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ENVIRONMENTAL SUSTAINABILITY ANALYSIS IN KAMAJAYA HOUSING IN SUPPORTING THE FEASIBILITY OF LIVING

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ABSTRACT

The increasing need for housing as the population grows is a challenge for sustainable environmental management. Housing is an important element of urban ecosystems that affect quality of life. Kamajaya housing in Singosari District is designed for the needs of modern housing with environmental aspects, but there is still a need for deeper analysis regarding the application of sustainability principles. Environmental sustainability in housing includes energy use, water and waste management, green space, and climate change adaptation. Sustainable housing improves air quality, resident health, and comfort. This study aims to evaluate the sustainability of Kamajaya Housing to provide recommendations for improving environmental quality and supporting sustainable housing policies. Suitability of Space Utilization Activities (KKPR) is a tool in spatial planning to ensure optimal and sustainable land use by considering environmental, social, and economic aspects. The Ministry of Fisheries and Fisheries prevents land conflicts, preserves the environment, and encourages sustainable economic growth. The implementation of the KKPR requires adequate data, conflict of interest management, and strong analytical capacity. The results of the study show that the Building Boundary Line (GSB) is decided to have a minimum distance of GSB of 5 m + 5.5 m. The distance of 11 m for this measurement is in accordance with the IKKPR Decree, namely the minimum distance of GSB 5 m + 5.5 m measured from the outermost side of a building mass to the Road Axle which is the measurement reference. Kamajaya Housing occupies 58.02% of the Land Area so that the KDB is less than 70% of the Land Area. KDH Residential Buildings less than 10 % Land area with RTH Composition: Garden: 132 m2. Net Needs for Residential Buildings, then the amount of water needs has been able to be met by the Clean Water Source by the PDAM network, which is 125 Liters / Minute. Referring to SNI 03 – 7065 : 2005 Plumbing System Planning Procedures. Consumption of Residential Houses with Occupants amounting to 4 people with effective activities per day is 8 hours, the waste of dirty water is 65 liters. Referring to SNI 03 – 7065 : 2005 Plumbing System Planning Procedures. For rainfall figures are = 8 Liters / Minute.

Keywords: Housing; Milieu; Sustainability; KKPR; Residence.

INTRODUCTION

The increasing need for housing as cities grow demands that housing planning no longer only focus on quantity, but also the quality of the environment that supports the long-term well-being of residents. Decent housing must guarantee social, economic, and ecological aspects simultaneously, from air quality and access to green open spaces to energy efficiency, water management, and reliable waste systems. Without the integration of sustainability principles, housing development has the potential to exacerbate urban environmental problems such as increased emissions, land degradation, flood risk, and a decrease in the quality of life of residents. Initial observations in Kamayaya Housing, Singosari District, show that although the design refers to the needs of modern housing, there are concrete obstacles that have not been systematically addressed. The problems that appear to include: the availability of limited and uneven green open space; inadequate drainage systems so that areas are prone to inundation during heavy rains; the management of household waste, which is partly dependent on unscheduled transport, resulting in

temporary dumping points; high household energy consumption without the support of renewable energy schemes; as well as inefficient water use practices and potential groundwater level subsidence. (Kurniawan & Luthfi, 2023) (Sutaryono et al., 2021) (Arwani et al., 2022) In addition, there are gaps in the implementation of technical policies and low residents' collective awareness of environmentally friendly practices so that all these factors magnify the risk of high operational costs, convenience disruptions, and vulnerability to climate change. This study aims to assess the extent to which sustainability principles have been applied in Kamajaya Housing in a measurable and problem-oriented way, namely identifying and prioritizing key environmental problems, measuring key indicators namely energy, water, waste, green open space, flood resistance, and analyzing technical, institutional, and behavioral barriers. The methods used will combine field surveys, spatial mapping, consumption and utility measurements, and household questionnaires to produce a valid and actionable picture. The results of the research are expected to provide practical recommendations ranging from design and technology interventions to local management strategies and policies so that they can improve the quality of life of residents while reducing the environmental impact of the area in a real and measurable manner. (Cahyono et al., 2025) (Keristian et al., 1997)

LITERATURE REVIEW

2. 1. Physical criteria of land

This is the fundamental factor that is the main determinant of the feasibility of a land, namely: (Maryanti, 2023)

1. Slope slope: Slopes that are too steep increase the risk of landslides and are difficult to build.
2. Soil type and texture: Determines the ability of soil to support the foundation of the building. Sandy soils have good drainage, but are poor in nutrients, while clay soils can hold water but are at risk of flooding.
3. Drainage and hydrology: The land must have a good drainage system to prevent waterlogging and flooding. The availability of clean water is also an important consideration.
4. Geological conditions and soil movements: Areas prone to earthquakes or soil movements, such as labile soil or steep slopes, are considered unsuitable for settlements.
5. Disaster vulnerability: Land must be avoided from potential natural disasters such as floods, landslides, and earthquakes.

2.2. Accessibility and infrastructure criteria

Land suitability is also assessed from the ease of access and availability of supporting facilities. (Rain, 2023)

1. Accessibility: The residential location must be easily accessible and have adequate road access.
2. Social facilities and utilities: The availability of basic facilities such as clean water, sanitation, waste disposal, and electricity is essential.
3. Transportation network: Proximity to the main transportation network and ease of community mobility are considerations.

2.3. Social and economic criteria

This factor looks at the feasibility of the project in terms of impact on society and cost. (Puspadewi et al., 2024)

1. Land value: The cost of land acquisition and development will affect the economic viability of the project.
2. Zoning and regulations: Land must be in accordance with its designation in the Regional Spatial Plan (RTRW) and meet permits such as Environmental Impact Analysis (EIA).
3. Social and cultural aspects: Housing development must pay attention to the social conditions of the local community and not cause conflicts.

Through this multi-criteria evaluation process, decisions regarding environmental suitability for housing can be made in a structured and objective manner, minimizing risks and maximizing sustainability.

RESEARCH METHODOLOGY

The suitability of the Spatial Utilization Activities (KKPR) is the conformity between the Space Utilization activity plan and the Spatial Plan (RTR) in accordance with the mandate of Law Number 11 of 2020 concerning Job Creation in Indonesia's Vision 2045 which is based on 4 (four) Pillars, namely Human Development and Science and Technology Development, Sustainable Economic Development, Equitable Development, and Strengthening National Resilience and Government Governance, Governance. The goal of KKPR (Suitability of Space Utilization Activities) in environmental sustainability is to maintain sustainable spatial planning and the environment. (Wahyuni et al., 2024) (Arnowo, 2023)

Figure 1. Utilization of the Kamajaya Housing Environment
Source. Data Analysis

The KKPR is a basic requirement for business licensing before environmental licensing and building permitting. The KKPR functions as a reference for the use of space and a reference for land administration. With the existence of the KKPR, development can run smoothly without neglecting the environmental aspects and the welfare of the community. (Arnowo, 2023)

The KKPR is the compatibility between the space utilization activity plan and the Spatial Plan (RTR). The implementation of KKPR for business activities is carried out through the Confirmation of Space Utilization Suitability (KKKPR) and the Approval of Space Utilization Activity Suitability (PKKPR). The KKPR assessment process involves several main stages: (Suraswat et al., 2023)

Table 1. Utilization of Kamajaya Housing Space

ARAHAN RENCANA TATA RUANG	
1. Luas tanah yang disetujui	: 1.422 m²
2. Rencana Pola Ruang	: Permukiman dan Tegalan
3. Koefisien Dasar Bangunan Maks.	: 70% = 995 m²
4. Ketentuan Lain:	
• GSP & GSB Min. LiP (Utara)	: 5,50 m & 5,00 m
• Koefisien Dasar Hijau Min.	: 10% = 142,2 m²

Source. Malang Regency Housing, Settlement and Creation Areas Office (DPKPC)

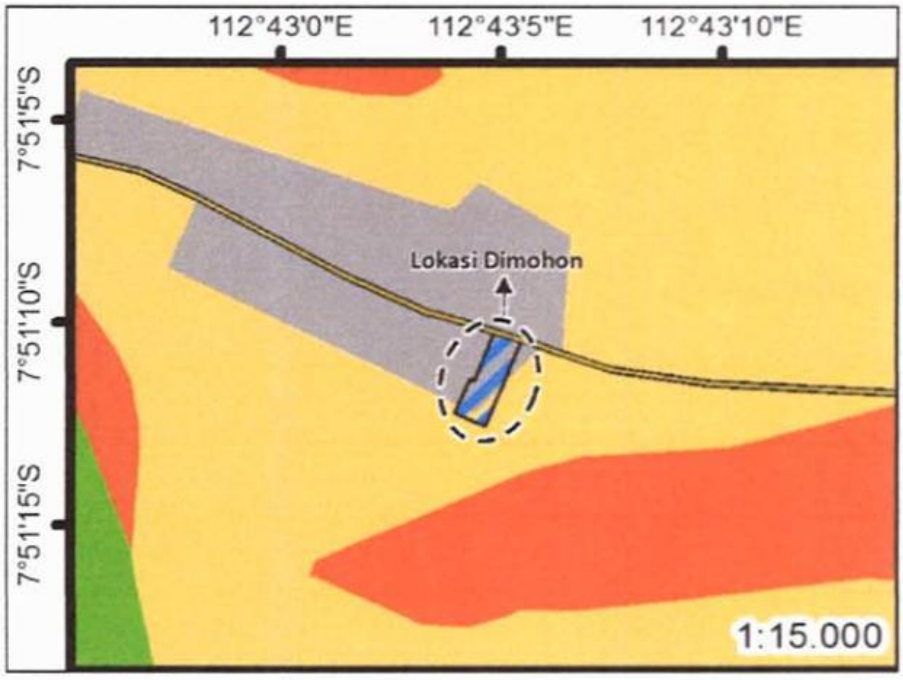

Figure 2. Utilization of Kamajaya Housing Space
Source. Malang Regency Housing, Settlement and Creation Areas Office (DPKPC)

3.1. Persil Boundary Distance Measurement Method (Persil Boundary Line — GSP)

Objective: To determine the actual distance of GSP to the road axle and assess the suitability of the PKKPR decision.

Data & Instruments: location maps (situation pictures/maps), certificates/letter C, GPS/GNSS RTK or total station, measuring tapes/laser distance meters, documentation photos.

Procedure:

1. Define the reference axles on the map and the field.
2. Conduct a topographic survey on the outermost side of the persil mass using GNSS RTK / total station; record the coordinates of the outermost point and project the distance perpendicular to the Road Axle.
3. Measure the minimum distance of GSP (m) and document points and photos.
4. Compare the measurement results with the provisions of PKKPR (GSP min 5 m).

Standard / Reference : PKKPR Document Number : 600.3.3.2 / 1272 / 35.07.111 / 2023.
Output: Measured point distance tables, small maps with GSP lines, administrative recommendations (e.g. statement letters).

3.2. Building Boundary Distance Measurement Method (GSB)
Objective: Determine the actual GSB distance and assess the suitability for the conditions.
Data & Instruments : Building Plans, GNSS/Total Station, Distance Measuring Instruments, Photos.
Procedure:
1. Identify the outermost side of the building against the Road Axle.
2. Measure the perpendicular distance from the outermost side of the building to the RoadAxle.
3. Take note of the value and compare it with the GSB terms (5 m + 5.5 m).

Standards / References : PKKPR related.
Output: Measured distance comparison report vs GSB requirements and placement map.

3.3. Environmental Intensity Conformity Calculation Method (KDB & KDH)
Objective: Calculate the percentage of KDB (Building Base Coefficient) and KDH (Green Base Coefficient) on land area.
Data & Instruments : Land Area Size and Building Area (m²), RTH / Park Area, Site Plan Drawings; CAD or GIS software for area measurement.
Procedure:
1. Verify the land area (certificate) and re-measure the area of the building as well as the area of RTH using CAD/GIS from situation drawings or field measurements.
2. Count:

$$KDB\ (\%) = (Building\ Area\ /\ Land\ Area) \times 100$$
$$KDH\ (\%) = (Green\ Open\ Space\ Area\ /\ Land\ Area) \times 100$$

3. Compare with the provisions of IKKPR (KDB max 70%, KDH min 10%).

Standards / References : IKKPR Related No.
Output: KDB/KDH table, RTH distribution map, RTH repair recommendations when KDH < standard.

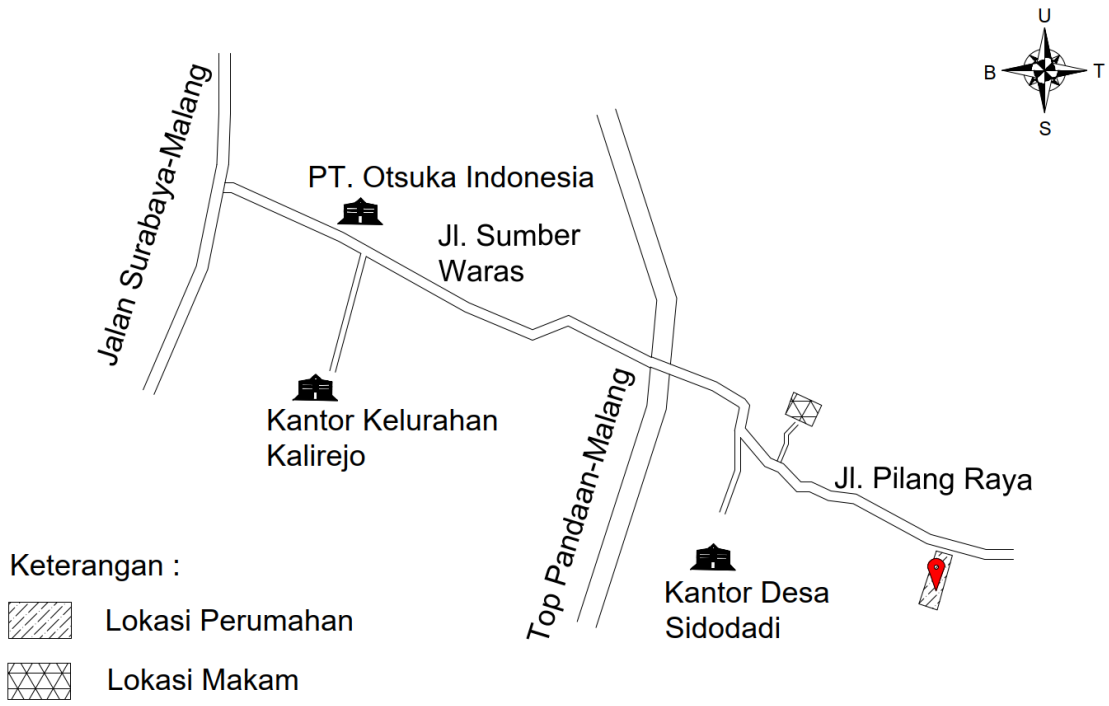

Figure 3. Kamajaya Housing Space Plan
Source. Data Analysis

3.4. Environmental Control Analysis Methods (Physical – Road, PJU, Lights)

Objective: Assess the suitability of road dimensions, height/number of lights, and environmental control facilities.
Data & Instruments: measurement of road width (meters), height of light poles (meters), number of lights, photos, handover PSU data.
Procedure:

1. Measure the width of the road ROW on multiple segments (using a ribbon/laser). Note the variation (6 m, 9 m).
2. Calculate the distance between the poles and verify the KWH per 10 poles.
3. Document the presence of hydrants, reservoirs, infiltration wells, pavement materials.
4. Evaluation of conformity to technical regulations and lighting standards.

Standards / References: Regional regulations related to PSUs; Permenhub / Permen related to PJU (as a technical reference).
Output: Road dimension conformity table, PJU, repair/addition recommendations.

3.5. Method of Verification of Conformity of Accommodation Conditions (ROW, Carport, SRP, Circulation)

Objective: Checking the fulfillment of accommodation standards (ROW width, carport size, SRP dimensions, vehicle circulation).
Data & Instruments: Plot Plans, Physical Field Measurements, Technical Drawings of House Units.
Procedure:

1. Measure the road ROW, carport of each unit, and circulation width for the car/motorcycle at the sample location.
2. Compare it with technical standards (minimum values specified).
3. Record the deviation and its impact on circulation and emergency services.

Standards/References: Local housing/SNI technical standards when available.
Output: A table of accommodation parameter fulfillment and recommendations (e.g. widening of access if required).

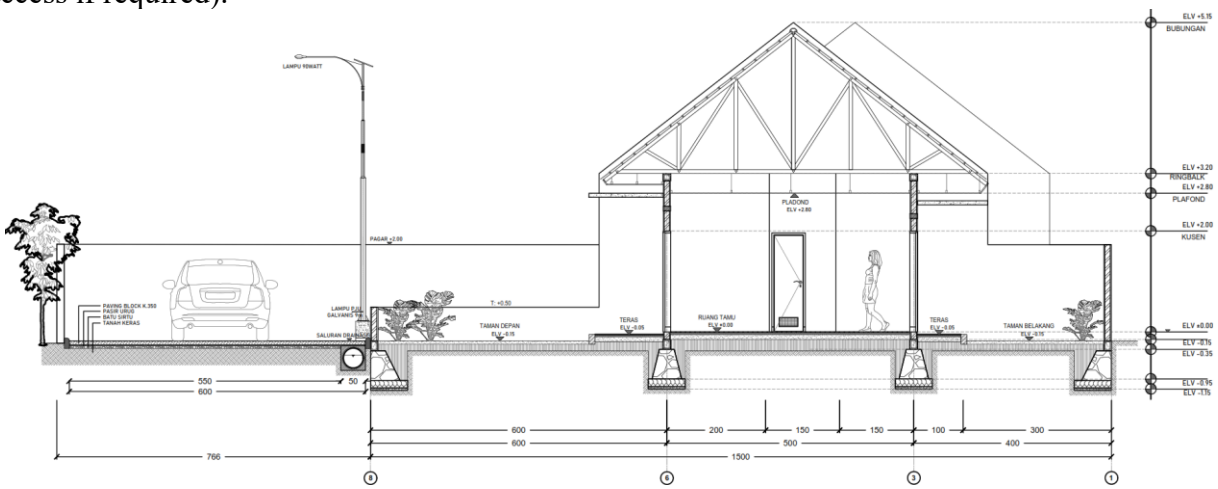

Figure 4. Kamajaya Housing Concept
Source. Data Analysis

3.6. Method of Calculating Clean Water Needs per Unit of Houses

Objective: Determine the daily water needs for each unit according to SNI 03-7065 : 2005.
Data & instruments: number of occupants per unit, consumption per person (L/turn), number of turns; Simple calculation equipment (spreadsheet).
Procedure:

1. Use the formula:

Total Water Requirement = Number of Occupants × Number of Usage (Turns/Day) × Usage per Turn (L)

2. Verify the availability of the source (PDAM discharge) by comparing the total requirement vs network capacity (L/min).

Standard / Reference : SNI 03-7065 : 2005.
Output: Table of water needs per unit and verification of the adequacy of the PDAM network.

3.7. Septic Tank Dimension Calculation Method

Objective: Assess the suitability of septic tank volume per unit to domestic waste load (SNI).
Data & instruments: number of occupants, daily water consumption, installed septic tank capacity (L), maintenance documents.
Procedure:
1. Count daily dirty water waste = Number of Occupants × Usage per Shift × Number of Shifts.
2. Compare it with the capacity of the septic tank (e.g. 3,000 L) and the SNI criteria; Perform the required retention calculations.
3. Recommend a cleaning/inspection schedule based on load.

Standard / Reference : SNI 03-7065 : 2005.
Output: Assessment of septic tank adequacy and maintenance inspection recommendations.

3.8. Toilet Number Verification Method

Objective: Ensure that the number of service toilets meets the requirements of occupational safety and health (toilet ratio).
Data & instruments: resident data, observation of facilities of each unit.
Procedure:
1. Apply the rule: 1 toilet / 25 people (Permenaker No.5 / 2018) for verification.
2. Calculate the minimum needs and compare them with existing facilities.

Standards / References: Permenaker No.5 of 2018.
Output: Statement of toilet adequacy per unit and recommendations if it is lacking.

3.9. Gutter Calculation Method

Objective: Assess whether the installed gutters are able to channel roof runoff based on SNI.
Data & instruments: roof area (m²), rainfall data (L/min or mm/hr), gutter capacity (L/min), gutter specification (diameter).
Procedure:
1. Calculate runoff = (Rainfall per minute × Roof Area) → conversion to L/min.
2. Determine the number of gutters needed = ceil(curah_limpasan / kapasitas_talang_per_unit).
3. Verify the number and location of gutters installed.

Standard / Reference : SNI 03-7065 : 2005.
Output: Calculation of gutter needs, sufficiency records (e.g. 2 pieces available vs 1 need).

3.10. Infiltration Well Capacity Calculation Method

Objective: Calculate the storage volume of infiltration wells needed to accommodate rainfall runoff.
Data & instruments: roof + pavement area (m²), runoff coefficient, average rainfall, infiltration factor, capacity per 25 m² => 1 m³ (compact method according to SNI used by the team).
Procedure:
1. Calculate the total rainfall catch.
2. Calculate runoff volume (use a ratio of 1 m³ per 25 m² if it is a local reference) :

Volume = Luas_tangkapan / 25.

3. Verify the number and location of installed infiltration wells and maintenance access.

Standard/Reference : SNI 03-7065 : 2005 (method used in the report).
Output: Catch volume, infiltration well adequacy, blockage prevention maintenance recommendations.

3.11. Dirty Water Management Methods (Communal & Individual Septic WWTP)

Objective: Assess the design, operation, and compliance of communal WWTP and individual bio-septic tanks with K3L and SPPL standards.
Data & instruments: communal WWTP / WWTP design documents, SK / SPPL, effluent quality sampling (BOD, COD, TSS, pH, coliform), maintenance form, manager interview. Basic lab equipment for waste parameter analysis.
Procedure:

1. Review the WWTP design document and compare the process stages (pretreatment, biological, filtration, disinfection) with best practices.
2. Sample effluent at the output point (grab sample); Analysis of key parameters in accredited laboratories.
3. Verify maintenance schedules, solids separation, and individual (bio-septic) treatment systems.
4. Evaluation of the possibility of reuse (non-potable) and the existence of SPPL.

Standards / References: K3L Standard, local wastewater quality standards, SPPL.
Output: Results of effluent quality tests, SPPL compliance checklists, recommendations for operational improvement and resident education.

3.12. Method for Drafting Environmental Aspects Recommendations

Objective: Prepare technical and management recommendations based on field findings and licensing documents.
Data & instruments: all previous data, IKKPR documents, related regulations (PPU/PSU, licensing), simple cost-benefit analysis (optional), validation workshop with stakeholders.
Procedure:

1. Integrate the results of measurement, calculation, and quality testing into a compliance & priority matrix (e.g. aspects, status: compliant/not, urgency, cost estimates).
2. Prepare operational recommendations (maintenance, cleaning schedule), technical (drainage repairs, addition of RTH, gutters, PJU), and administrative recommendations (GSP statements, SPPL documents).
3. Conduct a brief feasibility study (NPV/CBR if required) for investment recommendations.
4. Validate draft recommendations through meetings with developers, villages, and technical offices.

Standards / References: IKKPR, regional regulations, SNI, relevant ministerial regulations.
Output: A comprehensive priority recommendation report with actions, a brief cost estimate, and a monitoring plan.

RESULTS AND DISCUSSION

4.1. Persil Boundary Distance

The measurement for the Distance Inspection of the Persil Boundary Line Distance with the Reference Road Axle for Factual Condition Suitability is 0 m away. The decision in the PKKPR Information (Approval of the Suitability of Space Utilization Activities) Number: 600.3.3.2 / 1272 / 35.07.111 / 2023 Persil Boundary Line (GSP) is decided that the minimum distance of GSP is 5 m. The distance of 3 m for this measurement is not in accordance with the IKKPR Decree, namely the minimum distance of GSP 5 m is measured from the outermost side of a mass of a parcel to the Road Axle which is the reference for measurement.
Considering that the Persil Boundary Line Distance is not in accordance with the provisions of the IKKPR, in this case the technical examiner recommends that the applicant make a statement that if the Regional Government or Related Agencies carry out road widening, then the applicant's land

that enters the Persil Boundary Line area is willing to be released by the Regional Government or Related Agencies for this purpose.
The condition of the Persil Boundary Line Distance is not in accordance with the provisions of the IKKPR, so in this case the technical examiner recommends that the applicant make a statement that if the Regional Government or Related Agencies carry out road widening, then the applicant's land that enters the Persil Boundary Line area is willing to be released by the Regional Government or Related Agencies for this purpose.

Table 2. Kamajaya Housing Land Utilization

No.	Keterangan			Luas (m²)	%
I	SARANA				
	a. RTH / Taman				
	Taman			132	9,28
	Jumlah Luas RTH			132	9,28
JUMLAH SARANA				132	9,28

No.	Blok	Kaveling	Jumlah Unit	Tipe / Luas Tanah Standar (m2)	Kelebihan Tanah (m^2)	Total Luas Tanah (m²)	%
I	Rumah						
		1	1	36 / 74	0	74	5,20
		2	1	36 / 74	15	89	6,26
		3	1	36 / 74	15	89	6,26
		4	1	36 / 74	1	75	5,27
		5	1	36 / 74	1	75	5,27
		6	1	36 / 74	5	79	5,56
		7	1	36 / 74	25	99	6,96
		8	1	36 / 74	7	81	5,70
		9	1	36 / 74	6	80	5,63
		10	1	36 / 74	10	84	5,91
Jumlah Rumah			10			825	58,02
TOTAL LAHAN EFEKTIF			10			825	58,02

Source. Data Analysis

4.2. Building Boundary Distance

The measurement for the Distance Inspection of the Distance of the Building Boundary Line with the Reference Road Axle for Factual Condition Conformity is 11 m away. The Decision in the PKKPR Information (Approval of the Suitability of Space Utilization Activities) Number: 600.3.3.2 / 1272 / 35.07.111 / 2023 Building Boundary Line (GSB) is decided that the minimum distance of GSB is 5 m + 5.5 m. The distance of 11 m for this measurement is in accordance with the IKKPR Decree, namely the minimum distance of GSB 5 m + 5.5 m measured from the outermost side of a building mass to the Road Axle which is the measurement reference.

4.3. Environmental Intensity Suitability

Based on IKKPR Data Number: 600.3.3.2 / 1272 / 35.07.111 / 2023 with a Land Area of 1,422 m2, the Maximum KDB is 70%. Based on Visual Observations of the Persil Building Area 825 m2. So that the KDB Calculation of the Kamajaya Housing Building occupies 58.02% of the Land Area so that the KDB is less than 70% of the Land Area.

Based on IKKPR Data Number: 600.3.3.2 / 1272 / 35.07.111 / 2023 with a land area of 1,422 m2 Minimum KDH 10 %. Based on Visual Observations of Persil Area Area Green Area 132 m2. So that the calculation of KDH for Kamajaya Housing Buildings occupies 9.28% of the Land Area. KDH Residential Buildings less than 10 % Land area with RTH Composition: Garden: 132 m^2.

4.3. Environmental Control Analysis

The components of Environmental Control contained in Kamajaya Housing can be divided into aspects:

- Road Dimensions : 6 m and 9 m
- Street Light Height : 6 m
- Number of Street Lights : 4 m

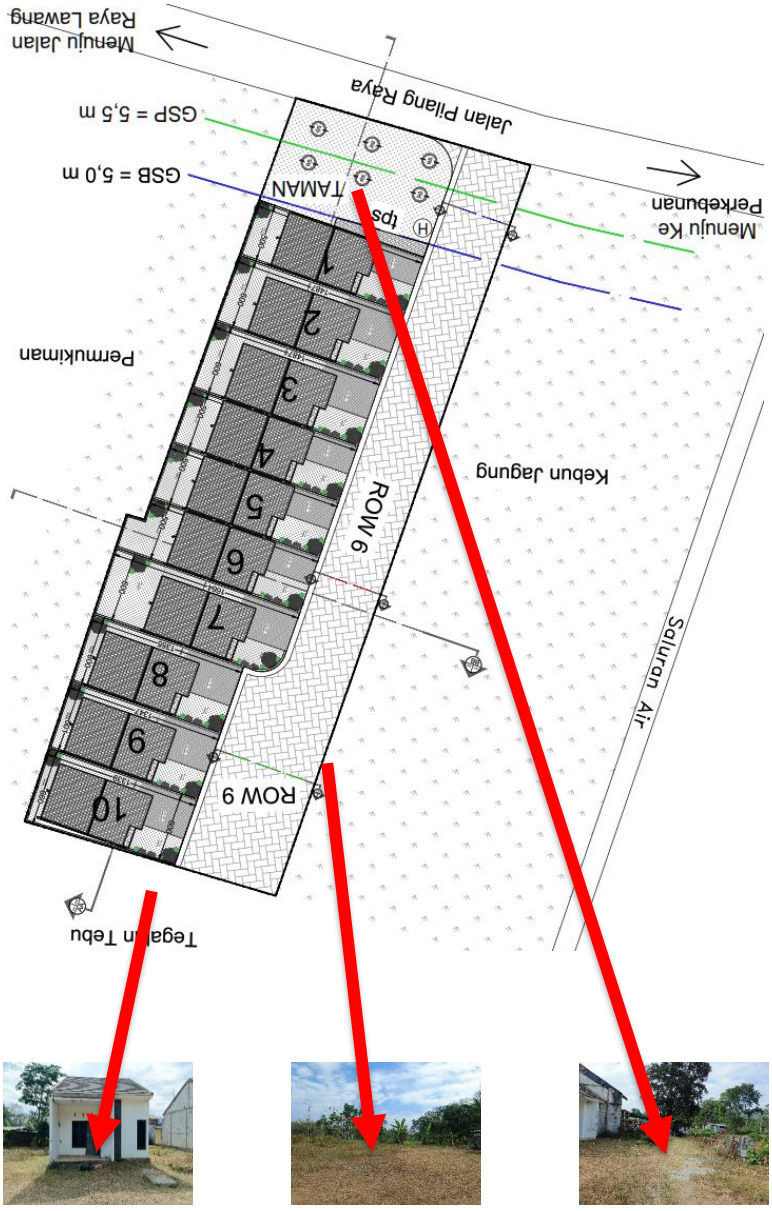

Figure 5. Kamajaya Housing Environmental Control
Source. Research Documentation

Provisions in the Implementation of Kamajaya Housing:

1. The developer has carried out the handover of Infrastructure, Facilities and Utilities (PSU) both administrative and physical to the Malang Regency Government in accordance with the

Regulation of the Regent of Malang Number 54 of 2020 concerning the Implementation Regulation of Regional Regulation of Malang Regency Number 5 of 2015 concerning the Handover of Infrastructure, Facilities and Utilities of Housing and Residential Areas.

2. Each building and PSU has obtained a Building Approval (PBG) and is prohibited from carrying out any construction activities including guardrails before obtaining PBG;
3. Kamajaya Housing has completed all the provisions stated in the KRK or KKR Study;
4. Providing Temporary Disposal Sites (TPS) / Integrated Temporary Disposal Sites (TPST) / Waste Depots and their processing management;
5. Providing a grave land covering an area of 29 m2 in the form of Letter C of Village Number 1795 Persil No. 32 Class d.I dated February 12, 2024 in accordance with the Decree of the Head of Sidodadi Village known by BPD Sidodadi and Lawang Sub-district Number: 138 / 943 / 35.07.25.2003 / 2023 dated October 3, 2023;
6. Building Infiltration Wells, Drainage Channels and following other provisions in accordance with the Letter of the Head of the Malang Regency Water Resources Public Works Office Number: 611 / 145 / 35.07.305 / 2024 dated January 18, 2024 regarding Technical Recommendations on Flood Mitigation Studies on behalf of PUSPITO NUGROHO BUNTORO;
7. Providing Drinking Water Network Infrastructure in accordance with the letter of the President Director of the Tirta Kanjuruhan Regional Public Company Number: 690 / 2497 / 35.07.302 / 2023 dated September 8, 2023 regarding Technical Recommendations for the Provision of Drinking Water Network Infrastructure in Kamajaya Garden Residence Housing;
8. Building infiltration wells in each plot to accommodate household wastewater (grey water);
9. Roads within residential environments use materials that easily absorb water;
10. It is forbidden to close residents' road access around housing;
11. Public Street Lighting (PJU) is installed in residential environments with a distance between poles of 25 - 30 meters with KWH meters per 10 poles;
12. Provides a general hydrant equipped with a reservoir/tub;
13. Planting one tree per house in a residential environment.

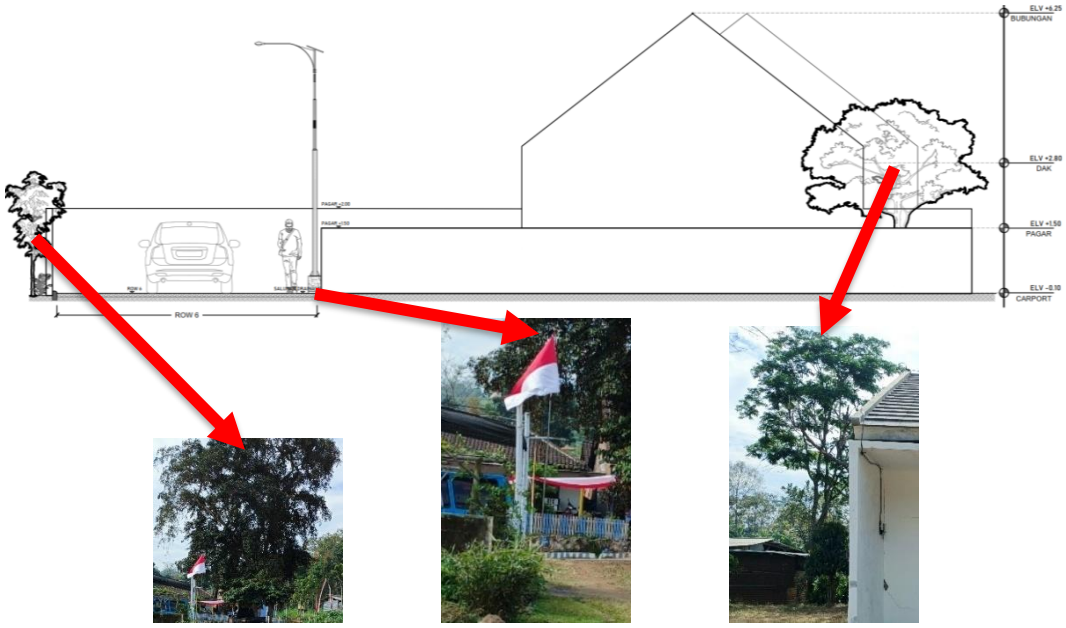

Figure 6. Kamajaya Housing Environmental Control
Source. Research Documentation

4.4. Suitability of Accommodation Conditions

1. Kamajaya Housing has a Row Road Width of 6 m and 9 m

2. For Each House Unit has a Carport Area with a Size of 4.5 m x 2.58 m
3. SRP Mobile : 2.30 x 5.00 m
4. SRP Motor : 0.75 x 2.00 m
5. 1-Way Car Circulation (min) : 3.50 cm
6. 1-Way Motor Circulation (min) : 2.00 cm

4.5. Calculation of Clean Water Needs

Referring to SNI 03 – 7065 : 2005 Plumbing System Planning Procedures. Consumption for Residential Buildings with Occupants amounting to 4 people with effective activities per day is 8 hours, the need for clean water is 65 liters per person per turn. Assuming 8 hours of effective activities, the number of each person using sanitary water is 2 times so that for 4 residents there are 8 turns.

1. Source of Clean Water :TAPS
2. Installation Towards Sanitair : PVC 1/2"
3. Number of Occupants : 4 Persons
4. Usage Amount : 8 times / day
5. Water Usage / Turn : 65 Liters
6. Number of Water Needs : 520 Liters

Net Needs for Residential Buildings, the amount of water needs has been able to be met by the Clean Water Source provided by the PDAM network with a clean water flow discharge of 125 Liters / Minute.

4.5. Septic Tank Calculation

Referring to SNI 03 – 7065 : 2005 Plumbing System Planning Procedures. Consumption for Residential Buildings with 4 Occupants with effective activities per day is 8 hours, the waste of dirty water is 65 liters per person per turn. Assuming 8 hours of effective activities, the number of each person using sanitary water is 2 times so that for 4 residents there are 8 turns.

1. Number of Occupants : 4 Persons
2. Usage Amount : 8 times / day
3. Water Usage / Turn : 65 Liters
4. Number of Water Needs : 520 Liters
5. Septic Tank Provided : 3,000 Liters

Considering that the Septick Tank provided in each House Unit in the persil area has met the dirty water discharge for the use of residents in each House Unit. So in this case, the technical examiner gave a recommendation, namely a gradual inspection of the condition of the septic tank so that there is no foreign body waste that is put through the toilet into the septic tank so as not to interfere with the operation of the septic tank.

4.6. Calculation of the Number of Toilets

Referring to Permenaker Number 5 of 2018 concerning Safety and Health of the Work Environment. The calculation of the number of toilets that must be provided in each House Unit is 1 toilet / 25 people:

1. Number of Occupants : 4 Persons
2. Minimal Toilet : 1 Unit
3. Toilets Provided : 1 Unit

With the number of toilets available in the building is 1 Unit, while the minimum need is 1 Unit, then with this the number of toilets can meet the needs for Occupant accommodation and operational use of the Building.

4.7. Calculation of the Number of Rain Gutters

Referring to SNI 03 – 7065 : 2005 Plumbing System Planning Procedures. Rainwater gutters with a diameter of 4" are able to accommodate rainwater pouring from the roof with a distribution capacity of 400 Liters / Minutes.

1. Roof Area : 37.5 m^2
2. Average Rain – Average : 8 Liters / Min
3. Rainfall : 300 Liters / Min
4. Building Chammocks S. 4"
5. Gutter Needs : 300 / (4*100) = 1 Piece
6. Chamfers Available : 2 Pieces

With the number of gutters available in the building being 2 pieces at the front and at the back of the house, while the minimum requirement is 1 piece, then with this the number of gutters can meet the need to pour rainwater into the control and drainage basin channels.

4.8. Infiltration Well Capacity Calculation

Referring to SNI 03 – 7065 : 2005 Plumbing System Planning Procedures. For the largest figure the average rainfall in Indonesia is = 8 Liters/Minute, and for every 25 m2 of rainfall produces 1 m3 of discharge for infiltration wells.

1. Roof Area : 375 m^2
2. Pavement Area : 458 m^2
3. Rainfall Catchment Area : 833 m^2
4. Average Rain – Average : 8 Liters / Min
5. Rainfall : 6,664 Liters / Minute
6. Infiltration Wells : 1 m^3 / 25 m2
7. Rain Catch : 33 m^3

Considering that the Infiltration Wells provided in the Persil area have met the needs of infiltration wells to accommodate rain catches, the Technical Examiner hereby recommends a gradual inspection of the condition of the well so that there is no discharge of foreign objects entering through drainage in persil into the infiltration well so as not to interfere with the operation of the infiltration well.

4.9. Dirty Water Management

In the concept of Kamayaya Housing, dirty water management must comply with Health, Safety, Security, and Environment (K3L) standards and Environmental Management Statement Letter (SPPL). Here is the management strategy:

1. Dirty Water Management according to K3L Standards

Domestic Wastewater Treatment System (Domestic WWTP)

- Communal WWTP Design: Using a centralized system to treat wastewater from the entire house unit.

- Phased Treatment Process: a step designed to remove contaminants from waste through physical, chemical, and biological methods in several stages.
- Separation of Solid and Liquid Sewage: Solid sewage is deposited in the reservoir before the wastewater is further processed.
- Biological Processing: Using anaerobic/aerobic bacteria to break down organic matter.
- Filtration and Disinfection: Add a filtration and disinfection stage (UV or chlorine) before water is discharged into the environment.

Individual Wastewater Management System (Eco-Friendly Septic Tank)

- Bio-Septic Tank Type: Using a biofilter system to decompose organic waste and minimize groundwater pollution.
- Periodic Maintenance: Regular schedule for cleaning and checking the system to prevent leaks and overcapacity.

Table 3. Safety, Occupational Health and Environment (K3L) Document for Kamajaya Housing

PERNYATAAN MANDIRI

Menjaga Keselamatan, Keamanan, Kesehatan dan pelestarian fungsi Lingkungan (K3L)

Berdasarkan Undang-Undang Nomor 6 Tahun 2023 tentang Penetapan Peraturan Pemerintah Pengganti Undang-Undang Nomor 2 Tahun 2022 tentang Cipta Kerja Menjadi Undang-Undang, Pelaku Usaha dengan identitas sebagai berikut:

Nama Pelaku Usaha : PUSPITO NUGROHO BUNTORO
Nomor Induk Berusaha (NIB) : 0607230320944

Menyatakan:

1. Bersedia menjaga Keselamatan, Keamanan, Kesehatan dan pelestarian fungsi Lingkungan (K3L) dalam menjalankan kegiatan usaha yang dimaksud;
2. Bersedia dengan sungguh-sungguh melaksanakan pengelolaan dan pemantauan dampak lingkungan;
3. Bersedia mengikuti pembinaan yang dilakukan dalam rangka memenuhi ketentuan terkait K3L tersebut; dan
4. Bersedia menerima sanksi terhadap pelanggaran atas ketentuan yang terkait dengan K3L tersebut,

sesuai dengan ketentuan peraturan perundang-undangan.

Demikian pernyataan ini dibuat dengan sebenar-benarnya. Apabila di kemudian hari ternyata terdapat kekeliruan ataupun ketidakakuratan dalam pernyataan ini, maka Pelaku Usaha bersedia menerima konsekuensi sesuai dengan ketentuan peraturan perundang-undangan.

Sidoarjo, 6 Juli 2023
ttd.
(PUSPITO NUGROHO BUNTORO)

Surat pernyataan ini tersimpan secara elektronik di dalam sistem OSS sebagai bagian tidak terpisahkan dari Perizinan Berusaha untuk Nomor Induk Berusaha yang dimaksud.

Resources. Kamajaya Housing Permit Documents

2. Compliance with SPPL

Preparation of SPPL Documents: Kamajaya Housing has prepared and submitted an SPPL to the local Environmental Agency which includes:

- Environmental Management and Monitoring Plan: Includes wastewater treatment methods and final disposal plans.
- Wastewater Quality Monitoring: Routine inspection of wastewater quality to ensure compliance with wastewater quality standards.

Table 4. Kamajaya Housing Environmental Management Statement Document

SURAT PERNYATAAN KESANGGUPAN PENGELOLAAN DAN PEMANTAUAN LINGKUNGAN HIDUP (SPPL)

Kami yang bertanda tangan di bawah ini:

Nama Pelaku Usaha : PUSPITO NUGROHO BUNTORO
Nomor Induk Berusaha (NIB) : 0607230320944
Nama Penanggung Jawab : PUSPITO NUGROHO BUNTORO
Jabatan :
Alamat : GRIYO MAPAN SENTOSA FA I/9, Desa/Kelurahan Tropodo, Kec. Waru, Kab. Sidoarjo, Provinsi Jawa Timur
No. Telepon :

No	Kode KBLI	Bidang Usaha / Kegiatan	Lokasi Usaha
1	68111	Real Estat Yang Dimiliki Sendiri Atau Disewa	Dusun Ngandeng RT. 002 RW.016 Jawa Timur Lawang Sidodadi

Menyatakan kesanggupan:

1. Mematuhi dan melaksanakan usaha dan/atau kegiatan pada lokasi yang sesuai dengan peruntukan rencana tata ruang;
2. Mematuhi dan melaksanakan usaha dan/atau kegiatan sesuai dengan ketentuan peraturan perundang-undangan di bidang perlindungan dan pengelolaan lingkungan hidup;
3. Mematuhi ketentuan persyaratan pemenuhan parameter baku mutu lingkungan sesuai dengan kegiatan yang dilakukan serta limbah yang dihasilkan;
4. Mematuhi ketentuan dan menyediakan fasilitas penyimpanan limbah sementara dan sampah domestik sesuai dengan kegiatan serta limbah dan sampah yang dihasilkan;
5. Mematuhi ketentuan dan menyediakan fasilitas pengelolaan limbah cair untuk usaha dan/atau kegiatan yang dilakukan sesuai dengan jumlah limbah yang dihasilkan dan jumlah tenaga kerjanya;
6. Bersedia untuk memenuhi pengaturan dan pengelolaan dampak usaha dan/atau kegiatan terhadap aspek transportasi;
7. Bersedia dilakukan pemeriksaan/pengawasan terhadap usaha dan/atau kegiatan yang dilakukan untuk memastikan pemenuhan persyaratan lingkungan sesuai ketentuan peraturan perundang-undangan di bidang perlindungan dan pengelolaan lingkungan hidup;
8. Bersedia memproses persetujuan lingkungan dalam hal akan menyediakan sarana dan prasarana dengan menyusun dokumen lingkungan sesuai dengan kewajiban dalam peraturan yang mengatur daftar usaha dan/atau kegiatan wajib Amdal, UKL-UPL dan SPPL; dan
9. Bersedia dihentikan usaha dan/atau kegiatannya dan diproses hukum sesuai degan peraturan perundang-undangan apabila melanggar atau tidak memenuhi ketentuan persyaratan yang telah ditetapkan sebagaimana butir 1 sampai 8.

Demikian pernyataan ini dibuat dengan sebenar-benarnya. Apabila di kemudian hari terdapat kekeliruan ataupun ketidakakuratan dalam pernyataan ini, maka Pelaku Usaha bersedia menerima konsekuensi sesuai dengan ketentuan peraturan perundang-undangan.

Sidoarjo, 6 Juli 2023
ttd.
(PUSPITO NUGROHO BUNTORO)

Surat pernyataan ini tersimpan secara elektronik di dalam sistem OSS sebagai bagian tidak terpisahkan dari Perizinan Berusaha untuk Nomor Induk Berusaha yang dimaksud.

Resources. Kamajaya Housing Permit Documents

3. Eco-Friendly Initiatives

- Reuse & Recycle: Wastewater that has been treated can be reused for garden watering or other non-potable purposes.
- Resident Education: Counseling program for residents related to the importance of good wastewater management and the application of K3L principles.

The implementation of this system ensures that the management of dirty water in Kamajaya Housing is in accordance with K3L and SPPL standards, maintaining the health of residents and the surrounding environment.

4.10. Environmental Recommendations

Based on the results of environmental and technical inspections related to the reliability of the building, through the IKKPR document Number: 600.3.3.2 / 1272 / 35.07.111 / 2023 and technical field inspections, it can hereby be declared that the Residential Building is Functional. By implementing the recommendations:

1. Carrying out regular maintenance of the waste disposal system in accordance with the Application of the 3R Principle (reduce, reuse, recycle) is intended to reduce waste caused by the owner, user, and/or manager of the PP Building Building Number: 16 of 2021.
2. Paving Repair in Residential Road Areas in accordance with SNI 03-0691-1996 Concrete Bricks (Paving Blocks) so that the paving area does not suffer additional damage so that damaged paving must be repaired.
3. Construction of the Perimeter Persil Boundary Wall in accordance with SNI 03-0691-1996 Concrete Brick (Paving Block) so that the paving area does not suffer additional damage so that the damaged paving must be repaired.
4. The construction of Public Street Lighting Lights (PJU) is in accordance with the Regulation of the Minister of Transportation (Permenhub) Number 47 of 2023 concerning Street Lighting Equipment.
5. Cleaning of the entire area of persil from construction waste is in accordance with Law Number 13 of 2003 concerning Manpower and Law Number 11 of 2020 concerning Job Creation.

CONCLUSION

Based on the results of the measurement and analysis of the Suitability of Space Utilization Activities (KKPR) Number: 600.3.3.2 / 1272 / 35.07.111 / 2023, there are several important findings related to land use in Kamajaya Housing that is in accordance with the applicable standards, also Based on the results of the study on Kamajaya Housing, the following is an analysis of the fulfillment of various aspects of infrastructure and facilities that support the lives of residents properly.

The factual distance measurement of GSP is 3 meters from the Road Axis, while the IKKPR's decision sets the minimum distance of GSP to be 5 meters. This condition shows that the factual distance of GSP is not in accordance with the provisions of the IKKPR. Therefore, it is recommended that the applicant make a statement of willingness to release land within the GSP area in the event of road widening by the Regional Government or related Agency.

The factual distance measurement of the GSB is 11 meters from the Road Axis, which has met the minimum GSB requirement of 10.5 meters (5 meters + 5.5 meters). Thus, the distance of GSB is in accordance with the provisions of the IKKPR and does not require further improvement actions.

With a land area of 1,422 m², the maximum allowable KDB is 70%. Based on observations, the building area is 825 m², so the actual KDB reaches 58.02%, which is still below the maximum permissible KDB. This shows that the use of land for buildings is in accordance with applicable regulations.

With a land area of 1,422 m², the minimum KDH required is 10%. However, the existing green area is only 132 m² or equivalent to 9.28% of the land area, which means that it does not meet the minimum requirements of KDH. Kamajaya Housing needs to increase the area of Green Open Space (RTH) to achieve the minimum requirement of 10% to support environmental balance and meet licensing requirements.

Overall, land use in Kamajaya Housing has met the provisions related to GSB and KDB, but there are discrepancies in terms of GSP and KDH. Corrective measures, such as the provision of a

statement letter and the addition of RTH, need to be carried out to ensure compliance with the applicable KKPR provisions and support environmental sustainability.

Measurements of the distance between the Building Boundary Line (GSB) and the Persil Boundary Line (GSP) show that the distance of the GSB is in accordance with the provisions, which is 11 meters from the Road Axis, exceeding the minimum distance set by 10.5 meters. This ensures adequate space for road access and vehicle parking, as well as supporting the mobility of residents and emergency vehicles. However, since the factual GSP is only 3 meters, the applicant needs to ensure that in the event of road widening occurs, the area can be freed up without disturbing the existing infrastructure.

Kamajaya Housing has provided a Green Open Space (RTH) covering an area of 132 m², which although still under the provisions of the minimum KDH of 10%, shows a commitment to providing green areas for residents. This facility can be used as a public area that supports social and recreational activities. To increase the feasibility of fasum, it is necessary to add green areas to meet minimum standards and strengthen social and environmental functions in this housing.

Analysis of clean water needs shows that Kamajaya Housing already has an adequate water distribution system, with a total area of 1,422 m² supported by clean water management infrastructure designed to serve the needs of residents. The availability of adequate water sources and equitable distribution support the feasibility of these facilities to maintain the health and comfort of residents.

Domestic waste management through a septic tank system is an important aspect in maintaining environmental sanitation. Kamajaya Housing has adopted a septic tank system designed according to the capacity of the occupants, ensuring that domestic waste is managed safely and does not pollute the surrounding environment. It also supports the cleanliness of groundwater and minimizes the risk of diseases sourced from domestic waste.

With the actual KDH condition of 9.28%, infiltration wells are a crucial element in rainwater management. Although the area of RTH is not optimal, infiltration wells designed in this area can help overcome rainwater runoff, reduce the risk of flooding, and maintain groundwater balance. The addition of infiltration wells in unused areas can also increase the effectiveness of rainwater management.

The wastewater management system at Kamajaya Housing is designed to ensure that domestic liquid waste is properly drained and treated before being discharged into the environment. This management is supported by adequate sewerage infrastructure, reducing the potential for environmental pollution and maintaining water quality around housing. To maintain sustainability, regular monitoring and maintenance of the wastewater management system need to be carried out regularly.

Overall, Kamajaya Housing has met most of the feasibility aspects of infrastructure and public facilities required to support the lives of residents. However, adjustments to RTH and GSP need to be made immediately to meet regulatory requirements, so that environmental feasibility and occupant comfort can continue to be maintained in the long term.

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