

## VALUE ENGINEERING ANALYSIS ON ANDALUSIA HOUSING PROY GRIYA GIRI PHASE II IN GRESIK DISTRICT

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### ABSTRACT

#### KEYWORDS

value engineering,  
housing projects,  
advantages, alternative  
design, comparative, site  
plan

The need for housing continues to increase as the number of inhabitants increases. Housing development as one of the efforts to meet the needs of the community for residential houses. The Andalusian Griya Giri housing estate in Gresik Regency was built with a type. However, with the vast area in Gresik Regency and the fierce competition of housing developers who offer housing in a higher segment and at prices that do not differ much, it can be concluded that this housing is a waste of costs in development. Therefore, a way is needed to overcome this problem, namely by applying Value Engineering. This study aims to analyze the optimization of the calculation of the cost budget plan without reducing the quality and function of the building with the Value Engineering method. The analysis technique in Value Engineering of this study uses a comparative method with cost analysis. This method compares the profit price of the landscape design before it is redesigned with the design that has been redesigned, namely changing the house plan, appearance and number of house compositions / site plans so that maximum profit is obtained. This analysis uses the stages of the Value Engineering plan, namely the information stage, stage, creative, analysis stage, recommendation stage and presentation stage. Based on the results of the Value Engineering analysis at the Griya Giri Andalusian Housing Project in Gresik district, the most profitable design alternative was to use Design C with the change of type 38/72 housing units to 36 units. The profit price after redesigning from the original design, the production price of the type 38 house is Rp. 122.240.000,000 becomes Rp. 90.728.514. The amount of profit increased generated after the redesign of the original design and the change in the number of house compositions / site plans was carried out amounting to Rp 7,864.960.000 becomes Rp. 9,981,773,496.

### INTRODUCTION

The house becomes a place to live to shelter from the outside weather and a gathering place for a family. Not only that, the house is also a place to rest, carry out daily activities and a place to show identity for the individual himself.

Gresik Regency is the most prospective area in East Java for the property sector in the Gerbangkertosusila Metropolitan area. The type and shape of this house will affect the construction of the house itself. The most visible influence is the use of building materials and materials which are differences in the type of building materials and the quantity of building materials used. The event that may occur is the waste of building materials and materials that can affect the price of the house. One of the disciplines of civil engineering, namely Construction Engineering Management (MRK), learns about how to save on project construction costs. This method is known as Value Engineering.

Andalusian Griya Giri Housing Developed by PT. Manzilah Visi Mulia has a comfortable residential area with a total area of 4.600 m<sup>2</sup>.located near the Gressmall shopping center in GKB Gresik regency.

Based on these conditions, the ongoing development project requires a large enough allocation of funds so it is necessary to consider that the design used has been optimal so that the price remains competitive with competitors. Therefore, it is necessary to review the design of development projects so that it is possible to make cost savings so that production prices can be lowered by identifying and reducing unnecessary costs without reducing the quality and function of the project.

### **Value Engineering**

In general, the definition of Value Engineering is a technique commonly used to increase profits by blocking creative ideas in order to reduce production costs by not reducing function and quality or by increasing production costs followed by increasing the product.

The meaning of Value Engineering is widely stated by experts, namely Value Engineering is a concept that is neatly arranged in a system and uses the technique of finding the function of a product or service that can be reduced in production costs by not reducing the function of the product or service (the most economical). (Imam Soeharto, 2001 quoted from Society Of American Value Engineers)

### **Understanding Home**

The definition of a house is a shelter or shelter from the influence of surrounding natural conditions (rain, sun, etc.) and serves as a place of rest after serving in the context of daily needs.

The interpretation of the house from experts is that a house is not only a building (structural), but also a place of residence that meets the conditions of a decent life, seen from various aspects of life. Home as a place to shelter, enjoy life, rest and rejoice with family. The resident gets an early impression of his life in this world in the house. The house must guarantee the interests of the family, among other things to develop, live in harmony with its neighbors and surroundings, and more than that, the house must give tranquility, pleasure, happiness, and comfort to every incident in its life. (Hartanto Wibowo, 2001)

### **Definition of Design and Site Plan**

Design is taken from the English word, namely "Design", which means to form a plan or design before making an object, system, component and structure. Meanwhile, the Site Plan is a situation plan. The definition of a site plan is a two-dimensional drawing that shows the details of the plan to be carried out on a land plot, both regarding the layout of the house, road plan, utilities, electricity, clean water, dirty water, social facilities and public facilities

### **RAB (Cost Budget Plan)**

According to Suyitno (2006) the cost budget is the cost of matrial and building materials that are calculated carefully, meticulously, and qualified. The Cost Budget Plan is the calculation of the costs required for materials and wages and other costs in the implementation of a construction or a project.

### **Profit**

Profit is a profit derived from a reduction in cost of goods produced, other costs, and losses from income or operating income so that it is expected to be sufficient to represent the company. Profit is also called net income or net earnings. (Faturrohman, 2005)

## Previous Research

Here are some of the previous studies relevant to this study:

Pottu, Y.E. (2014), with the title Application of Value Engineering in the Polyclinic and Veterinary Medicine Building Construction Project, Universitas Brawijaya Malang. Alternative selection, analysis of column dimensions and alternative costs of Wide Flange Profile Steel (WF) after design changes were made was Rp. 1,927,192,938,- of the total cost of Rp . 1,927,938,- of the total cost of Rp. 2.715.032.033,- Cost savings generated by Rp. 787,839,095,- (amounting to 29.02% of the initial design cost) and in terms of analysis of the selection of alternatives the global priority weight with a total value of 12,247. So that the recommendation for the design of the middle structure of the Polyclinic and Medicine Building, Universitas Brawijaya Malang uses a span column dimension of 4 m with a profile section of WF 300x300x10x15 and WF 250 x250x 9x 14, dimensions of 6 and 7 m span beams with WF profile sections 200 x 200 x 8 x 12, spans 3 and 5 m with WF profile sections 175x175x7.5 x 11.

## RESEARCH METHOD

This study collects references on matters related to the process and implementation of cost management on a good construction project from various sources, including: literature, both books and journals.

This informal field observation is in the form of a case study on the Andalusia Griya Giri Housing Development Project Phase II, which is to conduct direct interviews with staff / employees

## RESULT AND DISCUSSION

### Housing Data

1. Land Area = 4,200 m<sup>2</sup>
2. Land Area that can be built 65% x 4,200 = 2,730 m<sup>2</sup>
3. Fasum Fasos Area 35% x 4,200 = 1,470 m<sup>2</sup>
4. Types of houses based on Andalusian Griya Giri housing plan :
  - a. Type 38/72

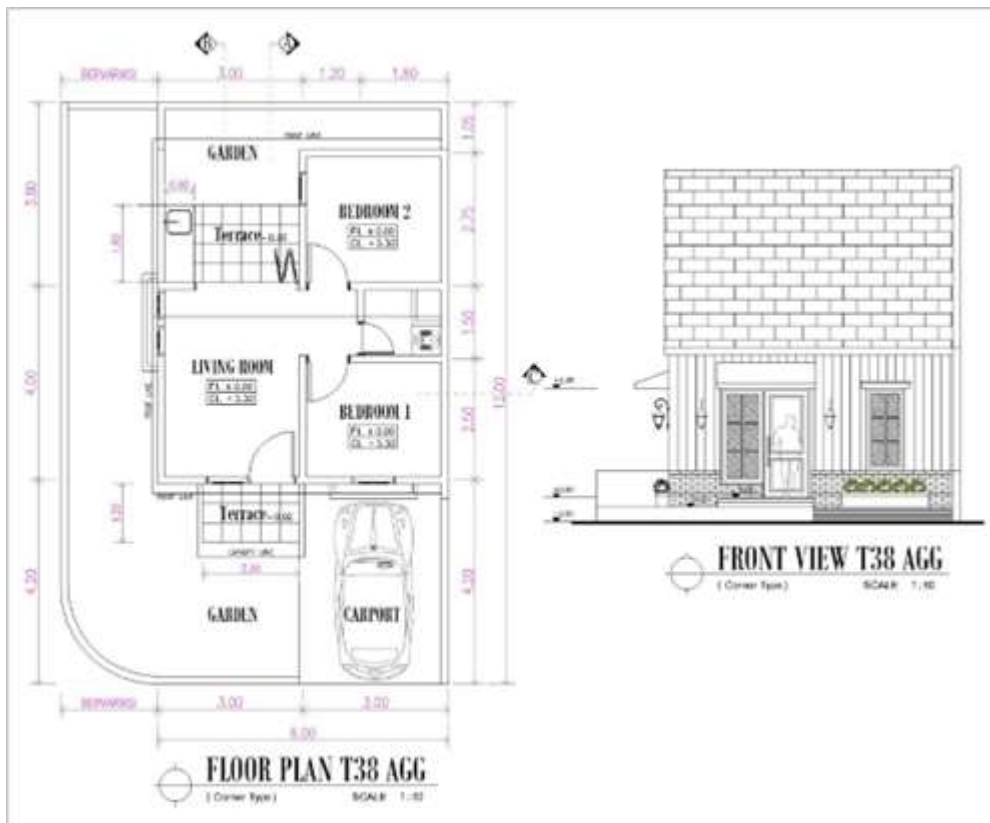
### Site Plan Plan Image



Figure 1 *Site Plan Original Andalusian Housing Griya Giri*

Source: PT. Manzilah Noble Vision, 2021

Figure 1 is the original *site plan* of Andalusian Griya Giri housing with an area of 4.600 m<sup>2</sup> with a total of 32 houses consisting of 1 house type and 1 same land area, namely type 38/72.



**Home Specifications**

1. Foundation : Stone times, Foot plate & Srtrauss Pile
2. Wall : Bata red & Lightweight Brick In aci and Paint
3. Roof tile : Flat Concrete
4. Ceramics : Room 4 0 x4 0, Wall Km 2 0 x25, Floor Km 2 0 x2 0 0
5. Sills : Aluminum
6. Ceiling : Gypsum finishing hollow frame paint
7. Door : Main Solid HD, KM PVC
8. Sanitair : Ktoilet seat, PVC bathtub, Water faucet
9. Electricity : (T38) 1300 Watts

**Cost Budget Plan (RAB)**

No.	Pekerjaan	Jumlah harga
I	Pekerjaan Persiapan	Rp 491,694, 00
II	Pekerjaan Tanah	Rp 2.880. 000
III	Pekerjaan Pondasi	Rp 11.747.339,81
IV	Pekerjaan Beton	Rp 18.285.799,24
V	Pekerjaan Dinding	Rp 25. 071.661,111
VI	Pekerjaan Lantai	Rp 9.641.557.57
VII	Pekerjaan Plafond	Rp 4. 058.250. 00
VIII	Pekerjaan Atap	Rp 15.764.366,67
IX	Pekerjaan kusen.pintu & iendela	Rp 22. 070. 000. 00

**Cost of Goods Built (HPPL)**

**Table 1 Cost of Goods Built on Land**

Description	theft	sat	unit price	amount of price
Land Acquisition & Legality				
Lahan production	4,600	m2	1. 000. 000	2,520,000,000
BPHTB	4,600	m2	59,782	275, 000,000
PPH	4,600	m2	30,000	138,000,000
SUM				<b>2,933, 000,000</b>

**Table 2 Cost of Goods Built on Land**

Description	Theft	Sat	Unit Price	Total Price
Land Acquisition & Legality				
Licensing & LEGALITY				
parent/reverse certificate name	4,600	m2	7,050	32,430,000
Site plan attestation	4,600	m2	420	1,932,000
UKL-UOL/AMDAL	4,600	m2	630	2,898,000
splitzing certificates	32	Unit	2,415,000	77,280,000
IMB parent & splitzing IMB	32	Unit	630,000	20,160,000
UN parent & splitzing UN	32	Unit	26,250	840, 000
AJB notary fee & back name	32	Unit	2,100,000	67,200,000
BPHTB	32	Unit	2,625,000	84, 000,000
Pph	32	Unit	1,312,500	42, 000, 000
PPn	32	Unit	10,783,500	345, 072, 000
SUM				<b>673,812, 000</b>
PRODUCTION				
Measurement and maturation of land area 4600 m2	1	Ls	221. 040. 000	221. 040. 000
road paving	1.284.80	m2	125.433,69	161.157.201.33
Mobile fencing work	242,43	m2	1.435.375,67	347.978.123.33

Channel Work 80x80	295, 07	m2	629.979.10	185.887.932,95
SUM				<b>916. 063.256</b>

**Table 3 Cost of Goods Developed Land**

Description	Theft	Sat	Harga Unit	Total Price
electricity				
PLN Electricity Connection	32	Unit	1,750. 000	56, 000,000
Road Description	12	Letter	2.500. 000	80.635,000
SUM				<b>136,635,000</b>
PDAM Water				
PDAM water installation	32	Unit	1.500. 000	48, 000, 000
Well	2	Unit	7.500. 000	15,000,000
SUM				<b>63, 000, 000</b>
TOTAL				<b>4,664,537,416</b>

**Data Analysis****Table 4 Pareto Analysis Test Results of House Type 38**

No.	Work	Total Price (Rp.)	Percentage (%) Price	Percentage (%) Compulsive
1	Roof Work	14,245,700	11. 71%	11. 71%
2	Wall Work	25.526.199.63	20,98%	14,69%
3	Foundation and soil work	15.147.153.6	12,45%	27,14%
4	Structure Work	18.968.149,34	15,59%	42,73%
5	Floor Work	8.722.533,57	7,2%	49,93%
6	Ceiling Work	4.058.250,00	3,4%	53,33%
7	Sills work	22. 070. 000	18,132%	71,462%
8	Paint jobs	7.922.466.61	6,5%	77,962%
9	Sanitair work	1.755. 000	1,45%	79,412%
10	Clean water installation work	2.002.617	1,65%	81, 062%
11	Dirty water installation work	2,608.687. 00	2,15%	83,212%
12	Electrical work	3,230. 000	2,7%	100%
Total Cost		121,723, 000		

**Recommendation Stage****Site Plan and Plan Images After Redesign**

**Figure 2 Site Plan Design A After Redesign**

Based on Figure 2 Site Plan design A housing with an area of 4,600 m<sup>2</sup> with an initial planning of 32 housing units after *redesigning* to 33 units maximizes land use by changing some area.



**Figure 3 Site Plan Design B After Redesign**

Figure 3 is a residential B design *site plan* with an area of 4,600 m<sup>2</sup> with an initial planning of 32 housing units after *redesigning* to 34 units, this change was obtained after changing the garden next to plot D10 into plots / units. So that a greater profit is obtained than the previous design.



**Figure 4 Site Plan Design C After Redesign**

Figure 4 is a residential C design *site plan* with an area of 4.600 m<sup>2</sup> with the initial planning of 32 housing units after *redesigning* to 36 units, this change was obtained after changing the garden / fasum next to the plot D1 0,C9,C1 into a plot / unit . So that a greater profit is obtained than the previous design.



**Figure 5 3Plan and HouseView type 38 after redesign**

Figure 5 The above 7 is a comparison of the floor plan, location of the room and the front view of the original type 38 house building and after *redesign*.

**Budget Plan (RAB) After Redesign**

No.	Work	Total price	Total price
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		Original Design		After Redesign	
1	Preparatory work	Rp	491,694, 00		Rp.791. 700
2	Roof Work	Rp	2.880. 000	Rp	7.955.975
3	Wall Work	Rp	11.747.339,81	Rp	20.689.323
4	Foundation and soil work	Rp	18.285.799,24	Rp	12.927.405
5	Structure Work	Rp	25. 071.661,111	Rp	15.139.440
6	Floor Work	Rp	9.641.557.57	Rp	4.212.946
7	Ceiling Work	Rp	4. 058.250. 00	Rp	2.819. 000
8	Sills work	Rp	15.764.366,67	Rp	11. 053.900
9	Paint jobs	Rp	22. 070. 000. 00	Rp	5.139.430
10	Sanitair work	Rp	7.922.466.61	Rp	595. 000
11	Clean water installation work	Rp	1.755. 000. 00	Rp	1.509.253
12	Dirty water installation work	Rp	2. 002.617.50		2.466.550
13	Electrical work	Rp	2.608.687.50		2.610. 000
TOTAL		Rp.	122.220. 000	Rp.	90,728. 514

**Table 5 Comparison of House Cost Budget Plan Type 38 House Production Price House Type after Redesign Each Unit**

No.	House Type	Building Price Before Redesign (RP.)	Building Price After Redesign (RP.)	Land Price	Building + Land Price (Before Redesign)	Building + Land Price (After Redesign)	Keuntungan
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)
					$f = c + (e * \text{moons ground})$	$g = d + (e * \text{land area})$	$h = f - g$
1	38/72	122.220. 000	90.728.514	1. 000. 000	194.220. 000	162.728.514	31,491,486

**Table 6 House Type Prices After Redesign Landscape Design / house composition After redesign**

No	Type	House Composition			
		Original Design	Design A	Design B	Design C
1	38/72	32	33	34	36
Total		32	33	34	36

**Table 7 Landscape Design Selling Price before Redesign**

(a)	(b)	(c)	(d)	(e)	(f)
No	Type	Unit	Building Price + Land Before Redesign	Selling Price of Buildings + Soil	Total Profit
					$f = ((e-d) \times c)$

1	38/72	32	194,220,000	440. 0000	245.780. 000
Total					7,864,960. 000

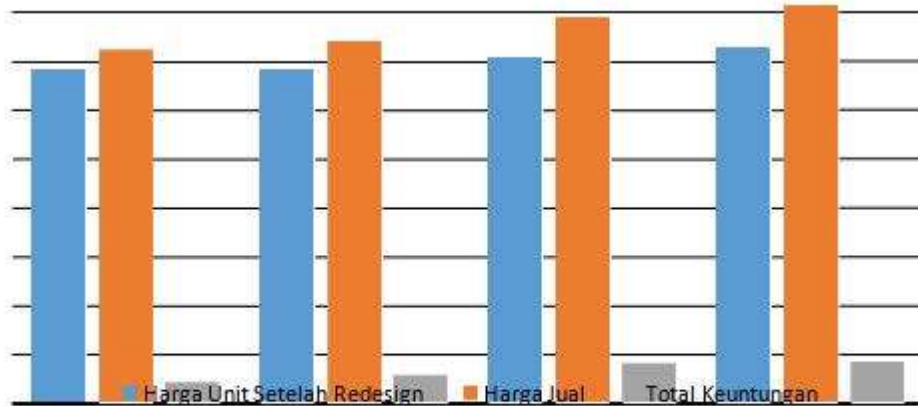
**Table 8 Selling Price Before Redesign****Selling Price after Redesign**

(a)	(b)	(c)	(d)	(e)	(f)
No	Type	Unit	Building Price + Land After Redesign	Selling Price of Building + Land	Total Advantage $f = ((e-d) \times c)$
Design A	38/72	33	162,728,514	440,000,000	112,447,481
<b>Total</b>		<b>33</b>			<b>9,149,959. 038</b>
Design B	38/72	34	162,728,514	440,000,000	0
<b>Total</b>		<b>34</b>			<b>9,427,230.524</b>
Design C	38/72	36	162,728,514	440,000,000	68,040,319
<b>Total</b>		<b>36</b>			<b>9,981,773.496</b>

**Continued Table 9 Design of House Unit Changes after Redesign Profit Chart****Table 9 Total Profit Price**

No.	Design	Production Price Rp.	Selling Price Rp.	Advantage Rp.	Percentage Advantage
1	Original Design	6,215,040,000	14, 080,000,000	7,864,960. 000	0.00%

2	Design A	5,370,040,962	14,520,000,000	9,149,959,030	37.98%
3	Design B	5,532,769,476	14,960,000,000	9,427,230,524	99.46%
4	Design C	5,858,226,504	15,840,000,000	9,981,773,496	107.87%



Sumber : Data Penulis, 2022

Based on figure graph 9 obtained the best and more profitable alternative is the C design composition, with the change of the previous type 38/72 32 units to 36 units. The amount of profit increased generated after *the redesign* of the original design was originally Rp. 7,864.960. 000 becomes Rp. 9,981,773,496. The increase in profit after *the redesign* is Rp. 2,116,813,496 or 107.87% of the initial profit.

## CONCLUSION

The most profitable design alternative is to use Design C, which is type 38/72 with a total of 36 units.

Alternative design of house type 38 housing Andalusia Griya Giri, namely changing the original design with a cheaper design and changing the composition of the house on the site plan. The alternative design carried out is to redesign the original shape of the plan and appearance of the building without changing the function of the building, as well as changing the number of house compositions on the siteplan using 1 type of house, namely type 38 and land area of 72 m<sup>2</sup>. Cost reduction obtained after redesign from the original production price of type 38 houses initially Rp.122,240,00,000 to Rp.90,728,514. The profit price after changing the design of each type of house, namely for type 38 design, a production profit of Rp. 9,981,773,496. Increased profit from the original design of Rp 7,864,960. 000 after redesign to Rp. 9,981,773,496.

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