

CHAPTER III ARCHITECTURAL PROGRAM ANALYSIS

3.1 BUILDING FUNCTION ANALYSIS

3.1.1 CHARACTERISTIC of USERS

A. Refugees

There are more than 13,000 asylum seekers in Indonesia, and most of them are Afghans with a total of 7,583 refugees, followed by Somalis, Iraqis, and Myanmar. From all refugees in Indonesia, the percentage of gender is 58% male and 42% female, and percentage based on age 73% are adults, and 27% are kids.² Refugees who arrive in Indonesia mostly are in a family, and only a few children are coming unaccompanied, but these children are sent to a foster family or shelter dedicated for unaccompanied kids. Refugees also tend to be socialized among themselves than socialized to the locals.

B. Official and Volunteer

- Staff

Staff can come from UNHCR or other international organizations. This staff can act as a translator, counselor, or connector to the main office. Right now, there are 70 staff of UNHCR separated in 6 cities in Indonesia

- Guardian

Guardian is a refugee who acts as a keeper for other refugees; these guardians are responsible for security and safety on the shelter and respond to the health or basic needs of the refugees because they are responsible for reporting it to the office.

² United Nations High Commissioner for Refugees, (2021), Laporan Statistik Bulanan Maret 2021, Jakarta, UNHCR Indonesia, hlm 1.

- Teacher

Teacher is volunteer or refugees that act a teacher in the learning center. Nationally standard for teacher and student is 1:32

- Healthcare staff

Healthcare staff includes doctors and nurses. According to the 2016 Indonesia humans rights act, the standard ratio for a doctor to the community is 1:2,500 and the ratio for a nurse to the community is 1:855.

C. Service

- Security

Security must maintain the security of the refugees and maintain refugees inside the housing

- Cleaning Staff

Cleaning staff has a duty to keep clean the office or the communal space of the housing

3.1.2 CAPACITY and ACTIVITIES of USERS

A. Refugees

The number of refugees in Jakarta is 7,137 per March 2021, but only 1,805 refugees are under the oversees of the Jakarta immigration detention center, and these refugees are placed in ten different locations throughout Greater Jakarta.

Table 3.1 Refugees Community Housing in Greater Jakarta
Source: Jakarta Detention Center

No	Location	Number of Refugees
1.	Mustika Bekasi, Bekasi	134
2.	Kost 40, Jakarta	72
3.	Maysa Kalibata, Jakarta	40
4.	Maysa kertamukti, Tangerang	97
5.	Maysa Cirendeu, Tangerang	48
6.	Pesona Gunung Indah, Tangerang	82
7.	Kost Tulip, Tangerang	197

8.	Paramount, Tangerang	876
9.	Wisma Duta	225
10.	Self-Accommodation	35
Total		1,805

From the table above, we can see that Jakarta Province is accommodating 371 refugees. With an assumption if Jakarta accommodates 371 refugees per 2021, with a growth of 10% annually. In the next five years, Jakarta will accommodate 600 refugees, through calculation :

- 2021-2022 = 371 refugees + 10% = 408
- 2022-2023 = 408 refugees + 10% = 448
- 2023-2024 = 448 refugees + 10% = 492
- 2024-2025 = 492 refugees + 10% = 541
- 2025-2026 = 541 refugees + 10% = 595

The social housing is expected can accommodate all the refugees in Jakarta Province in the next five years, with a total of 600 residents and among those, 73% are adults and 27% are children.

Activities for the refugees itself limited depends on the facility that is available in the accommodations. Refugees have a restricted area only on their accommodation; that is why their activities are usually doing their housework or socializing among refugees in their accommodation.

Table 3.2 Capacity and Activity of Refugees
Source: Personal Analysis

NO	USERS	CAPACITY	ACTIVITY	ROOM
1.	Adult	438	Arrive	Lobby
			Resting	Bedroom
			Eat and Drink	Dining room
			Cooking	Kitchen
			Laundry	Laundry
			Learning	Workshop

NO	USERS	CAPACITY	ACTIVITY	ROOM
			Praying	Prayer room
			Shower and defecate	Bathroom
			Leaving	Lobby
2	Children	162	Arrive	Lobby
			Resting	Bedroom
			Eat and Drink	Dining room
			Cooking	Kitchen
			Laundry	Laundry room
			Learning	Classroom
			Playing/Sport	Playground/Field
			Praying	Prayer room
			Shower and defecate	Bathroom
			Leaving	Lobby

B. Official and Volunteers

Official and volunteers are staff, teacher, healthcare staff or refugee's representative that helps refugees to meet their adequate living standard. Their activities in the social housing are to help the refugees with their specialty.

Table 3.3 Capacity and Activity of Official and Volunteers
Source: Personal Analysis

NO	USERS	CAPACITY	ACTIVITY	ROOM
1.	Staff	15	Arrive	Lobby
			Working	Office
			Receiving Guest	Lobby
			Meeting	Meeting room
			Eat and Drink	Break room
			Defecate	Toilet

NO	USERS	CAPACITY	ACTIVITY	ROOM
			Leaving	Parking area
2	Guardian	1	Working	Office
			Receiving Guest	Lobby
			Meeting	Meeting room
			Eat and Drink	Break room
			Defecate	Toilet
			Arrive	Lobby
3	Teacher	5	Working	Classroom
			Meeting	Meeting room
			Eat and Drink	Break room
			Defecate	Toilet
			Leaving	Parking area
			Arrive	Lobby
4	Healthcare Staff	1 doctor 2 nurses	Working	Exam room
			Register patient	Nurse station
			Redeem prescription	Storage room
			Eat and Drink	Break room
			Defecate	Toilet
			Leaving	Parking area
			Arrive	Lobby

C. Service

The service staff must maintain cleanliness or secure the social housing, so their activities depend on their duty.

Table 3.4 Capacity and Activity of Service
Source: Personal Analysis

NO	USERS	CAPACITY	ACTIVITY	ROOM
1.	Security	15	Arrive	Lobby
			Preparation	Security Room
			Patrols	-

NO	USERS	CAPACITY	ACTIVITY	ROOM
			Eat and Drink	Security Room
			Defecate	Toilet
			Leaving	Parking area
2	Cleaning Staff	6	Working	Office
			Preparation	Janitor
			Cleaning	-
			Eat and Drink	Break room
			Defecate	Toilet
			Leaving	Parking area

3.1.3 SPACE ANALYSIS

A. Space Requirement

The space requirement is analyzed based on the activity users doing in the room. The space requirement includes factors, such as:

- Space Characteristic divided into public, semi-public, and private
- Lighting Based on their needs, lighting from the natural or from artificial
- Air conditioning based on the wind circulation; needs natural air or artificial air
- Safety based on the possibility of fire and CCTV based on the needs of activities to be supervised
- Health is based on the need for normal humidity and a non-pollution room
- Acoustics based on needs a calm room or stable room

Below are the table of space requirement, for the descriptions is available on the attachment 1.

Table 3.5 Space Analysis
Source: Personal Analysis

No	Room	Characteristic	Lighting		Air		Safety		Health		Acoustics
			Natural	Artificial	Natural	Artificial	Fire	CCTV	Humidity	Pollution	
1.	Bedroom	Private	•	•	•	•			•	•	Calm
2.	Dining Room	Semi-public	•	•	•	•			•	•	Stable
3.	Kitchen	Semi-public	•	•	•		•		•	•	Stable
4.	Bathroom	Private		•	•				•	•	Stable
5.	Office	Semi-public	•	•	•	•		•	•	•	Stable
6.	Interview Room	Private	•	•	•	•		•	•	•	Calm
7.	Classroom	Private	•	•	•	•		•	•	•	Calm
8.	Exam Room	Private	•	•	•	•		•	•	•	Calm
9.	Nurse Station	Public	•	•	•	•		•	•	•	Stable
10.	Storage Room	Service		•	•			•	•	•	Stable
11.	Lobby	Public	•	•	•	•		•	•	•	Stable
12.	Prayer Room	Private	•	•	•	•	•	•	•	•	Calm
13.	Playground	Semi-public	•		•						
14.	Field	Semi-public	•		•						
15.	Toilet	Private		•	•				•	•	Stable
16.	Laundry	Service		•	•			•	•	•	Stable
17.	Security Room	Private	•	•	•	•		•	•	•	Stable
18.	Janitor	Private	•	•	•	•			•	•	Stable

B. Special Space Requirement

In order to accommodate the needs of the refugees, that is not only their basic needs but also their diversity such as religion, culture, mental health, recreation, and administration. Below is the requirement for the facilities that can complement their primary needs:

a) Multi-Faith Praying rooms

Multi-Faith Praying rooms are rooms or spaces for spiritual refreshment, exploration, quiet contemplation, and worship any religious persuasion and none. And to a design multi-faith room just like the name, it

needs to consider every religious requirement for praying (Practice & Design, n.d.), such as:

- Size of faith room

The size of a faith room depends on how many people will be expected to use it at any specific point in time. The requirements of Muslims are likely to be the most easily calculable since their daily prayer routines are usually undertaken at fixed times during the day, depending on the time of sunrise and sunset. There are also defined times for Jewish prayer at least twice a day, dependent again on dusk and dawn, although there is a degree of flexibility for Jewish prayer.

- Orientation of prayer area of faith room

There is no stated direction for prayer; However, Muslims must face the Ka'ba during prayer; Jews generally pray to face Jerusalem.

- Ritual washing area

Most religions have traditionally respected cleanliness; for Christian ritual practiced by Christian monks, which involved washing in a communal wash area known as a Lavatorium, has effectively been discontinued, being replaced today with a more casual tradition of washing hands before meals. Jews will wash their hands before prayer; however, this ritual is undertaken more like devotion to God and inner self-purification and less cleanliness. For Muslims, performed ritual cleansing ritual is named Wudu, performed by Muslims before undertaking Salat (prayer). Wudu requires the washing of some parts of the body, including the face, head, hands, arms, and feet, and this must be in clean, running water, except in certain exceptional circumstances where no water is available.

– Entrances

Entrances to the prayer room should be from the washing area (not toilets) and ideally at the rear of the room to allow discreet exit and entry by other users without interrupting those praying, performing Salat, or using the room for some other purpose.

b) Therapy Room

The therapy room is a room to improve the mental health of the refugees; the therapy room according to Sinclair (Sinclair, 2021) has two functions that aid the therapy. The first is to increase the trust toward the therapist and the second is to provide a safe place for the clients. To design a therapy room there are few criteria, namely :

- Intermediate distance (127 cm)
- seating arrangement with a choice of seats such as upright seats, lounge chairs, or cushions.
- The size of the room is not too small or not too large
- The use of warm, nurturing, and supportive colors
- Using non-fluorescent artificial lighting, for example, dim lighting (150 lux)
- Have access to a natural view

c) Interview Room

An interview room is a room for refugees to verify or use when they are interviewed for their status or when they need legal aid. This interview room has some design guidelines, namely :

- Room preserve refugees confidentiality
- The Room should have adequate partition, walls, or window
- Can accommodate from 3-4 persons
- Rooms should fully enclosed from outside
- Prevent Noises to enter the room

d) Field

For recreational and health purposes, sport is one of the options to achieve the goals. The choice of sports depends on the users; refugees mostly are Asian or middle eastern. According to the football association for a recreational purpose futsal court, the futsal court has a minimal 25 meters length and 15 meters wide, and it should be on a flat and hard surface. Besides that, futsal court can be transformed into another court such as basketball, netball, and handball.

e) Playground

The playground is outdoor area dedicated for children to played. Designing playground should not only think about a child but also thinking about every child, and to design a playground for all there are some criteria such as:

- Using a non-hard surface ground such as rubber
- Using a long durability material such as wood, steel, plastic, ropes
- Using a contrast color
- Using ramps instead of ladders or stairs
- Every equipment is completed with a guardrail or berries
- Every level has a high of 46 to 122 cm

3.1.4 SPACE DIMENSION

Dimension of the space is analyses using a layout completed with human circulation and furniture from the book human dimension (Panero & Zelnik, 1979). Below are the table of space dimension, for the layout is available on the attachment 2.

Table 3.6 Space Dimensions
Source: Personal Analysis

NO	ROOM	TOTAL OF ROOM	CAPACITY /room	ROOM DIMENSION	TOTAL AREA	SOURCE
HOUSING AREA						
1.	Bedroom	300	2	Room dimension: 10,5 m ²	3,150 m ²	HD +PA
2.	Kitchen and Family Area	300	2	Room dimension: 9 m ²	2,700 m ²	HD +PA
3.	Bathroom	300	1	Room dimension: 4 m ²	1,200 m ²	HD +PA
TOTAL AREA					7,050 m²	
COMMUNAL SPACE						
1.	Lobby	1	50	Room dimension: 66 m ²	66 m ²	HD +PA
2.	Prayer Room	6	15	Room dimension: 25 m ²	150 m ²	HD +PA
3.	Multi-Purpose Hall	1	100	Room dimension: 218,4 m ²	218,4 m ²	HD +PA
4.	Dining Area	1	50	Room dimension: 195 m ²	195 m ²	HD +PA
5.	Kitchen Area	1	10	Room dimension: 25 m ²	25 m ²	HD +PA
6.	Laundry	1	14	Room dimension: 20 m ²	20 m ²	HD +PA
7.	Toilet	4	5	Room dimension: 16 m ²	64 m ²	HD +PA
TOTAL AREA					738,4 m²	
OFFICE						
1.	Waiting Room	1	5	Room dimension: 21 m ²	21 m ²	HD +PA
2.	Private Office or Interview Room	3	3-4	Room dimension: 12 m ²	36 m ²	HD +PA
3.	Communal Office	1	15	Room dimension: 120 m ²	120 m ²	HD +PA
4.	Security Room	1	3-4	Room dimension: 44 m ²	44 m ²	HD +PA
5.	Break Room	2	10	Room dimension: 60 m ²	120 m ²	HD +PA
TOTAL AREA					341 m²	
LEARNING CENTER						
1.	Principal Office	1	3	Room dimension: 12 m ²	12 m ²	HD +PA
2.	Teacher Lounge	1	10	Room dimension: 60 m ²	60 m ²	HD +PA

NO	ROOM	TOTAL OF ROOM	CAPACITY /room	ROOM DIMENSION	TOTAL AREA	SOURCE
3.	Teacher Office	1	15	Room dimension: 120 m ²	120 m ²	HD +PA
4.	Classroom	10	30	Room dimension: 60 m ²	600 m ²	GR
TOTAL AREA					792 m ²	
CLINIC						
1.	Waiting room	1	5	Room dimension: 21 m ²	21 m ²	HD +PA
2.	Exam Room	1	3	Room dimension: 16 m ²	16 m ²	HD +PA
3.	Therapy Room	1	2	Room dimension: 20 m ²	20 m ²	HD +PA
4.	Nurse station	1	2	Room dimension: 9 m ²	9 m ²	HD +PA
TOTAL AREA					66 m ²	
SERVICE						
1.	Genset	1	3	50 m ²	50 m ²	PA
2.	MEP	5	2	12 m ²	60 m ²	PA
3.	Storage	5	2	9 m ²	45 m ²	PA
4.	Security	1	3	12 m ²	12 m ²	PA
6.	Janitor	2	2	9 m ²	18 m ²	PA
TOTAL AREA					185 m ²	
PARKING and OUTDOOR SPACE						
1.	Motorcycle	15	1	Space Dimension: 2.5 m ²	37.5 m ²	PA
2.	Car	5	1	Space Dimension: 10 m ²	50 m ²	PA
3.	Minibus	2	1	Space Dimension: 17.5 m ²	35 m ²	PA
4.	Field	1	1	Space Dimension: 372 m ²	372 m ²	PA
5.	Playground	1	1	Space Dimension: 150 m ²	150 m ²	PA
TOTAL AREA					644.5 m ²	

- TOTAL BUILDING AREA

Table 3.7 Total Building Area
Source: Personal Analysis

NO.	SPACE GROUP	AREA
1.	Housing Area	7,050 m ²
2.	Communal Area	738.4 m ²
3.	Office	341 m ²
4.	Learning Center	792 m ²
5.	Clinic	66 m ²
6.	Service	185 m ²
Total Area		9,172.4 m ²
Circulation (10%)		917.2 m ²
Total area + Circulation		10,089.6 m ²

3.1.5 SPACE ORGANIZATION STRUCTURE

A. Group Space

Based on the characteristic of space, room in the social housing can be separated into three groups based on the users of the social housing

Table 3.8 Group Space
Source: Personal Analysis

RESIDENT AREA	Unit Housing	MANAGEMENT AREA	Lobby	SERVICE	Security
	Lobby		Office		Janitor
	Prayer Room		Prayer Room		Toilet
	Multi-Purpose Hall		Multi-Purpose Hall		Genset
	Dining Area		Learning Center		MEP
	Kitchen Area		Clinic		Storage
	Laundry		Toilet		
	Classroom				

	Clinic				
	Playground				
	Field				



B. Space Structure Diagram

Space structure diagram is a diagram that shows the relation between space, the movement of the users, and the zoning of the space. The diagram is divided into two scopes. The first is macro that includes all space and movement in the building. The second is micro; this diagram is only for users, divided into residents or refugees and staff and volunteers.

a) Macro Diagram

The macro diagram is a diagram that shows a relation between space that includes all space and movement in the building

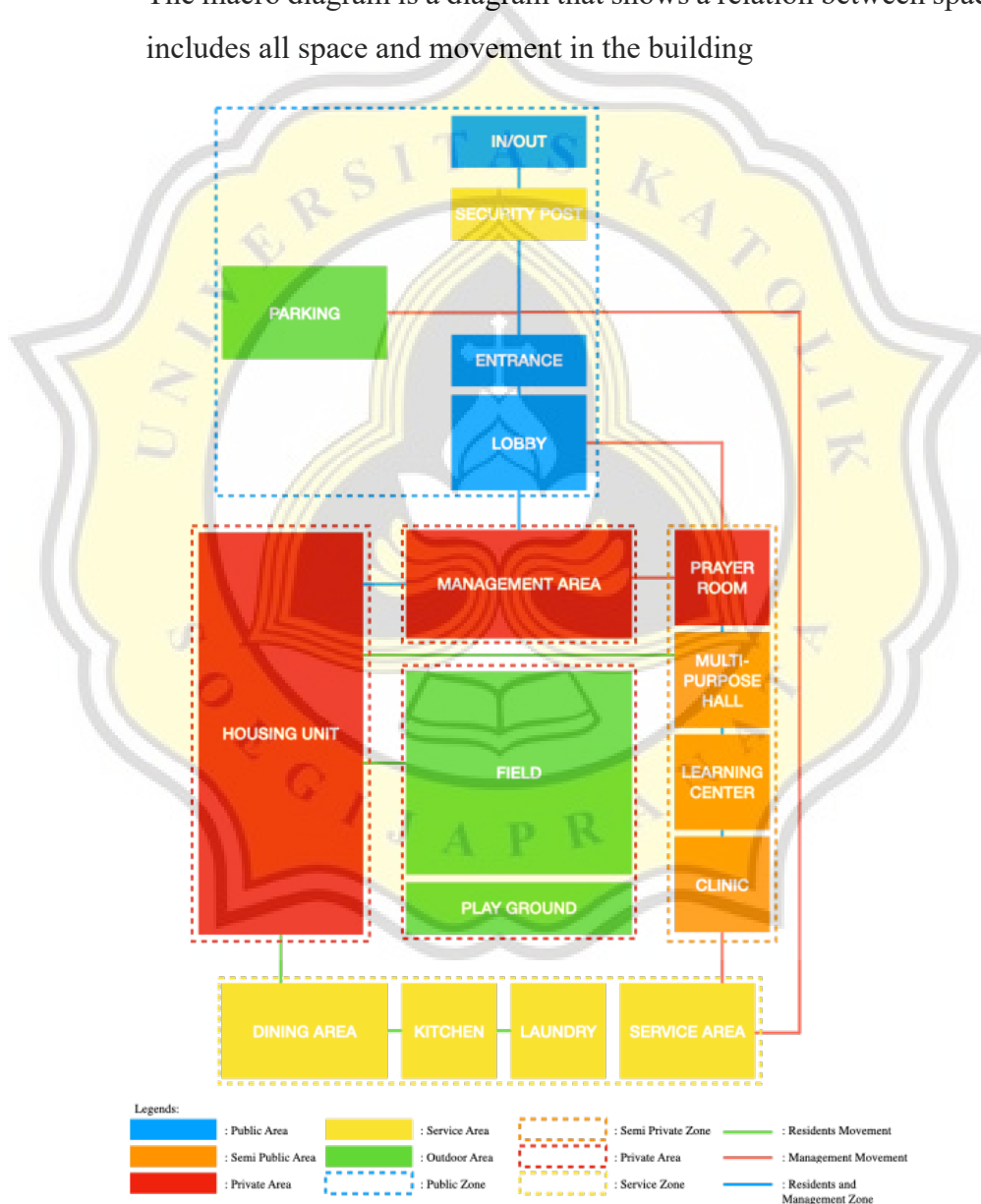


Diagram 3.1 Macro Diagram
Source: Personal Analysis

b) Micro Diagram (Resident)

A micro diagram for residents is a diagram that shows the relation between space that includes all space and movement in the building that involves refugees

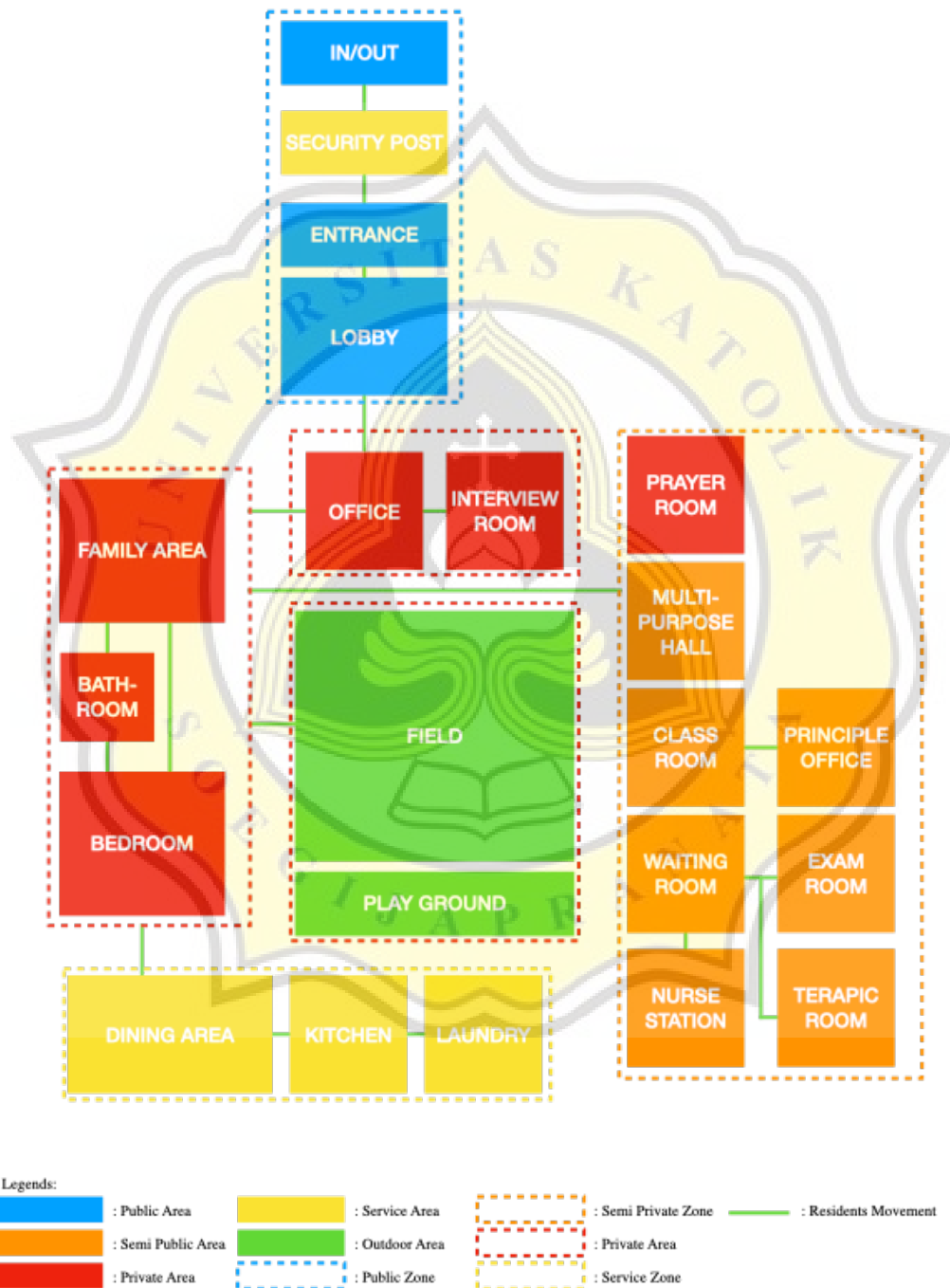


Diagram 3.2 Micro Diagram (residents)
Source: Personal Analysis

c) Micro Diagram (Management)

A micro diagram for management is a diagram that shows the relation between space that includes all space and movement in the building that involves staff and volunteers

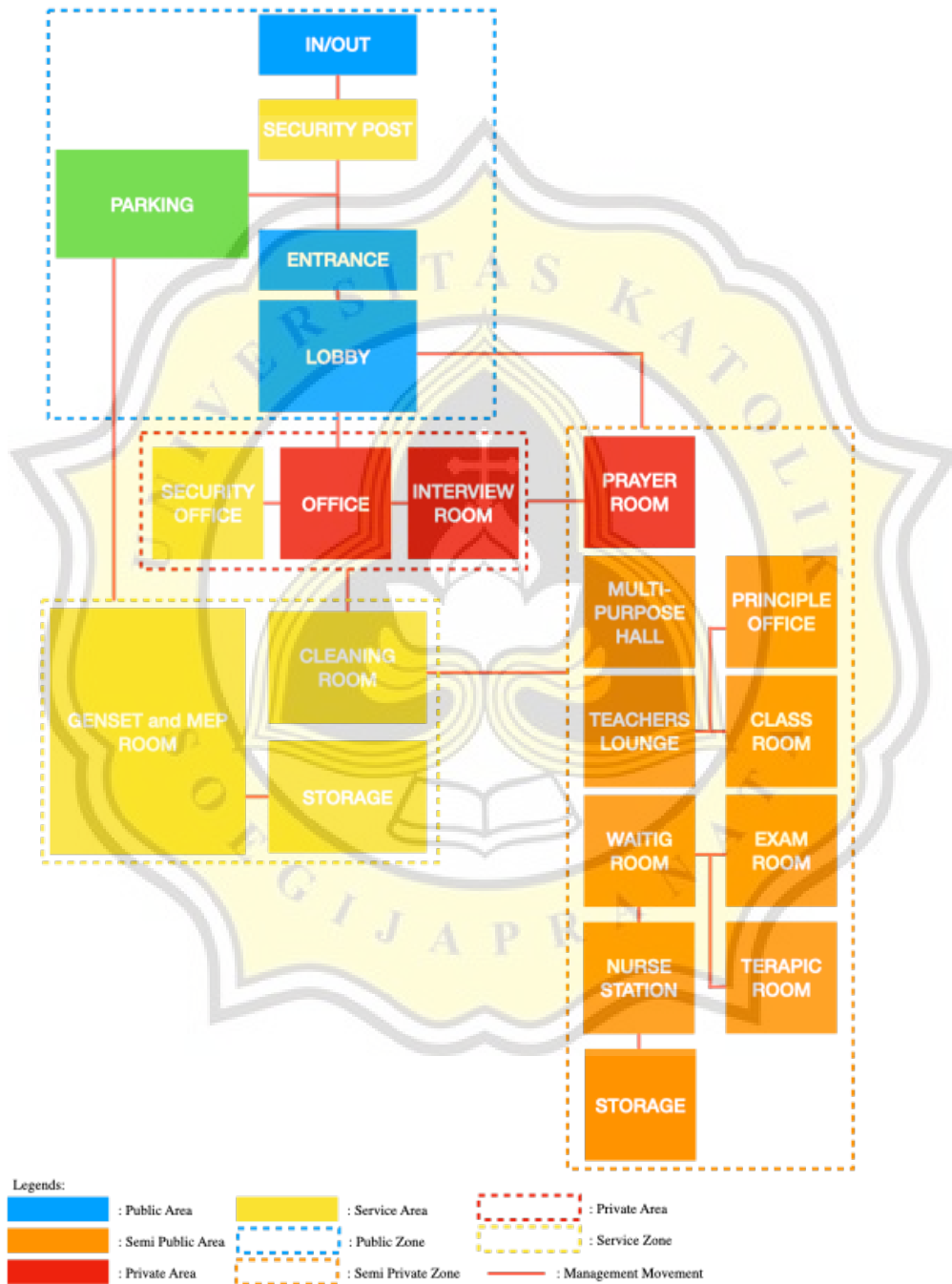


Diagram 3.3 Micro Diagram (Management)
Source: Personal Analysis

3.2 SITE ANALYSIS and SITE PROGRAM

A. SITE SELECTION

Selecting the site for social housing must meet the following criteria requirements.

- **SITE SELECTION CRITERIA**

According to the 2016 presidential regulation, there are few criteria regarding the place the shelter is built, they are:

- Close to a healthcare facility
- Close to worship facility
- In one jurisdiction with the immigration detention facility
- In the safe area

While, according to UNHCR (United Nations High Commissioner for Refugees, 2020), there are few criteria regarding the site, such as:

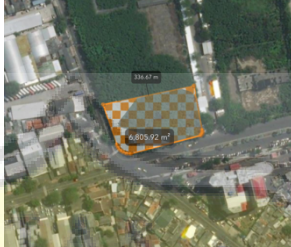

- Topography of site have to permit easy drainage and avoid a rocky site
- The topography of the area has a slope between 2%-4%
- The site has access to water
- The site can be accessed with an adequate infrastructure
- The site can be accessible for refugees handling agencies and related ministries
- The site is close to national services; such as health, market, and towns
- Not in an area that can cause disease for the refugees

- **LOCAL INTEGRATIONS**

Local integration is one of three durable solutions for refugees, according to UNHCR. Although Indonesia has a regulation regarding handling refugees, it does not mention local integration. Local integration can be divine as a wider range of rights such as freedom, employment, and education. On the other hand, local integration can be divine as social bonding between refugees and the host, enabling refugees to live amongst or alongside the locals without fear of discrimination, intimidation, or exploitation (Olivia et al., 2021).

From the criteria and requirement above, there are two possible sites in the block B Kemayoran area, below are the table to compare the two sites:

Table 3.9 Alternative Site
Source: Personal Analysis

CRITERIA	DATA	
	Alternatives 1: Jl. Garuda	Alternative 2: Jl. Rendani
	 <p>Figure 3.1 Alternative Site 1 Source: Jakartasatu.go.id</p>	 <p>Figure 3.2 Alternative Site 2 Source: Jakartasatu.go.id</p>
Neighborhood	Local Settlement	Business and Economy Building
Accessibility	The site is surrounded by a wide variety of roads and near public transportation stops	The site is surrounded by a wide variety of roads and did not available public transportation stop
Public Facilities	The local settlement is complete with public school, public health center, and worship facilities	Not available public school or public health center, but there are private hospital
Local Integration	Local integration may happen	Local integration may not happen
Noise	The Garuda Road is 20 meters wide and the main street; it can create noise to the site	The HBR motik road is 50 meters wide and the main street that can create high noise for the site
Vegetation	The site is covered with vegetation	There is no vegetation on the side

The Selected site is located on the Jl. Garuda on the district Kemayoran. This site is close to the departmental police office and the worship facility; both are located across from the site, while the public health center is located 10-minute drive from the site. The chosen site has a total area of 6,805 m².

The border of this site is:

North :Empty Warehouse

South : Jl. Garuda

East : Jl. Garuda 1

West : Jl. Angkasa

B. REGULATION

Based on the 2014 provincial regulation on spatial plan details and zonation regulation, the site is designated for business and trade areas, but it can be used for other purposes like housing or social purposes. This regulation also set the building regulation on the site, like:

- GSB : 8 meter
- KDB : 55%
- KLB : 4,5
- Maximum height is 24 story

C. PROGRAMMING of OUTDOOR SPACE

- PARKING AREA

Table 3.10 Programming Parking Area
Source: Personal Analysis

NO.	VEHICLE	DIMENSION	CAPACITY	AREA
1.	Motorcycle	2,5 m x 1 m	15	37.5 m ²
2.	Car	2 m x 5 m	5	50 m ²
3.	Bus/Truck	2,5 m x 7 m	2	35 m ²
TOTAL AREA				122,5 m ²
CIRCULATION 100%				122,5 m ²
TOTAL AREA + CIRCULATION				245 m ²

- OUTDOOR FACILITY

Table 3.11 Programming Outdoor Facility
Source: Personal Analysis

NO.	FACILITY	DIMENSION	AREA
1.	Field	25 m x 15 m	372 m ²
2.	Playground	10 m x 15 m	150 m ²
TOTAL AREA			522 m ²

- CALCULATION of SITE REQUIREMENTS
 - AREA of SITE
 - Area : (Total Building Area/KLB) + Outdoor Space
 - : $(10,089.6 \text{ m}^2/4.5) + 767 \text{ m}^2$
 - : $3,009.1 \text{ m}^2$
 - AREA of GROUND FLOOR
 - Area : KDB x Area of Site
 - : $55\% \times 3,009.1 \text{ m}^2$
 - : $1,655 \text{ m}^2$
 - AREA of GREEN SPACE
 - Area : $45\% \times (\text{Outdoor Space} + \text{Ground Floor})$
 - : $45\% \times 2,422 \text{ m}^2$
 - : $1,090 \text{ m}^2$
 - TOTAL AREA of SITE
 - Total Area : Area of Site + Outdoor Space + green Space
 - : $4,866 \text{ m}^2$

3.3 BUILDING STRUCTURE and SYSTEM ANALYSIS

A. BUILDING STRUCTURE

- SUB-STRUCTURE

This site has a bedrock that located on the 10 meters below the ground, so the substructure of the site can use a deep foundation, there are two types of deep foundation, they are:

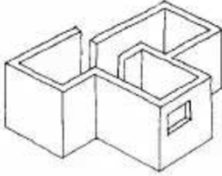
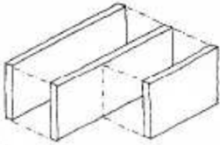
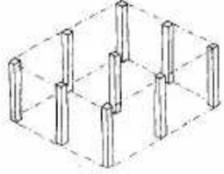
Table 3.12 Analysis Sub-structure
Source: Personal Analysis

	Pile	Bore Pile
Noises	Create a noise pollution	Do not create noise pollution
Cohesiveness	Working on cohesive soil	Working on non-cohesive soil
Efficiency and Time	Faster	Longer
Quality	Quality can be controlled	Only 80% of quality can be controlled
Working Area	Working area is larger	Working Area is smaller

- MIDDLE STRUCTURE

There are three types of middle structure on a building, they are :

Table 3.13 Analysis Middle structure
Source: Personal Analysis

Massive	Parallel Walls	Frame
 <p>Figure 3.3 Massive structure Source: Dasar-dasar eko-arsitektur</p>	 <p>Figure 3.4 Parallel walls structure Source: Dasar-dasar eko-arsitektur</p>	 <p>Figure 3.5 Frame structure Source: Dasar-dasar eko-arsitektur</p>
<ul style="list-style-type: none"> ▪ Able to resist heat enters the building ▪ has a thickness of 20-30 cm ▪ load distribution on the entire wall ▪ Openings are not more than 30% ▪ the walls surround forms space 	<ul style="list-style-type: none"> ▪ Divide space more efficiently ▪ Unlimited span ▪ Openings are not more than 30% ▪ Weak against horizontal forces ▪ only has one direction and its arranged in parallel 	<ul style="list-style-type: none"> ▪ Distribution of loads on columns and beams ▪ The use of concrete, steel, bamboo, or wood ▪ Openings can be extensive ▪ Filling elements can be brick, glass, concrete, and so on

- UPPER STRUCTURE

For the upper structure, there are two types of upper structure, namely:

Table 3.14 Analysis Upper Structure
Source: Personal Analysis

Pitched Roof	Flat Concrete
<ul style="list-style-type: none"> ▪ Fixed shape ▪ Many choices of roof coverings ▪ Rainwater will flow more easily 	<ul style="list-style-type: none"> ▪ Flexible can be shaped as needed ▪ The roof surface can be used for activities ▪ Easier maintenance ▪ Able to reduce heat ▪ Waterproof paint is needed to prevent leak

B. BUILDING SYSTEM

- Water System

- Clean Water

There are two water systems for building, they are :

Table 3.15 Analysis Clean Water System
Source: Personal Analysis

Up-Feed System	Down-Feed System
<p>The Up-Feed system distributes water directly from the bottom tank with a pump connected directly to the main pump providing clean water in the building, so this system relies on the pump's power.</p> <ul style="list-style-type: none"> ▪ Disadvantages: <ul style="list-style-type: none"> – The pump works continuously – It can only be used on small buildings 	<p>The down-feed system is an indirect distribution of water from the bottom tank. It works by pumping water from the bottom tank to the top tank, which will then be connected directly to the main pump providing clean water to the building.</p> <ul style="list-style-type: none"> ▪ Advantages: <ul style="list-style-type: none"> – Pump not working continuously – Water is always there ▪ Disadvantages: <ul style="list-style-type: none"> – Higher maintenance costs – Requires additional tank

- Wastewater

There are two wastewater treatment systems for building, they are :

Table 3.16 Analysis Wastewater System
Source: Personal Analysis

Conventional Water Treatment	Aerob-Anaerob Water Treatment
<ul style="list-style-type: none"> – Required the separation of waste management – Relying on the sewerage treatment system – 77.5% organic pollutant exits to the sewage system 	<ul style="list-style-type: none"> – treat all kinds of domestic wastewater – On-Site water treatment – 10% organic pollutant exits to the sewage system

3.4 NEIGHBORHOOD ANALYSIS

A. BUILDING SURROUNDING

The site is surrounded by a local settlement with supporting facilities such as a mosque, school, and public health center. On the front of the site is a police station and on the east of the site is used as a food center.



Figure 3.6 Surrounding Area
Source: Personal Analysis



Figure 3.7 Building Surrounding
(from left to right: Local Settlement, Police Resort, Food Center)
Source: <https://bit.ly/3tgFX3A>

B. TRANSPORTATION and ACCESSIBILITY

The site can be accessed using private vehicles or public transportation; the nearest bus stop is located 500 m from the site and this bus stop is in a Jaklingko line 33, and the nearest train station is 1.1 km from the site. From the site also can easily access to airport with via highway. Three streets surround the site are:



Figure 3.8 Public Transportation
Source: Personal Analysis





Legends :
 Jl. Angkasa
 Jl. Garuda
 Jl. Garuda 1

Figure 3.9 Accessibility
Source: Personal Analysis

- Jl. Garuda: 20 meters wide covered in asphalt
- Jl. Garuda 1: 15 meters wide covered in pavings
- Jl. Angkasa: 10 meters wide covered in asphalt

Table 3.17 Analysis Main Entrance
Source: Personal Analysis

	Alternatives 1	Alternatives 2
Main Entrance	 <p>Figure 3.10 Main entrance alternative 1 Source: Personal Analysis</p>	 <p>Figure 3.11 Main entrance alternative 2 Source: Personal Analysis</p>
Advantages	<ul style="list-style-type: none"> - Facing the police office - Located in the main street - Residents can easily access public transportation 	<ul style="list-style-type: none"> - Close to local settlement - Located on a more deserted road
Disadvantages	<ul style="list-style-type: none"> - Crowded during the day - Located near a U-turn 	<ul style="list-style-type: none"> - Keeping the security and safety of the residents - Resident needs to turn to access public transportation - Close to Intersection

With these conditions, the alternative for the main entrance can be located on the east side of the site on the Jl. Garuda, this alternative can give more security because it is located in front of the police office, and the residents can easily access public transportation stations.

C. NOISES

Noises of the site mostly are from the Jl. Garuda and Jl. Angkasa. Jl. Garuda is the main road and will be busy all day, especially on the day while Jl. Angkasa is a connector between Jl. Garuda and Jl. Angkasa; this street is less busy, but a bus pool can make noise from the bus.

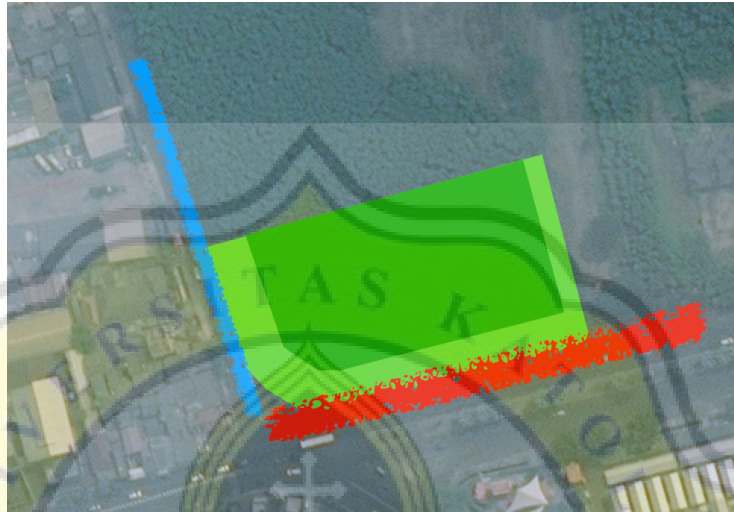


Figure 3.12 Noises Analysis
Source: *Personal Analysis*

So to respond to this situation, the private area of the site can be located in the darker green area of the site while the public area can be located in the paler green area.

D. PUBLIC UTILITIES



Figure 3.13 Drainage
Source: <https://bit.ly/3tgFX3A>



Figure 3.14 Streetlight
Source: <https://bit.ly/3tgFX3A>

The site area is already facilitated with electricity, water, and an internet network. The site also surrounds by a drainage and city sewer that has 2 meters wide, along Jl. Garuda streetlight is installed every 30 meters while on Jl. Angkasa streetlight is installed every 40 meters and covered with trees.

E. VEGETATION



Figure 3.15 Vegetation
Source: <https://bit.ly/3tgFX3A>

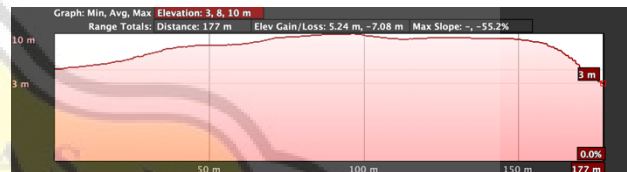


Figure 3.16 Trees Elevation
Source: Google Earth

The site is covered with shady trees such as lamtoro, with various high starting from 3 meters and the highest peak is on the 10 meters.

3.5 NATURAL ENVIRONMENT ANALYSIS

A. WIND

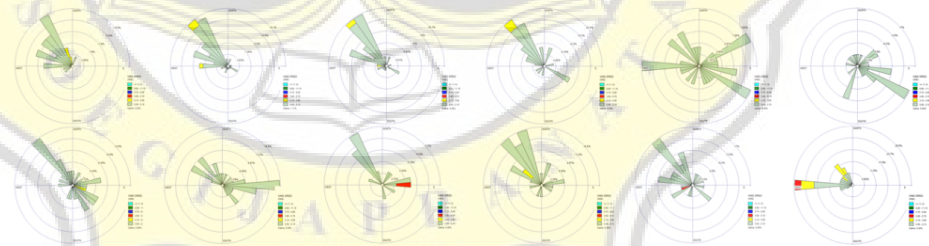


Figure 3.17 Wind Direction 2020
Source: Personal Analysis

The wind blows from the northwest almost every month, but the wind blows from the southeast for several months, like June to July. This site has an average temperature of 27°C. With this condition, the opening can be located on the northwest of the site.

B. SUN

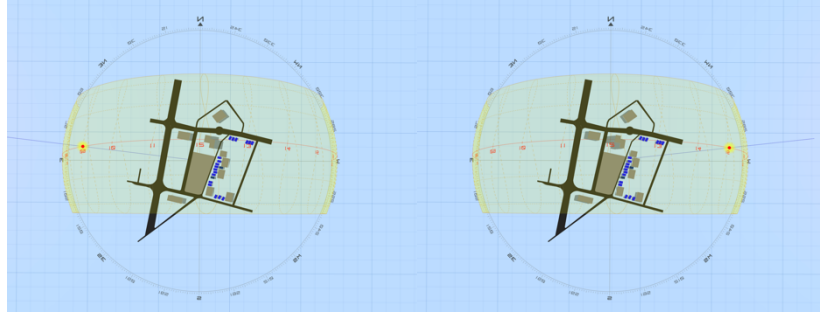


Figure 3.18 Sun path
Source: Personal Analysis

Based on the sun path, in the morning the shadow is pointing to the west-northwest, while in the afternoon the shadow is pointing to East-Southeast. This shadow can create the orientation of the opening, especially in the afternoon; the opening can be given at the east to the north of the site, and the West-Southwest area of the site can be built higher and more massive than the East-North side. This arrangement can reduce exposure of the afternoon sun's heat into the building and to the site.

3.6 LANDSCAPE ANALYSIS

The site is included in the lowland with topography relatively flat with a height about 4-4.9 meters above the sea. This area is mainly a settlement; it creates a densely populated residence; thus, the green space in the area is rare, except for the area of the site. The soil of the site is a latosol soil that has medium soil bearing capacity.