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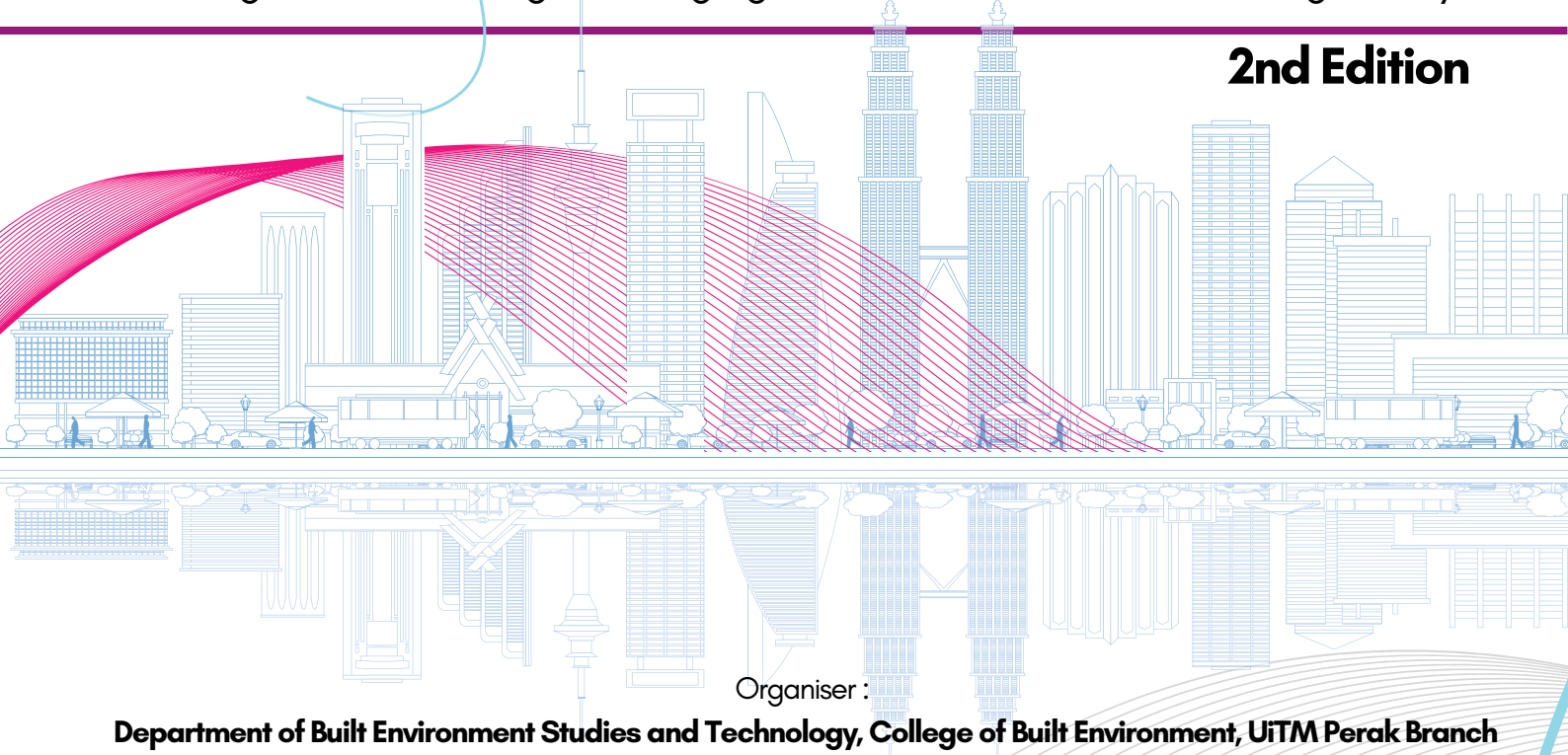
Cawangan Perak

e - Proceedings



Proceeding for International Undergraduates Get Together 2024 (IUGeT 2024)
"Undergraduates' Digital Engagement Towards Global Ingenuity"

2nd Edition



Organiser :

Department of Built Environment Studies and Technology, College of Built Environment, UiTM Perak Branch

Co-organiser :

INSPIRED 2024. Office of Research, Industrial Linkages, Community & Alumni (PJIMA), UiTM Perak Branch

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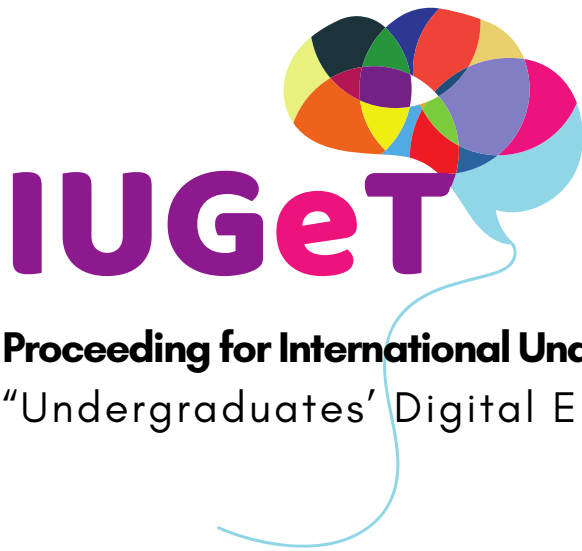
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GREENLEAF RESIDENCES (SMART AND SUSTAINABLE SINGLE-STOREY TERRACE HOUSE IN KAMPAR, PERAK)

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Abstract

Greenleaf Residences in Kampar, Perak is a new residential development that integrates smart and sustainable technologies in residential development. Its development combines cutting-edge technologies with sustainable practices to create eco-friendly, energy-efficient, and highly connected living spaces. These smart technologies require optimized resource consumption and sustainability is achieved through the use of renewable energy sources. This holistic approach not only minimizes the environmental footprint of the development, it also enhances the quality of life for the residents through increased comfort, safety, and convenience.

Keywords: *residential development, smart technologies, sustainability, eco-friendly, and environmental*

1. INTRODUCTION

Greenleaf Residences, located in Kampar, Perak is a smart and sustainable single-storey terrace house project. It is equipped with a few technologies that can help to reduce energy consumption and improve renewable energy sources such as solar panels, LED lights and rainwater harvesting tanks. These technologies are important in this residential development as they can help to improve the environment to make the residential area eco-friendly and reduce any waste of energy. Problems such as high energy consumption, resource inefficiency, environmental impact, and residence well-being often happen in residential developments. It will affect the condition of living spaces, residences, and also the environment. Therefore, the development of Greenleaf Residences in Kampar can help to reduce the problems by utilising smart technologies to sustain the environment.

The project uses a strategy that covers the use of water-saving technology, energy-efficient systems, and sustainable materials. The key features of this development include rainwater harvesting tanks to collect and reuse rainwater, solar panels to serve as an electricity source, and LED lighting to help reduce electricity waste. The use of these technologies has led to notable decreases in both energy usage and waste production. The rainwater harvesting tank can reduce the water bills as the residents reuse the water again in their daily lives. LED lighting offers energy efficiency as it consumes significantly less energy compared to other lights. Moreover, solar panels can produce environmental benefits as generating electricity from solar power reduces greenhouse gas emissions and air pollution, contributing to a cleaner environment.

2. MATERIALS AND METHODS

2.1 SITE ANALYSIS

i. Site description

The proposed development is located at Lot PT 18682, Kampar, Perak. The total area of the lot is 25 acres, but we will use only 10 acres for our development. The lot is close to many facilities and amenities, and it is also near the city center of Kampar. The zoning for the lot is residential.

ii. Topography

Topography refers to the physical features of the land's surface and provides a description of the land. The chosen terrain for our project is flat, with numerous bushes and trees, as shown in figure 2.1. According to the inspection, the land has an "L" shape.



Figure 2.1 shows the proposed land

2.2 MARKET ANALYSIS

Property Type		Kinta	Perak Tengah	Manjung	Larut Matang	Selama	Kerian	Kuala Kangsar	Hulu Perak	Hilir Perak	Batang Padang	Kampar	Muallim	Bagan Datuk	Total
Vacant Plt	Q1 2023	44.03	1.43	7.99	17.17	0.46	1.38	4.36	1.03	4.95	2.72	6.66	0.61	0.35	93.14
	Q4 2023	68.39	1.80	9.87	16.47	0.91	1.96	3.37	0.85	3.78	4.82	9.93	33.76	0.56	156.46
	Q1 2024 ^P	143.53	1.41	7.67	19.51	1.38	0.69	14.20	1.28	5.34	2.17	2.11	2.18	0.34	201.79
Single Storey Terrace		203.80	16.72	64.84	36.76	0.32	21.99	16.02	4.22	35.54	28.10	31.17	9.49	1.75	470.71
		239.14	54.35	105.77	59.66	0.63	29.78	22.67	11.51	29.35	54.18	18.05	10.49	3.50	639.06
		202.23	36.81	82.84	44.84	0.89	11.64	18.68	6.48	36.81	73.15	25.29	11.07	3.45	554.17

Figure 2.2.1 shows the residential property transaction in Kampar

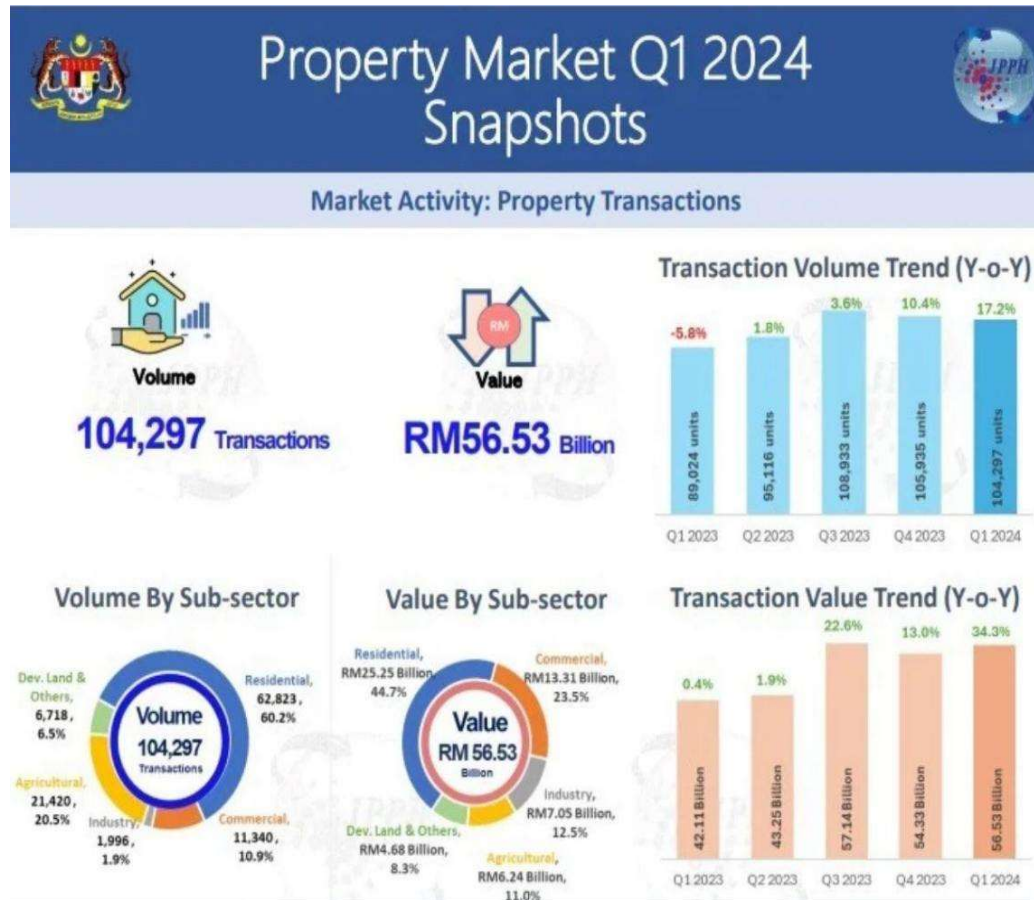


Figure 2.2.2 shows the property transactions

2.3 DESIGN ANALYSIS

Greenleaf Residence is a single-storey terrace house equipped with a range of smart and sustainable technologies. The development includes key features designed to promote smart and sustainable living. These elements will enhance the overall sustainability of the residence, improve the environment, and elevate living conditions.

a. Rainwater harvesting tank

One of the key elements of Greenleaf Residence's smart and sustainable technologies is the rainwater harvesting tank. This system collects and stores rainwater from rooftops and other surfaces for non-potable uses such as irrigation, toilet flushing, and laundry. By conserving water, reducing reliance on municipal supplies, and mitigating stormwater runoff, the rainwater harvesting system contributes to improved water management and overall sustainability.

b. LED lighting

Greenleaf Residence also incorporates LED lighting to enhance its smart and sustainable features. LED (Light Emitting Diode) lighting is highly energy-efficient and durable. LEDs consume less electricity, have a longer lifespan, and emit minimal heat compared to traditional lighting options. Their widespread use in residential developments results in lower energy consumption, reduced maintenance costs, and a decreased environmental impact due to lower carbon emissions and less waste.

c. Solar panel

Lastly, Greenleaf Residence incorporates solar panels as a key element of its smart and sustainable design. Solar panels convert sunlight into electricity, offering a renewable and clean energy source for the home. By harnessing solar energy, households can reduce or eliminate their dependence on non-renewable energy sources, leading to significant cost savings on electricity bills, reduced greenhouse gas emissions, and greater energy independence. Additionally, solar panels require minimal maintenance and greatly contribute to the environmental sustainability of the development.



Figure 2.3.1 shows the layout plan of the single-storey terrace house



Figure 2.3.2 shows the 3D proposed single-storey terrace house

3. RESULTS AND DISCUSSION

Address	PT 18682	Lawan Kuda, Gopeng, Kampar Perak	Jalan Duku, Taman Gopeng	Kota Bahru, Gopeng
Date of transaction		26/6/2024	19/6/2024	15/5/2024
Land area (acre)	10	14	17.43	1.05
Tenure	Leasehold	Leasehold	Freehold	Freehold
Transacted price		RM4,500,000.00	RM7,593,077.00	RM320,000.00
Analysis per sqft		RM7.40	RM10.00	RM7.00
ADJUSTMENT				
Location		5%	5%	0%
Date of transaction		0%	0%	5%
Land area (acre)		-5%	-7%	20%
Tenure		0%	5%	5%
TOTAL ADJUSTMENT		0%	3%	30%
Analysis per sqft		RM7.40	RM10.30	RM9.10
Transacted price		RM4,500,000.00	RM7,820,869.31	RM416,000.00
Land value of subject property				
	435600 sqft	x	RM7.40	
Land value		=	RM3,223,440.00	

Figure 3.2 shows the Gross Development Value (GDV)

GROSS DEVELOPMENT VALUE								
1-storey terraced house	Number of units	Total of Non-Bumi	Total of Bumi	Built up area	Land size	Selling price for non-bumi (RM)	Selling price for bumi (RM) (Discount)	Total (RM)
a) Intermediate lot	97	68	29	22' x 70'	22' x 90'	RM320,000.00	RM304,000.00	RM30,576,000.00
b) Corner lot	23	16	7	25' x 70'	25' x 90'	RM355,000.00	RM337,250.00	RM8,040,750.00
							TOTAL GDV	RM38,616,750.00

NO.	ITEMS	QUANTITY	UNITS	COST PER UNIT (RM)	DEVELOPMENT COST (RM)	TOTAL DEVELOPMENT COST (RM)
1	Site preliminaries	10	acre	RM10,000.00		RM100,000.00
2	Site preparation	10	acre	RM20,000.00		RM200,000.00
3	Survey and subdivision					
	Submission fee for subdivision	120	per unit	RM50.00	RM6,000.00	
	Survey of individual plots	120	per unit	RM250.00	RM30,000.00	RM36,000.00
4	Contribution to authorities	1.50%	of GDV	RM38,616,750.00		RM579,251.25
5	Infrastructure cost					
	Road and drain	120	per unit	RM2,500.00	RM300,000.00	
	Sewerage	120	per unit	RM1,300.00	RM156,000.00	
	TNB substation	1	per unit	RM155,000.00	RM155,000.00	
	Electricity	120	per unit	RM2,000.00	RM240,000.00	
	Telecommunication	120	per unit	RM2,000.00	RM240,000.00	
	Water	120	per unit	RM1,500.00	RM180,000.00	
	Rainwater harvesting tank	120	per unit	RM10,000.00	RM1,200,000.00	
	Solar panel	840	per unit	RM16,000.00	RM13,440,000.00	
	LED lighting	600	per unit	RM63.00	RM41,400.00	
	Surau	lumpsum			RM20,000.00	
	Playground	lumpsum			RM30,000.00	RM16,002,400.00
6	Building cost					
	Intermediate lot	97	per unit	143	RM750.00	RM10,403,250.00
	Corner lot	23	per unit	163	RM850.00	RM3,186,650.00
7	Professional fees	2%	of IC & BC		RM29,592,300.00	RM531,846.00
8	Advertising & Marketing	2%	of GDV	RM38,616,750.00		RM772,335.00
9	Landscaping	120	per unit	RM1,500.00		RM180,000.00
10	Project management	24	per month		RM20,000.00	RM480,000.00
11	Finance Cost (STB)	7%	of site preparation, building cost & infrastructure cost	RM29,792,300.00	RM14,896,150.00	RM1,042,730.50
12	Contingency Cost	3%	of IC & BC	RM29,592,300.00		RM887,763.00
					TOTAL TDC	RM34,462,231.75

Figure 3.3 shows the Total Development Cost (TDC)

4. USING THE TEMPLATE FOR SEVERAL COMPONENTS

Profit = Gross Development Value (GDV) – Total Development Cost (TDC)

Where:

- Gross Development Value (GDV) is the total revenue expected from the sale of the developed property.
- Total Development Cost (TDC) includes all costs associated with the development, such as land acquisition, construction, financing, marketing, and other related expenses.

For a more detailed financial analysis, you might also want to calculate the profit margin and return on investment (ROI).

Profit Margin:

Profit Margin = (Profit / Gross Development Value) x 100%

Return on Investment:

Return on Investment = (Profit / Total Development Cost) x 100%

GDV						RM38,616,750.00
	TDC				RM34,462,231.75	
	LAND COST				RM3,223,440.00	
	ACQUISITION COST	5% of land cost		RM3,223,440.00	RM161,172.00	
	HOLDING COST	3% of land cost		RM3,223,440.00	RM96,703.20	
NEW TDC						RM30,980,916.55
DEVELOPER'S PROFIT						RM7,635,833.45
	PROFIT ON GDV %	Developer's profit		x 100%		RM7,635,833.45
		Gross Development Value				RM38,616,750.00
						19.77%
	PROFIT ON TDC %	Developer's profit		x 100%		RM7,635,833.45
		Total Development Cost				RM30,980,916.55
						24.65%

Figure 4.1 shows the profits of the development

5. CONCLUSION

The development of smart and sustainable residential housing marks a pivotal advancement in addressing the pressing challenges of urbanization, environmental sustainability, and quality of life. By integrating technologies such as rainwater harvesting systems, LED lighting, and solar panels, residential developments can significantly enhance resource efficiency, reduce operational costs, and minimize environmental impact.

Rainwater harvesting systems promote water conservation and effective stormwater management, easing the burden on municipal water supplies and contributing to more sustainable water use practices. LED lighting offers remarkable energy efficiency, durability, and environmental benefits, resulting in substantial reductions in energy consumption and carbon emissions. Solar panels provide a renewable energy source that decreases dependence on fossil fuels, lowers electricity bills, and fosters energy independence.

Together, these technologies create a holistic and integrated approach to residential development that not only meets the immediate needs of residents but also aligns with broader societal goals of sustainability and resilience. The adoption of smart and sustainable practices in housing developments is essential for mitigating the adverse effects of climate change, conserving natural resources, and enhancing the overall living experience.

6. ACKNOWLEDGMENT

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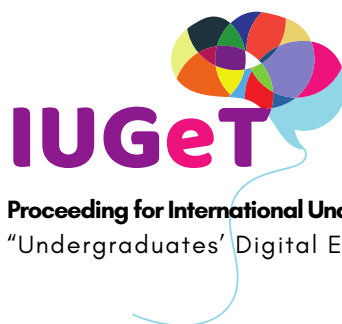
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7. REFERENCES

- Du, L., & Sun, L. (2018). "The role of green spaces in urban sustainable development." *Urban Forestry & Urban Greening*, 31, 20-27.
- Malaysia Green Building Confederation. (2021). Green Building Index. Retrieved from <https://www.greenbuildingindex.org>



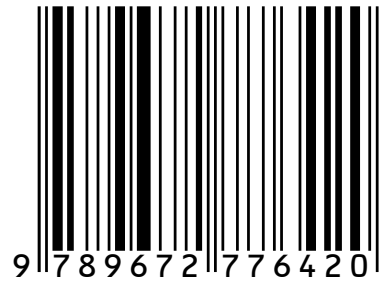
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