

Final Architectural Design Studio
2021/2022



DESIGN OF
NEW BANJARSARI MARKET
IN SAMPANGAN, PEKALONGAN CITY
THROUGH THE APPLICATION OF OPEN GREEN SPACE

Ajeng Sharma Diva Sharietta
17512038

Supervisor
Wiryono Raharjo, Ir. M.Arch., Ph.D.



UNIVERSITAS
ISLAM
INDONESIA

INTERNATIONAL UNDERGRADUATE PROGRAM IN ARCHITECTURE



DEPARTMENT of
ARCHITECTURE



한국건축학교육인증원
Korea Architectural Accrediting Board



CANBERRA
ACCORD





DEPARTMENT of
ARCHITECTURE



한국건축학교육인증원
Korea Architectural Accrediting Board



**CANBERRA
ACCORD**



WRITING PRODUCT

Final Architectural Design Studio

Department of Architecture

2021/2022

Design of New Banjarsari Market in Sampangan, Pekalongan City

through the Application of Open Green Space

Ajeng Sharma Diva Sharietta

17512038

Supervisor

Wiryono Raharjo, Ir. M.Arch., Ph.D.



**Department of Architecture
Universitas Islam Indonesia
Faculty of Civil Engineering and Planning**



Picture i Existing Condition of Market Area in Sampangan District
Source: Author, 2020



AUTHENTICATION SHEET

Final Architectural Design Studio entitled:

**Design of New Banjarsari Market in Sampangan, Pekalongan City,
through the Application of Open Green Space.**

*Perancangan Pasar Banjarsari Baru di Sampangan, Kota Pekalongan,
dengan Penerapan Ruang Terbuka Hijau.*

Student's Full Name : Ajeng Sharma Diva Sharietta
Student's Identity Number : 17512038
Have Been Evaluated and Approved on : Yogyakarta, January 31, 2022

Supervisor

Wiryono Raharjo Ir.,
M.Arch., Ph.D.

Examiner I

Ar. Ilya Fadjar Maharika,
Dr-Ing., MA., IAI

Examiner II

Revianto Budi Santosa,
Dr. Ir., M.Arch., IAI



Acknowledged by:

Head of Undergraduate Program in Architecture

Yulianto P. Prihatmaji, Dr., IPM, IAI

PREFACE

Praise and Gratitude to Allah SWT who has given grace, love, and companionship from the beginning until the author can complete final architectural design studio project entitled "Design of New Banjarsari Market in Sampangan, Pekalongan City, through the Application of Open Green Space". The author realizes during the process of making this project, she has received so much help, encourages, and love from many parties. On this occasion, the author wants to express her gratitude to:

1. Allah SWT for all the graces and blessings that provide health and wisdom to the author that this study can be completed through not an easy process, but by the believe in Him, He always provides such a way for her to walk through.
2. Mama, Papa, Aap, and Adek for the never ending supports although the author extended her study to one semester longer, but this family never stops to support and giving great understanding for the author.
3. Author's supervisor, Mr. Wiryono Raharjo, a person with a big heart who always understands my difficulties, gives constructive input, and the author could never ask for someone else as great as him.
4. Mr. Revianto Budi Santosa and Mr. Ilya Fajar Maharika for always giving the author hundredth chances to complete her project and for the constructive criticism so that the author could correct every errors.
5. Mrs. Dyah Hendrawati, also for the hundredth chances for the time and space to help me completing the evaluations.
6. All the lecturers and staffs in Department of Architecture of Universitas Islam Indonesia who have guided and provided knowledge which are useful, both in the past when the author was a student and in the future.
7. Dian Nugraheni, Alif Chandra Kusumawadhani Prabowo, and Alya Febrita Aulia, who always support the author until the very end of the design making and always being available whenever the author was tired and needing shoulders to lean on.
8. Hanung Ramadhan, Fikri Arsalan, Muhammad Abdunnaim Alghiffari, and Dara Safira Mazaya, who never stop giving positive energy to encourage the author to complete her final project and for the understanding that the author barely made time to see each others.
9. Aanisah Ayu Wulandari, Vanidia Vegantara, and Cut Thifal Nadya Tari, as friends in the same supervising group who have shared tips and enthusiasm to complete this project.
10. Friends of Architecture UII 2017 for the memories that have been shared from the very beginning until the end of the author's study.
11. Author's 18 cats at home for their cuteness and fluffiness as the author's stress relieving system.
12. Ajeng Sharma Diva Sharietta, the author herself, for the struggles, willing, and tears while completing this final project despite the condition that she had to handle all by herself. Thank you for not giving up. Thank you for holding on till the end.

Yogyakarta, February 20, 2022

Author,



Ajeng Sharma Diva Sharietta
17512038/FADS/FTSP/UII



DESIGN PREMISE



Picture iii Existing Condition of Borobudur Shopping Center Building
Source: Radar Pekalongan, 2019

The relocating Banjarsari Market is the development of the implementation of cultural approach and effective circulation in an effort to enhance the market area as the main trading area in Sampangan sub-district, Pekalongan City, as well as an icon and landmark of the area that showing the historical part of the city. The loss of the main market in the district due to the damaged building giving impact to the economic condition and creating non-sufficient emergency markets. In order to achieve a new market building that has characteristics of a region where it was established and which considers the effectiveness of a good circulation and green open area, it is done by improving the physical area through the application of open green space in the design.

To make this design different from market in Pekalongan that apply modern concepts to building forms, the application of regionalism and open green space as an architectural design approach is able to improve the quality of the Banjarsari Market design which upholds the identity of Sampangan area which is known as the cultural and heritage are.

With this, it can create a new branding on the market that carries the values of Sampangan culture as well as an attractive and efficient spatial layout so as to create market that reflects the city of Pekalongan.

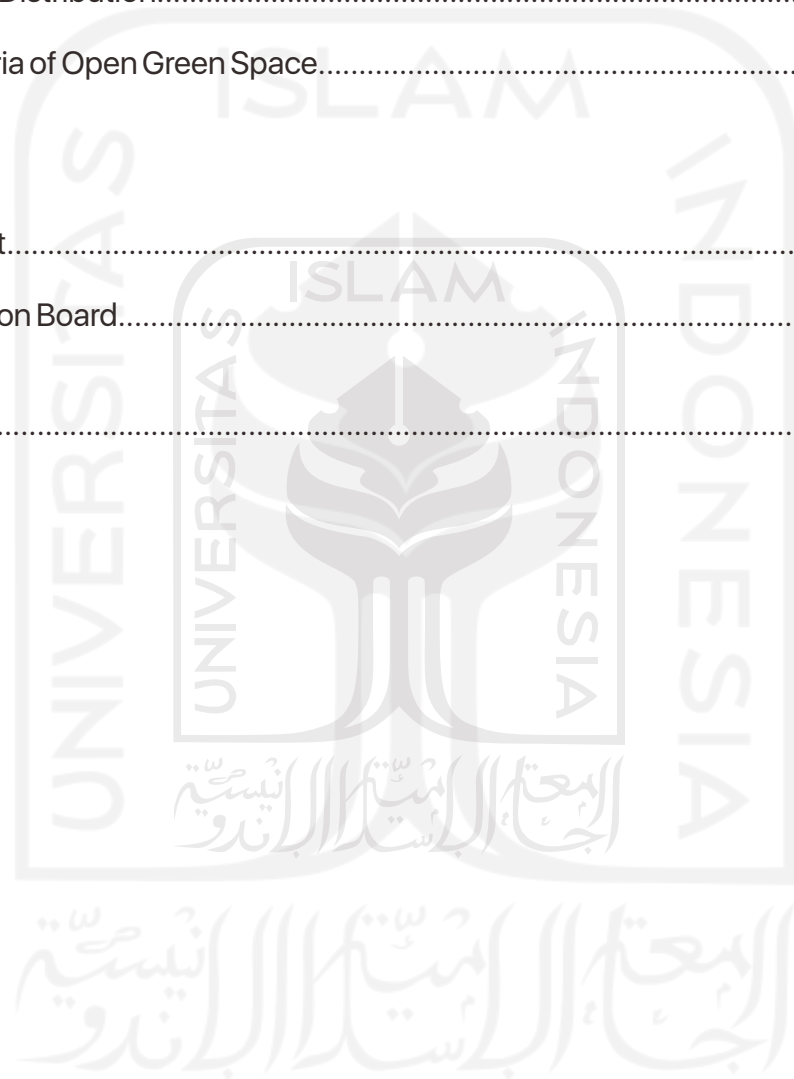
LIST OF CONTENTS

| | |
|---|------|
| TITLE PAGE..... | i. |
| AUTHENTICATION SHEET..... | iii. |
| PREFACE..... | iv. |
| DESIGN PREMISE/ABSTRACT..... | vi. |
| LIST OF CONTENTS..... | vii. |
| | |
| BAB I. INTRODUCTION | |
| 1.1. Background..... | 2. |
| 1.2. Design Problem Study..... | 4. |
| 1.3. Problem Formulation..... | 6. |
| 1.4. Design Methods..... | 9. |
| 1.5. Originality and Novelty..... | 11. |
| | |
| BAB II. BANJARSARI MARKET OVERVIEW | |
| 2.1. Commercial Types Overview..... | 14. |
| 2.1.1. Description and Classification of Shopping Place..... | 14. |
| 2.1.2. Differences of Traditional and Modern Market..... | 16. |
| 2.1.3. National Standard Regulations of Traditional Market..... | 17. |
| 2.2. Green City Attributes..... | 19. |
| 2.2.1. Green Open Space as Respond to Urban Issue..... | 20. |
| 2.2.1. Green Waste Management..... | 22. |
| 2.3. Precedent Studies..... | 23. |
| 2.4. Description and Boundary..... | 27. |

| | |
|---|-----|
| 2.5. Banjarsari Market Trading Overview..... | 29. |
| 2.5.1. Physical Condition..... | 29. |
| 2.5.2. Non - Physical Condition..... | 30. |
| 2.6. Banjarsari Market Trading Activity Overview..... | 31. |
| 2.6.1. Type of Market Activity..... | 31. |
| 2.6.2. Type of Service Activity..... | 31. |
| 2.6.3. Emergency Market Specification..... | 32. |
| 2.7. Banjarsari Market Building Requirements..... | 32. |
| BAB III. PROBLEM AND DESIGN ANALYSIS | |
| 3.1. Non-Physical Problem and Analysis..... | 34. |
| 3.1.1. Traders..... | 34. |
| 3.1.2. Buyers..... | 34. |
| 3.1.3. Management..... | 35. |
| 3.2. Physical Problem and Analysis..... | 36. |
| 3.2.1. Market Capacity..... | 36. |
| 3.3. Unit Typology of Banjarsari Market..... | 37. |
| 3.3.1. Regional Shopping Center Typology..... | 37. |
| 3.3.2. Zoning..... | 38. |
| 3.4. Mass and Form Exploration..... | 41. |
| 3.4.1. Site Analysis and Mass Transformation..... | 41. |
| 3.4.2. Joglo Roof..... | 42. |
| 3.4.3. Batik Jlamprang Pattern..... | 43. |
| 3.4.4. Kiosk, Store, and Waste Collection Space..... | 44. |

| | |
|--|-----|
| 3.5. Landscape Analysis..... | 46. |
| 3.5.1. Pedestrian Walkway..... | 46. |
| 3.5.2. Transportation Circulation..... | 47. |
| 3.5.3. Site Planning..... | 48. |
| 3.5.4. Green Concept Development..... | 49. |
| 3.5.5. Open Green Space..... | 50. |
| 3.5.6. Green Waste Management..... | 51. |
| 3.6. Batik Market..... | 53. |
| 3.6.1. Batik Types Classification..... | 53. |
| BAB IV. FINAL DESIGN | |
| 4.1. Site Planning..... | 56. |
| 4.2. Landscape Design..... | 57. |
| 4.2.1. Open Green Space..... | 57. |
| 4.2.2. Green Waste Management..... | 61. |
| 4.3. Banjarsari Market Building..... | 63. |
| 4.3.1. General Market..... | 67. |
| 4.3.2. Batik Market..... | 69. |
| 4.4. Barrier Free Design..... | 71. |
| 4.5. Building Facade and Structure..... | 72. |
| 4.6. Building Safety..... | 74. |
| BAB V. EVALUATION | 77. |
| 5.1. Opening Hours Office..... | 79. |
| 5.1.1. General Market and Loading Trucks Access..... | 79. |
| 5.1.2. Batik Market..... | 79. |
| 5.1.3. Open Layout Market..... | 79. |

| | |
|---|------------|
| 5.1.4. Rooftop Garden and Cafes..... | 80. |
| 5.2. Loads Access..... | 80. |
| 5.3. Open Green Space Access and Connection..... | 81. |
| 5.4. Green System of Open Green Space..... | 83. |
| 5.4.1. Rain Water and Clean Water Distribution..... | 83. |
| 5.4.2. Disposal Water Distribution..... | 85. |
| 5.5. Successfulness Criteria of Open Green Space..... | 86. |
| ATTACHMENT | |
| A. Plagiarism Check Result..... | 88. |
| B. Architectural Presentation Board..... | 89. |
| REFERENCE SOURCES..... | 93. |



01

INTRODUCTION



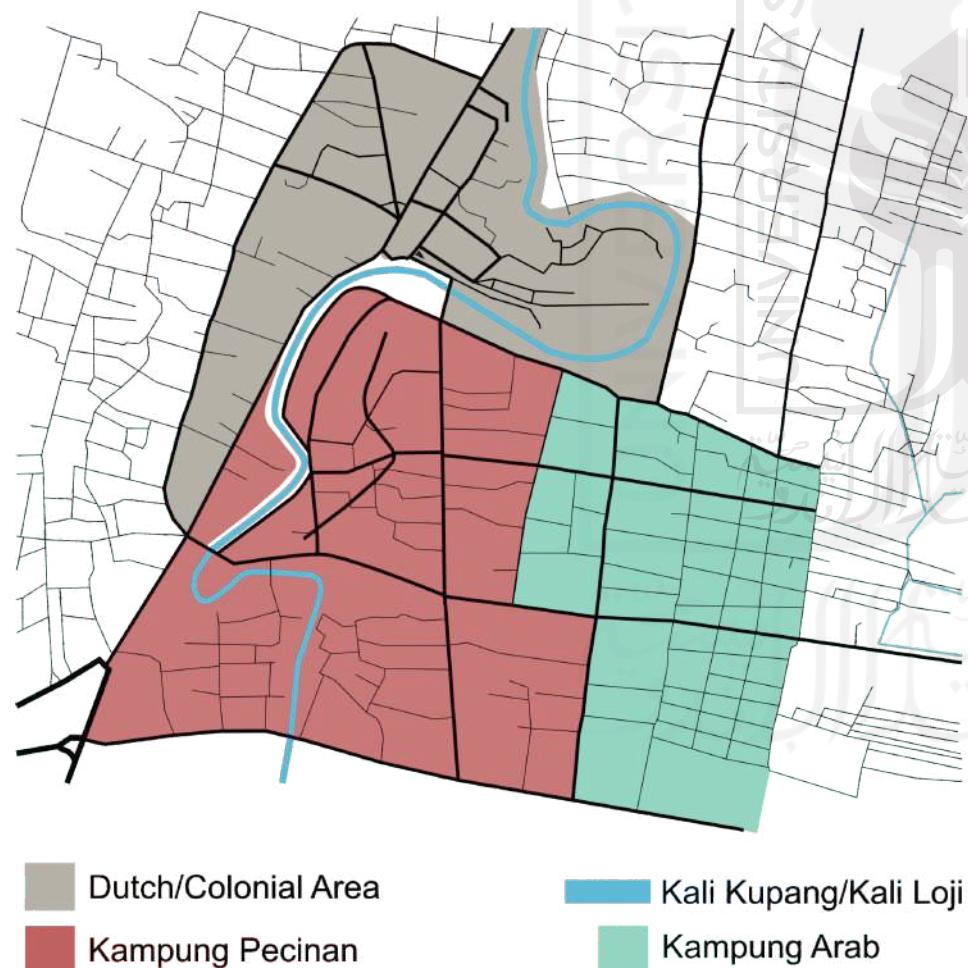
1.1. BACKGROUND

a. Eco Culture Settlements Potential

Culture communities settled in a region area is a phenomenon of urban life, especially in Asia, which, whether it is realized or not, is a picture of its character and inhabitants. The formation of a place by a community or several communities can create a new culture based on similarities or differences in thought patterns and behaviors that trigger the formation of a settlement agreement pattern.

According to the National Disaster Management Agency (BPNN), Sampangan area often experiences flooding when heavy rains occur. The condition of the site which has a lower contour than the surrounding area and the lack of drainage of rainwater in this area makes flooding last a long time. In addition, the flood that hit the Sampangan area was caused by river runoff because this area is located beside the Lodji River. The rainwater drainage system and the lack of green open areas are the shortcomings of the Sampangan area in dealing with flooding and causing decreased user comfort in this area.

In the 1960s, Jalan Kerimunan (now: Jalan Belimbing) was a residential area, not a mix-used area as it is today. Even though the current condition is mixed with business buildings and shops, some ancient buildings still look attractive because they are still being preserved so that they can become an attractive area for tourists to visit to see firsthand the conditions of the Pekalongan Chinatown in the past and to enjoy the architectural style of Chinese buildings living in Pekalongan.



Picture 1.0 Maps of Ethnic Settlements in Pekalongan City
Source: Author, 2020



Picture 1.1 and 1.2 Chinese and Arabia Buildings in Sampangan Area
Source: Author, 2020

b. Abandoned Building



Picture 1.3 Borobudur Mall building
Source: Pasar Indonesia Blog, 2005



Picture 1.4 Borobudur Mall building
Source: Batik TV, 2020

Banjarsari market used to be inside the building of Borobudur Mall until 3 years ago before the building caught fire. The government had the idea to combine the traditional and modern market in one building, but the result was not efficient because the mall was being downgraded to considerate the traditional market that was brought into the building.

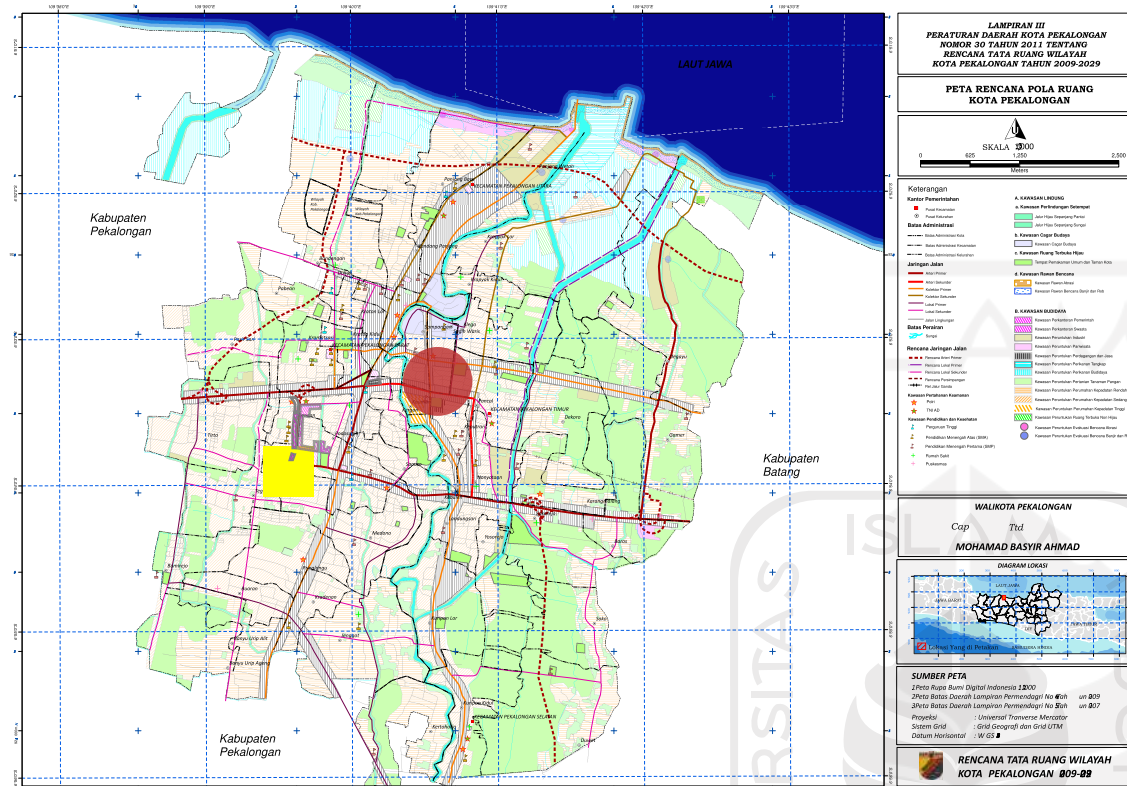
Since the building was abandoned, the market was moved into the riverside, remove the open green space and causing an inefficient circulation for users. The current condition of the building makes it impossible to be reused due to the strength of the burnt structure. The best idea to revitalize the place is to relocate the market to this area and demolish the building, then build a new one as the new market.



Picture 1.5 Current condition of Borobudur Mall
Source: Suara Indonesia News, 2019

1.2. DESIGN PROBLEM STUDY

a. Maps of Spatial Pattern of Pekalongan City



The site is located inside the cultural heritage area also trade and service designated area. It's located adjacent to primary river that causing rainwater runoff to the market area and cause flooding.

b. Site Boundaries



Location : Sampangan, Pekalongan City
Area : 27,250 m²
Buildings on site: Market, abandoned building, Chinese shops, etc.

Picture 1.6. Pekalongan City Spatial Pattern Map
Source: Bappeda of Pekalongan City

Picture 2.1 Maps of Site Location in Pekalongan City
Source: Cadmapper, 2021

b. Maps of Land Usage of Sampangan Sub-district

Chosen Site Building Usage



- Borobudur Mall building (abandoned)
- Chinese shops
- Banjarsari Market (existing)

Surrounding Building Usage



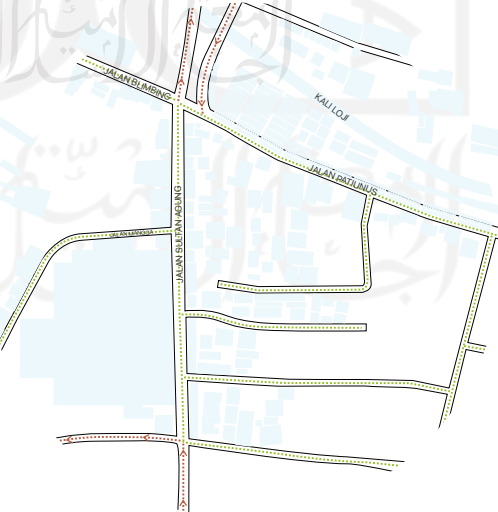
- Mixed use building (ruko)
- Residentials

Green and Blue Area



- Kali Loji
- Green area

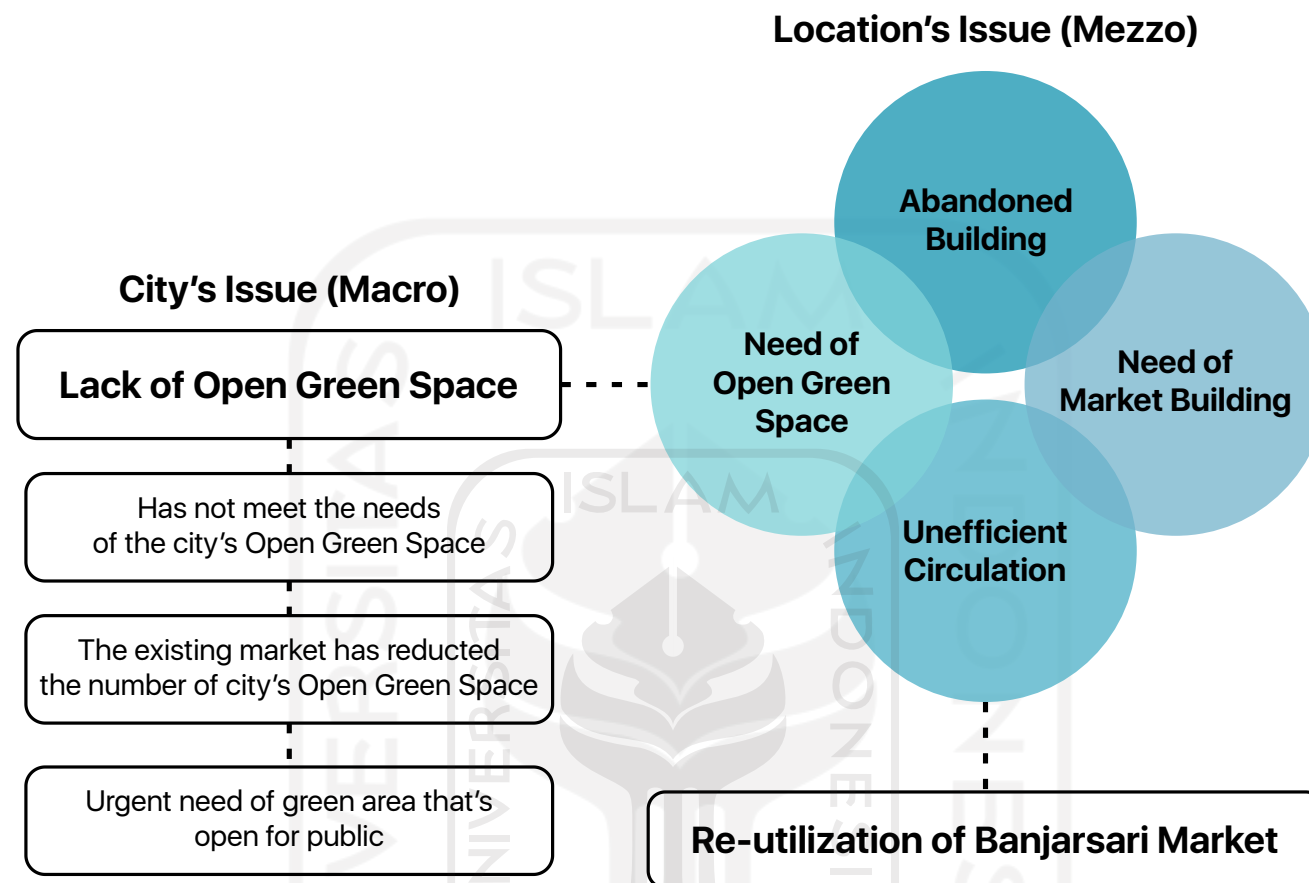
Transportation Networks



- One way
- Two ways

1.3. PROBLEM FORMULATION

a. Problematique Diagram



City's Issue: Lack of Green Open Space

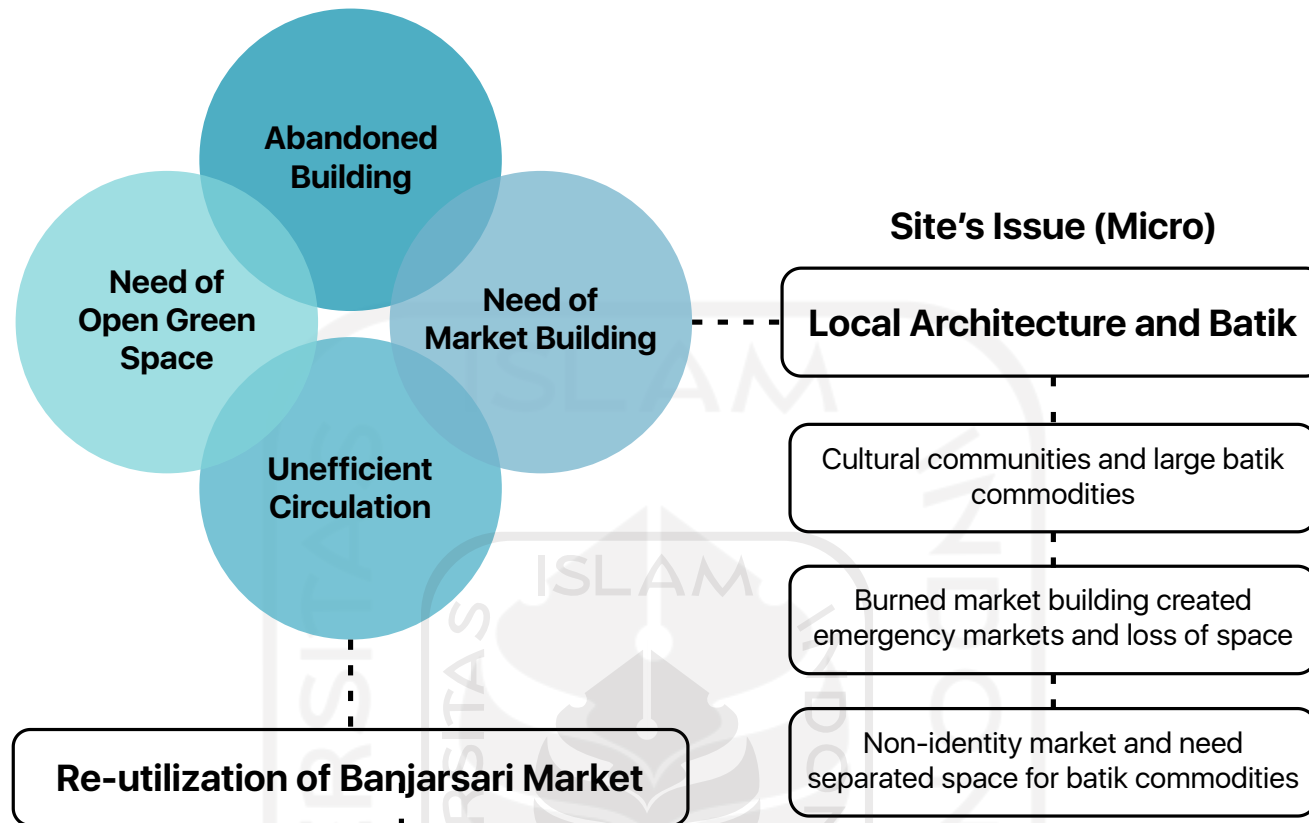
Based on the data of The Government of Central Java Province, Dinas PUSDATARU of Central Java Province, the number of public open green space in Pekalongan City has not meet the requirements. According to the data, the open green space area in Pekalongan City only 18 percent of the total area of this city. This means that the area of Pekalongan City's green open space does not meet the Regional Regulation (Perda) Number 30 of 2011 concerning spatial planning. The Regional Regulation mentioned that the total area of open green space in Pekalongan should be at least 30% of the total area, 20% of public green open space, 10% of private green open space. The area of Pekalongan City itself covers 45.25 square kilometers, but the need for green space is only 7 kilometers, which is only 18% of the area.

Location's Issue:

The abandoned building that had fire accident at the past used to be the main market in Sampangan sub-district, where it was both a general market and non-general market for batik and textiles. There were large amount of sellers and kiosks inside the building, but now they are moved into emergency markets located in two different location. These emergency markets have been running for three years and happen to having and causing some inconveniences for the public users: improper facilities, crowded traffic due to the usage of the road for the emergency market, decreasing quality of the kiosks building, loss of green open space (the space is used for the emergency markets).

The old building of Banjarsari Market (Borobudur Mall) has its building structure all-burned since the building was completely built and renovated in 2005 from 1970, which is already an old building, and did not have proper fire suppression infrastructure, causing impossibility for the building to be used again. The old design also did not provide enough area for the green space and parking area for car and loads truck, thus the visitors and the suppliers had to use the road as a parking area. There was only one access to the building from the street for all users, which caused inefficient circulation of entrance and exit area. In the decision, demolishing the old building and re-utilizing the site is the best option to design the new Banjarsari Market.

Location's Issue (Mezzo)



Site's Issue:

As the mentioned previously, Banjarsari Market is a combination of general market and batik commodity market which merged into one building inside Borobudur Mall. The ambience inside the building was confusing because the building was also a combination of modern and traditional market, where the entrance was filled with kiosks and batik store; and modern mall (retail shops, supermarket, playing zone, etc) inside. Users felt they were in a mall of modern building, but the ambience was just as the same as traditional market. Now, the old building can not be used again after the fire accident, the market was moved into emergency markets, where there are some loss of space for the commodities, especially for batik commodities. The government forced as many numbers as possible of the kiosks in the emergency markets, but the minimum space requirement is not fulfilled.

However, the design of the old building did not represent either local architecture or city's identity such as batik pattern, while the location of the market is right at the center of cultural settlements: Chinese, Arab, Javanese, and historical area of colonial era. The variety of architecture of the cultural settlements can be such a potential for the market to become a landmark of the location. The new design of the market need to include some regional value such as local architecture and other ornament of area's characteristic.

b. Design Problem Parameters

| | Designer | Client | User | Legislator |
|------------------|--|---|--|---|
| | Author as the initiator of design solutions. | Government | Traders, buyers, distributors of goods, visitors (all in any ages) | Government (having power in handling policies) |
| Symbolic | Creating new identity of the market for Sampangan area by eco-culture approach. | A design that can attract visitors to come, be able to be the new face of Sampangan area. | The appearance and spatial experience that brings comfort of movement. | Integration of the market and its surrounding. |
| Formal | Various types of stalls are integrated into one market area using modular form concept. | A design of market area that can fulfill the public needs of space and comfort. | Clear spatial organization to explore and meet the capacity of users. | Building codes and regulations applications, also fulfill at least 50% the needs of RTH of the city. |
| Practical | Implementation of area's culture in urban element, such as batik and chinese architecture | Low cost budget and revitalizing the market area with comfort and efficient networks | A clear and spacious design to get comfort to explore. | Not changing the face of the Chinese/Arab/Javanese communities nor the heritage area. |
| Radical | A design that can fulfill the needs, the visual comfort, productivity and RTH of the city. | A design that can increase the regional's productivity and economic condition. | Efficient system of the market and movement networks. | A design that is able to create new appearance and handle the river water overflow at the heavy rain. |

Table 1.1 Design Problem Parameters

c. Problem Formulation

Problem

Paying attention to the description above, the formulation of problems that can be identified and need to get attention in the process of redesigning Banjarsari Market that are expected to be resolved in the redesigning process are:

- a. How to re-utilize the old site of Banjarsari Market for a new market that can accommodate a general market and batik market.
- b. How to design green area as public space inside the market.
- c. How to design a market with local characteristics of architecture.

Goals

The goals in designing the new Banjarsari Market area are:

- a. To create new face of Banjarsari Market area that can outstand the city's and surrounding characteristics.
- b. To create open green space to solve the urban issue of the lackness of green space number.
- c. To revitalize the abandoned location.



1.4. DESIGN METHODS

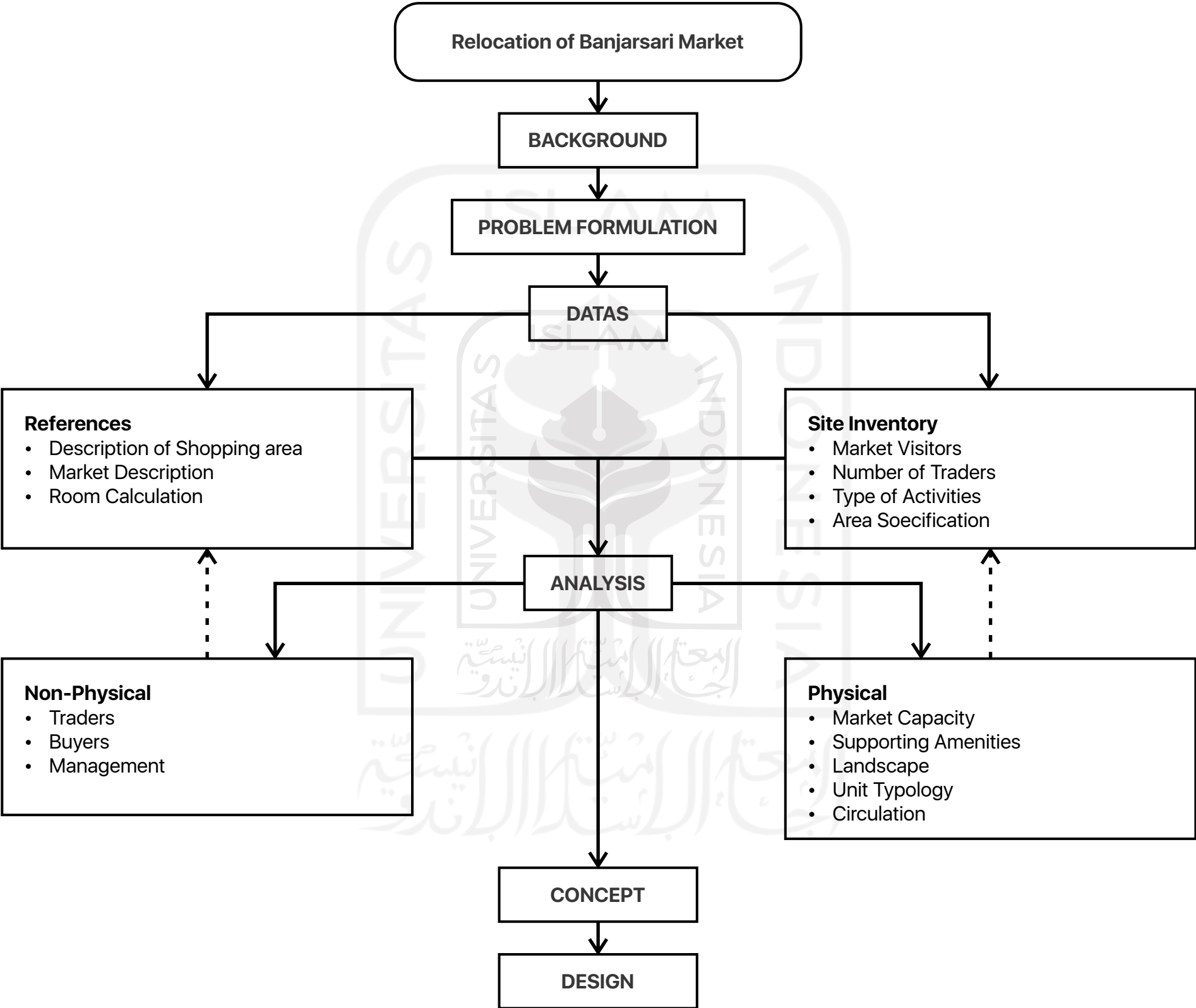


Diagram 1.1 Design Methods

1.5. ORIGINALITY AND NOVELTY

| No. | Name | Title | Approach |
|-----|-------------------|--|--------------------------|
| 1. | Zuhrotun Nisa | Pasar Banjarsari Pekalongan | Green Architecture |
| 2. | Sobirin | Redesain Pasar Banjarsari di Pekalongan | Spatial Impact |
| 3. | Tiovary J. Tilaar | Relokasi Pasar Tradisional Amurang | Post Modern Architecture |
| 4. | Julio R. | Relokasi Pasar Tradisional Bahu di Manado | Ecology Architecture |
| 5. | Nimas Nurafifah | Relokasi Pasar Kota Rembang | Modern Architecture |
| 6. | Putu Handy M. | Relokasi Pasar Tradisional Desa Adat Buduk, Bali | Tropical Architecture |
| 7. | Kurnianto Fery W. | Penataan Kembali Pasar Umum Caruban | Regionalism Architecture |

| | Tipology | Location | Year | Differences |
|----|-----------------|-----------------|-------------|---|
| | Market | Pekalongan | 2019 | Designing with green architecture approach |
| | Market | Pekalongan | 1997 | The design focus on the building and material usage |
| re | Market | Amurang | 2019 | Designing with post modern architecture concept |
| | Market | Manado | 2018 | Implementation of ecology architecture in building facade |
| | Market | Rembang | 2019 | The design focus on the interior and material usage |
| | Market | Badung | 2016 | Designing with tropical architecture concept |
| e | Market | Madiun | 2011 | The design focus on the interior and structure |

Table 1.2 Originality and Novelty

02



BANJARSARI MARKET OVERVIEW

2.1. Commercial Types Overview

2.1.1. Description and Classification of Shopping Area

Shopping area is a meeting place between sellers and buyers to interact, and in its development the market function increases as a recreation function. At present, shopping places can be classified into modern shopping places, which are usually owned by investors, and traditional shopping places or often referred to as traditional markets.

According to the type of goods sold, there are four types of shopping center (Beddington, Nadine 1982):

- **Demand Market**

Is a shopping center that sells daily necessities which are also basic necessities. For example, a market for grocery, clothing, and food.

- **Semi-Demand Market**

Is a shopping center that sells goods for certain needs in everyday life. For example, a vehicle sales center, household electronic equipment.

- **Impuls Market**

Is a shopping center that sell luxury goods that move the hearts of consumers at a certain time to buy them. For example, a center for selling watches and jewelry.

- **Drugery Market**

Is a shopping center that sell hygienic items such as soap, perfume and others. Drugery is a special type of store that usually has its own place in a shopping center.

According to the differences of the area, there are 3 types of shopping center:

- **Neighborhood Center**

The scale of the service of this local shopping center, at the smallest level, because it reaches out to neighborhoods that have a population of between 5,000 and 40,000. Thus, the area for this shopping center also classified as the smallest, where it ranges from 30,000 to 100,000 square feet, or about 2,787 to 9,290 m².

- **Community Center**

The service scale of this district shopping center, its level medium or regional scale, so the district shopping center is able to serve a population of between 40,000 and 150,000. thus, the floor area for this district shopping center must be larger than the local shopping center, which is between 100,000 to 300,000 square feet, or in the range of 9,290 to 27,870 m².

- **Regional Mall**

The service scale of this shopping center is greater than the two shopping centers mentioned above, so that this regional shopping center is able to serve 150,000 to 400,000 residents. Likewise, the area of this shopping center ranges from 100,000 to 1,000.00 square feet or ranges from 27,870-92,990 m². Based on the regulations or provisions within the Ministry of Trade which are conveyed by the director of trade facilities development to the head of the Regional Office of the Ministry of Trade, Central Java Province through letter No. 09/Bsp-2/11/94, dated 24 February 1994, the form or type of shopping is as follows:

a. Market

Is a transaction place for goods and services between sellers and buyers both in retail / small party or for consumption or by party bulk / wholesaler for resale.

b. Traditional Market

Is a transaction place for goods and services between a seller and a buyer has the following characteristics:

- a. Sell and buy goods / services for daily needs at retail.
- b. Involves many small scale retail traders.
- c. The buildings and market facilities are relatively simple.
- d. Ownership and management are generally carried out by the Regional Government.

c. Modern Market

Is a place for transactions of goods and services between sellers and buyers who have the following characteristics:

- a. Buying and selling goods and services both at retail and in bulk.
- b. Sellers are generally big investors / strong economy.
- c. Modern buildings and facilities equipped with air conditioning, escalators, music, parking area, and so on.
- d. Good arrangement of space and places of goods.
- e. Items that are traded are daily necessities right down to secondary and luxury goods.

d. Supermarket

Is a modern market where retail goods are sold large scale with self-service services. Ownership supermarkets can be owned by one person or a group. The core commodity for sale are food and household goods as well equipped with other items. Included in the category of supermarket, there are Carrefour, Transmart, Giant, Superindo, etc.

e. Department Store

Is a modern marketplace where scale retail goods are sold big. The core commodity that is sold is the type of fashion, such as clothing, shoes, bags, cosmetics and so on. The items are arranged well. Services are assisted by a sales assistant and there are also self service. Department store ownership can be owned by one person or group. For example Matahari Department Store, Ramayana Department Store, Centro, and so on.

f. Wholesale Market (Pasar Grosir) and Modern Wholesale Market

Conventional wholesale Market is a place for transactions of goods and services between sellers and buyers on a wholesales basis to then be traded back. While the modern one is a place for transactions of goods and services between sellers and buyers in bulk to then be processed or traded back with services that are self-service. Ownership can owned by one person or group. Example of a macro wholesale market.

g. Shopping Center / Mall

This explanation has been outlined above. The example is Gajah Mada Plaza, Blok M Mall, and so on.

h. Duty Free Shop

IA place to carry out trade in goods business activities whose goods are not subject to tax, so they can be purchased with cheaper prices but not everyone can shop on the spot. Usually the buyer must become a member and be prioritized for foreigners. This shop must be a legal entity.

i. Franchise

A way of trading carried out by a supplier(franchisor) by giving rights to a dealer (franchise)to sell its products for a certain fee. Franchiser usually helps provide equipment, buildings, knowledge management and even marketing, the franchise must comply the rules set by the franchiser. Example of Kentucky Fried Chicken, macro wholesale market, Sogo Department Store.

j. Shopping Complex

Is a neighborhood area / place / urban part where there are shop buildings along the main road and set by the local government as a shopping area.

k. Pilot Market (Pasar Percontohan)

It is an embryo or physical market seed in an area the economy is relatively backward and is expected to develop independent and able to encourage growth and development of potential the economy of the surrounding area. Types of goods traded are goods daily necessities and agricultural products and local community crafts.

l. Central Market

Is a market where goods and services transaction between sellers and buyers in bulk to then be traded back to other markets. Examples of Wholesale Fruits and Vegetables Market-Mayur Kramat Jati, Cipinang Rice Main Market.

2.1.2. Differences of Traditional Market and Modern Market

In general, people are most familiar with two types of market: traditional market and modern market. The main differences between these two markets are the management system, quality of interaction and transaction, also physical facilities provided. Modern market has a professionalism concept and service quality to interest consumers as many as possible. Thus, the market layout design is considered to create flexibility and comfortability, by providing large parking area, easy access for public transportation, goods sorting, and the service of the clerk. More than that, most of modern market have self service concept which makes the consumers feel independent and entices them to buy more products. This modern market is also known as supermarket at fixed price, where the consumers can not bargain the product price that has been set. While traditional market is known as the synonymous as slum, dirty, and crowded conditions. Moreover, coupled with the services of traders who often manipulate the quality and quantity of goods. This further reduces the trust and interest of consumers to choose traditional markets as a place to fulfill their needs.

| Traditional Market | Modern Market |
|--|--|
| Established and managed by the community or village government in suburban/road areas or residential neighborhoods. | Established and managed by a private body in the urban center area. |
| The target buyers, sellers, and suppliers are residents of the neighborhood, utilizing local resources. | The target buyers, sellers are local residents and immigrants from out of town. Target suppliers are broader than local resources, usually bringing in goods from outside the city. |
| Consists of stalls, kiosks, grocery stores, and street vendors. | Various modern markets: hypermarkets, supermarkets, minimarkets, department stores, factory outlets, and convenience stores. |
| The goods sold are daily necessities of low and medium quality. | The goods sold are daily necessities with a wider quality range, to superior quality. |
| The price of goods is usually cheaper and still negotiable. | There is a price tag on the goods and the price of the goods is a fixed price. |
| Implement direct interaction between sellers and buyers. | Implementing a self service system, so there is no need to interact directly with the seller, except for the cashier. |
| Identical to a slum building, there is no air conditioning, escalators, or elevators. The space for market users tends to be narrow so they are often crammed into market corridors. | Identical to modern air-conditioned buildings, there are escalators and lifts. The space for users tends to be wide so they don't need to be crammed into the corridor of the goods shelves. |
| Payment using cash. | Payment can use cash, card, or QRIS. |

Table 1.3 Differences of Traditional and Modern Market

Banjarsari Market is a combination between the traditional and modern market. The grey cells define the activity of Banjarsari, which the market is run with conventional style where the buyers need direct interaction to the sellers and they can negotiate the goods price. But, the buyers will be eased by the cash less payment as the system of the modern market does. Also, the batik market in Banjarsari Market will be formed in stores style, not kiosk as the general market has, thus the quality of the batik would remain good, not contaminated by the groceries or other stuff that wet and having bad smell.

2.1.3. National Standard Regulations of Traditional Market

The design of Banjarsari Market will be referring to *Peraturan Kepala Badan Standardisasi Nasional Nomor 7 Tahun 2015 tentang Skema Sertifikasi Pasar Rakyat* as the written below.

LAMPIRAN II

PERATURAN KEPALA BADAN STANDARDISASI NASIONAL,
NOMOR : 7 Tahun 2015
TANGGAL : 25 September 2015

PENILAIAN TIPE PASAR RAKYAT

Tabel 1 Klasifikasi Tingkat Kesesuaian Inspeksi dan Audit Pasar Rakyat

| No | Kriteria | Persyaratan Tipe I | Persyaratan Tipe II | Persyaratan Tipe III | Persyaratan Tipe IV | Tingkat Kesesuaian | Norma Penilaian |
|--|---------------------------|--|--|--|--|--------------------|---|
| Persyaratan Jumlah Pedagang | | | | | | | |
| 1. | Jumlah pedagang terdaftar | ≥750 | 501 – 750 | 250 - 500 | < 250 | | |
| Persyaratan Teknis (Pasal 4.2 dalam SNI 8152:2015) | | | | | | | |
| 2. | Ukuran luas ruang dagang | Min. 2m ² | Min. 2 m ² | Min. 2m ² | Min. 1 m ² | Utama | |
| 3. | Jumlah Pos | Min. 2 pos | Min. 2 pos | Min. 2 pos | Min. 1 pos | Utama | Untuk Tipe |
| No | Kriteria | Persyaratan Tipe I | Persyaratan Tipe II | Persyaratan Tipe III | Persyaratan Tipe IV | Tingkat Kesesuaian | Norma Penilaian |
| | Ukur Ulang | | | | | | I, II, dan III, apabila hanya tersedia 1 pos maka pasar dinilai memenuhi persyaratan kriteria "Jumlah Pos Ukur Ulang" |
| 4. | Zonasi | <ul style="list-style-type: none"> •Pangan basah •Pangan | <ul style="list-style-type: none"> • Pangan basah • Pangan | <ul style="list-style-type: none"> • Pangan basah • Pangan | <ul style="list-style-type: none"> • Pangan basah • Pangan | Utama | Pasar yang telah memenuhi 60% |
| No | Kriteria | Persyaratan Tipe I | Persyaratan Tipe II | Persyaratan Tipe III | Persyaratan Tipe IV | Tingkat Kesesuaian | Norma Penilaian |
| | | kering •Siap saji •Non pangan •Tempat pemotongan unggas hidup | kering • Siap saji • Non pangan • Tempat pemotongan unggas hidup | kering • Siap saji • Non pangan • Tempat pemotongan unggas hidup | kering • Siap saji • Non pangan • Tempat pemotongan unggas hidup | | persyaratan kriteria "Zonasi" dinilai memenuhi kriteria tersebut |
| 5. | Area parkir | Proporsional dengan luas lahan pasar | Proporsional dengan luas lahan pasar | Proporsional dengan luas lahan pasar | Proporsional dengan luas lahan pasar | Utama | Pasar yang telah memenuhi 75% persyaratan kriteria "Area parkir" |

| No | Kriteria | Persyaratan Tipe I | Persyaratan Tipe II | Persyaratan Tipe III | Persyaratan Tipe IV | Tingkat Kesesuaian | Norma Penilaian |
|----|--|--------------------|---------------------|----------------------|---------------------|--------------------|---|
| | | | | | | | dinilai memenuhi kriteria tersebut (lahan untuk area parkir 1 mobil: 8 m ²) |
| 6. | Area bongkar muat barang | Tersedia khusus | Tersedia khusus | Ada | Ada | Penunjang | |
| 7. | Akses untuk masuk dan keluar kendaraan | Terpisah | Terpisah | Ada | Ada | Utama | |
| 8. | Lebar koridor/ | Min. 1,8 m | Min. 1,8 m | Min. 1,5 m | Min. 1,2 m | Utama | |

| No | Kriteria | Persyaratan Tipe I | Persyaratan Tipe II | Persyaratan Tipe III | Persyaratan Tipe IV | Tingkat Kesesuaian | Norma Penilaian |
|-----|---|--|--|--|--|--------------------|---|
| | gangway | | | | | | |
| 9. | Kantor pengelola | Di dalam lokasi pasar | Di dalam lokasi pasar | Di dalam lokasi pasar | Ada | Utama | |
| 10. | Lokasi toilet dan Kamar mandi (terpisah antar gender) | Min. berada pada 4 lokasi yang berbeda | Min. berada pada 3 lokasi yang berbeda | Min. berada pada 2 lokasi yang berbeda | Min. berada pada 1 lokasi yang berbeda | Utama | Apabila hanya tersedia toilet di 1 lokasi, maka pasar dinilai memenuhi kriteria "Lokasi toilet dan Kamar mandi" |

| No | Kriteria | Persyaratan Tipe I | Persyaratan Tipe II | Persyaratan Tipe III | Persyaratan Tipe IV | Tingkat Kesesuaian | Norma Penilaian |
|-----|--|--|--|--|--|--------------------|------------------------------------|
| 11. | Jumlah toilet pada satu lokasi | Min. 4 toilet pria dan 4 toilet wanita | Min. 3 toilet pria dan 3 toilet wanita | Min. 2 toilet pria dan 2 toilet wanita | Min. 1 toilet pria dan 1 toilet wanita | Utama | |
| 12. | Tempat menyimpan bahan pangan basah bersuhu rendah/ lemari pendingin | Ada | Ada | - | - | Utama | |
| 13. | Tempat cuci tangan | Min. berada pada 4 lokasi yang berbeda | Min. berada pada 3 lokasi yang berbeda | Min. berada pada 2 lokasi yang berbeda | Min. berada pada 1 lokasi | Penunjang | Apabila tidak tersedia tempat cuci |

| No | Kriteria | Persyaratan Tipe I | Persyaratan Tipe II | Persyaratan Tipe III | Persyaratan Tipe IV | Tingkat Kesesuaian | Norma Penilaian |
|-----|---|--------------------|---------------------|----------------------|---------------------|--------------------|--|
| 21. | Ruang disinfektan | Ada | Ada | Ada | - | Penunjang | |
| 22. | Area penghijauan | Ada | Ada | Ada | Ada | Utama | Mengacu kepada peraturan daerah setempat |
| 23. | Tinggi anak tangga (untuk pasar dengan 2 lantai) | Maks. 18 cm | Maks. 18 cm | Maks. 18 cm | Maks. 18 cm | Penunjang | |
| 24. | Tinggi meja tempat penjualan dari lantai, di zona | Min. 60 cm | Min. 60 cm | Min. 60 cm | Min. 60 cm | Penunjang | |

| No | Kriteria | Persyaratan Tipe I | Persyaratan Tipe II | Persyaratan Tipe III | Persyaratan Tipe IV | Tingkat Kesesuaian | Norma Penilaian |
|-----|-------------------|-----------------------------------|-----------------------------------|---------------------------|---------------------|--------------------|---|
| | | | | | | | tangan sama sekali, maka pasar dinilai memenuhi kriteria "Tempat cuci tangan" |
| 14. | Ruang Menyui | Min. 2 ruang | Min. 1 ruang | Ada | Ada | Penunjang | |
| 15. | CCTV | Min. berada pada 2 lokasi berbeda | Min. berada pada 2 lokasi berbeda | Min. berada pada 1 lokasi | - | Penunjang | |
| 16. | Ruang peribadatan | Min. 2 ruang | Min. 1 ruang | Min. 1 ruang | Ada | Utama | |

| No | Kriteria | Persyaratan Tipe I | Persyaratan Tipe II | Persyaratan Tipe III | Persyaratan Tipe IV | Tingkat Kesesuaian | Norma Penilaian |
|-----|-----------------------------------|--|--|--|--|--------------------|-----------------|
| | tempat sampah | toko/kios/los / jongko/ konter/ pelataran •Setiap fasilitas pasar | toko/kios/los / jongko/ konter/ pelataran •Setiap fasilitas pasar | toko/kios/los / jongko/ konter/ pelataran •Setiap fasilitas pasar | toko/kios/los / jongko/ konter/ pelataran •Setiap fasilitas pasar | | |
| 32. | Alat angkut sampah | Ada | Ada | Ada | Ada | Utama | |
| 33. | TPS Sementara | Ada | Ada | Ada | Ada | Utama | |
| 34. | Pengelolaan sampah berdasarkan 3R | Ada | Ada | Ada | Ada | Penunjang | |
| 35. | Sarana pangan | Ada | Ada | Ada | Ada | Utama | |

| No | Kriteria | Persyaratan Tipe I | Persyaratan Tipe II | Persyaratan Tipe III | Persyaratan Tipe IV | Tingkat Kesesuaian | Norma Penilaian |
|-----|---------------|--------------------|---------------------|----------------------|---------------------|--------------------|--|
| | peribadatan | | | | | | |
| 17. | Ruang bersama | Ada | Ada | Ada | - | Utama | Ruangan dapat permanen atau tidak permanen |
| 18. | Pos kesehatan | Ada | Ada | Ada | Ada | Penunjang | |
| 19. | Pos keamanan | Ada | Ada | Ada | Ada | Utama | |
| 20. | Area merokok | Ada | Ada | Ada | Ada | Penunjang | Mengacu kepada peraturan daerah setempat |

| No | Kriteria | Persyaratan Tipe I | Persyaratan Tipe II | Persyaratan Tipe III | Persyaratan Tipe IV | Tingkat Kesesuaian | Norma Penilaian |
|-----|-------------------------------|--------------------|---------------------|----------------------|---------------------|--------------------|-----------------|
| | pangan | | | | | | |
| 25. | Akses untuk kursi roda | Ada | Ada | - | - | Penunjang | |
| 26. | Jalur evakuasi | Ada | Ada | Ada | Ada | Utama | |
| 27. | Tabung pemadam kebakaran | Ada | Ada | Ada | Ada | Utama | |
| 28. | Hidran air | Ada | Ada | - | - | Penunjang | |
| 29. | Pengujian kualitas air bersih | Setiap 6 bulan | Setiap 6 bulan | Setiap 1 tahun | Setiap 1 tahun | Penunjang | |
| 30. | Pengujian limbah cair | Setiap 6 bulan | Setiap 6 bulan | Setiap 1 tahun | Setiap 1 tahun | Penunjang | |
| 31. | Ketersediaan | •Setiap | •Setiap | •Setiap | •Setiap | Utama | |

2.2. Green City Attributes

1. Green Planning and Design

Improvements in the quality of urban planning and design that apply the concept of sustainable city development include the preparation of Detailed Spatial Plans or *Rencana Detil Tata Ruang (RDTR)*, Building and Environmental Planning or *Rencana Tata Bangunan dan Lingkungan (RTBL)* or regional master plans that have considered plans for the provision or conservation of open green areas (OGS).

2. Green Planning and Design

Green community is a strategy for involving various stakeholders from the government, business and community circles in the development of green cities. Green community aims to create real stakeholder participation in green city development and build communities that have environmentally friendly characters and habits, including the habit of disposing of waste, utilizing small land as green areas such as urban farming, and active community participation in green city programs.

3. Green Planning and Design

The improvements of both quality and quantity of open green areas of a city in accordance of the city or district characteristics with a minimum proportion of green open space is 30% of the area, with the composition of 20% public green open space and 10% private green open space (Law No. 26 of 2008 concerning Spatial Planning; Minister of Home Affairs Number 14 of 1988 concerning the standard area of Open Green Areas or *Ruang Terbuka Hijau (RTH)* of the City).

4. Green Building

Efforts to develop energy-efficient and environmentally friendly buildings through the application of green building principles. It's a building whose life cycle starts from the planning, construction, operation, maintenance, renovation, and demolition stages, taking into account negative impacts and creating positive impacts on the climate and natural environment. Indonesia has an institution to certify green buildings, namely the Green Building Council Indonesia (GBC Indonesia).

5. Green Energy

Utilization of non-renewable energy sources efficiently and environmentally friendly by utilizing renewable energy sources (alternative energy). Green energy is closely related to the concept of green building as a supporting element for the concept to achieve sustainable design goals.

6. Green Transportation

Efforts to overcome transportation system problems, especially congestion and motor vehicle pollution by developing sustainable transportation with the principle of reducing negative impacts on the environment, such as bicycle. The building can provide bicycle tracks and pedestrian pathway to support the use of green transportation.

7. Green Water

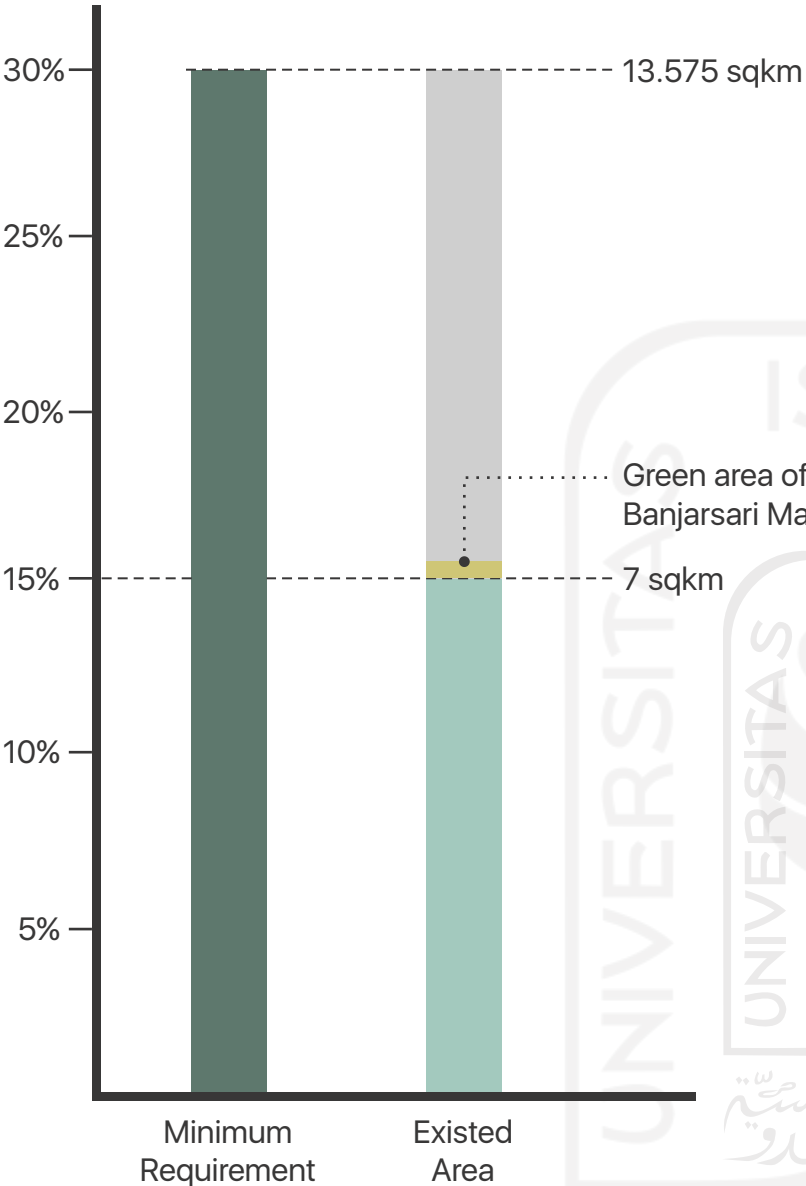
Efficient use of water resources for survival by maximizing water absorption, reducing water runoff, and streamlining water use. This effort can be in the form of recycling rainwater for reuse, or a sewerage system.

7. Green Waste

Waste/garbage management efforts to create zero waste by applying the 3R concept: Reuse (reduce waste), Reuse (add value to the waste from the recycling process), Recycle (recycle waste).



2.2.1. Green Open Space as Respond to Urban Issue



As a respond to the city's issue, lack of open green areas, providing a designed green open space in site is the most suitable attribute

Open green space requirement for a public building is 20% at the minimum number. However, the design also needs to increase the open green space area in city's scale, where the Regional Regulation mentioned that the total area of open green space in Pekalongan should be at least 30% of the total area, 20% of public green open space, 10% of private green open space. The area of Pekalongan City itself covers 45.25 square kilometer, but now the area for green space is only 7 square kilometer, which is only 15% out of 30%.

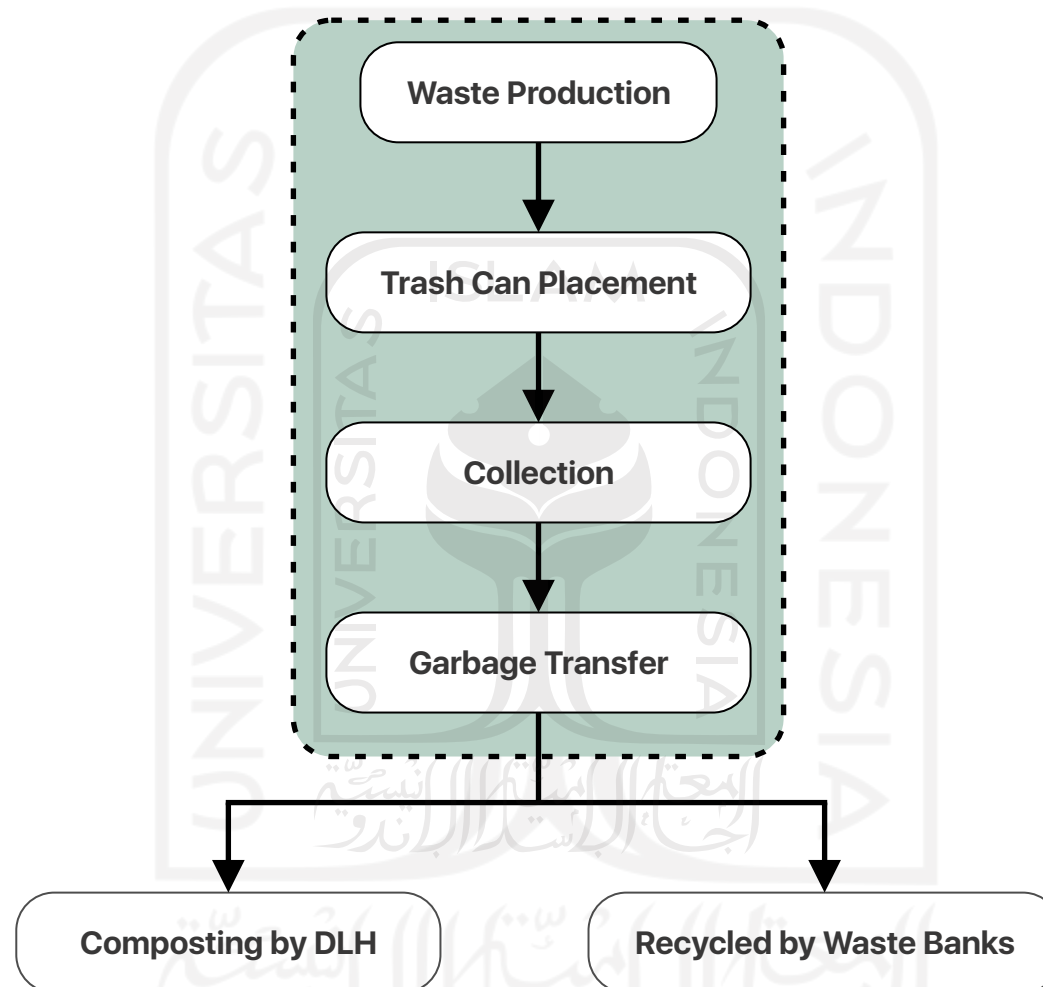
The gap or the number that needs to be fulfill to reach the minimum requirement of green areas in Pekalongan city is 15% or 7 sqkm more areas. Open green space requirement for a public building is 20% at the minimum number. The site area is 17.300 m2, so the site will need 3.460 m2 for open green space. Thus, the design of open green space in Banjarsari Market should contribute in increasing the percentage number of green areas in Pekalongan City for 0,0002593% at the minimum number.

Diagram 1.1 Open Green Areas number in Pekalongan City

2.2.2. Green Waste Management

The volume of waste generated by a market is needed to determine the design and management of waste according to the waste generated. Banjarsari Market, as the other market, will produce a lot of waste, both wet and dry. The concept of a traditional market that is in people's minds is a market that is muddy, smells, scattered trash, and it makes people don't want to visit traditional market, so they prefer to go to modern markets such as supermarkets. Good waste management will have a good impact on a sustainable market.

The solid waste management technique which includes trash can placement, collection, garbage transfer, treatment, and final disposal can be described in the following scheme:



Waste management at the Banjarsari Market will be managed up to waste transfer activities from the market to TPS3R (waste management site for 3R which is reduce, reuse, and recycle; or named *Tempat Pengelolaan Sampah 3R*) for organic waste to be processed into compost and to waste banks for inorganic waste to be recycled. The generated waste will be transferred to the management site by dump trucks with capacity 8m³ per truck, which each truck can be operated 2-3 times per day to pick up the waste.

At the Banjarsari Market, waste management will be one of the contributions to increase the 'green' number in Pekalongan City by:

1. Giving good understanding and remind all merchants in Banjarsari Market about the awareness of the cleanliness of the kiosks and shops they use for the convenience of all market users.
2. Providing trash bin at predetermined points.
3. Separation of organic and inorganic waste bins, as well as providing trash bins based on the type of inorganic waste, such as plastic, drink cans, paper, glass, and other types of waste that are not included in the types above.
4. Cooperate with the Pekalongan City Environment Agency or *Dinas Lingkungan Hidup* (DLH) to process organic waste into compost and reprocess inorganic waste at the waste bank provided by the management of the *Tim Penggerak Pemberdayaan dan Kesejahteraan Keluarga* (TP-PKK) with the principle of 3R (Reduce, Reuse, and Recycle).

Generated Waste Volume in Banjarsari Market

The waste production amount in the Banjarsari Market, Pekalongan City can be calculated based on the total area multiplied by the average amount of waste generation per person per day is 0,20-0,60 liters/m²/day. The population of Pekalongan City in 2020 is 315.218 people (source: BPS Pekalongan) and the total area of the active market area of Banjarsari Market in this design is 17.300 m² + (8.607 m² x 4) = 51.728 m². Thus the waste volume of Banjarsari market per day is:

- The minimum amount = 0,20 liter x 51.728 m² = 10.346 liter/day or 10,4 m³/day
- The maximum amount = 0,60 liter x 51.728 m² = 31.036 liter/day or 31,1 m³/day
- The average amount = (31,1 m³/day + 10,4 m³/day)/2 = 20,75 m³/day.

According to the calculation above, the maximum amount of waste production per day which is 31,1 m³/day will be used as a benchmark for the amount of waste collection space needed in Banjarsari Market.

Dump Trucks Needed

Based on the data mentioned in the journal of *Faktor-Faktor Yang Mempengaruhi Kinerja Pengelolaan Sampah Di Pasar Banjarsari, Kota Pekalongan* by Rondiyah and team (2014), there were one truck that was operated 3 times in a day to pick up the trash for 22 m³ waste. In this design, the market needs at least two different trucks to pick up the organic and inorganic trash. From the total amount 31,1 m³ waste in a day, 53,2% of them are organic waste and 46,8% of them are inorganic waste. It means according to the calculation of the total amount of generated waste in Banjarsari Market, the estimated organic waste amount is 16,55 m³ and the estimated inorganic waste amount is 14,5 m³.

- The dump trucks needed for the organic waste: 1 truck operated 2-3 times a day.
- The dump trucks needed for the inorganic waste: 1 truck operated 2 times a day.

2.3. Precedent Studies

a. Prawirotaman Traditional Market

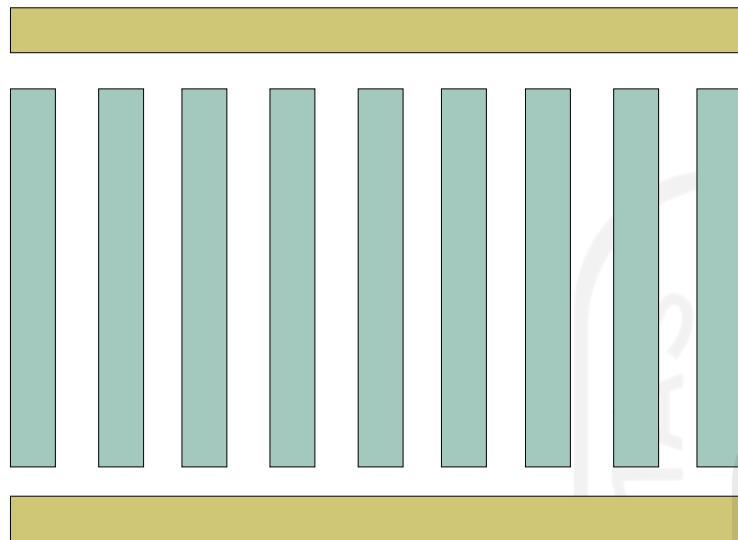


Picture 2.1.3.1 New Building of Prawirotaman Traditional Market
Source: Detik.com, 2020

Prawirotaman Traditional Market has been completely revitalized so that it is more contemporary. The traditional market is now equipped with a co-working space to a mini lounge. The traditional market which is located on Jalan Parangtritis, Yogyakarta City was originally only one level. However, after being revitalized the market now consists of 5 floors with a capacity of 619 kiosks and stalls. The lowest floor (basement) is designed for a traditional market in the form of 4 stalls and a parking area with a capacity of about 385 motorbikes and 8 cars. The first floor for 13 kiosks and 185 booths, the second floor for 265 booths, the third floor for 152 booths, and the fourth floor will be used for co-working space.

Floor 1, 2, 3 are used for buying and selling activities of the people's market. In addition, to support digitization 4.0 with the support of BPD DIY, a digital-based millennial traditional market was developed. This development is aimed at developing the creative economy (Ekraf), with facilities for co-working space, music studio, podcast studio, health room, meeting room, mini lounge, lactation room, children's play room, creative economy room, food court, and stage facilities for music creators.

The existence of the people's market is not only a place for transactions, but also plays an important role in civilization, socio-cultural, artistic and culinary aspects that describe the characteristics of a region. Looking inside Prawirotaman Market, the whole place looks neat and clean. Each stall also a barcode for online payments.



Dry Stuff Area
 Wet Stuff Area



Picture 2.1.3.2 & 2.1.3.3 Interior of Prawirotaman Traditional Market
Source: Detik.com, 2020

The zoning definition of wet and dry area in this market is quite efficient. The dry area is not totally separated from the wet area, instead they put the dry area alongside the wet area. This system allows the buyers move efficiently, for example: they can just simply turn their back around when they need to buy stuff from the dry section, such as groceries, while they are in the wet stuff section.



The previous condition of Prawirotaman Market was no longer suitable for buying and selling activities. These conditions include the lack of space for buyer circulation, lack of access to light inside the building, as well as the condition of the building structure that requires maintenance and repair. It can be seen that the buying and selling area has been redesigned to be wider and more comfortable for buyers to pass by.

Prawirotaman Market uses the kawung batik pattern on some of its building facades to show the unique identity of Jogja. This will be applied too on my Banjarsari Market design.

b. Jebres Traditional Market



Picture 2.1.3.4 New Building of Prawirotaman Traditional Market
Source: Radar Solo, 2019

Jebres Market was built for the first time in 1985. Until 2017 there has never been a complete repair. So it is not surprising that the initial conditions were muddy, shabby, dirty, with lots of rats and cockroaches. Inaugurated by the Municipal Government of Surakarta, the market building opposite Solo Jebres Station does look magnificent. The municipal government of Surakarta is considering upgrading the Jebres Market class, after the market building was revitalized and inaugurated last month. The plan for the Jebres Market to be raised from class 2 to class 1. Various supporting facilities, ranging from booths and kiosks, lactation rooms, health rooms to tarpaulins are also available in the market. The market development plan to be in line with the Solo Jebres Station area, which is a cultural heritage building, was immediately realized by the City Government. After all, the location of the market and the station which are only separated from Jalan Prof. John makes Jebres Market so strategic. This is because the market has the potential to attract residents outside Solo, especially train passengers who get off at Solo Jebres Station. We will specialize in a row of stalls at the front of the market as a location for selling Solo souvenirs. From a physical point of view, the Jebres Market building design has since been aligned with the station building. So it looks like one with the local area.

In Jebres Market, there are 10 stalls and 20 culinary special zone booths on the top floor of Jebres Market. However, only four units of kiosks are occupied by traders, while only seven booths are occupied. However, the culinary zone which occupies the top floor of Jebres Market is still quiet, because buyers are still reluctant to go upstairs to buy only food.

The number of traders in Jebres Market is 661 traders, including an additional 191 court traders and street vendors (PKL). But, there are hundreds of traders who have not occupied the stalls and booths at the Jebres Market. This is because there are traders who are not ready to sell in new locations.

PASAR JEBRES 2019

Riwayat Revitalisasi

2018 Pembangunan struktur dan konstruksi bangunan Didanai Pemprov Jateng sebesar Rp 1,3 miliar Alokasi APBD 2018 sebesar Rp 5,561 miliar

2019 Finishing atau tahap akhir pembangunan Alokasi APBD 2019 sebesar Rp 3,9 miliar

Fasilitas

- Kios
- Ruang laktasi
- Los
- Ruang kesehatan
- Pelataran
- Ruang tera
- Kuliner
- Mushalla
- Penggilingan daging
- Ruang informasi
- Kantor pengelola
- Ruang CCTV
- Gudang
- Toilet
- Loading area
- Drainase
- Instalasi pengolahan limbah
- Listrik
- APAR
- Akses difabel

Pembagian Zonasi Daya Tampung

Lantai dasar | 43 unit Kios, 200 unit Los
Sayuran, plastik, daging, parutan kelapa, grabadan, makanan kering, sembako, penggilingan daging, tahu-tempe, arang

Lantai atas | 26 unit Kios, 158 unit los
Kuliner, sayuran, buah, plastik, grabadan, makanan kering

Oprokan khusus PKL | 186 unit



Picture 2.1.3.5 Jebres Traditional Market Facility
Source: Surakarta.go.id, 2019



The previous condition of Prawirotaman Market was also no longer suitable for buying and selling activities. This market is located right across from Jebres Solo Station. In contrast to the station's majestic building, this market previously only had a tin roof with an iron structure that was increasingly rusty. The narrow area also makes buyers and sellers uncomfortable in the market for long. Finally, the current Jebres Market was built with a building typology that was aligned with the Jebres Station building design.

Parking area for market visitors are located on each outer side of the building to make it easier for visitors to shop efficiently. There is no need for a basement as a parking area because the parking space on the edge of the building is sufficient.

Picture 2.1.3.6 & 2.1.3.7 Jebres Traditional Market
Source: Suara Merdeka Solo, 2019

2.4. Description and Boundary

a. Description of Market

Market in terms of economic theory is a situation where buyers (consumers) and sellers (producers and traders) make transactions after the two parties have agreed on the price of a certain quantity (quantity) of goods which becomes the object of the transaction. Both parties, buyers and sellers, benefit from a transaction or market. The buyer of hestanto.web.id gets the desired item to meet and satisfy their needs, while the seller gets a reward for income which is then used to finance his activities as a production economic actor or trader.

Meanwhile, according to the Ministry of Public Works (DPU) the meaning of the market is divided into:

1. Functionally

- In an economic sense, the market is a buying and selling transaction between traders and buyers.
- In a social sense, the market is a place of social contact for the local community.

2. Formally

In an institutional sense, the market can be viewed as a formal institution managed by the regional government for which the retribution is formally collected by the Market Office (an institution under the Regional Government). Furthermore, according to some of the above definitions, the following conclusions can be drawn: *"Market is a formal institution managed by the Regional Government as a means of the economy of the community in a certain area, where in addition to a sale and purchase transaction between sellers and buyers, there is also a relationship or social contact. among these environmental communities "*.



- **Building Condition**

Banjarsari Market is a market that has been around for a long time, so the existing construction and facilities are no longer able to support current activities. Besides that, the shape of the building itself does not reflect buildings characterized by commercial buildings and lack of identity of regional architecture.

The market that has been around for a long time and the building located on Jalan Sultan Agung caught fire 3 years ago, so the condition of the building after the fire was not possible to be used again. Until now, the government has used a temporary / emergency market which is divided into 2 locations, namely the emergency market in Sampangan (still one area with the old building) and in Sorogenen. The number of traders and types of kiosk in Sorogenen is approximately the same as the number in emergency market in Sampangan.



Picture 2.3.1.1 Emergency Market in Sampangan Area
Source: Author, 2021

Existing Site and New Location

A. Emergency Market in Sampangan

Area: 8.700 m²



Picture 2.3.1.2 Emergency Market in Sampangan
Source: Google Earth, 2021

C. Emergency Market in Sampangan C. Proposed Site for New Market

Area: 8.650 m²



Picture 2.3.1.3 Emergency Market in Sorogenen
Source: Google Earth, 2021

Area: 17.000 m²



Picture 2.3.1.4 Proposed Site for Market Relocation
Source: Google Earth, 2021

2.5. Banjarsari Market Overview

2.5.1. Physical Condition

- **Population of Pekalongan City**

The total population of Pekalongan City in 2019 was 307,097, consisting of 153,518 men and 153,579 women. The largest population is in Pekalongan Barat Subdistrict, with a total of 95,555 inhabitants, while the smallest population is in Pekalongan Selatan Subdistrict, which is 63,052 inhabitants. In 2015 to 2019, the population growth rate in Pekalongan City was 1,24%. The population density in Pekalongan City also tends to increase along with the increase in population. In 2018, the population density in Pekalongan City was 6,729 people / km³, which in the following year, namely 2019, increased to 6,786 people / km³. The population structure in Pekalongan City is constructive. This means that the population of productive age is more than the population of old age. Based on BPS data, it is known that the population dependency ratio of Pekalongan City in 2019 is 42.37%.

| Year | Number of Population | Growth (%) |
|------|----------------------|------------|
| 2015 | 296.404 | - |
| 2016 | 299.222 | 0,95% |
| 2017 | 301.870 | 0,88% |
| 2018 | 303.938 | 0,69% |
| 2019 | 307.097 | 1, 04% |
| 2020 | 315.218 | 2,64% |

Table 2.0 Population Growth in Pekalongan City (2015 - 2020)
Source: BPS of Pekalongan City, 2020

- **Number of Market and Seller Registered in Pekalongan Municipality**

| Year | Number of Market | Number of Sellers | | | | | |
|------|------------------|-------------------|-------|-------|--------|-------|------------|
| | | Toko | Kios | Los | Eceran | Total | Growth (%) |
| 2014 | 10 | 247 | 1.524 | 3.154 | 1.400 | 6.325 | - |
| 2016 | 11 | 247 | 844 | 1.958 | 1.482 | 4.531 | -28,36% |
| 2018 | 11 | 74 | 466 | 1.300 | 1.228 | 3.068 | -32% |
| 2020 | 10 | 74 | 555 | 1.404 | 1.135 | 3.168 | 3,26% |

Table 2.1 Market Growth in Pekalongan City (2014 - 2018)
Source: BPS of Pekalongan City, 2020

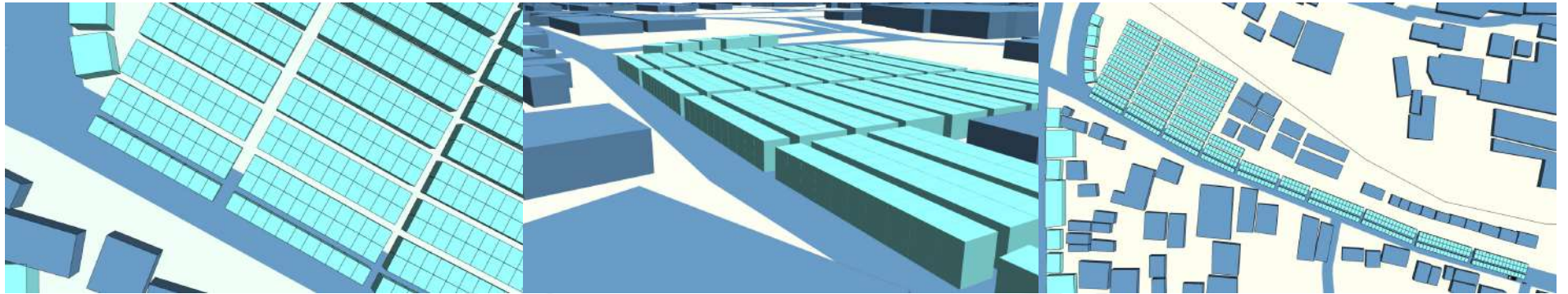
The market growth in Pekalongan City in 2014 to 2016 has decreased by 28,36% and 2016 to 2018 has decreased by 32%. In average, the market growth has decreased by 3,64%. This phenomenon was caused by the bad condition of the market and decreased financial capacity in Pekalongan City. But in 2020, the growth in the number of markets and economic activities in the city reached 3,26% from the number of 2018's growth. It is predicted that the same figure will be achieved in the next 2 years and so on. **So the hypothesis of market growth in Pekalongan City for the next 10 years, namely until 2030, the market growth that will occur is approximately 16.3%.**

| Year | Number of Market | Number of Sellers | | | | | |
|------|------------------|-------------------|------|-------|--------|-------|------------|
| | | Toko | Kios | Los | Eceran | Total | Growth (%) |
| 2020 | 10 | 74 | 555 | 1.404 | 1.135 | 3.168 | - |
| 2030 | Unknown | 87 | 646 | 1.633 | 1.321 | 3.687 | 16.3% |

Table 2.2 Prediction of Market Growth in Pekalongan City (2020 to 2030)
Source: Author Hypothesis, 2021

2.5.2 Non-Physical Condition

Number of Sellers and Stalls in Sampangan Emergency Market



Picture 2.3.1.5 - 2.3.1.6 Existing condition of the market
Source: Cadmapper, 2021

Data of Existing Market:

Number of sellers :1.024 persons
Number of kiosks :1.024 units

Types of Kiosks:

- Batik and textiles : 563 units
- Food stalls : 278 units
- Groceries : 234 units
- Fruit and Vegetables : 177 units
- Household Appliances : 80 units
- Toys Stalls : 64 units
- Hair Salon : 52 units
- Machine Garage : 17 units
- Meats : 294 units
- Fish and Seafood : 139 units
- Others : 57 units

Data of Abandoned Building:

Number of Storeys : 3 storeys

Types of Stalls:

- Clothes stalls
- Food stalls
- Groceries
- Fruit and Vegetables
- Household Appliance
- Toys Stalls
- Hair Salon
- Meats
- Fish and Seafood
- Others



Picture 2.3.1.7 - 2.3.1.11 Existing condition of the market
Source: Author, 2021



2.6. Banjarsari Market Trading Activity Overview

2.6.1. Type of Market Activities

The types of activities in the Banjarsari market are:

- **The main activities** are activities that dominate the Banjarsari market, namely batik, textiles and daily staples.
- **Secondary activity** is a type of trade that complements its main activities, namely, white, gold, grocery and other activities.

2.6.2. Type of Service Activities

There are five types of service activities in Banjarsari Market:

- **Shops / Stores**

The shops in the Banjarsari market are the same as the shops in general, namely sellers and buyers in the shop are limited by a table / window display or by letting the buyers see the merchants' merchandise. This form of service generally sells textiles, shoes and is located on the outside of the Banjarsari market building.



Picture 2.4.1 Chinese shops in Banjarsari Market
Source: Author, 2021

- **Market Stalls**

The form of Banjarsari market service is that sellers and buyers are in a standing position to select the desired goods. While the room divider is from a permanent wall.



- **Los**

The form of market service sellers and buyers in a sitting position on the board. The one that is raised to a height of about 30 cm, deep. This service traders and buyers can chat while choosing or browse the merchandise carefully and not in a hurry. The form of service from the Banjarsari market stall is to separate the seller and the buyer with their merchandise. With a room divider using bamboo or boards which also serve as a place to put or display items.

- **Street Vendors (PKL)**

It is a form of sidewalk trading service with the characteristics of the seller sitting or standing beside or behind his merchandise table. There are many street vendors in the market corridors and outside the market who use road and parking facilities as their place, as for their merchandise such as sandals, clothes, shoes, food, fruits and other things.



Picture 2.4.3 Street Vendors in Banjarsari Market
Source: Author, 2021

2.6.3. Emergency Market Building Specification

- **Total Area of Emergency Market**

Sampang: 8.700 m²

Sorogenen: 8.650 m²

- **Structure**

Iron frame, zinc panels (as wall), with structure module 2,5m x 2,5 m.

- **Flooring**

Inside the stalls: Wooden board and ceramic tiles

Circulation area: Unfinished asphalt (same as the road)

- **Roof**

Flat tin roofs.



Picture 2.4.4 Emergency Market in Sampangan
Source: Author, 2021

2.7. Banjarsari Market Building Requirements

According to *Peraturan Kepala Badan Standardisasi Nasional Nomor 7 Tahun 2015 tentang Skema Sertifikasi Pasar Rakyat*, Banjarsari Market is included in the market Type 1 with specification:

- Number of Registered Traders: ≥ 750 people.
- Selling Space Area: Minimum of 2 square meters.
- Number of Re-measurement Post: Minimum of 2 posts.
- Zoning: Wet food section, dry food section, fast food section, non-food section, live poultry slaughterhouse.
- Parking Area: Proportional with market area, with 8 square meters at the minimum area for 1 car.
- Loading and Unloading Area: Specifically provided.
- Transportation Entrance and Exit: Separated.
- Corridor Area: Minimum of 1,8 meters wide.
- Management Office: Inside the market.
- Toilet: Provided separately for each gender, located in 4 separated location at the minimum.
- Number of Toilet in One Location: Minimum of 4 for each gender.
- A place to store low-temperature wet food / refrigerator: Specifically provided.
- Hand Washing Facilities: Provided in 4 different location at the minimum.
- Nursing Room: Min. 2 rooms.
- CCTV Room: Min. 2 different rooms.
- Praying Room (mushola): Min. 2 rooms in different location.
- Praying Room (mushola): Min. 2 rooms in different location.
- Common Room: Provided.
- Health Room: Provided.
- Security Post: Provided.
- Smoking Area: Provided.
- Disinfectant Room: Provided.
- Green Space: Provided.
- Wheelchair Access: Provided
- Evacuation Route: Provided.
- Fire Extinguisher: Provided.
- Water Hydrant: Provided.
- Availability of Garbage Space/Shaft: Provided at each store/kiosk/counter/court and at every market facilities.
- Temporary Garbage Dump Area: Provided.



03

PROBLEM AND
DESIGN ANALYSIS

3.1. Non-Physical Problem and Analysis

3.1.1. Traders

Traders are people who occupy the market to offer or display or sell their wares. In general, they come from their own area, (Pekalongan) and some come from outside areas, they are usually from the middle to lower economic class, this is seen by the buying and selling system by bargaining. Meanwhile, modern traders or traders from a strong economic class, the goods presented are already the benchmark price so that buyers look at the goods and will buy based on their financial condition.

Their activities are:

- Preparing their merchandise
- Marketing their wares
- Paying retribution
- Packing their merchandise
- Going back home

Estimated amount of traders in next 10 years (2030):

Comparison condition to 2020

- Total population 315.218 souls
- Total traders 3.168 people

Percentage of traders = 1,005%

- Predicted total traders in 2030

Total Traders in 2020 + (Population in 2030 x KDB (for market) x Percentage of traders)

= 3.168 + (354.306 souls x 60% x 1,005%)

= 5.305 people (in total for Pekalongan City's traders)

The analysis here is only limited to the choice of traders in terms of displaying their wares to attract buyers.

3.1.2. Buyers

Buyers are people who take advantage of the existence of the market Banjarsari to buy basic necessities. Buyers are usually from the local community itself and do not rule out the possibility for people outside the area.

Analysis in the form of Ratio

Market Visitors Amount

- Weekdays: about 2.000
- Holidays: about 2.800

Space for one buyer $0.7 \times 0.7 = 0.49 \text{ m}^2$

So for the area of the visitors, as evidence of the area is 17.300 and a building area of 15,700 m².

- Total area for visitors on holidays $2.800 \times 0.49 = 1.372 \text{ m}^2/\text{visitor}$.
- Area for visitors on weekdays $2.000 \times 0.49 = 980 \text{ m}^2/\text{visitor}$.

In the existing Banjarsari market, various activities are still mixed in one zoning/area so that it confuses buyers to buy the desired goods. Therefore, **the zoning in the Banjarsari market must be distinguished from the location of the type of trade between wet and dry and the type of trade** that is often needed on a daily basis must be placed on access to achievement. so it saves for the buyer and also saves cost.

3.1.3. Management

The activities that occur are related to market management which consist of:

- **Administration Activities**
Consists of activities related to finance, bookkeeping, administration of goods, inventory and data collection.
- **Internal Activity Group And staff**
Managers consist of officers and officials as well as market officials of the Pekalongan Municipal Government which serve the fields of management, data collection, user fees and services.

The room types:

- Chairman's Room
- Head Office Room
- Meeting Room
- Lavatory
- Hall and Living Room



3.2. Physical Problem and Analysis

3.2.1. Market Capacity

Based on the data of the capacity of two emergency markets, the estimated number of sellers and stalls are the same as the emergency markets', which are 1.248 sellers and 2.048 units of stall. Look from the service point of view of the Banjarsari Market compared to the available land area, it cannot accommodate the activities that are in it, then an alternative to be able to accommodate the activities in it is to increase the number of floors in the form of a multi-story vertical building. When calculated by the ratio of the building area compared to the number of existing traders, to get a prediction of the floor area requirement in the Banjarsari market is:

- In 2020 total population = 315.218 souls.
- In 2030 total population = 219.040 people (growth 12,4% until 2030).

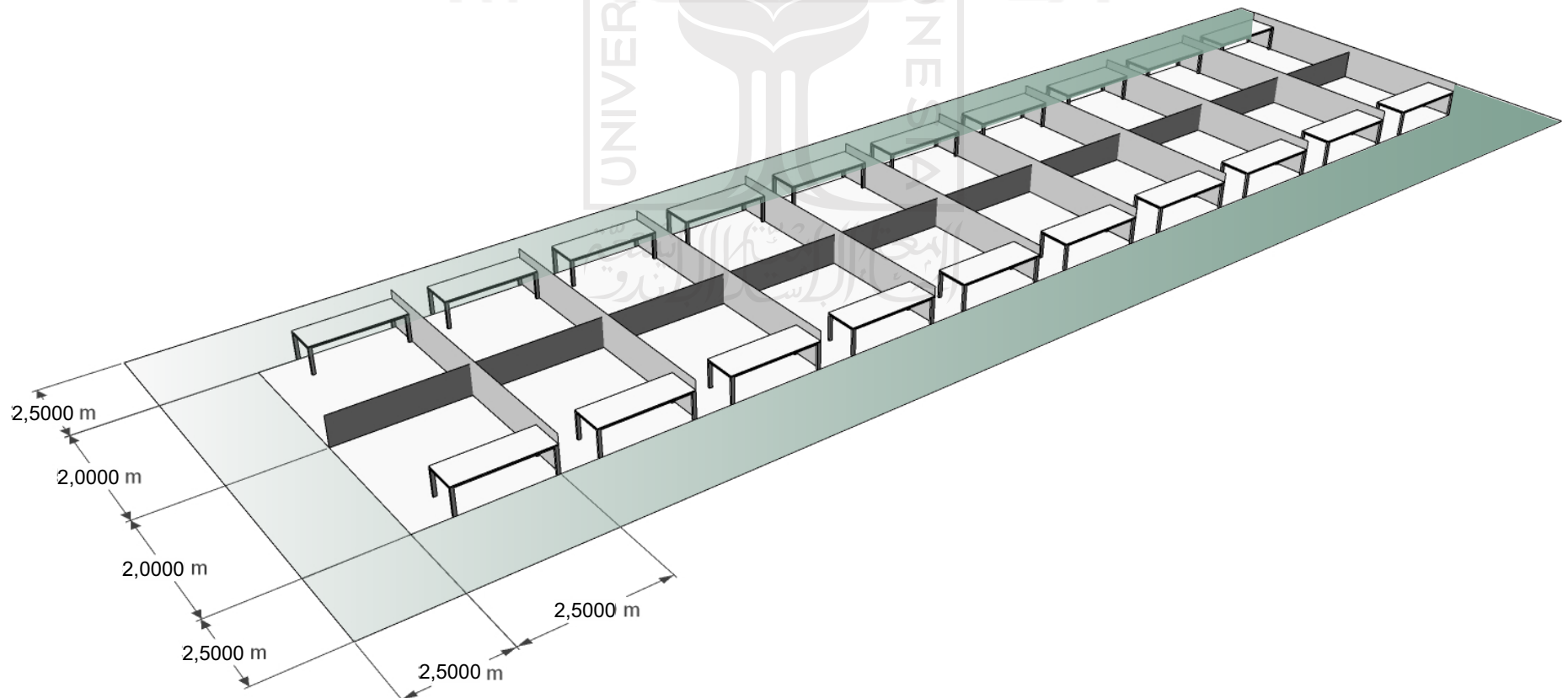
Based on the standard of RURTK, the need for shopping facilities is 0.25 m² / person. Then the need for shopping facilities in 2030 is estimated at 0,25m² / person x 219.040 = 54.760 m² / person.

The coefficient of shopping facilities in 1996/2007952/1375 = 60%.

Then the floor area requirements for the Banjarsari market are: 60% x 54.760 m² / person = 32.856 m².

32.856 m² : 2.382 = **5 m² / trader and their circulation.**

While the building area is 17.000 m², if at a glance the ratio of the average building area to the number of traders currently available is: 17.350 : 1.248 = 5 m² / trader. But in fact, the kiosk is 2m² for a seller, it's already fulfill the national standard for one kiosk but still far from enough to fulfill the minimum space requirement for one merchant to be comfortable. So the number of traders with a floor area does not give flexibility for traders and buyers to move in it. Thus, the market needs to be enhanced as multi-story building.



Picture 3.2.1. Market Kiosk Module
Source: Author, 2021

3.3. Unit Typology of Banjarsari Market

3.3.1. Regional Shopping Center Typology

This contains one to four department stores plus 50 to 100 or more satellite shops and facilities, all fronting on an internal pedestrian mall, or shopping walkway. Parking completely surrounds the building group so that all stores face inward to the mall with their "backs" to the parking area.

There is actually no specific composition of market floor plans, but there are 3 common spatial organization of market as the pictures at the right side. Generally, market will be arranged in grid and centralized form, but the placement of the core structure is different.

Building Codes and Green Area Regulation

Based on RDTRK 2010, Pekalongan city stipulates the following building intensities:

- Maximum KLB: 5
- Maximum KDB: 60%

Building ground floor area = site area X KDB = 17.000 m² x 60% = 13.600 m².

Building Floor Coefficient Requirements = Area of total space program (with parking) / Area of land that can be built = 17.000 m² / 10.200 m² = 1,25 (meet the requirements of max 5).

From the calculation of the space above, the total area of the shopping mall building and parking in the city of Pekalongan is 17,000 m². The plan is that the market will be built on an area of 10.200 m² and KDB 80% with a min height of 3 floors and a maximum of 5 floors.

Site area: 17,000 m²

BCR: 60% of 17.000 m² = 10.200 m²

FAR: 5 of 10.200 m² = 51.200 m²

Building Height: FAR/BCR = 5 Storeys

Open Green Space Requirements : 20% at the minimum number.

Requirements

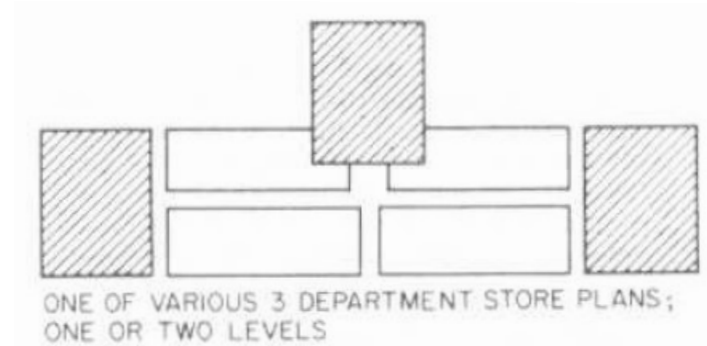
Total sellers in 2030= 2.382 persons

Number of sellers in one storey (at least)

= 2.382 persons : 5 storeys

= 477 sellers in one storey

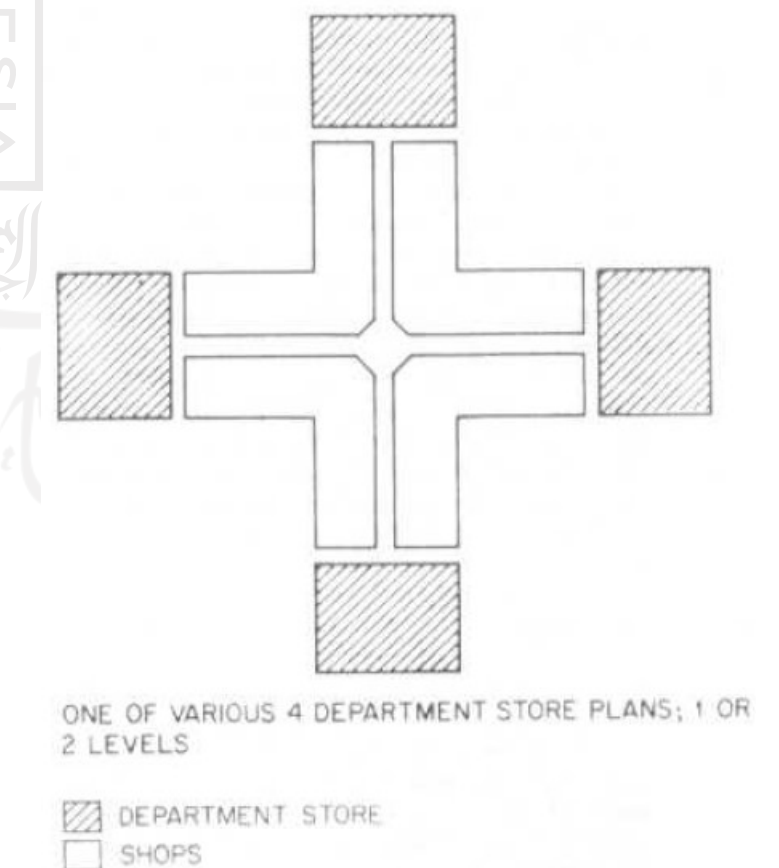
It means, the number of kiosk per storey is also at least 477 kiosks, while the module of one kiosk is 4m x 3m.



Picture 3.3.1. Unit Typology
Source: Time Saver Book by Joseph De Chiara, 1980



Picture 3.3.2. Unit Typology
Source: Time Saver Book by Joseph De Chiara, 1980

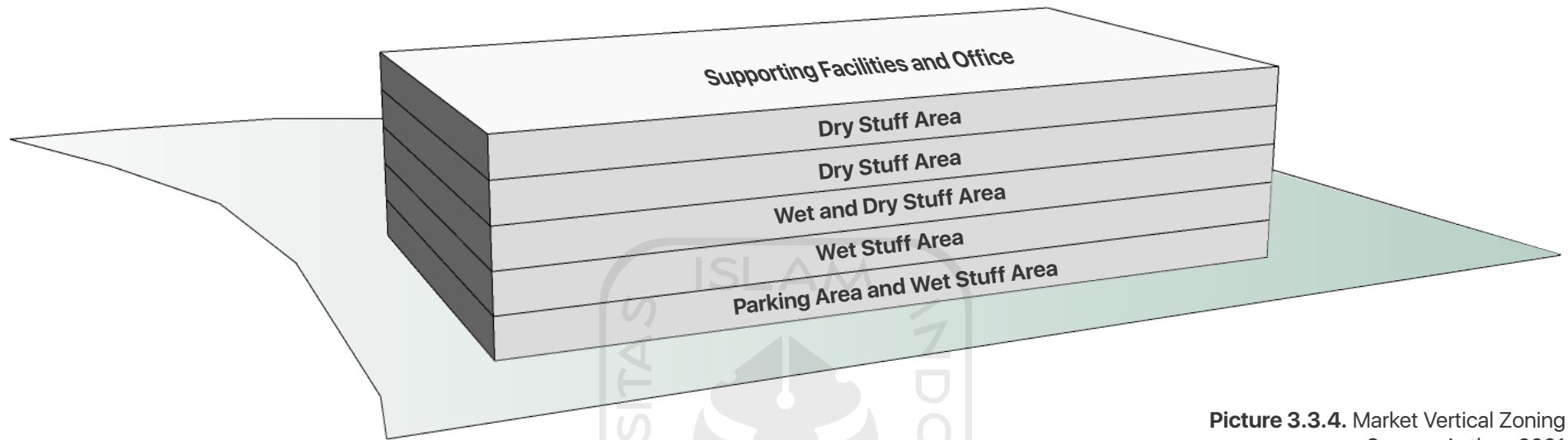


Picture 3.3.3. Unit Typology
Source: Time Saver Book by Joseph De Chiara, 1980

3.3.2. Zoning

Vertical Zoning

Market capacity based on the number of sellers in Banjarsari Market in 2020 is for 2.048 persons, and based on the prediction of the number of sellers in 2030 (for the next 10 years) is approximately 2.382 persons for Banjarsari Market. The building of the market will be divided into 3 main sections generally: Parking Area, Wet Stuffs Area, and Dry Stuffs Area.



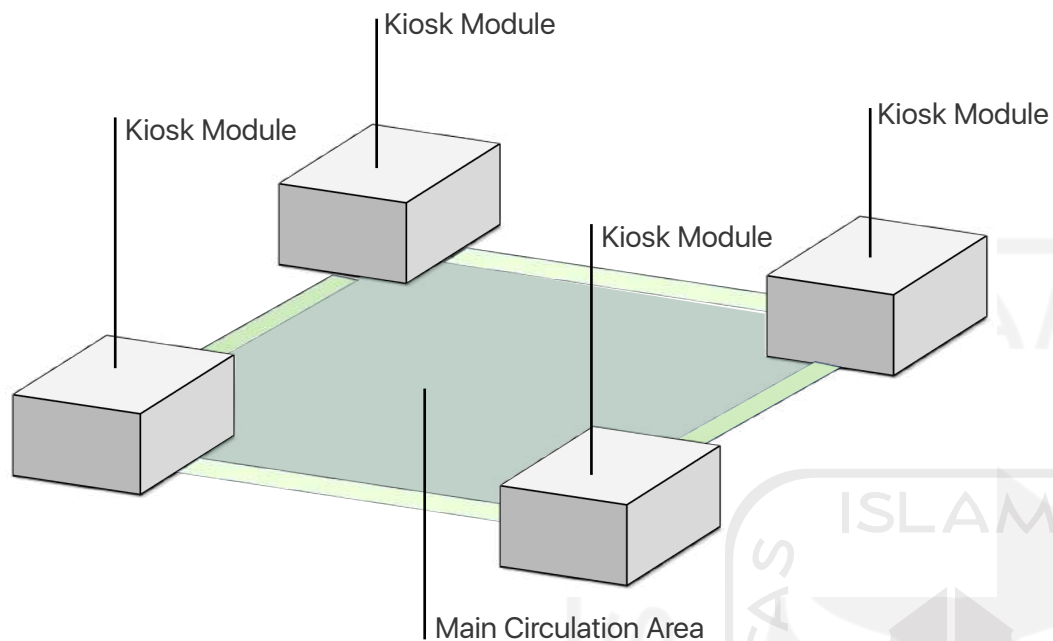
Picture 3.3.4. Market Vertical Zoning
Source: Author, 2021

The activities and function that has been existing in the market and the proposed ones:



Horizontal Zoning

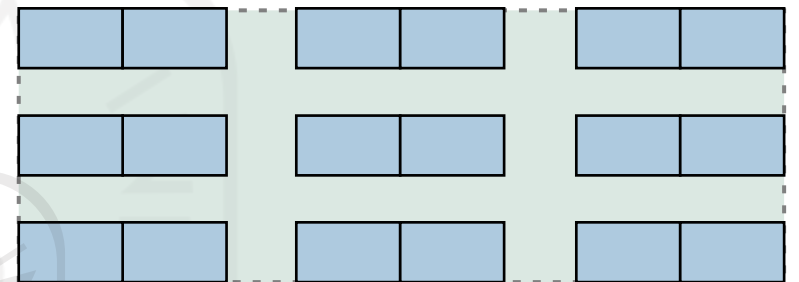
a. Alternative 1



Picture 3.3.4 Market Zoning Alternative 1
Source: Author, 2021

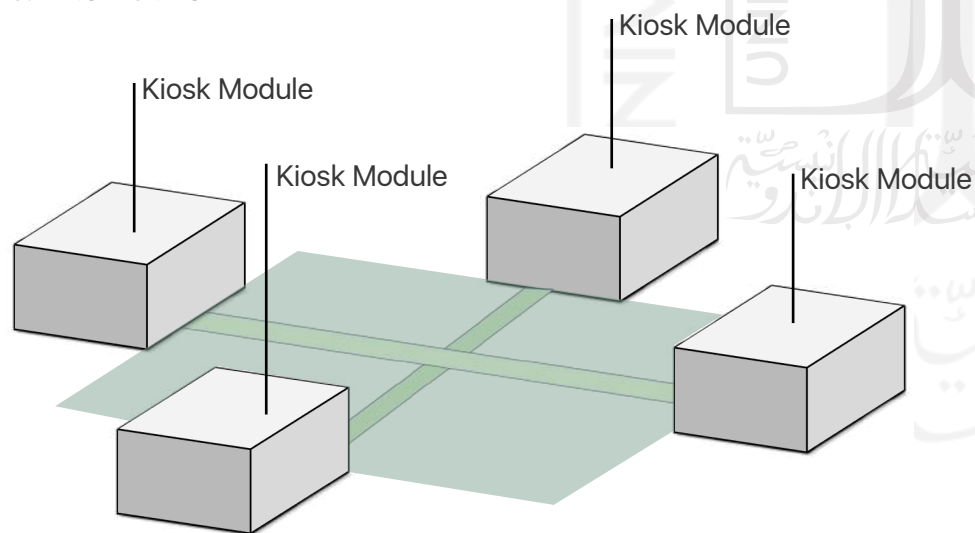
The idea is to arrange the kiosk module in grid form with main circulation area as the center of the spatial organization. The first alternative is to put the kiosk module at the corner of the grid to create the easiest way for the visitors to move inside the market.

The kiosks arrangement using Alternative 1 organization:



Picture 3.3.5. Market Zoning Alternative 1
Source: Author, 2021

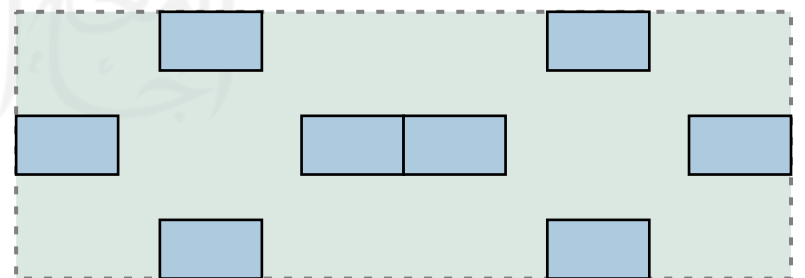
b. Alternative 2



Picture 3.3.6. Market Zoning Alternative 2
Source: Author, 2021

The second alternative is to arrange the kiosk at the middle of the grid line to create more space for circulation area. The space between the kiosk can be fitted for other support facilities, such as toilets, storage, or any others. Thus, the sellers can have closer distance to the storage.

The kiosks arrangement using Alternative 2 organization:



Picture 3.3.6. Market Zoning Alternative 2
Source: Author, 2021

Chosen Alternative

The most appropriate spatial organization for the market is the first alternative since it can fit more kiosks than the second alternative. The circulation will be also calculated thus the area will be spacious.

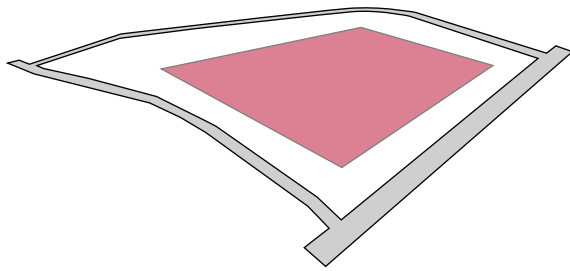
Number of Kiosks

| Function | 2020 | 2030 (total in 2020 x 16,3%) |
|------------------------|--------------|------------------------------|
| Batik and Textiles | 563 | +109 = 672 |
| Groceries | 234 | +45 = 279 |
| Food and Snacks | 278 | +53 = 335 |
| Household Appliances | 80 | +13 = 93 |
| Hair Salon | 52 | +9 = 61 |
| Motorbike Repair Store | 17 | +3 = 20 |
| Toys | 64 | +11 = 75 |
| Others | 53 | +14 = 67 |
| Meats | 294 | +54 = 348 |
| Fish and Seafood | 139 | +29 = 168 |
| Fruit and Vegetable | 177 | +37 = 214 |
| Total | 2.048 | 2.382 |

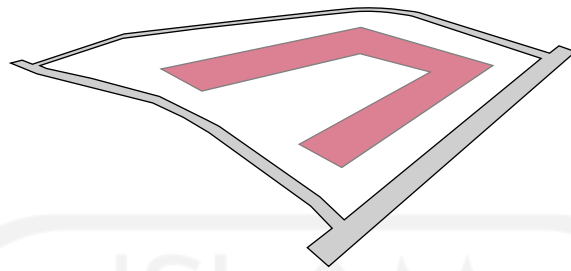
| Function | Total | GF | 1F | 2F | 3F | 4F | 5F |
|------------------------|-------|-----|-----|----|-----|-----|-----|
| Batik and Textiles | 672 | - | - | - | 369 | 303 | - |
| Groceries | 279 | 83 | 102 | 94 | - | - | - |
| Food and Snacks | 335 | - | - | - | - | 197 | 138 |
| Household Appliances | 93 | - | - | 93 | - | - | - |
| Hair Salon | 61 | - | - | - | 61 | - | - |
| Motorbike Repair Store | 20 | 20 | - | - | - | - | - |
| Toys | 75 | - | - | 75 | - | - | - |
| Others | 67 | - | - | 30 | 37 | - | - |
| Meats | 348 | 174 | 174 | - | - | - | - |
| Fish and Seafood | 168 | 85 | 83 | - | - | - | - |
| Fruit and Vegetable | 214 | 111 | 103 | - | - | - | - |

3.4. Mass and Form Exploration

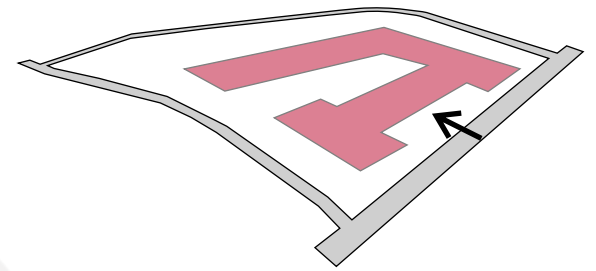
3.4.1. Site Analysis and Mass Transformation



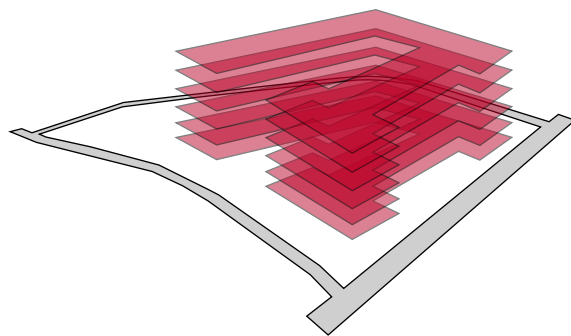
The BCR of the site is 60% of total area.



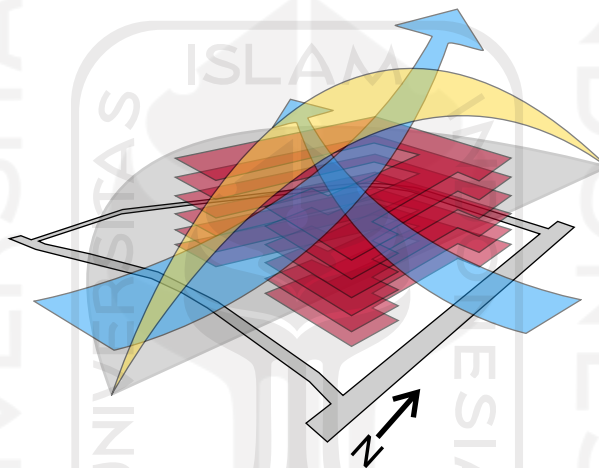
Giving an inner courtyard to have open layout market and open green space.



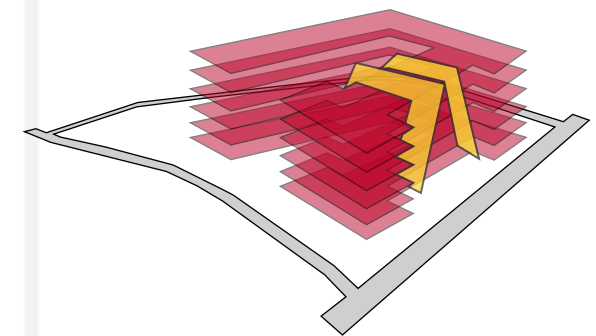
Giving mass extension for batik commodities area and giving entrance to the building.



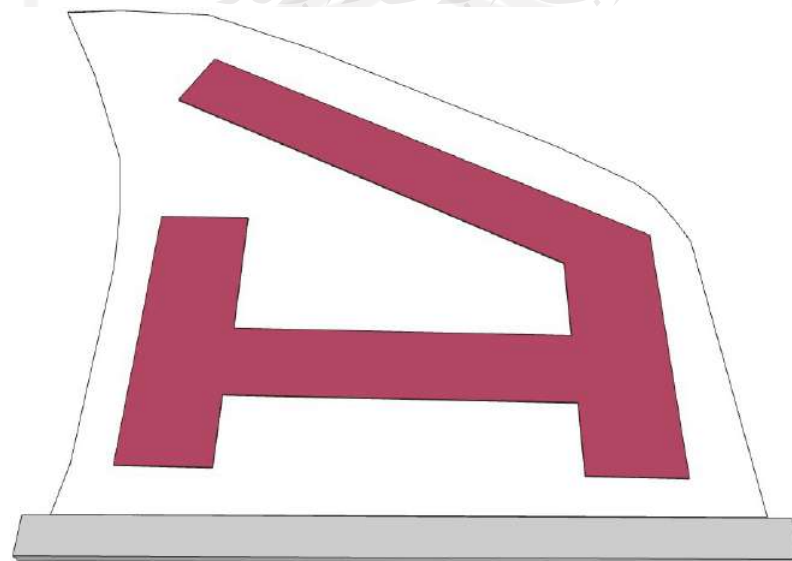
Making it into 5 storeys to fulfill the need of kiosks area.



Giving sun shading to north and west area, also opening at south and east side to catch the wind.



Giving Joglo Roof to show the Javanese architecture in Sampangan sub-district.



3.4.2. Joglo Roof



Chinese Roof

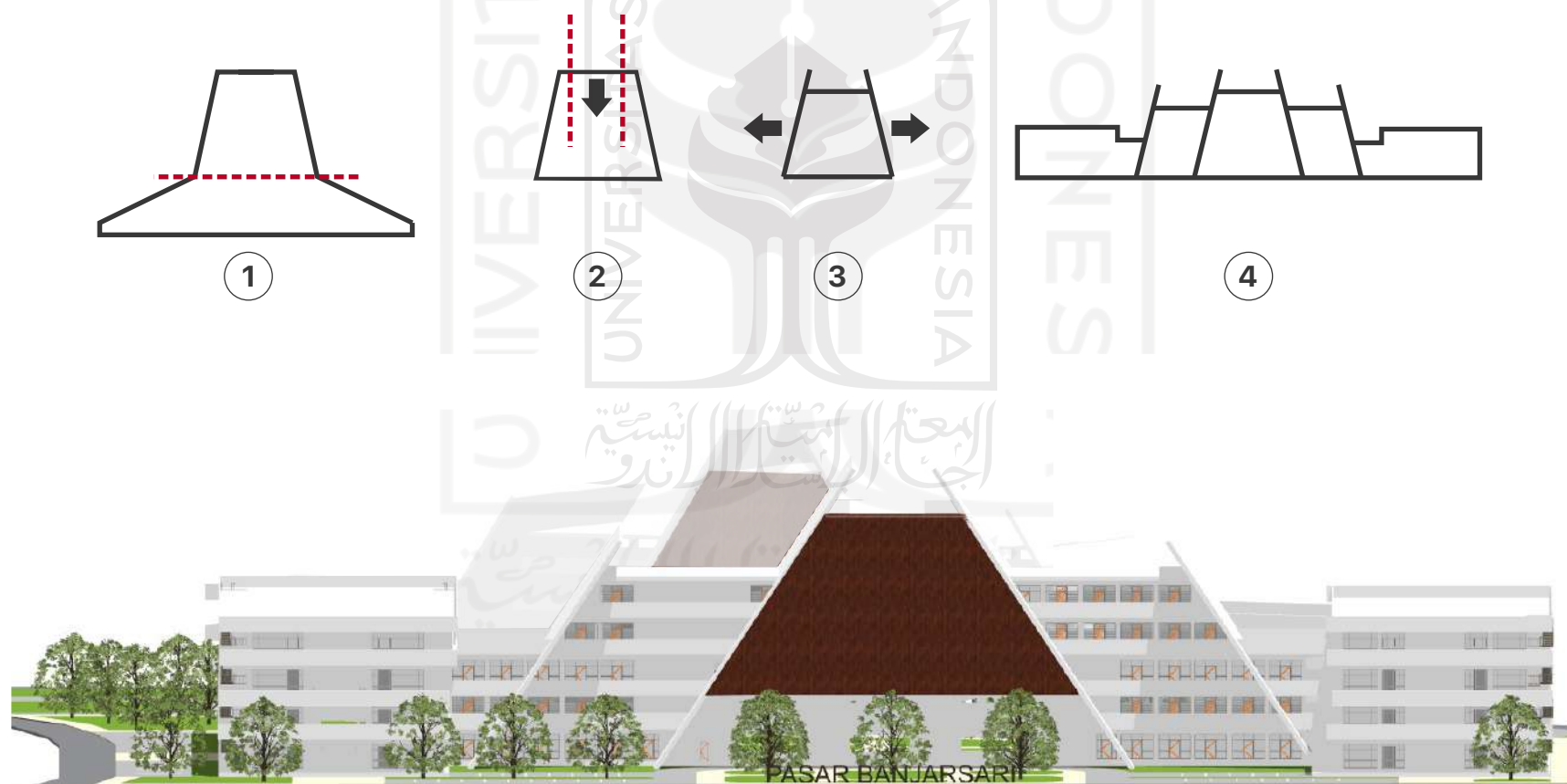


Limasan Roof



Joglo Roof

There are 3 types of roof which are commonly used in Sampangan area. They are Chinese Roof, Limasan Roof, and Joglo Roof. The Chinese roof type is usually applied for the Chinese shops and housings of the Chinese settlement. While the other settlements, the indigenous and Arabian, mostly use Limasan type for their houses. The Joglo roof is usually applied for administration and services building in the district.



Adapting the form of Joglo roof which is widely used for public building in the city of Pekalongan, especially in Sampangan's multi-cultural settlements. The roof has really large space inside the structure, thus it will be used as food court, co-working space, rental meeting rooms, mushola, and management offices. The front of the roof will be closed using a wooden lattice so that there is still access to sunlight and air entering the room.

3.4.3. Batik Jlamprang Pattern

Batik Jlamprang is one of Pekalongan City's special pattern. It's used the most in Sampangan and Podosugih sub-district, so this is the most suitable pattern to be applied in the building. This pattern has geometric accents in the form of circles, squares, squares, and others. Generally, in the center of the circle there is a picture of a lotus flower. It is said that this motif was created by batik makers of Arab descent who do not like ornaments of living things. However, there is also an opinion that this motif symbolizes Hindu and Buddhist influences.



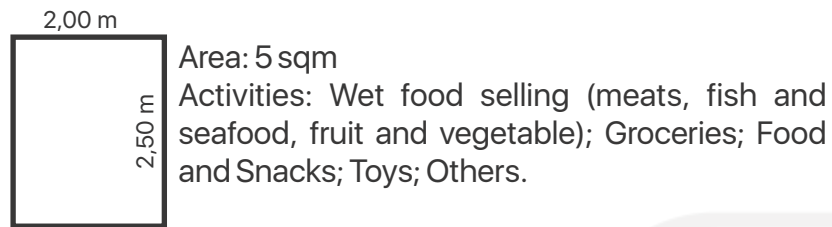
Steel Material



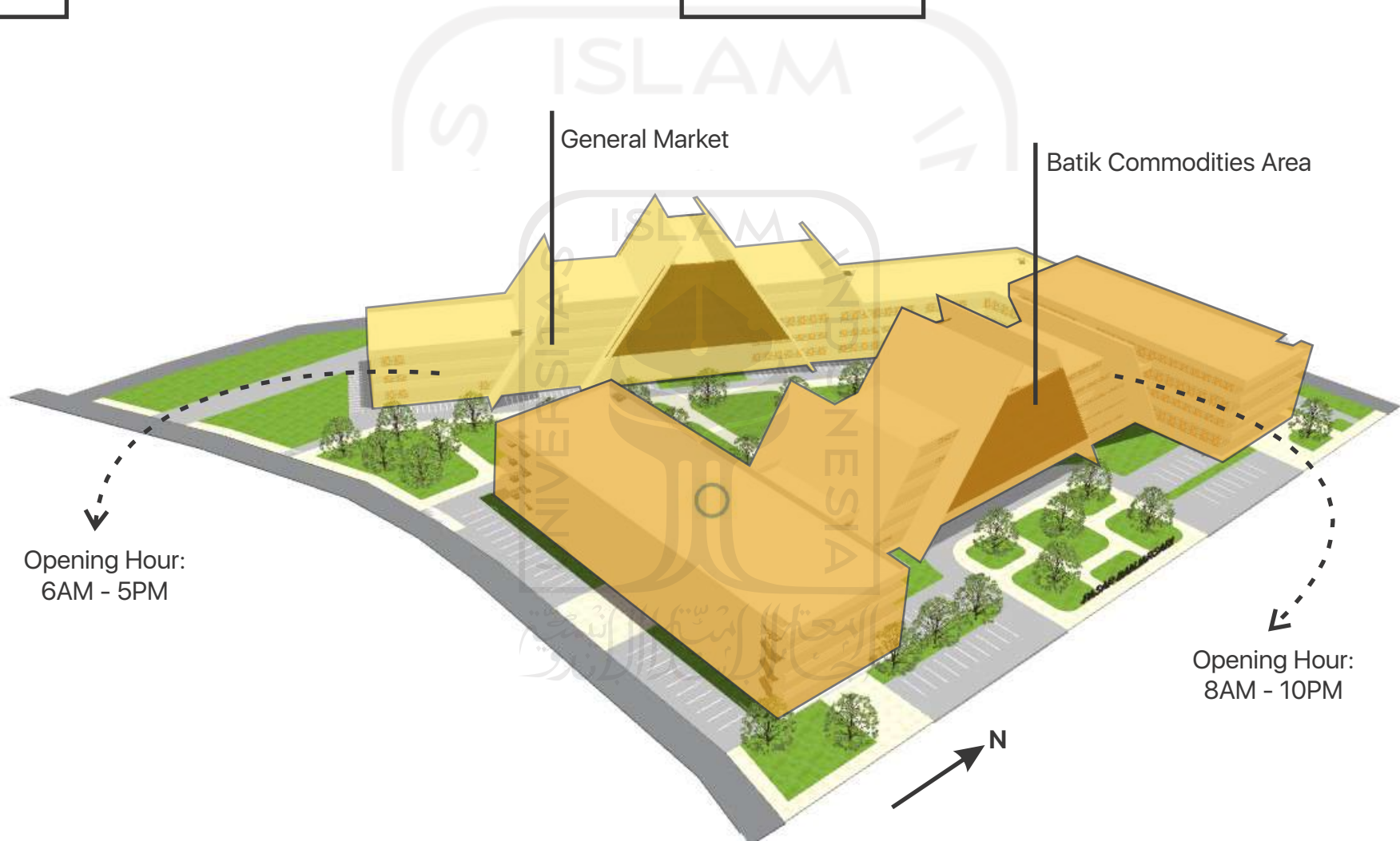
The pattern of Jlamprang will be used as the building facade in the design of the new market since it is a repetitive pattern. It will be on the wall (painted) and as the building envelope.

3.4.4. Dimension of Kiosk, Store, and Waste Collection Space

Kiosk



Store



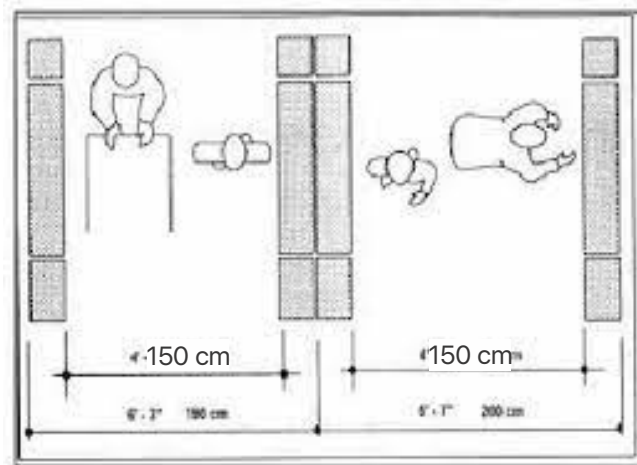
The building was designed as one mass that can be divided into two functions: general market and batik market. General market has opening hour for 11 hours, from 6 a.m. until 5 p.m, while batik market has longer opening hour for 14 hours, and started later than general market, from 8 a.m. until 10 p. m. The types of selling area of general market and batik market are also different, where general market will use kiosk (5sqm) as their stalls, and batik market will use store type (10 sqm).

Waste Collection Space

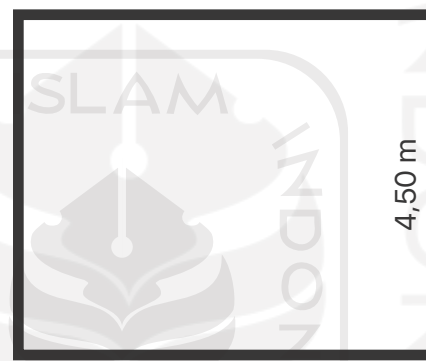
The Ministry of Environment and Forestry (*Kementerian Lingkungan Hidup dan Kehutanan* or KLHK) has requested that all districts/cities can immediately implement a closed waste disposal system (sanitary/controlled landfill). This is in accordance with the mandate of Undang-Undang number 18 of 2018 concerning Waste Management. The generated waste in Banjarsari Market will be classified as organic waste and inorganic waste generally, where there will be specified trash bin for each type of inorganic waste. Based on the calculation in the discussion on the previous chapter, the estimated amount per day of organic waste is 16,55 m³ waste and 14,55 m³ waste of inorganic waste. The height of generated waste will be assumed as 1m, and the circulation area for 30% of total space will be added to each space. Thereby the space needed is:

- Space of organic waste = 16,55 m² + 5m² = about 21,55 m²
- Space of inorganic waste = 14,55 m² + 4,4 m² = about 18,95 m²

Movement Scheme



Organic Waste Space



5,00 m

Total area: 22,5 m²

Inorganic Waste Space



5,00 m

Total area: 22,5 m²



Opening

Light weight material

The building of waste collection space will be designed as non-permanent building, meaning it can be moved or removed if needed. Therefore, the materials of the building are light weighted materials, such as container or galvalum as the wall, and light weight steel as the structure.

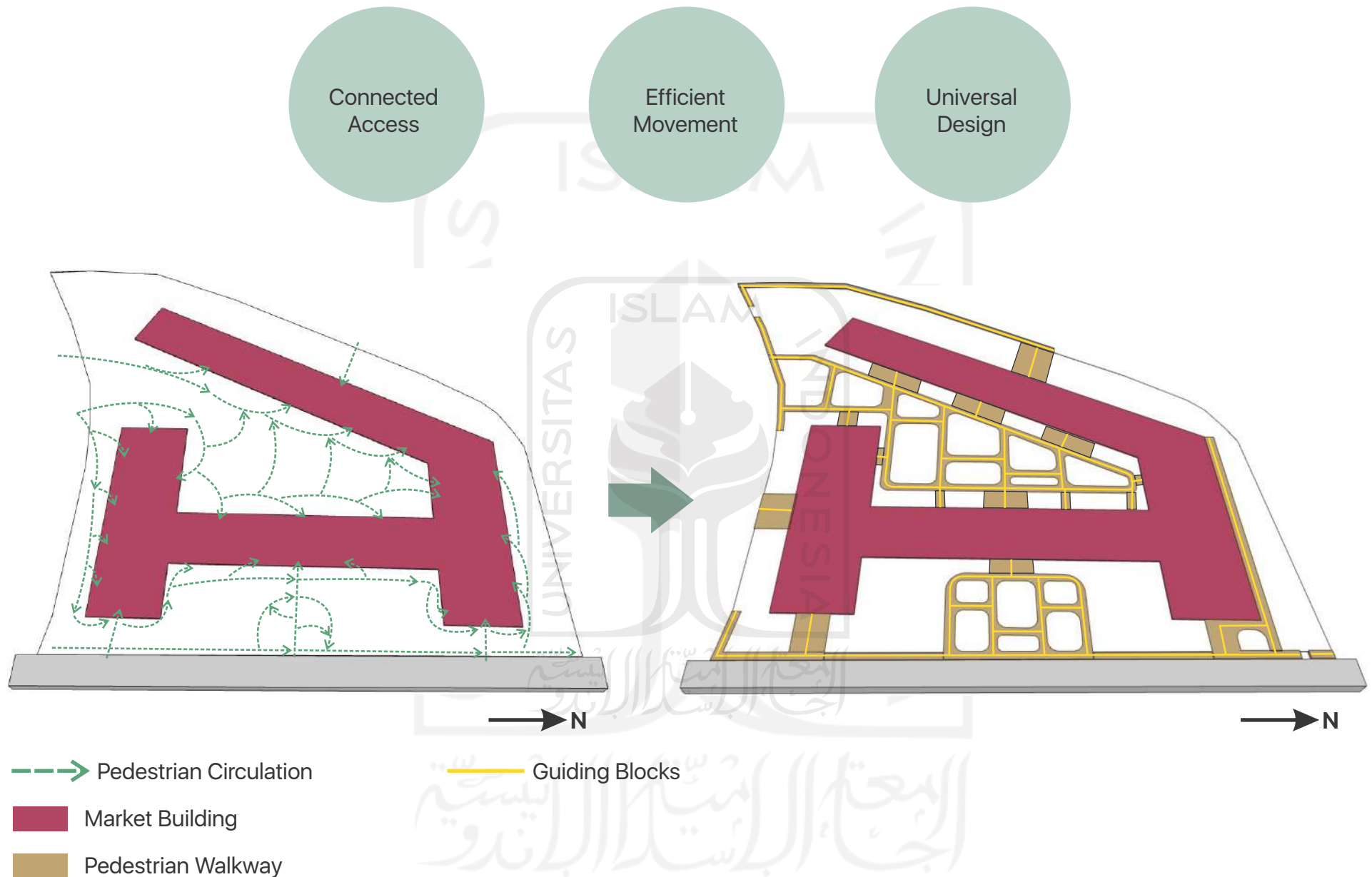


Opening

The waste collecting space should be a closed disposal system to prevent the bad odor interferes the users and activity in site. But if it's fully closed, the smell will be trapped inside the building. Thus it needs opening in the safe height to release the smell of the waste outside and giving proper air circulation into the waste collecting building. The opening should keep opened and not covered by glass or any other materials that can close the air access. The possible materials for the opening are wire or iron net, and light weight steel.

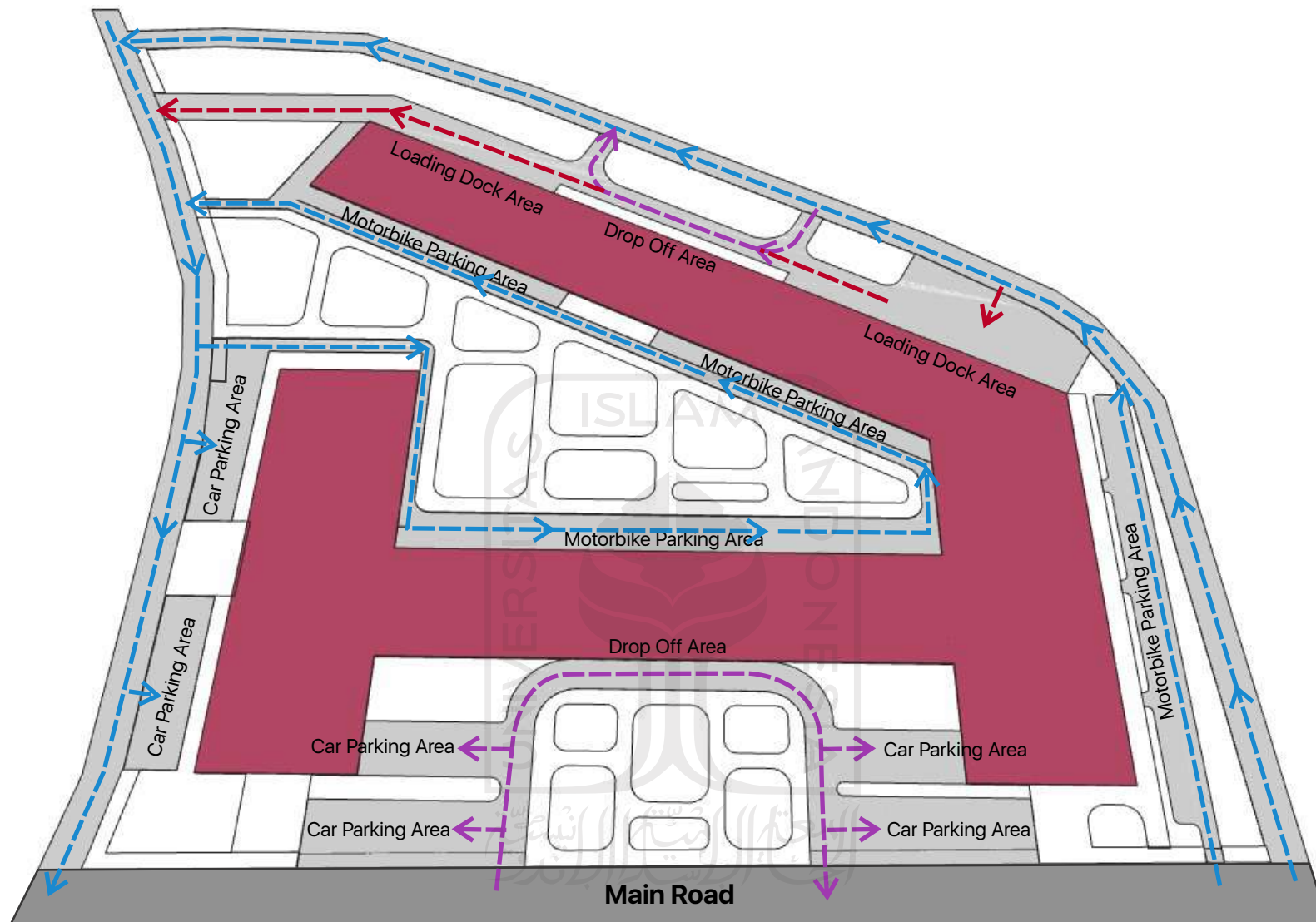
3.5. Landscape Analysis

3.5.1. Pedestrian Walkway



The pedestrian movement inside a market could be confusing because the users will need to explore every corner of the market. In the design, there are two courtyard which need to be connected for the pedestrian users so that the path for their circulation will not be confusing and avoiding being too crowded at every space. The walkway is designed to have junction at every 10m, so the pedestrian users can across the courtyard easily without having to walk further to across the courtyard. At the drop off area (the front side of the building on the main entrance), the walkway is also designed connected by junctions to create some green space in the middle area to fulfill the open green space requirement, also to have some view thus the users will be interested and not feel bored to enter the building. Blind people can access the site and the building with the guiding blocks that's provided on the walkway, also the people with wheel chair will be able to access the building by using ramp at every building entrance.

3.5.2. Transportation Circulation



—→ Car and Motorbike Circulation

—→ Drop Off Transportation Circulation

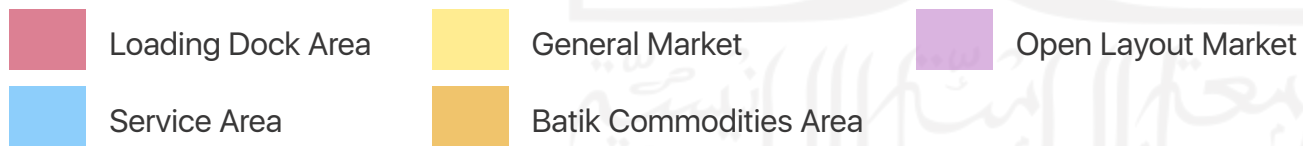
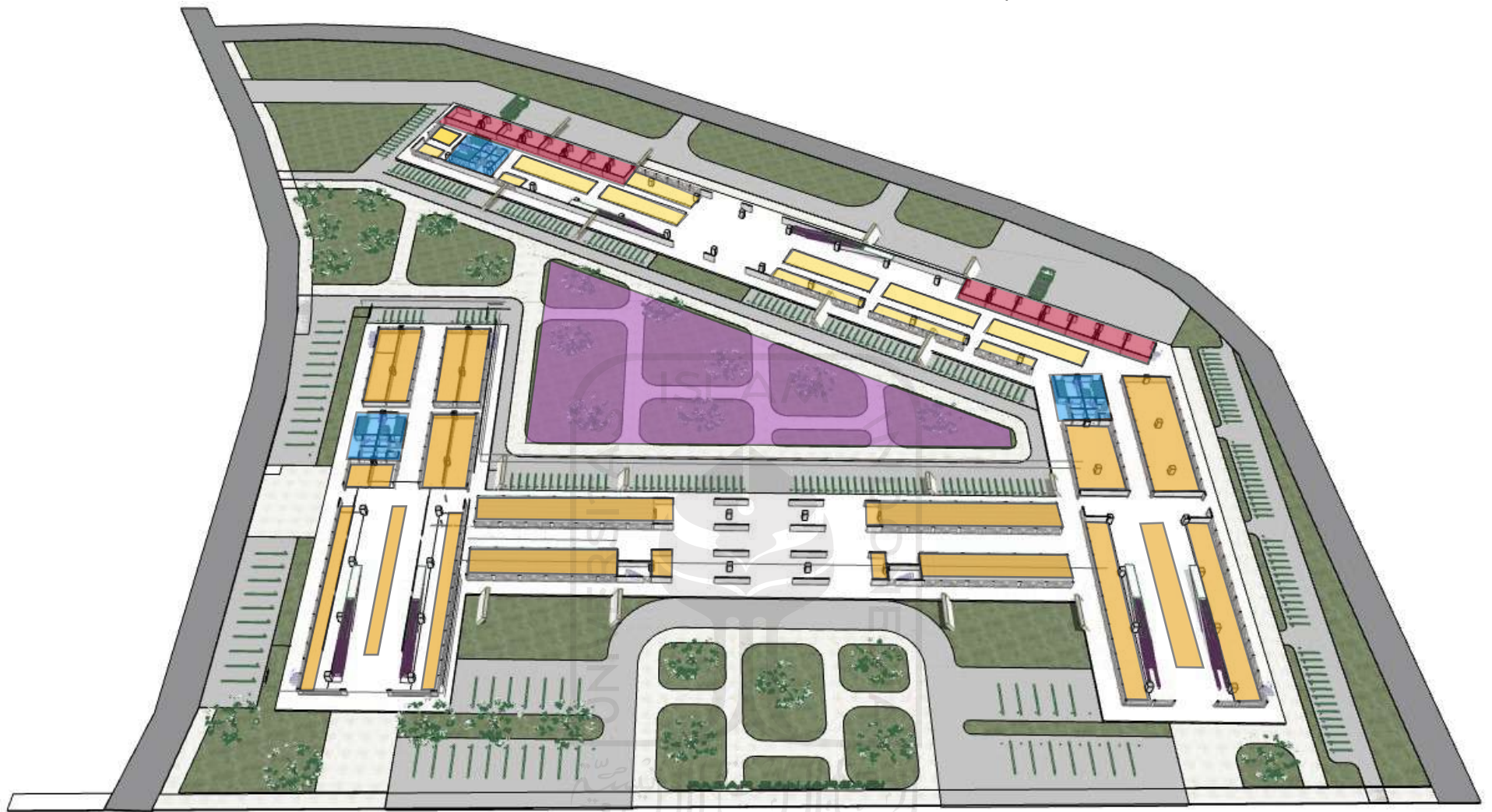
—→ Loads Transportation Circulation

■ Market Building

→ N

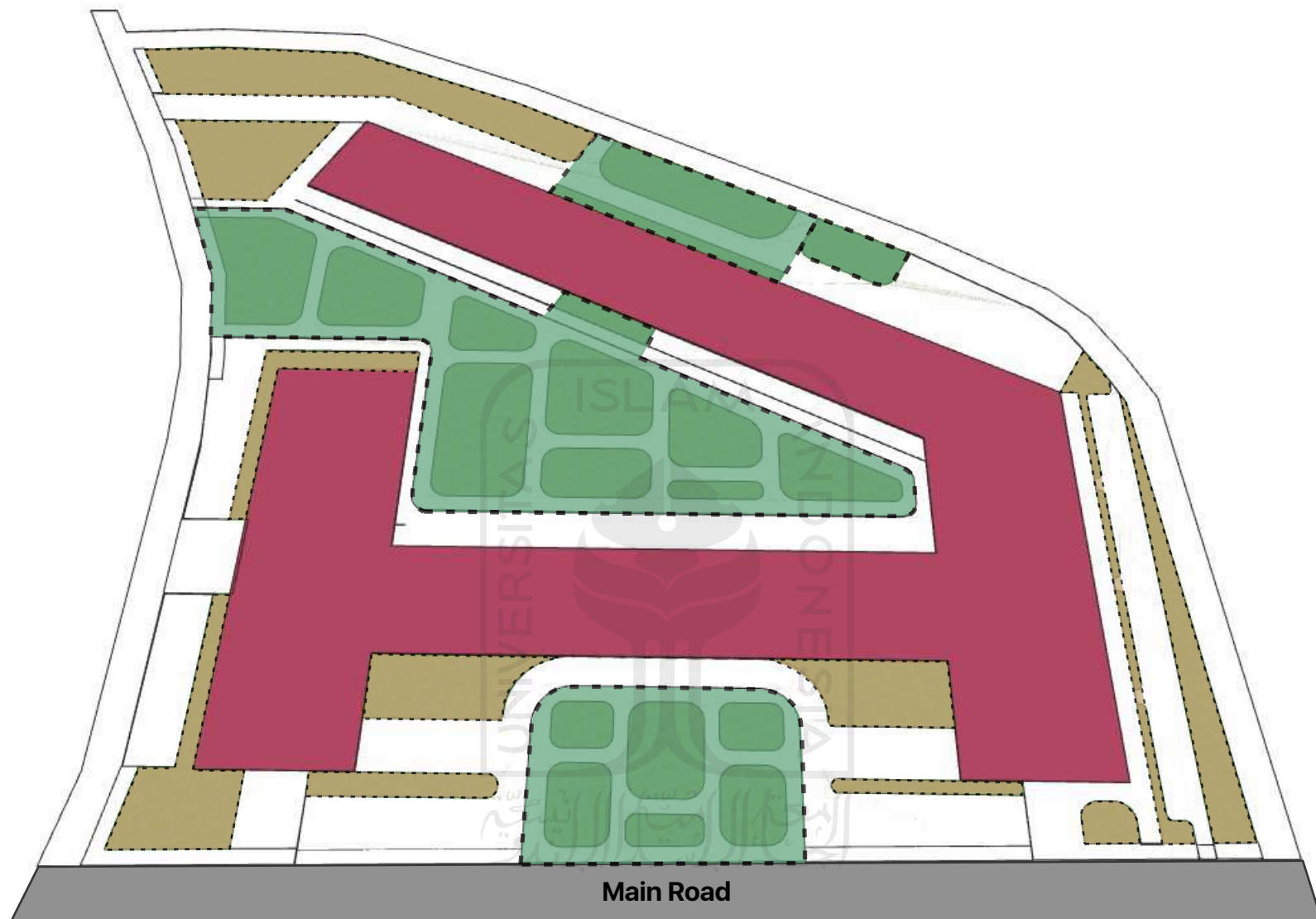
The building was designed as one mass that can be divided into two functions: general market and batik market. General market has opening hour for 11 hours, from 6 a.m. until 5 p.m, while batik market has longer opening hour for 14 hours, and started later than general market, from 8 a.m. until 10 p. m. The types of selling area of general market and batik market are also different, where general market will use kiosk (5sqm) as their stalls, and batik market will use store type (10 sqm).

3.5.3. Site Planning



The area for circulation inside the market is spacious = 2.5m, while the column span is 10m and 12m. The grid system allows the visitors shopping comfortably and efficiently. There are 55 parking lots for car, 230 parking lots for motorbike, and 15 parking lots for loads truck. There is also open layout market provided at the inner courtyard for the previous street vendors which existed at the trotoar. The kiosks are provided for 40 street vendors with various stuff, such as fruits, vegetables, flowers, and street food.

3.5.4. Green Concept Development

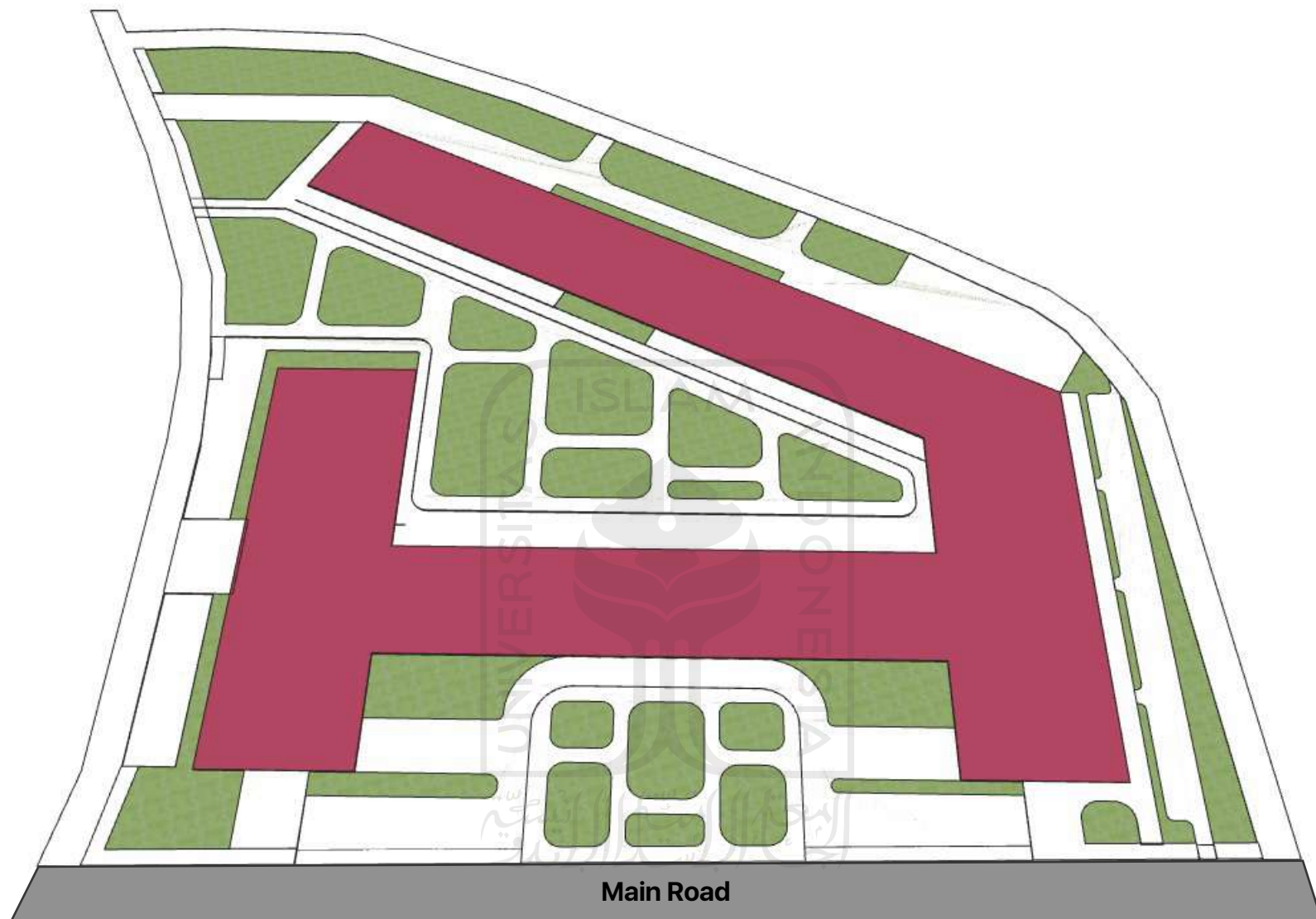


Market Building
Open Green Space

Green Area for boundaries

The area for circulation inside the market is spacious = 2.5m, while the column span is 10m and 12m. The grid system allows the visitors shopping comfortably and efficiently. There are 55 parking lots for car, 230 parking lots for motorbike, and 15 parking lots for loads truck. There is also open layout market provided at the inner courtyard for the previous street vendors which existed at the trotoar. The kiosks are provided for 40 street vendors with various stuff, such as fruits, vegetables, flowers, and street food.

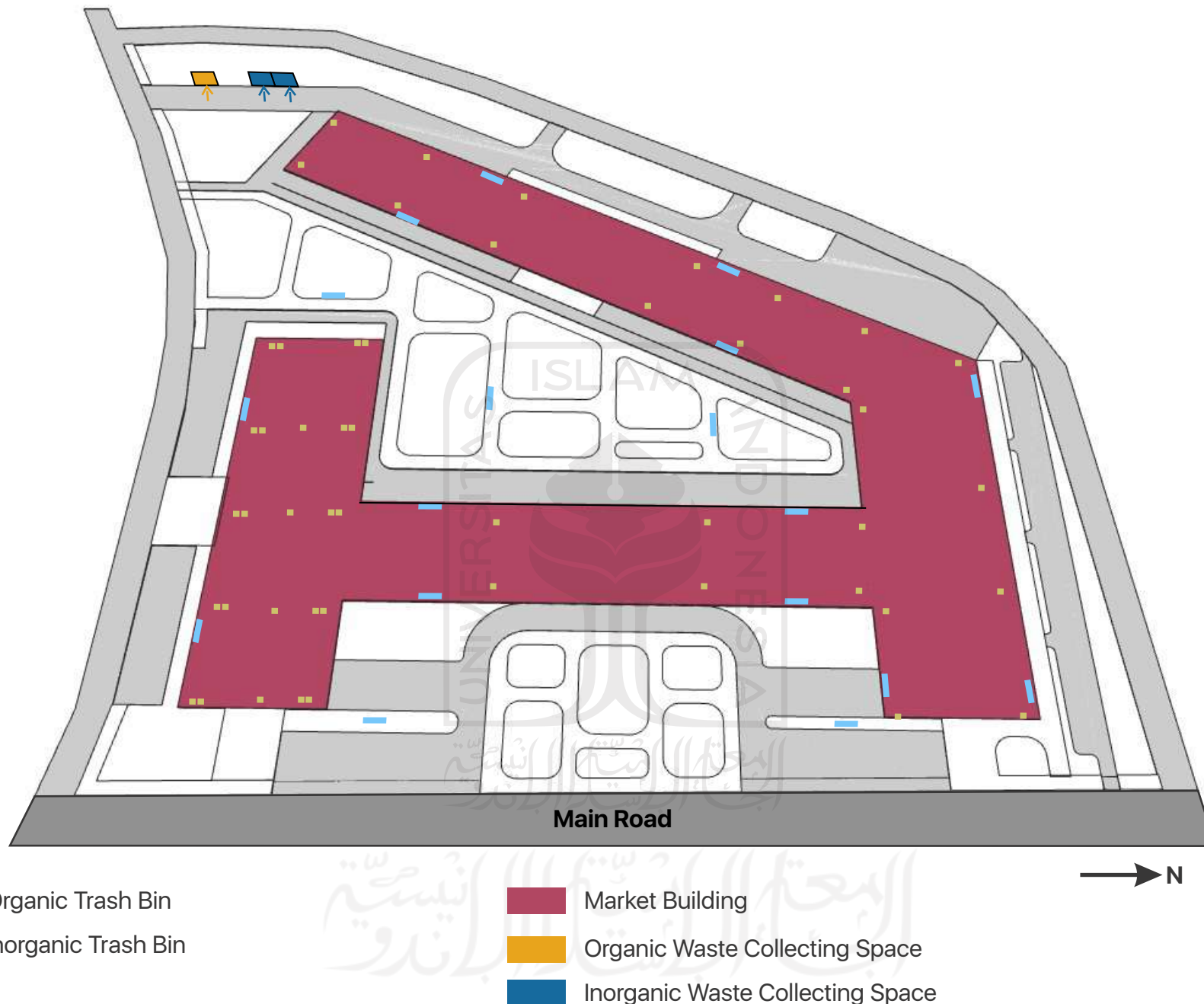
3.5.5. Open Green Space



- Market Building
- Open Green Space

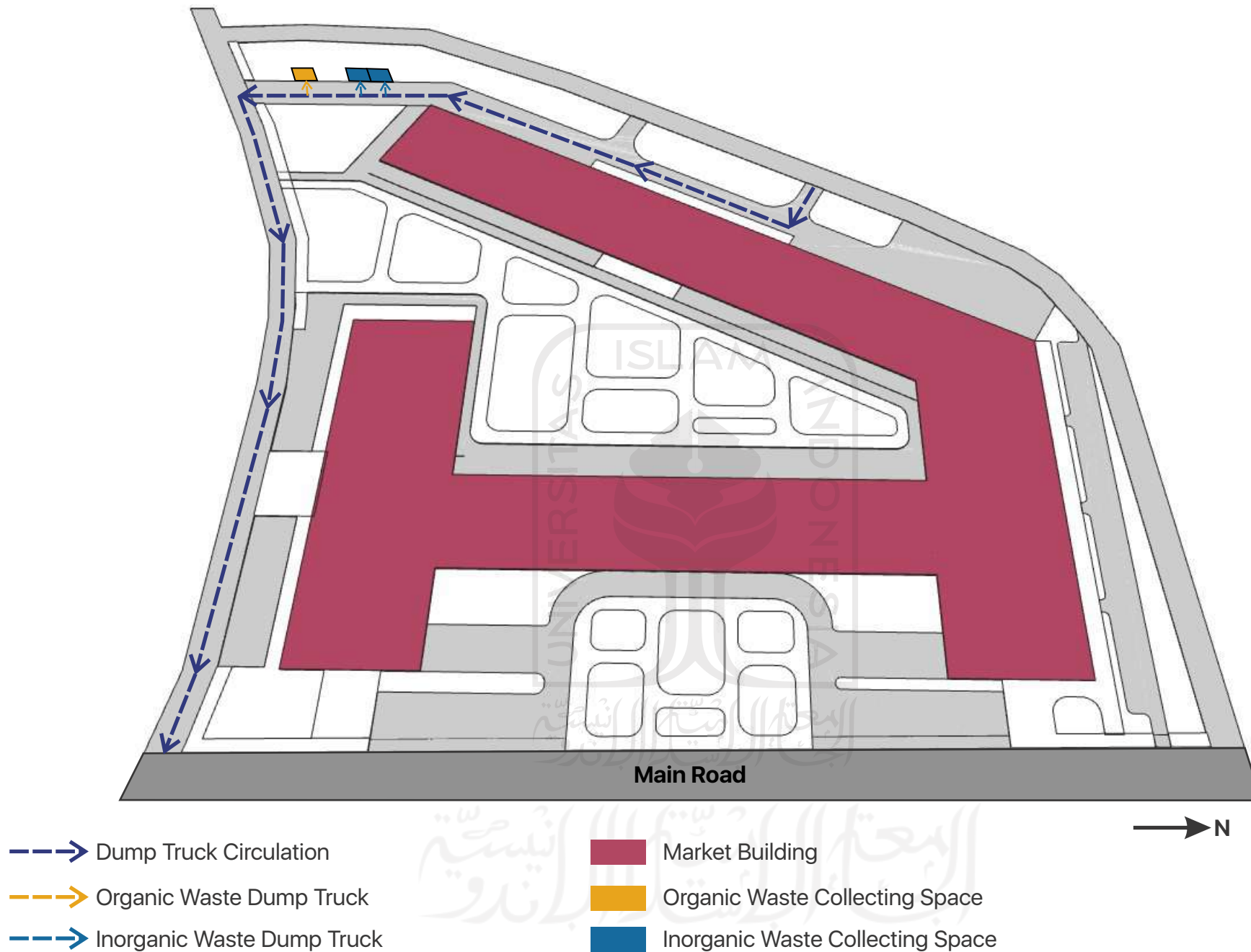
Areas that are not used as circulation areas will be used as reforestation areas to respond to the urban issue of Pekalongan city regarding the lack of green open space. The green space in this design is expected to be able to increase the percentage of available green open space in the city of Pekalongan. The green area at the site boundary will be filled with vegetation which serves as a visual barrier. Vegetation will also be placed in several open areas in the inner courtyard as shade.

3.5.6. Green Waste Management Waste Collection Scheme



Each 10 kiosks of the general market and each 20 kiosks of batik market will be facilitated with one trash bin for organic and wet waste where the waste will be transported by the cleaning staff every day on a predetermined schedule and collected at the organic waste collection point provided on the east side of the site. Meanwhile, for inorganic waste, special trash bins will be provided at several easily accessible points inside and outside the building with different bins for each type. Then the inorganic waste will also be transferred to the waste collection point in the north of the organic waste collection point on the east side of the site.

Dump Truck Circulation



There are three buildings for collecting waste generated by this market: 1 building for organic waste collection and 2 buildings for inorganic waste. Two places are provided for inorganic waste collection as a full anticipation of one of the places because the volume of inorganic objects is larger than organic waste, so that if one of the inorganic waste collection points is full, then there is still a place for garbage that cannot fit into that place.

3.6. Batik Market

3.6.1. Batik Types Classification

The batik shops in Banjarsari Market will be grouped according to type with the aim of making it easier for buyers to find the batik they want to buy without having to walk far and around the entire market just to get the batik they want. This grouping is done based on the author's personal experience regarding zoning of batik types in the batik market in Pekalongan.

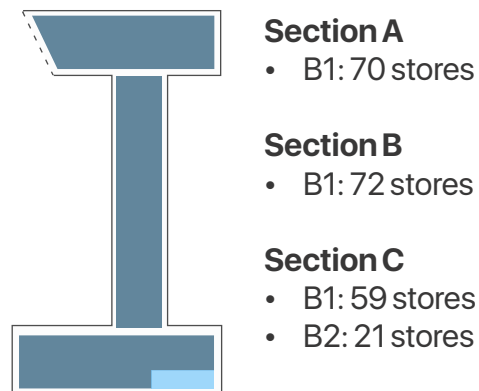
Estimated Number of Batik Types (2020 - 2030): 672 stores in total.

- Batik for Adults - Formal Clothes (B1): 30% or 201 stores.
- Batik for Adults - Casual Clothes (B2): 26% or 172 stores.
- Batik for Kids (B3): 20% or 135 stores.
- Fabric and Songket (B4): 20% or 135 stores.
- Batik Tulis (B5): 4% or 28 stores.
- Bag and Souvenirs (B6): 67 stores.

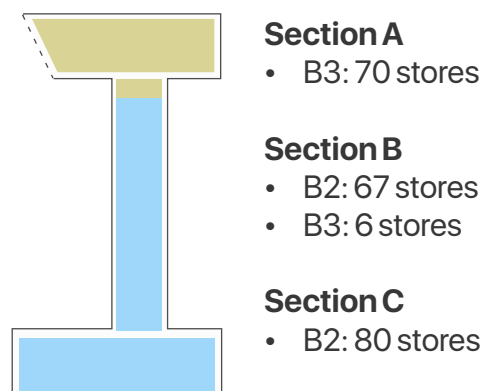


Store Division of Batik Stores per Floor

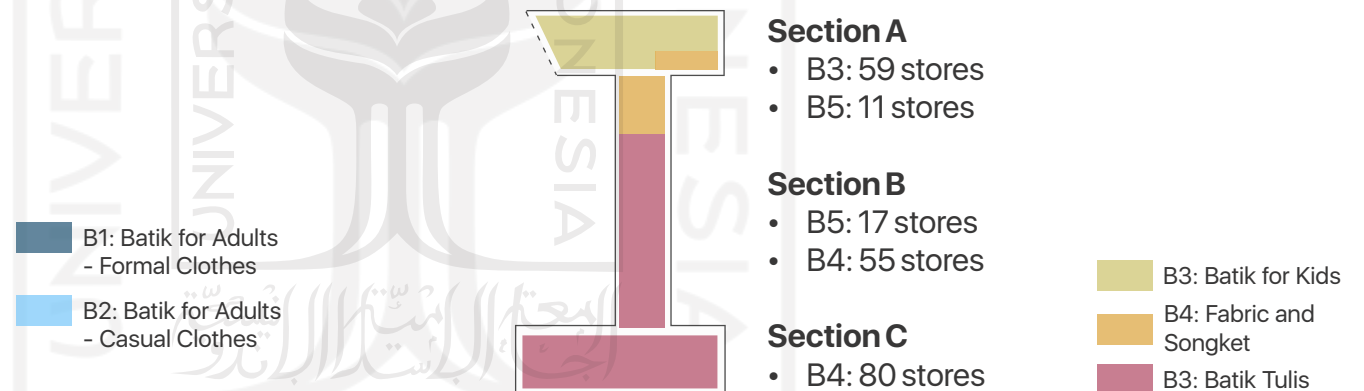
a. Ground Floor



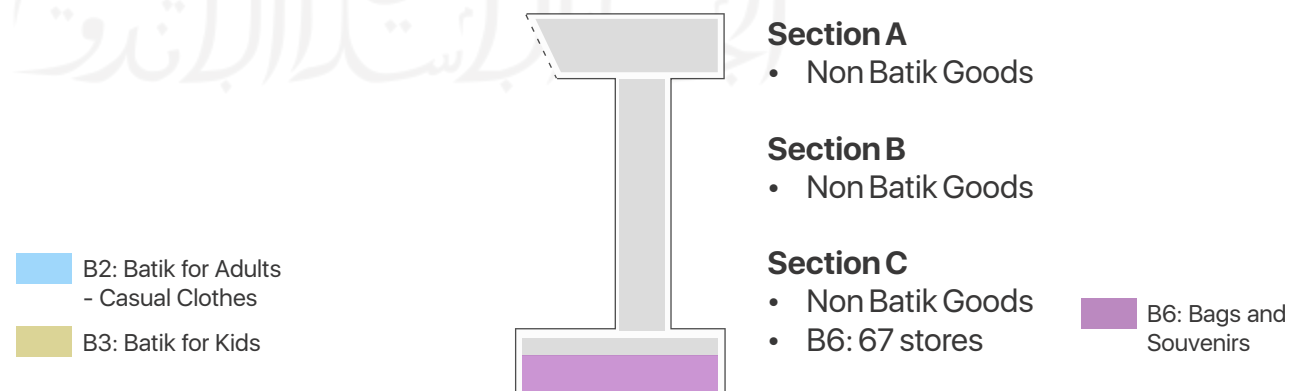
b. 1st Floor



c. 2nd Floor



d. 3rd Floor







4.1. Site Planning

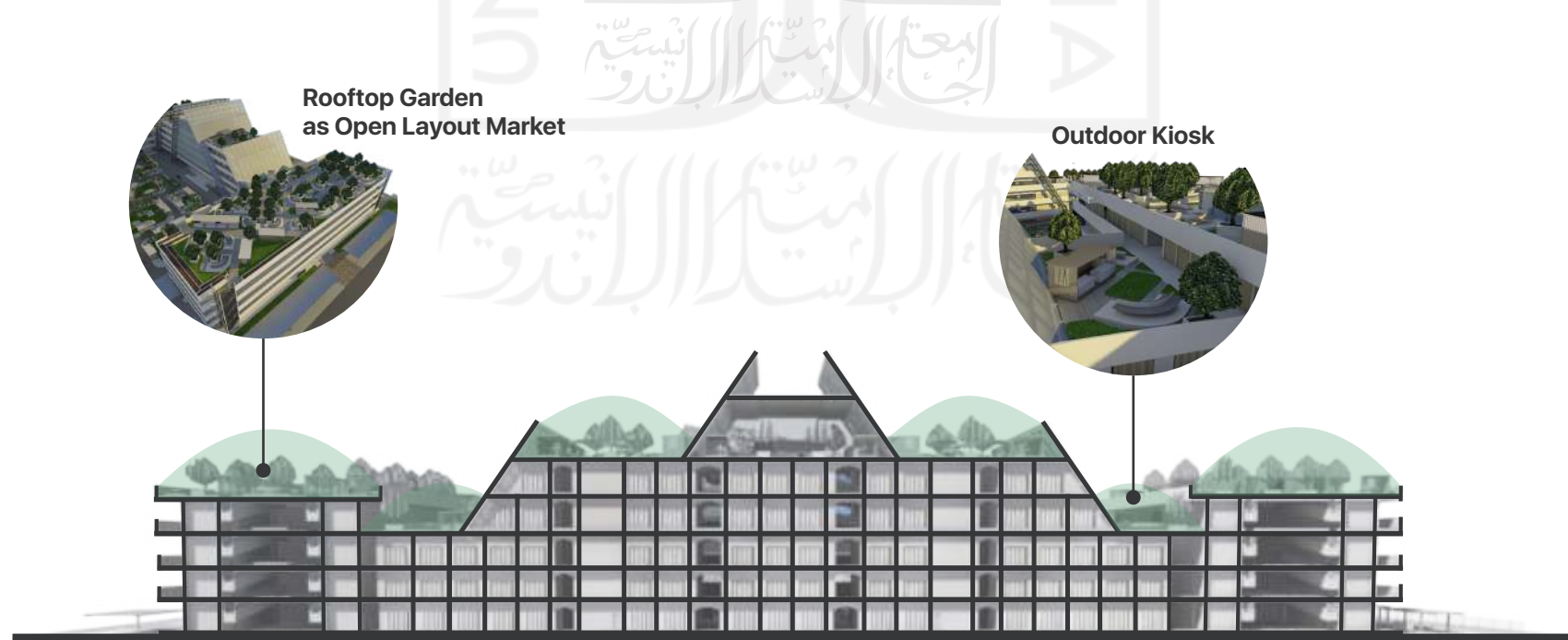
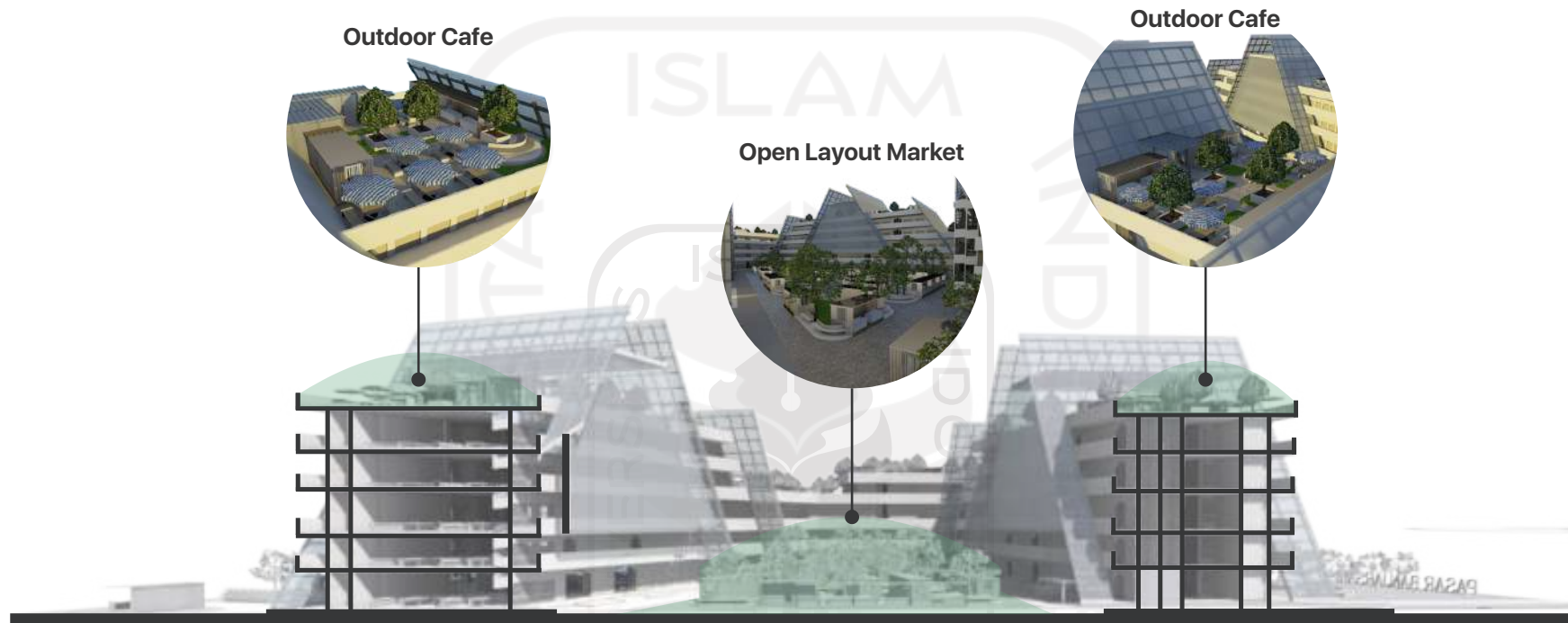
The building is designed with an inner courtyard that functions as a green open space which is also an open market layout for khaki lima traders and a sitting area for market users. The building has four main entrance that connects the batik market area with the general market area on the northwest side of the batik market building and the inner courtyard. The car park area for visitors is only located on the east and south sides of the outer batik market building because the back of the building, the outer northwest side of the building, is used as an entry and exit area for loading trucks. Meanwhile, there are more motorbike parking areas available, which are located on the north side of the outside of the building, also on the west and east sides in the inner courtyard area to facilitate the reach of visitors from the parking area to the entrances of the two market areas.



4.2. Landscape Design

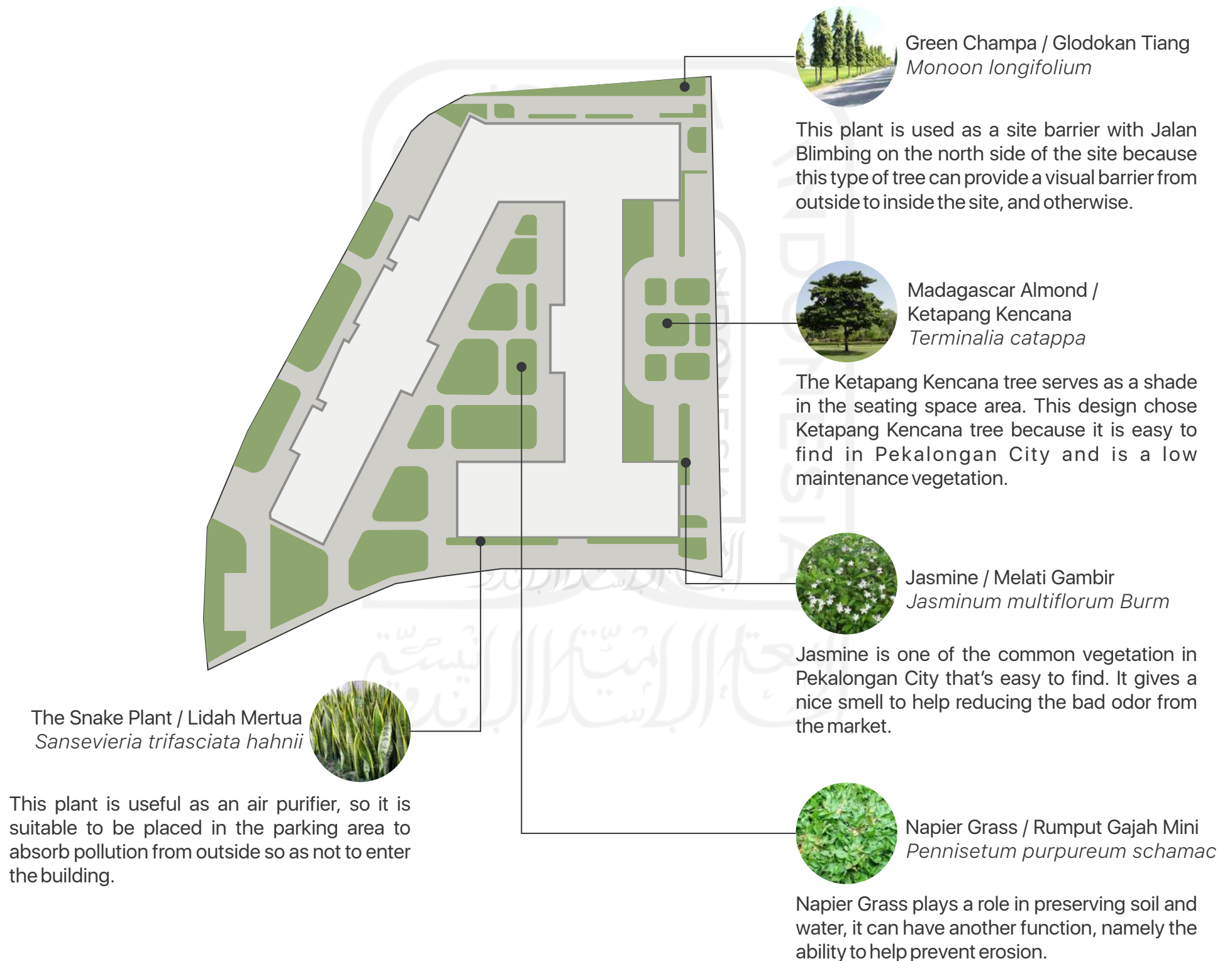
4.2.1. Open Green Space

The green areas in this design are distributed into two level, which are rooftop garden and the open green space on the ground floor. The green areas on the rooftop are utilized as open layout market and garden that providing seating space as well. The trees are planted in planted boxes thus the rooftop structure do not need any special structure system. While the green area on the ground level is utilized as an open aayout market that also provides seating space. These green areas are hoped to contribute to the city's green number by 0,0002593% for 3.460 m2 area.



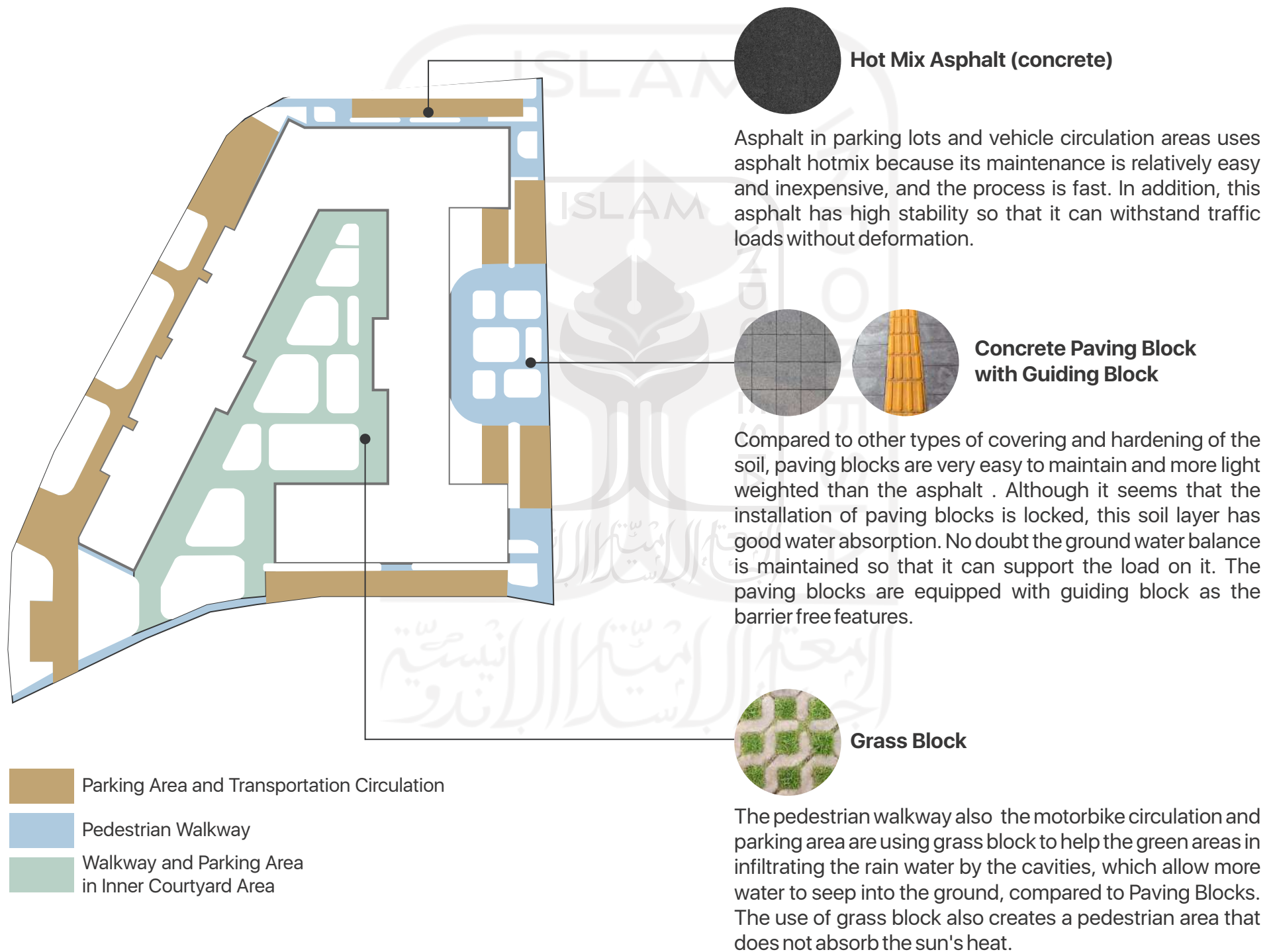
Softscape

The landscape design of the Banjarsari Market uses plants that are easily found in Pekalongan City to become a sustainable design. In the sitting area, shade trees are planted so that visitors can rest comfortably and not overheat.



Hardscapes

The hardscape features in the Banjarsari Market landscape design is also important to note because it requires elements that are relatively fast and easy to maintain. The other requirements are the elements should be able to allow the rain water infiltration process on the surface, thus the design will prevent to heavy rain or sudden flood. The hardscape will be divided into 3 main areas to differentiate the use of materials: parking areas and transportation circulation area, pedestrian walkway area, and the inner courtyard of the market.



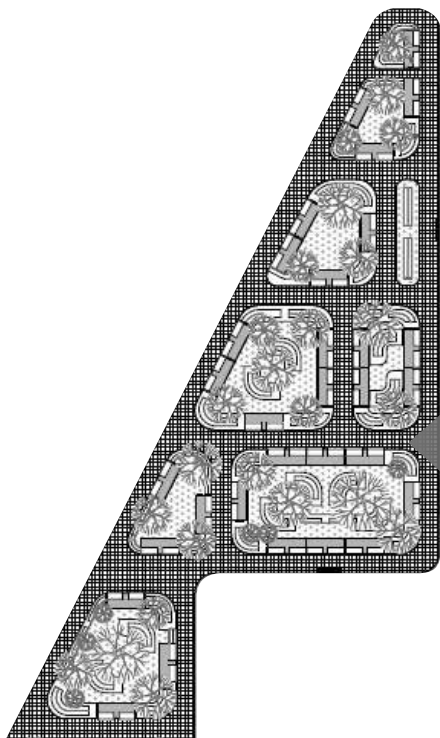
Open Green Space as Open Layout Market and Seating Space

The New Banjarsari Market design also tries to contribute to the issue of Pekalongan City regarding the lack of available green open space. With the hope of increasing the number of green open spaces in Pekalongan City, this market is designed with lots of green open space that doubles as an open market layout, seating area, and at the same time as a rainwater catchment area to prevent flooding on the site, especially in the inner courtyard area.



Street Vendor Kiosk

At the back side, northwest side of the Public Market, there are 32 kiosks for street vendor traders to make it more organized and the khaki pedestrian area to function properly.



- Green area only with vegetation
- Green area with sitting space
- Green area with street vendor and sitting space
- Green area with street vendor



Seating Space

The green open area at the front of the market is used as a place to sit for visitors who are after shopping and waiting to be picked up or just resting their feet.

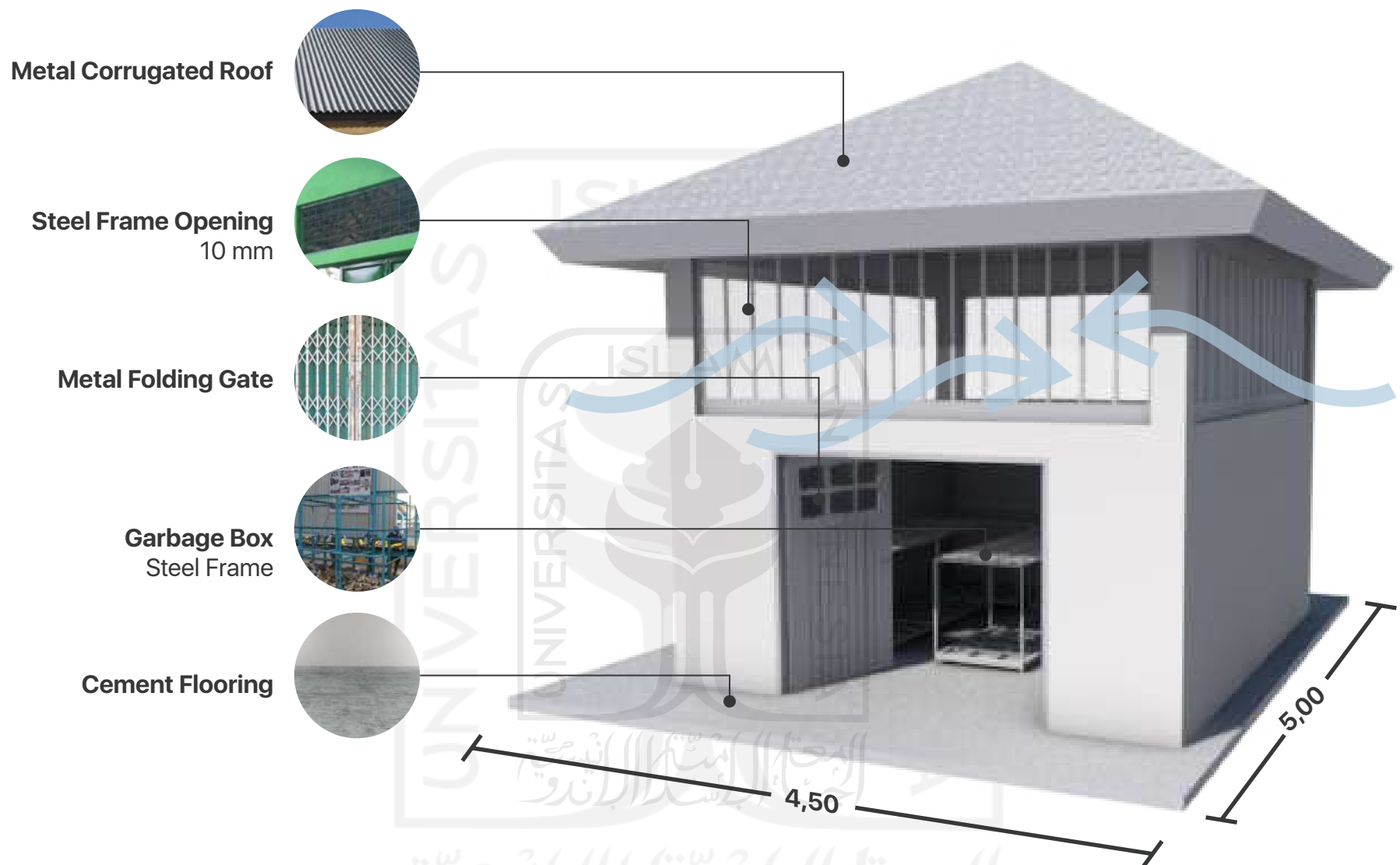


Open Layout Market

The market's inner courtyard is used as an open layout market to increase the economic value of the available open green space. Traders in this open layout are street vendors who were previously located on the sidewalks around the Banjarsari Market, thus disturbing pedestrian activities. If there are stalls provided for street vendors, visitors will be more comfortable shopping and the sidewalks can function properly.

4.2.1. Green Waste Management





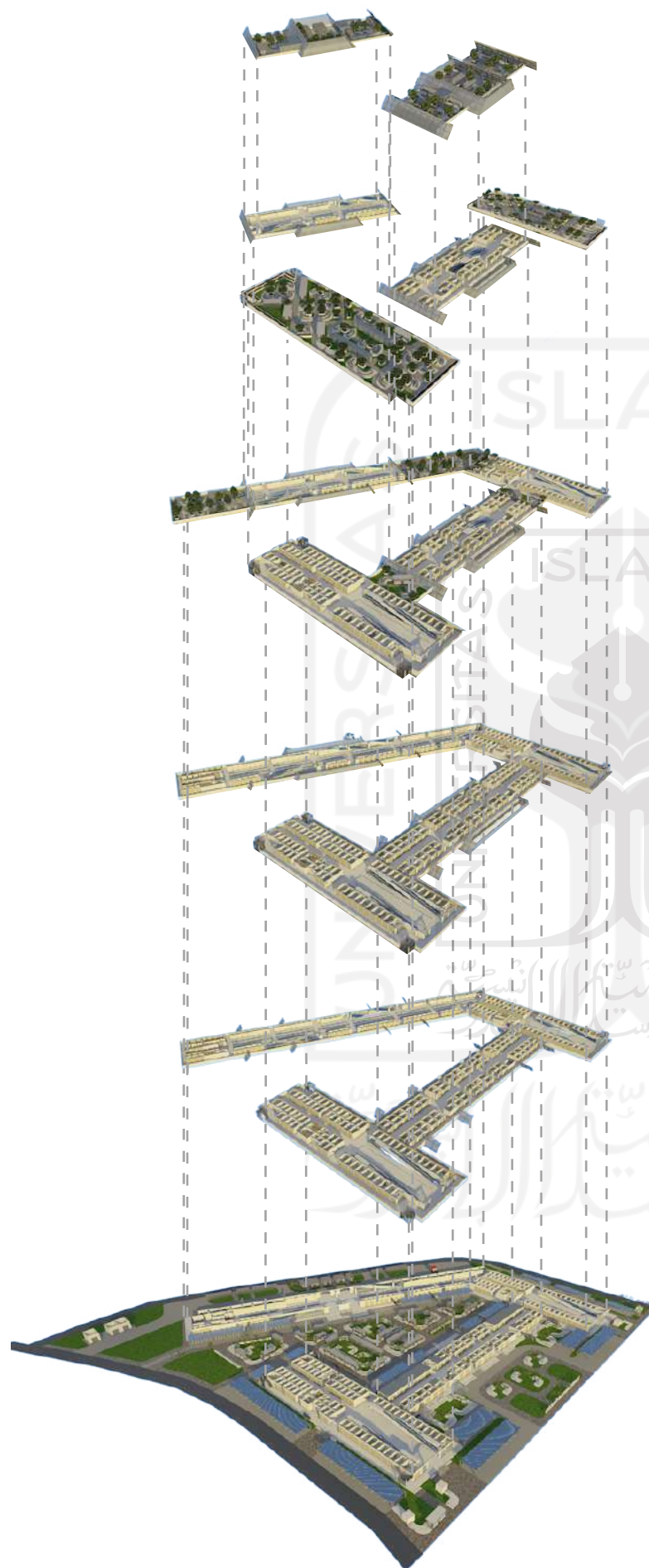
Garbage collection room. both organic and inorganic waste, designed as high as 4 meters with an opening of 4 meters wide and 1.2 meters high above the ground level as high as 2.30 meters. The opening made of an iron frame is intended to provide access to air circulation in the garbage collection room building so that the smell of garbage can be minimized and garbage officers can carry out their activities comfortably. This room is located far from the main market building so as not to interfere with market activities with the unpleasant smell of garbage.

This room can accommodate about 15,000 liters to 18,000 liters or 18 m³ of waste every day. This waste will then be transported to a waste processing site so that it does not become a useless pile and adds to the effect of global warming. The waste management system in this design can also be distributed to add value to the green space concept in the New Banjarsari Market design.

4.3. Banjarsari Market Building







Rooftop and 5th Floor

- Indoor Café
- Outdoor Café
- Outdoor Kiosks

4th Floor

- General Market
- Household Appliances Market
- Lavatory
- Open Green Space: Outdoor Kiosks and Café

3rd Floor

- General Market
- Batik Market
- Lavatory
- Open Green Space: Outdoor Kiosks and Café

2nd Floor

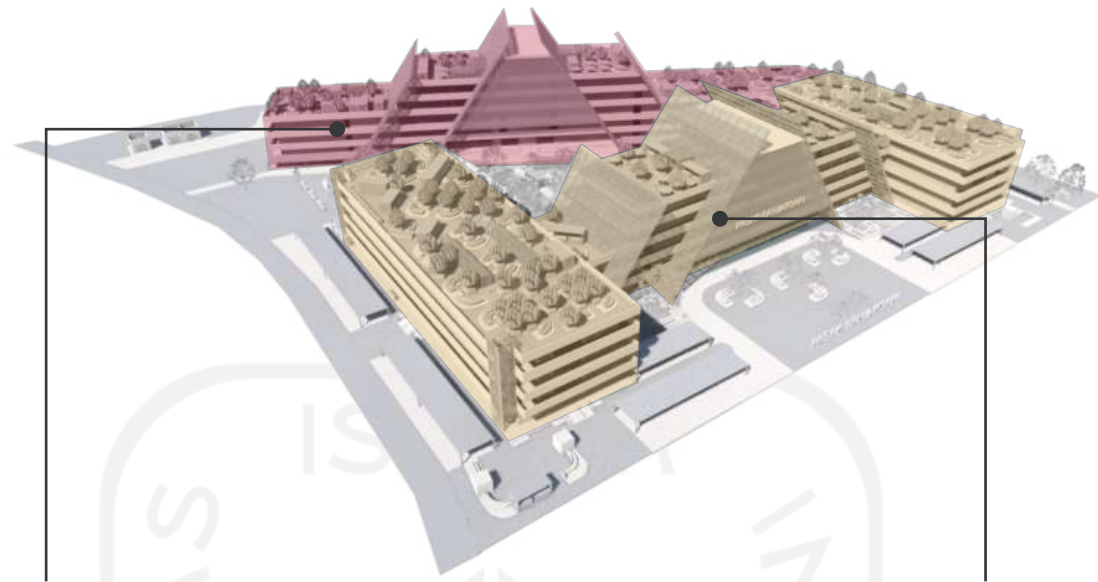
- General Market
- Batik Market
- Lavatory

1st Floor

- General Market
- Batik Market
- Lavatory

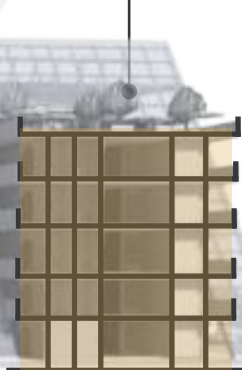
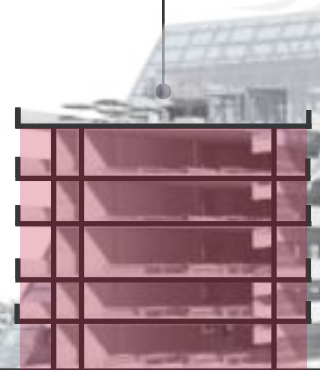
Ground Floor

- | | |
|--------------------|------------------|
| • Parking Area | • Batik Market |
| • Street Vendor | • General Market |
| • Open Green Space | • Mushola |
| • Loading Dock | • Lavatory |



General Market

Batik Market



4.3.1. General Market

Rooftop

There is an indoor café on the 5th floor and two outdoor cafes at the outdoor areas. Any merchants are welcome, but generally the stalls are intended for lower to medium class of merchants since Banjarsari Market is generally not a mall building.

4th Floor

The 4th floor of the public market building is also used for selling meats, agricultural products, and daily groceries. The 4th floor of the east building, whose the ground floor until 3rd floor are used for batik market, is used as the household appliances market such as glassware, kitchen utensils, household plastic items, etc. These two areas are not connected so the visitors have to go down 1 floor to visit one section of the other section.

3rd Floor

The 3rd floor is used for selling meats, agricultural products, and daily groceries. This floor has two rooftop which are used as outdoor café for the market users to relax after shopping.

2nd Floor

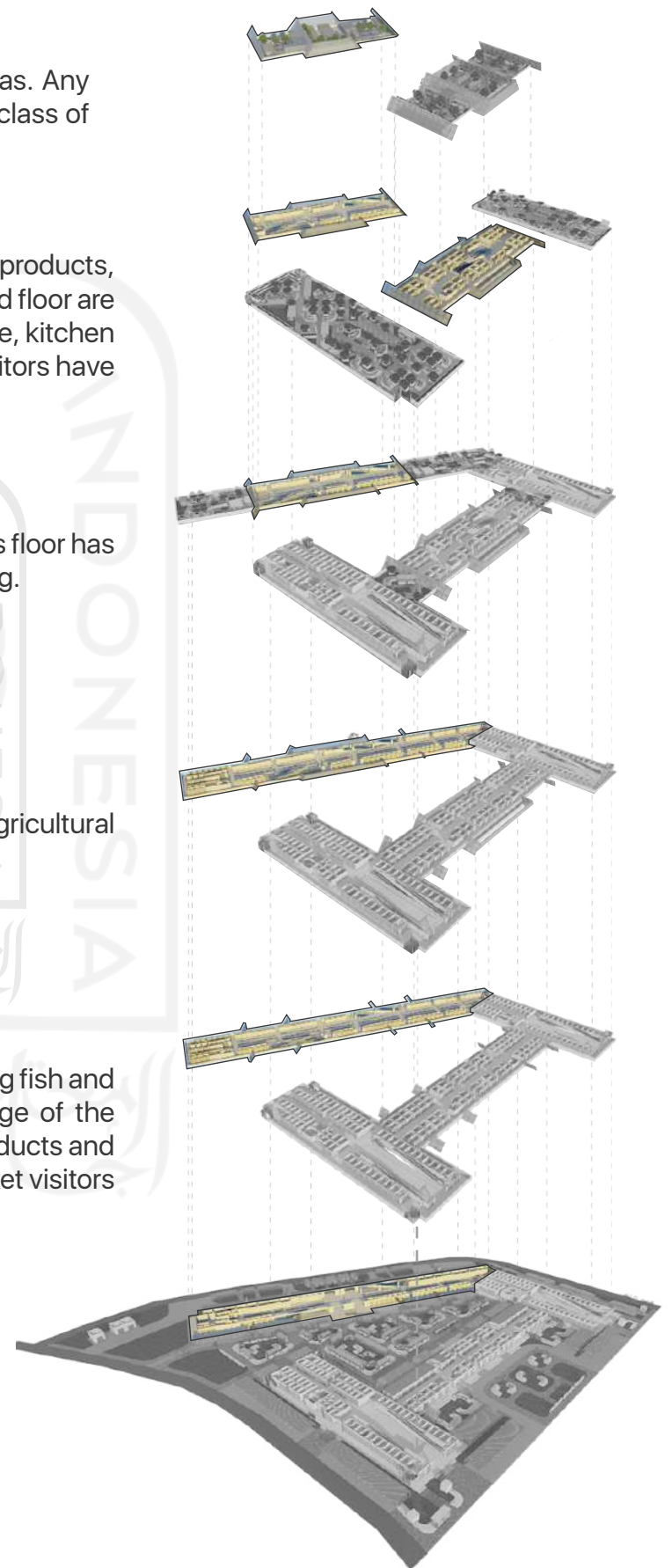
The usage of 2nd floor is the same as the section usage of the 1st floor: meats, agricultural products, and daily groceries.

1st Floor

The inside of the 1st floor public market building is still used as a wet section for selling fish and other seafood, as well as meat (chicken, beef, mutton, etc). Meanwhile, the edge of the building, using a closed kiosk concept, is used as a sales section for agricultural products and daily groceries (dry section). The merging of these sections is intended so that market visitors can shop in both sections without the need to change levels in the building.

Ground Floor

The ground floor of the public market is mostly used as a wet section for the sale of fish and other marine products as well as agricultural products such as vegetables and fruits. The fish sales section is located inside the building with an open kiosk concept (without permanent or temporary walls), while the agricultural products section is located on the edge of the building with closed kiosks using rolling doors. In addition, on the ground floor there are loading docks as a warehouse as well as a motor vehicle repair shop and a prayer room.



Street Vendors



General Market



General Market



Rooftop Café (Indoor)



4.3.2. Batik Market

Rooftop

There is an indoor café on the 5th floor and two outdoor cafes at the outdoor areas. Any merchants are welcome, but generally the stalls are intended for lower to medium class of merchants since Banjarsari Market is generally not a mall building.

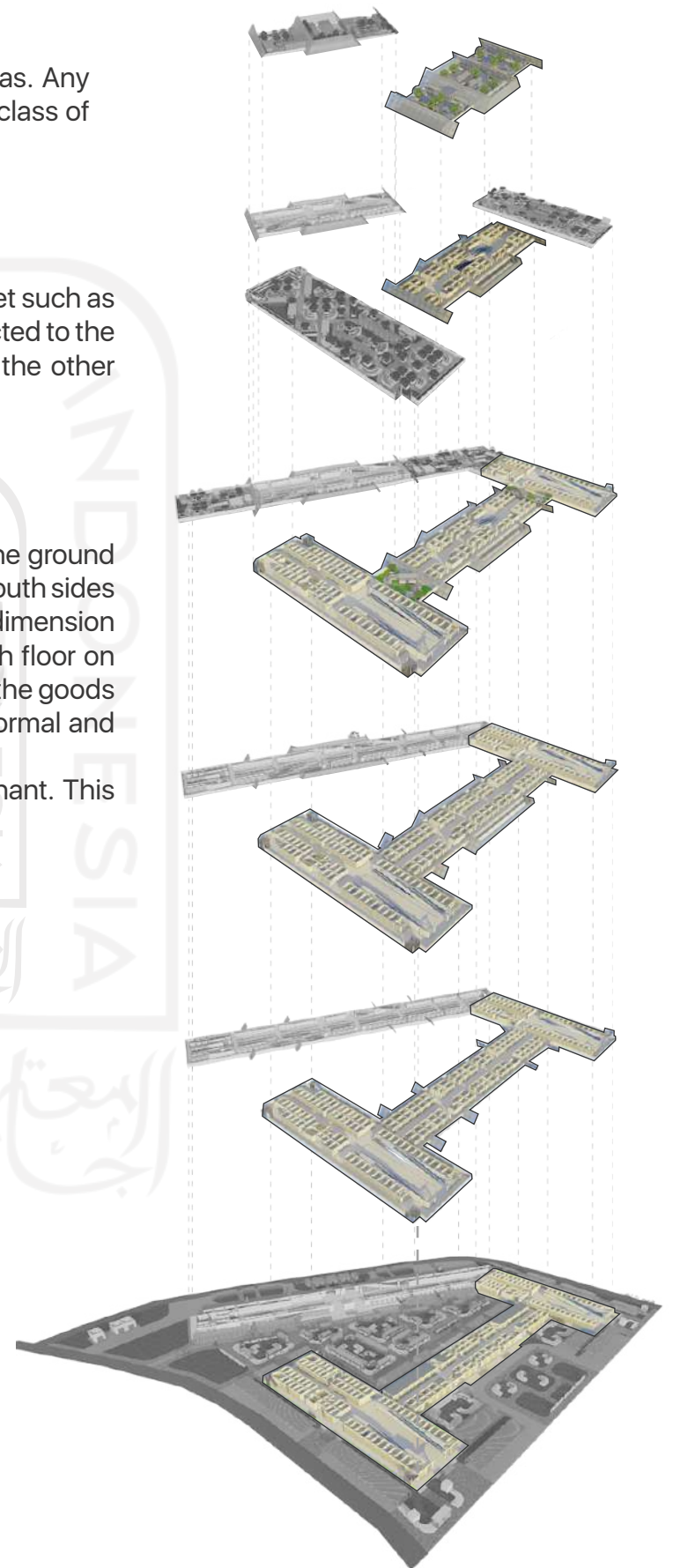
4th Floor

The 4th floor of the batik market building is used as the household appliances market such as glassware, kitchen utensils, household plastic items, etc. This building is not connected to the northwest building so the visitors have to go down 1 floor to visit one section of the other section.

Ground Floor to 3rd Floor

The batik market at Banjarsari Market is available in the west building located on the ground floor to the 3rd floor. Each floor is connected to a travelator located on the north and south sides of the building. This batik market uses a closed kiosk with a rolling door with a room dimension of 2.50 x 4.00 m. On the ground floor there are 173 shops, and 177 shops on each floor on floors 1 to 3, so there are a total of 704 shops in the batik market. Of the 704 stores, the goods sold are not only batik, but also other textile products such as children's clothes, formal and casual clothes, and fabrics.

On the 3rd floor, there are 2 open green spaces that provide 2 stalls for any merchant. This green area is also equipped with a seating space and shade for market visitors.



Batik Market



Batik Market



Rooftop Café (Indoor)



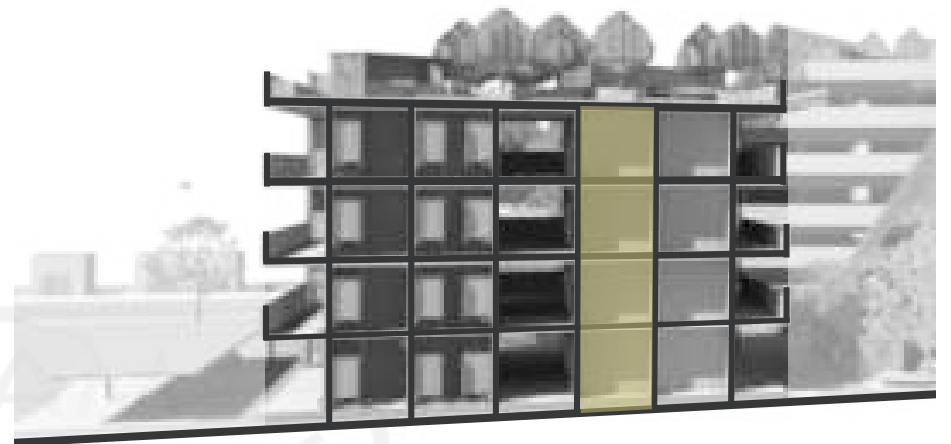
Rooftop Garden



4.4. Barrier Free Design

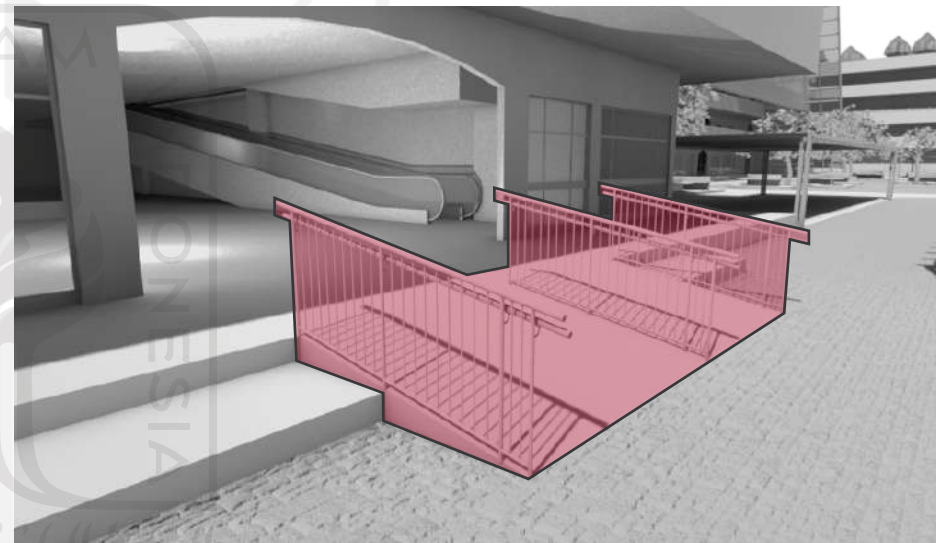
Disabled Lavatory

There are 3 lavatory areas in Banjarsari Market: two are in the batik market and one is in the general market. Each toilet is equipped with 2 disabled toilets for each gender.



Ramp

The building is equipped with ramps for the disabled people. The ramp is 9° with the height different of 40 cm and 120 cm wide for each ramp. It also has handrails as high as 96.5 cm. These ramps are available on each entrance door.



Vertical Transportation

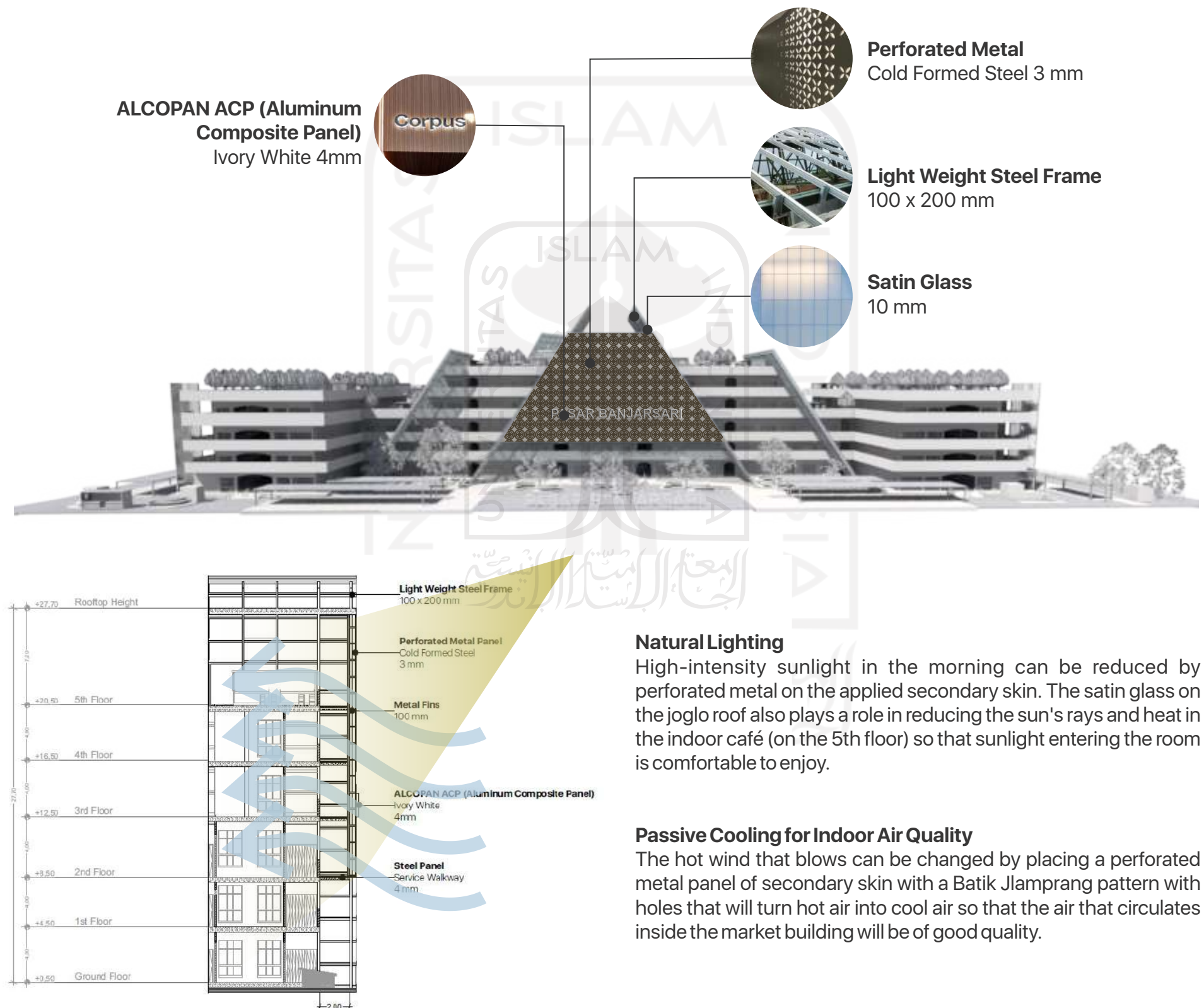
The vertical transportation in Banjarsari Market building is using travelator with a slope of 12° connecting each floor as high as 4 m. The travelator is 100 cm wide/each and there are two travelator in each area of the building.



4.5. Building Facade and Structure

4.5.1. Batik Jlamprang as Building Facade

To show the identity of the area where the New Banjarsari Market is located, the design of this building applies the Jlamprang Batik motif, which is a typical batik of the Sampangan area, on the secondary skin on the east side of the building. The secondary skin uses perforated metal panels from cold formed steel (*baja canai*). This panel is useful for reducing sunlight and heat in the morning and breaking the wind so that good air circulation occurs.



Natural Lighting

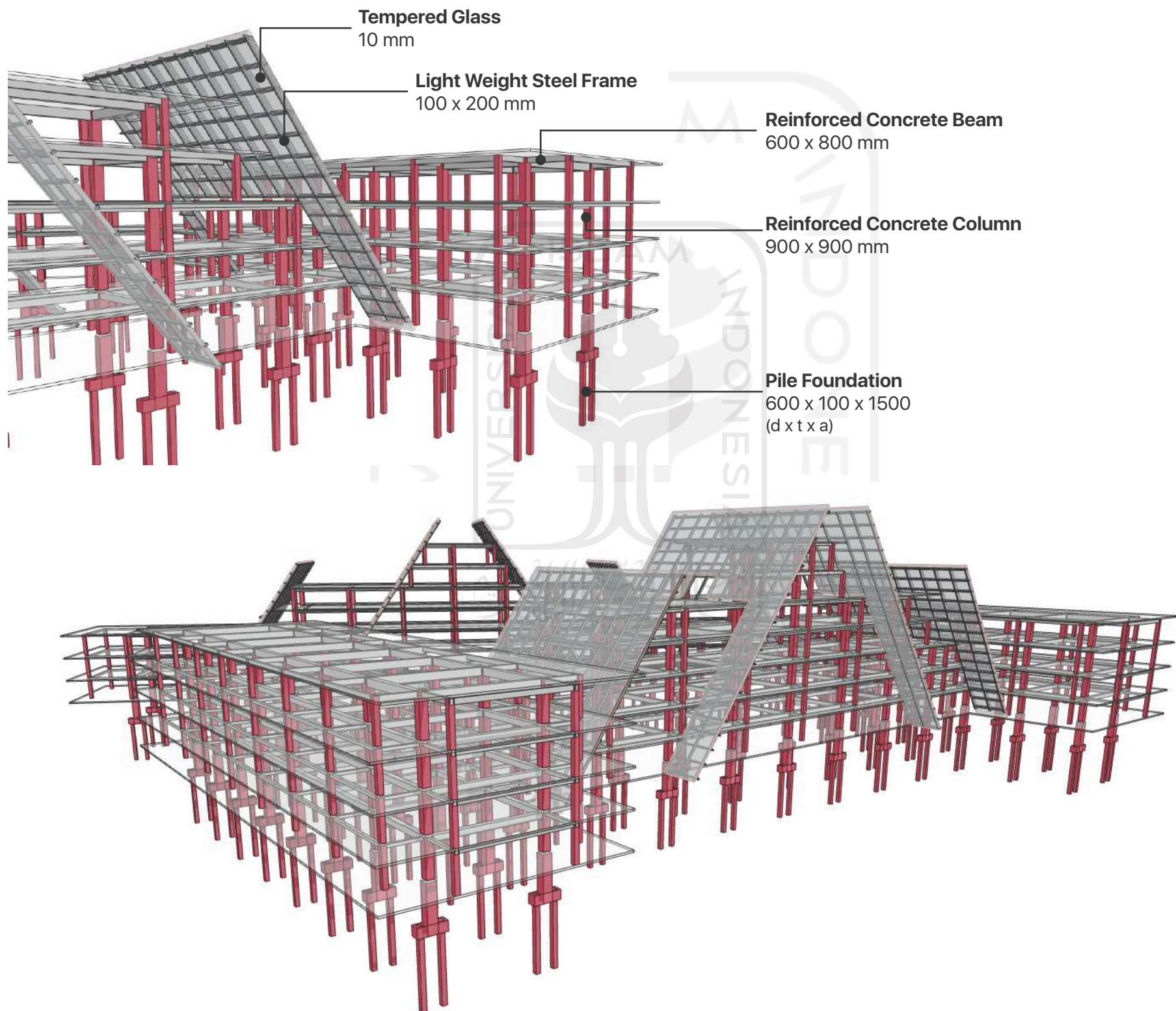
High-intensity sunlight in the morning can be reduced by perforated metal on the applied secondary skin. The satin glass on the joglo roof also plays a role in reducing the sun's rays and heat in the indoor café (on the 5th floor) so that sunlight entering the room is comfortable to enjoy.

Passive Cooling for Indoor Air Quality

The hot wind that blows can be changed by placing a perforated metal panel of secondary skin with a Batik Jlamprang pattern with holes that will turn hot air into cool air so that the air that circulates inside the market building will be of good quality.

4.5.1. Building Structure

The building uses rigid frame of reinforced concrete beam and column to resist movements induced at the joints of members. Its members can take bending moment, shear, and axial loads. The widest span of the column frame is 12 m with the cross-sectional area of the column as wide as 900 x 900 mm.

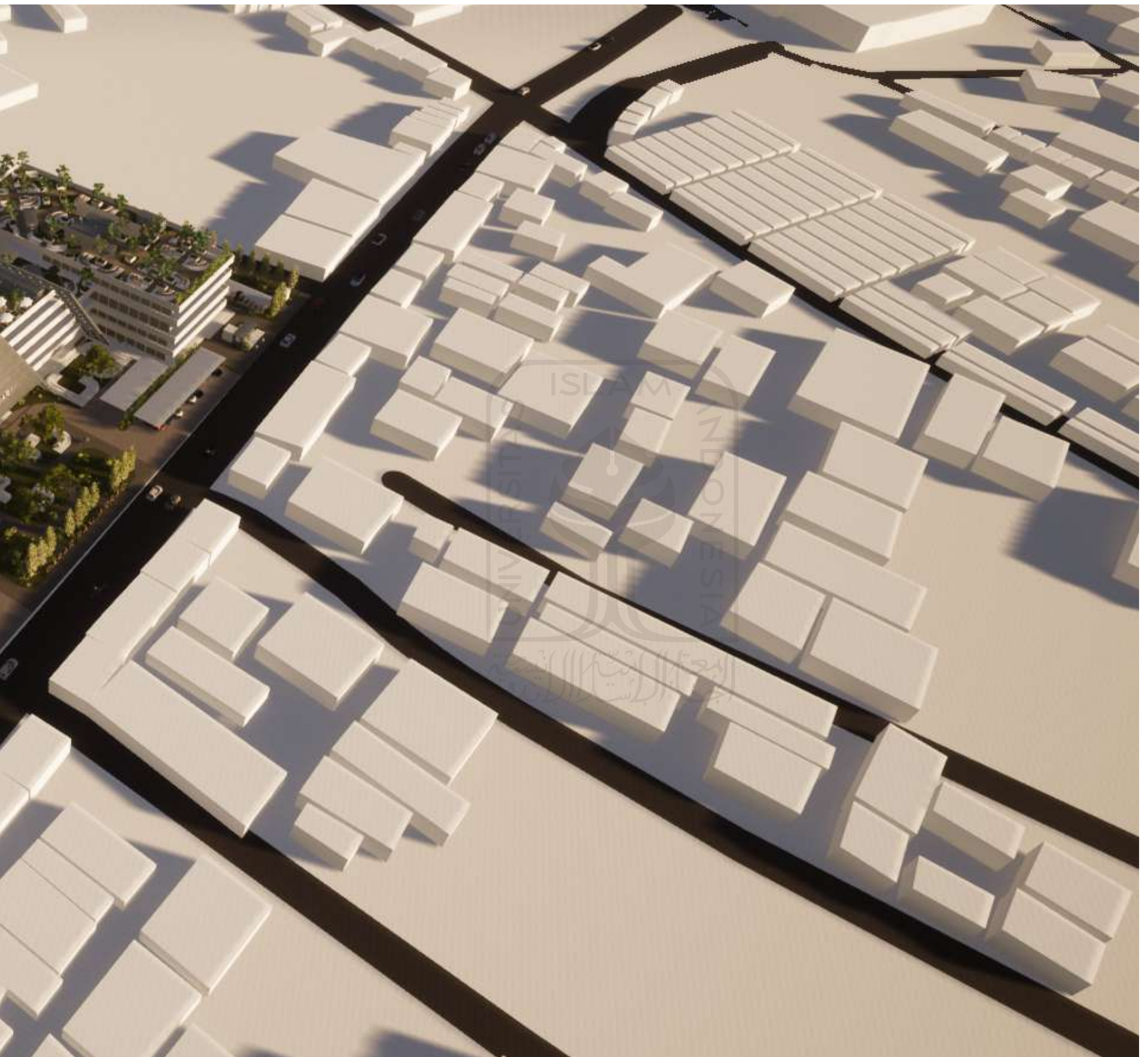


4.6. Building Safety

The design of the New Banjarsari Market building is equipped with emergency stairs at each end of the building. There are 5 outdoor emergency stairs and 3 indoor emergency stairs. The emergency stairs outside the building are left open with hand railing, so that in the event of a fire, the fire does not get bigger inside the emergency staircase area. Only one side is covered with a metal chain link fence as a visual barrier. The emergency stairs in this building have a stair width and landing of 1.40 m and a height of 20 cm for each stair. The hand railing is 95 cm high with mild steel material which is slow to conduct heat.







05 REFLECTION



JURY COMMENTS AND EVALUATIONS

1. What time is the exact opening hours of both markets, loading docks, and the open green space, including the open layout market at the inner courtyard and the rooftop garden?
2. How is the vertical access design (non-electrical access, such as ramp) for the market loads service?
3. Open green space is supposed to be open 24 hours for public, or at least the closing hour is around midnight. Please consider the vertical access to the rooftop garden and provide access to connect each rooftop garden (outside the building, so that the visitors can still access the open green space at each rooftop when the market already closed).
4. How is the green system applied on the design (including water distribution and vegetation)?
5. What is the successfulness criteria of the open green space concept?



5.1. Opening Hours Office

5.1.1. General Market and Loading Trucks Access

The general market in Banjarsari Market has the opening hours for 12 hours, from 5 a.m. until 5 p.m., while the access of the load trucks, which is connected to the residential in the back side of the market building from Jalan Mangga to Jalan Jeruk does not have any regulations problem related to the accessible accessible by heavy vehicles, thus any hours is safe for the load trucks to access the road. But in the design of New Banjarsari Market, the load trucks office hours will be applied starting at 5 p.m. and ended at 9 p.m.

The buyers and suppliers can drop their loads at the loading docks area in the evening when the general market is closed so that the market activity will not be disturbed and the loads access can be accessed freely.



5.1.2. Batik Market

The opening hours of the batik market in the design is started at 8 a.m. and ended at 8 p.m. The loads of batik goods will be dropped in each stores and can be done both before the sellers open their store and after the sellers close their store.



5.1.3. Open Layout Market

Open layout market in this market which located in the inner courtyard, front side and back side of the market is started operating at 5 a.m.



5.1.4. Rooftop Garden and Cafés

Previously, the rooftop gardens and café's opening hours is following the building below them, which means the rooftop garden on the general market building, its opening hours will be the same as the general market's opening hours (5 a.m. – 5 p.m.), and the rooftop garden on the batik market building, its opening hours will also be the same as the batik market's opening hours (8 a.m. – 8 p.m.). But, considering the jury's comment that open green space should be accessible for public until midnight, at least, if it can not be accessed for 24 hours, then the rooftop garden opening hours will be changed to 5 p.m. (when the general market starts operating) until 12 a.m.

Moreover, considering the daylight at noon, the visitors may not be comfortable since the rooftop gardens are so open. The visitors will be more comfortable to come at evening where there is not so much sunlight and they can enjoy the cityscape. This evaluation takes some correction of the design, where the author added ramps outside the building as an access to the rooftop garden, so that the visitors do not need to enter the building and going to the rooftop using the travelator.



5.2. Loads Access

In the previous design, vertical access for market loads is only available inside the building using a travelator which is also used by the visitors. Considering the jury comment's, related to the visitors' comfort and the condition if electrical power outage happens, the author added ramps outside the building as the manual vertical access.



5.3. Open Green Space Access and Connection

Access Outside the Building

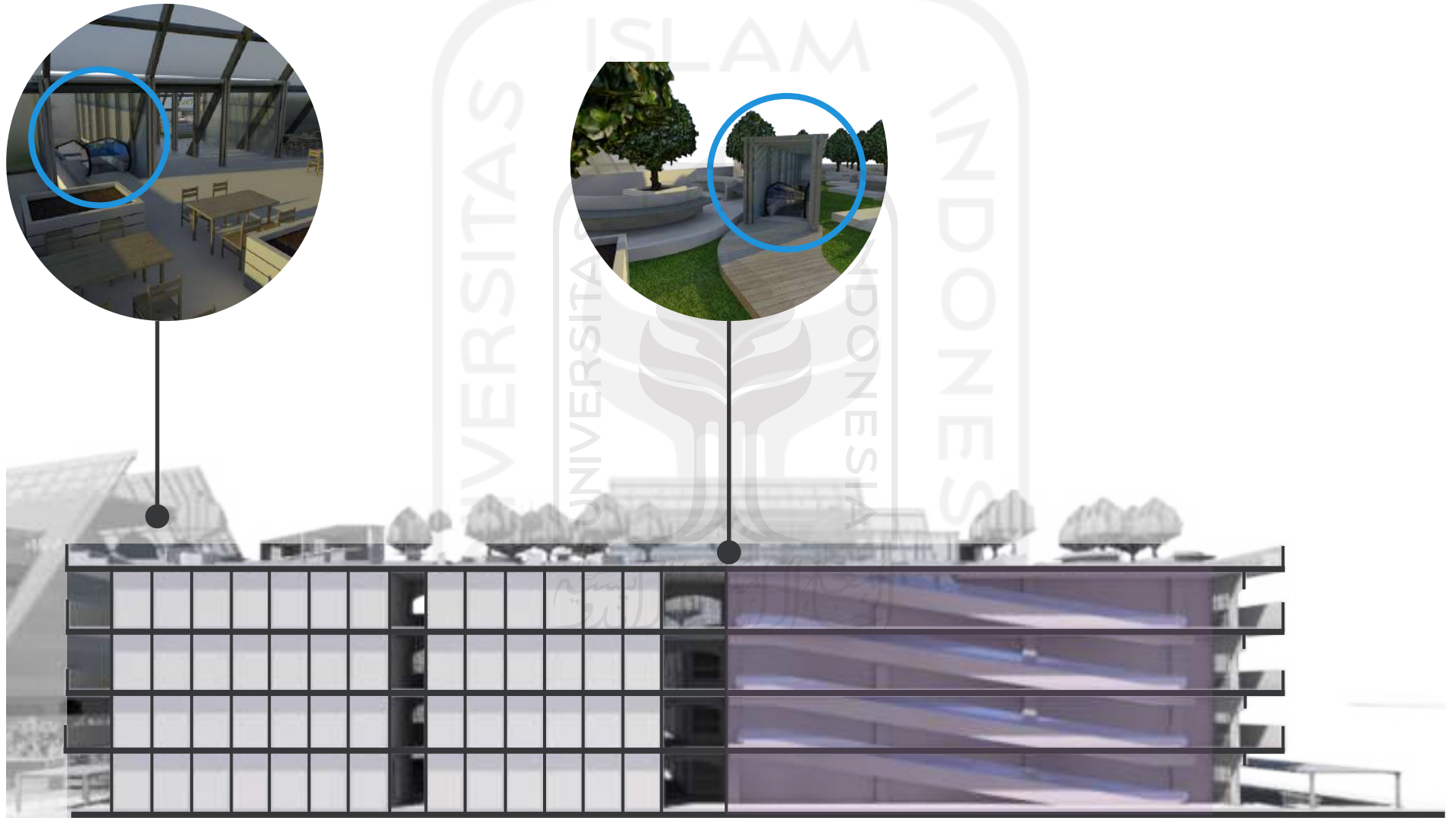
Considering the jury comment's, related to the opening hours of the open green space, that open green space should be accessible for public until midnight, at least, if it can not be accessed for 24 hours, then the rooftop garden opening hours will be changed to 5 p.m. (when the general market starts operating) until 12 a.m. Then, the author added ramps outside the building that's accessible until the closing hour of the rooftop garden.

The ramps are available connecting the ground floor to the 4th floor (red circle). Then from the 4th floor, the visitors must take the travelator inside the building to get into the 5th floor and the rooftop on the 5th floor (blue circle), even though the market on the 4th floor is closed.



Access Inside the Building

The vertical access to the rooftop garden inside the building is using travelator that's also used by the market visitors. If the electrical power outage happens, then the visitors have to use the non-electrical ramps that available outside the building.



5.4. Green System of Open Green Space

5.4.1. Rain Water and Clean Water Distribution

In the previous infrastructure system, the use of clean water in the building was sourced from a ground water tank which only utilized clean water from PDAM. However, related to the green concept the author raised in the design, the rain water will be considered to be recycled and distributed as clean water source.

A. General Market

Sellers and visitors estimation = 4.000 (1.710 sellers) person

Clean water usage = 30 liter / person / day

Total clean water usage = 4.000 person x 30 liter / day
= 120.000 liter / day

B. Batik Market

Sellers and visitors estimation = 2.000 (672 sellers) person

Clean water usage = 30 liter / person / day

Total clean water usage = 2.000 person x 30 liter / day
= 60.000 liter / day

C. Rooftop Garden

Faucet number = 38 faucet

Clean water usage = 100 liter / faucet / day

Total clean water usage = 38 faucet x 100 liter / day
= 3.800 liter / day

D. Mushola

Person number estimation = 150 person

Clean water usage = 10 liter / person / day

Total clean water usage = 150 person / day x 10 liter
= 1.500 liter / day

Total clean water usage per day

= A + B + C + D

= 185.300 liter / day

= 186 m³ / day (rounded)

GWT Capacity

2 day x total clean water usage per day

2 day x 186 m³ = 372 m³

Roof Tank Capacity

Daily usage per hour = 372 m³ / 10 hours

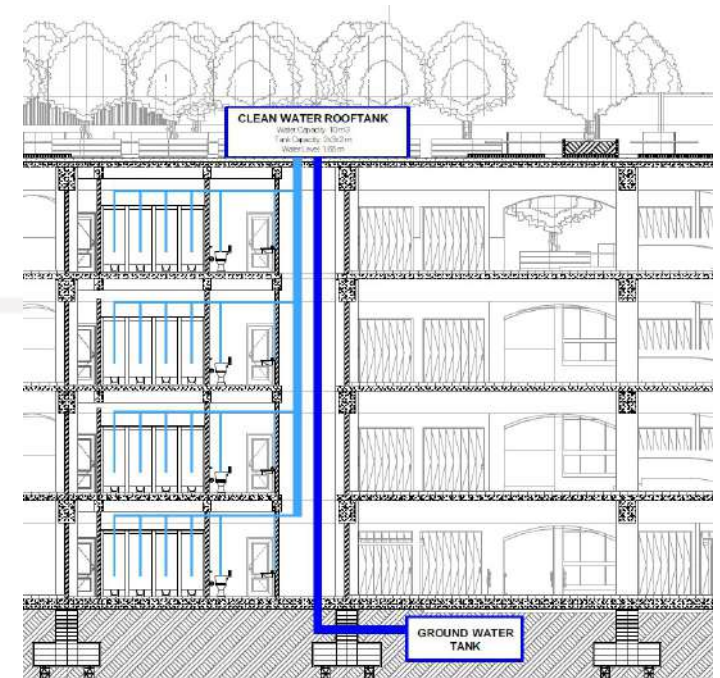
Multiplier constanta = 3

Peak of minute water usage =

$((372 \text{ m}^3 / 10 \text{ hours}) / 60 \text{ minutes}) \times 3 = 1,86 \text{ m}^3/\text{minute}$

Time filling the roof tank = 40 menit

Roof tank effective capacity = $1,86 \text{ m}^3/\text{min} \times 40 \text{ min} = 74.4 \text{ m}^3$



BOOSTER PUMP

c/w VSD (Various Speed Drive)

Pressure Tank

CLEAN WATER ROOFTANK

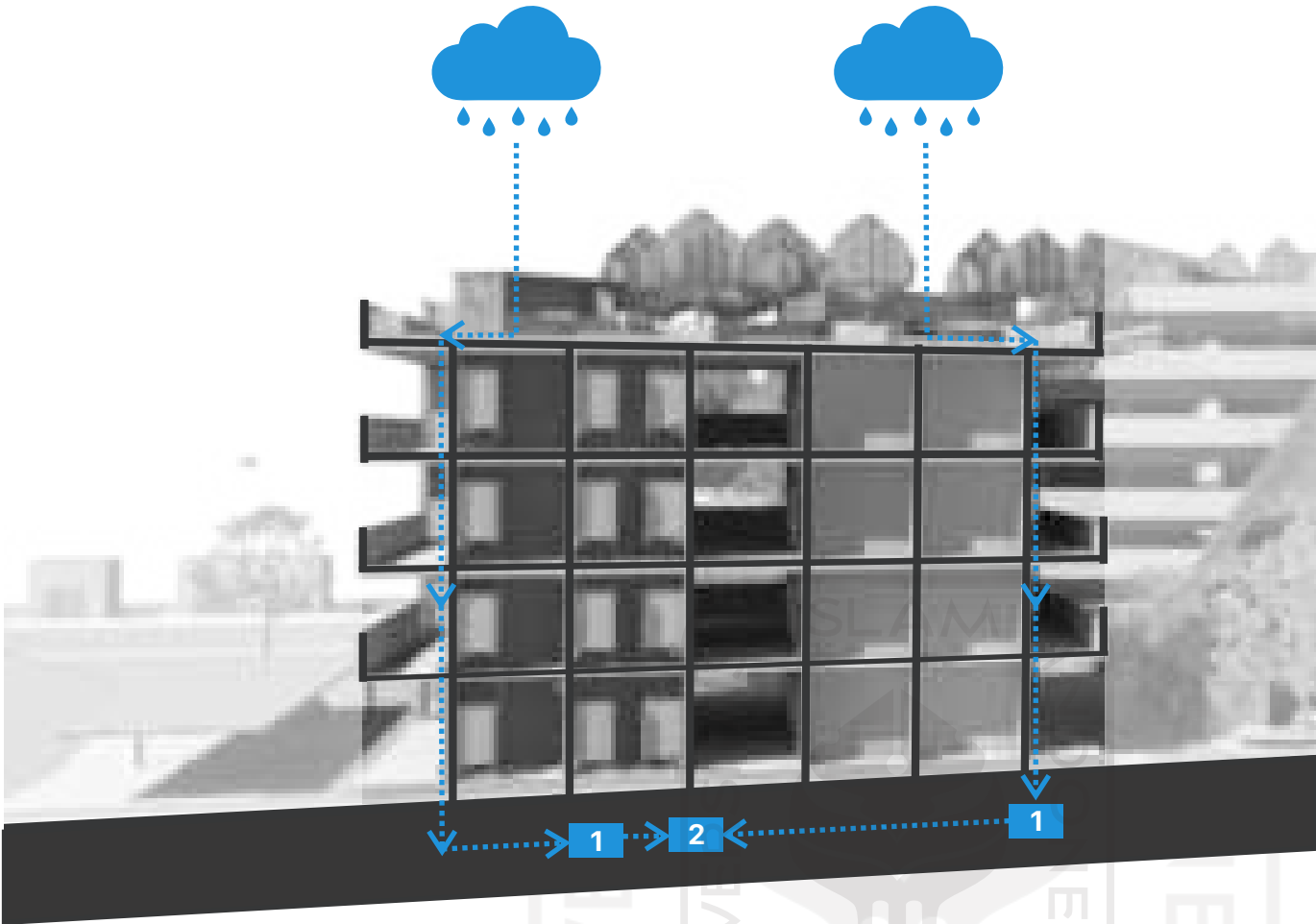
Water Capacity : 20 m³

Tank Capacity: 2 x 5 x 2 m

Water Level: 1.65 m

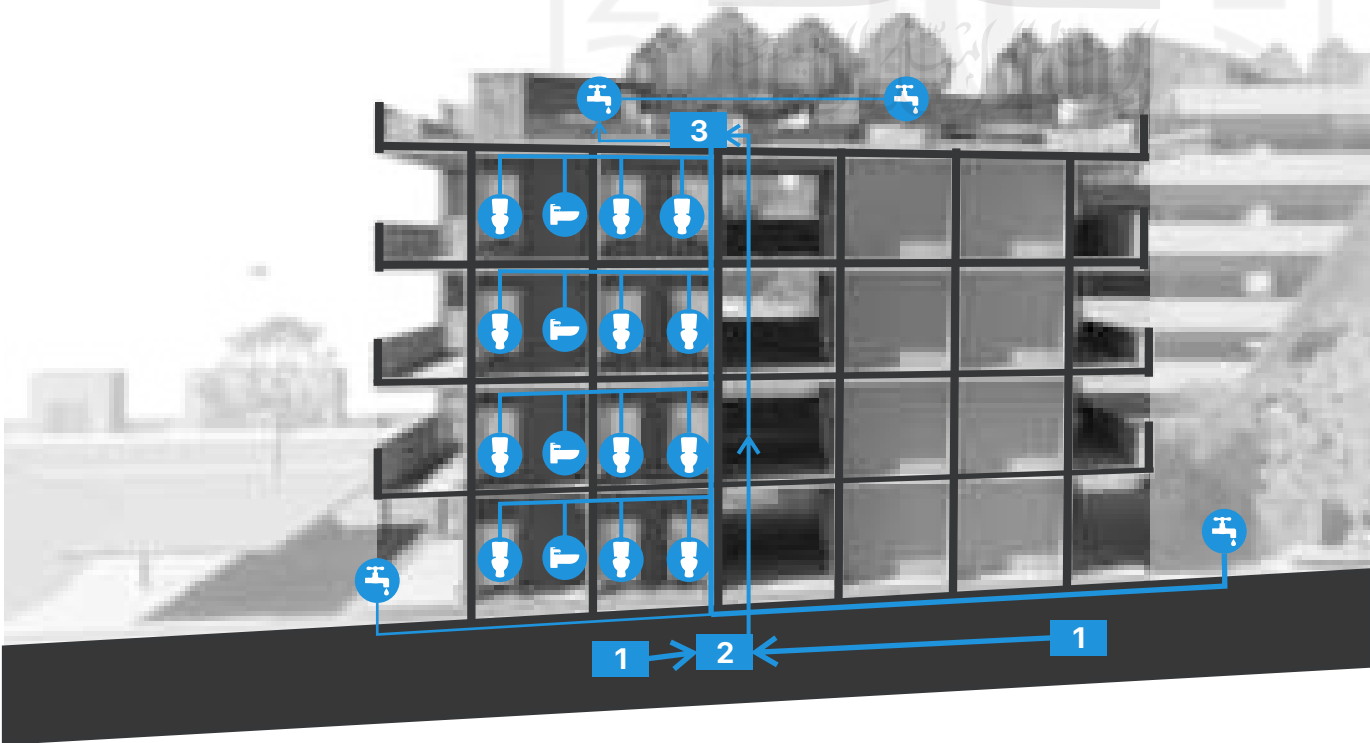
Total Roof Tank : 4 tanks

Rain Water Distribution



The rain water will be filtered in the filtration tank to be recycled and reused, distributed to the ground water tank.

Clean Water Distribution



The filtered water will be used as clean water and distributed into all the water usage area.

- 1 : Rain Water Filtration Box**
- 2 : Ground Water Tank**
- 3 : Roof Water Tank**

5.4.2. Disposal Water Distribution



2 : Ground Water Tank
4 : Grey Water Filtration Box

The grey water from the sinks on each floor is distributed to filtration tank and recycled to be distributed to the ground water tank. Then the water can be reused and adding the green value on the design.



5.5. Successfulness Criteria of Open Green Space

Open green space requirement for a public building is 20% at the minimum number. However, the design also needs to increase the open green space area in city's scale, where the Regional Regulation mentioned that the total area of open green space in Pekalongan should be at least 30% of the total area, 20% of public green open space, 10% of private green open space. The area of Pekalongan City itself covers 45.25 square kilometer, but now the area for green space is only 7 square kilometer, which is only 15% out of 30%.

The gap or the number that needs to be fulfill to reach the minimum requirement of green areas in Pekalongan city is 15% or 7 sqkm more areas. Open green space requirement for a public building is 20% at the minimum number. The site area is 17.300 m², so the site will need 3.460 m² for open green space. Thus, the design of open green space in Banjarsari Market should contribute in increasing the percentage number of green areas in Pekalongan City for 0,0002593% at the minimum number.

Site Area: 17.300 m²

A. Green Area on Ground Level: 7.328,261 m²

B. Green Area with Pavement: 5.103,225 m²

C. Asphalt Area: 4.868,514 m²

D. Rooftop Garden on 3th Floor: 689,312 m²

E. Rooftop Garden on 4th Floor: 939,246 m²

F. Rooftop Garden on 5th Floor: 347,727 m²

Total Green Area

= A + B + D + E + F

= 7.328,261 + 5.103,225 + 689,312 + 939,246 + 347,727

= 14.407,771 m²

Green Area Percentage on Ground Level

= (A + B / Site Area) x 100%

= (12.431,486 / 17.300) x 100%

= 71,85%

Building Coverage Area

1st Floor: 8.610 m²

2nd Floor: 8.610 m²

3rd Floor: 8.610 m²

4th Floor: 6.380 m²

5th Floor: 2.642 m²

Total = 34.852 m²

Green Area Percentage in New Banjarsari Market Design

= (Total Green Area/Total Building Coverage Area) x 100%

= (14.407,771 / 34.852) x 100%

= 41,3%



Green Area Contribution to Pekalongan City

= (Total Green Area in the design/Total Green Area needed in Pekalongan City) x 100%

= (14.407,771 / 14.000.000) x 100%

= 0,00103 x 100%

= 0,103%

The green areas in the design of New Banjarsari Market Area will contribute as 0,103% to the green number in Pekalongan City.



ATTACHMENT

A. Plagiarism Check Result



Direktorat Perpustakaan Universitas Islam Indonesia
Gedung Moh. Hatta
Jl. Kaliurang Km 14,5 Yogyakarta 55584
T. (0274) 88444 e xt.2301
F. (0274) 88444 p sw.209
E. perpustakaan@uii.ac.id
W. library.uui.ac.id

SURAT KETERANGAN HASIL CEK PLAGIASI

Nomor: 1740418010/Perpus./10/Dir.Perpus/X/2021

Bismillaahirrahmaanirrahiim

Assalamualaikum Wr. Wb.

Dengan ini, menerangkan Bahwa:

Nama : Ajeng Sharma Diva Sharietta
Nomor Mahasiswa : 17512038
Pembimbing : Wiryono Raharjo, Ir. M.Arch., Ph.D.
Fakultas / Prodi : Teknik Sipil dan Perencanaan/ Arsitektur
Judul Karya Ilmiah : Re-utilization of Banjarsari Traditional and Batik Market with Open Green Space in Sampangan, Pekalongan City

Karya ilmiah yang bersangkutan di atas telah melalui proses cek plagiasi menggunakan **Turnitin** dengan hasil kemiripan (*similarity*) sebesar **2 (Dua) %**.

Demikian Surat Keterangan ini dibuat untuk dapat dipergunakan sebagaimana mestinya.

Wassalamualaikum Wr. Wb.

Yogyakarta, 1/12/2022

Direktur



Joko S. Prianto, SIP., M.Hum

B. Architectural Presentation Board

DESIGN OF

NEW BANJARSARI MARKET

IN SAMPANGAN, PEKALONGAN CITY

THROUGH THE APPLICATION OF OPEN GREEN SPACE

The relocating Banjarsari Market is the development of the implementation of cultural approach and effective circulation in an effort to enhance the market area as the main trading area in Sampangan sub-district, Pekalongan City, as well as an icon and landmark of the area that showing the historical part of the city. The loss of the main market in the district due to the damaged building giving impact to the economic condition and creating non-sufficient emergency markets. In order to achieve a new market building that has characteristics of a region where it was established and which considers the effectiveness of a good circulation and green open area, it is done by improving the physical area through the application of open green space in the design.

To make this design different from market in Pekalongan that apply modern concepts to building forms, the application of regionalism and open green space as an architectural design approach is able to improve the quality of the Banjarsari Market design which upholds the identity of Sampangan area which is known as the cultural and heritage area. The New Banjarsari Market is hoped to be able to create a new branding on the market that carries the values of Sampangan culture as well as an attractive and efficient spatial layout so as to create market that reflects the city of Pekalongan.

BACKGROUNDS

CULTURAL SETTLEMENTS POTENTIAL

In the 1960s, Jalan Kerimunan (now: Jalan Belimbing) was a residential area, not a mixed-use area as it is today. Even though the current condition is mixed with business buildings and shops, some ancient buildings still look attractive because they are still being preserved so that they can become an attractive area for tourists to visit to see firsthand the conditions of the Pekalongan Chinatown in the past and to enjoy the architectural style of Chinese buildings living in Pekalongan.



OPEN GREEN SPACE NEEDS

Based on the data of The Government of Central Java Province, Dinas PUSDATARU of Central Java Province, the number of public open green space in Pekalongan City has not meet the requirements. According to the data, the open green space area in Pekalongan City only 18 percent of the total area of this city. This means that the area of Pekalongan City's green open space does not meet the Regional Regulation (Perda) Number 30 of 2011 concerning spatial planning. The Regional Regulation mentioned that the total area of open green space in Pekalongan should be at least 30% of the total area, 20% of public green open space, 10% of private green open space. The area of Pekalongan City itself covers 45.25 square kilometers, but the need for green space is only 7 kilometers, which is only 18% of the area.

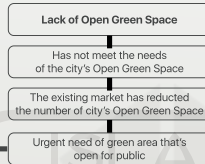
ABANDONED BUILDING

Banjarsari market used to be inside the building of Borobudur Mall, where the building was a combined function of traditional and modern market, until 3 years ago before the building caught fire. Since the building was abandoned, emergency market was established on the riverside, removing the open green space and causing inefficient circulation for citizens. The current condition of the burned building makes it impossible to be reused due to the strength of the burnt structure. The best idea to revitalize the place is to relocate the market to the initial site and demolish the burned building, then create a design of the new Banjarsari market.



ISSUES

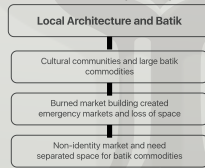
CITY'S ISSUE (MACRO)



LOCATION'S ISSUE (MEZZO)



SITE'S ISSUE (MICRO)



LOCATION



PROBLEM FORMULATION

PROBLEMS

Paying attention to the description above, the formulation of problems that can be identified and need to get attention in the process of redesigning Banjarsari Market that are expected to be resolved in the redesigning process are:

- a. How to re-utilize the old site of Banjarsari Market for a new market that can accommodate a general market and batik market.
- b. How to design green area as public space inside the market.
- c. How to design a market with local characteristics of architecture.

GOALS

The goals in designing the new Banjarsari Market area are:

- a. To create new face of Banjarsari Market area that can stand out the city's and surrounding characteristics.
- b. To create open green space to solve the urban issue of the lackness of green space number.
- c. To revitalize the abandoned location.



LAND USAGE BUILDINGS USAGE



- Borobudur Mall (abandoned)
- Residential and mix used
- Chinese shops
- Emergency Market (existing)

GREEN AND BLUE AREA



- Kali Loji
- Green area

TRANSPORTATION NETWORKS



- One way
- Two ways



UNIVERSITAS
ISLAM
INDONESIA

FINAL ARCHITECTURAL
DESIGN STUDIO
2021/2022

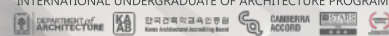
STUDENT
AJENG SHARMA DIVA SHARIETTA

EXAMINER 1
ILYA FAJAR MAHARIKA, MA., Dr.-Ing., IAI

SUPERVISOR
WIRYONO RAHARJO, Ir. M.Arch., Ph.D.

EXAMINER 2
REVIANTO BUDI SANTOSA, Dr. Ir., M.Arch., IAI

INTERNATIONAL UNDERGRADUATE OF ARCHITECTURE PROGRAM

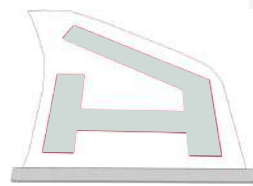
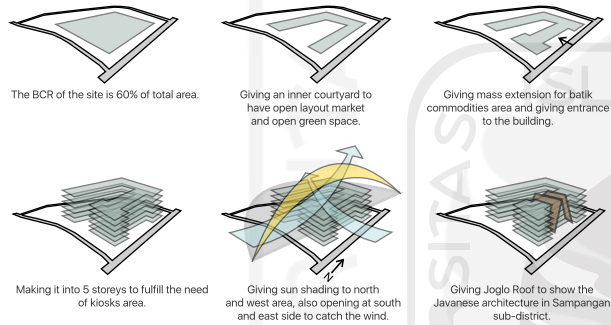


1



DESIGN ANALYSIS

MASS TRANSFORMATION



Site area: 17,000 m²
 BCR: 60% of 17,000 m² = 10,200 m²
 FAR: 5 of 10,200 m² = 51,200 m²
 Building Height: FAR/BCR = 5 Storeys
 Open Green Space Requirements : 20% at the minimum number.

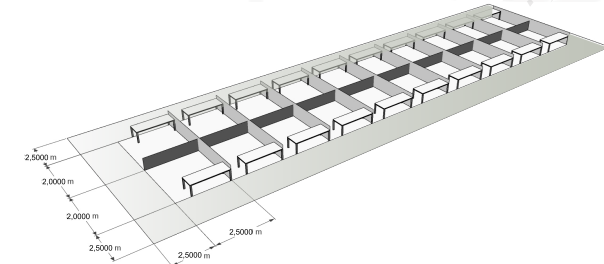
Requirements
 Total sellers in 2030 = 2.382 persons

Number of sellers in one storey (at least)
 = 2.382 persons : 5 storeys
 = 477 sellers in one storey

It means, the number of kiosk per storey is also at least 477 kiosks, while the module of one kiosk is 4m x 3m.

MARKET CAPACITY

Based on the standard of RURTK, the need for shopping facilities is 0.25 m² / person. Then the need for shopping facilities in 2030 is estimated at 0.25m²/person x 219.040 = 54.760 m² / person.
 The coefficient of shopping facilities in 1996/2007952/1375 = 60%.
 Then the floor area requirements for the Banjarsari market are: 60% x 54.760 m² / person = 32.856 m².
 32.856 m² : 2.382 = 5 m² / trader and their circulation.



Estimated amount of traders in next 10 years (2030):
 Comparison condition to 2020
 • Total population 315.218 souls
 • Total traders 3.168 people
 Percentage of traders = 1,005%

Predicted total traders in 2030
 Total Traders in 2020 + (Population in 2030 x KDB (for market) x Percentage of traders)
 = 3.168 + (354.306 souls x 60% x 1,005%)
 = 5.305 people (in total for Pekalongan City's traders)

KIOSK MODULE



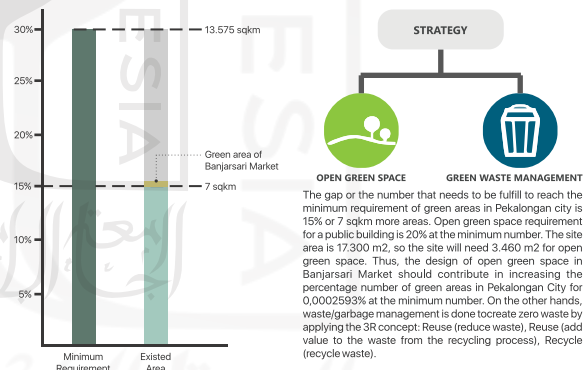
The idea is to arrange the kiosk module in grid form with main circulation area as the center of the spatial organization. The first alternative is to put the kiosk module at the corner of the grid to create the easiest way for the visitors to move inside the market.

NUMBER OF KIOSKS AND STORES

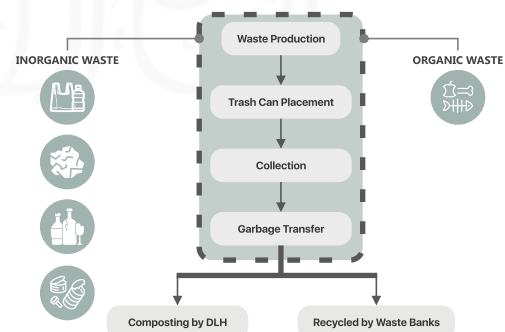
| FUNCTION | 2020 | 2030 (TOTAL IN 2020 x 16,3%) |
|---|------|------------------------------|
| Batik and Textiles | 563 | 672 |
| Groceries | 234 | 279 |
| Food and Snacks | 278 | 335 |
| Household Appliances | 77 | 93 |
| Motorbike Repair Store | 7 | 12 |
| Others | 53 | 67 |
| Fish and Other Seafood | 139 | 168 |
| Meats | 294 | 348 |
| Agricultural Products (Fruits and vegetables) | 177 | 214 |

The total number of traders in 2030 will be used as a reference for the design of the New Banjarsari Market building.

GREEN SPACE ISSUE



GREEN WASTE MANAGEMENT



Waste management at the Banjarsari Market will be managed up to waste transfer activities from the market to TPSSR (waste management site for 3R which is reduce, reuse, and recycle; or named *Tempat Pengelolaan Sampah 3R*) for organic waste to be processed into compost and to waste banks for inorganic waste to be recycled. The generated waste will be transferred to the management site by dump trucks with capacity 8m³ per truck, which each truck can be operated 2-3 times per day to pick up the waste.



UNIVERSITAS
ISLAM
INDONESIA

FINAL ARCHITECTURAL
DESIGN STUDIO
2021/2022

STUDENT
AJENG SHARMA DIVA SHARIETTA

EXAMINER 1
ILYA FAJAR MAHARIKA, MA., Dr.-Ing., IAI

SUPERVISOR
WIRYONO RAHARJO, Ir. M.Arch., Ph.D.

EXAMINER 2
REVIANTO BUDI SANTOSA, Dr. Ir., M.Arch., IAI

INTERNATIONAL UNDERGRADUATE OF ARCHITECTURE PROGRAM



2

GENERAL MARKET

5TH FLOOR AND ROOFTOP

There is an indoor café on the 5th floor and two outdoor cafés at the outdoor areas. Any merchants are welcome, but generally the stalls are intended for lower to medium class of merchants since Banjarsari Market is generally not a mall building.

4TH FLOOR

The 4th floor of the public market building is also used for selling meats, agricultural products, and daily groceries. The 4th floor of the east building, whose the ground floor until 3rd floor are used for batik market, is used as the household appliances market such as glassware, kitchen utensils, household plastic items, etc. These two areas are not connected so the visitors have to go down 1 floor to visit one section of the other section.

3RD FLOOR

The 3rd floor is used for selling meats, agricultural products, and daily groceries. This floor has two rooftop which are used as outdoor café for the market users to relax after shopping.

2ND FLOOR

The usage of 2nd floor is the same as the section usage of the 1st floor: meats, agricultural products, and daily groceries.

1ST FLOOR

The inside of the 1st floor public market building is still used as a wet section for selling fish and other seafood, as well as meat (chicken, beef, mutton, etc). Meanwhile, the edge of the building, using a closed kiosk concept, is used as a sales section for agricultural products and daily groceries (dry section). The merging of these sections is intended so that market visitors can shop in both sections without the need to change levels in the building.

GROUND FLOOR

The ground floor of the public market is mostly used as a wet section for the sale of fish and other marine products as well as agricultural products such as vegetables and fruits. The fish sales section is located inside the building with an open kiosk concept (without permanent or temporary walls), while the agricultural products section is located on the edge of the building with closed kiosks using rolling doors. In addition, on the ground floor there are loading docks as a warehouse as well as a motor vehicle repair shop and a prayer room.

OPEN LAYOUT MARKET

The New Banjarsari Market design also tries to contribute to the issue of Pekalongan City regarding the lack of available green open space. With the hope of increasing the number of green open spaces in Pekalongan City, this market is designed with lots of green open space that doubles as an open market layout, seating area, and at the same time as a rainwater catchment area to prevent flooding on the site, especially in the inner courtyard area.

OPEN LAYOUT MARKET

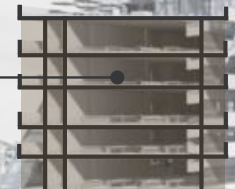


The market's inner courtyard is used as an open layout market to increase the economic value of the available open green space. Traders in this open layout are street vendors who were previously located on the sidewalks around the Banjarsari Market, thus disturbing pedestrian activities. If there are stalls provided for street vendors, visitors will be more comfortable shopping and the sidewalks can function properly.

SEATING SPACE



The green open area at the front of the market is used as a place to sit for visitors who are after shopping and waiting to be picked up or just resting their feet.



BATIK MARKET

ROOFTOP

There is an indoor café on the 5th floor and two outdoor cafés at the outdoor areas. Any merchants are welcome, but generally the stalls are intended for lower to medium class of merchants since Banjarsari Market is generally not a mall building.

4TH FLOOR

The 4th floor of the batik market building is used as the household appliances market such as glassware, kitchen utensils, household plastic items, etc. This building is not connected to the northwest building so the visitors have to go down 1 floor to visit one section of the other section.

GROUND FLOOR TO 3RD FLOOR

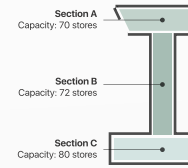
The batik market at Banjarsari Market is available in the west building located on the ground floor to the 3rd floor. Each floor is connected to a travelator located on the north and south sides of the building. This batik market uses a closed kiosk with a rolling door with a room dimension of 2.50 x 4.00 m. On the ground floor there are 173 shops, and 177 shops on each floor on floors 1 to 3, so there are a total of 704 shops in the batik market. Of the 704 stores, the goods sold are not only batik, but also other textile products such as children's clothes, formal and casual clothes, and fabrics. On the 3rd floor, there are 2 open green spaces that provide 2 stalls for any merchant. This green area is also equipped with a seating space and shade for market visitors.

BATIK TYPES CLASSIFICATIONS

The batik shops in Banjarsari Market will be grouped according to type with the aim of making it easier for buyers to find the batik they want to buy without having to walk far and around the entire market just to get the batik they want. This grouping is done based on the author's personal experience regarding zoning of batik types in the batik market in Pekalongan.

Estimated Number of Batik Types (2020-2030): 672 stores in total.

- Batik for Adults - Formal Clothes (B1): 30% or 201 stores.
- Batik for Adults - Casual Clothes (B2): 26% or 172 stores.
- Batik for Kids (B3): 20% or 135 stores.
- Fabric and Songket (B4): 20% or 135 stores.
- Batik Tulis (B5): 4% or 28 stores.
- Bag and Souvenirs (B6): 67 stores.



A. GROUND FLOOR

Section A
• B1: 70 stores

Section B
• B1: 72 stores

Section C
• B1: 59 stores
• B2: 21 stores

C. 2ND FLOOR

Section A
• B3: 59 stores
• B5: 11 stores

Section B
• B5: 17 stores
• B4: 55 stores

Section C
• B4: 80 stores

B. 1ST FLOOR

Section A
• B3: 70 stores

Section B
• B2: 67 stores
• B3: 6 stores

Section C
• B2: 80 stores

D. 3RD FLOOR

Section A
• Non Batik Goods

Section B
• Non Batik Goods

Section C
• Non Batik Goods
• B6: 67 stores

■ B1: Batik for Adults - Formal Clothes
■ B2: Batik for Adults - Casual Clothes
■ B3: Batik for Kids
■ B4: Fabric and Songket
■ B5: Batik Tulis
■ B6: Bags and Souvenirs

STREET VENDOR KIOSK



At the back side, northwest side of the Public Market, there are 32 kiosks for street vendor traders to make it more organized and the khaki pedestrian area to function properly.

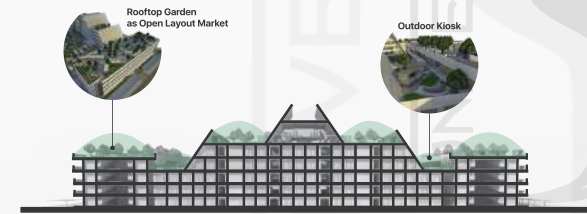
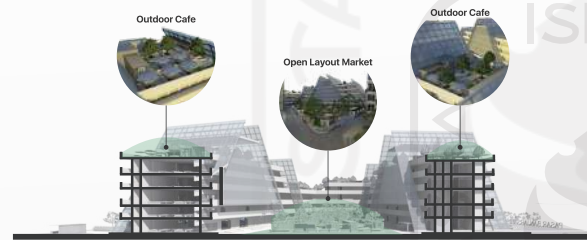
SITE PLANNING



- 1 Site Entrance
- 2 Drop Off Area
- 3 Site Exit
- 4 Loading Trucks Entrance
- 5 Motorcycle Parking Area
- 6 Car Parking Area
- 7 Building Main Entrance
- 8 Batik Market Building
- 9 General Market Building
- 10 Waste Collecting Room
- 11 Street Vendor Kiosks

The building is designed with an inner courtyard that functions as a green open space which is also an open market layout for khaki lima traders and a sitting area for market users. The building has four main entrance that connects the batik market area with the general market area on the northwest side of the batik market building and the inner courtyard. The car park area for visitors is only located on the east and south sides of the outer batik market building because the back of the building, the outer northwest side of the building, is used as an entry and exit area for loading trucks. Meanwhile, there are more motorcycle parking areas available, which are located on the north side of the outside of the building, also on the west and east sides in the inner courtyard area to facilitate the reach of visitors from the parking area to the entrances of the two market areas.

OPEN GREEN SPACE



The green areas in this design are distributed into two level, which are rooftop garden and the open green space on the ground floor. The green areas on the rooftop are utilized as open layout market and garden that providing seating space as well. The trees are planted in planted boxes thus the rooftop structure do not need any special structure system. While the green area on the ground level is utilized as an open ayout market that also provides seating space. These green areas are hoped to contribute to the city's green number by 0,0002593% for 3.460 m2 area.

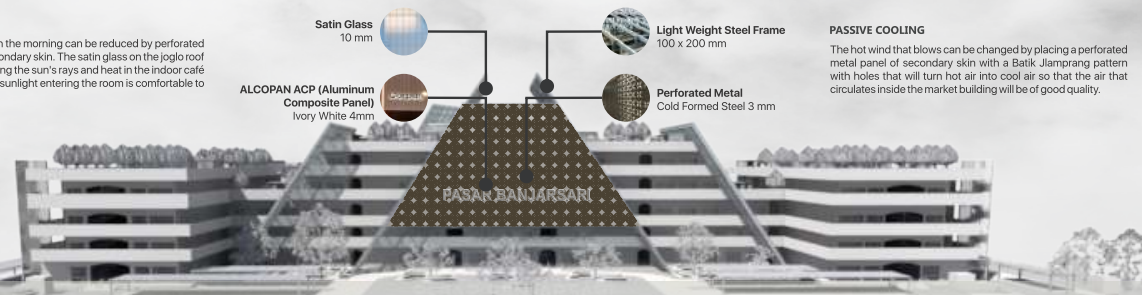
BATIK JLAMPRANG AS BUILDING FACADE



Batik Jlamprang is one of Pekalongan City's special pattern. It's used the most in Sampangan and Podosugih sub-district, so this is the most suitable pattern to be applied in the building. This pattern has geometric accents in the form of circles, squares, squares, and others. Generally, in the center of the circle there is a picture of a lotus flower. To show the identity of the area where the New Banjarsari Market is located, the design of this building applies the Jlamprang Batik motif, which is a typical batik of the Sampangan area, on the secondary skin on the east side of the building. The secondary skin uses perforated metal panels from cold formed steel (*baja canal*). This panel is useful for reducing sunlight and heat in the morning and breaking the wind so that good air circulation occurs.

NATURAL LIGHTING

High-intensity sunlight in the morning can be reduced by perforated metal on the applied secondary skin. The satin glass on the joglo roof also plays a role in reducing the sun's rays and heat in the indoor café (on the 5th floor) so that sunlight entering the room is comfortable to enjoy.



Satin Glass
10 mm

ALCOPAN ACP (Aluminum Composite Panel)
Ivory White 4mm

Light Weight Steel Frame
100 x 200 mm

Perforated Metal
Cold Formed Steel 3 mm

PASSIVE COOLING

The hot wind that blows can be changed by placing a perforated metal panel of secondary skin with a Batik Jlamprang pattern with holes that will turn hot air into cool air so that the air that circulates inside the market building will be of good quality.

SOFTSCAPE

Green Champa / Glodokan Tiang
Monoon longifolium

This plant is used as a site barrier with Jalan Blimbing on the north side of the site because this type of tree can provide a visual barrier from outside to inside the site, and otherwise.

Pucuk Merah Tree
Syzygium myrtifolium

Compared to other ornamental plants, red shoots have a greater ability to absorb carbon dioxide. Red shoots also have a very strong taproot structure. These advantages can be used as an effort to prevent landslides, and the roots of this plant can also store large amounts of water so that they can be relied on during the dry season.

Madagascar Almond / Ketapang Kencana
Terminalia catappa

The Ketapang Kencana tree serves as a shade in the seating space area. This design chose Ketapang Kencana tree because it is easy to find in Pekalongan City and is a low maintenance vegetation.

Jasmine / Melati Gambir
Jasminum multiflorum Burm

Jasmine is one of the common vegetation in Pekalongan City that's easy to find. It gives a nice smell to help reducing the bad odor from the market.

Napier Grass / Rumpun Gajah Mini
Pennisetum purpureum schamae

Napier Grass plays a role in preserving soil and water, it can have another function, namely the ability to help prevent erosion.

The Snake Plant / Lidah Mertua
Sansevieria trifasciata hahnii

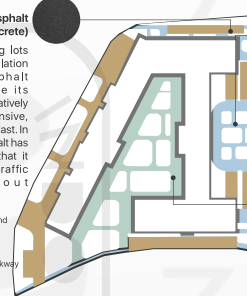
This plant is useful as an air purifier, so it is suitable to be placed in the parking area to absorb pollution from outside so as not to enter the building.

HARDSCAPE

Hot Mix Asphalt (concrete)

Asphalt in parking lots and vehicle circulation areas uses asphalt hotmix because its maintenance is relatively easy and inexpensive, and the process is fast. In addition, this asphalt has high stability so that it can withstand traffic loads without deformation.

- Parking Area and Transportation Circulation
- Pedestrian Walkway
- Walkway and Parking Area in Inner Courtyard Area



Concrete Paving Block with Guiding Block

Compared to other types of covering and hardening of the soil, paving blocks are very easy to maintain and more light weighted than the asphalt. Although it seems that the installation of paving blocks is locked, this soil layer has good water absorption. No doubt the ground water balance is maintained so that it can support the load on it. The paving blocks are equipped with guiding block as the barrier free features.

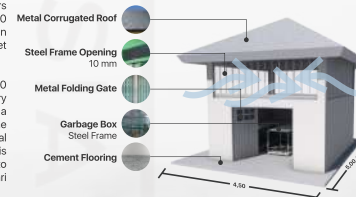
Grass Block

The pedestrian walkway also the motorbike circulation and parking area are using grass block to help the green areas in infiltrating the rain water by the cavities, which allow more water to seep into the ground, compared to Paving Blocks. The use of grass block also creates a pedestrian area that does not absorb the sun's heat.

WASTE COLLECTING ROOM

Garbage collection room, both organic and inorganic waste, designed as high as 4 meters with an opening of 4 meters wide and 1.2 meters high above the ground level as high as 2.30 meters. This room is located far from the main market building so as not to interfere with market activities with the unpleasant smell of garbage.

This room can accommodate about 15,000 liters to 18,000 liters or 18 m3 of waste every day. This waste will then be transported to a waste processing site so that it does not become a useless pile and adds to the effect of global warming. The waste management system in this design can also be distributed to add value to the green space concept in the New Banjarsari Market design.



Metal Corrugated Roof

Steel Frame Opening
10 mm

Metal Folding Gate

Garbage Box
Steel Frame

Cement Flooring

JOGLO ROOF

There are 3 types of roof which are commonly used in Sampangan area. They are Chinese Roof, Limasan Roof, and Joglo Roof. The Chinese roof type is usually applied for the Chinese shops and housings of the Chinese settlement. While the other settlements, the indigenous and Arabian, mostly use Limasan type for their houses. The Joglo roof is usually applied for administration and services building in the district.



REFERENCE SOURCES

Book

Chiara, Joseph De. *Time-Saver Standards for Building Types 2nd Edition*. 1987. Singapore: McGraw-Hill Book Inc.

Nadine, Bendington. 1982. *Design for Shopping Center*. London.

Journal

Arianty, Nel. 2013. *Analisis Perbedaan Pasar Modern dan Pasar Tradisional Ditinjau dari Strategi Tata Letak (Lay Out) dan Kualitas Pelayanan untuk Meningkatkan Posisi Tawar Menawar Pasar Tradisional*. Sumatera. DOI: jurnal.umsu.ac.id/

Chaerul, Mochammad. 2020. *Analisis Timbulan Sampah Pasar Tradisional (Studi Kasus: Pasar Ujungberung, Kota Bandung)*. Bandung. DOI: jurnalsaintek.uinsby.ac.id/

Fery, Kurnianto. 2011. *Penataan Kembali Pasar Umum Caruban*. Solo. DOI: digilib.uns.ac.id/

Iswadianto. 2018. *Studi Timbulan, Komposisi dan Perencanaan Pengelolaan Sampah Pasar (Studi Kasus di Wilayah Kabupaten Sleman Yogyakarta)*. Yogyakarta. DOI: dspace.uui.id/

M, Putu Handy. 2016. *Relokasi Pasar Tradisional Desa Adat Buduk, Bali*. Badung. DOI: sinta.unud.ac.id/

Nisa, Zuhrotun. 2019. *Pasar Banjarsari Pekalongan*. Semarang. DOI: ejournal2.undip.ac.id/

Nurafifah, Nimas. 2019. *Relokasi Pasar Kota Rembang*. Semarang. DOI: eprints.undip.ac.id/

R, Julio. 2018. *Relokasi Pasar Tradisional Bahu di Manado*. Manado. DOI: ejournal.unsrat.ac.id/

Rondiyah, 2014. *Faktor-Faktor Yang Mempengaruhi Kinerja Pengelolaan Sampah Di Pasar Banjarsari, Kota Pekalongan*. Semarang. DOI: <https://media.neliti.com/media/publications/18371-ID-faktor-faktor-yang-mempengaruhi-kinerja-pengelolaan-sampah-di-pasar-banjarsari-k.pdf>

Sobirin. 1997. *Redesain Pasar Banjarsari di Pekalongan*. Yogyakarta. DOI: dspace.uui.ac.id/

Tilaar, Tiovany J. *Relokasi Pasar Tradisional Amurang*. 2019. DOI: ejournal.unsrat.ac.id/

Wahyudin, Wahyudin. *Studi Sistem Pengelolaan Sampah Pasar di Pasar Tradisional Pagesangan Kota Mataram*. 2018. DOI: akrabjuara.com/

Regulation

Dinas Penanaman Modal dan Pelayanan Terpadu Satu Pintu, Kota Pekalongan. 2020. *Izin Mendirikan Bangunan*. DOI: oss.pekalongan.go.id/

Kepala Badan Standardisasi Nasional. 2015. *Skema Sertifikasi Pasar Rakyat*. Jakarta.

Peraturan Daerah Kota Pekalongan Nomor 3 Tahun 2009. 2009. *Bangunan Gedung*. Pekalongan.

Website

Direktorat Jenderal Cipta Karya, Kementerian Pekerjaan Umum dan Perumahan Rakyat. 2016. *Mengenal 8 Atribut Kota Hijau*. DOI: <http://sim.ciptakarya.pu.go.id/>

Direktorat Jenderal Cipta Karya, Kementerian Pekerjaan Umum dan Perumahan Rakyat. 2016. *6 Manfaat Ruang Terbuka Hijau*. DOI: <http://sim.ciptakarya.pu.go.id/>

Kementerian Lingkungan Hidup dan Kehutanan Direktorat Jenderal Pengelolaan Sampah, Limbah dan B3 Direktorat Pengelolaan Sampah. 2020. *Grafik Komposisi Sampah*. DOI: <https://sipsn.menlhk.go.id/sipsn/>

Susanto, Budi. 2019. *Kota Pekalongan Kekurangan Luas RTLH*. DOI: <http://jateng.tribunnews.com/>

Tim Komunikasi Publik. 2021. *Pemkot Komitmen Pertahankan 30 Persen RTH*. DOI: <http://pekalongankota.go.id/>

Winata, Dhika Kusuma. 2018. *Penerapan Sistem Pembuangan Sampah Tertutup Butuh Komitmen Pemda*. DOI: Source: <https://mediaindonesia.com/humaniora/216063/penerapan-sistem-pembuangan-sampah-terjual-need-komitmen-pemda/>