

## Highest and Best Use Analysis for an Apartment with Office Buildings or Shopping Centers in East Surabaya

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**Abstract.** Surabaya is the capital of East Java and the center of community activities. A developer has a plan to build a residential area in East Surabaya, located on Dharma Husada Indah Barat III road with an area of 7.123 m<sup>2</sup>. After considering many aspects, there are two alternative ideas that really attract the attention of this developer, namely, apartments with office buildings or apartments with shopping centers. The best decision results of the two alternatives can be analyzed through the highest and best use (HBU) analysis method. The HBU must fulfill four criteria, that is, legally permissible, physically possible, financially feasible, and maximally productive. Of the two scenarios, the one that meets the HBU aspect is an apartment with office buildings, with the annual internal rate of return of 99%, the net present value of Rp. 563.448.604.512,- with payback period 60,46 months and discounted payback period 60,8 months.

**Keywords:** apartment, shopping mall, office, highest and best use.

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### 1. Introduction

Surabaya city is the capital of East Java and has become the center of community activities. This causes the increment of the population's growth in Surabaya [1]. A developer from Surabaya has a plan to build residential development with a huge potential location in East Surabaya, specifically, the development of Outer East Ring Road (OERR) and also East Surabaya, which is the largest property supplier with percentage 47%. The developer plans to make a residential area with offices facility or shopping centers located on Dharma Husada Indah Barat III with an area of 7.123 m<sup>2</sup>. The best decision results of the two alternatives can be analyzed through HBU analysis method. HBU analysis must fulfill four criteria, that is, legally permissible, physically possible, financially feasible, and maximum productivity [2].

## 2. Theoretical Basis

As aforementioned, the HBU must fulfill four criteria and requirements complying to KPSPI, namely:

1. Legally permissible  
Things that need to be seen in the regulatory aspects include the requirements for inspecting the location's zone and building codes (Mubayyinah and Utomo, 2012).
2. Physically possible  
Tests of physical aspects have a close relationship component with soil characteristics [3]. These includes:
  - a) Building and facility form
    - Apartment categories
      - High-rise apartments, an apartment with more than ten floors and provides parking areas.
      - Mid-rise apartments, an apartment consisting of six to ten floors.
      - Walked-up apartments, an apartment consisting of three to five floors
      - Garden apartments, an apartment consisting of two to four floors and this type of apartment has a courtyard and garden around the building.
    - Shopping center categories
      - Neighborhood center, a shopping center with a scale of service 5.000 to 40.000 people with an area of 2.700 to 9.000 m<sup>2</sup>.
      - Community center, a shopping center with a scale of service 40.000 to 150.000 people with an area of 9.000 to 25.000m<sup>2</sup>.
      - Regional center, a shopping center with a scale of service 150.000 to 400.000 people with an area of 25.000 to 90.000m<sup>2</sup>.
    - Office categories
      - Open plan offices, an office without any separator walls or partitions
      - Closed plan offices, an office with separator or partitions for every room
    - Road hierarchy
      - Primary arterial road, a road that connects a residential environment.
      - Primary collector road, a connecting road between a city-scale activity centers.
      - Secondary arterial road, roads that connect activities between primary collector roads.
      - Secondary collector road, a road that connects activities between secondary arterial roads.
      - Primery local road, a road that connects local activities and is an uninterrupted road despite entering a residential area.
      - Secondary local road, roads for local needs.
    - Principles of plot distribution
      - Orientation, most Surabaya developers will choose the orientation north, south, east and avoid the west.
      - Shape and area of plots, standard plots are generally square and rectangular. While the area of the plot is influenced by the width of the road, the wider the road the wider the plot is determined.
  - b) Location  
Location factors determine achievement to a property whether easy or difficult to achieve. Property that has a location in the city area can be easily reached and has a complete infrastructure.

- c) Accessibility and environment  
Cash property located in the (central business district) (CBD) area, has a high value because the cost of accessibility allows the property as a commercial property.
  - d) Utilities  
A consideration in the provision of adequate urban utilities with good conditions, including the provision of electricity, telephone and water lines
  - e) Size and shape  
This factor greatly affects the physical form of property that can determine the value of the property
3. Financially profitable (financially feasible)
- a) Cash flow
    - Payback period, a method used to determine the time period for returning money invested in investments [4].

$$\text{Payback Period} = \frac{\text{Initial Expenditure}}{\text{Average Revenue Per Year}} \times 1 \text{ Year} \quad (1)$$

- Discounted payback period, a method used to determine the period of time needed to repay investments that have been made through discounted future cash inflows [4].

$$\text{Discounted Cash Inflow} = \frac{\text{Actual Cash Inflow}}{(1+i)^n} \quad (2)$$

$$\text{Discounted Payback Period} = A + \frac{B}{C} \quad (3)$$

Information:

$i$  = *discounted rate*

$n$  = *year of cash entry period*

$A$  = *last year with discounted cumulative cash flow (-)*

$B$  = *value of discounted cash flow at the end of period A*

$C$  = *discounted cash flow during the period after A*

- Net present value (NPV), the method for ranking investment proposals that is equivalent to the present value of future net cash flows, which is discounted at capital costs [5]. If the NPV value is 0, then the investment made will not change the value of the company.

$$NPV = \sum_{t=1} \frac{C_t}{(1+i)^t} - C \quad (4)$$

Information:

$C_t$  = *cash flow in period t*

$t$  = *time period of year t*

$C_0$  = total initial investment  
 $T$  = invest rate

- Internal rate of return (IRR), a method that calculates a discount rate that makes the present value of all estimated cash inflows equal to the present value of expected cash outflows [6]. The IRR results obtained are greater than the interest rate so the investment made produces a return that is greater than expected.

$$NPV = \sum_t^n \frac{FCF_t}{(1+IRR)^t} - I \quad (5)$$

Information:

$FCF_t$  = the annual free cash flow generated by the project  
 $I_0$  = present value of investment costs after tax  
 $IRR$  = internal rate of return  
 $t$  = time period

- Profitability index (PI), the present value ratio of future free cash flows to initial expenditures [7].

$$PI = \frac{PV \text{ of Cash Inflow}}{\text{Initial Investment}} \quad (6)$$

4. Maximum productivity

Where the use of HBU analysis will produce the highest residual value of a land and consistent with the guaranteed rate of return for the market [2].

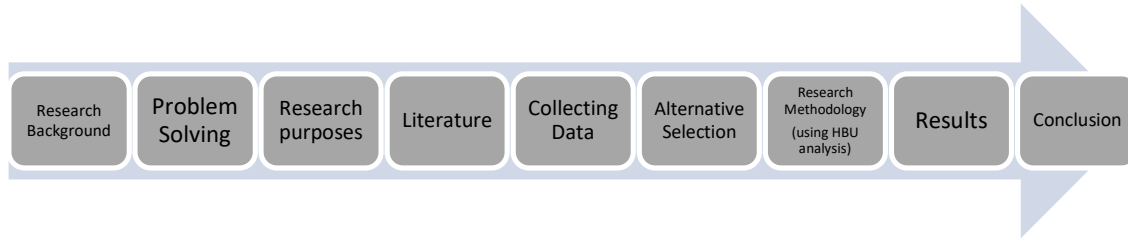
**3. Research Methodology**

This research uses quantitative descriptive method by conducting data collection techniques and observing carefully certain aspects related to the problem under study. The data used in this analysis are primary and secondary. The primary data is obtained from interviews and direct observations and secondary data is obtained from data collection and applicable regulations as shown in Table 1.

**Table 1.** Source of data collection

No.	Variable	Data Type	Data Source
1.	Selection of Alternative Properties	Primary	Interview with developer
2.	Law	Secondary	Surabaya C-Map and SKRK submission in 2017
3.	Physical	Primary and Secondary	Direct observation, obtaining data from land owners, conducting SWOT analysis.
4.	Financial	Secondary	Related comparison property

Figure 1 shows the research framework step by step from the background to get the research results and conclusions.



**Figure 1.** Research framework

## 4. Analysis and Discussions

### 4.1. General Description of Research Object

The object of this research is a residential project that will be built on an area of 7.123 m<sup>2</sup> and is located at Dharma Husada Indah Barat III, Surabaya.

### 4.2. Research Results

#### 4.2.1. Legal Aspects

In zoning, the Surabaya C-Map shows the land location as a public facility but has been changed into a residential zone with some boundaries and conditions listed in Table 2.

**Table 2.** Technical requirement based from SKRK

Technical Requirements	
Land allotment	Residential
Building requested	Apartment
Building floor coefficient (KLB)	8 point
Green base coefficient (KDH)	10% minimum
Basement coefficient (KTB)	65%
Building base coefficient (KDB)	50% maximum
Open space	50%
Maximum height	105 m
Number of Basement Floor	1

#### 4.2.2. Physical Aspects

Table 3 shows the site condition based on 9 parameters obtained by site survey. Score 1 for very bad conditions, 2 for bad conditions, 3 for moderate conditions, 4 for good conditions, and 5 for very good conditions.

**Table 3.** Site analysis tables based on physical conditions of research objects

No	Parameter	1	2	3	4	5	Information
1.	Site Location			x			The location is surrounded by elite residential and close to commercial area but no special view oriented.
2.	Area & Site Shapes			x			The shape of the location extends backward by comparison 1:2.
3.	Site Boundaries & Contours					x	The location borders surrounded by residential area and some public facility. This site has flat contours
4.	Track of the sun		x				Overall sunlight location.
5.	Accessibility & Traffic Density				x		To reach this location must go through arterial road that separated by well maintained boulevard

**Table 3.** Site analysis tables based on physical conditions of research objects (to be continued)

No	Parameter	1	2	3	4	5	Information
6.	Landscape & Vegetation			x			There is no vegetation landscape around sites.
7.	Noise			x			The location is close enough to arterial road and worship place
8.	Utilities					x	On road access, electricity, water and telephone lines have been passed.
9.	Public Facilities				x		Adjsacent to hospitals, schools, entertainment venues, worship places, and public transportation.
Total		0	2	12	8	10	Good

Information:

0 – 9 = Very Bad

10 – 18 = Bad

19 – 27 = Medium

28 – 36 = Good

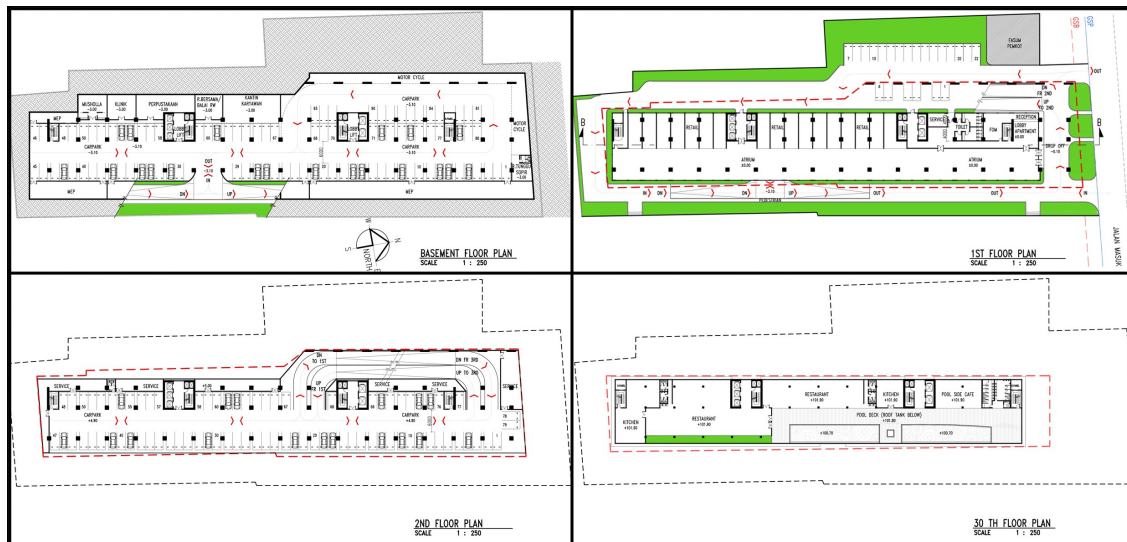
37 – 45 = Very Good

Based on site analysis shows good result (score 32)

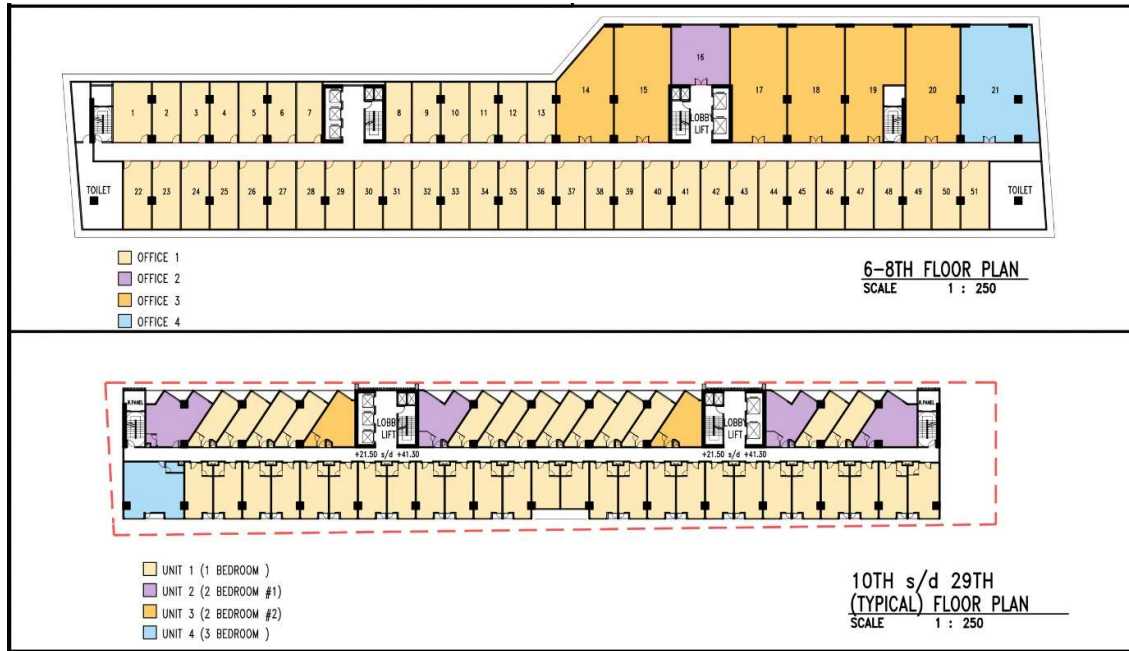
### Site Planning

#### 1. The 1<sup>st</sup> Scenario

The first scenario is an apartment with office building. This building has saleable and unsaleable area. The saleable area contain of apartments 51,32%, offices 12,52%, retails 0,9%, and apartments facilities like gymnasium 0,58%, meeting rooms 0,26%, lobby lounge 1,34%, restaurant 1,13%, children daycare and kids zone 0,53%, mushola 0,07%, public library 0,13%, health center 0,07%, and multifunction hall 0,07%. The unsaleable area contains of parking building 16,35%, basement 5,47%, and building circulation 9,35%. The selling price for the apartment units is Rp.22.540.000/m<sup>2</sup>, the office unit price is Rp 30.720.000/m<sup>2</sup>, and the retail units price is Rp 62.850.000/m<sup>2</sup>. Figure 2 shows the design drawing of the 1<sup>st</sup> scenario.



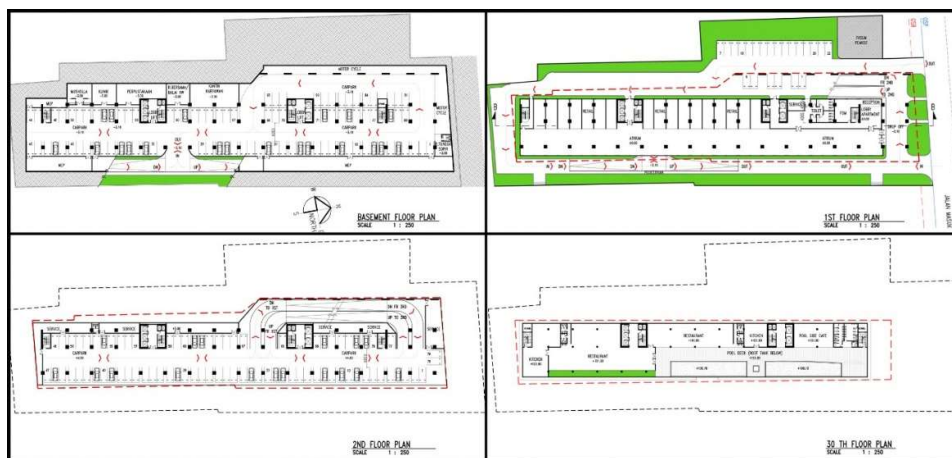
**Figure 2.** Building design of apartment with office building in the 1<sup>st</sup> scenario



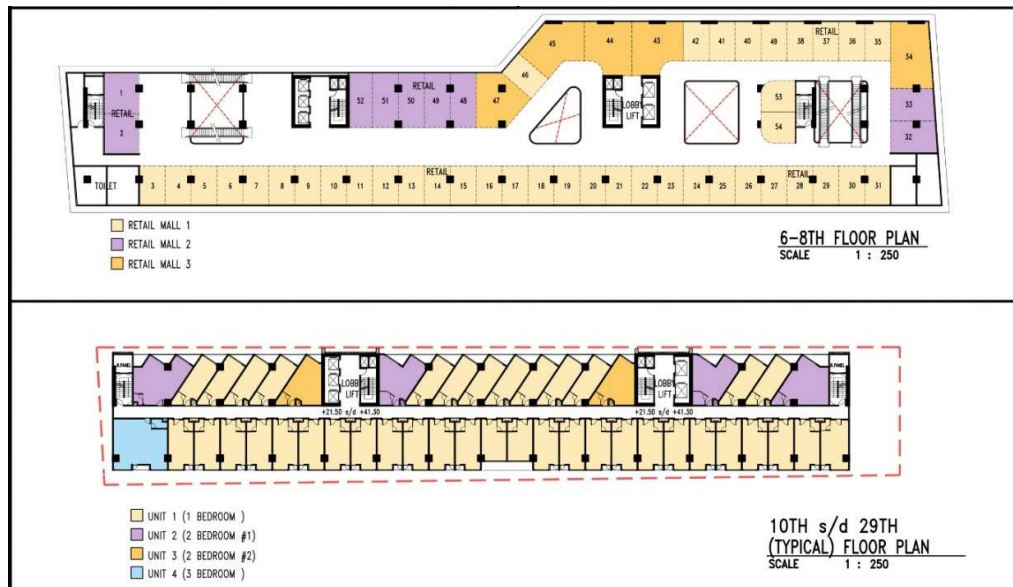
**Figure 2.** Building design of apartment with office building in the 1<sup>st</sup> scenario (contd.)

2. The 2<sup>nd</sup> Scenario

The second scenario is an apartment with shopping center. This building has saleable and unsaleable area. The saleable area contain of apartments 51,32%, mall’s retail 12,52%, retails 0,9%, and apartments facilities like gymnasium 0,58%, meeting rooms 0,26%, lobby lounge 1,34%, restaurant 1,13%, children daycare and kids zone 0,53%, mushola 0,07%, public library 0,13%, health center 0,07%, and multifunction hall 0,07%. The unsaleable area contain of parking building 16,35%, basement 5,47%, and building circulation 9,35%. The selling price for the apartment units is Rp.22.540.000/m<sup>2</sup> and the selling price for retails is Rp.62.850.000/m<sup>2</sup>. Figure 3 shows the design drawing of the 2<sup>nd</sup> scenario.



**Figure 3.** Building design of apartment with office building in the 2<sup>nd</sup> scenario



**Figure 3.** Building design of apartment with shopping center in the 2<sup>nd</sup> scenario (contd.)

### 4.2.3. Financial Aspects

Financial analysis is one of the four aspects assessed in highest and best use assessment after feasibility analysis on the legal aspect and physical aspect. The financial aspect will use the capital budgeting method with several methods, there are NPV, IRR, payback period, and discounted payback period of cash flow.

#### 1. The 1<sup>st</sup> Scenario

As shown in Table 4 and 5, the 1<sup>st</sup> scenario has total income Rp 1.490.471.050.491 which is bigger than project cost Rp 564.109.633.450, IRR > cost of capital 12% while yearly IRR is 99%, and NPV > 0 that is Rp 563.448.604.512,12, with payback period 60,46 months and discounted payback period 60,80 months, therefore the second scenario can be said to be financially feasible.

**Table 4.** Type and selling price of apartment in Scenario 1

Apartments				
Type	Area (m <sup>2</sup> )	Semi gross Area (m <sup>2</sup> )	Units Quantity	Selling Price (Rp.)
Unit 1 (1 bedroom)	32	40	780	901.600.000
Unit 2 (2 bedroom)#1	60	75	80	1.690.500.000
Unit 3 (2 bedroom)#2	39	49	40	1.098.825.000
Unit 4 (3 bedroom)	66	83	20	1.895.550.000
Offices				
Office 1	38	48	129	1.459.200.000
Office 2	68	85	3	2.611.200.000
Office 3	130	163	18	4.992.000.000
Office 4	172	215	3	6.604.800.000
Retails				
Type	Area (m <sup>2</sup> )	Semi gross Area (m <sup>2</sup> )	Units Quantity	Selling Price (Rp.)
Retail 1	42		17	2.639.700.000
Retail 2	314		1	19.734.900.000
Retail 3	585		1	36.767.250.000



**Table 5.** Financial analysis table for Scenario 1

Total Project Cost	Rp 564.109.633.450
Total Income	Rp 1.490.471.050.491
Yearly IRR	99%
NPV	Rp 563.448.604.512,12
Payback Period	60,46 months
Discounted Payback Period	60,80 months

2. The 2<sup>nd</sup> Scenario

As shown in table 6 and table 7, the 2<sup>nd</sup> scenario has total income Rp.1.495.832.370.669 which is bigger than project cost Rp.625.295.393.150, Internal Rate of Return IRR > cost of capital 12% while yearly internal rate of return is 128%, and NPV > 0 that is Rp 476.999.599.751,17, with payback period 60,46 months and discounted payback period 60,80 months, therefor second scenario can be said to be financially feasible.

**Table 6.** Type and selling price of apartment in Scenario 2

Apartments					
Type	Area (m <sup>2</sup> )	Semi gross Area (m <sup>2</sup> )	Units	Quantity	Selling Price (Rp.)
Unit 1 (1 bedroom)	32	40	780		901.600.000
Unit 2 (2 bedroom)#1	60	75	80		1.690.500.000
Unit 3 (2 bedroom)#2	39	49	40		1.098.825.000
Unit 4 (3 bedroom)	66	83	20		1.895.550.000
Shopping Retails					
Retail Mall 1	24			117	1.508.400.000
Retail Mall 2	32			33	2.011.200.000
Retail Mall 3	56			12	3.519.600.000
Retails					
Retail 1	42			17	2.639.700.000
Retail 2	314			1	19.734.900.000
Retail 3	585			1	36.767.250.000

**Table 7.** Financial analysis table for Scenario 2

Total Project Cost	Rp.625.295.393.150
Total Income	Rp.1.495.832.370.669
Yearly IRR	128%
NPV	Rp.476.999.599.751,17
Payback Period	60,46 months
Discounted Payback Period	60,80 months

**4.2.4. Maximum Productivity**

After the two alternatives have been tested on the legal aspect, physical aspect, and financial aspect, the next step is to calculate the highest value through the maximum productivity test. the land value of the two alternatives will be compared to the value of the vacant land before developed to find which alternatives have the highest increase in land value (Table 8).

**Table 8.** Maximum productivity analysis table

Description	Alternatives	
	1st	2nd
Property Value	564.109.633.450	625.533.371.150

**Table 8.** Maximum productivity analysis table (contd.)

Building Value	492.879.633.450	554.303.371.150
Land Value	71.230.000.000	71.230.000.000

**4.2.5. Results and Discussion**

After the three aspects of HBU fulfilled in Table 9, legal aspects, physical aspects, and financial aspects. Therefore the maximum productivity in HBU aspect which produces the highest land value is the 1<sup>st</sup> scenario which is an apartment with office building. This is because from the legal aspect, RTRW has already appropriate to its allotment which is for residential area according to City Planning Certificate (SKRK) and Surabaya Mayor Regulation of 2017 number 52. From physical aspect, site planning in the 1<sup>st</sup> scenario has considered the size and shape of the property that determines the concept, road hierarchy, road pattern, and plot arrangement. Based on the financial aspect, the 2<sup>nd</sup> scenario has a bigger IRR which is 128% and the 1<sup>st</sup> scenario is 99%, but 1<sup>st</sup> scenario has a bigger NPV which is Rp 563.448.604.512,12 and the 2<sup>nd</sup> scenario is Rp.476.999.599.751,17. Therefore, the decisions of investment will be taken based on the NPV, and it is the 1<sup>st</sup> scenario.

**Table 9.** Highest and best use analysis table

HBU Criteria	Scenarios	
	1st	2nd
<b>Legal Aspect</b>		
	SHGB Residential Area Building code	SHGB Residential Area Building code
<b>Physical Aspect</b>		
Scenario	Apartment with Office Building	Apartment with Shopping Centre
Facility	Gymnasium Meeting Room Lounge Restaurant Children Day Care Mushola Library Clinic Community Hall	Gymnasium Meeting Room Lounge Restaurant Children Day Care Mushola Library Clinic Community Hall
Apartment	51,32%	51,32%
HBU Criteria	1	2
Office	12,52%	-
Retail & Mall Retail	0,90%	13,42%
Facility	4,09%	4,09%
Parking Lot	16,35%	16,35%
Basement	5,47%	5,47%
Circulation	9,35%	9,35%
Number of Floors	30 Floors	30 Floors
<b>Financial Aspect</b>		
	1	2
Yearly IRR	99 %	128%
NPV	Rp.563.448.604.512.12	Rp.476.999.599.751,17
Payback Period	60,46 months	60,46 months

Discounted Payback Period	60,80 months	60,80 months
<b>Maximum Productivity</b>		
v		

## 5. Conclusions and Suggestions

### 5.1 Conclusion

The 1<sup>st</sup> scenario is the highest and best use for vacant land at Dharma Husada Indah Barat III, Surabaya. The first scenario is an apartment with office building. The compositions of this building contain of apartments 51,32%, mall's retail 12,52%, retails 0,9%, and apartments facilities like gymnasium 0,58%, meeting rooms 0,26%, lobby lounge 1,34%, restaurant 1,13%, children daycare and kids zone 0,53%, mushola 0,07%, public library 0,13%, health center 0,07%, and multifunction hall 0,07%. The unsaleable area contains parking building 16,35%, basement 5,47%, and building circulation 9,35%. This scenario has an annual IRR 99%, NPV Rp.563.448.604.512,12, with payback period of 60,46 months and discounted payback period of 60,80 months.

### 5.2 Suggestions

- a. It is expected that in the next study to do research of market taste in every alternative before making a sale plan.
- b. It is expected that in the next research to add another scenarios that are possible for this site plan without changing the main function of the building according to applicable regulations.

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