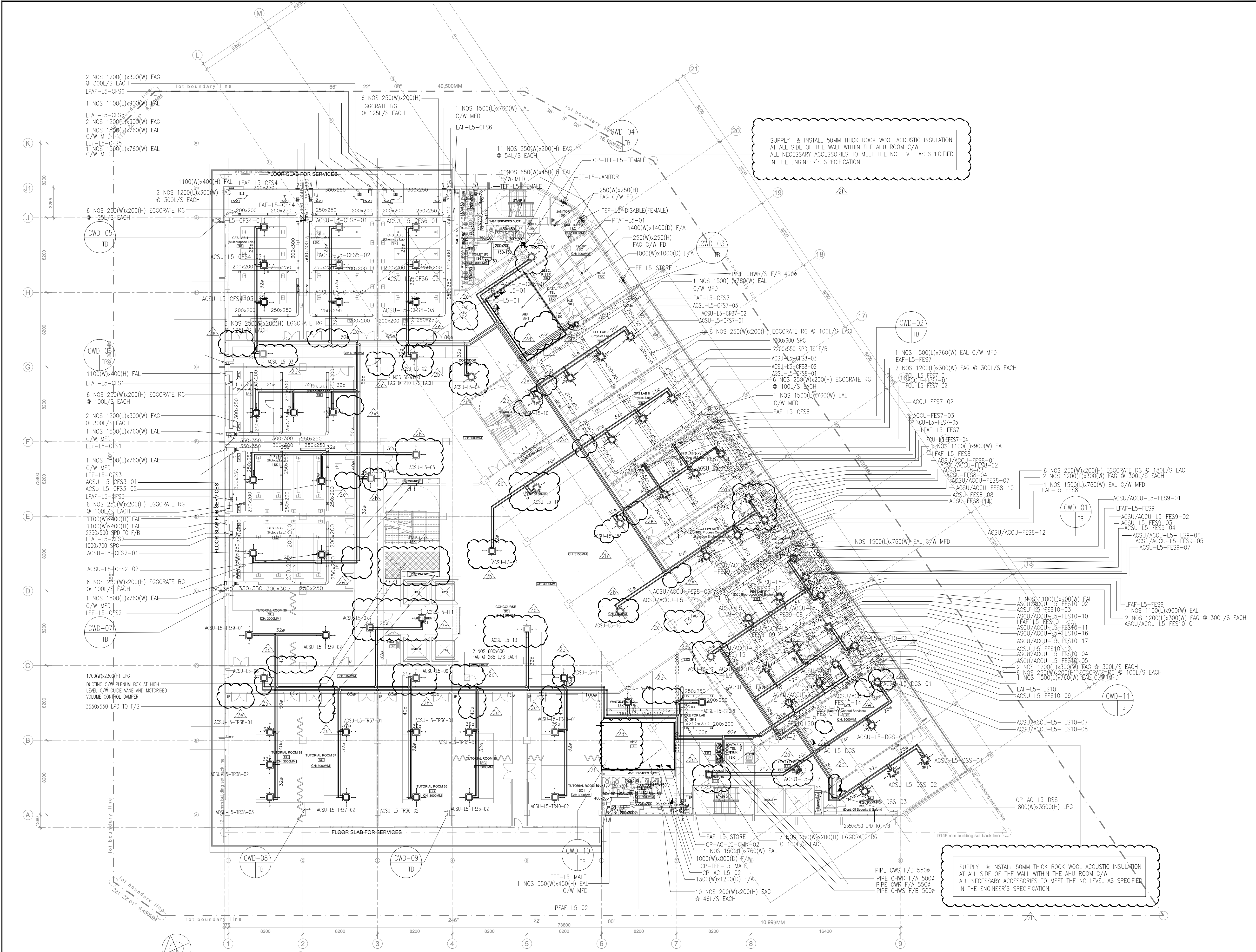


PELAN LANTAI TINGKAT EMPAT
SKALA: 1:200

SHOP DRAWING
NOVEMBER 2013

REV. NO.	DESCRIPTION	DRAWN	CHK.	REV. DATE

<p>DATUK LEONG TANG CHONG DIRECTOR/TRUSTEE UTAR EDUCATION FOUNDATION (CO NO. 578227-M)</p>	
<p>UTAR UNIVERSITI TUNKU ABDUL RAHMAN</p>	
<p>No. 13, Jalan 13/6, 46200 Petaling Jaya, Selangor Darul Ehsan, Tel : 603-79562628 Fax : 603-79561923 Homepage : http://www.utar.edu.my</p>	
<p>ARCHITECT :- S N LOW & ASSOCIATES SDN. BHD. No. 63 & 65, JALAN SS 15/4B, 47500 SUBANG JAYA, SELANGOR TEL : 603 - 5633 7252 FAX : 603 - 5633 2755</p>	
<p>M & E CONSULTING ENGINEERS.</p>	
<p>SSP (E&M) SDN. BHD. (208897-1) JURUTERA PERUNDING ELEKTRIK DAN JENTERA (CONSULTING ELECTRICAL & MECHANICAL ENGINEERS)</p>	
<p>WISMA SSP Level 7 No. 1, Jalan SR 8/3 43000 Seri Kembangan Selangor Darul Ehsan Malaysia Telephone : (603) 8943336 (H/L) Facsimile : (603) 8943333 E-Mail : em@ssp8.com.my Web Site : www.ssp8.com</p>	
<p>MAIN CONTRACTOR:- ASSOCIATED BUILDERS AND CONTRACTORS SDN. BHD. (Co. Reg. No. 7746-W) No. 58, JALAN GHAZALI JAWI, (OPPOSITE PERAK STADIUM), 31400 IPOH, PERAK D. R. TEL: 605 - 548 2219 (Hunting Line), 548 2950, 548 8739 FAX: 605 - 548 8606 E-mail: abcipoh@yahoo.com</p>	
<p>AC/MV CONTRACTOR (NSC):- HSB HEROSS SDN. BHD. (155135-X) No. 17, Jalan Daya 11, Taman Daya, 52100 Kepong, Selangor Darul Ehsan, Malaysia Tel: 603 - 6276 2928, 6276 2930, 62761516 Fax: 603 - 6274 2360 E-mail : herosshd@yahoo.com</p>	
<p>PROJECT: CADANGAN PEMBANGUNAN SATU BLOK BANGUNAN PERNIAGAAN 12 TINGKAT (UNIVERSITI TUNKU ABDUL RAHMAN-UTAR) DENGAN SEPARA BASEMENT SERTA SATU TINGKAT BASEMENT TEMPAT LETAK KERETA, TIGA (3) BUAH PONDOK PENGAWAL DI ATAS LOT PT 21145, JALAN PERSIARAN SG. LONG 1, BANDAR SG. LONG, MUKIM CHERAS, DAERAH HULU LANGAT, SELANGOR DARUL EHSAN UNTUK TETAPAN : UTAR EDUCATION FOUNDATION</p>	
<p>DRAWING TITLE : AIR CONDITIONING & MECHANICAL VENTILATION SERVICES LEVEL 4 PLAN</p>	
<p>Drawn : JW/JS/GCS Date : NOV '2014 Job No. : 41213</p>	<p>Checked : Date : Scale : 1:200 Rev</p>
<p>DRAWING NO. : HSB/UTSLC/ACMV/4016</p>	



SUPPLY & INSTALL 50MM THICK ROCK WOOL ACOUSTIC INSULATION AT ALL SIDE OF THE WALL WITHIN THE AHU ROOM C/W ALL NECESSARY ACCESSORIES TO MEET THE NC LEVEL AS SPECIFIED IN THE ENGINEER'S SPECIFICATION.

SUPPLY & INSTALL 50MM THICK ROCK WOOL ACOUSTIC INSULATION AT ALL SIDE OF THE WALL WITHIN THE AHU ROOM C/W ALL NECESSARY ACCESSORIES TO MEET THE NC LEVEL AS SPECIFIED IN THE ENGINEER'S SPECIFICATION.

PELAN LANTAI TINGKAT LIMA
SKALA: 1:200

SHOP DRAWING	
NOVEMBER 2013	
Drawn : JW/JS/GCS	Checked :
Date : NOV '2014	Date :
Job No. : 41213	Scale : 1:200
DRAWING NO. : HSB/UTSLC/ACMV/4017	Rev :

REV. NO.	DESCRIPTION	DRAWN	CHK.	REV. DATE

DATUK LEONG TANG CHONG
DIRECTOR/TRUSTEE
UTAR EDUCATION FOUNDATION
(CO NO. 578227-M)

UTAR
UNIVERSITI TUNKU ABDUL RAHMAN

No. 13, Jalan 13/6,
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M & E CONSULTING ENGINEERS.
SSP (E&M) SDN. BHD. (208897-1)
JURUTERA PERUNGKUPAN ELEKTRIK DAN JENTERA
(CONSULTING ELECTRICAL & MECHANICAL ENGINEERS)

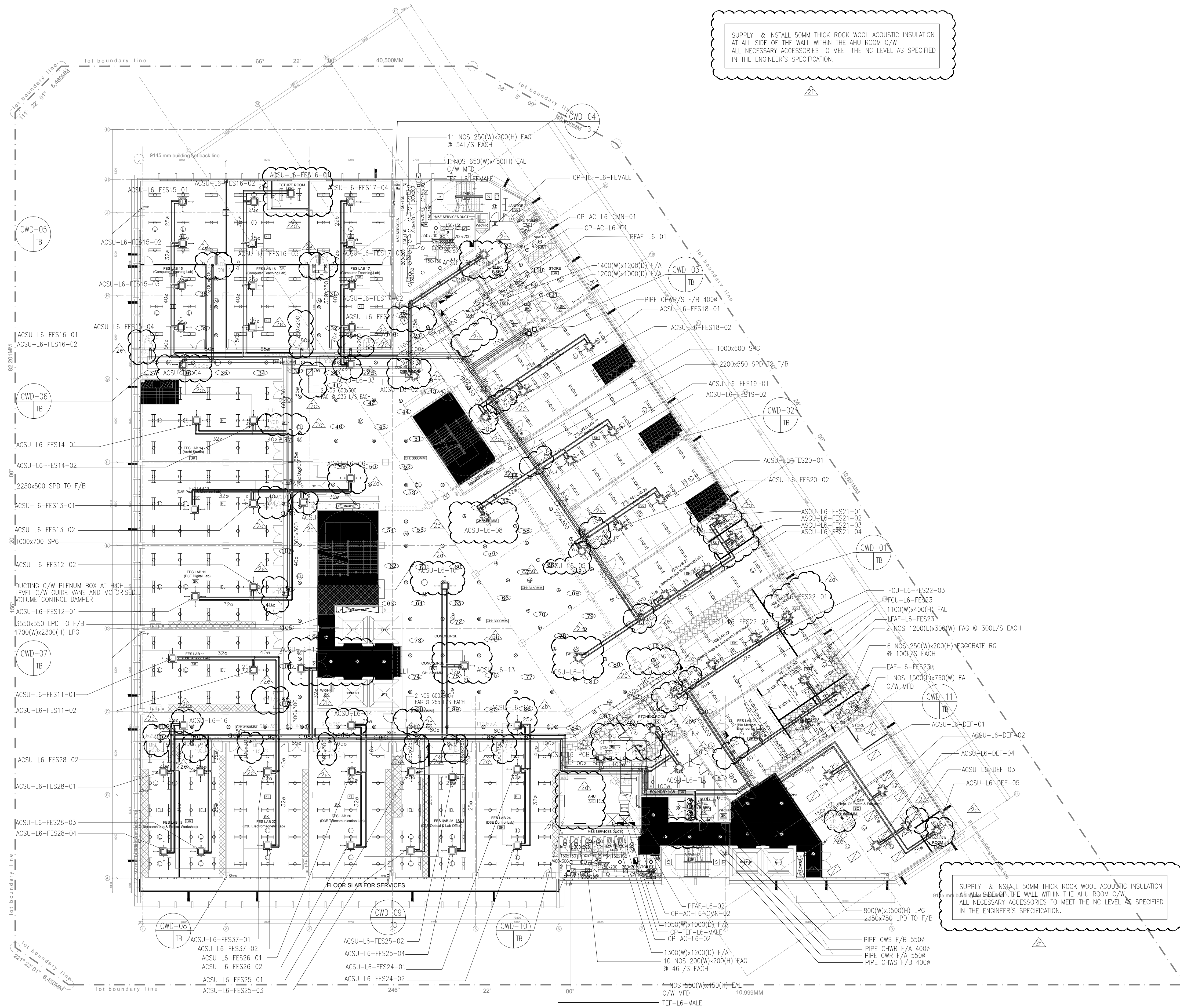
CONSULTING ENGINEERS.
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E-Mail : em@sspb.com.my
Web Site : www.sspb.com.my

MAIN CONTRACTOR:-
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52100 Kepong, Selangor Darul Ehsan, Malaysia
Tel: 603 - 6276 2928, 6276 2930, 62761516
Fax: 603 - 6274 2360
E-mail : herossbhd@yahoo.com

PROJECT:
CADANGAN PEMBANGUNAN SATU BLOK BANGUNAN
PERNIAGAAN 12 TINGKAT (UNIVERSITI TUNKU ABDUL
RAHMAN-UTAR) DENGAN SEPARA BASEMENT SERTA
SATU TINGKAT BASEMENT TEMPAT LETAK KERETA,
TIGA (3) BUAH PONDOK PENGAWAL
DI ATAS LOT PT 21145, JALAN PERSIARAN SG. LONG 1,
BANDAR SG. LONG, MUKIM CHERAS,
DAERAH HULU LANGAT, SELANGOR DARUL EHSAN
UNTUK TUJUAN :
UTAR EDUCATION FOUNDATION

DRAWING TITLE :
**AIR CONDITIONING & MECHANICAL
VENTILATION SERVICES
LEVEL 5 PLAN**



SUPPLY & INSTALL 50MM THICK ROCK WOOL ACOUSTIC INSULATION AT ALL SIDE OF THE WALL WITHIN THE AHU ROOM C/W ALL NECESSARY ACCESSORIES TO MEET THE NC LEVEL AS SPECIFIED IN THE ENGINEER'S SPECIFICATION.

SUPPLY & INSTALL 50MM THICK ROCK WOOL ACOUSTIC INSULATION AT ALL SIDE OF THE WALL WITHIN THE AHU ROOM C/W ALL NECESSARY ACCESSORIES TO MEET THE NC LEVEL AS SPECIFIED IN THE ENGINEER'S SPECIFICATION.

PELAN LANTAI TINGKAT ENAM

SHOP DRAWING
NOVEMBER 2013

REV. NO.	DESCRIPTION	DRAWN	CHK.	REV. DATE

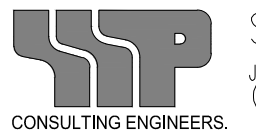
DATUK LEONG TANG CHONG
DIRECTOR/TRUSTEE
UTAR EDUCATION FOUNDATION
(CO NO. 578227-M)




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M & E CONSULTING ENGINEERS.



SSP (E&M) SDN. BHD. (208897-1)
JURUTERA PERUNDING ELEKTRIK DAN JENTERA
(CONSULTING ELECTRICAL & MECHANICAL ENGINEERS)



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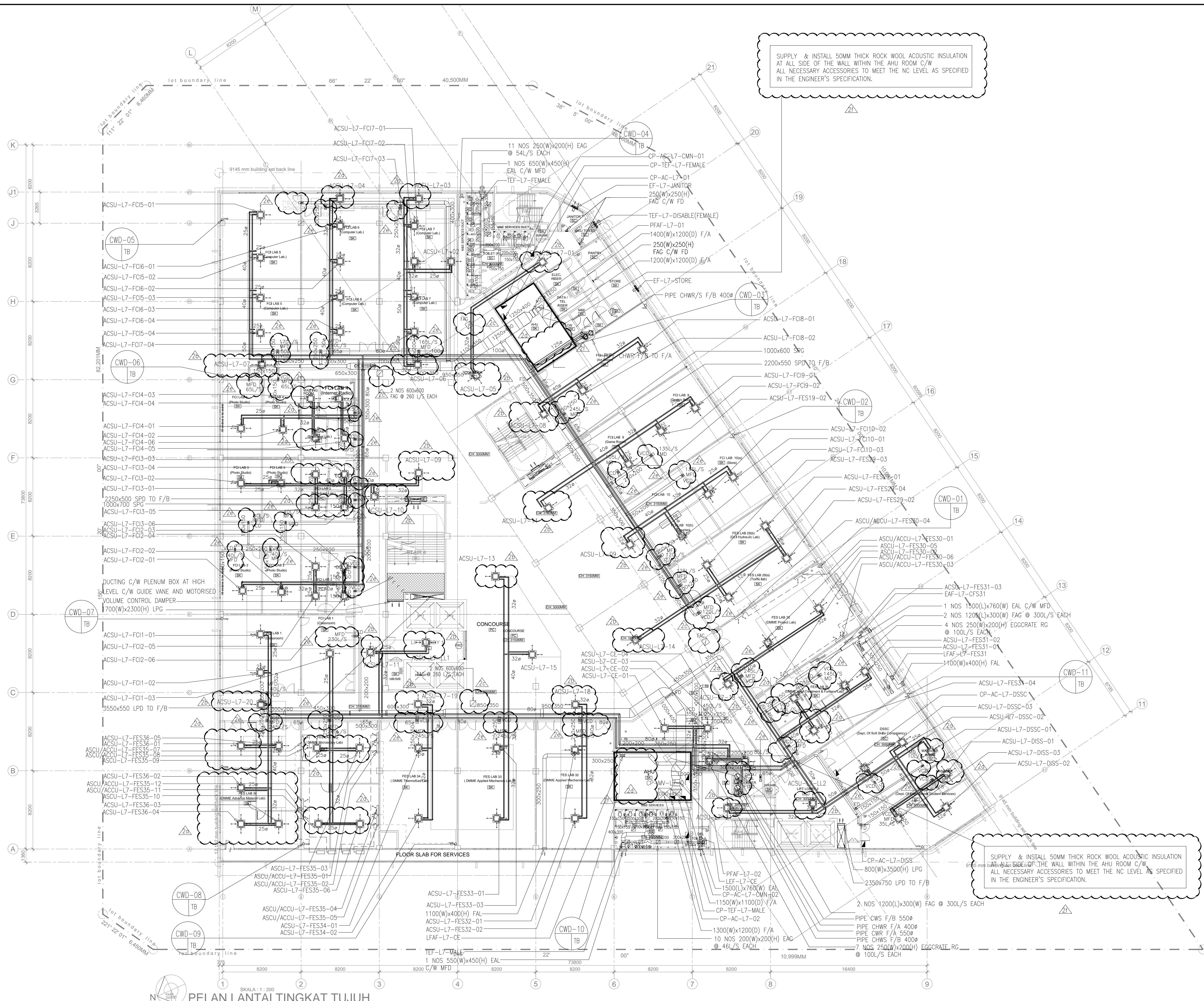
MAIN CONTRACTOR:-
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Tel: 603 - 6276 2928, 6276 2930, 62761516
Fax: 603 - 6274 2360
E-mail : herosshd@yahoo.com

PROJECT:-
CADANGAN PEMBANGUNAN SATU BLOK BANGUNAN
PERNIAGAAN 12 TINGKAT (UNIVERSITI TUNKU ABU
RAHMAN-UTAR) DENGAN SEPARA BASEMENT SERTA
SATU TINGKAT BASEMENT TEMPAT LETAK KERETA,
TIGA (3) BUAH PONDOK PENGAWAL
DI ATAS LOT PT 21145, JALAN PERSIARAN SG. LONG 1,
BANDAR SG. LONG, MUKIM CHERAS,
DAERAH HULU LANGAT, SELANGOR DARUL EHSAN
UNTUK TETUAN :
UTAR EDUCATION FOUNDATION

DRAWING TITLE :-
AIR CONDITIONING & MECHANICAL
VENTILATION SERVICES
LEVEL 6 PLAN

Drawn : JW/JS/GCS	Checked :
Date : NOV '2014	Date :
Job No. : 41213	Scale : 1:200
DRAWING NO. : HSB/UTSLC/ACMV/4018	Rev



SKALA: 1:200
PELAN LANTAI TINGKAT TUJUH

SHOP DRAWING
 NOVEMBER 2013

REV. NO.	DESCRIPTION	DRAWN	CHK.	REV. DATE

DATUK LEONG TANG CHONG
 DIRECTOR/TRUSTEE
 UTAR EDUCATION FOUNDATION
 (CO NO. 578227-M)

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 UNIVERSITI TUNKU ABDUL RAHMAN

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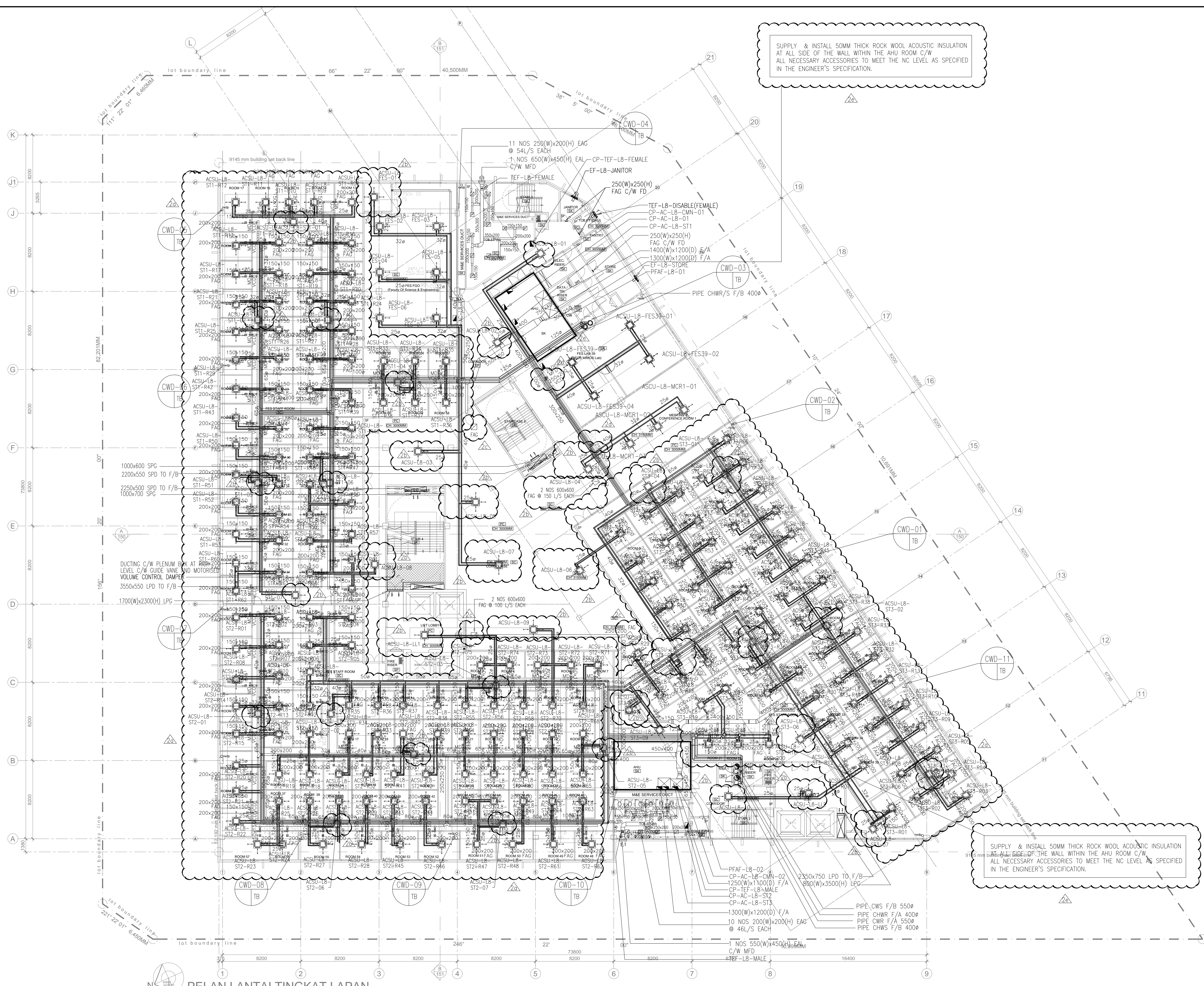
AC/MV CONTRACTOR (NSC):-
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PROJECT:
 CADANGAN PEMBANGUNAN SATU BLOK BANGUNAN
 PERNIAGAAN 12 TINGKAT (UNIVERSITI TUNKU ABDUL
 RAHMAN-UTAR) DENGAN SEPARA BASEMENT SERTA
 SATU TINGKAT BASEMENT TEMPAT LETAK KERETA,
 TIGA (3) BUAH PONDOK PENGAWAL
 DI ATAS LOT PT 21145, JALAN PERSIARAN SG. LONG 1,
 BANDAR SG. LONG, MUKIM CHERAS,
 DAERAH HULU LANGAT, SELANGOR DARUL EHSAN
 UNTUK TETUAN :
 UTAR EDUCATION FOUNDATION

DRAWING TITLE :
**AIR CONDITIONING & MECHANICAL
 VENTILATION SERVICES
 LEVEL 7 PLAN**

Drawn : JW/JS/GCS	Checked :
Date : NOV '2014	Date :
Job No. : 41213	Scale : 1:200
DRAWING NO. : HSB/UTSLC/ACMV/ 4019	Rev



PELAN LANTAI TINGKAT LAPAN
SKALA: 1:200

SHOP DRAWING
NOVEMBER 2013

REV. NO.	DESCRIPTION	DRAWN	CHK.	REV. DATE


DATUK LEONG TANG CHONG
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M & E CONSULTING ENGINEERS.



SSP (E&M) SDN. BHD. (208897-1)
JURUTERA PERUNDING ELEKTRIK DAN JENTERA
(CONSULTING ELECTRICAL & MECHANICAL ENGINEERS)



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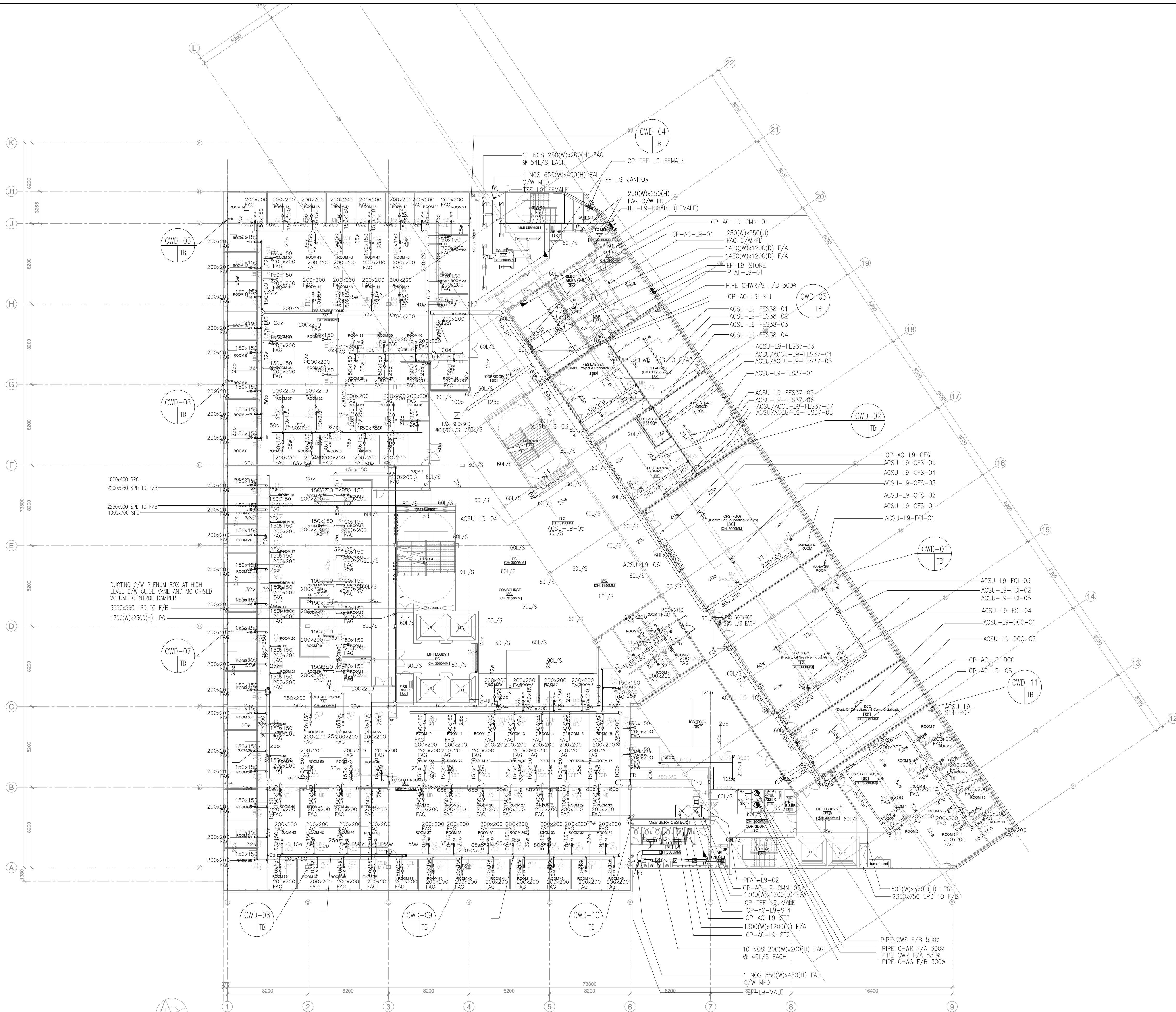
MAIN CONTRACTOR:-
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PROJECT:-
CADANGAN PEMBANGUNAN SATU BLOK BANGUNAN
PERNIAGAAN 12 TINGKAT (UNIVERSITI TUNKU ABU
RAHMAN-UTAR) DENGAN SEPARA BASEMENT SERTA
SATU TINGKAT BASEMENT TEMPAT LETAK KERETA,
TIGA (3) BUAH PONDOK PENGAWAL
DI ATAS LOT PT 21145, JALAN PERSIARAN SG. LONG 1,
BANDAR SG. LONG, MUKIM CHERAS,
DAERAH HULU LANGAT, SELANGOR DARUL EHSAN
UNTUK TETUAN :
UTAR EDUCATION FOUNDATION

DRAWING TITLE :
AIR CONDITIONING & MECHANICAL
VENTILATION SERVICES
LEVEL 8 PLAN

Drawn : JW/JS/GCS	Checked :
Date : NOV '2014	Date :
Job No. : 41213	Scale : 1:200
DRAWING NO. : HSB/UTSLC/ACMV/ 4020	Rev



PELAN LANTAI TINGKAT SEMBILAN
 SKALA: 1:200

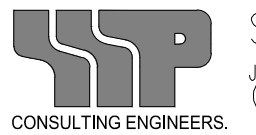
REV. NO.	DESCRIPTION	DRAWN	CHK.	REV. DATE


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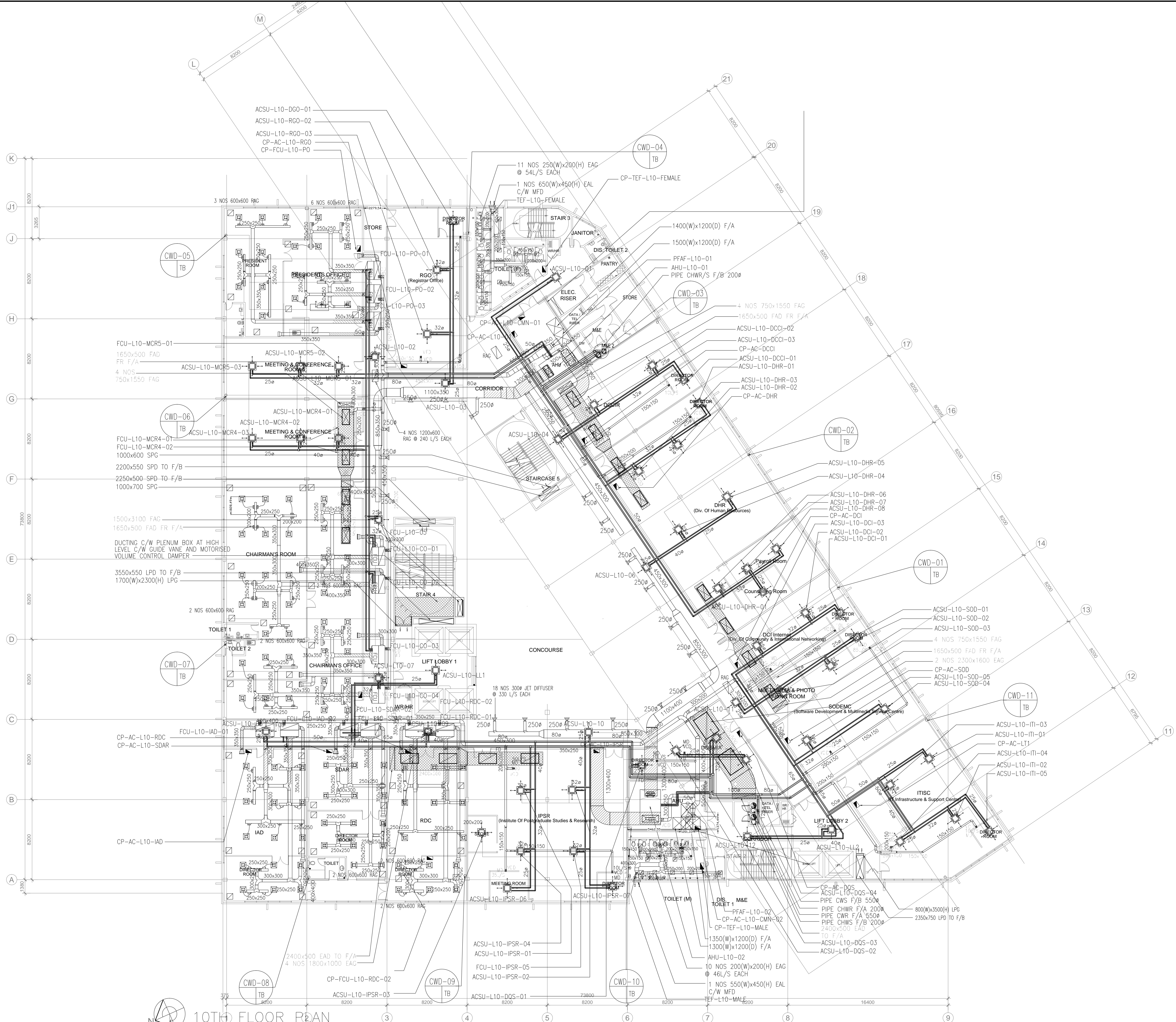
MAIN CONTRACTOR:-
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PROJECT:-
 CADANGAN PEMBANGUNAN SATU BLOK BANGUNAN
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 SATU TINGKAT BASEMENT TEMPAT LETAK KERETA,
 TIGA (3) BUAH PONDOK PENGAWAL
 DI ATAS LOT PT 21145, JALAN PERSIARAN SG. LONG 1,
 BANDAR SG. LONG, MUKIM CHERAS,
 DAERAH HULU LANGAT, SELANGOR DARUL EHSAN
 UNTUK TETUAN :
 UTAR EDUCATION FOUNDATION

DRAWING TITLE :
AIR CONDITIONING & MECHANICAL
VENTILATION SERVICES
LEVEL 9 PLAN

SHOP DRAWING		Drawn : JW/JS/GCS	Checked :
NOVEMBER 2013		Date : NOV '2014	Date :
		Job No. : 41213	Scale : 1:200
		DRAWING NO. : HSB/UTSLC/ACMV/ 4021	Rev



10TH FLOOR PLAN

REV. NO.	DESCRIPTION	DRAWN	CHK.	REV. DATE

DATUK LEONG TANG CHONG
DIRECTOR/TRUSTEE
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(CO NO. 578227-M)

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MIS ISO 9001 REG. NO. AR 1616

MAIN CONTRACTOR:-
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PROJECT:-
CADANGAN PEMBANGUNAN SATU BLOK BANGUNAN
PERNIAGAAN 12 TINGKAT (UNIVERSITI TUNKU ABDUL
RAHMAN-UTAR) DENGAN SEPARA BASEMENT SERTA
SATU TINGKAT BASEMENT TEMPAT LETAK KERETA,
TIGA (3) BUAH PONDOK PENGAWAL
DI ATAS LOT PT 21145, JALAN PERSIARAN SG. LONG 1,
BANDAR SG. LONG, MUKIM CHERAS,
DAERAH HULU LANGAT, SELANGOR DARUL EHSAN
UNTUK TETUAN :
UTAR EDUCATION FOUNDATION

DRAWING TITLE :-
**AIR CONDITIONING & MECHANICAL
VENTILATION SERVICES
LEVEL 10 PLAN**

Drawn : JW/JS/GCS	Checked :
Date : NOV '2014	Date :
Job No. : 41213	Scale : 1:200
DRAWING NO. : HSB/UTSLC/ACMV/ 4022	Rev

SHOP DRAWING
NOVEMBER 2013

Ground Floor Input Data

UTAR Sungai Long Campus

1. General Details:

Air System Name **Ground Floor**
 Equipment Type **Chilled Water AHU**
 Air System Type **Single Zone CAV**
 Number of zones **1**

2. Ventilation System Components:

Ventilation Air Data:

Airflow Control **Constant Ventilation Airflow**
 Ventilation Sizing Method **ASHRAE Std 62.1-2010**
 Unocc. Damper Position **Closed**
 Damper Leak Rate **10** %
 Outdoor Air CO2 Level **400** ppm

Central Cooling Data:

Supply Air Temperature **14.4** °C
 Coil Bypass Factor **0.100**
 Cooling Source **Chilled Water**
 Schedule **JFMAMJJASOND**
 Capacity Control **Cycled or Staged Capacity - Fan On**

Central Heating Data:

Supply Temperature **35.0** °C
 Heating Source **Hot Water**
 Schedule **JFMAMJJASOND**
 Capacity Control **Cycled or Staged Capacity - Fan On**

Supply Fan Data:

Fan Type **Forward Curved**
 Configuration **Draw-thru**
 Fan Performance **0** Pa
 Overall Efficiency **54** %

Duct System Data:

Supply Duct Data:

Duct Heat Gain **0** %
 Duct Leakage **0** %

Return Duct or Plenum Data:

Return Air Via **Ducted Return**

3. Zone Components:

Space Assignments:

Zone 1: Zone 1	
Center For Extension	x1
Center Of Education	x1
class room	x1
conference room 1	x1
conference room 2	x1
Corridor 2	x1
Corridor 3	x1
Corridor 4	x1
Corridor 5	x1
corridor_1	x1
Counselling Room	x1
Div Of Credit Add	x1
Div of Examination	x1
Div of Finance	x1
Div of Finance 2	x1
Div of Program Promotion	x1
exam transcript	x1
Fire Control Room	x1
Lift Lobby 1	x1
Lift Lobby 2	x1
manager room 1	x1
manager room 2	x1
manager room 3	x1
manager room 4	x1

Ground Floor Input Data

UTAR Sungai Long Campus

manager room 5	x1
Printing Room	x1
Reception and Entrance	x1
service lobby	x1
student affairs	x1

Thermostats and Zone Data:

Zone	Cooling T-Stat Occ. (°C)	Cooling T-Stat Unocc. (°C)	Heating T-Stat Occ. (°C)	Heating T-Stat Unocc. (°C)	T-Stat Throttling Range (°C)	Diversity Factor (%)	Direct Exhaust Airflow (L/s)	Direct Exhaust Fan (kW)
1	23.9	26.7	21.1	18.3	0.83	100	0.0	0.0

Thermostat Schedule **Sample Schedule**
 Unoccupied Cooling is **Available**

Supply Terminals Data:

Zone **All**
 Terminal Type **Diffuser**
 Minimum Airflow **0.00** L/s/person

Zone Heating Units:

Zone **All**
 Zone Heating Unit Type **None**

 Zone Unit Heat Source **Hot Water**
 Zone Heating Unit Schedule **JFMAMJJASOND**

4. Sizing Data (Computer-Generated):

System Sizing Data:

Sizing Data:

Cooling Supply Temperature **14.4** °C
 Supply Fan Airflow **69427.3** L/s
 Ventilation Airflow **21213.7** L/s
 Heating Supply Temperature **35.0** °C

Hydronic Sizing Specifications:

Chilled Water Delta-T **5.6** °K
 Hot Water Delta-T **11.1** °K

Safety Factors:

Cooling Sensible **0** %
 Cooling Latent **0** %
 Heating **0** %

Zone Sizing Data:

Zone Airflow Sizing Method **Sum of space airflow rates**
 Space Airflow Sizing Method **Individual peak space loads**

Zone	Supply Airflow (L/s)	Zone Htg Unit (kW)	Reheat Coil (kW)	- (L/s)
1	69427.3	-	-	

5. Equipment Data

Changeover Controller:

Used **No**

level 01 Input Data

UTAR Sungai Long Campus

1. General Details:

Air System Name level 01
 Equipment Type Undefined
 Air System Type Single Zone CAV
 Number of zones 1

2. Ventilation System Components:

Ventilation Air Data:

Airflow Control Constant Ventilation Airflow
 Ventilation Sizing Method Sum of Space OA Airflows
 Unocc. Damper Position Closed
 Damper Leak Rate 0 %
 Outdoor Air CO2 Level 400 ppm

Central Cooling Data:

Supply Air Temperature 14.4 °C
 Coil Bypass Factor 0.100
 Cooling Source Any
 Schedule JFMAMJJASOND
 Capacity Control Cycled or Staged Capacity - Fan On

Central Heating Data:

Supply Temperature 35.0 °C
 Heating Source Any
 Schedule JFMAMJJASOND
 Capacity Control Cycled or Staged Capacity - Fan On

Supply Fan Data:

Fan Type Forward Curved
 Configuration Draw-thru
 Fan Performance 0 Pa
 Overall Efficiency 54 %

Duct System Data:

Supply Duct Data:

Duct Heat Gain 0 %
 Duct Leakage 0 %

Return Duct or Plenum Data:

Return Air Via Ducted Return

3. Zone Components:

Space Assignments:

Zone 1: Zone 1	
LV_1 corridor 1	x1
LV_1 corridor 2	x1
LV_1 corridor 3	x1
LV_1 Lecture Hall 1	x1
LV_1 Lecture Hall 2	x1
LV_1 Lecture Hall 3	x1
LV_1 Lecture Hall 4	x1
LV_1 Lecture Hall 5	x1
LV_1 Lift Lobby 1	x1
LV_1 Lift Lobby 2	x1
LV_1 Student Activity	x1
LV_1 Tutorial room 3	x1
LV_1 Tutorial room 4	x1
LV_1 Tutorial room 4a	x1

Thermostats and Zone Data:

Zone All
 Cooling T-stat: Occ. 23.9 °C
 Cooling T-stat: Unocc. 26.7 °C
 Heating T-stat: Occ. 21.1 °C
 Heating T-stat: Unocc. 18.3 °C
 T-stat Throttling Range 0.83 °K
 Diversity Factor 100 %
 Direct Exhaust Airflow 0.0 L/s
 Direct Exhaust Fan kW 0.0 kW

Thermostat Schedule Sample Schedule
 Unoccupied Cooling is Available

level 01 Input Data

UTAR Sungai Long Campus

Supply Terminals Data:

Zone All
Terminal Type Diffuser
Minimum Airflow 0.00 L/s/person

Zone Heating Units:

Zone All
Zone Heating Unit Type None

Zone Unit Heat Source Any
Zone Heating Unit Schedule JFMAMJJASOND

4. Sizing Data (Computer-Generated):

System Sizing Data:

Sizing Data:

Cooling Supply Temperature 14.4 °C
Supply Fan Airflow 41518.3 L/s
Ventilation Airflow 7565.8 L/s
Heating Supply Temperature 35.0 °C

Hydronic Sizing Specifications:

Chilled Water Delta-T 5.6 °K
Hot Water Delta-T 11.1 °K

Safety Factors:

Cooling Sensible 0 %
Cooling Latent 0 %
Heating 0 %

Zone Sizing Data:

Zone Airflow Sizing Method Sum of space airflow rates
Space Airflow Sizing Method Individual peak space loads

Zone	Supply Airflow (L/s)	Zone Htg Unit (kW)	Reheat Coil (kW)	- (L/s)
1	41518.3	-	-	

5. Equipment Data

No equipment data required for this system.

Level 02 Input Data

UTAR Sungai Long Campus

1. General Details:

Air System Name **Level 02**
 Equipment Type **Chilled Water AHU**
 Air System Type **Single Zone CAV**
 Number of zones **1**

2. Ventilation System Components:

Ventilation Air Data:

Airflow Control **Constant Ventilation Airflow**
 Ventilation Sizing Method **Sum of Space OA Airflows**
 Unocc. Damper Position **Closed**
 Damper Leak Rate **0** %
 Outdoor Air CO2 Level **400** ppm

Central Cooling Data:

Supply Air Temperature **14.4** °C
 Coil Bypass Factor **0.100**
 Cooling Source **Chilled Water**
 Schedule **JFMAMJJASOND**
 Capacity Control **Cycled or Staged Capacity - Fan On**

Central Heating Data:

Supply Temperature **35.0** °C
 Heating Source **Hot Water**
 Schedule **JFMAMJJASOND**
 Capacity Control **Cycled or Staged Capacity - Fan On**

Supply Fan Data:

Fan Type **Forward Curved**
 Configuration **Draw-thru**
 Fan Performance **0** Pa
 Overall Efficiency **54** %

Duct System Data:

Supply Duct Data:

Duct Heat Gain **0** %
 Duct Leakage **0** %

Return Duct or Plenum Data:

Return Air Via **Ducted Return**

3. Zone Components:

Space Assignments:

Zone 1: Zone 1	
Lv 2 Corridor 1	x1
Lv 2 Corridor 2	x1
Lv 2 Corridor 3	x1
LV 2 Lecture Hall 10	x1
LV 2 Lecture Hall 6	x1
LV 2 Lecture Hall 7	x1
LV 2 Lecture Hall 8	x1
LV 2 Lecture Hall 9	x1
Lv 2 Lift Lobby 1	x1
Lv 2 Lift Lobby 2	x1
Lv 2 Surau	x1
LV 2 Tutorial 14	x1
LV_2 Tutorial Room 10	x1
LV_2 Tutorial Room 11	x1
LV_2 Tutorial Room 12	x1
LV_2 Tutorial Room 13	x1
LV_2 Tutorial Room 5	x1
LV_2 Tutorial Room 6	x1
LV_2 Tutorial Room 7	x1
LV_2 Tutorial Room 8	x1
LV_2 Tutorial Room 9	x1

Thermostats and Zone Data:

Zone **All**
 Cooling T-stat: Occ. **23.9** °C
 Cooling T-stat: Unocc. **26.7** °C
 Heating T-stat: Occ. **21.1** °C

Level 02 Input Data

UTAR Sungai Long Campus

Heating T-stat: Unocc. **18.3** °C
 T-stat Throttling Range **0.83** °K
 Diversity Factor **100** %
 Direct Exhaust Airflow **0.0** L/s
 Direct Exhaust Fan kW **0.0** kW

Thermostat Schedule **Sample Schedule**
 Unoccupied Cooling is **Available**

Supply Terminals Data:

Zone **All**
 Terminal Type **Diffuser**
 Minimum Airflow **0.00** L/s/person

Zone Heating Units:

Zone **All**
 Zone Heating Unit Type **None**

Zone Unit Heat Source **Hot Water**
 Zone Heating Unit Schedule **JFMAMJJASOND**

4. Sizing Data (Computer-Generated):

System Sizing Data:

Sizing Data:

Cooling Supply Temperature **14.4** °C
 Supply Fan Airflow **31055.4** L/s
 Ventilation Airflow **14325.4** L/s
 Heating Supply Temperature **35.0** °C

Hydronic Sizing Specifications:

Chilled Water Delta-T **5.6** °K
 Hot Water Delta-T **11.1** °K

Safety Factors:

Cooling Sensible **0** %
 Cooling Latent **0** %
 Heating **0** %

Zone Sizing Data:

Zone Airflow Sizing Method **Sum of space airflow rates**
 Space Airflow Sizing Method **Individual peak space loads**

Zone	Supply Airflow (L/s)	Zone Htg Unit (kW)	Reheat Coil (kW)	- (L/s)
1	31055.4	-	-	

5. Equipment Data

Changeover Controller:

Used **No**

Level 03 Input Data

UTAR Sungai Long Campus

1. General Details:

Air System Name Level 03
 Equipment Type Chilled Water AHU
 Air System Type Single Zone CAV
 Number of zones 1

2. Ventilation System Components:

Ventilation Air Data:

Airflow Control Constant Ventilation Airflow
 Ventilation Sizing Method Sum of Space OA Airflows
 Unocc. Damper Position Closed
 Damper Leak Rate 0 %
 Outdoor Air CO2 Level 400 ppm

Central Cooling Data:

Supply Air Temperature 14.4 °C
 Coil Bypass Factor 0.100
 Cooling Source Chilled Water
 Schedule JFMAMJJASOND
 Capacity Control Cycled or Staged Capacity - Fan On

Central Heating Data:

Supply Temperature 35.0 °C
 Heating Source Hot Water
 Schedule JFMAMJJASOND
 Capacity Control Cycled or Staged Capacity - Fan On

Supply Fan Data:

Fan Type Forward Curved
 Configuration Draw-thru
 Fan Performance 0 Pa
 Overall Efficiency 54 %

Duct System Data:

Supply Duct Data:

Duct Heat Gain 0 %
 Duct Leakage 0 %

Return Duct or Plenum Data:

Return Air Via Ducted Return

3. Zone Components:

Space Assignments:

Zone 1: Zone 1	
LV_3 Corridor 1	x1
LV_3 Corridor 2	x1
LV_3 Corridor 3	x1
LV_3 Corridor 4	x1
LV_3 Councourse	x1
LV_3 Dept of Alumni	x1
LV_3 Lift Lobby 1	x1
LV_3 Lift Lobby 2	x1
LV_3 Room (1- 40)	x1
LV_3 Tutorial Room 15	x1
LV_3 Tutorial Room 16	x1
LV_3 Tutorial Room 17	x1
LV_3 Tutorial Room 22	x1
LV_3 Tutorial Room 23	x1
LV_3 Tutorial Room 24	x1
LV_3 Tutorial Room 25	x1
LV_3 Tutorial Room 26	x1
LV_3 Tutorial Room 27	x1
LV_3 Tutorial Room 29	x1
LV_3 Tutorial Room 30	x1
LV_3 Tutorial Room 31	x1
LV_3 Tutorial Room 32	x1
LV_3 Tutorial Room 33	x1
LV_3 Tutorial Room 34	x1

Thermostats and Zone Data:

Level 03 Input Data

UTAR Sungai Long Campus

Zone **All**
 Cooling T-stat: Occ. **23.9** °C
 Cooling T-stat: Unocc. **26.7** °C
 Heating T-stat: Occ. **21.1** °C
 Heating T-stat: Unocc. **18.3** °C
 T-stat Throttling Range **0.83** °K
 Diversity Factor **100** %
 Direct Exhaust Airflow **0.0** L/s
 Direct Exhaust Fan kW **0.0** kW

 Thermostat Schedule **Sample Schedule**
 Unoccupied Cooling is **Available**

Supply Terminals Data:

Zone **All**
 Terminal Type **Diffuser**
 Minimum Airflow **0.00** L/s/person

Zone Heating Units:

Zone **All**
 Zone Heating Unit Type **None**

 Zone Unit Heat Source **Hot Water**
 Zone Heating Unit Schedule **JFMAMJJASOND**

4. Sizing Data (Computer-Generated):

System Sizing Data:

Sizing Data:
 Cooling Supply Temperature **14.4** °C
 Supply Fan Airflow **32453.1** L/s
 Ventilation Airflow **14975.3** L/s
 Heating Supply Temperature **35.0** °C

Hydronic Sizing Specifications:

Chilled Water Delta-T **5.6** °K
 Hot Water Delta-T **11.1** °K

Safety Factors:

Cooling Sensible **0** %
 Cooling Latent **0** %
 Heating **0** %

Zone Sizing Data:

Zone Airflow Sizing Method **Sum of space airflow rates**
 Space Airflow Sizing Method **Individual peak space loads**

Zone	Supply Airflow (L/s)	Zone Htg Unit (kW)	Reheat Coil (kW)	- (L/s)
1	32453.1	-	-	

5. Equipment Data

Changeover Controller:

Used **No**

Level 04 Input Data

UTAR Sungai Long Campus

1. General Details:

Air System Name **Level 04**
 Equipment Type **Chilled Water AHU**
 Air System Type **Single Zone CAV**
 Number of zones **1**

2. Ventilation System Components:

Ventilation Air Data:

Airflow Control **Constant Ventilation Airflow**
 Ventilation Sizing Method **Sum of Space OA Airflows**
 Unocc. Damper Position **Closed**
 Damper Leak Rate **0** %
 Outdoor Air CO2 Level **400** ppm

Central Cooling Data:

Supply Air Temperature **14.4** °C
 Coil Bypass Factor **0.100**
 Cooling Source **Chilled Water**
 Schedule **JFMAMJJASOND**
 Capacity Control **Cycled or Staged Capacity - Fan On**

Central Heating Data:

Supply Temperature **35.0** °C
 Heating Source **Hot Water**
 Schedule **JFMAMJJASOND**
 Capacity Control **Cycled or Staged Capacity - Fan On**

Supply Fan Data:

Fan Type **Forward Curved**
 Configuration **Draw-thru**
 Fan Performance **0** Pa
 Overall Efficiency **54** %

Duct System Data:

Supply Duct Data:

Duct Heat Gain **0** %
 Duct Leakage **0** %

Return Duct or Plenum Data:

Return Air Via **Ducted Return**

3. Zone Components:

Space Assignments:

Zone 1: Zone 1	
LV_4 Cor	x1
LV_4 FES Lab	x1
LV_4 IT Lab 1	x1
LV_4 IT Lab 2	x1
LV_4 IT Lab 3	x1
LV_4 Library	x1

Thermostats and Zone Data:

Zone **All**
 Cooling T-stat: Occ. **23.9** °C
 Cooling T-stat: Unocc. **26.7** °C
 Heating T-stat: Occ. **21.1** °C
 Heating T-stat: Unocc. **18.3** °C
 T-stat Throttling Range **0.83** °K
 Diversity Factor **100** %
 Direct Exhaust Airflow **0.0** L/s
 Direct Exhaust Fan kW **0.0** kW

Thermostat Schedule **Sample Schedule**
 Unoccupied Cooling is **Available**

Supply Terminals Data:

Zone **All**
 Terminal Type **Diffuser**
 Minimum Airflow **0.00** L/s/person

Zone Heating Units:

Zone **All**
 Zone Heating Unit Type **None**

Level 04 Input Data

UTAR Sungai Long Campus

Zone Unit Heat Source **Hot Water**
Zone Heating Unit Schedule **JFMAMJJASOND**

4. Sizing Data (Computer-Generated):

System Sizing Data:

Sizing Data:

Cooling Supply Temperature **14.4** °C
Supply Fan Airflow **31673.9** L/s
Ventilation Airflow **16376.0** L/s
Heating Supply Temperature **35.0** °C

Hydronic Sizing Specifications:

Chilled Water Delta-T **5.6** °K
Hot Water Delta-T **11.1** °K

Safety Factors:

Cooling Sensible **0** %
Cooling Latent **0** %
Heating **0** %

Zone Sizing Data:

Zone Airflow Sizing Method **Sum of space airflow rates**
Space Airflow Sizing Method **Individual peak space loads**

Zone	Supply Airflow (L/s)	Zone Htg Unit (kW)	Reheat Coil (kW)	- (L/s)
1	31673.9	-	-	

5. Equipment Data

Changeover Controller:

Used **No**

Level 05 Input Data

UTAR Sungai Long Campus

1. General Details:

Air System Name Level 05
 Equipment Type Chilled Water AHU
 Air System Type Single Zone CAV
 Number of zones 1

2. Ventilation System Components:

Ventilation Air Data:

Airflow Control Constant Ventilation Airflow
 Ventilation Sizing Method Sum of Space OA Airflows
 Unocc. Damper Position Closed
 Damper Leak Rate 0 %
 Outdoor Air CO2 Level 400 ppm

Central Cooling Data:

Supply Air Temperature 14.4 °C
 Coil Bypass Factor 0.100
 Cooling Source Chilled Water
 Schedule JFMAMJJASOND
 Capacity Control Cycled or Staged Capacity - Fan On

Central Heating Data:

Supply Temperature 35.0 °C
 Heating Source Hot Water
 Schedule JFMAMJJASOND
 Capacity Control Cycled or Staged Capacity - Fan On

Supply Fan Data:

Fan Type Forward Curved
 Configuration Draw-thru
 Fan Performance 0 Pa
 Overall Efficiency 54 %

Duct System Data:

Supply Duct Data:

Duct Heat Gain 0 %
 Duct Leakage 0 %

Return Duct or Plenum Data:

Return Air Via Ducted Return

3. Zone Components:

Space Assignments:

Zone 1: Zone 1	
LV_5 CFS Lab 1	x1
LV_5 CFS Lab 10	x1
LV_5 CFS Lab 2	x1
LV_5 CFS Lab 3	x1
LV_5 CFS Lab 4	x1
LV_5 CFS Lab 5	x1
LV_5 CFS Lab 6	x1
LV_5 CFS Lab 7	x1
LV_5 CFS Lab 8	x1
LV_5 CFS Lab 9	x1
Lv_5 Corridor	x1
LV_5 Corridor and concou	x1
Lv_5 Department of GS	x1
Lv_5 Department of Secur	x1
LV_5 Lift Lobby 1(1)	x1
Lv_5 Lift Lobby 2	x1
LV_5 Random ACSU (L6)	x1
Lv_5 Store For Lab	x1
LV_5 Tutorial 35 & 36	x1
LV_5 Tutorial 37 & 38	x1
LV_5 Tutorial 39	x1
LV_5 Tutorial 40	x1

Thermostats and Zone Data:

Zone All
 Cooling T-stat: Occ. 23.9 °C

Level 05 Input Data

UTAR Sungai Long Campus

Cooling T-stat: Unocc. 26.7 °C
 Heating T-stat: Occ. 21.1 °C
 Heating T-stat: Unocc. 18.3 °C
 T-stat Throttling Range 0.83 °K
 Diversity Factor 100 %
 Direct Exhaust Airflow 0.0 L/s
 Direct Exhaust Fan kW 0.0 kW

Thermostat Schedule **Sample Schedule**
 Unoccupied Cooling is **Available**

Supply Terminals Data:

Zone **All**
 Terminal Type **Diffuser**
 Minimum Airflow **0.00** L/s/person

Zone Heating Units:

Zone **All**
 Zone Heating Unit Type **None**

 Zone Unit Heat Source **Hot Water**
 Zone Heating Unit Schedule **JFMAMJJASOND**

4. Sizing Data (Computer-Generated):

System Sizing Data:

Sizing Data:

Cooling Supply Temperature 14.4 °C
 Supply Fan Airflow 26964.4 L/s
 Ventilation Airflow 14249.5 L/s
 Heating Supply Temperature 35.0 °C

Hydronic Sizing Specifications:

Chilled Water Delta-T 5.6 °K
 Hot Water Delta-T 11.1 °K

Safety Factors:

Cooling Sensible 0 %
 Cooling Latent 0 %
 Heating 0 %

Zone Sizing Data:

Zone Airflow Sizing Method **Sum of space airflow rates**
 Space Airflow Sizing Method **Individual peak space loads**

Zone	Supply Airflow (L/s)	Zone Htg Unit (kW)	Reheat Coil (kW)	- (L/s)
1	26964.4	-	-	

5. Equipment Data

Changeover Controller:

Used **No**

Level 06 Input Data

UTAR Sungai Long Campus

1. General Details:

Air System Name **Level 06**
 Equipment Type **Chilled Water AHU**
 Air System Type **Single Zone CAV**
 Number of zones **1**

2. Ventilation System Components:

Ventilation Air Data:

Airflow Control **Constant Ventilation Airflow**
 Ventilation Sizing Method **Sum of Space OA Airflows**
 Unocc. Damper Position **Closed**
 Damper Leak Rate **0** %
 Outdoor Air CO2 Level **400** ppm

Central Cooling Data:

Supply Air Temperature **14.4** °C
 Coil Bypass Factor **0.100**
 Cooling Source **Chilled Water**
 Schedule **JFMAMJJASOND**
 Capacity Control **Cycled or Staged Capacity - Fan On**

Central Heating Data:

Supply Temperature **35.0** °C
 Heating Source **Hot Water**
 Schedule **JFMAMJJASOND**
 Capacity Control **Cycled or Staged Capacity - Fan On**

Supply Fan Data:

Fan Type **Forward Curved**
 Configuration **Draw-thru**
 Fan Performance **0** Pa
 Overall Efficiency **54** %

Duct System Data:

Supply Duct Data:

Duct Heat Gain **0** %
 Duct Leakage **0** %

Return Duct or Plenum Data:

Return Air Via **Ducted Return**

3. Zone Components:

Space Assignments:

Zone 1: Zone 1	
Lv6 Concourse	x1
Lv6 Corridor	x1
Lv6 Corridor 2	x1
Lv6 FES Facility	x1
Lv6 FES Lab 13 - Lab 11	x1
Lv6 FES Lab 14	x1
Lv6 FES Lab 15	x1
Lv6 FES Lab 16	x1
Lv6 FES Lab 17	x1
Lv6 FES Lab 18 - 23	x1
Lv6 FES Lab 28- 24	x1
Lv6 Lift Lobby	x1
Lv6 Lift Lobby 2	x1
Lv6 PCB Lab	x1

Thermostats and Zone Data:

Zone **All**
 Cooling T-stat: Occ. **23.9** °C
 Cooling T-stat: Unocc. **26.7** °C
 Heating T-stat: Occ. **21.1** °C
 Heating T-stat: Unocc. **18.3** °C
 T-stat Throttling Range **0.83** °K
 Diversity Factor **100** %
 Direct Exhaust Airflow **0.0** L/s
 Direct Exhaust Fan kW **0.0** kW

Thermostat Schedule **Sample Schedule**
 Unoccupied Cooling is **Available**

Level 06 Input Data

UTAR Sungai Long Campus

Supply Terminals Data:

Zone All
 Terminal Type Diffuser
 Minimum Airflow 0.00 L/s/person

Zone Heating Units:

Zone All
 Zone Heating Unit Type None

 Zone Unit Heat Source Hot Water
 Zone Heating Unit Schedule JFMAMJJASOND

4. Sizing Data (Computer-Generated):

System Sizing Data:

Sizing Data:

Cooling Supply Temperature 14.4 °C
 Supply Fan Airflow 29204.5 L/s
 Ventilation Airflow 15265.0 L/s
 Heating Supply Temperature 35.0 °C

Hydronic Sizing Specifications:

Chilled Water Delta-T 5.6 °K
 Hot Water Delta-T 11.1 °K

Safety Factors:

Cooling Sensible 0 %
 Cooling Latent 0 %
 Heating 0 %

Zone Sizing Data:

Zone Airflow Sizing Method Sum of space airflow rates
 Space Airflow Sizing Method Individual peak space loads

Zone	Supply Airflow (L/s)	Zone Htg Unit (kW)	Reheat Coil (kW)	- (L/s)
1	29204.5	-	-	

5. Equipment Data

Changeover Controller:

Used No

Level 07 Input Data

UTAR Sungai Long Campus

1. General Details:

Air System Name **Level 07**
 Equipment Type **Chilled Water AHU**
 Air System Type **Single Zone CAV**
 Number of zones **1**

2. Ventilation System Components:

Ventilation Air Data:

Airflow Control **Constant Ventilation Airflow**
 Ventilation Sizing Method **Sum of Space OA Airflows**
 Unocc. Damper Position **Closed**
 Damper Leak Rate **0** %
 Outdoor Air CO2 Level **400** ppm

Central Cooling Data:

Supply Air Temperature **14.4** °C
 Coil Bypass Factor **0.100**
 Cooling Source **Chilled Water**
 Schedule **JFMAMJJASOND**
 Capacity Control **Cycled or Staged Capacity - Fan On**

Central Heating Data:

Supply Temperature **35.0** °C
 Heating Source **Hot Water**
 Schedule **JFMAMJJASOND**
 Capacity Control **Cycled or Staged Capacity - Fan On**

Supply Fan Data:

Fan Type **Forward Curved**
 Configuration **Draw-thru**
 Fan Performance **0** Pa
 Overall Efficiency **54** %

Duct System Data:

Supply Duct Data:

Duct Heat Gain **0** %
 Duct Leakage **0** %

Return Duct or Plenum Data:

Return Air Via **Ducted Return**

3. Zone Components:

Space Assignments:

Zone 1: Zone 1	
Lv7 concourse	x1
Lv7 Corridor 1	x1
Lv7 Corridor 2	x1
Lv7 Corridor 3	x1
Lv7 FES Lab 10	x1
Lv7 FES Lab 29	x1
Lv7 FES Lab 30	x1
Lv7 FES Lab 31	x1
Lv7 FES Lab 36-32	x1
Lv7 FES Lab 4 - 1	x1
Lv7 FES Lab 5 - 7	x1
Lv7 FES Lab 8	x1
Lv7 FES Lab 9	x1
Lv7 FES Lift lobby 1	x1
Lv7 lift lobby 2	x1
Lv7 random room	x1
Lv7 random room 11	x1
Lv7 random room 14	x1

Thermostats and Zone Data:

Zone **All**
 Cooling T-stat: Occ. **23.9** °C
 Cooling T-stat: Unocc. **26.7** °C
 Heating T-stat: Occ. **21.1** °C
 Heating T-stat: Unocc. **18.3** °C
 T-stat Throttling Range **0.83** °K
 Diversity Factor **100** %

Level 07 Input Data

UTAR Sungai Long Campus

Direct Exhaust Airflow **0.0** L/s
 Direct Exhaust Fan kW **0.0** kW
 Thermostat Schedule **Sample Schedule**
 Unoccupied Cooling is **Available**

Supply Terminals Data:

Zone **All**
 Terminal Type **Diffuser**
 Minimum Airflow **0.00** L/s/person

Zone Heating Units:

Zone **All**
 Zone Heating Unit Type **None**
 Zone Unit Heat Source **Hot Water**
 Zone Heating Unit Schedule **JFMAMJJASOND**

4. Sizing Data (Computer-Generated):

System Sizing Data:

Sizing Data:

Cooling Supply Temperature **14.4** °C
 Supply Fan Airflow **27979.0** L/s
 Ventilation Airflow **12681.8** L/s
 Heating Supply Temperature **35.0** °C

Hydronic Sizing Specifications:

Chilled Water Delta-T **5.6** °K
 Hot Water Delta-T **11.1** °K

Safety Factors:

Cooling Sensible **0** %
 Cooling Latent **0** %
 Heating **0** %

Zone Sizing Data:

Zone Airflow Sizing Method **Sum of space airflow rates**
 Space Airflow Sizing Method **Individual peak space loads**

Zone	Supply Airflow (L/s)	Zone Htg Unit (kW)	Reheat Coil (kW)	- (L/s)
1	27979.0	-	-	

5. Equipment Data

Changeover Controller:

Used **No**

Level 08 Input Data

UTAR Sungai Long Campus

1. General Details:

Air System Name **Level 08**
 Equipment Type **Chilled Water AHU**
 Air System Type **Single Zone CAV**
 Number of zones **1**

2. Ventilation System Components:

Ventilation Air Data:

Airflow Control **Constant Ventilation Airflow**
 Ventilation Sizing Method **Sum of Space OA Airflows**
 Unocc. Damper Position **Closed**
 Damper Leak Rate **0** %
 Outdoor Air CO2 Level **400** ppm

Central Cooling Data:

Supply Air Temperature **14.4** °C
 Coil Bypass Factor **0.100**
 Cooling Source **Chilled Water**
 Schedule **JFMAMJJASOND**
 Capacity Control **Cycled or Staged Capacity - Fan On**

Central Heating Data:

Supply Temperature **35.0** °C
 Heating Source **Hot Water**
 Schedule **JFMAMJJASOND**
 Capacity Control **Cycled or Staged Capacity - Fan On**

Supply Fan Data:

Fan Type **Forward Curved**
 Configuration **Draw-thru**
 Fan Performance **0** Pa
 Overall Efficiency **54** %

Duct System Data:

Supply Duct Data:

Duct Heat Gain **0** %
 Duct Leakage **0** %

Return Duct or Plenum Data:

Return Air Via **Ducted Return**

3. Zone Components:

Space Assignments:

Zone 1: Zone 1	
LV8 - FES FGO	x1
LV8 - lecturer's office	x1
Lv8 concourse	x1
Lv8 corridor	x1
Lv8 corridor2	x1
Lv8 FES Lab 39	x1
Lv8 Lift lobby 1	x1
Lv8 Lift lobby 2	x1

Thermostats and Zone Data:

Zone **All**
 Cooling T-stat: Occ. **23.9** °C
 Cooling T-stat: Unocc. **26.7** °C
 Heating T-stat: Occ. **21.1** °C
 Heating T-stat: Unocc. **18.3** °C
 T-stat Throttling Range **0.83** °K
 Diversity Factor **100** %
 Direct Exhaust Airflow **0.0** L/s
 Direct Exhaust Fan kW **0.0** kW

Thermostat Schedule **Sample Schedule**
 Unoccupied Cooling is **Available**

Supply Terminals Data:

Zone **All**
 Terminal Type **Diffuser**
 Minimum Airflow **0.00** L/s/person

Zone Heating Units:

Level 08 Input Data

UTAR Sungai Long Campus

Zone **All**
Zone Heating Unit Type **None**

Zone Unit Heat Source **Hot Water**
Zone Heating Unit Schedule **JFMAMJJASOND**

4. Sizing Data (Computer-Generated):

System Sizing Data:

Sizing Data:

Cooling Supply Temperature **14.4** °C
Supply Fan Airflow **29751.5** L/s
Ventilation Airflow **8858.0** L/s
Heating Supply Temperature **35.0** °C

Hydronic Sizing Specifications:

Chilled Water Delta-T **5.6** °K
Hot Water Delta-T **11.1** °K

Safety Factors:

Cooling Sensible **0** %
Cooling Latent **0** %
Heating **0** %

Zone Sizing Data:

Zone Airflow Sizing Method **Sum of space airflow rates**
Space Airflow Sizing Method **Individual peak space loads**

Zone	Supply Airflow (L/s)	Zone Htg Unit (kW)	Reheat Coil (kW)	- (L/s)
1	29751.5	-	-	

5. Equipment Data

Changeover Controller:

Used **No**

Level 09 Input Data

UTAR Sungai Long Campus

1. General Details:

Air System Name **Level 09**
 Equipment Type **Chilled Water AHU**
 Air System Type **Single Zone CAV**
 Number of zones **1**

2. Ventilation System Components:

Ventilation Air Data:

Airflow Control **Constant Ventilation Airflow**
 Ventilation Sizing Method **Sum of Space OA Airflows**
 Unocc. Damper Position **Closed**
 Damper Leak Rate **0** %
 Outdoor Air CO2 Level **400** ppm

Central Cooling Data:

Supply Air Temperature **14.4** °C
 Coil Bypass Factor **0.100**
 Cooling Source **Chilled Water**
 Schedule **JFMAMJJASOND**
 Capacity Control **Cycled or Staged Capacity - Fan On**

Central Heating Data:

Supply Temperature **35.0** °C
 Heating Source **Hot Water**
 Schedule **JFMAMJJASOND**
 Capacity Control **Cycled or Staged Capacity - Fan On**

Supply Fan Data:

Fan Type **Forward Curved**
 Configuration **Draw-thru**
 Fan Performance **0** Pa
 Overall Efficiency **54** %

Duct System Data:

Supply Duct Data:

Duct Heat Gain **0** %
 Duct Leakage **0** %

Return Duct or Plenum Data:

Return Air Via **Ducted Return**

3. Zone Components:

Space Assignments:

Zone 1: Zone 1	
LV9 - FES FGO(1)	x1
LV9 - lecturer's offi(1)	x1
Lv9 concourse(1)	x1
Lv9 corridor(1)	x1
Lv9 FES Lab 39(1)	x1
Lv9 Lift lobby 1(1)	x1
Lv9 Lift lobby 2(1)	x1
Lv9corridor2(1)	x1

Thermostats and Zone Data:

Zone **All**
 Cooling T-stat: Occ. **23.9** °C
 Cooling T-stat: Unocc. **26.7** °C
 Heating T-stat: Occ. **21.1** °C
 Heating T-stat: Unocc. **18.3** °C
 T-stat Throttling Range **0.83** °K
 Diversity Factor **100** %
 Direct Exhaust Airflow **0.0** L/s
 Direct Exhaust Fan kW **0.0** kW

Thermostat Schedule **Sample Schedule**
 Unoccupied Cooling is **Available**

Supply Terminals Data:

Zone **All**
 Terminal Type **Diffuser**
 Minimum Airflow **0.00** L/s/person

Zone Heating Units:

Level 09 Input Data

UTAR Sungai Long Campus

Zone **All**
Zone Heating Unit Type **None**

Zone Unit Heat Source **Hot Water**
Zone Heating Unit Schedule **JFMAMJJASOND**

4. Sizing Data (Computer-Generated):

System Sizing Data:

Sizing Data:

Cooling Supply Temperature **14.4** °C
Supply Fan Airflow **29751.5** L/s
Ventilation Airflow **8858.0** L/s
Heating Supply Temperature **35.0** °C

Hydronic Sizing Specifications:

Chilled Water Delta-T **5.6** °K
Hot Water Delta-T **11.1** °K

Safety Factors:

Cooling Sensible **0** %
Cooling Latent **0** %
Heating **0** %

Zone Sizing Data:

Zone Airflow Sizing Method **Sum of space airflow rates**
Space Airflow Sizing Method **Individual peak space loads**

Zone	Supply Airflow (L/s)	Zone Htg Unit (kW)	Reheat Coil (kW)	- (L/s)
1	29751.5	-	-	

5. Equipment Data

Changeover Controller:

Used **No**

Level 10 Input Data

UTAR Sungai Long Campus

1. General Details:

Air System Name Level 10
 Equipment Type Chilled Water AHU
 Air System Type Single Zone CAV
 Number of zones 1

2. Ventilation System Components:

Ventilation Air Data:

Airflow Control Constant Ventilation Airflow
 Ventilation Sizing Method Sum of Space OA Airflows
 Unocc. Damper Position Closed
 Damper Leak Rate 0 %
 Outdoor Air CO2 Level 400 ppm

Central Cooling Data:

Supply Air Temperature 14.4 °C
 Coil Bypass Factor 0.100
 Cooling Source Chilled Water
 Schedule JFMAMJJASOND
 Capacity Control Cycled or Staged Capacity - Fan On

Central Heating Data:

Supply Temperature 35.0 °C
 Heating Source Hot Water
 Schedule JFMAMJJASOND
 Capacity Control Cycled or Staged Capacity - Fan On

Supply Fan Data:

Fan Type Forward Curved
 Configuration Draw-thru
 Fan Performance 0 Pa
 Overall Efficiency 54 %

Duct System Data:

Supply Duct Data:

Duct Heat Gain 0 %
 Duct Leakage 0 %

Return Duct or Plenum Data:

Return Air Via Ducted Return

3. Zone Components:

Space Assignments:

Zone 1: Zone 1	
Lv 10 Lift Lobby 1	x1
LV_10 Chairman's Room	x1
LV_10 Corridor	x1
LV_10 Corridor 2	x1
LV_10 Councourse	x1
LV_10 Directors room 1	x1
LV_10 Directors room 2	x1
LV_10 Lift lobby 2	x1
LV_10 meeting and confer	x1
LV_10 Presidents room	x1
LV_10 ROG Office	x1

Thermostats and Zone Data:

Zone All
 Cooling T-stat: Occ. 23.9 °C
 Cooling T-stat: Unocc. 26.7 °C
 Heating T-stat: Occ. 21.1 °C
 Heating T-stat: Unocc. 18.3 °C
 T-stat Throttling Range 0.83 °K
 Diversity Factor 100 %
 Direct Exhaust Airflow 0.0 L/s
 Direct Exhaust Fan kW 0.0 kW

Thermostat Schedule Sample Schedule
 Unoccupied Cooling is Available

Supply Terminals Data:

Zone All
 Terminal Type Diffuser

Level 10 Input Data

UTAR Sungai Long Campus

Minimum Airflow **0.00** L/s/person

Zone Heating Units:

Zone **All**
 Zone Heating Unit Type **None**
 Zone Unit Heat Source **Hot Water**
 Zone Heating Unit Schedule **JFMAMJJASOND**

4. Sizing Data (Computer-Generated):

System Sizing Data:

Sizing Data:

Cooling Supply Temperature **14.4** °C
 Supply Fan Airflow **26714.4** L/s
 Ventilation Airflow **8561.3** L/s
 Heating Supply Temperature **35.0** °C

Hydronic Sizing Specifications:

Chilled Water Delta-T **5.6** °K
 Hot Water Delta-T **11.1** °K

Safety Factors:

Cooling Sensible **0** %
 Cooling Latent **0** %
 Heating **0** %

Zone Sizing Data:

Zone Airflow Sizing Method **Sum of space airflow rates**
 Space Airflow Sizing Method **Individual peak space loads**

Zone	Supply Airflow (L/s)	Zone Htg Unit (kW)	Reheat Coil (kW)	- (L/s)
1	26714.4	-	-	

5. Equipment Data

Changeover Controller:

Used **No**

Zone Sizing Summary for Ground Floor

UTAR Sungai Long Campus

Air System Information

Air System Name **Ground Floor**
 Equipment Class **CW AHU**
 Air System Type **SZCAV**

Number of zones **1**
 Floor Area **3200.3** m²
 Location **Kuala Lumpur, Malaysia**

Sizing Calculation Information

Calculation Months **Jan to Dec**
 Sizing Data **Calculated**

Zone L/s Sizing **Sum of space airflow rates**
 Space L/s Sizing **Individual peak space loads**

Zone Sizing Data

Zone Name	Maximum Cooling Sensible (kW)	Design Airflow (L/s)	Minimum Airflow (L/s)	Time of Peak Load	Maximum Heating Load (kW)	Zone Floor Area (m ²)	Zone L/(s-m ²)
Zone 1	679.0	66266	66266	Jun 1700	0.0	3200.3	20.71

Zone Terminal Sizing Data

No Zone Terminal Sizing Data required for this system.

Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (kW)	Time of Load	Air Flow (L/s)	Heating Load (kW)	Floor Area (m ²)	Space L/(s-m ²)
Zone 1							
Center For Extension	1	18.0	Jan 2300	1580	0.0	204.0	7.74
Center Of Education	1	96.7	Jun 1600	8507	0.0	204.7	41.57
class room	1	100.9	Sep 1700	8871	0.0	803.0	11.05
conference room 1	1	18.5	Dec 1600	1623	0.0	95.0	17.09
conference room 2	1	15.7	Dec 1600	1385	0.0	64.2	21.57
Corridor 2	1	10.6	Jan 2300	929	0.0	120.0	7.74
Corridor 3	1	3.5	Jan 2300	310	0.0	40.0	7.74
Corridor 4	1	13.7	Jan 2300	1208	0.0	156.0	7.74
Corridor 5	1	1.7	Jan 2300	147	0.0	19.0	7.74
corridor_1	1	1.7	Jan 2300	147	0.0	19.0	7.74
Counselling Room	1	0.8	Jan 2300	71	0.0	8.5	8.37
Div Of Credit Add	1	86.3	Jun 1600	7587	0.0	85.8	88.38
Div of Examination	1	26.6	Dec 1600	2344	0.0	188.0	12.47
Div of Finance	1	13.2	Jan 2300	1161	0.0	150.0	7.74
Div of Finance 2	1	68.4	Sep 1100	6015	0.0	39.0	154.24
Div of Program Promotion	1	101.6	Jun 1600	8935	0.0	260.0	34.37
exam transcript	1	8.9	Dec 1600	786	0.0	38.0	20.68
Fire Control Room	1	2.2	Jun 1800	192	0.0	13.0	14.74
Lift Lobby 1	1	2.5	Jan 2300	217	0.0	28.0	7.74
Lift Lobby 2	1	4.9	Jan 2300	434	0.0	56.0	7.74
manager room 1	1	2.2	Jun 1600	193	0.0	9.7	19.87
manager room 2	1	2.1	Jun 1600	181	0.0	9.7	18.67
manager room 3	1	0.7	Jan 2300	65	0.0	8.9	7.26
manager room 4	1	0.7	Jan 2300	62	0.0	8.5	7.26
manager room 5	1	0.8	Jan 2300	72	0.0	9.3	7.74
Printing Room	1	3.0	Jan 2300	263	0.0	34.0	7.74
Reception and Entrance	1	20.5	Jan 2300	1804	0.0	233.0	7.74
service lobby	1	58.4	Sep 1100	5140	0.0	96.0	53.54
student affairs	1	68.7	Nov 1800	6038	0.0	200.0	30.19

Zone Design Load Summary for Ground Floor

UTAR Sungai Long Campus

Zone 1	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jun 1700 COOLING OA DB / WB 33.0 °C / 25.3 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C		
	OCCUPIED T-STAT 23.9 °C			OCCUPIED T-STAT 21.1 °C		
ZONE LOADS	Details	Sensible (W)	Latent (W)	Details	Sensible (W)	Latent (W)
Window & Skylight Solar Loads	1666 m ²	216821	-	1666 m ²	-	-
Wall Transmission	3258 m ²	140178	-	3258 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	1666 m ²	43071	-	1666 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	1352 m ²	0	-	1352 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	34448 W	34444	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	3405	244458	204555	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	678971	204555	-	0	0

Space Design Load Summary for Ground Floor

UTAR Sungai Long Campus

TABLE 1.1.A. COMPONENT LOADS FOR SPACE " Center For Extension " IN ZONE " Zone 1 "

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jan 2300			HEATING DATA AT DES HTG		
	COOLING OA DB / WB 22.0 °C / 20.2 °C OCCUPIED T-STAT 23.9 °C			HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
SPACE LOADS	Details	Sensible (W)	Latent (W)	Details	Sensible (W)	Latent (W)
Window & Skylight Solar Loads	0 m ²	0	-	0 m ²	-	-
Wall Transmission	0 m ²	0	-	0 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	0 m ²	0	-	0 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	0 m ²	0	-	0 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	2196 W	2196	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	220	15766	13193	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	17962	13193	-	0	0

TABLE 1.1.B. ENVELOPE LOADS FOR SPACE " Center For Extension " IN ZONE " Zone 1 "

				COOLING	COOLING	HEATING
				TRANS	SOLAR	TRANS
				(W)	(W)	(W)
	Area	U-Value	Shade			
	(m ²)	(W/(m ² -°K))	Coeff.			

Space Design Load Summary for Ground Floor

UTAR Sungai Long Campus

TABLE 1.2.A. COMPONENT LOADS FOR SPACE " Center Of Education " IN ZONE " Zone 1 "

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jun 1600 COOLING OA DB / WB 33.6 °C / 25.5 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible (W)	Latent (W)		Sensible (W)	Latent (W)
SPACE LOADS	Details			Details		
Window & Skylight Solar Loads	300 m ²	46633	-	300 m ²	-	-
Wall Transmission	485 m ²	24006	-	485 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	300 m ²	8080	-	300 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	0 m ²	0	-	0 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	2203 W	2203	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	220	15817	13236	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	96739	13236	-	0	0

TABLE 1.2.B. ENVELOPE LOADS FOR SPACE " Center Of Education " IN ZONE " Zone 1 "

				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m ²)	(W/(m ² -°K))	Coeff.	(W)	(W)	(W)
N EXPOSURE						
WALL	485	3.041	-	24006	-	0
WINDOW 1	300	3.237	0.717	8080	46633	0

Space Design Load Summary for Ground Floor

UTAR Sungai Long Campus

TABLE 1.3.A. COMPONENT LOADS FOR SPACE " class room " IN ZONE " Zone 1 "

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Sep 1700 COOLING OA DB / WB 32.4 °C / 24.8 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible (W)	Latent (W)		Sensible (W)	Latent (W)
SPACE LOADS	Details			Details		
Window & Skylight Solar Loads	115 m ²	24092	-	115 m ²	-	-
Wall Transmission	67 m ²	3319	-	67 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	115 m ²	2766	-	115 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	0 m ²	0	-	0 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	8643 W	8643	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	864	62059	51929	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	100879	51929	-	0	0

TABLE 1.3.B. ENVELOPE LOADS FOR SPACE " class room " IN ZONE " Zone 1 "

				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m ²)	(W/(m ² -°K))	Coeff.	(W)	(W)	(W)
W EXPOSURE						
WALL	67	3.041	-	3319	-	0
WINDOW 1	115	3.237	0.717	2766	24092	0

Space Design Load Summary for Ground Floor

UTAR Sungai Long Campus

TABLE 1.4.A. COMPONENT LOADS FOR SPACE " conference room 1 " IN ZONE " Zone 1 "

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Dec 1600 COOLING OA DB / WB 29.2 °C / 22.7 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible (W)	Latent (W)		Sensible (W)	Latent (W)
SPACE LOADS	Details			Details		
Window & Skylight Solar Loads	40 m ²	8076	-	40 m ²	-	-
Wall Transmission	35 m ²	1519	-	35 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	40 m ²	502	-	40 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	0 m ²	0	-	0 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	1023 W	1022	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	102	7342	6144	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	18461	6144	-	0	0

TABLE 1.4.B. ENVELOPE LOADS FOR SPACE " conference room 1 " IN ZONE " Zone 1 "

					COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS	
	(m ²)	(W/(m ² -°K))	Coeff.	(W)	(W)	(W)	
S EXPOSURE							
WALL	35	3.041	-	1519	-	0	
WINDOW 1	40	3.237	0.717	502	8076	0	

Space Design Load Summary for Ground Floor

UTAR Sungai Long Campus

TABLE 1.5.A. COMPONENT LOADS FOR SPACE " conference room 2 " IN ZONE " Zone 1 "

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Dec 1600 COOLING OA DB / WB 29.2 °C / 22.7 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible (W)	Latent (W)		Sensible (W)	Latent (W)
SPACE LOADS	Details			Details		
Window & Skylight Solar Loads	40 m ²	8076	-	40 m ²	-	-
Wall Transmission	35 m ²	1519	-	35 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	40 m ²	502	-	40 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	0 m ²	0	-	0 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	691 W	691	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	69	4961	4151	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	15749	4151	-	0	0

TABLE 1.5.B. ENVELOPE LOADS FOR SPACE " conference room 2 " IN ZONE " Zone 1 "

				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m ²)	(W/(m ² -°K))	Coeff.	(W)	(W)	(W)
S EXPOSURE						
WALL	35	3.041	-	1519	-	0
WINDOW 1	40	3.237	0.717	502	8076	0

Space Design Load Summary for Ground Floor

UTAR Sungai Long Campus

TABLE 1.6.A. COMPONENT LOADS FOR SPACE " Corridor 2 " IN ZONE " Zone 1 "

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jan 2300 COOLING OA DB / WB 22.0 °C / 20.2 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible (W)	Latent (W)		Sensible (W)	Latent (W)
SPACE LOADS	Details			Details		
Window & Skylight Solar Loads	0 m ²	0	-	0 m ²	-	-
Wall Transmission	0 m ²	0	-	0 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	0 m ²	0	-	0 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	0 m ²	0	-	0 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	1292 W	1292	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	129	9274	7760	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	10566	7760	-	0	0

TABLE 1.6.B. ENVELOPE LOADS FOR SPACE " Corridor 2 " IN ZONE " Zone 1 "

				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m ²)	(W/(m ² -°K))	Coeff.	(W)	(W)	(W)

Space Design Load Summary for Ground Floor

UTAR Sungai Long Campus

TABLE 1.7.A. COMPONENT LOADS FOR SPACE " Corridor 3 " IN ZONE " Zone 1 "

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jan 2300 COOLING OA DB / WB 22.0 °C / 20.2 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible (W)	Latent (W)		Sensible (W)	Latent (W)
SPACE LOADS	Details			Details		
Window & Skylight Solar Loads	0 m ²	0	-	0 m ²	-	-
Wall Transmission	0 m ²	0	-	0 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	0 m ²	0	-	0 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	0 m ²	0	-	0 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	431 W	431	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	43	3091	2587	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	3522	2587	-	0	0

TABLE 1.7.B. ENVELOPE LOADS FOR SPACE " Corridor 3 " IN ZONE " Zone 1 "

				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m ²)	(W/(m ² -°K))	Coeff.	(W)	(W)	(W)

Space Design Load Summary for Ground Floor

UTAR Sungai Long Campus

TABLE 1.8.A. COMPONENT LOADS FOR SPACE " Corridor 4 " IN ZONE " Zone 1 "

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jan 2300 COOLING OA DB / WB 22.0 °C / 20.2 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible (W)	Latent (W)		Sensible (W)	Latent (W)
SPACE LOADS	Details			Details		
Window & Skylight Solar Loads	0 m ²	0	-	0 m ²	-	-
Wall Transmission	0 m ²	0	-	0 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	0 m ²	0	-	0 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	0 m ²	0	-	0 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	1679 W	1679	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	168	12057	10088	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	13736	10088	-	0	0

TABLE 1.8.B. ENVELOPE LOADS FOR SPACE " Corridor 4 " IN ZONE " Zone 1 "

				COOLING	COOLING	HEATING
		Area	U-Value	TRANS	SOLAR	TRANS
		(m ²)	(W/(m ² -°K))	(W)	(W)	(W)
			Shade			
			Coeff.			

Space Design Load Summary for Ground Floor

UTAR Sungai Long Campus

TABLE 1.9.A. COMPONENT LOADS FOR SPACE " Corridor 5 " IN ZONE " Zone 1 "

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jan 2300 COOLING OA DB / WB 22.0 °C / 20.2 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible (W)	Latent (W)		Sensible (W)	Latent (W)
SPACE LOADS	Details			Details		
Window & Skylight Solar Loads	0 m ²	0	-	0 m ²	-	-
Wall Transmission	0 m ²	0	-	0 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	0 m ²	0	-	0 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	0 m ²	0	-	0 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	205 W	204	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	20	1468	1229	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	1673	1229	-	0	0

TABLE 1.9.B. ENVELOPE LOADS FOR SPACE " Corridor 5 " IN ZONE " Zone 1 "

				COOLING	COOLING	HEATING
				TRANS	SOLAR	TRANS
				(W)	(W)	(W)
	Area	U-Value	Shade			
	(m ²)	(W/(m ² -°K))	Coeff.			

Space Design Load Summary for Ground Floor

UTAR Sungai Long Campus

TABLE 1.10.A. COMPONENT LOADS FOR SPACE " corridor_1 " IN ZONE " Zone 1 "

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jan 2300 COOLING OA DB / WB 22.0 °C / 20.2 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible (W)	Latent (W)		Sensible (W)	Latent (W)
SPACE LOADS	Details			Details		
Window & Skylight Solar Loads	0 m ²	0	-	0 m ²	-	-
Wall Transmission	0 m ²	0	-	0 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	0 m ²	0	-	0 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	664 m ²	0	-	664 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	205 W	204	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	20	1468	1229	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	1673	1229	-	0	0

TABLE 1.10.B. ENVELOPE LOADS FOR SPACE " corridor_1 " IN ZONE " Zone 1 "

				COOLING	COOLING	HEATING
				TRANS	SOLAR	TRANS
				(W)	(W)	(W)
	Area	U-Value	Shade			
	(m ²)	(W/(m ² -°K))	Coeff.			

Space Design Load Summary for Ground Floor

UTAR Sungai Long Campus

TABLE 1.11.A. COMPONENT LOADS FOR SPACE " Counselling Room " IN ZONE " Zone 1 "

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jan 2300 COOLING OA DB / WB 22.0 °C / 20.2 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible (W)	Latent (W)		Sensible (W)	Latent (W)
SPACE LOADS	Details			Details		
Window & Skylight Solar Loads	0 m ²	0	-	0 m ²	-	-
Wall Transmission	0 m ²	0	-	0 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	0 m ²	0	-	0 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	0 m ²	0	-	0 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	91 W	91	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	10	718	601	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	809	601	-	0	0

TABLE 1.11.B. ENVELOPE LOADS FOR SPACE " Counselling Room " IN ZONE " Zone 1 "

				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m ²)	(W/(m ² -°K))	Coeff.	(W)	(W)	(W)

Space Design Load Summary for Ground Floor

UTAR Sungai Long Campus

TABLE 1.12.A. COMPONENT LOADS FOR SPACE " Div Of Credit Add " IN ZONE " Zone 1 "

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jun 1600 COOLING OA DB / WB 33.6 °C / 25.5 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible (W)	Latent (W)		Sensible (W)	Latent (W)
SPACE LOADS	Details			Details		
Window & Skylight Solar Loads	300 m ²	46633	-	300 m ²	-	-
Wall Transmission	485 m ²	24006	-	485 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	300 m ²	8080	-	300 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	0 m ²	0	-	0 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	924 W	924	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	92	6634	5551	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	86277	5551	-	0	0

TABLE 1.12.B. ENVELOPE LOADS FOR SPACE " Div Of Credit Add " IN ZONE " Zone 1 "

				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m ²)	(W/(m ² -°K))	Coeff.	(W)	(W)	(W)
N EXPOSURE						
WALL	485	3.041	-	24006	-	0
WINDOW 1	300	3.237	0.717	8080	46633	0

Space Design Load Summary for Ground Floor

UTAR Sungai Long Campus

TABLE 1.13.A. COMPONENT LOADS FOR SPACE " Div of Examination " IN ZONE " Zone 1 "

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Dec 1600 COOLING OA DB / WB 29.2 °C / 22.7 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible (W)	Latent (W)		Sensible (W)	Latent (W)
SPACE LOADS	Details			Details		
Window & Skylight Solar Loads	40 m ²	8076	-	40 m ²	-	-
Wall Transmission	35 m ²	1519	-	35 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	40 m ²	502	-	40 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	0 m ²	0	-	0 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	2024 W	2023	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	202	14529	12158	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	26650	12158	-	0	0

TABLE 1.13.B. ENVELOPE LOADS FOR SPACE " Div of Examination " IN ZONE " Zone 1 "

				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m ²)	(W/(m ² -°K))	Coeff.	(W)	(W)	(W)
S EXPOSURE						
WALL	35	3.041	-	1519	-	0
WINDOW 1	40	3.237	0.717	502	8076	0

Space Design Load Summary for Ground Floor

UTAR Sungai Long Campus

TABLE 1.14.A. COMPONENT LOADS FOR SPACE " Div of Finance " IN ZONE " Zone 1 "

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jan 2300 COOLING OA DB / WB 22.0 °C / 20.2 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible (W)	Latent (W)		Sensible (W)	Latent (W)
SPACE LOADS	Details			Details		
Window & Skylight Solar Loads	0 m ²	0	-	0 m ²	-	-
Wall Transmission	0 m ²	0	-	0 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	0 m ²	0	-	0 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	0 m ²	0	-	0 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	1615 W	1615	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	161	11593	9700	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	13208	9700	-	0	0

TABLE 1.14.B. ENVELOPE LOADS FOR SPACE " Div of Finance " IN ZONE " Zone 1 "

		COOLING			HEATING	
		Area (m ²)	U-Value (W/(m ² -°K))	Shade Coeff.	TRANS (W)	SOLAR (W)

Space Design Load Summary for Ground Floor

UTAR Sungai Long Campus

TABLE 1.15.A. COMPONENT LOADS FOR SPACE " Div of Finance 2 " IN ZONE " Zone 1 "

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Sep 1100 COOLING OA DB / WB 29.8 °C / 24.1 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible (W)	Latent (W)		Sensible (W)	Latent (W)
SPACE LOADS	Details			Details		
Window & Skylight Solar Loads	300 m ²	51642	-	300 m ²	-	-
Wall Transmission	289 m ²	11116	-	289 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	300 m ²	4945	-	300 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	0 m ²	0	-	0 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	420 W	420	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	4	280	234	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	68403	234	-	0	0

TABLE 1.15.B. ENVELOPE LOADS FOR SPACE " Div of Finance 2 " IN ZONE " Zone 1 "

				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m ²)	(W/(m ² -°K))	Coeff.	(W)	(W)	(W)
E EXPOSURE						
WALL	289	3.041	-	11116	-	0
WINDOW 1	300	3.237	0.717	4945	51642	0

Space Design Load Summary for Ground Floor

UTAR Sungai Long Campus

TABLE 1.16.A. COMPONENT LOADS FOR SPACE " Div of Program Promotion " IN ZONE " Zone 1 "

SPACE LOADS	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jun 1600 COOLING OA DB / WB 33.6 °C / 25.5 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
	Details	Sensible (W)	Latent (W)	Details	Sensible (W)	Latent (W)
Window & Skylight Solar Loads	300 m ²	46633	-	300 m ²	-	-
Wall Transmission	485 m ²	24006	-	485 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	300 m ²	8080	-	300 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	0 m ²	0	-	0 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	2799 W	2798	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	280	20094	16814	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	101611	16814	-	0	0

TABLE 1.16.B. ENVELOPE LOADS FOR SPACE " Div of Program Promotion " IN ZONE " Zone 1 "

N EXPOSURE	Area (m ²)	U-Value (W/(m ² -°K))	Shade Coeff.	COOLING	COOLING	HEATING
				TRANS	SOLAR	TRANS
				(W)	(W)	(W)
WALL	485	3.041	-	24006	-	0
WINDOW 1	300	3.237	0.717	8080	46633	0

Space Design Load Summary for Ground Floor

UTAR Sungai Long Campus

TABLE 1.17.A. COMPONENT LOADS FOR SPACE " exam transcript " IN ZONE " Zone 1 "

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Dec 1600 COOLING OA DB / WB 29.2 °C / 22.7 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible (W)	Latent (W)		Sensible (W)	Latent (W)
SPACE LOADS	Details			Details		
Window & Skylight Solar Loads	20 m ²	4038	-	20 m ²	-	-
Wall Transmission	30 m ²	1302	-	30 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	20 m ²	251	-	20 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	344 m ²	0	-	344 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	409 W	409	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	41	2937	2457	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	8937	2457	-	0	0

TABLE 1.17.B. ENVELOPE LOADS FOR SPACE " exam transcript " IN ZONE " Zone 1 "

					COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS	
	(m ²)	(W/(m ² -°K))	Coeff.	(W)	(W)	(W)	
S EXPOSURE							
WALL	30	3.041	-	1302	-	0	
WINDOW 1	20	3.237	0.717	251	4038	0	

Space Design Load Summary for Ground Floor

UTAR Sungai Long Campus

TABLE 1.18.A. COMPONENT LOADS FOR SPACE " Fire Control Room " IN ZONE " Zone 1 "

		DESIGN COOLING			DESIGN HEATING		
		COOLING DATA AT Jun 1800 COOLING OA DB / WB 32.0 °C / 25.1 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
SPACE LOADS	Details	Sensible (W)	Latent (W)	Details	Sensible (W)	Latent (W)	
Window & Skylight Solar Loads	0 m ²	0	-	0 m ²	-	-	
Wall Transmission	20 m ²	1035	-	20 m ²	0	-	
Roof Transmission	0 m ²	0	-	0 m ²	0	-	
Window Transmission	0 m ²	0	-	0 m ²	0	-	
Skylight Transmission	0 m ²	0	-	0 m ²	0	-	
Door Loads	0 m ²	0	-	0 m ²	0	-	
Floor Transmission	0 m ²	0	-	0 m ²	0	-	
Partitions	0 m ²	0	-	0 m ²	0	-	
Ceiling	0 m ²	0	-	0 m ²	0	-	
Overhead Lighting	140 W	140	-	0	0	-	
Task Lighting	0 W	0	-	0	0	-	
Electric Equipment	0 W	0	-	0	0	-	
People	14	1005	841	0	0	0	
Infiltration	-	0	0	-	0	0	
Miscellaneous	-	0	0	-	0	0	
Safety Factor	0% / 0%	0	0	0%	0	0	
>> Total Zone Loads	-	2179	841	-	0	0	

TABLE 1.18.B. ENVELOPE LOADS FOR SPACE " Fire Control Room " IN ZONE " Zone 1 "

				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m ²)	(W/(m ² -°K))	Coeff.	(W)	(W)	(W)
N EXPOSURE						
WALL	20	3.041	-	1035	-	0

Space Design Load Summary for Ground Floor

UTAR Sungai Long Campus

TABLE 1.19.A. COMPONENT LOADS FOR SPACE " Lift Lobby 1 " IN ZONE " Zone 1 "

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jan 2300 COOLING OA DB / WB 22.0 °C / 20.2 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible (W)	Latent (W)		Sensible (W)	Latent (W)
SPACE LOADS	Details			Details		
Window & Skylight Solar Loads	0 m ²	0	-	0 m ²	-	-
Wall Transmission	0 m ²	0	-	0 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	0 m ²	0	-	0 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	0 m ²	0	-	0 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	301 W	301	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	30	2164	1811	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	2465	1811	-	0	0

TABLE 1.19.B. ENVELOPE LOADS FOR SPACE " Lift Lobby 1 " IN ZONE " Zone 1 "

				COOLING	COOLING	HEATING
				TRANS	SOLAR	TRANS
				(W)	(W)	(W)
	Area	U-Value	Shade			
	(m ²)	(W/(m ² -°K))	Coeff.			

Space Design Load Summary for Ground Floor

UTAR Sungai Long Campus

TABLE 1.20.A. COMPONENT LOADS FOR SPACE " Lift Lobby 2 " IN ZONE " Zone 1 "

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jan 2300 COOLING OA DB / WB 22.0 °C / 20.2 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible (W)	Latent (W)		Sensible (W)	Latent (W)
SPACE LOADS	Details			Details		
Window & Skylight Solar Loads	0 m ²	0	-	0 m ²	-	-
Wall Transmission	0 m ²	0	-	0 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	0 m ²	0	-	0 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	0 m ²	0	-	0 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	603 W	603	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	60	4328	3621	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	4931	3621	-	0	0

TABLE 1.20.B. ENVELOPE LOADS FOR SPACE " Lift Lobby 2 " IN ZONE " Zone 1 "

				COOLING	COOLING	HEATING
				TRANS	SOLAR	TRANS
				(W)	(W)	(W)
Area (m ²)	U-Value (W/(m ² -°K))	Shade Coeff.				

Space Design Load Summary for Ground Floor

UTAR Sungai Long Campus

TABLE 1.21.A. COMPONENT LOADS FOR SPACE " manager room 1 " IN ZONE " Zone 1 "

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jun 1600 COOLING OA DB / WB 33.6 °C / 25.5 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible (W)	Latent (W)		Sensible (W)	Latent (W)
SPACE LOADS	Details	(W)	(W)	Details	(W)	(W)
Window & Skylight Solar Loads	6 m ²	933	-	6 m ²	-	-
Wall Transmission	6 m ²	297	-	6 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	6 m ²	162	-	6 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	0 m ²	0	-	0 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	104 W	104	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	10	696	583	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	2192	583	-	0	0

TABLE 1.21.B. ENVELOPE LOADS FOR SPACE " manager room 1 " IN ZONE " Zone 1 "

					COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS	
	(m ²)	(W/(m ² -°K))	Coeff.	(W)	(W)	(W)	
N EXPOSURE							
WALL	6	3.041	-	297	-	0	
WINDOW 1	6	3.237	0.717	162	933	0	

Space Design Load Summary for Ground Floor

UTAR Sungai Long Campus

TABLE 1.22.A. COMPONENT LOADS FOR SPACE " manager room 2 " IN ZONE " Zone 1 "

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jun 1600 COOLING OA DB / WB 33.6 °C / 25.5 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible (W)	Latent (W)		Sensible (W)	Latent (W)
SPACE LOADS	Details			Details		
Window & Skylight Solar Loads	5 m ²	777	-	5 m ²	-	-
Wall Transmission	7 m ²	346	-	7 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	5 m ²	135	-	5 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	0 m ²	0	-	0 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	104 W	104	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	10	696	583	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	2059	583	-	0	0

TABLE 1.22.B. ENVELOPE LOADS FOR SPACE " manager room 2 " IN ZONE " Zone 1 "

					COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS	
	(m ²)	(W/(m ² -°K))	Coeff.	(W)	(W)	(W)	
N EXPOSURE							
WALL	7	3.041	-	346	-	0	
WINDOW 1	5	3.237	0.717	135	777	0	

Space Design Load Summary for Ground Floor

UTAR Sungai Long Campus

TABLE 1.23.A. COMPONENT LOADS FOR SPACE " manager room 3 " IN ZONE " Zone 1 "

SPACE LOADS	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jan 2300 COOLING OA DB / WB 22.0 °C / 20.2 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
	Details	Sensible (W)	Latent (W)	Details	Sensible (W)	Latent (W)
Window & Skylight Solar Loads	0 m ²	0	-	0 m ²	-	-
Wall Transmission	0 m ²	0	-	0 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	0 m ²	0	-	0 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	0 m ²	0	-	0 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	96 W	96	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	9	639	535	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	735	535	-	0	0

TABLE 1.23.B. ENVELOPE LOADS FOR SPACE " manager room 3 " IN ZONE " Zone 1 "

	Area (m ²)	U-Value (W/(m ² -°K))	Shade Coeff.	COOLING	COOLING	HEATING
				TRANS	SOLAR	TRANS
				(W)	(W)	(W)

Space Design Load Summary for Ground Floor

UTAR Sungai Long Campus

TABLE 1.24.A. COMPONENT LOADS FOR SPACE " manager room 4 " IN ZONE " Zone 1 "

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jan 2300 COOLING OA DB / WB 22.0 °C / 20.2 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible (W)	Latent (W)		Sensible (W)	Latent (W)
SPACE LOADS	Details			Details		
Window & Skylight Solar Loads	0 m ²	0	-	0 m ²	-	-
Wall Transmission	0 m ²	0	-	0 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	0 m ²	0	-	0 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	0 m ²	0	-	0 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	91 W	91	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	9	610	511	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	702	511	-	0	0

TABLE 1.24.B. ENVELOPE LOADS FOR SPACE " manager room 4 " IN ZONE " Zone 1 "

				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m ²)	(W/(m ² -°K))	Coeff.	(W)	(W)	(W)

Space Design Load Summary for Ground Floor

UTAR Sungai Long Campus

TABLE 1.25.A. COMPONENT LOADS FOR SPACE " manager room 5 " IN ZONE " Zone 1 "

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jan 2300 COOLING OA DB / WB 22.0 °C / 20.2 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible (W)	Latent (W)		Sensible (W)	Latent (W)
SPACE LOADS	Details			Details		
Window & Skylight Solar Loads	0 m ²	0	-	0 m ²	-	-
Wall Transmission	0 m ²	0	-	0 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	0 m ²	0	-	0 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	0 m ²	0	-	0 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	100 W	100	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	10	718	601	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	818	601	-	0	0

TABLE 1.25.B. ENVELOPE LOADS FOR SPACE " manager room 5 " IN ZONE " Zone 1 "

				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m ²)	(W/(m ² -°K))	Coeff.	(W)	(W)	(W)

Space Design Load Summary for Ground Floor

UTAR Sungai Long Campus

TABLE 1.26.A. COMPONENT LOADS FOR SPACE " Printing Room " IN ZONE " Zone 1 "

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jan 2300 COOLING OA DB / WB 22.0 °C / 20.2 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible (W)	Latent (W)		Sensible (W)	Latent (W)
SPACE LOADS	Details			Details		
Window & Skylight Solar Loads	0 m ²	0	-	0 m ²	-	-
Wall Transmission	0 m ²	0	-	0 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	0 m ²	0	-	0 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	344 m ²	0	-	344 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	366 W	366	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	37	2628	2199	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	2994	2199	-	0	0

TABLE 1.26.B. ENVELOPE LOADS FOR SPACE " Printing Room " IN ZONE " Zone 1 "

				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m ²)	(W/(m ² -°K))	Coeff.	(W)	(W)	(W)

Space Design Load Summary for Ground Floor

UTAR Sungai Long Campus

TABLE 1.27.A. COMPONENT LOADS FOR SPACE " Reception and Entrance " IN ZONE " Zone 1 "

SPACE LOADS	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jan 2300 COOLING OA DB / WB 22.0 °C / 20.2 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
	Details	Sensible (W)	Latent (W)	Details	Sensible (W)	Latent (W)
Window & Skylight Solar Loads	0 m ²	0	-	0 m ²	-	-
Wall Transmission	0 m ²	0	-	0 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	0 m ²	0	-	0 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	0 m ²	0	-	0 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	2508 W	2508	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	251	18007	15068	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	20515	15068	-	0	0

TABLE 1.27.B. ENVELOPE LOADS FOR SPACE " Reception and Entrance " IN ZONE " Zone 1 "

	Area (m ²)	U-Value (W/(m ² -°K))	Shade Coeff.	COOLING	COOLING	HEATING
				TRANS	SOLAR	TRANS
				(W)	(W)	(W)

Space Design Load Summary for Ground Floor

UTAR Sungai Long Campus

TABLE 1.28.A. COMPONENT LOADS FOR SPACE " service lobby " IN ZONE " Zone 1 "

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Sep 1100 COOLING OA DB / WB 29.8 °C / 24.1 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible (W)	Latent (W)		Sensible (W)	Latent (W)
SPACE LOADS	Details			Details		
Window & Skylight Solar Loads	200 m ²	34428	-	200 m ²	-	-
Wall Transmission	319 m ²	12270	-	319 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	200 m ²	3296	-	200 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	0 m ²	0	-	0 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	1033 W	1033	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	103	7419	6208	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	58447	6208	-	0	0

TABLE 1.28.B. ENVELOPE LOADS FOR SPACE " service lobby " IN ZONE " Zone 1 "

				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m ²)	(W/(m ² -°K))	Coeff.	(W)	(W)	(W)
E EXPOSURE						
WALL	319	3.041	-	12270	-	0
WINDOW 1	200	3.237	0.717	3296	34428	0

Space Design Load Summary for Ground Floor

UTAR Sungai Long Campus

TABLE 1.29.A. COMPONENT LOADS FOR SPACE " student affairs " IN ZONE " Zone 1 "

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Nov 1800 COOLING OA DB / WB 28.7 °C / 23.4 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible (W)	Latent (W)		Sensible (W)	Latent (W)
SPACE LOADS	Details			Details		
Window & Skylight Solar Loads	0 m ²	0	-	0 m ²	-	-
Wall Transmission	960 m ²	51050	-	960 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	0 m ²	0	-	0 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	0 m ²	0	-	0 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	2153 W	2153	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	215	15457	12934	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	68659	12934	-	0	0

TABLE 1.29.B. ENVELOPE LOADS FOR SPACE " student affairs " IN ZONE " Zone 1 "

				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m ²)	(W/(m ² -°K))	Coeff.	(W)	(W)	(W)
SW EXPOSURE						
WALL	960	3.041	-	51050	-	0

Hourly Zone Loads for Ground Floor

UTAR Sungai Long Campus

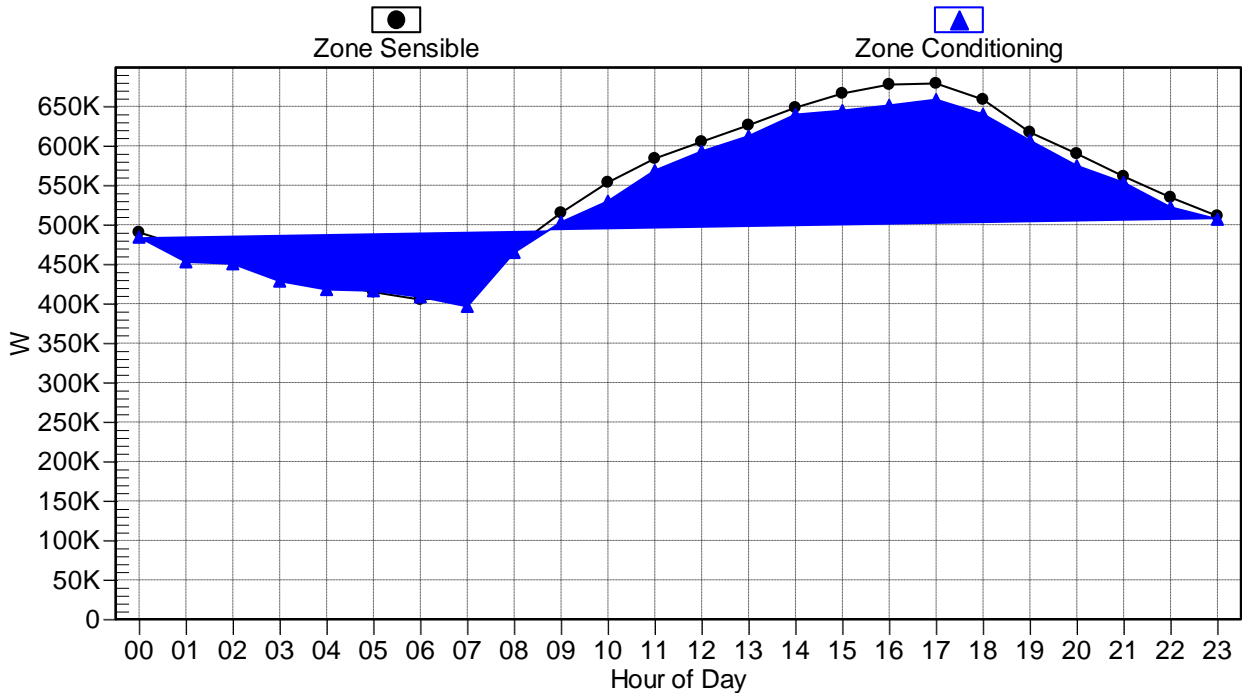
ZONE: Zone 1 DESIGN MONTH: JUNE									
Hour	OA TEMP (°C)	ZONE TEMP (°C)	RH (%)	ZONE AIRFLOW (L/s)	ZONE SENSIBLE LOAD (W)	ZONE COND (W)	TERMINAL COOLING COIL (W)	TERMINAL HEATING COIL (W)	ZONE HEATING UNIT (W)
0000	26.5	24.4	72	66265.9	490204.5	484190.9	0.0	0.0	0.0
0100	26.1	24.6	74	66265.9	471675.5	452930.1	0.0	0.0	0.0
0200	25.6	24.4	74	66265.9	454873.5	450492.8	0.0	0.0	0.0
0300	25.2	24.5	76	66265.9	439817.6	428517.3	0.0	0.0	0.0
0400	25.0	24.4	76	66265.9	426309.5	417860.6	0.0	0.0	0.0
0500	24.9	24.2	76	66265.9	414608.3	416355.6	0.0	0.0	0.0
0600	25.1	24.2	77	66265.9	405122.9	408625.7	0.0	0.0	0.0
0700	25.5	24.5	78	66265.9	409220.9	396431.9	0.0	0.0	0.0
0800	26.3	24.3	73	66265.9	470737.6	464810.3	0.0	0.0	0.0
0900	27.5	24.5	71	66265.9	514947.8	503135.1	0.0	0.0	0.0
1000	28.8	24.7	69	66265.9	553515.3	529737.6	0.0	0.0	0.0
1100	30.4	24.5	67	66265.9	583877.2	568559.6	0.0	0.0	0.0
1200	31.8	24.5	66	66265.9	605089.9	592890.0	0.0	0.0	0.0
1300	32.9	24.5	65	66265.9	626160.4	612195.8	0.0	0.0	0.0
1400	33.6	24.4	63	66265.9	648317.2	639584.3	0.0	0.0	0.0
1500	33.9	24.7	63	66265.9	666343.1	644533.3	0.0	0.0	0.0
1600	33.6	24.8	63	66265.9	677659.5	651135.5	0.0	0.0	0.0
1700	33.0	24.7	62	66265.9	678971.0	658394.3	0.0	0.0	0.0
1800	32.0	24.6	63	66265.9	658673.3	639961.5	0.0	0.0	0.0
1900	30.8	24.5	65	66265.9	617146.3	606545.1	0.0	0.0	0.0
2000	29.7	24.6	67	66265.9	589927.8	574602.3	0.0	0.0	0.0
2100	28.7	24.4	68	66265.9	561169.5	553366.3	0.0	0.0	0.0
2200	27.8	24.5	70	66265.9	534638.9	522083.6	0.0	0.0	0.0
2300	27.0	24.4	71	66265.9	511066.8	506959.0	0.0	0.0	0.0

Hourly Zone Design Day Loads for Ground Floor

UTAR Sungai Long Campus

Zone: Zone 1

Data for June



Zone Sizing Summary for level 01

UTAR Sungai Long Campus

Air System Information

Air System Name **level 01**
 Equipment Class **UNDEF**
 Air System Type **SZCAV**

Number of zones **1**
 Floor Area **2356.0** m²
 Location **Kuala Lumpur, Malaysia**

Sizing Calculation Information

Calculation Months **Jan to Dec**
 Sizing Data **Calculated**

Zone L/s Sizing **Sum of space airflow rates**
 Space L/s Sizing **Individual peak space loads**

Zone Sizing Data

Zone Name	Maximum Cooling Sensible (kW)	Design Airflow (L/s)	Minimum Airflow (L/s)	Time of Peak Load	Maximum Heating Load (kW)	Zone Floor Area (m ²)	Zone L/(s-m ²)
Zone 1	430.7	38818	38818	Jun 1800	0.0	2356.0	16.48

Zone Terminal Sizing Data

No Zone Terminal Sizing Data required for this system.

Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (kW)	Time of Load	Air Flow (L/s)	Heating Load (kW)	Floor Area (m ²)	Space L/(s-m ²)
Zone 1							
LV_1 corridor 1	1	23.6	Jan 2300	2077	0.0	286.0	7.26
LV_1 corridor 2	1	12.0	Jan 2300	1053	0.0	145.0	7.26
LV_1 corridor 3	1	8.2	Jan 2300	719	0.0	99.0	7.26
LV_1 Lecture Hall 1	1	54.6	Jun 1600	4801	0.0	297.0	16.16
LV_1 Lecture Hall 2	1	84.0	Jul 1800	7389	0.0	343.0	21.54
LV_1 Lecture Hall 3	1	63.9	Jul 1800	5617	0.0	99.0	56.74
LV_1 Lecture Hall 4	1	80.5	Jul 1800	7077	0.0	300.0	23.59
LV_1 Lecture Hall 5	1	36.5	Dec 1600	3208	0.0	246.0	13.04
LV_1 Lift Lobby 1	1	2.3	Jan 2300	203	0.0	28.0	7.26
LV_1 Lift Lobby 2	1	3.4	Jan 2300	302	0.0	39.0	7.74
LV_1 Student Activity	1	16.4	Dec 1600	1445	0.0	123.0	11.75
LV_1 Tutorial room 3	1	21.7	Jun 1700	1904	0.0	129.0	14.76
LV_1 Tutorial room 4	1	14.5	Jun 1600	1272	0.0	114.0	11.16
LV_1 Tutorial room 4a	1	19.9	Jun 1700	1751	0.0	108.0	16.22

Zone Design Load Summary for level 01

UTAR Sungai Long Campus

Zone 1	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jun 1800 COOLING OA DB / WB 32.0 °C / 25.1 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C		
	OCCUPIED T-STAT 23.9 °C			OCCUPIED T-STAT 21.1 °C		
ZONE LOADS	Details	Sensible (W)	Latent (W)	Details	Sensible (W)	Latent (W)
Window & Skylight Solar Loads	490 m ²	66779	-	490 m ²	-	-
Wall Transmission	2760 m ²	156973	-	2760 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	490 m ²	11694	-	490 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	592 m ²	0	-	592 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	25360 W	25358	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	492 W	492	-	0	0	-
People	2359	169375	141724	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	430673	141724	-	0	0

Space Design Load Summary for level 01

UTAR Sungai Long Campus

TABLE 1.1.A. COMPONENT LOADS FOR SPACE " LV_1 corridor 1 " IN ZONE " Zone 1 "						
	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jan 2300 COOLING OA DB / WB 22.0 °C / 20.2 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
SPACE LOADS	Details	Sensible (W)	Latent (W)	Details	Sensible (W)	Latent (W)
Window & Skylight Solar Loads	0 m ²	0	-	0 m ²	-	-
Wall Transmission	0 m ²	0	-	0 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	0 m ²	0	-	0 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	0 m ²	0	-	0 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	3078 W	3078	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	286	20535	17183	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	23614	17183	-	0	0

TABLE 1.1.B. ENVELOPE LOADS FOR SPACE " LV_1 corridor 1 " IN ZONE " Zone 1 "						
				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m ²)	(W/(m ² -°K))	Coeff.	(W)	(W)	(W)

Space Design Load Summary for level 01

UTAR Sungai Long Campus

TABLE 1.2.A. COMPONENT LOADS FOR SPACE " LV_1 corridor 2 " IN ZONE " Zone 1 "

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jan 2300 COOLING OA DB / WB 22.0 °C / 20.2 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible (W)	Latent (W)		Sensible (W)	Latent (W)
SPACE LOADS	Details			Details		
Window & Skylight Solar Loads	0 m ²	0	-	0 m ²	-	-
Wall Transmission	0 m ²	0	-	0 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	0 m ²	0	-	0 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	0 m ²	0	-	0 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	1561 W	1561	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	145	10411	8712	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	11972	8712	-	0	0

TABLE 1.2.B. ENVELOPE LOADS FOR SPACE " LV_1 corridor 2 " IN ZONE " Zone 1 "

				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m ²)	(W/(m ² -°K))	Coeff.	(W)	(W)	(W)

Space Design Load Summary for level 01

UTAR Sungai Long Campus

TABLE 1.3.A. COMPONENT LOADS FOR SPACE " LV_1 corridor 3 " IN ZONE " Zone 1 "

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jan 2300 COOLING OA DB / WB 22.0 °C / 20.2 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible (W)	Latent (W)		Sensible (W)	Latent (W)
SPACE LOADS	Details			Details		
Window & Skylight Solar Loads	0 m ²	0	-	0 m ²	-	-
Wall Transmission	0 m ²	0	-	0 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	0 m ²	0	-	0 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	0 m ²	0	-	0 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	1066 W	1066	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	99	7108	5948	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	8174	5948	-	0	0

TABLE 1.3.B. ENVELOPE LOADS FOR SPACE " LV_1 corridor 3 " IN ZONE " Zone 1 "

				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m ²)	(W/(m ² -°K))	Coeff.	(W)	(W)	(W)

Space Design Load Summary for level 01

UTAR Sungai Long Campus

TABLE 1.4.A. COMPONENT LOADS FOR SPACE " LV_1 Lecture Hall 1 " IN ZONE " Zone 1 "

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jun 1600 COOLING OA DB / WB 33.6 °C / 25.5 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible (W)	Latent (W)		Sensible (W)	Latent (W)
SPACE LOADS	Details	(W)	(W)	Details	(W)	(W)
Window & Skylight Solar Loads	150 m ²	20762	-	150 m ²	-	-
Wall Transmission	117 m ²	5277	-	117 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	150 m ²	4034	-	150 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	0 m ²	0	-	0 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	3197 W	3197	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	297	21325	17844	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	54594	17844	-	0	0

TABLE 1.4.B. ENVELOPE LOADS FOR SPACE " LV_1 Lecture Hall 1 " IN ZONE " Zone 1 "

				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m ²)	(W/(m ² -°K))	Coeff.	(W)	(W)	(W)
N EXPOSURE						
WALL	65	3.041	-	3215	-	0
WINDOW 1	100	3.237	0.717	2690	15427	0
E EXPOSURE						
WALL	52	3.041	-	2062	-	0
WINDOW 1	50	3.237	0.717	1345	5335	0

Space Design Load Summary for level 01

UTAR Sungai Long Campus

TABLE 1.5.A. COMPONENT LOADS FOR SPACE " LV_1 Lecture Hall 2 " IN ZONE " Zone 1 "

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jul 1800 COOLING OA DB / WB 32.6 °C / 25.1 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible (W)	Latent (W)		Sensible (W)	Latent (W)
SPACE LOADS	Details			Details		
Window & Skylight Solar Loads	40 m ²	7211	-	40 m ²	-	-
Wall Transmission	810 m ²	47466	-	810 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	40 m ²	1027	-	40 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	104 m ²	0	-	104 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	3692 W	3692	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	343	24628	20607	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	84024	20607	-	0	0

TABLE 1.5.B. ENVELOPE LOADS FOR SPACE " LV_1 Lecture Hall 2 " IN ZONE " Zone 1 "

					COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS	
	(m ²)	(W/(m ² -°K))	Coeff.	(W)	(W)	(W)	
NW EXPOSURE							
WALL	810	3.041	-	47466	-	0	
WINDOW 1	40	3.237	0.717	1027	7211	0	

Space Design Load Summary for level 01

UTAR Sungai Long Campus

TABLE 1.6.A. COMPONENT LOADS FOR SPACE " LV_1 Lecture Hall 3 " IN ZONE " Zone 1 "

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jul 1800 COOLING OA DB / WB 32.6 °C / 25.1 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible (W)	Latent (W)		Sensible (W)	Latent (W)
SPACE LOADS	Details			Details		
Window & Skylight Solar Loads	40 m ²	7211	-	40 m ²	-	-
Wall Transmission	810 m ²	47466	-	810 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	40 m ²	1027	-	40 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	104 m ²	0	-	104 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	1066 W	1066	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	99	7108	5948	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	63878	5948	-	0	0

TABLE 1.6.B. ENVELOPE LOADS FOR SPACE " LV_1 Lecture Hall 3 " IN ZONE " Zone 1 "

				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m ²)	(W/(m ² -°K))	Coeff.	(W)	(W)	(W)
NW EXPOSURE						
WALL	810	3.041	-	47466	-	0
WINDOW 1	40	3.237	0.717	1027	7211	0

Space Design Load Summary for level 01

UTAR Sungai Long Campus

TABLE 1.7.A. COMPONENT LOADS FOR SPACE " LV_1 Lecture Hall 4 " IN ZONE " Zone 1 "

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jul 1800 COOLING OA DB / WB 32.6 °C / 25.1 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible (W)	Latent (W)		Sensible (W)	Latent (W)
SPACE LOADS	Details			Details		
Window & Skylight Solar Loads	40 m ²	7211	-	40 m ²	-	-
Wall Transmission	810 m ²	47466	-	810 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	40 m ²	1027	-	40 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	104 m ²	0	-	104 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	3229 W	3229	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	300	21540	18024	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	80474	18024	-	0	0

TABLE 1.7.B. ENVELOPE LOADS FOR SPACE " LV_1 Lecture Hall 4 " IN ZONE " Zone 1 "

				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m ²)	(W/(m ² -°K))	Coeff.	(W)	(W)	(W)
NW EXPOSURE						
WALL	810	3.041	-	47466	-	0
WINDOW 1	40	3.237	0.717	1027	7211	0

Space Design Load Summary for level 01

UTAR Sungai Long Campus

TABLE 1.8.A. COMPONENT LOADS FOR SPACE " LV_1 Lecture Hall 5 " IN ZONE " Zone 1 "

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Dec 1600 COOLING OA DB / WB 29.2 °C / 22.7 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible (W)	Latent (W)		Sensible (W)	Latent (W)
SPACE LOADS	Details	(W)	(W)	Details	(W)	(W)
Window & Skylight Solar Loads	95 m ²	11680	-	95 m ²	-	-
Wall Transmission	92 m ²	2814	-	92 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	95 m ²	1189	-	95 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	0 m ²	0	-	0 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	2648 W	2648	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	492 W	492	-	0	0	-
People	246	17663	14780	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	36485	14780	-	0	0

TABLE 1.8.B. ENVELOPE LOADS FOR SPACE " LV_1 Lecture Hall 5 " IN ZONE " Zone 1 "

				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m ²)	(W/(m ² -°K))	Coeff.	(W)	(W)	(W)
N EXPOSURE						
WALL	40	3.041	-	560	-	0
WINDOW 1	45	3.237	0.717	563	1664	0
S EXPOSURE						
WALL	52	3.041	-	2254	-	0
WINDOW 1	50	3.237	0.717	626	10016	0

Space Design Load Summary for level 01

UTAR Sungai Long Campus

TABLE 1.9.A. COMPONENT LOADS FOR SPACE " LV_1 Lift Lobby 1 " IN ZONE " Zone 1 "

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jan 2300 COOLING OA DB / WB 22.0 °C / 20.2 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible (W)	Latent (W)		Sensible (W)	Latent (W)
SPACE LOADS	Details			Details		
Window & Skylight Solar Loads	0 m ²	0	-	0 m ²	-	-
Wall Transmission	0 m ²	0	-	0 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	0 m ²	0	-	0 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	0 m ²	0	-	0 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	301 W	301	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	28	2010	1682	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	2312	1682	-	0	0

TABLE 1.9.B. ENVELOPE LOADS FOR SPACE " LV_1 Lift Lobby 1 " IN ZONE " Zone 1 "

				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m ²)	(W/(m ² -°K))	Coeff.	(W)	(W)	(W)

Space Design Load Summary for level 01

UTAR Sungai Long Campus

TABLE 1.10.A. COMPONENT LOADS FOR SPACE " LV_1 Lift Lobby 2 " IN ZONE " Zone 1 "

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jan 2300 COOLING OA DB / WB 22.0 °C / 20.2 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible (W)	Latent (W)		Sensible (W)	Latent (W)
SPACE LOADS	Details			Details		
Window & Skylight Solar Loads	0 m ²	0	-	0 m ²	-	-
Wall Transmission	0 m ²	0	-	0 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	0 m ²	0	-	0 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	0 m ²	0	-	0 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	420 W	420	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	42	3011	2519	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	3431	2519	-	0	0

TABLE 1.10.B. ENVELOPE LOADS FOR SPACE " LV_1 Lift Lobby 2 " IN ZONE " Zone 1 "

				COOLING TRANS	COOLING SOLAR	HEATING TRANS
	Area (m ²)	U-Value (W/(m ² -°K))	Shade Coeff.	(W)	(W)	(W)

Space Design Load Summary for level 01

UTAR Sungai Long Campus

TABLE 1.11.A. COMPONENT LOADS FOR SPACE " LV_1 Student Activity " IN ZONE " Zone 1 "

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Dec 1600 COOLING OA DB / WB 29.2 °C / 22.7 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible (W)	Latent (W)		Sensible (W)	Latent (W)
SPACE LOADS	Details			Details		
Window & Skylight Solar Loads	25 m ²	5008	-	25 m ²	-	-
Wall Transmission	22 m ²	954	-	22 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	25 m ²	313	-	25 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	0 m ²	0	-	0 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	1324 W	1324	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	123	8832	7390	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	16430	7390	-	0	0

TABLE 1.11.B. ENVELOPE LOADS FOR SPACE " LV_1 Student Activity " IN ZONE " Zone 1 "

					COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS	
	(m ²)	(W/(m ² -°K))	Coeff.	(W)	(W)	(W)	
S EXPOSURE							
WALL	22	3.041	-	954	-	0	
WINDOW 1	25	3.237	0.717	313	5008	0	

Space Design Load Summary for level 01

UTAR Sungai Long Campus

TABLE 1.12.A. COMPONENT LOADS FOR SPACE " LV_1 Tutorial room 3 " IN ZONE " Zone 1 "

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jun 1700 COOLING OA DB / WB 33.0 °C / 25.3 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible (W)	Latent (W)		Sensible (W)	Latent (W)
SPACE LOADS	Details			Details		
Window & Skylight Solar Loads	40 m ²	8103	-	40 m ²	-	-
Wall Transmission	35 m ²	1864	-	35 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	40 m ²	1032	-	40 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	140 m ²	0	-	140 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	1389 W	1388	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	129	9262	7750	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	21650	7750	-	0	0

TABLE 1.12.B. ENVELOPE LOADS FOR SPACE " LV_1 Tutorial room 3 " IN ZONE " Zone 1 "

				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m ²)	(W/(m ² -°K))	Coeff.	(W)	(W)	(W)
NW EXPOSURE						
WALL	35	3.041	-	1864	-	0
WINDOW 1	40	3.237	0.717	1032	8103	0

Space Design Load Summary for level 01

UTAR Sungai Long Campus

TABLE 1.13.A. COMPONENT LOADS FOR SPACE " LV_1 Tutorial room 4 " IN ZONE " Zone 1 "

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jun 1600 COOLING OA DB / WB 33.6 °C / 25.5 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible (W)	Latent (W)		Sensible (W)	Latent (W)
SPACE LOADS	Details			Details		
Window & Skylight Solar Loads	20 m ²	3085	-	20 m ²	-	-
Wall Transmission	29 m ²	1434	-	29 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	20 m ²	538	-	20 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	0 m ²	0	-	0 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	1227 W	1227	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	114	8185	6849	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	14470	6849	-	0	0

TABLE 1.13.B. ENVELOPE LOADS FOR SPACE " LV_1 Tutorial room 4 " IN ZONE " Zone 1 "

				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m ²)	(W/(m ² -°K))	Coeff.	(W)	(W)	(W)
N EXPOSURE						
WALL	29	3.041	-	1434	-	0
WINDOW 1	20	3.237	0.717	538	3085	0

Space Design Load Summary for level 01

UTAR Sungai Long Campus

TABLE 1.14.A. COMPONENT LOADS FOR SPACE " LV_1 Tutorial room 4a " IN ZONE " Zone 1 "

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jun 1700 COOLING OA DB / WB 33.0 °C / 25.3 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible (W)	Latent (W)		Sensible (W)	Latent (W)
SPACE LOADS	Details			Details		
Window & Skylight Solar Loads	40 m ²	8103	-	40 m ²	-	-
Wall Transmission	35 m ²	1864	-	35 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	40 m ²	1032	-	40 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	140 m ²	0	-	140 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	1163 W	1162	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	108	7755	6489	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	19916	6489	-	0	0

TABLE 1.14.B. ENVELOPE LOADS FOR SPACE " LV_1 Tutorial room 4a " IN ZONE " Zone 1 "

					COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS	
	(m ²)	(W/(m ² -°K))	Coeff.	(W)	(W)	(W)	
NW EXPOSURE							
WALL	35	3.041	-	1864	-	0	
WINDOW 1	40	3.237	0.717	1032	8103	0	

Hourly Zone Loads for level 01

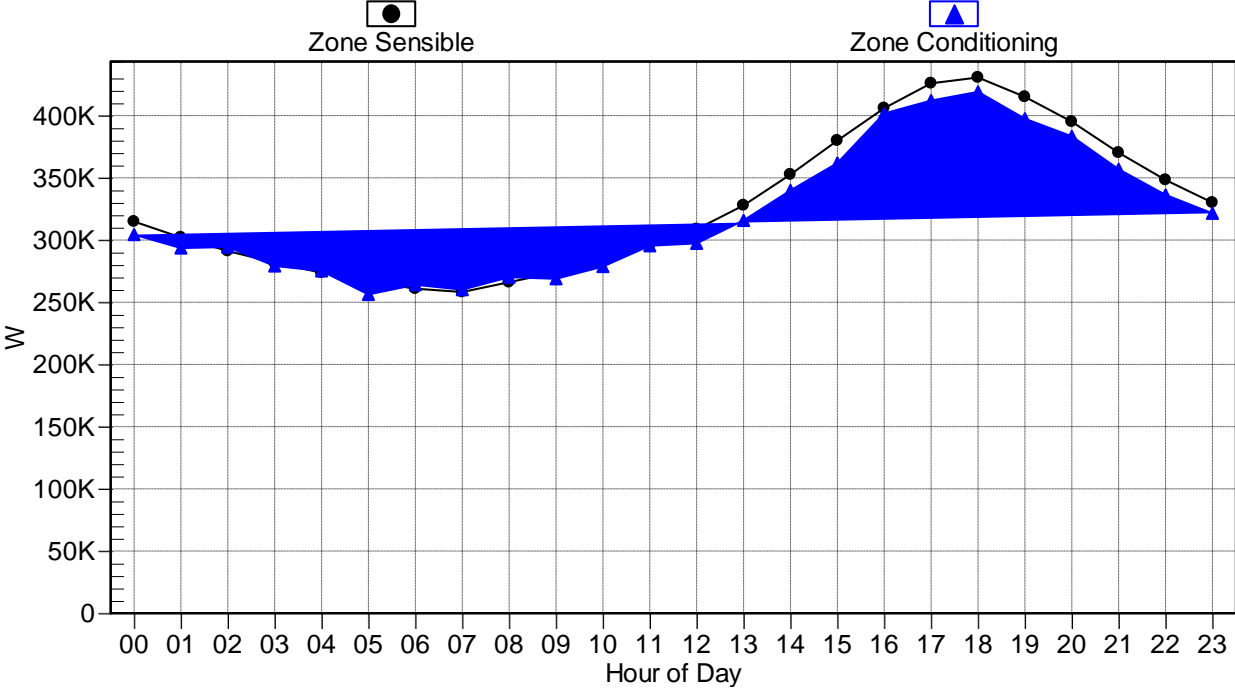
UTAR Sungai Long Campus

ZONE: Zone 1 DESIGN MONTH: JUNE									
Hour	OA TEMP (°C)	ZONE TEMP (°C)	RH (%)	ZONE AIRFLOW (L/s)	ZONE SENSIBLE LOAD (W)	ZONE COND (W)	TERMINAL COOLING COIL (W)	TERMINAL HEATING COIL (W)	ZONE HEATING UNIT (W)
0000	26.5	24.6	71	38818.0	314855.4	304392.7	0.0	0.0	0.0
0100	26.1	24.5	72	38818.0	302108.0	293572.1	0.0	0.0	0.0
0200	25.6	24.2	72	38818.0	291222.2	294332.6	0.0	0.0	0.0
0300	25.2	24.4	74	38818.0	281841.2	279156.7	0.0	0.0	0.0
0400	25.0	24.2	74	38818.0	273665.8	275155.7	0.0	0.0	0.0
0500	24.9	24.5	76	38818.0	266644.8	256297.1	0.0	0.0	0.0
0600	25.1	24.2	75	38818.0	260878.2	264061.2	0.0	0.0	0.0
0700	25.5	24.2	76	38818.0	258226.5	260096.3	0.0	0.0	0.0
0800	26.3	24.1	75	38818.0	266157.8	270163.6	0.0	0.0	0.0
0900	27.5	24.4	75	38818.0	274111.2	268853.0	0.0	0.0	0.0
1000	28.8	24.4	74	38818.0	284112.5	278747.3	0.0	0.0	0.0
1100	30.4	24.2	72	38818.0	295464.8	295364.8	0.0	0.0	0.0
1200	31.8	24.5	71	38818.0	308653.4	297342.4	0.0	0.0	0.0
1300	32.9	24.6	70	38818.0	327850.5	315771.8	0.0	0.0	0.0
1400	33.6	24.6	67	38818.0	352662.7	339840.6	0.0	0.0	0.0
1500	33.9	24.8	65	38818.0	379964.0	361852.5	0.0	0.0	0.0
1600	33.6	24.4	62	38818.0	405973.2	401723.3	0.0	0.0	0.0
1700	33.0	24.6	61	38818.0	425960.5	412113.0	0.0	0.0	0.0
1800	32.0	24.6	61	38818.0	430672.5	419100.2	0.0	0.0	0.0
1900	30.8	24.8	63	38818.0	415087.7	397496.6	0.0	0.0	0.0
2000	29.7	24.6	64	38818.0	395130.8	383359.3	0.0	0.0	0.0
2100	28.7	24.7	66	38818.0	370220.0	356876.2	0.0	0.0	0.0
2200	27.8	24.6	68	38818.0	348291.8	336296.4	0.0	0.0	0.0
2300	27.0	24.6	70	38818.0	330045.1	321494.0	0.0	0.0	0.0

Hourly Zone Design Day Loads for level 01

UTAR Sungai Long Campus

Zone: Zone 1
Data for June



Zone Sizing Summary for Level 02

UTAR Sungai Long Campus

Air System Information

Air System Name **Level 02**
 Equipment Class **CW AHU**
 Air System Type **SZCAV**

Number of zones **1**
 Floor Area **3494.0** m²
 Location **Kuala Lumpur, Malaysia**

Sizing Calculation Information

Calculation Months **Jan to Dec**
 Sizing Data **Calculated**

Zone L/s Sizing **Sum of space airflow rates**
 Space L/s Sizing **Individual peak space loads**

Zone Sizing Data

Zone Name	Maximum Cooling Sensible (kW)	Design Airflow (L/s)	Minimum Airflow (L/s)	Time of Peak Load	Maximum Heating Load (kW)	Zone Floor Area (m ²)	Zone L/(s-m ²)
Zone 1	336.8	30725	30725	Nov 1700	0.0	3494.0	8.79

Zone Terminal Sizing Data

No Zone Terminal Sizing Data required for this system.

Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (kW)	Time of Load	Air Flow (L/s)	Heating Load (kW)	Floor Area (m ²)	Space L/(s-m ²)
Zone 1							
Lv 2 Corridor 1	1	30.5	Jan 2300	2686	0.0	370.0	7.26
Lv 2 Corridor 2	1	21.7	Jan 2300	1910	0.0	263.0	7.26
Lv 2 Corridor 3	1	2.6	Jan 2300	232	0.0	32.0	7.26
LV 2 Lecture Hall 10	1	26.2	Dec 1500	2302	0.0	220.0	10.46
LV 2 Lecture Hall 6	1	29.7	Sep 1700	2615	0.0	302.0	8.66
LV 2 Lecture Hall 7	1	30.0	Sep 1700	2640	0.0	302.0	8.74
LV 2 Lecture Hall 8	1	30.0	Sep 1700	2640	0.0	302.0	8.74
LV 2 Lecture Hall 9	1	23.8	Dec 1600	2094	0.0	220.0	9.52
Lv 2 Lift Lobby 1	1	1.9	Jan 2300	167	0.0	23.0	7.26
Lv 2 Lift Lobby 2	1	4.0	Jan 2300	349	0.0	48.0	7.26
Lv 2 Surau	1	4.0	Jan 2300	349	0.0	48.0	7.26
LV 2 Tutorial 14	1	11.9	Dec 1600	1048	0.0	112.0	9.36
LV_2 Tutorial Room 10	1	14.8	Jun 1600	1301	0.0	149.0	8.73
LV_2 Tutorial Room 11	1	14.8	Jun 1600	1301	0.0	149.0	8.73
LV_2 Tutorial Room 12	1	13.8	Sep 1700	1216	0.0	126.0	9.65
LV_2 Tutorial Room 13	1	14.5	Dec 1700	1275	0.0	107.0	11.91
LV_2 Tutorial Room 5	1	14.1	Sep 1100	1242	0.0	143.0	8.69
LV_2 Tutorial Room 6	1	14.1	Sep 1100	1242	0.0	143.0	8.69
LV_2 Tutorial Room 7	1	14.1	Sep 1100	1242	0.0	143.0	8.69
LV_2 Tutorial Room 8	1	14.1	Sep 1100	1242	0.0	143.0	8.69
LV_2 Tutorial Room 9	1	18.6	Jun 1500	1632	0.0	149.0	10.95

Zone Design Load Summary for Level 02

UTAR Sungai Long Campus

Zone 1	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Nov 1700 COOLING OA DB / WB 29.7 °C / 23.6 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C		
	OCCUPIED T-STAT 23.9 °C			OCCUPIED T-STAT 21.1 °C		
ZONE LOADS	Details	Sensible (W)	Latent (W)	Details	Sensible (W)	Latent (W)
Window & Skylight Solar Loads	244 m ²	34317	-	244 m ²	-	-
Wall Transmission	295 m ²	10287	-	295 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	244 m ²	3665	-	244 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	2940 m ²	0	-	2940 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	37609 W	37607	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	3494	250875	209918	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	336750	209918	-	0	0

Space Design Load Summary for Level 02

UTAR Sungai Long Campus

TABLE 1.1.A. COMPONENT LOADS FOR SPACE " Lv 2 Corridor 1 " IN ZONE " Zone 1 "

		DESIGN COOLING		DESIGN HEATING		
		COOLING DATA AT Jan 2300 COOLING OA DB / WB 22.0 °C / 20.2 °C OCCUPIED T-STAT 23.9 °C		HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
SPACE LOADS	Details	Sensible (W)	Latent (W)	Details	Sensible (W)	Latent (W)
Window & Skylight Solar Loads	0 m ²	0	-	0 m ²	-	-
Wall Transmission	0 m ²	0	-	0 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	0 m ²	0	-	0 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	140 m ²	0	-	140 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	3983 W	3982	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	370	26567	22229	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	30549	22229	-	0	0

TABLE 1.1.B. ENVELOPE LOADS FOR SPACE " Lv 2 Corridor 1 " IN ZONE " Zone 1 "

				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m ²)	(W/(m ² -°K))	Coeff.	(W)	(W)	(W)

Space Design Load Summary for Level 02

UTAR Sungai Long Campus

TABLE 1.2.A. COMPONENT LOADS FOR SPACE "Lv 2 Corridor 2" IN ZONE "Zone 1"

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jan 2300 COOLING OA DB / WB 22.0 °C / 20.2 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible (W)	Latent (W)		Sensible (W)	Latent (W)
SPACE LOADS	Details			Details		
Window & Skylight Solar Loads	0 m ²	0	-	0 m ²	-	-
Wall Transmission	0 m ²	0	-	0 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	0 m ²	0	-	0 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	140 m ²	0	-	140 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	2831 W	2831	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	263	18884	15801	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	21715	15801	-	0	0

TABLE 1.2.B. ENVELOPE LOADS FOR SPACE "Lv 2 Corridor 2" IN ZONE "Zone 1"

				COOLING TRANS	COOLING SOLAR	HEATING TRANS
	Area (m ²)	U-Value (W/(m ² -°K))	Shade Coeff.	(W)	(W)	(W)

Space Design Load Summary for Level 02

UTAR Sungai Long Campus

TABLE 1.3.A. COMPONENT LOADS FOR SPACE "Lv 2 Corridor 3" IN ZONE "Zone 1"

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jan 2300 COOLING OA DB / WB 22.0 °C / 20.2 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible (W)	Latent (W)		Sensible (W)	Latent (W)
SPACE LOADS	Details			Details		
Window & Skylight Solar Loads	0 m ²	0	-	0 m ²	-	-
Wall Transmission	0 m ²	0	-	0 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	0 m ²	0	-	0 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	140 m ²	0	-	140 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	344 W	344	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	32	2298	1923	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	2642	1923	-	0	0

TABLE 1.3.B. ENVELOPE LOADS FOR SPACE "Lv 2 Corridor 3" IN ZONE "Zone 1"

				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m ²)	(W/(m ² -°K))	Coeff.	(W)	(W)	(W)

Space Design Load Summary for Level 02

UTAR Sungai Long Campus

TABLE 1.4.A. COMPONENT LOADS FOR SPACE " LV 2 Lecture Hall 10 " IN ZONE " Zone 1 "

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Dec 1500 COOLING OA DB / WB 29.4 °C / 22.8 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible (W)	Latent (W)		Sensible (W)	Latent (W)
SPACE LOADS	Details	(W)	(W)	Details	(W)	(W)
Window & Skylight Solar Loads	37 m ²	6076	-	37 m ²	-	-
Wall Transmission	43 m ²	1460	-	43 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	37 m ²	472	-	37 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	140 m ²	0	-	140 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	2368 W	2368	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	220	15796	13218	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	26172	13218	-	0	0

TABLE 1.4.B. ENVELOPE LOADS FOR SPACE " LV 2 Lecture Hall 10 " IN ZONE " Zone 1 "

				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m ²)	(W/(m ² -°K))	Coeff.	(W)	(W)	(W)
E EXPOSURE						
WALL	21	3.041	-	573	-	0
WINDOW 1	15	3.237	0.717	191	1701	0
S EXPOSURE						
WALL	22	3.041	-	886	-	0
WINDOW 1	22	3.237	0.717	281	4375	0

Space Design Load Summary for Level 02

UTAR Sungai Long Campus

TABLE 1.5.A. COMPONENT LOADS FOR SPACE " LV 2 Lecture Hall 6 " IN ZONE " Zone 1 "

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Sep 1700 COOLING OA DB / WB 32.4 °C / 24.8 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible (W)	Latent (W)		Sensible (W)	Latent (W)
SPACE LOADS	Details	(W)	(W)	Details	(W)	(W)
Window & Skylight Solar Loads	16 m ²	3325	-	16 m ²	-	-
Wall Transmission	22 m ²	1089	-	22 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	16 m ²	384	-	16 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	140 m ²	0	-	140 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	3251 W	3251	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	302	21684	18144	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	29733	18144	-	0	0

TABLE 1.5.B. ENVELOPE LOADS FOR SPACE " LV 2 Lecture Hall 6 " IN ZONE " Zone 1 "

					COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS	
	(m ²)	(W/(m ² -°K))	Coeff.	(W)	(W)	(W)	
W EXPOSURE							
WALL	22	3.041	-	1089	-	0	
WINDOW 1	16	3.237	0.717	384	3325	0	

Space Design Load Summary for Level 02

UTAR Sungai Long Campus

TABLE 1.6.A. COMPONENT LOADS FOR SPACE " LV 2 Lecture Hall 7 " IN ZONE " Zone 1 "

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Sep 1700 COOLING OA DB / WB 32.4 °C / 24.8 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible (W)	Latent (W)		Sensible (W)	Latent (W)
SPACE LOADS	Details			Details		
Window & Skylight Solar Loads	18 m ²	3740	-	18 m ²	-	-
Wall Transmission	19 m ²	916	-	19 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	18 m ²	432	-	18 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	140 m ²	0	-	140 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	3251 W	3251	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	302	21684	18144	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	30023	18144	-	0	0

TABLE 1.6.B. ENVELOPE LOADS FOR SPACE " LV 2 Lecture Hall 7 " IN ZONE " Zone 1 "

				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m ²)	(W/(m ² -°K))	Coeff.	(W)	(W)	(W)
W EXPOSURE						
WALL	19	3.041	-	916	-	0
WINDOW 1	18	3.237	0.717	432	3740	0

Space Design Load Summary for Level 02

UTAR Sungai Long Campus

TABLE 1.7.A. COMPONENT LOADS FOR SPACE " LV 2 Lecture Hall 8 " IN ZONE " Zone 1 "

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Sep 1700 COOLING OA DB / WB 32.4 °C / 24.8 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible (W)	Latent (W)		Sensible (W)	Latent (W)
SPACE LOADS	Details	(W)	(W)	Details	(W)	(W)
Window & Skylight Solar Loads	18 m ²	3740	-	18 m ²	-	-
Wall Transmission	19 m ²	916	-	19 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	18 m ²	432	-	18 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	140 m ²	0	-	140 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	3251 W	3251	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	302	21684	18144	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	30023	18144	-	0	0

TABLE 1.7.B. ENVELOPE LOADS FOR SPACE " LV 2 Lecture Hall 8 " IN ZONE " Zone 1 "

					COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS	
	(m ²)	(W/(m ² -°K))	Coeff.	(W)	(W)	(W)	
W EXPOSURE							
WALL	19	3.041	-	916	-	0	
WINDOW 1	18	3.237	0.717	432	3740	0	

Space Design Load Summary for Level 02

UTAR Sungai Long Campus

TABLE 1.8.A. COMPONENT LOADS FOR SPACE " LV 2 Lecture Hall 9 " IN ZONE " Zone 1 "

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Dec 1600 COOLING OA DB / WB 29.2 °C / 22.7 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible (W)	Latent (W)		Sensible (W)	Latent (W)
SPACE LOADS	Details			Details		
Window & Skylight Solar Loads	22 m ²	4407	-	22 m ²	-	-
Wall Transmission	22 m ²	962	-	22 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	22 m ²	275	-	22 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	140 m ²	0	-	140 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	2368 W	2368	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	220	15796	13218	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	23809	13218	-	0	0

TABLE 1.8.B. ENVELOPE LOADS FOR SPACE " LV 2 Lecture Hall 9 " IN ZONE " Zone 1 "

					COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS	
	(m ²)	(W/(m ² -°K))	Coeff.	(W)	(W)	(W)	
S EXPOSURE							
WALL	22	3.041	-	962	-	0	
WINDOW 1	22	3.237	0.717	275	4407	0	

Space Design Load Summary for Level 02

UTAR Sungai Long Campus

TABLE 1.9.A. COMPONENT LOADS FOR SPACE "Lv 2 Lift Lobby 1" IN ZONE "Zone 1"

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jan 2300 COOLING OA DB / WB 22.0 °C / 20.2 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible (W)	Latent (W)		Sensible (W)	Latent (W)
SPACE LOADS	Details			Details		
Window & Skylight Solar Loads	0 m ²	0	-	0 m ²	-	-
Wall Transmission	0 m ²	0	-	0 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	0 m ²	0	-	0 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	140 m ²	0	-	140 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	248 W	248	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	23	1651	1382	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	1899	1382	-	0	0

TABLE 1.9.B. ENVELOPE LOADS FOR SPACE "Lv 2 Lift Lobby 1" IN ZONE "Zone 1"

				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m ²)	(W/(m ² -°K))	Coeff.	(W)	(W)	(W)

Space Design Load Summary for Level 02

UTAR Sungai Long Campus

TABLE 1.10.A. COMPONENT LOADS FOR SPACE " Lv 2 Lift Lobby 2 " IN ZONE " Zone 1 "

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jan 2300 COOLING OA DB / WB 22.0 °C / 20.2 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible (W)	Latent (W)		Sensible (W)	Latent (W)
SPACE LOADS	Details			Details		
Window & Skylight Solar Loads	0 m ²	0	-	0 m ²	-	-
Wall Transmission	0 m ²	0	-	0 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	0 m ²	0	-	0 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	140 m ²	0	-	140 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	517 W	517	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	48	3446	2884	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	3963	2884	-	0	0

TABLE 1.10.B. ENVELOPE LOADS FOR SPACE " Lv 2 Lift Lobby 2 " IN ZONE " Zone 1 "

				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m ²)	(W/(m ² -°K))	Coeff.	(W)	(W)	(W)

Space Design Load Summary for Level 02

UTAR Sungai Long Campus

TABLE 1.11.A. COMPONENT LOADS FOR SPACE " Lv 2 Surau " IN ZONE " Zone 1 "

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jan 2300 COOLING OA DB / WB 22.0 °C / 20.2 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible (W)	Latent (W)		Sensible (W)	Latent (W)
SPACE LOADS	Details			Details		
Window & Skylight Solar Loads	0 m ²	0	-	0 m ²	-	-
Wall Transmission	0 m ²	0	-	0 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	0 m ²	0	-	0 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	140 m ²	0	-	140 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	517 W	517	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	48	3446	2884	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	3963	2884	-	0	0

TABLE 1.11.B. ENVELOPE LOADS FOR SPACE " Lv 2 Surau " IN ZONE " Zone 1 "

				COOLING	COOLING	HEATING
				TRANS	SOLAR	TRANS
				(W)	(W)	(W)
	Area	U-Value	Shade			
	(m ²)	(W/(m ² -°K))	Coeff.			

Space Design Load Summary for Level 02

UTAR Sungai Long Campus

TABLE 1.12.A. COMPONENT LOADS FOR SPACE " LV 2 Tutorial 14 " IN ZONE " Zone 1 "

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Dec 1600 COOLING OA DB / WB 29.2 °C / 22.7 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible (W)	Latent (W)		Sensible (W)	Latent (W)
SPACE LOADS	Details			Details		
Window & Skylight Solar Loads	10 m ²	2003	-	10 m ²	-	-
Wall Transmission	13 m ²	546	-	13 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	10 m ²	125	-	10 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	140 m ²	0	-	140 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	1206 W	1205	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	112	8042	6729	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	11922	6729	-	0	0

TABLE 1.12.B. ENVELOPE LOADS FOR SPACE " LV 2 Tutorial 14 " IN ZONE " Zone 1 "

				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m ²)	(W/(m ² -°K))	Coeff.	(W)	(W)	(W)
S EXPOSURE						
WALL	13	3.041	-	546	-	0
WINDOW 1	10	3.237	0.717	125	2003	0

Space Design Load Summary for Level 02

UTAR Sungai Long Campus

TABLE 1.13.A. COMPONENT LOADS FOR SPACE " LV_2 Tutorial Room 10 " IN ZONE " Zone 1 "

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jun 1600 COOLING OA DB / WB 33.6 °C / 25.5 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible (W)	Latent (W)		Sensible (W)	Latent (W)
SPACE LOADS	Details			Details		
Window & Skylight Solar Loads	10 m ²	1543	-	10 m ²	-	-
Wall Transmission	14 m ²	683	-	14 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	10 m ²	269	-	10 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	140 m ²	0	-	140 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	1604 W	1604	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	149	10698	8952	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	14796	8952	-	0	0

TABLE 1.13.B. ENVELOPE LOADS FOR SPACE " LV_2 Tutorial Room 10 " IN ZONE " Zone 1 "

				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m ²)	(W/(m ² -°K))	Coeff.	(W)	(W)	(W)
N EXPOSURE						
WALL	14	3.041	-	683	-	0
WINDOW 1	10	3.237	0.717	269	1543	0

Space Design Load Summary for Level 02

UTAR Sungai Long Campus

TABLE 1.14.A. COMPONENT LOADS FOR SPACE " LV_2 Tutorial Room 11 " IN ZONE " Zone 1 "

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jun 1600 COOLING OA DB / WB 33.6 °C / 25.5 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible (W)	Latent (W)		Sensible (W)	Latent (W)
SPACE LOADS	Details			Details		
Window & Skylight Solar Loads	10 m ²	1543	-	10 m ²	-	-
Wall Transmission	14 m ²	683	-	14 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	10 m ²	269	-	10 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	140 m ²	0	-	140 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	1604 W	1604	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	149	10698	8952	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	14796	8952	-	0	0

TABLE 1.14.B. ENVELOPE LOADS FOR SPACE " LV_2 Tutorial Room 11 " IN ZONE " Zone 1 "

				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m ²)	(W/(m ² -°K))	Coeff.	(W)	(W)	(W)
N EXPOSURE						
WALL	14	3.041	-	683	-	0
WINDOW 1	10	3.237	0.717	269	1543	0

Space Design Load Summary for Level 02

UTAR Sungai Long Campus

TABLE 1.15.A. COMPONENT LOADS FOR SPACE " LV_2 Tutorial Room 12 " IN ZONE " Zone 1 "

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Sep 1700 COOLING OA DB / WB 32.4 °C / 24.8 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible (W)	Latent (W)		Sensible (W)	Latent (W)
SPACE LOADS	Details			Details		
Window & Skylight Solar Loads	12 m ²	2494	-	12 m ²	-	-
Wall Transmission	13 m ²	644	-	13 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	12 m ²	288	-	12 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	140 m ²	0	-	140 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	1356 W	1356	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	126	9047	7570	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	13829	7570	-	0	0

TABLE 1.15.B. ENVELOPE LOADS FOR SPACE " LV_2 Tutorial Room 12 " IN ZONE " Zone 1 "

				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m ²)	(W/(m ² -°K))	Coeff.	(W)	(W)	(W)
W EXPOSURE						
WALL	13	3.041	-	644	-	0
WINDOW 1	12	3.237	0.717	288	2494	0

Space Design Load Summary for Level 02

UTAR Sungai Long Campus

TABLE 1.16.A. COMPONENT LOADS FOR SPACE " LV_2 Tutorial Room 13 " IN ZONE " Zone 1 "

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Dec 1700 COOLING OA DB / WB 28.5 °C / 22.5 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible (W)	Latent (W)		Sensible (W)	Latent (W)
SPACE LOADS	Details			Details		
Window & Skylight Solar Loads	21 m ²	4108	-	21 m ²	-	-
Wall Transmission	31 m ²	1311	-	31 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	21 m ²	240	-	21 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	140 m ²	0	-	140 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	1152 W	1152	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	107	7683	6429	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	14493	6429	-	0	0

TABLE 1.16.B. ENVELOPE LOADS FOR SPACE " LV_2 Tutorial Room 13 " IN ZONE " Zone 1 "

				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m ²)	(W/(m ² -°K))	Coeff.	(W)	(W)	(W)
W EXPOSURE						
WALL	9	3.041	-	317	-	0
WINDOW 1	6	3.237	0.717	69	1178	0
S EXPOSURE						
WALL	22	3.041	-	994	-	0
WINDOW 1	15	3.237	0.717	171	2930	0

Space Design Load Summary for Level 02

UTAR Sungai Long Campus

TABLE 1.17.A. COMPONENT LOADS FOR SPACE " LV_2 Tutorial Room 5 " IN ZONE " Zone 1 "

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Sep 1100 COOLING OA DB / WB 29.8 °C / 24.1 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible (W)	Latent (W)		Sensible (W)	Latent (W)
SPACE LOADS	Details			Details		
Window & Skylight Solar Loads	10 m ²	1706	-	10 m ²	-	-
Wall Transmission	12 m ²	450	-	12 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	10 m ²	165	-	10 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	140 m ²	0	-	140 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	1539 W	1539	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	143	10268	8591	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	14128	8591	-	0	0

TABLE 1.17.B. ENVELOPE LOADS FOR SPACE " LV_2 Tutorial Room 5 " IN ZONE " Zone 1 "

					COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS	
	(m ²)	(W/(m ² -°K))	Coeff.	(W)	(W)	(W)	
E EXPOSURE							
WALL	12	3.041	-	450	-	0	
WINDOW 1	10	3.237	0.717	165	1706	0	

Space Design Load Summary for Level 02

UTAR Sungai Long Campus

TABLE 1.18.A. COMPONENT LOADS FOR SPACE " LV_2 Tutorial Room 6 " IN ZONE " Zone 1 "

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Sep 1100 COOLING OA DB / WB 29.8 °C / 24.1 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible (W)	Latent (W)		Sensible (W)	Latent (W)
SPACE LOADS	Details			Details		
Window & Skylight Solar Loads	10 m ²	1706	-	10 m ²	-	-
Wall Transmission	12 m ²	450	-	12 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	10 m ²	165	-	10 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	140 m ²	0	-	140 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	1539 W	1539	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	143	10268	8591	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	14128	8591	-	0	0

TABLE 1.18.B. ENVELOPE LOADS FOR SPACE " LV_2 Tutorial Room 6 " IN ZONE " Zone 1 "

					COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS	
	(m ²)	(W/(m ² -°K))	Coeff.	(W)	(W)	(W)	
E EXPOSURE							
WALL	12	3.041	-	450	-	0	
WINDOW 1	10	3.237	0.717	165	1706	0	

Space Design Load Summary for Level 02

UTAR Sungai Long Campus

TABLE 1.19.A. COMPONENT LOADS FOR SPACE " LV_2 Tutorial Room 7 " IN ZONE " Zone 1 "

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Sep 1100 COOLING OA DB / WB 29.8 °C / 24.1 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible (W)	Latent (W)		Sensible (W)	Latent (W)
SPACE LOADS	Details			Details		
Window & Skylight Solar Loads	10 m ²	1706	-	10 m ²	-	-
Wall Transmission	12 m ²	450	-	12 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	10 m ²	165	-	10 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	140 m ²	0	-	140 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	1539 W	1539	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	143	10268	8591	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	14128	8591	-	0	0

TABLE 1.19.B. ENVELOPE LOADS FOR SPACE " LV_2 Tutorial Room 7 " IN ZONE " Zone 1 "

					COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS	
	(m ²)	(W/(m ² -°K))	Coeff.	(W)	(W)	(W)	
E EXPOSURE							
WALL	12	3.041	-	450	-	0	
WINDOW 1	10	3.237	0.717	165	1706	0	

Space Design Load Summary for Level 02

UTAR Sungai Long Campus

TABLE 1.20.A. COMPONENT LOADS FOR SPACE " LV_2 Tutorial Room 8 " IN ZONE " Zone 1 "

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Sep 1100 COOLING OA DB / WB 29.8 °C / 24.1 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible (W)	Latent (W)		Sensible (W)	Latent (W)
SPACE LOADS	Details			Details		
Window & Skylight Solar Loads	10 m ²	1706	-	10 m ²	-	-
Wall Transmission	12 m ²	450	-	12 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	10 m ²	165	-	10 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	140 m ²	0	-	140 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	1539 W	1539	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	143	10268	8591	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	14128	8591	-	0	0

TABLE 1.20.B. ENVELOPE LOADS FOR SPACE " LV_2 Tutorial Room 8 " IN ZONE " Zone 1 "

					COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS	
	(m ²)	(W/(m ² -°K))	Coeff.	(W)	(W)	(W)	
E EXPOSURE							
WALL	12	3.041	-	450	-	0	
WINDOW 1	10	3.237	0.717	165	1706	0	

Space Design Load Summary for Level 02

UTAR Sungai Long Campus

TABLE 1.21.A. COMPONENT LOADS FOR SPACE " LV_2 Tutorial Room 9 " IN ZONE " Zone 1 "

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jun 1500 COOLING OA DB / WB 33.9 °C / 25.6 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible (W)	Latent (W)		Sensible (W)	Latent (W)
SPACE LOADS	Details			Details		
Window & Skylight Solar Loads	30 m ²	3749	-	30 m ²	-	-
Wall Transmission	40 m ²	1689	-	40 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	30 m ²	814	-	30 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	140 m ²	0	-	140 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	1604 W	1604	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	149	10698	8952	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	18555	8952	-	0	0

TABLE 1.21.B. ENVELOPE LOADS FOR SPACE " LV_2 Tutorial Room 9 " IN ZONE " Zone 1 "

				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m ²)	(W/(m ² -°K))	Coeff.	(W)	(W)	(W)
N EXPOSURE						
WALL	14	3.041	-	639	-	0
WINDOW 1	10	3.237	0.717	271	1517	0
E EXPOSURE						
WALL	26	3.041	-	1050	-	0
WINDOW 1	20	3.237	0.717	543	2232	0

Hourly Zone Loads for Level 02

UTAR Sungai Long Campus

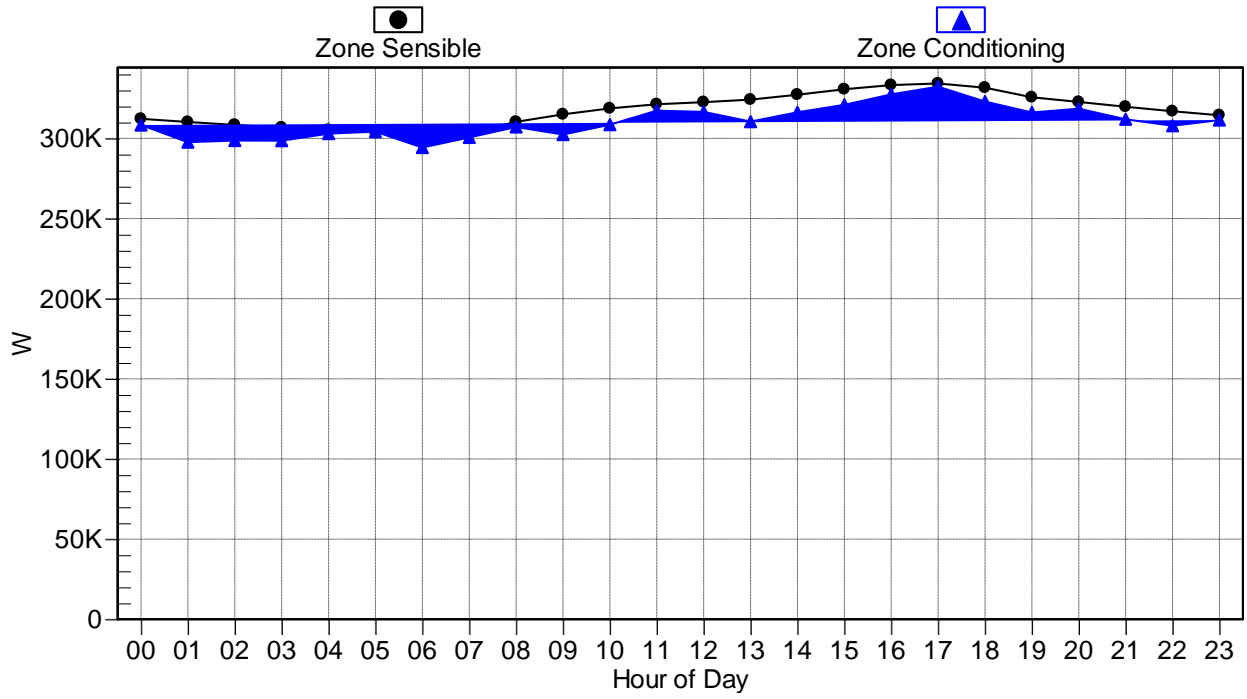
ZONE: Zone 1 DESIGN MONTH: JUNE									
Hour	OA TEMP (°C)	ZONE TEMP (°C)	RH (%)	ZONE AIRFLOW (L/s)	ZONE SENSIBLE LOAD (W)	ZONE COND (W)	TERMINAL COOLING COIL (W)	TERMINAL HEATING COIL (W)	ZONE HEATING UNIT (W)
0000	26.5	24.5	70	30725.1	312234.8	308368.4	0.0	0.0	0.0
0100	26.1	24.7	71	30725.1	310251.9	297632.9	0.0	0.0	0.0
0200	25.6	24.6	71	30725.1	308432.3	298697.3	0.0	0.0	0.0
0300	25.2	24.6	71	30725.1	306796.4	298577.3	0.0	0.0	0.0
0400	25.0	24.5	71	30725.1	305327.3	303044.3	0.0	0.0	0.0
0500	24.9	24.4	71	30725.1	304067.1	304205.0	0.0	0.0	0.0
0600	25.1	24.6	72	30725.1	303072.3	294352.0	0.0	0.0	0.0
0700	25.5	24.5	71	30725.1	303562.2	300611.6	0.0	0.0	0.0
0800	26.3	24.5	70	30725.1	310331.5	307147.0	0.0	0.0	0.0
0900	27.5	24.7	70	30725.1	315018.5	302395.9	0.0	0.0	0.0
1000	28.8	24.6	70	30725.1	318770.3	308592.3	0.0	0.0	0.0
1100	30.4	24.5	68	30725.1	321321.9	317358.5	0.0	0.0	0.0
1200	31.8	24.5	68	30725.1	322630.2	316517.2	0.0	0.0	0.0
1300	32.9	24.7	69	30725.1	324178.8	310499.8	0.0	0.0	0.0
1400	33.6	24.7	68	30725.1	327291.4	316293.3	0.0	0.0	0.0
1500	33.9	24.6	67	30725.1	330691.1	320963.7	0.0	0.0	0.0
1600	33.6	24.6	67	30725.1	333299.8	327479.8	0.0	0.0	0.0
1700	33.0	24.5	67	30725.1	334288.8	332296.9	0.0	0.0	0.0
1800	32.0	24.6	68	30725.1	331644.8	322989.5	0.0	0.0	0.0
1900	30.8	24.6	68	30725.1	325688.2	316195.8	0.0	0.0	0.0
2000	29.7	24.5	68	30725.1	322785.0	318553.3	0.0	0.0	0.0
2100	28.7	24.6	69	30725.1	319766.3	311959.2	0.0	0.0	0.0
2200	27.8	24.6	70	30725.1	316960.8	307894.1	0.0	0.0	0.0
2300	27.0	24.5	70	30725.1	314458.1	311471.9	0.0	0.0	0.0

Hourly Zone Design Day Loads for Level 02

UTAR Sungai Long Campus

Zone: Zone 1

Data for June



Zone Sizing Summary for Level 03

UTAR Sungai Long Campus

Air System Information

Air System Name **Level 03**
 Equipment Class **CW AHU**
 Air System Type **SZCAV**

Number of zones **1**
 Floor Area **3652.5** m²
 Location **Kuala Lumpur, Malaysia**

Sizing Calculation Information

Calculation Months **Jan to Dec**
 Sizing Data **Calculated**

Zone L/s Sizing **Sum of space airflow rates**
 Space L/s Sizing **Individual peak space loads**

Zone Sizing Data

Zone Name	Maximum Cooling Sensible (kW)	Design Airflow (L/s)	Minimum Airflow (L/s)	Time of Peak Load	Maximum Heating Load (kW)	Zone Floor Area (m ²)	Zone L/(s-m ²)
Zone 1	352.4	32194	32194	Jul 1700	0.0	3652.5	8.81

Zone Terminal Sizing Data

No Zone Terminal Sizing Data required for this system.

Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (kW)	Time of Load	Air Flow (L/s)	Heating Load (kW)	Floor Area (m ²)	Space L/(s-m ²)
Zone 1							
LV_3 Corridor 1	1	34.3	Jan 2300	3020	0.0	416.0	7.26
LV_3 Corridor 2	1	2.1	Jan 2300	185	0.0	25.5	7.26
LV_3 Corridor 3	1	2.1	Jan 2300	182	0.0	25.0	7.26
LV_3 Corridor 4	1	2.5	Jan 2300	218	0.0	30.0	7.26
LV_3 Councourse	1	37.1	Jan 2300	3260	0.0	449.0	7.26
LV_3 Dept of Alumni	1	6.0	Jan 2300	530	0.0	73.0	7.26
LV_3 Lift Lobby 1	1	2.3	Jan 2300	203	0.0	28.0	7.26
LV_3 Lift Lobby 2	1	4.0	Jan 2300	349	0.0	48.0	7.26
LV_3 Room (1- 40)	1	70.9	Jun 1500	6237	0.0	672.0	9.28
LV_3 Tutorial Room 15	1	12.3	Sep 1000	1081	0.0	117.0	9.24
LV_3 Tutorial Room 16	1	12.3	Sep 1000	1081	0.0	117.0	9.24
LV_3 Tutorial Room 17	1	12.3	Sep 1000	1081	0.0	117.0	9.24
LV_3 Tutorial Room 22	1	13.6	Sep 1700	1196	0.0	125.0	9.57
LV_3 Tutorial Room 23	1	15.7	Sep 1700	1377	0.0	150.0	9.18
LV_3 Tutorial Room 24	1	13.3	Sep 1700	1174	0.0	122.0	9.62
LV_3 Tutorial Room 25	1	14.0	Sep 1700	1232	0.0	130.0	9.48
LV_3 Tutorial Room 26	1	14.0	Sep 1700	1232	0.0	130.0	9.48
LV_3 Tutorial Room 27	1	15.5	Sep 1700	1363	0.0	148.0	9.21
LV_3 Tutorial Room 29	1	12.0	Sep 1700	1058	0.0	106.0	9.98
LV_3 Tutorial Room 30	1	14.1	Dec 1600	1241	0.0	134.0	9.26
LV_3 Tutorial Room 31	1	13.0	Dec 1600	1146	0.0	121.0	9.47
LV_3 Tutorial Room 32	1	13.0	Dec 1600	1146	0.0	121.0	9.47
LV_3 Tutorial Room 33	1	13.0	Dec 1600	1146	0.0	121.0	9.47
LV_3 Tutorial Room 34	1	16.6	Dec 1500	1456	0.0	127.0	11.46

Zone Design Load Summary for Level 03

UTAR Sungai Long Campus

Zone 1	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jul 1700 COOLING OA DB / WB 33.5 °C / 25.3 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C		
	OCCUPIED T-STAT 23.9 °C			OCCUPIED T-STAT 21.1 °C		
ZONE LOADS	Details	Sensible (W)	Latent (W)	Details	Sensible (W)	Latent (W)
Window & Skylight Solar Loads	280 m ²	33045	-	280 m ²	-	-
Wall Transmission	239 m ²	10083	-	239 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	280 m ²	7730	-	280 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	3360 m ²	0	-	3360 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	39315 W	39313	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	3653	262257	219442	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	352428	219442	-	0	0

Space Design Load Summary for Level 03

UTAR Sungai Long Campus

TABLE 1.1.A. COMPONENT LOADS FOR SPACE " LV_3 Corridor 1 " IN ZONE " Zone 1 "

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jan 2300			HEATING DATA AT DES HTG		
	COOLING OA DB / WB 22.0 °C / 20.2 °C OCCUPIED T-STAT 23.9 °C			HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
SPACE LOADS	Details	Sensible (W)	Latent (W)	Details	Sensible (W)	Latent (W)
Window & Skylight Solar Loads	0 m ²	0	-	0 m ²	-	-
Wall Transmission	0 m ²	0	-	0 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	0 m ²	0	-	0 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	140 m ²	0	-	140 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	4478 W	4478	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	416	29870	24993	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	34347	24993	-	0	0

TABLE 1.1.B. ENVELOPE LOADS FOR SPACE " LV_3 Corridor 1 " IN ZONE " Zone 1 "

				COOLING	COOLING	HEATING
				TRANS	SOLAR	TRANS
				(W)	(W)	(W)
	Area (m ²)	U-Value (W/(m ² -°K))	Shade Coeff.			

Space Design Load Summary for Level 03

UTAR Sungai Long Campus

TABLE 1.2.A. COMPONENT LOADS FOR SPACE " LV_3 Corridor 2 " IN ZONE " Zone 1 "

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jan 2300 COOLING OA DB / WB 22.0 °C / 20.2 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible (W)	Latent (W)		Sensible (W)	Latent (W)
SPACE LOADS	Details			Details		
Window & Skylight Solar Loads	0 m ²	0	-	0 m ²	-	-
Wall Transmission	0 m ²	0	-	0 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	0 m ²	0	-	0 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	140 m ²	0	-	140 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	275 W	275	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	26	1832	1533	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	2107	1533	-	0	0

TABLE 1.2.B. ENVELOPE LOADS FOR SPACE " LV_3 Corridor 2 " IN ZONE " Zone 1 "

				COOLING TRANS	COOLING SOLAR	HEATING TRANS
	Area (m ²)	U-Value (W/(m ² -°K))	Shade Coeff.	(W)	(W)	(W)

Space Design Load Summary for Level 03

UTAR Sungai Long Campus

TABLE 1.3.A. COMPONENT LOADS FOR SPACE " LV_3 Corridor 3 " IN ZONE " Zone 1 "

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jan 2300 COOLING OA DB / WB 22.0 °C / 20.2 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible (W)	Latent (W)		Sensible (W)	Latent (W)
SPACE LOADS	Details			Details		
Window & Skylight Solar Loads	0 m ²	0	-	0 m ²	-	-
Wall Transmission	0 m ²	0	-	0 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	0 m ²	0	-	0 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	140 m ²	0	-	140 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	269 W	269	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	25	1795	1502	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	2064	1502	-	0	0

TABLE 1.3.B. ENVELOPE LOADS FOR SPACE " LV_3 Corridor 3 " IN ZONE " Zone 1 "

				COOLING TRANS	COOLING SOLAR	HEATING TRANS
	Area (m ²)	U-Value (W/(m ² -°K))	Shade Coeff.	(W)	(W)	(W)

Space Design Load Summary for Level 03

UTAR Sungai Long Campus

TABLE 1.4.A. COMPONENT LOADS FOR SPACE " LV_3 Corridor 4 " IN ZONE " Zone 1 "

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jan 2300 COOLING OA DB / WB 22.0 °C / 20.2 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible (W)	Latent (W)		Sensible (W)	Latent (W)
SPACE LOADS	Details			Details		
Window & Skylight Solar Loads	0 m ²	0	-	0 m ²	-	-
Wall Transmission	0 m ²	0	-	0 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	0 m ²	0	-	0 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	140 m ²	0	-	140 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	323 W	323	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	30	2154	1802	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	2477	1802	-	0	0

TABLE 1.4.B. ENVELOPE LOADS FOR SPACE " LV_3 Corridor 4 " IN ZONE " Zone 1 "

				COOLING	COOLING	HEATING
				TRANS	SOLAR	TRANS
				(W)	(W)	(W)
	Area	U-Value	Shade			
	(m ²)	(W/(m ² -°K))	Coeff.			

Space Design Load Summary for Level 03

UTAR Sungai Long Campus

TABLE 1.5.A. COMPONENT LOADS FOR SPACE " LV_3 Councourse " IN ZONE " Zone 1 "

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jan 2300 COOLING OA DB / WB 22.0 °C / 20.2 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible (W)	Latent (W)		Sensible (W)	Latent (W)
SPACE LOADS	Details			Details		
Window & Skylight Solar Loads	0 m ²	0	-	0 m ²	-	-
Wall Transmission	0 m ²	0	-	0 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	0 m ²	0	-	0 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	140 m ²	0	-	140 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	4833 W	4833	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	449	32239	26976	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	37072	26976	-	0	0

TABLE 1.5.B. ENVELOPE LOADS FOR SPACE " LV_3 Councourse " IN ZONE " Zone 1 "

				COOLING	COOLING	HEATING
				TRANS	SOLAR	TRANS
				(W)	(W)	(W)
	Area	U-Value	Shade			
	(m ²)	(W/(m ² -°K))	Coeff.			

Space Design Load Summary for Level 03

UTAR Sungai Long Campus

TABLE 1.6.A. COMPONENT LOADS FOR SPACE " LV_3 Dept of Alumni " IN ZONE " Zone 1 "

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jan 2300 COOLING OA DB / WB 22.0 °C / 20.2 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible (W)	Latent (W)		Sensible (W)	Latent (W)
SPACE LOADS	Details			Details		
Window & Skylight Solar Loads	0 m ²	0	-	0 m ²	-	-
Wall Transmission	0 m ²	0	-	0 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	0 m ²	0	-	0 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	140 m ²	0	-	140 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	786 W	786	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	73	5242	4386	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	6027	4386	-	0	0

TABLE 1.6.B. ENVELOPE LOADS FOR SPACE " LV_3 Dept of Alumni " IN ZONE " Zone 1 "

		COOLING		COOLING		HEATING
		TRANS		SOLAR		TRANS
		Area (m ²)	U-Value (W/(m ² -°K))	Shade Coeff.	(W)	(W)

Space Design Load Summary for Level 03

UTAR Sungai Long Campus

TABLE 1.7.A. COMPONENT LOADS FOR SPACE " LV_3 Lift Lobby 1 " IN ZONE " Zone 1 "

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jan 2300 COOLING OA DB / WB 22.0 °C / 20.2 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible (W)	Latent (W)		Sensible (W)	Latent (W)
SPACE LOADS	Details			Details		
Window & Skylight Solar Loads	0 m ²	0	-	0 m ²	-	-
Wall Transmission	0 m ²	0	-	0 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	0 m ²	0	-	0 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	140 m ²	0	-	140 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	301 W	301	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	28	2010	1682	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	2312	1682	-	0	0

TABLE 1.7.B. ENVELOPE LOADS FOR SPACE " LV_3 Lift Lobby 1 " IN ZONE " Zone 1 "

				COOLING TRANS	COOLING SOLAR	HEATING TRANS
	Area (m ²)	U-Value (W/(m ² -°K))	Shade Coeff.	(W)	(W)	(W)

Space Design Load Summary for Level 03

UTAR Sungai Long Campus

TABLE 1.8.A. COMPONENT LOADS FOR SPACE " LV_3 Lift Lobby 2 " IN ZONE " Zone 1 "

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jan 2300 COOLING OA DB / WB 22.0 °C / 20.2 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible (W)	Latent (W)		Sensible (W)	Latent (W)
SPACE LOADS	Details			Details		
Window & Skylight Solar Loads	0 m ²	0	-	0 m ²	-	-
Wall Transmission	0 m ²	0	-	0 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	0 m ²	0	-	0 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	140 m ²	0	-	140 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	517 W	517	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	48	3446	2884	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	3963	2884	-	0	0

TABLE 1.8.B. ENVELOPE LOADS FOR SPACE " LV_3 Lift Lobby 2 " IN ZONE " Zone 1 "

				COOLING TRANS	COOLING SOLAR	HEATING TRANS
	Area (m ²)	U-Value (W/(m ² -°K))	Shade Coeff.	(W)	(W)	(W)

Space Design Load Summary for Level 03

UTAR Sungai Long Campus

TABLE 1.9.A. COMPONENT LOADS FOR SPACE " LV_3 Room (1- 40) " IN ZONE " Zone 1 "

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jun 1500 COOLING OA DB / WB 33.9 °C / 25.6 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible (W)	Latent (W)		Sensible (W)	Latent (W)
SPACE LOADS	Details			Details		
Window & Skylight Solar Loads	80 m ²	10533	-	80 m ²	-	-
Wall Transmission	64 m ²	2740	-	64 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	80 m ²	2172	-	80 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	140 m ²	0	-	140 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	7233 W	7233	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	672	48251	40373	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	70928	40373	-	0	0

TABLE 1.9.B. ENVELOPE LOADS FOR SPACE " LV_3 Room (1- 40) " IN ZONE " Zone 1 "

				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m ²)	(W/(m ² -°K))	Coeff.	(W)	(W)	(W)
N EXPOSURE						
WALL	28	3.041	-	1296	-	0
WINDOW 1	40	3.237	0.717	1086	6069	0
E EXPOSURE						
WALL	36	3.041	-	1443	-	0
WINDOW 1	40	3.237	0.717	1086	4464	0

Space Design Load Summary for Level 03

UTAR Sungai Long Campus

TABLE 1.10.A. COMPONENT LOADS FOR SPACE " LV_3 Tutorial Room 15 " IN ZONE " Zone 1 "

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Sep 1000 COOLING OA DB / WB 28.3 °C / 23.7 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible (W)	Latent (W)		Sensible (W)	Latent (W)
SPACE LOADS	Details			Details		
Window & Skylight Solar Loads	12 m ²	2188	-	12 m ²	-	-
Wall Transmission	10 m ²	289	-	10 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	12 m ²	157	-	12 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	140 m ²	0	-	140 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	1259 W	1259	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	117	8401	7029	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	12293	7029	-	0	0

TABLE 1.10.B. ENVELOPE LOADS FOR SPACE " LV_3 Tutorial Room 15 " IN ZONE " Zone 1 "

				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m ²)	(W/(m ² -°K))	Coeff.	(W)	(W)	(W)
E EXPOSURE						
WALL	10	3.041	-	289	-	0
WINDOW 1	12	3.237	0.717	157	2188	0

Space Design Load Summary for Level 03

UTAR Sungai Long Campus

TABLE 1.11.A. COMPONENT LOADS FOR SPACE " LV_3 Tutorial Room 16 " IN ZONE " Zone 1 "

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Sep 1000 COOLING OA DB / WB 28.3 °C / 23.7 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible (W)	Latent (W)		Sensible (W)	Latent (W)
SPACE LOADS	Details			Details		
Window & Skylight Solar Loads	12 m ²	2188	-	12 m ²	-	-
Wall Transmission	10 m ²	289	-	10 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	12 m ²	157	-	12 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	140 m ²	0	-	140 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	1259 W	1259	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	117	8401	7029	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	12293	7029	-	0	0

TABLE 1.11.B. ENVELOPE LOADS FOR SPACE " LV_3 Tutorial Room 16 " IN ZONE " Zone 1 "

				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m ²)	(W/(m ² -°K))	Coeff.	(W)	(W)	(W)
E EXPOSURE						
WALL	10	3.041	-	289	-	0
WINDOW 1	12	3.237	0.717	157	2188	0

Space Design Load Summary for Level 03

UTAR Sungai Long Campus

TABLE 1.12.A. COMPONENT LOADS FOR SPACE " LV_3 Tutorial Room 17 " IN ZONE " Zone 1 "

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Sep 1000 COOLING OA DB / WB 28.3 °C / 23.7 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible (W)	Latent (W)		Sensible (W)	Latent (W)
SPACE LOADS	Details			Details		
Window & Skylight Solar Loads	12 m ²	2188	-	12 m ²	-	-
Wall Transmission	10 m ²	289	-	10 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	12 m ²	157	-	12 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	140 m ²	0	-	140 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	1259 W	1259	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	117	8401	7029	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	12293	7029	-	0	0

TABLE 1.12.B. ENVELOPE LOADS FOR SPACE " LV_3 Tutorial Room 17 " IN ZONE " Zone 1 "

				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m ²)	(W/(m ² -°K))	Coeff.	(W)	(W)	(W)
E EXPOSURE						
WALL	10	3.041	-	289	-	0
WINDOW 1	12	3.237	0.717	157	2188	0

Space Design Load Summary for Level 03

UTAR Sungai Long Campus

TABLE 1.13.A. COMPONENT LOADS FOR SPACE " LV_3 Tutorial Room 22 " IN ZONE " Zone 1 "

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Sep 1700 COOLING OA DB / WB 32.4 °C / 24.8 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible (W)	Latent (W)		Sensible (W)	Latent (W)
SPACE LOADS	Details			Details		
Window & Skylight Solar Loads	12 m ²	2494	-	12 m ²	-	-
Wall Transmission	10 m ²	495	-	10 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	12 m ²	288	-	12 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	140 m ²	0	-	140 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	1345 W	1345	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	125	8975	7510	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	13597	7510	-	0	0

TABLE 1.13.B. ENVELOPE LOADS FOR SPACE " LV_3 Tutorial Room 22 " IN ZONE " Zone 1 "

				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m ²)	(W/(m ² -°K))	Coeff.	(W)	(W)	(W)
W EXPOSURE						
WALL	10	3.041	-	495	-	0
WINDOW 1	12	3.237	0.717	288	2494	0

Space Design Load Summary for Level 03

UTAR Sungai Long Campus

TABLE 1.14.A. COMPONENT LOADS FOR SPACE " LV_3 Tutorial Room 23 " IN ZONE " Zone 1 "

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Sep 1700 COOLING OA DB / WB 32.4 °C / 24.8 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible (W)	Latent (W)		Sensible (W)	Latent (W)
SPACE LOADS	Details			Details		
Window & Skylight Solar Loads	12 m ²	2494	-	12 m ²	-	-
Wall Transmission	10 m ²	495	-	10 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	12 m ²	288	-	12 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	140 m ²	0	-	140 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	1615 W	1614	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	150	10770	9012	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	15662	9012	-	0	0

TABLE 1.14.B. ENVELOPE LOADS FOR SPACE " LV_3 Tutorial Room 23 " IN ZONE " Zone 1 "

				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m ²)	(W/(m ² -°K))	Coeff.	(W)	(W)	(W)
W EXPOSURE						
WALL	10	3.041	-	495	-	0
WINDOW 1	12	3.237	0.717	288	2494	0

Space Design Load Summary for Level 03

UTAR Sungai Long Campus

TABLE 1.15.A. COMPONENT LOADS FOR SPACE " LV_3 Tutorial Room 24 " IN ZONE " Zone 1 "

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Sep 1700 COOLING OA DB / WB 32.4 °C / 24.8 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible (W)	Latent (W)		Sensible (W)	Latent (W)
SPACE LOADS	Details			Details		
Window & Skylight Solar Loads	12 m ²	2494	-	12 m ²	-	-
Wall Transmission	10 m ²	495	-	10 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	12 m ²	288	-	12 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	140 m ²	0	-	140 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	1313 W	1313	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	122	8760	7330	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	13350	7330	-	0	0

TABLE 1.15.B. ENVELOPE LOADS FOR SPACE " LV_3 Tutorial Room 24 " IN ZONE " Zone 1 "

				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m ²)	(W/(m ² -°K))	Coeff.	(W)	(W)	(W)
W EXPOSURE						
WALL	10	3.041	-	495	-	0
WINDOW 1	12	3.237	0.717	288	2494	0

Space Design Load Summary for Level 03

UTAR Sungai Long Campus

TABLE 1.16.A. COMPONENT LOADS FOR SPACE " LV_3 Tutorial Room 25 " IN ZONE " Zone 1 "

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Sep 1700 COOLING OA DB / WB 32.4 °C / 24.8 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible (W)	Latent (W)		Sensible (W)	Latent (W)
SPACE LOADS	Details			Details		
Window & Skylight Solar Loads	12 m ²	2494	-	12 m ²	-	-
Wall Transmission	10 m ²	495	-	10 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	12 m ²	288	-	12 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	140 m ²	0	-	140 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	1399 W	1399	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	130	9334	7810	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	14010	7810	-	0	0

TABLE 1.16.B. ENVELOPE LOADS FOR SPACE " LV_3 Tutorial Room 25 " IN ZONE " Zone 1 "

				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m ²)	(W/(m ² -°K))	Coeff.	(W)	(W)	(W)
W EXPOSURE						
WALL	10	3.041	-	495	-	0
WINDOW 1	12	3.237	0.717	288	2494	0

Space Design Load Summary for Level 03

UTAR Sungai Long Campus

TABLE 1.17.A. COMPONENT LOADS FOR SPACE " LV_3 Tutorial Room 26 " IN ZONE " Zone 1 "

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Sep 1700 COOLING OA DB / WB 32.4 °C / 24.8 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible (W)	Latent (W)		Sensible (W)	Latent (W)
SPACE LOADS	Details			Details		
Window & Skylight Solar Loads	12 m ²	2494	-	12 m ²	-	-
Wall Transmission	10 m ²	495	-	10 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	12 m ²	288	-	12 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	140 m ²	0	-	140 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	1399 W	1399	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	130	9334	7810	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	14010	7810	-	0	0

TABLE 1.17.B. ENVELOPE LOADS FOR SPACE " LV_3 Tutorial Room 26 " IN ZONE " Zone 1 "

				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m ²)	(W/(m ² -°K))	Coeff.	(W)	(W)	(W)
W EXPOSURE						
WALL	10	3.041	-	495	-	0
WINDOW 1	12	3.237	0.717	288	2494	0

Space Design Load Summary for Level 03

UTAR Sungai Long Campus

TABLE 1.18.A. COMPONENT LOADS FOR SPACE " LV_3 Tutorial Room 27 " IN ZONE " Zone 1 "

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Sep 1700 COOLING OA DB / WB 32.4 °C / 24.8 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible (W)	Latent (W)		Sensible (W)	Latent (W)
SPACE LOADS	Details			Details		
Window & Skylight Solar Loads	12 m ²	2494	-	12 m ²	-	-
Wall Transmission	10 m ²	495	-	10 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	12 m ²	288	-	12 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	140 m ²	0	-	140 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	1593 W	1593	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	148	10627	8892	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	15496	8892	-	0	0

TABLE 1.18.B. ENVELOPE LOADS FOR SPACE " LV_3 Tutorial Room 27 " IN ZONE " Zone 1 "

				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m ²)	(W/(m ² -°K))	Coeff.	(W)	(W)	(W)
W EXPOSURE						
WALL	10	3.041	-	495	-	0
WINDOW 1	12	3.237	0.717	288	2494	0

Space Design Load Summary for Level 03

UTAR Sungai Long Campus

TABLE 1.19.A. COMPONENT LOADS FOR SPACE " LV_3 Tutorial Room 29 " IN ZONE " Zone 1 "

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Sep 1700 COOLING OA DB / WB 32.4 °C / 24.8 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible (W)	Latent (W)		Sensible (W)	Latent (W)
SPACE LOADS	Details			Details		
Window & Skylight Solar Loads	12 m ²	2494	-	12 m ²	-	-
Wall Transmission	10 m ²	495	-	10 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	12 m ²	288	-	12 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	140 m ²	0	-	140 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	1141 W	1141	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	106	7611	6368	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	12029	6368	-	0	0

TABLE 1.19.B. ENVELOPE LOADS FOR SPACE " LV_3 Tutorial Room 29 " IN ZONE " Zone 1 "

				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m ²)	(W/(m ² -°K))	Coeff.	(W)	(W)	(W)
W EXPOSURE						
WALL	10	3.041	-	495	-	0
WINDOW 1	12	3.237	0.717	288	2494	0

Space Design Load Summary for Level 03

UTAR Sungai Long Campus

TABLE 1.20.A. COMPONENT LOADS FOR SPACE " LV_3 Tutorial Room 30 " IN ZONE " Zone 1 "

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Dec 1600 COOLING OA DB / WB 29.2 °C / 22.7 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible (W)	Latent (W)		Sensible (W)	Latent (W)
SPACE LOADS	Details			Details		
Window & Skylight Solar Loads	12 m ²	2404	-	12 m ²	-	-
Wall Transmission	11 m ²	490	-	11 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	12 m ²	150	-	12 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	140 m ²	0	-	140 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	1442 W	1442	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	134	9621	8051	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	14108	8051	-	0	0

TABLE 1.20.B. ENVELOPE LOADS FOR SPACE " LV_3 Tutorial Room 30 " IN ZONE " Zone 1 "

				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m ²)	(W/(m ² -°K))	Coeff.	(W)	(W)	(W)
S EXPOSURE						
WALL	11	3.041	-	490	-	0
WINDOW 1	12	3.237	0.717	150	2404	0

Space Design Load Summary for Level 03

UTAR Sungai Long Campus

TABLE 1.21.A. COMPONENT LOADS FOR SPACE " LV_3 Tutorial Room 31 " IN ZONE " Zone 1 "

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Dec 1600 COOLING OA DB / WB 29.2 °C / 22.7 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible (W)	Latent (W)		Sensible (W)	Latent (W)
SPACE LOADS	Details			Details		
Window & Skylight Solar Loads	12 m ²	2404	-	12 m ²	-	-
Wall Transmission	11 m ²	490	-	11 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	12 m ²	150	-	12 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	140 m ²	0	-	140 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	1302 W	1302	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	121	8688	7270	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	13034	7270	-	0	0

TABLE 1.21.B. ENVELOPE LOADS FOR SPACE " LV_3 Tutorial Room 31 " IN ZONE " Zone 1 "

				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m ²)	(W/(m ² -°K))	Coeff.	(W)	(W)	(W)
S EXPOSURE						
WALL	11	3.041	-	490	-	0
WINDOW 1	12	3.237	0.717	150	2404	0

Space Design Load Summary for Level 03

UTAR Sungai Long Campus

TABLE 1.22.A. COMPONENT LOADS FOR SPACE " LV_3 Tutorial Room 32 " IN ZONE " Zone 1 "

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Dec 1600 COOLING OA DB / WB 29.2 °C / 22.7 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible (W)	Latent (W)		Sensible (W)	Latent (W)
SPACE LOADS	Details			Details		
Window & Skylight Solar Loads	12 m ²	2404	-	12 m ²	-	-
Wall Transmission	11 m ²	490	-	11 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	12 m ²	150	-	12 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	140 m ²	0	-	140 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	1302 W	1302	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	121	8688	7270	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	13034	7270	-	0	0

TABLE 1.22.B. ENVELOPE LOADS FOR SPACE " LV_3 Tutorial Room 32 " IN ZONE " Zone 1 "

				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m ²)	(W/(m ² -°K))	Coeff.	(W)	(W)	(W)
S EXPOSURE						
WALL	11	3.041	-	490	-	0
WINDOW 1	12	3.237	0.717	150	2404	0

Space Design Load Summary for Level 03

UTAR Sungai Long Campus

TABLE 1.23.A. COMPONENT LOADS FOR SPACE " LV_3 Tutorial Room 33 " IN ZONE " Zone 1 "

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Dec 1600 COOLING OA DB / WB 29.2 °C / 22.7 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible (W)	Latent (W)		Sensible (W)	Latent (W)
SPACE LOADS	Details			Details		
Window & Skylight Solar Loads	12 m ²	2404	-	12 m ²	-	-
Wall Transmission	11 m ²	490	-	11 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	12 m ²	150	-	12 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	140 m ²	0	-	140 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	1302 W	1302	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	121	8688	7270	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	13034	7270	-	0	0

TABLE 1.23.B. ENVELOPE LOADS FOR SPACE " LV_3 Tutorial Room 33 " IN ZONE " Zone 1 "

				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m ²)	(W/(m ² -°K))	Coeff.	(W)	(W)	(W)
S EXPOSURE						
WALL	11	3.041	-	490	-	0
WINDOW 1	12	3.237	0.717	150	2404	0

Space Design Load Summary for Level 03

UTAR Sungai Long Campus

TABLE 1.24.A. COMPONENT LOADS FOR SPACE " LV_3 Tutorial Room 34 " IN ZONE " Zone 1 "

SPACE LOADS	DESIGN COOLING			DESIGN HEATING		
	Details	Sensible (W)	Latent (W)	Details	Sensible (W)	Latent (W)
Window & Skylight Solar Loads	32 m ²	4654	-	32 m ²	-	-
Wall Transmission	31 m ²	1005	-	31 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	32 m ²	408	-	32 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	140 m ²	0	-	140 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	1367 W	1367	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	127	9119	7630	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	16554	7630	-	0	0

TABLE 1.24.B. ENVELOPE LOADS FOR SPACE " LV_3 Tutorial Room 34 " IN ZONE " Zone 1 "

	Area (m ²)	U-Value (W/(m ² -°K))	Shade Coeff.	COOLING	COOLING	HEATING
				TRANS	SOLAR	TRANS
				(W)	(W)	(W)
E EXPOSURE						
WALL	20	3.041	-	554	-	0
WINDOW 1	20	3.237	0.717	255	2268	0
S EXPOSURE						
WALL	11	3.041	-	451	-	0
WINDOW 1	12	3.237	0.717	153	2386	0

Hourly Zone Loads for Level 03

UTAR Sungai Long Campus

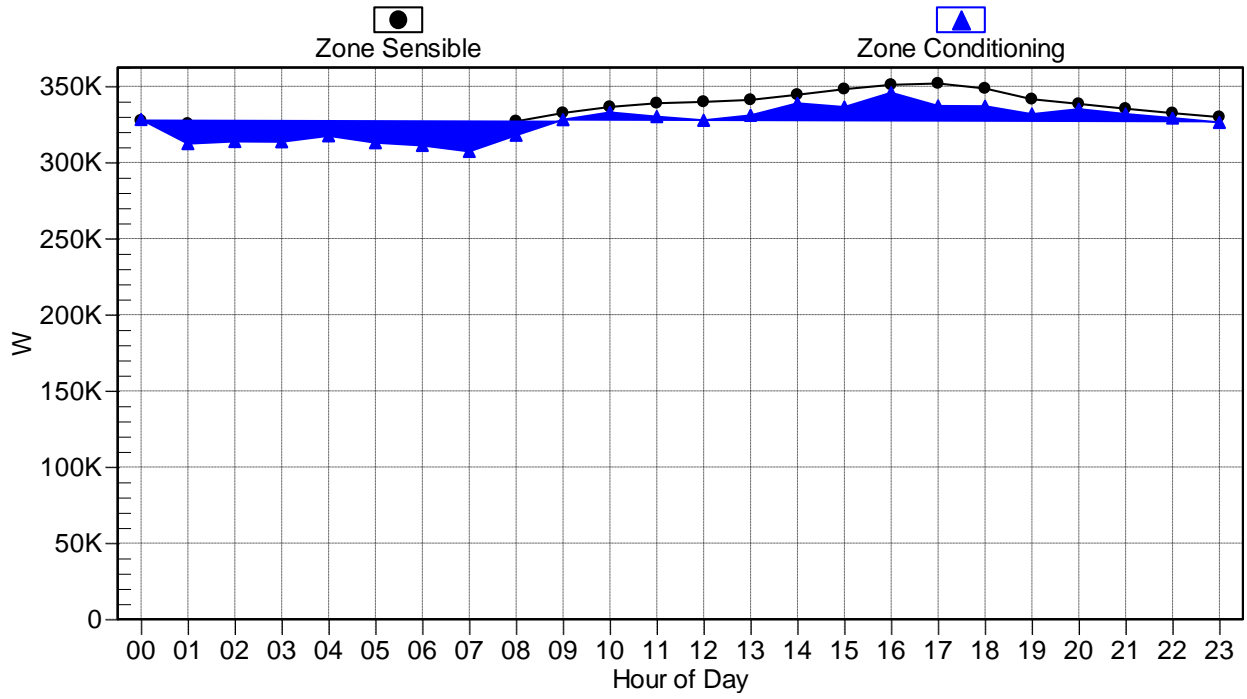
ZONE: Zone 1 DESIGN MONTH: JUNE									
Hour	OA TEMP (°C)	ZONE TEMP (°C)	RH (%)	ZONE AIRFLOW (L/s)	ZONE SENSIBLE LOAD (W)	ZONE COND (W)	TERMINAL COOLING COIL (W)	TERMINAL HEATING COIL (W)	ZONE HEATING UNIT (W)
0000	26.5	24.4	70	32193.8	327441.5	328153.3	0.0	0.0	0.0
0100	26.1	24.7	71	32193.8	325362.2	312338.2	0.0	0.0	0.0
0200	25.6	24.6	71	32193.8	323438.7	313717.5	0.0	0.0	0.0
0300	25.2	24.6	71	32193.8	321702.7	313519.1	0.0	0.0	0.0
0400	25.0	24.5	71	32193.8	320138.8	317430.2	0.0	0.0	0.0
0500	24.9	24.5	71	32193.8	318796.9	312895.5	0.0	0.0	0.0
0600	25.1	24.6	71	32193.8	317738.6	311140.7	0.0	0.0	0.0
0700	25.5	24.6	72	32193.8	318489.2	307181.6	0.0	0.0	0.0
0800	26.3	24.6	70	32193.8	326972.9	317816.0	0.0	0.0	0.0
0900	27.5	24.5	69	32193.8	332434.8	328037.4	0.0	0.0	0.0
1000	28.8	24.5	69	32193.8	336430.9	332842.2	0.0	0.0	0.0
1100	30.4	24.6	69	32193.8	338838.4	330079.0	0.0	0.0	0.0
1200	31.8	24.7	69	32193.8	339728.2	327600.2	0.0	0.0	0.0
1300	32.9	24.6	68	32193.8	341055.7	330882.3	0.0	0.0	0.0
1400	33.6	24.5	67	32193.8	344396.7	338820.3	0.0	0.0	0.0
1500	33.9	24.7	67	32193.8	348112.3	336368.1	0.0	0.0	0.0
1600	33.6	24.5	67	32193.8	350901.1	345736.8	0.0	0.0	0.0
1700	33.0	24.7	67	32193.8	351823.1	337065.3	0.0	0.0	0.0
1800	32.0	24.7	68	32193.8	348526.4	336933.0	0.0	0.0	0.0
1900	30.8	24.6	68	32193.8	341473.0	331674.7	0.0	0.0	0.0
2000	29.7	24.5	68	32193.8	338388.4	334984.6	0.0	0.0	0.0
2100	28.7	24.5	69	32193.8	335265.8	331751.1	0.0	0.0	0.0
2200	27.8	24.5	69	32193.8	332360.1	329110.7	0.0	0.0	0.0
2300	27.0	24.5	70	32193.8	329759.5	326248.1	0.0	0.0	0.0

Hourly Zone Design Day Loads for Level 03

UTAR Sungai Long Campus

Zone: Zone 1

Data for June



Zone Sizing Summary for Level 04

UTAR Sungai Long Campus

Air System Information

Air System Name **Level 04**
 Equipment Class **CW AHU**
 Air System Type **SZCAV**

Number of zones **1**
 Floor Area **3790.0** m²
 Location **Kuala Lumpur, Malaysia**

Sizing Calculation Information

Calculation Months **Jan to Dec**
 Sizing Data **Calculated**

Zone L/s Sizing **Sum of space airflow rates**
 Space L/s Sizing **Individual peak space loads**

Zone Sizing Data

Zone Name	Maximum Cooling Sensible (kW)	Design Airflow (L/s)	Minimum Airflow (L/s)	Time of Peak Load	Maximum Heating Load (kW)	Zone Floor Area (m ²)	Zone L/(s-m ²)
Zone 1	354.7	31426	31426	Nov 1600	0.0	3790.0	8.29

Zone Terminal Sizing Data

No Zone Terminal Sizing Data required for this system.

Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (kW)	Time of Load	Air Flow (L/s)	Heating Load (kW)	Floor Area (m ²)	Space L/(s-m ²)
Zone 1							
LV_4 Cor	1	2.1	Jan 2300	182	0.0	25.0	7.26
LV_4 FES Lab	1	12.5	Sep 1700	1100	0.0	118.0	9.32
LV_4 IT Lab 1	1	12.9	Sep 1700	1136	0.0	123.0	9.24
LV_4 IT Lab 2	1	12.0	Sep 1700	1056	0.0	112.0	9.43
LV_4 IT Lab 3	1	12.0	Sep 1700	1056	0.0	112.0	9.43
LV_4 Library	1	305.8	Nov 1400	26896	0.0	3300.0	8.15

Zone Design Load Summary for Level 04

UTAR Sungai Long Campus

Zone 1	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Nov 1600 COOLING OA DB / WB 30.3 °C / 23.8 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C		
	OCCUPIED T-STAT 23.9 °C			OCCUPIED T-STAT 21.1 °C		
ZONE LOADS	Details	Sensible (W)	Latent (W)	Details	Sensible (W)	Latent (W)
Window & Skylight Solar Loads	245 m ²	31312	-	245 m ²	-	-
Wall Transmission	207 m ²	6547	-	207 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	245 m ²	3946	-	245 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	840 m ²	0	-	840 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	40795 W	40793	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	3790	272128	227702	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	354726	227702	-	0	0

Space Design Load Summary for Level 04

UTAR Sungai Long Campus

TABLE 1.1.A. COMPONENT LOADS FOR SPACE " LV_4 Cor " IN ZONE " Zone 1 "

		DESIGN COOLING		DESIGN HEATING		
		COOLING DATA AT Jan 2300 COOLING OA DB / WB 22.0 °C / 20.2 °C OCCUPIED T-STAT 23.9 °C		HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
SPACE LOADS	Details	Sensible (W)	Latent (W)	Details	Sensible (W)	Latent (W)
Window & Skylight Solar Loads	0 m ²	0	-	0 m ²	-	-
Wall Transmission	0 m ²	0	-	0 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	0 m ²	0	-	0 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	140 m ²	0	-	140 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	269 W	269	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	25	1795	1502	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	2064	1502	-	0	0

TABLE 1.1.B. ENVELOPE LOADS FOR SPACE " LV_4 Cor " IN ZONE " Zone 1 "

		COOLING	COOLING	HEATING
		TRANS	SOLAR	TRANS
Area	U-Value	Shade		
(m ²)	(W/(m ² -°K))	Coeff.	(W)	(W)

Space Design Load Summary for Level 04

UTAR Sungai Long Campus

TABLE 1.2.A. COMPONENT LOADS FOR SPACE " LV_4 FES Lab " IN ZONE " Zone 1 "

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Sep 1700 COOLING OA DB / WB 32.4 °C / 24.8 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible (W)	Latent (W)		Sensible (W)	Latent (W)
SPACE LOADS	Details			Details		
Window & Skylight Solar Loads	10 m ²	2078	-	10 m ²	-	-
Wall Transmission	9 m ²	446	-	9 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	10 m ²	240	-	10 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	140 m ²	0	-	140 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	1270 W	1270	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	118	8473	7089	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	12506	7089	-	0	0

TABLE 1.2.B. ENVELOPE LOADS FOR SPACE " LV_4 FES Lab " IN ZONE " Zone 1 "

				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m ²)	(W/(m ² -°K))	Coeff.	(W)	(W)	(W)
W EXPOSURE						
WALL	9	3.041	-	446	-	0
WINDOW 1	10	3.237	0.717	240	2078	0

Space Design Load Summary for Level 04

UTAR Sungai Long Campus

TABLE 1.3.A. COMPONENT LOADS FOR SPACE "LV_4 IT Lab 1" IN ZONE "Zone 1"

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Sep 1700 COOLING OA DB / WB 32.4 °C / 24.8 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible (W)	Latent (W)		Sensible (W)	Latent (W)
SPACE LOADS	Details			Details		
Window & Skylight Solar Loads	10 m ²	2078	-	10 m ²	-	-
Wall Transmission	9 m ²	446	-	9 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	10 m ²	240	-	10 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	140 m ²	0	-	140 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	1324 W	1324	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	123	8832	7390	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	12919	7390	-	0	0

TABLE 1.3.B. ENVELOPE LOADS FOR SPACE "LV_4 IT Lab 1" IN ZONE "Zone 1"

					COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS	
	(m ²)	(W/(m ² -°K))	Coeff.	(W)	(W)	(W)	
W EXPOSURE							
WALL	9	3.041	-	446	-	0	
WINDOW 1	10	3.237	0.717	240	2078	0	

Space Design Load Summary for Level 04

UTAR Sungai Long Campus

TABLE 1.4.A. COMPONENT LOADS FOR SPACE " LV_4 IT Lab 2 " IN ZONE " Zone 1 "

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Sep 1700 COOLING OA DB / WB 32.4 °C / 24.8 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible (W)	Latent (W)		Sensible (W)	Latent (W)
SPACE LOADS	Details	(W)	(W)	Details	(W)	(W)
Window & Skylight Solar Loads	10 m ²	2078	-	10 m ²	-	-
Wall Transmission	9 m ²	446	-	9 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	10 m ²	240	-	10 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	140 m ²	0	-	140 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	1206 W	1205	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	112	8042	6729	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	12011	6729	-	0	0

TABLE 1.4.B. ENVELOPE LOADS FOR SPACE " LV_4 IT Lab 2 " IN ZONE " Zone 1 "

					COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS	
	(m ²)	(W/(m ² -°K))	Coeff.	(W)	(W)	(W)	
W EXPOSURE							
WALL	9	3.041	-	446	-	0	
WINDOW 1	10	3.237	0.717	240	2078	0	

Space Design Load Summary for Level 04

UTAR Sungai Long Campus

TABLE 1.5.A. COMPONENT LOADS FOR SPACE " LV_4 IT Lab 3 " IN ZONE " Zone 1 "

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Sep 1700 COOLING OA DB / WB 32.4 °C / 24.8 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible (W)	Latent (W)		Sensible (W)	Latent (W)
SPACE LOADS	Details			Details		
Window & Skylight Solar Loads	10 m ²	2078	-	10 m ²	-	-
Wall Transmission	9 m ²	446	-	9 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	10 m ²	240	-	10 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	140 m ²	0	-	140 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	1206 W	1205	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	112	8042	6729	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	12011	6729	-	0	0

TABLE 1.5.B. ENVELOPE LOADS FOR SPACE " LV_4 IT Lab 3 " IN ZONE " Zone 1 "

					COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS	
	(m ²)	(W/(m ² -°K))	Coeff.	(W)	(W)	(W)	
W EXPOSURE							
WALL	9	3.041	-	446	-	0	
WINDOW 1	10	3.237	0.717	240	2078	0	

Space Design Load Summary for Level 04

UTAR Sungai Long Campus

TABLE 1.6.A. COMPONENT LOADS FOR SPACE " LV_4 Library " IN ZONE " Zone 1 "

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Nov 1400 COOLING OA DB / WB 30.3 °C / 23.8 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible (W)	Latent (W)		Sensible (W)	Latent (W)
SPACE LOADS	Details			Details		
Window & Skylight Solar Loads	205 m ²	25160	-	205 m ²	-	-
Wall Transmission	171 m ²	5066	-	171 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	205 m ²	3160	-	205 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	140 m ²	0	-	140 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	35521 W	35519	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	3300	236945	198263	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	305849	198263	-	0	0

TABLE 1.6.B. ENVELOPE LOADS FOR SPACE " LV_4 Library " IN ZONE " Zone 1 "

				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m ²)	(W/(m ² -°K))	Coeff.	(W)	(W)	(W)
N EXPOSURE						
WALL	36	3.041	-	456	-	0
WINDOW 1	30	3.237	0.717	462	1174	0
E EXPOSURE						
WALL	80	3.041	-	2641	-	0
WINDOW 1	120	3.237	0.717	1850	14771	0
S EXPOSURE						
WALL	55	3.041	-	1969	-	0
WINDOW 1	55	3.237	0.717	848	9215	0

Hourly Zone Loads for Level 04

UTAR Sungai Long Campus

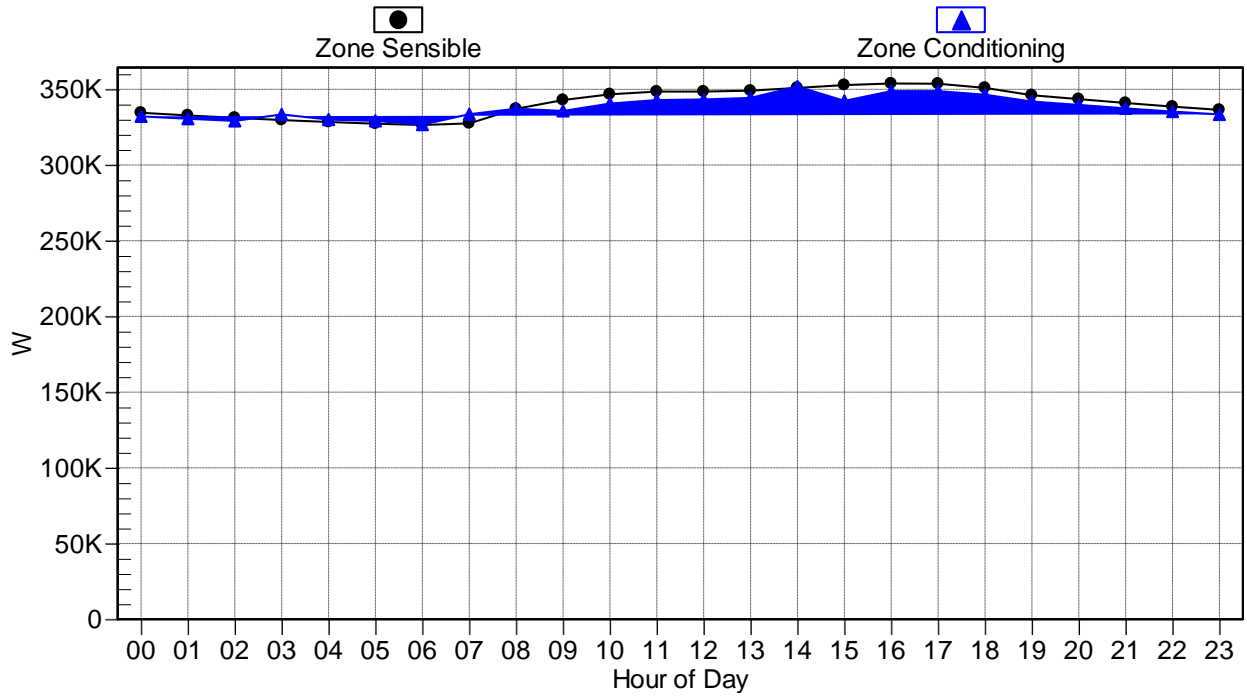
ZONE: Zone 1 DESIGN MONTH: JUNE									
Hour	OA TEMP (°C)	ZONE TEMP (°C)	RH (%)	ZONE AIRFLOW (L/s)	ZONE SENSIBLE LOAD (W)	ZONE COND (W)	TERMINAL COOLING COIL (W)	TERMINAL HEATING COIL (W)	ZONE HEATING UNIT (W)
0000	26.5	24.7	69	31425.7	334466.7	332107.3	0.0	0.0	0.0
0100	26.1	24.7	69	31425.7	332737.1	330557.4	0.0	0.0	0.0
0200	25.6	24.7	70	31425.7	331132.6	329114.3	0.0	0.0	0.0
0300	25.2	24.5	69	31425.7	329683.1	333390.0	0.0	0.0	0.0
0400	25.0	24.6	70	31425.7	328377.2	329995.7	0.0	0.0	0.0
0500	24.9	24.5	70	31425.7	327259.6	329154.4	0.0	0.0	0.0
0600	25.1	24.6	70	31425.7	326385.1	326619.9	0.0	0.0	0.0
0700	25.5	24.4	69	31425.7	327477.5	333540.6	0.0	0.0	0.0
0800	26.3	24.6	69	31425.7	337073.3	337164.8	0.0	0.0	0.0
0900	27.5	24.7	69	31425.7	342859.8	335701.2	0.0	0.0	0.0
1000	28.8	24.7	68	31425.7	346683.6	340593.5	0.0	0.0	0.0
1100	30.4	24.7	67	31425.7	348490.3	342880.9	0.0	0.0	0.0
1200	31.8	24.7	67	31425.7	348478.7	343299.8	0.0	0.0	0.0
1300	32.9	24.7	67	31425.7	349074.9	344272.3	0.0	0.0	0.0
1400	33.6	24.6	66	31425.7	350938.7	351808.1	0.0	0.0	0.0
1500	33.9	24.8	67	31425.7	352760.2	342351.8	0.0	0.0	0.0
1600	33.6	24.7	66	31425.7	353830.7	348766.5	0.0	0.0	0.0
1700	33.0	24.7	66	31425.7	353663.4	348778.3	0.0	0.0	0.0
1800	32.0	24.7	67	31425.7	350938.9	346420.0	0.0	0.0	0.0
1900	30.8	24.7	67	31425.7	346078.3	341914.0	0.0	0.0	0.0
2000	29.7	24.7	68	31425.7	343506.4	339668.5	0.0	0.0	0.0
2100	28.7	24.7	68	31425.7	340939.9	337403.8	0.0	0.0	0.0
2200	27.8	24.7	69	31425.7	338544.3	335285.7	0.0	0.0	0.0
2300	27.0	24.7	69	31425.7	336392.1	333387.7	0.0	0.0	0.0

Hourly Zone Design Blue Loads for Level 04

UTAR Sungai Long Campus

Zone: Zone 1

Data for June



Zone Sizing Summary for Level 05

UTAR Sungai Long Campus

Air System Information

Air System Name **Level 05**
 Equipment Class **CW AHU**
 Air System Type **SZCAV**

Number of zones **1**
 Floor Area **3017.0** m²
 Location **Kuala Lumpur, Malaysia**

Sizing Calculation Information

Calculation Months **Jan to Dec**
 Sizing Data **Calculated**

Zone L/s Sizing **Sum of space airflow rates**
 Space L/s Sizing **Individual peak space loads**

Zone Sizing Data

Zone Name	Maximum Cooling Sensible (kW)	Design Airflow (L/s)	Minimum Airflow (L/s)	Time of Peak Load	Maximum Heating Load (kW)	Zone Floor Area (m ²)	Zone L/(s-m ²)
Zone 1	293.4	26758	26758	Jun 1500	0.0	3017.0	8.87

Zone Terminal Sizing Data

No Zone Terminal Sizing Data required for this system.

Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (kW)	Time of Load	Air Flow (L/s)	Heating Load (kW)	Floor Area (m ²)	Space L/(s-m ²)
Zone 1							
LV_5 CFS Lab 1	1	14.2	Sep 1000	1249	0.0	140.0	8.92
LV_5 CFS Lab 10	1	11.6	Jun 1600	1022	0.0	111.0	9.21
LV_5 CFS Lab 2	1	12.2	Sep 1000	1075	0.0	116.0	9.27
LV_5 CFS Lab 3	1	12.4	Sep 1000	1090	0.0	118.0	9.23
LV_5 CFS Lab 4	1	17.8	Jun 1500	1563	0.0	140.0	11.16
LV_5 CFS Lab 5	1	14.0	Jun 1600	1232	0.0	140.0	8.80
LV_5 CFS Lab 6	1	14.0	Jun 1600	1232	0.0	140.0	8.80
LV_5 CFS Lab 7	1	11.5	Jun 1600	1015	0.0	110.0	9.22
LV_5 CFS Lab 8	1	11.7	Jun 1600	1029	0.0	112.0	9.19
LV_5 CFS Lab 9	1	11.7	Jun 1600	1029	0.0	112.0	9.19
Lv_5 Corridor	1	2.4	Jan 2300	209	0.0	27.0	7.74
LV_5 Corridor and concou	1	53.7	Jan 2300	4719	0.0	650.0	7.26
Lv_5 Department of GS	1	8.1	Jan 2300	708	0.0	91.5	7.74
Lv_5 Department of Secur	1	6.8	Jan 2300	600	0.0	77.5	7.74
LV_5 Lift Lobby 1(1)	1	2.3	Jan 2300	203	0.0	28.0	7.26
Lv_5 Lift Lobby 2	1	3.1	Jan 2300	271	0.0	35.0	7.74
LV_5 Random ACSU (L6)	1	5.8	Jan 2300	508	0.0	70.0	7.26
Lv_5 Store For Lab	1	7.5	Jan 2300	658	0.0	85.0	7.74
LV_5 Tutorial 35 & 36	1	26.8	Dec 1500	2355	0.0	222.0	10.61
LV_5 Tutorial 37 & 38	1	29.2	Dec 1500	2565	0.0	251.0	10.22
LV_5 Tutorial 39	1	12.1	Sep 1100	1062	0.0	118.0	9.00
LV_5 Tutorial 40	1	15.5	Dec 1600	1363	0.0	123.0	11.08

Zone Design Load Summary for Level 05

UTAR Sungai Long Campus

Zone 1	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jun 1500 COOLING OA DB / WB 33.9 °C / 25.6 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C		
	OCCUPIED T-STAT 23.9 °C			OCCUPIED T-STAT 21.1 °C		
ZONE LOADS	Details	Sensible (W)	Latent (W)	Details	Sensible (W)	Latent (W)
Window & Skylight Solar Loads	236 m ²	25168	-	236 m ²	-	-
Wall Transmission	284 m ²	10988	-	284 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	236 m ²	6407	-	236 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	2380 m ²	0	-	2380 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	32475 W	32473	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	3041	218358	182710	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	293394	182710	-	0	0

Space Design Load Summary for Level 05

UTAR Sungai Long Campus

TABLE 1.1.A. COMPONENT LOADS FOR SPACE " LV_5 CFS Lab 1 " IN ZONE " Zone 1 "						
	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Sep 1000 COOLING OA DB / WB 28.3 °C / 23.7 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
SPACE LOADS	Details	Sensible (W)	Latent (W)	Details	Sensible (W)	Latent (W)
Window & Skylight Solar Loads	12 m ²	2188	-	12 m ²	-	-
Wall Transmission	10 m ²	304	-	10 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	12 m ²	157	-	12 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	140 m ²	0	-	140 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	1507 W	1507	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	140	10052	8411	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	14207	8411	-	0	0

TABLE 1.1.B. ENVELOPE LOADS FOR SPACE " LV_5 CFS Lab 1 " IN ZONE " Zone 1 "						
	Area	U-Value	Shade	COOLING	COOLING	HEATING
	(m ²)	(W/(m ² -°K))	Coeff.	TRANS (W)	SOLAR (W)	TRANS (W)
E EXPOSURE						
WALL	10	3.041	-	304	-	0
WINDOW 1	12	3.237	0.717	157	2188	0

Space Design Load Summary for Level 05

UTAR Sungai Long Campus

TABLE 1.2.A. COMPONENT LOADS FOR SPACE " LV_5 CFS Lab 10 " IN ZONE " Zone 1 "

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jun 1600 COOLING OA DB / WB 33.6 °C / 25.5 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible (W)	Latent (W)		Sensible (W)	Latent (W)
SPACE LOADS	Details			Details		
Window & Skylight Solar Loads	10 m ²	1543	-	10 m ²	-	-
Wall Transmission	13 m ²	643	-	13 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	10 m ²	269	-	10 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	140 m ²	0	-	140 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	1195 W	1195	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	111	7970	6669	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	11619	6669	-	0	0

TABLE 1.2.B. ENVELOPE LOADS FOR SPACE " LV_5 CFS Lab 10 " IN ZONE " Zone 1 "

				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m ²)	(W/(m ² -°K))	Coeff.	(W)	(W)	(W)
N EXPOSURE						
WALL	13	3.041	-	643	-	0
WINDOW 1	10	3.237	0.717	269	1543	0

Space Design Load Summary for Level 05

UTAR Sungai Long Campus

TABLE 1.3.A. COMPONENT LOADS FOR SPACE " LV_5 CFS Lab 2 " IN ZONE " Zone 1 "

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Sep 1000 COOLING OA DB / WB 28.3 °C / 23.7 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible (W)	Latent (W)		Sensible (W)	Latent (W)
SPACE LOADS	Details			Details		
Window & Skylight Solar Loads	12 m ²	2188	-	12 m ²	-	-
Wall Transmission	10 m ²	304	-	10 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	12 m ²	157	-	12 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	140 m ²	0	-	140 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	1249 W	1249	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	116	8329	6969	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	12226	6969	-	0	0

TABLE 1.3.B. ENVELOPE LOADS FOR SPACE " LV_5 CFS Lab 2 " IN ZONE " Zone 1 "

				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m ²)	(W/(m ² -°K))	Coeff.	(W)	(W)	(W)
E EXPOSURE						
WALL	10	3.041	-	304	-	0
WINDOW 1	12	3.237	0.717	157	2188	0

Space Design Load Summary for Level 05

UTAR Sungai Long Campus

TABLE 1.4.A. COMPONENT LOADS FOR SPACE " LV_5 CFS Lab 3 " IN ZONE " Zone 1 "

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Sep 1000 COOLING OA DB / WB 28.3 °C / 23.7 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible (W)	Latent (W)		Sensible (W)	Latent (W)
SPACE LOADS	Details			Details		
Window & Skylight Solar Loads	12 m ²	2188	-	12 m ²	-	-
Wall Transmission	10 m ²	304	-	10 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	12 m ²	157	-	12 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	140 m ²	0	-	140 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	1270 W	1270	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	118	8473	7089	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	12391	7089	-	0	0

TABLE 1.4.B. ENVELOPE LOADS FOR SPACE " LV_5 CFS Lab 3 " IN ZONE " Zone 1 "

					COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS	
	(m ²)	(W/(m ² -°K))	Coeff.	(W)	(W)	(W)	
E EXPOSURE							
WALL	10	3.041	-	304	-	0	
WINDOW 1	12	3.237	0.717	157	2188	0	

Space Design Load Summary for Level 05

UTAR Sungai Long Campus

TABLE 1.5.A. COMPONENT LOADS FOR SPACE " LV_5 CFS Lab 4 " IN ZONE " Zone 1 "

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jun 1500 COOLING OA DB / WB 33.9 °C / 25.6 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible (W)	Latent (W)		Sensible (W)	Latent (W)
SPACE LOADS	Details			Details		
Window & Skylight Solar Loads	30 m ²	3749	-	30 m ²	-	-
Wall Transmission	39 m ²	1652	-	39 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	30 m ²	814	-	30 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	140 m ²	0	-	140 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	1507 W	1507	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	140	10052	8411	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	17775	8411	-	0	0

TABLE 1.5.B. ENVELOPE LOADS FOR SPACE " LV_5 CFS Lab 4 " IN ZONE " Zone 1 "

				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m ²)	(W/(m ² -°K))	Coeff.	(W)	(W)	(W)
N EXPOSURE						
WALL	13	3.041	-	602	-	0
WINDOW 1	10	3.237	0.717	271	1517	0
E EXPOSURE						
WALL	26	3.041	-	1050	-	0
WINDOW 1	20	3.237	0.717	543	2232	0

Space Design Load Summary for Level 05

UTAR Sungai Long Campus

TABLE 1.6.A. COMPONENT LOADS FOR SPACE " LV_5 CFS Lab 5 " IN ZONE " Zone 1 "

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jun 1600 COOLING OA DB / WB 33.6 °C / 25.5 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible (W)	Latent (W)		Sensible (W)	Latent (W)
SPACE LOADS	Details			Details		
Window & Skylight Solar Loads	10 m ²	1543	-	10 m ²	-	-
Wall Transmission	13 m ²	643	-	13 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	10 m ²	269	-	10 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	140 m ²	0	-	140 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	1507 W	1507	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	140	10052	8411	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	14014	8411	-	0	0

TABLE 1.6.B. ENVELOPE LOADS FOR SPACE " LV_5 CFS Lab 5 " IN ZONE " Zone 1 "

				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m ²)	(W/(m ² -°K))	Coeff.	(W)	(W)	(W)
N EXPOSURE						
WALL	13	3.041	-	643	-	0
WINDOW 1	10	3.237	0.717	269	1543	0

Space Design Load Summary for Level 05

UTAR Sungai Long Campus

TABLE 1.7.A. COMPONENT LOADS FOR SPACE " LV_5 CFS Lab 6 " IN ZONE " Zone 1 "

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jun 1600 COOLING OA DB / WB 33.6 °C / 25.5 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible (W)	Latent (W)		Sensible (W)	Latent (W)
SPACE LOADS	Details			Details		
Window & Skylight Solar Loads	10 m ²	1543	-	10 m ²	-	-
Wall Transmission	13 m ²	643	-	13 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	10 m ²	269	-	10 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	140 m ²	0	-	140 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	1507 W	1507	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	140	10052	8411	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	14014	8411	-	0	0

TABLE 1.7.B. ENVELOPE LOADS FOR SPACE " LV_5 CFS Lab 6 " IN ZONE " Zone 1 "

				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m ²)	(W/(m ² -°K))	Coeff.	(W)	(W)	(W)
N EXPOSURE						
WALL	13	3.041	-	643	-	0
WINDOW 1	10	3.237	0.717	269	1543	0

Space Design Load Summary for Level 05

UTAR Sungai Long Campus

TABLE 1.8.A. COMPONENT LOADS FOR SPACE " LV_5 CFS Lab 7 " IN ZONE " Zone 1 "

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jun 1600 COOLING OA DB / WB 33.6 °C / 25.5 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible (W)	Latent (W)		Sensible (W)	Latent (W)
SPACE LOADS	Details			Details		
Window & Skylight Solar Loads	10 m ²	1543	-	10 m ²	-	-
Wall Transmission	13 m ²	643	-	13 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	10 m ²	269	-	10 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	140 m ²	0	-	140 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	1184 W	1184	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	110	7898	6609	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	11537	6609	-	0	0

TABLE 1.8.B. ENVELOPE LOADS FOR SPACE " LV_5 CFS Lab 7 " IN ZONE " Zone 1 "

				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m ²)	(W/(m ² -°K))	Coeff.	(W)	(W)	(W)
N EXPOSURE						
WALL	13	3.041	-	643	-	0
WINDOW 1	10	3.237	0.717	269	1543	0

Space Design Load Summary for Level 05

UTAR Sungai Long Campus

TABLE 1.9.A. COMPONENT LOADS FOR SPACE " LV_5 CFS Lab 8 " IN ZONE " Zone 1 "

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jun 1600 COOLING OA DB / WB 33.6 °C / 25.5 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible (W)	Latent (W)		Sensible (W)	Latent (W)
SPACE LOADS	Details			Details		
Window & Skylight Solar Loads	10 m ²	1543	-	10 m ²	-	-
Wall Transmission	13 m ²	643	-	13 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	10 m ²	269	-	10 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	140 m ²	0	-	140 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	1206 W	1205	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	112	8042	6729	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	11702	6729	-	0	0

TABLE 1.9.B. ENVELOPE LOADS FOR SPACE " LV_5 CFS Lab 8 " IN ZONE " Zone 1 "

				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m ²)	(W/(m ² -°K))	Coeff.	(W)	(W)	(W)
N EXPOSURE						
WALL	13	3.041	-	643	-	0
WINDOW 1	10	3.237	0.717	269	1543	0

Space Design Load Summary for Level 05

UTAR Sungai Long Campus

TABLE 1.10.A. COMPONENT LOADS FOR SPACE " LV_5 CFS Lab 9 " IN ZONE " Zone 1 "

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jun 1600 COOLING OA DB / WB 33.6 °C / 25.5 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible (W)	Latent (W)		Sensible (W)	Latent (W)
SPACE LOADS	Details			Details		
Window & Skylight Solar Loads	10 m ²	1543	-	10 m ²	-	-
Wall Transmission	13 m ²	643	-	13 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	10 m ²	269	-	10 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	140 m ²	0	-	140 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	1206 W	1205	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	112	8042	6729	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	11702	6729	-	0	0

TABLE 1.10.B. ENVELOPE LOADS FOR SPACE " LV_5 CFS Lab 9 " IN ZONE " Zone 1 "

					COOLING	COOLING	HEATING
	Area	U-Value	Shade	COOLING	COOLING	HEATING	
	(m ²)	(W/(m ² -°K))	Coeff.	TRANS	SOLAR	TRANS	
N EXPOSURE				(W)	(W)	(W)	
WALL	13	3.041	-	643	-	0	
WINDOW 1	10	3.237	0.717	269	1543	0	

Space Design Load Summary for Level 05

UTAR Sungai Long Campus

TABLE 1.11.A. COMPONENT LOADS FOR SPACE "Lv_5 Corridor" IN ZONE "Zone 1"

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jan 2300 COOLING OA DB / WB 22.0 °C / 20.2 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible (W)	Latent (W)		Sensible (W)	Latent (W)
SPACE LOADS	Details			Details		
Window & Skylight Solar Loads	0 m ²	0	-	0 m ²	-	-
Wall Transmission	0 m ²	0	-	0 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	0 m ²	0	-	0 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	0 m ²	0	-	0 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	291 W	291	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	29	2087	1746	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	2377	1746	-	0	0

TABLE 1.11.B. ENVELOPE LOADS FOR SPACE "Lv_5 Corridor" IN ZONE "Zone 1"

		COOLING			HEATING	
		Area (m ²)	U-Value (W/(m ² -°K))	Shade Coeff.	TRANS (W)	SOLAR (W)

Space Design Load Summary for Level 05

UTAR Sungai Long Campus

TABLE 1.12.A. COMPONENT LOADS FOR SPACE " LV_5 Corridor and concou " IN ZONE " Zone 1 "

SPACE LOADS	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jan 2300 COOLING OA DB / WB 22.0 °C / 20.2 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
	Details	Sensible (W)	Latent (W)	Details	Sensible (W)	Latent (W)
Window & Skylight Solar Loads	0 m ²	0	-	0 m ²	-	-
Wall Transmission	0 m ²	0	-	0 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	0 m ²	0	-	0 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	140 m ²	0	-	140 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	6997 W	6996	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	650	46671	39052	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	53667	39052	-	0	0

TABLE 1.12.B. ENVELOPE LOADS FOR SPACE " LV_5 Corridor and concou " IN ZONE " Zone 1 "

	Area (m ²)	U-Value (W/(m ² -°K))	Shade Coeff.	COOLING	COOLING	HEATING
				TRANS	SOLAR	TRANS
				(W)	(W)	(W)

Space Design Load Summary for Level 05

UTAR Sungai Long Campus

TABLE 1.13.A. COMPONENT LOADS FOR SPACE "Lv_5 Department of GS" IN ZONE "Zone 1"

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jan 2300 COOLING OA DB / WB 22.0 °C / 20.2 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible (W)	Latent (W)		Sensible (W)	Latent (W)
SPACE LOADS	Details			Details		
Window & Skylight Solar Loads	0 m ²	0	-	0 m ²	-	-
Wall Transmission	0 m ²	0	-	0 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	0 m ²	0	-	0 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	0 m ²	0	-	0 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	985 W	985	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	98	7072	5917	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	8056	5917	-	0	0

TABLE 1.13.B. ENVELOPE LOADS FOR SPACE "Lv_5 Department of GS" IN ZONE "Zone 1"

				COOLING	COOLING	HEATING
				TRANS	SOLAR	TRANS
				(W)	(W)	(W)
	Area (m ²)	U-Value (W/(m ² -°K))	Shade Coeff.			

Space Design Load Summary for Level 05

UTAR Sungai Long Campus

TABLE 1.14.A. COMPONENT LOADS FOR SPACE "Lv_5 Department of Secur" IN ZONE "Zone 1"

SPACE LOADS	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jan 2300 COOLING OA DB / WB 22.0 °C / 20.2 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
	Details	Sensible (W)	Latent (W)	Details	Sensible (W)	Latent (W)
Window & Skylight Solar Loads	0 m ²	0	-	0 m ²	-	-
Wall Transmission	0 m ²	0	-	0 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	0 m ²	0	-	0 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	0 m ²	0	-	0 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	834 W	834	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	83	5990	5012	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	6824	5012	-	0	0

TABLE 1.14.B. ENVELOPE LOADS FOR SPACE "Lv_5 Department of Secur" IN ZONE "Zone 1"

	Area (m ²)	U-Value (W/(m ² -°K))	Shade Coeff.	COOLING	COOLING	HEATING
				TRANS	SOLAR	TRANS
				(W)	(W)	(W)

Space Design Load Summary for Level 05

UTAR Sungai Long Campus

TABLE 1.15.A. COMPONENT LOADS FOR SPACE " LV_5 Lift Lobby 1(1) " IN ZONE " Zone 1 "

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jan 2300 COOLING OA DB / WB 22.0 °C / 20.2 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible (W)	Latent (W)		Sensible (W)	Latent (W)
SPACE LOADS	Details			Details		
Window & Skylight Solar Loads	0 m ²	0	-	0 m ²	-	-
Wall Transmission	0 m ²	0	-	0 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	0 m ²	0	-	0 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	140 m ²	0	-	140 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	301 W	301	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	28	2010	1682	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	2312	1682	-	0	0

TABLE 1.15.B. ENVELOPE LOADS FOR SPACE " LV_5 Lift Lobby 1(1) " IN ZONE " Zone 1 "

				COOLING TRANS	COOLING SOLAR	HEATING TRANS
	Area (m ²)	U-Value (W/(m ² -°K))	Shade Coeff.	(W)	(W)	(W)

Space Design Load Summary for Level 05

UTAR Sungai Long Campus

TABLE 1.16.A. COMPONENT LOADS FOR SPACE "Lv_5 Lift Lobby 2" IN ZONE "Zone 1"

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jan 2300 COOLING OA DB / WB 22.0 °C / 20.2 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible (W)	Latent (W)		Sensible (W)	Latent (W)
SPACE LOADS	Details			Details		
Window & Skylight Solar Loads	0 m ²	0	-	0 m ²	-	-
Wall Transmission	0 m ²	0	-	0 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	0 m ²	0	-	0 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	0 m ²	0	-	0 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	377 W	377	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	38	2705	2263	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	3082	2263	-	0	0

TABLE 1.16.B. ENVELOPE LOADS FOR SPACE "Lv_5 Lift Lobby 2" IN ZONE "Zone 1"

				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m ²)	(W/(m ² -°K))	Coeff.	(W)	(W)	(W)

Space Design Load Summary for Level 05

UTAR Sungai Long Campus

TABLE 1.17.A. COMPONENT LOADS FOR SPACE " LV_5 Random ACSU (L6) " IN ZONE " Zone 1 "

SPACE LOADS	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jan 2300 COOLING OA DB / WB 22.0 °C / 20.2 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
	Details	Sensible (W)	Latent (W)	Details	Sensible (W)	Latent (W)
Window & Skylight Solar Loads	0 m ²	0	-	0 m ²	-	-
Wall Transmission	0 m ²	0	-	0 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	0 m ²	0	-	0 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	140 m ²	0	-	140 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	753 W	753	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	70	5026	4206	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	5780	4206	-	0	0

TABLE 1.17.B. ENVELOPE LOADS FOR SPACE " LV_5 Random ACSU (L6) " IN ZONE " Zone 1 "

	Area (m ²)	U-Value (W/(m ² -°K))	Shade Coeff.	COOLING	COOLING	HEATING
				TRANS	SOLAR	TRANS
				(W)	(W)	(W)

Space Design Load Summary for Level 05

UTAR Sungai Long Campus

TABLE 1.18.A. COMPONENT LOADS FOR SPACE "Lv_5 Store For Lab" IN ZONE "Zone 1"

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jan 2300 COOLING OA DB / WB 22.0 °C / 20.2 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible (W)	Latent (W)		Sensible (W)	Latent (W)
SPACE LOADS	Details			Details		
Window & Skylight Solar Loads	0 m ²	0	-	0 m ²	-	-
Wall Transmission	0 m ²	0	-	0 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	0 m ²	0	-	0 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	0 m ²	0	-	0 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	915 W	915	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	91	6569	5497	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	7484	5497	-	0	0

TABLE 1.18.B. ENVELOPE LOADS FOR SPACE "Lv_5 Store For Lab" IN ZONE "Zone 1"

				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m ²)	(W/(m ² -°K))	Coeff.	(W)	(W)	(W)

Space Design Load Summary for Level 05

UTAR Sungai Long Campus

TABLE 1.19.A. COMPONENT LOADS FOR SPACE " LV_5 Tutorial 35 & 36 " IN ZONE " Zone 1 "

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Dec 1500 COOLING OA DB / WB 29.4 °C / 22.8 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible (W)	Latent (W)		Sensible (W)	Latent (W)
SPACE LOADS	Details			Details		
Window & Skylight Solar Loads	40 m ²	6245	-	40 m ²	-	-
Wall Transmission	50 m ²	1691	-	50 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	40 m ²	511	-	40 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	140 m ²	0	-	140 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	2390 W	2389	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	222	15940	13338	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	26776	13338	-	0	0

TABLE 1.19.B. ENVELOPE LOADS FOR SPACE " LV_5 Tutorial 35 & 36 " IN ZONE " Zone 1 "

				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m ²)	(W/(m ² -°K))	Coeff.	(W)	(W)	(W)
E EXPOSURE						
WALL	25	3.041	-	692	-	0
WINDOW 1	20	3.237	0.717	255	2268	0
S EXPOSURE						
WALL	25	3.041	-	998	-	0
WINDOW 1	20	3.237	0.717	255	3977	0

Space Design Load Summary for Level 05

UTAR Sungai Long Campus

TABLE 1.20.A. COMPONENT LOADS FOR SPACE " LV_5 Tutorial 37 & 38 " IN ZONE " Zone 1 "

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Dec 1500 COOLING OA DB / WB 29.4 °C / 22.8 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible (W)	Latent (W)		Sensible (W)	Latent (W)
SPACE LOADS	Details			Details		
Window & Skylight Solar Loads	40 m ²	6245	-	40 m ²	-	-
Wall Transmission	50 m ²	1691	-	50 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	40 m ²	511	-	40 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	140 m ²	0	-	140 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	2702 W	2702	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	251	18022	15080	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	29170	15080	-	0	0

TABLE 1.20.B. ENVELOPE LOADS FOR SPACE " LV_5 Tutorial 37 & 38 " IN ZONE " Zone 1 "

				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m ²)	(W/(m ² -°K))	Coeff.	(W)	(W)	(W)
E EXPOSURE						
WALL	25	3.041	-	692	-	0
WINDOW 1	20	3.237	0.717	255	2268	0
S EXPOSURE						
WALL	25	3.041	-	998	-	0
WINDOW 1	20	3.237	0.717	255	3977	0

Space Design Load Summary for Level 05

UTAR Sungai Long Campus

TABLE 1.21.A. COMPONENT LOADS FOR SPACE " LV_5 Tutorial 39 " IN ZONE " Zone 1 "

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Sep 1100 COOLING OA DB / WB 29.8 °C / 24.1 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible (W)	Latent (W)		Sensible (W)	Latent (W)
SPACE LOADS	Details			Details		
Window & Skylight Solar Loads	10 m ²	1706	-	10 m ²	-	-
Wall Transmission	12 m ²	462	-	12 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	10 m ²	165	-	10 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	140 m ²	0	-	140 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	1270 W	1270	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	118	8473	7089	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	12075	7089	-	0	0

TABLE 1.21.B. ENVELOPE LOADS FOR SPACE " LV_5 Tutorial 39 " IN ZONE " Zone 1 "

					COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS	
	(m ²)	(W/(m ² -°K))	Coeff.	(W)	(W)	(W)	
E EXPOSURE							
WALL	12	3.041	-	462	-	0	
WINDOW 1	10	3.237	0.717	165	1706	0	

Space Design Load Summary for Level 05

UTAR Sungai Long Campus

TABLE 1.22.A. COMPONENT LOADS FOR SPACE " LV_5 Tutorial 40 " IN ZONE " Zone 1 "

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Dec 1600 COOLING OA DB / WB 29.2 °C / 22.7 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible (W)	Latent (W)		Sensible (W)	Latent (W)
SPACE LOADS	Details			Details		
Window & Skylight Solar Loads	20 m ²	4006	-	20 m ²	-	-
Wall Transmission	25 m ²	1084	-	25 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	20 m ²	250	-	20 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	140 m ²	0	-	140 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	1324 W	1324	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	123	8832	7390	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	15496	7390	-	0	0

TABLE 1.22.B. ENVELOPE LOADS FOR SPACE " LV_5 Tutorial 40 " IN ZONE " Zone 1 "

				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m ²)	(W/(m ² -°K))	Coeff.	(W)	(W)	(W)
S EXPOSURE						
WALL	25	3.041	-	1084	-	0
WINDOW 1	20	3.237	0.717	250	4006	0

Hourly Zone Loads for Level 05

UTAR Sungai Long Campus

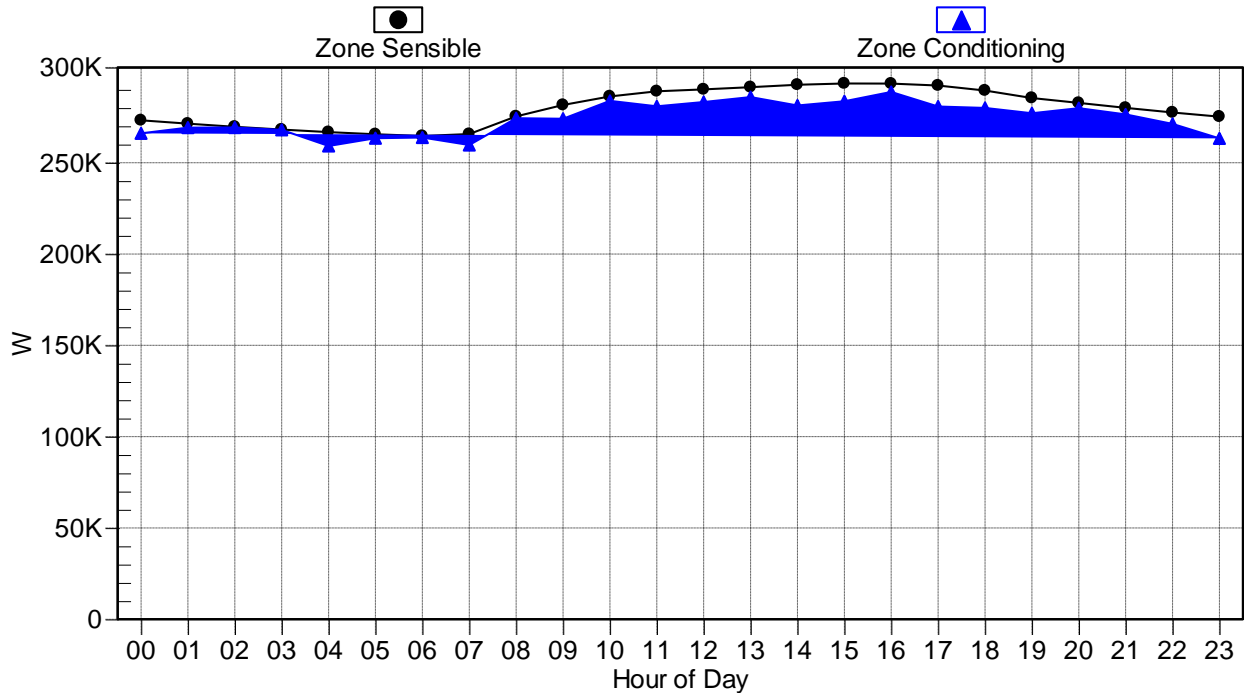
ZONE: Zone 1 DESIGN MONTH: JUNE									
Hour	OA TEMP (°C)	ZONE TEMP (°C)	RH (%)	ZONE AIRFLOW (L/s)	ZONE SENSIBLE LOAD (W)	ZONE COND (W)	TERMINAL COOLING COIL (W)	TERMINAL HEATING COIL (W)	ZONE HEATING UNIT (W)
0000	26.5	24.6	70	26758.3	273204.2	266104.0	0.0	0.0	0.0
0100	26.1	24.5	70	26758.3	271368.5	269232.4	0.0	0.0	0.0
0200	25.6	24.4	70	26758.3	269671.8	269269.6	0.0	0.0	0.0
0300	25.2	24.4	70	26758.3	268139.7	267971.8	0.0	0.0	0.0
0400	25.0	24.6	71	26758.3	266759.2	259178.0	0.0	0.0	0.0
0500	24.9	24.5	71	26758.3	265573.9	263413.0	0.0	0.0	0.0
0600	25.1	24.4	71	26758.3	264640.1	263789.9	0.0	0.0	0.0
0700	25.5	24.6	71	26758.3	265695.1	259701.2	0.0	0.0	0.0
0800	26.3	24.4	70	26758.3	275353.4	274377.9	0.0	0.0	0.0
0900	27.5	24.6	69	26758.3	281620.6	274084.8	0.0	0.0	0.0
1000	28.8	24.5	68	26758.3	286300.7	283877.5	0.0	0.0	0.0
1100	30.4	24.6	68	26758.3	289126.1	280894.4	0.0	0.0	0.0
1200	31.8	24.6	67	26758.3	290139.3	283242.1	0.0	0.0	0.0
1300	32.9	24.5	67	26758.3	291371.6	285950.0	0.0	0.0	0.0
1400	33.6	24.7	67	26758.3	292692.7	281337.9	0.0	0.0	0.0
1500	33.9	24.7	67	26758.3	293393.7	283669.4	0.0	0.0	0.0
1600	33.6	24.5	66	26758.3	293315.4	288736.6	0.0	0.0	0.0
1700	33.0	24.7	67	26758.3	292273.8	280783.5	0.0	0.0	0.0
1800	32.0	24.7	68	26758.3	289524.1	279994.2	0.0	0.0	0.0
1900	30.8	24.6	68	26758.3	285449.0	277102.3	0.0	0.0	0.0
2000	29.7	24.5	68	26758.3	282735.8	279902.6	0.0	0.0	0.0
2100	28.7	24.5	69	26758.3	280041.4	276457.2	0.0	0.0	0.0
2200	27.8	24.6	70	26758.3	277521.2	271283.1	0.0	0.0	0.0
2300	27.0	24.7	70	26758.3	275246.5	263309.2	0.0	0.0	0.0

Hourly Zone Design Blue Loads for Level 05

UTAR Sungai Long Campus

Zone: Zone 1

Data for June



Zone Sizing Summary for Level 06

UTAR Sungai Long Campus

Air System Information

Air System Name **Level 06**
 Equipment Class **CW AHU**
 Air System Type **SZCAV**

Number of zones **1**
 Floor Area **3190.9** m²
 Location **Kuala Lumpur, Malaysia**

Sizing Calculation Information

Calculation Months **Jan to Dec**
 Sizing Data **Calculated**

Zone L/s Sizing **Sum of space airflow rates**
 Space L/s Sizing **Individual peak space loads**

Zone Sizing Data

Zone Name	Maximum Cooling Sensible (kW)	Design Airflow (L/s)	Minimum Airflow (L/s)	Time of Peak Load	Maximum Heating Load (kW)	Zone Floor Area (m ²)	Zone L/(s-m ²)
Zone 1	314.7	28911	28911	Nov 1700	0.0	3190.9	9.06

Zone Terminal Sizing Data

No Zone Terminal Sizing Data required for this system.

Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (kW)	Time of Load	Air Flow (L/s)	Heating Load (kW)	Floor Area (m ²)	Space L/(s-m ²)
Zone 1							
Lv6 Concourse	1	15.9	Jan 2300	1394	0.0	192.0	7.26
Lv6 Corridor	1	38.1	Jan 2300	3347	0.0	461.0	7.26
Lv6 Corridor 2	1	2.3	Jan 2300	203	0.0	28.0	7.26
Lv6 FES Facility	1	19.2	Dec 1600	1684	0.0	173.0	9.73
Lv6 FES Lab 13 - Lab 11	1	37.1	Sep 1100	3263	0.0	361.0	9.04
Lv6 FES Lab 14	1	13.0	Sep 1000	1142	0.0	125.0	9.13
Lv6 FES Lab 15	1	19.0	Jun 1500	1674	0.0	152.0	11.02
Lv6 FES Lab 16	1	13.9	Jun 1600	1224	0.0	135.0	9.06
Lv6 FES Lab 17	1	13.9	Jun 1600	1224	0.0	135.0	9.06
Lv6 FES Lab 18 - 23	1	80.2	Sep 1700	7053	0.0	709.0	9.95
Lv6 FES Lab 28- 24	1	62.6	Dec 1600	5506	0.0	555.0	9.92
Lv6 Lift Lobby	1	2.3	Jan 2300	203	0.0	28.0	7.26
Lv6 Lift Lobby 2	1	4.0	Jan 2300	349	0.0	48.0	7.26
Lv6 PCB Lab	1	7.3	Jan 2300	645	0.0	88.9	7.26

Zone Design Load Summary for Level 06

UTAR Sungai Long Campus

Zone 1	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Nov 1700 COOLING OA DB / WB 29.7 °C / 23.6 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C		
	OCCUPIED T-STAT 23.9 °C			OCCUPIED T-STAT 21.1 °C		
ZONE LOADS	Details	Sensible (W)	Latent (W)	Details	Sensible (W)	Latent (W)
Window & Skylight Solar Loads	271 m ²	38052	-	271 m ²	-	-
Wall Transmission	264 m ²	9161	-	264 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	271 m ²	4071	-	271 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	1960 m ²	0	-	1960 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	34347 W	34345	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	3191	229112	191708	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	314740	191708	-	0	0

Space Design Load Summary for Level 06

UTAR Sungai Long Campus

TABLE 1.1.A. COMPONENT LOADS FOR SPACE " Lv6 Concourse " IN ZONE " Zone 1 "

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jan 2300			HEATING DATA AT DES HTG		
	COOLING OA DB / WB 22.0 °C / 20.2 °C OCCUPIED T-STAT 23.9 °C			HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
SPACE LOADS	Details	Sensible (W)	Latent (W)	Details	Sensible (W)	Latent (W)
Window & Skylight Solar Loads	0 m ²	0	-	0 m ²	-	-
Wall Transmission	0 m ²	0	-	0 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	0 m ²	0	-	0 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	140 m ²	0	-	140 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	2067 W	2067	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	192	13786	11535	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	15853	11535	-	0	0

TABLE 1.1.B. ENVELOPE LOADS FOR SPACE " Lv6 Concourse " IN ZONE " Zone 1 "

				COOLING	COOLING	HEATING
				TRANS	SOLAR	TRANS
				(W)	(W)	(W)
Area	U-Value	Shade				
(m ²)	(W/(m ² -°K))	Coeff.				

Space Design Load Summary for Level 06

UTAR Sungai Long Campus

TABLE 1.2.A. COMPONENT LOADS FOR SPACE " Lv6 Corridor " IN ZONE " Zone 1 "

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jan 2300 COOLING OA DB / WB 22.0 °C / 20.2 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible (W)	Latent (W)		Sensible (W)	Latent (W)
SPACE LOADS	Details			Details		
Window & Skylight Solar Loads	0 m ²	0	-	0 m ²	-	-
Wall Transmission	0 m ²	0	-	0 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	0 m ²	0	-	0 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	140 m ²	0	-	140 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	4962 W	4962	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	461	33101	27697	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	38063	27697	-	0	0

TABLE 1.2.B. ENVELOPE LOADS FOR SPACE " Lv6 Corridor " IN ZONE " Zone 1 "

				COOLING	COOLING	HEATING
				TRANS	SOLAR	TRANS
				(W)	(W)	(W)
	Area	U-Value	Shade			
	(m ²)	(W/(m ² -°K))	Coeff.			

Space Design Load Summary for Level 06

UTAR Sungai Long Campus

TABLE 1.3.A. COMPONENT LOADS FOR SPACE "Lv6 Corridor 2" IN ZONE "Zone 1"

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jan 2300 COOLING OA DB / WB 22.0 °C / 20.2 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible (W)	Latent (W)		Sensible (W)	Latent (W)
SPACE LOADS	Details			Details		
Window & Skylight Solar Loads	0 m ²	0	-	0 m ²	-	-
Wall Transmission	0 m ²	0	-	0 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	0 m ²	0	-	0 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	140 m ²	0	-	140 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	301 W	301	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	28	2010	1682	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	2312	1682	-	0	0

TABLE 1.3.B. ENVELOPE LOADS FOR SPACE "Lv6 Corridor 2" IN ZONE "Zone 1"

				COOLING	COOLING	HEATING
		Area	U-Value	TRANS	SOLAR	TRANS
		(m ²)	(W/(m ² -°K))	(W)	(W)	(W)
			Shade			
			Coeff.			

Space Design Load Summary for Level 06

UTAR Sungai Long Campus

TABLE 1.4.A. COMPONENT LOADS FOR SPACE "Lv6 FES Facility" IN ZONE "Zone 1"

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Dec 1600 COOLING OA DB / WB 29.2 °C / 22.7 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible (W)	Latent (W)		Sensible (W)	Latent (W)
SPACE LOADS	Details			Details		
Window & Skylight Solar Loads	19 m ²	3806	-	19 m ²	-	-
Wall Transmission	19 m ²	824	-	19 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	19 m ²	238	-	19 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	140 m ²	0	-	140 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	1862 W	1862	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	173	12422	10394	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	19151	10394	-	0	0

TABLE 1.4.B. ENVELOPE LOADS FOR SPACE "Lv6 FES Facility" IN ZONE "Zone 1"

				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m ²)	(W/(m ² -°K))	Coeff.	(W)	(W)	(W)
S EXPOSURE						
WALL	19	3.041	-	824	-	0
WINDOW 1	19	3.237	0.717	238	3806	0

Space Design Load Summary for Level 06

UTAR Sungai Long Campus

TABLE 1.5.A. COMPONENT LOADS FOR SPACE "Lv6 FES Lab 13 - Lab 11" IN ZONE "Zone 1"

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Sep 1100 COOLING OA DB / WB 29.8 °C / 24.1 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible (W)	Latent (W)		Sensible (W)	Latent (W)
SPACE LOADS	Details	(W)	(W)	Details	(W)	(W)
Window & Skylight Solar Loads	32 m ²	5459	-	32 m ²	-	-
Wall Transmission	34 m ²	1309	-	34 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	32 m ²	528	-	32 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	140 m ²	0	-	140 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	3886 W	3886	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	361	25920	21689	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	37101	21689	-	0	0

TABLE 1.5.B. ENVELOPE LOADS FOR SPACE "Lv6 FES Lab 13 - Lab 11" IN ZONE "Zone 1"

				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m ²)	(W/(m ² -°K))	Coeff.	(W)	(W)	(W)
E EXPOSURE						
WALL	34	3.041	-	1309	-	0
WINDOW 1	32	3.237	0.717	528	5459	0

Space Design Load Summary for Level 06

UTAR Sungai Long Campus

TABLE 1.6.A. COMPONENT LOADS FOR SPACE " Lv6 FES Lab 14 " IN ZONE " Zone 1 "

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Sep 1000 COOLING OA DB / WB 28.3 °C / 23.7 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible (W)	Latent (W)		Sensible (W)	Latent (W)
SPACE LOADS	Details			Details		
Window & Skylight Solar Loads	12 m ²	2188	-	12 m ²	-	-
Wall Transmission	11 m ²	316	-	11 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	12 m ²	157	-	12 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	140 m ²	0	-	140 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	1345 W	1345	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	125	8975	7510	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	12981	7510	-	0	0

TABLE 1.6.B. ENVELOPE LOADS FOR SPACE " Lv6 FES Lab 14 " IN ZONE " Zone 1 "

				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m ²)	(W/(m ² -°K))	Coeff.	(W)	(W)	(W)
E EXPOSURE						
WALL	11	3.041	-	316	-	0
WINDOW 1	12	3.237	0.717	157	2188	0

Space Design Load Summary for Level 06

UTAR Sungai Long Campus

TABLE 1.7.A. COMPONENT LOADS FOR SPACE " Lv6 FES Lab 15 " IN ZONE " Zone 1 "

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jun 1500 COOLING OA DB / WB 33.9 °C / 25.6 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible (W)	Latent (W)		Sensible (W)	Latent (W)
SPACE LOADS	Details			Details		
Window & Skylight Solar Loads	32 m ²	4053	-	32 m ²	-	-
Wall Transmission	37 m ²	1569	-	37 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	32 m ²	869	-	32 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	140 m ²	0	-	140 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	1636 W	1636	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	152	10914	9132	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	19040	9132	-	0	0

TABLE 1.7.B. ENVELOPE LOADS FOR SPACE " Lv6 FES Lab 15 " IN ZONE " Zone 1 "

				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m ²)	(W/(m ² -°K))	Coeff.	(W)	(W)	(W)
N EXPOSURE						
WALL	12	3.041	-	556	-	0
WINDOW 1	12	3.237	0.717	326	1821	0
E EXPOSURE						
WALL	25	3.041	-	1014	-	0
WINDOW 1	20	3.237	0.717	543	2232	0

Space Design Load Summary for Level 06

UTAR Sungai Long Campus

TABLE 1.8.A. COMPONENT LOADS FOR SPACE " Lv6 FES Lab 16 " IN ZONE " Zone 1 "

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jun 1600 COOLING OA DB / WB 33.6 °C / 25.5 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible (W)	Latent (W)		Sensible (W)	Latent (W)
SPACE LOADS	Details			Details		
Window & Skylight Solar Loads	12 m ²	1851	-	12 m ²	-	-
Wall Transmission	12 m ²	593	-	12 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	12 m ²	323	-	12 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	140 m ²	0	-	140 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	1453 W	1453	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	135	9693	8111	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	13914	8111	-	0	0

TABLE 1.8.B. ENVELOPE LOADS FOR SPACE " Lv6 FES Lab 16 " IN ZONE " Zone 1 "

					COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS	
	(m ²)	(W/(m ² -°K))	Coeff.	(W)	(W)	(W)	
N EXPOSURE							
WALL	12	3.041	-	593	-	0	
WINDOW 1	12	3.237	0.717	323	1851	0	

Space Design Load Summary for Level 06

UTAR Sungai Long Campus

TABLE 1.9.A. COMPONENT LOADS FOR SPACE " Lv6 FES Lab 17 " IN ZONE " Zone 1 "

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jun 1600 COOLING OA DB / WB 33.6 °C / 25.5 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible (W)	Latent (W)		Sensible (W)	Latent (W)
SPACE LOADS	Details			Details		
Window & Skylight Solar Loads	12 m ²	1851	-	12 m ²	-	-
Wall Transmission	12 m ²	593	-	12 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	12 m ²	323	-	12 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	140 m ²	0	-	140 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	1453 W	1453	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	135	9693	8111	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	13914	8111	-	0	0

TABLE 1.9.B. ENVELOPE LOADS FOR SPACE " Lv6 FES Lab 17 " IN ZONE " Zone 1 "

				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m ²)	(W/(m ² -°K))	Coeff.	(W)	(W)	(W)
N EXPOSURE						
WALL	12	3.041	-	593	-	0
WINDOW 1	12	3.237	0.717	323	1851	0

Space Design Load Summary for Level 06

UTAR Sungai Long Campus

TABLE 1.10.A. COMPONENT LOADS FOR SPACE "Lv6 FES Lab 18 - 23" IN ZONE "Zone 1"

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Sep 1700 COOLING OA DB / WB 32.4 °C / 24.8 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible (W)	Latent (W)		Sensible (W)	Latent (W)
SPACE LOADS	Details			Details		
Window & Skylight Solar Loads	80 m ²	16624	-	80 m ²	-	-
Wall Transmission	63 m ²	3119	-	63 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	80 m ²	1921	-	80 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	140 m ²	0	-	140 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	7632 W	7631	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	709	50907	42596	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	80203	42596	-	0	0

TABLE 1.10.B. ENVELOPE LOADS FOR SPACE "Lv6 FES Lab 18 - 23" IN ZONE "Zone 1"

					COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS	
	(m ²)	(W/(m ² -°K))	Coeff.	(W)	(W)	(W)	
W EXPOSURE							
WALL	63	3.041	-	3119	-	0	
WINDOW 1	80	3.237	0.717	1921	16624	0	

Space Design Load Summary for Level 06

UTAR Sungai Long Campus

TABLE 1.11.A. COMPONENT LOADS FOR SPACE "Lv6 FES Lab 28- 24" IN ZONE "Zone 1"

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Dec 1600 COOLING OA DB / WB 29.2 °C / 22.7 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible (W)	Latent (W)		Sensible (W)	Latent (W)
SPACE LOADS	Details			Details		
Window & Skylight Solar Loads	72 m ²	12938	-	72 m ²	-	-
Wall Transmission	76 m ²	2954	-	76 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	72 m ²	901	-	72 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	140 m ²	0	-	140 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	5974 W	5974	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	555	39850	33344	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	62617	33344	-	0	0

TABLE 1.11.B. ENVELOPE LOADS FOR SPACE "Lv6 FES Lab 28- 24" IN ZONE "Zone 1"

				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m ²)	(W/(m ² -°K))	Coeff.	(W)	(W)	(W)
S EXPOSURE						
WALL	56	3.041	-	2428	-	0
WINDOW 1	56	3.237	0.717	701	11218	0
E EXPOSURE						
WALL	20	3.041	-	526	-	0
WINDOW 1	16	3.237	0.717	200	1720	0

Space Design Load Summary for Level 06

UTAR Sungai Long Campus

TABLE 1.12.A. COMPONENT LOADS FOR SPACE " Lv6 Lift Lobby " IN ZONE " Zone 1 "

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jan 2300 COOLING OA DB / WB 22.0 °C / 20.2 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible (W)	Latent (W)		Sensible (W)	Latent (W)
SPACE LOADS	Details			Details		
Window & Skylight Solar Loads	0 m ²	0	-	0 m ²	-	-
Wall Transmission	0 m ²	0	-	0 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	0 m ²	0	-	0 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	140 m ²	0	-	140 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	301 W	301	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	28	2010	1682	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	2312	1682	-	0	0

TABLE 1.12.B. ENVELOPE LOADS FOR SPACE " Lv6 Lift Lobby " IN ZONE " Zone 1 "

				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m ²)	(W/(m ² -°K))	Coeff.	(W)	(W)	(W)

Space Design Load Summary for Level 06

UTAR Sungai Long Campus

TABLE 1.13.A. COMPONENT LOADS FOR SPACE "Lv6 Lift Lobby 2" IN ZONE "Zone 1"

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jan 2300 COOLING OA DB / WB 22.0 °C / 20.2 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible (W)	Latent (W)		Sensible (W)	Latent (W)
SPACE LOADS	Details			Details		
Window & Skylight Solar Loads	0 m ²	0	-	0 m ²	-	-
Wall Transmission	0 m ²	0	-	0 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	0 m ²	0	-	0 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	140 m ²	0	-	140 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	517 W	517	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	48	3446	2884	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	3963	2884	-	0	0

TABLE 1.13.B. ENVELOPE LOADS FOR SPACE "Lv6 Lift Lobby 2" IN ZONE "Zone 1"

				COOLING TRANS	COOLING SOLAR	HEATING TRANS
	Area (m ²)	U-Value (W/(m ² -°K))	Shade Coeff.	(W)	(W)	(W)

Space Design Load Summary for Level 06

UTAR Sungai Long Campus

TABLE 1.14.A. COMPONENT LOADS FOR SPACE "Lv6 PCB Lab" IN ZONE "Zone 1"

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jan 2300 COOLING OA DB / WB 22.0 °C / 20.2 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible (W)	Latent (W)		Sensible (W)	Latent (W)
SPACE LOADS	Details			Details		
Window & Skylight Solar Loads	0 m ²	0	-	0 m ²	-	-
Wall Transmission	0 m ²	0	-	0 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	0 m ²	0	-	0 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	140 m ²	0	-	140 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	957 W	957	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	89	6383	5341	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	7340	5341	-	0	0

TABLE 1.14.B. ENVELOPE LOADS FOR SPACE "Lv6 PCB Lab" IN ZONE "Zone 1"

				COOLING	COOLING	HEATING
				TRANS	SOLAR	TRANS
				(W)	(W)	(W)
	Area	U-Value	Shade			
	(m ²)	(W/(m ² -°K))	Coeff.			

Hourly Zone Loads for Level 06

UTAR Sungai Long Campus

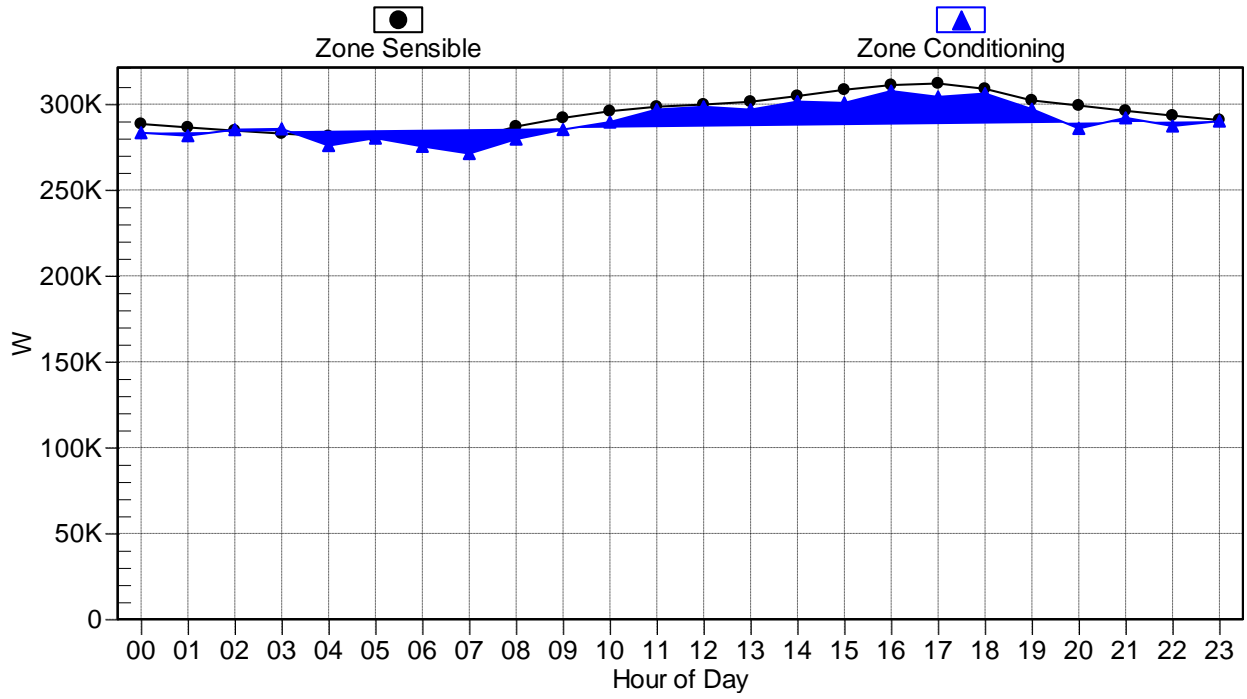
ZONE: Zone 1 DESIGN MONTH: JUNE									
Hour	OA TEMP (°C)	ZONE TEMP (°C)	RH (%)	ZONE AIRFLOW (L/s)	ZONE SENSIBLE LOAD (W)	ZONE COND (W)	TERMINAL COOLING COIL (W)	TERMINAL HEATING COIL (W)	ZONE HEATING UNIT (W)
0000	26.5	24.6	70	28910.8	288463.2	283324.5	0.0	0.0	0.0
0100	26.1	24.6	71	28910.8	286428.8	281620.3	0.0	0.0	0.0
0200	25.6	24.5	70	28910.8	284549.5	285132.8	0.0	0.0	0.0
0300	25.2	24.4	71	28910.8	282854.6	285579.9	0.0	0.0	0.0
0400	25.0	24.6	72	28910.8	281329.2	275833.3	0.0	0.0	0.0
0500	24.9	24.5	71	28910.8	280021.5	280220.6	0.0	0.0	0.0
0600	25.1	24.5	72	28910.8	278992.8	275388.5	0.0	0.0	0.0
0700	25.5	24.7	72	28910.8	279564.9	271231.4	0.0	0.0	0.0
0800	26.3	24.6	71	28910.8	286942.3	279619.1	0.0	0.0	0.0
0900	27.5	24.6	70	28910.8	291953.3	285199.0	0.0	0.0	0.0
1000	28.8	24.6	69	28910.8	295872.4	289551.8	0.0	0.0	0.0
1100	30.4	24.5	68	28910.8	298487.6	296849.9	0.0	0.0	0.0
1200	31.8	24.5	68	28910.8	299780.8	298437.2	0.0	0.0	0.0
1300	32.9	24.6	68	28910.8	301349.5	296756.4	0.0	0.0	0.0
1400	33.6	24.5	67	28910.8	304700.8	301503.3	0.0	0.0	0.0
1500	33.9	24.6	67	28910.8	308360.9	300679.3	0.0	0.0	0.0
1600	33.6	24.5	67	28910.8	311099.5	307627.5	0.0	0.0	0.0
1700	33.0	24.6	67	28910.8	312021.2	304199.6	0.0	0.0	0.0
1800	32.0	24.5	67	28910.8	308893.0	306158.3	0.0	0.0	0.0
1900	30.8	24.6	68	28910.8	302163.1	297082.1	0.0	0.0	0.0
2000	29.7	24.8	69	28910.8	299164.0	285858.2	0.0	0.0	0.0
2100	28.7	24.6	69	28910.8	296116.4	291989.7	0.0	0.0	0.0
2200	27.8	24.6	70	28910.8	293276.1	287243.8	0.0	0.0	0.0
2300	27.0	24.5	70	28910.8	290731.4	290131.0	0.0	0.0	0.0

Hourly Zone Design Day Loads for Level 06

UTAR Sungai Long Campus

Zone: Zone 1

Data for June



Zone Sizing Summary for Level 07

UTAR Sungai Long Campus

Air System Information

Air System Name **Level 07**
 Equipment Class **CW AHU**
 Air System Type **SZCAV**

Number of zones **1**
 Floor Area **3171.7 m²**
 Location **Kuala Lumpur, Malaysia**

Sizing Calculation Information

Calculation Months **Jan to Dec**
 Sizing Data **Calculated**

Zone L/s Sizing **Sum of space airflow rates**
 Space L/s Sizing **Individual peak space loads**

Zone Sizing Data

Zone Name	Maximum Cooling Sensible (kW)	Design Airflow (L/s)	Minimum Airflow (L/s)	Time of Peak Load	Maximum Heating Load (kW)	Zone Floor Area (m ²)	Zone L/(s-m ²)
Zone 1	304.0	27715	27715	Jul 1700	0.0	3171.7	8.74

Zone Terminal Sizing Data

No Zone Terminal Sizing Data required for this system.

Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (kW)	Time of Load	Air Flow (L/s)	Heating Load (kW)	Floor Area (m ²)	Space L/(s-m ²)
Zone 1							
Lv7 concourse	1	15.4	Jan 2300	1350	0.0	186.0	7.26
Lv7 Corridor 1	1	44.6	Jan 2300	3921	0.0	540.0	7.26
Lv7 Corridor 2	1	3.0	Jan 2300	261	0.0	36.0	7.26
Lv7 Corridor 3	1	1.9	Jan 2300	165	0.0	22.7	7.26
Lv7 FES Lab 10	1	11.9	Sep 1700	1046	0.0	110.0	9.51
Lv7 FES Lab 29	1	12.4	Sep 1700	1090	0.0	116.0	9.39
Lv7 FES Lab 30	1	11.9	Sep 1700	1046	0.0	110.0	9.51
Lv7 FES Lab 31	1	11.9	Sep 1700	1046	0.0	110.0	9.51
Lv7 FES Lab 36-32	1	61.8	Dec 1600	5434	0.0	565.0	9.62
Lv7 FES Lab 4 - 1	1	50.5	Sep 1000	4440	0.0	489.0	9.08
Lv7 FES Lab 5 - 7	1	44.3	Jun 1600	3892	0.0	401.0	9.71
Lv7 FES Lab 8	1	11.9	Sep 1700	1046	0.0	110.0	9.51
Lv7 FES Lab 9	1	12.3	Sep 1700	1082	0.0	115.0	9.41
Lv7 FES Lift lobby 1	1	2.3	Jan 2300	203	0.0	28.0	7.26
Lv7 lift lobby 2	1	4.0	Jan 2300	349	0.0	48.0	7.26
Lv7 random room	1	3.3	Jan 2300	290	0.0	40.0	7.26
Lv7 random room 11	1	6.6	Jan 2300	581	0.0	80.0	7.26
Lv7 random room 14	1	5.4	Jan 2300	472	0.0	65.0	7.26

Zone Design Load Summary for Level 07

UTAR Sungai Long Campus

Zone 1	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jul 1700			HEATING DATA AT DES HTG		
	COOLING OA DB / WB 33.5 °C / 25.3 °C			HEATING OA DB / WB 21.7 °C / 15.2 °C		
	OCCUPIED T-STAT 23.9 °C			OCCUPIED T-STAT 21.1 °C		
ZONE LOADS	Details	Sensible (W)	Latent (W)	Details	Sensible (W)	Latent (W)
Window & Skylight Solar Loads	221 m ²	25671	-	221 m ²	-	-
Wall Transmission	248 m ²	10350	-	248 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	221 m ²	6101	-	221 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	2520 m ²	0	-	2520 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	34140 W	34138	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	3172	227733	190554	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	303993	190554	-	0	0

Space Design Load Summary for Level 07

UTAR Sungai Long Campus

TABLE 1.1.A. COMPONENT LOADS FOR SPACE "Lv7 concourse" IN ZONE "Zone 1"

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jan 2300 COOLING OA DB / WB 22.0 °C / 20.2 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible	Latent		Sensible	Latent
SPACE LOADS	Details	(W)	(W)	Details	(W)	(W)
Window & Skylight Solar Loads	0 m ²	0	-	0 m ²	-	-
Wall Transmission	0 m ²	0	-	0 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	0 m ²	0	-	0 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	140 m ²	0	-	140 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	2002 W	2002	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	186	13355	11175	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	15357	11175	-	0	0

TABLE 1.1.B. ENVELOPE LOADS FOR SPACE "Lv7 concourse" IN ZONE "Zone 1"

				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m ²)	(W/(m ² -°K))	Coeff.	(W)	(W)	(W)

Space Design Load Summary for Level 07

UTAR Sungai Long Campus

TABLE 1.2.A. COMPONENT LOADS FOR SPACE "Lv7 Corridor 1" IN ZONE "Zone 1"

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jan 2300			HEATING DATA AT DES HTG		
	COOLING OA DB / WB 22.0 °C / 20.2 °C OCCUPIED T-STAT 23.9 °C			HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
SPACE LOADS	Details	Sensible (W)	Latent (W)	Details	Sensible (W)	Latent (W)
Window & Skylight Solar Loads	0 m ²	0	-	0 m ²	-	-
Wall Transmission	0 m ²	0	-	0 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	0 m ²	0	-	0 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	140 m ²	0	-	140 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	5813 W	5812	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	540	38773	32443	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	44585	32443	-	0	0

TABLE 1.2.B. ENVELOPE LOADS FOR SPACE "Lv7 Corridor 1" IN ZONE "Zone 1"

				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m ²)	(W/(m ² -°K))	Coeff.	(W)	(W)	(W)

Space Design Load Summary for Level 07

UTAR Sungai Long Campus

TABLE 1.3.A. COMPONENT LOADS FOR SPACE "Lv7 Corridor 2" IN ZONE "Zone 1"

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jan 2300			HEATING DATA AT DES HTG		
	COOLING OA DB / WB 22.0 °C / 20.2 °C OCCUPIED T-STAT 23.9 °C			HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
SPACE LOADS	Details	Sensible (W)	Latent (W)	Details	Sensible (W)	Latent (W)
Window & Skylight Solar Loads	0 m ²	0	-	0 m ²	-	-
Wall Transmission	0 m ²	0	-	0 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	0 m ²	0	-	0 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	140 m ²	0	-	140 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	388 W	387	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	36	2585	2163	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	2972	2163	-	0	0

TABLE 1.3.B. ENVELOPE LOADS FOR SPACE "Lv7 Corridor 2" IN ZONE "Zone 1"

				COOLING	COOLING	HEATING
				TRANS	SOLAR	TRANS
				(W)	(W)	(W)
Area	U-Value	Shade				
(m ²)	(W/(m ² -°K))	Coeff.				

Space Design Load Summary for Level 07

UTAR Sungai Long Campus

TABLE 1.4.A. COMPONENT LOADS FOR SPACE "Lv7 Corridor 3" IN ZONE "Zone 1"

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jan 2300			HEATING DATA AT DES HTG		
	COOLING OA DB / WB 22.0 °C / 20.2 °C OCCUPIED T-STAT 23.9 °C			HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
SPACE LOADS	Details	Sensible (W)	Latent (W)	Details	Sensible (W)	Latent (W)
Window & Skylight Solar Loads	0 m ²	0	-	0 m ²	-	-
Wall Transmission	0 m ²	0	-	0 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	0 m ²	0	-	0 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	140 m ²	0	-	140 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	244 W	244	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	23	1630	1364	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	1874	1364	-	0	0

TABLE 1.4.B. ENVELOPE LOADS FOR SPACE "Lv7 Corridor 3" IN ZONE "Zone 1"

				COOLING	COOLING	HEATING
				TRANS	SOLAR	TRANS
				(W)	(W)	(W)
Area	U-Value	Shade				
(m ²)	(W/(m ² -°K))	Coeff.				

Space Design Load Summary for Level 07

UTAR Sungai Long Campus

TABLE 1.5.A. COMPONENT LOADS FOR SPACE " Lv7 FES Lab 10 " IN ZONE " Zone 1 "

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Sep 1700			HEATING DATA AT DES HTG		
	COOLING OA DB / WB 32.4 °C / 24.8 °C OCCUPIED T-STAT 23.9 °C			HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
SPACE LOADS	Details	Sensible (W)	Latent (W)	Details	Sensible (W)	Latent (W)
Window & Skylight Solar Loads	10 m ²	2078	-	10 m ²	-	-
Wall Transmission	10 m ²	495	-	10 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	10 m ²	240	-	10 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	140 m ²	0	-	140 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	1184 W	1184	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	110	7898	6609	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	11895	6609	-	0	0

TABLE 1.5.B. ENVELOPE LOADS FOR SPACE " Lv7 FES Lab 10 " IN ZONE " Zone 1 "

	Area (m ²)	U-Value (W/(m ² -°K))	Shade Coeff.	COOLING	COOLING	HEATING
				TRANS	SOLAR	TRANS
				(W)	(W)	(W)
W EXPOSURE						
WALL	10	3.041	-	495	-	0
WINDOW 1	10	3.237	0.717	240	2078	0

Space Design Load Summary for Level 07

UTAR Sungai Long Campus

TABLE 1.6.A. COMPONENT LOADS FOR SPACE " Lv7 FES Lab 29 " IN ZONE " Zone 1 "

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Sep 1700			HEATING DATA AT DES HTG		
	COOLING OA DB / WB 32.4 °C / 24.8 °C OCCUPIED T-STAT 23.9 °C			HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible	Latent		Sensible	Latent
SPACE LOADS	Details	(W)	(W)	Details	(W)	(W)
Window & Skylight Solar Loads	10 m ²	2078	-	10 m ²	-	-
Wall Transmission	10 m ²	495	-	10 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	10 m ²	240	-	10 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	140 m ²	0	-	140 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	1249 W	1249	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	116	8329	6969	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	12391	6969	-	0	0

TABLE 1.6.B. ENVELOPE LOADS FOR SPACE " Lv7 FES Lab 29 " IN ZONE " Zone 1 "

				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m ²)	(W/(m ² -°K))	Coeff.	(W)	(W)	(W)
W EXPOSURE						
WALL	10	3.041	-	495	-	0
WINDOW 1	10	3.237	0.717	240	2078	0

Space Design Load Summary for Level 07

UTAR Sungai Long Campus

TABLE 1.7.A. COMPONENT LOADS FOR SPACE " Lv7 FES Lab 30 " IN ZONE " Zone 1 "

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Sep 1700			HEATING DATA AT DES HTG		
	COOLING OA DB / WB 32.4 °C / 24.8 °C OCCUPIED T-STAT 23.9 °C			HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible	Latent		Sensible	Latent
SPACE LOADS	Details	(W)	(W)	Details	(W)	(W)
Window & Skylight Solar Loads	10 m ²	2078	-	10 m ²	-	-
Wall Transmission	10 m ²	495	-	10 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	10 m ²	240	-	10 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	140 m ²	0	-	140 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	1184 W	1184	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	110	7898	6609	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	11895	6609	-	0	0

TABLE 1.7.B. ENVELOPE LOADS FOR SPACE " Lv7 FES Lab 30 " IN ZONE " Zone 1 "

				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m ²)	(W/(m ² -°K))	Coeff.	(W)	(W)	(W)
W EXPOSURE						
WALL	10	3.041	-	495	-	0
WINDOW 1	10	3.237	0.717	240	2078	0

Space Design Load Summary for Level 07

UTAR Sungai Long Campus

TABLE 1.8.A. COMPONENT LOADS FOR SPACE " Lv7 FES Lab 31 " IN ZONE " Zone 1 "

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Sep 1700			HEATING DATA AT DES HTG		
	COOLING OA DB / WB 32.4 °C / 24.8 °C OCCUPIED T-STAT 23.9 °C			HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible	Latent		Sensible	Latent
SPACE LOADS	Details	(W)	(W)	Details	(W)	(W)
Window & Skylight Solar Loads	10 m ²	2078	-	10 m ²	-	-
Wall Transmission	10 m ²	495	-	10 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	10 m ²	240	-	10 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	140 m ²	0	-	140 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	1184 W	1184	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	110	7898	6609	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	11895	6609	-	0	0

TABLE 1.8.B. ENVELOPE LOADS FOR SPACE " Lv7 FES Lab 31 " IN ZONE " Zone 1 "

				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m ²)	(W/(m ² -°K))	Coeff.	(W)	(W)	(W)
W EXPOSURE						
WALL	10	3.041	-	495	-	0
WINDOW 1	10	3.237	0.717	240	2078	0

Space Design Load Summary for Level 07

UTAR Sungai Long Campus

TABLE 1.9.A. COMPONENT LOADS FOR SPACE "Lv7 FES Lab 36-32" IN ZONE "Zone 1"

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Dec 1600			HEATING DATA AT DES HTG		
	COOLING OA DB / WB 29.2 °C / 22.7 °C OCCUPIED T-STAT 23.9 °C			HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible	Latent		Sensible	Latent
SPACE LOADS	Details	(W)	(W)	Details	(W)	(W)
Window & Skylight Solar Loads	63 m ²	10950	-	63 m ²	-	-
Wall Transmission	86 m ²	3404	-	86 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	63 m ²	788	-	63 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	140 m ²	0	-	140 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	6082 W	6081	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	565	40568	33945	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	61792	33945	-	0	0

TABLE 1.9.B. ENVELOPE LOADS FOR SPACE "Lv7 FES Lab 36-32" IN ZONE "Zone 1"

	Area	U-Value	Shade	COOLING	COOLING	HEATING
				TRANS	SOLAR	TRANS
				(W)	(W)	(W)
	(m ²)	(W/(m ² -°K))	Coeff.			
E EXPOSURE						
WALL	19	3.041	-	500	-	0
WINDOW 1	18	3.237	0.717	225	1935	0
S EXPOSURE						
WALL	67	3.041	-	2904	-	0
WINDOW 1	45	3.237	0.717	563	9014	0

Space Design Load Summary for Level 07

UTAR Sungai Long Campus

TABLE 1.10.A. COMPONENT LOADS FOR SPACE " Lv7 FES Lab 4 - 1 " IN ZONE " Zone 1 "

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Sep 1000			HEATING DATA AT DES HTG		
	COOLING OA DB / WB 28.3 °C / 23.7 °C OCCUPIED T-STAT 23.9 °C			HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
SPACE LOADS	Details	Sensible (W)	Latent (W)	Details	Sensible (W)	Latent (W)
Window & Skylight Solar Loads	45 m ²	8204	-	45 m ²	-	-
Wall Transmission	44 m ²	1324	-	44 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	45 m ²	587	-	45 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	140 m ²	0	-	140 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	5264 W	5263	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	489	35111	29379	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	50490	29379	-	0	0

TABLE 1.10.B. ENVELOPE LOADS FOR SPACE " Lv7 FES Lab 4 - 1 " IN ZONE " Zone 1 "

	Area (m ²)	U-Value (W/(m ² -°K))	Shade Coeff.	COOLING	COOLING	HEATING
				TRANS	SOLAR	TRANS
				(W)	(W)	(W)
E EXPOSURE						
WALL	44	3.041	-	1324	-	0
WINDOW 1	45	3.237	0.717	587	8204	0

Space Design Load Summary for Level 07

UTAR Sungai Long Campus

TABLE 1.11.A. COMPONENT LOADS FOR SPACE " Lv7 FES Lab 5 - 7 " IN ZONE " Zone 1 "

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jun 1600			HEATING DATA AT DES HTG		
	COOLING OA DB / WB 33.6 °C / 25.5 °C OCCUPIED T-STAT 23.9 °C			HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible	Latent		Sensible	Latent
SPACE LOADS	Details	(W)	(W)	Details	(W)	(W)
Window & Skylight Solar Loads	53 m ²	7082	-	53 m ²	-	-
Wall Transmission	58 m ²	2643	-	58 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	53 m ²	1425	-	53 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	140 m ²	0	-	140 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	4316 W	4316	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	401	28792	24092	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	44259	24092	-	0	0

TABLE 1.11.B. ENVELOPE LOADS FOR SPACE " Lv7 FES Lab 5 - 7 " IN ZONE " Zone 1 "

	Area	U-Value	Shade	COOLING	COOLING	HEATING
				TRANS	SOLAR	TRANS
				(W)	(W)	(W)
	(m ²)	(W/(m ² -°K))	Coeff.			
N EXPOSURE						
WALL	35	3.041	-	1731	-	0
WINDOW 1	30	3.237	0.717	807	4628	0
E EXPOSURE						
WALL	23	3.041	-	912	-	0
WINDOW 1	23	3.237	0.717	619	2454	0

Space Design Load Summary for Level 07

UTAR Sungai Long Campus

TABLE 1.12.A. COMPONENT LOADS FOR SPACE " Lv7 FES Lab 8 " IN ZONE " Zone 1 "

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Sep 1700			HEATING DATA AT DES HTG		
	COOLING OA DB / WB 32.4 °C / 24.8 °C OCCUPIED T-STAT 23.9 °C			HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
SPACE LOADS	Details	Sensible (W)	Latent (W)	Details	Sensible (W)	Latent (W)
Window & Skylight Solar Loads	10 m ²	2078	-	10 m ²	-	-
Wall Transmission	10 m ²	495	-	10 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	10 m ²	240	-	10 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	140 m ²	0	-	140 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	1184 W	1184	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	110	7898	6609	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	11895	6609	-	0	0

TABLE 1.12.B. ENVELOPE LOADS FOR SPACE " Lv7 FES Lab 8 " IN ZONE " Zone 1 "

				COOLING	COOLING	HEATING
				TRANS	SOLAR	TRANS
				(W)	(W)	(W)
W EXPOSURE	Area (m ²)	U-Value (W/(m ² -°K))	Shade Coeff.			
WALL	10	3.041	-	495	-	0
WINDOW 1	10	3.237	0.717	240	2078	0

Space Design Load Summary for Level 07

UTAR Sungai Long Campus

TABLE 1.13.A. COMPONENT LOADS FOR SPACE "Lv7 FES Lab 9" IN ZONE "Zone 1"

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Sep 1700			HEATING DATA AT DES HTG		
	COOLING OA DB / WB 32.4 °C / 24.8 °C OCCUPIED T-STAT 23.9 °C			HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
SPACE LOADS	Details	Sensible (W)	Latent (W)	Details	Sensible (W)	Latent (W)
Window & Skylight Solar Loads	10 m ²	2078	-	10 m ²	-	-
Wall Transmission	10 m ²	495	-	10 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	10 m ²	240	-	10 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	140 m ²	0	-	140 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	1238 W	1238	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	115	8257	6909	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	12308	6909	-	0	0

TABLE 1.13.B. ENVELOPE LOADS FOR SPACE "Lv7 FES Lab 9" IN ZONE "Zone 1"

	Area (m ²)	U-Value (W/(m ² -°K))	Shade Coeff.	COOLING	COOLING	HEATING
				TRANS	SOLAR	TRANS
				(W)	(W)	(W)
W EXPOSURE						
WALL	10	3.041	-	495	-	0
WINDOW 1	10	3.237	0.717	240	2078	0

Space Design Load Summary for Level 07

UTAR Sungai Long Campus

TABLE 1.14.A. COMPONENT LOADS FOR SPACE " Lv7 FES Lift lobby 1 " IN ZONE " Zone 1 "

SPACE LOADS	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jan 2300			HEATING DATA AT DES HTG		
	COOLING OA DB / WB 22.0 °C / 20.2 °C OCCUPIED T-STAT 23.9 °C			HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
	Details	Sensible (W)	Latent (W)	Details	Sensible (W)	Latent (W)
Window & Skylight Solar Loads	0 m ²	0	-	0 m ²	-	-
Wall Transmission	0 m ²	0	-	0 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	0 m ²	0	-	0 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	140 m ²	0	-	140 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	301 W	301	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	28	2010	1682	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	2312	1682	-	0	0

TABLE 1.14.B. ENVELOPE LOADS FOR SPACE " Lv7 FES Lift lobby 1 " IN ZONE " Zone 1 "

	Area	U-Value	Shade	COOLING TRANS	COOLING SOLAR	HEATING TRANS
	(m ²)	(W/(m ² -°K))	Coeff.	(W)	(W)	(W)

Space Design Load Summary for Level 07

UTAR Sungai Long Campus

TABLE 1.15.A. COMPONENT LOADS FOR SPACE " Lv7 lift lobby 2 " IN ZONE " Zone 1 "

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jan 2300			HEATING DATA AT DES HTG		
	COOLING OA DB / WB 22.0 °C / 20.2 °C OCCUPIED T-STAT 23.9 °C			HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
SPACE LOADS	Details	Sensible (W)	Latent (W)	Details	Sensible (W)	Latent (W)
Window & Skylight Solar Loads	0 m ²	0	-	0 m ²	-	-
Wall Transmission	0 m ²	0	-	0 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	0 m ²	0	-	0 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	140 m ²	0	-	140 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	517 W	517	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	48	3446	2884	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	3963	2884	-	0	0

TABLE 1.15.B. ENVELOPE LOADS FOR SPACE " Lv7 lift lobby 2 " IN ZONE " Zone 1 "

				COOLING	COOLING	HEATING
				TRANS	SOLAR	TRANS
				(W)	(W)	(W)
Area	U-Value	Shade				
(m ²)	(W/(m ² -°K))	Coeff.				

Space Design Load Summary for Level 07

UTAR Sungai Long Campus

TABLE 1.16.A. COMPONENT LOADS FOR SPACE " Lv7 random room " IN ZONE " Zone 1 "

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jan 2300			HEATING DATA AT DES HTG		
	COOLING OA DB / WB 22.0 °C / 20.2 °C OCCUPIED T-STAT 23.9 °C			HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible	Latent		Sensible	Latent
SPACE LOADS	Details	(W)	(W)	Details	(W)	(W)
Window & Skylight Solar Loads	0 m ²	0	-	0 m ²	-	-
Wall Transmission	0 m ²	0	-	0 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	0 m ²	0	-	0 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	140 m ²	0	-	140 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	431 W	431	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	40	2872	2403	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	3303	2403	-	0	0

TABLE 1.16.B. ENVELOPE LOADS FOR SPACE " Lv7 random room " IN ZONE " Zone 1 "

				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m ²)	(W/(m ² -°K))	Coeff.	(W)	(W)	(W)

Space Design Load Summary for Level 07

UTAR Sungai Long Campus

TABLE 1.17.A. COMPONENT LOADS FOR SPACE " Lv7 random room 11 " IN ZONE " Zone 1 "

SPACE LOADS	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jan 2300			HEATING DATA AT DES HTG		
	COOLING OA DB / WB 22.0 °C / 20.2 °C OCCUPIED T-STAT 23.9 °C			HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
	Details	Sensible (W)	Latent (W)	Details	Sensible (W)	Latent (W)
Window & Skylight Solar Loads	0 m ²	0	-	0 m ²	-	-
Wall Transmission	0 m ²	0	-	0 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	0 m ²	0	-	0 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	140 m ²	0	-	140 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	861 W	861	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	80	5744	4806	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	6605	4806	-	0	0

TABLE 1.17.B. ENVELOPE LOADS FOR SPACE " Lv7 random room 11 " IN ZONE " Zone 1 "

	Area	U-Value	Shade	COOLING TRANS	COOLING SOLAR	HEATING TRANS
	(m ²)	(W/(m ² -°K))	Coeff.	(W)	(W)	(W)

Space Design Load Summary for Level 07

UTAR Sungai Long Campus

TABLE 1.18.A. COMPONENT LOADS FOR SPACE " Lv7 random room 14 " IN ZONE " Zone 1 "

SPACE LOADS	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jan 2300			HEATING DATA AT DES HTG		
	COOLING OA DB / WB 22.0 °C / 20.2 °C OCCUPIED T-STAT 23.9 °C			HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
	Details	Sensible (W)	Latent (W)	Details	Sensible (W)	Latent (W)
Window & Skylight Solar Loads	0 m ²	0	-	0 m ²	-	-
Wall Transmission	0 m ²	0	-	0 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	0 m ²	0	-	0 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	140 m ²	0	-	140 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	700 W	700	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	65	4667	3905	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	5367	3905	-	0	0

TABLE 1.18.B. ENVELOPE LOADS FOR SPACE " Lv7 random room 14 " IN ZONE " Zone 1 "

	Area	U-Value	Shade	COOLING TRANS	COOLING SOLAR	HEATING TRANS
	(m ²)	(W/(m ² -°K))	Coeff.	(W)	(W)	(W)

Hourly Zone Loads for Level 07

UTAR Sungai Long Campus

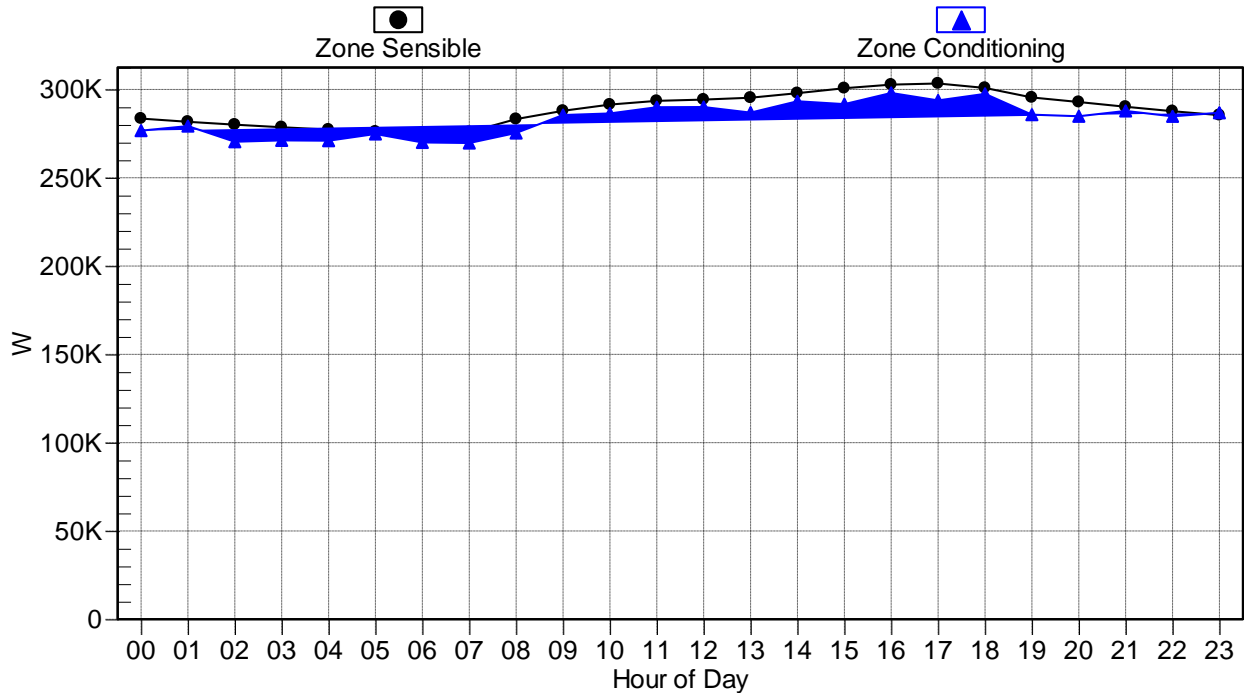
ZONE: Zone 1									
DESIGN MONTH: JUNE									
Hour	OA TEMP (°C)	ZONE TEMP (°C)	RH (%)	ZONE AIRFLOW (L/s)	ZONE SENSIBLE LOAD (W)	ZONE COND (W)	TERMINAL COOLING COIL (W)	TERMINAL HEATING COIL (W)	ZONE HEATING UNIT (W)
0000	26.5	24.6	70	27714.6	283516.8	276712.4	0.0	0.0	0.0
0100	26.1	24.5	70	27714.6	281739.6	279275.5	0.0	0.0	0.0
0200	25.6	24.7	71	27714.6	280103.1	270416.0	0.0	0.0	0.0
0300	25.2	24.6	71	27714.6	278628.3	271161.7	0.0	0.0	0.0
0400	25.0	24.6	71	27714.6	277301.2	270994.0	0.0	0.0	0.0
0500	24.9	24.5	71	27714.6	276160.4	274841.6	0.0	0.0	0.0
0600	25.1	24.6	71	27714.6	275256.8	270024.9	0.0	0.0	0.0
0700	25.5	24.6	71	27714.6	275910.5	269702.2	0.0	0.0	0.0
0800	26.3	24.6	70	27714.6	283213.4	275363.7	0.0	0.0	0.0
0900	27.5	24.5	69	27714.6	287953.7	285542.6	0.0	0.0	0.0
1000	28.8	24.6	69	27714.6	291457.8	286415.8	0.0	0.0	0.0
1100	30.4	24.5	68	27714.6	293544.9	289958.8	0.0	0.0	0.0
1200	31.8	24.5	68	27714.6	294264.1	290066.5	0.0	0.0	0.0
1300	32.9	24.6	68	27714.6	295351.3	286892.0	0.0	0.0	0.0
1400	33.6	24.5	67	27714.6	297917.7	293329.1	0.0	0.0	0.0
1500	33.9	24.6	67	27714.6	300704.5	291694.0	0.0	0.0	0.0
1600	33.6	24.6	67	27714.6	302770.1	298069.2	0.0	0.0	0.0
1700	33.0	24.7	67	27714.6	303409.3	293818.8	0.0	0.0	0.0
1800	32.0	24.5	67	27714.6	300875.4	297547.1	0.0	0.0	0.0
1900	30.8	24.7	68	27714.6	295492.9	285736.5	0.0	0.0	0.0
2000	29.7	24.6	69	27714.6	292888.4	284837.3	0.0	0.0	0.0
2100	28.7	24.5	69	27714.6	290217.1	287865.3	0.0	0.0	0.0
2200	27.8	24.5	69	27714.6	287729.6	284802.1	0.0	0.0	0.0
2300	27.0	24.4	69	27714.6	285502.4	286811.0	0.0	0.0	0.0

Hourly Zone Design Day Loads for Level 07

UTAR Sungai Long Campus

Zone: Zone 1

Data for June



Zone Sizing Summary for Level 08

UTAR Sungai Long Campus

Air System Information

Air System Name **Level 08**
 Equipment Class **CW AHU**
 Air System Type **SZCAV**

Number of zones **1**
 Floor Area **3171.7 m²**
 Location **Kuala Lumpur, Malaysia**

Sizing Calculation Information

Calculation Months **Jan to Dec**
 Sizing Data **Calculated**

Zone L/s Sizing **Sum of space airflow rates**
 Space L/s Sizing **Individual peak space loads**

Zone Sizing Data

Zone Name	Maximum Cooling Sensible (kW)	Design Airflow (L/s)	Minimum Airflow (L/s)	Time of Peak Load	Maximum Heating Load (kW)	Zone Floor Area (m ²)	Zone L/(s-m ²)
Zone 1	329.3	29497	29497	Dec 1600	0.0	3171.7	9.30

Zone Terminal Sizing Data

No Zone Terminal Sizing Data required for this system.

Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (kW)	Time of Load	Air Flow (L/s)	Heating Load (kW)	Floor Area (m ²)	Space L/(s-m ²)
Zone 1							
LV8 - FES FGO	1	17.5	Jun 1600	1540	0.0	175.0	8.80
LV8 - lecturer's office	1	266.8	Dec 1700	23461	0.0	2500.0	9.38
Lv8 concourse	1	12.7	Jan 2300	1118	0.0	154.0	7.26
Lv8 corridor	1	2.3	Jan 2300	203	0.0	28.0	7.26
Lv8 corridor2	1	1.4	Jan 2300	121	0.0	16.7	7.26
Lv8 FES Lab 39	1	29.1	Sep 1000	2560	0.0	230.0	11.13
Lv8 Lift lobby 1	1	1.7	Jan 2300	145	0.0	20.0	7.26
Lv8 Lift lobby 2	1	4.0	Jan 2300	349	0.0	48.0	7.26

Zone Design Load Summary for Level 08

UTAR Sungai Long Campus

Zone 1	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Dec 1600 COOLING OA DB / WB 29.2 °C / 22.7 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C		
	OCCUPIED T-STAT 23.9 °C			OCCUPIED T-STAT 21.1 °C		
ZONE LOADS	Details	Sensible (W)	Latent (W)	Details	Sensible (W)	Latent (W)
Window & Skylight Solar Loads	358 m ²	51623	-	358 m ²	-	-
Wall Transmission	363 m ²	11289	-	363 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	358 m ²	4491	-	358 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	840 m ²	0	-	840 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	34140 W	34137	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	3172	227727	190554	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	329266	190554	-	0	0

Space Design Load Summary for Level 08

UTAR Sungai Long Campus

TABLE 1.1.A. COMPONENT LOADS FOR SPACE " LV8 - FES FGO " IN ZONE " Zone 1 "						
	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jun 1600 COOLING OA DB / WB 33.6 °C / 25.5 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
SPACE LOADS	Details	Sensible (W)	Latent (W)	Details	Sensible (W)	Latent (W)
Window & Skylight Solar Loads	13 m ²	2021	-	13 m ²	-	-
Wall Transmission	14 m ²	693	-	14 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	13 m ²	350	-	13 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	0 m ²	0	-	0 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	1884 W	1883	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	175	12565	10514	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	17512	10514	-	0	0

TABLE 1.1.B. ENVELOPE LOADS FOR SPACE " LV8 - FES FGO " IN ZONE " Zone 1 "						
				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m ²)	(W/(m ² -°K))	Coeff.	(W)	(W)	(W)
N EXPOSURE						
WALL	14	3.041	-	693	-	0
WINDOW 1	13	3.237	0.717	350	2021	0

Space Design Load Summary for Level 08

UTAR Sungai Long Campus

TABLE 1.2.A. COMPONENT LOADS FOR SPACE " LV8 - lecturer's office " IN ZONE " Zone 1 "

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Dec 1700 COOLING OA DB / WB 28.5 °C / 22.5 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible (W)	Latent (W)		Sensible (W)	Latent (W)
SPACE LOADS	Details			Details		
Window & Skylight Solar Loads	300 m ²	46289	-	300 m ²	-	-
Wall Transmission	305 m ²	10658	-	305 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	300 m ²	3440	-	300 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	0 m ²	0	-	0 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	26910 W	26907	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	2500	179499	150199	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	266793	150199	-	0	0

TABLE 1.2.B. ENVELOPE LOADS FOR SPACE " LV8 - lecturer's office " IN ZONE " Zone 1 "

				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m ²)	(W/(m ² -°K))	Coeff.	(W)	(W)	(W)
N EXPOSURE						
WALL	21	3.041	-	323	-	0
WINDOW 1	20	3.237	0.717	229	697	0
E EXPOSURE						
WALL	93	3.041	-	2338	-	0
WINDOW 1	100	3.237	0.717	1147	10092	0
S EXPOSURE						
WALL	126	3.041	-	5703	-	0
WINDOW 1	120	3.237	0.717	1376	23632	0
W EXPOSURE						
WALL	65	3.041	-	2293	-	0
WINDOW 1	60	3.237	0.717	688	11868	0

Space Design Load Summary for Level 08

UTAR Sungai Long Campus

TABLE 1.3.A. COMPONENT LOADS FOR SPACE "Lv8 concourse" IN ZONE "Zone 1"

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jan 2300 COOLING OA DB / WB 22.0 °C / 20.2 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible (W)	Latent (W)		Sensible (W)	Latent (W)
SPACE LOADS	Details			Details		
Window & Skylight Solar Loads	0 m ²	0	-	0 m ²	-	-
Wall Transmission	0 m ²	0	-	0 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	0 m ²	0	-	0 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	140 m ²	0	-	140 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	1658 W	1658	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	154	11057	9252	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	12715	9252	-	0	0

TABLE 1.3.B. ENVELOPE LOADS FOR SPACE "Lv8 concourse" IN ZONE "Zone 1"

				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m ²)	(W/(m ² -°K))	Coeff.	(W)	(W)	(W)

Space Design Load Summary for Level 08

UTAR Sungai Long Campus

TABLE 1.4.A. COMPONENT LOADS FOR SPACE " Lv8 corridor " IN ZONE " Zone 1 "

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jan 2300 COOLING OA DB / WB 22.0 °C / 20.2 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible (W)	Latent (W)		Sensible (W)	Latent (W)
SPACE LOADS	Details			Details		
Window & Skylight Solar Loads	0 m ²	0	-	0 m ²	-	-
Wall Transmission	0 m ²	0	-	0 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	0 m ²	0	-	0 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	140 m ²	0	-	140 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	301 W	301	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	28	2010	1682	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	2312	1682	-	0	0

TABLE 1.4.B. ENVELOPE LOADS FOR SPACE " Lv8 corridor " IN ZONE " Zone 1 "

				COOLING TRANS	COOLING SOLAR	HEATING TRANS
	Area (m ²)	U-Value (W/(m ² -°K))	Shade Coeff.	(W)	(W)	(W)

Space Design Load Summary for Level 08

UTAR Sungai Long Campus

TABLE 1.5.A. COMPONENT LOADS FOR SPACE "Lv8 corridor2" IN ZONE "Zone 1"

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jan 2300 COOLING OA DB / WB 22.0 °C / 20.2 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible (W)	Latent (W)		Sensible (W)	Latent (W)
SPACE LOADS	Details			Details		
Window & Skylight Solar Loads	0 m ²	0	-	0 m ²	-	-
Wall Transmission	0 m ²	0	-	0 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	0 m ²	0	-	0 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	140 m ²	0	-	140 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	180 W	180	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	17	1199	1003	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	1379	1003	-	0	0

TABLE 1.5.B. ENVELOPE LOADS FOR SPACE "Lv8 corridor2" IN ZONE "Zone 1"

				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m ²)	(W/(m ² -°K))	Coeff.	(W)	(W)	(W)

Space Design Load Summary for Level 08

UTAR Sungai Long Campus

TABLE 1.6.A. COMPONENT LOADS FOR SPACE " Lv8 FES Lab 39 " IN ZONE " Zone 1 "

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Sep 1000 COOLING OA DB / WB 28.3 °C / 23.7 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible (W)	Latent (W)		Sensible (W)	Latent (W)
SPACE LOADS	Details			Details		
Window & Skylight Solar Loads	45 m ²	8204	-	45 m ²	-	-
Wall Transmission	44 m ²	1324	-	44 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	45 m ²	587	-	45 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	140 m ²	0	-	140 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	2476 W	2476	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	230	16514	13818	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	29106	13818	-	0	0

TABLE 1.6.B. ENVELOPE LOADS FOR SPACE " Lv8 FES Lab 39 " IN ZONE " Zone 1 "

				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m ²)	(W/(m ² -°K))	Coeff.	(W)	(W)	(W)
E EXPOSURE						
WALL	44	3.041	-	1324	-	0
WINDOW 1	45	3.237	0.717	587	8204	0

Space Design Load Summary for Level 08

UTAR Sungai Long Campus

TABLE 1.7.A. COMPONENT LOADS FOR SPACE " Lv8 Lift lobby 1 " IN ZONE " Zone 1 "

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jan 2300 COOLING OA DB / WB 22.0 °C / 20.2 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible (W)	Latent (W)		Sensible (W)	Latent (W)
SPACE LOADS	Details			Details		
Window & Skylight Solar Loads	0 m ²	0	-	0 m ²	-	-
Wall Transmission	0 m ²	0	-	0 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	0 m ²	0	-	0 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	140 m ²	0	-	140 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	215 W	215	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	20	1436	1202	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	1651	1202	-	0	0

TABLE 1.7.B. ENVELOPE LOADS FOR SPACE " Lv8 Lift lobby 1 " IN ZONE " Zone 1 "

				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m ²)	(W/(m ² -°K))	Coeff.	(W)	(W)	(W)

Space Design Load Summary for Level 08

UTAR Sungai Long Campus

TABLE 1.8.A. COMPONENT LOADS FOR SPACE " Lv8 Lift lobby 2 " IN ZONE " Zone 1 "

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jan 2300 COOLING OA DB / WB 22.0 °C / 20.2 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible (W)	Latent (W)		Sensible (W)	Latent (W)
SPACE LOADS	Details			Details		
Window & Skylight Solar Loads	0 m ²	0	-	0 m ²	-	-
Wall Transmission	0 m ²	0	-	0 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	0 m ²	0	-	0 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	140 m ²	0	-	140 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	517 W	517	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	48	3446	2884	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	3963	2884	-	0	0

TABLE 1.8.B. ENVELOPE LOADS FOR SPACE " Lv8 Lift lobby 2 " IN ZONE " Zone 1 "

				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m ²)	(W/(m ² -°K))	Coeff.	(W)	(W)	(W)

Hourly Zone Loads for Level 08

UTAR Sungai Long Campus

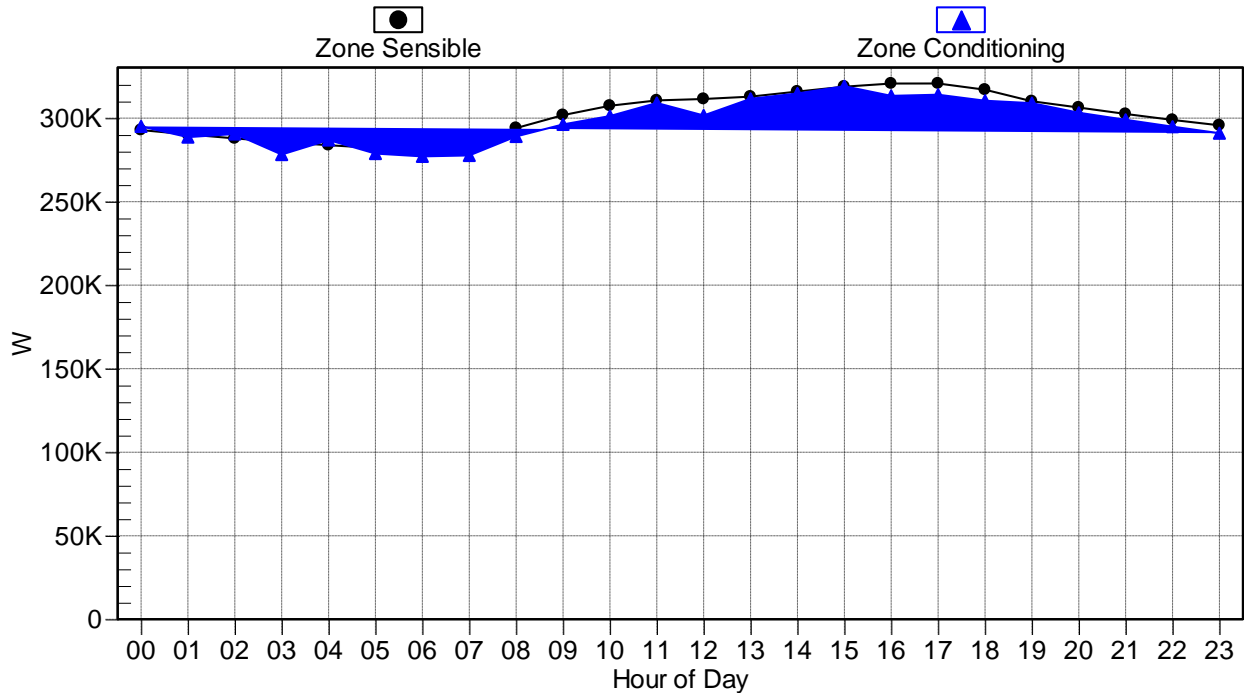
ZONE: Zone 1 DESIGN MONTH: JUNE									
Hour	OA TEMP (°C)	ZONE TEMP (°C)	RH (%)	ZONE AIRFLOW (L/s)	ZONE SENSIBLE LOAD (W)	ZONE COND (W)	TERMINAL COOLING COIL (W)	TERMINAL HEATING COIL (W)	ZONE HEATING UNIT (W)
0000	26.5	24.5	69	29497.2	292814.7	295072.5	0.0	0.0	0.0
0100	26.1	24.6	70	29497.2	290234.7	288607.9	0.0	0.0	0.0
0200	25.6	24.5	70	29497.2	287848.1	290502.1	0.0	0.0	0.0
0300	25.2	24.7	71	29497.2	285696.5	278184.9	0.0	0.0	0.0
0400	25.0	24.5	70	29497.2	283762.1	286886.7	0.0	0.0	0.0
0500	24.9	24.6	71	29497.2	282110.8	278774.8	0.0	0.0	0.0
0600	25.1	24.6	71	29497.2	280825.4	277104.9	0.0	0.0	0.0
0700	25.5	24.7	71	29497.2	282051.3	277638.7	0.0	0.0	0.0
0800	26.3	24.7	70	29497.2	294059.9	289041.9	0.0	0.0	0.0
0900	27.5	24.7	69	29497.2	301814.1	296213.2	0.0	0.0	0.0
1000	28.8	24.7	68	29497.2	307418.1	301225.8	0.0	0.0	0.0
1100	30.4	24.6	67	29497.2	310599.4	309062.1	0.0	0.0	0.0
1200	31.8	24.8	68	29497.2	311454.5	301559.5	0.0	0.0	0.0
1300	32.9	24.6	67	29497.2	312861.7	311556.0	0.0	0.0	0.0
1400	33.6	24.6	66	29497.2	315873.1	314750.4	0.0	0.0	0.0
1500	33.9	24.5	66	29497.2	318827.6	319118.4	0.0	0.0	0.0
1600	33.6	24.7	66	29497.2	320699.9	313314.9	0.0	0.0	0.0
1700	33.0	24.7	66	29497.2	320742.9	314013.6	0.0	0.0	0.0
1800	32.0	24.7	67	29497.2	317015.2	310427.0	0.0	0.0	0.0
1900	30.8	24.6	67	29497.2	310092.4	308954.1	0.0	0.0	0.0
2000	29.7	24.6	68	29497.2	306313.6	303204.7	0.0	0.0	0.0
2100	28.7	24.7	68	29497.2	302496.8	298991.1	0.0	0.0	0.0
2200	27.8	24.7	69	29497.2	298922.8	294863.4	0.0	0.0	0.0
2300	27.0	24.7	70	29497.2	295707.3	290989.9	0.0	0.0	0.0

Hourly Zone Design Day Loads for Level 08

UTAR Sungai Long Campus

Zone: Zone 1

Data for June



Zone Sizing Summary for Level 09

UTAR Sungai Long Campus

Air System Information

Air System Name **Level 09**
 Equipment Class **CW AHU**
 Air System Type **SZCAV**

Number of zones **1**
 Floor Area **3171.7** m²
 Location **Kuala Lumpur, Malaysia**

Sizing Calculation Information

Calculation Months **Jan to Dec**
 Sizing Data **Calculated**

Zone L/s Sizing **Sum of space airflow rates**
 Space L/s Sizing **Individual peak space loads**

Zone Sizing Data

Zone Name	Maximum Cooling Sensible (kW)	Design Airflow (L/s)	Minimum Airflow (L/s)	Time of Peak Load	Maximum Heating Load (kW)	Zone Floor Area (m ²)	Zone L/(s-m ²)
Zone 1	329.3	29497	29497	Dec 1600	0.0	3171.7	9.30

Zone Terminal Sizing Data

No Zone Terminal Sizing Data required for this system.

Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (kW)	Time of Load	Air Flow (L/s)	Heating Load (kW)	Floor Area (m ²)	Space L/(s-m ²)
Zone 1							
LV9 - FES FGO(1)	1	17.5	Jun 1600	1540	0.0	175.0	8.80
LV9 - lecturer's offi(1)	1	266.8	Dec 1700	23461	0.0	2500.0	9.38
Lv9 concourse(1)	1	12.7	Jan 2300	1118	0.0	154.0	7.26
Lv9 corridor(1)	1	2.3	Jan 2300	203	0.0	28.0	7.26
Lv9 FES Lab 39(1)	1	29.1	Sep 1000	2560	0.0	230.0	11.13
Lv9 Lift lobby 1(1)	1	1.7	Jan 2300	145	0.0	20.0	7.26
Lv9 Lift lobby 2(1)	1	4.0	Jan 2300	349	0.0	48.0	7.26
Lv9corridor2(1)	1	1.4	Jan 2300	121	0.0	16.7	7.26

Zone Design Load Summary for Level 09

UTAR Sungai Long Campus

Zone 1	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Dec 1600 COOLING OA DB / WB 29.2 °C / 22.7 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C		
	OCCUPIED T-STAT 23.9 °C			OCCUPIED T-STAT 21.1 °C		
ZONE LOADS	Details	Sensible (W)	Latent (W)	Details	Sensible (W)	Latent (W)
Window & Skylight Solar Loads	358 m ²	51623	-	358 m ²	-	-
Wall Transmission	363 m ²	11289	-	363 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	358 m ²	4491	-	358 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	840 m ²	0	-	840 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	34140 W	34137	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	3172	227727	190554	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	329266	190554	-	0	0

Space Design Load Summary for Level 09

UTAR Sungai Long Campus

TABLE 1.1.A. COMPONENT LOADS FOR SPACE " LV9 - FES FGO(1) " IN ZONE " Zone 1 "						
	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jun 1600 COOLING OA DB / WB 33.6 °C / 25.5 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
SPACE LOADS	Details	Sensible (W)	Latent (W)	Details	Sensible (W)	Latent (W)
Window & Skylight Solar Loads	13 m ²	2021	-	13 m ²	-	-
Wall Transmission	14 m ²	693	-	14 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	13 m ²	350	-	13 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	0 m ²	0	-	0 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	1884 W	1883	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	175	12565	10514	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	17512	10514	-	0	0

TABLE 1.1.B. ENVELOPE LOADS FOR SPACE " LV9 - FES FGO(1) " IN ZONE " Zone 1 "						
	Area	U-Value	Shade	COOLING	COOLING	HEATING
	(m ²)	(W/(m ² -°K))	Coeff.	TRANS (W)	SOLAR (W)	TRANS (W)
N EXPOSURE						
WALL	14	3.041	-	693	-	0
WINDOW 1	13	3.237	0.717	350	2021	0

Space Design Load Summary for Level 09

UTAR Sungai Long Campus

TABLE 1.2.A. COMPONENT LOADS FOR SPACE " LV9 - lecturer's offi(1) " IN ZONE " Zone 1 "

SPACE LOADS	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Dec 1700 COOLING OA DB / WB 28.5 °C / 22.5 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
	Details	Sensible (W)	Latent (W)	Details	Sensible (W)	Latent (W)
Window & Skylight Solar Loads	300 m ²	46289	-	300 m ²	-	-
Wall Transmission	305 m ²	10658	-	305 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	300 m ²	3440	-	300 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	0 m ²	0	-	0 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	26910 W	26907	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	2500	179499	150199	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	266793	150199	-	0	0

TABLE 1.2.B. ENVELOPE LOADS FOR SPACE " LV9 - lecturer's offi(1) " IN ZONE " Zone 1 "

	Area (m ²)	U-Value (W/(m ² -°K))	Shade Coeff.	COOLING	COOLING	HEATING
				TRANS	SOLAR	TRANS
				(W)	(W)	(W)
N EXPOSURE						
WALL	21	3.041	-	323	-	0
WINDOW 1	20	3.237	0.717	229	697	0
E EXPOSURE						
WALL	93	3.041	-	2338	-	0
WINDOW 1	100	3.237	0.717	1147	10092	0
S EXPOSURE						
WALL	126	3.041	-	5703	-	0
WINDOW 1	120	3.237	0.717	1376	23632	0
W EXPOSURE						
WALL	65	3.041	-	2293	-	0
WINDOW 1	60	3.237	0.717	688	11868	0

Space Design Load Summary for Level 09

UTAR Sungai Long Campus

TABLE 1.3.A. COMPONENT LOADS FOR SPACE "Lv9 concourse(1)" IN ZONE "Zone 1"

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jan 2300 COOLING OA DB / WB 22.0 °C / 20.2 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible (W)	Latent (W)		Sensible (W)	Latent (W)
SPACE LOADS	Details			Details		
Window & Skylight Solar Loads	0 m ²	0	-	0 m ²	-	-
Wall Transmission	0 m ²	0	-	0 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	0 m ²	0	-	0 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	140 m ²	0	-	140 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	1658 W	1658	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	154	11057	9252	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	12715	9252	-	0	0

TABLE 1.3.B. ENVELOPE LOADS FOR SPACE "Lv9 concourse(1)" IN ZONE "Zone 1"

				COOLING TRANS	COOLING SOLAR	HEATING TRANS
	Area (m ²)	U-Value (W/(m ² -°K))	Shade Coeff.	(W)	(W)	(W)

Space Design Load Summary for Level 09

UTAR Sungai Long Campus

TABLE 1.4.A. COMPONENT LOADS FOR SPACE "Lv9 corridor(1)" IN ZONE "Zone 1"

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jan 2300 COOLING OA DB / WB 22.0 °C / 20.2 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible (W)	Latent (W)		Sensible (W)	Latent (W)
SPACE LOADS	Details			Details		
Window & Skylight Solar Loads	0 m ²	0	-	0 m ²	-	-
Wall Transmission	0 m ²	0	-	0 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	0 m ²	0	-	0 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	140 m ²	0	-	140 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	301 W	301	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	28	2010	1682	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	2312	1682	-	0	0

TABLE 1.4.B. ENVELOPE LOADS FOR SPACE "Lv9 corridor(1)" IN ZONE "Zone 1"

				COOLING	COOLING	HEATING
				TRANS	SOLAR	TRANS
				(W)	(W)	(W)
	Area	U-Value	Shade			
	(m ²)	(W/(m ² -°K))	Coeff.			

Space Design Load Summary for Level 09

UTAR Sungai Long Campus

TABLE 1.5.A. COMPONENT LOADS FOR SPACE "Lv9 FES Lab 39(1)" IN ZONE "Zone 1"

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Sep 1000 COOLING OA DB / WB 28.3 °C / 23.7 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible (W)	Latent (W)		Sensible (W)	Latent (W)
SPACE LOADS	Details			Details		
Window & Skylight Solar Loads	45 m ²	8204	-	45 m ²	-	-
Wall Transmission	44 m ²	1324	-	44 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	45 m ²	587	-	45 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	140 m ²	0	-	140 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	2476 W	2476	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	230	16514	13818	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	29106	13818	-	0	0

TABLE 1.5.B. ENVELOPE LOADS FOR SPACE "Lv9 FES Lab 39(1)" IN ZONE "Zone 1"

				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m ²)	(W/(m ² -°K))	Coeff.	(W)	(W)	(W)
E EXPOSURE						
WALL	44	3.041	-	1324	-	0
WINDOW 1	45	3.237	0.717	587	8204	0

Space Design Load Summary for Level 09

UTAR Sungai Long Campus

TABLE 1.6.A. COMPONENT LOADS FOR SPACE "Lv9 Lift lobby 1(1)" IN ZONE "Zone 1"

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jan 2300 COOLING OA DB / WB 22.0 °C / 20.2 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible (W)	Latent (W)		Sensible (W)	Latent (W)
SPACE LOADS	Details			Details		
Window & Skylight Solar Loads	0 m ²	0	-	0 m ²	-	-
Wall Transmission	0 m ²	0	-	0 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	0 m ²	0	-	0 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	140 m ²	0	-	140 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	215 W	215	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	20	1436	1202	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	1651	1202	-	0	0

TABLE 1.6.B. ENVELOPE LOADS FOR SPACE "Lv9 Lift lobby 1(1)" IN ZONE "Zone 1"

				COOLING	COOLING	HEATING
				TRANS	SOLAR	TRANS
				(W)	(W)	(W)
	Area	U-Value	Shade			
	(m ²)	(W/(m ² -°K))	Coeff.			

Space Design Load Summary for Level 09

UTAR Sungai Long Campus

TABLE 1.7.A. COMPONENT LOADS FOR SPACE "Lv9 Lift lobby 2(1)" IN ZONE "Zone 1"

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jan 2300 COOLING OA DB / WB 22.0 °C / 20.2 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible (W)	Latent (W)		Sensible (W)	Latent (W)
SPACE LOADS	Details			Details		
Window & Skylight Solar Loads	0 m ²	0	-	0 m ²	-	-
Wall Transmission	0 m ²	0	-	0 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	0 m ²	0	-	0 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	140 m ²	0	-	140 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	517 W	517	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	48	3446	2884	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	3963	2884	-	0	0

TABLE 1.7.B. ENVELOPE LOADS FOR SPACE "Lv9 Lift lobby 2(1)" IN ZONE "Zone 1"

				COOLING TRANS	COOLING SOLAR	HEATING TRANS
	Area (m ²)	U-Value (W/(m ² -°K))	Shade Coeff.	(W)	(W)	(W)

Space Design Load Summary for Level 09

UTAR Sungai Long Campus

TABLE 1.8.A. COMPONENT LOADS FOR SPACE "Lv9corridor2(1)" IN ZONE "Zone 1"

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jan 2300 COOLING OA DB / WB 22.0 °C / 20.2 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible (W)	Latent (W)		Sensible (W)	Latent (W)
SPACE LOADS	Details			Details		
Window & Skylight Solar Loads	0 m ²	0	-	0 m ²	-	-
Wall Transmission	0 m ²	0	-	0 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	0 m ²	0	-	0 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	140 m ²	0	-	140 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	180 W	180	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	17	1199	1003	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	1379	1003	-	0	0

TABLE 1.8.B. ENVELOPE LOADS FOR SPACE "Lv9corridor2(1)" IN ZONE "Zone 1"

				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m ²)	(W/(m ² -°K))	Coeff.	(W)	(W)	(W)

Hourly Zone Loads for Level 09

UTAR Sungai Long Campus

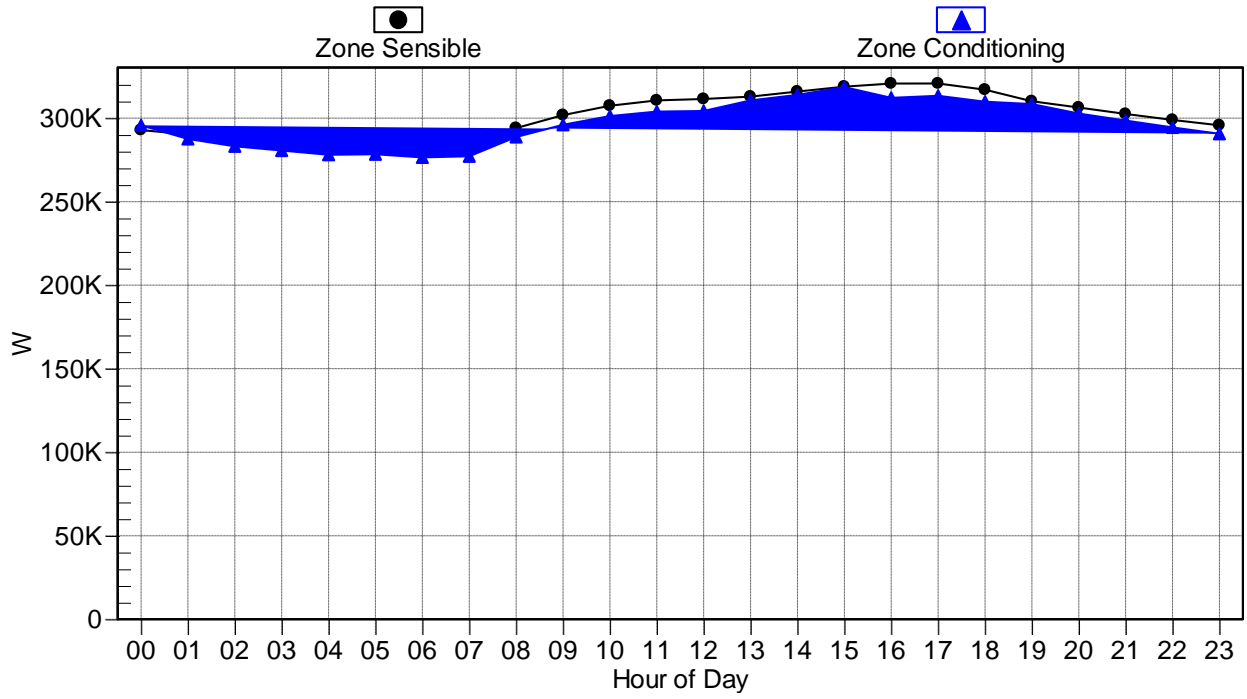
ZONE: Zone 1 DESIGN MONTH: JUNE									
Hour	OA TEMP (°C)	ZONE TEMP (°C)	RH (%)	ZONE AIRFLOW (L/s)	ZONE SENSIBLE LOAD (W)	ZONE COND (W)	TERMINAL COOLING COIL (W)	TERMINAL HEATING COIL (W)	ZONE HEATING UNIT (W)
0000	26.5	24.4	69	29497.2	292814.7	295672.8	0.0	0.0	0.0
0100	26.1	24.6	70	29497.2	290234.7	287547.6	0.0	0.0	0.0
0200	25.6	24.6	71	29497.2	287848.1	283127.2	0.0	0.0	0.0
0300	25.2	24.6	71	29497.2	285696.5	280588.5	0.0	0.0	0.0
0400	25.0	24.7	71	29497.2	283762.1	278083.3	0.0	0.0	0.0
0500	24.9	24.6	71	29497.2	282110.8	278384.9	0.0	0.0	0.0
0600	25.1	24.6	71	29497.2	280825.4	276476.1	0.0	0.0	0.0
0700	25.5	24.6	71	29497.2	282051.2	277147.5	0.0	0.0	0.0
0800	26.3	24.7	70	29497.2	294059.9	288695.4	0.0	0.0	0.0
0900	27.5	24.7	69	29497.2	301814.1	296020.7	0.0	0.0	0.0
1000	28.8	24.7	68	29497.2	307418.1	301199.5	0.0	0.0	0.0
1100	30.4	24.7	68	29497.2	310599.4	303923.0	0.0	0.0	0.0
1200	31.8	24.7	68	29497.2	311454.5	304248.6	0.0	0.0	0.0
1300	32.9	24.6	67	29497.2	312861.7	310576.9	0.0	0.0	0.0
1400	33.6	24.6	66	29497.2	315873.1	313914.0	0.0	0.0	0.0
1500	33.9	24.5	66	29497.2	318827.6	318543.9	0.0	0.0	0.0
1600	33.6	24.8	66	29497.2	320699.9	312125.7	0.0	0.0	0.0
1700	33.0	24.7	66	29497.2	320742.9	313370.7	0.0	0.0	0.0
1800	32.0	24.7	67	29497.2	317015.2	309808.9	0.0	0.0	0.0
1900	30.8	24.6	67	29497.2	310092.4	308429.8	0.0	0.0	0.0
2000	29.7	24.6	68	29497.2	306313.6	302714.7	0.0	0.0	0.0
2100	28.7	24.7	69	29497.2	302496.8	298536.2	0.0	0.0	0.0
2200	27.8	24.7	69	29497.2	298922.8	294441.6	0.0	0.0	0.0
2300	27.0	24.7	70	29497.2	295707.3	290599.7	0.0	0.0	0.0

Hourly Zone Design Day Loads for Level 09

UTAR Sungai Long Campus

Zone: Zone 1

Data for June



Zone Sizing Summary for Level 10

UTAR Sungai Long Campus

Air System Information

Air System Name **Level 10**
 Equipment Class **CW AHU**
 Air System Type **SZCAV**

Number of zones **1**
 Floor Area **2812.0** m²
 Location **Kuala Lumpur, Malaysia**

Sizing Calculation Information

Calculation Months **Jan to Dec**
 Sizing Data **Calculated**

Zone L/s Sizing **Sum of space airflow rates**
 Space L/s Sizing **Individual peak space loads**

Zone Sizing Data

Zone Name	Maximum Cooling Sensible (kW)	Design Airflow (L/s)	Minimum Airflow (L/s)	Time of Peak Load	Maximum Heating Load (kW)	Zone Floor Area (m ²)	Zone L/(s-m ²)
Zone 1	288.8	26466	26466	Nov 1700	0.0	2812.0	9.41

Zone Terminal Sizing Data

No Zone Terminal Sizing Data required for this system.

Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (kW)	Time of Load	Air Flow (L/s)	Heating Load (kW)	Floor Area (m ²)	Space L/(s-m ²)
Zone 1							
Lv 10 Lift Lobby 1	1	2.5	Jan 2300	218	0.0	30.0	7.26
LV_10 Chairman's Room	1	113.9	Dec 1500	10014	0.0	1069.0	9.37
LV_10 Corridor	1	1.2	Jan 2300	109	0.0	15.0	7.26
LV_10 Corridor 2	1	25.6	Jan 2300	2251	0.0	310.0	7.26
LV_10 Councourse	1	11.1	Jan 2300	973	0.0	134.0	7.26
LV_10 Directors room 1	1	3.0	Jan 2300	261	0.0	36.0	7.26
LV_10 Directors room 2	1	84.6	Oct 1700	7437	0.0	725.0	10.26
LV_10 Lift lobby 2	1	3.3	Jan 2300	290	0.0	40.0	7.26
LV_10 meeting and confer	1	14.6	Sep 1100	1285	0.0	122.0	10.53
LV_10 Presidents room	1	24.4	Jun 1500	2145	0.0	197.0	10.89
LV_10 ROG Office	1	16.9	Jun 1600	1483	0.0	134.0	11.06

Zone Design Load Summary for Level 10

UTAR Sungai Long Campus

Zone 1	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Nov 1700 COOLING OA DB / WB 29.7 °C / 23.6 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C		
	OCCUPIED T-STAT 23.9 °C			OCCUPIED T-STAT 21.1 °C		
ZONE LOADS	Details	Sensible (W)	Latent (W)	Details	Sensible (W)	Latent (W)
Window & Skylight Solar Loads	300 m ²	41359	-	300 m ²	-	-
Wall Transmission	310 m ²	10730	-	310 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	300 m ²	4519	-	300 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	140 m ²	0	-	140 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	30268 W	30265	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	2812	201900	168944	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	288773	168944	-	0	0

Space Design Load Summary for Level 10

UTAR Sungai Long Campus

TABLE 1.1.A. COMPONENT LOADS FOR SPACE " Lv 10 Lift Lobby 1 " IN ZONE " Zone 1 "

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jan 2300 COOLING OA DB / WB 22.0 °C / 20.2 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible (W)	Latent (W)		Sensible (W)	Latent (W)
SPACE LOADS	Details			Details		
Window & Skylight Solar Loads	0 m ²	0	-	0 m ²	-	-
Wall Transmission	0 m ²	0	-	0 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	0 m ²	0	-	0 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	140 m ²	0	-	140 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	323 W	323	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	30	2154	1802	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	2477	1802	-	0	0

TABLE 1.1.B. ENVELOPE LOADS FOR SPACE " Lv 10 Lift Lobby 1 " IN ZONE " Zone 1 "

				COOLING	COOLING	HEATING
				TRANS	SOLAR	TRANS
				(W)	(W)	(W)
	Area	U-Value	Shade			
	(m ²)	(W/(m ² -°K))	Coeff.			

Space Design Load Summary for Level 10

UTAR Sungai Long Campus

TABLE 1.2.A. COMPONENT LOADS FOR SPACE " LV_10 Chairman's Room " IN ZONE " Zone 1 "

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Dec 1500 COOLING OA DB / WB 29.4 °C / 22.8 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible (W)	Latent (W)		Sensible (W)	Latent (W)
SPACE LOADS	Details			Details		
Window & Skylight Solar Loads	120 m ²	19734	-	120 m ²	-	-
Wall Transmission	128 m ²	4345	-	128 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	120 m ²	1535	-	120 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	0 m ²	0	-	0 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	11507 W	11505	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	1069	76753	64225	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	113872	64225	-	0	0

TABLE 1.2.B. ENVELOPE LOADS FOR SPACE " LV_10 Chairman's Room " IN ZONE " Zone 1 "

				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m ²)	(W/(m ² -°K))	Coeff.	(W)	(W)	(W)
E EXPOSURE						
WALL	63	3.041	-	1748	-	0
WINDOW 1	50	3.237	0.717	640	5714	0
S EXPOSURE						
WALL	65	3.041	-	2597	-	0
WINDOW 1	70	3.237	0.717	895	14020	0

Space Design Load Summary for Level 10

UTAR Sungai Long Campus

TABLE 1.3.A. COMPONENT LOADS FOR SPACE " LV_10 Corridor " IN ZONE " Zone 1 "

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jan 2300 COOLING OA DB / WB 22.0 °C / 20.2 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible (W)	Latent (W)		Sensible (W)	Latent (W)
SPACE LOADS	Details			Details		
Window & Skylight Solar Loads	0 m ²	0	-	0 m ²	-	-
Wall Transmission	0 m ²	0	-	0 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	0 m ²	0	-	0 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	0 m ²	0	-	0 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	161 W	161	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	15	1077	901	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	1238	901	-	0	0

TABLE 1.3.B. ENVELOPE LOADS FOR SPACE " LV_10 Corridor " IN ZONE " Zone 1 "

				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m ²)	(W/(m ² -°K))	Coeff.	(W)	(W)	(W)

Space Design Load Summary for Level 10

UTAR Sungai Long Campus

TABLE 1.4.A. COMPONENT LOADS FOR SPACE " LV_10 Corridor 2 " IN ZONE " Zone 1 "

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jan 2300 COOLING OA DB / WB 22.0 °C / 20.2 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible (W)	Latent (W)		Sensible (W)	Latent (W)
SPACE LOADS	Details			Details		
Window & Skylight Solar Loads	0 m ²	0	-	0 m ²	-	-
Wall Transmission	0 m ²	0	-	0 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	0 m ²	0	-	0 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	0 m ²	0	-	0 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	3337 W	3337	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	310	22258	18625	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	25595	18625	-	0	0

TABLE 1.4.B. ENVELOPE LOADS FOR SPACE " LV_10 Corridor 2 " IN ZONE " Zone 1 "

				COOLING TRANS	COOLING SOLAR	HEATING TRANS
	Area (m ²)	U-Value (W/(m ² -°K))	Shade Coeff.	(W)	(W)	(W)

Space Design Load Summary for Level 10

UTAR Sungai Long Campus

TABLE 1.5.A. COMPONENT LOADS FOR SPACE " LV_10 Councourse " IN ZONE " Zone 1 "

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jan 2300 COOLING OA DB / WB 22.0 °C / 20.2 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible (W)	Latent (W)		Sensible (W)	Latent (W)
SPACE LOADS	Details			Details		
Window & Skylight Solar Loads	0 m ²	0	-	0 m ²	-	-
Wall Transmission	0 m ²	0	-	0 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	0 m ²	0	-	0 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	0 m ²	0	-	0 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	1442 W	1442	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	134	9621	8051	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	11064	8051	-	0	0

TABLE 1.5.B. ENVELOPE LOADS FOR SPACE " LV_10 Councourse " IN ZONE " Zone 1 "

				COOLING	COOLING	HEATING
				TRANS	SOLAR	TRANS
				(W)	(W)	(W)
	Area	U-Value	Shade			
	(m ²)	(W/(m ² -°K))	Coeff.			

Space Design Load Summary for Level 10

UTAR Sungai Long Campus

TABLE 1.6.A. COMPONENT LOADS FOR SPACE " LV_10 Directors room 1 " IN ZONE " Zone 1 "

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jan 2300 COOLING OA DB / WB 22.0 °C / 20.2 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible (W)	Latent (W)		Sensible (W)	Latent (W)
SPACE LOADS	Details			Details		
Window & Skylight Solar Loads	0 m ²	0	-	0 m ²	-	-
Wall Transmission	0 m ²	0	-	0 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	0 m ²	0	-	0 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	0 m ²	0	-	0 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	388 W	387	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	36	2585	2163	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	2972	2163	-	0	0

TABLE 1.6.B. ENVELOPE LOADS FOR SPACE " LV_10 Directors room 1 " IN ZONE " Zone 1 "

				COOLING TRANS	COOLING SOLAR	HEATING TRANS
	Area (m ²)	U-Value (W/(m ² -°K))	Shade Coeff.	(W)	(W)	(W)

Space Design Load Summary for Level 10

UTAR Sungai Long Campus

TABLE 1.7.A. COMPONENT LOADS FOR SPACE " LV_10 Directors room 2 " IN ZONE " Zone 1 "

SPACE LOADS	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Oct 1700 COOLING OA DB / WB 31.3 °C / 24.2 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
	Details	Sensible (W)	Latent (W)	Details	Sensible (W)	Latent (W)
Window & Skylight Solar Loads	95 m ²	18315	-	95 m ²	-	-
Wall Transmission	97 m ²	4460	-	97 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	95 m ²	1944	-	95 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	0 m ²	0	-	0 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	7804 W	7803	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	725	52055	43558	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	84575	43558	-	0	0

TABLE 1.7.B. ENVELOPE LOADS FOR SPACE " LV_10 Directors room 2 " IN ZONE " Zone 1 "

W EXPOSURE	Area (m ²)	U-Value (W/(m ² -°K))	Shade Coeff.	COOLING	COOLING	HEATING
				TRANS	SOLAR	TRANS
				(W)	(W)	(W)
WALL	82	3.041	-	3866	-	0
WINDOW 1	80	3.237	0.717	1637	16912	0
S EXPOSURE						
WALL	15	3.041	-	594	-	0
WINDOW 1	15	3.237	0.717	307	1403	0

Space Design Load Summary for Level 10

UTAR Sungai Long Campus

TABLE 1.8.A. COMPONENT LOADS FOR SPACE " LV_10 Lift lobby 2 " IN ZONE " Zone 1 "

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jan 2300 COOLING OA DB / WB 22.0 °C / 20.2 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible (W)	Latent (W)		Sensible (W)	Latent (W)
SPACE LOADS	Details			Details		
Window & Skylight Solar Loads	0 m ²	0	-	0 m ²	-	-
Wall Transmission	0 m ²	0	-	0 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	0 m ²	0	-	0 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	0 m ²	0	-	0 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	431 W	431	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	40	2872	2403	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	3303	2403	-	0	0

TABLE 1.8.B. ENVELOPE LOADS FOR SPACE " LV_10 Lift lobby 2 " IN ZONE " Zone 1 "

				COOLING TRANS	COOLING SOLAR	HEATING TRANS
	Area (m ²)	U-Value (W/(m ² -°K))	Shade Coeff.	(W)	(W)	(W)

Space Design Load Summary for Level 10

UTAR Sungai Long Campus

TABLE 1.9.A. COMPONENT LOADS FOR SPACE " LV_10 meeting and confer " IN ZONE " Zone 1 "

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Sep 1100 COOLING OA DB / WB 29.8 °C / 24.1 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible (W)	Latent (W)		Sensible (W)	Latent (W)
SPACE LOADS	Details			Details		
Window & Skylight Solar Loads	20 m ²	3443	-	20 m ²	-	-
Wall Transmission	20 m ²	769	-	20 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	20 m ²	330	-	20 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	0 m ²	0	-	0 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	1313 W	1313	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	122	8759	7330	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	14614	7330	-	0	0

TABLE 1.9.B. ENVELOPE LOADS FOR SPACE " LV_10 meeting and confer " IN ZONE " Zone 1 "

					COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS	
	(m ²)	(W/(m ² -°K))	Coeff.	(W)	(W)	(W)	
E EXPOSURE							
WALL	20	3.041	-	769	-	0	
WINDOW 1	20	3.237	0.717	330	3443	0	

Space Design Load Summary for Level 10

UTAR Sungai Long Campus

TABLE 1.10.A. COMPONENT LOADS FOR SPACE " LV_10 Presidents room " IN ZONE " Zone 1 "

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jun 1500 COOLING OA DB / WB 33.9 °C / 25.6 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible (W)	Latent (W)		Sensible (W)	Latent (W)
SPACE LOADS	Details			Details		
Window & Skylight Solar Loads	40 m ²	5305	-	40 m ²	-	-
Wall Transmission	40 m ²	1738	-	40 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	40 m ²	1087	-	40 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	0 m ²	0	-	0 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	2120 W	2120	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	197	14144	11836	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	24394	11836	-	0	0

TABLE 1.10.B. ENVELOPE LOADS FOR SPACE " LV_10 Presidents room " IN ZONE " Zone 1 "

				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m ²)	(W/(m ² -°K))	Coeff.	(W)	(W)	(W)
N EXPOSURE						
WALL	20	3.041	-	926	-	0
WINDOW 1	20	3.237	0.717	544	3056	0
E EXPOSURE						
WALL	20	3.041	-	812	-	0
WINDOW 1	20	3.237	0.717	544	2249	0

Space Design Load Summary for Level 10

UTAR Sungai Long Campus

TABLE 1.11.A. COMPONENT LOADS FOR SPACE " LV_10 ROG Office " IN ZONE " Zone 1 "

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jun 1600 COOLING OA DB / WB 33.6 °C / 25.5 °C OCCUPIED T-STAT 23.9 °C			HEATING DATA AT DES HTG HEATING OA DB / WB 21.7 °C / 15.2 °C OCCUPIED T-STAT 21.1 °C		
		Sensible (W)	Latent (W)		Sensible (W)	Latent (W)
SPACE LOADS	Details			Details		
Window & Skylight Solar Loads	25 m ²	3886	-	25 m ²	-	-
Wall Transmission	25 m ²	1237	-	25 m ²	0	-
Roof Transmission	0 m ²	0	-	0 m ²	0	-
Window Transmission	25 m ²	673	-	25 m ²	0	-
Skylight Transmission	0 m ²	0	-	0 m ²	0	-
Door Loads	0 m ²	0	-	0 m ²	0	-
Floor Transmission	0 m ²	0	-	0 m ²	0	-
Partitions	0 m ²	0	-	0 m ²	0	-
Ceiling	0 m ²	0	-	0 m ²	0	-
Overhead Lighting	1442 W	1442	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	134	9621	8051	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	16860	8051	-	0	0

TABLE 1.11.B. ENVELOPE LOADS FOR SPACE " LV_10 ROG Office " IN ZONE " Zone 1 "

				COOLING	COOLING	HEATING
	Area	U-Value	Shade	TRANS	SOLAR	TRANS
	(m ²)	(W/(m ² -°K))	Coeff.	(W)	(W)	(W)
N EXPOSURE						
WALL	25	3.041	-	1237	-	0
WINDOW 1	25	3.237	0.717	673	3886	0

Hourly Zone Loads for Level 10

UTAR Sungai Long Campus

ZONE: Zone 1 DESIGN MONTH: JUNE									
Hour	OA TEMP (°C)	ZONE TEMP (°C)	RH (%)	ZONE AIRFLOW (L/s)	ZONE SENSIBLE LOAD (W)	ZONE COND (W)	TERMINAL COOLING COIL (W)	TERMINAL HEATING COIL (W)	ZONE HEATING UNIT (W)
0000	26.5	24.6	70	26466.3	260099.5	258137.4	0.0	0.0	0.0
0100	26.1	24.7	70	26466.3	257757.7	254755.7	0.0	0.0	0.0
0200	25.6	24.6	71	26466.3	255601.8	253564.0	0.0	0.0	0.0
0300	25.2	24.7	71	26466.3	253661.4	250188.0	0.0	0.0	0.0
0400	25.0	24.5	71	26466.3	251918.0	255010.1	0.0	0.0	0.0
0500	24.9	24.6	71	26466.3	250424.2	249440.7	0.0	0.0	0.0
0600	25.1	24.6	71	26466.3	249247.8	247465.6	0.0	0.0	0.0
0700	25.5	24.7	71	26466.3	249901.7	246880.3	0.0	0.0	0.0
0800	26.3	24.7	70	26466.3	258337.0	254076.0	0.0	0.0	0.0
0900	27.5	24.4	69	26466.3	264128.1	269443.5	0.0	0.0	0.0
1000	28.8	24.6	68	26466.3	268696.3	267769.1	0.0	0.0	0.0
1100	30.4	24.7	68	26466.3	271776.8	267148.3	0.0	0.0	0.0
1200	31.8	24.6	68	26466.3	273334.8	272069.2	0.0	0.0	0.0
1300	32.9	24.7	67	26466.3	275161.4	271486.5	0.0	0.0	0.0
1400	33.6	24.7	67	26466.3	278779.0	274196.0	0.0	0.0	0.0
1500	33.9	24.8	67	26466.3	282677.2	276838.7	0.0	0.0	0.0
1600	33.6	24.8	66	26466.3	285597.4	280044.1	0.0	0.0	0.0
1700	33.0	24.8	66	26466.3	286579.6	281314.3	0.0	0.0	0.0
1800	32.0	24.8	67	26466.3	283234.8	278096.3	0.0	0.0	0.0
1900	30.8	24.6	67	26466.3	275988.7	276606.3	0.0	0.0	0.0
2000	29.7	24.7	68	26466.3	272524.5	268052.4	0.0	0.0	0.0
2100	28.7	24.5	68	26466.3	268980.0	273362.6	0.0	0.0	0.0
2200	27.8	24.6	69	26466.3	265684.3	266750.8	0.0	0.0	0.0
2300	27.0	24.4	69	26466.3	262739.2	268447.4	0.0	0.0	0.0

Hourly Zone Design Day Loads for Level 10

UTAR Sungai Long Campus

Zone: Zone 1

Data for June

