



Natural Sciences Engineering & Technology Journal (NASET Journal)

Journal Homepage: <https://nasetjournal.com/index.php/nasetjournal>

Analysis of Land Use Changes and Land Value Zones Due to Phase 1 Mass Rapid Transit (MRT) Development in Menteng District, Central Jakarta

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ARTICLE INFO

Keywords:

Changes in land use
Changes in land values
Land value zones
Mass land valuations
Mass rapid transit

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All authors have reviewed and approved the final version of the manuscript.

<https://doi.org/10.37275/nasetjournal.v3i1.22>

ABSTRACT

The high demand for land in the area around the MRT station causes changes in land prices that tend to increase. These conditions can be the cause of changes in land use. This study used high-resolution images in 2021 and land use maps in 2014 and 2021. The data is used to analyze land-use changes. Meanwhile, the analysis of land value changes uses the 2014 land value zone map and the 2021 land value zone map obtained from the results of a field survey using the mass land valuation method. From these results, an analysis of the effect of changes in land use was carried out on changes in land value in Menteng District as a result of the construction of mass rapid transit phase 1. The results showed that there was a change in land use. The total area of land change was 18.604 hectares or 2.879%. The details of the changes are trade increased by 1.362%, settlements decreased by 1.938%, hotels increased by 0.071%, lakes increased by 0.114%, vacant land decreased by 0.006%, parks increased by 0.368%, PT regularly increased by 0.485%, sports facilities decreased by 0.368% and government offices decreased by 0.088%. The highest price increase was Rp110,218,903/m² because there was a change in land use from regular housing to trading areas. The largest increase in land value seen from the dominant land use characteristics was in commercial or trade areas, which was 187%, with an average increase in value of Rp. 76,170,137/m².

1. Introduction

The mass transportation system in the city, rapid mass transit (MRT) is considered to have a real impact on rising property prices. The existence of new transportation corridors or changes to the mass transportation system will increase the potential for property investment in an area. The trend of rising property prices along the MRT line is also evident in the Rumah Property Index (RPI). RPI data shows that the average price index per quarter of DKI Jakarta throughout 2018 was 122 points, up 4% from the average price index per quarter of DKI Jakarta in 2017. When compared to the average price index per quarter of DKI Jakarta, the average Central Jakarta price index per quarter was 149 points, up 4%

compared to the previous year. The average increase in the price index per quarter in Central Jakarta 2018, along with East Jakarta by 5%, South Jakarta and West Jakarta recorded an increase of 4%, while North Jakarta was the lowest, at 2%.¹⁻³

Menteng District is a sub-district located in Central Jakarta and is the administrative center of the Central Jakarta Administration City. Menteng sub-district has 6 sub-districts, with an area of 653 ha. In 2013 the DKI Jakarta Regional Government built a rapid mass transit or what is commonly known as MRT phase 1 and 13 stations, connecting the cities of DKI Jakarta and also South Tangerang. One of these stations is the Bundaran HI Station, located in Menteng District, Central Jakarta, which has been operating since

2017.⁴⁻⁶

The high demand for land in the area around the MRT station causes changes in land prices that tend to increase. These conditions can be the cause of changes in land use. For example, settlements become non-residential.⁷⁻⁹ Lands that were previously used as residential areas are now used as offices, shophouses, and other places of business. Changes in land use have an effect on changes in land values in Menteng District from year to year. This study aims to analyze the relationship of MRT development to changes in land use and value zones in the Menteng sub-district, Central Jakarta.

2. Methods

This research is an observational study. The research location is located in Menteng District with an area of 6.53 km². This sub-district is bordered by Gambir District to the north, Tanah Abang District to the west, Senen District to the east, and Setiabudi District to the south. Administratively, it consists of 5 Urban villages, 38 RW, 425 RT, and 10,587 KK, with a population density of 12,304/km².

The data needed in this research is in the form of non-spatial spatial data. Spatial data in the form of digital maps, administrative maps, maps of land parcels, and land value zone maps of Menteng District, in shapefile format (*.shp), Quickbird satellite imagery has been corrected in 2021, land use maps for 2014 and 2021 in Menteng District, Central Jakarta Obtained from the Central Jakarta National Land Agency. Non-spatial data in the form of transaction price data and land offers in Menteng District was obtained from field surveys.

The equipment used in this research is an Asus ROG GL552JX, with specifications Intel Core™ i7 4720HQ 2.5 GHz ~ 3.5 GHz Processor, 12 GB RAM

DDR3L 1600MHz SDRAM, NVIDIA GeForce GTX 950M 4GB VRAM, 512GB SSD, Windows 10 operating system, GPS handheld navigation, Microsoft Office 2016 for report generation and ArcGIS 10.3 software for data processing.

The sample was selected using a purposive technique, which is based on considerations of the characteristics of the village or urban village proportionally to the use of residential, commercial, and agricultural land, which in the land market is reflected in one land value zone with a minimum number of 3 (three) samples for each land value zone, while for zones above 10 x 10 cm, the minimum sample is 5 (five). For 100 excess for every 10 x 10 cm, the number of samples is added by 2 (two) and so on for multiples of 10 x 10 cm. The selected sample is a vacant plot of land, which refers to the base map that is used as the existing work map.

3. Results and Discussion

Latest land value

The land value data used is the latest land value data obtained from the results of field surveys. The latest land value data is obtained from information provided by local property agents/brokers to record the sale and purchase of land in each zone in 2021. Land sale and purchase data are obtained in the form of land sale and purchase prices per meter or per land plot, so to simplify, the price obtained is calculated into the price per meter of land. The determination of the amount of land value data is based on the rules for the area of each zone. This activity is carried out to find out information about the transaction value and land offers that occur in the market. The sample taken depends on the area of one zone. In this study, there were 208 sample points.

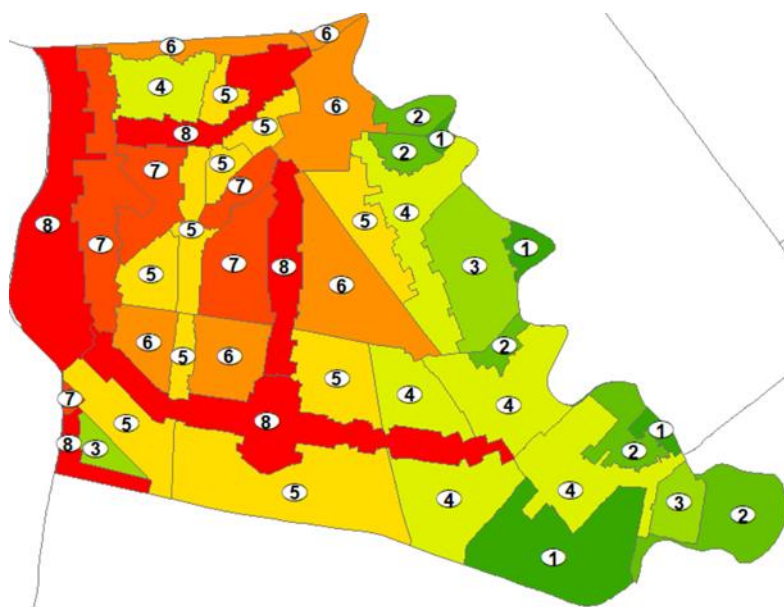


Figure 1. Location point of land price survey

Analysis of the 2021 land value zone map

Figure 2 shows the 2021 land value zone map in Menteng District, which is divided into 44 areas, each of which has a different average index value (NIR). The

highest average land value in 2021 in Menteng District is in area 120, which is Rp. 217,601,184/m² and the lowest average price is in area 12, which is a densely populated zone, which is Rp. 16,849,479, -/ m².



Tabel Klasifikasi Zona Nilai Tanah :

No Zona	Nilai Tanah	Simbol
1.	Rp. 16.170.000.- - Rp. 21.210.000.-	
2.	Rp. 21.211.000.- - Rp. 31.527.000.-	
3.	Rp. 31.528.000.- - Rp. 53.889.000.-	
4.	Rp. 53.890.000.- - Rp. 68.506.000.-	
5.	Rp. 68.507.000.- - Rp. 85.190.000.-	
6.	Rp. 85.191.000.- - Rp. 100.440.000.-	
7.	Rp. 100.441.000.- - Rp. 114.703.000.-	
8.	Rp. 114.704.000.- - Rp. 217.602.000.-	

Figure 2. Map of land value zones in Menteng Subdistrict in 2021.

Table 1. Land value classification based on NIR 2021

Price Range	Area	Land price per M ²	Class Zone
Rp. 16,170,000, - - Rp. 21,210,000,-	12	Rp16,849,479	1
	87	Rp20,814,609	
	54	Rp20,937,298	
	26	Rp21,210,438	
Rp. 21,211,000, - - Rp. 31,527,000,-	15	Rp23,000,335	2
	92	Rp23,493,755	
	38	Rp24,204,148	
	81	Rp24,609,166	
	29	Rp26,799,284	
	59	Rp28,903,925	
	24	Rp31,527,397	
Rp. 31.528.000,- - Rp. 53,889.000,-	16	Rp40,559,153	3
	99	Rp49,914,591	
	28	Rp53,889,480	
Rp. 53,890,000, - - Rp. 68,506,000,-	19	Rp58,796,148	4
	82	Rp62,934,646	
	33	Rp64,186,429	
	36	Rp67,443,361	
Rp. 68.507.000,- - Rp. 85,190,000,-	31	Rp73,854,628	5
	94	Rp77,817,124	
	98	Rp78,135,766	
	52	Rp78,914,044	
	39	Rp79,209,367	
	74	Rp81,740,934	
	72	Rp84,275,912	
	69	Rp84,340,395	
	23	Rp85,039.916	
34	Rp85,189,997		
Rp. 85.191.000,- - Rp. 100,440,000,-	41	Rp89,533,991	6
	37	Rp91,302,820	
	124	Rp92,382,711	
	109	Rp93,444,995	
	119	Rp99,211,018	
	61	Rp100,439,975	
Rp. 100.441.000,- - Rp. 114.703.000,-	73	Rp102.528.529	7
	30	Rp105.743.588	
	58	Rp106.543.269	
	100	Rp113.593.365	
	71	Rp114.703.311	
Rp. 114.704.000,- - Rp. 217.602.000,-	68	Rp133.344.427	8
	25	Rp134.860.198	
	35	Rp135.145.163	
	102	Rp146.385.475	
	120	Rp217.601.184	

Based on table 1 and Figure 2 above, the lowest land value is dominated by the Kelurahan Pegangsaan and Cikini, as many as 11 areas that are densely populated, while the highest land values are in Menteng and Gondangdia Villages with 10 areas with the dominant land use characteristics being commercial or trade areas which are trade centers located in the Central Jakarta City Administration.

Analysis of the land value zone map in Menteng District in 2014

Figure 3 below shows the 2014 land value zone map in Menteng District, which is divided into 48 areas, each of which has a different average index value (NIR).

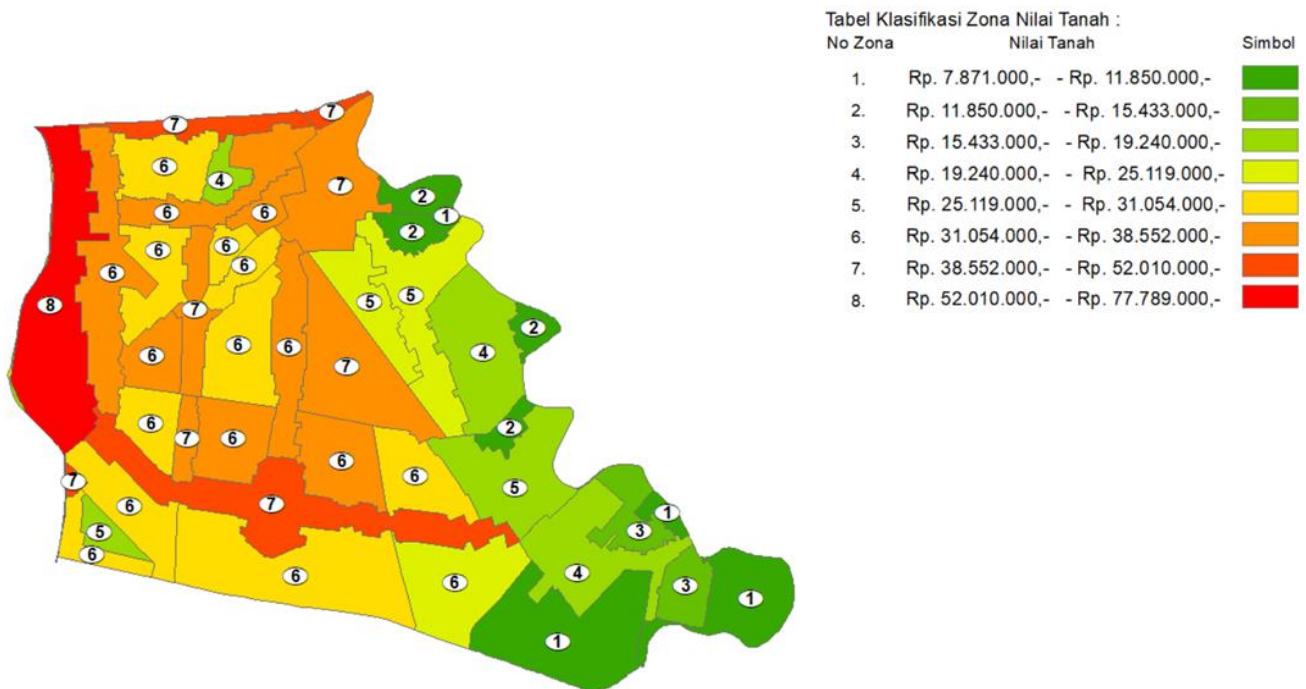


Figure 3. Map land value zone Menteng District in 2014

From Figure 3 above, it can be seen that the highest average value in 2014 in Menteng District was in the area of 120, which was Rp. 77.789.000,-/m². And the

lowest average price is in area 15, which is a densely populated zone, which is Rp. 7,870,000-/m².

Table 2. Land value classification based on 2014 NIR

Price Range	No Area	Land price per M ²	Class Zone
Rp. 7.871.000,- - Rp. 11,850,000,-	15	Rp7,870,685	1
	26	Rp8,779,178	
	12	Rp9,650,959	
	87	Rp11,032,877	
Rp. 11.850.000,- - Rp. 15,433,000,-	38	Rp12,991,659	2
	114	Rp13,170,959	
	92	Rp13,259,658	
	81	Rp13,518,565	
	54	Rp14,0007,563	
Rp. 15,433,000,- - Rp. 19,240,000,-	29	Rp. 15,572,603	3
	16	Rp. 16,578,082	
	40	Rp. 18,909,871	
Rp. 19.240.000,- - Rp. 25,119,000,-	59	Rp22,756,849	4
	28	Rp24,169,960	
	98	Rp24,561,517	
	85	Rp24,799,284	
Rp. 25,119,000,- - Rp. 31,054,000,-	36	Rp26,921,492	5
	24	Rp27,419,942	
	125	Rp27,527,397	
	82	Rp30,890,174	
	69	Rp30,891,267	
Rp. 31,054,000,- - Rp. 38,552,000,-	19	Rp31,795,660	6
	25	Rp32,276,713	
	74	Rp32,732,538	
	33	Rp32,763,975	
	99	Rp33,542,976	
	71	Rp33,655,462	
	58	Rp33,750,885	
	41	Rp33,918,766	
	73	Rp34,198,012	
	23	Rp34,289,977	
	31	Rp34,748,592	
	34	Rp35,836,690	
	94	Rp35,850,148	
	102	Rp36,166,571	
	52	Rp36,343,676	
68	Rp36,367,182		
100	Rp36,764,819		
37	Rp37,128,767		
109	Rp38,552,333		
Rp. 38.552.000,- - Rp. 52,010,000,-	61	Rp39,009,690	7
	72	Rp39,477,775	
	39	Rp39,883,849	
	30	Rp42,187,639	
	35	Rp42,204,951	
	124	Rp43,154,178	
	119	Rp44,282,354	
Rp. 52.010,000,- - Rp. 77.789.000,-	120	Rp77.789.218	8

Based on table 2 and figure 3 above the lowest land value in the dominance of Pegangsaan and Cikini Villages is as many as 16 areas that are densely populated areas, while the highest land values are in Menteng Village, Cikini Village, and Gondangdia Village as many as 4 areas with characteristics of land use that dominate is the commercial or trade area which is the center of trade located in the Central

Jakarta Administration Area.

Analysis of changes in land value zones for 2014 – 2021

Figure 4 shows a map of changes in land value zones for 2014 – 2021 in Menteng District, which consists of 44 zones.

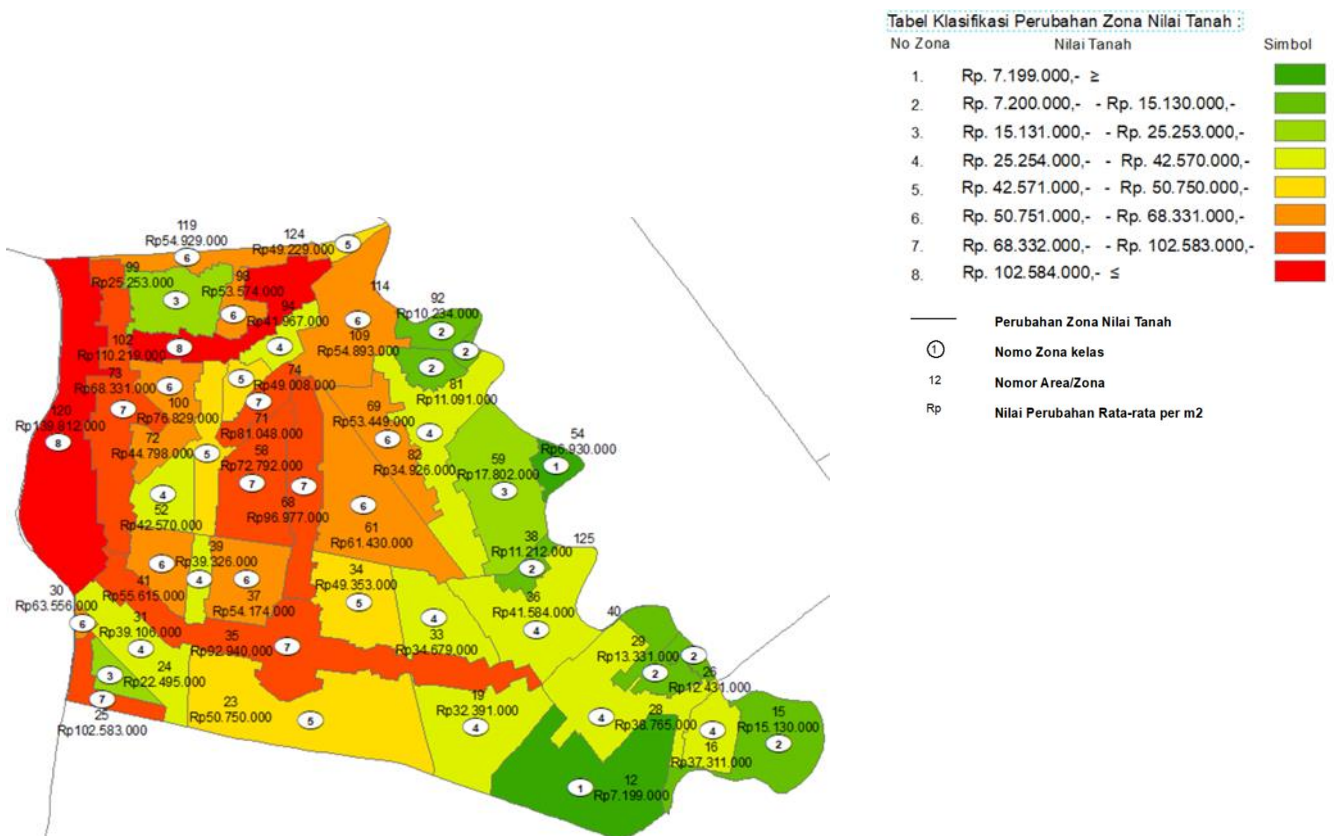


Figure 4. Map of land value zone changes in Menteng District.

Table 3. Changes in land value based on NIR in 2014 and 2021.

No Area/Zone		Land Price per m ² (Rp)		Large Percentage Change	Percentage increase in price
Year 2014	Year 2021	Year 2014	in 2021		
12	12	Rp 9,650,959	16,849,479 Rp	7,198,520	75%
15	15	Rp7,870,685	Rp23,000,335	Rp15,129,650	192%
16	16	Rp16,578,082	Rp53,889,480	Rp37,311,398	225%
19	19	Rp31,795,660	Rp64,186,429	Rp32,390,769	102%
23	23	Rp34,289,997	Rp85,039,916	Rp50,749,919	148 %
24	24	Rp27,419,942	Rp49,914,591	Rp22,494,649	82%
25	25	Rp32,276,713	Rp134,860,198	Rp102,583,485	318%
26	26	Rp8,779,178	Rp21,210,438	Rp12,431,260	142%
28	28	Rp24,169,960	Rp62,934,646	Rp38. 764,686	160%
29	29	Rp15,572,603	Rp28,903,925	Rp13,331,322	86%
30	30	Rp42,187,639	Rp105,743,588	Rp63,555,949	151%
31	31	Rp34,748,592	Rp73,854,628	Rp39,106,036	113%
33	33	Rp32,763,975	Rp67,443,361	Rp34,679,386	106%
34	34	Rp35,836,690	Rp85,189,997	Rp49,353,307	138%
35	35	Rp42,204,951	Rp135,145,163	Rp92,940,212	220%
36	36	Rp26,921,492	Rp68,505,857	Rp41,584,365	154%
37	37	Rp37,128.767	Rp91,302,820	Rp54,174,053	146%
38	38	Rp12,991,659	Rp24,204,148	Rp11,212,490	86%
39	39	Rp39,883,849	Rp79,209,367	Rp39,325,518	99%
40	40	Rp18,909,871			0%
41	41	Rp33,918,766	Rp89,533,991	Rp55,615,225	164%
52	52	Rp36,343,676	Rp78,914,044	Rp42,570,368	117%
54	54	Rp14,0007,563	Rp20,937,298	Rp6,929,735	49%
58	58	Rp33,750,885	Rp106,543,269	Rp72.792,384	216%
59	59	Rp22,756,849	Rp40,559,153	Rp17,802,304	78%
61	61	Rp39,009,690	Rp100,439,975	Rp61,430,285	157%
68	68	Rp36,367,182	Rp133,344,427	Rp96,977,245	267%
69	69	Rp30,891,267	Rp84. 340,395	Rp53,449,128	173%
71	71	Rp33,655,462	Rp114,703,311	Rp81,047,849	241%
72	72	Rp39,477,775	Rp84,275,912	Rp44,798,137	113%
73	73	Rp34,198,012	Rp102,528,529	Rp68,330517	200%
74	74	Rp32.732.538	Rp81.740.934	Rp49.008.397	150%
81	81	Rp13,518,565	Rp24,609,166	Rp11,090,602	82%
82	82	Rp30,890,174	Rp65,816,232	Rp34,926,059	113%
85	85	Rp24,799,284			0%
87	87	Rp11,032,877	Rp20,814,609	Rp9,781,732	89%
92	92	Rp13,259,658	Rp23,493,755	Rp10,234,097	77%
94	94	Rp35,850,148	Rp77,817,124	Rp41,966,976	117%
98	98	Rp24,561,517	Rp135,766	Rp .574.249	218%
99	99	Rp33,542,976	Rp58,796,148	Rp25,253,172	75%
100	100	Rp36,764,819	Rp113,593,365	Rp76,828,546	209%
102	102	Rp36,166,571	Rp146,385.475	Rp110,218,903	305%
109	109	Rp38.552.333	Rp93.444.995	Rp54.892.662	142%
114	114	Rp13,170,959			
119	119	Rp44,282,354	Rp99,211,018	Rp54,928,664	124%
120	120	Rp77,789,218	Rp217,601,184	Rp139,811,966	180%
124	124	Rp43,154,178	Rp92,382,711	Rp49,228,533	114%
125	125	Rp27,527,397			

From the table above, it can be seen that there is a change in the number of areas. In 2014 there were 48 areas, while in 2021, there were 44 areas. This happened because of the merging of two areas located in the Pegangsaan Village, namely densely populated areas, namely areas 128 and 40 in 2014 to area 41 in 2021, and zones 114 and 125 in 2014 to area 87 in 2021.

The increase in value of the highest land is Rp 139,811,966 per m², increased by 180% from the land value in 2014, which occurred in area 120 with the characteristics of land use being a commercial or trade area which is a trading center located in the Central Jakarta Administration Area. And the lowest increase in land value was in area 54, which was Rp. 6,929,735 per m², an increase of 49% from 2014, with the characteristics of land use being a densely populated

area. The highest percentage increase is 318%, which occurs in area 25, with the characteristics of land use being a commercial or trade area which is 500 m from the MRT station.

Analysis of land-use change in Menteng District in 2014 – 2021

Based on table 4, there were 9 types of land-use changes in Menteng District in the 2014 – 2021 period, with a total land-use change of 18,604 hectares. The biggest change in area increase was in the trading area, which was 1.362% and the biggest change in the area decrease was for regular housing, which was 1.938%. Table 5 describes the extent of land-use change in Menteng District in the period 2014-2021.

Table 4. Percentage of land-use change in 2014-2021.

Land Use	Area (HA)		Changes in Land Use	
	The year 2014	The year 2021	Area (HA)	Percentage
Apartments	6,4286469	6,4286469	Not Changed	Not Changed
Lake	0,7128944	1,4468944	0,734	0,114%
Sports Hall	2.5938965	0.2178965	-2.376	- 0.368%
Hotel	14,7367908	15,1937908	0,457	0,071%
installation	0.485302	0.485302	Unchanged	Unchanged
Road	78,0096059	78,0096059	Unchanged	Unchanged
Green Line	19,3864787	19,3864787	Unchanged	Unchanged
Railway	12, 0295297	12,0295297	Unchanged	Unchanged
Health Service	10.706538	10.706538	Unchanged	Unchanged
Educational Service	23,8277328	Unchanged	Worship	Unchanged
Worship Service	4,612276	4,612276	2,5762229	BUMN
BUMN Office	2,5762229	2,5762229	Unchanged	21.0374729
Government Office	20,4704729	-0,567	-0.088	%
Private Office	47,3006488	50,4366488	1.1738419	%
City Park	1.1738419	3,3869403	Unchanged	Unchanged
Mall	3,3869403	0.485	No Change	Unchanged
Market	0.96482 26	0.9648226	Unchanged	Unchanged
Trade	18,39199551	27,1899955	8,797999993	1,362%
Regular Housing	255.7294549	243.2074549	-12.5219999	-1.938%
Irregular Housing	84.4002475	84.4002475	Unchanged	Irregular
Transportation Facilities	2.9010602	2.9010602	No Change	No Change
Gas Station	0.255481	0.255481	No Change	No Change
River	12,9088334	12,9088334	No	Change
Park	4,28926	6,66526	2,376	0.368%
Vacant Land	7,4250073	7,3890073	-0.036	-0.006%
Recreation Area	9.8804958	9.8804958	Unchanged	Unchanged
TOTAL	646,1514767	646,1514767	18,60399999	2,879%

Table 5. Changes in land-use area 2014 – 2021.

No	Change in Land Use		Area HA	
1	Regular Housing	Becomes Hotel	0.457	12,522
		Becomes Private Office	5,269	
		Becomes Trade	6,795999993	
2	Government Offices	Become Trades	0.141	0.567
		Becomes Vacant Land	0.426	
3	Empty Lands	Become Lakes	0.734	
4	PTs	Become Trades	2,133	
5	Sports Facilities	Become Parks	2,376	
6	Trades	Become An Empty Land	0.272	
Total			18,60399999	

Analysis of the influence of the construction of mass rapid transit phase 1 on changes in land use and land value zone at the Bundaran HI Station

From Table 6 it can be seen that the highest price increase was within a radius of 500-750 m from the Bundaran HI Station of Rp. 110,218,903 in area 102

because there were changes in land use from regular housing to commercial areas. Meanwhile, the lowest average price increase was Rp.22,494,649 located within a radius of 1 – 1.25 km from Bundaran HI Station in area 24 and there is a change in land use from regular housing to trading.

Table 6. Changes in land value due to MRT construction at Bundaran HI Station

Radius	Area	Type of Land Use Change	Price Increase (Rp)	Percentage Increase
0 - 250m	100	Regular Housing - Private Office	Rp76,828,546	209%
	120	Government Office - Vacant Land	Rp139,811,966	180%
250 - 500m	100	Regular Housing - Private Office	Rp76,828,546	209%
	52	Regular Housing - Private Office	Rp42,570,368	117%
	100	Government Office - Trade	Rp76,828,546	209%
500 - 750m	120	Government Office - Vacant Land	Rp139,811,966	180%
	39	Sports Facilities - Garden	Rp39,325,518	99%
	72	Regular Housing - Private Office	Rp44,798,137	113%
	73	Regular Housing - trade	Rp68,330,517	200%
	100	Regular Housing - trade	Rp76,828,546	209%
	102	Regular Housing - trade	Rp110,218,903	305%
	100	Office Government - Trade	Rp76,828,546	209%
750 m - 1km	99	Vacant Land - Lake	Rp25,253,172	75%
	25	Regular Housing - trade	Rp102,583,485	318%
	24	Regular Housing - trade	Rp22,494,649	85%
	31	Regular Housing - trading	Rp39,106,036	113%
	37	Sports Facilities - Park	Rp54,174,053	148%
	94	Regular housing - trading	Rp41,966,976	117%
	102	Regular housing - trading	Rp110,218,903	305%
	102	Regular housing - Private office	Rp110,218,903	305%
	99	Regular Housing - Hotel	Rp25,253,172	75%
	102	Regular Housing - Hotel	Rp110,218,903	305%
	99	Regular PT - Trade	Rp25,253,172	75%
1 - 1.25km	100	Trade - Vacant Land	Rp76,828,546	209%
	25	Regular Housing - trading	Rp102,583,485	318%
	24	Regular Housing - trade	Rp22,494,649	85%
	35	Regular Housing - Private Office	Rp92,940,212	220%
	94	Regular Housing - trade	Rp41,966,976	117%
102	Regular Housing - trade	Rp110,218,903	305%	

The percentage increase was the highest at 305% and 318%, respectively, which are within a radius of 500 – 750 m and 750 m – 1 km from the HI Roundabout Station, which is located in area 102 and area 25 with the characteristics of changing land use into trading. This is supported because, in this area, access to the Bundaran HI Station is very easy. From table 6, it can also be concluded that the percentage increase in the average value of land to changes in land use around the HI Roundabout Station within a radius of up to 1.25 km is 187% if based on the annual land

value inflation of 10% / year, it means that it was in the range In 2014 – 2021, the land value will only increase by 70%, but due to the construction of the mass rapid transit phase 1, the land value which has an impact on changes in land use around the HI Roundabout Station will increase by 117% to 187%. The correlation calculation to determine the relationship between price increases (variable X) and the radius of the station (variable Y) is based on table 6 with the formula:

$$r = \frac{n\sum xy - (\sum x)(\sum y)}{\sqrt{\{n\sum x^2 - (\sum x)^2\} \{n\sum y^2 - (\sum y)^2\}}}$$

Produces a correlation value of -0.21028 which means that the variable X (increase in land prices) and variable Y (Radius from the station) is correlated, but other parameters must be taken into account, including the characteristics of land use before changes in the surrounding area. The area/area, access to the MRT station, and environmental conditions around the area/area so that the correlation becomes stronger.

Analysis of the Effect of Mass Rapid Transit Changes on Land Use and Land Value Zones at BNI Dukuh Atas Station

The following is a table of changes in land value on land use changes due to the construction of Mass Rapid Transit (MRT) at BNI Dukuh Atas Station.

Table 7. Changes in land value due to MRT construction at BNI Dukuh Atas Station

Radius	Area	Type of Change in Land Use	Price Increase (RP)	Percentage Increase
0 - 250m	25	Regular Housing - trade	Rp102,583,485	318%
250m -500m	25	Regular Housing - trading	Rp102,583,485	318%
	24	Regular housing - trading	Rp22,494,649	82%
	31	Regular housing - trading	Rp39,106,036	113%
500m - 750m	35	Regular housing - Private office	Rp92,940,212	220%
750 -1 km	23	Regular Housing - Private Office	Rp50,749,919	148%
	37	Sports Facilities - Park	Rp54,174,053	146%
	39	Sports Facilities - Park	Rp39,325,518	99%
	100	Regular Housing - Trading	Rp76,828,546	209%
1-1.25 km	23	Regular Housing - Private Office	Rp50,749,919	148%
	35	Regular Housing - Private Office	Rp92,940,212	220%
	37	Sports Facilities - Park	Rp54,174,053	146%
	52	Regular Housing - Private Office	Rp42,570,368	117%

From Table 7 it can be seen that the highest price is within a radius of 0 m - 25 m from Dukuh Atas BNI Station at Rp. 102,583,485 per m² in area 25 because there is a change in land use from regular housing to trading areas. Meanwhile, the lowest average price increase was Rp. 22,494,649 per m² located within a 250 m – 500 m radius from BNI Dukuh Atas Station in area 24, and there was a change in land use from regular housing to trading.

The highest percentage increase is 318% and 220%, which are within a radius of 0 – 250 m and 500 m – 750 m from Dukuh Atas BNI Station, which is located in area 24 and area 35 with the characteristics of changing land use into trading and private offices. This is supported because in this area access to

$$r = \frac{n\sum xy - (\sum x)(\sum y)}{\sqrt{\{n\sum x^2 - (\sum x)^2\} \{n\sum y^2 - (\sum y)^2\}}}$$

Produces a correlation value of -0.2964 which means that the variable X (Increase in land prices) and variable Y (Radius from the station) are correlated, but other parameters must be taken into account among others, namely the characteristics of land use before changes around the area/area, access to MRT stations and environmental conditions around the area/area so that the correlation becomes stronger.

Dukuh Atas BNI Station is close.

From table 7 it can also be concluded that the percentage increase in the average value of land to changes in land use around Dukuh Atas BNI Station within a radius of up to 1.25km is 176% is based on the annual land value inflation of 10% / year, it means that it is in the range in 2014 – 2021, the land value will only increase by 70%, but due to the construction of mass rapid transit phase 1, the land value which has an impact on changes in land use around BNI Dukuh Atas Station rose 106% to 176%.

The correlation calculation to determine the relationship between price increases (variable X) and the radius of the station (variable Y) is based on table 7 with the formula:

Analysis of land value zone changes on dominant land use characteristics

Table 8 shows land value changes for each dominant land use characteristic. From table 8, it can be seen that the highest increase value in Menteng District with the dominant land use characteristic is the trading area, which is in area 120, which is Rp. 139,811,966. /m², and, the increase with the largest percentage, is in area 25 with a percentage increase of 318%.

Table 8. Changes in land value in the trading area

Characteristics of Land Use	No Area	Price Increase	Percentage Increase
In Trading Area	25	Rp102,583,485	318%
	30	Rp63,555,949	151%
	100	Rp76,828,546	209%
	102	Rp110,218,903	305%
	119	Rp54,928,664	124%
	120	Rp139,811,966	180%
	124	Rp49,228,533	114%
	69	Rp53,449,128	173%
	82	Rp34,926,059	113%
Percentage Increase Average			187%

Table 9. Changes in land value for regular residential areas

Characteristics of Land Use	No Area	Price Increase	Percentage increase
In Regular Housing Area	19	Rp32,390,769	102%
	23	Rp50,749,919	148%
	31	Rp39,106,036	113%
	33	Rp34,679,386	106%
	34	Rp49,353,307	138%
	35	Rp92,940,212	220%
	36	Rp41,584,365	154%
	37	Rp54,174,053	146%
	39	Rp39,325,518	99%
	41	Rp55,615,225	164%
	52	Rp42,570,368	117%
	58	Rp72,792,384	216%
	61	Rp61,430,285	157%
	68	Rp96,977,245	267
	71	Rp81,047,849	241%
	72	Rp44,798,137	113%
73	Rp68,330,517	200%	
74	Rp49,008,397	150%	
Percentage of Average Increase			158%

From table 9, it can be seen that the highest increase in the value in Menteng District with the dominant land use characteristic is Regular area in

area 71, which is IDR 81,047,849 /m². And the increase with the largest percentage is also in area 71 with a percentage increase of 241%.

Table 10. Changes in land value in densely populated residential areas

Land Use Characteristics	No Area	Price Increase	Percentage increase
Dense Residential Housing	12	Rp7,198,520	75%
	15	Rp15,129,650	192%
	16	Rp37,311,398	225%
	24	Rp22,494,649	82%
	26	Rp12,431,260	142%
	38	Rp11,212,490	86%
	54	Rp6,929,735	49%
	81	Rp11,090,602	82%
	87	Rp9,781,732	89%
	92	Rp10,234,097	77%
	98	Rp53,574,249	218%
	99	Rp25,253,172	75%
Percentage of Average Increase			116%

From table 10 above, it can be seen that the highest increase value is in Menteng District, with the dominant land use characteristic being a densely populated residential area in area 98, which is Rp.

53,574,249/m². And the increase with the largest percentage is in area 16 with a percentage increase of 225%.

Table 11. Changes in land value for office areas

Characteristics of Land Use	No Area	Price Increase	Percentage Increase
In-Office Area	59	Rp17,802,304	78%
	94	Rp41,966,976	117%
Percentage of Average Increase			98%

From table 11 above, it can be seen the highest price increase and the highest percentage increase in

price. The office area is located in area 94, which is Rp 41,966,976/m² and 117%.

Table 12. Changes in land value for education service areas

Land Use Characteristics	No Area	Price Increase	Percentage Increase
in Education Services Area	28	Rp38,764,686	160%
	29	Rp13,331,322	86%
	109	Rp54,892,662	142%
Percentage of Average Increase			129%

From table 12 above, it can be seen that the highest increase value is in Menteng District, with the dominant land use characteristic being densely populated residential areas in area 109, which is IDR 54,892,662 /m². And the increase with the largest percentage is in area 28, with a percentage increase of 160%.

110,218,903/m² because there was a change in land use from regular housing to trading areas. The largest percentage increase in land value seen from the dominant land use characteristics is in commercial or trade areas.

4. Conclusion

Our study concluded that the average change in land value from 2014 to 2021 was IDR 47,313,743/m², with a percentage increase in land value of 155%. There are 9 types of land-use changes in Menteng District in the period 2014 – 2021, with a total land change area of 18,604 hectares or 2.879%. Changes in land value due to the construction of Mass Rapid Transit phase 1 seen from a radius of up to 1.25 km from the HI Roundabout Station show that there are 14 areas that have changes in land use. The highest price increase was within a radius of 500 m - 750 m from the Bundaran HI Station of Rp.

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