green residential

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Is Green Concept in Residential Expensive?

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Abstract

A house, especially landed housing is one of the primary needs and yet scarcity continues to occur due to the depletion of land quantity and increasingly rising selling prices. In order for the development of a residential area to be more directed and productive, it is necessary to analyze the appropriate land allocation and generate maximum land value. Through this paper, the author examines the effect of a residential planning with green concepts along with housing support facilities in relevance with highest and best use analysis, especially its impact on costs and revenues.

Keywords: Residential; highest and best use; feasibility study.

1. Introduction

Housing is one of the basic needs that one must fulfill as a form of decent living. A residential is a set of houses as a part of an urban and rural settlements and equipped with infrastructures, facilities and utilities as a result of efforts to fulfill decent housing (Law No. 1 2011 on Housing and Residence) (UU No. 1 Tahun 2011 Tentang Perumahan dan Pemukiman). According to Supriyadi et al. (2013), while referring to the importance of housing functions in the planning of a region, it is necessary to understand the problems and potentials contained in a residential group, including the efforts to analyze and identify infrastructure of housing to become integrated housing.

The city of Malang is the second largest city in East Java after Surabaya and is located on the southern part of East Java. Together with Malang District and Batu City, Malang City is part of a region union called Malang Raya. Malang itself has several designations. This includes 'Education City' because of its many notable universities and 'Tourism City' because it is located in the highlands and is surrounded by mountains, giving it a beautiful natural scenery and cool air. A large number of people flock from outside the city for vacation making the real estate in Malang a promising investment. These factors certainly give a big impact on property price in Malang Raya (the area consisting of the city of Malang, its suburb, and the city of Batu), escalating the amount of investors who sees this opportunity to invest in real estate in Malang Raya. The growth rate of properties in Malang increased by 30% in the period 2010 to 2013. While in the average property price, since October 2012 to June 2013 the average price increases of 24.3% (Claradiesty, August 21, 2013).

With many investors starting to invest in its property, as well as the rapid development in Malang, the land becomes increasingly scarce and a significant price increase occur in several locations. One of the locations in Malang with a significant land price increase is Ijen Street. As the main road in Malang with a boulevard and wide sidewalks and open green spaces, Ijen Street hosts a number of city events because of its beautiful scenery and some Dutch colonial styled houses. The prevailing market price in Jalan Ijen has reached around 25 million to 50 million rupiah per square meter, while the average land tax value set by the Malang only around 7.4 million rupiah ("Penggiran Rp. 7 juta per m^2", January 21, 2017).

The land price increase in Malang would affect the price increase of other property types such as houses, shop-houses, warehouses, and others building types. Government interference also becomes the key to the many inflow of investors in Malang that invest in property. The construction of Surabaya-Malang toll road or highway which is planned to be completed in 2018 is one example. In addition, the construction of new roads, the development of tourism areas, the building of new universities, the construction of housing residential, and the construction of new shopping areas also supports the rising property prices in Malang.

On the other hand, the rampant development in Malang also affect the city's environmental conditions. The decreasing amount of open green spaces became one of the environmental issue that occurred in Malang. In 2015, the number of open green spaces in Malang is estimated to be only about 13% from the total area of Malang. Whereas according to Law No. 26 Year 2007 (Undang-Undang No. 26 Tahun 2007) on Spatial Planning (2007), urban spatial planning shall contain a plan for the provision and utilization of open green spaces, which is a minimum of 30% of the total area, consisting of 20% for public green space and

10% for private open green space from the home yard. The reason for the small number of green space in the city of Malang nowadays is the number of land that shifts function, mainly into residential areas, trade centers, and industry as a result of the rapid development in the city of Malang.

According to the Malang City Local Regulation (Peraturan Daerah Kota Malang) (2015) on the Delivery of Infrastructure, Facilities and Utilities of Housing and Settlement Area, any property developer shall provide infrastructure, utilities and utilities with a proportion of at least 30% of the developed land area. Thus, the minimum percentage comparison of sellable and non-sellable areas is 70% for sellable areas versus 30% for infrastructure and utilities. The open green space is a part of the facility that must exist within a residential area with a minimum requirement of 250 m^2 for a population of 250 people (Badan Standarisasi Nasional, 2004). So that a residential area can be said applying green concept if not only meet the minimum requirement of green space, but able to give more green spaces as public facilities.

The phenomenon of significant property price increase and the lack of open green space in Malang becomes the background of this research and it will follow upon the feasibility for the development of residential area. This research was conducted on a piece of land in Malang located in Pandanlandung, near Bandulan industrial area. It is an area surrounded with many factories, warehouses, shops, and in that area has started to grow a lot of residential developed for various market segmentations, ranging from lower middle to upper middle segmentation. With the growth of other residential area and a high-potential growth, the land is planned to be built as a mix-used housing area complete with facilities, infrastructure, and housing support utilities with green building concept. Therefore, the purpose of this study is to find out the scale of impact regarding the application of green concept in terms of highest and best use analysis. The result would show which land use has more chance of success and is most likely to be permitted while also being able to produce the highest and best land value.

2. Literature review

2.1 Real Estate, Housing, and Green Concept

Property are divided into two categories: real estate and real property. Real estate is the land and all its improvements or development and is therefore tangible. On the other hand, Real property is a legal concept that includes land rights, interests and benefits related to real estate and is therefore intangible (Hidayati and Harjanto 2003). Properties could be divided into four kinds according to their intended use: residential, commercial, industrial estate and special type property (Miles et al, 2007).

Housing is a set of houses as part of the settlement, both urban and rural areas, equipped with public facilities, infrastructures, and utilities as a result of efforts to fulfill a decent home (Government Regulation No. 14, 2016) (Peraturan Pemerintah No. 14, 2016). The house is a building that serves as a habitable residence, family development site, a reflection of the dignity of its inhabitants, as well as assets for the owner. Housing has a crucial function and an important role in human life. The state of housing in one place reflects the living standards, welfare, personality, and civilization of its inhabitants (Anastasia et al, 2005).

Green architecture is an architectural planning approach trying to minimize harmful effects on human health and the environment. This concept has several advantages such as durability, energy-saving, lower maintenance costs, extra comfort and healthier living condition (Suwardani, 2012). These concept are achieved through the better design, selection, materials selection, construction, operation, maintenance, disposal and recycling. Kibert (2004) states that the concept of green construction includes work site protection plan, occupational health and safety program, waste or dismantling management, training for subcontractors, ecological footprint of the construction process, material handling and installation, and quality air. Green buildings are buildings that are designed, constructed and operated with minimum impact on the environment with an emphasis on resource conservation, efficient energy use, and healthier living environment. In keeping with the sustainable concept, a green construction must fulfill the needs of human life today without compromising the needs of future generations (Frost and Sullivan, 2008). 'Green' usually has a better meaning and environmental impact than a building measured by energy and use of materials or water, soil, and air pollution. Frost and Sulivan (2008) then define 'sustainability' as a summary of environmental, economic, resource and social impacts of development and demands that the principles of sustainability be applied throughout the life cycle of buildings.

The concept of green architecture contributes to environmental problems, especially global warming. Buildings are the largest producer of more than 30% of global carbon dioxide emissions, making it one of the major causes of global warming (Suwardani, 2012). Due to such enormous impact on the environment, a green movement was born as to increase efficiency in construction projects in its resource usage and to

minimize the negative impacts resulting from the project on the environment (Retzlaff, 2009). In Indonesia, the assessor based on rating tools for green criteria is Green Building Council Indonesia (GBCI). GBCI consists of several professionals in their fields, as follows: construction, building and property industries, government, academia, and community who are concerned about environmental issues. GBCI has 5 types of rating tools that includes green ship new building, green ship existing building, green ship interior spaces, green ship homes, and green ship neighborhood. In general, green ships have six aspects of assessment: Appropriate Site Development (ASD), Energy Efficiency and Conservation (EEC), Water Conservation (WAC), Materials Resource and Cycle (MRC), Indoor Health and Comfort (IHC), and Building & Environment Management (BEM).

2.2 Highest and Best Use

In order for the development of a region to be better directed and productive, it is necessary to do an analysis on the appropriate land use in the area and generate the maximum land value. To identify the most beneficial uses, a highest and best use (HBU) analysis is required. Hidayati and Harjanto (2003) define HBU as a process of data analysis to draw inferences based on the selection of possible development alternatives. The concept of HBU can be distinguished into HBU for the development of vacant land and the HBU concept for properties that have been developed. HBU analysis of the land in an empty state is to consider whether the land should be developed or remain empty. If developed, what kind of development it should be. As for a developed property, things to consider are whether the existing development is maintained, modified, or dismantled for other uses and when it is appropriate to be developed (Komite Penyusun Standar Penilaian Indonesia Masyarakat Profesi Penilai Indonesia, 2015). Hidayati and Harjanto (2003) also added that in addition to identifying properties that are expected to generate the highest returns, the HBU of built properties is also used to identify comparable properties.

Four criteria or requirements in the concept of HBU that must be fulfilled according to Hidayati and Harjanto (2003) are:

1. Legally permissible
2. Physically possible
3. Financially feasible
4. Maximally productive

2.3 Market Analysis

According to Kotler and Keller (2009), marketing is a social process, in which individuals and groups get what they need, and they want by creating and maintaining products and values with other individuals and groups. Buyers are too numerous, too widespread, and too diverse in their needs and buying patterns. Therefore most companies shift from mass marketing to market segmentation and market penetration, identifying several market segments, selecting one or more existing segments, then developing the products and marketing programs designed specifically for each segment.

Kotler and Armstrong (2003) mentions three main steps in target marketing:

a. Market Segmentation
   Market segmentation is the activity of dividing a market into smaller or distinct buyer groups based on their needs, characteristics, or behaviors that may require a separate product or marketing mix. The main variables that can be used to segment the consumer market are based on its geographic, demographic, psychographic, and behavioral aspects.
b. Market Targeting
   Market targeting is the process of evaluating the attractiveness of each segment and selecting one or more segments as the target. After segmenting the market, the company then conducts a market investigation process that consists of evaluating the market segment and choosing the target market segment. The purpose of market targeting is to market the product more effectively by adjusting prices, products, and communication programs to the consumer.
c. Positioning in the market
   After dividing the market into segments and the target market is determined, the next step is to position or arrange the product in order to occupy a clear, distinctive, and desirable position in the customer's mind relative to the competitor's product.

3. Methods

This research uses a quantitative descriptive analysis method. Descriptive quantitative is defined as describing the problems that exist at this time with calculations. Primary data in this study were obtained through site survey in the form of land location, landform, accessibility, competitors, and market analysis around the location of the land. While secondary data is obtained through literature review with data

such as zoning area and other regulations that support the development of housing projects.

The operational definition in this study is the HBU analysis as an analysis used to determine the most permissible use of a land or building which is physically possible, legally supported, financially feasible, and produces the highest value. This study will compare two alternative site plans based on the highest legal, physical, financial, and productivity aspects. The empirical indicators of this research are:

1. Legally Permissible
   In each of all cases, property valuation should be determined in advance through legal use permitted by the government, including zoning or land use based on the spatial plan or Rencana Tata Ruang Wilayah (RTRW) of Malang City.
2. Physically possible
   Physical aspects assessed include the suitability of land area, landform, land contour, and availability of public facilities and social facilities to the purpose of land development. In this study, the purpose of land development is housing with green concept for specific segments, along with alternative development to support the housing. Thus, in this physical aspect, market analysis is also conducted to find out the segment that would be developed, the type of houses based on the market segmentation, the price of each unit, as well as alternative development of suitable facilities to support the housing. Thus after performing assessment in legal and physical aspects as well as performing market analysis, the site plan and home designs could be made possible to be performed financially.
3. Financially feasible
   After analyzing the legal and physical aspects, financial analysis using net present value (NPV), internal rate of return (IRR), payback period, and benefit-cost ratio (BCR) could be calculated.
   Calculation model for net present value (NPV):

$$\mathbf{NPV} = \frac{\boldsymbol{NOI_1}}{(\mathbf{1}+\boldsymbol{i})^{\mathbf{1}}} + \frac{\boldsymbol{NOI_2}}{(\mathbf{1}+\boldsymbol{i})^{\mathbf{2}}} + \cdots + \frac{\boldsymbol{NOI_{n-1}}}{(\mathbf{1}+\boldsymbol{i})^{\boldsymbol{n-1}}} + \frac{\boldsymbol{NOI_n}}{(\mathbf{1}+\boldsymbol{i})^{\boldsymbol{n}}} \quad (1)$$

   NPV = net present value
   NOI = net operating income
   i = discount rate
   Calculation model for internal rate of return (IRR):

$$NPV = \sum_{t=0}^{n} \frac{CFt}{(1+r)^t} = 0 \quad (2)$$

   NPV = net present value
   CF_t = cash flow in terms of time
   R = discount rate
   t = time

   Calculation model for payback period:

$$\boldsymbol{Payback\ Period} = \frac{\boldsymbol{investation}}{\boldsymbol{net\ cash\ inflow}}\ \boldsymbol{x\ 1\ year} \quad (3)$$

   Calculation model for benefit-cost ratio:

$$\mathbf{B/C} = \frac{\textbf{PV of Cash in Flow}}{\textbf{PV of Initial Investment}} \quad (4)$$

4. Maximally productive
   In the aspect of maximum productivity, measurements are made using the residual value of land that has been developed into a property that has a profit. With the development of the property, the value of the land would arise. The land value of some of these alternatives will be compared to the value of the land before the development of the property in order to obtain a significant increase in property values.

   Calculation model for maximum productivity:

$$\text{Land value per m}^2 = \frac{\text{property value} - \text{building value}}{\text{total land area}} \quad (5)$$

4. Results

4.1 Legal Aspect

In order to avoid any misuse of land use functions as established by the government, the first stage in the process of appraising a property in the HBU analysis is an assessment on the legal aspect (Mubbayinah and Utomo, 2012). Government regulations for land use or zoning are based on Spatial Plans or Rencana Tata Ruang Wilayah (RTRW). Based on Malang District's spatial plan, the designation plan in the location is an agriculture area. Therefore, it is necessary receive governmental consent in order to change the allotment of land into residential area.

Figure 1. Spatial Plan of Malang

(*Source*:https://perumahanmalang.files.wordpress.com/2011/04/tata_guna_lahan_2030-malang-petadasarfotoudara.jpg)

Currently, the location is designated as a green space, specifically as an agriculture area. The number of green spaces in Malang is estimated to be only about 13% public open green spaces from the total area of Malang. In reality, the minimum target set by the government is about 30%. It is because there are a significant number of lands that switch function from green area into residential area. Therefore, this research digs about residential development from green area, while still highlighting the green concept residential in order to contribute to the decreasing amount of green spaces and the need for houses in Malang.

4.2 Physical Aspect

Physical assessment aims to determine the feasibility of a project based on the suitability of landform, land area, land contour, and the availability of public and social facilities around the land for land development for residential area with green concept. In this research, the physical aspect also includes market analysis in order to find the target market, house type, the price of each unit, and supporting alternative facilities that support the housing following market competition.

Based on Table 1, the total value of physical analysis is 34 and can be categorized as "good." In general, the site conditions from land shape, land area, land topography, boundaries, and the quality of the scenery can be classified as "good" because the land has an area of ± 4 hectares, large enough to be used as housing and supporting facilities. The shape of the land resembles the letter "L" with a length and width that is not too narrow. The contours of land tends to be flat, and the boundaries of land is an empty land with a view of the hill on the south. In the assessment of location parameters, access to the land, traffic density, urban planning regulations, and the availability of public utilities around are categorized as "fair," because it is located in the suburb of Malang adjacent to the industrial area. The land is not directly adjacent to the factory, but the access road passing through the industrial area are easily damaged during the rainy season due to heavy vehicles. Additionally, access roads are also packed during rush hours. For general utility parameters, the location are surrounded by health facilities such as hospital, religious facilities such as Mosques and Catholic churches, markets, schools, and universities that are relatively close to the site and are accessible.

Table 1. Highest and Best Use Analysis Based on Physical Aspect

Parameter	Bad	Fair	Good	Excellent	Explanation
Points	**1**	**2**	**3**	**4**	
Location		x			The location of the land is near the industrial area, the access road to the location is a second-row road far from noises, and the scenery is still green in location
Area			x		The land has an area of ± 4 ha suitable for housing, an RTH area wide enough to support the green concept, and supportive housing facilities
Land Shape			x		The land shape is "L" and is proportionally long and wide enough to make a residential area with a green space
Land Boundary			x		The site is bordered by farmland and other housing
Topography			x		The land tends to be flat, but there is a dry river that divides the tread into 2 parts, making it difficult to design
Accessibility		x			Access road to the location of the land is still narrow and is often damaged due to the many trucks and cars that pass through the industrial areas
Traffic Density		x			The traffic is rather crowded in the morning and afternoon due to rush hours and the large number of factory workers as well as trucks passing by the access road
Scenery			x		The quality of the scenery is relatively good because the location is in the highlands and is surrounded by agriculture and housing (far from industrial zone)
Regulations		x			The government's allotment is for the lot to be an agriculture area; therefore a consent to change it into a residential area should be made
Land condition				x	The condition of the soil is relatively hard and fertile due to the former farming, as well as its position of being in the highlands
Utility		x			Road access are passed by electricity and telephone cables.
Public Utility		x			Health centers, mosques, schools, entertainment and sports, and public transport are available on the access roads to land sites
Total	**0**	**12**	**18**	**4**	**34**

Source: author. For purpose of analysis, criteria are ranked from bad to excellent; 1 = bad, 2 = fair, 3 = good, 4 = excellent

Table 2. Facilities and Land Selling Prices from Competitors

	Competitors				
	A	**B**	**C**	**D**	**E**
Facilities					
Road Surfaces	Concrete Paver	Concrete Paver	Concrete Paver	Concrete Paver	Concrete Paver
Security System	One Gate System	One Gate System	One Gate System	One Gate System	One Gate System
Internet	x	x	x	x	x
Electricity	v	v	v	v	v
Water network	v	v	v	v	v
Drainage	open	open	open	open	open
Religious facilities	x	x	x	x	x
Parks	v	v	v	v	v
Swimming pool	x	x	x	v	x
Playground	x	x	x	x	x
Shop houses	v	x	x	v	v
Food court	x	x	x	x	x
Gate	x	x	x	v	v
Land selling prices / m^2 (in millions Rupiah)	1,72 – 2,35	2,31 – 3,81	2,02 – 2,12	3,1 – 4,96	3,2 – 4,69

4.3 Market Analysis

Before researching the financial aspect, the market analysis should be conducted in order to know the market's condition in that area, the condition of the competitor, and which market segmentation should be addressed.

a. Competitor Analysis

Pandanlandung is an area close to an industrial area called Bandulan Industrial with some growth in residential area owned by developers around the growing area. In this study, the researcher took several examples of direct competitors in Pandanlandung by their locations and their segmentation. Some competitors provide some housing facilities as an added value for the housing, which could appeal to buyers. In this research, there are 5 competitors within nearby location which has a similar market segmentation which will be named competitor A, B, C, D, and E.

Based on Table 2, some competitors adopt the one-gate system and provide utilities such as electric network, water network, and drainage network, as well as providing an open green space. Some additional facilities such as swimming pools, gates, and the presence of commercial areas in the form of shophouses can attract the consumers and provide more selling price for the housing. Thus, to be able to intrigue the consumer's interest, the facilities must be supplied with a minimum or better equivalent than the competitors to seize market share from the same market segmentation.

b. Market Segmentation

Market segmentation is an analysis done to see the community's ability to buy certain products. By implementing market segmentation, marketing activities can be more focused, and resources owned by a company can be used more effectively and efficiently in order to provide satisfaction for consumers (Lubis, 2004). According to Malang Central Bureau of Statistic (Badan Pusat Statistik Malang) (2016), the distribution of productive age (group of 20 to 54 years) shows a distinct amount of about 49.67% of the total population in Malang District and 55.2% of the total population in Malang City. With a highly productive age group, which is the moment for someone to work, start a family, and have their own house, hence the requirement of a house will be high and expected able to absorb middle to upper-middle market segmentation in Malang.

Market segmentation based on education level is also necessary in this research, given the connection between people's purchasing power and their education level. The data from Malang Central Bureau of Statistic (2016), states that the number of people with a minimum education level of high school or equivalent is quite high in Malang District with a percentage of 25.79%. While for Malang City, the percentage of the population reaches 64.02%. Thus, with the quite high number of educated population and their ability to get a decent work position, the awareness of having a house is therefore high. According to Malang Central Bureau of Statistic (2016) the majority of residents in Malang District work in agriculture, livestock, fishery, forestry, and hunting field, and the second largest group is a job in trade, hotels and restaurants, and services. While in Malang City, the most significant number of employment is in trade, hotels and restaurants, and services, and become the second-largest number of jobs in Malang District. Thus, with quite high number of self-employment, the level of people's purchasing power is also high, enabling this

project to reach to the middle to upper-middle segmentation.

Based on the description above, the next step is to set the main target of the best market segment. The potential target market is the middle to upper-middle segmentation based on the sizeable productive age, the high level of education, and the high number of self-employment field in Malang.

c. SWOT Identification (*Strength, Weakness, Opportunity, and Threat*)

One of the goals of the company is to obtain optimal profit from its daily activities, especially marketing activities. In order to carry out the marketing activities well and following the expected goals, the company must implement an appropriate strategy for the company's marketing environment (Lubis, 2004). One way to plan a marketing strategy is to do a strength weakness opportunity threat (SWOT) analysis. According to Pearce and Robinson (2003), SWOT analysis is a method to identify factors in marketing to formulate strategies to maximize strength by looking at opportunities and minimizing weaknesses and threats.

d. Market Targeting

After evaluating the SWOT and implementing the marketing strategy, product positioning as compared to the competitor's product. According to Lubis (2004), product positioning includes the formulation of the product placement in competition. Product placement is the act of designing products based on analysis that has been done beforehand to be accepted by the market.

Table 4 is an assessment table of criteria in determining the product position of the research project's product. In scoring, each criteria is scored between 1 (bad) to 4 (very good) based on the criteria in Table 5. The purpose of scoring in Table 5 is to compare products with other competitor's products into a comparison chart as follows (Figure 2)

Based on Figure 2, it can be seen that the average value of each housing is assessed with the criteria based on its location, facilities, design, after-sales, and the suitability of selling price to market value. In general, the residential D, E, and housing for the research project has the same average value of 3. The advantages of housing D and E is their complete

Table 3. SWOT Project Identification

Internal / External	***Strength***	***Weakness***
	1. Beautiful environment 2. Hilly landscape view 3. Relatively competitive price because of the cheap land price 4. Planned public and social facilities in the form of parks, Musholla, and food court & modern markets 5. Modern minimalist home design 6. Green plan site design concept	1. ± 3.5 meters wide access road to location 2. The existence of dry rivers at the site that separates the land into 2 parts 3. Often damaged access road due to heavy vehicle
Opportunities		
1. Broad target market (close to industrial area as the primary target market and young couple who do not have home) 2. Future possibility of land expansion 3. Declining interest rates 4. The opening of Surabaya-Malang toll road that potentially increases the number of tourist and investment 5. Access road widening	1. Target the market share of nearby industrial employees, young couples, and people outside the Malang City to invest 2. Provide an ease of payment through mortgage	1. Work with other developers around for road maintenance 2. Do a strategic marketing by multiplying the number of banners in the streets and the highway to get known by the public quickly 3. Create a bridge as to separate the housing with other facilities (due to the dry river)
Threat		
1. The growing number of new housing with the similar target market 2. The development of the surrounding area for housing tends to be slower because of the people's mindset as an industrial area 3. Property market conditions that have not improved due to lack of purchasing power	1. Provision of public and social facilities per the needs for housing residents and local people 2. Maintenance of houses quality until handover and provision of guarantee to maintain public housing and social facilities	1. Open a marketing office in a strategic location 2. Build a sample home for the product to be known 3. Create a model house model and mock site plan to attract the attention of the public on the exhibition 4. Create a tagline to increase product awareness

Table 4. Positioning Assessment Criteria

Competitors	Criteria							Average Land Selling Prices /m² (millions Rupiah)
	Location	Facilities	Design	After Sales	Suitable Selling Price	Total	Average	
A	2	2	2	2	4	12	2.4	2.03
B	3	2	2	3	3	13	2.6	3.06
C	3	1	2	2	4	12	2.4	2.07
D	3	4	3	3	2	15	3	3.98
E	3	3	4	3	2	15	3	3.93
Project	2	3	4	3	3	15	3	3

Note: For analysis purpose, criteria are ranked from bad to excellent; 1 = bad, 2 = fair, 3 = good, 4 = excellent.

Table 5. Standard Positioning Assessment Criteria

Criteria	Assessment Standard			
	4	3	2	1
Location				
Located in a local road type	v	v	v	v
Road width >5 m	v	v	v	
Public Transport	v	v		
Located in a collector road type	v	v		
Reachable	v	v		
Located in an arterial road type	v			
Facilities				
Electricity	v	v	v	v
Water Network	v	v	v	v
Parks	v	v	v	v
Street Lamp	v	v	v	v
Gate	v	v	v	
Place of Worship	v	v		
Commercial Area	v	v		
Sports Area	v			
Playground	v			
Design				
Differentiation in Unit Types	v	v	v	v
Neat Area	v	v	v	
Efficient floor plan	v	v		
After Sales				
Facility Maintenance Services	v	v	v	v
Security Services	v	v	v	
Cleaning Services	v	v	v	
Customer Services	v	v		
Suitable Selling Prices with Market				
Selling Price > Market Price	v	v	v	v
Selling Price ± Market Price	v	v	v	
Selling Price < Market Price	v	v		

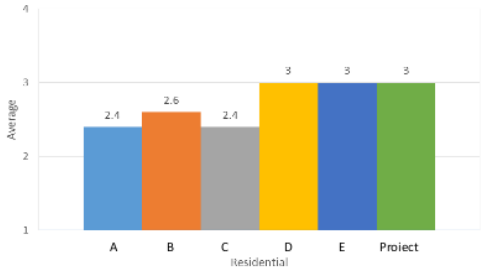

Figure 2. Positioning Chart

facilities and house design, roads, gardens, and excellent amenities. So this housing project will also have to provide similar or better facilities and a selling price that can compete with the two competitors in order to seize market share, that is, for the middle to upper market segment.

4.4 Financial Analysis

Financial analysis is one of the four aspects assessed in HBU assessment following the feasibility analysis on legal aspect and physical aspect by using capital budgeting with several methods such as net present value (NPV) analysis, internal rate of return (IRR), payback period, and benefit-cost ratio (BCR) from cash flow in 2 alternative site plan's designs

where the percentage factor of sellable and non-sellable becomes the distinguishing variable. In the previous section, it has been established that the segmentation of the housing market is middle to upper segmentation. Therefore the design of the site plan will apply a green concept: the road inside the housing will be designed to be wide to add the impression of luxury and the design of the house will be more modern with good quality and environmentally friendly building materials. With the use of green concepts, environmentally friendly building materials, house designs, and energy-saving facilities, the cost of the land development will increase compared to non-green designs in both site plan and house building development.

This research is conducted to compare two scenarios of site plan where both have applied green concept both at its house design and site plan design. The green concept in the site plan arrangement is based on the percentage of open green space and greater service area for the public where the minimum requirement set by the government is 70% for sellable area and 30% for facilities, infrastructure, and utilities including open green space. While the green concept applied in the house building and the facility is the use of environmentally friendly materials, energy and water conservation, and the existence of private garden inside the house.

Figure 3 and Figure 4 illustrate the site plan from both scenarios. Both scenarios are designed with green concept, but the difference is the proportion of the housing and green spaces. The land proportion can be seen in the following table 6.

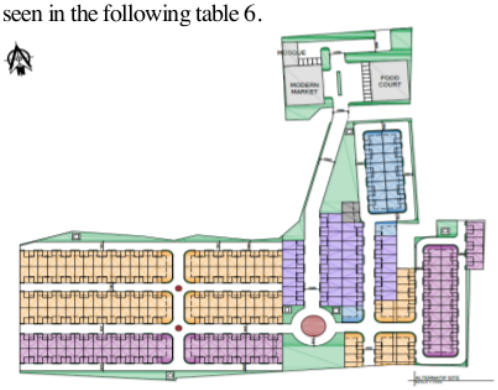

Figure 3. Site Plan Scenario 1

Based on Table 6, the difference between scenario 1 and scenario 2 is the percentage of the sellable and service area/non sellable area. In scenario 1, the percentage of houses is higher than scenario 2, making the total of sellable area more significant in scenario 1. The less percentage of housing in scenario 2 creates a more significant percentage of open green spaces compared to scenario 1. This is because the site plan design in scenario 2 is built provide more open green space to the public with the difference of 5% sellable area. With the percentage difference of the scenario, the financial analysis of the two scenarios is as follows (Table 7).

Figure 4. Site Plan Scenario 2

Table 6. Site Plan Percentage Area

Facilities	Scenario 1	Scenario 2
Land Area	40.000 m^2	40.000 m^2
Housing	20.313 m^2	18.300 m^2
Percentage	50.78%	45,75%
Food court and modern market	1.500 m^2	1.500 m^2
Percentage	3,75%	3,75%
Parks / open green spaces	5.409,19 m^2	7.460 m^2
Percentage	13,52%	18,65%
Road	12.597,81 m^2	12.560 m^2
Percentage	31,5%	31,4%
Mosque	180 m^2	180 m^2
Percentage	0,45%	0,45%
Sellable Area	55%	50%
Service Area	45%	50%

Based on Table 7, it is acknowledged that scenario 1 has a lower development cost and higher income compared to scenario 2, which has 5% difference in sellable area. Scenario 2 site plan's concept is made to have more green areas with 50% sellable area, while scenario 1 has 55% sellable area. With less sellable area (scenario 2), there will be less income as the development cost is higher in order to provide green spaces. Therefore, a bigger initial investment is required. Thus, with the same housing sale price on both scenario, the annual IRR, NPV, and BCR value on scenario 1 (with bigger sellable area) is higher.

4.5 Maximum Productivity Analysis

After several alternatives are assessed on the legal, physical, and financial aspects, the next step is to calculate the highest land value through the Maximum Productivity Test. The land value of the alternative will

Table 7. Financial Analysis of Scenario 1 and Scenario 2

	Scenario 1				Scenario 2			
	Optimist	Most Likely	Pessimist	Expected Return	Optimist	Most Likely	Pessimist	Expected Return
Total Development Cost (billions rupiah)	97.4	100.6	102.7	-	96.2	102	103	-
Total Income (billions rupiah)	113.7	115.6	114	-	111	113.9	109.9	-
Annual IRR	40,39%	27,17%	3,84%	**17,10%**	53,30%	14,05%	-20,31	**15,27%**
NPV (billions rupiah)	4.5	2.5	-1.4	2.1	5.5	0.4	-4.2	0.5
Payback Period (quarterly)	8	9	12	-	8	11	13	-
BCR	1,17	1,15	1,11	-	1,15	1,13	1,11	-

be compared with the value of a vacant land or before a land is developed to find out which scenario has the highest land value increase.

Table 8. Maximum Productivity Analysis

	Scenario	
	1	**2**
Property Value (Rp)	58.207.908.140	55.047.839.362
Building Value (Rp)	44.025.163.225	41.517.416.770
Land Value (Rp)	14.182.744.915	13.530.422.592
Land Value/m^2 (Rp)	354.569	338.261
Increased Land Value	77,3%	69,1%

Based on Table 8, it is concluded that since scenario 1 has more sellable area, the property and building value are also higher compared to scenario 2. Thus, the increased land value on scenario 1 is also higher than scenario 2. The increased land value is the comparison of the land before it is developed and after it is developed into a residential area with facilities, infrastructures, and other utilities. This indicates that even though the site is equipped with a greater number of green plan, the land value is less increased because the green spaces doesn't give much effect on land value after it is developed into buildings.

5. Discussion

In legal and physical aspect, this land is possible to be developed because of the supporting environment, the government regulations, ease of access, the housing market conditions, and the need for housing with green concept in Malang. From the financial and maximum productivity analysis, both site plan's scenarios apply the green concept, but with different proportion in open green spaces, more significant number public services area, and fewer houses. The difference is that scenario 2 have 5% less sellable area than scenario 1, so it could be concluded that scenario 2 is more "green." By that difference, scenario 2 has a higher development cost, less total income, less annual IRR value, less NPV value, and less increased land value. Thus, we can say that scenario 1 which has more sellable area and less green spaces is more financially profitable. However, concerning sustainability, scenario 2 which has more green spaces, benefits of a more comfortable and healthier environment, better social interaction in public open spaces, a more beautiful view, and better economic profit caused by the increasing value in the future can be obtained.

6. Conclusion

From the four assessment aspect in highest and best use analysis, it could be concluded that this land is feasible to be developed into a green residential area. The development of residential area with the green concept has more benefits in the long run. With the application of green concepts on houses and residential area, the environment becomes more comfortable and healthier for the residents. However, a greener site plan (having more parks, more open green spaces, and more public facilities), will burden the developer with a higher cost due to requirement of a more expensive development cost and the maintenance costs for parks and other public spaces.

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