



NAWASRI RESIDENCE

The Design of Incremental Housing Residential for Upper Middle-Income Households in Serang

International Undergraduate Program

Author

Kinasih Marew - 21512081



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Supervisor:

Ar. Agus Setiawan, S.T., M.Arch., IAI

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The Design of Incremental Housing Residential for Upper Middle-Income Households in Serang

Perancangan Perumahan Berbasis Pendekatan Hunian Inkremental bagi Rumah Tangga Berpenghasilan Menengah Atas di Serang

Kinasih Marew - 21512081

Supervised by

Ar. Agus Setiawan, S.T., M.Arch., IAI

Examiners

M.Galieh Gunagama, ST., M.Sc

Dr.-Ing. Putu Ayu Pramanasari A., S.T., M.A.

Lab. Komunikasi dan Bisnis Arsitektur

Department of Architecture

Architecture International Undergraduate Program

Faculty of Engineering, Design, and Innovation

Universitas Islam Indonesia



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Student's Full Name : Kinasih Marew
Student's Identification Number : 21512081
Has been evaluated and agreed on : August 10th, 2026

Supervisor

Ar. Agus Setiawan, S.T., M.Arch., IAI

1st Examiner

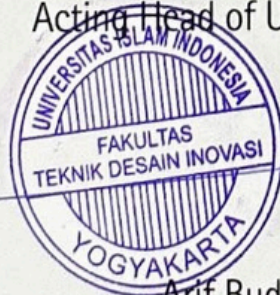
M. Galieh Gunagama, ST., M.Sc

2nd Examiner

Dr.-Ing. Putu Ayu Pramanasari A., S.T., M.A.

Acknowledged by

Acting Head of Undergraduate Program in Architecture



Arif Budi Sholihah, S.T., M.Sc., Ph.D



SUPERVISOR NOTE SHEET

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Supervisor

Ar. Agus Setiawan, S.T., M.Arch., IAI

STATEMENT OF AUTHENTICITY

I hereby declare that this work is entirely my own, except where proper references have been cited. No external assistance, either in whole or in part, has been involved in its preparation.

I further affirm that there is no conflict regarding the intellectual ownership of this work. All ideas, analyses, and written content presented herein are the intellectual contributions of the author under the supervision of the academic supervisor.

This final project is submitted to the Department of Architecture, Universitas Islam Indonesia, for academic, educational, and publication purposes..

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Author



Kinasih Marew

Preface

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Abstract

This project proposes the design of cost-efficient residential housing for upper-middle-income households in Serang through an incremental housing approach. The project responds to the growing housing issue faced by the "missing middle" group, which refers to households that are not eligible for subsidized housing yet are still unable to afford standard commercial housing. Along with the increasing urban development and housing demand in Serang, there is a need for a more flexible, affordable, and sustainable residential model.

The design applies the concept of incremental housing, or Rumah Inti Tumbuh (RIT), where housing development begins with a core unit that already fulfills basic living needs and is structurally prepared for future expansion. This approach allows residents to gradually develop their homes according to their financial capacity and changing household needs while maintaining spatial order and structural safety.

The project also emphasizes livable neighborhood planning through proper infrastructure, accessibility, public facilities, drainage systems, and environmental considerations. By integrating affordability, flexibility, and long-term growth potential, the proposed residential development aims to provide a more adaptive housing solution for emerging middle-income communities in Serang.

Proyek ini mengusulkan perancangan hunian residential yang terjangkau bagi rumah tangga menengah atas di Serang dengan pendekatan Incremental Housing. Proyek ini merespon permasalahan kebutuhan hunian bagi kelompok missing middle, yaitu masyarakat yang tidak memenuhi syarat untuk mendapatkan rumah subsidi namun masih kesulitan menjangkau harga perumahan komersial standar. Seiring dengan perkembangan perkotaan dan meningkatnya kebutuhan hunian di Serang, dibutuhkan model perumahan yang lebih fleksibel, terjangkau, dan berkelanjutan.

Perancangan menggunakan konsep Incremental Housing atau Rumah Inti Tumbuh (RIT), yaitu strategi pembangunan rumah yang dimulai dari unit inti yang telah memenuhi kebutuhan dasar penghuni dan dipersiapkan secara struktur untuk pengembangan di masa depan. Pendekatan ini memungkinkan penghuni mengembangkan rumah secara bertahap sesuai kemampuan ekonomi dan kebutuhan keluarga, dengan tetap menjaga keamanan struktur serta keteraturan tata ruang.

Selain itu, proyek juga menekankan perencanaan lingkungan hunian yang layak melalui penyediaan infrastruktur, aksesibilitas, fasilitas publik, sistem drainase, dan pertimbangan lingkungan yang baik. Dengan mengintegrasikan aspek keterjangkauan, fleksibilitas, dan potensi perkembangan jangka panjang, perancangan ini diharapkan dapat menjadi solusi hunian yang lebih adaptif bagi masyarakat emerging middle-income di Serang.

NAWASRI Residence: The Design of Incremental Housing Residential for Upper Middle-Income Households in Serang

NAWASRI Residence

"Nawasri Residence" is derived from two Sanskrit words: "Nawa," meaning "new beginning" or "renewal," and "Sri," meaning "prosperity," "fertility," and "well-being." Together, the name symbolizes a new beginning toward a prosperous and flourishing future. Nawasri Residence represents a residential community designed to support continuous growth, adaptability, and prosperity. A place where homes, families, and futures can flourish together.

Incremental Housing

Refers to a housing strategy where homes are built progressively. Instead of delivering a fully finished house, the design begins with a core unit (Rumah Inti Tumbuh) that is structurally prepared for future expansion. This allows residents to develop their homes over time according to their economic growth, while maintaining structural safety and spatial order.

Residential

Residential refers to buildings or areas designed for people to live in, such as houses, apartments, or housing complexes. In architecture and urban planning, residential spaces focus on providing comfort, safety, and daily living needs for occupants.

Upper-Middle-Income Households

Highlights the target users. households that are not eligible for subsidized housing yet cannot afford standard commercial housing. This group represents the "missing middle," a significant but underserved segment in Serang's housing market.

Serang

Serang is the capital city of Banten Province, Indonesia, located on the western part of Java Island. Serang functions as an administrative, educational, commercial, and residential center, with growing urban development supported by government offices, universities, transportation networks, and housing expansion.

NAWASRI Residence: Perancangan Perumahan Berbasis Pendekatan Hunian Inkremental bagi Rumah Tangga Berpenghasilan Menengah Atas di Serang

NAWASRI Residence

Nawasri Residence berasal dari dua kata dalam bahasa Sanskerta, yaitu Nawa yang berarti awal yang baru, pembaruan, atau perjalanan baru, dan Sri yang berarti kemakmuran, kesuburan, kesejahteraan, dan keberlimpahan. Secara keseluruhan, Nawasri Residence dapat dimaknai sebagai awal baru menuju kehidupan yang lebih sejahtera dan berkembang. Nawasri Residence merepresentasikan sebuah kawasan hunian yang memberikan kesempatan bagi setiap keluarga untuk memulai langkah baru, bertumbuh secara bertahap, dan mencapai kehidupan yang lebih sejahtera dalam lingkungan yang nyaman, berkelanjutan, dan mendukung masa depan.

Incremental Housing

Strategi perumahan yang dibangun secara bertahap. Alih-alih menyediakan rumah yang langsung selesai sepenuhnya, desain dimulai dengan unit inti atau Rumah Inti Tumbuh (RIT) yang sudah dipersiapkan secara struktural untuk pengembangan di masa depan.

Pendekatan ini memungkinkan penghuni mengembangkan rumah sesuai pertumbuhan ekonomi dan kebutuhan mereka dari waktu ke waktu, dengan tetap menjaga keamanan struktur serta keteraturan tata ruang.

Residential

Residential atau hunian merujuk pada bangunan maupun kawasan yang dirancang sebagai tempat tinggal manusia, seperti rumah, apartemen, atau kompleks perumahan. Dalam arsitektur dan perencanaan kota, ruang residential berfokus pada penyediaan kenyamanan, keamanan, serta kebutuhan hidup sehari-hari bagi penghuninya.

Upper-Middle-Income Households

Upper-middle Income Households atau rumah tangga menengah atas merujuk pada kelompok masyarakat yang menjadi target pengguna proyek. Kelompok ini tidak memenuhi syarat untuk mendapatkan rumah subsidi, namun juga belum mampu membeli perumahan komersial standar.

Kelompok ini dikenal sebagai missing middle, yaitu segmen masyarakat yang cukup besar tetapi masih kurang terlayani dalam pasar perumahan di Serang.

Serang

Serang merupakan ibu kota Provinsi Banten yang terletak di bagian barat Pulau Jawa, Indonesia. Serang berfungsi sebagai pusat pemerintahan, pendidikan, perdagangan, dan kawasan hunian, dengan perkembangan perkotaan yang terus meningkat didukung oleh keberadaan kantor pemerintahan, universitas, jaringan transportasi, serta perkembangan perumahan.

LIST OF CONTENTS

01.

INTRODUCTION

- 1.1 Design Premise
- 1.2 Design Problem Study
 - Housing Backlog*
 - Indonesia's Class Population*
 - Housing Price Standard*
 - Housing Market in Serang*
 - Serang's Salary*
 - Young Workers*
 - Housing Typology for Young Workers*
 - Housing Condition in Serang*
- 1.3 Problem Mapping
 - Problematique*
 - Matrix of Design Thinking*
 - Initiators*
- 1.4 Methodology
 - Excellency, Originality and Novelty*

02.

PROBLEM STUDY

- 2.1 Study of Location and Site
 - Curug, Serang, Banten*
 - Accessibility Map*
 - Regulation*
 - Site Analysis*
 - Site Consideration*
- 2.2 Study of Building Typology
 - Housing*
- 2.3 Study of Design Approach
 - Rumah Inti Tumbuh (Incremental Housing)*
- 2.4 Precedents
 - Visenda Residence*
 - p-ISSN 2964-8483*

03.

DESIGN PROBLEM SOLVING

- 3.1 Schematic and Response
- 3.2 Design Concept
- 3.3 Advantages
- 3.4 Figurative Concept
- 3.5 Solving

04. ANALYSIS AND RESPOND

1.1 Design Responses

Site Responses

Public Transport Responses

Park and Ride

Public Transport Proposal

Incremental House Approach Responses

Roof Concept

Structure Concept

Water Flow Concept

Facilities Concept

Pricing Concept

1.2 Design Analysis and Alternatives–Masterplan

Masterplan Consideration

Precedents–Masterplan Residential

Alternative 1

Alternative 2

Alternative 3

Alternative 4

Alternative 5

Design Solution–Masterplan

4.3 Design Analysis and Alternatives–Incremental Housing

Precedents Incremental Housing

Alternative 1

Alternative 2

Alternative 3

Design Solution – House

Design Proof

4.4 Design Analysis Estimated Price

Precedents Estimated Price

Cost Estimation – House

Cost Estimation – Site Infrastructure

Overall Cost Estimation

Target Price

4.5 Schematic Design

Combined

05. Design Development

5.1 Schematic Design

Site Plan

Phase 1

Phase 2

Phase 3

Mosque and Security

Details

Envelope

Interior

Structure

Utilities

Safety

Proof and Evaluation

Precedents Estimated Price

5.2 Design Proof

Cost Estimation—House

Cost Estimation—Facilities & Infrastructure Site

Cost Estimation—Recap

Target Price

Financial Analysis

5.3 Rendering

Phase 1

Phase 2

Phase 3

06. Design Development

6.1 Review

Conclusion Review

Terrace

Additional Room

Section

Exposed Ceiling

Stairs

Integrated Scheme

Clean Water Plan

Badminton Court

Playground

Park

Retaining Wall

Safety

BMC and Marketing

Block C - South
Padestrian Way-Border

6.2 Phases

Phase 1

Phase 2

Phase 3

L I S T O F F I G U R E S

01. INTRODUCTION

- 1.1 Diagram of Indonesia's Class population
- 1.2 Diagram of Indonesia's Class population
- 1.3 Diagram of Indonesia's Class population and Income level
- 1.4 Diagram of Indonesia's workers' and house demands' typologies
- 1.5 Diagram of Income and Housing Options
- 1.6 Diagram of Housing Options
- 1.7 Diagram of Housing Options, Unit Price, and Income
- 1.8 News of Serang's Residential Floods
- 1.9 Serang's Residential Floods
- 1.10 Diagram of Problem Mapping
- 1.11 Diagram of Problem Mapping
- 1.12 Diagram of Problematique
- 1.13 Diagram of Design Method

02. PROBLEM STUDY

- 2.1 Java Island and Serang City
- 2.2 Accessibility Map
- 2.3 Diagram of Regulations
- 2.4 Map of Potentials
- 2.5 Site's Terrain
- 2.6 Diagram of Temperature
- 2.7 Diagram of Windrose
- 2.8 Site Area
- 2.9 Site Area Waterways
- 2.10 Site Area Development
- 2.11 Accessibility Map of Public Transport
- 2.12 Public Transport Route
- 2.13 Proposal of Public Transport Route
- 2.14 View and Vista of Site
- 2.15 SHM of Site
- 2.16 SWOT Diagram of Site
- 2.17 Facade of Sukawana Asri
- 2.18 Floor Plan of Sukawana Asri
- 2.19 Master Plan of Sukawana Asri

- 2.20 Rendering of Citraland Serang
- 2.21 Rumah Inti Tumbuh
- 2.22 Rumah Inti Tumbuh
- 2.23 Rumah Inti Tumbuh
- 2.24 Rumah Inti Tumbuh
- 2.25 Rumah Inti Tumbuh Foundation
- 2.26 Rumah Inti Tumbuh Foundation
- 2.27 Rumah Inti Tumbuh Detail
- 2.28 Example of RISHA + RIT
- 2.29 RIT expansion
- 2.30 Floorplan OF Visenda Residence
- 2.31 Floorplan of Visenda Residence
- 2.32 Floorplan of p-ISSN 2964-8483
- 2.33 Facade of p-ISSN 2964-8483
- 2.34 Section of p-ISSN 2964-8483

03. DESIGN PROBLEM SOLVING

- 3.1 Diagram of Proposed Solution
- 3.2 Diagram of Architectural Concept
- 3.3 Site's Bubble Diagram
- 3.4 Accessibility and Public Transport. Route
- 3.5 Proposed Accessibility and Public Transport Route
- 3.6 Diagram of Proposed Solution

04. ANALYSIS AND RESPOND

- 1.1 Site Area and Responses
- 4.2 Accessibility and Public Transport. Route
- 4.3 Proposed Accessibility and Public Transport Route
- 4.4 Concept of P&R
- 4.5 Accessibility and Public Transport. Route
- 4.6 Accessibility and Public Transport. Proposal
- 4.7 Phase 1 of Incremental Housing
- 4.8 Phase 2 of Incremental Housing
- 4.9 Phase 3 of Incremental Housing
- 4.10 Roof Section
- 4.11 Flat Roof Disadvantages

- 4.12 Flat Roof Drainage
- 4.13 River on Site
- 4.14 Water Flow on Site
- 4.15 Diagram of Facilities Solution
- 4.16 Diagram of Pricing Solution
- 4.17 Precedents of Master Plan–Residential
- 4.18 Considerations of Masterplan–Residential
- 4.19 Alternative Masterplan 1
- 4.20 Alternative Masterplan 2
- 4.21 Alternative Masterplan 3
- 4.22 Alternative Masterplan 4
- 4.23 Alternative Masterplan
- 4.24 Explanation Masterplan
- 4.25 Explanation Masterplan
- 4.26 Explanation Masterplan
- 4.27 Alternative Masterplan 5
- 4.28 Explanation Masterplan
- 4.29 Explanation Masterplan
- 4.30 Design Solution–Masterplan–River
- 4.31 Design Solution–Masterplan–Accessibility
- 4.32 Precedents Incremental Housing
- 4.33 Precedents Incremental Housing
- 4.34 Precedents Incremental Housing
- 4.35 Room Programming Alternative 1
- 4.36 Room Programming Alternative 1–3 Phases
- 4.37 Room Programming Alternative 2
- 4.38 Room Programming Alternative 2–Phases
- 4.39 Room Programming Alternative 3
- 4.40 Room Programming Alternative 3–3 Phases
- 4.41 Room Programming Alternative 3–Phase 1
- 4.42 Room Programming Alternative 3–Phase 2
- 4.43 Room Programming Alternative 3–Phase 3
- 4.44 Roof Alternatives 1&2
- 4.45 Roof Alternatives 3&4
- 4.46 Design Proof–House–Plans
- 4.47 Design Proof–House–Elevations
- 4.48 Design Proof–House–Axonometry
- 4.49 Alternative 4–Houses
- 4.50 Room Programming Alternative 4–3 Phases
- 4.51 Room Programming Alternative 4–1st phase
- 4.52 Room Programming Alternative 4–2nd phase
- 4.53 Room Programming Alternative 4–3rd phase

- 4.54 Design Proof-House-Plans
- 4.55 Design Proof-House-Elevations
- 4.56 Design Proof-House-Axonometry
- 4.57 Phase 1
- 4.58 Phase 2
- 4.59 Phase 3
- 4.60 Precedents Estimated Price
- 4.61 BMC

05. DESIGN DEVELOPMENT

- 5.1 Exterior Rendering Houses
- 5.2 Exterior Rendering Houses
- 5.3 Block Plan
- 5.4 Phase 1 Floor Plan and Elevations
- 5.5 Phase 1 Floor Pattern Plan and Ceiling Plan
- 5.6 Phase 1 Structure
- 5.7 Phase 1 Plumbing
- 5.8 Phase 1 Interior
- 5.9 Phase 2 Floor Plan and Elevation
- 5.10 Phase 2 Floor Pattern Plan and Ceiling Plan
- 5.11 Phase 2 Structure
- 5.12 Phase 2 Plumbing
- 5.13 Phase 2 Interior
- 5.14 Phase 3 Floor Plan and Elevation
- 5.15 Phase 3 Floor Pattern Plan
- 5.16 Phase 3 Ceiling Plan
- 5.17 Phase 3 Structure
- 5.18 Phase 3 Plumbing
- 5.19 Phase 3 Interior
- 5.20 Phase 1 Door and Window Plan
- 5.21 Phase 2 Door and Window Plan
- 5.22 Phase 3 Door and Window Plan
- 5.23 Door details
- 5.24 Window details
- 5.25 Musholla and Security
- 5.26 Roster Details
- 5.27 Roster Details
- 5.28 Phase 1 Axonometry
- 5.29 Phase 1 Structure
- 5.30 Clean Water Site
- 5.31 Waste Water Site

- 5.32 Site's Safety
- 5.33 Site's Electricity
- 5.34 Resist
- 5.35 Blocks Prices
- 5.36 Phase 1
- 5.37 Phase 2
- 5.38 Phase 3
- 5.39 Residential Area

06. DESIGN EVALUATION

- 6.1 Terrace Phases
- 6.2 Before 3rd Phase Floor Plan
- 6.3 After 3rd Phase Floor Plan
- 6.4 Before 3rd Phase Sections
- 6.5 After 3rd Phase Sections
- 6.6 After 1st Phase Sections
- 6.7 After 2nd Phase Sections
- 6.8 After 3rd Phase Sections
- 6.9 After 1st Phase Ceiling Plan
- 6.10 After 2nd Phase Ceiling Plan
- 6.11 After 3rd Phase Ceiling Plan
- 6.12 Rendering Stairs
- 6.13 1st Phase Integrated Scheme
- 6.14 2nd Phase Integrated Scheme
- 6.15 3rd Phase Integrated Scheme
- 6.16 Revised Clean Water Scheme Site
- 6.17 Rendering Badminton Court
- 6.18 Rendering Playground
- 6.19 Rendering Park
- 6.20 Revised Site's Safety
- 6.21 Site's Safety
- 6.22 Broschure
- 6.23 Rendering Padestrian Way-Border
- 6.24 Render Day and Night
- 6.25 Render Phase 1
- 6.26 Render Phase 2
- 6.27 Render Phase 3

L I S T O F T A B L E S

01. INTRODUCTION

- 1.1 Table of Indonesia Income Levels
- 1.2 Table of Income Levels and Target Income
- 1.3 Table of Income Levels and House Price
- 1.4 Table of Income Levels and House Price
- 1.5 Table of IDesign Thinking by Bryan Lawson
- 1.6 Table of Excellency, Originality, and Novelty

02. PROBLEM STUDY

- 2.1 Table of Estimated Land Price
- 2.2 Table of Incremental House Phases
- 2.3 Table of Incremental House Differences

03. DESIGN PROBLEM SOLVING

- 3.1 Table of Room Standards
- 3.2 Table of Advantages
- 3.3 Table of Differences of Facilities, Infrastructure and Quality

04. ANALYSIS AND RESPOND

- 4.1 Table of Comparison Between Subsidized, Incremental, and Commercial Housing
- 4.2 Table of Structure Concept

05. DESIGN DEVELOPMENT

- 5.1 Table of Estimated Prices for House Construction
- 5.2 Table of Estimated Prices for Site Construction
- 5.3 Estimated Investment Prices
- 5.4 Blocks Price
- 5.5 Target Price
- 5.6 Financial Analysis

01. *INTRODUCTION*

1.1 Design Premise

Rapid urban growth in Kota Serang has significantly increased the demand for housing, particularly among middle-income households. Driven by economic expansion and proximity to Jakarta, Serang is attracting a growing workforce; however, the housing market remains polarized between subsidized units and high-end commercial housing. As a result, many households are excluded from both systems, creating a critical "missing middle" gap.

In response, this project proposes a cost-efficient residential housing model based on an incremental housing approach. Housing units are initially developed as core units (Rumah Inti Tumbuh) that are structurally prepared and spatially planned for future expansion. This approach enables residents to adapt and grow their homes progressively according to their financial capacity while maintaining safety, functionality, and spatial quality.

Unlike conventional rumah tumbuh developments that often result in unregulated and inefficient extensions, this proposal integrates design-to-cost principles with a controlled growth framework at both unit and neighborhood scales. Modular structural systems and predetermined expansion zones are implemented to guide future development, while the overall site planning ensures adequate infrastructure provision, including circulation, drainage, and public facilities in alignment with local regulations.

Through this approach, the project aims to deliver a flexible, affordable, and sustainable housing environment that responds to Serang's rapid urbanization. It positions housing not as a finished product but as a long-term process, allowing homes to evolve alongside the economic growth of their residents while maintaining urban order, environmental resilience, and long-term habitability.



1.2 Design Problem Study

Housing Backlog

Housing backlog refers to the gap between the number of households and the number of adequate housing units available. This concept is widely used as an indicator of housing shortages in national housing policy. In general, backlog occurs when the demand for housing exceeds the supply of housing units available to the population.

In Indonesia, the concept of housing backlog is interpreted slightly differently by institutions. According to the Badan Pusat Statistik (BPS), backlog refers to households that do not own a house, including those who live in rented houses or with relatives. Meanwhile, the Ministry of Public Works and Housing (PUPR) often associates backlog with the lack of adequate and livable housing units.

Based on data from the National Socio-Economic Survey (Susenas) conducted by BPS, Indonesia still faces a significant housing shortage. In 2023, the housing ownership backlog was recorded at approximately 9.9 million housing units, meaning around 9.9 million households did not yet own a house.

In addition to ownership backlog, Indonesia also faces a housing habitability backlog, referring to houses that exist but do not meet livability standards such as sufficient living space, safe construction, and adequate access to sanitation and clean water. BPS uses several indicators of adequate housing, including minimum living space of 7.2 m² per capita, access to safe drinking water, and proper sanitation.

The high housing backlog in Indonesia is driven by several factors, including rapid population growth, limited supply of affordable housing, and the increasing price of residential properties that exceed the purchasing power of many households.

Because of this gap between housing demand and supply, the government has introduced several housing programs such as the **One Million Houses Program (Program Sejuta Rumah)** and various subsidized housing schemes aimed at reducing the housing deficit and improving access to adequate housing for lower-income groups.

The persistent housing backlog in Indonesia indicates a structural gap between housing demand and affordable supply. This condition particularly affects emerging middle-income households who are not eligible for housing subsidies but still face difficulties accessing formal housing markets

The housing shortage not only affects low-income communities but also emerging middle-income households who fall outside the eligibility criteria for subsidized housing programs. Government programs such as FLPP subsidized housing are generally targeted at households with limited income, while commercial housing developments are often priced beyond the affordability range of young families and early-career workers. As a result, many middle-income households experience difficulty accessing formal housing markets, creating what is often referred to as the "missing middle" in housing provision.

This condition is also reflected in Banten Province, where rapid urban expansion in cities such as Serang has increased demand for housing while the supply of affordable and appropriately designed housing remains limited. According to BPS Banten, population growth and increasing household formation continue to drive residential demand in the region, creating pressure on housing supply and urban land availability (BPS Banten, 2023). Without innovative housing strategies, this gap between demand and affordability is likely to persist.

housing backlog is defined as a housing deficit or the gap that occurs when the total number of constructed houses does not meet the actual housing needs of the community.(Boediardjo & Suhartoko Y.B., 2023) This issue is particularly prevalent in developing nations and is categorized into two distinct perspectives:

- **Home Ownership Backlog (Backlog Kepemilikan Rumah):** This refers to the total number of households that do not own their own home.(Hanifa et al., 2022) It is calculated by subtracting the number of households that occupy self-owned houses from the total number of households.(Boediardjo & Suhartoko Y.B., 2023)
- **Housing Occupancy Backlog (Backlog Kepenghunian Rumah):** This measures households that do not have a fixed residence to inhabit (Boediardjo & Suhartoko Y.B., 2023), whether through ownership or rental. It is based on the ideal concept that one family should occupy one house.(Boediardjo & Suhartoko Y.B., 2023)

The Scale of the Problem

The sources highlight that the housing backlog is a perpetual and growing problem in Indonesia. In 2022, the home ownership backlog reached 11 million units, while the occupancy backlog stood at 7.6 million units. By 2030, the ownership backlog is predicted to rise to 14.9 million homes (affecting approximately 19.4% of households), with occupancy backlog reaching 8 million houses. (Boediardjo & Suhartoko Y.B., 2023)

Factors Influencing Backlog

The backlog is heavily concentrated among Low-Income Communities (MBR) and the poor, who often lack the purchasing power to acquire decent housing. Research in Surakarta identifies three primary groups of influencing factors:

- **Economic Factors:** These have the greatest influence (approx. 42.4%) and include income levels, type of work, rental prices, and ease of access to loans.(Hanifa et al., 2022)
- **Infrastructure Factors:** Access to transportation, neighborhood facilities, and distance to the city center affect housing demand and occupancy.(Hanifa et al., 2022)
- **Population Growth:** While a contributing factor, its influence can be lower than economic

Proposed Solutions

Addressing the backlog effectively requires more than just physical construction; it necessitates a multisectoral approach. (Boediardjo & Suhartoko Y.B., 2023) The sources suggest that:

- **Self-help housing and "sites and services" programs.** Where the state provides land and basic infrastructure while allowing residents to build their own homes. Can be an effective delivery mechanism to reduce the backlog for the poor. (Ward, n.d.)
- **Government subsidies** (such as FLPP or SSB) must be evaluated for efficiency, as they often benefit banks and developers more than the target consumers. (Boediardjo & Suhartoko Y.B., 2023)

Solutions must include social and environmental considerations, ensuring that housing is not just affordable but also located near employment opportunities and essential services (Boediardjo & Suhartoko Y.B., 2023)

Indonesia's Class Population

Nationally, the combined middle class and aspiring middle class represent around 66.35% of Indonesia's population, making them a crucial economic group that contributes significantly to domestic consumption and economic growth. This classification is important in housing studies because middle-income households often fall outside government housing subsidy eligibility but still face affordability constraints in the commercial housing market.



Indonesia's
"class"
population

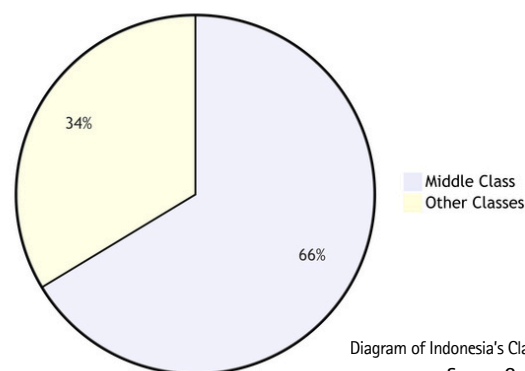


Figure 1.1
Diagram of Indonesia's Class population
Source: GoodStats, 2024

Figure 1.2
Diagram of Indonesia's Class population
Source: Author, 2026

The classification of these groups depends on monthly per capita expenditure:

- **Emerging (Aspiring) Middle Class:** This group is no longer poor but not yet economically secure. They spend between 1.5 to 3.5 times the poverty line, or approximately Rp874,398 to Rp2,040,262 per person per month.
- **Middle Class:** Defined as those with a per capita monthly expenditure between 3.5 until 17 times the poverty line. (Pratomo et al., 2020) This range is approximately Rp2,040,262 to Rp9,909,844. They have less than a 10% probability of falling back into poverty. (Pratomo et al., 2020)
- **Upper Middles:** While "upper middle" often refers to the top tier of the middle class, it formally defined as those spending above 17 times the poverty line (> Rp9,909,844 per month).

Income Level	Category
Rp.800.000 - 2 million	lower income / entry workers
Rp2-10 million	aspiring middle class
> Rp10 million	urban middle-income households (Upper Middle Class)

Table 1.1
Table of Indonesia Income Levels
Source: Author, 2026

Characteristics of Each Class

Each segment is distinguished by educational attainment, asset ownership, and housing preferences:

- **Emerging Middle (The "Scooter Class"):**
 - **Assets:** Typically identified by owning at least one scooter, having a secondary education, and living in a home with brick walls. (Schlogl & Sumner, 2014)
 - **Vulnerability:** They are highly sensitive to fuel price hikes and inflation because they rely on private motorized transport for their networked, mobile lifestyles. (Schlogl & Sumner, 2014)
- **Middle Class (Standard):**
 - **Education & Employment:** Nearly 80% have completed senior high school, and one-third have tertiary education, which acts as an "entrance ticket" to formal sector jobs.(Pratomo et al., 2020)
 - **Digitalization:** Approximately 78% use digital technology in their work. (Pratomo et al., 2020)
 - **Housing:** Over 74% prefer landed housing. They prioritize units between 36-90 m², and 68.9% require a dedicated home workspace due to the rise of hybrid work.(Farisa & Hardi, 2026)
- **Upper Middle (The "Car Class"):**
 - **Assets:** Distinguished by the ownership of passenger cars rather than just scooters.(Schlogl & Sumner, 2014)
 - **Stability:** This group typically possesses bank accounts and higher education, enjoying the highest degree of economic certainty. (Pratomo et al., 2020; Schlogl & Sumner, 2014)

Indonesia's "class" population

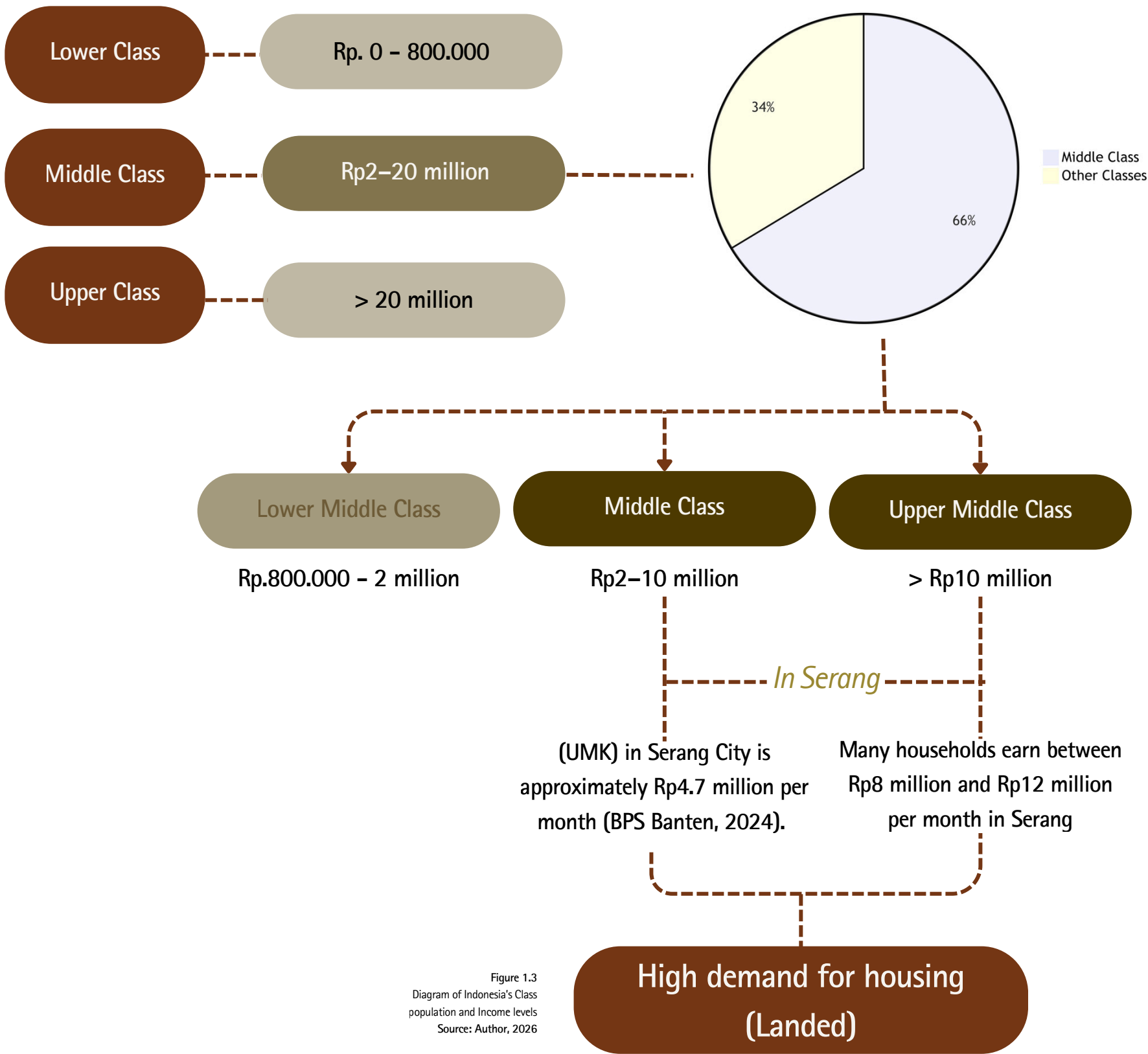


Figure 1.3
Diagram of Indonesia's Class
population and Income levels
Source: Author, 2026

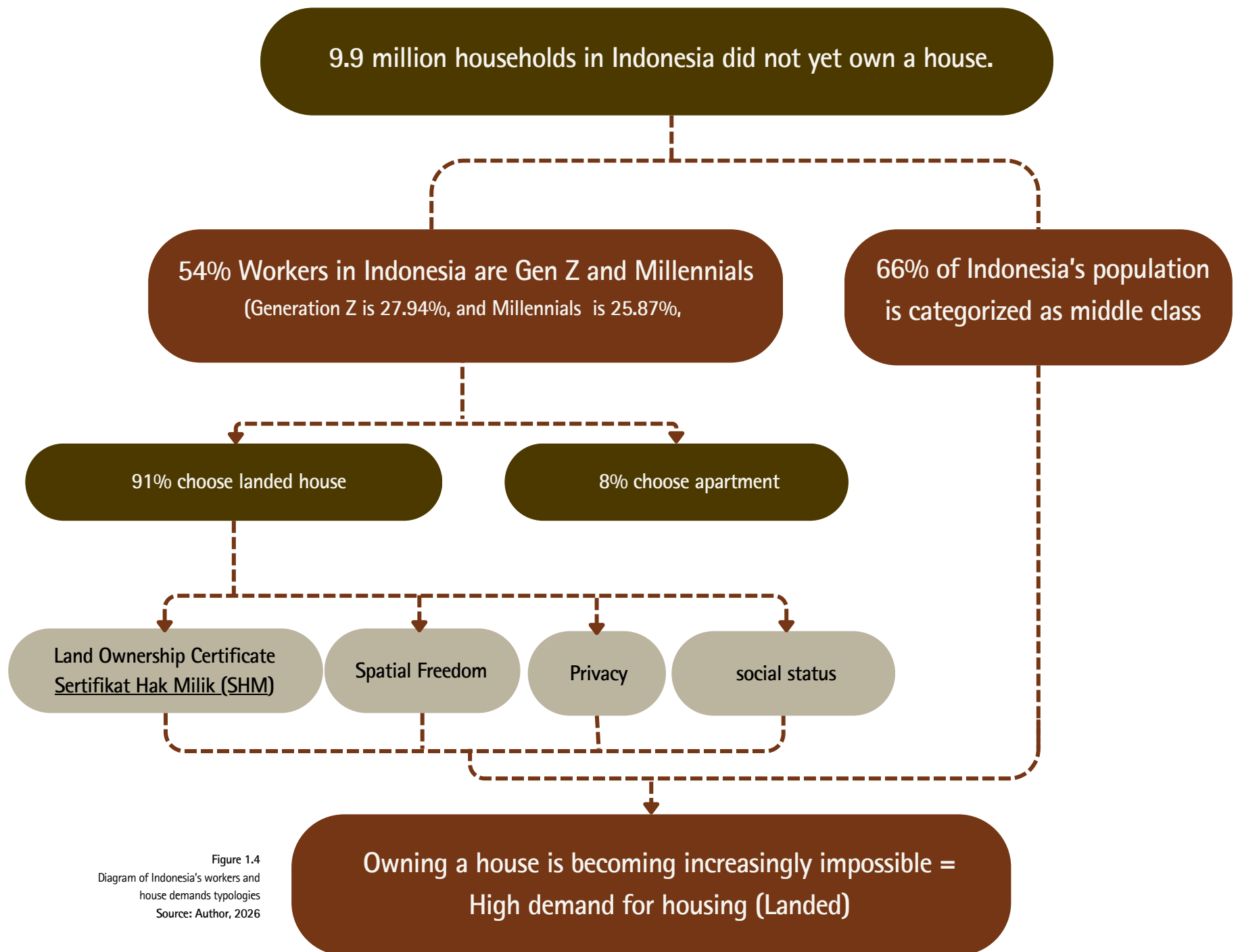


Figure 1.4
Diagram of Indonesia's workers and
house demands typologies
Source: Author, 2026

Today, Gen Z and Millennials dominate the workforce (54%), and despite being the most productive generation, their aspiration remains very grounded: 91% still prefer landed houses. This preference reflects cultural values, family structure, and long-term stability. At the same time, 66% of Indonesia's population is categorized as middle class, which theoretically should have the capacity to access housing. However, the reality shows a contradiction. Many young people believe that owning a house is becoming increasingly impossible. This is not because housing does not exist, but because available housing does not match their financial reality.

Housing Price Standard

The gap between income levels and housing prices creates what is commonly known as the Missing Middle housing problem. This phenomenon occurs when middle-income households fall between two housing market segments: subsidized housing and commercial housing.

Government housing programs in Indonesia primarily target Masyarakat Berpenghasilan Rendah (MBR) through subsidized housing schemes such as FLPP mortgages. These programs impose income thresholds and price ceilings to ensure affordability.

As a result, households whose incomes slightly exceed these limits become ineligible for subsidized housing. At the same time, these households often cannot afford commercial housing provided by private developers. In cities like Serang, subsidized housing is typically priced around Rp 166–185 million, while commercial housing developments commonly range from Rp 450 million to more than Rp 700 million, depending on location and building specifications.

Housing Category	Target Income (person)	Typical Price Range	Notes
Subsidized Housing (MBR / FLPP)	≤ ± Rp 8–10 million/month	± Rp 166–185 million	Regulated price ceiling by government
Middle Housing	Rp 10–20 million/month	± Rp 280–450 million	Rarely supplied by developers
Commercial Housing	≥ Rp 20 million/month	± Rp 600m–1 billion	Dominant private development

Table 1.2
Table of Income Levels and Target Income
Source: Author, 2026

This table shows a market gap of approximately Rp 200–300 million between subsidized and commercial housing. Many middle-income households fall into this gap, meaning they cannot afford commercial houses but are also not eligible for government housing subsidies.

- Kementerian PUPR (FLPP price regulation)
- Property listings Serang (Rumah123, 99.co)
- World Bank (2020) housing affordability analysis

Based on World Bank (2020) housing affordability guidelines and BPS wage data (2024) Housing affordability is commonly measured using the 30–40% income rule, meaning housing installments should not exceed this percentage of monthly income.

Household Income	Maximum Safe Housing Installment (30%)	Approximate House Price Affordable
Rp 5 million	Rp 1.5 million	± Rp 150–200 million
Rp 10 million	Rp 3 million	± Rp 300–350 million
Rp 20million	Rp 4.5 million	± Rp 600–1000 million/1b

Table 1.3
Table of Income Levels and House Price
Source: Author, 2026

Most young professionals in Serang earn between Rp 5–10 million per month, meaning the houses they can realistically afford are around Rp 200–450 million. However, most commercial housing in Serang starts above Rp 600 million, creating the Missing Middle problem.

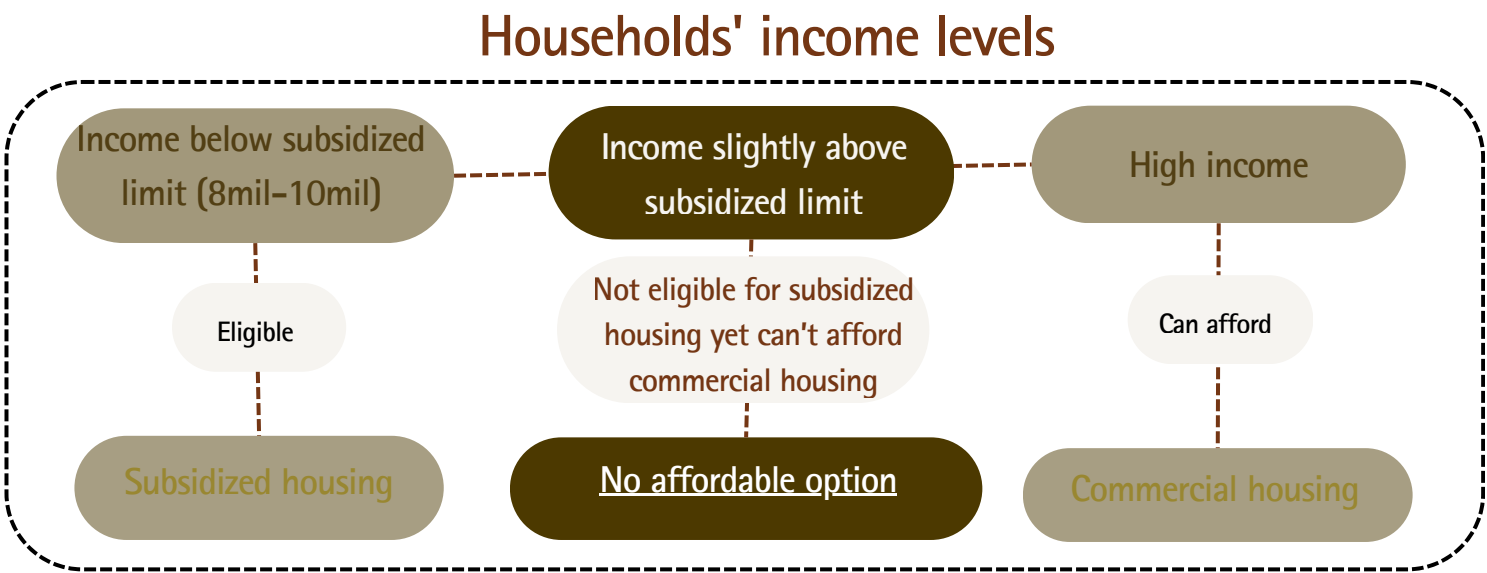


Figure 1.5
Diagram of Income and Housing Options
Source: Author, 2026

Housing Market in Serang

Serang, as the capital city of Banten Province, has experienced rapid urban development driven by administrative, educational, and economic activities. The presence of government institutions, universities, and public service facilities attracts workers and students from surrounding regions, increasing the demand for housing.

The housing market in Serang reflects a typical pattern of developing urban areas, where private developers attempt to balance housing affordability with market demand. However, the housing supply tends to focus on two main segments: subsidized housing and higher-end commercial housing.

Research conducted in housing developments such as Cijung River Park in Kragilan indicates that price and location are the most important factors influencing housing purchase decisions in Serang. Accessibility to workplaces, transportation networks, and public facilities significantly affects the attractiveness of residential developments.

Meanwhile, studies conducted in Perumahan Persada Banten in Walantaka show that neighborhood facilities such as security systems, road infrastructure, and green spaces also play an important role in shaping buyer preferences.

Despite the growth of housing developments, Serang still faces several structural challenges in the residential sector. olds.



Figure 1.6
Diagram of Housing Options
Source: Author, 2026

When applying standard mortgage calculations, banks typically require that monthly housing payments should not exceed 30–35% of household income.

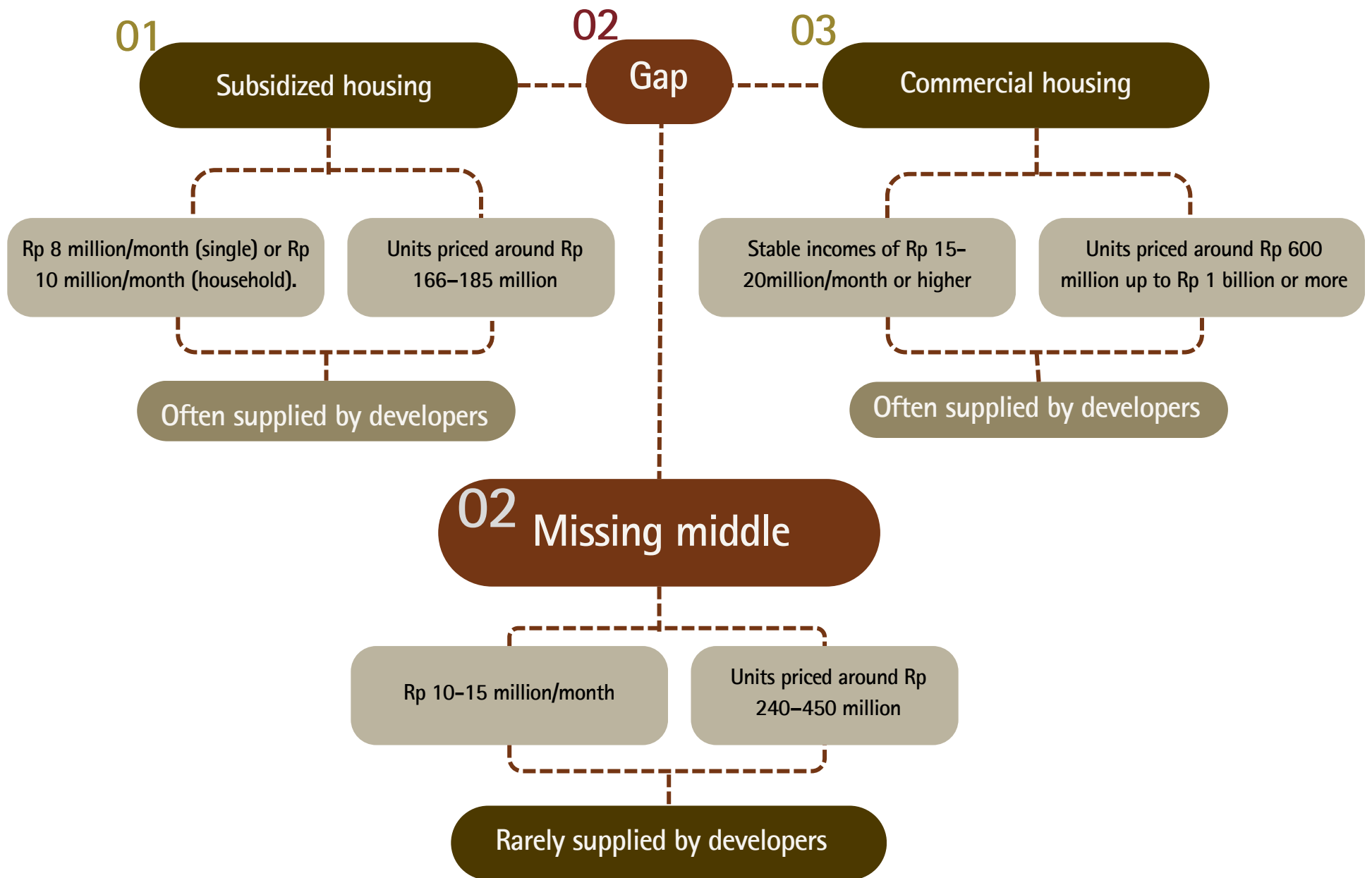


Figure 1.7
Diagram of Housing Options, Unit Price and Income
Source: Author, 2026

This group is known as the "missing middle," and currently, there is almost no housing product designed for them. *They earn too much to qualify for subsidized housing and earn too little to afford commercial housing*

Serang's Salary

Local socio-economic data from 2023–2024 provides a clearer picture of how communities in Serang fit within Indonesia's income classifications. According to data from Badan Pusat Statistik (BPS), informal workers in Serang City earn an average net income of approximately Rp2,492,711 per month, while informal workers in Serang Regency earn around Rp2,268,500 per month.

These values place many informal workers at the lower boundary of the middle-income category, slightly above the national middle-class threshold of around Rp2.04 million per capita expenditure. Meanwhile, the regional minimum wage (UMK) in 2024 further reflects the income structure of the region, with Kabupaten Serang at Rp4,560,894 per month and Kota Serang at Rp4,148,602 per month. Workers earning at least the minimum wage generally fall within the middle-income group in urban economic classifications.

However, household income levels are often higher than individual wages, particularly in urban areas where dual-income households are common. As a result, many families in Serang earn significantly above the minimum wage. Higher-earning professionals, entrepreneurs, and employees working in industrial or service sectors form the upper middle-income segment, characterized by greater purchasing power, private vehicle ownership, and the ability to access larger landed housing.

Considering these socio-economic conditions, households with monthly incomes above Rp10 million represent urban middle-income families who are typically ineligible for government housing subsidies but still require affordable and cost-efficient housing solutions. This group represents an important yet often underserved segment of the housing market, particularly in rapidly developing secondary cities such as Serang.

Household Income	Maximum Affordable Monthly Mortgage (30%)	Estimated House Price (8 Years)
Rp5,000,000	Rp1,500,000	± Rp180–220 million
Rp10,000,000	Rp3,000,000	± Rp280–350 million
Rp15,000,000	Rp4,500,000	± Rp432–504million

Table 1.4
Table of Income Levels and House Price
Source: Author, 2026

Housing affordability is closely related to household income levels. According to the minimum wage standard, the regional minimum wage (UMK) in Serang City is approximately Rp4.7 million per month (BPS Banten, 2024). Many households earn between Rp5 million and Rp12 million per month, which places them within the aspiring middle-income and middle-income categories.

However, the price of residential properties in urban areas often exceeds this purchasing capacity. Commercial housing units in Serang commonly range between Rp300 million and Rp600 million, depending on location and developer specifications. When applying standard mortgage calculations, banks typically require that monthly housing payments should not exceed 30–35% of household income.

Indonesia's "class" population

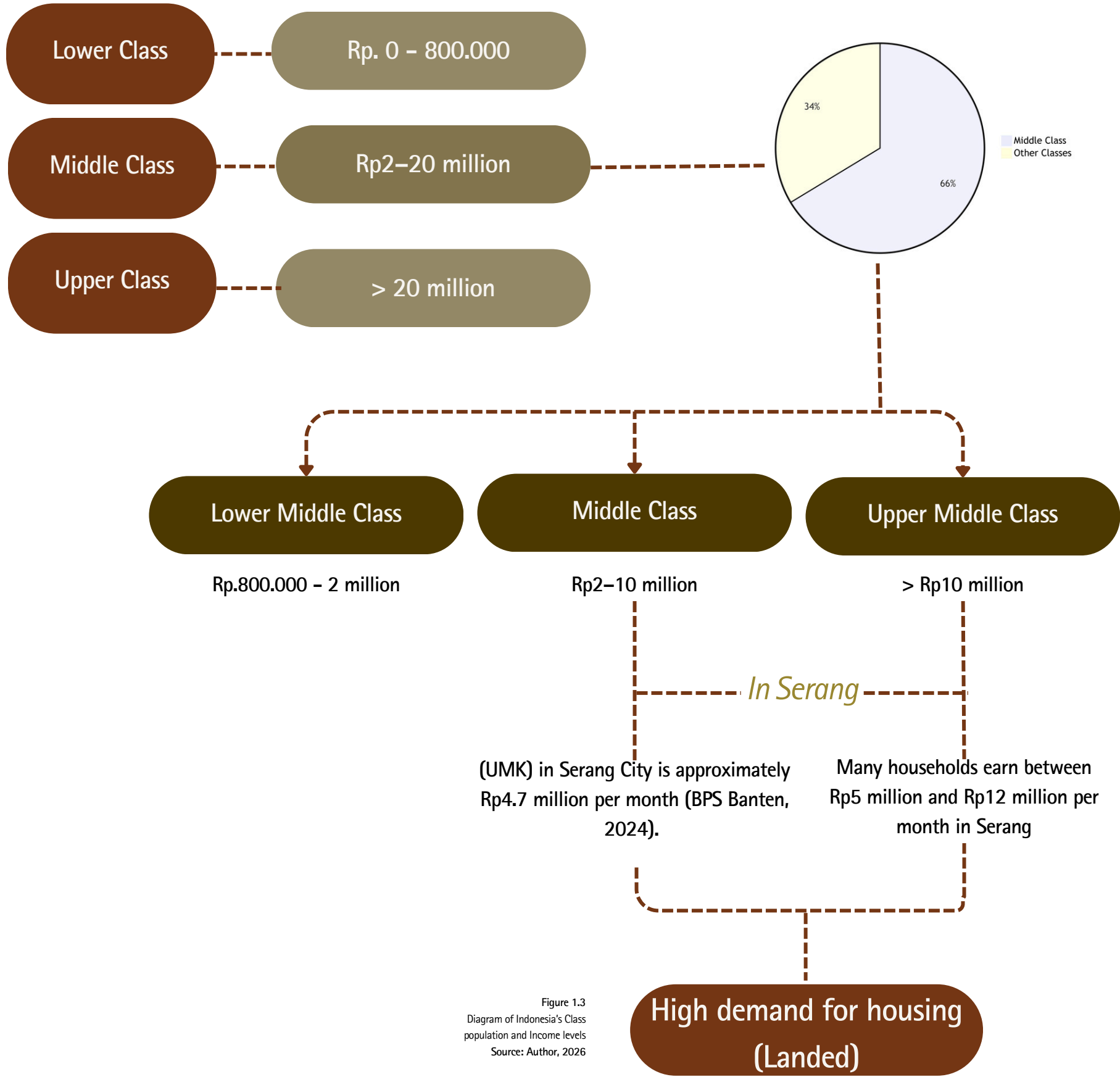


Figure 1.3
Diagram of Indonesia's Class
population and Income levels
Source: Author, 2026

Young Workers

Therefore, Indonesia is currently experiencing a major demographic shift in which younger generations are becoming the dominant workforce. According to Badan Pusat Statistik, Millennials (born 1981–1996) and Generation Z (born 1997–2012) together constitute more than half of Indonesia's population. The 2020 Population Census reports that Generation Z represents 27.94% of the population and Millennials represent 25.87%, making these generations the largest demographic groups in the country (BPS, 2021).

As these generations enter early professional stages and begin forming households, their demand for housing continues to grow. However, younger households face increasing barriers to homeownership. One of the main issues is the imbalance between income growth and property prices. Data from Badan Pusat Statistik indicates that early-career workers in Indonesia generally earn between Rp 5–8 million per month, while the regional minimum wage in Serang is approximately Rp 4–5 million per month (Pemerintah Provinsi Banten, 2024). Even in dual-income households, the total monthly income often remains within Rp 10–20 million, which limits the capacity to purchase conventional housing.

Housing affordability standards commonly suggest that housing costs should not exceed 30–40% of household income (World Bank, 2020). Based on this guideline, households earning around Rp 10 million per month can only safely afford housing prices of approximately Rp 300–350 million. In reality, however, many residential properties in urban areas exceed this price range.

In addition to economic constraints, younger households face unique social pressures such as the "sandwich generation" phenomenon, in which individuals must financially support both their parents and their children simultaneously. This condition reduces the capacity of young families to accumulate savings for housing down payments and mortgage payments.

Despite these challenges, studies show that Millennials and Generation Z still prefer landed houses compared to vertical housing such as apartments. Homeownership is often viewed as an important long-term asset and a symbol of stability within Indonesian cultural values. As a result, younger households continue to prioritize owning a house even when affordability becomes a major obstacle.

In the near future, Millennials and Gen Z will become the leading generations in Indonesia. Therefore, the need for housing for themselves and their households will be essential.

Housing Typology for Young Workers

Research indicates that a vast majority of the Millennial and Gen Z demographic in Indonesia and abroad strongly prefer landed houses over vertical housing options like apartments. (Kurniawan et al., 2020) In a study of 179 Indonesian millennial respondents, 91.62% chose to purchase landed houses, while only 6.70% opted for apartments.(Kurniawan et al., 2020) This preference is driven by several key factors:

1. The Flexibility and Freedom Factor

The most dominant reason for choosing landed housing on the outskirts of the city is flexibility, cited by approximately 35% of respondents.(Tang et al., 2022)

- **Land Ownership:** Unlike apartments, which often come with Right to Build (SHGB) certificates, landed houses offer the security of a Sertifikat Hak Milik (SHM) or Certificate of Ownership. (Tang et al., 2022)
- **Spatial Freedom:** Residents prioritize the ability to have a garden, a backyard, or a terrace, which are essential for families with children.(Tang et al., 2022)
- **Privacy:** Landed houses provide a level of **privacy** that many feel is unachievable in vertical housing. (Tang et al., 2022)

2. Cultural and Social Influences

The preference for landed houses is deeply rooted in "budaya berhuri" (living culture). (Tang et al., 2022)

- **Family Aspirations:** There is a strong cultural paradigm that views a home as a family asset and a primary indicator of social status. In fact, nearly 60% of Gen Z men and 50% of women believe that homeownership increases their social status. (Napiórkowska-Baryła et al., 2024)
- **Multigenerational Living:** Many young people choose landed houses to remain close to or live with their parents, a common practice in Indonesia. (Tang et al., 2022)



Figure 1.4
Diagram of Indonesia's workers and
house demands typologies
Source: Author, 2026

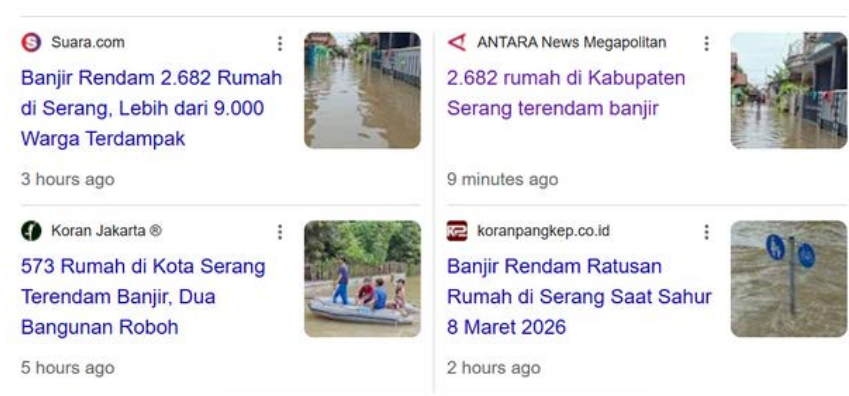
Today, Gen Z and Millennials dominate the workforce (54%), and despite being the most productive generation, their aspiration remains very grounded: 91% still prefer landed houses. This preference reflects cultural values, family structure, and long-term stability. At the same time, 66% of Indonesia's population is categorized as middle class, which theoretically should have the capacity to access housing. However, the reality shows a contradiction. Many young people believe that owning a house is becoming increasingly impossible. This is not because housing does not exist, but because available housing does not match their financial reality.

Housing Conditions in Serang

One major issue in Serang's housing sector is the management of Prasarana, Sarana, dan Utilitas (PSU). According to data from the Serang Regency Government, 121 out of 167 housing developments have not yet completed the mandatory PSU handover, with 30 developments exceeding the deadline. As a result, many residential areas experience deteriorating infrastructure conditions such as damaged roads and inadequate drainage systems.

Environmental vulnerability also presents a significant challenge. Flooding frequently affects several residential areas in Serang, including BTN Karangantu, Perumahan Lebak Indah in Terondol, and Perumahan Puri Keraton in Kasemen. These flooding problems are mainly caused by poorly designed drainage systems that are not properly connected to the city's main drainage network.

In addition, land-use changes along riverbanks and unregulated development reduce the capacity of natural waterways, further increasing flood risks during heavy rainfall. These challenges highlight the importance of integrating housing development with infrastructure planning and environmental management.



<https://megapolitan.antaranews.com/berita/510119/2682-rumah-di-kabupaten-serang-terendam-banjir>

Figure 1.8
News of Serang's Residential Floods
Source: Google, 2026



Figure 1.9
Serang's Residential Floods
Source: DetikNews, 2022

1.3 Probelm Mapping

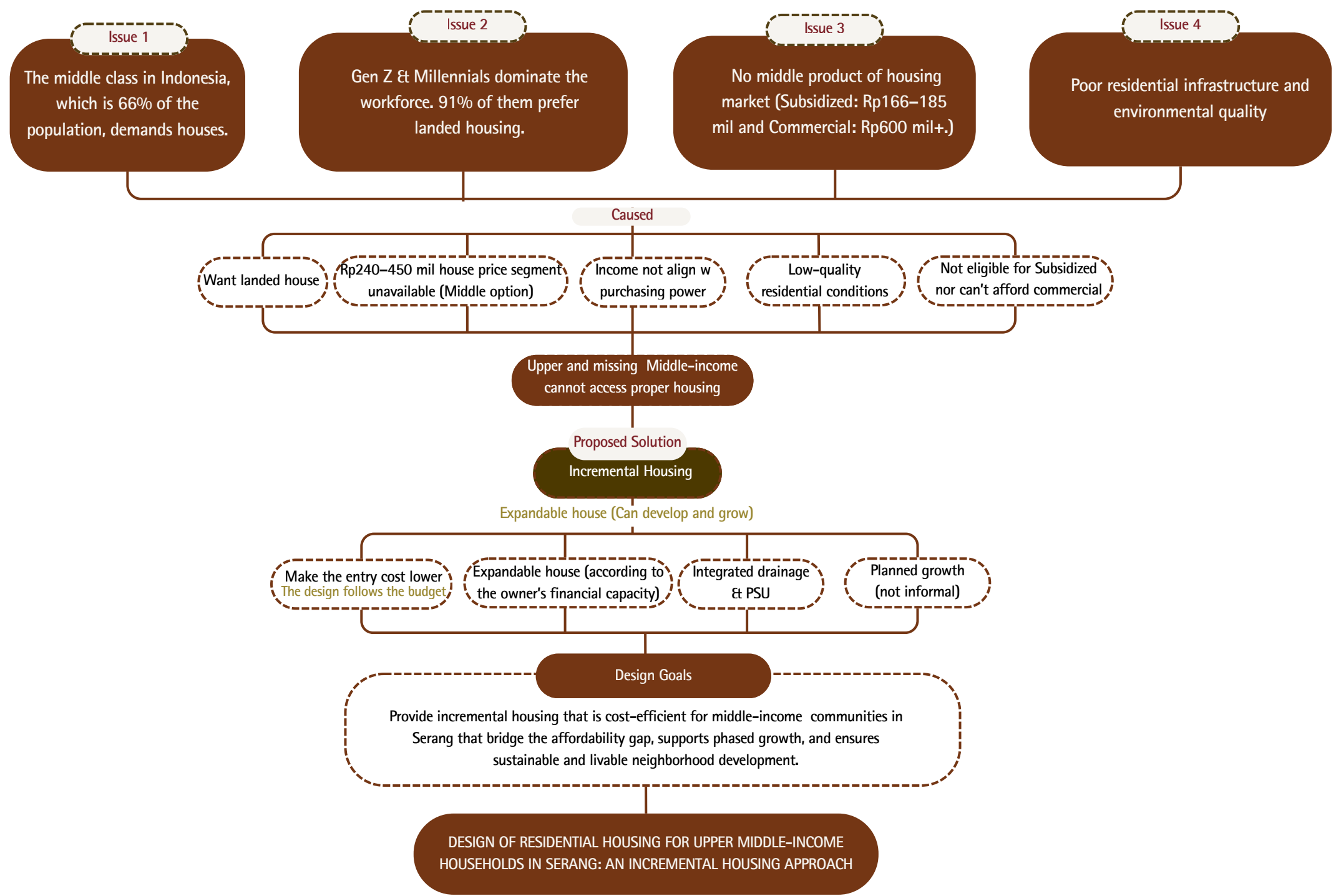


Figure 1.10
Daigram of Problem Mapping
Source: Author, 2026

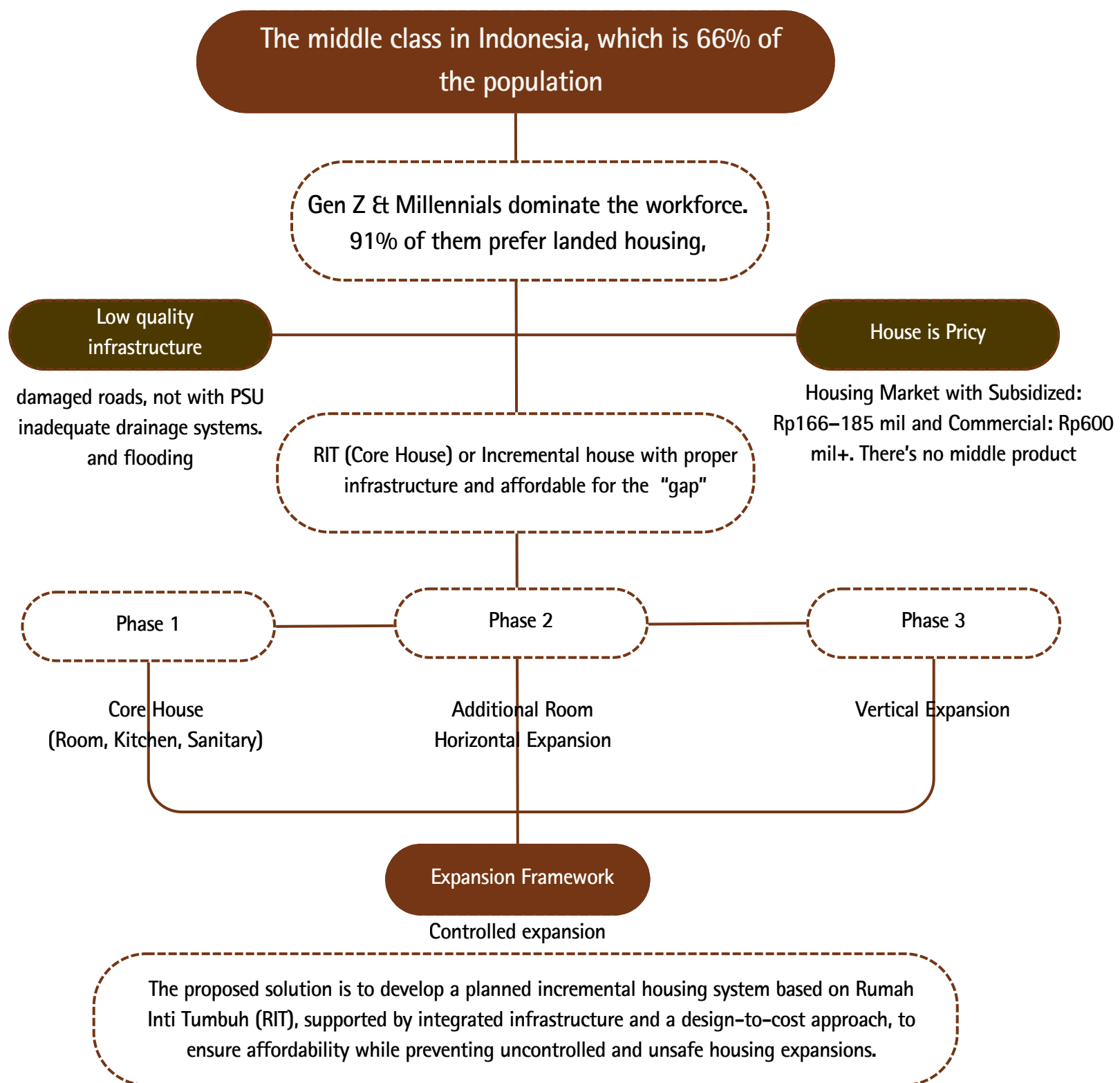


Figure 1.11
Diagram of Problem Mapping
Source: Author, 2026

Problematique

Non Architectural Problem

Middle-income households in Serang face limited access to landed housing due to the affordability gap between subsidized and commercial housing.

Architectural Problem

Existing housing supply does not adequately provide expandable and adaptable dwelling units that can respond to residents' changing spatial needs and financial growth over time.

Problem Formulation

How can residential housing in Serang be designed through an incremental housing approach to accommodate middle-income households who are excluded from subsidized housing yet unable to access commercial housing, while remaining affordable through a design-to-cost strategy?

Problem Limitation

The project is limited to the design of housing units within a price range positioned between subsidized and commercial housing and regulation like KDB, KLB, Setbacks etc.

Approach

The design adopts the incremental housing concept through Rumah Inti Tumbuh (RIT) or core house as the main architectural approach.

Design Goals

The project aims to design affordable and adaptable housing for middle-income households in Serang who are not eligible for subsidized housing but cannot afford commercial housing. By integrating the principles of Rumah Inti Tumbuh (RIT), design-to-cost, and proper drainage and PSU planning, the design aspires to create a healthy, sustainable, and growable residential environment.

Figure 1.12
Diagram of Problematique
Source: Author, 2026

Matrix of Design Thinking

Bryan Lawson's

Aspect	Practical	Formal	Symbolic	Radical
Regulation	Housing must comply with Kepmen Kimpraswil No. 403/KPTS/M/2002 regarding Rumah Sederhana Sehat (Rs Sehat) and Rumah Inti Tumbuh (RIT), ensuring minimum livable space ($\pm 21 \text{ m}^2$), basic functions (sleeping, cooking, sanitation), and planned expansion. Also aligned with UU No. 1 Tahun 2011 tentang Perumahan dan Kawasan Permukiman to ensure livable, safe, and affordable housing.	Site planning and housing development must follow GISTARU land use zoning and RTRW regulations in Serang PP No. 14 Tahun 2016 tentang Penyelenggaraan Perumahan dan Kawasan Permukiman (and its updates), including land use efficiency, housing layout standards, and integration of infrastructure systems. Modular and phased design must be pre-planned to comply with formal spatial planning.	Regulation ensures quality + trust, reinforcing the developer's reputation as reliable and compliant.	Regulation is used as a design tool to structure long-term housing growth, not just a constraint.
User (Upper-Missing Middle)	Affordable entry housing with incremental growth, aligned with real financial capacity of $\pm 8\text{--}20$ juta/month.	Flexible spatial layout supporting future expansion, family growth, and hybrid lifestyles.	Housing becomes a milestone of dignity and independence for Gen Z & millennials.	Users shift from buyers to co-creators of their homes, participating in phased development.
Client (PT. Buana Karya Sejati)	Already strong in construction quality & PSU performance (no flooding issues) but they need design to enhance architectural value without increasing cost significantly.	Develop a more attractive and competitive housing product to transition from subsidized to private/commercial market.	The project becomes a branding transformation: from "technically good developer" to "design-conscious, future-oriented developer."	Introduce a new development model. not just selling houses, but delivering a growth-based housing system for the missing middle.
Designer (Architect)	Ensure cost-efficient, buildable, and expandable system, maintaining client's construction strengths.	Create a cohesive visual identity across phases so housing remains aesthetically controlled even after expansion.	Translate the environment that can grow.	Architect becomes strategic partner to developer, redefining housing delivery through incremental systems, not just design output.

Table 1.5
Table of IDesign Thinking by Bryan Lawson
Source: Author, 2026

Initiators



PT. Buana Karya Sejati, a limited liability company incorporated in Indonesia with business registration number 549212, is based in KOMPLEK RSS PEMDA BLOK A3 NOMOR 12 in SERANG.

The PT is handled by a team that already has 10 subsidized housing residential units in Serang and its surroundings areas without any flooding or PSU problems. Therefore, this developer wants to improve themselves and wants to level up by making a private residential complex.

PT Buana Karya Sejati (the project from 2018) maintains better construction quality and material standards, yet the architectural appearance remains less developed. Consequently, the developer seeks design assistance to enhance the aesthetic quality while maintaining construction performance.

1.4 Methodology

Incremental Housing Approach

Incremental housing is an approach where a house is built in stages over time, starting from a basic, livable core unit and gradually expanded as the owner's needs and financial capacity grow. In Indonesia, this concept is known as Rumah Inti Tumbuh (RIT), introduced through government guidelines as a "core house" that is designed to grow.

Data Collection Method

Primary Data

Primary data were collected through field observations in Serang, focusing on existing site conditions and the housing-related challenges faced by young generations and middle-income households.

Secondary Data

Secondary data were collected through literature review and spatial mapping of the study area. This process aimed to analyze existing infrastructure conditions and identify potential development opportunities.

Design Approach Method

The design approach is carried out after observation and literature review, which then identified the housing affordability gap and the lack of adaptable housing for middle-income communities in Serang. The design uses an incremental housing approach through the concept of Rumah Inti Tumbuh (RIT), combined with a design-to-cost strategy to create affordable and expandable housing.

- 1.Designing a core house (Rumah Inti Tumbuh) that provides minimum livable space while allowing future expansion based on the residents' needs and financial capacity.
- 2.A design that plans and controls future growth, ensuring that house expansions are structured, safe, and in accordance with building regulations, preventing random and unhealthy renovations.
- 3.Designing integrated infrastructure (PSU and drainage systems) to support long-term residential development, ensuring a healthy, safe, and sustainable living environment.
- 4.Applying a design-to-cost strategy to maintain affordability from the initial phase, allowing users to access housing within their financial limits while enabling gradual development.

Proposed Design Solution Method by Mapping

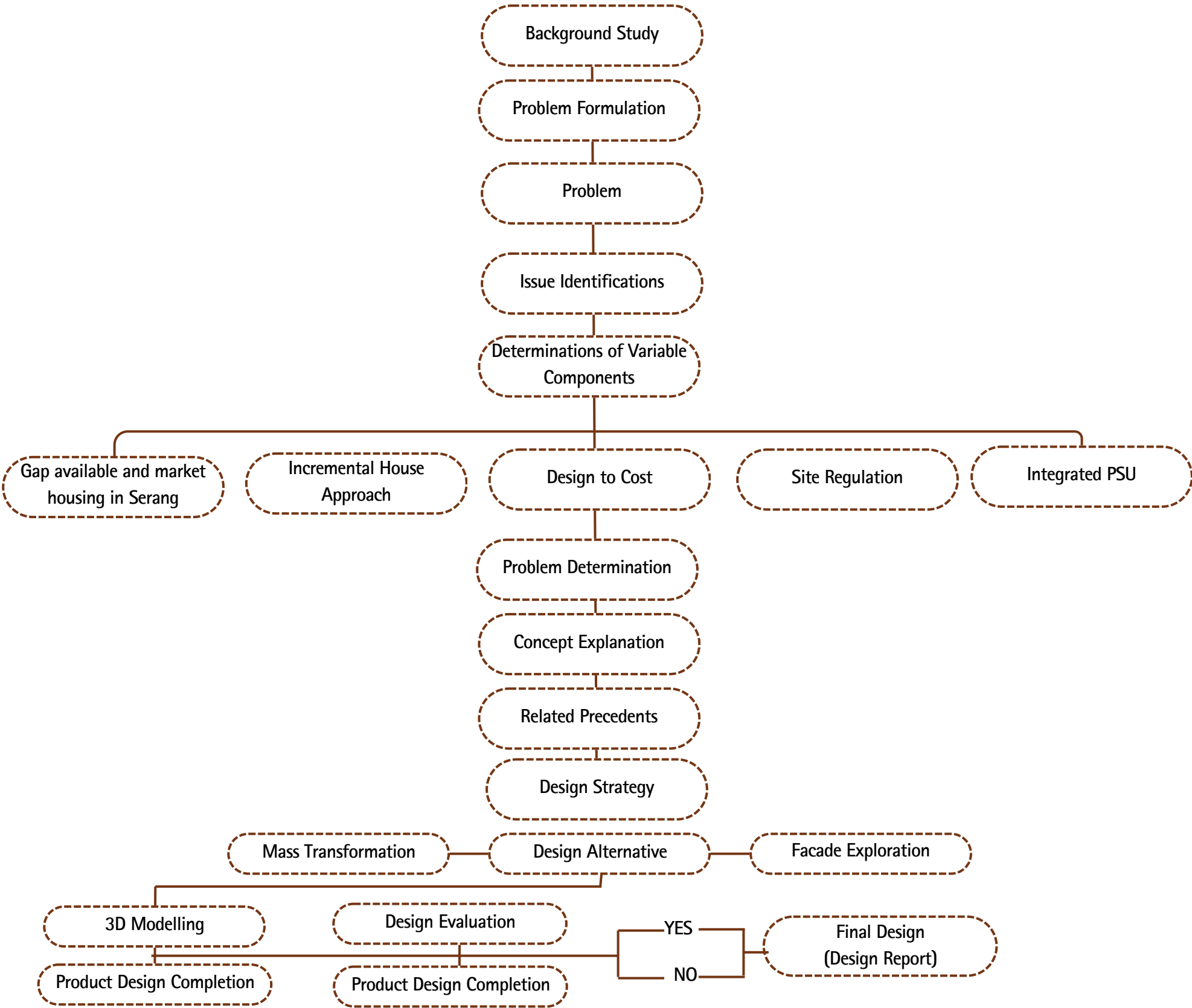


Figure 1.13
Diagram of Design Method
Source: Author, 2026

— Excellency, Originality, and Novelty

Project Title	Lesson Learned	Difference
Perancangan Perumahan Modular Inklusif Dengan Pendekatan Bangunan Terbuka Untuk Merespon Banjir di Kawasan Kemang, Jakarta Selatan Author: Abdur Rahman Year: 2022	This project demonstrates how modular housing and open building systems can respond to both environmental and social challenges. It highlights the importance of flexible housing that can adapt to flooding conditions while also improving spatial inclusivity. The integration of public spaces along riverbanks becomes a key strategy to reconnect fragmented communities.	The difference lies in its dual focus on flood resilience and social inclusivity within an elite urban context. Unlike typical housing projects, it addresses both environmental issues (flooding, lack of infiltration) and social segregation, creating shared spaces between different socio-economic groups.
Perancangan Bangunan Mixed Use Berupa Transit Station dan Incremental Housing pada Ruang Left Over Author: Ega Naufaliadhli, Nandana Year: 2021	This project explores the potential of incremental housing combined with TOD (Transit-Oriented Development) to address urban density and housing backlog. It emphasizes the adaptive reuse of leftover urban spaces as a strategic solution for limited land availability. The design approach introduces flexibility in both spatial planning and housing growth.	The project stands out through its use of leftover spaces as housing opportunities and integration with transit systems. It differs by proposing a speculative and adaptive urban strategy, rather than conventional large-scale housing development, making it highly relevant for dense metropolitan contexts like Jakarta.
Perancangan Desain Perumahan Terintegrasi (The Extension) Sebagai Fasilitas Permukiman Untuk Kota Metropolitan Serang Author: Latifah Chusna Year: 2021	This project highlights the importance of integrated residential planning in supporting metropolitan development. It applies the concept of Transit-Oriented Development (TOD) to connect housing with commercial, office, and public facilities. The project emphasizes mobility (work, residential, and travel mobility) as a key driver in shaping urban form.	The difference is in its focus on long-term metropolitan growth in a developing city (Serang). Unlike dense metropolitan case studies, this project addresses emerging urban conditions, emphasizing integration and mobility as a foundation for future expansion rather than retrofitting existing urban issues.

Table 1.6
Table of Excellency, Originality, and Novelty
Source: Author, 2026

02. *PROBLEM STUDY*

2.1 Study of ocation and Site

Location

The selection of the site in Serang is strategically aligned with the Affordability and Accessibility factor, which is one of the six primary groups of factors influencing the housing purchase decisions of Generations Y and Z. For the "Upper Middle Class" target market, location is not merely a physical coordinate but a major preference that determines the property's investment value, and daily operational efficiency indicates that distance to the workplace is a decisive factor for young professionals to shorten travel times and optimize their daily activities.

Serang City, Banten Province in Java Island



Figure 2.1
Java Island and Serang
Source: Author, 2026

Accessibility Map

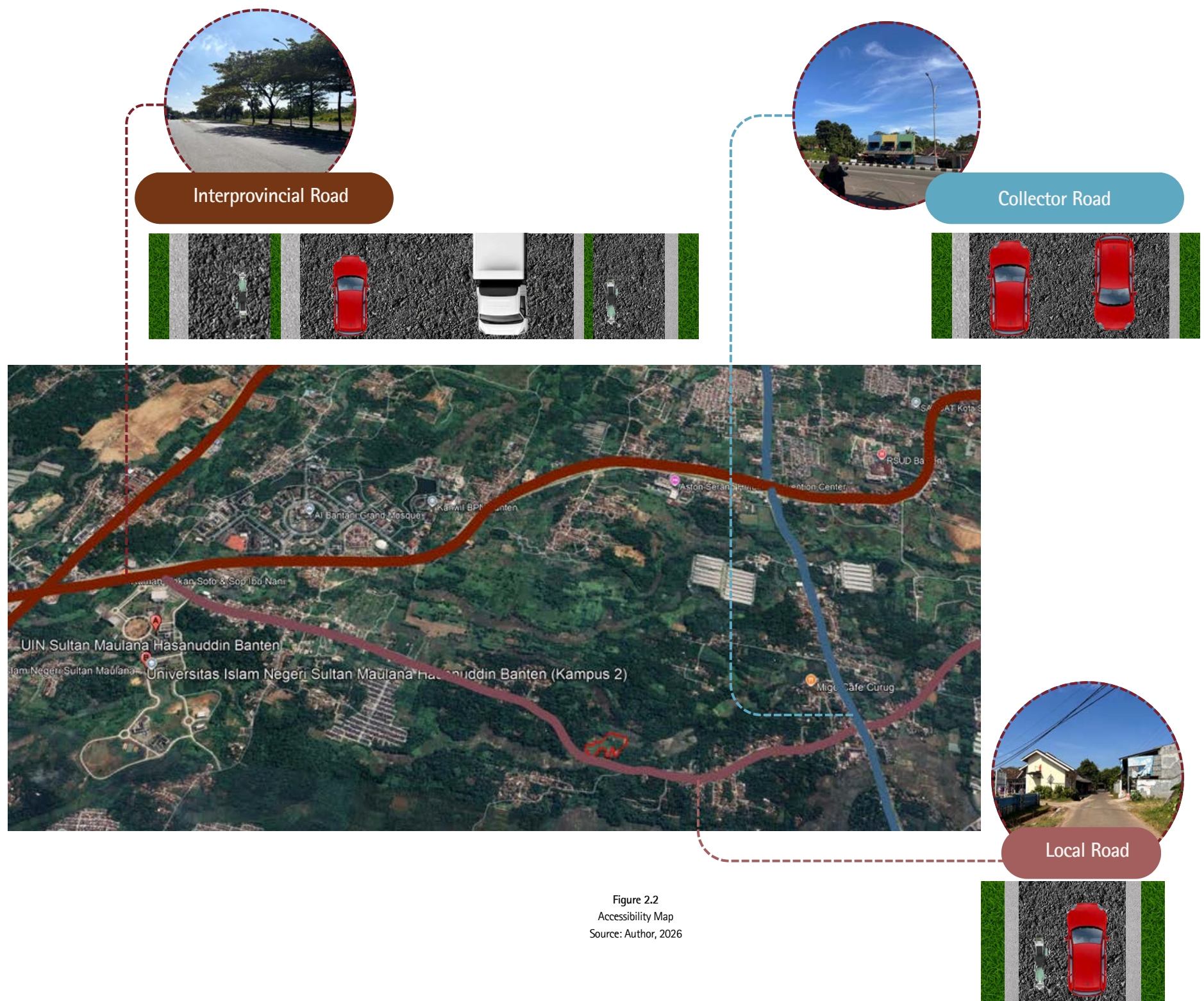


Figure 2.2
Accessibility Map
Source: Author, 2026

Regulation

RTRW Kota Serang 2011–2031

KDB

60%

KLB

1.2 – 2.0
8–12 m

KDH

30%

GSB

Front: 3–5 m
Side: 1–2 m
Back: 2–3 m

Perda Kota Serang No. 1 Tahun
2018 tentang Prasarana, Sarana, dan
Utilitas Umum (PSU)

Requires developers to provide essential infrastructure such as roads, drainage systems, clean water, and electricity. These elements must meet minimum service standards and be handed over to the local government upon completion. This regulation is particularly important in preventing unplanned and informal expansions that often lead to environmental issues such as flooding, which is a known challenge in Serang. Therefore, the project must integrate infrastructure planning from the beginning, ensuring that the incremental growth of housing units does not compromise the performance of the overall residential system.

Peraturan Pemerintah No. 16 Tahun
2021 tentang Bangunan Gedung

Replaces the previous IMB system with the PBG (Persetujuan Bangunan Gedung). This regulation ensures that all buildings, including those developed incrementally, meet standards related to structural safety, ventilation, lighting, and overall comfort. As a result, even the initial phase of the house must comply with these standards, reinforcing the idea that a core house should already function as a proper dwelling rather than a temporary structure.

Figure 2.3
Diagram of Regulations
Source: Author, 2026

Site Analysis

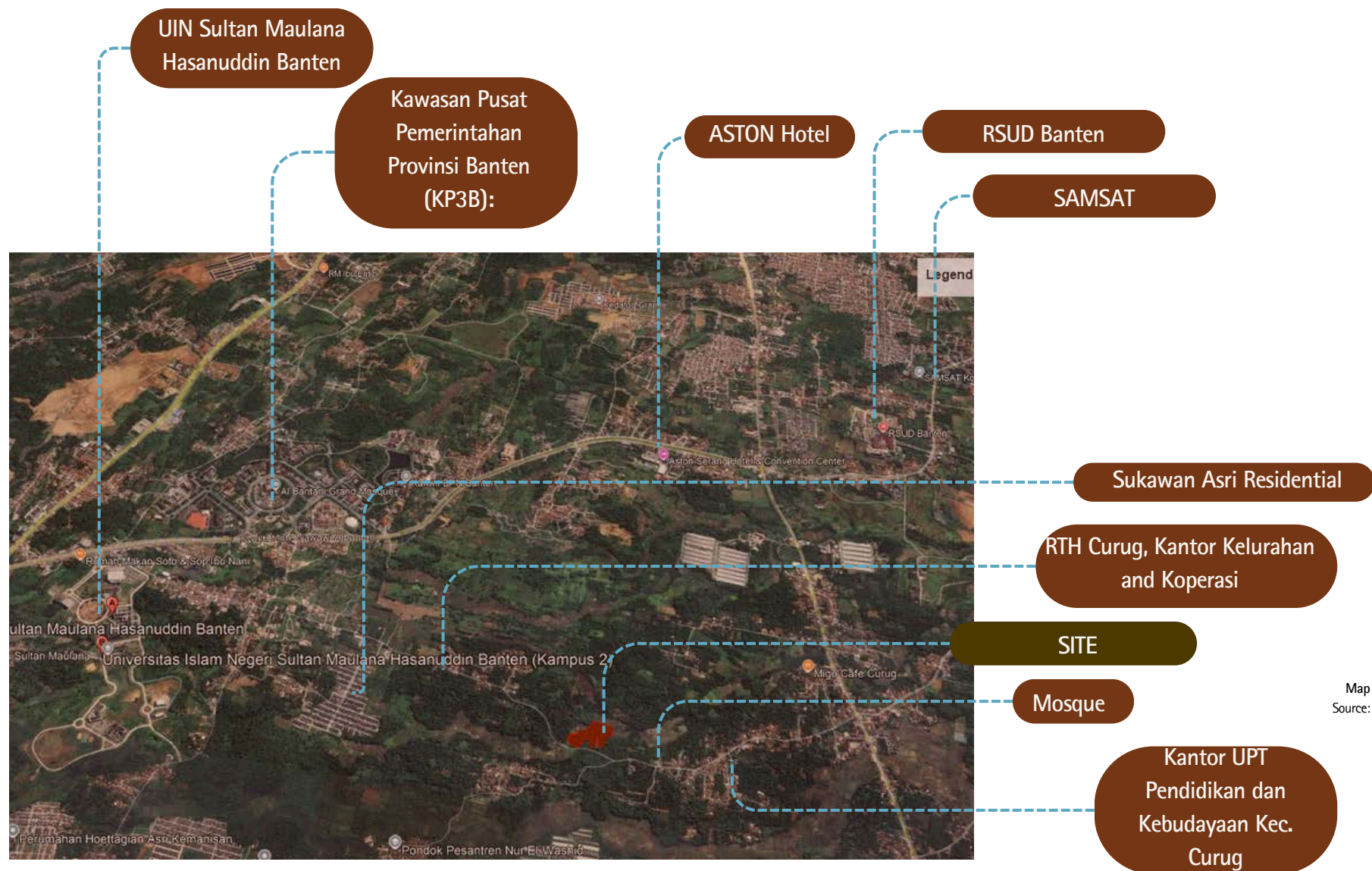


Figure 2.4
Map of Potentials
Source: Author, 2026

- **Kawasan Pusat Pemerintahan Provinsi Banten (KP3B):** The site is located only *12 minutes (3.9 km)* from the provincial government center. This proximity serves the significant population of government employees within the target income bracket of Rp 13–20 million.
- **Universitas Sultan Ageng Tirtayasa (Untirta):** The *16-minute (7 km)* to Universitas Sultan Ageng Tirtayasa (Untirta), the primary Public State University (PTN) in Banten.
- **Polda Banten:** Located *12 minutes (5.5 km)* from the site, providing both a workplace destination and a secondary factor of "Kualitas Sosial" regarding neighborhood safety and stability.
- **UIN Sultan Maulana Hasanuddin Banten:** The site is highly accessible at *9 minutes (3.7 km)* from this major educational institution. Proximity to education centers is a key that historically shows high validity in housing selection for Gen Y/Z.
- **RSUD Banten:** The site is situated *9 minutes (3.8 km)* from the regional public hospital. Access to "Sarana Kesehatan" (Health Facilities) is a vital factor that improves the "Willingness to Pay" for non-subsidized commercial housing.

Topography

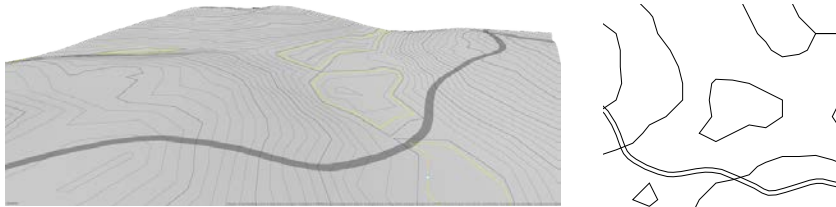


Figure 2.5
Site's Terrain
Source: Metabolue, 2026

Average temperatures and precipitation

The climate shows relatively stable temperatures throughout the year, with mean daily maximums around 29–31°C and minimums around 23–24°C. This indicates a consistently warm tropical climate with low seasonal variation.

The small difference between day and night temperatures suggests high humidity and limited cooling at night. Therefore, building design should prioritize natural ventilation, shading, and heat reduction strategies to maintain indoor thermal comfort.

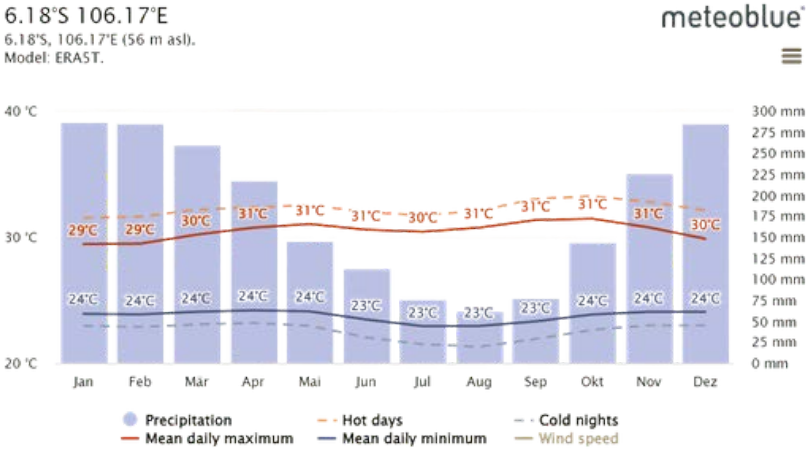


Figure 2.6
Diagram of Temperature
Source: Metabolue, 2026

Wind Rose

The wind rose indicates that prevailing winds predominantly come from the south-west (SW) to south (S) directions, with moderate speeds (5–20 km/h). Secondary winds also occur from the north-east (NE), but with lower frequency.

This pattern suggests that the site should maximize openings toward the SW–S direction to enhance natural ventilation, while controlling stronger winds through shading or buffer spaces.

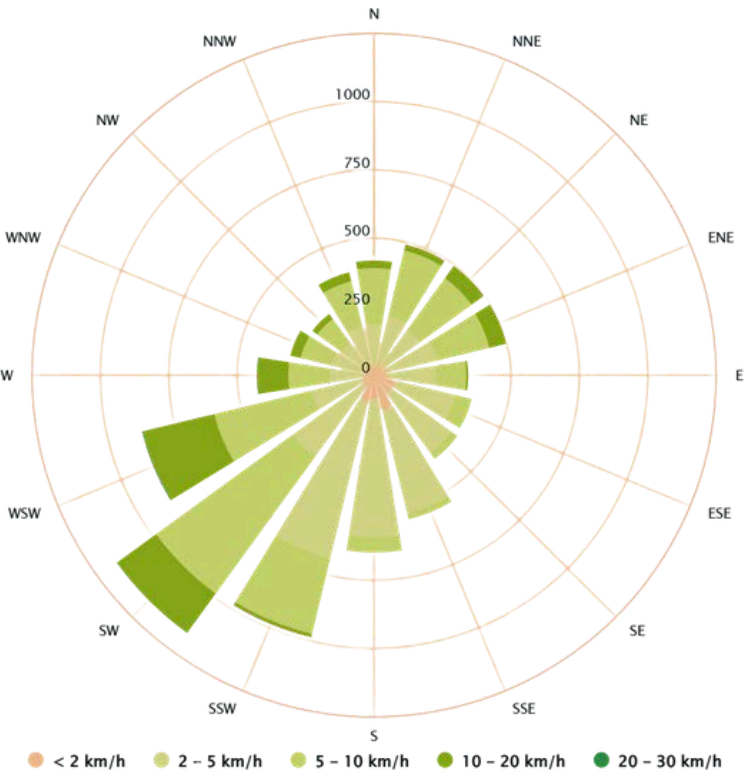


Figure 2.7
Diagram of Windrose
Source: Metabolue, 2026

Site Price

To justify the site selection, the land used in this project is owned by the client and was purchased in 2017 at an average price of Rp150.000 per m². The variation between the front and back portions of the site was considered, and the value was averaged. With a total land area of 11.209 m², the initial land cost was approximately Rp1.68 billion.

Based on current market conditions in the Curug–Serang area, the land price has increased to around Rp400.000 per m² in 2026, which brings the estimated land value today to about Rp4.48 billion. This shows a significant increase in value over time, indicating that the area is developing and has growing demand.

Land Area (sqm)	Price /m	Total	Detail
9990	Rp150,000	Rp1,498,500,000	Bought at 2017
9990	Rp400,000	Rp3,996,000,000	Approximately bought 2026

Table 2.1
Table of Estimated Land Price
Source: Author, 2026

Consumer

From the consumer side, the location remains relatively affordable compared to more central areas. When combined with the incremental housing approach, buyers are not required to pay for a fully finished house upfront. Instead, they can enter at a lower price point and expand over time based on their financial capacity.

Developer

From the developer's perspective, this is a strong advantage. Since the land was acquired at a relatively low price, the project has a lower initial capital burden compared to buying land at today's market value. This creates room to maintain a competitive selling price while still achieving profit.

So in this case, the project sits in a balanced position. The developer benefits from early land acquisition and rising land value, while the buyers benefit from a more accessible entry price.

Site Development

The site located at Lingkungan Bojongsalam, Kelurahan Curug, Kecamatan Curug, Kota Serang, Banten.

Area 9.990m²

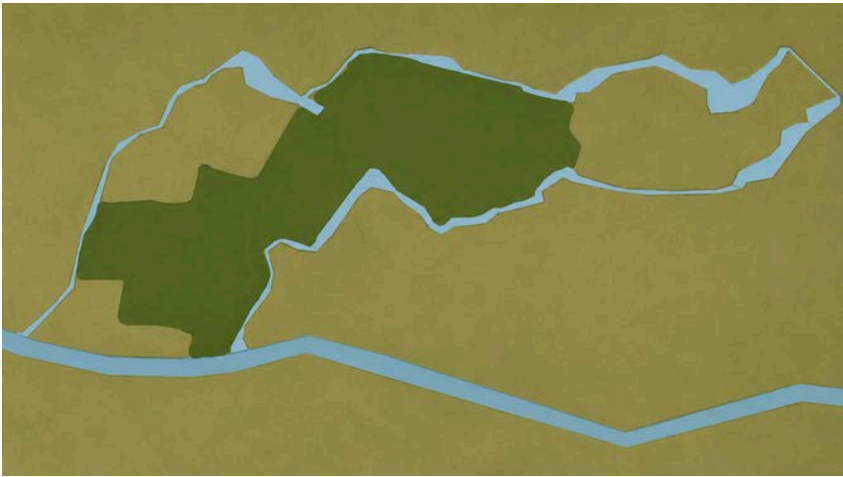


Figure 2.8
Site Area
Source: Author, 2026

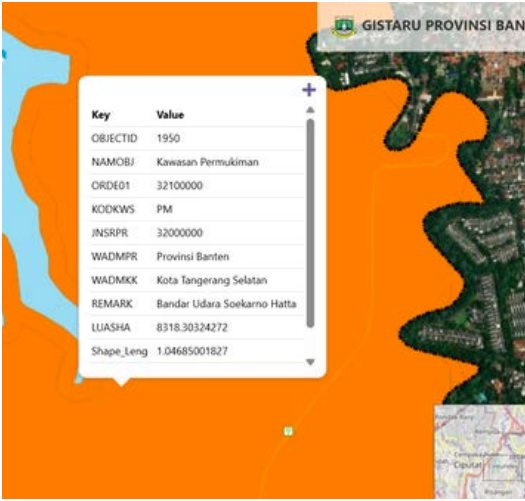
Figure 2.9
Site Area Waterways
Source: Author, 2026

Figure 2.10
Site Area Development
Source: Gistaru, 2026

Waterways



GISTARU



Based on GISTARU, the site is shown in **orange**, meaning it is allocated for **residential and housing development**. Therefore, the site is in accordance with the applicable spatial planning and zoning regulations, especially the RTRW and RDTR.

Public Transport

Public transportation in Serang is still mostly dependent on angkot. Since January 2026, Trans Banten has started operating, but its service is still limited to one main route in Serang.

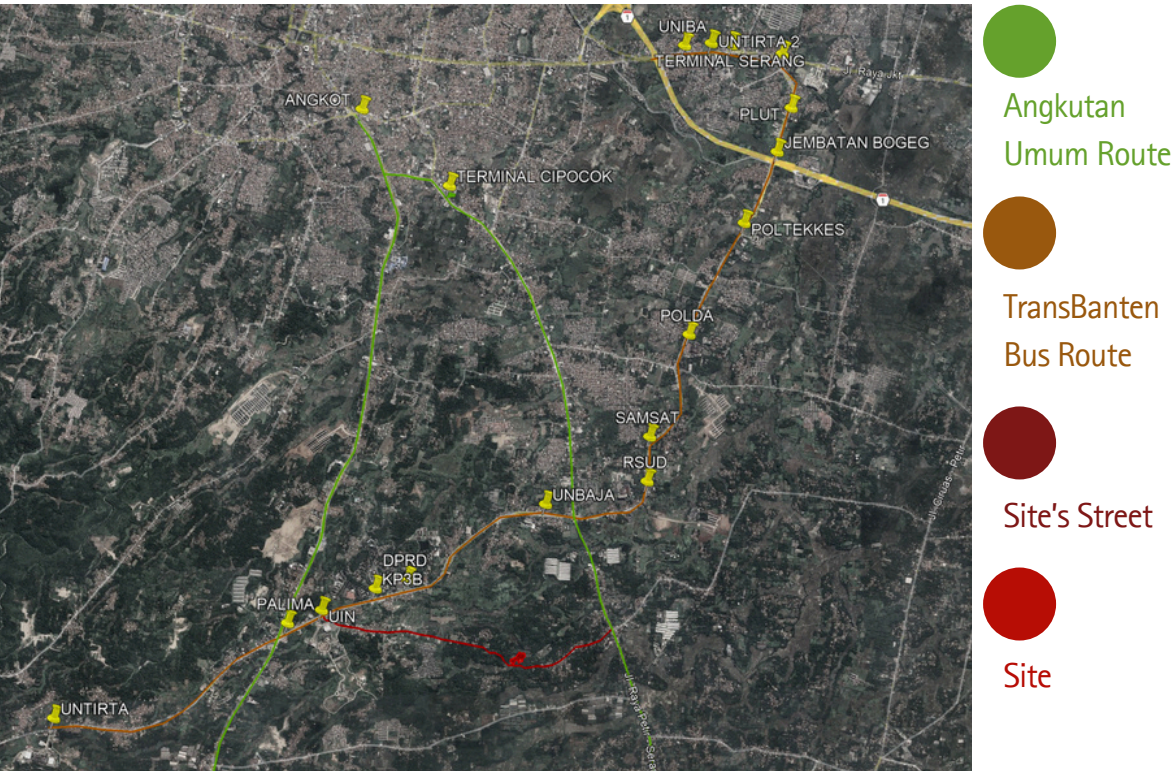


Figure 2.11
Accessibility Map of Public Transport
Source: Gistaru, 2026

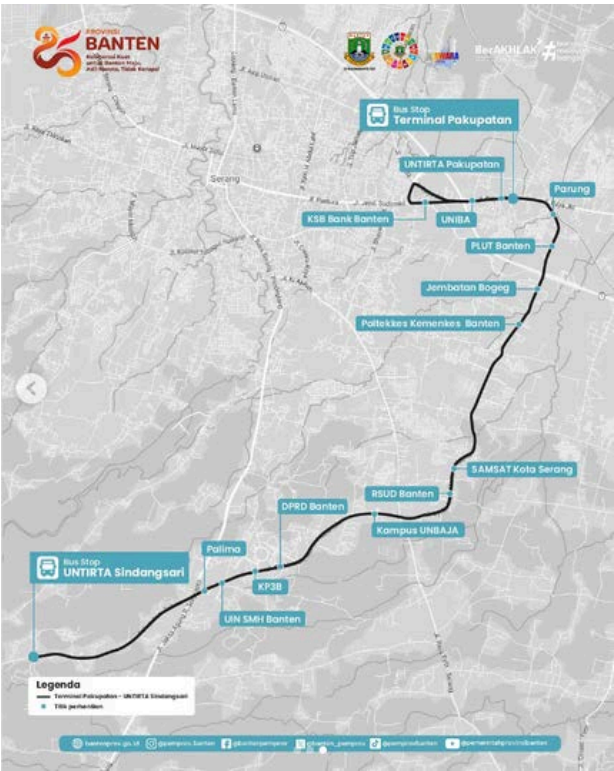


Figure 2.12
Public Transport Route
Source: Pemprov Banten, 2026

The site has indirect access to this public transport network. **The interprovincial road is connected to the Trans Banten route**, while the collector road near the site is served by angkot. In the diagram, the green line shows the angkot route, the yellow line shows the Trans Banten route, and the red line shows the local road leading to the site.

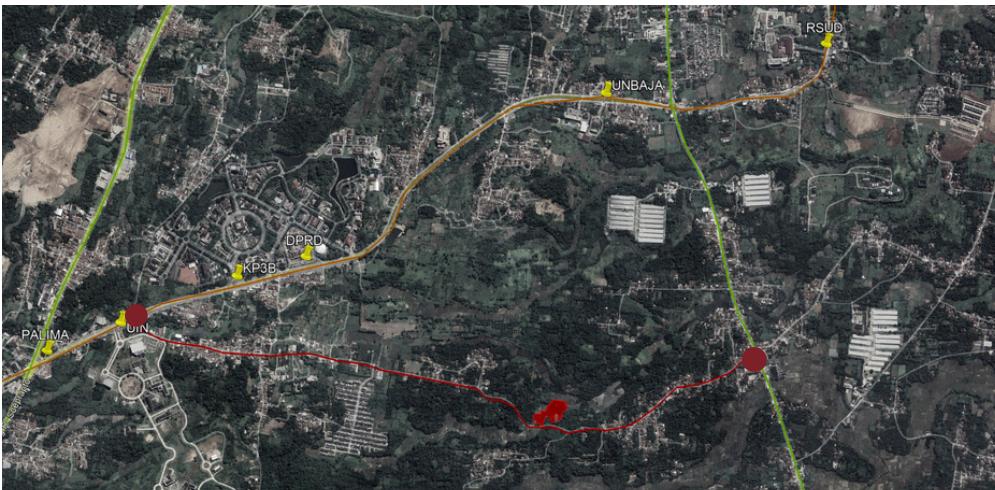


Figure 2.13
Proposal of Public Transport Route
Source: Author, 2026

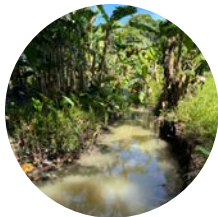
Site Consideration

- The selected site is considered highly suitable for residential development due to its strategic location near key urban facilities such as education centers, offices, hospitals, and Polda Banten, ensuring accessibility to daily needs while maintaining a more शांत and livable environment.
- Despite being located approximately 1 km from the main road, this condition offers an advantage by creating a quieter residential setting, away from traffic noise and congestion. The existing village context also provides an opportunity to develop a community-oriented housing environment that integrates local social structures with planned urban growth.
- Additionally, the site is surrounded by rivers, which presents a significant environmental advantage. This condition allows for more efficient and natural water management strategies, particularly for drainage and wastewater systems, reducing flood risks and supporting sustainable infrastructure planning.
- With its great potential for development, good location, and environmental advantages, the site provides a perfect base for creating an affordable and gradually expanding housing plan that can adapt to the needs of its residents.

View



Vista



SHM



Figure 2.14
View and Vista of Site
Source: Author, 2026

Figure 2.15
SHM of Site
Source: Author, 2026

RTRW Kota Serang 2011–2031

KDB

60%

KDB x land size
 $60\% \times 9.990 = 5.994$

KLB

1.2 – 2.0
8–12 m

1.2 – 2.0
1–3 Floors
8–12 m

KDH

30%

KDH x Land size
 $30\% \times 9900 = 2.997$

GSB

Front: 3–5 m
Side: 1–2 m
Back: 2–3 m

Setbacks
Front: 3–5 m Side: 1–2 m
Back: 2–3 m
River: 3 meters

S

- Strategically located near essential facilities (education, offices, hospital, Polda Banten).
- High potential for future development due to surrounding urban growth.
- Relatively quieter environment compared to main road areas (better residential comfort).

W

- Located ± 1 km from the main road, reducing accessibility and visibility.
- Existing road width only accommodates two cars, limiting traffic flow and future scalability.
- Surrounding area is still predominantly village-based, with limited infrastructure quality.

O

- Potential to become a transitional housing model between rural and urban areas.
- Opportunity to introduce planned infrastructure (roads, drainage, utilities) as part of development.
- Suitable for incremental housing (RIT) concept, allowing gradual growth aligned with area development.

T

- Risk of unplanned or organic growth from surrounding village context.
- Infrastructure lag (drainage, road capacity) may not keep up with development.
- Possible mismatch between new housing typology and existing rural character/social structure

Figure 2.16
SWOT Diagram of Site
Source: Author, 2026

2.2 Study of Building Typology

Building Typology

Residential Housing

Housing in Serang is generally divided into two main typologies: MBR (subsidized housing) and commercial housing (middle to high-end). This creates a dual system in which housing is either affordable but minimal, or adequate but expensive, with very limited options in between—especially for the emerging middle-income group. Understanding this typology is important because it reflects real user conditions, including income levels, lifestyles, and patterns of household growth, ensuring that design responds to actual needs. At the same time, it reveals a critical housing gap, where subsidized housing is often too small and inflexible, while commercial housing remains financially out of reach. This condition directly informs design strategies, particularly in determining unit flexibility, infrastructure readiness, and future expansion potential, which are essential in incremental housing approaches. Moreover, housing typology is closely tied to both government regulations and market systems, making it crucial for any design proposal to balance policy compliance with economic feasibility.

01. MBR Housing (Subsidized)



Sukawana Asri

Figure 2.17
Facade of Sukawana Asri
Source: Sukawana Asri, 2024



Figure 2.18
Floor Plan of Sukawana Asri
Source: Sukawana Asri, 2024



Figure 2.19
Master Plan of Sukawana Asri
Source: Google Maps, 2026

Narrow roads



± 3–4 m,
sometimes only
fit 2 cars

Basic drainage



Small musholla



Characteristic

- Small house types: Type 30 / 36
- Land size: ± 60–72 m²
- Highly standardized design
- Basic materials & finishing
- Located in peri-urban / fringe areas

Criteria (User Eligibility)

- Income limit: ± ≤ Rp 8 juta (single) / ≤ Rp 10 juta (married)
- Must not own a house
- Eligible for government subsidy (FLPP/KPR subsidi)

Requirement

- Minimum house size: ~21–36 m²
- Must include: Sleeping area, Living/multipurpose space, Bathroom (MCK)
- Kepmen Kimpraswil No. 403/KPTS/M/2002
- Basic infrastructure required: Road access, Drainage, Clean water & sanitation

02.

Commercial Housing (Middle to High-End)

Citraland Serang



Playground



Security Gate System



Openspace

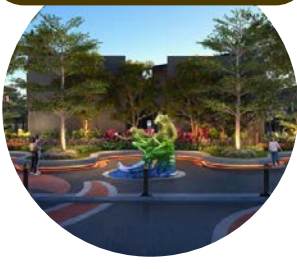


Figure 2.20
Rendering of Citraland Serang
Source: CitraLand, 2025

Wider roads



main road +
local streets

Planned
drainage system



street lighting



Characteristic

- House types: Type 45 – 120+
- Land size: 72–200 m²+
- Better construction quality
- Planned clusters (sometimes gated)
- More complete infrastructure

Criteria (User Eligibility)

- No income restriction
- Salary ± Rp 10–20 juta+ / month
- Financing via commercial KPR (non-subsidy)

Requirement

- PSU (Prasarana, Sarana, Utilitas)
- Perda Kota Serang No. 1 Tahun 2018
- Includes: Road hierarchy (wider access), Drainage system, Public/open space (RTH)
- Developer-driven design standards

The disparity in infrastructure and facilities between subsidized and commercial housing in Serang highlights an imbalance between affordability and livability, where lower-cost housing lacks long-term capacity, while better-equipped environments remain financially inaccessible.

01

Subsidized housing

02

Gap

03

Commercial housing

2.3 Study of Design Approach

Rumah Inti Tumbuh (RIT) or Incremental House

In response to the affordability gap and urban housing challenges, incremental housing has emerged as a potential strategy for providing more flexible housing solutions.

Incremental housing, commonly known in Indonesia as *rumah tumbuh*, refers to a housing approach in which a house is built gradually according to the owner's financial capacity and changing household needs. **Instead of constructing a fully completed house from the beginning, the housing unit starts with a core structure that provides essential living functions such as sleeping, cooking, and sanitation.**

In Indonesia, the concept of incremental housing is formally recognized through the **Rumah Inti Tumbuh (RIT)** framework regulated by Keputusan Menteri Permukiman dan Prasarana Wilayah No. 403/KPTS/M/2002. According to this regulation, a core house typically has a **building area of approximately 21 m² on land plots of around 72–90 m²**, allowing the house to expand gradually while maintaining adequate lighting and ventilation standards.

To support efficient housing construction, the Indonesian government has also developed **RISHA (Rumah Instan Sederhana Sehat)**, a modular prefabricated housing system introduced by the Ministry of Public Works and Housing. RISHA uses precast concrete components assembled through a knock-down system, enabling faster construction while maintaining structural safety and earthquake resistance (Kementerian PUPR, 2021).

For MBR units, renovation flexibility is limited, especially when financed under subsidy schemes that restrict early structural modification. Meanwhile, commercial housing is delivered fully finished at higher prices, making entry financially burdensome.

The missing middle household lacks sufficient savings for both the high entry price and the large renovation cost. However, they also seek better environmental quality, ownership security, and growth flexibility.

Incremental housing provides a middle-ground solution:

- Lower initial cost
- Structured growth mechanism
- Protection against informal densification
- Financial adaptability

Kepmen 403/2002 – Rumah Inti Tumbuh

RIT is a housing model designed to meet only the minimum basic living requirements, with the following characteristics:

- RIT consists of simple spatial arrangements, including enclosed spaces, open spaces, and basic sanitation facilities (bathroom/toilet).
- The roof design is adaptable to future development, allowing open spaces to be covered and transformed into multifunctional areas.
- In addition to gable roofs, other roof forms such as hip roofs, conical roofs, or other locally appropriate types may be used.
- Natural ventilation and daylighting are integrated through openings to maximize air circulation and sunlight penetration into the building.

RIT serves as an initial housing unit that accommodates basic living needs and is designed to expand incrementally. The development stages typically progress from RIT-1 to RIT-2, then to RS Sehat-1, and eventually to RS Sehat-2. This growth depends on the occupants' needs, financial capacity, and lifestyle demands.

The spatial dimensions in RIT are based on modular standards and human activity requirements. The minimum room dimensions for RIT-1 include:

- Bedroom: minimum 3 m × 3 m
- Multipurpose room: minimum 3 m × 3 m
- Bathroom: minimum 1.2 m × 1.5 m

Building engineering and structure concept

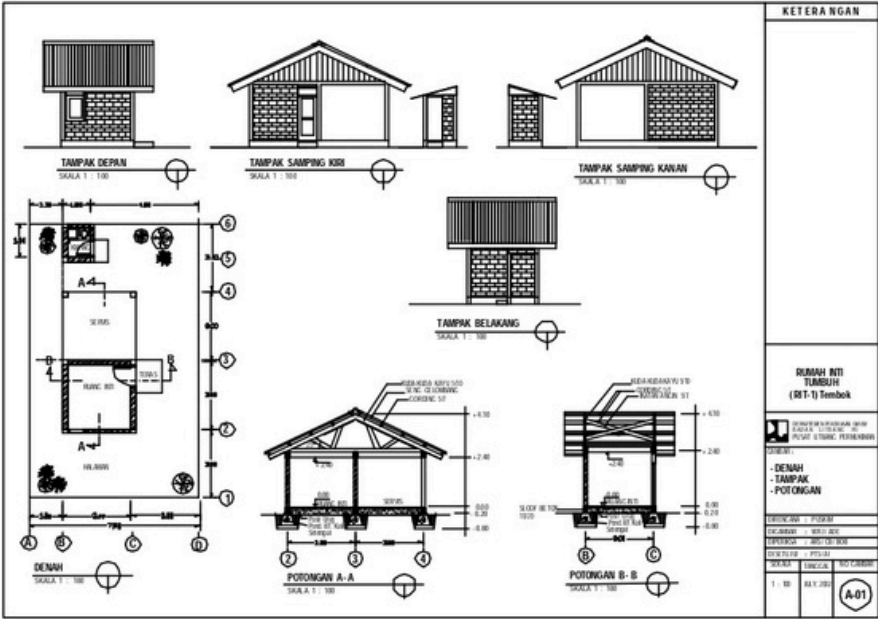


Figure 2.21
Rumah Inti Tumbuh
Source: Kepmen 403/2002, 2002

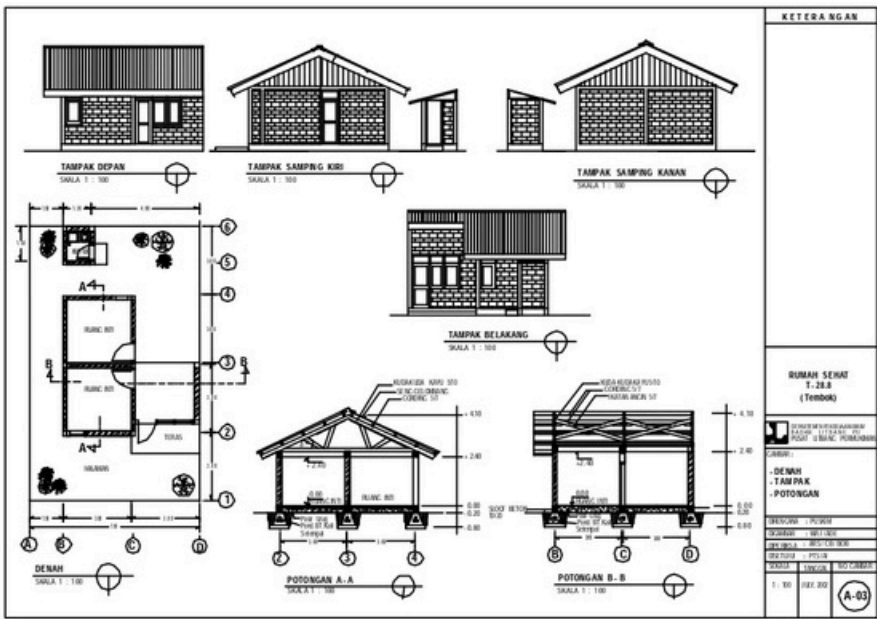
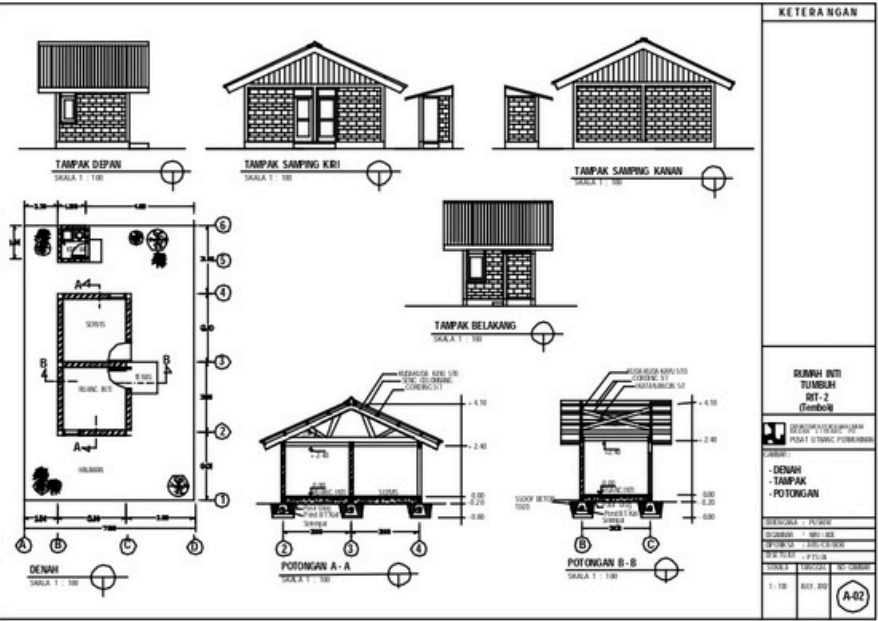
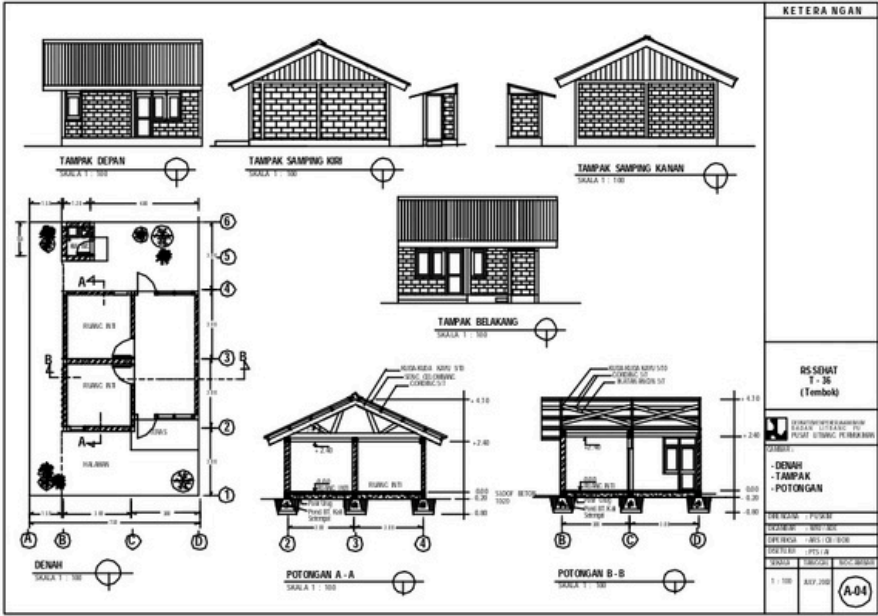


Figure 2.23
Rumah Inti Tumbuh
Source: Kepmen 403/2002, 2002



Pedoman teknis pembangunan rumah sederhana sehat

Figure 2.22
Rumah Inti Tumbuh
Source: Kepmen 403/2002, 2002



Pedoman teknis pembangunan rumah sederhana sehat

Figure 2.24
Rumah Inti Tumbuh
Source: Kepmen 403/2002, 2002

4. Spesifikasi teknis dan kebutuhan bahan

5.1. Pekerjaan Persiapan

- 1) Gambar-gambar :
a) Rencana

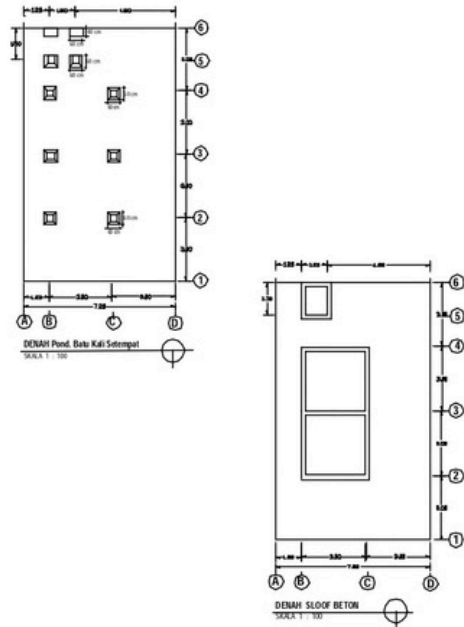


Figure 2.25
Rumah Inti Tumbuh Foundation
Source: Kepmen 403/2002, 2002

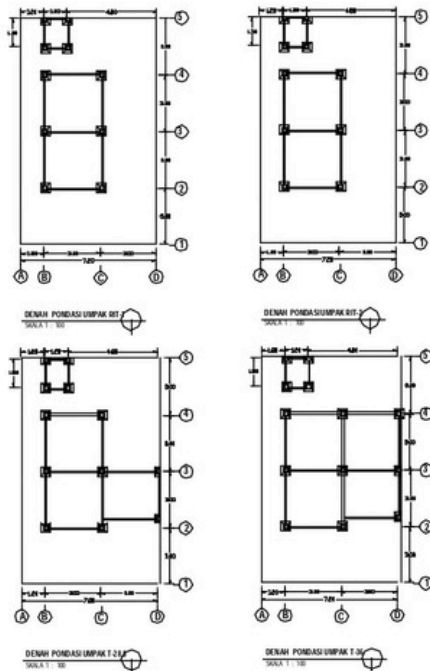
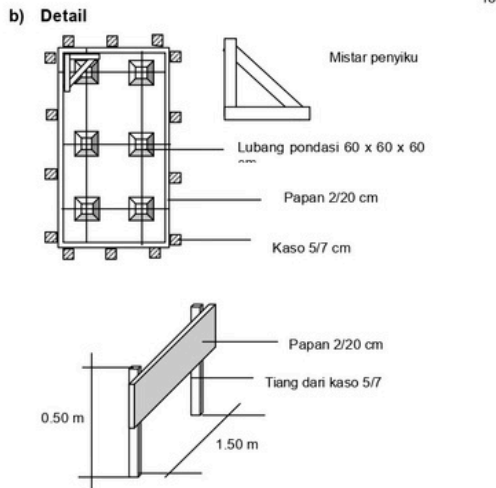


Figure 2.26
Rumah Inti Tumbuh Foundation
Source: Kepmen 403/2002, 2002



- 2) Kebutuhan bahan dan volume pekerjaan
a. volume pekerjaan:

No	Pekerjaan	Vol	Rumah tipe			
			RIT-1	RIT-2	RsS-1	RsS-2
1	Galian tanah	M3	3,5	3,5	4,55	4,9
2	boplang	M1	26	26	32	32

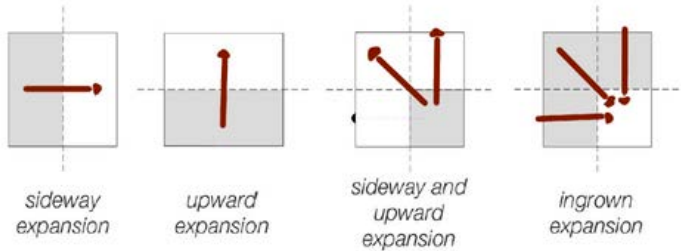
Figure 2.27
Rumah Inti Tumbuh Detail
Source: Kepmen 403/2002, 2002

Example of RISHA + RIT



Figure 2.28
Example of RISHA + RIT
Source: Sakapari, 2024

Figure 2.29
RIT expansion
Source: Sakapari, 2024



Phase	House Condition	Estimated Cost
Phase 1	Core unit (1 bedroom + bathroom)	± Rp 200–250 million
Phase 2	Additional bedroom	± Rp 50–70 million
Phase 3	Second floor expansion	± Rp 100–150 million

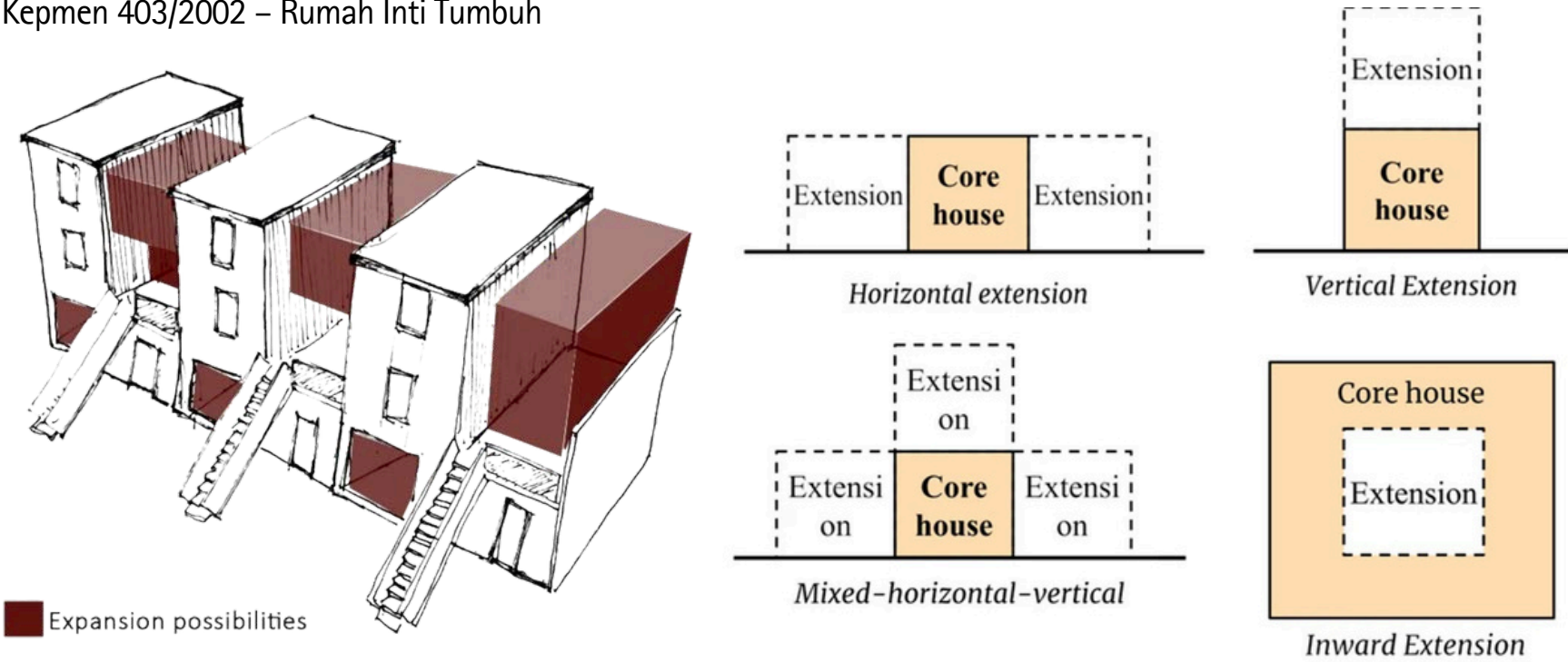
Table 2.2
Table of Incremental House Phases
Source: Author, 2026

This phased construction allows households to:

- buy a house earlier
- expand according to financial ability
- avoid large initial mortgages

This data came from

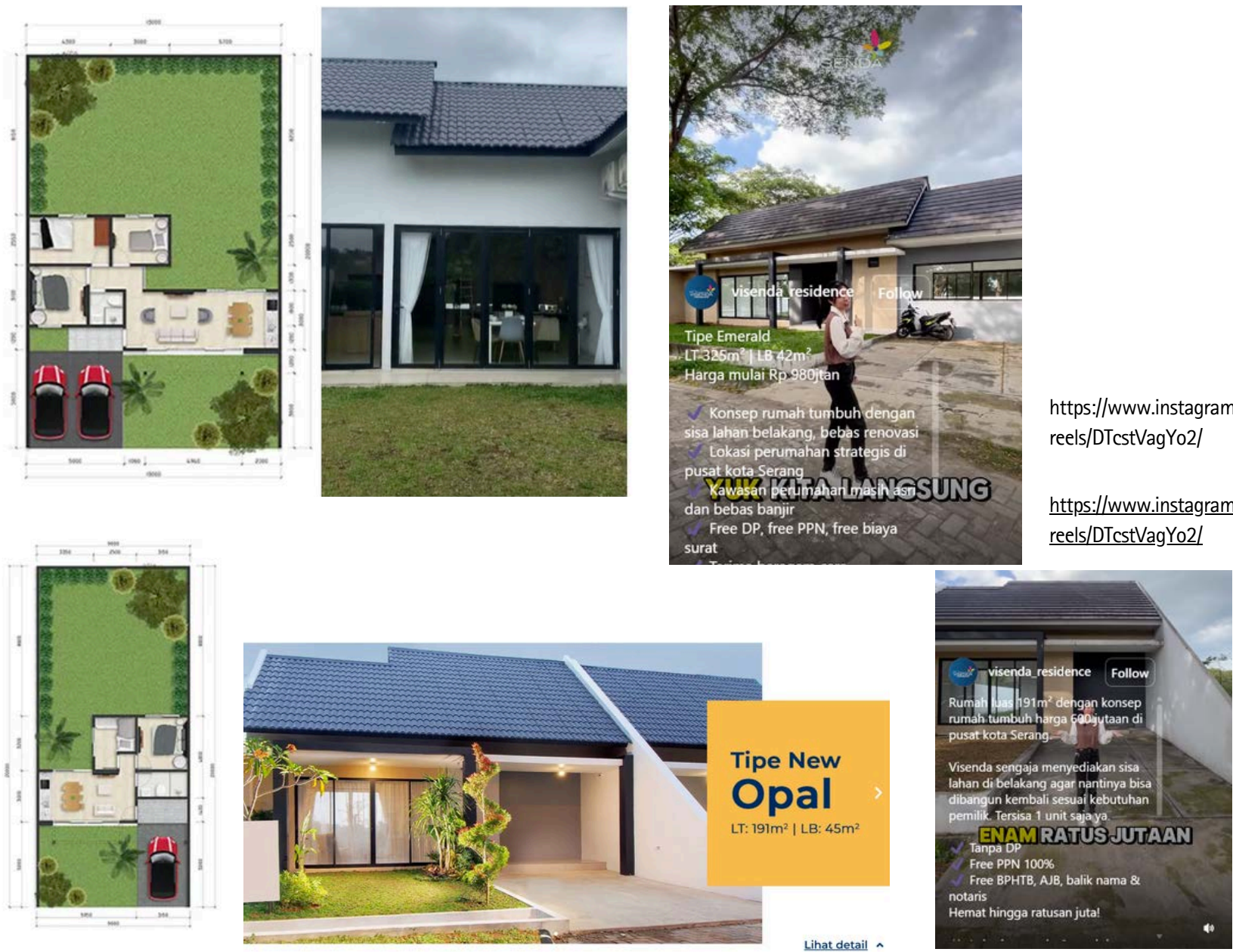
Aravena & Iacobelli (2012) – Incremental Housing
Kepmen 403/2002 – Rumah Inti Tumbuh



2.4 Study of Precedents

The Visenda Residence

The rumah tumbuh concept has also been adopted by several housing developments in Serang. One example is The Visenda Residence, located in Kelurahan Kaligandu, which markets its housing units to millennials and first-time homebuyers. This development provides a structurally stable core housing unit designed to support future expansion. Homeowners can gradually expand their houses horizontally into available yard spaces or vertically by adding additional floors, depending on their financial capacity and family needs.



Aspect	Proper Incremental Housing (Architectural Approach)	Commercial "Rumah Tumbuh" in the Observed Case
Concept Objective	Provides an affordable entry house that can expand gradually according to household growth and financial capacity.	Marketed as a flexible house with future expansion potential, but the initial price remains relatively high compared to the built area.
Initial Affordability	Entry price is intentionally kept low because the building is incomplete and will grow over time.	Buyers pay a significant price while still receiving a small initial building area (around 42–45 m²).
Structural Preparation	Foundation, structural grid, and roof system are designed to accommodate future expansion without major demolition.	Expansion potential is indicated mainly by leftover land rather than clearly planned structural preparation.
Spatial Planning	Future growth phases are pre-designed so additional rooms can be added without disrupting ventilation, lighting, or circulation.	The growth scenario is not clearly defined; expansion is left to the homeowner's own renovation decisions.
Infrastructure Readiness	Plumbing, drainage, and electrical systems anticipate future capacity increases.	Infrastructure preparation for future expansion is not explicitly communicated in the project marketing.

Environmental Performance	Incremental expansion is controlled to maintain natural ventilation, lighting, and environmental comfort.	Uncontrolled future renovation may reduce ventilation, block light, and increase heat gain within the housing cluster.
Estate Management	Housing management often regulates expansion guidelines to maintain neighborhood quality and infrastructure performance.	Marketing emphasizes "bebas renovasi", which may lead to inconsistent building forms and unmanaged construction activities.
Developer Responsibility	Developer provides phased design guidance and technical manuals for growth.	Responsibility for design, construction, and expansion planning shifts mostly to the homeowner.
Housing Value Proposition	Balanced between affordability, flexibility, and long-term housing improvement.	The product functions closer to a land-heavy starter house rather than a fully planned incremental housing system.

Table 2.3
Table of Incremental House Differences
Source: Author, 2026

The case indicates that the rumah tumbuh concept is increasingly used as a marketing strategy rather than as a fully developed incremental housing system. Although the housing is promoted as flexible and expandable, the relatively high initial price combined with a limited built area shifts much of the future construction cost and design responsibility to homeowners. Without clear structural preparation, phased development guidelines, and estate-level renovation management, the concept risks functioning merely as a land-heavy starter house rather than a cost-efficient housing solution. This condition highlights the need for a more integrated architectural and managerial framework to ensure that incremental housing truly supports affordability, spatial quality, and long-term neighborhood sustainability.

The Visenda Residence



Figure 2.30
Floorplan OF Visenda Residence
Source: Visenda Residence, 2026

With area of 191 sqm and the building area is 45sqm. Including 2 rooms, 1 bathroom and toilet, kitchen and 1 garage

If we added KDB to this plan of 60%, then the available area is 114 sqm for building, and the KLB is 2-3 floors with approximately 8-12 meters.

Figure 2.31
Floorplan of Visenda Residence
Source: Visenda Residence, 2026



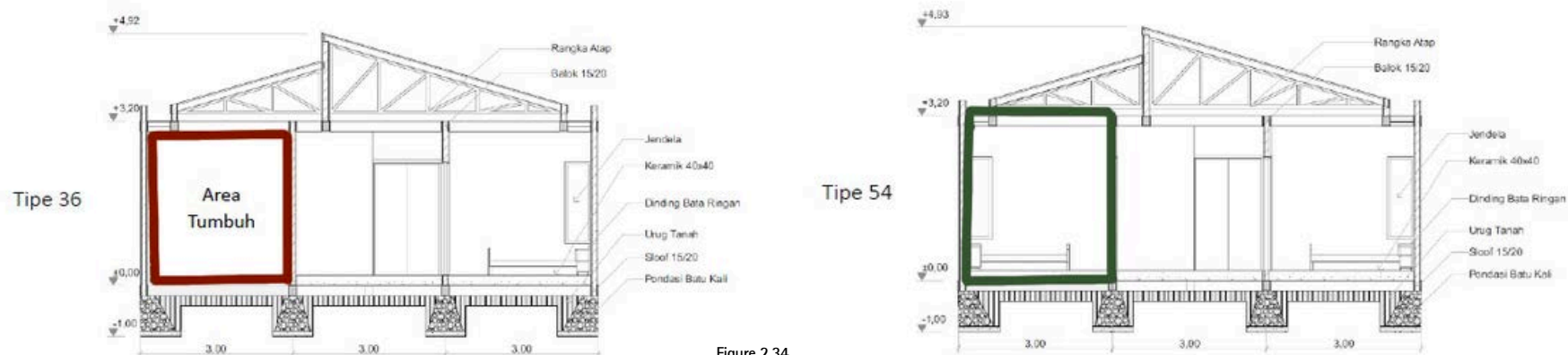
If we added KDB to this plan of 60% then tit can be expand to maximum 195 sqm and the KLB is 2 - 3 floors which can be expand verically with approximately 8-12 meters.

The total area is 325 sqm, and the building area is 45 sqm, including 3 rooms, 1 bathroom and toilet, a kitchen, and 2 garages. Based on KDB, it can still be expanded to 195sqm

Horizontal expansion from 36's type to 54's type.. Total area 108sqm, added KDB 60% which become 65sqm. The building is 54, so it still fulfill the KDB



Figure 2.33
Facade of p-ISSN 2964-8483
Source: Sakapari, 2023



Developer-Oriented “Rumah Inti Tumbuh” (Observed Case)

Phase 1 – Initial Purchase

- Small house ($\pm 42\text{--}45\text{ m}^2$)
- Large remaining backyard
- High entry price relative to built area

Phase 2 – Homeowner Renovation

- Owner independently plans expansion
- Requires new design and contractor
- Possible demolition of existing elements

Phase 3 – Uncontrolled Growth

- Irregular building forms
- Reduced ventilation and lighting
- Inconsistent neighborhood character

Developer responsibility ends after first construction.
Future development burden is transferred to the homeowner.

Proper Incremental Housing System

Phase 1 – Core House

- Complete basic living unit
- Structural system prepared for expansion
- Utilities planned for future capacity

Phase 2 – Planned Expansion

- Additional bedroom or service area added
- Structural grid already prepared
- Minimal demolition required

Phase 3 – Final House

- Full housing program achieved
- Environmental quality maintained
- Neighborhood remains spatially coherent

Growth is planned, guided, and technically prepared from the beginning.

Proposed Solution

The proposed solution is the development of a cost-efficient residential housing model for emerging middle-income households in Serang through an incremental housing approach. The project introduces a planned "rumah tumbuh" system that allows houses to expand gradually according to the financial capacity of residents while maintaining structural safety, spatial quality, and compliance with local housing regulations.

Instead of building a fully completed house with a high initial price, the design proposes a core housing unit (rumah inti) that already provides essential living functions such as sleeping, cooking, sanitation, and social space. The house is designed with a pre-planned structural framework and modular layout, enabling future expansions to be carried out safely and systematically without disrupting infrastructure or neighborhood order.

At the neighborhood scale, the proposal integrates housing units with proper infrastructure planning, including drainage, utilities, and open spaces, to ensure that incremental growth does not create environmental problems such as flooding or irregular settlement patterns. The design also applies design-to-cost principles, optimizing building materials, construction methods, and spatial efficiency to maintain affordability while improving architectural quality.

Through this approach, the project aims to create a flexible, affordable, and sustainable housing model that bridges the gap between subsidized housing and expensive commercial housing in Serang. The proposed model supports gradual homeownership for middle-income families while ensuring long-term livability, structural safety, and urban compliance.

03.*DESIGN SOLVING*

3.1 Schematic and Response

It is hypothesized that the application of an incremental housing approach through Rumah Inti Tumbuh (RIT), supported by a design-to-cost strategy and integrated infrastructure systems, will enable the provision of affordable, adaptable, and sustainable housing for middle-income communities in Serang who are excluded from both subsidized and commercial housing markets.

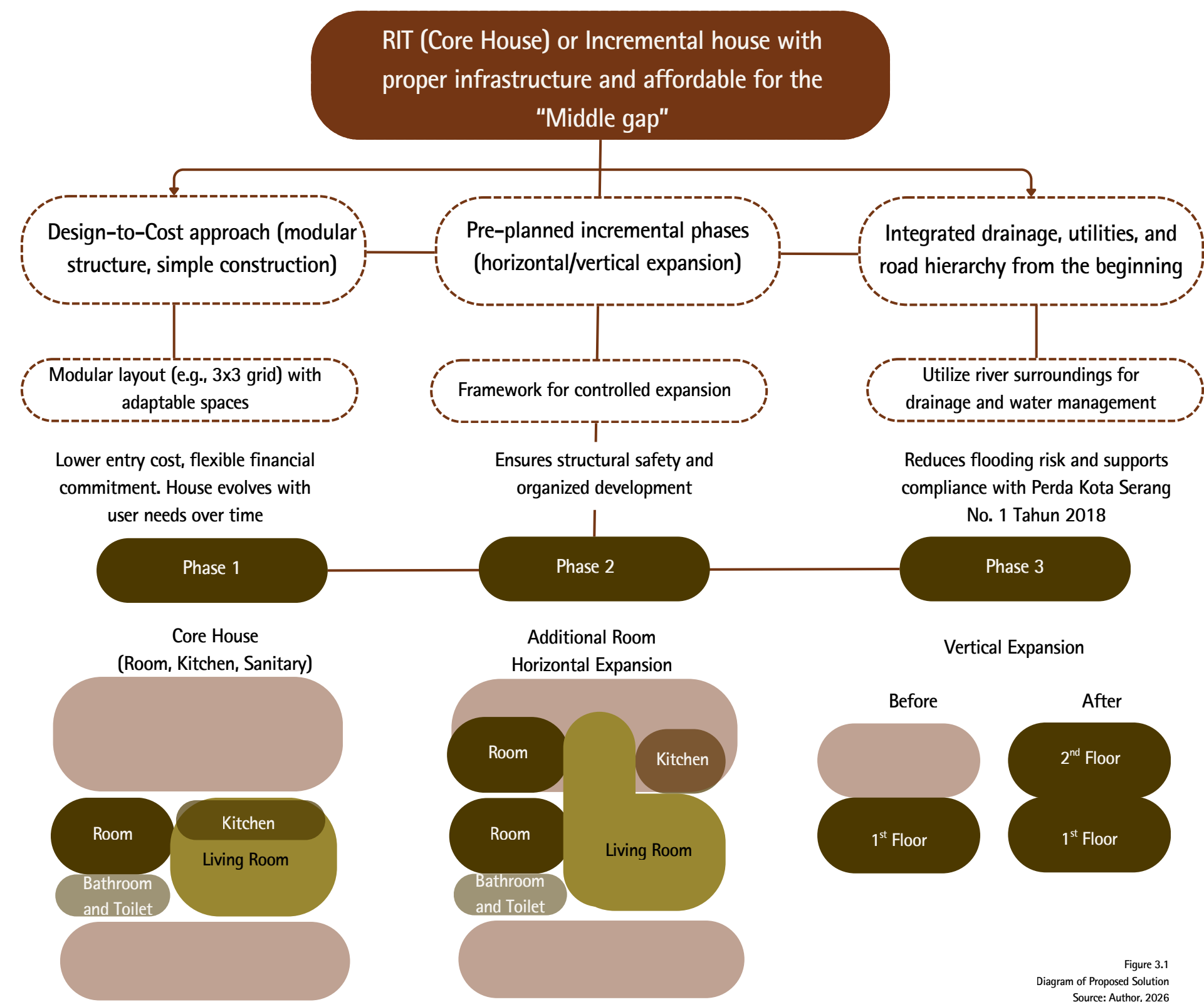


Figure 3.1
Diagram of Proposed Solution
Source: Author, 2026

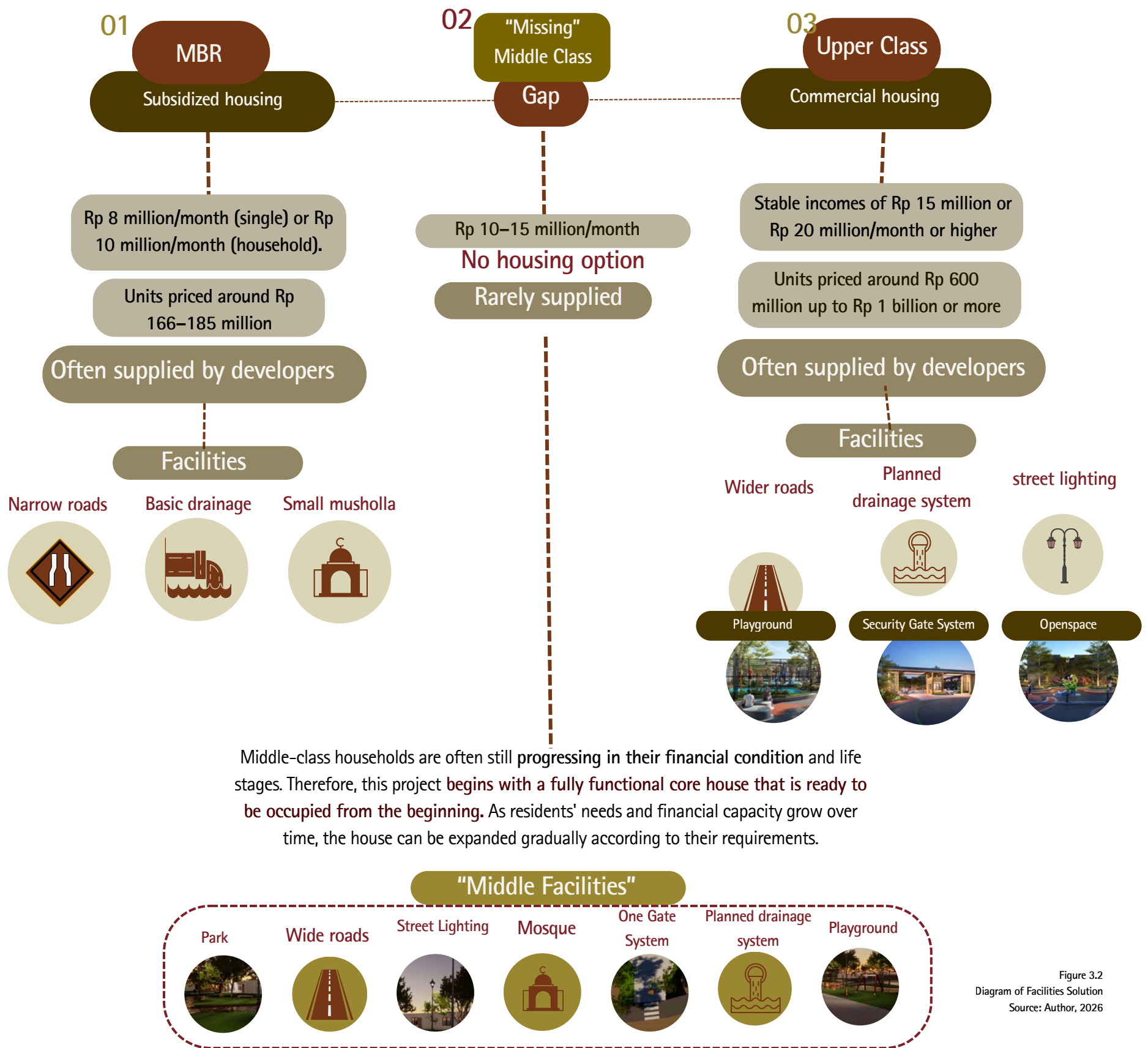


Figure 3.2
Diagram of Facilities Solution
Source: Author, 2026



Household Income	Maximum Monthly Mortgage (30%)	Estimated House Price (8 Years)
Rp5,000,000	Rp1,500,000	± Rp144–168 million
Rp10,000,000	Rp3,000,000	± Rp280–350 million
Rp15,000,000	Rp4,500,000	± Rp432–504million
Rp 20,000,000	Rp 6,000,000	± 576–672 Million

Figure 3.2
Diagram of Pricing Solution
Source: Author, 2026

3.2 Design Concept

Architectural Concept

Planned Incremental Housing for the Missing Middle

This project proposes an architectural approach called Planned Incremental Housing, which is a housing strategy where dwellings are designed to grow gradually over time in a controlled, structured, and sustainable manner. The concept responds directly to the condition of the missing middle in Serang—households who are financially above subsidized housing eligibility but still unable to afford conventional commercial housing. Instead of delivering a fully finished but expensive house, this approach provides a well-designed initial core unit that meets basic living standards, while allowing future expansion as the household's economic capacity increases.

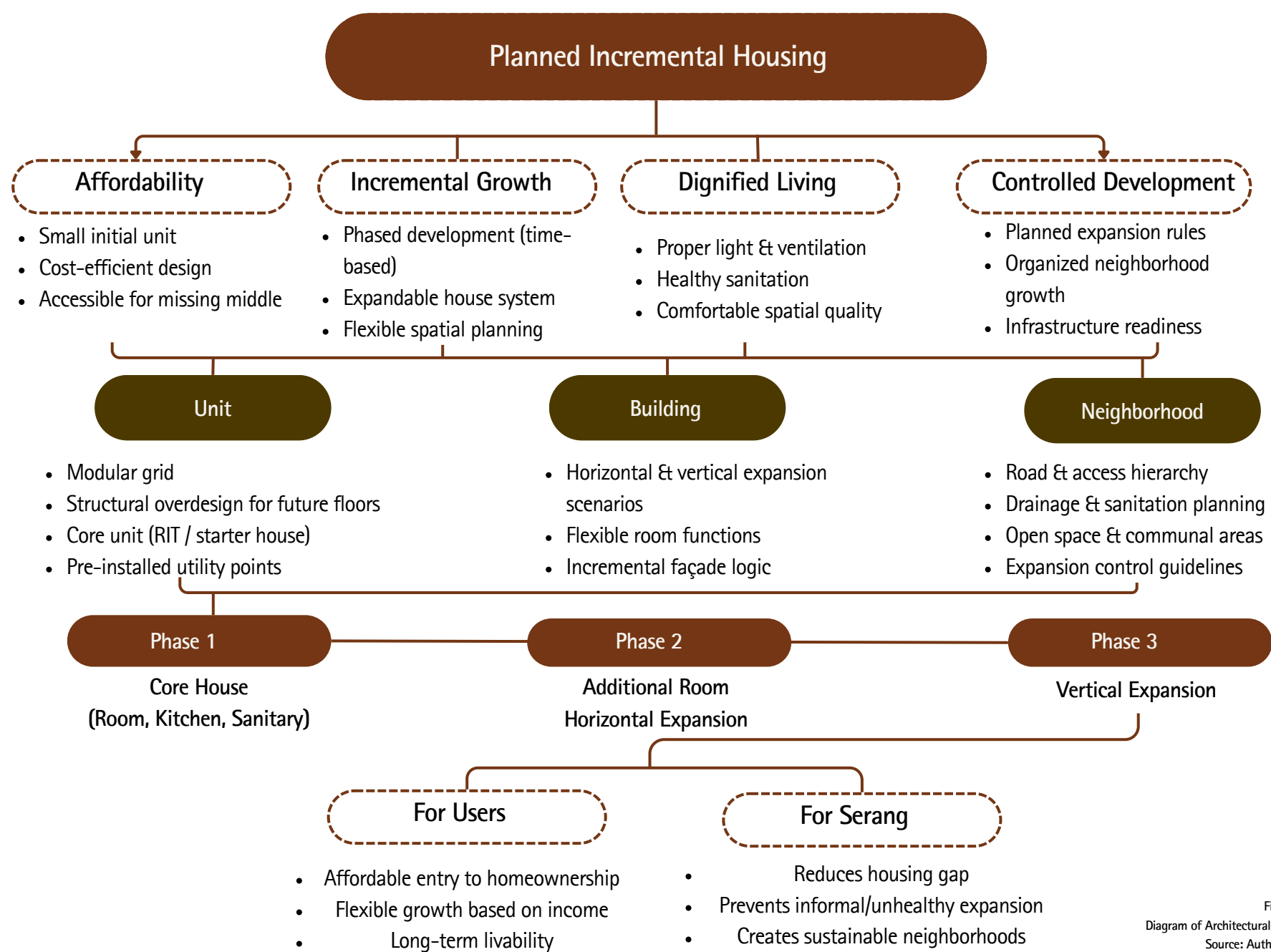


Figure 3.2
Diagram of Architectural Concept
Source: Author, 2026

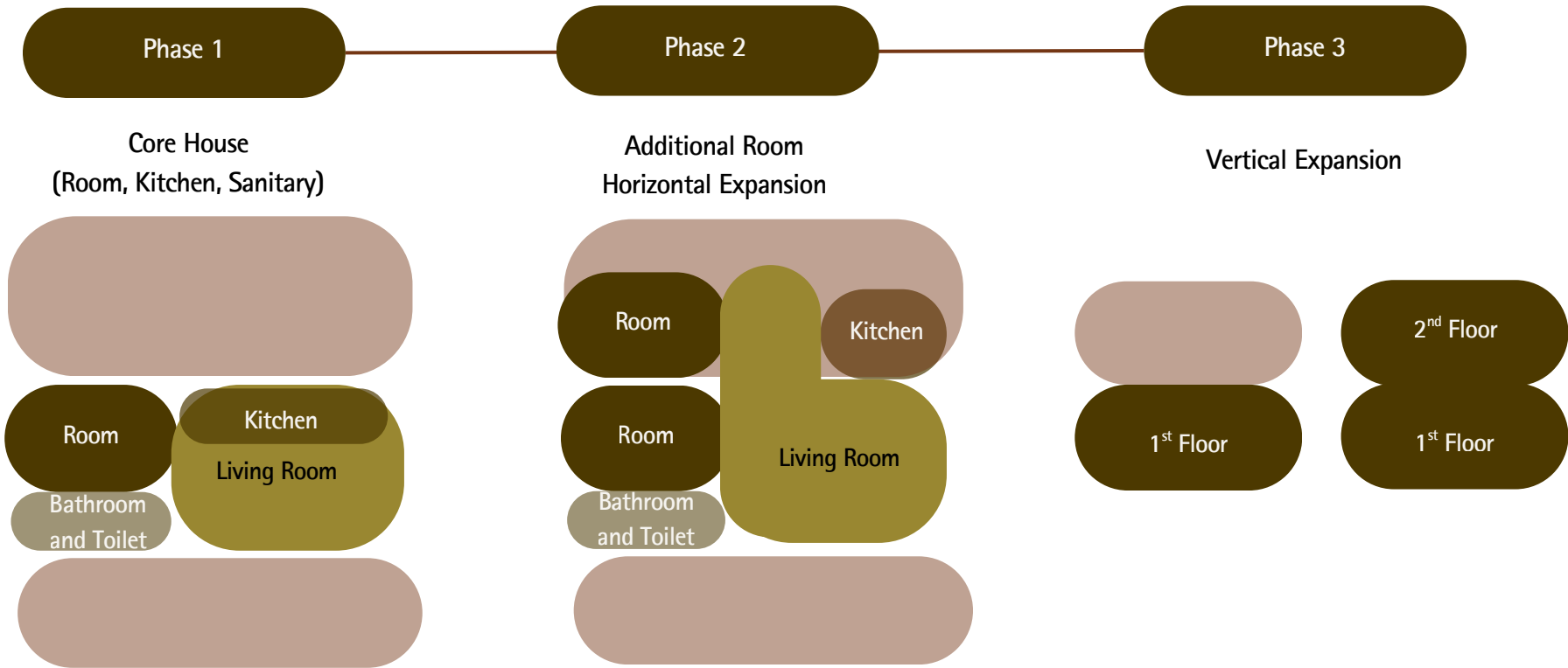
Site Development

The site is organized as a gradual sequence from public to private space. Entry begins at the gate, leading directly to a public space that functions as a welcoming communal area. Nearby, the mosque is placed for easy access, acting as a social and spiritual anchor. From this point, circulation follows the natural flow of the site and river, guiding movement into the residential clusters. Housing is arranged organically, with pocket parks and a central green area distributed throughout, ensuring each cluster remains connected to open space and nature.



Figure 3.3
Diagram of Site Development
Source: Author, 2026

Space Arrangement



Space Arrangement

Minimum room standards based on SNI 03-1733-2004, Kepmen Kimpraswil No.403/2002, and Indonesian architect references.

Room / Space	Required?	Min. Size	Type 45 Present?	Type 54 Present?	Type 63 Present?	Type 63 2F Present?
Master Bedroom	REQUIRED	3×3 m	YES	YES	YES	YES
Children's Bedroom	RECOMMENDED	2.75×3 m	YES	YES	YES	YES
Living / Family Room	REQUIRED	3×3 m	YES	YES	YES	YES
Dining Room	RECOMMENDED	3×3 m	YES	YES	YES	YES
Kitchen	REQUIRED	2.5×3.5 m	YES	YES	YES	YES
Bathroom / Toilet	REQUIRED	1.2×1.5 m	YES	YES	YES	YES
Garage / Carport	RECOMMENDED	3×5 m	YES	YES	YES	YES
Total Area ≥ 36m ²	REQUIRED	9m ² /person	YES	YES	YES	YES

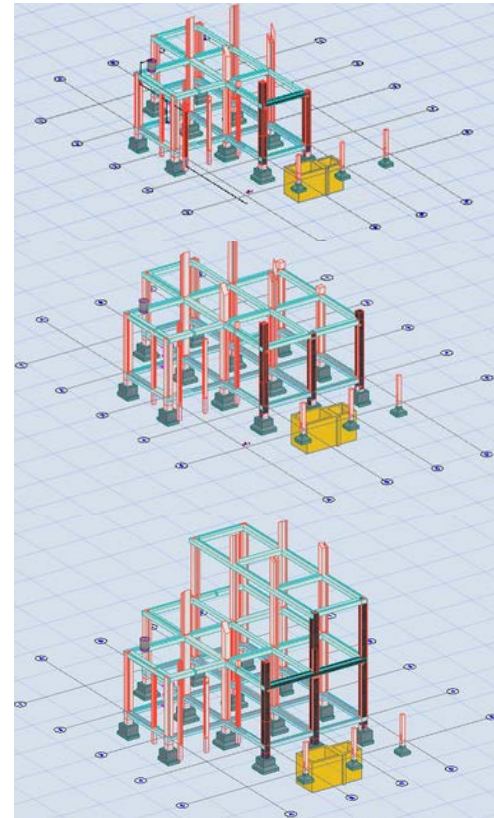
Table 3.1
Table of Room Standards
Source: Author, 2026

All required spaces according to SNI standards are provided from Phase 1 (core house), including bedrooms, sanitary facilities, and a kitchen. As the house expands, all additional spaces continue to comply with Indonesian standards in terms of availability and minimum room dimensions.

Structural Engineering

The structural system is designed not only for the present condition, but also for future expansion phases. The initial house (core unit) already includes a strong foundation and structural frame that can support additional floors or extensions.

1. Overdesigned foundation → prepared for 2–3 floors from the beginning
2. Modular structural grid ($\pm 3 \times 3$ m) → allows easy horizontal expansion
3. Column–beam system → flexible and adaptable for layout changes
4. Phased construction logic → structure remains stable in every stage



Building Infrastructure

The infrastructure is planned at the neighborhood scale from the beginning, even though houses grow over time. This prevents common problems like poor drainage, messy wiring, or sanitation issues.

1. Centralized drainage system integrated with the river flow
2. Water supply network distributed with future capacity in mind
3. Electrical infrastructure prepared for increased load
4. Road hierarchy (main access → local streets → housing access)

Waterways



Figure 3.4
Waterways of the Site
Source: Author, 2026

3.3 Advantages

Aspect	Design Strategy	Design Advantage	Impact / Value
Affordability	Small initial unit (RIT / core house) with phased expansion	Lower entry cost, flexible financial commitment	Enables middle-income group to access homeownership
Growth System	Pre-planned incremental phases (horizontal/vertical expansion)	Prevents random, unsafe renovations	Ensures structural safety and organized development
Flexibility	Modular layout (e.g., 3x3 grid) with adaptable spaces	House evolves with user needs over time	Supports lifecycle housing (single → family → multi-gen)
Infrastructure (PSU)	Integrated drainage, utilities, and road hierarchy from the beginning	Infrastructure-ready development	Reduces flooding risk and supports compliance with Perda Kota Serang No. 1 Tahun 2018
Cost Efficiency	Design-to-Cost approach (modular structure, simple construction)	Optimized construction cost and material use	Achieves affordable yet quality housing
Environmental Response	Utilize river surroundings for drainage and water management	Water-sensitive and sustainable design	Improves resilience and environmental performance
Social Relevance	Target Gen Z & Millennials (missing middle group)	Directly addresses housing gap issue	Reduces housing inequality and improves living stability
Governance	Framework for controlled expansion + neighborhood planning	Aligns unit growth with area planning	Prevents informal and chaotic settlement patterns

Table 3.2
Table of Advantages
Source: Author, 2026

The project integrates affordability, flexibility, and controlled growth into a single housing system, ensuring that incremental development remains safe, organized, and scalable while addressing the missing middle housing gap.

3.4 Figurative Concept

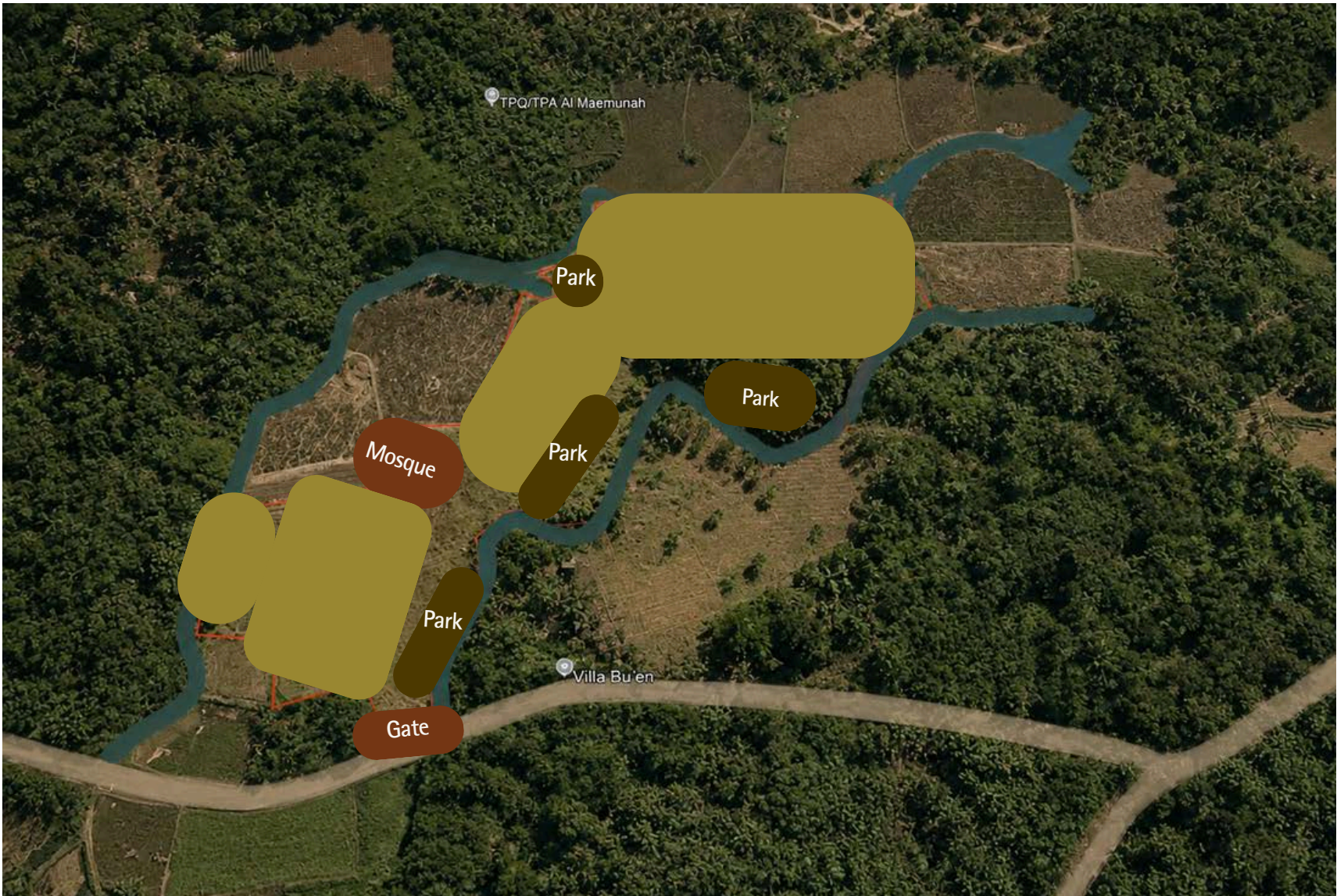


Figure 3.5
Site's Bubble Diagram
Source: Author, 2026

The site is organized as a gradual sequence from public to private space. Entry begins at the gate, leading directly to a public space that functions as a welcoming communal area. Nearby, the mosque is placed for easy access, acting as a social and spiritual anchor. From this point, circulation follows the natural flow of the site and river, guiding movement into the residential clusters. Housing is arranged organically, with pocket parks and a central green area distributed throughout, ensuring each cluster remains connected to open space and nature.

Precedents Masterplan - Residential

Drawn from: Pondok Banten Indah (Serang), New Bumi Mutiara Serang, CitraLand Serang, PIK2 riverfront, and The Visenda Residence.



Commercial/Ruko

Playground/Taman

Security/One Gate System

Roundabout

Bridge

Only one bridge to the back area (East)

River

RTH

cul-de-sacs

Figure 3.6
Precedents of Masterplan-Residential
Source: Author, 2026

One Gate System

Single controlled entry/exit for the whole estate. Pos keamanan 24 jam, RFID, or barrier. Greatly improves security and site identity. All Serang cluster precedents use this.

River not boundary

The sempadan sungai becomes a linear park / riverwalk. Adds value to riverside units.

Roundabout

Internal roads loop or terminate in roundabouts/cul-de-sacs so there are no through-routes. Reduces crime, slows traffic, creates address hierarchy.

Road Hierarchy

3-tier road system. Main collector 8–12m wide, local/cluster roads 6–8m

Commercial at entry

Ruko or commercial units placed near the main gate (highest visibility/traffic). Seen in most Serang developments.

Facility

musholla, taman bermain at the geometric centre of the site — equidistant from all clusters. Required by regulation (fasos/fasum).

3.5 Solving

Building Type

By implementing a modular incremental housing strategy, it is possible to provide cost-efficient housing for middle-income communities in Serang that bridges the affordability gap, while enabling controlled phased growth and maintaining sustainable and livable neighborhood conditions.

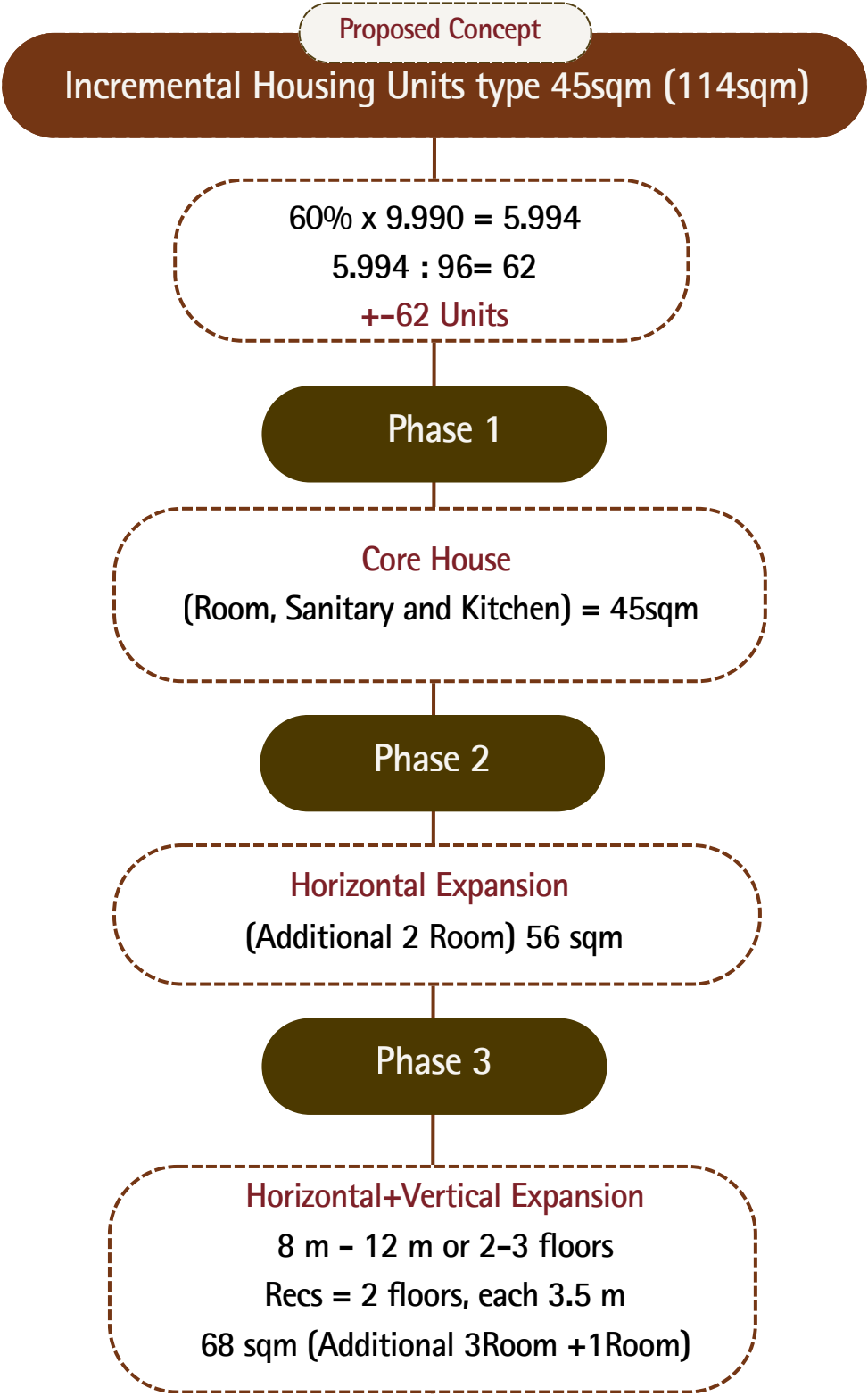
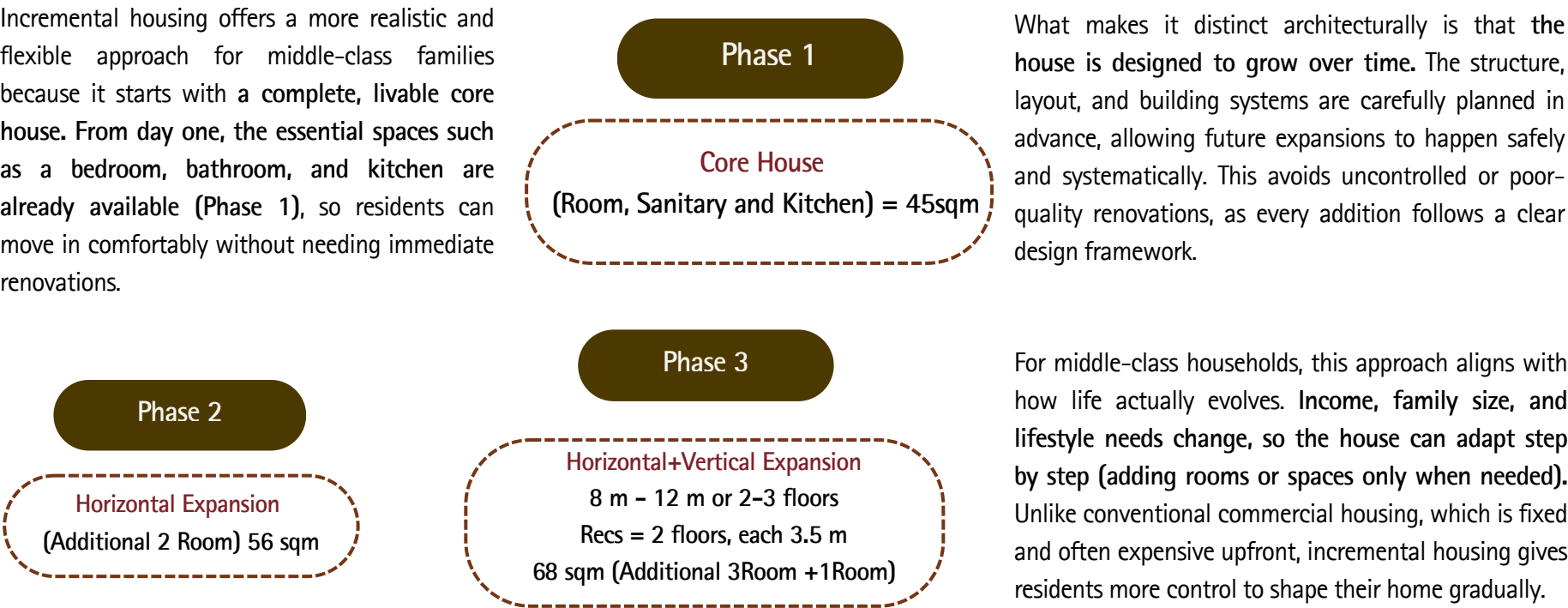


Figure 3.7
Diagram of Proposed Solution
Source: Author, 2026

Missing Middle Market Targets

Incremental housing offers a more realistic and flexible approach for middle-class families because it starts with a complete, livable core house. From day one, the essential spaces such as a bedroom, bathroom, and kitchen are already available (Phase 1), so residents can move in comfortably without needing immediate renovations.



What makes it distinct architecturally is that the house is designed to grow over time. The structure, layout, and building systems are carefully planned in advance, allowing future expansions to happen safely and systematically. This avoids uncontrolled or poor-quality renovations, as every addition follows a clear design framework.

For middle-class households, this approach aligns with how life actually evolves. Income, family size, and lifestyle needs change, so the house can adapt step by step (adding rooms or spaces only when needed). Unlike conventional commercial housing, which is fixed and often expensive upfront, incremental housing gives residents more control to shape their home gradually.

In this project, the architectural quality is positioned deliberately between subsidized housing and high-end commercial developments. The design aims to meet middle-class standards by providing better construction quality, well-planned infrastructure, and adequate facilities, while still remaining cost-efficient. This ensures the housing is not only affordable, but also dignified, durable, and capable of supporting long-term growth.

MBR Housing (Subsidized)	Your Project (Middle / Missing Middle)	Commercial Housing (Middle–High End)
Narrow roads (±3–4 m), limited access, often without hierarchy	Moderate width (±4–6 m), hierarchical but efficient layout, supports accessibility and future ..	Wide roads with clear hierarchy (main boulevard, local streets)
Basic, often open drainage, prone to poor maintenance	Planned open–closed hybrid system, integrated with site (e.g., river proximity, natural flow)	Fully engineered and underground integrated drainage system
Basic provision, sometimes irregular and unorganized	Pre-planned infrastructure core, scalable for future expansion (incremental-ready)	Fully installed, stable, and high-capacity utility networks
Very limited or none	Functional green spaces, small-scale but distributed (pocket parks, productive landscape)	Large, designed parks and landscaped green areas
Very basic (e.g., small musholla)	Essential + flexible communal spaces (musholla, shared space, adaptable for community use)	Complete facilities (playgrounds, sports areas, clubhouses)

Table 3.3
Table of Differences of Facilities, Infrastructure and Quality
Source: Author, 2026

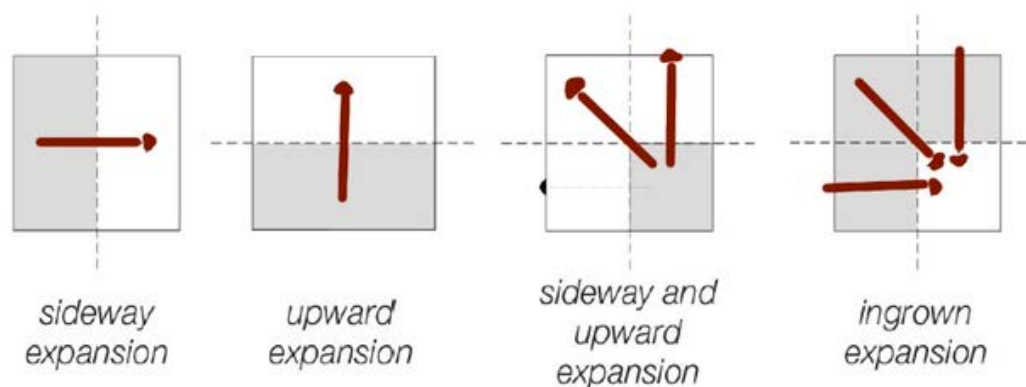
Conclusion

This project addresses the housing gap faced by the missing middle-income group in Serang, who are not eligible for subsidized housing yet struggle to afford conventional commercial housing. Instead of providing a fully finished but expensive product, the project proposes an incremental housing approach that allows residents to start with an affordable core unit and expand their homes over time according to their financial capacity.

At the architectural level, the project solves the issue of unplanned and unhealthy self-built extensions by introducing a pre-designed growth system, where structure, spatial layout, and utilities are prepared from the beginning. This ensures that future development remains safe, organized, and livable.

At the neighborhood scale, the project responds to common problems such as poor infrastructure, lack of open space, and environmental degradation by integrating planned circulation, drainage systems, green spaces, and communal facilities like public areas and a mosque. The presence of the river is also utilized as part of a natural infrastructure system, supporting water management and environmental quality.

Overall, the project offers a solution that is not only economically accessible, but also spatially adaptable and environmentally responsive, creating a housing environment that can grow sustainably with its residents while maintaining dignity and urban quality.





04. *ANALYSIS AND RESPONSES*

4.1 Design Responses

Site Responses

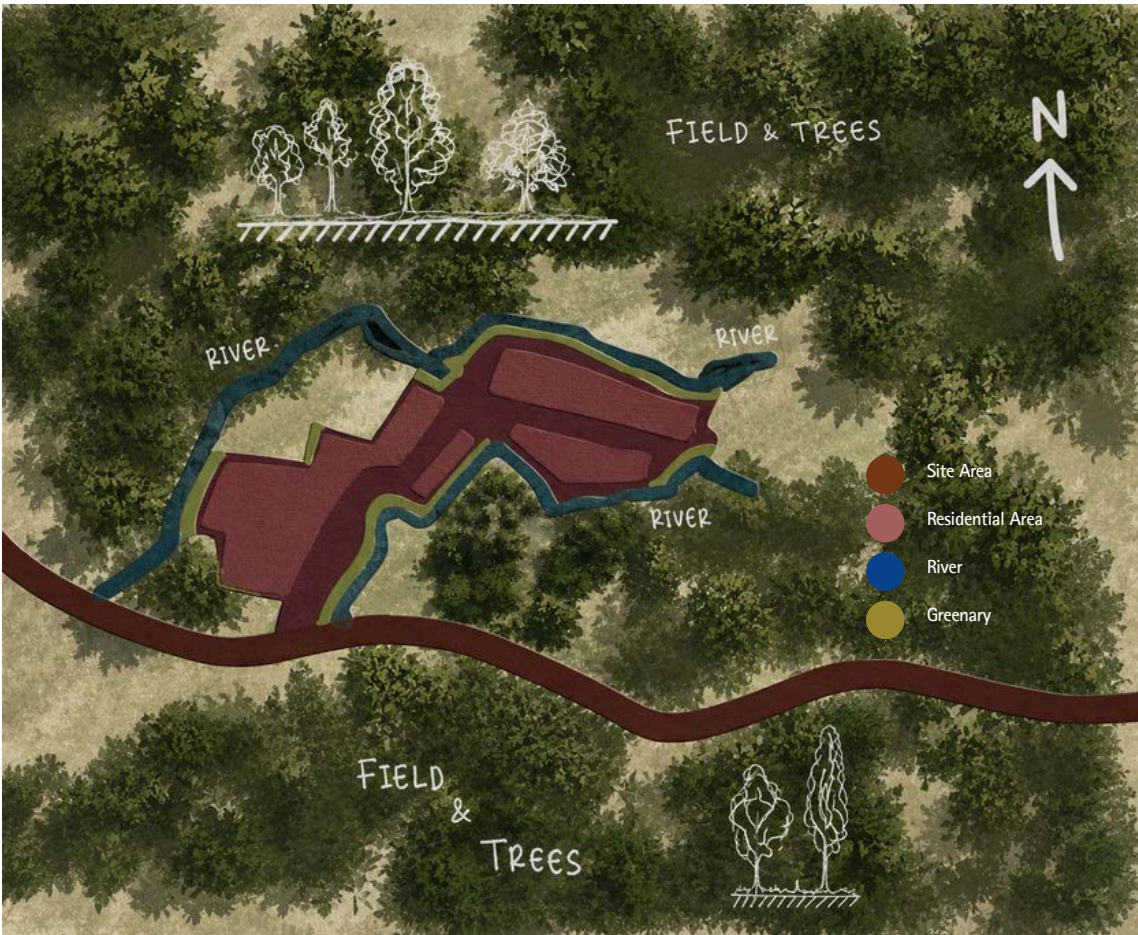


Figure 4.1
Site Area and Responses
Source: Author, 2026

Greenary

Greenery and vegetated buffer areas concentrated near the river edges. This strategy is intentionally designed to minimize development risks in areas closer to water while preserving environmental quality. Placing green spaces near the rivers allows easier landscape maintenance due to direct water accessibility and reduces the possibility of structural damage from flooding or soil instability. These green corridors also function as ecological buffers, passive cooling elements, public open spaces, and visual transitions between the residential clusters and the natural landscape.

Site Area

Represents the overall project site for the proposed incremental housing residential development in Serang. The site is strategically located within a developing suburban area that is still surrounded by natural elements such as rivers, fields, and existing vegetation. This condition supports the project's vision of creating a middle-income residential environment that is affordable, adaptable, and environmentally responsive. The organic shape of the site also reflects the existing natural contours and river boundaries surrounding the land.

Residential Area

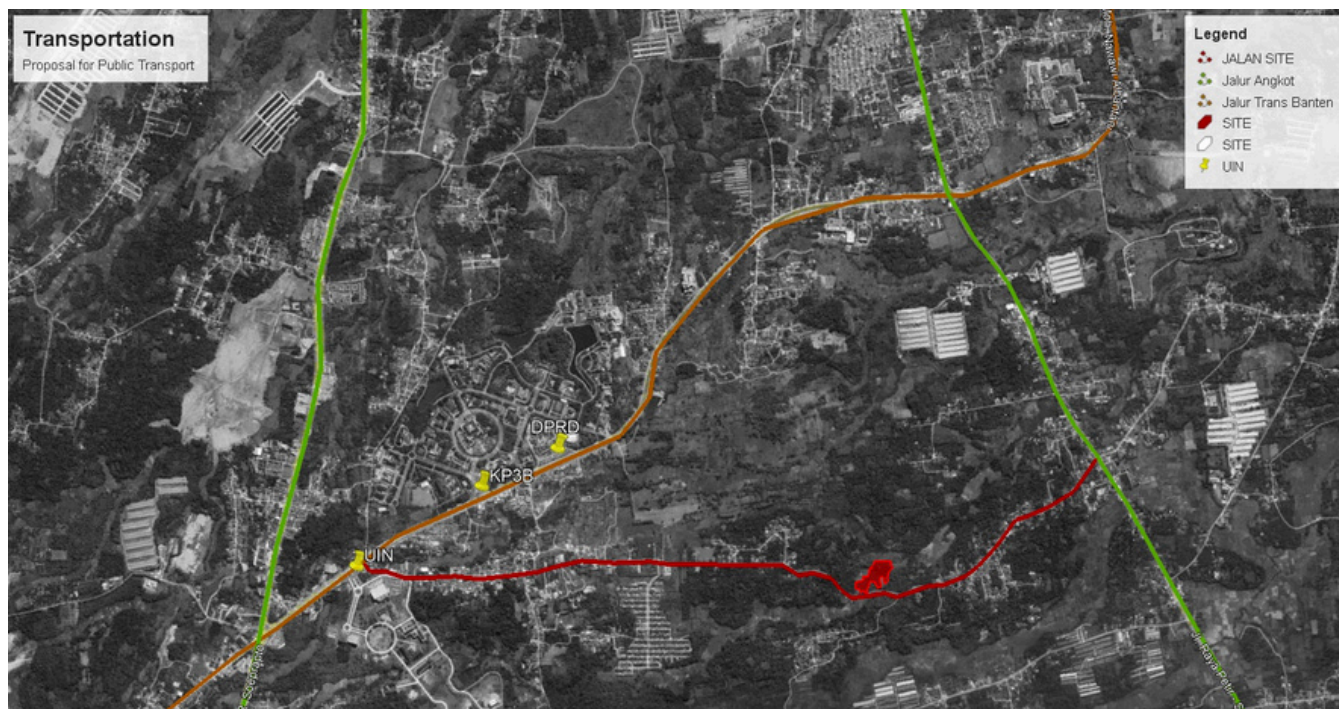
the main incremental housing residential zone. This becomes the core living area. Through the incremental housing approach, residents are able to begin with a livable core house and gradually expand their homes over time according to their economic growth and family needs. The housing clusters are positioned within the safer and more buildable parts of the site to ensure better accessibility, infrastructure efficiency, and long-term neighborhood growth.

River

rivers surrounding and penetrating parts of the site. Instead of treating the rivers as obstacles, the project integrates them as environmental assets. The rivers provide opportunities for natural drainage management, water runoff control, microclimate improvement, and ecological enhancement.

Public Transportation Response

Because the site is not directly served by any public transport—neither angkot nor Trans Banten—accessibility becomes a key issue. Currently, residents need to walk approximately 17 minutes (± 1.2 km) to reach Jl. Petir, which is the nearest angkot route. If they want to access the Trans Banten shuttle, the distance is even further, requiring around 42 minutes of walking (± 2.7 km).



- Angkutan Umum Route
- TransBanten Bus Route
- Street to Site (Jl. Andamui)
- Sukawana Asri
- Bus Stop
- Site

Figure 4.2
Accessibility and Public
Transport. Route
Source: Author, 2026

Public Transport Proposal 1

To respond to this, the proposal introduces a new shuttle stop in front of the site and suggests extending the angkot route into the local road where the site is located. The proposed angkot movement would connect from Jl. Petir, pass through the site area, continue to Jl. Syekh Nawawi Al-Bantani near UIN Sultan Maulana Hasanuddin Banten, and then reconnect to the main corridor at Jl. Raya Pandeglang.

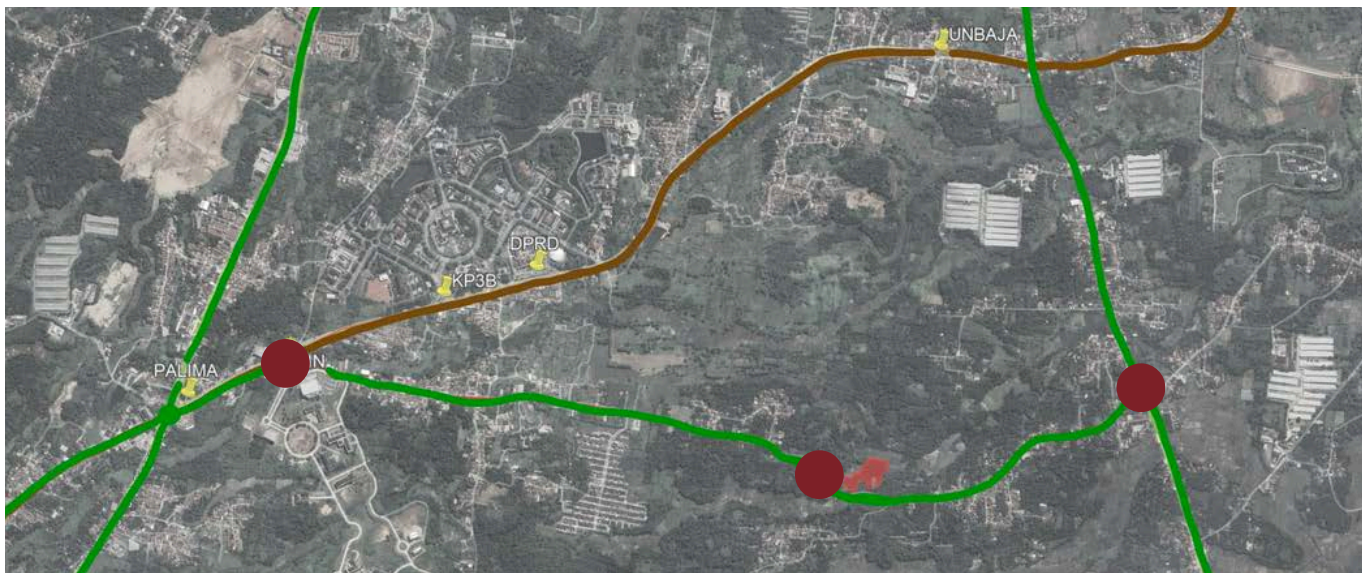


Figure 4.3
Proposed Accessibility and Public Transport Route
Source: Author, 2026

This strategy improves accessibility by reducing walking distance, strengthening the connection to existing transport networks, and integrating the site into the broader urban mobility system. It also supports a more inclusive and livable neighborhood by ensuring that residents without private vehicles can still move efficiently within the city.

Park and Ride

Park and Ride (P&R) is a transportation strategy consisting of a set of facilities distributed within a city's urban environment to serve as a modal interchange or connection point.(Cundoko & Herijanto, 2022). It allows commuters. Particularly those living in suburban areas with limited direct access to public transport. And they have to drive their private vehicles (cars or motorcycles) to a station, park them, and complete their journey using more sustainable public transit modes like rail or bus (Ortega et al., 2021)

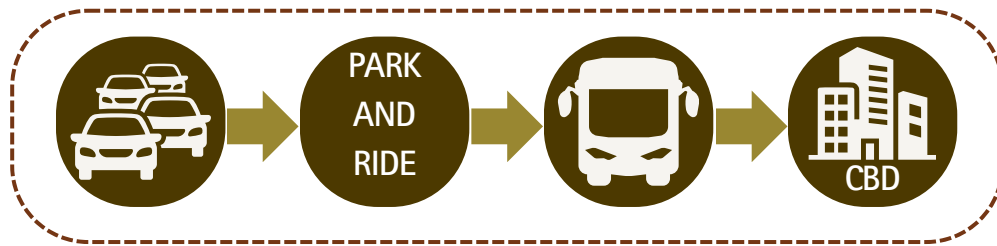


Figure 4.4
Concept of P&R
Source: Author, 2026

The P&R system is a form of transportation demand management (TDM) designed to shift travel demand away from private vehicles (Lubis et al., 2019). It successfully addresses traffic and commuting issues through several key mechanisms

- **Mode Shifting and Ridership:** It encourages motorists to switch to public transport, which increases transit ridership and reduces the total volume of private vehicles on congested urban roads. (Ortega et al., 2021)
- **Alleviating City-Center Congestion:** By providing parking on the urban periphery or near city borders, P&R intercepts drivers before they enter the Central Business District (CBD), reducing the environmental damage and gridlock associated with high car volumes. (Ortega et al., 2021)
- **Time and Cost Savings:** Commuters often experience faster travel times by avoiding city-center traffic delays and save significant money by avoiding expensive downtown parking fees.(Lubis et al., 2019)
- **Improving Commuter Well-being:** The system can reduce driver exhaustion, passenger stress, and the overall risk of accidents (Lubis et al., 2019)

In Indonesia, specifically in South Tangerang (Tangsel), Banten, P&R is being planned and implemented as a critical solution for the Jabodetabek megapolitan area .(Cundoko & Herijanto, 2022)

- **The Challenge in Banten:** South Tangerang has a population of approximately 1.8 million, with many residents commuting to Jakarta for work (Cundoko & Herijanto, 2022). Due to inadequate public transport infrastructure, many residents prefer private vehicles, leading to severe traffic congestion on roads heading out of the city.(Cundoko & Herijanto, 2022)
- **The Jurang Mangu Case Study:** A primary focus in Banten is the development of a P&R facility at Jurang Mangu Station in Ciputat. This station is strategically located near housing complexes and connected to the Commuter Line. (Cundoko & Herijanto, 2022)
- **Projected Success and Demand:** Surveys at Jurang Mangu indicate that 91% of passengers are willing to use a P&R facility if it is comfortable, safe, and affordable .(Cundoko & Herijanto, 2022). Planning for this site includes a 12-story building designed to accommodate a projected demand of 756 motorcycles and 276 cars by 2026. (Cundoko & Herijanto, 2022)
- **User Profile and Motivation:** The typical potential P&R user in Banten is a worker (88%) aged 20–40 (79%) who parks for more than 8 hours daily (Cundoko & Herijanto, 2022). Their primary motivations for switching to P&R are saving on travel costs and travel time. (Cundoko & Herijanto, 2022)
- **Requirements for Effectiveness:** For P&R to be truly successful in the Indonesian context, studies emphasize that transit waiting times must be short and predictable.(Lubis et al., 2019) Additionally, there is a need for better information systems (signage and advertisements), improved intermodal transfer facilities, and enhanced security at parking sites to build user trust(Lubis et al., 2019)

Public Transport Proposal Final

The site is currently not directly served by any public transportation route, as neither angkot nor the Trans Banten corridor passes through the site access road. Due to the limited accessibility, the most feasible transportation strategy is a ride-and-park system, where residents use private vehicles, motorcycles, or local feeder transport to reach the nearest public transportation node.



Figure 4.5
Accessibility and Public
Transport. Route
Source: Author, 2026

Figure 4.6
Accessibility and Public
Transport. Proposal
Source: Author, 2026

The nearest and most accessible public transportation point is the Trans Banten shuttle stop located near UIN Sultan Maulana Hasanuddin Banten. However, access to this shuttle remains relatively challenging, as the distance from the site to the nearest Trans Banten stop is approximately 2.7 km, requiring around 42 minutes of walking time. This condition indicates that the existing public transportation network has not yet fully integrated with the site area.

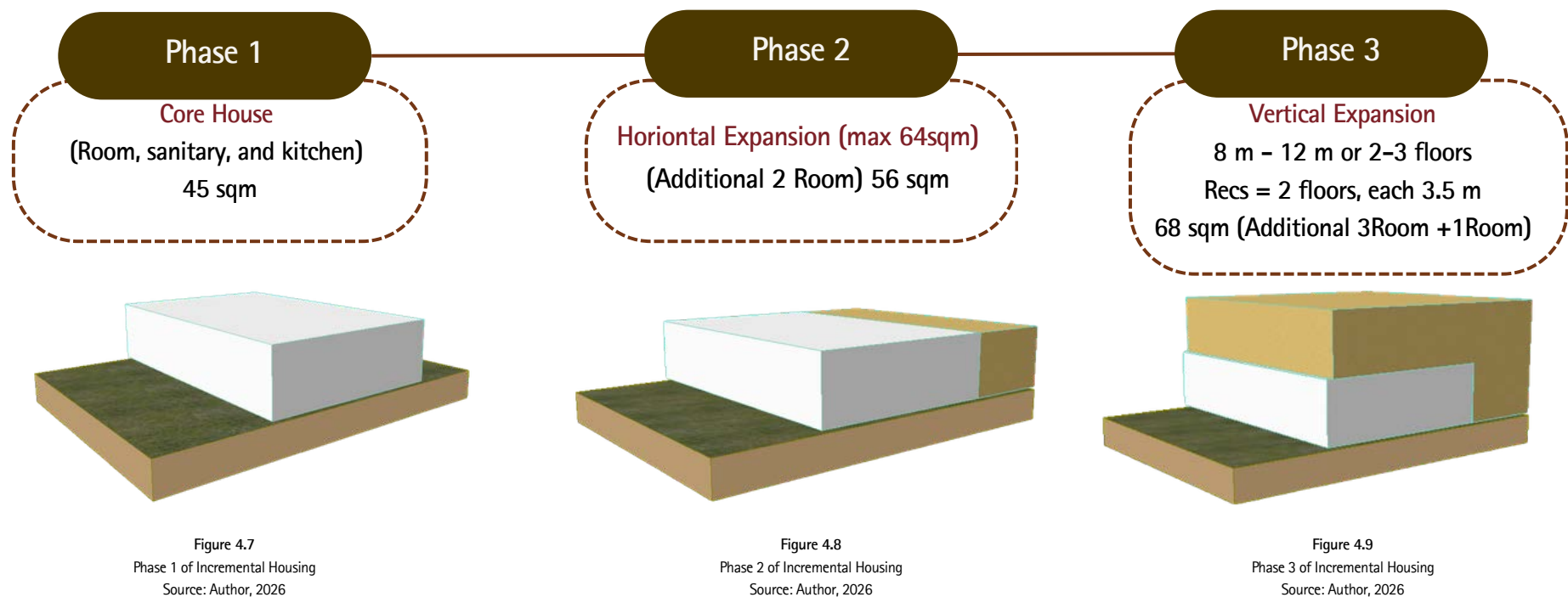


Therefore, the proposal emphasizes improving connectivity between the housing area and the nearest public transportation hub through a feeder-based mobility approach. This strategy aims to increase accessibility, reduce dependency on private cars for long-distance commuting, and support future transportation integration as the surrounding area continues to develop.



Incremental House Approach Response

By implementing the incremental housing approach, the residential units are designed to undergo future expansion through three phases of growth. A clear development framework is also provided to guide the expansion process, ensuring that each stage of growth remains organized, structurally safe, and adaptable to the residents' changing needs over time.



In Phase 1, the project provides a core house containing essential living spaces such as a bedroom, kitchen, and sanitary facilities. The unit is designed to be fully livable from the beginning, allowing residents to immediately occupy and use the house comfortably.

The design also reserves additional land for future development, enabling the house to expand gradually toward the front or back area according to the residents' needs and economic growth.

In Phase 2, the house undergoes horizontal expansion to accommodate the growing needs of the residents. The development is limited to a maximum Type 64 house with a total floor area of 64 sqm

In accordance with the 60% KDB (Building Coverage Ratio) regulation, at least 40% of the land must remain open for green space and outdoor areas. Therefore, the expansion is carefully planned so the house can grow into Type 56 while still maintaining environmental quality and spatial balance. This phase usually includes the addition of new rooms or expanded living spaces according to the household's needs.

In Phase 3, the house undergoes vertical expansion into a two-story building, with a maximum development of up to three floors. Based on local regulations, the allowable building height ranges from 8–12 meters.

This phase allows the addition of new bedrooms and sanitary facilities to accommodate larger household needs. The placement of the additional toilets follows the exact position of the lower-floor plumbing system to improve infrastructure efficiency and simplify maintenance.

Comparison Between Subsidized, Proposed Project and Commercial House

The proposed residential development positions itself between subsidized and commercial housing typologies by providing moderate pricing, improved spatial quality, and planned incremental growth. Unlike conventional commercial housing that often neglects future expansion, this project integrates structural and spatial preparedness for long-term adaptability, making it more responsive to the evolving needs of emerging middle-income households in Serang

Aspect	Subsidized Housing (Sukawana Asri Serang)	Proposed Project	Commercial Housing (Citriland Puri Serang)
Target Group	Low-income households (MBR)	<i>Emerging middle-income / missing middle</i>	Middle-upper income households
Building Size	±35 m ²	<i>±45 m² (incremental growth)</i>	±45–68+ m ²
Land Size	±60–72 m ²	<i>±90 m²</i>	±90–108+ m ²
Housing System	Fixed and minimal	<i>Incremental and adaptable</i>	Fully finished housing
Spatial Flexibility	Limited	<i>High</i>	Moderate
Infrastructure Quality	Basic	<i>Moderate and organized</i>	High-quality infrastructure
Facilities	Limited communal facilities	<i>Moderate communal facilities</i>	Premium facilities
Price Range	±Rp166–185 million	<i>±Rp300–450 million (estimated)</i>	±Rp600 million–1 billion+
Expansion Strategy	Usually unplanned	<i>Planned horizontal and vertical growth</i>	Expansion not integrated in initial design
Construction Approach	Cost minimization	<i>Design-to-cost and phased growth</i>	Market-driven development

Table 4.1
Table of Comparison Between Subsidized, Incremental, and Commercial housing
Source: Author, 2026

The subsidized housing precedent emphasizes affordability through minimum spatial provision and basic infrastructure. However, the housing units are generally rigid and have limited adaptability toward future household growth. Spatial expansion often occurs through self-built renovations without integrated structural preparation.

In contrast, commercial housing developments provide better infrastructure quality, larger unit sizes, and more complete facilities. Nevertheless, the housing typology is generally delivered as a finished product with limited consideration for future expansion. Renovation and spatial modifications are commonly conducted independently by residents after occupancy, which may reduce spatial efficiency and architectural consistency.

The proposed project adopts a middle position between both typologies. The project maintains affordability through a design-to-cost strategy while improving residential quality through better infrastructure, communal facilities, and adaptable housing systems. The incremental housing approach allows the housing units to remain fully livable from the initial phase while providing opportunities for future development according to household needs and economic growth.

Main Strengths

The primary strength of the proposal lies in its **planned growth strategy**. Future expansion is integrated into the initial architectural and structural planning through modular organization, structural preparedness, utility alignment, and phased development scenarios. This approach enables horizontal and vertical expansion to occur in a more controlled, safe, and organized manner.

Compared to conventional commercial housing, the project offers higher long-term adaptability because future spatial transformation has been anticipated from the beginning of the design process. Compared to subsidized housing, the proposal provides improved housing quality and infrastructure while remaining more financially accessible than standard commercial developments.

Therefore, the project functions as an intermediate housing model that bridges the affordability and quality gap between subsidized and commercial housing in Serang, while simultaneously supporting long-term residential growth and sustainability.

Roof Concept

The vertical expansion of a house with a flat roof is achieved through a process called "vertical extension" (VE), which involves constructing one or more additional storeys atop an existing base building (Julistiono et al., 2023). This approach is increasingly used as a "re-densification solution" in urban environments to accommodate growing populations while minimizing the carbon emissions associated with new construction. (Julistiono et al., 2023)

How Houses with Flat Roofs Expand Vertically

- Structural Support Strategies: There are three primary ways to support a vertical addition:
 - Fully Supported: The VE is supported entirely by the existing structure of the base building(Julistiono et al., 2023).
 - Supported with Reinforcement: The existing structure is reinforced, for example by strengthening or enlarging columns or adding lateral strengthening. This is the most common approach, used in 40% of reviewed projects.(Julistiono et al., 2023)
 - Separate Structure: The VE is supported by an entirely separate structure built around or through the original building(Julistiono et al., 2023)
- Material Choice: Lightweight materials are preferred for VEs to minimize the additional load on the existing structure (Julistiono et al., 2023). Steel is the most common structural material (used in 57% of projects), followed by timber (19%) (Julistiono et al., 2023). Timber is particularly beneficial because its lighter weight can reduce the need for extensive structural reinforcement(Julistiono et al., 2023).
- Architectural Forms: VEs can take various forms, such as extruded (matching the existing building's shape), setback (recessed from the front or sides), or appearing as a roof form or cluster of rooftop cottages.(Julistiono et al., 2023)

Safety and Comfort for Houses in Indonesia

It is possible to make a vertically expanded house in Indonesia both safe and comfortable by addressing structural capacity and tropical heat transfer.

- **Comfort and Energy Efficiency:** To ensure a comfortable indoor environment without excessive reliance on air conditioning, the building envelope must prevent rapid heat transfer. (Machfudiyanto et al., 2023)
 - **Insulation:** Adding layers like polyurethane (PU) foam, polyisocyanurate (PI) foam, or fiberglass batts to the roof can significantly reduce heat convection into the building (Machfudiyanto et al., 2023).
 - **Roof Coverings:** Using reflective materials like glossy ceramics or EPDM membranes can block solar radiation. (Machfudiyanto et al., 2023)
 - **Green Roofs:** Implementing a green roof with grass vegetation is highlighted as the most promising option for Indonesia, achieving a 23.5% reduction in energy consumption in office building models (Machfudiyanto et al., 2023). The vegetation and substrate act as heat absorbers and provide a cooling effect.
- **Safety and Structural Integrity:** Safety is achieved by ensuring the base building has the excess structural capacity to handle new loads (Julistiono et al., 2023)..
 - Industrial buildings often provide the best opportunities for vertical expansion because they were originally designed for higher loads (e.g., warehouses or factories) compared to residential buildings (Julistiono et al., 2023)..
 - If a building is unplanned for expansion (which is true for 97% of projects), a thorough structural assessment is necessary to determine if reinforcement is required (Julistiono et al., 2023).

Safe Construction for Vertical Expansion

Safe construction practices for vertical extensions include:

- **Load Assessment:** Calculating whether the existing columns and foundations can support the added weight (Julistiono et al., 2023)..
- **Use of Prefabrication:** Offsite construction and modular building systems are considered the most suitable methods for VEs because they are often lighter and can be installed quickly (Julistiono et al., 2023)..
- **Lateral Strengthening:** Even if a building can handle vertical loads, it may require additional lateral strengthening to ensure stability during environmental events like wind or earthquakes (Julistiono et al., 2023).
- **Partial Demolition:** In some cases, a safe expansion involves removing existing heavy roof or floor layers and replacing them with multiple floors of lightweight construction (Julistiono et al., 2023).

Flat roofs have increasingly been adopted in contemporary Indonesian architecture, particularly in urban tropical residential developments and modern minimalist housing. Despite being commonly referred to as “flat roofs,” these roof systems are technically designed with a slight slope, generally around 2–5%, to ensure proper rainwater drainage in response to Indonesia’s tropical climate and high annual rainfall intensity.

In the Indonesian context, flat roof systems are commonly constructed using reinforced concrete slabs (*dak beton*), often combined with waterproofing membranes, screed layers, thermal insulation, and concealed drainage systems. This typology is widely applied in tropical-modern architecture because it allows a cleaner geometric expression, efficient structural planning, and flexibility for future vertical expansion.

From a technical perspective, flat roofs in Indonesia require careful detailing to address challenges associated with tropical weather conditions. The primary concern is water infiltration caused by heavy rainfall and water ponding. Therefore, the roof assembly typically consists of several integrated layers, including:

1. Roof finish or rooftop tiles
2. Waterproofing membrane
3. Screed layer with slope (2–5%)
4. Reinforced concrete slab
5. Ceiling cavity and ceiling finish

The slope is essential to direct water toward internal drains or gutters connected to vertical rainwater pipes. Additionally, parapet flashing and overflow drainage systems are necessary to prevent leakage and water accumulation during extreme rainfall events.



Figure 4.10
Roof Section
Source: Author, 2026

In tropical architecture, flat roofs also contribute to spatial and functional flexibility. The roof area can be utilized as a rooftop terrace, utility space, solar panel platform, rainwater harvesting area, or future vertical expansion zone. This characteristic makes flat roofs particularly relevant for incremental housing approaches, where buildings are designed to accommodate phased growth over time.

Advantages Using Flat Roof

For residential developments targeting middle-income households, flat roofs can provide several architectural and structural advantages

- Easier future vertical expansion
- More efficient structural modularity
- Contemporary architectural appearance
- Flexible rooftop utilization
- Simpler integration of utilities and water tanks

However, the implementation of flat roofs in Indonesia also requires additional considerations,

- High-quality waterproofing systems
- Routine maintenance and inspection
- Thermal insulation to reduce heat gain
- Proper drainage capacity
- Detailed construction supervision

Disadvantages Using Flat Roof

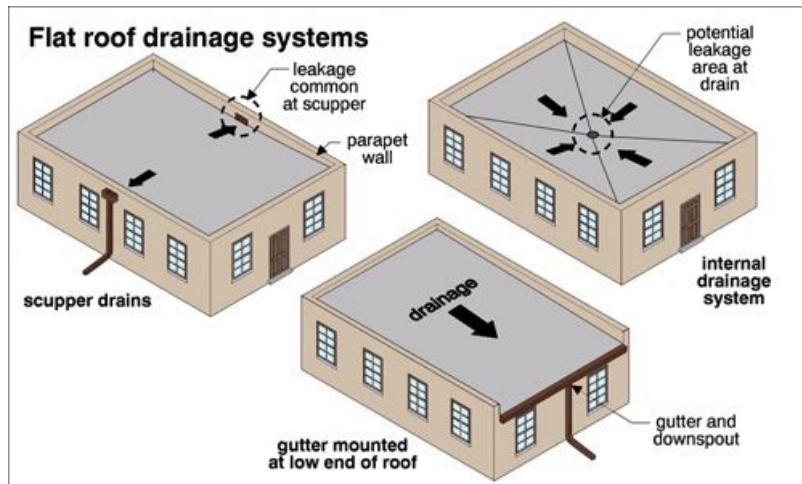


Figure 4.11
Flat Roof Disadvantages
Source: <https://constructiontuts.com/> 2018

One of the main disadvantages of using a flat roof in tropical climates such as Indonesia is the high risk of water leakage caused by heavy rainfall and water ponding. Unlike pitched roofs that naturally drain rainwater quickly, flat roofs retain water for a longer period if the drainage system is not properly designed. This condition may increase the possibility of waterproofing failure, structural moisture penetration, and ceiling damage over time.

To respond to this issue, several technical strategies are commonly implemented in flat roof construction. First, the roof surface is designed with a slight slope, generally around 2–5%, to direct rainwater toward drainage outlets and prevent water accumulation. Second, waterproofing membranes are installed above the concrete slab to protect the structure from water infiltration. Third, internal drainage systems, such as roof drains and vertical rainwater pipes, are integrated to ensure efficient water discharge during heavy rainfall.

Additionally, parapet flashing details, overflow drains, and regular maintenance are important to maintain the performance of the roof system. Thermal insulation and protective roof coatings may also be added to reduce heat absorption and prolong the durability of waterproofing materials.

One of the main disadvantages of using a flat roof in tropical climates such as Indonesia is the high risk of water leakage caused by heavy rainfall and water ponding. Unlike pitched roofs that naturally drain rainwater quickly, flat roofs retain water for a longer period if the drainage system is not properly designed. This condition may increase the possibility of waterproofing failure, structural moisture penetration, and ceiling damage over time.

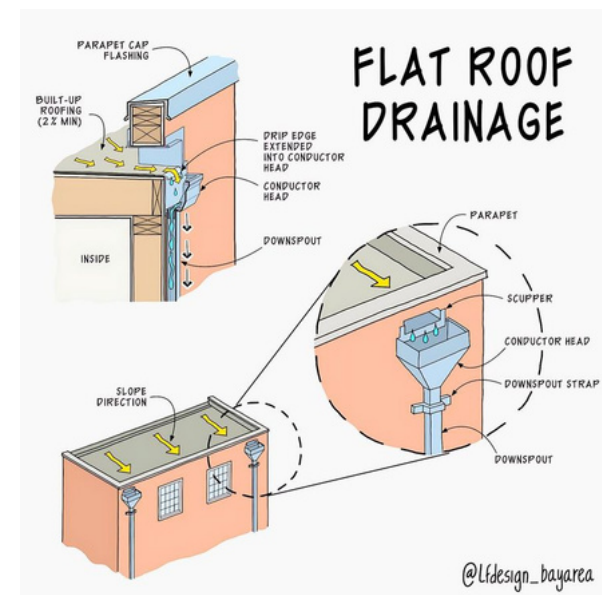


Figure 4.12
Flat Roof Drainage
Source: [Alex garzab](#), 2025

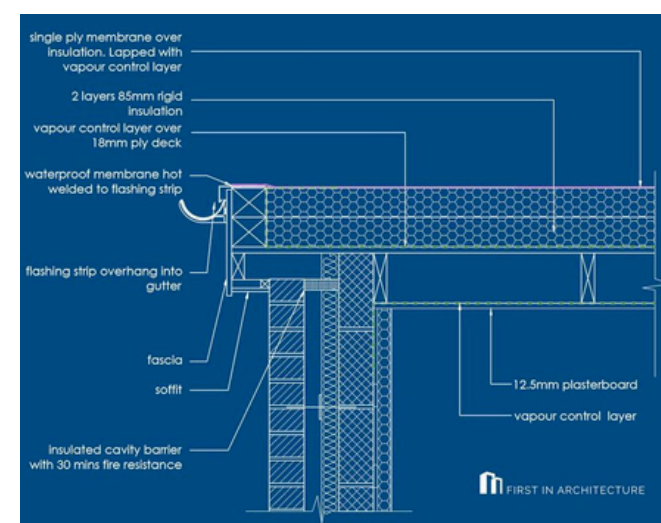


Figure 4.12
Flat Roof Details
Source: firstinarchitecture.co.uk, 2020

Structure Concept

Structural Element	Proposed System	Approximate Dimension	Material	Structural Function	Incremental Housing Role	Advantages	Technical Consideration
Foundation	Isolated Pad Foundation (Foot Plate) connected with tie beams (sloof)	Approx. 80×80 cm to 120×120 cm (depending on soil condition and load)	Reinforced Concrete	Transfers building load safely into the soil	Prepared from the initial phase to support future expansion up to 3 floors	Economical, suitable for modular housing, easy phased construction	Foundation should already be calculated for ultimate future load, not only current 1-floor condition
Tie Beam (Sloof)	Reinforced Concrete Tie Beam	Approx. 15/20 cm to 20/30 cm	Reinforced Concrete	Connects foundations and distributes load evenly while reducing differential	Creates stable structural base for future development	Improves structural stability and earthquake resistance	Continuous connection between foundations is important in seismic areas
Column	Reinforced Concrete Column	Minimum 20×20 cm, preferably 25×25 cm for future 3-floor expansion	Reinforced Concrete	Main vertical load-bearing structure	Allows vertical growth without replacing structural system	Durable, strong, suitable for phased construction	Reinforcement bars should already anticipate future floor loads
Main Beam	Reinforced Concrete Beam	Approx. 15/30 cm to 20/40 cm	Reinforced Concrete	Transfers slab and roof loads to columns	Structural framework already prepared for future	Provides rigid frame system and earthquake resistance	Beam size depends on span, loading, and floor system
Secondary Beam	Reinforced Concrete Beam	Approx. 12/20 cm to 15/25 cm	Reinforced Concrete	Supports slab and distributes floor load	Supports modular room expansion	Reduces slab span and improves efficiency	Layout should follow modular grid consistency
Floor Slab	Reinforced Concrete Slab	Approx. 10–12 cm thickness	Reinforced Concrete	Acts as floor plate and horizontal diaphragm	Enables future upper-floor construction	Strong, durable, compatible with modular frame	Slab reinforcement should consider future live loads

Roof Structure	Lightweight Steel Roof Truss or Flat Concrete Roof	Depends on roof type	Lightweight Steel / Reinforced Concrete	Protects interior spaces and transfers roof load	Roof can later become future floor expansion area	Lightweight steel reduces structural load	If future vertical expansion is planned, temporary lightweight roofing is preferable
Wall System	Non-Load Bearing Wall	Approx. 10–15 cm thickness	Lightweight Brick / AAC Block / Clay Brick	Space enclosure and partition	Allows flexible modification during future expansion	Easier renovation and lower structural load	Structural loads should not rely on walls
Stair Structure	Reinforced Concrete Stair or Lightweight Steel Stair	Depends on floor height	Reinforced Concrete / Steel	Vertical circulation between floors	Supports future second and third floor addition	Durable and efficient circulation	Stair location should already be planned in Phase 1
Structural Grid	Modular Structural Grid	3×3 meter module	Reinforced Concrete Frame System	Organizes structural rhythm and space planning	Simplifies phased horizontal and vertical growth	Efficient construction, easier expansion, less material waste	Grid consistency is important for future development

Horizontal Expansion Zone	Planned Empty Land Area	Flexible	Future Structural Addition	Future room enlargement	Supports incremental growth based on family needs	Reduces uncontrolled renovation	Expansion zones should already follow structural rhythm
Vertical Expansion Zone	Pre-planned Column Continuation	Maximum 3 Floors	Reinforced Concrete Frame	Supports additional future floors	Enables long-term housing adaptability	More economical than rebuilding	Structural reinforcement must already anticipate future expansion
Earthquake Resistance System	Reinforced Concrete Frame System	Integrated into structure	Reinforced Concrete	Resists lateral seismic forces	Ensures safety during future development	Suitable for Indonesian seismic conditions	Beam-column joint detailing is critical
Utility Shaft Alignment	Vertical Wet Area Alignment	Same location each floor	Plumbing System	Simplifies plumbing and maintenance	Future toilets and kitchens can be added efficiently	Reduces renovation cost and technical complexity	Toilets should align vertically between floors
Structural Concept	Modular Incremental Structural System	3×3 meter grid	Reinforced Concrete Modular Frame	Supports phased and controlled housing growth	Core strategy for incremental housing	Flexible, efficient, future-adaptive	Structure should be designed for ultimate growth phase from the beginning

Table 4.2
Table of Structure Concept
Source: Author, 2026

Water Flow Concept



Figure 4.13
River on Site
Source: Author, 2026

The site is surrounded by local rivers that are traditionally used to irrigate the surrounding fields and vegetation. This condition provides an environmental advantage for the project, particularly in supporting natural water management, stormwater control, and landscape irrigation. The presence of the rivers also contributes to maintaining the site's ecological quality and supports the integration of green open spaces within the residential development

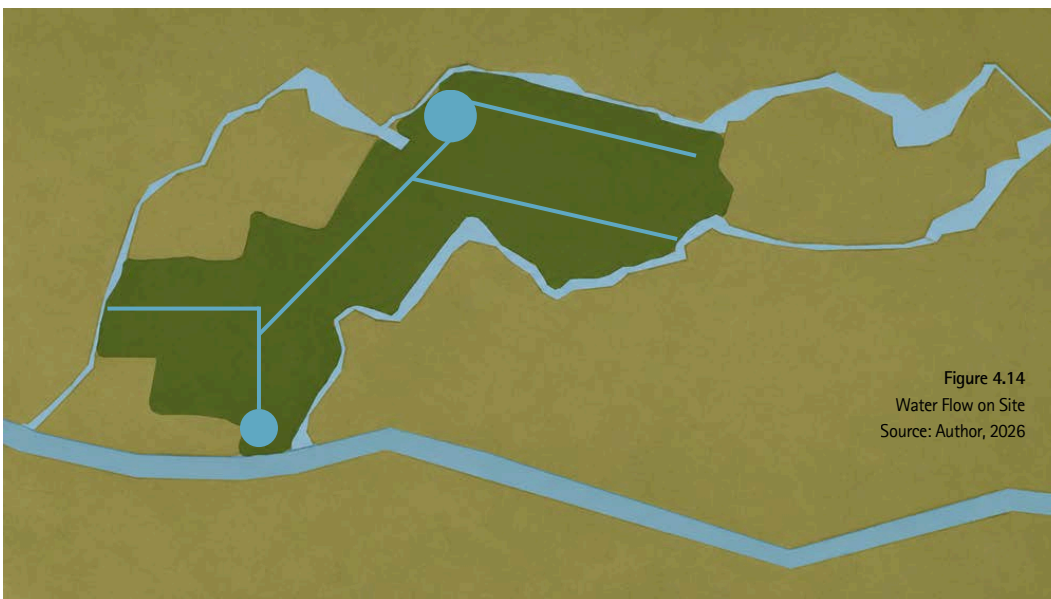


Figure 4.14
Water Flow on Site
Source: Author, 2026

The water pump system is proposed to be located near the main entrance gate in order to facilitate easier maintenance access, monitoring, and utility installation. This placement also allows more efficient operational management without disrupting the residential area. After being utilized and treated through the site's water management system, the water is planned to be discharged back into the river located at the rear side of the site, supporting controlled water circulation and site drainage management.

Facilities Concept

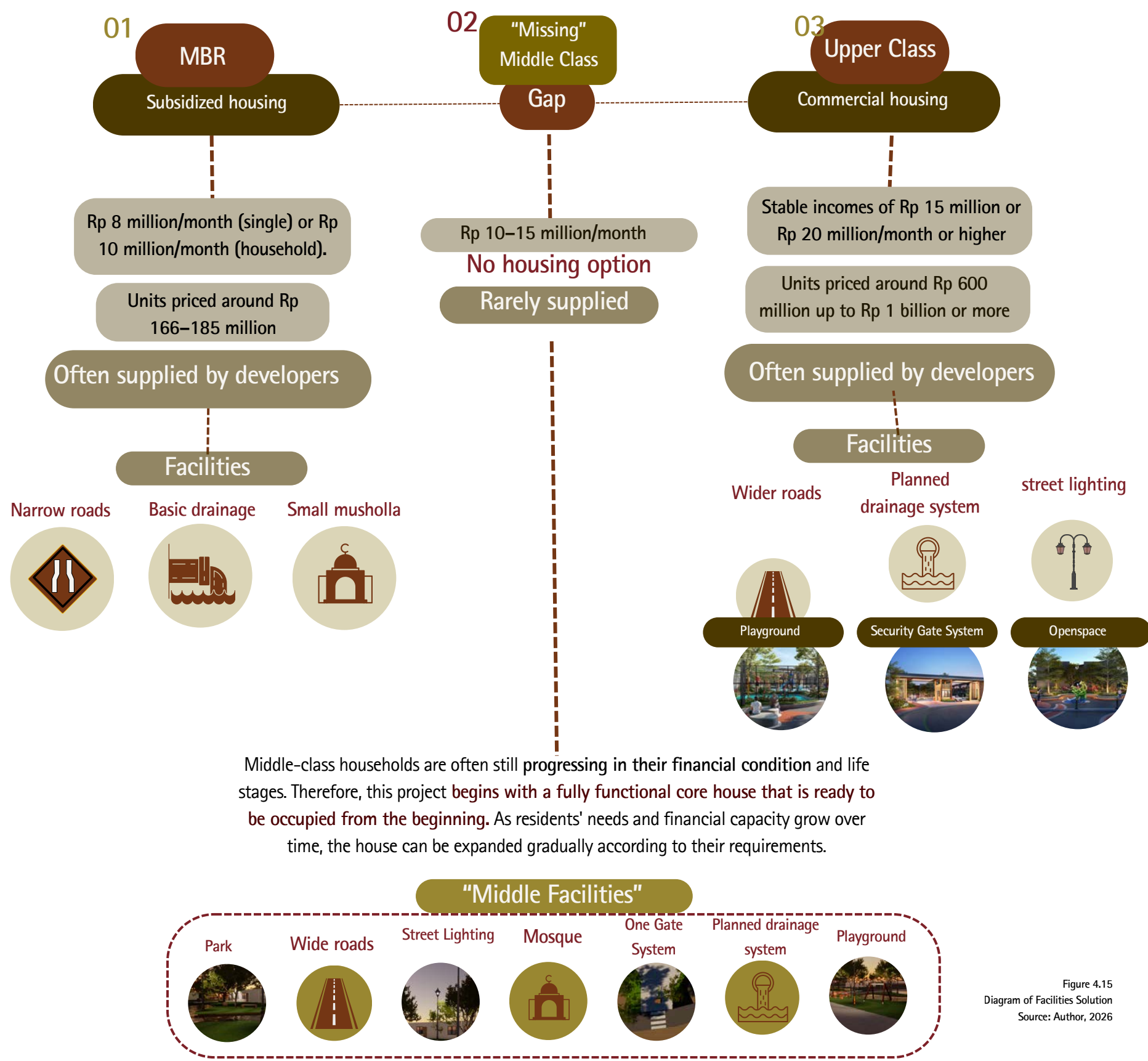


Figure 4.15
Diagram of Facilities Solution
Source: Author, 2026

Pricing Concept



Household Income	Maximum Monthly Mortgage (30%)	Estimated House Price (8 Years)
Rp5,000,000	Rp1,500,000	± Rp144–168 million
Rp10,000,000	Rp3,000,000	± Rp280–350 million
Rp15,000,000	Rp4,500,000	± Rp432–504million
Rp 20,000,000	Rp 6,000,000	± 576–672 Million

Figure 4.16
Diagram of Pricing Solution
Source: Author, 2026

4.2 Design Analysis and Alternatives-Masterplan

Masterplan Consideration

The masterplan is developed in accordance with Serang Regency regulations, including a maximum KDB of 60% (6,725 m²), minimum KDH of 30% (3,362.7 m²), KLB of 1.2–2.0, building height limits of 8–12 m (2 floors), required GSB setbacks, and a 3 m river setback (sempadan sungai). These regulations determine the allowable building density, open space allocation, and overall development capacity of the site.

Another important consideration is the site's relationship with the river. The river divides the site into three separate land parcels, including two smaller areas isolated from the main development zone. In addition, several surrounding parcels are owned by other parties, limiting development and connectivity options. These conditions influence the master plan layout, circulation system, bridge placement, and land utilization strategy. Furthermore, site accessibility is restricted to a single access road, requiring all vehicular and pedestrian circulation to be organized through the main entrance connected to Jl. Andamui Sukawana Asri.

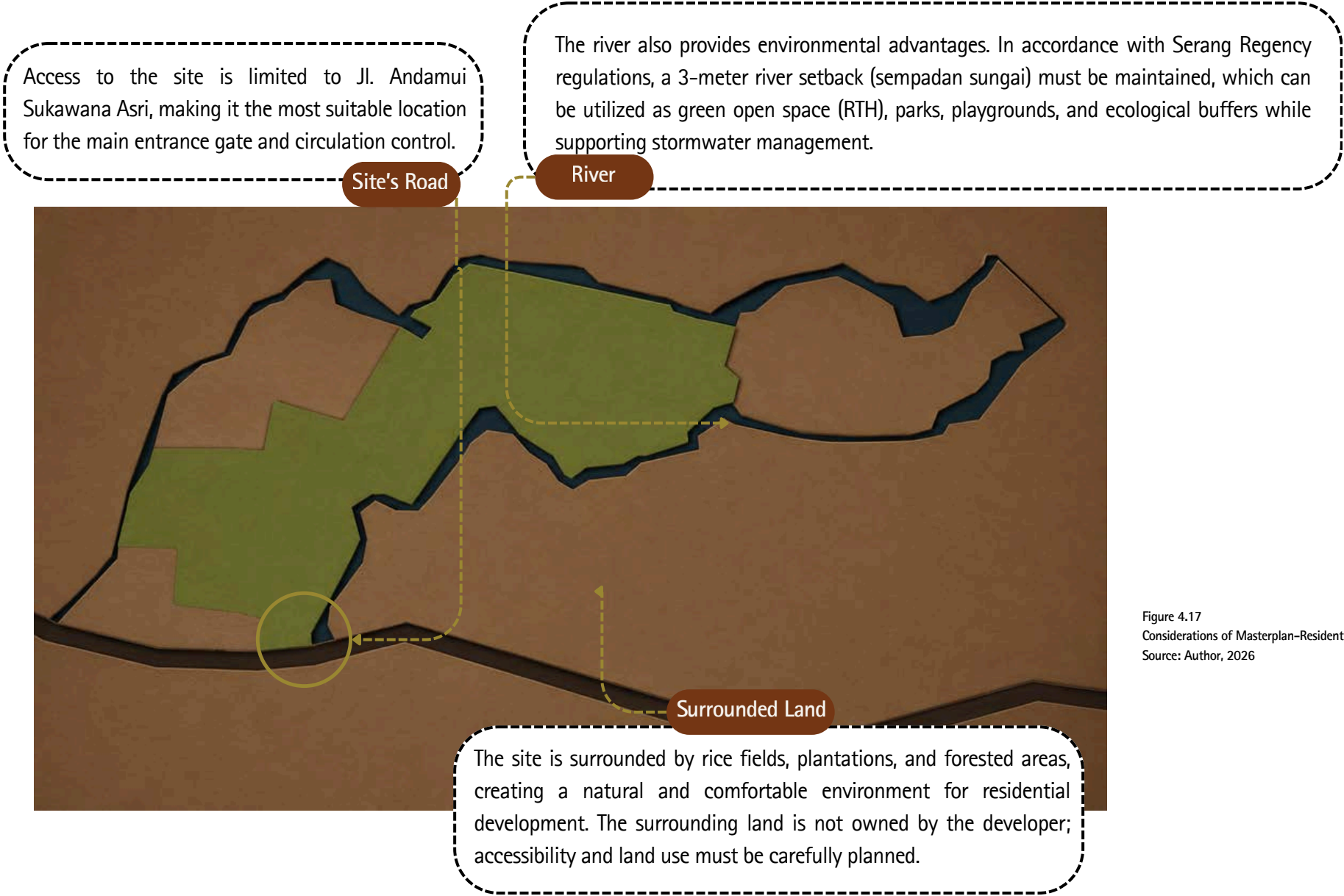


Figure 4.17
Considerations of Masterplan-Residential
Source: Author, 2026

Precedents Masterplan - Residential

Drawn from CitraLand Serang



Commercial/Ruko

Playground/Taman

Security/One Gate System

Roundabout

Bridge

Only one bridge to the back area (East)

River

RTH

cul-de-sacs

Figure 4.18
Precedents of Masterplan-Residential
Source: Author, 2026

One Gate System

Single controlled entry/exit for the whole estate. Pos keamanan 24 jam, RFID, or barrier. Greatly improves security and site identity. All Serang cluster precedents use this.

River not boundary

The sempadan sungai becomes a linear park / riverwalk. Adds value to riverside units.

Roundabout

Internal roads loop or terminate in roundabouts/cul-de-sacs so there are no through-routes. Reduces crime, slows traffic, creates address hierarchy.

Road Hierarchy

3-tier road system. Main collector 8–12m wide, local/cluster roads 6–8m

Commercial at entry

Ruko or commercial units placed near the main gate (highest visibility/traffic). Seen in most Serang developments.

Facility

musholla, taman bermain at the geometric centre of the site — equidistant from all clusters. Required by regulation (fasos/fasum).

Alternative 1

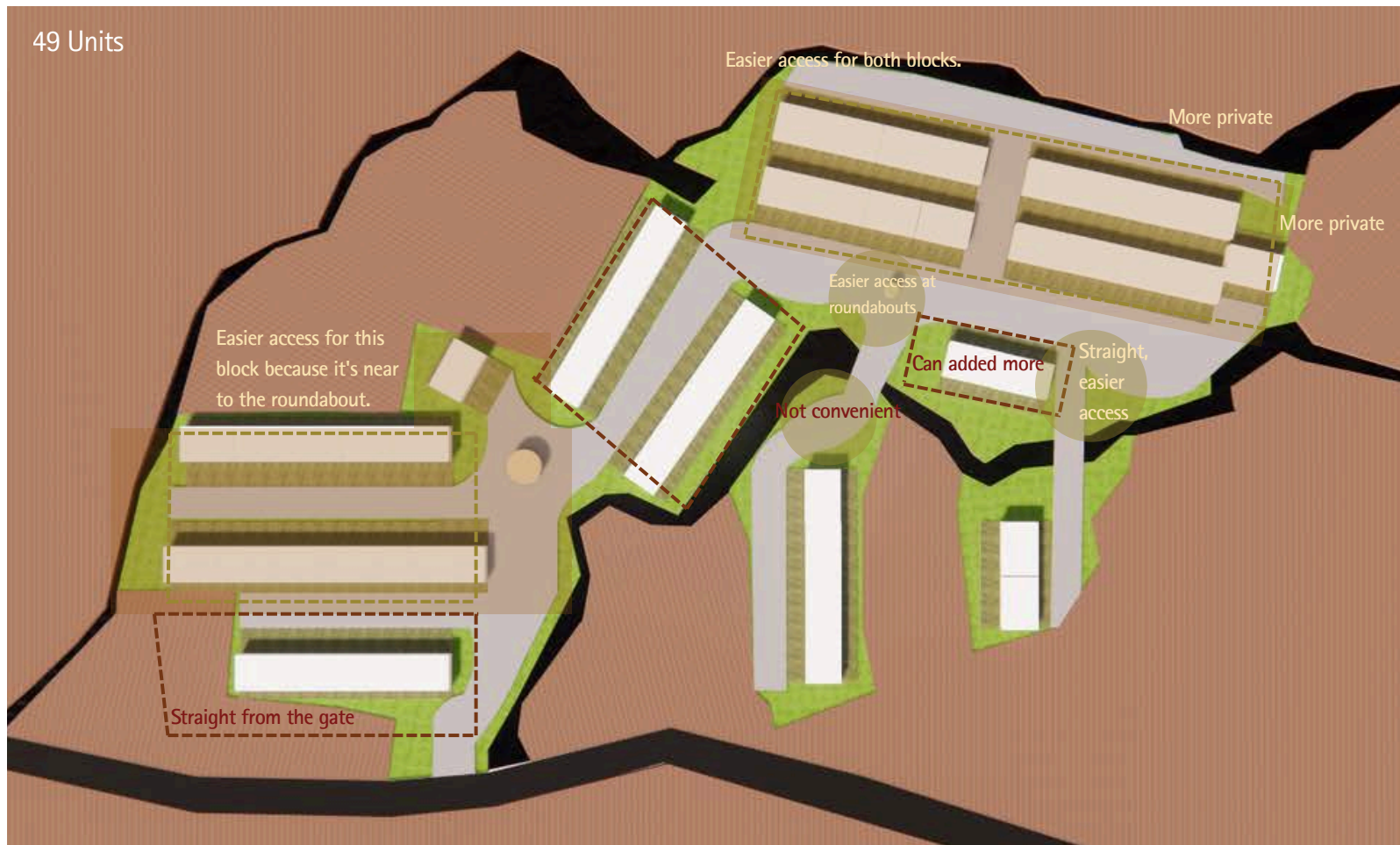


Figure 4.19
Alternative Masterplan 1
Source: Author, 2026

Alternative 1 (49 Units): The west cluster benefits from proximity to the roundabout, making access easy. The central and right-side blocks are more private, have easier access, and are also accessible via the roundabout. The southern block are not convenient for bridges in curved orientation, but overall this is a fairly balanced layout. A road runs along the back of the east blocks.

Advantages

- Good access for the west cluster due to proximity to the roundabout
- East blocks are more private, which is suitable for residential comfort
- Road runs along the back of east blocks, keeping frontage clean
- Reasonable unit count with a relatively balanced layout

Disadvantages

- Some central blocks are "not convenient" in orientation relative to the bridge
- Not all blocks benefit equally from roundabout access
- The privacy advantage of east blocks comes at the cost of accessibility

Alternative 2

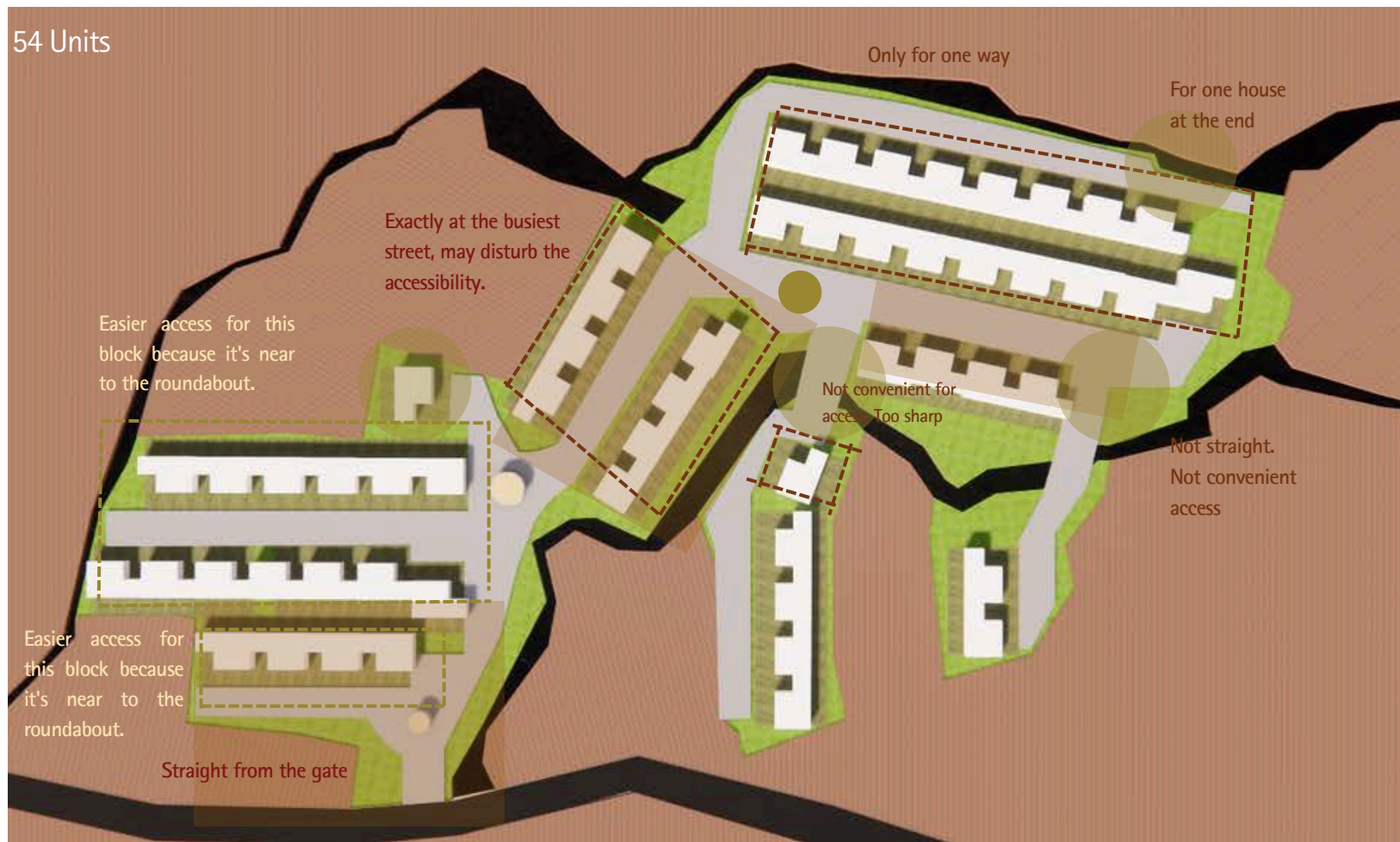


Figure 4.20
Alternative Masterplan 2
Source: Author, 2026

Alternative 2 (54 Units): This is the densest option but comes with significant access trade-offs. The west blocks work well, with easy access from the roundabout and straight from the gate. However, the central area sits exactly at the busiest street, which may disturb accessibility. The east side has severe issues: one road serves only a single end house. At the south area the bridge access is too sharp, and the bridge is not straight or convenient.

Advantages

- Highest unit density of all five alternatives (54 units)
- West blocks have excellent access — straight from the gate and near the roundabout
- Maximum land utilization

Disadvantages

- Central blocks sit exactly on the busiest street, which may disturb access and comfort
- East blocks have very sharp turns
- One road on the east side serves only a single end house, making it highly inefficient
- South blocks' bridges are not straight in orientation, making access awkward
- Highest density comes at a serious cost to circulation quality

Alternative 3

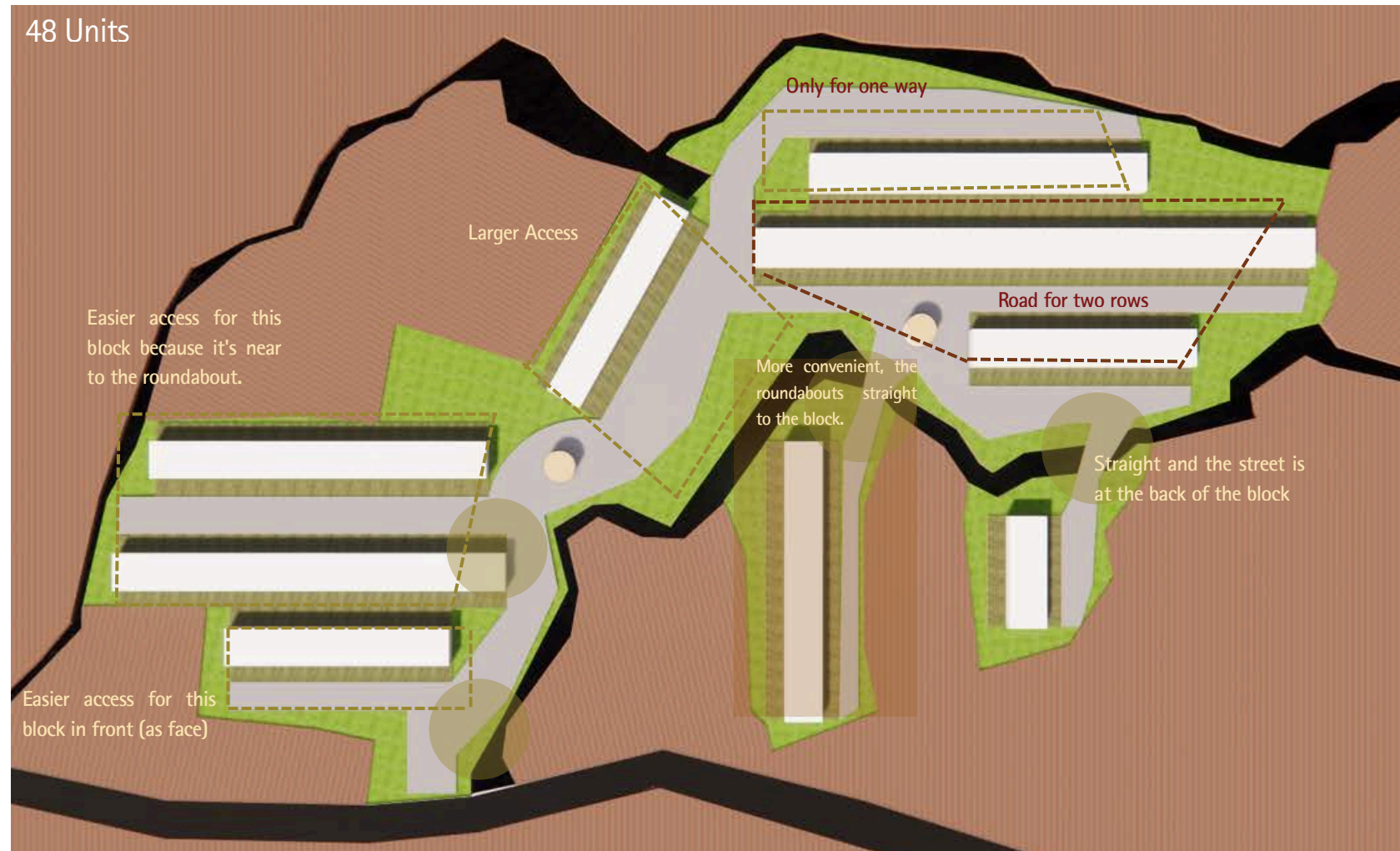


Figure 4.21
Alternative Masterplan 3
Source: Author, 2026

Alternative 3 (48 Units) This alternative introduces a larger access road to the west, improving entry flow. The west cluster is easy to access (facing the street as the front facade). The north-east-lower block has a road serving two rows, though that road is one-directional. The East block is well-oriented with the road at the back and south block is well oriented with one straight bridge.

Advantages

- Larger access road on the west side improves entry flow for the whole site
- West cluster is well-oriented with the building face toward the street
- East block has the road at the back
- Roundabout connects directly and conveniently to the central block
- One road serves two rows of houses efficiently in the north zone
- Good balance between density and accessibility

Disadvantages

- North zone road is one-directional only, limiting traffic flow
- One internal access point has a sharp turn

Alternative 4



Figure 4.22
Alternative Masterplan 4
Source: Author, 2026

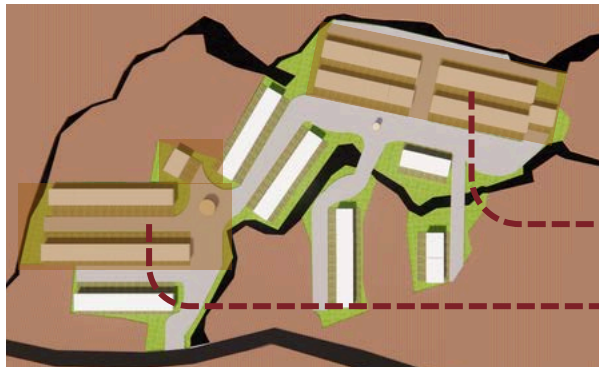
Alternative 4 (45 Units) The least dense option. It features the largest access road, and the west block has simple, straight access. However, the central blocks suffer from very sharp turn angles that are not convenient and are too sharp, and the far-east block is too far from the main gate. The low unit count combined with these access problems makes this the least efficient alternative overall.

Advantages

- Largest access road entry, improving entry experience
- West block has simple, easy, and straight access
- Some east-central blocks's bridges more convenient, straight to the block
- Roundabout connects directly to certain blocks

Disadvantages

- Lowest unit density (45 units) the east efficient use of land
- Central blocks have sharp turns.
- The far east block is too distant from the main gate, making it the least accessible unit cluster across all alternatives



Alternative 1



Alternative 2



Alternative 3



Alternative 4

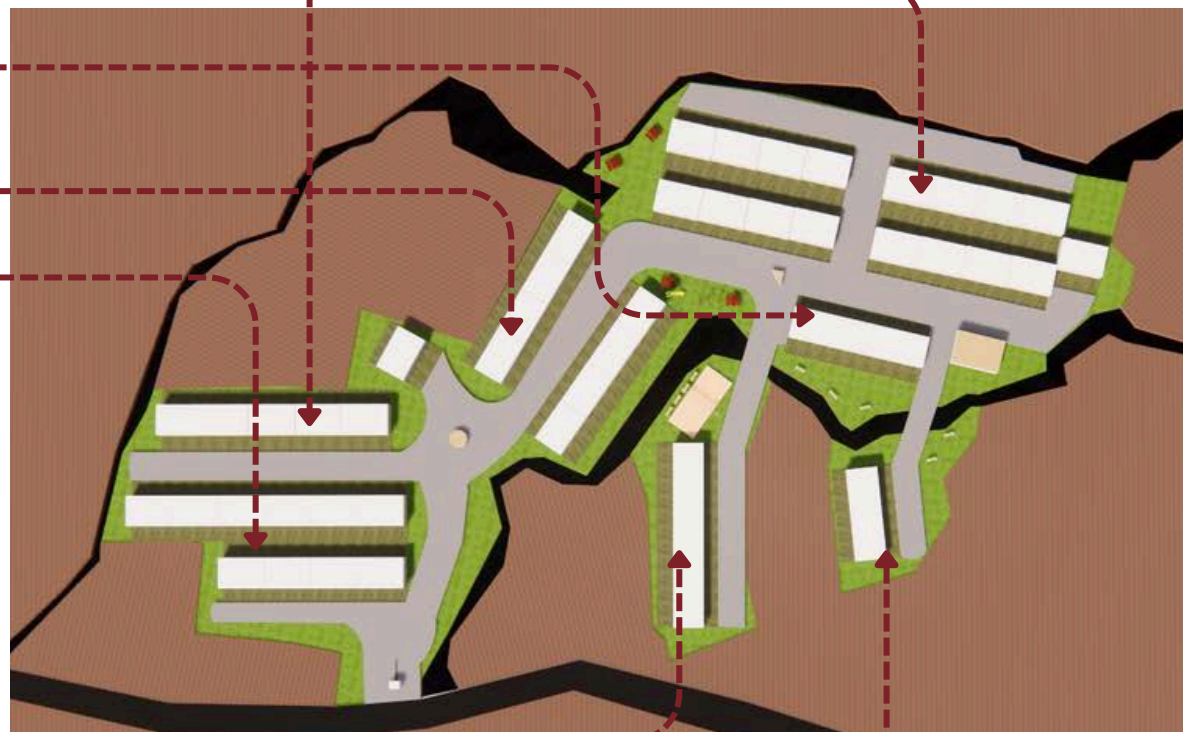


Figure 4.23
Alternative Masterplan
Source: Author, 2026

Alternative 5

Alternative 5 is the culmination of all previous studies, combining the strongest access strategies, highest unit count considerations, and adding community and commercial elements.

Alternative 5



Figure 4.24
Explanation Masterplan
Source: Author, 2026

Advantages

- Integrates the best access strategies from all previous alternatives.
- One gate system improves site security and management.
- West cluster retains the strongest access feature: proximity to the roundabout.
- The northeast cluster road now loops to serve two rows.
- South block access is fully resolved through two straight bridge crossings.
- Mosque adds a community facility and creates a landmark in the quiet place.
- The roundabout is fully committed as the central circulation hub linking all zones.
- The land that have sempadan and not fit to the unit configuration act as the public facilities.

Disadvantages

- More complex to build due to the two bridge structures required for South access.
- The single-gate system, while secure, may create a bottleneck during peak hours.

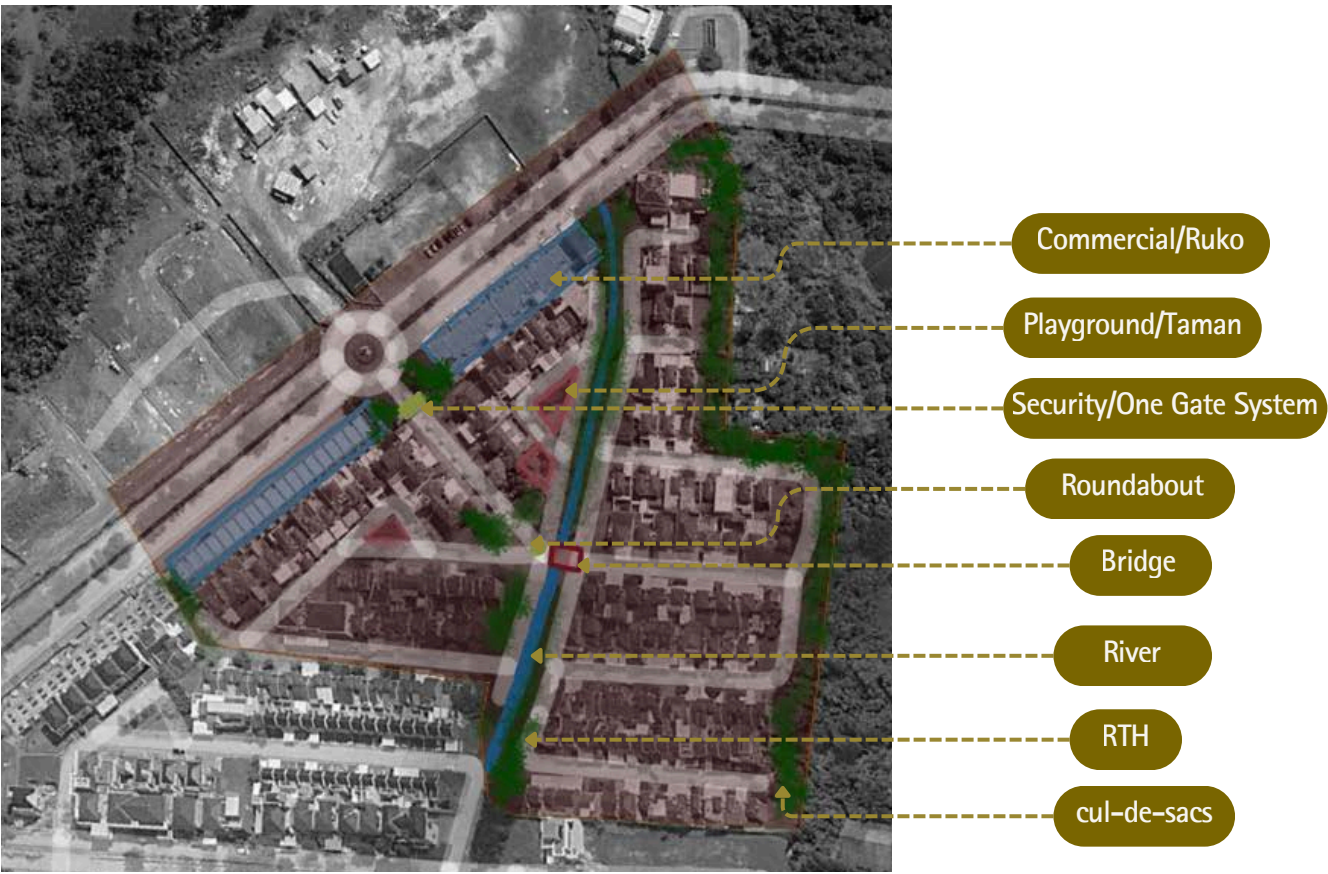


Figure 4.18
Precedents of Masterplan-Residential
Source: Author, 2026

CitraLand Serang

Similar to nearby commercial residential developments such as CitraLand Serang, the masterplan incorporates key neighborhood elements including a one-gate security system, commercial/ruko area, playground, roundabout, green open spaces (RTH), bridges, and riverfront buffers.



Figure 4.25
Explanation Masterplan
Source: Author, 2026

Alternative 5

Alternative 5 provides a sufficient range of supporting facilities despite its relatively compact layout. Although developed at a more moderate scale, the design still ensures residents have access to essential daily services, recreational spaces, and community facilities. This creates a balanced neighborhood environment that remains functional, secure, and livable without requiring excessive land allocation for facilities.

Design Solution- Master Plan

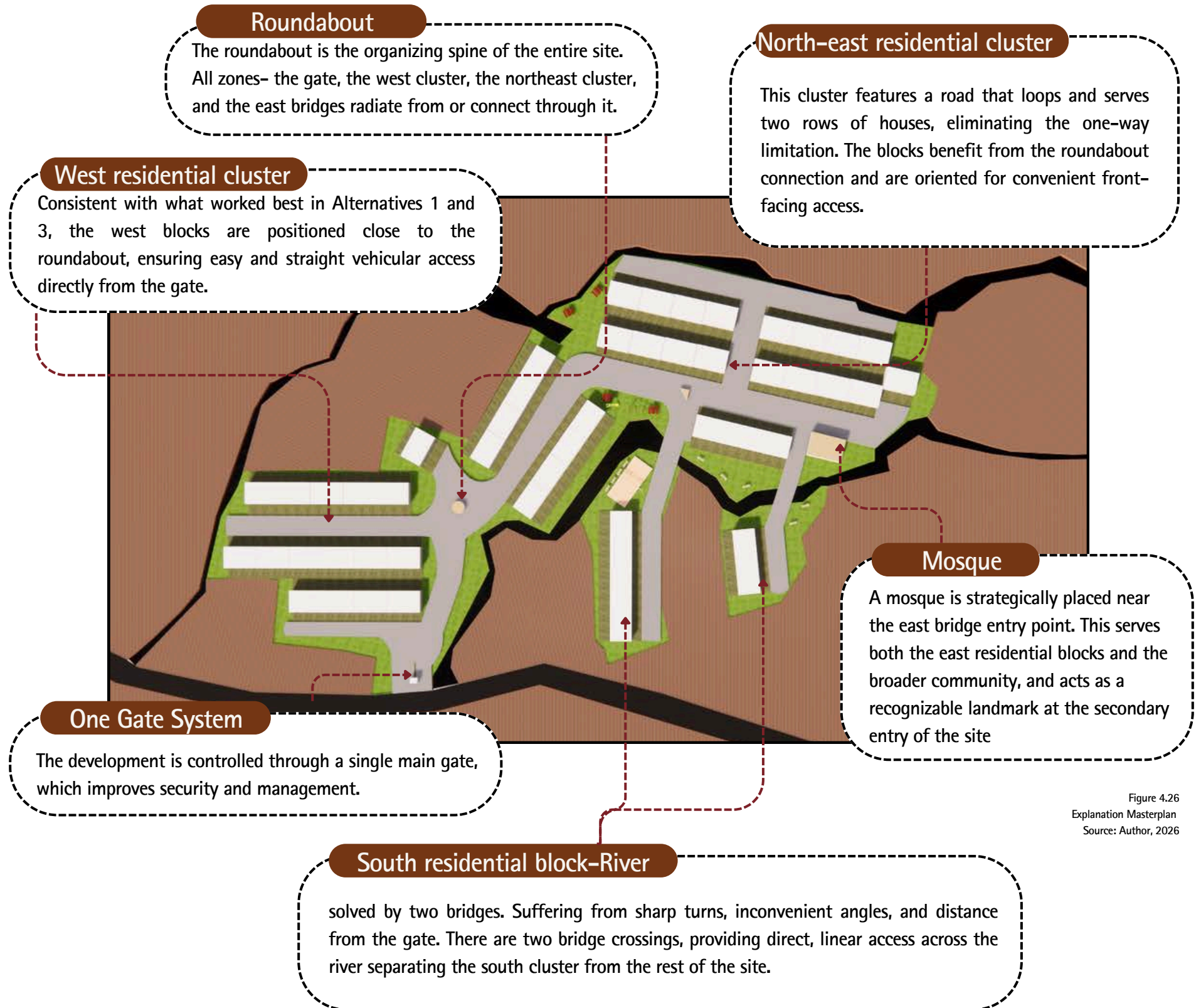


Figure 4.26
Explanation Masterplan
Source: Author, 2026

Alternative 6 - Final



Figure 4.27
Alternative Masterplan 5
Source: Author, 2026

Advantages

- Integrates the best access strategies from all previous alternatives.
- One gate system improves site security and management.
- West cluster retains the strongest access feature
- The northeast cluster road now loops to serve two rows.
- The mosque at the center and easy access add a community facility and create a landmark in the private area
- The land that has sempadan and is not fit to the unit configuration act as the public facilities.
- Maximizing the land while still considering the setbacks

Disadvantages

- The single-gate system, while secure, may create a bottleneck during peak hours.

Design Solution- Master Plan-Final

West residential cluster

Consistent with what worked best in Alternatives 1 and 3, the west blocks are positioned close to the roundabout, ensuring easy and straight vehicular access directly from the gate.

North-east residential cluster

This cluster features a road that loops and serves two rows of houses, eliminating the one-way limitation. Oriented for convenient front-facing access.



Figure 4.28
Explanation Masterplan
Source: Author, 2026

One Gate System

The development is controlled through a single main gate, which improves security and management.

Mosque

A mosque is strategically placed at the center. This serves both the east residential blocks and the broader community.

The residential development is divided into three housing blocks based on their location within the site.

Block A is situated at the front of the residential area, providing the easiest and most direct access from the main entrance. Due to its prime location and accessibility, it is considered the most valuable block. Residents of Block A also have convenient access to a musholla, which is located at the rear of the block while remaining directly connected to the main entrance.

Block B is located in the center of the development, serving as the transition between the front and rear sections of the residential area. One row of houses in this block enjoys direct access and views toward the river, enhancing the environmental quality and residential experience.

Block C occupies the northern and eastern portions of the site and contains the largest number of housing units. To support community activities and improve residents' quality of life, this block is equipped with a badminton court and several neighborhood parks, providing accessible recreational and green open spaces.



Figure 4.29
Explanation Masterplan
Source: Author, 2026

Due to the 3-meter river setback requirement (sempadan sungai), the riverside areas are designated as green open spaces (RTH), serving as ecological buffers, recreational areas, and landscape elements. Furthermore, after accommodating setbacks, facilities, utilities, and circulation networks, not all land can be allocated for residential plots of 108 m². Consequently, the remaining land is utilized as green open space, contributing to environmental quality, stormwater management, and communal outdoor spaces within the residential development.



Figure 4.30
Design Solution–Masterplan–River
Source: Author, 2026



Figure 4.31
Design Solution–Masterplan–Accessibility
Source: Author, 2026

A one-gate system is implemented as the site has only one direct access from Jl. Andamui Sukawana Asri, while the surrounding land is under different ownership. This approach improves security, access control, and circulation efficiency within the residential development.

4.3 Design Analysis and Alternatives-Incremental Housing

Precedents Incremental Housing

p - ISSN 2964 - 8483

Example of a house that follows the framework of Kepmen of RIT approach in Klaten. from RIT 1 to RS Sehat



Horizontal expansion from 36's type to 54's type. Total area 108sqm, added KDB 60% which become 65sqm. The building is 54, so it still fulfill the KDB

Figure 4.32
Precedents Incremental Housing
Source: Author, 2026

The Visenda Residence

Example of Incremental housing residential unit in Serang given without the Incremental Housing planned growth framework



191 sqm -

115 sqm (Max)

With area of 191 sqm and the building area is 45sqm. Including 2 rooms, 1 bathroom and toilet, kitchen and 1 garage

If we added KDB to this plan of 60%, then the available area is 114 sqm for building, and the KLB is 2-3 floors with approximately 8-12 meters.



Figure 4.33
Precedents Incremental Housing
Source: Author, 2026

325 sqm - 195

sqm (Max)

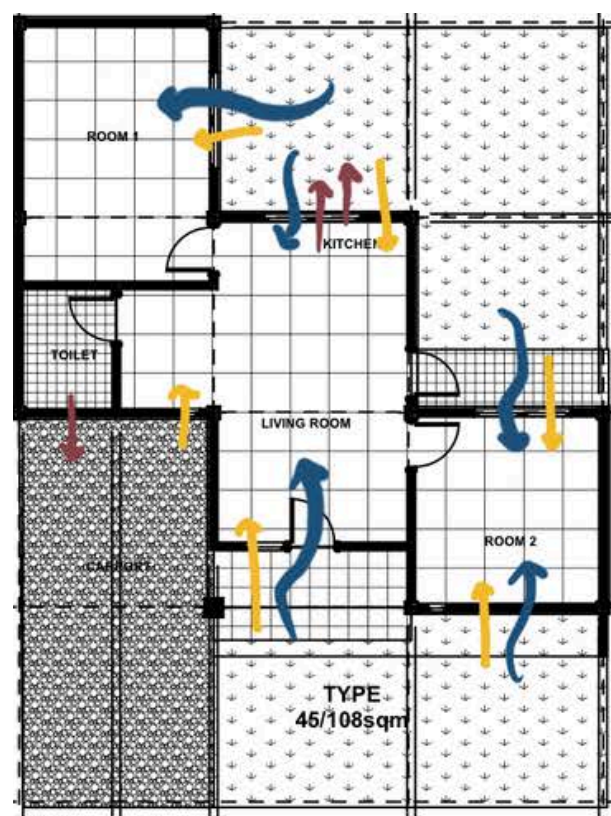
The total area is 325 sqm, and the building area is 45 sqm, including 3 rooms, 1 bathroom and toilet, a kitchen, and 2 garages. Based on KDB, it can still be expanded to 195sqm

If we added KDB to this plan of 60% then tit can be expand to maximum 195 sqm and the KLB is 2 - 3 floors which can be expand verically with approximately 8-12 meters.

Alternative 1

The toilet is placed at the front side of the house to make plumbing and service maintenance easier, since it can be accessed more directly from the outside. This position also keeps the wet area compact and efficient.

Overall, the plan already provides good daylight and air circulation for each room, but the kitchen becomes the main point that needs to be reconsidered for long-term flexibility.



The kitchen is located at the back-center of the house, allowing easier connection to the rear outdoor area and supporting daily service circulation. However, this position also creates some disadvantages. Because it is close to the central living space, cooking odor may spread more easily throughout the house. In future expansion, the kitchen position may also disturb access, airflow, and circulation, especially if the house grows horizontally or vertically.

Figure 4.35
Room Programming Alternative 1
Source: Author, 2026

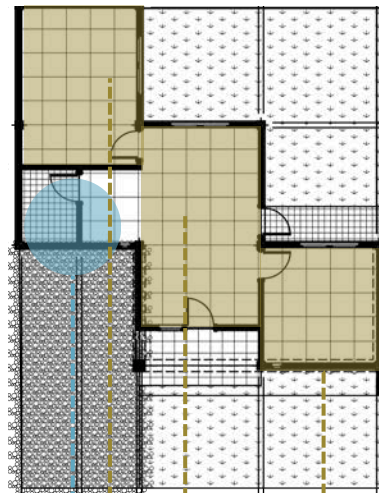
Alternative 1

Phase 1

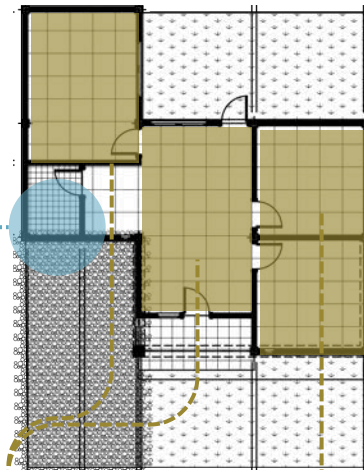
Phase 2

Phase 3

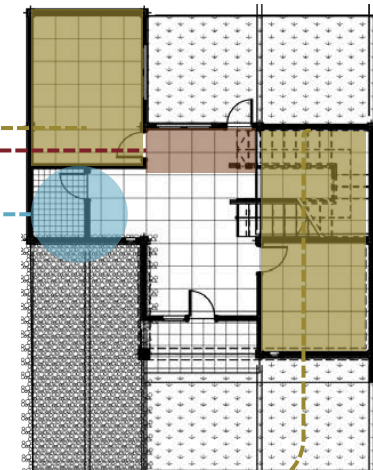
Type 45



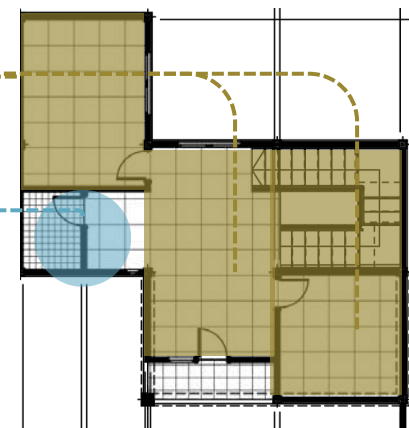
Type 54



Type 54-1st Floor



Type 54-2nd Floor



Facing Outside

Natural air circulation and sun exposure

Easy Service

To ease the movement for service and maintenance

Blocked Access

To ease the movement for service and maintenance

Figure 4.36
Room Programming Alternative 1-3 Phases
Source: Author, 2026

Alternative 1 becomes less efficient during future expansion phases. While the initial core house functions adequately, the location of the kitchen creates spatial conflicts as the dwelling grows. During horizontal expansion, the kitchen becomes positioned in the middle of the enlarged floor plan, limiting spatial flexibility and reducing the efficiency of internal circulation. Furthermore, when the house expands vertically, the kitchen interferes with the most logical location for the staircase, resulting in a less direct and less efficient connection to the second floor.

Alternative 2

In Phase 1, the layout performs well environmentally. All rooms receive direct access to natural daylight and cross ventilation, while the central living room acts as a shared space that distributes air movement throughout the house. As a result, the house achieves good thermal comfort and reduces dependence on artificial lighting during the day.

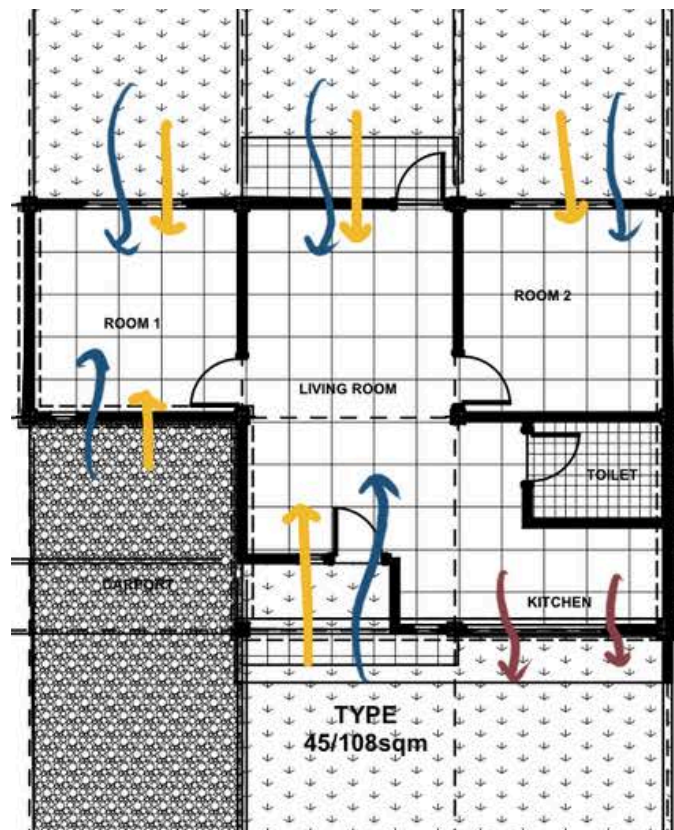


Figure 4.37
Room Programming Alternative 2
Source: Author, 2026

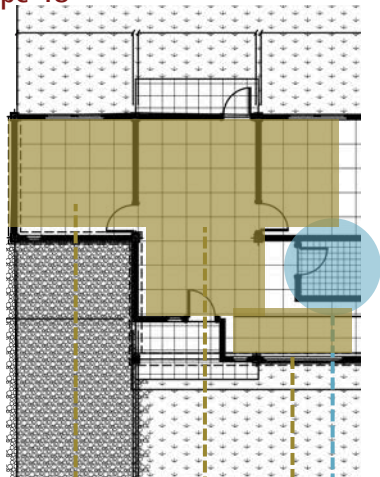
However, this configuration presents limitations for future horizontal expansion. When additional rooms are built on the right side of the plot, Room 2 may lose its direct access to external walls, reducing the quality of natural lighting and ventilation. Consequently, the room may become more dependent on artificial lighting and mechanical ventilation unless additional design strategies, such as light wells, ventilation shafts, skylights, or internal courtyards, are incorporated during the expansion phase. Therefore, while the layout performs efficiently in its initial stage, its long-term environmental performance is less adaptable compared to layouts that preserve side openings for future growth.

The kitchen is positioned at the front of the house, allowing cooking odors and heat to be discharged directly to the outdoor area. This arrangement also improves service access and reduces the possibility of odors spreading into the private areas of the house. Meanwhile, the toilet remains at the front to simplify plumbing installation, inspection, and future maintenance, as all wet-area services are concentrated near the building edge.

Alternative 2

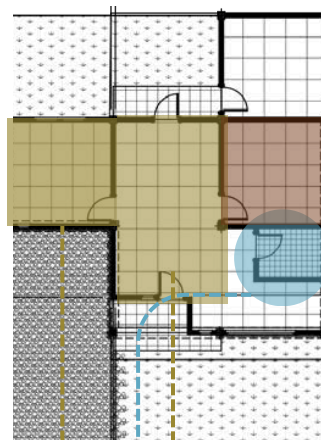
Phase 1

Type 45



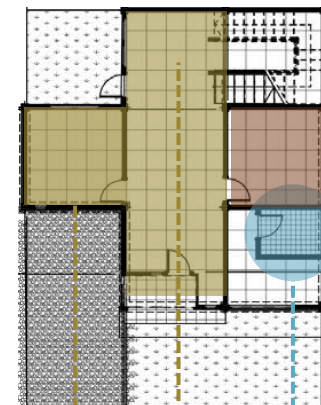
Phase 2

Type 54



Phase 3

Type 54-1st Floor



Easy Service

To ease the movement for service and maintenance,

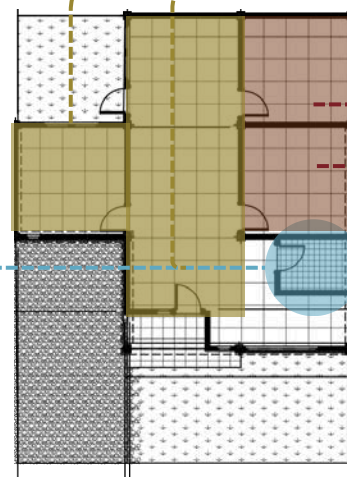
Facing Outside

Natural air circulation and sun exposure

Blocked

No natural air circulation and sun exposure

Type 63



Type 54-2nd Floor

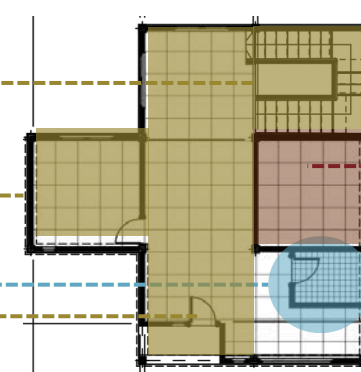


Figure 4.38
Room Programming Alternative 2-Phases
Source: Author, 2026

Alternative 2 presents limitations after the horizontal expansion phase. As additional spaces are added toward the rear of the building, some rooms become located deeper within the floor plan and lose direct access to external walls. Consequently, these rooms no longer receive sufficient direct sunlight and natural ventilation, relying instead on borrowed light and indirect airflow from adjacent spaces.

Alternative 3

This alternative provides the strongest environmental performance among the options. The kitchen and toilet are located along the side of the house, allowing plumbing and service lines to remain efficient while keeping wet areas concentrated in one zone. Their placement also minimizes the spread of cooking odors into the main living spaces.

In Phase 1, all rooms receive direct access to natural daylight and ventilation through external openings. The living room, although positioned in the center of the house, can still benefit from cross-ventilation due to the alignment of openings on opposite sides, allowing air to flow continuously through the interior spaces. This improves thermal comfort and reduces dependence on mechanical cooling and artificial lighting.

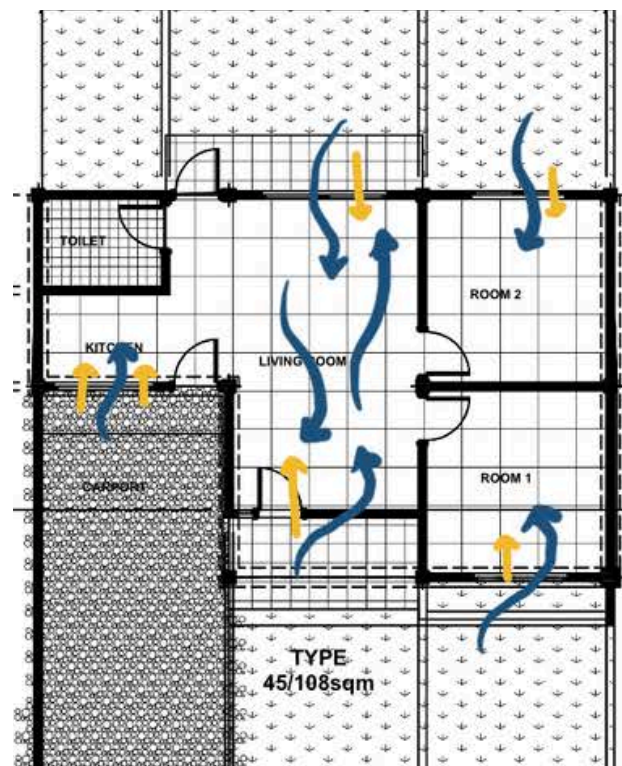


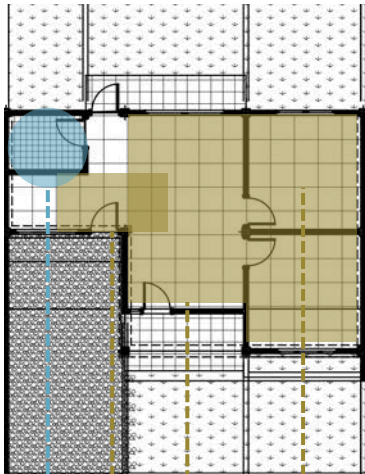
Figure 4.39
Room Programming Alternative 3
Source: Author, 2026

A major advantage of this layout is its adaptability for future expansion. Even after horizontal growth, the primary rooms can still maintain access to natural light and airflow because the expansion areas do not completely block existing openings. The arrangement preserves ventilation paths and sunlight penetration better than the previous alternatives, ensuring that environmental quality remains relatively consistent as the house grows. As a result, this scheme offers a more sustainable and flexible framework for incremental housing development while maintaining occupant comfort over time.

Alternative 3

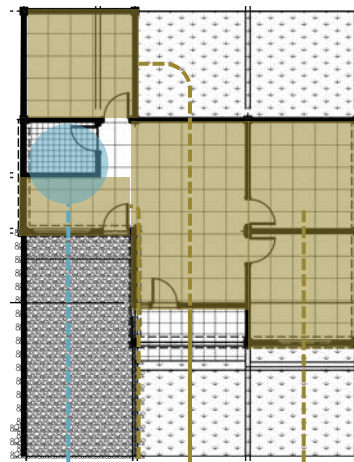
Phase 1

Type 45



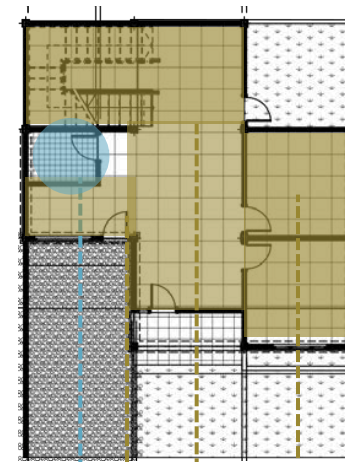
Phase 2

Type 54



Phase 3

Type 63-1st Floor



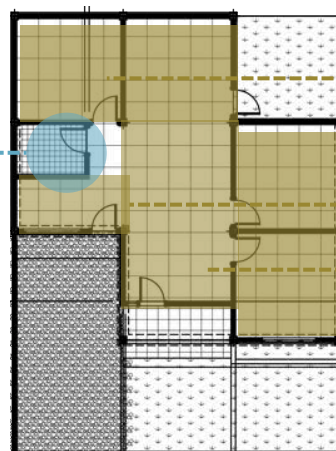
Easy Service

To ease the movement for service and maintenance

Facing Outside

Natural air circulation and sun exposure

Type 63



Type 63-2nd Floor

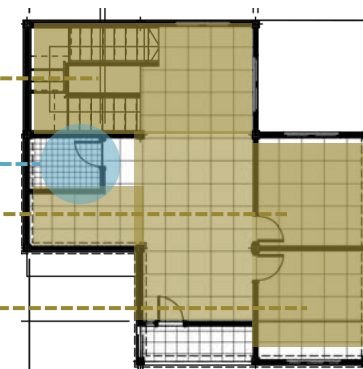
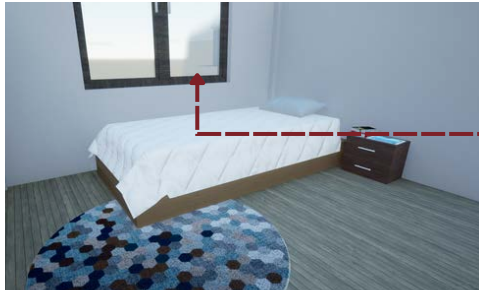


Figure 4.40
Room Programming Alternative 3-3 Phases
Source: Author, 2026

Alternative 3 offers the most resilient and adaptable growth pattern among all design alternatives because it maintains environmental quality, service efficiency, and spatial flexibility throughout all three phases of development. Rather than treating future expansion as an afterthought, the design anticipates both horizontal and vertical growth from the beginning, ensuring that building performance remains consistent as the dwelling evolves.

Design Solution- House

Alternative 3 Phase 1



The toilet is located near the front service zone, creating a compact wet area that simplifies plumbing installation, inspection, and future maintenance. By concentrating service functions in one area, infrastructure costs can be minimized from the initial construction stage.



The initial core house is designed around passive environmental principles. The kitchen is positioned adjacent to the carport and directly connected to the exterior, allowing cooking heat, moisture, and odors to be naturally ventilated. This arrangement improves indoor air quality while reducing dependence on mechanical ventilation.

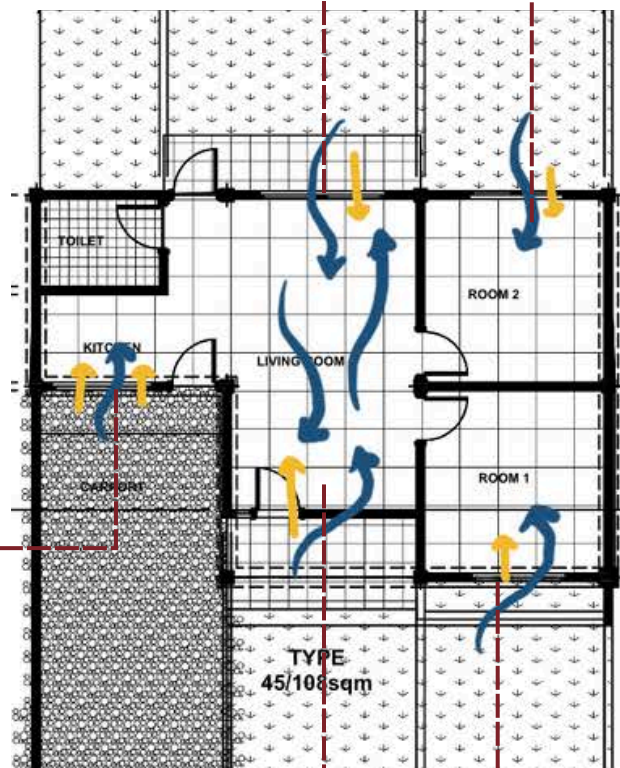
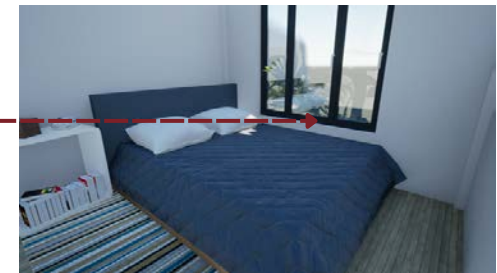


Figure 4.41
Room Programming Alternative 3-Phase 1
Source: Author, 2026



Furthermore, the bedroom and living spaces are positioned along the building perimeter, providing direct access to daylight and natural ventilation. Unlike alternatives where some rooms depend on internal spaces for light, every primary room in Alternative 3 faces an external boundary, creating a healthier living environment from the first phase.



Cross ventilation is established through the center of the house by positioning openings on opposite sides of the building. The kitchen and service area are connected to the exterior, while the living area and bedroom also face outdoor spaces. This arrangement allows fresh air to flow continuously through the central living space, improving thermal comfort and reducing indoor heat accumulation.

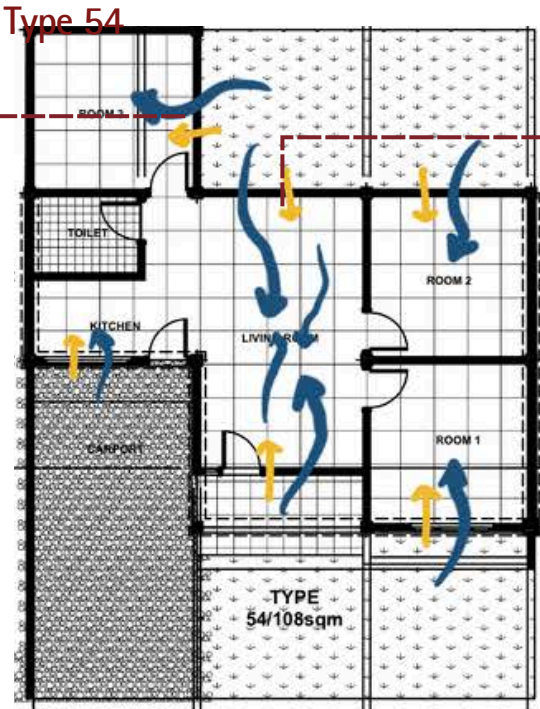
Alternative 3

Phase 2

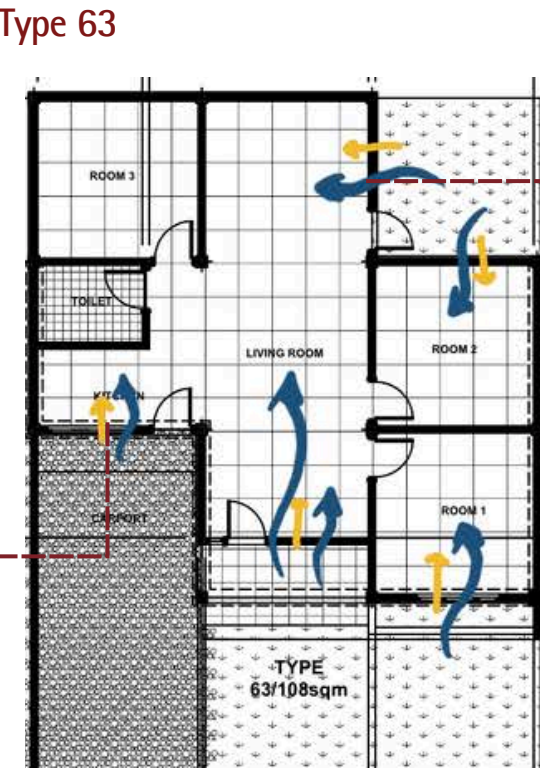


As the household grows, the dwelling can expand horizontally toward the rear without compromising environmental performance. Because the original bedroom is already located along the exterior façade, future construction at the back does not block its access to daylight and ventilation.

The service zone remains in the same location, allowing the kitchen and toilet infrastructure to extend efficiently without major modifications to the plumbing network. This reduces renovation costs and minimizes disruption to occupants during expansion. The service zone remains in the same location, allowing the kitchen and toilet infrastructure to extend efficiently without major modifications to the plumbing network. This reduces renovation costs and minimizes disruption to occupants during expansion.



Compared with other alternatives where rear extensions may create deep floor plans and reduce natural lighting, Alternative 3 preserves external wall exposure for the main habitable spaces, ensuring that environmental quality is maintained even after growth.



Although the house expands toward the rear, the design maintains ventilation pathways through the central living area. The placement of rooms along the building perimeter ensures that airflow can still move across the house from one side to the other. As a result, natural ventilation remains effective despite the increased floor area.

Figure 4.42
Room Programming Alternative 3-Phase 2
Source: Author, 2026

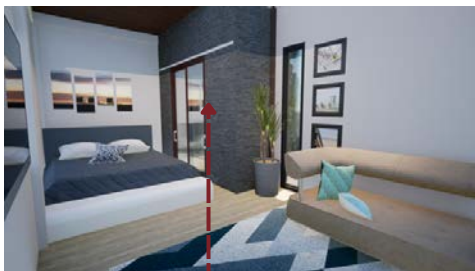
Alternative 3

Phase 3

The greatest strength of Alternative 3 appears during vertical development. The stair is strategically located within the service core, allowing additional floors to be added without significant structural alterations.

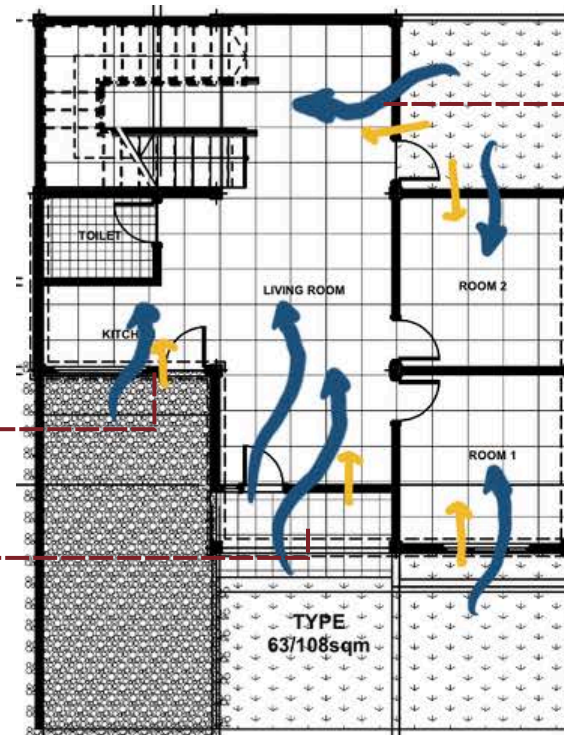


The toilets on the upper floor are positioned directly above the ground-floor toilet, creating a vertical plumbing shaft. This arrangement shortens pipe runs, reduces construction costs, simplifies maintenance, and minimizes the risk of leakage. The stacked wet-area strategy follows common architectural and building-service principles for efficient multi-storey housing.



At the same time, bedrooms on both floors continue to face the exterior, ensuring direct access to natural lighting and cross ventilation. Even after expansion to two or three storeys, no bedroom becomes dependent on borrowed light or internal ventilation.

Type 63-1st Floor



The addition of upper floors does not compromise the ventilation strategy. The central circulation and stair area function as a vertical air channel, while rooms on both levels continue to face the exterior. This creates opportunities for both cross ventilation and stack ventilation, allowing warm air to rise and escape while cooler air enters through lower openings, maintaining indoor comfort throughout the expanded house.

Type 63-2nd Floor

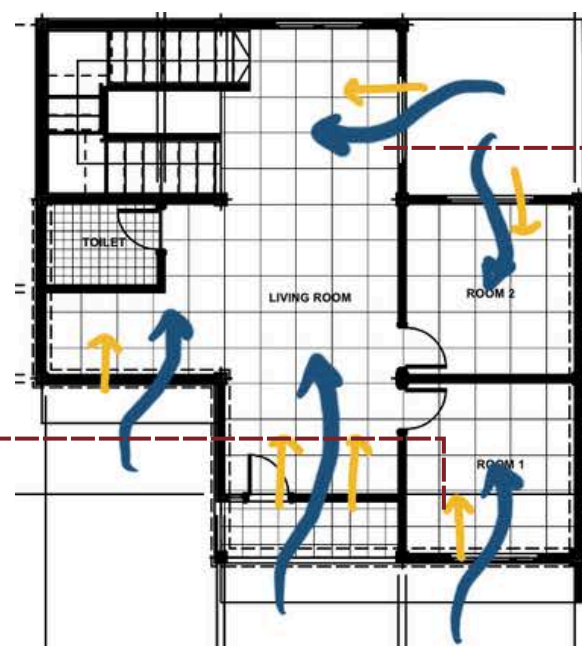


Figure 4.43
Room Programming Alternative 3-Phase 3
Source: Author, 2026

Roof Phase 3 - Alternatives

Roof Alternative 1



Alternative 1 uses two separate roof forms with a gap between the main roof and the secondary roof. This design creates a dynamic architectural appearance; however, the roof intersection becomes a vulnerable point for water leakage and requires additional waterproofing treatment. Rainwater may also be directed toward adjacent units, making it less suitable for a dense residential development. Furthermore, the complex roof geometry increases construction and maintenance requirements.

Roof Alternative 2



Alternative 2 improves upon the previous design by connecting the secondary roof to the main roof, creating a more continuous roof form. This reduces the risk of leakage and simplifies construction compared to Alternative 1. However, rainwater is still discharged toward the side boundaries, which may affect neighboring units in a closely spaced housing development. While more practical than Alternative 1, it remains relatively complex compared to a conventional roof system.

Figure 4.44
Roof Alternatives 1&2
Source: Author, 2026

Roof Phase 3 - Alternatives

Alternative 3 adopts a simple gable roof that directs rainwater toward the front and rear of the building. This minimizes disturbance to neighboring units and provides the most efficient drainage strategy for a dense residential environment. The roof form is simple, economical, easy to maintain, and well suited to local construction practices. Its straightforward geometry also supports future expansion and creates a consistent visual identity throughout the housing development.

Figure 4.45
Roof Alternatives 3&4
Source: Author, 2026

Roof Alternative 3



Roof Alternative 4



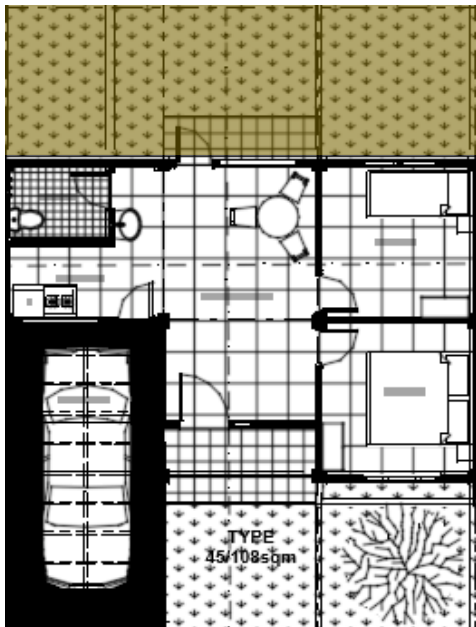
Alternative 4 combines a gable roof with a stepped roof configuration. Similar to Alternative 3, most rainwater is directed toward the front and rear; however, part of the runoff is concentrated at the stepped roof junction and discharged toward the canopy area. This creates additional drainage considerations and increases construction complexity. Although it offers a more distinctive architectural appearance, it requires more maintenance and detailing than Alternative 3. Therefore, it is less efficient for a large-scale middle-income housing development.

Design Proof

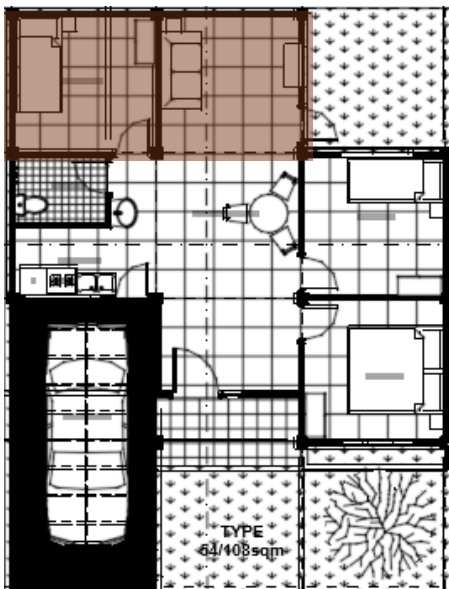
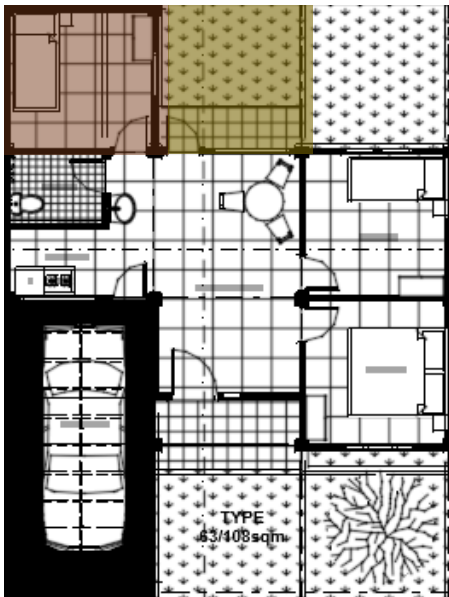
Floor Plans

The floor plans demonstrate the implementation of the incremental housing approach, illustrating the planned growth of the dwelling from the initial core house to subsequent horizontal and vertical expansion phases. The design provides a clear framework for future development while maintaining functional efficiency, structural safety, and spatial continuity.

Phase 1



Phase 2



Phase 3

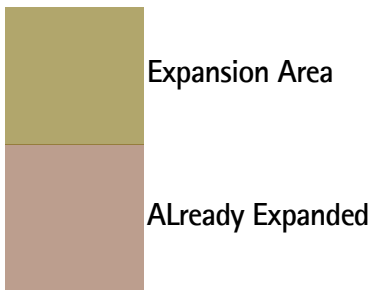
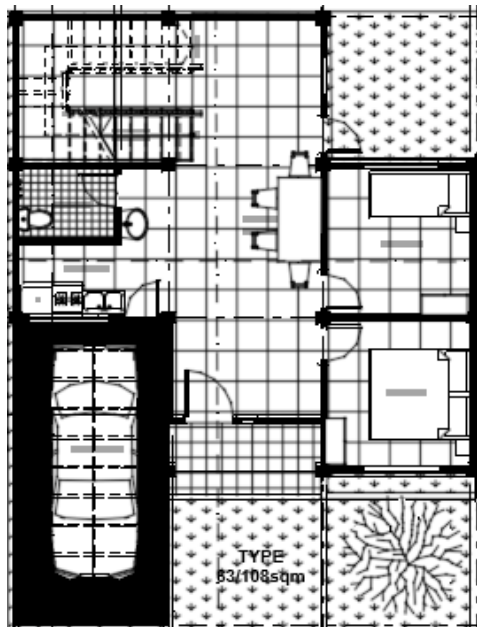
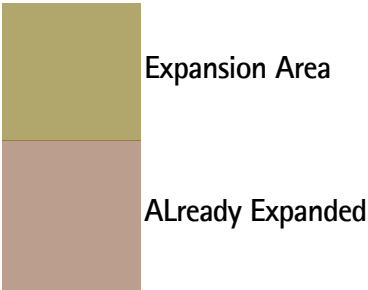
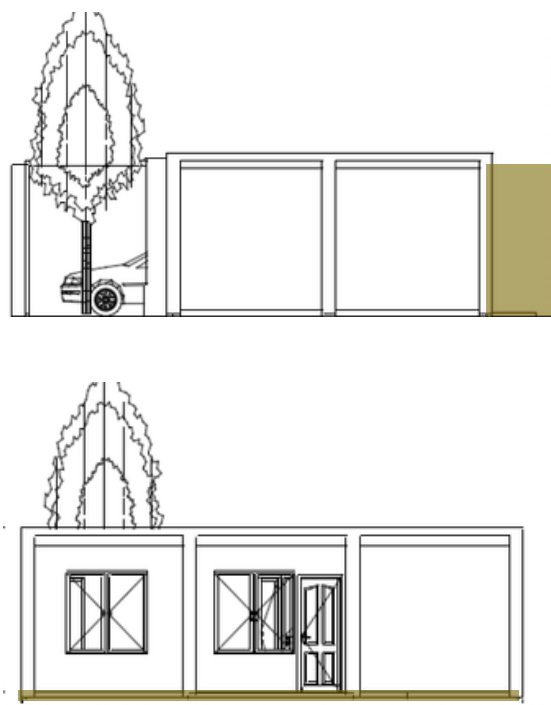


Figure 4.46
Design Proof-House-Plans
Source: Author, 2026

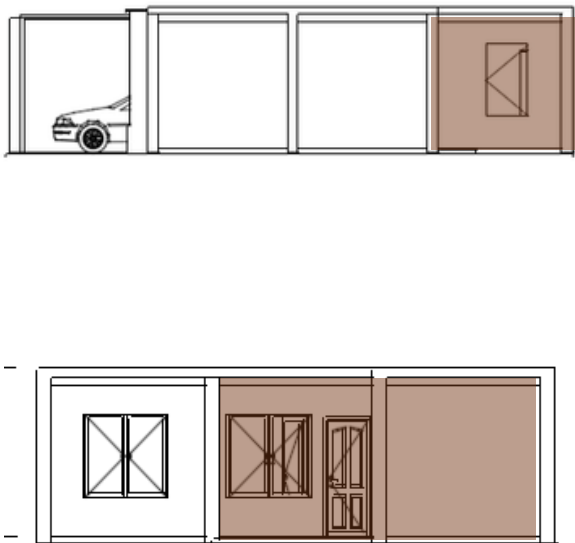
Elevation

The elevations demonstrate the implementation of the incremental housing approach, illustrating the transformation of the dwelling through successive expansion phases while maintaining architectural coherence and proportionality.

Phase 1



Phase 2



Phase 3

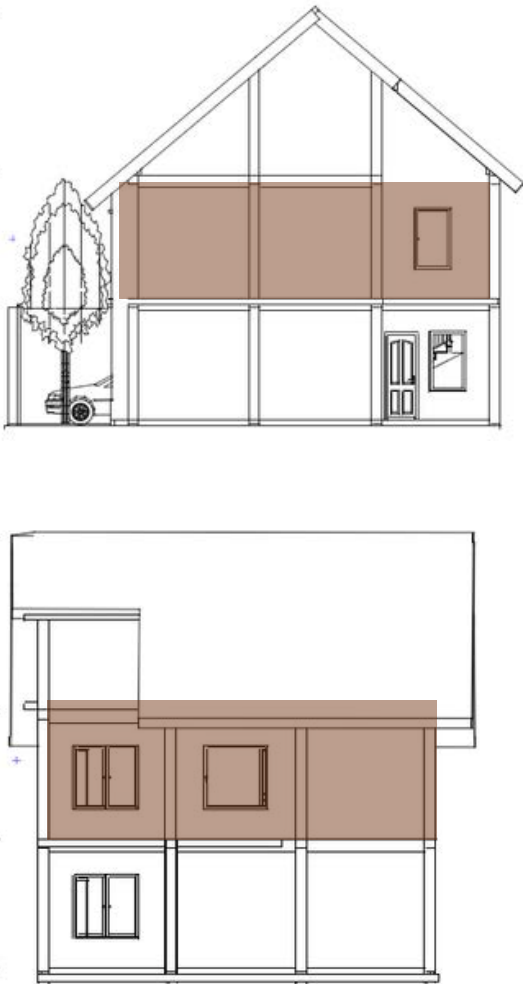
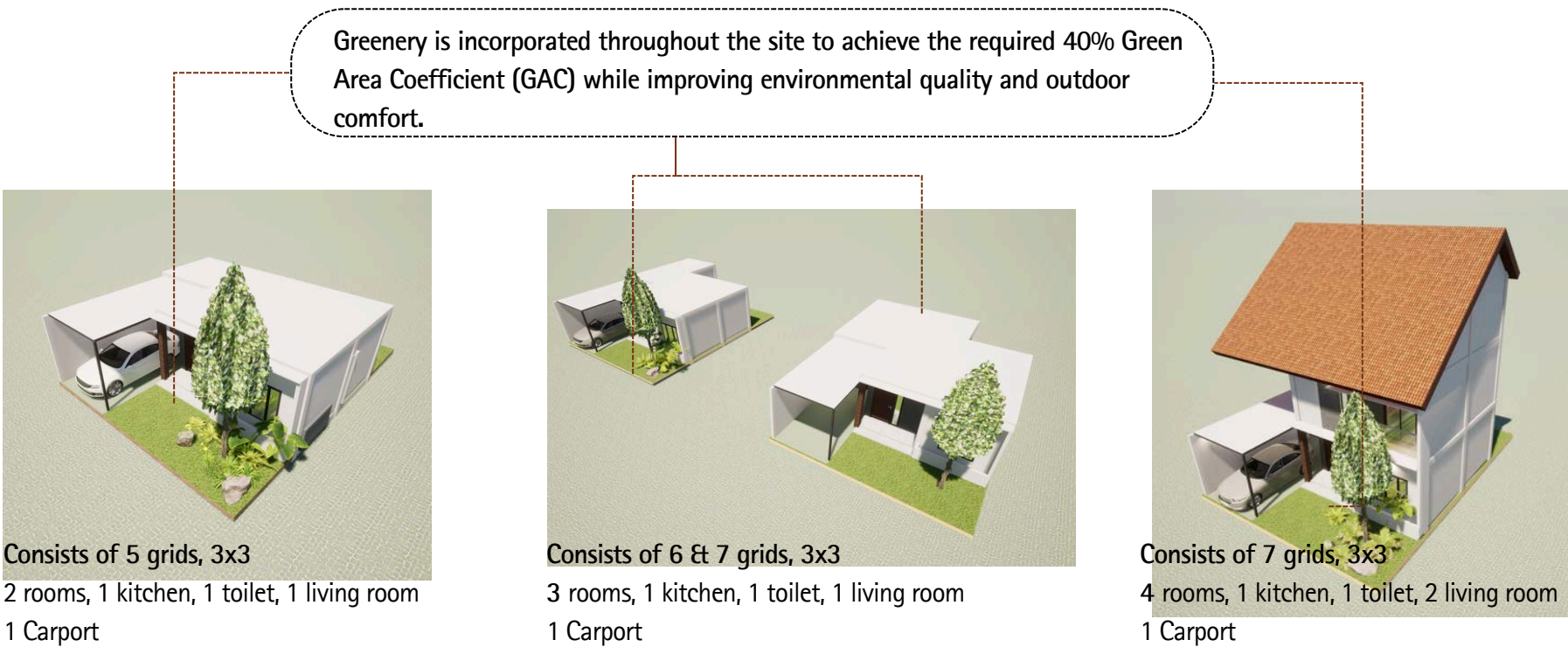


Figure 4.47
Design Proof-House-Elevations
Source: Author, 2026

Rendering Exterior

The exterior renderings illustrate the incremental housing concept, showing the transformation from a core house into larger dwelling units through planned horizontal and vertical expansions while maintaining a consistent architectural identity.



Phase 1

Phase 2

Phase 3

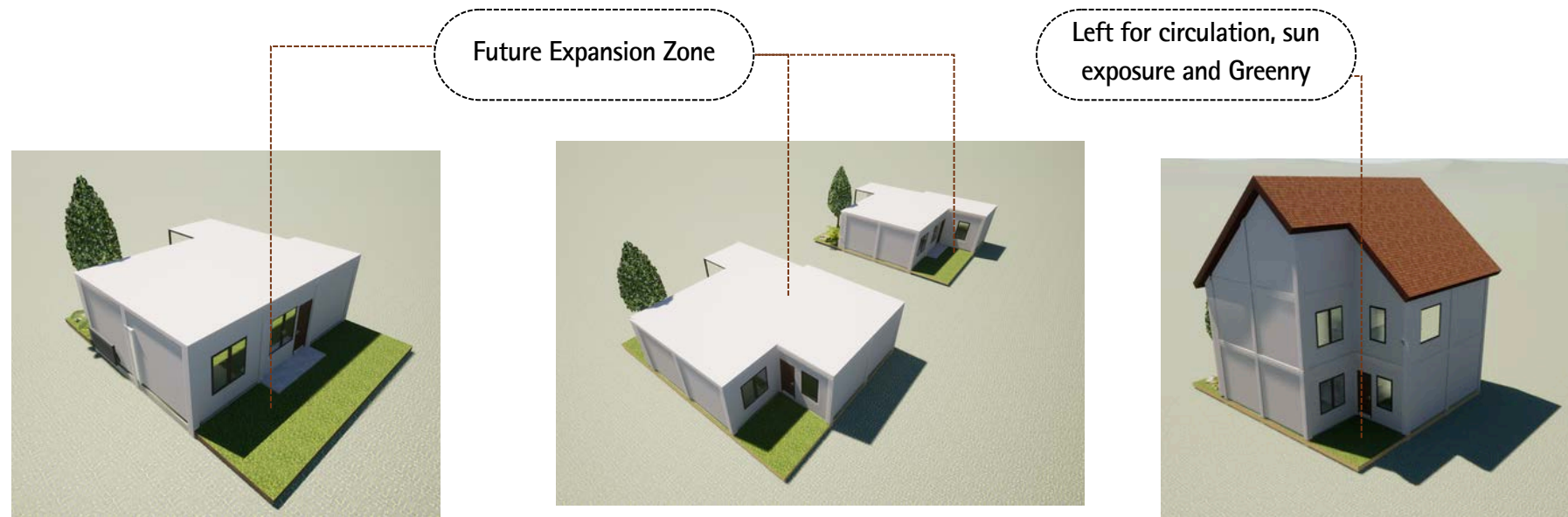


Figure 4.48
Design Proof-House-Axonometry
Source: Author, 2026

Alternative 4 - Final

Figure 4.49
Alternative 4-Houses
Source: Author, 2026

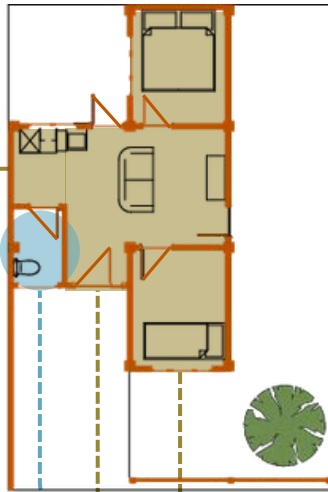


Alternative 4 provides the most practical and homeowner-friendly growth strategy by allowing the house to expand with minimal demolition and disruption. Since the future extensions are integrated into the initial design, residents can continue living comfortably in the core house while additional spaces are constructed. This approach reduces renovation costs, minimizes construction waste, and shortens the expansion process. As family needs and financial capacity grow, the house can evolve seamlessly without sacrificing comfort or functionality, making Alternative 4 the most efficient and future-ready choice for long-term living.

Alternative 4 - Final

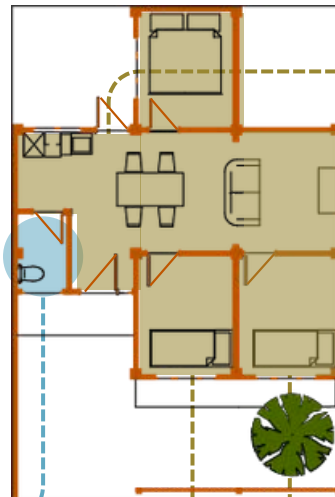
Phase 1

Type 35



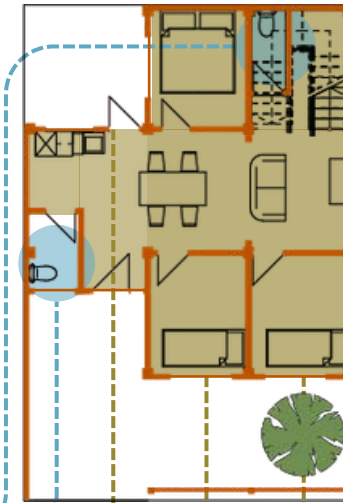
Phase 2

Type 56



Phase 3

Type 68 - 1st Floor



Easy Service

To ease the movement for service and maintenance

Facing Outside

Natural air circulation and sun exposure

Type 68-2nd Floor

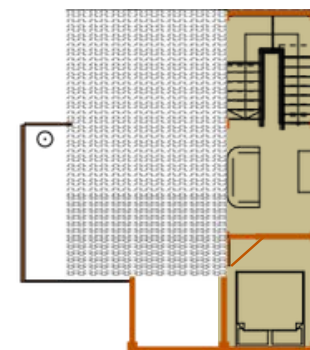


Figure 4.50
Room Programming Alternative 4-3 Phases
Source: Author, 2026

Alternative 4 was selected because it allows future expansion with minimal demolition, reducing disruption to the original core house. The expansion is planned from the beginning, enabling residents to continue living comfortably in the core house while construction takes place. This approach provides a practical and efficient growth strategy, ensuring the house can expand over time without significantly affecting the occupants' daily activities.

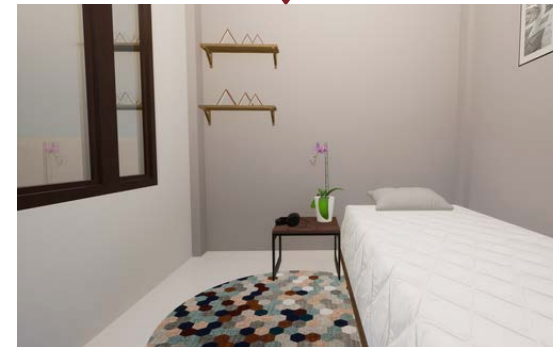
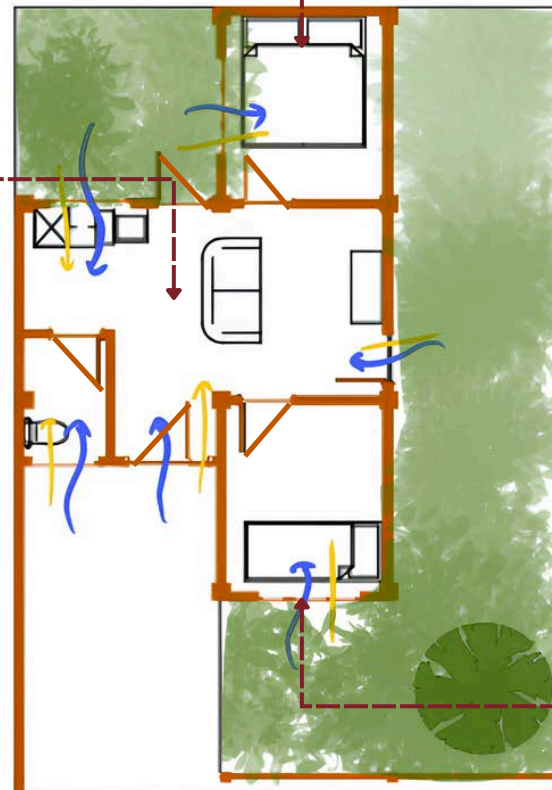
Design Solution- House

Alternative 4 Phase 1

The core house is designed using passive environmental principles. Cross ventilation is created by placing openings on opposite sides of the house. The kitchen and service area are directly connected to the outside, allowing heat, moisture, and cooking odors to escape naturally. This improves indoor air quality and reduces the need for mechanical ventilation.



The toilet is located near the front service zone, creating a compact wet area that simplifies plumbing installation, inspection, and future maintenance. By concentrating service functions in one area, infrastructure costs can be minimized from the initial construction stage.



Furthermore, the bedroom and living spaces are positioned along the building perimeter, providing direct access to daylight and natural ventilation.

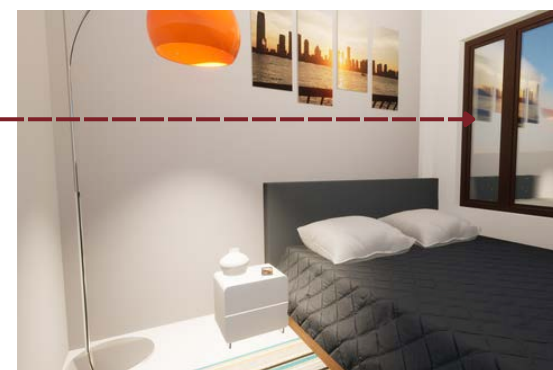


Figure 4.51
Room Programming Alternative 4-1st phase
Source: Author, 2026

Alternative 4 Phase 2

As the family's needs grow, the house can be expanded horizontally without affecting the comfort of the original core house. The bedroom is placed along the outer façade, so it continues to receive natural daylight and ventilation even after the side extension is built.

The kitchen and bathroom also remain in the same location, making it easier to extend the plumbing system without major changes. This helps reduce construction costs and allows the family to continue living in the house with minimal disruption during the expansion process.

Even after the house is enlarged, natural ventilation is maintained. Openings on opposite sides of the house allow fresh air to flow through the central living area, while the room arrangement ensures good airflow and indoor comfort throughout the expanded house.

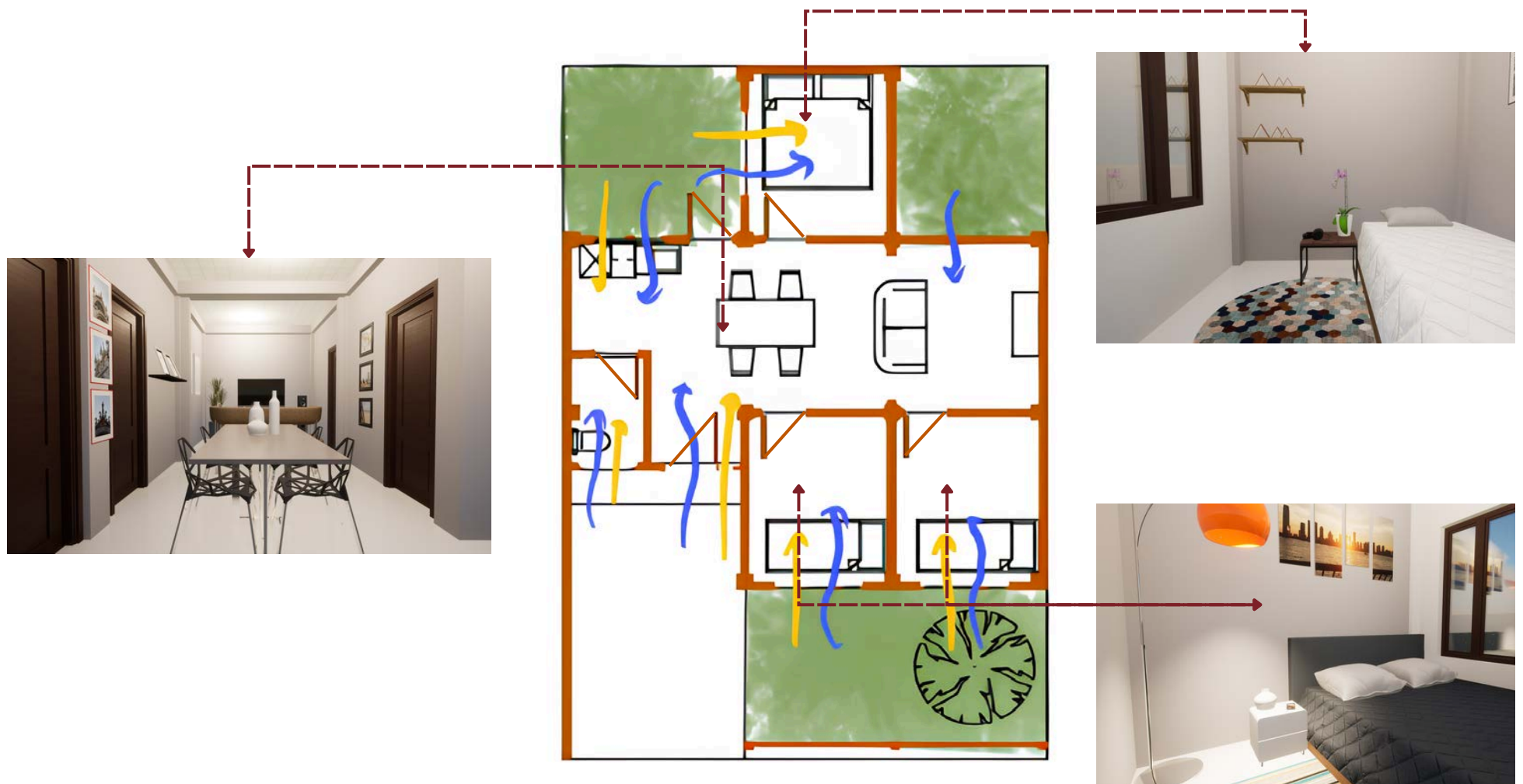
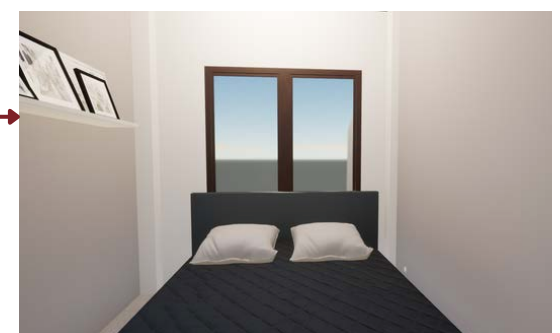
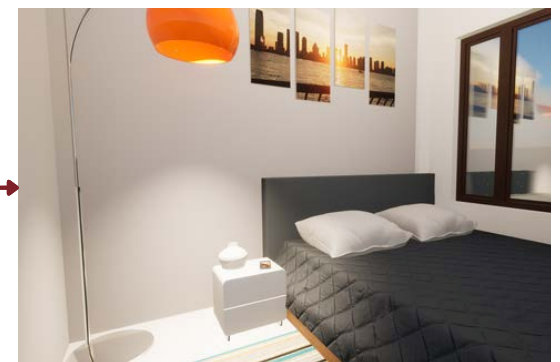
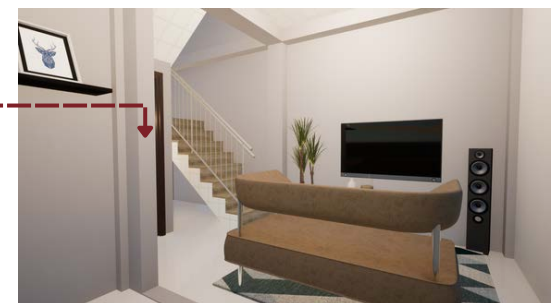
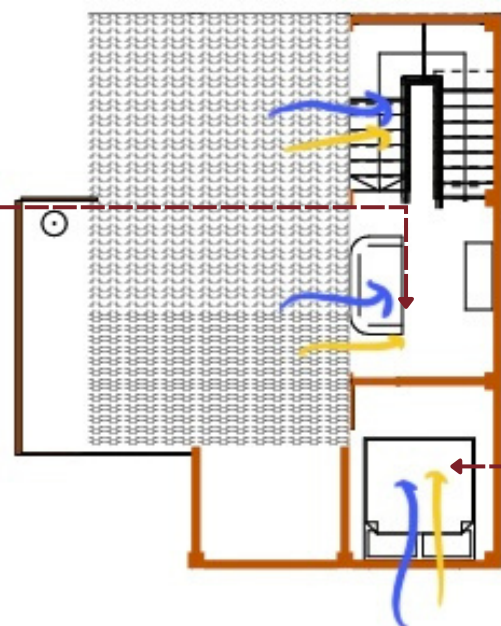
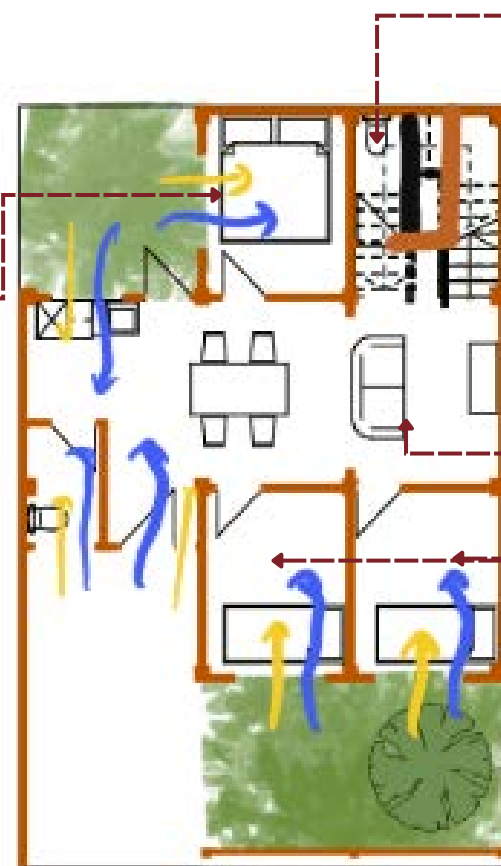
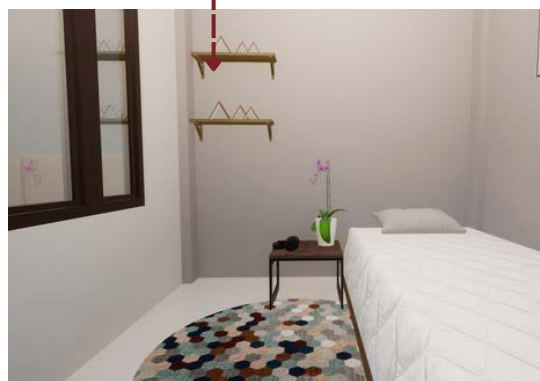


Figure 4.52
Room Programming Alternative 4-2nd phase
Source: Author, 2026

Alternative 4 Phase 3

The staircase is placed at the back of the house to support future vertical expansion with minimal demolition. This location allows an additional floor to be built without disturbing the original core house or the spaces added during the previous expansion phase. As a result, residents can continue living comfortably while construction takes place.



The bedrooms on both floors face the exterior, allowing them to receive natural daylight and fresh air. The staircase also helps improve natural ventilation by acting as a vertical air channel. Warm air rises and escapes through the upper level, while cooler air enters through openings on the lower floor. Together with cross ventilation, this helps maintain a comfortable indoor environment even after the house is expanded.

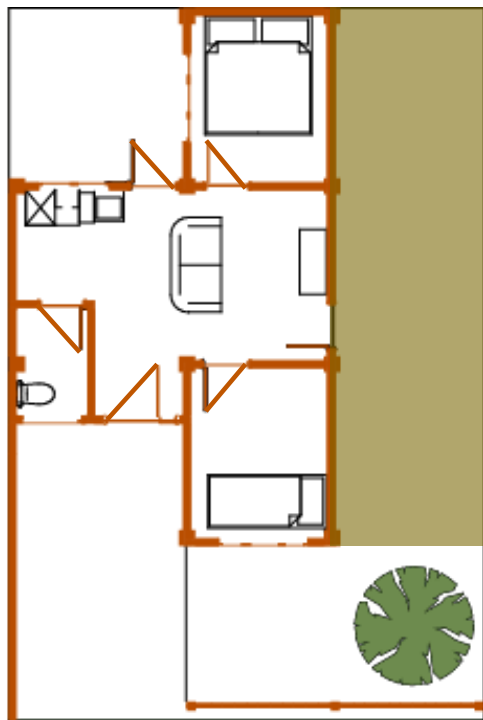
Figure 4.53
Room Programming Alternative 4-3rd phase
Source: Author, 2026

Design Proof

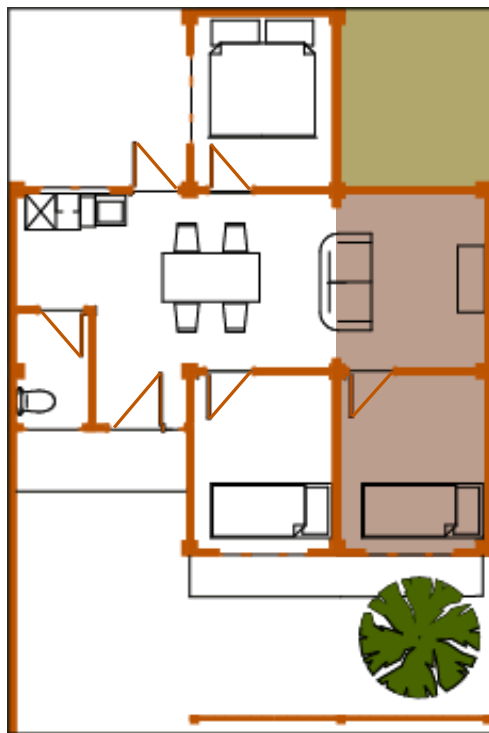
Floor Plans

The floor plans demonstrate the implementation of the incremental housing approach, illustrating the planned growth of the dwelling from the initial core house to subsequent horizontal and vertical expansion phases. The design provides a clear framework for future development while maintaining functional efficiency, structural safety, and spatial continuity.

Phase 1



Phase 2



Phase 3

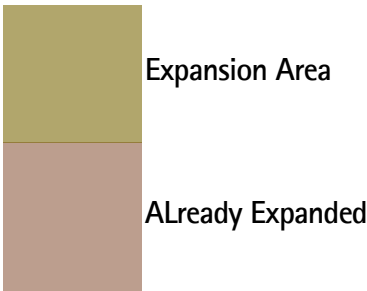
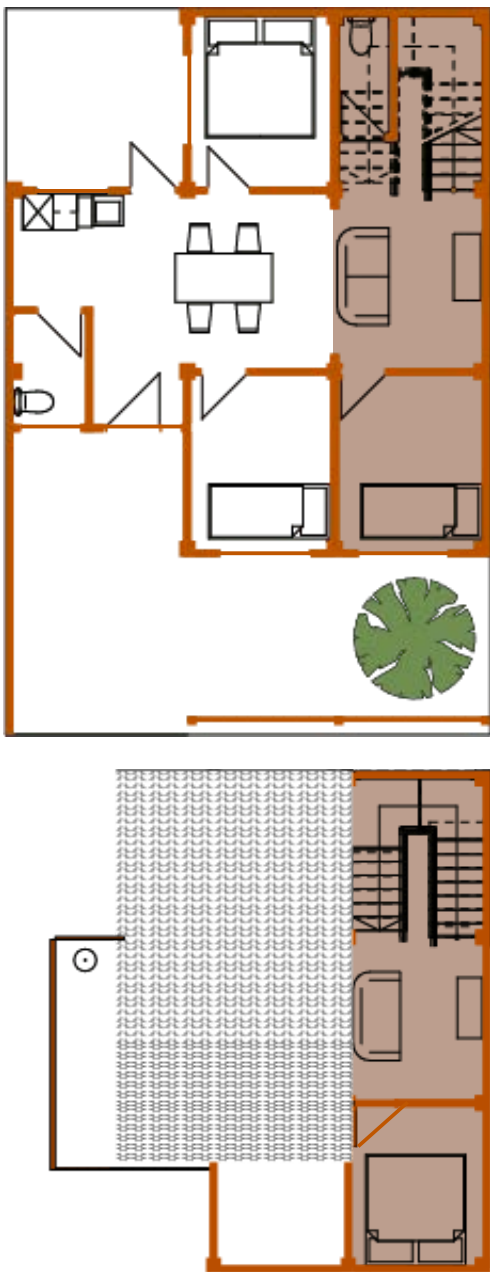
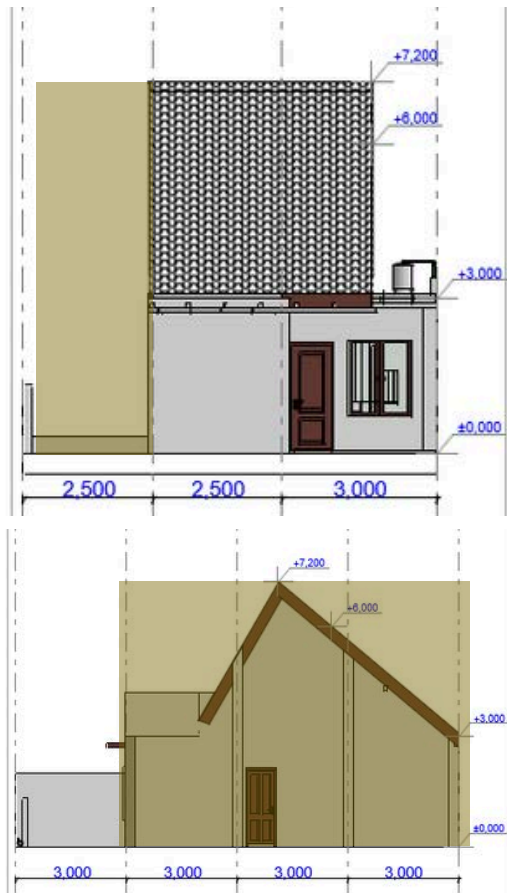


Figure 4.54
Design Proof-House-Plans
Source: Author, 2026

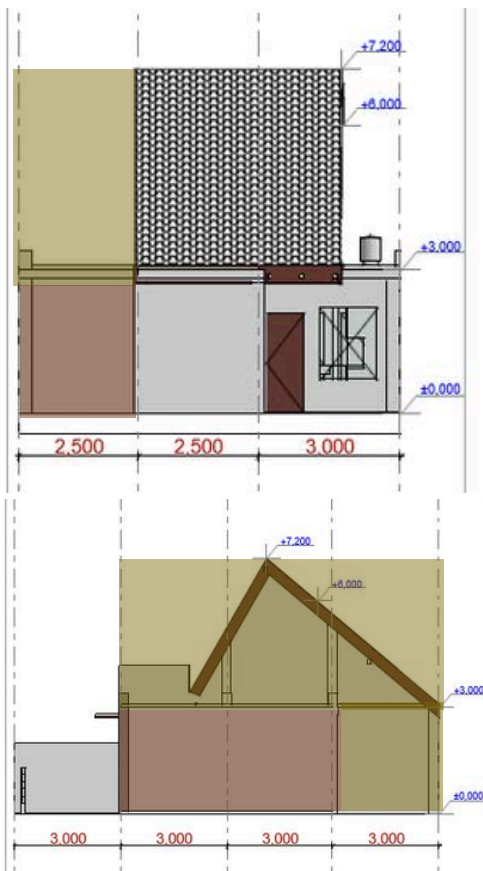
Elevation

The elevations demonstrate the implementation of the incremental housing approach, illustrating the transformation of the dwelling through successive expansion phases while maintaining architectural coherence and proportionality.

Phase 1



Phase 2



Phase 3

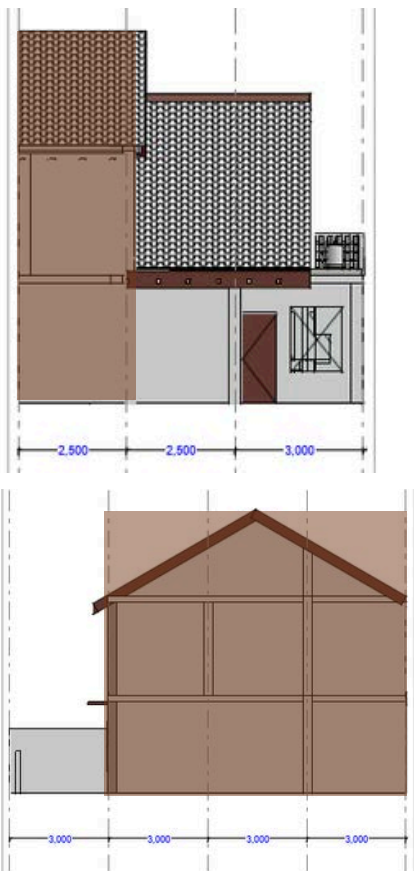
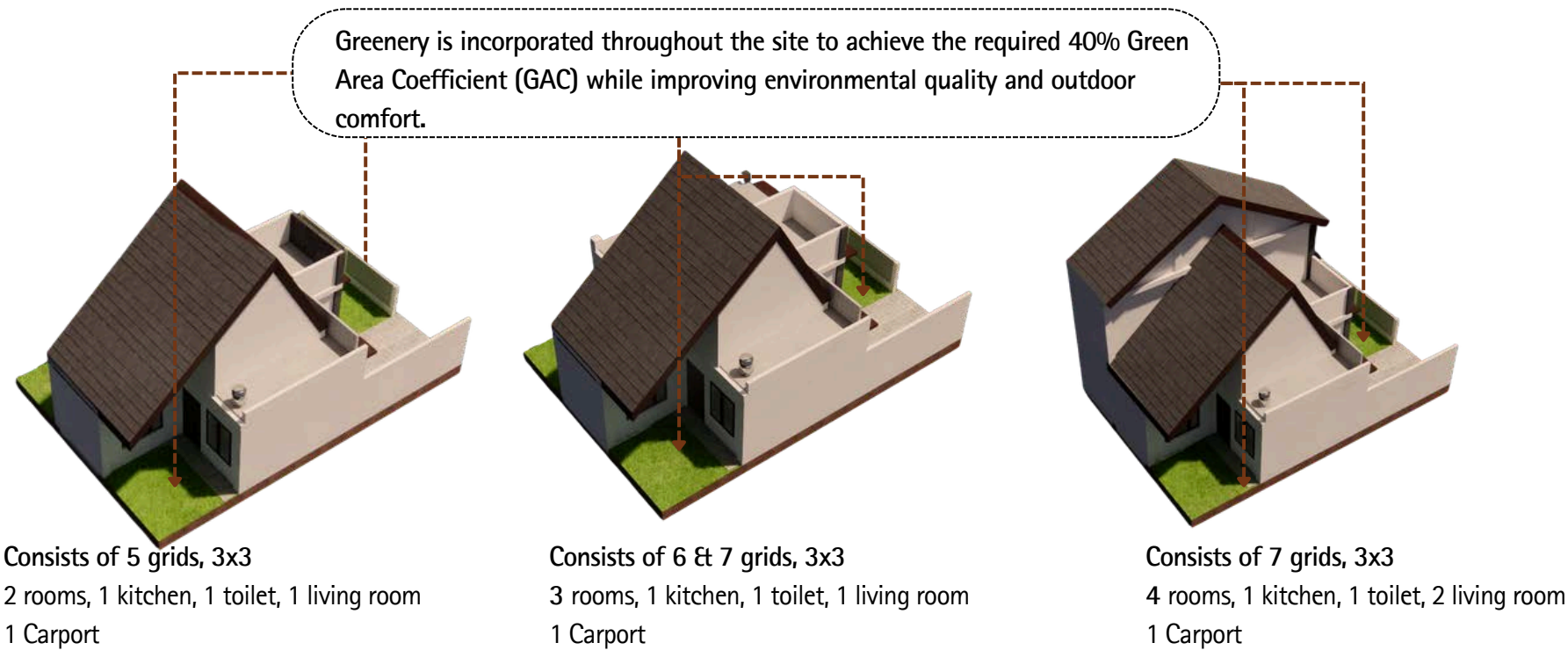


Figure 4.55
Design Proof-House-Elevations
Source: Author, 2026

Rendering Exterior

The exterior renderings illustrate the incremental housing concept, showing the transformation from a core house into larger dwelling units through planned horizontal and vertical expansions while maintaining a consistent architectural identity.



Phase 1

Phase 2

Phase 3

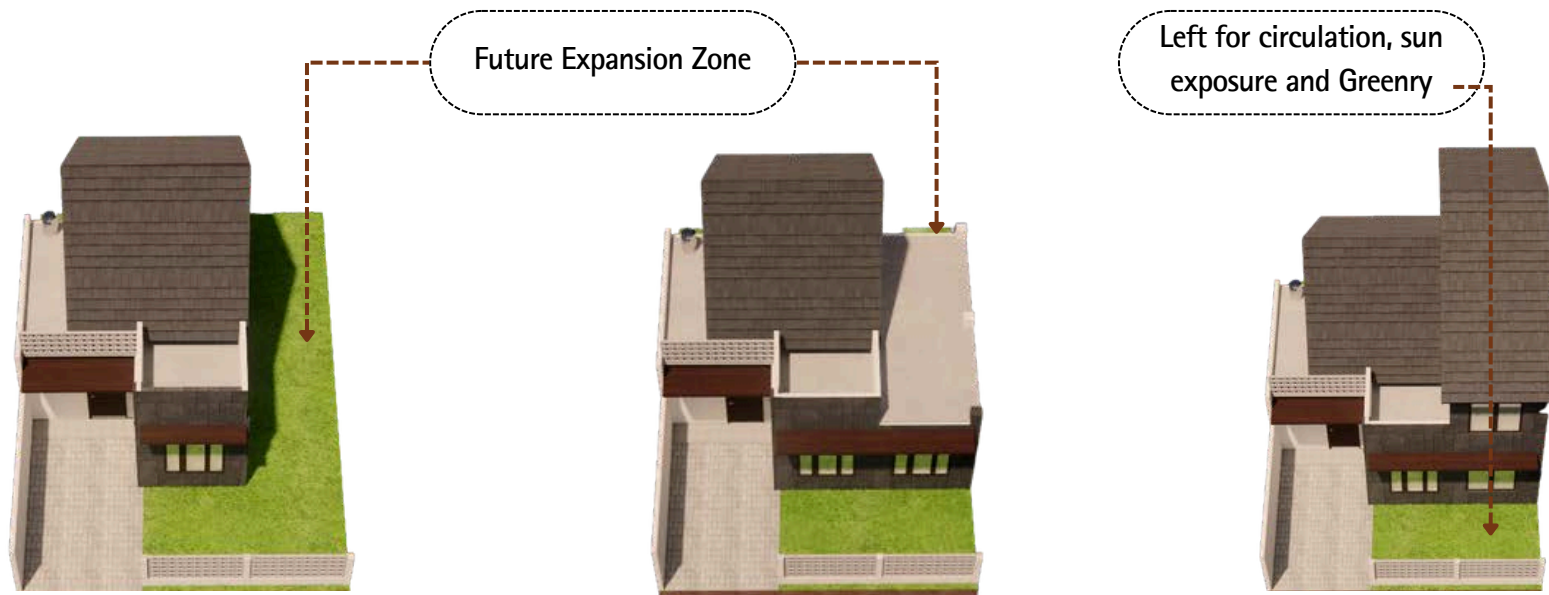


Figure 4.56
Design Proof-House-Axonometry
Source: Author, 2026

Phase 1

Phase 1 is the initial core house offered to buyers. It includes two bedrooms, one bathroom, a kitchen, a living area, and a carport. The house also provides a front garden, a back garden, and a side yard that is reserved for future expansion. This layout ensures the house is fully functional from the beginning while allowing homeowners to easily expand as their needs and budget grow. A 35 sqm building on 96 sqm land area.



Figure 4.57
Phase 1
Source: Author, 2026

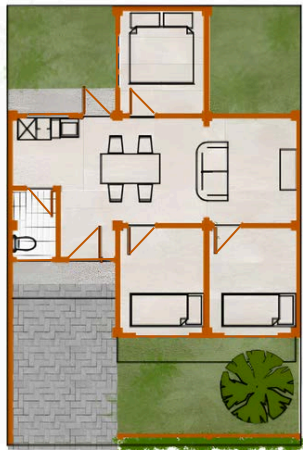


Phase 2

In Phase 2, the house is expanded by two structural grids to the side, adding one additional bedroom and a larger living area. One grid is intentionally left undeveloped to accommodate the future staircase for vertical expansion in Phase 3. This expansion requires only minimal demolition, allowing the original core house to remain functional and comfortable while construction takes place. A 56 sqm building on 96 sqm land area.



Figure 4.58
Phase 2
Source: Author, 2026



Phase 3

In Phase 3, the house expands vertically without any demolition, requiring only new construction. The staircase is built in the space reserved during Phase 2, providing access to the second floor. A second bathroom is added beneath the stairs, while the upper floor includes one additional bedroom. This planned expansion allows the house to grow efficiently without disrupting the existing living spaces. a 68 sqm building in 96 sqm land area.

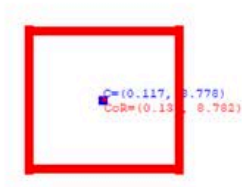


Figure 4.59
Phase 3
Source: Author, 2026



Design Proof-RESIST

Building Construction



The structure is evaluated as a normal 2-storey residential building with a total height of 8.5 meters. The house uses a 3 × 3 meter structural grid, which makes the column spacing simple, regular, and efficient for residential construction. The roof, floor, interior wall, and external wall loads are categorized as light to medium, so the structure is still suitable for a small residential unit.

Building Construction

Building importance category	Normal structures
Number of storeys	2
Total height	8.5 m
Floor plan points	(-1.41, 7.364), (1.645, 7.431), (1.645, 10.13), (-1.365, 10.2)
Floor plan properties	Area: 8.393 m ² ; Perimeter length: 11.6 m; Centroid: (0.1167, 8.778) m; Bound lengths: (3.055, 2.834) m
Inter-storey height	3 m
Floor	Weight type: medium, Dead load: 2.90 kPa, Live load: domestic (2.00 kPa)
Interior wall	Weight type: light, Dead load: 0.30 kPa (over floor area)
External wall	Weight type: medium, Dead load: 1.26 kPa (over wall area)
Roof	Weight type: medium, Weight type: medium, Height: 2.5 m, Dead load: 0.80 kPa (over floor area), Live load: 0.25 kPa (over floor area)
Structure in X direction	Reinforced Concrete Moment Frame (x 2) Locations: (0.2019, 7.389), (0.1107, 10.18)
Structure in Y direction	Reinforced Concrete Moment Frame (x 2) Locations: (-1.375, 8.781), (1.64, 8.781)

Foundation

The app suggests using foundation beams with square pad foundations. The distance between pads is 3 meters, with a pad width of 0.90 meters and pad depth of 0.30 meters. This foundation system is suitable for a small residential building because the loads are relatively moderate and the structural grid is regular.



The result shows that the structure performs within the acceptable range for wind and earthquake loads in both X and Y directions. The highest demand appears in earthquake drift, reaching around 87–89%, but it is still below 100%, meaning the structure is still acceptable according to the app evaluation.

Y Direction Structure

Lateral Load Structure, Y Direction

Type	Reinforced Concrete Moment Frame
Design method	Limit-state
Number of frames	2
Number of bays	1
Bay length	3m
Floor width supported by beam	2m
Column size	Depth: 0.3m, Width: 0.18m
Beam size	Depth: 0.3m, Width: 0.153m
Foundations	Foundation beam: centre-line distance between pads: 3.00 m, square pad width: 0.90 m, pad depth: 0.30 m To anchor the lateral resisting component against tensile uplift, the weight and strength of ground slabs and foundation beams may suffice.

In the Y direction, the structure also uses a reinforced concrete moment frame with 2 frames and 1 bay. The bay length is also 3 meters, making the structural system balanced in both directions. The same column and beam dimensions are used, which creates a consistent and simple structural system.

X Direction Structure

Lateral Load Structure, X Direction

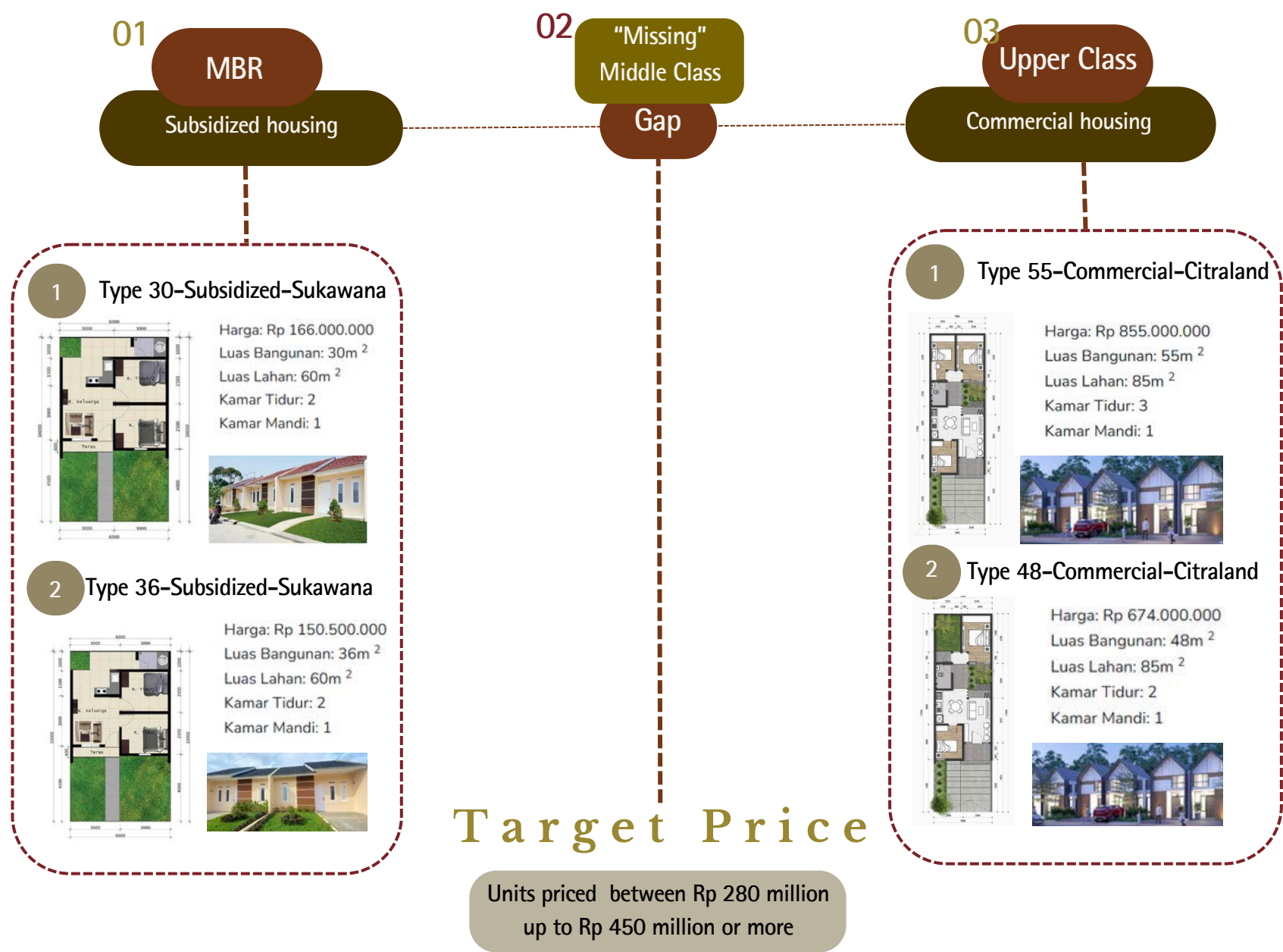
Type	Reinforced Concrete Moment Frame
Design method	Limit-state
Number of frames	2
Number of bays	1
Bay length	3m
Floor width supported by beam	2m
Column size	Depth: 0.3m, Width: 0.18m
Beam size	Depth: 0.3m, Width: 0.153m
Foundations	Foundation beam: centre-line distance between pads: 3.00 m, square pad width: 0.90 m, pad depth: 0.30 m To anchor the lateral resisting component against tensile uplift, the weight and strength of ground slabs and foundation beams may suffice.

In the X direction, the building uses a reinforced concrete moment frame with 2 frames and 1 bay. The bay length is 3 meters, following the 3 × 3 meter grid. The column size is 30 × 18 cm, and the beam size is approximately 30 × 15.3 cm. This shows that the structure can resist lateral loads through the beam-column frame system.

Overall Reasoning

Overall, the RESIST result supports the use of a 3 × 3 meter reinforced concrete grid for the residential unit, applied from 5 grids in the core house stage and developed up to 7 grids after expansion. The regular column spacing makes the structure efficient, easy to construct, and suitable for the incremental housing concept. With vertical expansion to the second floor, the reinforced concrete moment frame helps resist lateral loads from wind and earthquakes. Since the structural demand remains below 100%, the proposed system can be considered adequate for the 2-storey house, while still requiring detailed structural verification in the next design stage.

Precedents Estimated Price



Household Income	Maximum Monthly Mortgage (30%)	Estimated House Price (8 Years)
Rp5,000,000	Rp1,500,000	± Rp144–168 million
Rp10,000,000	Rp3,000,000	± Rp280–350 million
Rp15,000,000	Rp4,500,000	± Rp432–504million
Rp 20,000,000	Rp 6,000,000	± 576-672 Million

Figure 4.60
Precedents Estimated Price
Source: Author, 2026

Business Model Canvas (BMC)

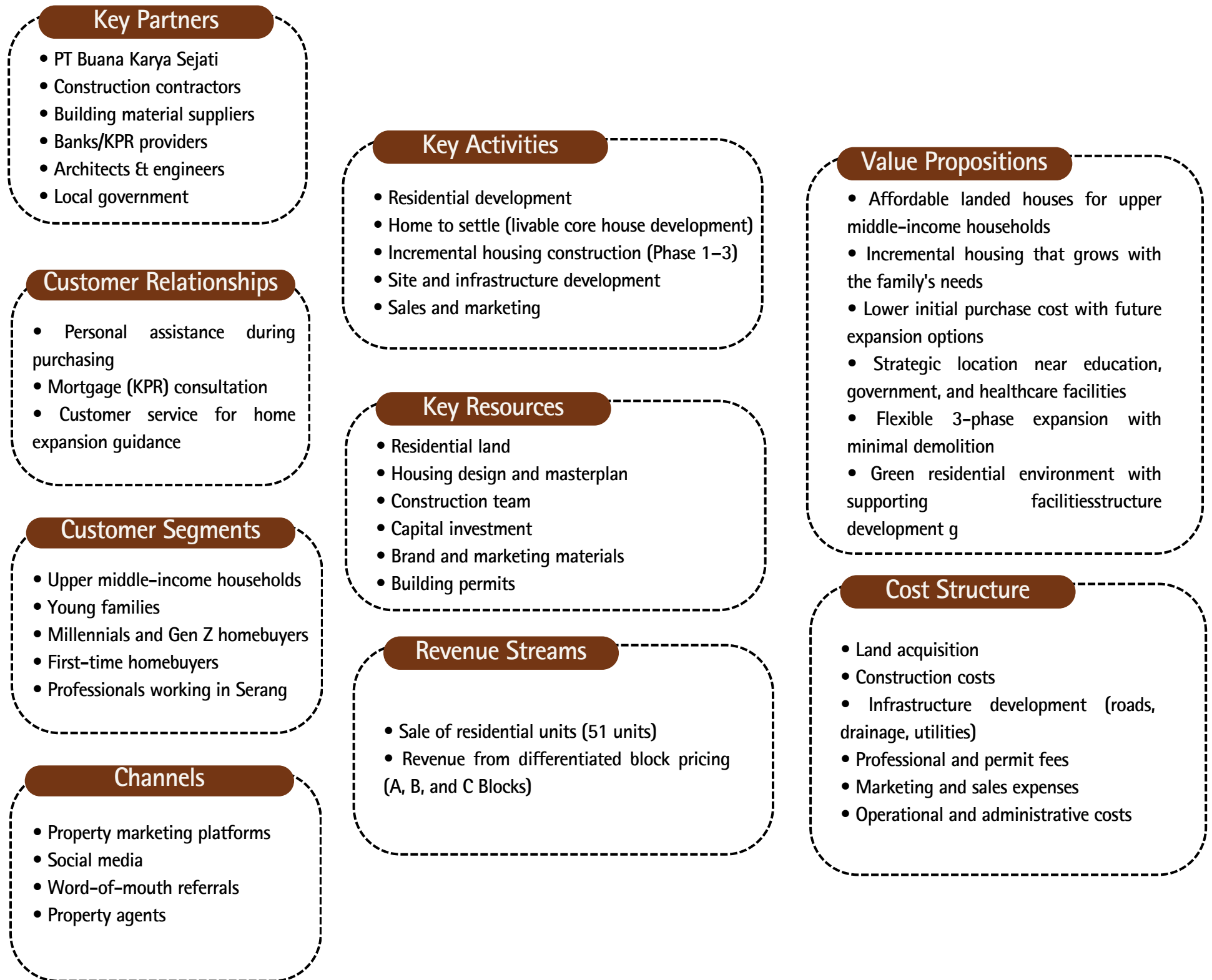


Figure 4.61
Business Model Canvas (BMC)
Source: Author, 2026



05. *DESIGN DEVELOPMENT*

5.1 Schematic Design



Figure 5.1
Exterior Rendering Houses
Source: Author, 2026





Figure 5.2
Exterior Rendering Houses
Source: Author, 2026

Site Plan

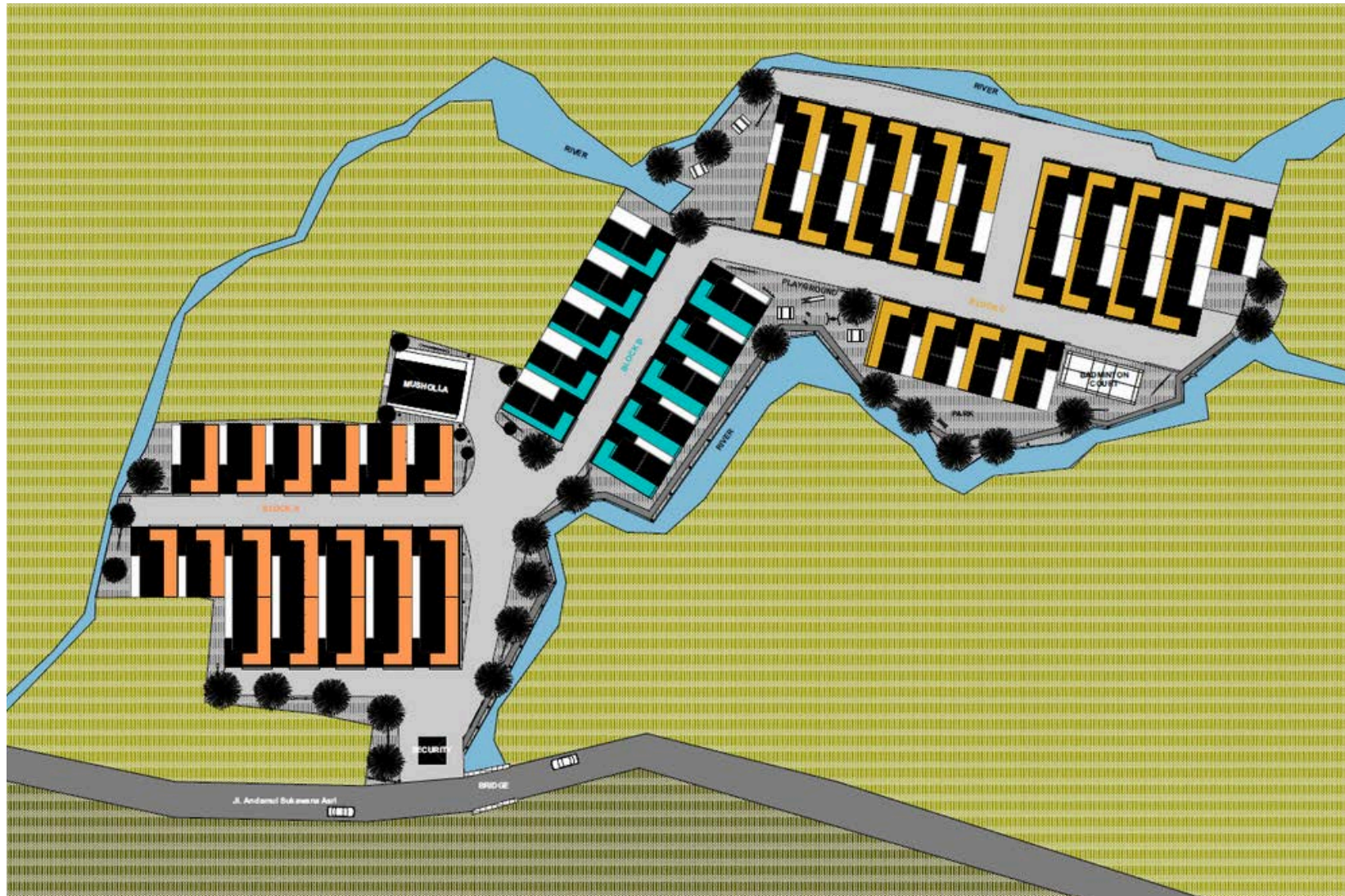


Figure 5.3
Block Plan
Source: Author, 2026

The site planning was developed based on the natural condition of the land. The existing river is preserved as a natural landscape element, while buildings are placed outside the required river setback. Green spaces and trees are distributed to provide shading and create comfortable outdoor spaces. Internal roads connect all residential blocks efficiently, while pedestrian paths link the houses to public facilities such as the musholla, playground, park, and badminton court. This layout creates a safe, accessible, and community-oriented residential environment.

Phase 1

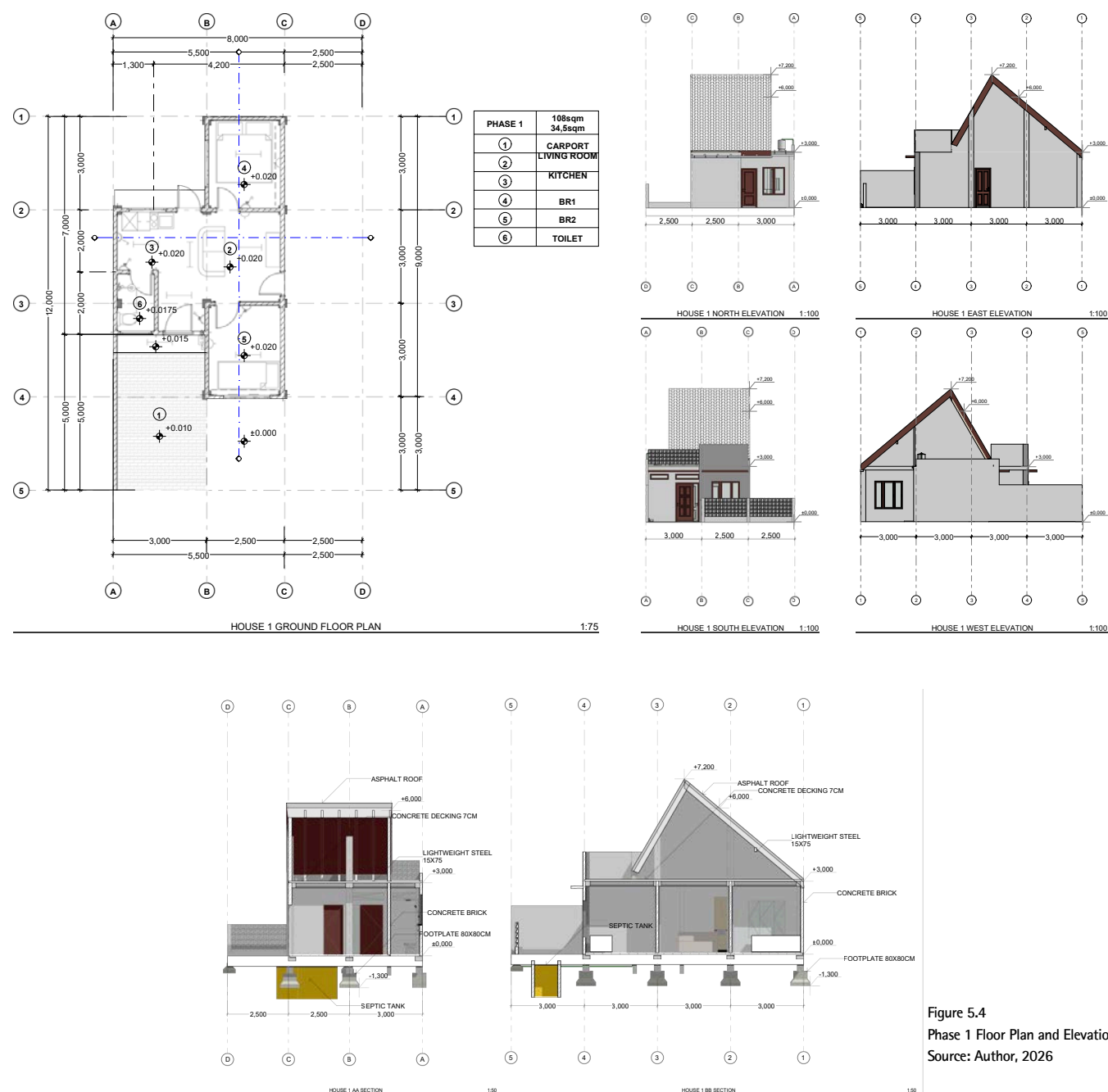


Figure 5.4
Phase 1 Floor Plan and Elevations
Source: Author, 2026

the core house, which represents the initial and most affordable stage of the incremental housing concept. The house is designed to be fully functional from the beginning, providing all the essential spaces needed for daily living, including one bedroom, one bathroom, a living room, a kitchen, and a carport. Although the built area is only 34.5 square meters on a 108-square-meter plot, the structural frame and column layout are already designed to accommodate future expansions. This minimizes demolition and reduces future construction costs while allowing residents to move into a complete and livable home immediately."

Floor Pattern Plan and Ceiling Plan

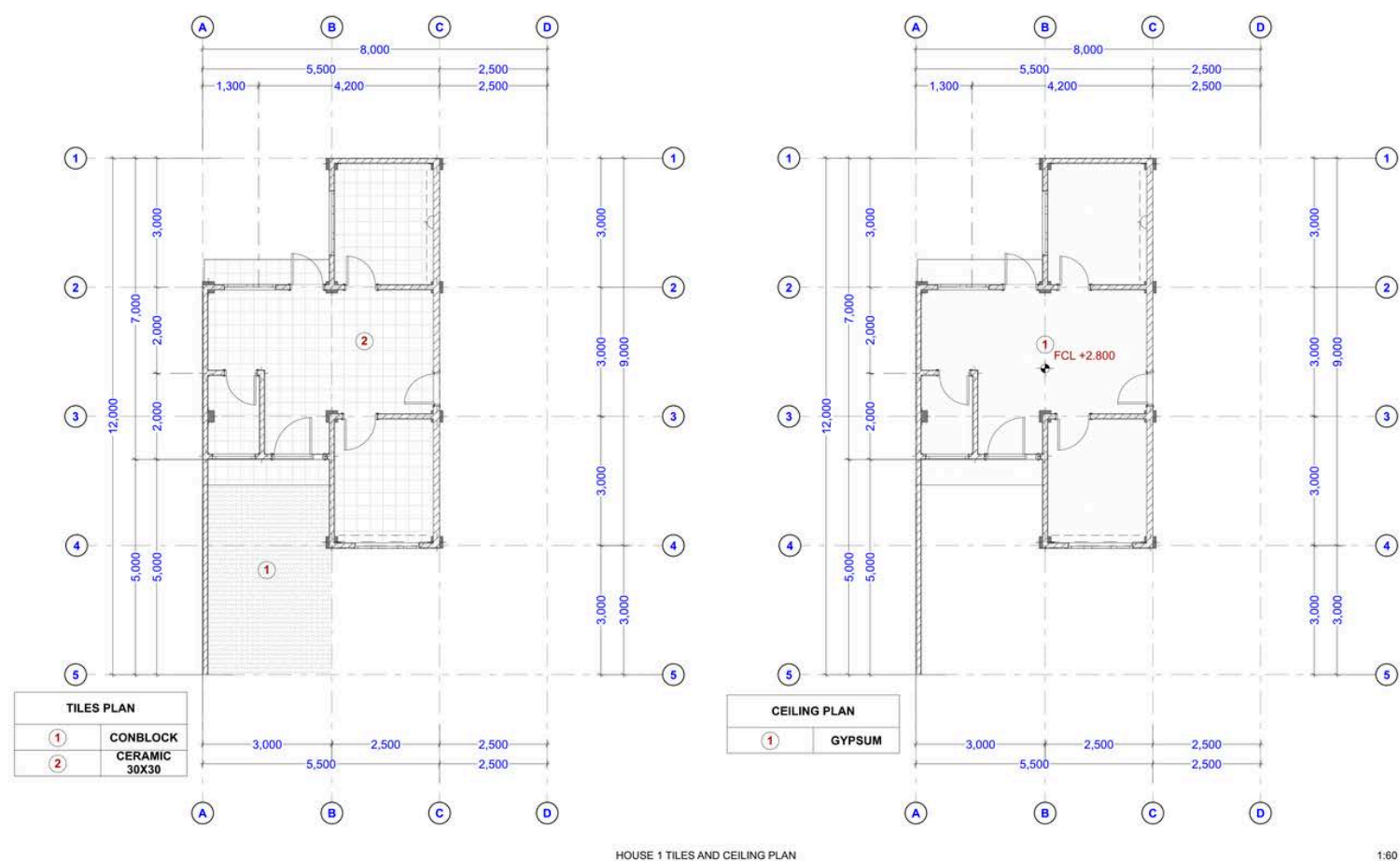


Figure 5.5
Phase 1 Floor Pattern Plan and Ceiling Plan
Source: Author, 2026

The illustration presents the floor pattern plan and ceiling plan for Phase 1 of the house. The floor pattern uses 30 × 30 cm ceramic tiles for the main interior spaces, while conblock paving is applied to the outdoor carport area. The ceiling plan shows the use of a gypsum ceiling throughout the main indoor spaces, following the room layout and structural grid. Together, these drawings provide guidance for the selection, placement, and installation of floor and ceiling finishes during the initial construction phase.

Structure

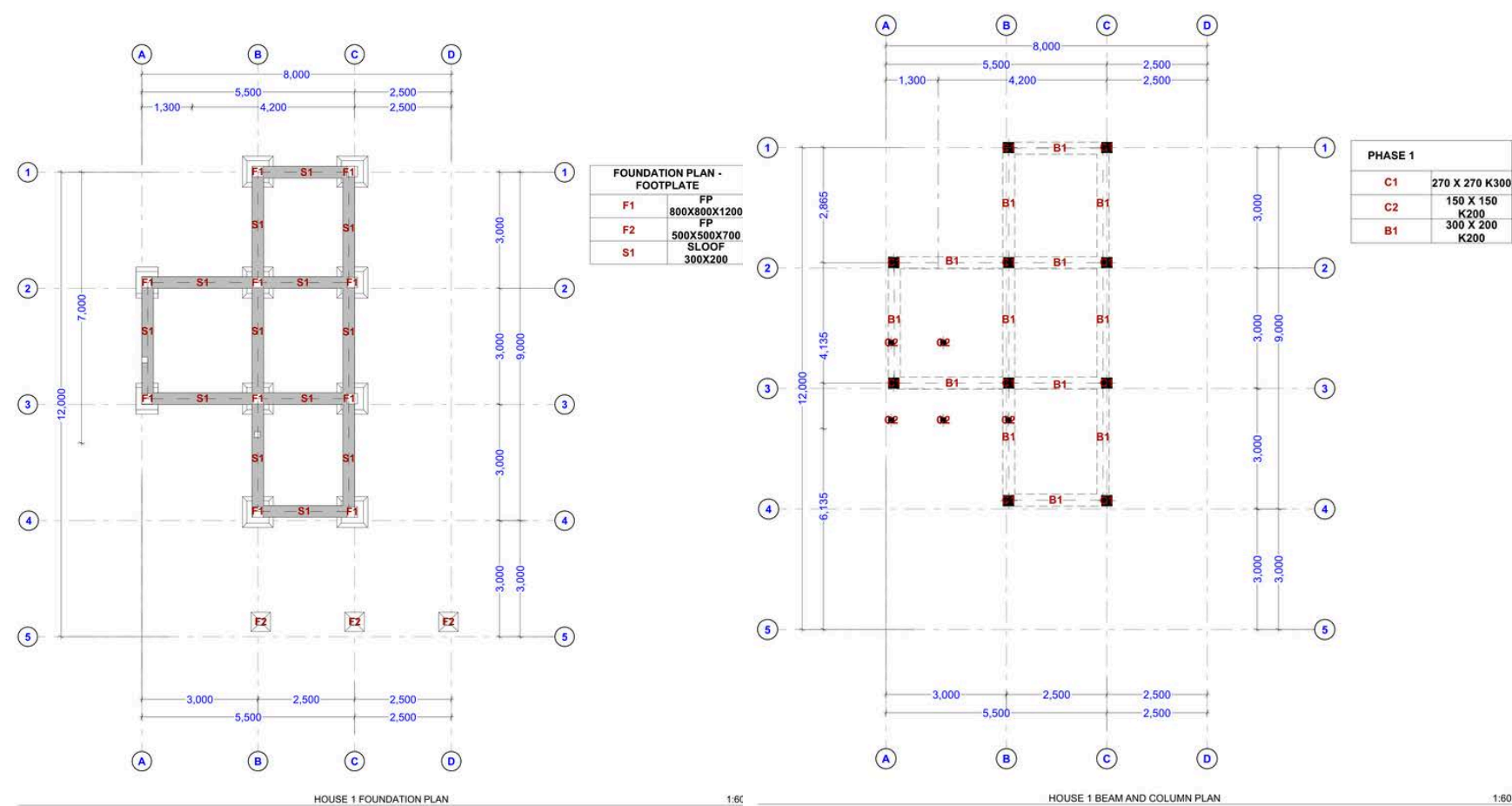


Figure 5.6
Phase 1 Structure
Source: Author, 2026

The illustration presents the structural system for Phase 1 of the house, including the foundation, column, and beam plans. The foundation uses footplate foundations connected by reinforced concrete sloof beams to distribute structural loads to the ground. The upper structural system consists of reinforced concrete columns and beams arranged according to the building grid. This structural layout is designed to provide stability for the initial house while also supporting the planned future horizontal and vertical expansion of the incremental housing concept.

Plumbing

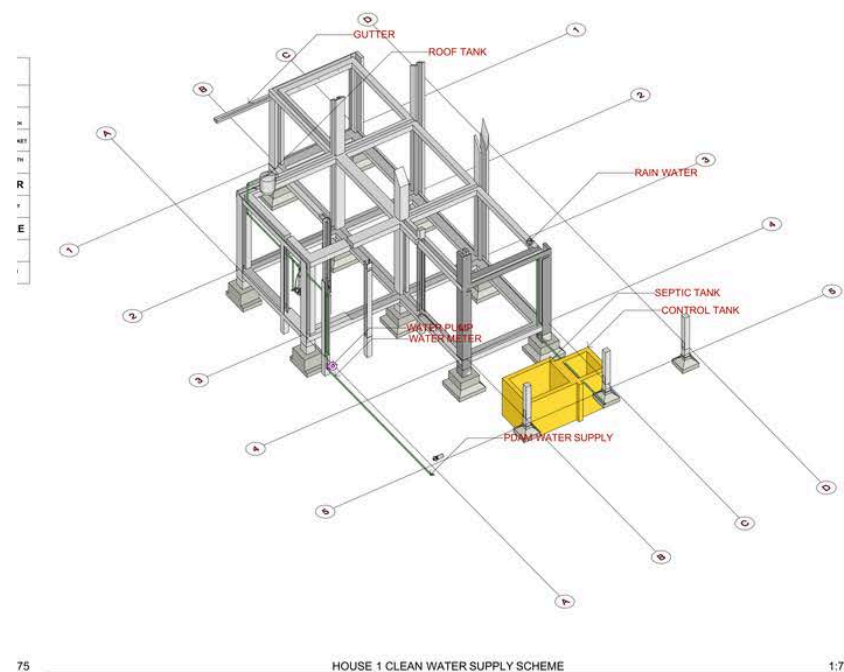
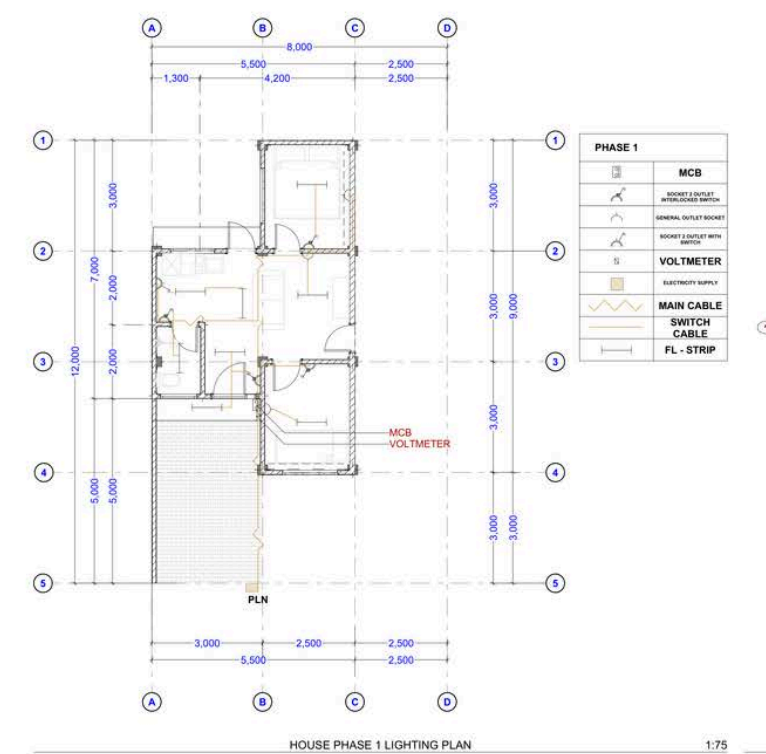
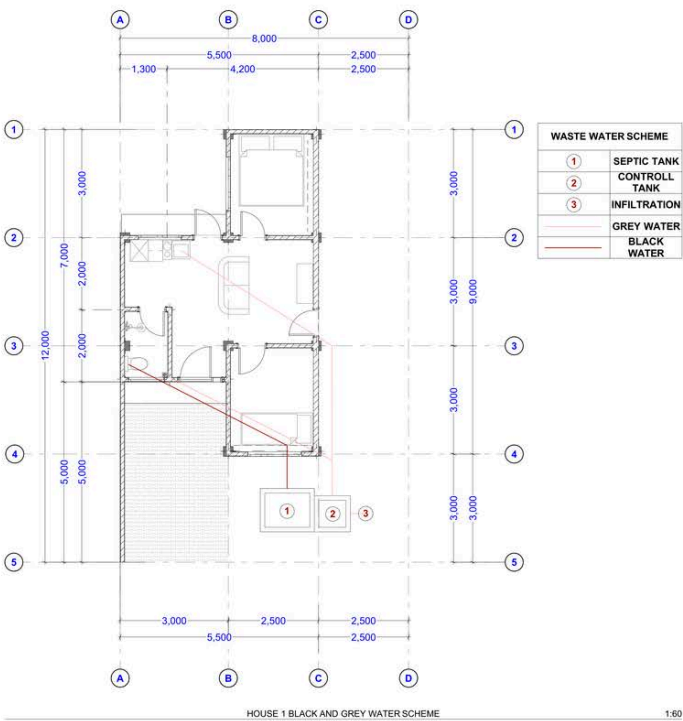


Figure 5.7
Phase 1 Plumbing
Source: Author, 2026

The illustration presents the Phase 1 utility systems, including clean water supply, wastewater, rainwater drainage, and electrical distribution. Clean water is supplied from the main water source through a water meter and distributed to a roof tank before reaching household fixtures. Wastewater is separated into greywater and blackwater, with blackwater directed to the septic tank and control tank before infiltration. Rainwater from the roof is collected through gutters and directed to the drainage system. The electrical plan shows the distribution from PLN through the MCB and voltmeter to lighting, switches, and electrical outlets throughout the house.



Interior- Phase 1

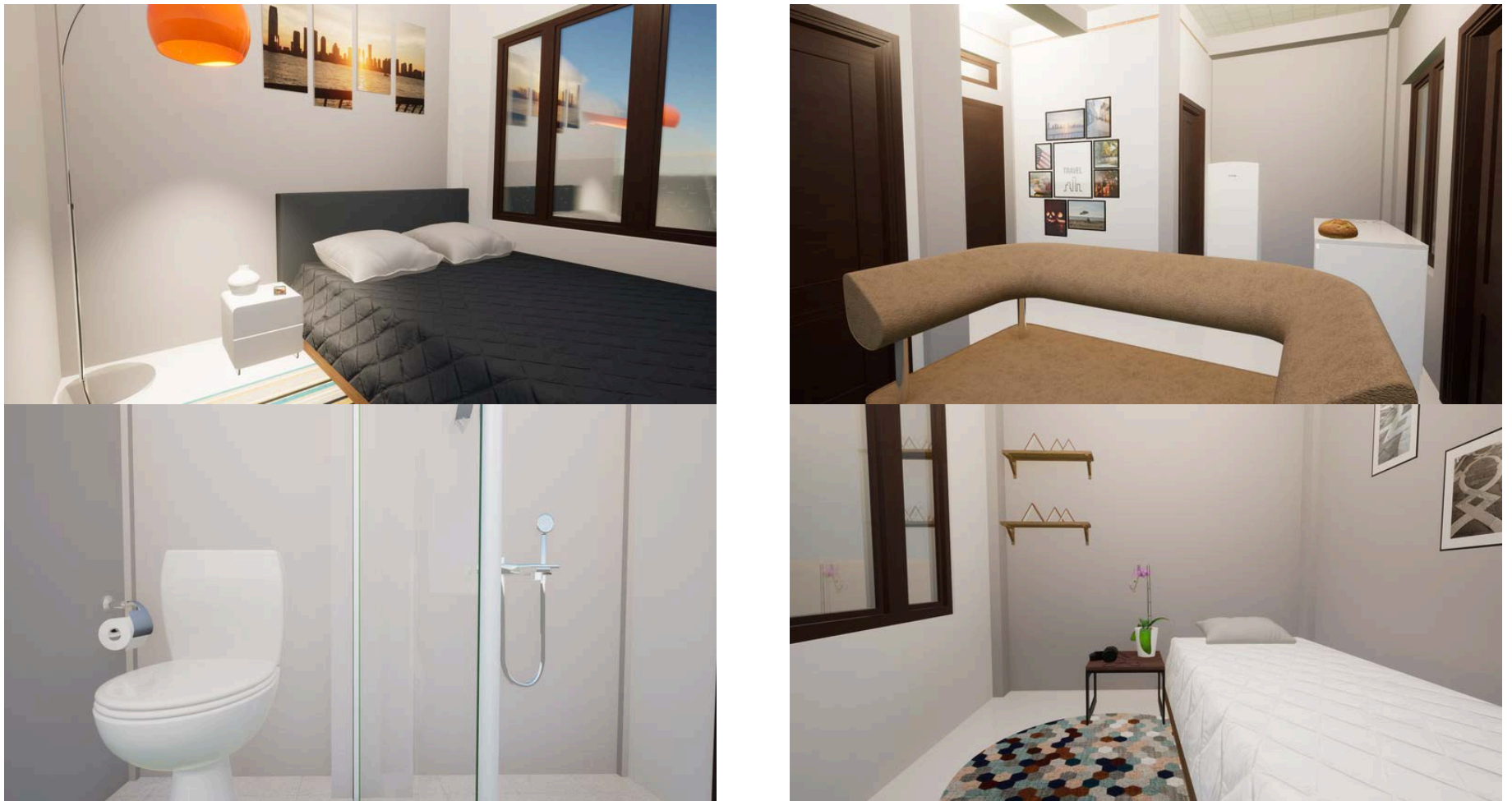


Figure 5.8
Phase 1 Interior
Source: Author, 2026

The illustration presents the Phase 1 interior design, showing the main spaces provided in the initial house, including two bedrooms, a bathroom, and the living and kitchen area. The interior uses a simple and functional approach with broken-white walls, beige ceramic flooring, and dark wood accents to create a warm and neutral atmosphere. Windows provide natural daylight and ventilation, while the furniture arrangement maintains efficient circulation within the compact spaces. The design provides essential living functions in Phase 1 while allowing the house to be expanded in the following phases according to residents' future needs.

Phase 2

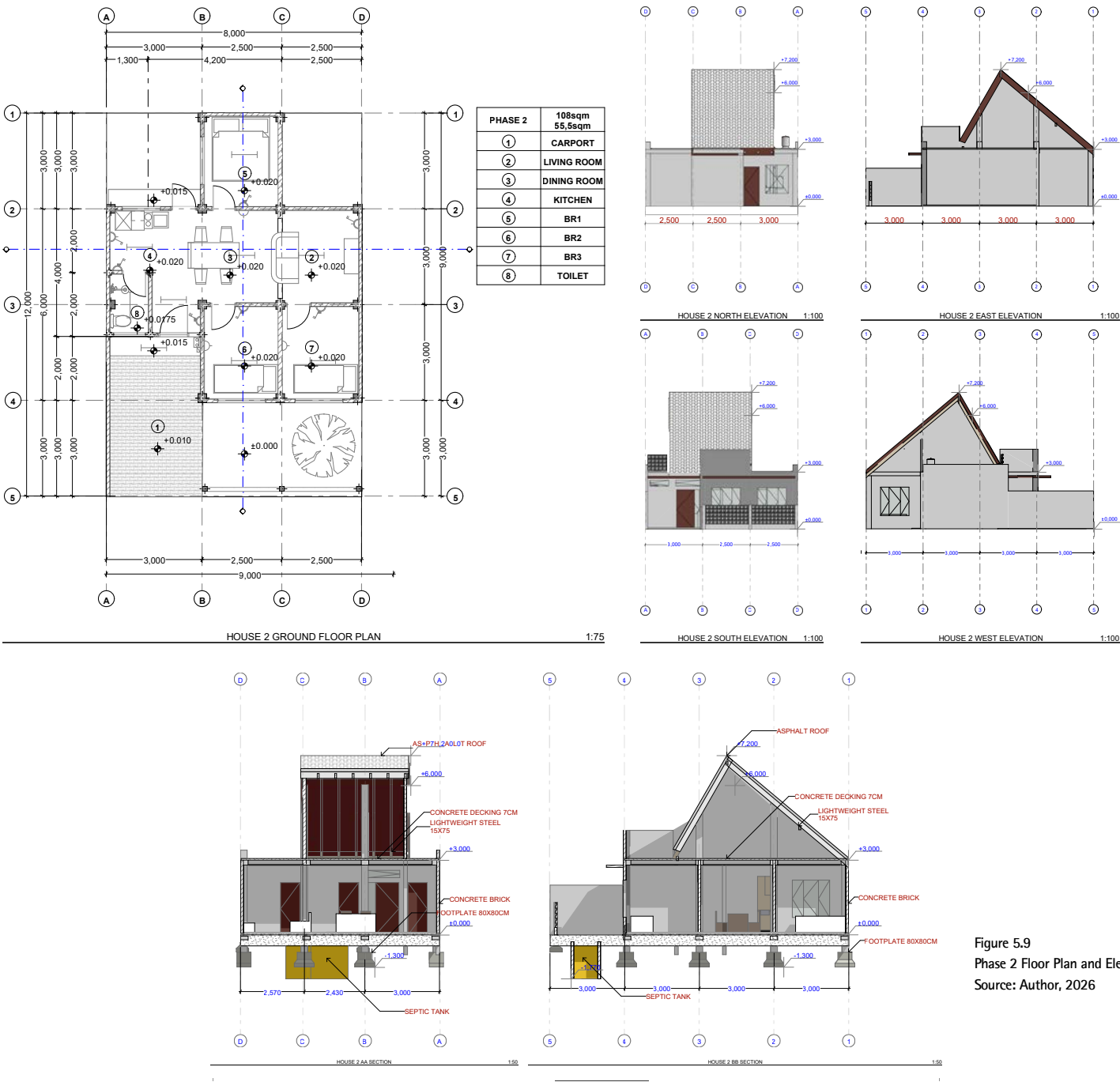


Figure 5.9
Phase 2 Floor Plan and Elevation
Source: Author, 2026

Phase 2 introduces the first stage of expansion as the family's needs increase. The house expands horizontally by utilizing the reserved land on both sides, increasing the building area from 34.5 square meters to 55.5 square meters. This phase adds one additional bedroom and a dining area while enlarging the living space, making the house more comfortable for a growing family. Because the structural grid and foundation were planned during Phase 1, only minimal demolition is required, making the expansion faster, more economical, and less disruptive to the occupants.

Floor Pattern Plan and Ceiling Plan

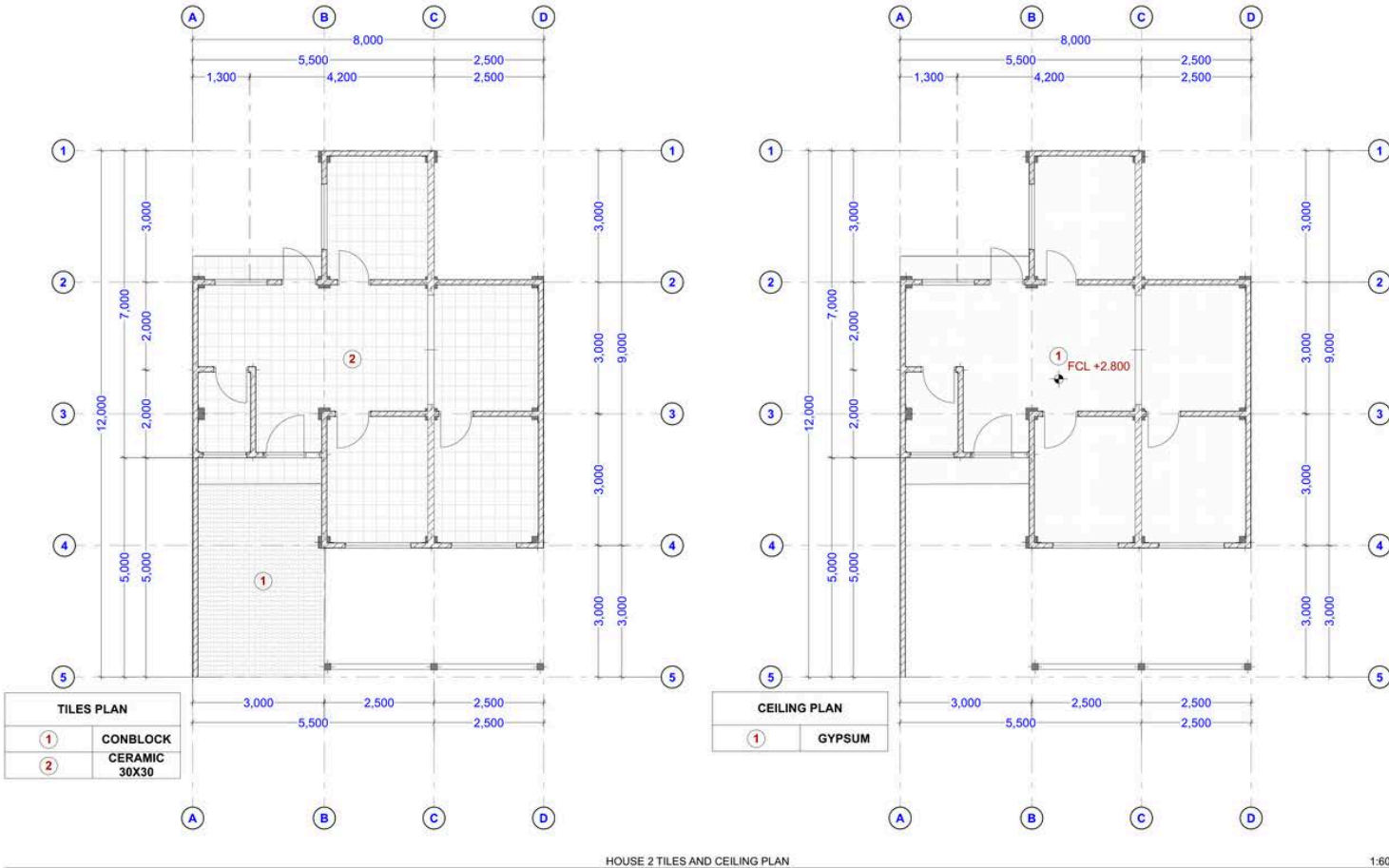


Figure 5.10
Phase 2 Floor Pattern Plan and Ceiling Plan
Source: Author, 2026

The illustration presents the floor pattern and ceiling plan for Phase 2, following the horizontal expansion of the house. The additional spaces continue to use 30 × 30 cm ceramic tiles, maintaining consistency with the Phase 1 interior, while conblock paving is used for the outdoor area. The ceiling is extended using gypsum to cover the newly developed spaces at the same ceiling level. This approach allows the finishes to remain consistent as the house gradually expands according to the residents' needs.

Structure

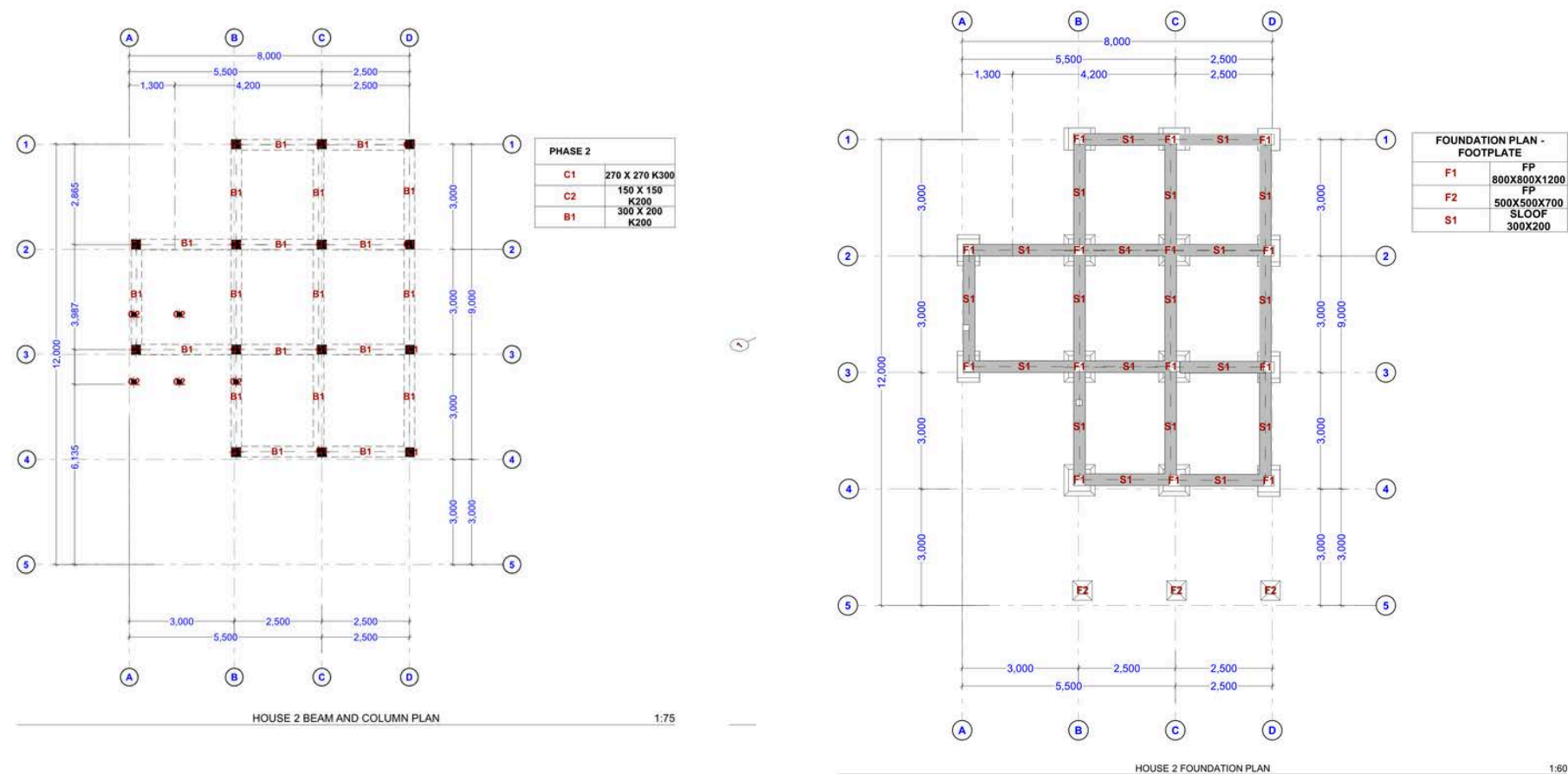


Figure 5.11
Phase 2 Structure
Source: Author, 2026

The illustration presents the structural system for Phase 2, showing the development of the foundation, columns, and beams following the horizontal expansion of the house. The additional structure continues the structural grid established in Phase 1, using footplate foundations connected by reinforced concrete sloof beams, with reinforced concrete columns and beams above. This continuous structural system allows the new spaces to be integrated with the existing house while maintaining stability and preparing the building for future vertical expansion in Phase 3.

Plumbing

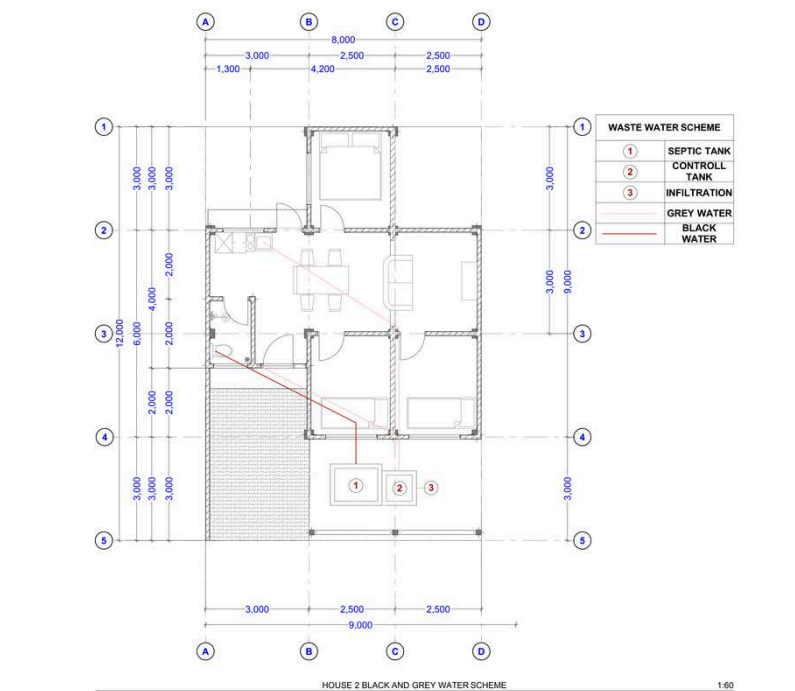
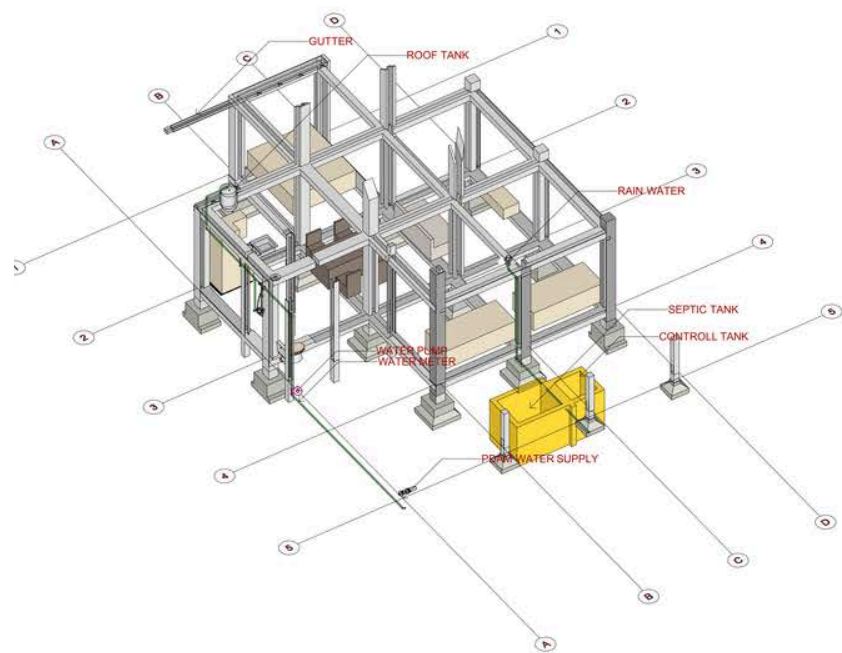
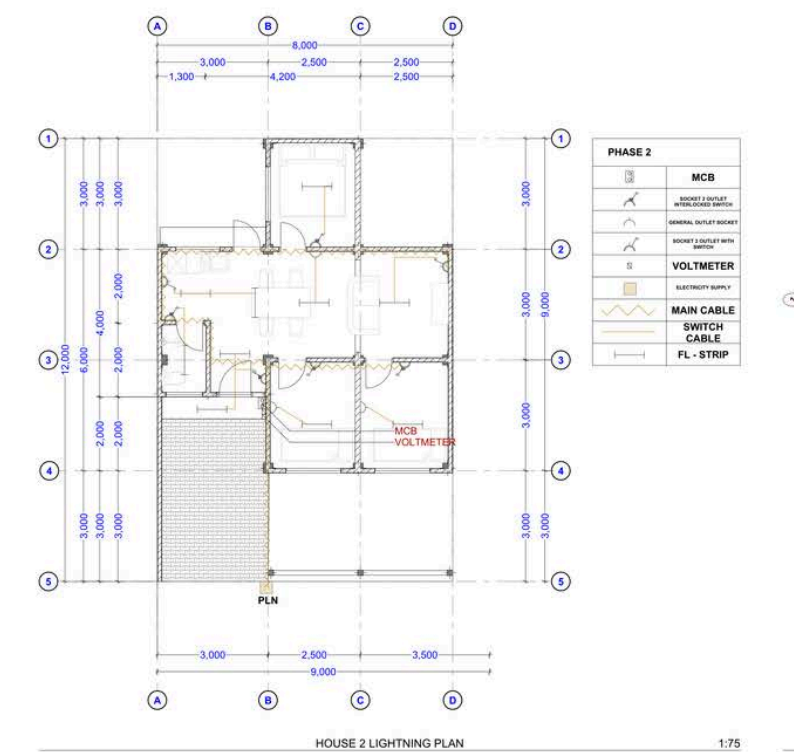


Figure 5.12
Phase 2 Plumbing
Source: Author, 2026

The illustration presents the utility systems for Phase 2, developed to accommodate the horizontal expansion of the house. The clean water system continues to distribute water through the roof tank to household fixtures, while rainwater is collected through the roof gutters and directed to the drainage system. Greywater and blackwater are managed separately, with blackwater directed to the septic tank and control tank before infiltration. The electrical system is also extended from the PLN supply through the MCB and voltmeter to provide lighting and electrical outlets for the additional spaces.

Interior- Phase 2

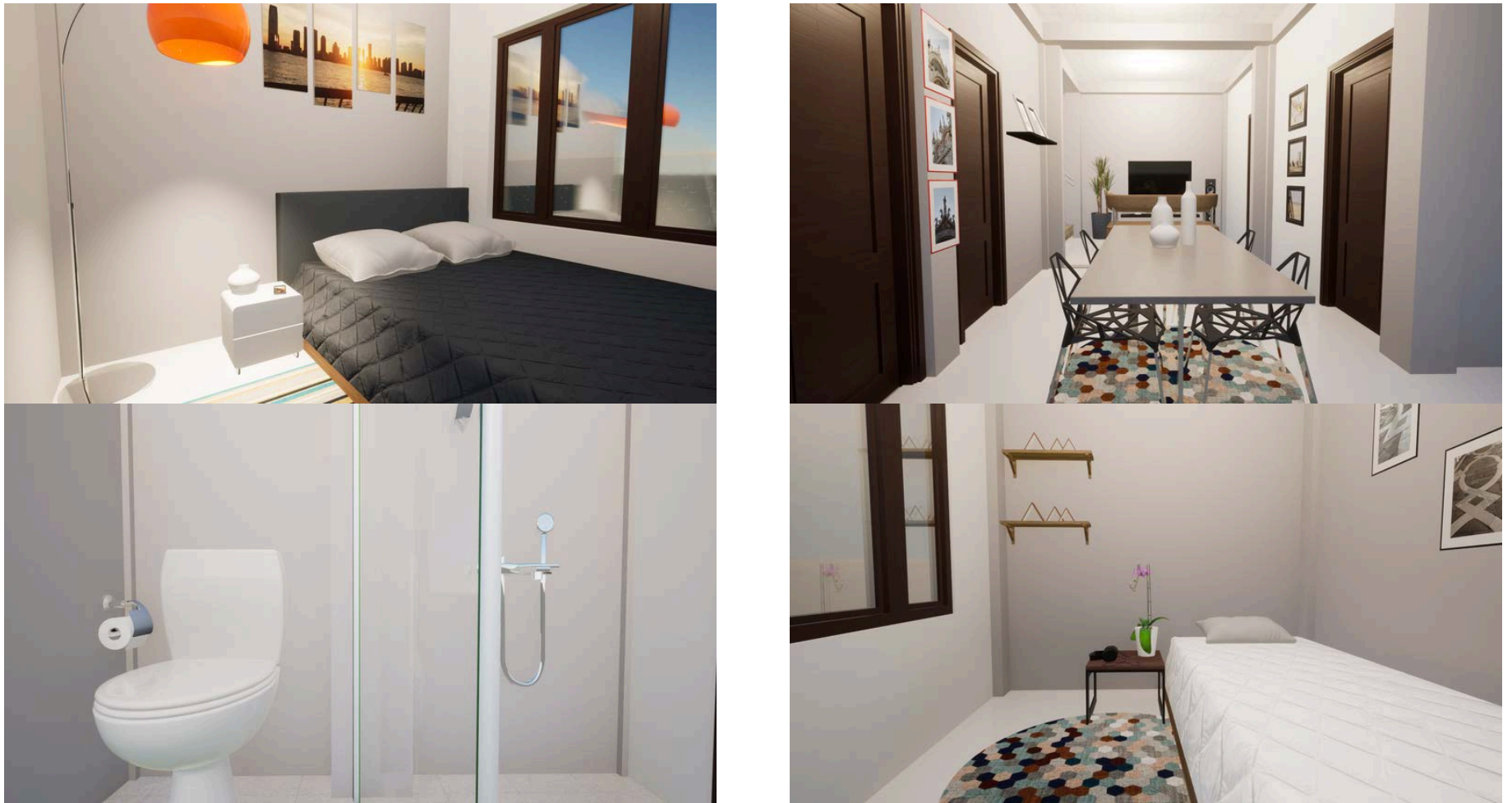


Figure 5.13
Phase 2 Interior
Source: Author, 2026

The illustration presents the Phase 2 interior design, showing the development of the house after horizontal expansion. The original bedrooms and bathroom are maintained, while the additional space provides a more spacious living and dining area to support the residents' growing needs. The interior continues the same material and color palette from Phase 1, using broken-white walls, beige ceramic flooring, and dark wood accents to maintain visual consistency. The arrangement provides more functional living space while keeping efficient circulation, natural lighting, and ventilation throughout the house.

Phase 3

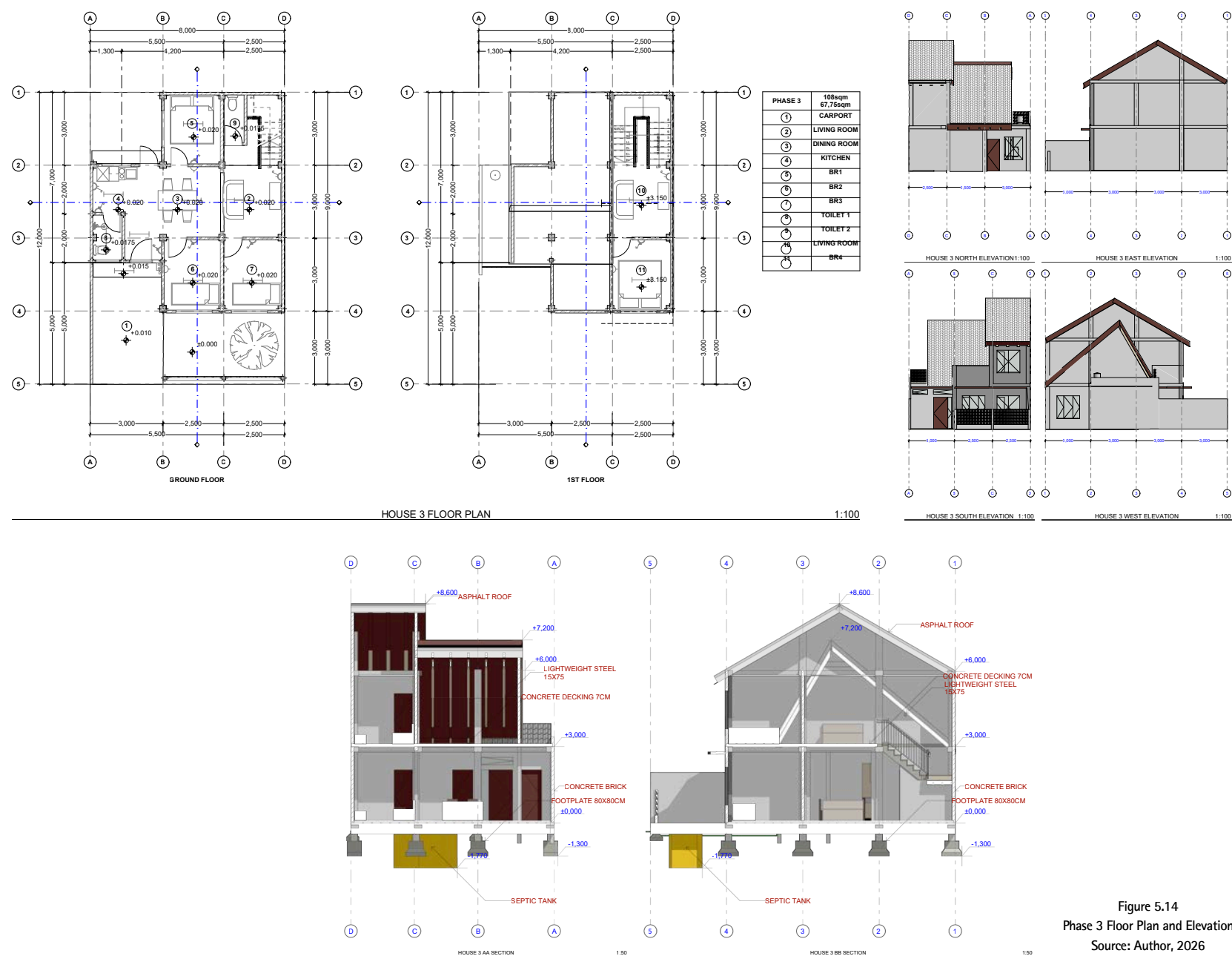


Figure 5.14
Phase 3 Floor Plan and Elevation
Source: Author, 2026

Phase 3 is the final stage of the incremental housing process. Instead of expanding further on the ground, the house grows vertically by adding a second floor. Since the structural system was designed from the beginning to support two stories, no major demolition is needed. This phase adds a fourth bedroom, a second bathroom, and an additional family living area on the upper floor, increasing the total building area to approximately 67.75 square meters. By expanding upward, the house accommodates the family's long-term needs while preserving open space on the site for natural lighting, ventilation, and green areas.

Floor Pattern Plan

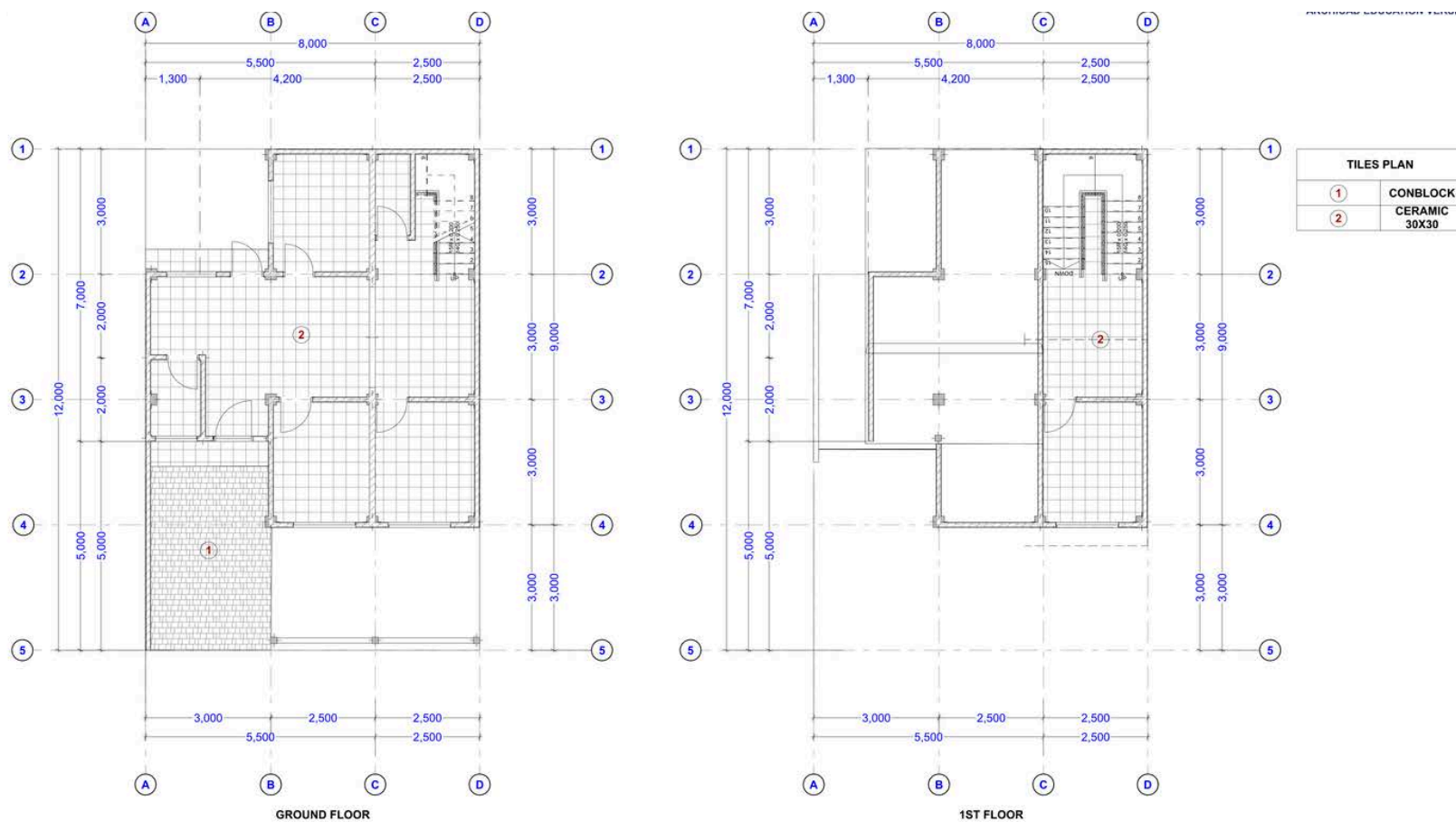


Figure 5.15
Phase 3 Floor Pattern Plan
Source: Author, 2026

The illustration presents the floor pattern plan for Phase 3, showing both the ground floor and the newly developed upper floor as part of the vertical expansion. The existing ground-floor finishes from Phase 2 are maintained, while the additional upper-floor spaces use the same 30 × 30 cm ceramic tiles to create consistency throughout the house. Conblock paving remains in the outdoor area. This continuity of materials supports the incremental housing concept, allowing the house to expand vertically while maintaining a consistent and practical interior finish.

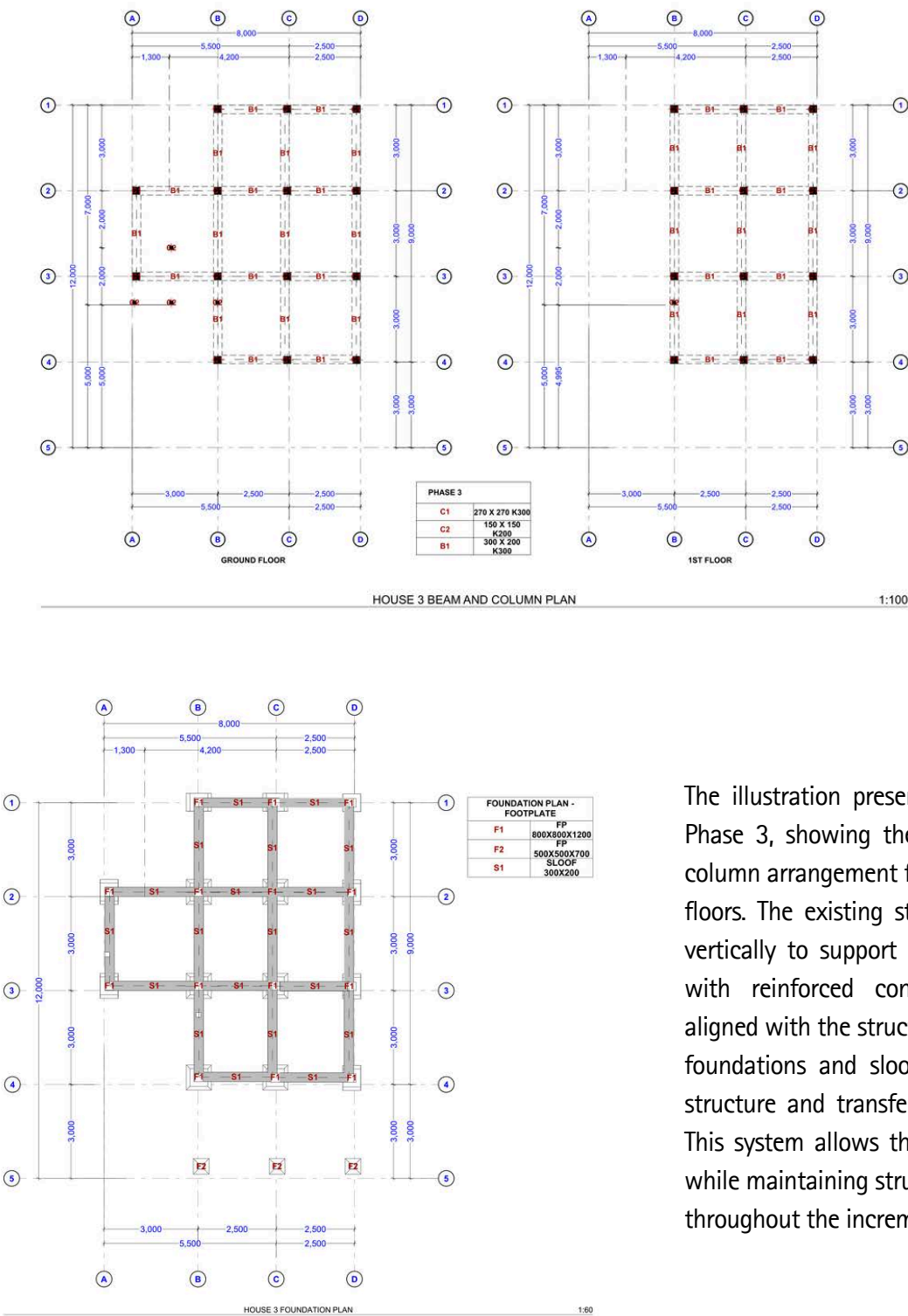
Ceiling Plan



Figure 5.16
Phase 3 Ceiling Plan
Source: Author, 2026

The illustration presents the ceiling plan for Phase 3, showing both the ground floor and the newly developed upper floor. The house continues to use gypsum ceilings throughout the main interior spaces, maintaining the same material used in the previous phases. The ground-floor ceiling is adapted to accommodate the new staircase and vertical expansion, while the upper-floor ceiling follows the new room layout. This consistent ceiling system supports the gradual development of the house while maintaining a unified interior appearance.

Structure



The illustration presents the structural system for Phase 3, showing the foundation and the beam-column arrangement for both the ground and upper floors. The existing structural system is continued vertically to support the second-storey expansion, with reinforced concrete columns and beams aligned with the structural grid below. The footplate foundations and sloof beams support the overall structure and transfer loads safely to the ground. This system allows the house to develop vertically while maintaining structural continuity and stability throughout the incremental expansion.

Figure 5.17
Phase 3 Structure
Source: Author, 2026

Plumbing

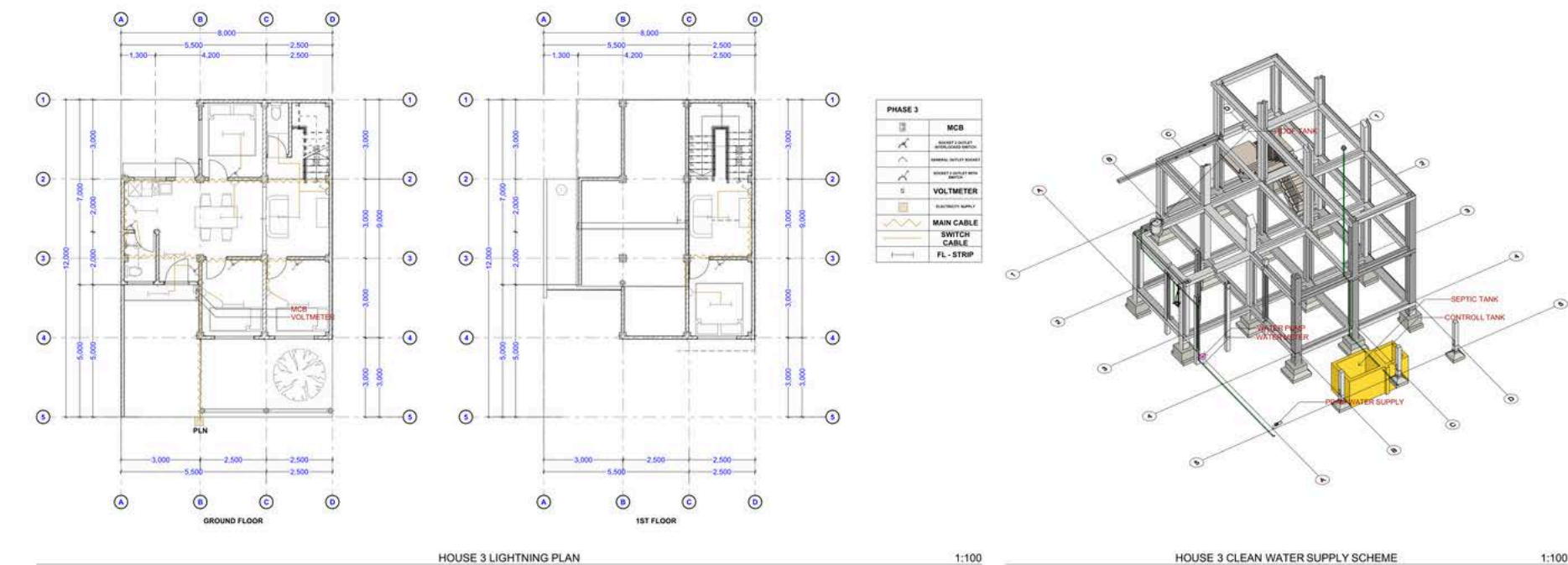


Figure 5.18
Phase 3 Plumbing
Source: Author, 2026



The illustration presents the utility systems for Phase 3, showing their development across both the ground and upper floors. The clean water system is extended vertically to supply the additional spaces, while greywater and blackwater pipelines are connected to the existing wastewater system, including the septic tank, control tank, and infiltration system. The electrical system is also extended from the existing PLN supply, MCB, and voltmeter to provide lighting and electricity for both floors. The utility layout is integrated with the structural system, allowing the house to expand vertically while maintaining an efficient and continuous service system.

Interior- Phase 3

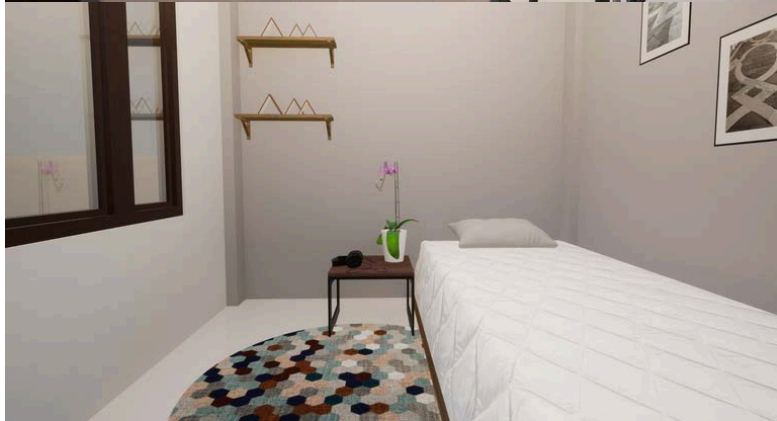
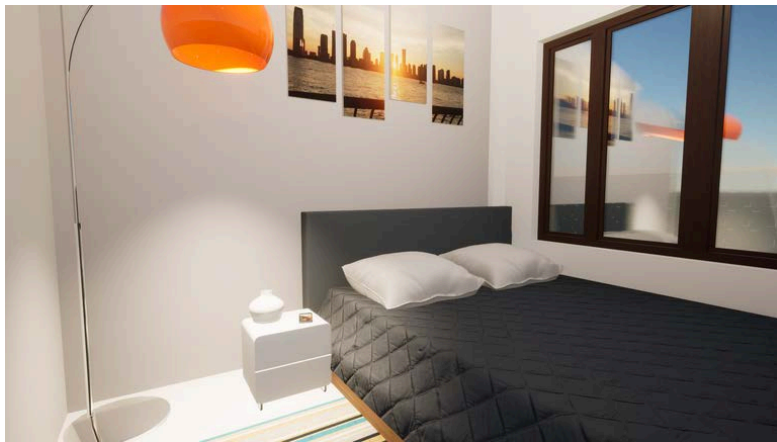


Figure 5.19
Phase 3 Interior
Source: Author, 2026

Door and Window Plan

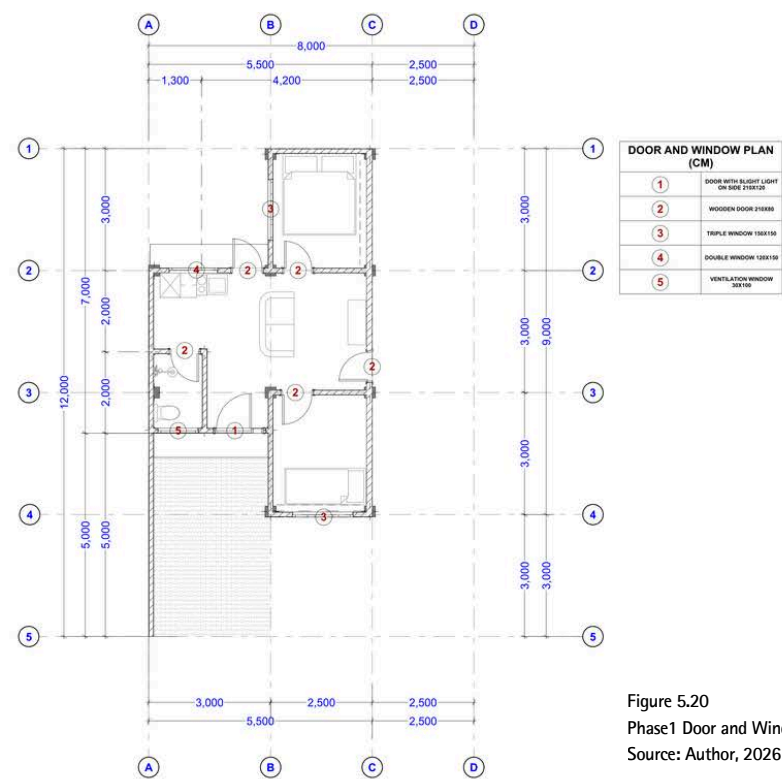


Figure 5.20
Phase1 Door and Window Plan
Source: Author, 2026

The illustration presents the door and window plans for Phase 1 and Phase 2, showing how the openings are adapted as the house expands horizontally. In Phase 1, doors and windows are positioned to support basic circulation, natural lighting, and cross ventilation within the initial spaces. In Phase 2, additional doors and windows are introduced for the expanded rooms while maintaining the existing openings where possible. This arrangement supports the incremental housing concept by allowing the house to grow with minimal alteration to the original building while maintaining comfortable daylight and ventilation.

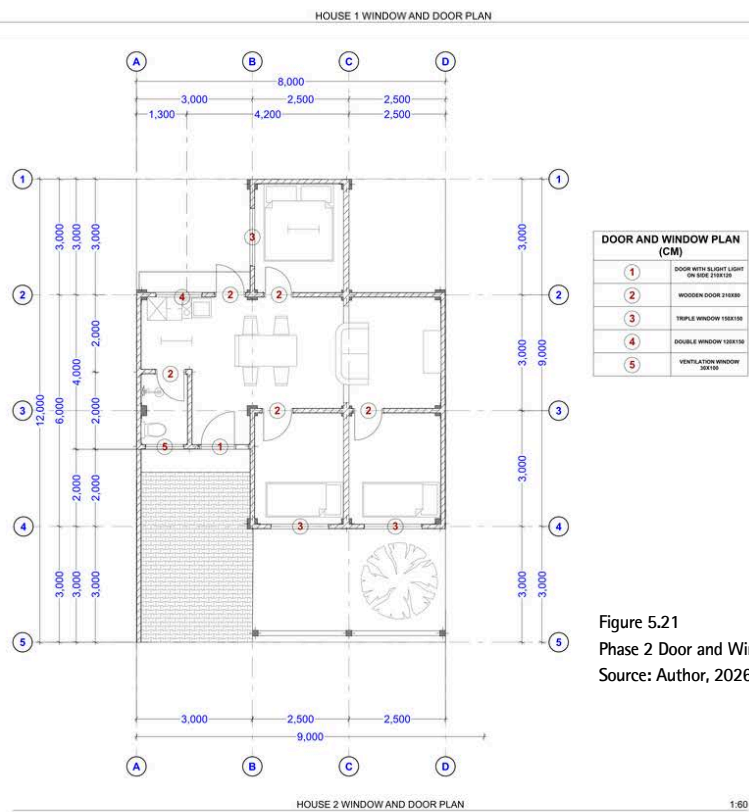


Figure 5.21
Phase 2 Door and Window Plan
Source: Author, 2026



Figure 5.22
Phase 3 Door and Window Plan
Source: Author, 2026

The illustration presents the door and window plan for Phase 3, showing the arrangement of openings on both the ground and upper floors after vertical expansion. The existing ground-floor doors and windows are maintained where possible, while new openings are added to accommodate the upper-floor spaces. Their placement supports natural daylight, ventilation, and circulation throughout both floors. This arrangement allows the house to expand vertically while maintaining environmental comfort and minimizing changes to the openings established in the previous phases.

Door Schedule																	
Identification	Element ID	DOO - 007	DOO - 007	DOO - 007	DOO - 008	DOO - 008	DOO - 008	DOO - 008	DOO - 010	DOO - 010	DOO - 010	DOO - 011	DOO - 011	DOO - 011	DOO - 014	DOO - 014	DOO - 037
Symbol	Classification	Door	Door	Door	Door with Sidelight	Door with Sidelight	Door with Sidelight	Door with Sidelight	Door	Door	Door	Door	Door	Door	Door	Door	Door
	Opening Name	Door	Door	Door	Door with Sidelight	Door with Sidelight	Door with Sidelight	Door with Sidelight	Door	Door	Door	Door	Door	Door	Door	Door	Door
Position	Quantity	3	25	25	1	2	25	25	3	25	25	3	25	25	1	1	25
	W x H Size	0.750x2.100	0.750x2.100	0.750x2.100	1.200x2.100	1.300x2.100	1.200x2.100	1.200x2.100	0.800x2.100	0.800x2.100	0.800x2.100	0.800x2.100	0.800x2.100	0.800x2.100	0.800x2.100	0.800x2.100	0.750x2.100
Surface	Orientation	R	R	L	L	L	L	R	L	L	R	R	L	L	L	L	R
	Plan																
Elevation	3D Back View																
	Home Story Name	1st Floor	1st Floor	1st Floor	1st Floor	1st Floor	1st Floor	1st Floor	1st Floor	1st Floor	1st Floor	1st Floor	1st Floor	1st Floor	1st Floor	2nd Floor	1st Floor
Wall	Elevation to Home Story	0.000	0.100	0.100	0.000	0.000	0.100	0.100	0.000	0.100	0.100	0.000	0.100	0.100	0.000	0.000	0.000
	sill height	0.000	0.100	0.100	0.000	0.000	0.100	0.100	0.000	0.100	0.100	0.000	0.100	0.100	0.000	0.000	0.070
Surface	Head height	2.100	2.200	2.200	2.100	2.100	2.200	2.200	2.100	2.200	2.200	2.100	2.200	2.200	2.100	2.100	2.170
	Wall Thickness	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.140
Surface	Wall Structure	Brick Double Plaste	Brick Double Plaste	Brick Double Plaste	Brick Double Plaste	Brick Double Plaste	Brick Double Plaste	Brick Double Plaste	Brick Double Plaste	Brick Double Plaste	Brick Double Plaste	Brick Double Plaste	Brick Double Plaste	Brick Double Plaste	Brick Double Plaste	Brick Double Plaste	Brick - Structural
	Frame Thickness	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12
Surface	Egress Dimensions	0.670x2.060	0.670x2.060	0.670x2.060	0.860x2.060	0.860x2.060	0.860x2.060	0.860x2.060	0.720x2.060	0.720x2.060	0.720x2.060	0.720x2.060	0.720x2.060	0.720x2.060	0.720x2.060	0.720x2.060	0.700x2.060
	Nominal Surface Area	1.58	1.58	1.58	2.52	2.73	2.52	2.52	1.68	1.68	1.68	1.68	1.68	1.68	1.68	1.68	1.64
Surface	Surfaces (All)	Wood - Mahogany	Wood - Mahogany	Wood - Mahogany	Metal - Stainless St.	Metal - Stainless St.	Metal - Stainless St.	Metal - Stainless St.	Metal - Stainless St.	Metal - Stainless St.	Metal - Stainless St.	Metal - Stainless St.	Metal - Stainless St.	Metal - Stainless St.	Metal - Stainless St.	Metal - Stainless St.	Metal - Stainless St.

Door Schedule											
Identification	Element ID	DOO - 037	DOO - 039	DOO - 039	DOO - 039	DOO - 040	DOO - 041	DOO - 042	DOO - 043	DOO - 046	DOO - 065
Symbol	Classification	Door	Door	Door	Door	Door	Door	Door	Door	Double Door with 2	Double Door with 2
	Opening Name	Door	Door	Door	Door	Door	Door	Door	Door	Double Door with 2	Double Door with 2
Position	Quantity	25	1	25	25	1	1	1	1	2	2
	W x H Size	0.750x2.100	0.750x2.100	0.750x2.100	0.750x2.100	0.750x2.100	0.750x2.100	0.750x2.100	0.750x2.100	2.700x2.400	2.500x2.400
Surface	Orientation	L	R	R	L	R	R	L	R	L	L
	Plan										
Elevation	3D Back View										
	Home Story Name	1st Floor	1st Floor	1st Floor	1st Floor	1st Floor	1st Floor	1st Floor	1st Floor	1st Floor	1st Floor
Wall	Elevation to Home Story	0.070	0.000	0.100	0.100	0.000	0.000	0.000	0.000	0.100	0.000
	sill height	0.070	0.000	0.100	0.100	0.000	0.000	0.000	0.000	0.100	0.000
Surface	Head height	2.170	2.100	2.200	2.200	2.100	2.100	2.100	2.100	2.500	2.400
	Wall Thickness	0.140	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.125
Surface	Wall Structure	Brick - Structural	Brick Double Plaste	Brick Double Plaste	Brick Double Plaste	Brick Double Plaste	Brick Double Plaste	Brick Double Plaste	Brick Double Plaste	Brick Double Plaste	Brick Double Plaste
	Frame Thickness	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12
Surface	Egress Dimensions	0.700x2.060	0.680x2.060	0.680x2.060	0.680x2.060	0.700x2.060	0.700x2.060	0.700x2.060	0.700x2.060	1.500x2.100	0.870x1.980
	Nominal Surface Area	1.64	1.60	1.60	1.60	1.64	1.64	1.64	1.64	4.48	3.00
Surface	Surfaces (All)	Metal - Stainless St.	Metal - Stainless St.	Metal - Stainless St.	Metal - Stainless St.	Metal - Stainless St.	Metal - Stainless St.	Metal - Stainless St.	Metal - Stainless St.	Metal - Stainless St.	Metal - Stainless St.

IES-03

Door Schedule

1:1

Figure 5.23
Door details
Source: Author, 2026

Window Schedule																	
Identification	Element ID	WD - 001	WD - 002	WD - 002	WD - 004	WD - 005	WD - 005	WD - 005	WD - 020	WD - 020	WD - 020	WD - 020	WD - 024	WD - 025	WD - 026	WD - 027	WD - 045
Symbol	Classification	Window	Window	Window	Window	Window	Window	Window	Window	Window	Window	Window	Window	Window	Window	Window	Window
	Opening Name	Triple Window	Double Window	Double Window	Triple Window	Double Window	Double Window	Double Window	Window	Window	Window	Window	Window	Window	Window	Window	Double Window
Position	Quantity	65	54	54	54	53	2	2	26	26	26	26	1	1	1	1	2
	W x H Size	1,500x1,500	1,200x1,500	1,200x1,500	1,000x1,500	1,300x1,500	1,500x1,500	1,000x1,300	1,000x1,300	1,300x1,300	1,300x1,300	1,300x1,300	1,000x1,300	1,297x1,300	1,000x1,300	1,274x1,300	2,000x2,300
Surface	Orientation							L	R	L	R	R	R	R	R	R	
	2D Symbol																
Elevation	3D Back View																
	Home Story Name	1st Floor	1st Floor	1st Floor	1st Floor	1st Floor	2nd Floor	1st Floor	1st Floor	1st Floor	1st Floor	1st Floor	1st Floor	1st Floor	1st Floor	1st Floor	1st Floor
Wall	Elevation to Home Story	0.700	0.750	0.700	0.700	0.700	0.700	0.700	0.700	2.300	2.300	2.300	2.300	2.300	2.300	2.300	0.150
	sill height	0.700	0.750	0.700	0.700	0.700	0.700	0.700	0.700	2.300	2.300	2.300	2.300	2.300	2.300	2.300	0.150
Surface	Head height	2.200	2.250	2.200	2.200	2.200	2.200	2.200	2.200	2.600	2.600	2.600	2.600	2.600	2.600	2.600	2.450
	Wall Thickness	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Surface	Wall Structure	Brick Double Plaste	Brick Double Plaste	Brick Double Plaste	Brick Double Plaste	Brick Double Plaste	Brick Double Plaste	Brick Double Plaste	Brick Double Plaste	Brick Double Plaste	Brick Double Plaste	Brick Double Plaste	Brick Double Plaste	Brick Double Plaste	Brick Double Plaste	Brick Double Plaste	Brick Double Plaste
	Frame Thickness	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.125
Surface	Egress Dimensions	2.25	1.80	1.80	2.35	2.25	2.25	0.30	0.30	0.39	0.39	0.39	0.30	0.39	0.30	0.38	4.80
	Nominal Surface Area	2.25	1.80	1.80	2.35	2.25	2.25	0.30	0.30	0.39	0.39	0.39	0.30	0.39	0.30	0.38	4.80
Surface	Surfaces (All)	Glass - Clear Fast	Glass - Clear Fast	Glass - Clear Fast	Glass - Clear Fast	Glass - Clear Fast	Glass - Clear Fast	Glass - Clear Fast	Glass - Clear Fast	Glass - Clear Fast	Glass - Clear Fast	Glass - Clear Fast	Glass - Clear Fast	Glass - Clear Fast	Glass - Clear Fast	Glass - Clear Fast	Glass - Clear Fast

Window Schedule				
Identification	Element ID	WD - 048	WD - 050	WD - 056
Symbol	Classification	Window	Window	Window
	Opening Name	Double Window	Double Window	Double Window
Position	Quantity	2	4	2
	W x H Size	1,500x2,300	1,500x2,300	1,500x1,000
Surface	Orientation			
	2D Symbol			
Elevation	3D Back View			
	Home Story Name	1st Floor	1st Floor	1st Floor
Wall	Elevation to Home Story	0.150	0.150	1.000
	sill height	0.150	0.150	1.000
Surface	Head height	2.450	2.450	2.000
	Wall Thickness	0.05	0.05	0.05
Surface	Wall Structure	Brick Double Plaste	Brick Double Plaste	Brick Double Plaste
	Frame Thickness	0.125	0.125	0.125
Surface	Egress Dimensions	3.45	3.45	1.50
	Nominal Surface Area	3.45	3.45	1.50
Surface	Surfaces (All)	Glass - Clear Fast	Glass - Clear Fast	Glass - Clear Fast

IES-04

Window Schedule

1:1

Figure 5.24
Window details
Source: Author, 2026

Mosque and Security

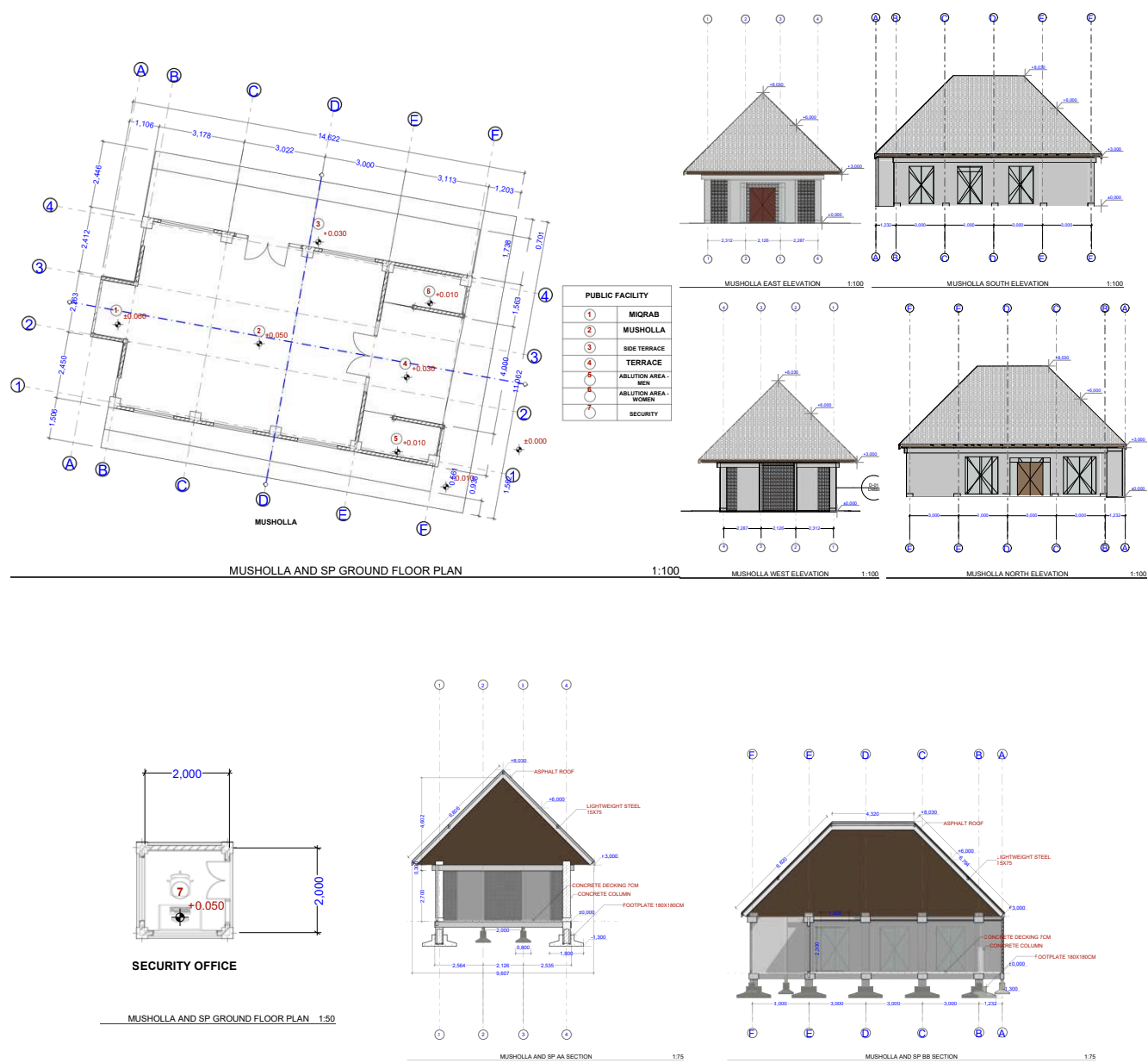


Figure 5.25
Musholla and Security
Source: Author, 2026

The musholla is centrally located to provide easy access for all residents and includes a prayer hall, mihrab, separate men's and women's ablution areas, and terraces for gathering. The security post is placed at the main gate to monitor access and support the one-gate security system. Together, these facilities provide essential religious, social, and security functions for the residential community

Details

Roster

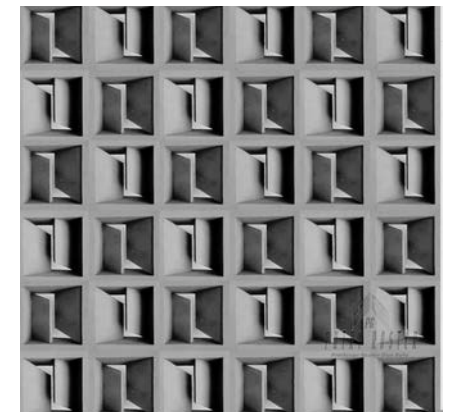
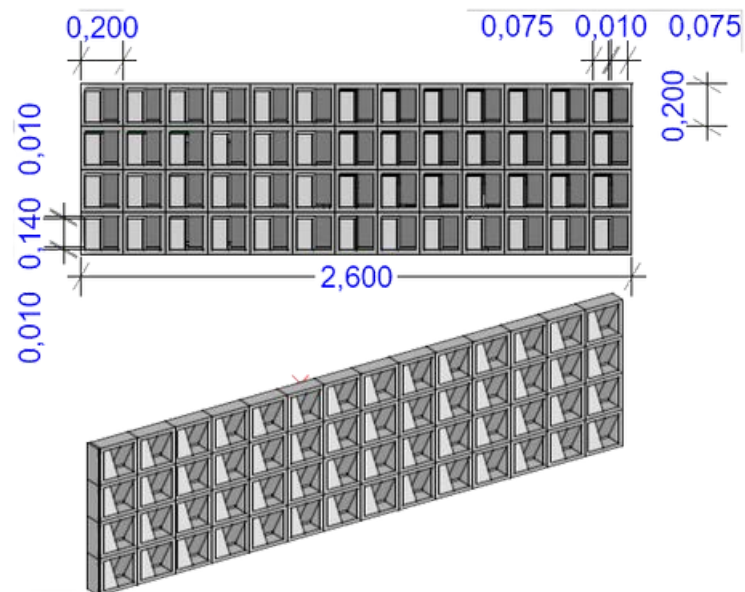
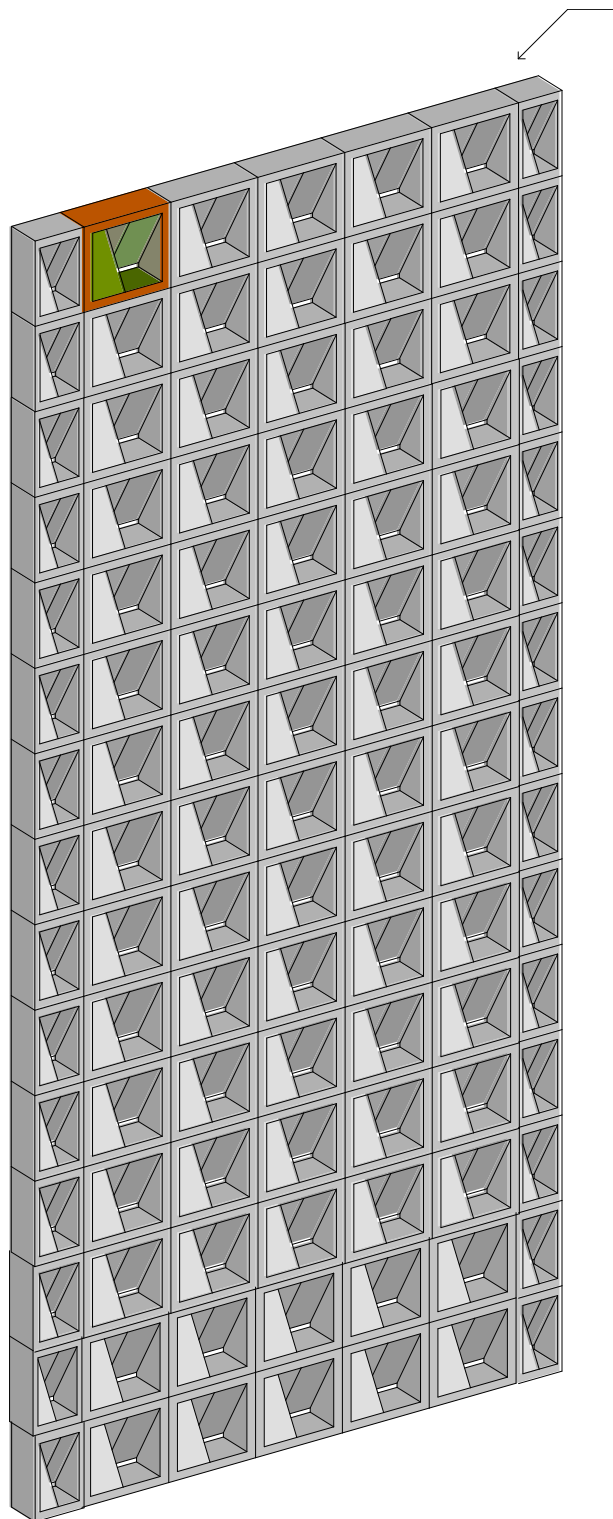


Figure 5.27
Roster Details
Source: Author, 2026

The façade uses $20 \times 20 \times 10$ cm concrete rosters as a secondary skin. The 10 cm thickness provides structural stability while maintaining open voids for natural ventilation. The angled openings reduce direct sunlight, improve thermal comfort, allow diffused daylight, and provide privacy. Its modular dimensions also make the roster easy to construct and compatible with the incremental housing concept, allowing future façade extensions without changing the overall design.

Figure 5.26
Roster Details
Source: Author, 2026

Envelope

Phase 1 - Envelope

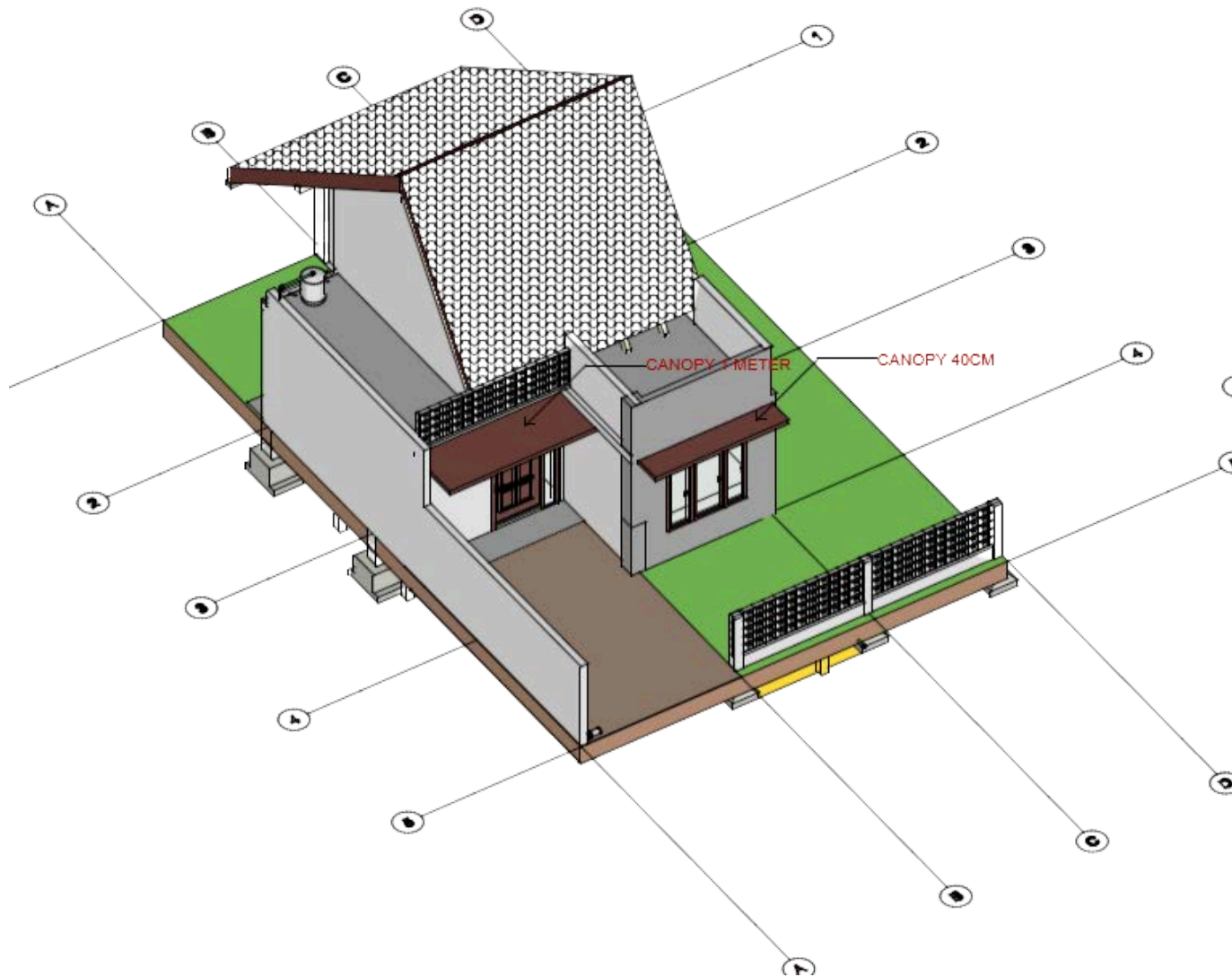
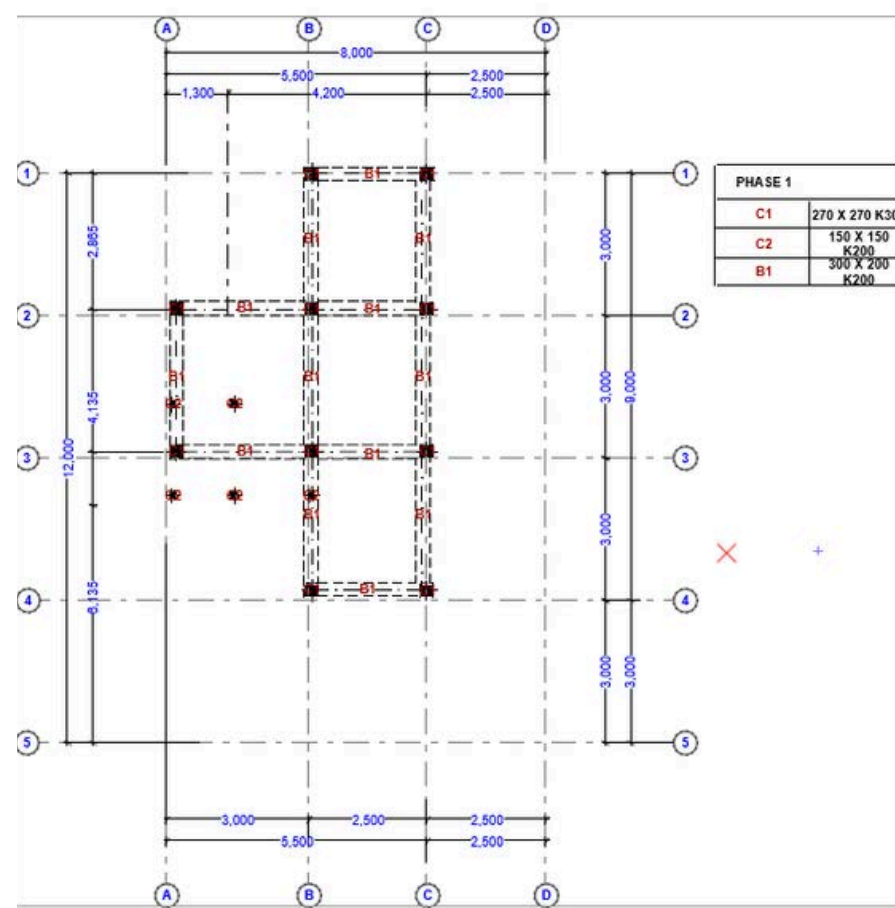


Figure 5.28
Phase 1 Axonometry
Source: Author, 2026

The building envelope consists of a 1-meter canopy above the entrance door and a 40-centimeter canopy above the windows, in addition to the ventilation blocks (roster).

Structural Plan



Foundation Plan

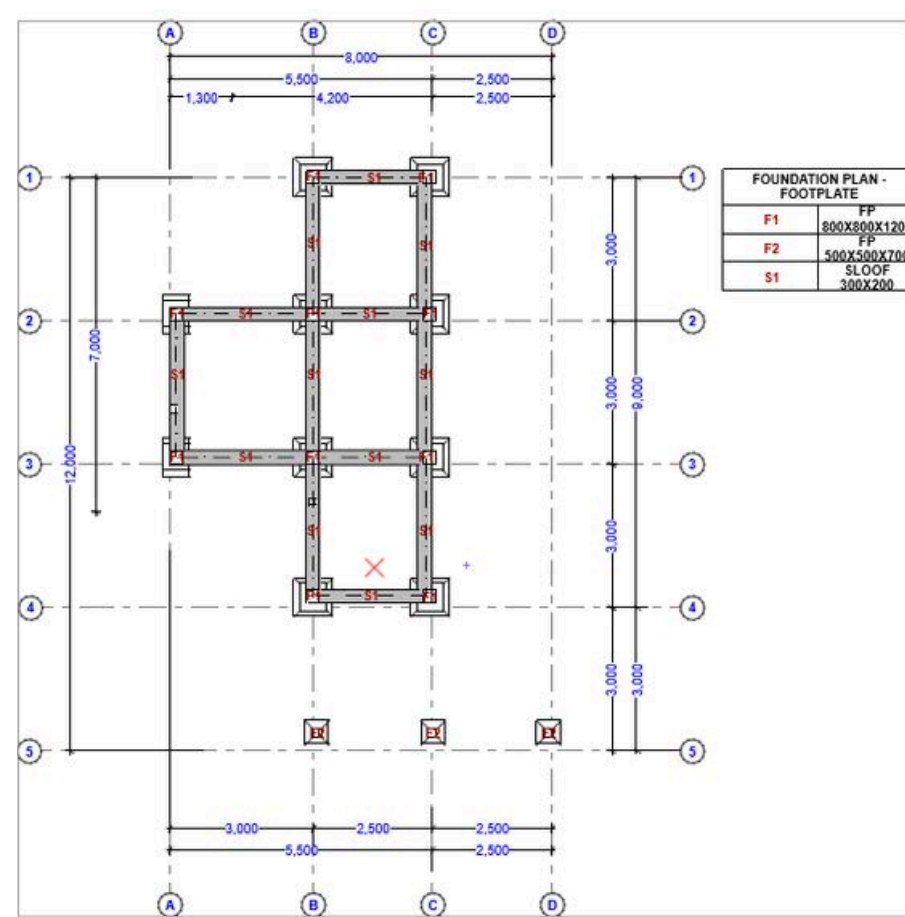


Figure 5.29
Phase 1 Structure
Source: Author, 2026

The structural plan shows the reinforced concrete structural system used in the Phase 1 core house. It consists of main columns (C1), secondary columns (C2), and reinforced concrete beams (B1) arranged on a regular 3 × 3 meter modular grid. This layout provides sufficient structural strength for the initial house while allowing future horizontal and vertical expansion with minimal structural modifications, supporting the incremental housing concept.

The foundation plan illustrates the footing and ground beam arrangement that supports the structural system. The building uses two sizes of isolated footings (F1 and F2) connected by reinforced concrete ground beams (S1) to distribute loads safely to the soil. The foundations are placed directly beneath the columns according to the structural grid, ensuring building stability and providing adequate support for future expansion phases.

Utilities

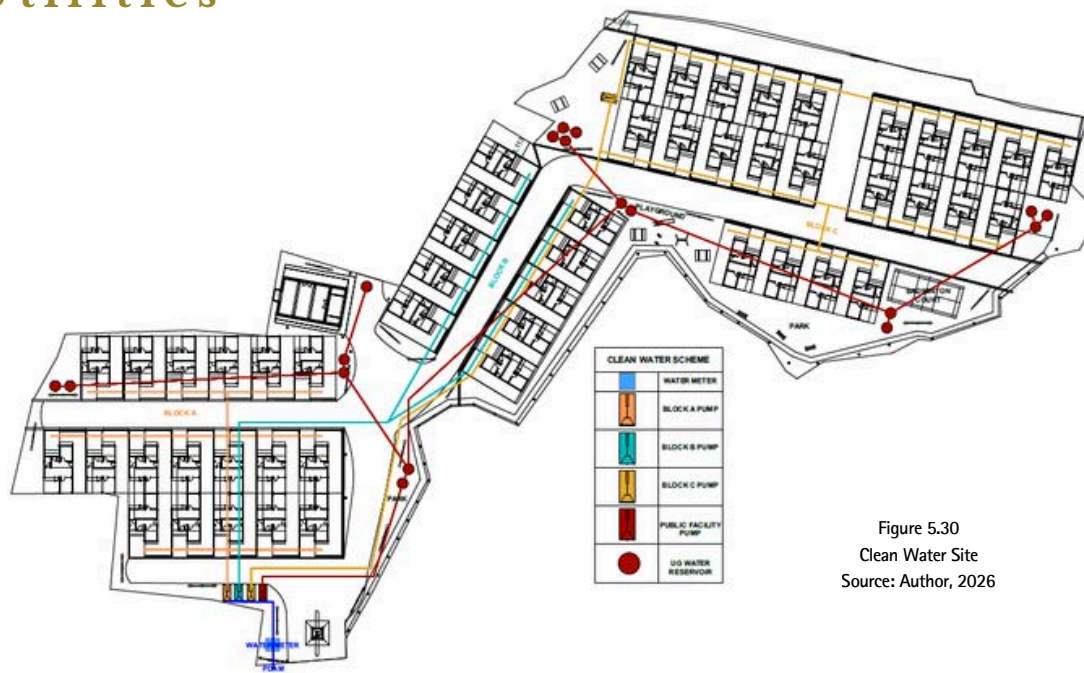


Figure 5.30
Clean Water Site
Source: Author, 2026

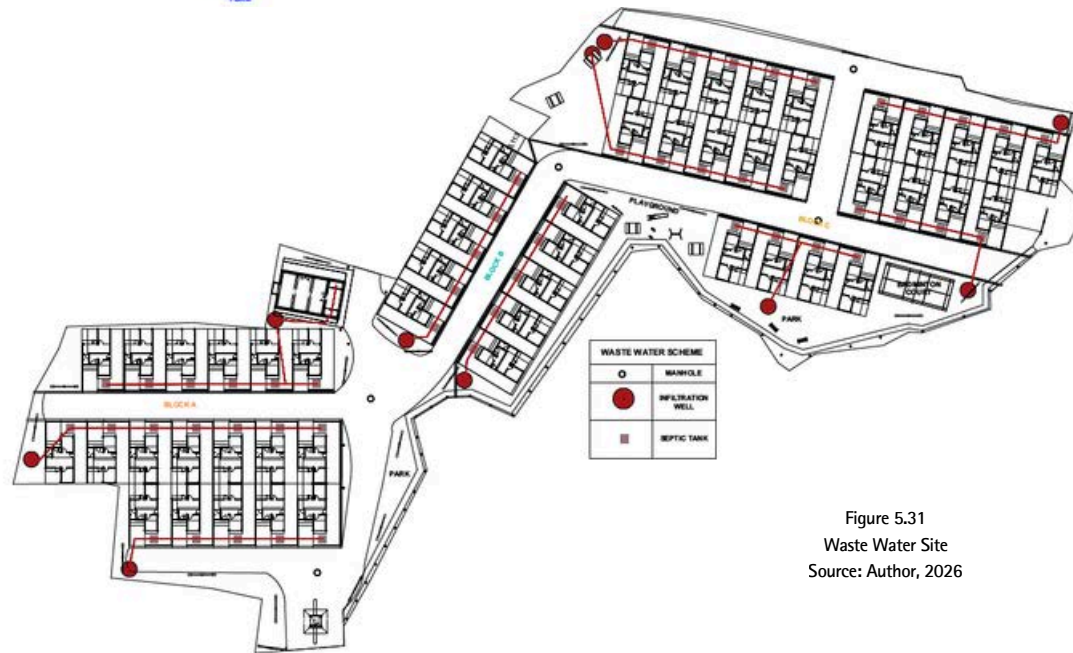


Figure 5.31
Waste Water Site
Source: Author, 2026

This diagram shows the utility system of a typical house. Clean water from PDAM passes through the water meter and is stored in a roof tank before being distributed throughout the house. Rainwater from the roof is collected by gutters and directed to the drainage system. Meanwhile, wastewater is treated in a septic tank, passes through a control tank, and is discharged into an infiltration well. This integrated system ensures a reliable water supply, effective drainage, and environmentally friendly wastewater management.

The clean water system starts with the PDAM supply, which passes through the main water meter before being distributed throughout the residential area. Separate pumps deliver water to Block A, Block B, Block C, and the public facilities. Each block has its own underground water reservoir to maintain water pressure and provide a reliable supply to every house. This decentralized distribution system improves efficiency, simplifies maintenance, and ensures that both residential units and communal facilities receive a consistent, clean water supply.

The wastewater system uses an individual septic tank for each house to treat domestic wastewater. After treatment, the water flows into nearby infiltration wells, where it is safely absorbed into the ground. The pipelines are connected through manholes, which allow easy inspection and maintenance. This decentralized system is efficient, environmentally friendly, and ensures wastewater is safely managed throughout the residential area.

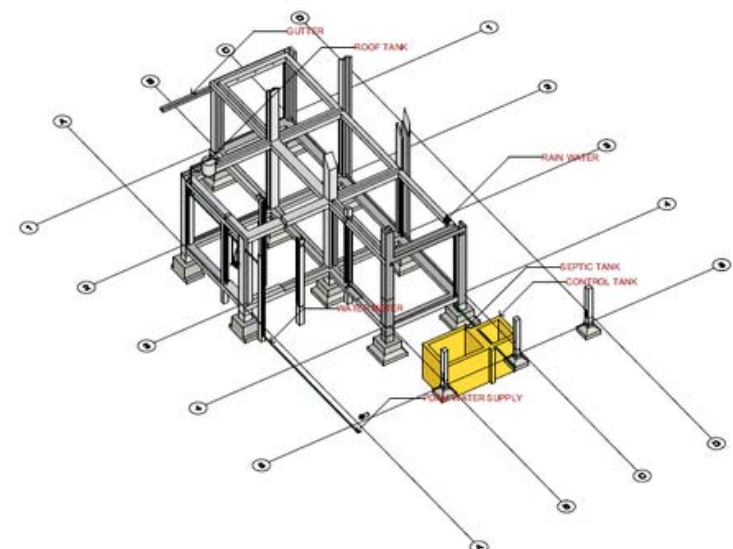




Figure 5.32
Site's Safety
Source: Author, 2026

This diagram shows the residential security system. The site is surrounded by a 2-meter concrete fence to secure the residential area. A one-gate system with a security office controls all access, improving safety and monitoring visitors. Several meeting points integrated with green open spaces are also provided throughout the site, serving as emergency assembly areas and community gathering spaces. Together, these elements create a secure and well-organized residential environment.

Electricity

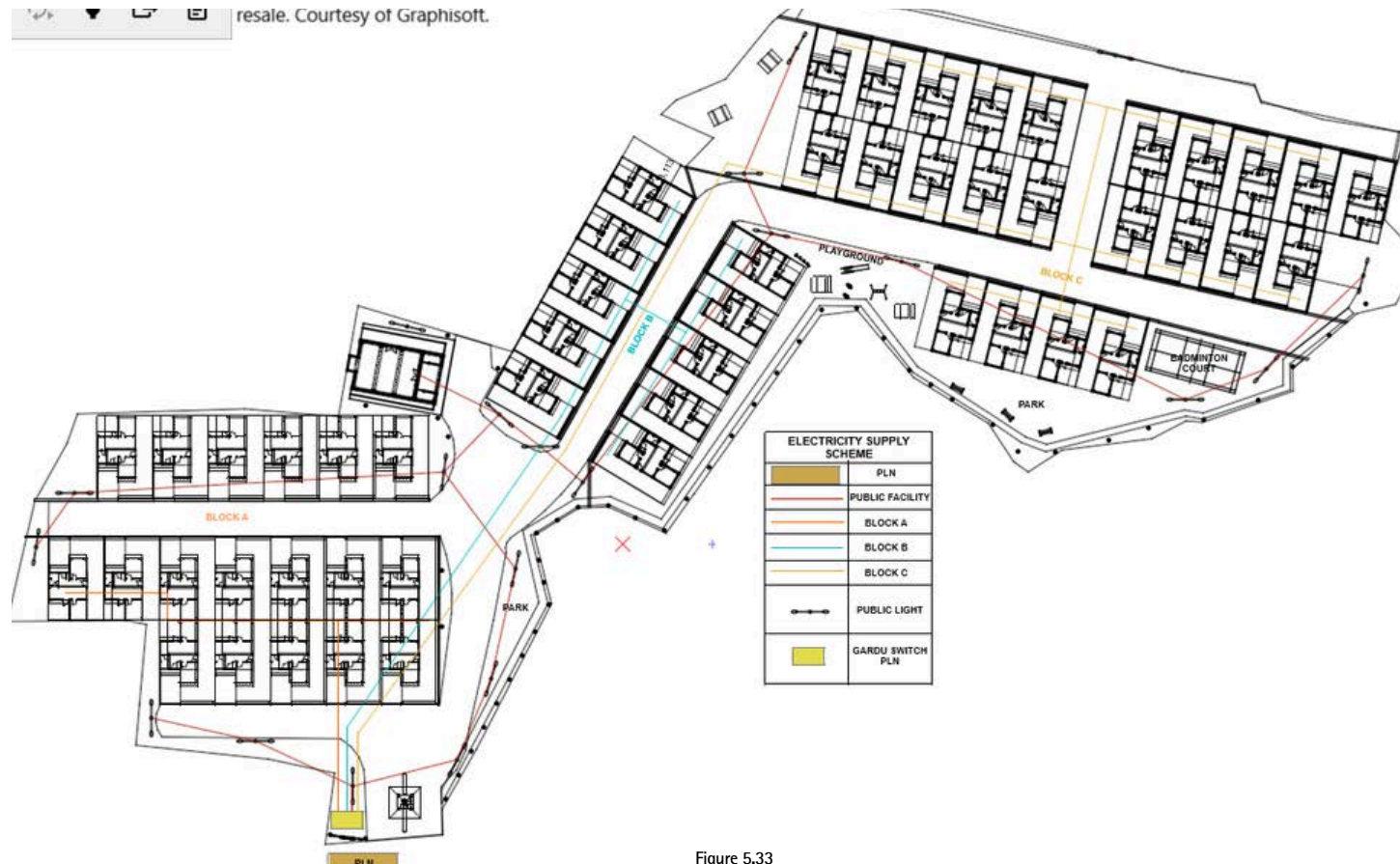
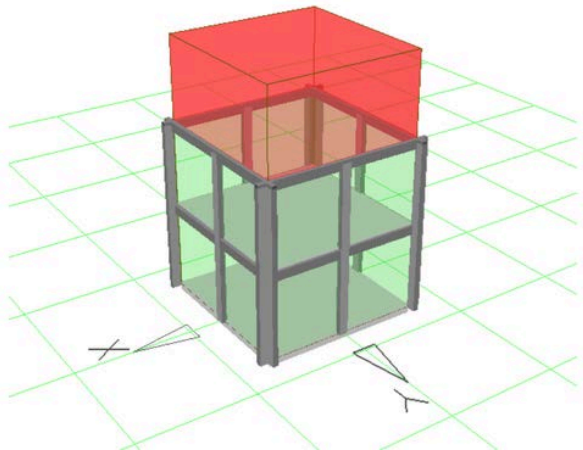


Figure 5.33
Site's Electricity
Source: Author, 2026

The electricity system begins with the PLN power supply, which enters the main switch panel before being distributed to Block A, Block B, Block C, and the public facilities. Each house has its own electricity meter for independent energy use, while public facilities are connected through a separate circuit. Street lights are provided along the internal roads to improve safety and visibility at night, creating a reliable and well-organized electrical distribution system.

Resist



Lateral Load Structure, X Direction

Type	Reinforced Concrete Moment Frame
Design method	Limit-state
Number of frames	2
Number of bays	2
Bay length	3m
Floor width supported by beam	8m
Column size	Depth: 0.32m, Width: 0.192m
Beam size	Depth: 0.32m, Width: 0.163m
Foundations	Foundation beam: centre-line distance between pads: 6.00 m, square pad width: 1.10 m, pad depth: 0.30 m To anchor the lateral resisting component against tensile uplift, the weight and strength of ground slabs and foundation beams may suffice.

Lateral Load Structure, Y Direction

Type	Reinforced Concrete Moment Frame
Design method	Limit-state
Number of frames	2
Number of bays	2
Bay length	3m
Floor width supported by beam	8m
Column size	Depth: 0.32m, Width: 0.192m
Beam size	Depth: 0.32m, Width: 0.163m
Foundations	Foundation beam: centre-line distance between pads: 6.00 m, square pad width: 1.10 m, pad depth: 0.30 m To anchor the lateral resisting component against tensile uplift, the weight and strength of ground slabs and foundation beams may suffice.

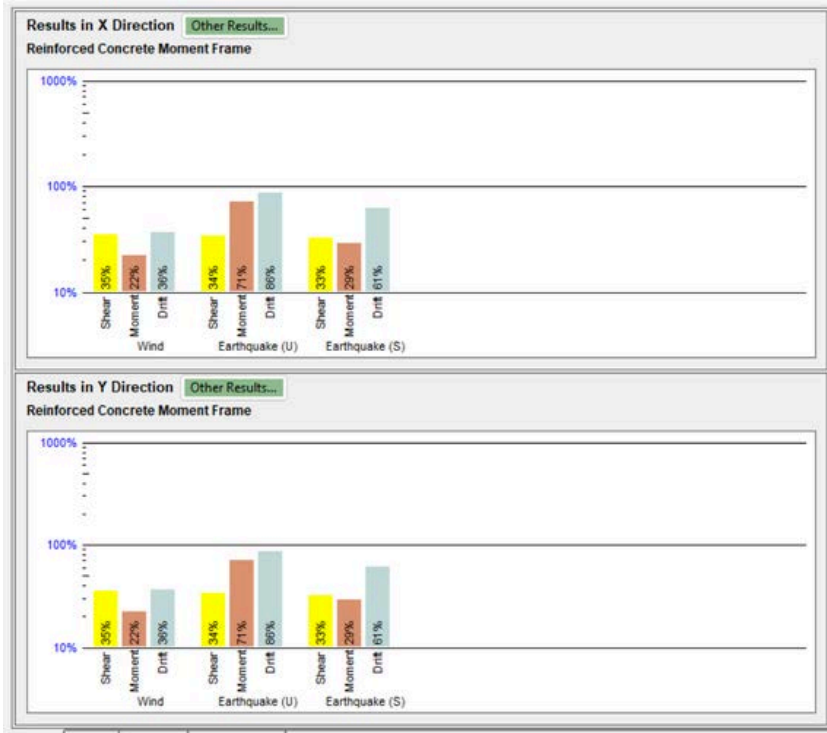


Figure 5.34
Resist
Source: Author, 2026

The structure is evaluated as a normal 2-story residential building with a total height of 8 meters. The house uses a 3 × 3 meter structural grid, which makes the column spacing simple, regular, and efficient for residential construction. The roof, floor, interior wall, and external wall loads are categorized as light to medium, so the structure is still suitable for a small residential unit.

5.2 Design Proof

Cost Estimation-House

The cost estimation and unit price calculations were developed based on the Banten Regional Unit Price Standards (HSPK Banten) and Governor Regulation of Banten No. 58 of 2021 concerning the Standard Unit Prices for Government Activities (Standar Harga Satuan Pokok Kegiatan Pemerintah), ensuring that the proposed costs reflect local market conditions and regional construction standards.

RENCANA ANGGARAN BIAYA – UNIT RUMAH (UNTUK SELURUH 51 UNIT)							
TYPE 45/96 Bangunan 45 m² Kavling 96 m² Bojongsalam, Curug, Kota Serang, Banten 2026							
Disusun untuk		Kinasih Marew-21512081					
Project		NAWASRI Residence (9.990 m², 51 unit)					
Typology		Type 45/96					
Location		Lingkungan Bojongsalam, Kel. Curug, Kec. Curug, Kota Serang, Banten					
No	URAIAN PEKERJAAN	Sat.	Volume	Harga Satuan (Rp)	Jumlah (Rp)		Keterangan
A. PEKERJAAN PERSIAPAN							
A.1	Pembersihan lahan & uitzet (pengukuran ulang & peninjauan)	m²	96,00	13.000	1.248.000		Kavling 96 m²
A.2	Bouwplank & pengukuran tapak	ls	1,00	1.600.000	1.600.000		Lumpsum
SUB TOTAL A					2.848.000		
B. PEKERJAAN TANAH & PONDASI							
B.1	Galian tanah pondasi footplat 80×80cm (10 titik)	m³	5,10	100.000	510.000		10 titik × 0,8×0,8×0,8m
B.2	Urugan pasir bawah pondasi t=10cm	m³	0,64	110.000	70.400		10 titik × 0,8×0,8×0,1m
B.3	Pondasi footplat beton bertulang 80×80cm	titik	10,00	1.300.000	13.000.000		10 titik sesuai denah struktur
B.4	Sloof beton bertulang 20/30cm	m³	1,10	2.000.000	2.200.000		Keliling + partisi, bangunan 45m²
B.5	Urugan tanah kembali & pemadatan	m³	6,00	75.000	450.000		Estimasi
SUB TOTAL B					16.230.400		
C. PEKERJAAN STRUKTUR (KOLOM, BALOK, DAK)							
C.1	Kolom beton bertulang 27/27cm – 10 titik × 3m	m³	0,68	2.000.000	1.350.000		Besi Ø10 + beugel Ø6-150, K-250, 10 titik
C.2	Ring balok 12/15cm keliling + partisi	m³	0,75	2.000.000	1.500.000		Keliling bangunan 45m²
C.3	Rangka atap baja ringan 15×75mm + genteng berpasir + t	m²	50,00	320.000	16.000.000		Termasuk gutter & rain water pipe
C.4	Concrete decking t=7cm (dak/teras lantai 2 sesuai potong)	m²	15,00	390.000	5.850.000		Area dak depan, bangunan 45m²
SUB TOTAL C					24.700.000		
D. PEKERJAAN DINDING & LANTAI							
D.1	Pasangan concrete brick + plester + aci 2 muka	m²	115,00	160.000	18.400.000		Sesuai spesifikasi potongan, bangunan 45m²
D.2	Keramik granit 40×40 lantai (semua ruangan)	m²	45,00	140.000	6.300.000		Full floor 45m²
D.3	Keramik dinding kamar mandi 15×15	m²	9,00	155.000	1.395.000		KM 2×1,5m × 3 sisi (tile lebih kecil = lebih banyak net)
D.4	Acian halus + pengecatan plint bawah	m'	34,00	30.000	1.020.000		Keliling dinding bawah
SUB TOTAL D					27.115.000		
E. KUSEN, PINTU & JENDELA							
E.1	Pintu utama kayu kamper panel + kusen	unit	1,00	2.800.000	2.800.000		90×210cm, finishing PU coating
E.2	Pintu dalam kamar kayu panel + kusen (BR1 + BR2)	unit	2,00	2.000.000	4.000.000		80×210cm
E.3	Pintu dapur / servis kayu + kusen	unit	1,00	1.850.000	1.850.000		80×210cm
E.4	Pintu kamar mandi PVC + kusen aluminium	unit	1,00	1.000.000	1.000.000		70×210cm
E.5	Jendela aluminium 4" + kaca tempered 6mm	unit	6,00	1.400.000	8.400.000		BR1+BR2+Living+Dapur+fasad
SUB TOTAL E					18.050.000		
F. PLAFOND, FINISHING & FASAD							
F.1	Plafond gypsum 9mm + rangka metal furing	m²	45,00	130.000	5.850.000		Seluruh ruangan, bangunan 45m²
F.2	Cat dinding interior 2 lapis	m²	115,00	55.000	6.325.000		Net wall area
F.3	Cat dinding eksterior weathershield 2 lapis	m²	75,00	68.000	5.100.000		
F.4	Aksen fasad batu alam / andesit sebagian dinding depan	m²	6,00	800.000	4.800.000		Facade feature

F.5	Screed slope + waterproofing membrane dak/decking	m²	15,00	85.000	1.275.000	Membrane + screed 3cm
				SUB TOTAL F	23.350.000	
G. MEP – MEKANIKAL, ELEKTRIKAL & PLUMBING						
G.1	Instalasi listrik titik (NYM 2,5mm + conduit PVC)	titik	11,00	420.000	4.620.000	~1 titik/4m², bangunan 45m²
G.2	Panel MCB + grounding + kWh meter PLN	unit	1,00	1.150.000	1.150.000	1 panel per unit
G.3	Stop kontak + saklar + plate cover	titik	10,00	165.000	1.650.000	10 titik per unit
G.4	Instalasi air bersih PVC AW ¾"	titik	5,00	500.000	2.500.000	Dapur + KM + carport + taman
G.5	Kloset duduk + aksesoris lengkap	unit	1,00	2.000.000	2.000.000	Close coupled
G.6	Wastafel dapur stainless + mixer tap	unit	1,00	1.200.000	1.200.000	Kitchen sink 1 lubang
G.7	Shower + floor drain kamar mandi	unit	1,00	750.000	750.000	Shower head + trap
G.8	Tandon air 500L + tower/dudukan struktur baja H=3m (RO	unit	1,00	3.900.000	3.900.000	roof tank di atas rangka baja
G.9	Sambungan PDAM (PDAM WATER SUPPLY) + pendafta	ls	1,00	2.300.000	2.300.000	Per unit
G.10	Septic tank individual + bak kontrol (control tank) per unit	unit	1,00	7.200.000	7.200.000	septic tank + control tank
				SUB TOTAL G	27.270.000	
H. PEKERJAAN LUAR – CARPORT, TAMAN, PAGAR, DRAINASE						
H.1	Carport – rabat beton t=7cm + paving block	m²	9,00	250.000	2.250.000	Area 3×3m
H.2	Taman depan – tanah subur + rumput	m²	6,00	70.000	420.000	Area hijau depan kavling 96m²
H.3	Roster (dinding ventilasi blok berlubang) – 2 titik: dak 3m×	m²	8,00	200.000	1.600.000	Roster 1: dak 3m panjang x1m tinggi (3m²) Roster 2: 5m panjang x1m
H.4	Saluran drainase unit ke saluran site (PVC 4")	m'	6,00	160.000	960.000	Ke drainase utama site
				SUB TOTAL H	5.230.000	
TOTAL BIAYA KONSTRUKSI (sebelum OH & PPN)					144.793.400	
Overhead & Keuntungan Kontraktor (10%)					14.479.340	
PPN 11% (Sekarang 0%)					0	
GRAND TOTAL RAB UNIT RUMAH (incl. OH + PPN)					159.272.740	Berlaku SAMA untuk 51 unit
ANALISIS HARGA POKOK & ESTIMASI HARGA JUAL PER UNIT						
1	Biaya konstruksi unit			159.272.740		
2	Harga tanah per kavling (96m² × Rp 400,000)			38.400.000		108 × Rp 400,000 – harga 2026
3	Infrastruktur site per unit (÷ 51 unit)			31.493.770		Grand Total Infrastruktur Site / 51 unit
4	Kontingensi 5%			11.458.326		5% × (1+2+3)
5	SUB TOTAL HARGA POKOK PER UNIT			240.624.836		
6	Profit developer 45%			108.281.176		
7	ESTIMASI HARGA JUAL PER UNIT			348.906.011		Target: Rp 300–450 juta

Table 5.1
Table of Estimated Prices for House Construction
Source: Author, 2026

The cost estimate (RAB) summarizes the construction cost of one Type 45/96 housing unit and is applied equally to all 51 units in the residential development. The work is divided into eight categories: site preparation, foundation, structural works, walls and flooring, doors and windows, ceiling and finishing, mechanical, electrical and plumbing (MEP), and external works such as the carport, landscaping, ventilation blocks, and drainage. The total construction cost for one unit is Rp 144,793,400, and after adding 10% contractor overhead and profit, the final construction cost becomes Rp 159,272,740 per unit. To determine the selling price, additional costs are included, consisting of land acquisition, site infrastructure, and a 5% contingency, resulting in a total development cost of Rp 240,624,836 per unit. By applying a 45% developer profit margin, the estimated selling price is Rp 348,906,011 per unit, which remains within the project's target selling price range of Rp 300–450 million. This cost estimation demonstrates that the proposed incremental housing design can provide a complete and affordable landed house while maintaining the project's financial feasibility.

Cost Estimation—Facilities & Infrastructure Site

RENCANA ANGGARAN BIAYA – INFRASTRUKTUR & FASILITAS UMUM SITE							
Perumahan Bojongsalam Curug Total Lahan 9.990 m² (bekas sawah) 51 Unit Kavling 2026							
No	URAIAN PEKERJAAN	Sat.	Volume	Harga Satuan (Rp)	Jumlah (Rp)		Keterangan
I. PEKERJAAN PERSIAPAN & PEMBERSIHAN LAHAN SITE (BEKAS SAWAH)							
I.1	Pembersihan lahan, cut & fill, dan pemadatan tanah bekas	m²	9.990,00	65.000	649.350.000		Total site 9.990 m² – tanah lunak bekas sawah
I.2	Uitzet & pengukuran tapak keseluruhan	ls	1,00	5.000.000	5.000.000		Lumpsum
I.3	Mobilisasi & demobilisasi peralatan berat	ls	1,00	9.000.000	9.000.000		Lumpsum
SUB TOTAL I					663.350.000		
J. PEKERJAAN TANAH & DRAINASE SITE							
J.1	Galian & urugan tanah jalan + kompaksi	m³	700,00	75.000	52.500.000		Jalan internal
J.2	Drainase U-ditch 30×30 cm	m'	500,00	340.000	170.000.000		Keliling + internal site
J.3	Bak kontrol drainase	unit	25,00	750.000	18.750.000		Per ±20m drainase
J.4	Gorong-gorong pipa ø40cm pada akses masuk	m'	12,00	580.000	6.960.000		Crossing akses masuk
SUB TOTAL J					248.210.000		
K. PEKERJAAN JALAN LINGKUNGAN							
K.1	Jalan utama dalam site – paving block 6cm	m²	1.200,00	250.000	300.000.000		Jaringan jalan utama site
K.2	Jalan setapak antar unit – conblock	m²	300,00	160.000	48.000.000		Akses pejalan antar blok
K.3	Kerb / kanstin beton	m'	450,00	75.000	33.750.000		Kedua sisi jalan utama
K.4	Marka jalan & signage lingkungan	ls	1,00	4.500.000	4.500.000		Lumpsum
SUB TOTAL K					386.250.000		
L. PEKERJAAN UTILITAS SITE							
L.1	Jaringan distribusi air bersih PDAM (PVC AW ø3")	m'	450,00	160.000	72.000.000		Backbone distribusi ke semua unit
L.2	Tangki reservoir komunal 10.000L	unit	2,00	11.500.000	23.000.000		Cadangan air bersih site
L.3	Jaringan listrik PLN – tiang & kabel SR per blok	ls	1,00	46.000.000	46.000.000		Lumpsum per blok
L.4	Lampu jalan PJU LED 40W	unit	18,00	3.200.000	57.600.000		Per ±25m jarak
L.5	Septic tank komunal cadangan (musholla & fasum)	unit	1,00	36.000.000	36.000.000		Rumah sudah pakai septic individual
L.6	Sumur resapan / biopori komunal	unit	12,00	2.900.000	34.800.000		Per kluster
SUB TOTAL L					269.400.000		

M. PEKERJAAN FASILITAS UMUM (FASUM)							
M.1	Pos keamanan / security post	m ²	12,00	2.000.000	24.000.000		Termasuk MEP dasar
M.2	Musholla komunal	m ²	60,00	4.100.000	246.000.000		60m ² termasuk toilet wudhu
M.3	Area bermain anak (playground equipment)	m ²	100,00	680.000	68.000.000		Lumpsum area + peralatan
M.4	Lapangan badminton (konstruksi + net + pagar)	m ²	150,00	1.100.000	165.000.000		Termasuk buffer area
M.5	Jalur pedestrian tepi sungai (paving block)	m ²	450,00	270.000	121.500.000		±300m × 1,5m di tepi sungai
SUB TOTAL M					624.500.000		
N. PEKERJAAN PAGAR & GERBANG SITE							
N.1	Pagar keliling tinggi 2m (pasangan bata + pondasi + finish)	m ¹	450,00	1.350.000	607.500.000		Keliling perimeter site ±450m
N.2	Gerbang utama / gapura + pos jaga terintegrasi	unit	1,00	54.000.000	54.000.000		Manual swing gate + gapura
N.3							
SUB TOTAL N					661.500.000		
TOTAL BIAYA INFRASTRUKTUR SITE (sebelum OH):					2.853.210.000		
Overhead & Keuntungan Kontraktor (10%)					285.321.000		
GRAND TOTAL RAB INFRASTRUKTUR SITE (incl. OH)					3.138.531.000		÷ 51 unit

Table 5.2
Table of Estimated Prices for Site Construction
Source: Author, 2026

The site infrastructure cost estimate covers all shared infrastructure and public facilities required to support the 51-unit residential development. The budget includes site preparation, earthworks, drainage, internal roads, utility networks, public facilities, and site security. Infrastructure works consist of land clearing, cut and fill, drainage systems, paving block roads, pedestrian paths, clean water distribution, electricity, street lighting, communal reservoirs, and environmental infrastructure such as biopores and infiltration wells. Public facilities include a security post, musholla, playground, badminton court, and riverside pedestrian path, while site security is supported by a perimeter fence and a main entrance gate. The total infrastructure development cost is Rp 2,853,210,000, and after adding 10% contractor overhead and profit, the final infrastructure cost becomes Rp 3,138,531,000. This cost is distributed across all 51 housing units and forms part of the overall housing production cost, ensuring that the residential area is supported by complete infrastructure, public amenities, and reliable utility services.

Cost Estimation—Recap

REKAPITULASI TOTAL RAB – PERUMAHAN BOJONGSALAM CURUG		
TYPE 45/96 51 Unit Total Lahan 9.990 m² (bekas sawah) Lingkungan Bojongsalam, Kel. Curug, Kota Serang, Banten 2026		
A. RINGKASAN BIAYA PER UNIT RUMAH (Type 45/96, 1 Unit – SAMA UNTUK SEMUA 51 UNIT)		
No	Komponen Biaya	Nilai (Rp)
1	Sub Total A – Pekerjaan Persiapan	2.848.000
2	Sub Total B – Tanah & Pondasi	16.230.400
3	Sub Total C – Struktur (Kolom, Balok, Atap, Decking)	24.700.000
4	Sub Total D – Dinding & Lantai	27.115.000
5	Sub Total E – Kusen, Pintu & Jendela	18.050.000
6	Sub Total F – Plafond, Finishing & Fasad	23.350.000
7	Sub Total G – MEP (Mekanikal, Elektrikal, Plumbing)	27.270.000
8	Sub Total H – Pekerjaan Luar (Carport, Taman, dll)	5.230.000
PN)		144.793.400
10%		14.479.340
iku)		0
0%)		159.272.740
B. RINGKASAN BIAYA INFRASTRUKTUR & FASUM SITE (Total 51 Kavling)		
No	Komponen Biaya	Nilai (Rp)
I	Sub Total I – Persiapan & Pembersihan Lahan (bekas sawah)	663.350.000
J	Sub Total J – Tanah & Drainase Site	248.210.000
K	Sub Total K – Jalan Lingkungan	386.250.000
L	Sub Total L – Utilitas Site	269.400.000
M	Sub Total M – Fasilitas Umum (Musholla, Pos Jaga, Playground, Badminton, Pedestrian)	624.500.000
N	Sub Total N – Pagar Keliling 2m & Gerbang Site	661.500.000
DH)		2.853.210.000
0%		285.321.000
DH)		3.138.531.000

C. TOTAL INVESTASI PROYEK		
No	Komponen	Nilai (Rp)
1	Grand Total 51 Unit Rumah (51 × Grand Total Unit) – biaya SAMA per unit	8.122.909.740
2	Grand Total Infrastruktur & Fasum Site	3.138.531.000
3	Total Nilai Lahan 2026 (9.990 m² × Rp400.000)	3.996.000.000
EK		15.257.440.740

D. HARGA POKOK PENJUALAN (HPP) PER UNIT – SAMA UNTUK SEMUA 51 UNIT		
No	Komponen HPP	Nilai (Rp)
1	Grand Total RAB Unit Rumah (1 unit)	159.272.740
2	Infrastruktur & Fasum site per unit (÷ 51)	61.539.824
3	Harga tanah per kavling (96 m² × Rp400.000)	38.400.000
4	Kontingensi & biaya tak terduga (5%)	12.960.628
C)		272.173.192

Table 5.3
Estimated Investment Prices
Source: Author, 2026

The cost recap summarizes the overall financial feasibility of the proposed residential development by combining the construction cost of the housing units, site infrastructure, and land acquisition. Each Type 45/96 house has a construction cost of Rp 159.27 million including contractor overhead, while the total infrastructure and public facilities investment for the site is Rp 3.14 billion. Together with the land value of Rp 3.996 billion, the total project investment for the 51-unit development reaches approximately Rp 15.26 billion. When the infrastructure cost is distributed equally among all units and combined with the construction cost, land cost, and a 5% contingency, the housing production cost (HPP) is Rp 272.17 million per unit. This recap demonstrates that the project is financially feasible, as it accounts for all major development costs before determining the final selling price while ensuring that each housing unit is supported by complete infrastructure and public facilities.

E. HARGA JUAL PER BLOK & PROFIT DEVELOPER (HPP SAMA, HARGA JUAL BERBEDA)			
Sel kuning = harga jual target per unit (dapat diubah). Ketentuan: Blok C (termurah) maksimum Rp450.000.000; Blok A & B maksimum Rp600.000.000.			
BLOK A – Depan & Belakang (posisi terbaik, 22 unit)			
- Jumlah Unit			22
- HPP per Unit (sama untuk semua blok, dari Bagian D)			272.173.192
- Harga Jual per Unit (TARGET – dapat diubah)			580.000.000
- Profit Developer per Unit (Harga Jual – HPP)			307.826.808
- Margin Keuntungan (Profit ÷ HPP)			113,1%
ial)			12.760.000.000
BLOK B – Tengah (10 unit)			
- Jumlah Unit			10
- HPP per Unit (sama untuk semua blok, dari Bagian D)			272.173.192
- Harga Jual per Unit (TARGET – dapat diubah)			550.000.000
- Profit Developer per Unit (Harga Jual – HPP)			277.826.808
- Margin Keuntungan (Profit ÷ HPP)			102,1%
al)			5.500.000.000
BLOK C – Sisanya / standar (19 unit, termurah)			
- Jumlah Unit			19
- HPP per Unit (sama untuk semua blok, dari Bagian D)			272.173.192
- Harga Jual per Unit (TARGET – dapat diubah)			450.000.000
- Profit Developer per Unit (Harga Jual – HPP)			177.826.808
- Margin Keuntungan (Profit ÷ HPP)			65,3%
ial)			8.550.000.000
ok)			26.810.000.000

Table 5.4
Blocks Price
Source: Author, 2026

The selling price analysis applies the same housing production cost (HPP) of Rp 272.17 million to all 51 units, while the selling price varies according to the location and market value of each block. Block A, located in the most strategic position near the entrance, is priced at Rp 580 million per unit, generating a developer profit of Rp 307.83 million per unit with a 113.1% profit margin. Block B, located in the central area of the site, is priced at Rp 550 million per unit, resulting in a profit of Rp 277.83 million per unit and a 102.1% margin. Meanwhile, Block C, which occupies the standard residential area, has the most affordable selling price of Rp 450 million per unit, providing a profit of Rp 177.83 million per unit with a 65.3% margin. This pricing strategy reflects the different values of each block based on location and accessibility while maintaining the same construction quality and production cost for every housing unit, allowing the project to achieve both market competitiveness and financial feasibility.

Target Price

Units priced between Rp 280 million
up to Rp 450 million or more

Household Income	Maximum Monthly Mortgage (30%)	Estimated House Price (8 Years)
Rp5,000,000	Rp1,500,000	± Rp144–168 million
Rp10,000,000	Rp3,000,000	± Rp280–350 million
Rp15,000,000	Rp4,500,000	± Rp432–504million
Rp 20,000,000	Rp 6,000,000	± 576–672 Million

Achieved

Household Monthly Income	Affordable Monthly Mortgage (30%)	Affordable House Price (8-Year Mortgage)	Nawasri Residence Selling Price
Rp 10,000,000	Rp 3,000,000	± Rp 280–350 million	Block C: Rp 450 million (upper target)
Rp 15,000,000	Rp 4,500,000	± Rp 432–504 million	Block C: Rp 450 million (Achieved)
Rp 20,000,000	Rp 6,000,000	± Rp 576–672 million	Block B: Rp 550 million; Block A: Rp 580 million (Achieved)

Table 5.5
Target Price
Source: Author, 2026

The proposed selling prices successfully achieve the project's affordability target while remaining competitive within the Serang housing market. The standard units in Block C are priced at Rp 450 million, meeting the target range for middle-income households. Meanwhile, units in Blocks A and B are offered at Rp 580 million and Rp 550 million, respectively, because they occupy more desirable locations with better accessibility, views, and proximity to public facilities, resulting in higher market value. Despite these premium prices, they remain below the typical selling price of the lowest commercial housing projects in Serang, which starts at approximately Rp 680 million per unit. This pricing strategy allows the development to provide affordable options while capturing additional value from strategically located units, ensuring both market competitiveness and project feasibility.

Price based on Blocks

The selling price varies between blocks based on their location within the residential area, while the house quality and production cost remain the same. Block A is priced at Rp 580 million per unit because it is located at the front of the site with the easiest access and the highest location value. Block B is sold at Rp 550 million per unit as it is centrally located and still has good access to the main road and public facilities. Block C has the lowest selling price at Rp 450 million per unit, making it the most affordable option while providing the same house specifications and infrastructure as the other blocks. The difference in price reflects the value of each location rather than the quality of the house. Even the highest-priced units remain competitive, as the lowest-priced commercial housing in Serang is generally around Rp 680 million per unit. This pricing strategy allows buyers to choose a unit based on their budget while maintaining the project's financial feasibility.

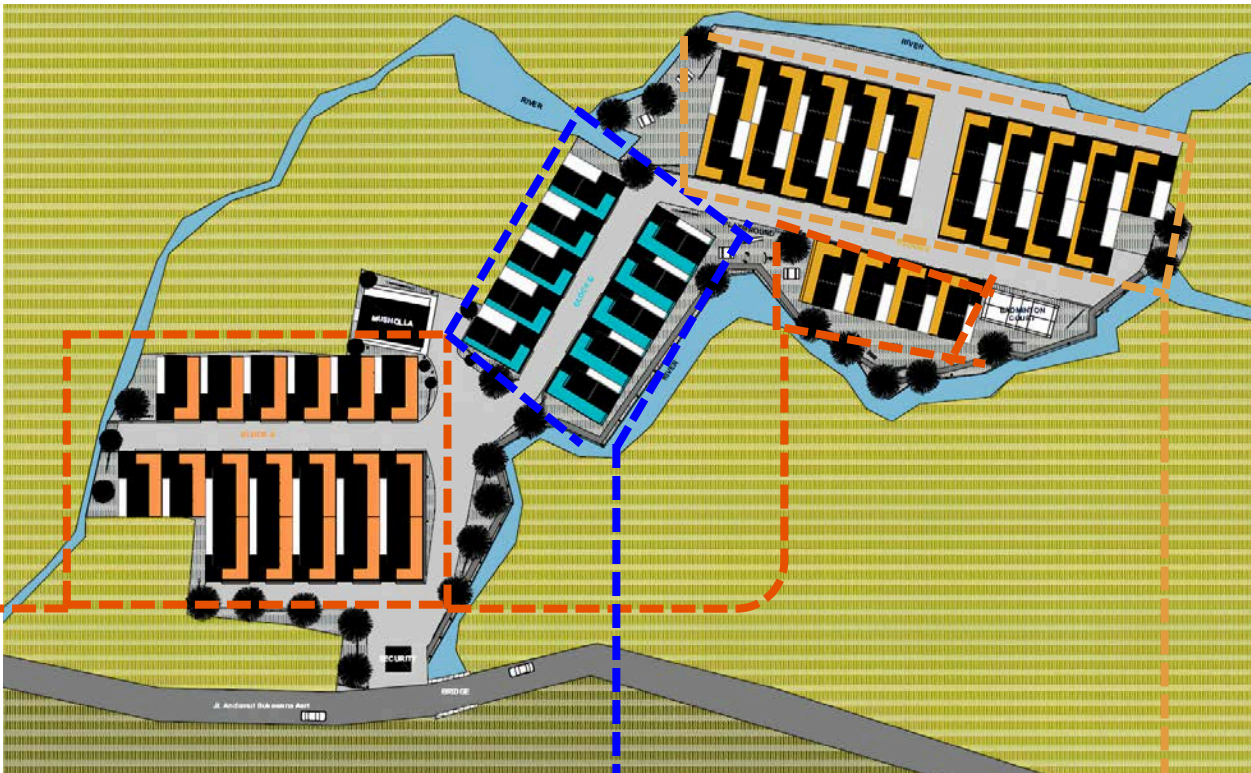


Figure 5.35
Blocks Prices
Source: Author, 2026

Item	Value
Number of Units	22
HPP per Unit	Rp 272,173,192
Selling Price per Unit	Rp 580,000,000
Developer Profit per Unit	Rp 307,826,808
Profit Margin	113.10%

Item	Value
Number of Units	10
HPP per Unit	Rp 272,173,192
Selling Price per Unit	Rp 550,000,000
Developer Profit per Unit	Rp 277,826,808
Profit Margin	102.10%

Item	Value
Number of Units	19
HPP per Unit	Rp 272,173,192
Selling Price per Unit	Rp 450,000,000
Developer Profit per Unit	Rp 177,826,808
Profit Margin	65.30%

Financial Analysis

F. ANALISIS KEUANGAN PROYEK (Financial Analysis)			
No	Komponen	Nilai (Rp)	Keterangan
1	TOTAL REVENUE (51 unit × harga jual terdiferensiasi per Blok)	26.810.000.000	Jumlah pendapatan Blok A + B + C
2	TOTAL INVESTASI KESELURUHAN PROYEK	15.257.440.740	Dari Bagian C
3	ESTIMATED PROFIT (Total Revenue – Total Investasi)	11.552.559.260	Laba proyek keseluruhan
4	ROI – Return on Investment (Profit ÷ Total Investasi)	75,7%	% return atas total investasi proyek
5	Harga Jual Rata-rata per Unit	525.686.275	Total Revenue ÷ 51 unit
6	BREAK EVEN POINT (Rupiah) = Total Investasi	15.257.440.740	Titik impas dalam Rupiah
7	BREAK EVEN POINT (Jumlah Unit Terjual)	30	Jumlah unit minimal terjual agar ir

Konstruksi per unit ≈ Rp149,1 juta (≈Rp4,14 jt/m²) – SAMA untuk seluruh 51 unit. HPP per unit (Bagian D) juga sama. Profit developer TINGGI pada unit yang dijual dengan harga tinggi (Blok A & B) karena biaya pokoknya sama namun harga jual dinaikkan sesuai posisi/keunggulan kavling – bukan karena menambah spesifikasi bangunan. ROI dihitung dari Estimated Profit ÷ Total Investasi Keseluruhan. BEP = jumlah unit yang perlu terjual untuk menutup total investasi.

Table 5.6
Financial Analysis
Source: Author, 2026

The financial analysis shows that the proposed residential development is financially feasible. With differentiated selling prices for each block, the project is expected to generate a total revenue of approximately Rp 26.81 billion, while the total investment, including construction, infrastructure, public facilities, and land acquisition, is around Rp 15.26 billion. This results in an estimated project profit of Rp 11.55 billion, with a Return on Investment (ROI) of 75.7%, indicating that the project provides a good return compared to the total investment. The average selling price across all 51 units is Rp 525.69 million per unit. Based on the financial analysis, the project reaches its break-even point (BEP) after selling approximately 30 housing units, meaning that the remaining units contribute directly to the project's profit. Overall, these results indicate that the proposed development is both financially viable and commercially competitive while maintaining affordable housing options for the target market.

Consumer

From the consumer's perspective, the project offers several price options while maintaining the same house quality, construction standards, and infrastructure. Buyers with a more limited budget can choose Block C at Rp 450 million, while those who value better accessibility, a more strategic location, and proximity to the entrance and public facilities can choose Blocks A or B. Even the highest-priced units remain competitive, as they are still lower than the starting price of many commercial housing developments in Serang, which is around Rp 680 million.

Developer

From the developer's perspective, using the same house design and construction specification for all units keeps the construction process efficient and controls production costs. The different selling prices are based on the market value of each block rather than different building specifications, allowing the developer to maximize revenue from premium locations while still providing affordable units. This pricing strategy improves the overall profitability of the project, shortens the break-even period, and helps maintain the project's financial feasibility without reducing housing quality.

The financial analysis indicates that the proposed residential development is economically feasible, generating a total projected revenue of approximately Rp 26.81 billion from a total investment of Rp 15.26 billion. This results in an estimated project profit of Rp 11.55 billion with a Return on Investment (ROI) of 75.7%. The project is expected to reach its break-even point after approximately 30 housing units are sold, while the remaining units contribute directly to project profit. Based on the assumption that monthly mortgage payments should not exceed 30% of household income with an 8-year mortgage period, the standard units in Block C, priced at Rp 450 million, are affordable for households with a minimum monthly income of around Rp 15 million. Meanwhile, the higher-priced units in Blocks A and B are intended for households with higher purchasing power who seek the added value of more strategic locations and better accessibility. Although the selling prices differ, all units have the same house specifications, construction quality, and supporting infrastructure. This pricing strategy allows the project to remain affordable for its target market while maximizing the value of premium locations, and even the highest-priced units remain below the typical entry price of commercial housing developments in Serang, which is approximately Rp 680 million per unit.

5.3 Rendering

Phase 1



Figure 5.36
Phase 1
Source: Author, 2026

Phase 2



Figure 5.37
Phase 2
Source: Author, 2026

Phase 3



Figure 5.38
Phase 3
Source: Author, 2026



Figure 5.39
Residential Area
Source: Author, 2026



06. *DESIGN EVALUATION*

6.1 Review



Conclusion Review

House

The review and evaluation for the house covered several structural and design aspects, including the addition of a terrace at the front of the house, and an additional room above the living room. Structural adjustments were also assessed, such as adding a beam and changing the foundation, along with an integrated scheme covering structure, MEP, and canopy, as well as improving natural light at the staircase.

Masterplan

For the masterplan, the evaluation addressed revisions to the water block pump, landscaping for the park and playground, the border between the park and the houses in Block C South, the retaining wall, and fire safety measures.

BMC & Marketing

The review also covered the BMC and marketing portfolio for the project, including the addition of unit pricing for Block C South.

Table of Review

No.	Review / Feedback	Required Revision
1	The space beneath the roof can be utilized for the second-floor living area.	Utilize the space beneath the roof to expand the living room on the second floor.
2	The landscape around the housing units needs to be designed.	Develop the landscape design for each housing unit, including vegetation and outdoor spaces.
3	The public area near the sports court needs better safety and supervision.	Redesign the area to be safer, more open, and easier to supervise by residential security.
4	Natural lighting in the staircase area needs improvement.	Add a bovenlight to provide more natural lighting in the staircase area.
5	The residential clean water distribution system needs to be reviewed.	Recheck and improve the clean water distribution system throughout the residential area.
6	Fire safety and universal accessibility need to be included.	Add fire safety and universal accessibility packages, including hydrant layouts, evacuation routes, and assembly points.
7	The integration of structure, envelope, and MEP systems needs to be clearly presented.	Provide structural plans and sections showing the integration of structural, envelope, and MEP systems.
8	The phased growth concept and use of public facilities need further visualization.	Provide 3D models or renderings showing the phased growth concept and the use of public facilities during the day and night.
9	A marketing strategy based on the Business Model Canvas (BMC) needs to be presented.	Prepare a sample marketing portfolio aligned with the proposed BMC channels.
10	The garden at Block C-South needs to be reorganized and clearly defined.	Rearrange the Block C-South garden and add landscape elements and boundaries between public and residential areas.
11	An outdoor terrace should be provided at the front of the house.	Add an outdoor terrace in front of the house as an additional semi-outdoor space.
12	The retaining wall needs to be strengthened.	Increase the thickness of the retaining wall to improve its structural stability.

Terrace

Phase 1

Phase 2

Phase 3



Figure 6.1
Terrace Phases
Source: Author, 2026

The terrace is introduced as an extension of the front façade to provide a comfortable semi-outdoor space between the public street and the interior of the house. It can accommodate everyday activities such as relaxing, receiving guests, or waiting before entering the house. The addition of the canopy improves thermal comfort by providing shade and protecting the entrance from direct sunlight and rainfall, while also enhancing the overall façade composition.

The terrace design is maintained consistently throughout all three development phases to preserve the architectural identity of the house despite future expansions. As the house grows horizontally and vertically, the terrace remains functional without requiring major modifications, supporting the incremental housing concept. Integrated lighting beneath the canopy further improves visibility and safety at night while creating a warm and welcoming appearance that enhances the residential streetscape.

Additional Room

Before

Phase 3 - 1st floor



Phase 3 - 2nd floor

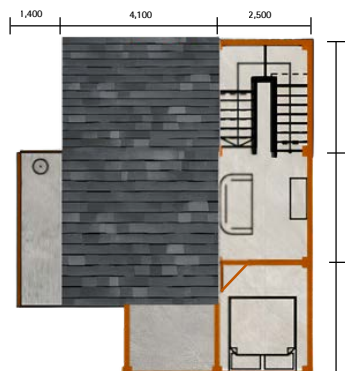
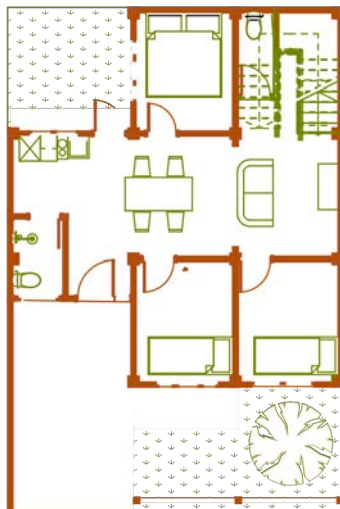


Figure 6.2
Before 3rd Phase Floor Plan
Source: Author, 2026

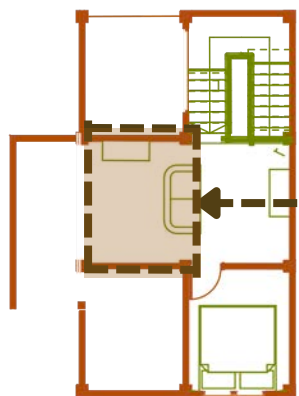
Before the revision, the space beneath the original roof of the Phase 1 house remained unused, despite having sufficient headroom to accommodate an additional room. The second floor only consisted of the planned bedroom, leaving a portion of the roof volume unutilized. As a result, the available building volume was not fully optimized for future expansion.

After

Phase 3 - 1st floor



Phase 3 - 2nd floor



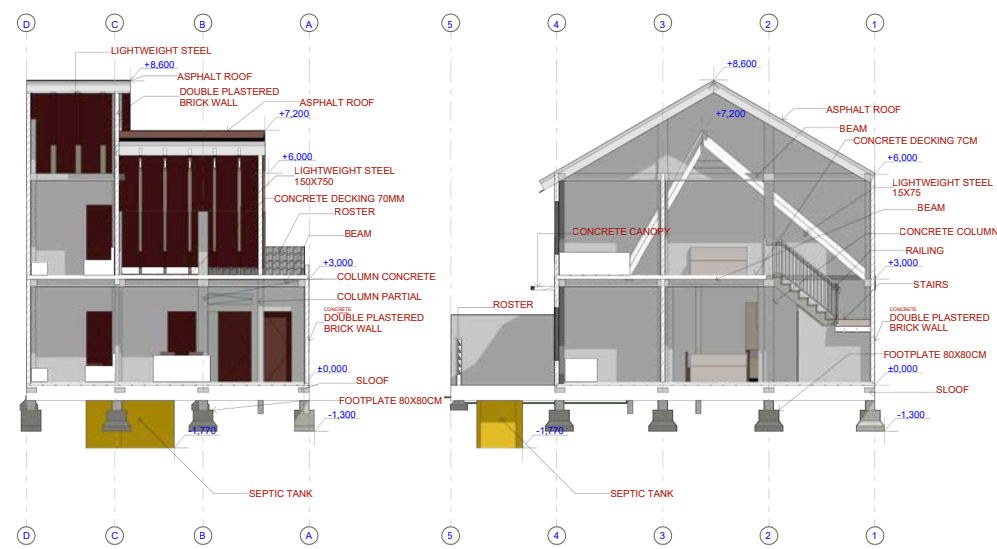
Additional Room

Figure 6.3
After 3rd Phase Floor Plan
Source: Author, 2026

After further design development, the unused space beneath the original roof was optimized by adding an additional room above the living room. This room becomes accessible once the staircase is constructed in Phase 3, making it a functional part of the second floor without requiring changes to the original roof form. By utilizing the existing roof volume, the design increases the usable floor area while maintaining the same building footprint and minimizing additional construction. This revision further strengthens the incremental housing concept by maximizing the potential of the original structure while providing greater flexibility for future household needs.

Before

Phase 3 - 1st floor

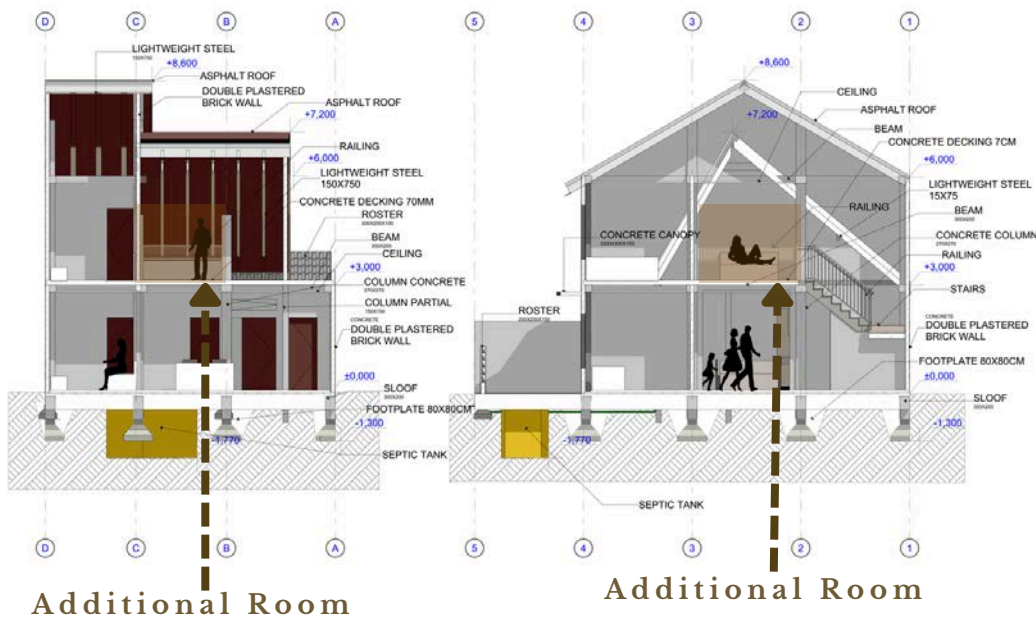


Before the design revision, the section shows that the space beneath the original sloped roof remained unused. Although the roof geometry provided sufficient vertical clearance, the area was left as an empty roof void, resulting in underutilized building volume. Consequently, the second floor only accommodated the planned bedroom, while the potential space above the living room was not optimized.

Figure 6.4
Before 3rd Phase Sections
Source: Author, 2026

After

Phase 3 - 1st floor

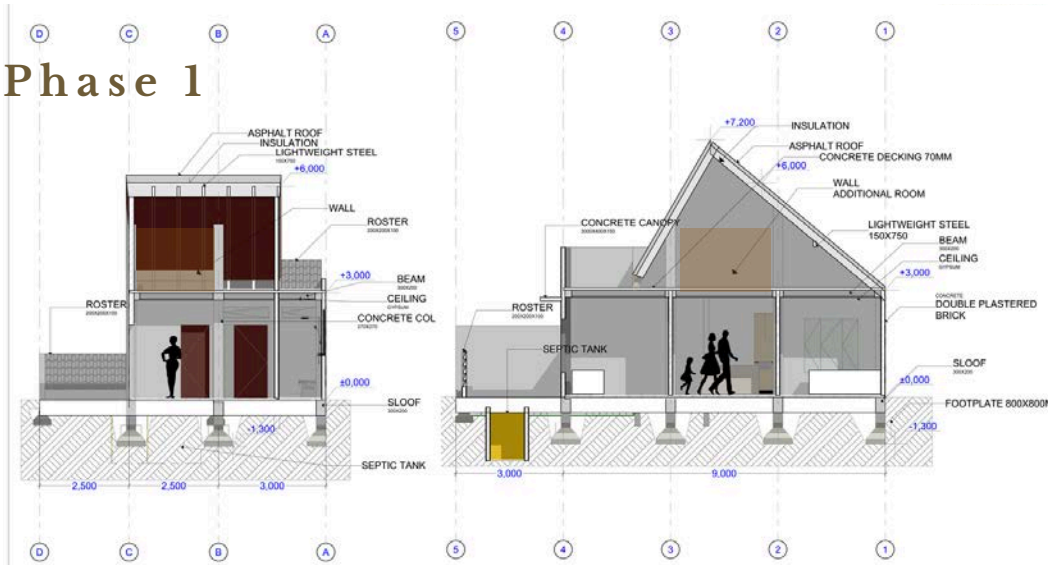


After the design revision, the section illustrates that the previously unused roof void has been converted into an additional room located above the living room. The existing roof structure is retained, allowing the room to fit within the original roof profile without altering the overall building form. This room becomes fully accessible in Phase 3 through the addition of the staircase, maximizing the usable interior space while preserving the building footprint and minimizing structural modifications. This improvement enhances the efficiency of the incremental housing design by making full use of the available roof volume for future household needs.

Figure 6.5
After 3rd Phase Sections
Source: Author, 2026

Section

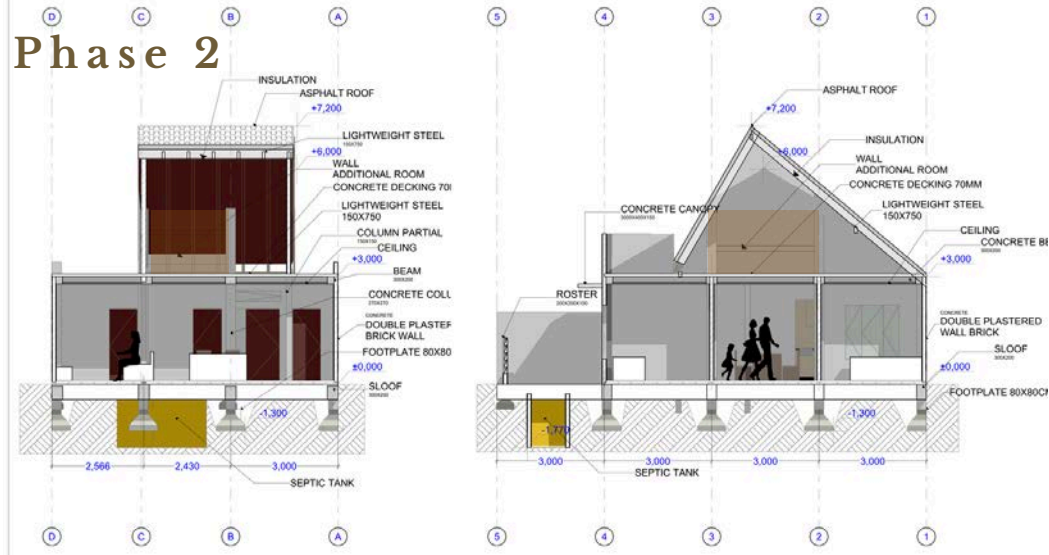
Phase 1



In Phase 1, the section shows that the space beneath the sloped roof, directly above the living room, is intentionally left as a void. This design creates a more spacious interior while reserving the roof volume for future development. By leaving the area unoccupied, the house can accommodate future expansion without requiring changes to the existing roof structure.

Figure 6.6
After 1st Phase Sections
Source: Author, 2026

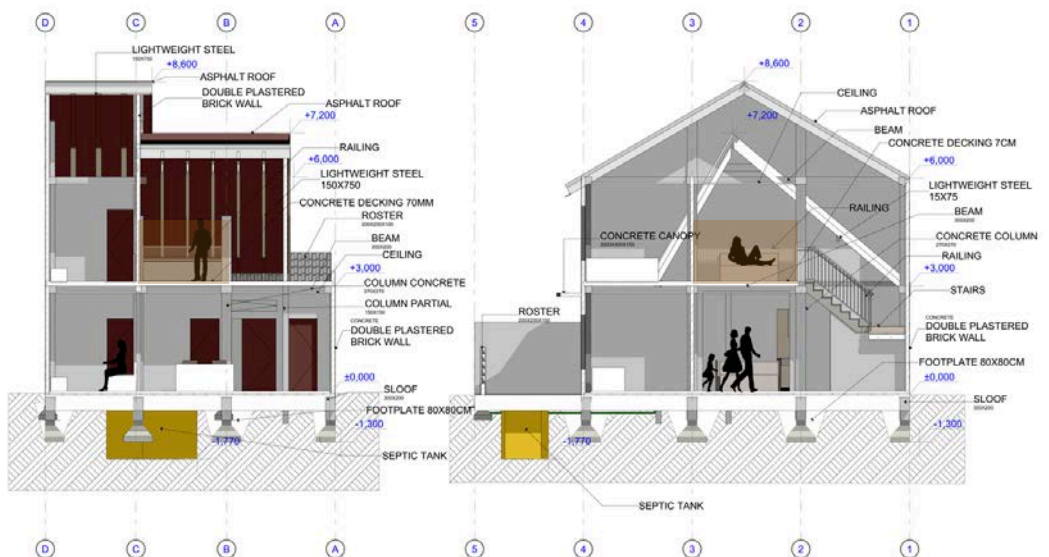
Phase 2



In Phase 2, although the house expands horizontally, the roof void above the living room is maintained. The additional bedroom and enlarged living area improve the functionality of the house, while the reserved roof space continues to provide flexibility for future vertical expansion. This approach ensures that the next development phase can be carried out with minimal structural modifications.

Figure 6.7
After 2nd Phase Sections
Source: Author, 2026

Phase 3



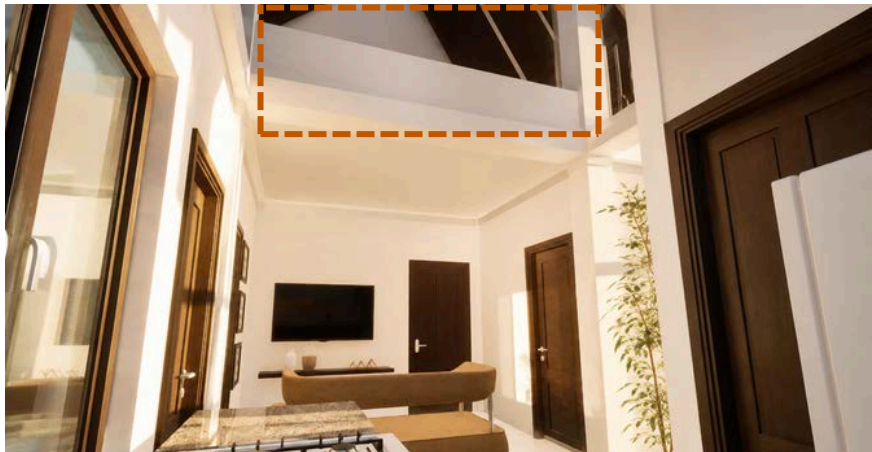
In Phase 3, the previously unused roof void is transformed into an additional room. The space beneath the original roof is fully utilized by constructing a room above the living room, which becomes accessible through the newly added staircase. This design maximizes the existing building volume without altering the roof form or increasing the building footprint, demonstrating an efficient incremental housing strategy that anticipates future household needs.

Figure 6.8
After 3rd Phase Sections
Source: Author, 2026

Exposed Ceiling

Ceiling Plan

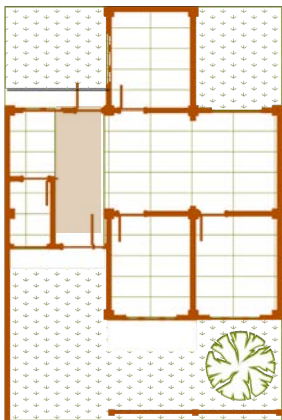
Phase 1



.In Phase 1, the ceiling plan incorporates an exposed ceiling above the entrance, creating a double-height void that enhances the sense of arrival and provides a more spacious interior experience. Meanwhile, the space beneath the sloped roof above the living room is intentionally left unoccupied, allowing the roof volume to be utilized for future expansion without requiring changes to the existing roof structure.

Figure 6.9
After 1st Phase Ceiling Plan
Source: Author, 2026

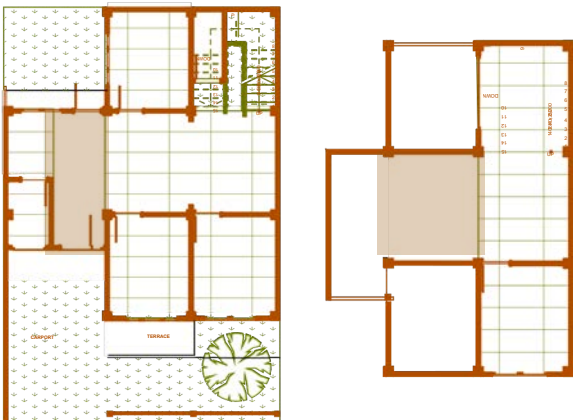
Phase 2



.In Phase 2, the exposed ceiling above the entrance is maintained, preserving the visual openness and allowing natural light to penetrate deeper into the house. Although the house expands horizontally, the roof volume above the living room remains unoccupied and is reserved for future development, ensuring flexibility for the next phase of expansion.

Figure 6.10
After 2nd Phase Ceiling Plan
Source: Author, 2026

Phase 3

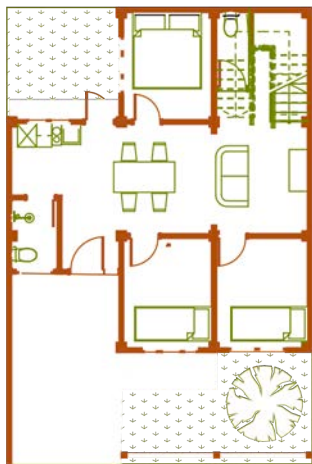


In Phase 3, the exposed ceiling above the entrance is retained to preserve the double-height spatial quality of the entrance area. At the same time, the previously unused space beneath the sloped roof above the living room is converted into an additional room, accessed via the newly constructed staircase. This strategy maximizes the existing roof volume without altering the original roof form, allowing the house to grow efficiently while maintaining its architectural character and supporting the incremental housing concept.

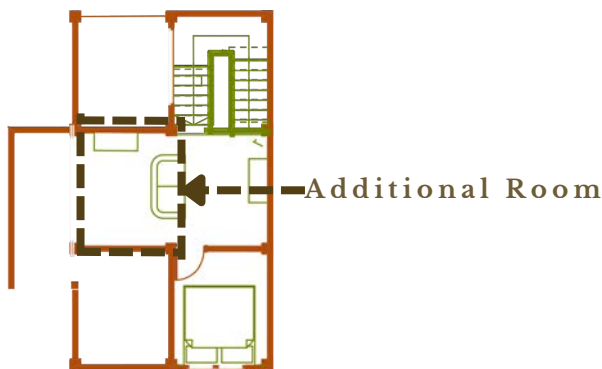
Figure 6.11
After 3rd Phase Ceiling Plan
Source: Author, 2026

The renderings illustrate the potential use of the additional space created beneath the original Phase 1 roof and above the original living room. Instead of remaining as an unused roof void, this area is transformed into a flexible space that can adapt to the changing needs of the occupants. Connected directly to the second floor through the newly constructed staircase, the space functions as an extension of the upper-level living area while maintaining visual connectivity with the entrance void below.

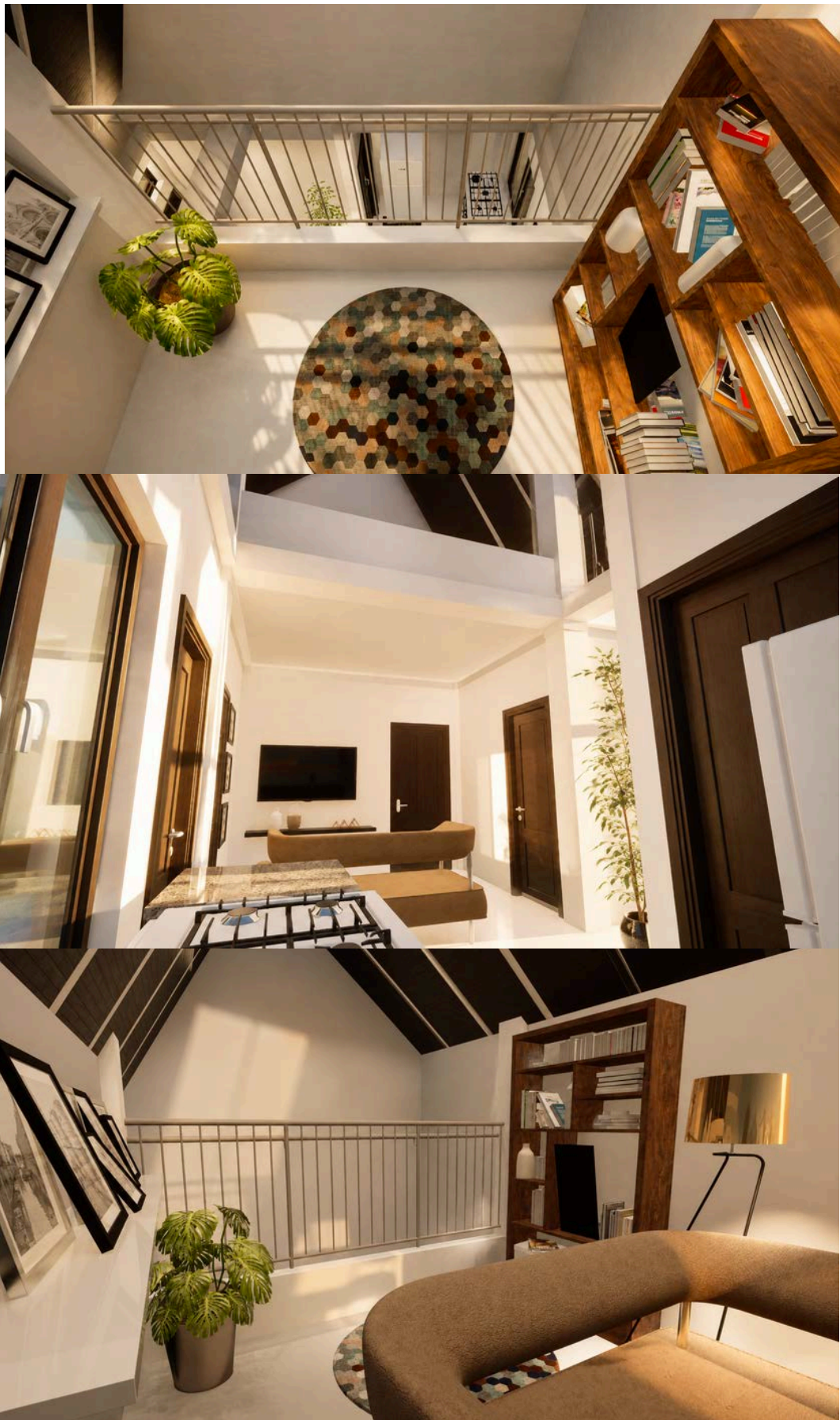
Phase 3 - 1st floor



Phase 3 - 2nd floor



The open layout allows the space to accommodate various functions, such as a family lounge, home office, reading area, study room, or hobby space. By utilizing the existing roof volume, the design increases the usable floor area without expanding the building footprint or modifying the original roof form. This approach demonstrates the adaptability of the incremental housing concept, enabling homeowners to customize the space according to their evolving lifestyles while making efficient use of the building's existing structure.



Stairs

The staircase is illuminated by a fixed bouven light positioned adjacent to the stairwell, allowing natural daylight to enter the vertical circulation space. This daylight opening reduces the reliance on artificial lighting during the day and prevents the staircase from becoming a dark and enclosed area. The improved visibility also enhances user comfort and safety while moving between floors.

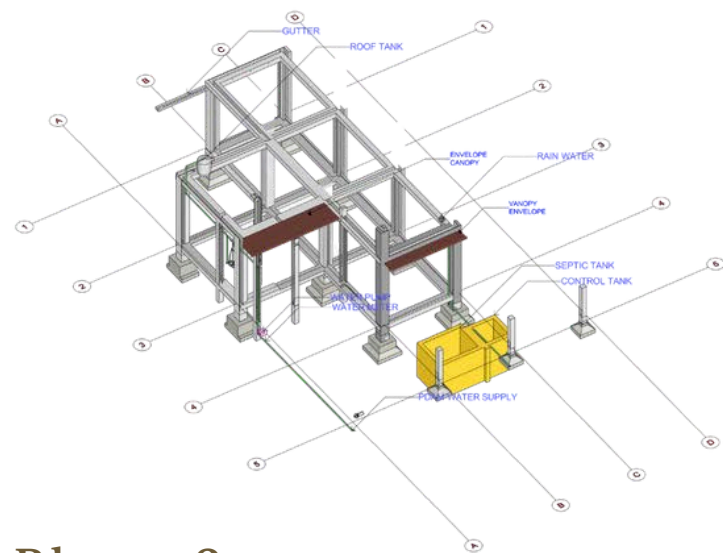
Although the bouven light is not operable and does not contribute to natural ventilation, it plays an important role in improving the spatial quality of the stairwell. Together with the open landing and entrance void, the natural lighting creates a brighter and more welcoming circulation space while maintaining privacy and the architectural character of the house.



Figure 6.12
Rendering Stairs
Source: Author, 2026

Integrated Scheme

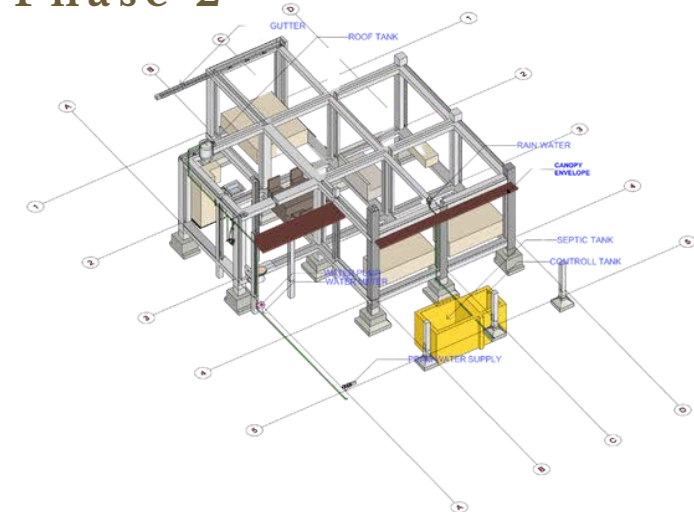
Phase 1



In Phase 1, the integrated scheme establishes the core structural, envelope, and plumbing systems required for the initial house. The reinforced concrete structural frame is designed to accommodate future expansion, while the building envelope, including the roof, walls, doors, and windows, encloses the essential living spaces. The plumbing system consists of a clean water supply connected to a roof tank and a wastewater system comprising a septic tank and control tank, providing a complete and functional utility network from the beginning.

Figure 6.13
1st Phase Integrated Scheme
Source: Author, 2026

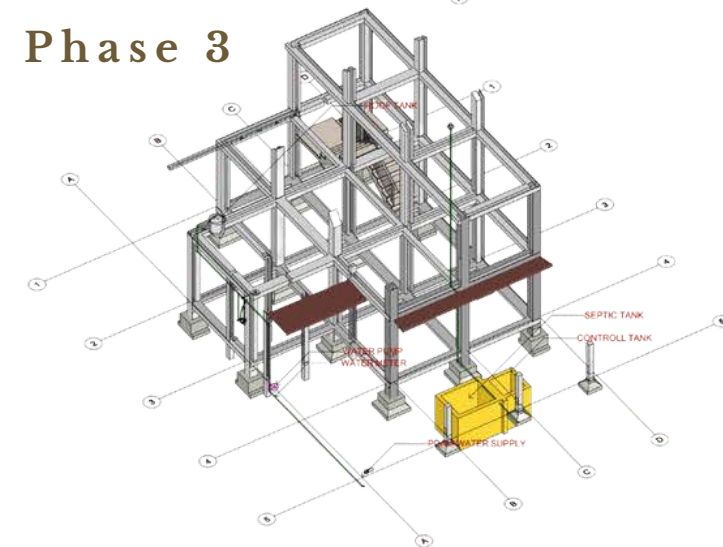
Phase 2



In Phase 2, the structural frame is extended horizontally to support the additional rooms while maintaining continuity with the original construction. The building envelope expands accordingly with new walls, roofing, and openings that seamlessly integrate with the existing house. The clean water and wastewater systems are also extended to serve the new spaces without altering the primary utility layout, allowing the expansion to be completed efficiently with minimal disruption.

Figure 6.14
2nd Phase Integrated Scheme
Source: Author, 2026

Phase 3



In Phase 3, the structural system is further developed to support the vertical expansion, including the staircase and the additional room beneath the existing roof. The envelope is completed by enclosing the newly occupied space while preserving the original roof form. The plumbing system is extended vertically to serve the upper floor, utilizing the existing utility infrastructure established in the earlier phases. This integrated approach ensures that the structural, architectural, and utility systems develop together, allowing the house to expand efficiently while minimizing demolition and maintaining overall system continuity.

Figure 6.15
3rd Phase Integrated Scheme
Source: Author, 2026

Clean Water Plan



The clean water distribution system has been revised by introducing a dedicated pump for each residential block instead of extending distribution pipes directly beneath the housing units. Water from the PDAM network first passes through the main water meter before being distributed to separate pumps serving Block A, Block B, Block C, and the public facilities. This arrangement creates a clearer and more organized distribution network while reducing the length of the main pipelines.

The revised system improves maintenance efficiency, as each block can be operated and serviced independently without affecting the water supply to the other blocks. It also minimizes the need for extensive underground piping beneath the residential units, making future maintenance and repairs more accessible. Overall, this decentralized distribution approach provides a more practical, reliable, and efficient clean water system for the residential development.

Badminton Court



Figure 6.17
Rendering Badminton Court
Source: Author, 2026

.The badminton court serves as a recreational facility that encourages physical activity and social interaction among residents. Located within the residential area and surrounded by green open spaces, the facility provides a comfortable environment for sports and informal community gatherings. Its placement allows easy access for nearby residents while maintaining a safe distance from the main vehicular circulation.

The renderings illustrate the atmosphere of the badminton court during both daytime and nighttime. During the day, the surrounding landscaping and open views create a pleasant and refreshing environment for outdoor activities. At night, adequate street and landscape lighting provide sufficient illumination for safe use while enhancing visibility along the pedestrian pathways. The court is situated within a quiet residential setting with low traffic, creating a secure, comfortable, and family-friendly recreational space for residents throughout the day.

Playground



.The playground is designed as a child-friendly recreational space that encourages outdoor play, social interaction, and community engagement within the residential area. Located adjacent to the green open space and connected to the pedestrian network, it provides a safe and easily accessible environment where children can play while remaining within sight of nearby houses and public spaces. The surrounding trees and landscaped areas also create a comfortable microclimate by providing shade and enhancing the overall outdoor experience.

The renderings illustrate the playground during both daytime and nighttime. During the day, the open lawn and play equipment offer an inviting environment for children's activities and family gatherings. At night, adequate landscape and street lighting improve visibility and safety, allowing the space to remain comfortable for residents while maintaining a calm residential atmosphere. The integration of recreational facilities, pedestrian paths, and green spaces creates an active yet secure environment that supports the quality of life within the neighborhood.

Figure 6.18
Rendering Playground
Source: Author, 2026

Park



The park provides a green open space where residents can relax, socialize, and enjoy outdoor activities. Surrounded by trees and landscaping, it creates a comfortable environment while enhancing the visual quality of the residential area. Its location also serves as a communal space that encourages interaction among residents.

The renderings show the park during both daytime and nighttime. During the day, the shaded green space offers a pleasant setting for recreation and informal gatherings. At night, landscape lighting provides adequate illumination, creating a safe, comfortable, and welcoming environment while preserving the calm atmosphere of the neighborhood.

Figure 6.19
Rendering Park
Source: Author, 2026

Retaining Wall



Figure 6.20
Revised Site's Safety
Source: Author, 2026

The residential area is enclosed by a 2-meter-high reinforced concrete boundary wall that defines the perimeter of the development and enhances overall security. The wall clearly separates the residential environment from the surrounding area while supporting the one-gate access system, allowing all entries and exits to be monitored through the main security post.

Safety

Before

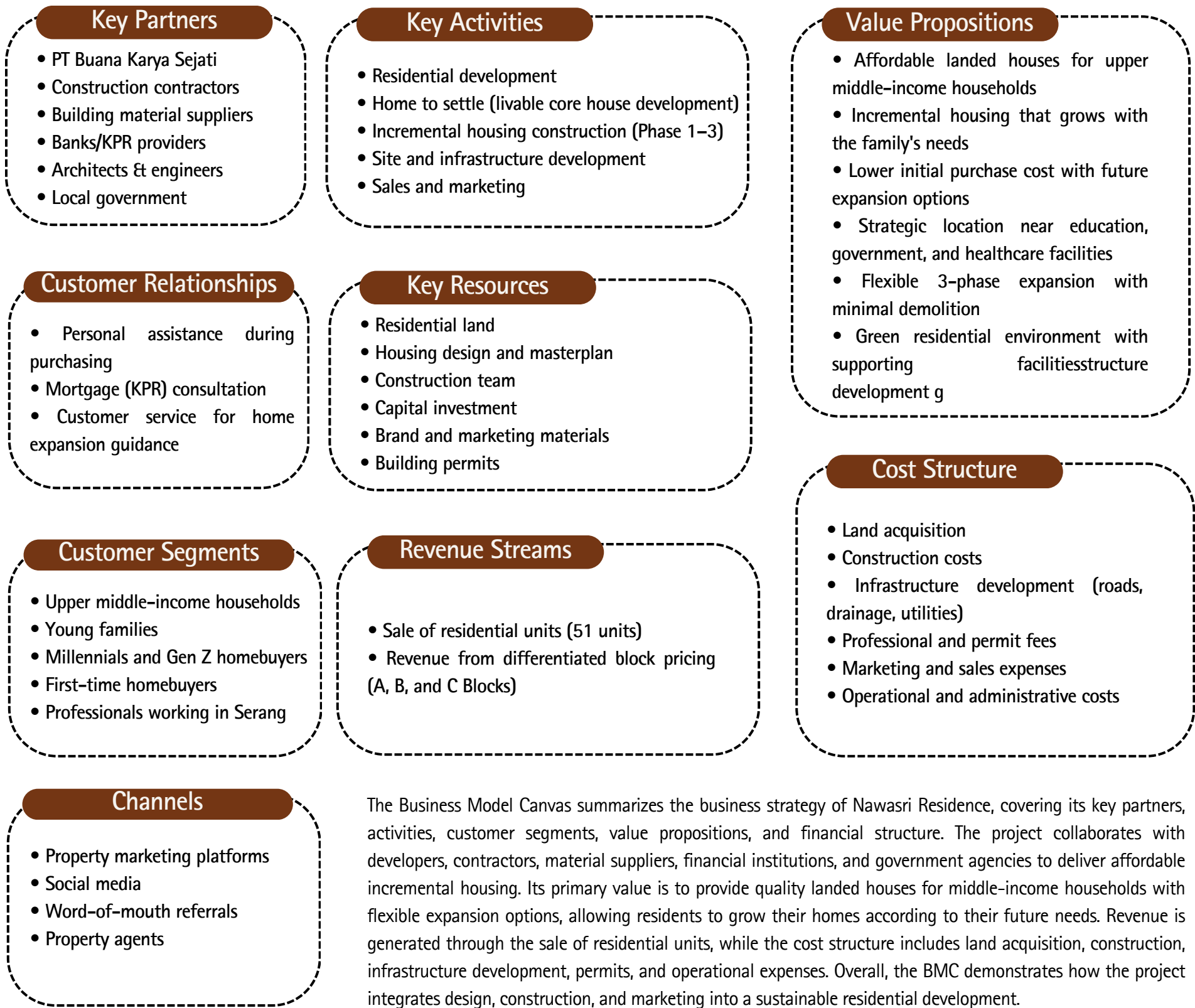


The initial safety scheme relied on a limited number of fire hydrants, resulting in uneven fire protection coverage across the residential area. Several housing clusters were located relatively far from the nearest hydrant, which could reduce the efficiency of emergency response during a fire incident.

After



The revised safety scheme improves fire protection by distributing fire hydrants throughout the residential area, ensuring that each block has better access to emergency water supply. Together with the one-gate security system, 2-meter concrete boundary wall, and strategically located emergency assembly points within the green open spaces, the revised layout creates a more comprehensive and reliable safety system for the entire residential development.



Broschure



Total Area: 69 sqm
Building Area: 45 sqm



"A home designed to grow with you"



Figure 6.22
Broschure
Source: Author, 2026

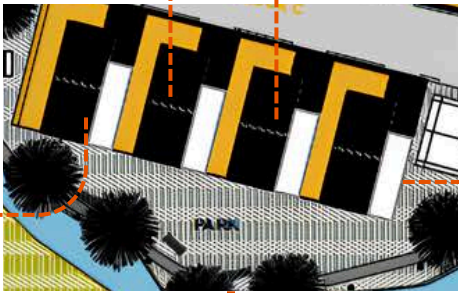
The marketing brochure presents Nawasri Residence as an affordable housing alternative for middle-income households, particularly for families who are not eligible for subsidized housing but still find conventional commercial housing beyond their budget. The project offers a balanced solution by providing residential units with infrastructure and construction quality positioned between subsidized and commercial housing.

The brochure also highlights the project's incremental housing concept, which allows homeowners to expand their houses in three phases with minimal demolition as their needs and financial capacity grow. Supported by complete facilities such as green open spaces, a playground, a badminton court, a mosque, and a one-gate security system, Nawasri Residence provides a comfortable, safe, and sustainable living environment. Located near educational institutions, government offices, and healthcare facilities, the development offers both affordability and long-term value for young families and working professionals.

Block C - South

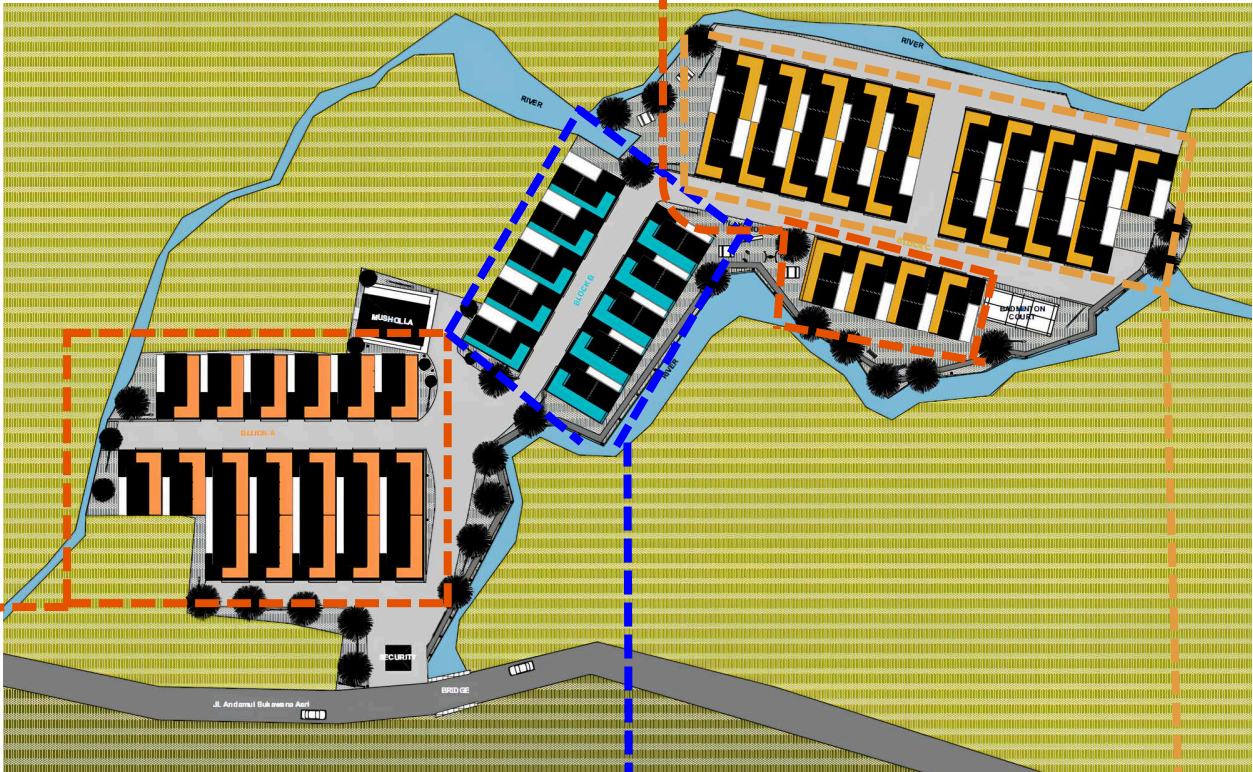
The second unit is priced at Rp 640,000,000, including an additional 30 m² of land valued at Rp 2,000,000 per square meter.

The first unit is priced at Rp 580,000,000 and includes the standard plot without any additional land.



The third unit is priced at Rp 660,000,000 with an additional 40 m² of land

while the fourth unit is priced at Rp 620,000,000, including an additional 20 m² of land



Item	Value
Number of Units	22
HPP per Unit	Rp 272,173,192
Selling Price per Unit	Rp 580,000,000
Developer Profit per Unit	Rp 307,826,808
Profit Margin	113.10%

Item	Value
Number of Units	10
HPP per Unit	Rp 272,173,192
Selling Price per Unit	Rp 550,000,000
Developer Profit per Unit	Rp 277,826,808
Profit Margin	102.10%

Item	Value
Number of Units	19
HPP per Unit	Rp 272,173,192
Selling Price per Unit	Rp 450,000,000
Developer Profit per Unit	Rp 177,826,808
Profit Margin	65.30%

Padestrian Way-Border



Figure 6.23
Rendering Padestrian Way-Border
Source: Author, 2026

The rear side of Block C – South is designed to take advantage of its location along the river by integrating a pedestrian walkway with the existing river inspection road (jalan inspeksi sungai). Besides providing access for maintenance, the pathway also functions as a recreational space where residents can walk, jog, and enjoy the riverside environment. The open views and landscaped setting create a comfortable outdoor experience while encouraging healthy daily activities.

To maintain privacy for the adjacent houses, a landscape buffer consisting of trees, shrubs, and low planting is placed between the pedestrian walkway and the residential units. This green buffer clearly defines the transition between the public circulation area and the private residential space without the need for solid barriers. During the evening, bollard and landscape lighting improve visibility and safety along the pathway while preserving the calm atmosphere of the neighborhood.

6.2 Phases



Figure 6.24
Render Day and Night
Source: Author, 2026



Phase 1



Figure 6.25
Render Phase 1
Source: Author, 2026

The renderings show the core house in Phase 1 as a complete and comfortable living space that is ready for future expansion. The exterior features a simple contemporary design with white walls, andesite stone accents, and a roster fence that provides privacy while maintaining ventilation. Day and night views demonstrate how natural and artificial lighting create a welcoming and safe environment.

The interior is designed with an open layout connecting the living room, dining area, and kitchen to maximize the sense of space. Large windows bring natural light into the house, while the exposed ceiling above the entrance creates a brighter and more spacious atmosphere. These features provide a comfortable home while supporting the incremental housing concept.

Phase 2



Figure 6.26
Render Phase 2
Source: Author, 2026

The renderings show the second phase of the house after the horizontal expansion. The façade maintains the same design and materials as Phase 1, creating a consistent appearance while providing additional living space. Day and night views illustrate a comfortable and secure residential environment.

The interior features a larger living and dining area to better accommodate family activities. Large windows and the open layout continue to provide ample natural light, while the exposed ceiling above the entrance is maintained to keep the space bright and spacious. The expansion improves the functionality of the house with minimal changes to the original structure.

Phase 3



Figure 6.27
Render Phase 3
Source: Author, 2026

The renderings illustrate the final phase of the incremental housing concept, where the house expands vertically to provide additional living space while preserving the original architectural character. The second floor is added with minimal demolition by utilizing the existing structure and roof volume. Day and night views show a complete house with a balanced façade and a comfortable residential atmosphere.

The interior features the new staircase, an upper-level living area, and an additional room, creating more flexible spaces for the growing family. The open layout and entrance void continue to provide natural light, while the new upper floor offers extra space that can be used as a family lounge, home office, or other activities. This final phase demonstrates how the house can grow efficiently to meet changing household needs over time.

07. *ATTACHMENT*



Direktorat Perpustakaan Universitas Islam Indonesia
Gedung Moh. Hatta
Jl. Kaliurang Km 14,5 Yogyakarta 55584
T. (0274) 898444 ext.2301
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Nomor:3011091800/Perpus./10/Dir.Perpus/VIII/2026

Bismillaahirrahmaanirrahiim

Assalamualaikum Wr. Wb.

Dengan ini, menerangkanbahwa:

Nama : Kinasih Marew
Nomor Mahasiswa : 21512081
Pembimbing : Ar. Agus Setiawan, S.T., M.Arch., IAI
Fakultas / Prodi : Teknik Desain Inovasi/ Arsitektur
Judul Karya Ilmiah : The Design of Incremental Housing Residential for Upper
Middle-Income Households in Serang

Karya ilmiah yang bersangkutan di atas telah melalui proses cek plagiasi menggunakan **Turnitin** dengan hasil kemiripan (*similarity*) sebesar **4 (Empat) %**.

Demikian Surat Keterangan ini dibuat untuk dapat dipergunakan sebagaimana mestinya.

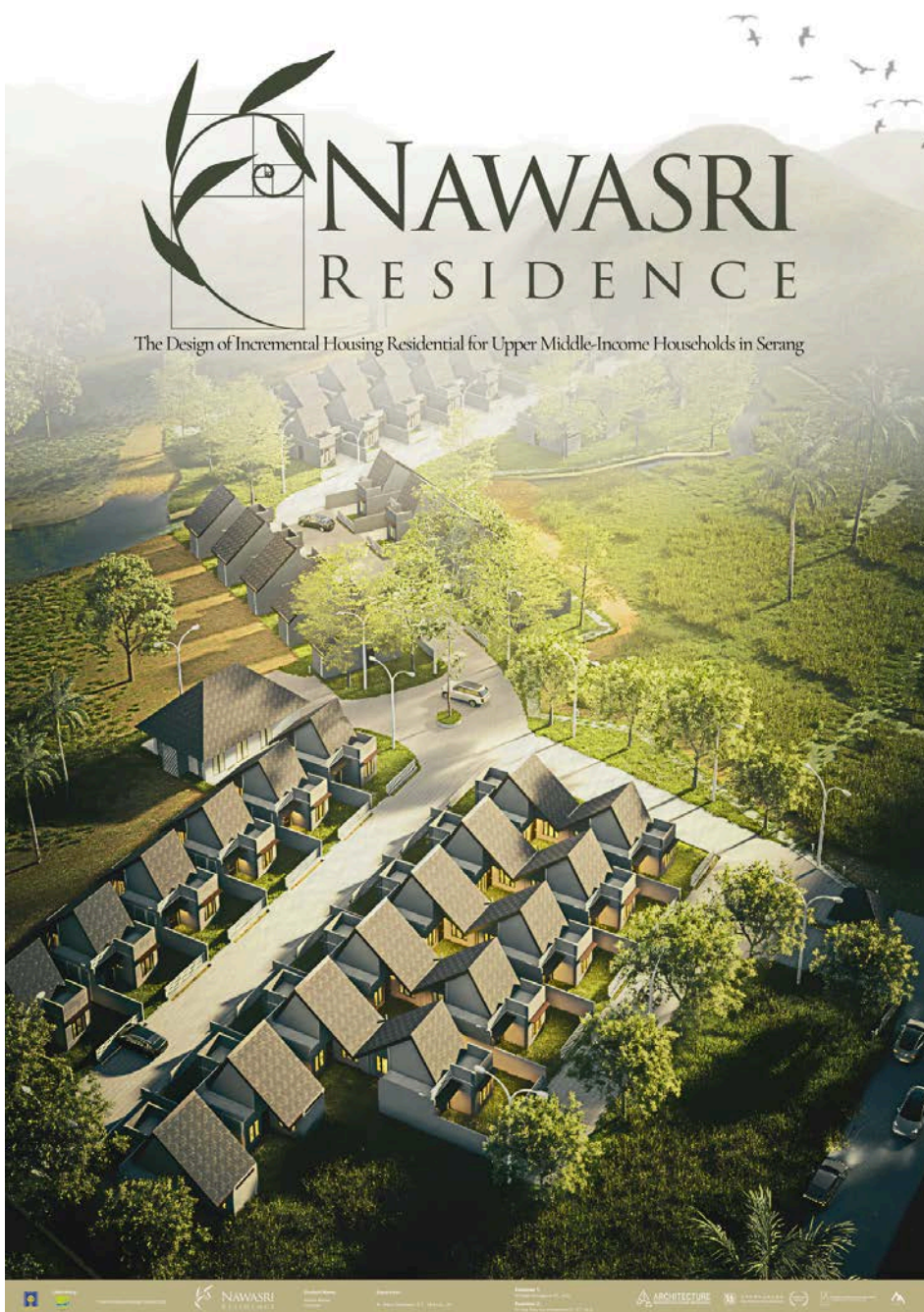
Wassalamualaikum Wr. Wb.

Yogyakarta, 11/08/2026

Direktur



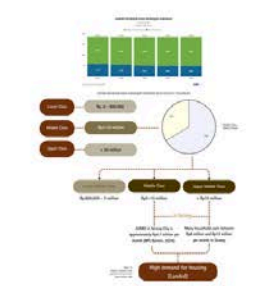
Muhammad Jamil, SIP.



ISSUES

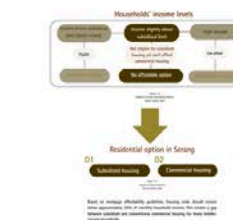
INDONESIA'S "CLASS" POPULATION

Historical practices in addressing the middle class, representing the largest segment of households, is needed to meet demand, particularly for basic shelter toward affordable rental housing that offers better living quality and long-term value. This creates a significant opportunity for national development targeting middle income households.



The County also hosts the largest housing market, creating strong demand for affordable rental housing.

HOUSEHOLDS RESIDENTIAL OPTIONS

LANDED HOUSING
DEMAND

Tobias, Ben J and Michaelis dominate the southern 5000, and Angles being the most productive generation. In aggregate, Angles are good producers, drive and pull better than any other generation. They produce a variety of calves, many of which are good milking cows. But by age five, 80% of the following generation is considered as cullable. Thus, such a theoretical study has the capacity to cause breeding. However, the Angles have a reputation. Many young people before reaching a breed a breeding program is possible. But it is not because Angles does not need, but because Angles breeding does not Angles does financial saving.

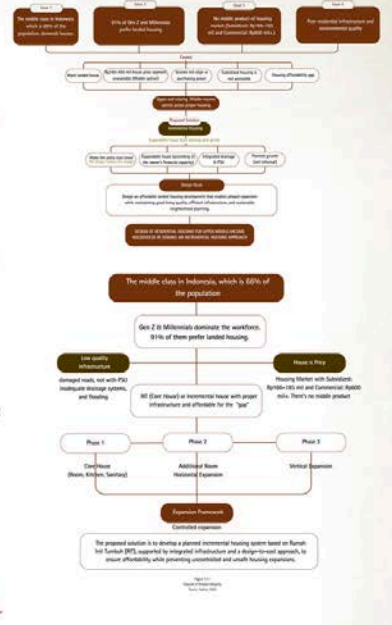


HOUSING CONDITIONS IN SERANG

*Worldwide internet access is being utilized to expedite finding out if companies through various and varied information. These methods require the need for individual privacy that companies must understand, or otherwise, it will be a disaster for the company.



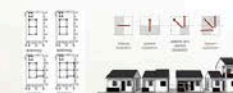
LANDED HOUSING DEMAND



APPROACH

INCREMENTAL HOUSING

Incremental housing is a housing strategy that allows homes to be developed in stages according to the owner's financial capacity. The core house provides essential spaces, while future expansions can be completed without major demolition, making the approach more affordable and adaptable over time.



THE VISENDA RESIDENCE

Although the project successfully supports environmental learning principles, the final house price exceeds the affordability of many people, making it impossible for the house to be a true affordable environmental learning house.



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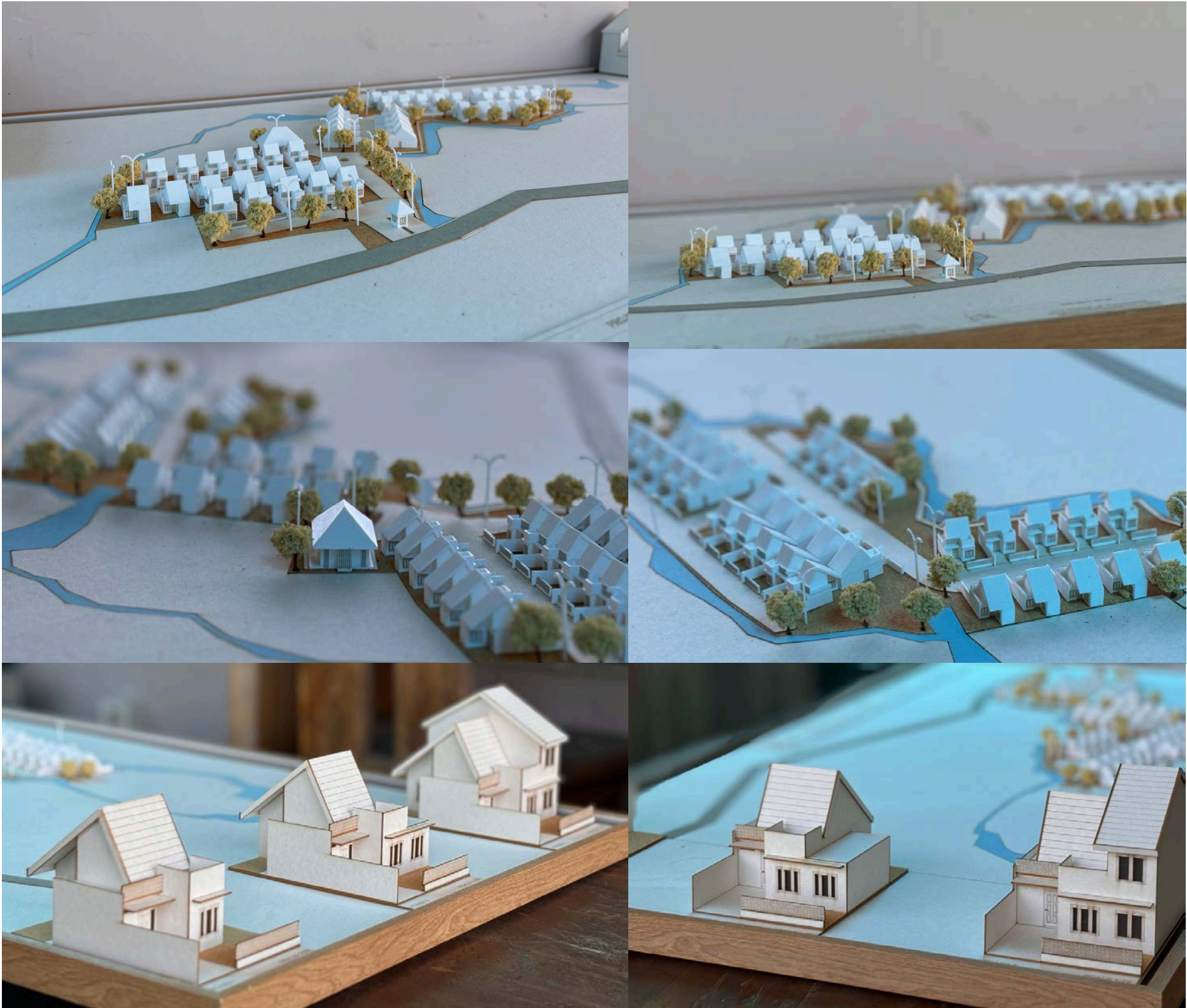
Horizontal response from 300 kN to 140 kN. Total area 1100 mm², added 800 kN/m² which becomes 1400 kN. The building is 30 m x 4 m x 10 m (100 ft).



FACILITIES



7.2 3D Model



For a better experience



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Kinasih Marew - 21512081

Supervised by

Ar. Agus Setiawan, S.T., M.Arch., IAI

Examiners

M.Galieh Gunagama, ST., M.Sc

Dr.-Ing. Putu Ayu Pramanasari A., S.T., M.A.

Lab. Komunikasi dan Bisnis Arsitektur

Department of Architecture

Architecture International Undergraduate Program

Faculty of Engineering, Design, and Innovation

Universitas Islam Indonesia

Final Architectural Design Studio

2026

The Design of Incremental Housing Residential for Upper Middle-Income Households in Serang

NAWASRI RESIDENCE

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