REAL ESTATE DEVELOPMENT VALUATION AND APPRAISAL: A BASIC UNDERSTANDING

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ABSTRACT

This working paper explains the basic application of the residual value approach in valuing and appraising a real estate development project. The Residual Method of Valuation is one of the valuation methodologies which use the income approach in valuing and appraising the market value of a development land. Besides that, this method also uses in determining the profitability and viability ratios of a real estate development project. Generally, there are two main components of this method known as the Gross Development Value (GDV) and Development Cost (DC). GDV refers to the total of the selling price of development units that could be constructed while DC comprises the costs required in a real estate development project. For valuation purposes, the additional valuation components required are the developer's profit, residue value (also known as Net Development Value or Future Site Value), and an acquisition cost which covers the stamp duty, legal fee, and estate agent fee. In the appraising exercise to determine the profitability and viability ratios of a real estate development project, the component of land cost (including land acquisition cost) to estimate the profit that could be generated from a proposed real estate development project. From this method, there are two approaches used either to calculate the market value of development land or estimate the profitability and viability ratios known as conventional and cash flow approaches. This paper also describes the simple valuation and appraisal models in determining the market value and the profitability of a real estate development project. To ensure this paper can be easily understood, the writers made a study through secondary resources such as the research papers and journals published by previous researchers and writers. At the end of this paper, the writers have established a simple valuation and appraisal models which use both conventional and cash flow approaches.

Keywords: *Real Estate Development Project, Real Estate Valuation & Appraisal and Residual Value Method of Valuation*

1. INTRODUCTION

The development process is a medium used by the government to develop an area or a settlement. Real estate development is one of the components of real estate investment. Based on the economic sector pyramid, the real estate development (or known as construction industry) sector is ranked at the second level of the three main economic sectors. Real estate development provides the platform and facilities for the purpose of another economic sector to operate. Real estate development also refers to a form of physical development which changes the land use and pattern. In the process of development, there are many requirements and terms which were provided by the authorities where the local authorities (also known as the local government) such as city hall, city council, municipal council, and district council implemented their main functions in the approval process. Some statutes and regulations purposely ensured that the development process is in line with such regulations. For instance, the regulations relating to the development process in the Malaysian context are National Land Code 1965, Town and Country Planning Act 1976, Road, Drainage and Building Act 1974, Uniform Building By-Laws 1984, Local Government Act 1976, and many more. While the interested parties involving the development process are the landowners, investors, professional consultants, banks and financial institutions, authorities, and others. Property valuers is one of the professional consultants also involved in real estate development. The valuers play their functions to provide and to assists the landowners or investors in the decision-making process and to prepare the report and valuation for the purpose to acquire loan facilities from the banks or financial institutions. The valuers' participation in the real estate development covers on the real estate development valuation and appraisal with taking appropriate valuation approaches and methodologies to determine the estimated market value of the property and analyzing the profitability and viability of a purpose land development project.

2. INTERPRETATIONS

2.1 Definition of the Real Estate Development Valuation

In general, a development valuation is a valuation approach used in determining the market value of development land. The suitable valuation methodology in valuing the development land is the Residual Method of Valuation where this method comprises of two approaches namely the conventional or traditional approach and cash flow approach. The principle of Residual Method of Valuation is based on the concept where the market value of development land is depending on the development potential itself. By using the Residual Method of Valuation, the development potential of land could be shown by the residue value between the Gross Development Value (GDV) and the Development Cost (DC). Usually, the Residual Method of Valuation is used to determine the value of land which having development or redevelopment potential based on the "Highest and Best Use" principles. This method is also the most suitable method in determining the value of development land which has been approved by the authority based on the submitted layout of a proposed development plan. The Residual Method of Valuation model is shown below:

Gross Development Value (GDV)	X
Less: Development Cost	x
Developer's Risk and Profit	xx
	XX
Net Development Value (NDV) or Residue Value	XXX
Multiply: Present Value@ i% for n years	XXXX
Current Site Value	XXXXX
Less: Acquisition Cost	x
Holding Cost	xx
	XXXXXX
MARKET VALUE	**XXXXXXX**

Figure 1 shows the main components used in the valuation process by using the Residual Method of Valuation:

MAIN COMPONENTS OF RESIDUAL METHOD		
	Gross Development Value	Total revenue from the selling of real estate development units such as residential, commercial, industrial and mixed units.
	Development Cost	Total development cost such as approval, construction, financial, fees, marketing, developer's profit and contigency.
	Discounting Factor	The use of Present Value RM1.00 factor to discount the future value in determining the current value.

Figure 1: The main components of Residual Method of Valuation Model

The market value of development land can be determined by estimating the expected total revenue (refers to GDV) from the units to be develop on the land, based on the proposed development plan approved by the local authority, deducting all development costs required (refers to DC) and developer's risk and profit. The result from this equation is known as NDV or Residue Value which will be discounted by the Present Value (or PV) of RM1.00 by taking into account the construction period and financing interest in order to determine the current site value.

2.2 Definition of Real Estate Development Appraisal

Real estate development appraisal is a financial appraisal approach that provides the developer to determine the profitability and viability of a proposed real estate development project. The purpose of development appraisal is to assist the investor/developer to identify the degree of profitability and viability of a proposed real estate development project by taking into account various obligation views which able to influence the trend and pattern of financial projection in that particular development appraisal. This approach is also used to determine the profitability ratio or percentages that can be achieved by the developer or investor in the real estate development project based on the simple calculation where the revenues deduct the cost resulting in either normal profit abnormal profit, or loss. The other purposes of development appraisal are as follow :

- To identify the flexibility process of the proposed development project comprising the construction costs, fees and revenues.
- To forecast the future situation by taking into consideration the inflation rate and growth that may influence the fluctuation of development cost.
- To specify the implementation development period.
- To detail the flow and projection of cost and revenue during the implementation of a development project.
- To determine the profitability and developer's risk can be achieved from development project and the factors that may influence it.
- To evaluate and analyse the profitability and viability that can be derived from the development project.

According to the Royal Institution of Chartered Surveyors (RICS), UK, development appraisal can be interpreted as an objective financial viability test of the ability of a development project to meet its costs including the cost of planning obligations, whilst ensuring an appropriate site value for the landowner and a market risk-adjusted return to the developer in delivering the project. To determine the profitability and viability index or ratio by using the development appraisal analysis, there are three main components to be considered namely GDV, DC (excluding the developer's risk and profit), Land Cost (also known as the Land Acquisition Cost), and Holding Cost. The differences between development valuation and development appraisal can be shown as follow:

Table 1: The differences between Development Valuation and Development Appraisal

Factors	Development Valuation	Development Appraisal
Developer's Profit and Risk	√	X
Land Cost	X	√
Holding Cost	√	√
Financing Cost	√	√

The land cost refers to the costs relating to the acquisition of land and land purchasing costs. Land purchasing can be in form of open market purchasing between seller and buyer, compulsory purchase through any land acquisition laws, land alienation according to the land law (payment of premium to the state authority) or inheritance of land. Market value is a basic use in the acquisition process of land while for the development acquired from the inheritance, the engagement of the valuer is required to determine the value of the land on the death date of the deceased person before inheriting the estate to the heirs.

The reason why the land acquisition is taken into account in the development appraisal process is, to determine the capital gain on land between before and after the land was developed. Land acquisition cost is comprising the land purchasing cost and additional costs required to acquire the land such as stamp duty, legal fee, estate agent fee, and others. While the holding cost refers to the annual expenditures to defence and upkeep the ownership of land such as assessment rate and quit rent during the construction period.

The appraisal model used in determining the expected profitability from the proposed development project is as follow:

Gross Development Value (GDV).....X
Less : Development Cost.....x
Land Cost (including land acquisition and holding costs).....xx.....XX

Developer's Risk and Profit.....XXX

The developer's risk and profit are in a form of financial return to the developer from the proposed development project. It can be determined or estimated in terms of monetary value e.g. RM and it can be shown in certain percentages by using a specified formula such as Return on Investment (ROI) and Return on Cost (ROC). In the development appraisal context, the Return on Investment is known as Profit on Gross Development Value, while the Return on Cost is known as Profit on Total Development Cost. The formula is as follow:

$$\text{Profit on GDV} = \frac{\text{Developer's risk and profit}}{\text{Gross Development Value}} \times 100$$

$$\text{Profit on TDC} = \frac{\text{Developer's risk and profit}}{\text{Total Development Cost}} \times 100$$

There are three important components used in the development appraisal such as GDV, TDC, and land cost. Both conventional and cash flow approaches can be used in determining analysis on the profitability and viability of the proposed development project.

3. MAIN COMPONENTS IN THE REAL ESTATE DEVELOPMENT VALUATION AND APPRAISAL MODEL

3.1 Gross Development Value

Gross Development Value (GDV) can be defined as a sum of revenue acquired from the development of land which is referred to as the development units or products constructed on the land. The Highest and Best Use is an important component to be considered in developing the land where it refers to the current land use, the possibility of changes in category of land use, current demand, supply factors and surrounding development. Secondly, the suitability of proposed development and marketing of development units. Thirdly, the detail of plans, specifications and others relating to the proposed development project. And finally, to study the development proposal in terms of expecting project completion, selling and tenancies rates, selling price and rental and other surrounding/adjacent development projects. In determining GDV, the valuers may use other valuation approaches and it depends on the type of development project to be constructed. The following examples show the valuation methodologies to be used in determining the GDV:

a) Comparison Method

By using the following model:

GDV	=	Price per Unit x Numbers of unit

Example 1: Determine the GDV of a proposed development project in an urbanization area. The information relating to the proposed development project was extracted from an approved development plan by the local authority:

Types of Development	Nos. of Unit	Price per Unit (RM)
Single Storey Low-Cost Terrace Houses	60	42,000.00
Single Storey Terrace Houses	80	180,000.00
Double Storey Terrace Houses	45	220,000.00
Double Storey Shop Offices	20	450,000.00

Valuation

Types of Development	Nos. of Unit	Price per Unit (RM)	Total (RM)
Single Storey Low-Cost Terrace Houses	60	42,000.00	2,520,000.00
Single Storey Terrace Houses	80	180,000.00	14,400,000.00
Double Storey Terrace Houses	45	220,000.00	9,900,000.00
Double Storey Shop Offices	20	450,000.00	9,000,000.00
		GDV	**35,820,000.00**

b) Investment Method

The following GDV is determined by using the Investment Method of Valuation where in this model, there are three main components required such as rental per square feet (psf) or per square metre (psm), net lettable area square feet (sf) or square metre (sm) and the All-Risks Yield:

Rental psf/psm……X
X Net Lettable Area (sf/sm)……..……....…...XX

Market Rental Value……...……XXX
X Year's Purchase……....……XXXX

Market Value/GDV……..…….....….XXXXX

Example 2: Determine the GDV of a proposed development project of a commercial complex located in a city centre. The land is a freehold interest and it's estimated that the total gross floor area is 100,000 square feet while its net lettable area is estimated at 85,000 square feet. Based on a market study made, the estimated market rental value of similar properties is RM5.00 psf per annum net and all risks yield is 8.5% per annum net.

Valuation

Rental psf pa	RM5.00
X Net Lettable Area (sf)	85,000
Market Rental Value pa net	RM425,000.00
X YP in-perp. @8.5%	11.7647
Market Value/GDV	**RM5,000,000.00**

c) **Profit Method**

The following shows formula of Profit Method to be used in determining the GDV :

Annual Gross Revenue	X
Less: Annual Operating Cost	XX
Divisible Balance	XXX
Less: Operator's Share	XXXX
Gross Annual Rental	XXXXX
Less: Outgoings	XXXXXX
Net Annual Rental	XXXXXXX
x YP	XXXXXXXX
Market Value/GDV	**XXXXXXXX**

Example 3: A piece of vacant development land has been proposed to develop a hotel which is located within a town area. The land is a 99-year leasehold having an unexpired term of 76 years. According to the market study and business plan made, the estimated average annual revenue and operating cost of similar hotel properties are as follow:

Estimated Average Revenue per annum

No.	Types of Room	Nos. of unit	Rate per day (RM)	Occupancy Rate (%)		
				2017	2018	2019
1.	Suite	10	450.00	80%	75%	65%
2.	Super Deluxe	60	250.00	75%	67%	60%
3.	Deluxe	110	180.00	75%	85%	75%
4.	Superior	150	120.00	86%	88%	84%

Letting Area

No.	Area/Space	Floor Area (mp)	Rental (RM)
1.	Night Club	200.00	30.00 sf per month
2.	Banquet Hall (annual average occupancy rate is 70%)	200.00	1,000.00 per day
3.	Gymnasium	70.00	15.00 sf per month
4.	Souvenir Shop	70.00	30.00 sf per month

Other Income

No.	Sources	Nos. of unit	Rate (RM)
1.	Parking Bays	200 unit	2,500.00 per month
2.	Food and Beverage	50% from the room rate	

Estimated Annual Operating Cost

No.	Expenditures	Total (RM)
1.	Salary, EPF and SOCSO	5,220,000.00
2.	Electricity and water	1,500,000.00
3.	Laundry and Linen	250,000.00
4.	Taxes	130,000.00
5.	Insurance	15,000.00
6.	Telephone and Internet	52,000.00
7.	Promotion and Marketing	220,000.00
8.	Audit and Administration	28,000.00
9.	Vehicles Maintenance	120,000.00
10.	Building and Machinery Maintenance Costs	1,500,000.00

Purchasing and Replacement

No.	Types	Total (RM)
1.	Furnitures and Fittings	55,000.00

Operator's Share and Profit

1. Working Capital is RM5,000,000.00.
2. Interest on Capital is 8% per annum.
3. Risks and Uncertainties is 20% from the divisible balance.
4. Operator's remuneration is 10% from the divisible balance.

All risks yield of the similar hotel properties is 12% per annum.

Valuation

Gross Revenue per annum

Rooms rate			
1 suite	: 10 unit x 450.00 per day x 365 days x 73%	= RM 1,204,500.00	
	: 60 unit x 250.00 per day x 365 days x 67%	= RM 3,686,500.00	
	: 110 unit x 180.00 per day x 365 days x 78%	= RM 5,661,150.00	
	150 unit x 120.00 per day x 365 days x 86%	= RM 5,650,200.00	RM 16,202,350.00
(+) Other Income	:		
1 Food and Beverage	: 50% RM 16,202,350.00	= RM 8,101,175.00	
2 Parking Bays	: RM 2,500.00 pm x 12 months	= RM 30,000.00	
3 Banquet Hall	: RM 1,000.00 pm x 365 days x 70%	= RM 255,500.00	RM 8,356,675.00
		Total Gross Revenue per anmum	**RM 24,589,025.00**
(-) Operating Cost per anmum			
1 Salary, EPF and SOCSO		RM 5,220,000.00	
2 Electrical and water		RM 1,500,000.00	
3 Laundry and Linen		RM 250,000.00	
4 Taxes		RM 130,000.00	
5 Insurance		RM 15,000.00	
6 Telephone and Internet		RM 52,000.00	
7 Promotion and Marketing		RM 220,000.00	
8 Audit and Administration		RM 28,000.00	
9 Vehicles Maintenance		RM 120,000.00	RM 7,535,000.00
Total Operating Cost			**RM 17,054,025.00**
(-) Purchasing and Replacement			
1 Furnitures and Fittings			RM 55,000.00
		Divisible Balance/Net Profit	**RM 16,999,025.00**
(-) Operator's share			
1 interest on Capital	: 8% x RM 5,000,000.00	= RM 400,000.00	
2 Risks and Uncertainties	20% x RM 17,054,025.00	= RM 3,410,805.00	
3 Operator's remuneration	10% x RM 17, 054,025.00	= RM 1,705,402.50	RM 5,516,207.50
		Total Gross Rental per anmum	**RM 11,482,817.50**
(+) Other rental income			
1 Night Club	: 200 sm x RM 30.00 psm pm x 12 months	= RM 72,000.00	
2 Gymnasium	: 70 sm x RM 15.00 psm psm x 12 months	= RM 12,600.00	
3 Souvenir Shop	: 70 sm x RM 30.00 psm psm x 12 months	= RM 25,200.00	RM109,800.00
		Total Gross Rental per anmum	**RM 11,592,617.50**
(-) Outgoings			
1 Building and Machinery Maintenance Costs:		RM 1,500,000.00	
2 Fire Insurance Premium	: 3% x RM 11,592,617.50	= RM 347,778.53	
3 Assessment Rate	: 5% x RM 11,592,617.50	= RM 579,630.88	
4 Quit Rent	: 5% x RM 11,592,617.50	= RM 579,630.88	
5 Management	: 2% x RM 11,592,617.50	= RM 231,852.35	RM 3,238,892.63
		Net Rental per anmum	**RM 8,353,724.88**
			0.998485571
X YP for 76 years @ 12%		Market Value/GDM	**RM 8,353,724.88**
		Say	**RM 8,341,000.00**

3.2 Development Cost

Development cost refers to the costs required in a real estate development project such as initial cost, construction cost, management, professional fees, marketing, financing, and contingency cost. The amount of development costs can be determined based on per unit rate or per square feet/metre (psf/psm). The following shows types of development costs required in a project:

Table 2: The Development Cost

Nos.	Development Cost	Types of Cost
a)	Pre-Construction Cost	Initial cost, contour, site clearing, earthwork, Environmental Impact Assessment (EIA) Report (only for a development land having an area of more than 50 acres) and Development Proposal Report submitted to the local authority.
b)	Construction Cost	Building construction cost.
c)	Surveying and Registration of Titles	Surveying cost pay to the Licensed Land Surveyor and amount to be paid to the Registration of Titles office for issuing individual titles.
d)	Infrastructure Cost	A sum of the cost required to build public infrastructure and facilities such as road, drainage and sewerage system, water piping system, communication and telecommunication lines, etc.
e)	Contribution to the Authorities	Refers to the infrastructures and facilities either to be reserved or constructed and these facilities will be surrendered to the appropriate authorities to manage such as TNB substation, sewerage treatment plant and etc.
f)	Professional Fees	The amount of professional fees paid to the professionals such as architect, quantity surveyor and engineers who are provide professional services such as preparation of plans, estimating cost and preparing Bill of Quantities and etc. All these fees are subjected to the provisions as stipulated in their legislations and professional bodies.
g)	Landscaping Cost	Refers to the cost required to provide landscaping plans by the Landscape Architecture.
h)	Legal and Promotion Fees	A sum cost to be paid to the solicitor who provides the sale and purchase agreement and the amount of professional fee paid to the estate agent who is marketed the development units.
i)	Financing Cost	Refers to the amount of financing interest paid to the bank and financial institutions who are provide financing facilities to the developer. The financing facilities provided are known as Bridging Finance. The amount of financing interest paid is subject to the construction method either Build then Sale (BTS) or Sale then Build (STB).
j)	Contingency Cost	A sum of the cost to be allocated as preparation in the event of increasing of existing cost, project delaying and etc.

3.2.1 Present Value Factor

The residue value is calculated by the differences figure between GDV and DC that produce the expected site value after the development project is completed. It is also known as Net Development Value (NDV). To determine the future site value at the current value, the Present Value (PV) factor is required in order to discount the NDV computed. The PV factor must consider two main components namely development period and financing interest. The formula of PV of RM1.00 is as follow:

$$\text{PV of RM1.00} = \frac{1}{(1 + i)^n}$$

Where,

i refers to the financing interest
n refers to the construction period

3.2.2 Total Development Cost

Total Development Cost (TDC) comprises three main costs required in a real estate development project. The costs are land cost, holding cost and development cost. The land costs include land purchasing and land acquisition costs, while the development cost is the total costs as stated in the previous topic. Holding cost refers to the quit rent and assessment rate. The summary of these costs is as follows:

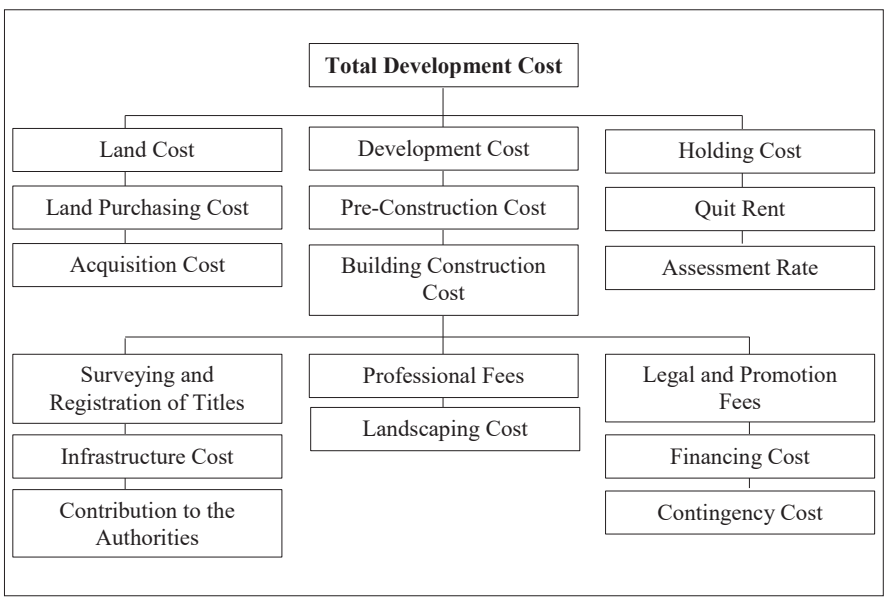

Figure 2: Summary of TDC

Example 4: Determining the Land Purchasing and Holding Costs based on the following data:

Cost	Types of Cost	Rate
Land Purchasing and Acquisition Cost	Stamp Duty	150,000.00
	Legal Fee	200,000.00
	Estate Agent Fee	130,000.00
Land Holding Cost	Quit Rent	150,000.00 per annum
	Assessment Rate	80,000.00 per annum

Site Valuation					
Gross Development Value				RM	35,820,000.00
Less: DC				RM	29,804,902.16
		Residue Value/Net Development Value		RM	6,015,097.84
X PV for	2 years @		8.75%		0.8456
			Current Site Value	RM	5,086,091.45
Less: Land Purchasing and Acquisition Cost					
1 Stamp Duty	:		RM 150,000.00		
2 Legal Fee	:		RM 200,000.00		
3 Estate Agent Fee	:		RM 130,000.00	RM	480,000.00
Less: Land Holding Cost					
1 Quit Rent	:	RM 150,000.00 pa. x 2 years =	RM 300,000.00		
2 Assessment Rate	:	RM 80,000.00 pa. x 2 years =	RM 160,000.00	RM	460,000.00
			Market Value	RM	4,146,091.45
			Say	**RM**	**4,146,000.00**

3.2.3 Developer's Profit and Risk

Developer's profit and risk is a part to be allocated and targeted by development as the profit and risk to be liable during the project construction. It is referring to the developer's right to acquired profit from the development project. Normally, the ideal portion of developers' profits is between 15% to 20% from the GDV. However, in determining the profit rate, an analysis is required to indicate whether a proposed development project will gain normal profit, abnormal profit or loss. This analysis can be calculated by using the Internal Rate of Return (IRR). IRR refers to a condition where the Net Present Value (NPV) is equal to zero. The NPV can determine through a result where the NPV deducts the TDC by using the cash flow approach.

3.3 Development Valuation

The following topics show the example of development valuation workings to determine the site value by using both conventional and cash flow approaches.

Example 5: You are required to value a piece of development land located in a town area by using the Conventional Residual Method of Valuation. Recently, the land had acquired development approval from the local authority for a mixed residential development project. The land area is 15 acres and ready to develop. The expected construction period is 2 years and the composition of development is as follow:

Nos.	Types of Units	Land Dimension	Selling Price (RM/unit)
a)	Single storey low-cost terrace houses	14' X 45'	RM42,000.00
b)	Double storey terrace houses	22' X 75'	RM180,000.00
c)	Single storey semi-detached houses	35' X 80'	RM300,000.00
d)	Single storey detached houses	40' X 85'	RM450,000.00
e)	Double storey shop offices	18' X 60'	RM350,000.00

The expected development cost as follow:

Nos.	Types of Cost	Cost (RM)
1.	Initial Cost	RM10,000.00 per acre
2.	Site Clearing	RM8,000.00 per acre
3.	Survey and Subdivision	RM350.00 per lot
4.	Registration of Land Titles	RM100.00 per lot
5.	Building Construction Cost	40% from GDV
6.	Infrastructure Cost	RM500.00 per unit
7.	Contribution to the Authorities	RM20,000.00
8.	Professional Fee	5% from building and infrastructure costs
9.	Landscaping	RM4,000.00 per acre
10.	Project Management	RM300,000.00 per month
11.	Marketing	1% from GDV
12.	Financing Interest	8.25% per annum
13.	Contingency Cost	10% from item 5-11
14.	Developer's Risk and Profit	20% from GDV

Approach 1: Conventional Residual Method of Valuation

Determine the lot size of development units

Land Area : 15 acres
Lot Size :
SSTLCT : 14 feet x 45 feet = 630 sf
DST : 22 feet x 75 feet = 1,650 sf
DSSD : 35 feet x 80 feet = 2,800 sf
SSD : 40 feet x 85 feet = 3,400 sf
DSSO : 18 feet x 60 feet = 1,080 sf

Determine the numbers of units to be developed

Land allocation for development

Building construction allocation @ 60% = 9 acres x 43,560 sf = 392,040 sf
Infrastructure (including the open space) @ 40% = 6 acres x 43,560 sf = 261,360 sf

Assuming the development portions:
Building construction = 392,040 sf

SSTLCT : 30% = $\frac{117{,}612 \text{ sf}}{630 \text{ sf}}$ = 190 units

DST : 30% = $\frac{117{,}612 \text{ sf}}{1{,}650 \text{ sf}}$ = 70 units

DSSD : 15% = $\frac{58{,}806 \text{ sf}}{2{,}800 \text{ sf}}$ = 20 units

SSD : 15% = $\frac{58{,}806 \text{ sf}}{3{,}400 \text{ sf}}$ = 20 units

DSSO : 10% = $\frac{39{,}204 \text{ sf}}{1{,}080 \text{ sf}}$ = 40 units

Total : 100% 340 units

Gross Development Value

1 SSTLCT	: 190 units x RM 42,000.00 per unit	= RM 7,980,000.00
2 DST		
Open	: 49 units x RM 180,000.00 per unit	= RM 8,820,000.00
Bumiputera	: 21 units x RM 171,000.00 per unit	= RM 3,591,000.00
3 DSSD		
Open	: 14 units x RM 300,000.00 per unit	= RM 4,200,000.00
Bumiputera	: 6 units x RM 285,000.00 per unit	= RM 1,710,000.00
4 SSD		
Open	: 14 units x RM 450,000.00 per unit	= RM 6,300,000.00
Bumiputera	: 6 units x RM 427,500.00 per unit	= RM 2,565,000.00
5 DSSO		
Open	: 28 units x RM 350,000.00 per unit	= RM 9,800,000.00
Bumiputera	: 12 unit x RM 332,500.00 per unit	= RM 3,990,000.00

Gross Development Value RM 48,956,000.00

Development Cost

1	Initial Cost	:	15 acres	X	RM	10,000.00	per acre			= RM	150,000.00
2	Site Clearing	:	15 acres	X	RM	8,000.00	per acre			= RM	120,000.00
3	Survey and Subdivision	:	340 lots	X	RM	350.00	per acre			= RM	119,000.00
4	Registration of Land Titles	:	340 lots	X	RM	100.00	per acre			= RM	34,000.00
5	Building Construction Cost										
	SSTLCT	:	190 units	X	RM	16,800.00	per unit	= RM	3,192,000.00		
	DST	:	70 units	X	RM	72,000.00	per unit	= RM	5,040,000.00		
	DSSD	:	20 units	X	RM	120,000.00	per unit	= RM	2,400,000.00		
	SSD	:	20 units	X	RM	180,000.00	per unit	= RM	3,600,000.00		
	DSSO	:	40 units	X	RM	140,000.00	per unit	= RM	5,600,000.00	= RM	19,832,000.00
6	Infrastructure Cost	:	340 units	X	RM	500.00	per unit			= RM	170,000.00
7	Contribution to the Authorities									= RM	20,000.00
8	Professional Fee	:	5%	X	RM	20,002,000.00				= RM	1,000,100.00
9	Landscaping	:	15 acres	X	RM	4,000.00	per acre			= RM	60,000.00
10	Project Management	:	24 months	X	RM	300,000.00	per month			= RM	7,200,000.00
11	Marketing	:	1%	X	RM	48,956,000.00				= RM	489,560.00
12	Financing Interest	:	8.25% pa.	X	RM	29,194,660.00		X	2 years	= RM	1,204,279.73
13	Contingency Cost	:	10%	X	RM	28,771,660.00				= RM	2,877,166.00
14	Developer's Risk and Profit	:	10%	X	RM	48,956,000.00				= RM	4,895,600.00
									Development Cost	= **RM**	**38,171,705.73**

Valuation

Gross Development Value			RM	48,956,000.00
Less : Development Cost			RM	38,171,705.73
Residue Value			RM	10,784,294.28
X Present Value of RM1.00 for		2 years @ 8.25%		0.8534
		Current Site Value	RM	9,203,137.70
Less : Land Acquisition Cost	:	5%	RM	460,156.88
		Market Value	RM	8,742,980.81
			Say RM	**8,743,000.00**

Approach 2: Payback Method

Gross Development Value	1 5%	2 10%	3 20%	4 25%	5 15%	6 10%	7 10%	8 5%
1 SSTLCT	399,000.00	798,000.00	1,596,000.00	1,995,000.00	1,197,000.00	798,000.00	798,000.00	399,000.00
2 DST								
2.1 Open	441,000.00	882,000.00	1,764,000.00	2,205,000.00	1,323,000.00	882,000.00	882,000.00	441,000.00
2.2 Bumiputera	179,550.00	359,100.00	718,200.00	897,750.00	538,650.00	359,100.00	359,100.00	179,550.00
3 DSSD								
3.1 Open	210,000.00	420,000.00	840,000.00	1,050,000.00	630,000.00	420,000.00	420,000.00	210,000.00
3.2 Bumiputera	85,500.00	171,000.00	342,000.00	427,500.00	256,500.00	171,000.00	171,000.00	85,500.00
4 SSD								
4.1 Open	315,000.00	630,000.00	1,260,000.00	1,575,000.00	945,000.00	630,000.00	630,000.00	315,000.00
4.2 Bumiputera	128,250.00	256,500.00	513,000.00	641,250.00	384,750.00	256,500.00	256,500.00	128,250.00
5 DSSO								
5.1 Open	490,000.00	980,000.00	1,960,000.00	2,450,000.00	1,470,000.00	980,000.00	980,000.00	490,000.00
5.2 Bumiputera	199,500.00	399,000.00	798,000.00	997,500.00	598,500.00	399,000.00	399,000.00	199,500.00
Cash Inflow	**2,447,800.00**	**4,895,600.00**	**9,791,200.00**	**12,239,000.00**	**7,343,400.00**	**4,895,600.00**	**4,895,600.00**	**2,447,800.00**
Less : Development Cost								
1 Initial Cost	75,000.00	75,000.00						
2 Site Clearing	48,000.00	72,000.00						
3 Survey and Subdivision		119,000.00						
4 Registration of Land Titles			34,000.00					
5 Building Construction Cost	1,983,200.00	1,983,200.00	2,974,800.00	1,983,200.00	1,983,200.00	1,983,200.00	2,974,800.00	3,966,400.00
6 Infrastructure Cost			34,000.00	42,500.00	51,000.00	17,000.00	17,000.00	8,500.00
7 Contribution to the Authorities				5,000.00	10,000.00	5,000.00		
8 Professional Fee					400,040.00	300,030.00	300,030.00	
9 Landscaping					12,000.00	18,000.00	18,000.00	12,000.00
10 Project Management	720,000.00	720,000.00	720,000.00	720,000.00	720,000.00	1,080,000.00	1,080,000.00	1,440,000.00
11 Marketing	48,956.00	48,956.00	48,956.00	48,956.00	48,956.00	73,434.00	73,434.00	97,912.00
12 Contingency Cost	287,716.60	287,716.60	287,716.60	287,716.60	287,716.60	431,574.90	431,574.90	575,433.20

Cash Outflow	**3,162,872.60**	**3,305,872.60**	**4,099,472.60**	**3,087,372.60**	**3,512,912.60**	**3,908,238.90**	**4,894,838.90**	**6,100,245.20**
Net Cash Flow	**(715,072.60)**	**1,589,727.40**	**5,691,727.40**	**9,151,627.40**	**3,830,487.40**	**987,361.10**	**761.10**	**(3,652,445.20)**
X Interest @ 1.00%	(7,120.98)	(7,191.90)	8,567.63	65,333.48	157,119.72	196,829.93	208,622.59	210,707.71
Cummulative Capital Outstanding	**(722,193.58)**	**860,341.92**	**6,560,636.95**	**15,777,597.84**	**19,765,204.96**	**20,949,395.99**	**21,158,779.68**	**17,717,042.19**

Less : Developer's Profit and Risk	4,895,600.00
Residue Value	12,821,442.19
X PV RM1.00 @ 1.00%	0.9238
Current Site Value	11,844,288.40
Less: Land Acquisition Cost @ 5%	592,214.42
Market Value	11,252,073.98
Say	**11,252,000.00**

Determine the interest rate per quarter

Interest Rate = (1 + i)^ n = (1 + i)
= (1 + i)^ 8 = (1 + 0.0825)
= (1 + i) = 1.0825 ^ (1 / 8)
= (1 + i) = 1.0825 ^ 0.125
= (1 + i) = 1.0100
i = 1.0100 - 1
i = 0.0100 @ 1.00%

Approach 3: Net Terminal Value Method

Gross Development Value	1 5%	2 10%	3 20%	4 25%	5 15%	6 10%	7 10%	8 5%
1 SSTLCT	399,000.00	798,000.00	1,596,000.00	1,995,000.00	1,197,000.00	798,000.00	798,000.00	399,000.00
2 DST								
2.1 Open	441,000.00	882,000.00	1,764,000.00	2,205,000.00	1,323,000.00	882,000.00	882,000.00	441,000.00
2.2 Bumiputera	179,550.00	359,100.00	718,200.00	897,750.00	538,650.00	359,100.00	359,100.00	179,550.00
3 DSSD								
3.1 Open	210,000.00	420,000.00	840,000.00	1,050,000.00	630,000.00	420,000.00	420,000.00	210,000.00
3.2 Bumiputera	85,500.00	171,000.00	342,000.00	427,500.00	256,500.00	171,000.00	171,000.00	85,500.00
4 SSD								
4.1 Open	315,000.00	630,000.00	1,260,000.00	1,575,000.00	945,000.00	630,000.00	630,000.00	315,000.00
4.2 Bumiputera	128,250.00	256,500.00	513,000.00	641,250.00	384,750.00	256,500.00	256,500.00	128,250.00
5 DSSO								
5.1 Open	490,000.00	980,000.00	1,960,000.00	2,450,000.00	1,470,000.00	980,000.00	980,000.00	490,000.00
5.2 Bumiputera	199,500.00	399,000.00	798,000.00	997,500.00	598,500.00	399,000.00	399,000.00	199,500.00
Cash Inflow	**2,447,800.00**	**4,895,600.00**	**9,791,200.00**	**12,239,000.00**	**7,343,400.00**	**4,895,600.00**	**4,895,600.00**	**2,447,800.00**
Less : Development Cost								
1 Initial Cost	75,000.00	75,000.00						
2 Site Clearing	48,000.00	72,000.00						
3 Survey and Subdivision		119,000.00						
4 Registration of Land Titles			34,000.00					
5 Building Construction Cost	1,983,200.00	1,983,200.00	2,974,800.00	1,983,200.00	1,983,200.00	1,983,200.00	2,974,800.00	3,966,400.00
6 Infrastructure Cost			34,000.00	42,500.00	51,000.00	17,000.00	17,000.00	8,500.00
7 Contribution to the Authorities				5,000.00	10,000.00	5,000.00		
8 Professional Fee					400,040.00	300,030.00	300,030.00	
9 Landscaping					12,000.00	18,000.00	18,000.00	12,000.00
10 Project Management	720,000.00	720,000.00	720,000.00	720,000.00	720,000.00	1,080,000.00	1,080,000.00	1,440,000.00
11 Marketing	48,956.00	48,956.00	48,956.00	48,956.00	48,956.00	73,434.00	73,434.00	97,912.00
12 Contingency Cost	287,716.60	287,716.60	287,716.60	287,716.60	287,716.60	431,574.90	431,574.90	575,433.20

Cash Outflow	**3,162,872.60**	**3,305,872.60**	**4,099,472.60**	**3,087,372.60**	**3,512,912.60**	**3,908,238.90**	**4,894,838.90**	**6,100,245.20**
Net Cash Flow	**(715,072.60)**	**1,589,727.40**	**5,691,727.40**	**9,151,627.40**	**3,830,487.40**	**987,361.10**	**761.10**	**(3,652,445.20)**
X Amount of RM 1 @ 1.00%	1.0718	1.0613	1.0508	1.0404	1.0302	1.0200	1.0100	1.0000
Net Outlay	**(766,433.63)**	**1,687,110.73**	**5,980,831.02**	**9,521,651.51**	**3,946,067.43**	**1,007,124.10**	**768.68**	**(3,652,445.20)**
Cummulative	**(766,433.63)**	**920,677.10**	**6,901,508.12**	**16,423,159.64**	**20,369,227.07**	**21,376,351.17**	**21,377,119.85**	**17,724,674.65**

Less : Developer's Profit and Risk	4,895,600.00
Residue Value	12,829,074.65
X PV RM1.00 @ 1.00%	1.0000
Current Site Value	12,829,074.65
Less: Land Acquisition Cost @ 5%	641,453.73
Market Value	12,187,620.92
Say	**12,188,000.00**

Determine the interest rate per quarter

Interest Rate = (1 + i)^ n = (1 + i)
= (1 + i)^ 8 = (1 + 0.0825)
= (1 + i) = 1.0825 ^ (1 / 8)
= (1 + i) = 1.0825 ^ 0.125
= (1 + i) = 1.0100
i = 1.0100 - 1
i = 0.0100 @ 1.00%

3.4 Development Appraisal

To determine the profitability and viability ratios of a proposed real estate development appraisal, two approaches can be applied namely conventional Residual Method of Appraisal and cash flow approaches. By using these approaches, both analyses will produce a result to assist the investor or developer in the decision-making process for the proposed real-estate development project. The developer's profit and risk can be derived from the differences between GDV and TDC. Therefore, from the developer's profit and risk, the valuer will determine both profitability and viability index by using the formulas as given before. The profitability index is a ratio between the developer's profit and risk and GDV (known as the Profit on GDV) and between the developer's profit and risk and TDC (known as the Profit on TDC). Both analyses show the minimum and maximum of the profitability ratio can be derived from the project. The result from the profitability index will be compared with indicators (also indicate as the viability index) such as rate of return, development yield (or known as the IRR), financing interest rate and etc. Basically, the investor or developer may use an IRR analysis as a common indicator to compare the expected profitability index and the development yield. As discussed before, the development yield or IRR can provide a platform to assist the investor or developer to indicate the IRR is at a minimum profit which is the developer only gains capital invested after the project is completed with the assumption that, all units are sold.

Example 6: You are required to determine the profitability and viability ratios on a piece of development to develop a commercial complex in a town centre. The land is a freehold interest and has the land area at 1 acre 3 rod and 02 poles. The plot ratio and plinth area gazetted by the local authority is 1:5 and 50% respectively, while the estimated net lettable area is 80% from the total gross floor area. According to the market study, the expected market rental value of similar properties is RM30.00 psf per annum net, the occupancy rate is 75% and the all-risks yield is 9% per annum net. The development cost (excluding the developer's profit and risk) is as follows:

Nos.	Types of Cost	Amount
1.	Initial Cost	RM5,000.00 per acre
2.	Site Clearing and Preparation	RM5,000.00 per acre
3.	Building Construction Cost	40% from GDV
4.	Infrastructure Cost	RM30,000.00
5.	Contribution to the Authorities	RM20,000.00
6.	Professional Fees	5% from building construction cost, infrastructure cost and contribution to the authorities
7.	Landscaping	RM10,000.00
8.	Project Management	RM50,000.00 per month
9.	Marketing	1.5% from GDV

Nos.	Types of Cost	Amount
10.	Financing Cost	8.25% from item (1) to (8) BTS.
12.	Project duration	18 months

The land acquisition and holding costs are as follow:

No.	Types of Cost	Amount (RM)
1.	Land Purchasing Cost	RM8,000,000 per acre
2.	Land Acquisition Cost	
	2.1 Stamp Duty	Refers to the item 32(a), First Schedule, Stamp Act 1949
	2.2 Legal Fee	Refers to the Solicitor's Remuneration Order (Amendment) 2017
3.	Land Holding Cost	
	3.1 Quit Rent	RM2.80 psm
	3.2 Assessment Rate	11% on the Annual Value.

Based on the information provided, determine:

a) The profitability index by using the Conventional Residual Method, Payback and Net Present Value approaches, and
b) The viability index by using the Internal Rate of Return approach.

Valuation

Determine the profitability index of proposed real estate development project:

Convert to acre

Land Area = 1 acre + 3 rod + 2 pole
= 1 acre + 3/4 acre + 2 / 160 acre
= 1 acre + 0.75 acre + 0.0125 acre

Total Gross Floor Area

Land Area (sf) = 1.7625 acres x 43,560 sf
= 76,775 sf

Plot Ratio = 1: 5 Land Area = 1
Gross Floor Area = 5

= Land Area : 1x 76,775= 76,775 sf
Gross Floor Area : 5x 76,775= 383,873 sf

= **383,873 sf**

Plinth Area = % x Land Area
= 50% x 76,775 sf
= 38,387 sf

Nos. of bldg storey = $\frac{\text{Gross Floor Area}}{\text{Plinth Area}}$

= $\frac{383,873 \text{ sf}}{38,387 \text{ sf}}$

= 10 storey

Net Floor Area

Net Floor Area = 80% x Gross Floor Area
= 80% x 383,873 sf
= **307,098 sf**

$$\text{Floor Area each} = \frac{\text{Net Floor Area}}{\text{Nos of bldg storey}}$$

$$= \frac{307{,}098 \text{ sf}}{10 \text{ sf}}$$

= **30,710 sf**

Gross Development Value

Ground Floor	: RM 30.00 psf pa X 30,710 sf = RM	921,294.00	per annum
Level 1 (-20%)	: RM 24.00 psf pa X 30,710 sf = RM	737,035.20	per annum
Level 2 (-30%)	: RM 21.00 psf pa X 30,710 sf = RM	644,905.80	per annum
Level 3 (-40%)	: RM 18.00 psf pa X 30,710 sf = RM	552,776.40	per annum
Level 4 (-50%)	: RM 15.00 psf pa X 30,710 sf = RM	460,647.00	per annum
Level 5 (-50%)	: RM 15.00 psf pa X 30,710 sf = RM	460,647.00	per annum
Level 6 (-50%)	: RM 15.00 psf pa X 30,710 sf = RM	460,647.00	per annum
Level 7 (-60%)	: RM 12.00 psf pa X 30,710 sf = RM	368,517.60	per annum
Level 8 (-60%)	: RM 12.00 psf pa X 30,710 sf = RM	368,517.60	per annum
Level 9 (-60%)	: RM 12.00 psf pa X 30,710 sf = RM	368,517.60	per annum
Total Rental Value		RM 5,343,505.20	per annum
Less : Outgoings @ 25%		RM 1,335,876.30	per annum
Net Rental Value		RM 4,007,628.90	per annum
X Occupancy Rate @ 75%		0.75	
Adjusted Rental		RM 4,007,628.90	
X YP in-perp. @ 9%		11.1111	
		RM 44,529,210.00	
	Gross Development Value	**RM 44,529,000.00**	

Land Cost and Holding Cost

Land Purchasing Cost : 1.7625 acres X RM 8,000.000.00 per acre =						RM 14,100,000.00
Plus :						
Land Acquisition Cost						
1 Stamp Duty	: 1%	X RM	100,000.00 =	RM 1,000.00		
	: 2%	X RM	400,000.00 =	RM 8,000.00		
	: 3%	X RM	1,500,000.00 =	RM 45,000.00		
	: 4%	X RM	12,100,000.00 =	RM484,000.00	RM	538,000.00
2 Legal Fee	: 1.0%	X RM	500,000.00 =	RM 5,000.00		
	: 0.8%	X RM	500,000.00 =	RM 4,000.00		
	: 0.7%	X RM	2,000,000.00 =	RM 14,000.00		
	: 0.6%	X RM	2,000,000.00 =	RM 12,000.00		
	: 0.5%	X RM	9,100,000.00 =	RM 45,500.00	RM	80,500.00
Land Holding Cost	:					
1 Quit Rent	: 7,132.58 sm	X RM	2.80 =	RM 19,971.24		
2 Assessment Rate	: 11%	X RM	1,621,500.00 =	RM 535,095.00	RM	555,066.24
						RM 15,273,566.24

Development Cost,

1 Initial Cost	: 1.7625 acres	x RM 5.000.00 per acre		= RM	8,812.50
2 Site Clearing and Preparation	: 1.7625 acres	x RM 5.000.00 per acre		= RM	8,812.50
3 Building Construction Cost	: 40%	x RM 44,529,000.00		= RM	17,811.600.00
4 Infrastructure Cost	:			= RM	39,000.00
5 Contribution to the Authorities	:			= RM	20,000.00
6 Professional Fees	: 5%	x	RM 17,861,600.00	= RM	17,811.600.00
7 Landscaping	:			= RM	10,000.00
8 Project Management	: 18months	x	RM 50.000,00 per month	= RM	900,000.00
9 Marketing	: 1.5%	x	RM 48,956,000.00	= RM	734,340.00
10 Contigency Cost	: 10%	x	RM 2,587,420.00	= RM	258,742.00
			Development Cost	**=**	**RM 20,675,387.00**

Approach 1: Conventional Residual Method

Development Apprrisal				
Gross Development Value			RM	44,529,000.00
Less:				
Development Cost	RM	20,675,387.00		
Land Purchasing Cost	RM	14,100,000.00		
Land Acquisition Cost	RM	618,500.00		
Holding Cost	RM	555,066.24	RM	35,948,953.24
Developer's Profit and Risk			**RM**	**8,550,046.76**

Profitability Ratio

$$\text{Profit on GDV} = \frac{\text{Developer's Profit and Risk}}{\text{Gross Development Value}} \times 100$$

$$= \frac{\text{RM } 8,580,046.76}{\text{RM } 44,529,000.00} \times 100$$

$$= \mathbf{19.27\%}$$

$$\text{Profit on TDC} = \frac{\text{Developer's Profit and Risk}}{\text{Total Development Cost}} \times 100$$

$$= \frac{\text{RM } 8,580,046.76}{\text{RM } 35,948,953.24} \times 100$$

$$= \mathbf{23.87\%}$$

Investment Appraisal by using the Cash Flow Approaches

Determine the interest rate per quarter

Interest rate per quarter

$$\text{Interest Rate} = (1 + i)^{n} = (1 + i)$$
$$= (1 + i)^{6} = (1 + 0.0825)$$
$$= (1 + i) = 1.0825^{(1/6)}$$
$$= (1 + i) = 1.0825^{0.166667}$$
$$= (1 + i) = 1.0133$$
$$i = 1.0133 - 1$$
$$\mathbf{i = 0.0133 \quad @ 1.33\%}$$

b) Payback Method

	0	1	2	3	4	5	6	7	8	Exit Value
Gross Development Value										
1 Ground Floor								92,129.40	138,194.10	-
2 Level 1 (-20%)								73,703.52	110,555.28	-
3 Level 2 (-30%)								64,490.58	96,735.87	-
4 Level 3 (-40%)								55,277.64	82,916.46	-
5 Level 4 (-50%)								46,064.70	69,097.05	-
6 Level 5 (-50%)								46,064.70	69,097.05	-
7 Level 6 (-50%)								46,064.70	69,097.05	-
8 Level 7 (-60%)								36,851.76	55,277.64	-
9 Level 8 (-60%)								36,851.76	55,277.64	-
10 Level 9 (-60%)								36,851.76	55,277.64	-
Cash Inflow	-	-	-	-	-	-	-	**534,350.52**	**801,525.78**	**44,529,000.00**
Less : Development Cost										
1 Land Cost	15,273,566.24									
2 Initial Cost		4,406.25	4,406.25							
3 Site Clearing and Preparation		2,203.13	2,203.13	4,406.25						
4 Building Construction Cost		1,781,160.00	4,452,900.00	5,343,480.00	2,671,740.00	1,781,160.00	1,781,160.00			
5 Infrastructure Cost		3,000.00	7,500.00	9,000.00	4,500.00	3,000.00	3,000.00			
6 Contribution to the Authorities			5,000.00	10,000.00	4,000.00	1,000.00				
6 Professional Fees		89,308.00	223,270.00	267,924.00	133,962.00	89,308.00	89,308.00			
7 Landscaping			1,000.00	3,000.00	3,000.00	1,500.00	1,500.00			
8 Project Management		90,000.00	135,000.00	180,000.00	225,000.00	135,000.00	135,000.00			
9 Marketing		73,434.00	110,151.00	146,868.00	183,585.00	110,151.00	110,151.00			
10 Contigency Cost		38,811.30	38,811.30	51,748.40	51,748.40	38,811.30	38,811.30			
Less : Outgoings										
1 Internal Repairs								66,793.82	66,793.82	
2 External Repairs								66,793.82	66,793.82	
3 Insurance								40,076.29	40,076.29	
4 Management								26,717.53	26,717.53	
5 Quit Rent								66,793.82	66,793.82	
6 Assessment Rate								66,793.82	66,793.82	
Cash Outflow	**15,273,566.24**	**2,082,322.68**	**4,980,241.68**	**6,016,426.65**	**3,277,535.40**	**2,159,930.30**	**2,158,930.30**	**333,969.08**	**333,969.08**	-
Net Cash Flow	**(15,273,566.24)**	**(2,082,322.68)**	**(4,980,241.68)**	**(6,016,426.65)**	**(3,277,535.40)**	**(2,159,930.30)**	**(2,158,930.30)**	**200,381.45**	**467,556.71**	**44,529,000.00**
X Interest Rate @ 1.33%		(203,136.35)	(233,532.64)	(302,875.13)	(386,920.98)	(435,657.75)	(470,178.72)	(505,145.51)	(509,198.83)	-
Modal Terkumpul	**(15,273,566.24)**	**(17,559,025.26)**	**(22,772,799.57)**	**(29,092,101.35)**	**(32,756,557.73)**	**(35,352,145.78)**	**(37,981,254.79)**	**(38,286,018.85)**	**(38,327,660.98)**	**6,201,339.02**

Profitability Ratio

$$\text{Profit on GDV} = \frac{\text{Developer's Profit and Risk}}{\text{Gross Development Value}} \times 100$$

$$= \frac{\text{RM } 6{,}201{,}339.02}{\text{RM } 44{,}529{,}000.00} \times 100$$

$$= \mathbf{13.93\%}$$

$$\text{Profit on TDC} = \frac{\text{Developer's Profit and Risk}}{\text{Total Development Cost}} \times 100$$

$$\frac{\text{RM } 6{,}201{,}339.02}{\text{RM } 35{,}948{,}953.24} \times 100$$

$$= \mathbf{17.25\%}$$

Payback Period

$$\text{Payback Period} = \text{Period before break-even} + \frac{\text{Unrecovered Amount}}{\text{Cash Flow in Recovery Period}}$$

$$= \text{Period- } 7 + \frac{\text{RM } 38{,}286{,}018{,}85}{\text{RM}44{,}529{,}000.00}$$

$$= (7 + 0.86) \times 4$$

$$= 7.86 \times 4$$

$$= \mathbf{31.44 \text{ month}}$$

c) Net Present Value Method

	0	1	2	3	4	5	6	7	8	Exit Value
Gross Development Value										
1 Ground Floor								92,129.40	138,194.10	
2 Level 1 (-20%)								73,703.52	110,555.28	
3 Level 2 (-30%)								64,490.58	96,735.87	
4 Level 3 (-40%)								55,277.64	82,916.46	
5 Level 4 (-50%)								46,064.70	69,097.05	
6 Level 5 (-50%)								46,064.70	69,097.05	
7 Level 6 (-50%)								46,064.70	69,097.05	
8 Level 7 (-60%)								36,851.76	55,277.64	
9 Level 8 (-60%)								36,851.76	55,277.64	
10 Level 9 (-60%)								36,851.76	55,277.64	
Cash Inflow	-	-	-	-	-	-	-	**534,350.52**	**801,525.78**	**44,529,000.00**
Less : Development Cost										
1 Land Cost	15,273,566.24									
2 Initial Cost		4,406.25	4,406.25							
3 Site Clearing and Preparation		2,203.13	2,203.13	4,406.25						
4 Building Construction Cost		1,781,160.00	4,452,900.00	5,343,480.00	2,671,740.00	1,781,160.00	1,781,160.00			
5 Infrastructure Cost		3,000.00	7,500.00	9,000.00	4,500.00	3,000.00	3,000.00			
6 Contribution to the Authorities			5,000.00	10,000.00	4,000.00	1,000.00				
6 Professional Fees		89,308.00	223,270.00	267,924.00	133,962.00	89,308.00	89,308.00			
7 Landscaping			1,000.00	3,000.00	3,000.00	1,500.00	1,500.00			
8 Project Management		90,000.00	135,000.00	180,000.00	225,000.00	135,000.00	135,000.00			
9 Marketing		73,434.00	110,151.00	146,868.00	183,585.00	110,151.00	110,151.00			
10 Contigency Cost		38,811.30	38,811.30	51,748.40	51,748.40	38,811.30	38,811.30			
Less : Outgoings										
1 Internal Repairs								66,793.82	66,793.82	
2 External Repairs								66,793.82	66,793.82	
3 Insurance								40,076.29	40,076.29	
4 Management								26,717.53	26,717.53	
5 Quit Rent								66,793.82	66,793.82	
6 Assessment Rate								66,793.82	66,793.82	
Cash Outflow	**15,273,566.24**	**2,082,322.68**	**4,980,241.68**	**6,016,426.65**	**3,277,535.40**	**2,159,930.30**	**2,158,930.30**	**333,969.08**	**333,969.08**	-
Net Cash Flow	**(15,273,566.24)**	**(2,082,322.68)**	**(4,980,241.68)**	**(6,016,426.65)**	**(3,277,535.40)**	**(2,159,930.30)**	**(2,158,930.30)**	**200,381.45**	**467,556.71**	**44,529,000.00**
X PV of RM1 @ 1.33%	1.0000	0.9869	0.9739	0.9611	0.9485	0.9361	0.9238	0.9117	0.8997	0.8997
Discounted Cash Flow	**(15,273,566.24)**	**(2,054,991.57)**	**(4,850,365.32)**	**(5,782,620.26)**	**(3,108,819.12)**	**(2,021,854.11)**	**(1,994,392.89)**	**182,680.26**	**420,659.22**	**40,062,594.27**
									Net Present Value (NPV)	**5,579,324.24**

Profitability Ratio

$$\text{Profit on GDV} = \frac{\text{Developer's Profit and Risk}}{\text{Gross Development Value}} \times 100$$

$$= \frac{\text{RM } 5{,}579{,}324.24}{\text{RM } 44{,}529{,}000.00} \times 100$$

$$= \mathbf{12.53\%}$$

$$\text{Profit on TDC} = \frac{\text{Developer's Profit and Risk}}{\text{Total Development Cost}} \times 100$$

$$\frac{\text{RM } 5{,}579{,}324.24}{\text{RM } 35{,}948{,}953.24} \times 100$$

$$= \mathbf{15.52\%}$$

The viability index or development yield by using the Internal Rate of Return approach:

Gross Development Value										
1 Ground Floor								92,129.40	138,194.10	
2 Level 1 (-20%)								73,703.52	110,555.28	
3 Level 2 (-30%)								64,490.58	96,735.87	
4 Level 3 (-40%)								55,277.64	82,916.46	
5 Level 4 (-50%)								46,064.70	69,097.05	
6 Level 5 (-50%)								46,064.70	69,097.05	
7 Level 6 (-50%)								46,064.70	69,097.05	
8 Level 7 (-60%)								36,851.76	55,277.64	
9 Level 8 (-60%)								36,851.76	55,277.64	
10 Level 9 (-60%)								36,851.76	55,277.64	
Cash Inflow	-	-	-	-	-	-	-	**534,350.52**	**801,525.78**	**44,529,000.00**
Less : Development Cost										
1 Land Cost	15,273,566.24									
2 Initial Cost		4,406.25	4,406.25							
3 Site Clearing and Preparation		2,203.13	2,203.13	4,406.25						
4 Building Construction Cost		1,781,160.00	4,452,900.00	5,343,480.00	2,671,740.00	1,781,160.00	1,781,160.00			
5 Infrastructure Cost		3,000.00	7,500.00	9,000.00	4,500.00	3,000.00	3,000.00			
6 Contribution to the Authorities			5,000.00	10,000.00	4,000.00	1,000.00				
6 Professional Fees		89,308.00	223,270.00	267,924.00	133,962.00	89,308.00	89,308.00			
7 Landscaping			1,000.00	3,000.00	3,000.00	1,500.00	1,500.00			
8 Project Management		90,000.00	135,000.00	180,000.00	225,000.00	135,000.00	135,000.00			
9 Marketing		73,434.00	110,151.00	146,868.00	183,585.00	110,151.00	110,151.00			
10 Contigency Cost		38,811.30	38,811.30	51,748.40	51,748.40	38,811.30	38,811.30			
Less : Outgoings										
1 Internal Repairs								66,793.82	66,793.82	
2 External Repairs								66,793.82	66,793.82	
3 Insurance								40,076.29	40,076.29	
4 Management								26,717.53	26,717.53	
5 Quit Rent								66,793.82	66,793.82	
6 Assessment Rate								66,793.82	66,793.82	
Cash Outflow	**15,273,566.24**	**2,082,322.68**	**4,980,241.68**	**6,016,426.65**	**3,277,535.40**	**2,159,930.30**	**2,158,930.30**	**333,969.08**	**333,969.08**	-
Net Cash Flow	**(15,273,566.24)**	**(2,082,322.68)**	**(4,980,241.68)**	**(6,016,426.65)**	**(3,277,535.40)**	**(2,159,930.30)**	**(2,158,930.30)**	**200,381.45**	**467,556.71**	**44,529,000.00**
X PV of RM1 @ 3%	1.0000	0.9709	0.9426	0.9151	0.8885	0.8626	0.8375	0.8131	0.7894	0.7894
Discounted Cash Flow	**(15,273,566.24)**	**(2,021,672.50)**	**(4,694,355.43)**	**(5,505,882.67)**	**(2,912,047.75)**	**(1,863,174.85)**	**(1,808,070.14)**	**162,928.45**	**369,093.58**	**35,151,603.79**
									NPV R1	**1,604,856.25**
X PV of RM1 @ 4%	1.0000	0.9615	0.9246	0.8890	0.8548	0.8219	0.7903	0.7599	0.7307	0.7307
Discounted Cash Flow	**(15,273,566.24)**	**(2,002,233.34)**	**(4,604,513.38)**	**(5,348,581.38)**	**(2,801,651.00)**	**(1,775,305.26)**	**(1,706,233.98)**	**152,273.43**	**341,639.10**	**32,536,904.14**
									NPV R2	**(481,267.91)**

$$IRR = R1 + (R2 - R1) \times \frac{NPVR1}{NPVR1 + NPVR2}$$

$$= 3 + (4 - 3) \times \frac{1,604,856.25}{1,604,856.25 + 481,267.91}$$

$$= 3 + \frac{1,604,856.25}{2,086,124.16}$$

$$\text{Profit on TDC} = 3 + 0.7693$$

$$= \mathbf{3.7693\%}$$

Result: According to the appraising and analysis on both profitability and viability index, the proposed development project shows that the profitability index is higher than the viability index. The expected viability ratio is 3.7693% is below than the profitability index which can be derived between 12% and 16%. Therefore, the proposed development project is profitable and viable.

4. SUMMARY

Real estate development is one of the property investments sectors where the revenue from the property development is a gross return to the developer or investor from the capital invested in early. To calculate and appraise the potential and profitability from the investment, analysis on Earnings Before Interests and Taxes (EBIT) as a basic component in the income approach will be used. From this data and information, a development valuation and appraisal model will be developed which is known as the Residual Method. From this method also, the conventional and cash flow approaches can be applied. In the development valuation process by using both conventional and cash flow approaches, the valuer is able to determine the project value, site value, market value and the viability of a proposed development project. The development appraisal exercise used by using both approaches also can help the valuer to analyse and determine the profitability and viability of the proposed development project. There are two different factors to distinguish between the development valuation and development appraisal namely the land cost (use in the development appraisal) and the developer's profit and risk (as one of the development costs uses in the development valuation). In simple terms, the development valuation uses to determine the site value and the market value of vacant development by taking into account the development potential of the land. Besides that, the development appraisal will help the valuer to assist the developer or investor to determine the profitability and viability of the project in order to determine whether the proposed project can be benefited from every capital invested by them.

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