



ARGUS  
Developer™

# Calculations Manual

Release Version 4.0



## **ARGUS Software: ARGUS Developer Calculations Manual**

The contents of this document are considered proprietary by ARGUS Software, the information enclosed and any portion thereof may not be utilised for any purpose other than the consideration of ARGUS Software. Information in this document is subject to change without notice and represents no commitment on the part of ARGUS Software.

Copyright © 2008 ARGUS Software, Inc. All rights reserved.

### **Trademarks**

ARGUS Software™ is a trademark of ARGUS Software. All other trademarks and registered trademarks are property of their respective companies and should be treated as such.

ARGUS Developer was formerly known as CircleDeveloper.

ARGUS Development Budget was formerly known as CircleBudget.

### **Disclaimer**

This manual has been prepared for use by ARGUS Software personnel, licensees and customers.

ARGUS Software reserves the right to make changes without notice at any time to this document, and shall not be held legally responsible for any typographical, arithmetic and listing errors.

Build date: 13 February 2008 4:40 pm USA/CAN

# Table of Contents

## Chapter 1

<b>Valuation</b> .....	<b>1</b>
Valuation .....	1
Valuation Rent .....	1
Rent Escalation .....	2
% Rents .....	3
Hotel Valuation .....	5
Alternate Capitalization Option:Hardcore Method .....	7
Voids and Rent Free Periods .....	8
Gross Development Value .....	9
Purchaser's Costs .....	10
Net Realization .....	10

## Chapter 2

<b>Land Transfer Tax</b> .....	<b>11</b>
Cumulative Bands .....	11
Non-Cumulative Bands .....	12

## Chapter 3

<b>Cash Flow</b> .....	<b>13</b>
Internal Rate of Return and Net Present Value .....	13
Inflation and Rent Escalation .....	14

## Chapter 4

<b>Finance</b> .....	<b>17</b>
Basic Finance (Interest Sets) .....	17
Interest Rates .....	17
Breakdown of Interest .....	18
Structured Finance .....	18
Mortgage .....	19

## Chapter 5

<b>Performance Measures</b> .....	<b>21</b>
Profit on Cost% .....	21
Profit on GDV% .....	21
Development Yield .....	21
Cost per gross sq ft/sq m .....	22
Cost per net sq ft/sq m .....	22
Plot Ratio (Floor Area Ratio) .....	22

---

Cap Rent per net sq ft/sq m .....	22
Return on Equity (ROE) .....	22
Pre Finance IRR .....	23
Equity IRR .....	23
 <b>Chapter 6</b>	
<b>Distribution</b> .....	<b>25</b>
S Curve .....	25
Weighted Curve.....	26
 <b>Chapter 7</b>	
<b>Contact details</b> .....	<b>29</b>

# CHAPTER 1

## Valuation

Valuation is the process of calculating the worth of an asset.

The value of a property investment generally relates to the income-generating capability of the property or completed development, i.e. its value to the investor is based on the annual rental income from tenants of the property.

## Valuation

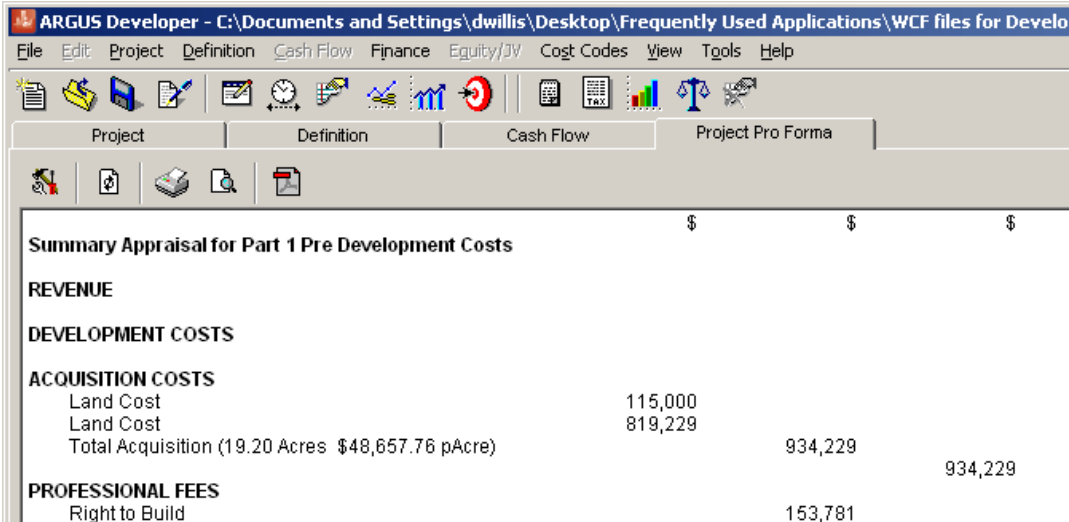
The capital value of an investment property is calculated by capitalizing the net rental income stream from the property.

The yield, used to capitalize the rental income, reflects the return required by investors in the open market for a type of investment. In simple terms, the **yield** is the income from an investment expressed as a proportion of the investment's Capital Value, or Capitalized Rent (CR).

$$\text{Yield (\%)} = \frac{\text{Net rental income}}{\text{Capital value}} \times 100$$

From this simple formula we can calculate the capital value of a property when the rent and yield are known.

An example valuation is displayed in the Project Proforma screen of ARGUS Developer as follows:



	\$	\$	\$
<b>Summary Appraisal for Part 1 Pre Development Costs</b>			
<b>REVENUE</b>			
<b>DEVELOPMENT COSTS</b>			
<b>ACQUISITION COSTS</b>			
Land Cost	115,000		
Land Cost	819,229		
Total Acquisition (19.20 Acres \$48,657.76 pAcre)		934,229	
			934,229
<b>PROFESSIONAL FEES</b>			
Right to Build		153,781	

For more complex valuations in which you may wish to take account of, for example, future changes in income, the formula may be expanded.

## Valuation Rent

To value a property investment, any non-recoverable costs must be deducted from the gross annual rent to calculate the actual net rental income receivable by the investor, or the Net Operating

Income. Such costs might include non-recoverable outgoings such as voids costs and non-recoverable service charge or insurance. The net rent is then capitalized to calculate the value of the investment.

In ARGUS Developer, the net operating income is identified as the **Valuation Rent**, displayed in Capitalized Rent as follows:

Heading	Office Building A	Gross Unit Area ft <sup>2</sup>	12,000	Unfinished Unit Area ft <sup>2</sup>	0
Unit Number		Gross Area ft <sup>2</sup>	12,000	Unfinished Area ft <sup>2</sup>	0
Use Type	Offices	Net Unit Area ft <sup>2</sup>	10,000	Alternate Area	0
Number of Units	1	Net Area ft <sup>2</sup>	10,000	ITZA Area ft <sup>2</sup>	0
Parking Spaces	0.0	Gross:Net Ratio	83.33%	<input checked="" type="checkbox"/> Locked	

Construction Cost	Financial	Rent	% Rent	Lease	Financial	Rent Capitalization	
Rate pf <sup>2</sup>	80.00	Market Rent Rate pf <sup>2</sup> pa	50.00			Tenure	Freehold
Rate Unfinished pf <sup>2</sup>	0.00	Rent Escalation	(None)			Cap Rate%	10.0000%
Cost / Unit	960,000	Step Rent Profile	(None)			Initial Rent	499,980
Cost / Parking Space	0	Annual Rent / Unit	499,980			Changes during Lease	0
Parking Spaces Cost	0	Gross Market Rent pa	499,980			Rent at Capitalisation Date	448,982
Gross Cost	960,000	Initial Rent	499,980			% Non-Recov. Cost	10.000%
Stage	Construction	% Non-Recov. Cost	10.000%			Fixed Non-Recov. Cost	1,000
Starts in	Feb 2008	Fixed Non-Recov. Cost	1,000			Total Ground Rent Deduct.	0
Distribution Months	12	Total Non-Recov. Cost	50,998			Total Costs	50,998
TI Rate pf <sup>2</sup> (Letting)	0.00	Ground Rent Deductions	0			% Rent	
		Annual Rent	448,982			Valuation Rent	448,982
		Rent Free Period (Months)	0			Capitalized Rent	4,489,820
		Lease Comm. Profile	(None)			Manual Capital Value	0
						Stage	Sale
						Capitalized At	Feb 2009

[Click to View Construction Cost Breakdown](#)      [Click to View Rent Additions/Costs](#)

The Valuation Rent, or net rent, in this example is therefore \$448,982 per annum.

$$\text{Valuation Rent} = 499980 - 50998 = 448982$$

## Rent Escalation

If rent escalation is applied from the project start date, then the initial Valuation Rent will include escalation at the specified rate for the period from the project start date. Fixed deductions are not grown.

The formula to calculate rent escalation is as follows:

$$R \times \left( 1 + \frac{i}{100} \right)^{\frac{n}{12}}$$

- $R$  = Current annual rent, to be inflated  
 $i$  = Annual rate of escalation, as a percentage  
 $n$  = Escalation period in months

The valuation rent is then calculated as follows:

$$\text{Valuation Rent} = (\text{Annual Gross Rent} \times \text{Rent Escalation}) - (\text{Total Non Recov Costs})$$

where Total Non Recov. Costs (when specified as a % rent) are calculated on the escalated rent.

**Example:** A freehold property let at a gross rent of \$500,000 pa. There are non-recoverable outgoings of \$1,000 pa and 10% rent passing.

Assuming that the building is let and sold 24 months after the project start date and that escalation of 3% per annum is applied from the project start date, the screenshot below displays the resultant Valuation Rent.

The inflated Annual Gross Rent is the rent at which the building is assumed to let, taking into account escalation (in this example at 3% pa) from the project start date to the letting date. It is important to note that deductions are calculated on the inflated Annual Gross Rent, so that the calculation of the Valuation Rent in the above example is as follows:

$$\text{Inflated Annual Gross Rent} = 500000 \times \left(1 + \frac{3}{100}\right)^{\frac{24}{12}} = 530450$$

Deductions from the inflated annual gross rent are then calculated as follows:

$$\text{Total Non Recov Cost} = (10\% \times 530450) + 1000 = 54045$$

$$\text{Valuation Rent} = 530450 - 54045 = 476405$$

Rounding to the nearest whole number gives a Valuation Rent of \$476,405 per annum.

Construction Costs		Financial		Rent		% Rent		Lease		Financial		Rent Capitalization	
Rate pf <sup>2</sup>	80.00	Market Rent Rate pf <sup>2</sup> pa	50.00	Tenure	Freehold	Cap Rate%	10.0000%	Initial Rent	530,450	Changes during Lease	0	Rent at Cap Date	530,450
Cost/Unit	960,000	Rent Escalation	Office escalatic	% Vac. & Non-rec Cost	10.000%	Fixed Non-recov. Cost	1,000	Ground Rent Deductions	0	Total Costs	54,045	% Rent	0
Total Cost	960,000	Step Rent Profile	(None)	Total Non-recov. Cost	54,045	Total GR Deduction	0	Valuation Rent	476,405	Capitalized Rent	4,764,050	Manual Cap. Value	0
Stage	Construction	Market Rent/Unit pa	500,000	Annual Rent	476,405	Rent Free Period (mths)	0	Stage	Sale	Capitalized At	Mar 2009		
Starts in	Mar 2007	Gross Market Rent pa	500,000	Lease Comm. Profile	(None)								
Distribution months	12	Initial Rent	530,450										
TI Rate pf <sup>2</sup> (Leasing)	0.00												

## % Rents

Percentage, or %, rents are calculated based on Sales Volume or turnover.

Details of the anticipated Sales Volume per annum must be entered. A multiplier is then applied to the Sales Volume to calculate the Turnover (or %) Rent.

The Sales Volume may be defined as a fixed annual amount throughout the cash flow. Alternatively the user can apply escalation to the Sales Volume by applying a Rent Escalation Set, and specify whether the Sales Volume grows during the income period or for the whole cash flow period.

There are three “Breakpoint Type” options available for the calculation of % rents:

- zero breakpoint
- natural breakpoint
- arbitrary breakpoint

## Zero Breakpoint

When zero breakpoint is selected, the % Turnover multiplier is applied to the entire Sales Volume p.a. to calculate the rent payable. The rent payable will therefore rise and fall depending on turnover.

$$\% \text{ rent pa} = \text{Sale Volume pa} \times \% \text{ Turnover}$$

Example: Assuming an Annual Sales Volume of \$1,000,000 and % Turnover set at 7%, the % rent is calculated as follows:

$$\% \text{ rent pa} = 1000000 \times 0.07 = 70000$$

Detail		Gross Unit Area ft <sup>2</sup>		Alternate Area	
Heading	Retail Unit A1		5,500		0
Unit Number		Gross Area ft <sup>2</sup>	5,500	ITZA Area ft <sup>2</sup>	0
Use Type	Retail Shop	Net Unit Area ft <sup>2</sup>	5,000	Gross:Net Ratio	90.91%
Number of Units	1	Net Area ft <sup>2</sup>	5,000		<input type="checkbox"/> Locked

Construction Costs		Financial		Rent		% Rent		Lease		Financial		Rent Capitalization	
Rate pf <sup>2</sup>			0.00	Sales Volume pa			1,000,000	Tenure				Freehold	
Cost/Unit			0	Sales Volume pf <sup>2</sup> pa			200.00	Cap Rate%				6.0000%	
Total Cost			0	% Rate			7.000%	Initial Rent				0	
Stage		Construction	...	Breakpoint Type			Zero	Changes during Lease				0	
Starts in		Mar 2007		Arbitrary Break amt			0	Rent at Cap Date				0	
Distribution months		12		Arbitrary Break pf <sup>2</sup> pa			0.00	% Vac. & Non-rec Cost				0.000%	
TI Rate pf <sup>2</sup> (Leasing)		0.00		% Rent Escalation			Ignore	Fixed Non-recov. Cost				0	
								Total Costs					0
								% Rent					70,000
								Valuation Rent					70,000
								Capitalized Rent					1,166,667
								Manual Cap. Value					0
								Stage					Sale
								Capitalized At					Mar 2009

## Natural Breakpoint

This is used when the total rent payable comprises a core, or base, rent together with an additional % rent. In this case the rent payable will never fall below the base rent. For example, a lease may guarantee the landlord a percentage of total sales subject to a minimum core rent.

In order to calculate the “Natural Breakpoint” the core rent is calculated as an equivalent value in terms of Sales Volume, by dividing the rent by the % Turnover. This equivalent value is the Natural Breakpoint.

$$\text{Natural Breakpoint} = \frac{\text{Base Rent}}{\% \text{ Turnover}}$$

Only Sales Volume in excess of this Natural Breakpoint is used for the calculation of % Rent. So the % Rent is calculated as follows:

$$\% \text{ Rent pa} = (\text{Sales Volume} - \text{Natural Breakpoint}) \times \% \text{ Turnover}$$

The total rent payable is then calculated:

$$\text{Total rent payable pa} = \text{Base Rent} + \% \text{ Rent}$$

Example: Assuming Sales Volume pa of \$1,000,000, Base rent of \$10,000 pa and % Turnover of 8%, the calculation is:

$$\text{Natural Breakpoint} = \frac{10000}{0.08} = 125000$$

$$\% \text{ Rent pa} = (1000000 - 125000) \times 0.08 = 70000$$

$$\text{Total rent payable pa} = 10000 + 70000 = 80000$$

## Arbitrary Breakpoint

The Arbitrary Breakpoint may be entered as an amount per month per unit area (in sq ft or sq m) or as a total annual amount. Only Sales Volume in excess of the Arbitrary Breakpoint is used to calculate the Percentage Rent. So:

$$\% \text{ Rent pa} = (\text{Sales Volume} - \text{Arbitrary Breakpoint}) \times \% \text{ Turnover}$$

Example: Assuming a Sales Volume pa of \$1,000,000, Rent \$100,000 pa, Arbitrary Breakpoint set at \$200,000 and % Turnover of 8%, the rent payable is calculated as follows:

$$\% \text{ Rent pa} = (1000000 - 200000) \times 0.08 = 64000$$

$$\text{Total rent payable pa} = 100000 + 64000 = 164000$$

Upon sale of a leased unit, any Percentage Rent is annualized and capitalized as an addition to the capital value of the unit.

## Hotel Valuation

In ARGUS Developer hotels may be valued by selecting the Use Type “Hotel” in the Capitalized Rent form.

Typically hotel valuation is based on room and occupancy rates, rather than floor area. **Occupancy rates** may vary throughout the year, with varying room rates applied, and the valuation should reflect this. A typical hotel valuation cannot, therefore, be undertaken using the straightforward “Area \* Rent Rate \* Yield” model as for other types of valuation. Hotel valuation requires several steps to be completed before capitalization can take place.

To establish the rental value of a hotel, **occupancy profiles** must be defined for different room types within the hotel, specifying the average occupancy rate (as a percentage) for each month of the year. These occupancy rates are then multiplied by the room rate to calculate the total annual rental value for each room type. This is then multiplied by the total number of rooms to give a total MRV (Market Rental Value) for the hotel.

The formula is as follows:

$$\text{MRV pa} = [\text{Daily room rate} \times \text{Occupancy rate} \times \text{No. days}] \times \text{Total no. rooms}$$

The total MRV for the hotel is then capitalized in the usual way (see “Valuation” on page 1).

Example: To use a simple example for illustrative purposes: a hotel with 15 double rooms, all of which are available at a room rate of \$50 per night. Assuming average occupancy throughout the year of 80%, the MRV may be calculated as follows:

$$\text{MRV pa per room} = \text{Room Rate} \times \text{Occupancy Rate} \times \text{No. days}$$

$$\text{MRV pa per room} = 50 \times 0.8 \times 365 = 14600$$

Therefore, the hotel gross rent is calculated:

$$\text{Total MRV pa} = \text{MRV pa per room} \times \text{Total no. rooms}$$

$$\text{Total MRV pa} = 14600 \times 15 = 219000$$

This total gross rent per annum of \$219,000 is then capitalized to produce a capital value for the hotel (see “Valuation” on page 1).

The above example would be entered in the Capitalized Rent form in ARGUS Developer as follows:

The screenshot shows the 'Capitalized Rent' form in ARGUS Developer. The 'Detail' section includes: Heading (Hotel double rooms), Unit Number, Use Type (Hotel), and Number of Rooms (15). The 'Construction Costs' section shows a rate of 0.00 pf<sup>2</sup> and a total cost of 0. The 'Hotel' tab is active, displaying: Room Rate (daily) 50.00, Occupancy Profile 80% Av occup, Room Rate (annual) 14,600, and Gross Rent 219,000. The 'Rent Capitalization' section shows: Tenure Freehold, Cap Rate% 10.0000%, Initial Rent 219,000, and Capitalized Rent 2,190,000.

## Occupancy Profiles

More complex occupancy profiles can be created, specifying different average occupancy rates for each month of the year.

The annual gross rent, or MRV, is calculated by multiplying each month's occupancy rate by the number of days in that month and totalling these for the whole year. The room rate is multiplied by the resultant figure.

This can be represented as follows:

$$\text{MRV pa per room} = \text{Room rate} \times [(OR_1 \times D_1) + (OR_2 \times D_2) + (\dots) + (OR_{12} \times D_{12})]$$

Where:

$OR_1$  = Occupancy rate in month 1

$D_1$  = Number of days in month 1

The 'Hotel Room Occupancy Profile' dialog box contains the following table:

	Profile Name	Jan	Feb	Mar	Apr	May	Jun	Jul
1	Occupancy Profile 1	65.00%	70.00%	70.00%	80.00%	85.00%	90.00%	90.00%
2	80% Av occupancy	80.00%	80.00%	80.00%	80.00%	80.00%	80.00%	80.00%

## Alternate Capitalization Option: Hardcore Method

An exit valuation is undertaken for each tenant created in the Capitalized Rent form, displayed in Project Proforma.

By default, ARGUS Developer takes the net rent (Valuation Rent) at the cash flow exit date and applies the appropriate capitalization yield to calculate the capital value, as set out in the first section of this Chapter.

There may be instances, however, where you wish to take account of future changes in income from a property, for example, where the market rental value (MRV) at that date is different to the current rent passing or where voids or stepped rents are to be included.

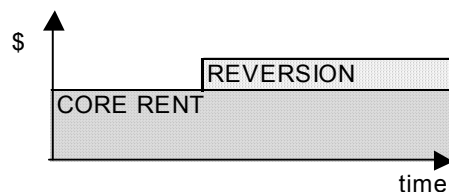
In this case, the user should untick the **Capitalize Income only at Sale Date** checkbox on the Receipts tab of Assumptions for Calculation.

ARGUS Developer then uses the **hardcore method** of valuation. The Hardcore method values rental income in layers.

The “**core**” **net rental income** is valued into perpetuity at the yield or “hardcore rate”, as outlined in the Valuation section above.

If the property is reversionary, i.e. the market rental value is higher than the current rent, then the future uplift in income or “**reversion**” is also capitalized. This future increase in rental income is valued at the same yield and discounted to a present value.

This can be illustrated as follows:



The basic formula for valuation by the hardcore method is as follows:

$$CR = [NI \times \text{Years Purchase into perpetuity}] + [(NR - NI) \times \text{Years Purchase into perp.} \times \text{Present Value}]$$

$$CR = \left[ NI \times \frac{1}{i} \right] + \left[ (NR - NI) \times \frac{1}{i} \times (1 + i)^{-n} \right]$$

where:

- CR = Gross capital value, or Capitalized Rent
- NI = Net current rent per annum (net of any deductions and ground rent) i.e. Valuation Rent
- NR = Net open market rental value (MRV) per annum (net of any deductions and ground rent)
- i = Hardcore rate (yield)
- n = Number of years from the valuation date to the reversion to market rent

Details of rents and yields are entered in ARGUS Developer in the Capitalized Rent form. Years Purchase and Present Value multipliers may be sourced from valuation tables.

**Example:** For a freehold property let at a net rent of \$100,000 per annum, with a reversion to market rental value (MRV) of \$115,000 per annum at the next rent review in four years' time, and adopting a hardcore rate (yield) of 8.00% (annually in arrears), the valuation is calculated as follows:

$$CR = \left[ 100000 \times \frac{1}{0.08} \right] + \left[ 15000 \times \frac{1}{0.08} \times (1 + 0.08)^{-4} \right]$$

$$CR = 1250000 + 137818 = 1387818$$

So the gross capital value of the property is \$1,387,818.

This example valuation is displayed in the Project Proforma screen of ARGUS Developer as follows:

Project	Definition	Cash Flow	Project Pro Forma	
<b>Project Pro Forma for Phase 2</b>				
\$                      \$                      \$				
<b>REVENUE</b>				
<b>Rental Area Summary</b>				
	<b>ft<sup>2</sup></b>	<b>Rate ft<sup>2</sup></b>	<b>Rent at Lease Start</b>	<b>Rent At Sale</b>
‡ Office Building B	5,000	\$20.00	100,000	100,000
<b>Investment Valuation</b>				
<b>Office Building B</b>				
Capitalized Rent	100,000	Cap Rate	8.0000%	1,250,000
Reversion	15,000	Cap Rate	8.0000%	
		PV 4yrs @	8.0000%	137,818
				<b>1,387,818</b>

## Voids and Rent Free Periods

You may specify void and rent free periods in the Capitalized Rent form in ARGUS Developer.

**Rent free periods** may be applied at the start of the lease and on a renewal lease. A **void period** may be entered on lease expiry (or break) prior to reletting. In these cases, the valuation should reflect the lack of rental income during these periods.

The following formula is used to value rental income, allowing for a void and/or rent free period on lease expiry/break, followed by a reversion to market rent, using the hardcore method of valuation.

$$CR = [NI \times YP \text{ into perp}] - [NI \times YP_d \times \text{Present Value}] + [(NR - NI) \times YP \text{ into perp.} \times \text{Present Value}]$$

$$CR = \left[ NI \times \frac{1}{i} \right] - \left[ NI \times \frac{1 - (1 + i)^{-d}}{i} \times (1 + i)^{-n} \right] + \left[ (NR - NI) \times \frac{1}{i} \times (1 + i)^{-(n + d)} \right]$$

where:

- CR = Gross capital value, or Capitalized Rent
- NI = Net current rent per annum (net of any deductions and ground rent) i.e. Valuation Rent
- NR = Net open market rental value (MRV) per annum (net of any deductions and ground rent)
- YP<sub>d</sub> = YP (single rate) for *d* years
- i* = Hardcore rate (yield)
- n* = Number of years from the valuation date to the start of the void or rent free period
- d* = Total duration of the void and/or rent free period in years

Example: Assuming a property let at \$100,000 pa on a lease expiring in four years' time. On lease expiry it is estimated that there will be a 6 month void, before the property is relet at the market rent of \$115,000 per annum with an initial 3 month rent free period. There will, therefore, be a total period of 9 months during which the property will be non income-producing. Adopting a yield of 8%, the valuation is as follows:

$$CR = \left[ 100000 \times \frac{1}{0.08} \right] - \left[ 100000 \times \frac{1 - (1 + 0.08)^{-0.75}}{0.08} \times (1 + 0.08)^{-4} \right] + \left[ 15000 \times \frac{1}{0.08} \times (1 + 0.08)^{-4.75} \right]$$

So

$$CR = 1250000 - 51532 + 130088 = 1328557$$

The gross capital value of the property is therefore \$1,328,557.

This example valuation is displayed in the Project Proforma screen of ARGUS Developer as follows:

Project	Definition	Cash Flow	Project Pro Forma	
Project Pro Forma for Phase 2				
<b>REVENUE</b>				
<b>Rental Area Summary</b>				
	<b>ft<sup>2</sup></b>	<b>Rate ft<sup>2</sup></b>	<b>Rent at Lease Start</b>	<b>Rent At Sale</b>
‡ Office Building B	5,000	\$20.00	100,000	100,000
<b>Investment Valuation</b>				
<b>Office Building B</b>				
Capitalized Rent	100,000	Cap Rate	8.0000%	1,250,000
Vacancy & Rent Free	(100,000)	Cap Rate	8.0000%	
		PV 4yrs @	8.0000%	(51,532)
Reversion	15,000	Cap Rate	8.0000%	
		PV 4yrs 9mths @	8.0000%	130,088
				<b>1,328,557</b>

## Gross Development Value

The Gross Development Value is the sum of the following:

- Capitalized Rent: the capitalization of net rental income before deduction of purchaser's costs, if defined, (from the Capitalized Rent form in ARGUS Developer);
- Gross sales receipts (from the Unit Sales form in ARGUS Developer).

Project	Definition	Cash Flow	Project Pro Forma	
Project Pro Forma for Phase 1 Office/residential				
<b>REVENUE</b>				
<b>Sales Valuation</b>				
	<b>ft<sup>2</sup></b>	<b>Rate ft<sup>2</sup></b>	<b>Gross Sales</b>	
Apartments	20,000	\$250.00	5,000,000	
<b>Rental Area Summary</b>				
	<b>ft<sup>2</sup></b>	<b>Rate ft<sup>2</sup></b>	<b>Rent at Lease Start</b>	<b>Rent At Sale</b>
Office Building A1	100,000	\$35.00	3,500,000	3,500,000
Office Building B	65,000	\$35.00	2,275,000	2,275,000
Totals	<u>165,000</u>		<u>5,775,000</u>	<u>5,775,000</u>
<b>Investment Valuation</b>				
<b>Office Building A1</b>				
Capitalized Rent	3,500,000	Cap Rate	7.0000%	50,000,000
<b>Office Building B</b>				
Capitalized Rent	2,275,000	Cap Rate	7.5000%	30,333,333
				<b>80,333,333</b>
GROSS DEVELOPMENT VALUE				
				85,333,333
Purchaser's Costs				
		1.00%	(803,333)	
NET DEVELOPMENT VALUE				
				<u>84,530,000</u>
TOTAL PROJECT REVENUE				
				<b>84,530,000</b>

## Net Development Value

The Net Development Value is calculated as the Gross Development Value less Purchaser's Costs (if defined).

$$NDV = GDV - A$$

where:

<i>NDV</i>	=	Net Development Value
<i>GDV</i>	=	Gross Development Value
<i>A</i>	=	Acquisition costs (also referred to as purchaser's costs - see below)

**Note: The data entry field for Purchaser's costs is hidden unless Show Purchaser's Costs has been checked on the Country tab of System Configuration, under Administration in the File menu.**

## Purchaser's Costs

Purchaser's costs, or acquisition costs, are calculated on the price paid for an investment, i.e. on Capitalized Rent. These are generally not deducted from gross sales receipts (Unit Sales), although the user may select this option (Apply to Direct Sales) in the Expenditure tab of the Assumptions for Calculation form.

**Note: The data entry field for Purchaser's Costs is hidden unless Show Purchaser's Costs has been checked on the Country tab of System Configuration, under Administration in the File menu.**

Purchaser's costs comprise agents and legal fees, and other acquisition costs, totalled to give a single percentage figure.

Costs are generally residualised on the total Capitalized Rent and are calculated by the following formula:

$$A = CR - \left( \frac{CR}{1 + a} \right)$$

where

<i>CR</i>	=	Capitalized Rent
<i>a</i>	=	Purchaser's costs, expressed as a percentage
<i>A</i>	=	Purchaser's costs, expressed as an amount

In ARGUS Developer, in the Expenditure tab of Assumptions for Calculation, users may specify whether Purchaser's Costs are calculated on the Gross Development Value (i.e Capitalized Rent before deduction of purchaser's costs) or Net Development Value.

The above formula assumes Purchaser's Costs are calculated on the Net Development Value. If the Gross Development Value is selected for calculation, the formula for calculating Purchaser's Costs on the Capitalized Rent is as follows:

$$A = CR \times a$$

In the Expenditure tab of Assumptions for Calculation in ARGUS Developer, the user may also select whether Purchaser's Costs are to be deducted from revenue or added to costs.

## Net Realization

Net Realization is the Net Development Value plus any rental income received from tenants during the project or phase where tenants' income stream has been enabled.

# CHAPTER 2

## Land Transfer Tax

Land Transfer Tax is the tax payable by the purchaser when acquiring land or property, generally calculated as a % of the purchase price. In ARGUS Developer this is calculated on the Land Acquisition Price.

Land Transfer Tax can be entered as a single % rate or amount in the Land Transfer field in Definition or, when the tax is calculated at different %s based on stepped thresholds, a tax profile can be created using the **Land Transfer Tax Schemes** form in File|Administration.

Bands are defined by specifying lower and upper band limits and the % tax rate applicable to each band. The calculation of tax may also be as cumulative or non-cumulative, and fixed amounts can be manually specified for each band if required.

Land Transfer Tax Schemes

Schemes Help

Land Transfer Tax Scheme Browser

Name

- Canada - Ontario
- Canada - British Columbia

Name: Canada - Ontario

Round up to nearest: £0.00  Manual cumulative amounts

Lower Limit	Upper Limit	Percentage	Cumulative	Cumulative Amount
\$0	\$55,000	0.500%	<input checked="" type="checkbox"/>	\$0.00
\$55,001	\$250,000	1.000%	<input checked="" type="checkbox"/>	\$275.00
\$250,001	(No limit)	1.500%	<input checked="" type="checkbox"/>	\$2,225.00

Save Cancel

## Cumulative Bands

In some countries, land transfer tax is calculated as a continual accumulation from one band to the next (as opposed to a single percentage applied to the total value). In this case the tax bands are **cumulative**, with differing rates applied to different tranches of the purchase price. These are totalled to calculate the total tax payment.

For example, purchase tax on a \$1,000,000 acquisition, based on the Land Transfer Tax Scheme set out below, would be calculated as follows:

Cumulative Land Transfer Tax Scheme:

Lower Limit	Upper Limit	Percentage
\$0	\$55,000	0.50%
\$55,001	\$250,000	1.00%
\$250,001	(No limit)	1.50%

Tax calculation:

\$55,000 @ 0.5%	\$275.00
\$195,000 @ 1.0%	\$1,950.00
\$750,000 @ 1.5%	\$11,250.00
<u>\$1,000,000</u>	<u>\$13,475.00</u>

So the Purchase Tax payable would be \$13,475.

## Non-Cumulative Bands

When bands are non-cumulative, tax is calculated on the whole purchase price at the single % rate applicable to the band within which the total purchase price falls.

For example, purchase tax on a \$450,000 acquisition, based on the Land Transfer Tax Scheme set out below, would be calculated as follows:

Non-Cumulative Land Transfer Tax Scheme:

Lower Limit	Upper Limit	Percentage
\$0	\$59,999	0.00%
\$60,000	\$249,999	1.00%
\$250,000	\$499,999	2.50%
\$500,000	(No limit)	4.00%

Tax is calculated on the whole purchase price at 2.5%, since the property purchase price of \$450,000 falls within the band \$250,000-\$499,999.

So the Purchase Tax payable is:

$$\$450,000 * 2.50\% = \$11,250$$

# CHAPTER 3

## Cash Flow

### Internal Rate of Return and Net Present Value

The Internal Rate of Return (IRR) is the discount rate which, when applied to each positive and negative amount in the cash flow, results in a figure (called the Net Present Value or NPV) equal to zero. The IRR represents the return to an investor of the performance of his money, in terms of expenditure on purchase, construction costs and fees, rental income and the sales receipt at the end of the project.

The cash flow in ARGUS Developer follows the standard formulae for computation of the Internal Rate of Return and Net Present Value. Basically, this is the sum of discounted successive positive and negative amounts.

The standard formula applied in the mathematics is:

$$V_0 = \left( \frac{R_{x1}}{1+a} \right) + \left( \frac{R_{x2}}{(1+a)^{x2}} \right) + \dots + \left( \frac{R_{x(n-1)}}{(1+a)^{x(n-1)}} \right) + \left( \frac{R_{xn} + V_{xn}}{(1+a)^{xn}} \right)$$

where:

$V_0$  = Initial value, or Acquisition Price, as a manual figure or residual through iteration mathematics.

$a$  = Discount rate

$n$  = Number of periods

$x$  = Measure standard for the period (i.e. monthly)

$R$  = Net Income after operating costs and ground rent

$V_{xn}$  = Valuation net of associated costs

The Cash Flow works through for each period resulting in the accumulation by:

$$V_0 = \sum_{i=1}^{xn} \frac{R_i}{(1+a)^i} + \frac{V_{xn}}{(1+a)^{xn}}$$

where:

$R_i$  = Recurring periodic net revenue

The practical effects of  $x$  and  $n$  are illustrated below.

The standard principles for discounting are applied so that the NET PRESENT VALUE is ZERO.

The program finds the IRR by iterating (*produces multiple calculated guess rates*) over the time based series of costs and revenues in the cash flow spreadsheet until the difference between the sum of the discounted receipts and the sum of the discounted costs is zero.

An Initial IRR guess rate must be entered in the Calculation tab of Assumptions for Calculation.

## Monthly Discounting

ARGUS Developer calculates the IRR based on monthly discounting where all future figures are assumed to be timed at the start of each month. The aggregate figure for each month is discounted from the first of the month. Therefore, total expenditure in, say, month 4 of the cash flow is discounted from the 1st day of the 4th month back to the project start date.

Example

Total expenditure in month 4 of \$100,000 discounted at 12% (PV of \$1 for 4 months).

To be precise, it is discounted by the number of days from the first of the (4th) month back to the project start date.

The formula used is as follows:

$$(1 + i)^n$$

where  $i$  = IRR and  $n$  is the fractional number of days  $(122 / 365) = 0.3342$

$$(1 + 0.12)^{0.3342} = 1.03860$$

So the calculation is:

\$100,000 divided by 1.03860

= **\$96,283**

## Manual Discount Rate for Present Value

In ARGUS Developer the user may specify a manual discount rate for the calculation of the Present Value of the project.

This is entered in the Calculation tab of Assumptions for Calculation. ARGUS Developer will then calculate the Present Value based on this manually entered discount rate. If this option is selected, the Present Value and discount rate are displayed in the Performance Measures section of the Project Proforma report.

## Interest and Finance Fees in IRR Calculations

When finance is applied to a project the user may specify whether the calculation of the IRR takes account of interest payments. This option is set in the Finance tab of Assumptions for Calculation.

If the “Include Interest and Finance Fees in IRR Calculations” option is checked **on**, then the cost of interest and finance fees are included in the IRR calculations as accrued, on a monthly basis. If this option is checked **off**, then the cost of interest is not charged as a cost to the project until there is revenue to repay the loan.

The exception to this is the Pre Finance IRR (see “Pre Finance IRR” on page 23) which is always calculated on the project cashflow excluding interest and fees.

## Inflation and Rent Escalation

Inflation and rent escalation are calculated period by period from the start of the project or phase, and can be applied in advance or in arrears (starting from the first or second month of the project), by selecting the required setting in the Inflation/Escalation tab of Assumptions for Calculation.

The formula for applying growth (rent escalation and cost inflation) to an amount is:

$$C \times \left( 1 + \frac{i}{100} \right)^{\frac{n}{12}}$$

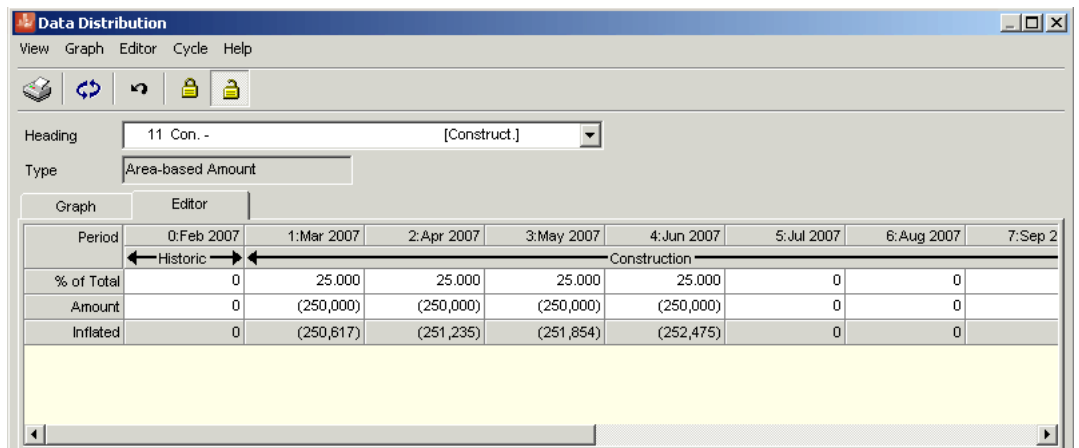
Where:

- $C$  = Amount to be inflated
- $i$  = Annual rate of escalation/inflation
- $n$  = Escalation period in months from phase start

For example, assume a cost of \$1,000,000 payable monthly from the project start over a period of 4 months, with inflation at 3% per annum. The inflated cost is calculated as follows:

Total cost      1,000,000                      Inflation              3.00%  
 Dist. mths        4

Month	Cost	In Arrears		In Advance	
		Inflation factor	Inflated cost	Inflation factor	Inflated cost
1	250,000	1.0000	250,000	1.0025	250,617
2	250,000	1.0025	250,617	1.0049	251,235
3	250,000	1.0049	251,235	1.0074	251,854
4	250,000	1.0074	251,854	1.0099	252,475



Inflation in arrears



# CHAPTER 4

## Finance

There are two financing methods available in ARGUS Developer:

- Basic (interest sets)
- Structured Finance

The financing method is selected in the Finance tab of Assumptions for Calculation.

### Basic Finance (Interest Sets)

When the Basic (Interest Sets) financing method is selected, interest is calculated on the net total amount in each period, which is detailed in the **Period Total for Interest** row of the Finance Cash Flow (see graphic below). The monthly interest amounts calculated are shown in the **Total Interest** rows.

Where the net period total is negative, i.e. an outflow, then the debit rate is applied; where the net period total is positive (an inflow) the credit rate is applied.

Project		Definition		Cash Flow		Project Pro Forma			
		Cash Flow View Cycle: Monthly							
		Show Zero Value Rows <input type="checkbox"/> Show Timed Finance Rows <input type="checkbox"/>		View Order		Show Consolidated Profit & Source Cash Flows <input type="checkbox"/>			
Row Heading	TOTALS	0	1	2	3	4	5	6	7
		Nov 2004	Dec 2004	Jan 2005	Feb 2005	Mar 2005	Apr 2005	May 2005	Jun 2005
		0	0	(77,269,500)	(77,849,021)	(71,355,705)	(74,833,373)	(76,154,510)	(78,120,121)
		← Historic →	← Purchase →	← Pre-Construction →			← Construction →		
Land Cost	(65,000,000)	0	(65,000,000)	0	0	0	0	0	0
Land Transfer Tax	(3,250,000)	0	(3,250,000)	0	0	0	0	0	0
Agent Fee	(1,300,000)	0	(1,300,000)	0	0	0	0	0	0
Legal Fee	(650,000)	0	(650,000)	0	0	0	0	0	0
Additional Fees	(45,000)	0	(45,000)	0	0	0	0	0	0
<b>Construction Costs</b>									
Demolition	(2,500,000)	0	0	0	0	(2,500,000)	0	0	0
Road/Site Works	(150,000)	0	0	0	0	(150,000)	0	0	0
Total GST paid	0	(7,024,500)	0	0	(267,500)	(69,081)	(157,596)	(235,783)	
GST recovered on cycle date	0	0	0	7,024,500	0	0	336,581	0	
Net period total	0	(77,269,500)	0	7,024,500	(2,942,500)	(759,887)	(1,396,976)	(2,593,613)	
Period Total for Interest	0	0	(77,269,500)	(70,824,521)	(71,355,705)	(74,833,373)	(75,817,929)	(78,120,121)	
Inflation Set 1. Rate pa = 0.00%		0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Interest Set 1. Debit Rate pa = 9.00%		9.00	9.00	9.00	9.00	9.00	9.00	9.00	
Interest Set 1. Credit Rate pa = 3.00%		3.00	3.00	3.00	3.00	3.00	3.00	3.00	
Total for Interest Set 1	0	(579,521)	(531,184)	(535,168)	(561,250)	(568,634)	(585,901)		
Total Interest (All Sets)	0	(579,521)	(531,184)	(535,168)	(561,250)	(568,634)	(585,901)		
Period Total For IRR	0	(77,269,500)	(579,521)	6,493,316	(3,477,668)	(1,321,137)	(1,965,611)	(3,179,514)	
Cumulative Total C/F	0	(77,269,500)	(77,849,021)	(71,355,705)	(74,833,373)	(76,154,510)	(78,120,121)	(81,299,635)	

### Interest Rates

The interest rate(s) to be used in ARGUS Developer are defined in the Interest/PR Sets tab of Assumptions for Calculation.

The **debit** rate is the rate of interest charged by the lender on the loan amount and represents an outflow from the cash flow. The **credit** rate is the rate at which interest is earned when the finance arrangement is in credit. It represents an inflow of money to the cash flow.

Basic Finance is calculated on a monthly basis on the Period Total for Interest row in the Finance Cash flow in ARGUS Developer.

## Breakdown of Interest

The breakdown of interest is provided for information purposes only and is only available when the basic financing method has been selected. It is not used when calculating the total interest charge. The breakdown is approximate only due to the way in which additional revenues and other income are used to offset the Building Interest charges. Interest is reported as follows:

### Land Interest

This is the total amount of interest attributable to the land costs from the start of the phase to the beginning of the Letting Void period.

### Building Interest

This is the total amount of interest attributable to everything other than land costs. This includes any income from Additional Revenues and Capitalization. The interest is accrued from the beginning of the phase to the start of the Letting Void period.

### Void Interest

This is the interest attributable to all costs from the start of the Letting Void to the end of the Letting Void period.

### Other Interest

This is the interest attributable to all costs from the end of the Letting Void period to the end of the phase. Interest is shown in several circumstances:

- If a phase is part of a linked multi-phased scheme and does not realise a profit - interest accrues on outstanding costs if the phase length is shorter than the project length.
- If a phase is part of a linked multi-phased scheme and realises a profit - interest accrues on the profit amount if the phase length is shorter than the project length. A Credit Interest rate must be entered for this to happen.
- If a phase has a duration entered for the stage after the Letting Void. If the phase realises a profit and a Credit Interest rate has been entered, interest is earned on the profit amount.

## Structured Finance

When Structured Finance is selected, users can set up multiple equity partners, interim loans during construction (as debt sources of finance) and mortgages to look at financing scenarios for projects.

Heading	Total	1 Jul 2006	2 Aug 2006	3 Sep 2006	4 Oct 2006	5 Nov 2006	6 Dec 2006	7 Jan 2007	8 Feb 2007
+ Finance : Project Cash Flow Pre-FinIRR: 16.9%									
+ Finance : Developer Project IRR: 59.6% ROE: 130.3% Profit Amount: \$647,792									
+ Finance : Equity Partner Project IRR: 65.4% ROE: 135.2% Profit Amount: \$1,344,638									
- Finance : Construction Lender Project IRR: 0.0% Profit Amount: \$0									
<b>Timed Contribution: Project</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
Auto. Project Contribution	(5,469,037)	(493,944)	0	(1,494,642)	(1,227,254)	(1,458,811)	(794,385)	0	0
Total Contribution	(5,469,037)	(493,944)	0	(1,494,642)	(1,227,254)	(1,458,811)	(794,385)	0	0
Fixed Amount Loan Fees	(30,000)	(30,000)	0	0	0	0	0	0	0
% Loan Fees	(62,380)	(62,380)	0	0	0	0	0	0	0
Total Loan Fees	(92,380)	(92,380)	0	0	0	0	0	0	0
Interest and Fees	(861,329)	(92,380)	(4,939)	(4,989)	(19,985)	(32,458)	(47,370)	(55,788)	(56,346)
<b>Timed Repayment: Project</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
Auto. Repayment	6,330,366	0	0	0	0	0	0	0	0
Total Repayment	6,330,366	0	0	0	0	0	0	0	0
Closing Balance		(586,324)	(591,264)	(2,090,895)	(3,338,134)	(4,829,403)	(5,671,158)	(5,726,946)	(5,783,292)
Timed Profit Participation	0	0	0	0	0	0	0	0	0
Auto. Profit Participation	0	0	0	0	0	0	0	0	0
Total Profit Participation	0	0	0	0	0	0	0	0	0

For further information on setting up, and options for, Structured Finance please see the ARGUS Developer Reference Manual.

## Mortgage

A mortgage loan can be applied when Structured Debt and Equity is used to calculate the financing of a project appraisal. ARGUS Developer calculates interest and principal (capital repayments), amortising down to zero for the specified amortization period.

The total monthly payment (DS) to the mortgage lender (principal plus interest) is calculated as follows:

$$\frac{(1+f)^N \times f}{(1+f)^N - 1} \times L$$

where

- $L$  Loan amount
- $N$  Mortgage loan term, or amortization period, in months
- $f$  interest factor, calculated from the formula below:

$$f = \left(1 + \frac{i}{p}\right)^{\frac{1}{n}} - 1$$

where:

- $i$  interest rate
- $n$  Compounding period (see table below)
- $p$  Dividing factor for each compounding period option (see table below)

For example:

	Compound Period (months) ( $n$ )	Dividing Factor ( $p$ )
Monthly	1	12

	Compound Period (months) ( $n$ )	Dividing Factor ( $p$ )
Quarterly	3	4
Six Monthly	6	2
Annually	12	1

This total monthly mortgage payment amount (DS) comprises principal and interest.

The interest payment each period is calculated as follows:

$$\text{Outstanding loan balance} \times f$$

where  $f$  is the interest factor, calculated as set out above.

The principal may then be calculated as the total mortgage payment less this interest payment.

## Debt Service Ratio

The ratio of net operating income to annual mortgage repayment.

$$\frac{\text{Net Operating Income}}{\text{Annual mortgage repayment}}$$

A ratio of 1.0 indicates a break even situation where the net operating income is just enough to cover mortgage payments. A higher ratio indicates that the income from the project is more than sufficient to service the debt.

# CHAPTER 5

## Performance Measures

Performance measures are used to assess the return from a project, to analyse the degree of risk associated with a project and to compare returns from different projects. These measures are displayed in the Project Proforma screen in ARGUS Developer, and can also be viewed in the Results Panel. Additional performance measures are calculated in the Finance DCF when Structured Debt and Equity is applied to a project.

The performance measures calculated in ARGUS Developer are summarised below, with the exception of the Internal Rate of Return (IRR) which is detailed in Chapter 3 'Internal Rate of Return and Net Present Value' on page 13.

### Profit on Cost%

For a project to be financially viable and attractive to a developer, the developer will seek a margin for risk and profit. This will vary according to the scheme proposed and the state of the market. A developer's target profit margin is generally expressed as a yield calculated in terms of either total costs or total capital value, as shown below.

Profit on Cost is the Profit expressed as a percentage of Total Costs (including interest).

$$\frac{\text{Profit}}{\text{Total Costs}}$$

### Profit on GDV%

The Profit expressed as a percentage of the Gross Development Value. The Gross Development Value is the sum of Unit Sales and Capitalized Rent.

$$\frac{\text{Profit}}{\text{Gross Development Value}}$$

### Development Yield

The Development Yield reflects the investment yield plus the annual return to cover risk and profit, and is used to assess a scheme's viability.

Users may specify on the Calculation tab in Assumptions for Calculation whether the Development Yield is calculated using the Rent or MRV at the Sale Date.

The Development Yield is then calculated as the exit Rent or MRV per annum, inclusive of rental growth if applied, expressed as a percentage of Total Costs (including interest).

$$\frac{\text{Rent or MRV}}{\text{Total Costs}}$$

In ARGUS Developer the user may also specify whether the calculation of the Development Yield is to be net of non recoverable costs, ground rent and rent additions/costs, in the Calculation tab of

the Assumptions for Calculation form. The user may also select whether to include tenants with no capital value.

It should be noted that the development yield will be distorted where there is residential accommodation, for example, which is to be sold to owner occupiers which will not, therefore, be income-producing. This accommodation contributes to total costs but not rental value. A possible solution to this problem would be to create separate phases for the part of the development which is to be sold to owner occupiers and the part which is to be let and income-producing and to apportion the land cost between these two phases.

## Cost per gross sq ft/sq m

The total project or phase cost (including interest) expressed as an amount per gross floor area, in sq ft or sq m. This may be displayed in the Results Panel.

$$\frac{\text{Total Costs}}{\text{Gross floor area}}$$

## Cost per net sq ft/sq m

The total project or phase cost (including interest) expressed as an amount per net floor area, in sq ft or sq m. This may be displayed in the Results Panel.

$$\frac{\text{Total Costs}}{\text{Net floor area}}$$

## Plot Ratio (Floor Area Ratio)

This is a measure of the density of development on the site and is calculated by the total gross floor area expressed as a proportion of the total site area. This may be displayed in the Results Panel.

$$\frac{\text{Total Gross Floor Area}}{\text{Total site area}}$$

## Cap Rent per net sq ft/sq m

The Capital Value, or capitalised rent, expressed as an amount per net floor area, in sq ft or sq m. This may be displayed in the Results Bar.

$$\frac{\text{Capital Value}}{\text{Net floor area}}$$

## Return on Equity (ROE)

This is a measure of the return on capital invested in a project to an individual partner, when Structured Debt and Equity is applied.

$$\frac{\text{Partner profit share}}{\text{Partner Total contribution} + \text{Interest paid}}$$

Please note that if the Include Interest and Finance Fees in IRR Calculations switch in Assumptions for Calculation, Finance tab is **not** checked then interest is excluded from this calculation.

## Pre Finance IRR

This is the Internal Rate of Return calculated on the project cashflow before finance i.e. excluding interest and finance fees.

For further information on the IRR calculation please see Chapter 3 ‘Internal Rate of Return and Net Present Value’ on page 13.

## Equity IRR

This is the overall Internal Rate of Return for all equity funding sources in a project, when Structured Finance is applied. This is calculated from the combined net cashflow for all Equity funding sources.

For further information on the IRR calculation please see “Internal Rate of Return and Net Present Value” on page 13.



# CHAPTER 6

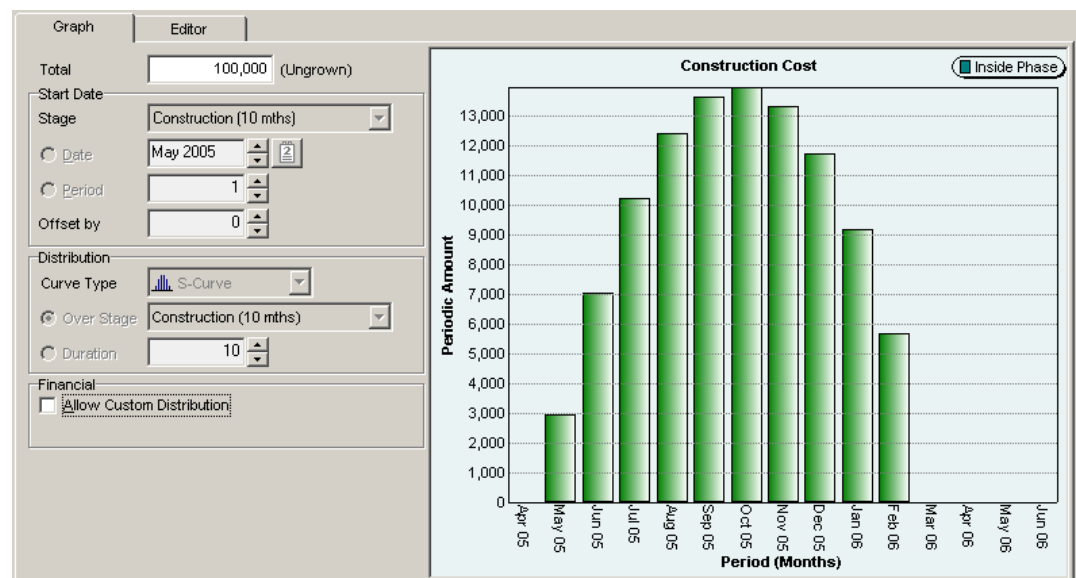
## Distribution

ARGUS Developer provides pre-defined curve types for distributing cost and revenue items in the cash flow over the timescale of the project. The S Curve and Weighted Curve types are detailed below.

### S Curve

S Curve distribution is typically used to spread construction and associated costs over a project contract period. The curve imitates the actual spend pattern in a typical building contract.

The S Curve shows a slow initial spend rate, rising to a peak after the mid point of the construction period and then falling in the period to completion. The resultant cumulative spend curve broadly follows an “S” shape, hence the name of this distribution type.



The formula for the standard construction distribution curve, the “S Curve”, is as follows:

Starting with:

$$\text{Old Val} = 0$$

Then loop through each period with the following equations:

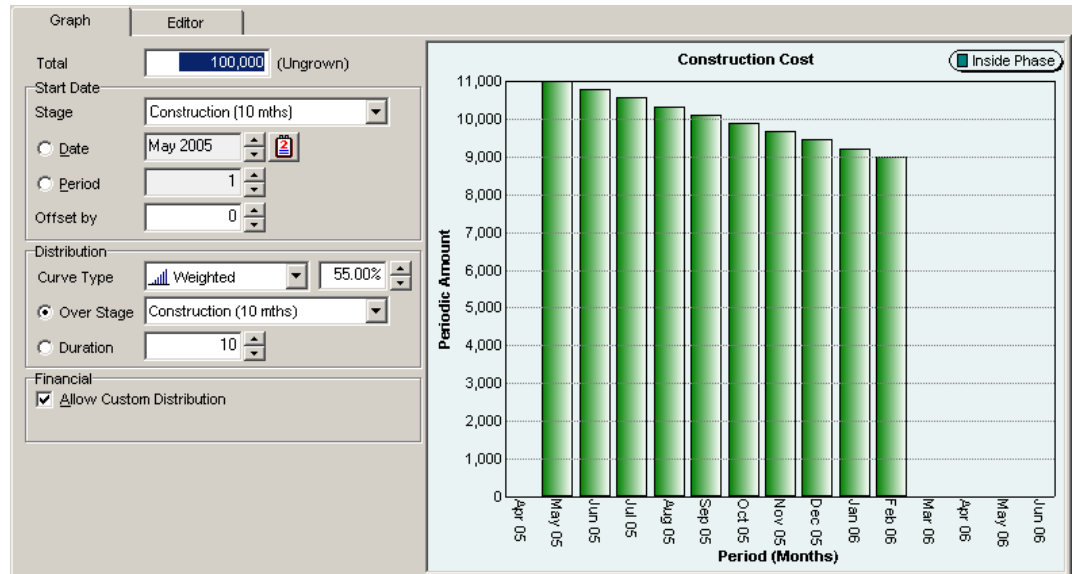
$$CM = \frac{\text{Period Number}}{\text{Number of Periods}}$$

$$\text{NewVal} = \text{Total Value} \times \left[ CM + (0.15 \times CM^2) - (0.15 \times CM) - \frac{(6CM^3 - 9CM^2 + 3CM)}{3.8} \right]$$

$$\text{Period Val} = \text{New Val} - \text{Old Val}$$



the spend rate increasing during the project.



The formula for the weighted curve is as follows:

$$\text{BaseValue} = \frac{\text{Weighting} \times \text{Total Cost}}{\text{Number of Periods}} \times 0.02$$

$$\text{Increment} = \left[ \frac{100 - (\text{Weighting} \times 2)}{\text{Number of Periods} - 1} \right] \times \left[ \frac{\text{Total Cost}}{\text{Number of Periods}} \times 0.02 \right]$$

Starting with:

$$\text{Period} = 0$$

Then loop through each period with the following equations:

$$\text{Period Value} = \text{Base Value} + \text{Period} \times \text{Increment}$$

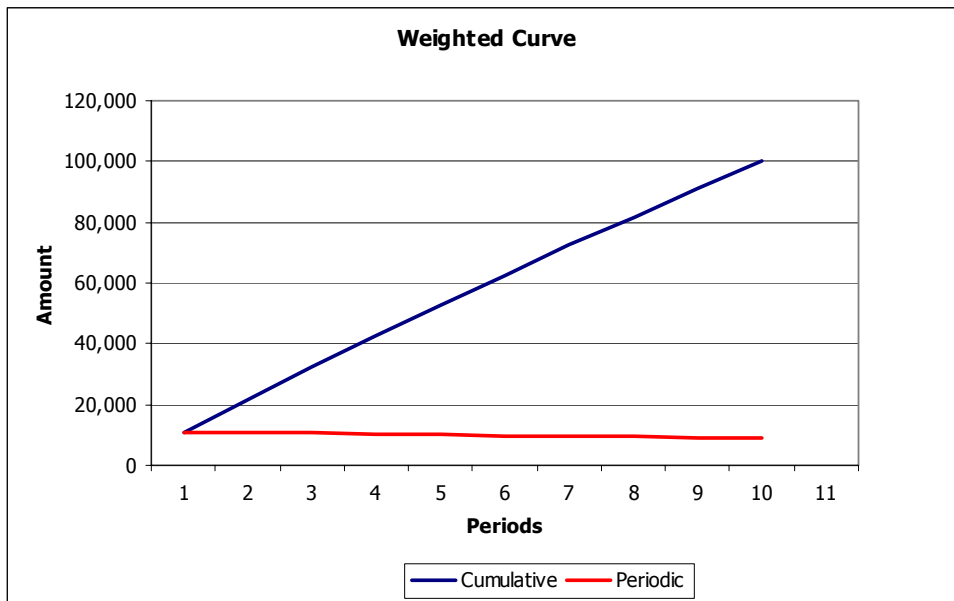
$$\text{Period} = \text{Period} + 1$$

**Example**

This can be illustrated by the following example, assuming a total cost of \$100,000 to be distributed over 10 periods:

		<b>Period</b>	<b>Period Value</b>	<b>Cumulative</b>
Total Cost	100,000	1	11,000	11,000
NumPeriods	10	2	10,778	21,778
Weighting (%)	55	3	10,556	32,333
		4	10,333	42,667
Base Value	11,000	5	10,111	52,778
PeriodIncrement	-222.2222	6	9,889	62,667
		7	9,667	72,333
		8	9,444	81,778
		9	9,222	91,000
		10	9,000	100,000
<b>Total Weighted Curve Amount</b>			<b>100,000</b>	

These values can be displayed graphically as follows:



# CHAPTER 7

## Contact details

Find us on the Web: <http://www.argussoftware.com>

### UK contact details:

ARGUS Software (UK)  
London  
UNITED KINGDOM

Tel : +44 (0)20 8906 4059 or 0845 6440 400

Fax: +44 (0)20 8959 6079

Support Tel : +44 (0)20 8238 8345

**Support email:** [supportEU@argussoftware.com](mailto:supportEU@argussoftware.com)

**Info email:** [infoEU@argussoftware.com](mailto:infoEU@argussoftware.com)

### US contact details:

ARGUS Software  
Houston, TX  
USA

Tel : +1 713-621-4343

Fax: +1 713-621-2787

Support Tel: +1 888-472-1005

**Support email:** [support@argussoftware.com](mailto:support@argussoftware.com)

**Info email:** [info@argussoftware.com](mailto:info@argussoftware.com)

ARGUS Software  
Plano, TX  
USA

Tel : +1 469-791-1000

Fax: +1 469-791-1810

Support Tel: +1 888-472-1005

**Support email:** [support@argussoftware.com](mailto:support@argussoftware.com)

**Info email:** [info@argussoftware.com](mailto:info@argussoftware.com)

ARGUS Software  
Cherry Hill, NJ  
USA

Tel : +1 856-874-4449

Fax: +1 856-874-9179

Support Tel: +1 888-472-1005

**Support email:** [support@argussoftware.com](mailto:support@argussoftware.com)

**Info email:** [info@argussoftware.com](mailto:info@argussoftware.com)

### Canada contact details:

ARGUS Software  
Coquitlam, BC  
CANADA

Toll-free: 1-888-472-1005

Tel : +1 604-472-1001

Fax: +1 604-472-1002

**Support email:** [support@argussoftware.com](mailto:support@argussoftware.com)

**Info email:** [info@argussoftware.com](mailto:info@argussoftware.com)

**Australia and Asia Pacific region contact details:**

ARGUS Software  
Sydney NSW  
AUSTRALIA

Tel : +61 2 9262 1332

Fax: +61 2 9262 1350

**Support email:** [support@argussoftware.com](mailto:support@argussoftware.com)

**Info email:** [infoasiapacific@argussoftware.com](mailto:infoasiapacific@argussoftware.com)

**Malaysia and East Asia region contact details:**

ARGUS Software  
Kuala Lumpur  
MALAYSIA

Tel : +603 6203 2876

Fax: +603 6203 1802

**Support email:** [support@argussoftware.com](mailto:support@argussoftware.com)

**Info email:** [infoeastasia@argussoftware.com](mailto:infoeastasia@argussoftware.com)

**Singapore region contact details:**

ARGUS Software  
SINGAPORE

Tel : +65 6332-9778

Fax: +65 6338-7959

**Support email:** [support@argussoftware.com](mailto:support@argussoftware.com)

**Info email:** [info@argussoftware.com](mailto:info@argussoftware.com)

**Japan region contact details:**

ARGUS Software  
Kanagawa-Ken  
JAPAN

Tel : +81 467-39-1187

Fax: +81 467-39-1186

**Support email:** [support@argussoftware.com](mailto:support@argussoftware.com)

**Info email:** [info@argussoftware.com](mailto:info@argussoftware.com)

**South Africa region contact details:**

ABO Software  
Cape Town  
SOUTH AFRICA

Toll-free: 080 226 7638

Tel : +27 (0)21 447 9592

Fax: +27 (0)21 426 2708

**Info email:** [info@abosoftware.co.za](mailto:info@abosoftware.co.za)

**Symbols**

% Rents 3  
 Arbitrary Breakpoint 5  
 Natural Breakpoint 4  
 Zero Breakpoint 4

**A**

Acquisition costs 10  
 ARGUS Software web address 29

**C**

Cap Rent per net sq ft/sq m 22  
 Capital value 1  
 Capitalized Rent 1, 7, 8, 9  
 Cash Flow 13  
   Inflation 14  
   Interest & finance fees in IRR 14  
   Internal Rate of Return 13  
   Manual Discount Rate for Present Value 14  
   Monthly Discounting 14  
   Net Present Value 13  
   Rent Escalation 14  
 Cost per gross sq ft/sq m 22  
 Cost per net sq ft/sq m 22

**D**

Debt Service Ratio 20  
 Development Yield 21  
 Distribution 25  
   S Curve 25  
   Weighted Curve 26

**E**

Escalation 2

**F**

Finance 17  
   Basic Finance (Interest Sets) 17  
   Breakdown of Interest 18  
   Debt Service Ratio 20  
   Development Finance 17  
   Finance Fees 19  
   Interest Rates 17  
   Mortgage 19  
   Structured Finance 18  
 Floor Area Ratio 22

**G**

Gross Development Value 9  
 Growth/escalation 14

**H**

Hotel Valuation 5  
 Occupancy Profiles 5, 6  
 Occupancy rates 5  
 Room rate 5

**I**

Inflation 14  
 Interest  
   Breakdown of Interest 18  
   Building Interest 18  
   Debt and Credit Rates 17  
   Interest & finance fees in IRR 14  
   Interest Rate Type 17  
   Land Interest 18  
   Other Interest 18  
   Period Total for Interest 17  
   Void Interest 18  
 Internal Rate of Return 13  
   Equity IRR 23  
   Interest & finance fees in IRR 14  
   Pre Finance IRR 14, 23

**L**

Land Transfer Tax 11  
 Cumulative Bands 11  
 Non-Cumulative Bands 12

**M**

Manual Discount Rate 14  
 Market rental value (MRV) 7  
 Mortgage 19  
   Debt Service Ratio 20

**N**

Net Development Value 9  
 Net Operating Income 1  
 Net Present Value 13  
   Manual Discount Rate 14  
 Net Realization 10

**O**

Occupancy Profiles 6  
 Occupancy Rates 5

**P**

Performance Measures 21  
   Cap Rent per net sq ft/sq m 22  
   Cost per gross sq ft/sq m 22  
   Cost per net sq ft/sq m 22  
   Development Yield 21  
   Equity IRR 23  
   Floor Area Ratio 22

Plot Ratio 22  
Pre Finance IRR 23  
Profit on Cost% 21  
Profit on GDV% 21  
Return on Equity (ROE) 22  
Plot Ratio 22  
Profit on Cost% 21  
Profit on GDV% 21  
Purchaser's Costs 10

Capitalization yield 1, 7  
Development yield 21  
Hardcore rate 7

## R

Rent  
  % Rents 3  
  Net Operating Income 1  
  Rent deductions 1  
  Valuation Rent 1  
Rent Escalation 2  
Rent free periods  
  Valuation 8  
Return on Equity (ROE) 22

## S

S Curve 25  
Structured Finance 18

## T

Tax - Property Purchase 11  
Turnover Rents 3

## V

Valuation 1  
  % Rents 3  
  Capital value 1, 7  
  Capitalization yield 7  
  Capitalized Rent 1, 7, 8  
  Core rental income 7  
  Exit valuation 7  
  Hardcore Method 7  
  Hardcore rate 7  
  Hotel Valuation 5  
  Net Operating Income 1  
  Rent Escalation 2  
  Reversion 7  
  Turnover Rent 3  
  Valuation Rent 1  
  Voids and Rent Free Periods 8  
Voids  
  Valuation 8  
  Void Interest 18

## W

Weighted Curve 26

## Y

Yields