



ARGUS
Developer™

Calculations Manual

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ARGUS Software: ARGUS Developer Calculations Manual

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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 cap rate, 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 cap rate are known.

Example

Assuming a property is let at a net rental income of \$1,500,000 pa and applying a cap rate of 8%, the valuation is:

$$8 = \frac{1,500,000}{CR} \times 100$$

So

$$CR = 1,500,000 \times \frac{100}{8}$$

$$CR = 1,500,000 \times 12.5 = 18,750,000$$

Therefore, the capital value (CR) of the property is \$18,750,000.

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

Project Definition Project Cash Flow Pro Forma Data Checker					
Pro Forma for Part 1 Office Building					
REVENUE					
Rental Area Summary					
	Units	ft²	Rate ft²	Unit Amount	Rent at Lease Start
Office Building	1	50,000	\$30.00	\$1,500,000	1,500,000
Investment Valuation					
Office Building					
Capitalized Rent	1,500,000	Cap Rate	8.0000%	18,750,000	
Income from Tenants				3,000,000	
TOTAL PROJECT REVENUE				21,750,000	

So the basic formula for valuation is:

$$\text{Capitalised Rent} = \text{Net Rental Income} \times \text{Years Purchase}$$

The multiplier 12.5 (see the above example) is calculated from $\frac{100}{8}$ and is known as the **Years Purchase** or **YP**.

The YP in perpetuity is calculated as follows:

$$YP \text{ in perp} = \frac{100}{y} \text{ Where } y \text{ is the yield expressed as a percentage (in the above example, 8\%).}$$

This can also be expressed as follows: $YP \text{ in perp} = \frac{1}{i}$ where i is the yield (in the above example 0.08).

The above formula may be used to calculate the capital value of simple, rack rented freehold investments (where the rent passing is equal to the market rent). However for more complex valuations which take account of, for example, future changes in income, the formula must be expanded (see “**Hardcore Method**” on page 12).

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 ground rent and other non-recoverable outgoings such as vacancy 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**, and is displayed in the Capitalized Rent form, as follows:

Heading	Office Building Prelet A	Gross Unit Area ft²	10,000	Additional Unit Area ft²	0
Unit Number		Gross Area ft²	10,000	Additional Area ft²	0
Use Type	Undefined	Net Unit Area ft²	10,000	Alternate Area	0
Number of Units	1	Net Area ft²	10,000	ITZA Area ft²	0
Parking Stalls	0.0	Gross:Net Ratio	100.00%	Locked	

Construction Cost		Rent		Rent Capitalization	
	Frequency		Percentage Rent	Lease	Frequency
Rate pF	0.00	Market Rent Rate pF pa	50.00	Tenure	Freehold
Rate Additional pF	0.00	Rental Escalation	(None)	Cap Rate%	10.000%
Cost / Unit	0	Step Rent Profile	(None)	Initial Rent	500,000
Cost / Parking Stall	0	Annual Rent / Unit	500,000	Changes during Lease	0
Parking Stalls Cost	0	Gross Market Rent pa	500,000	Rent at Capitalization Date	449,000
Gross Cost	0	Initial Rent	500,000	% Non-Recov. Cost	10.000%
Stage	Construction	% Non-Recov. Cost	10.000%	Fixed Non-Recov. Cost	1,000
Starts in	Apr 2010	Fixed Non-Recov. Cost	1,000	Total Ground Rent Deduct	0
Distribution Months	12	Total Non-Recov. Cost	51,000	Total Costs	51,000
TI Rate pF (Leasing)	0.00	Ground Rent Deductions	0	Percentage Rent	0
		Annual Rent	449,000	Valuation Rent	449,000
		Rent Free Period (Months)	0	Capitalized Rent	4,490,000
		Lease Comm. Profile	(None)	Manual Capital Value	0
		Lease Comm. Distribution		Stage	Sale
				Capitalized At	Apr 2014

The Valuation Rent, or net rent, in this example is, therefore, \$449,000 per annum.

$$\text{Valuation Rent} = 5,000,000 - 51,000 = 4,490,000$$

The Net Rent is \$423,500 per annum.

Rental Escalation

If rental escalation is applied from the project start date, then the initial rent will include escalation at the specified rate for the period from the project start date to the letting date. Ground rent and other deductions, where these are specified as a percentage of rent, are calculated on the inflated annual gross rent. Fixed deductions are not escalated.

The formula to calculate rental escalation is as follows:

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

Where:

R = Rent to be inflated

i = Annual rate of rental escalation, as a percentage

n = Escalation period in months

The net rent is then calculated as follows:

Net Rent =

$$(\text{Annual Gross Rent} \times \text{Rental Growth}) - (\text{Total Non Recov Cost} + \text{Total GR Deduction})$$

where Total Non Recov. Cost and Total GR Deduction (where specified as a % rent) are calculated on the inflated annual gross rent.

Example

A leasehold property, with ground rent calculated as 5% tenants' rents plus a fixed ground rent of \$500 pa. The property is 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 24 months after the project start date and that rental escalation of 3% per annum is applied from the project start date, the graphic below displays the resultant Net Rent.

The inflated Annual Gross Rent is the rent at which the building is assumed to let, taking into account rental 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 Net Rent in the above example is as follows:

$$\text{Inflated Annual Gross Rent} = 500,000 \times \left[\left(1 + \frac{3}{12} \right)^{24} \right] = 530,450$$

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

$$\text{Total Non Recov Cost} = (10\% \times 530,450) + 1,000 = 54,045$$

$$\text{Total GR Deduction} = (5\% \times 530,450) + 500 = 27,022.5$$

So

$$\text{Net Rent} = 530,450 - (54,045 + 27,022.5) = 449,382.5$$

Rounding to the nearest whole number gives a Net Rent of \$449,383 per annum.

% Rents

Percentage, or % rent calculations are 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 % 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 Rental 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

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:

$$\% \text{ Rent pa} = 1,000,000 \times 0.07 = 70,000$$

Heading:	Retail Unit #	Gross Unit Area ft ² :	5,500	Additional Unit Area ft ² :	0
Unit Number:		Gross Area ft ² :	5,500	Additional Area ft ² :	0
Use Type:	Retail Shop	Net Unit Area ft ² :	5,000	Alternate Area:	0
Number of Units:	1	Net Area ft ² :	5,000	ITZA Area ft ² :	0
Parking Stalls:	0.0	Gross:Net Ratio:	99.91%	Locked:	

Construction Cost		Rent		Rent Capitalization	
Rate pF	0.00	Market Rent Rate pF pa	0.00	Tenure	Freehold
Rate Additional pF	0.00	Rental Escalation	(None)	Cap Rate%	0.0000%
Cost / Unit	0	Step Rent Profile	(None)	Initial Rent	0
Cost / Parking Stall	0	Annual Rent / Unit	0	Changes during Lease	0
Parking Stalls Cost	0	Gross Market Rent pa	0	Rent at Capitalization Date	70,000
Gross Cost	0	Initial Rent	0	% Non-Recov. Cost	0.0000%
Stage	Construction	% Non-Recov. Cost	0.0000%	Fixed Non-Recov. Cost	0
Starts in	Oct 2009	Fixed Non-Recov. Cost	0	Total Ground Rent Deduct	0
Distribution Months	1	Total Non-Recov. Cost	0	Total Costs	0
TI Rate pF (Leasing)	0.00	Ground Rent Deductions	0	Percentage Rent	70,000
		Annual Rent	0	Valuation Rent	70,000
		Rent Free Period (Months)	0	Capitalized Rent	1,166,567
		Lease Comm. Profile	(None)	Manual Capital Value	0
		Lease Comm. Distribution		Stage	Sale
				Capitalized At	Oct 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. In this case, the % Rent is calculated as follows:

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

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:

$$\text{Natural Breakpoint} = \frac{10,000}{0.08} = 125,000$$

$$\% \text{ Rent pa} = (1,000,000 - 125,000) \times 0.08 = 70,000$$

$$\text{Total Rent Payable pa} = 10,000 + 70,000 = 80,000$$

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 % 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:

$$\% \text{ Rent } pa = (1,000,000 - 200,000) \times 0.08 = 64,000$$

$$\text{Total Rent Payable } pa = 100,000 + 64,000 = 164,000$$

Operated Asset Valuations

In ARGUS Developer, any property type whose income is derived from operations, such as hotels, golf courses, marinas or amusement parks, is valued on a different basis to the more usual commercial leases.

The valuation is based on the Net Operating Income (NOI) projected twelve months into the future starting on the Capitalization Date. The total Net Operating Income for this period is divided by a Capitalization Rate to calculate the Capital Value.

Net Operating Income comprises several key elements: base revenue generated from operations, direct operating expenses, indirect operating expenses and, possibly, management charges, allowances for replacement of fixtures and fittings and insurance. The exact mix of revenues and costs will be determined by the asset type.

To establish the Net Operating Income for an operated asset, a profile that holds the number of units, rates per unit and frequency of use must be defined. The rates in each of the tables may be constant or they can vary in value month by month.

Other operating revenues can be expressed as a percentage of the Base Revenue, or can be specified by a number of different calculation methods which will be discussed later.

Direct and Indirect operating expenses can be calculated as a percentage of their associated operating revenue types, but, again, different calculation methods are available.

Occupancy and Rate Profiles

A profile is a collection of tables that describe the physical dimensions of the asset, the number of units, the rates charged for using the asset and the frequency of use, or occupancy. Each table allows the entry of data that can remain constant, or that may vary, month by month.

Taking a hotel as an example, the base revenue is typically calculated as:

$$\text{Total Base Revenue} = \text{Number of Rooms} \times \text{Room Rate} \times \text{Occupancy}$$

The calculation is performed for each period of the projection, building up a cash flow of operating revenue. Once the Base Revenue has been established, any other operating revenues and expenses can be calculated.

Where the number of years specified in the tables is less than the number of years in the cash flow projection, the program will use the data from the final year in each table for the remainder of the projection.

Calculation Methods

The calculation methods available to define operated assets are selected from the Operating Revenues/Expenses tab in the Operated Assets Editor. The Calculation Type drop down selector is used to select a calculation method for the Revenue or Expense.

Base Income

The Base Income calculation method is used to specify the basic core revenue for an asset. For hotels, this would be room revenue, for marinas, this would be berthing charges.

The Base Income method takes as its parameters a list of tables that have been set up on the Occupancy and Rates tab. The calculation multiplies the rate in each period of a table with the corresponding period rate in the next table, and so on. The result of each of these calculations is then multiplied by the number of units on the Area Record. So, if there are three tables used to define the revenue, the calculation would be as follows:

$$\text{Total Base Income} = \text{Number of Units} \times (T1_1 \times T2_1 \times T3_1) + (T1_2 \times T2_2 \times T3_2) + \dots + (T1_n \times T2_n \times T3_n)$$

Where:

Number of Units = number of units entered in the area record

$T1_1$ = value in the first period of Table 1

$T2_1$ = value in the first period of Table 2

$T3_1$ = value in the first period of Table 3

The result of each period's multiplication is placed in the cash flow as the base revenue for the month.

Percent of Base Income

This calculation method is used to multiply a percentage rate against each month's Base Revenue. The percentage rate may be a single rate for all periods, or may vary month by month. It will not include any items that are defined as 'Other Income'.

$$\text{Total \% of Base Income} = (BI_1 \times \%BI_1) + (BI_2 \times \%BI_2) + \dots + (BI_n \times \%BI_n)$$

Where:

BI_1 = Base Income in month 1

$\%BI_1$ = % of Base Income in month 1

Other Income

The Other Income calculation method is similar to the Base Income type, in that it takes a list of Occupancy and Rate tables and performs the same type of rate calculations. The difference is that it is not included in the 'Percent of Base Income' calculations.

Percent of Section Total

The Percent of Section Total calculation is used to multiply a percentage rate against the monthly total of all revenues or expenses held in a Section. A Section is defined on the Operating Revenues/Expenses tab and is used to group similar types of revenues or expenses. The percentage rate may be a single rate for all periods, or may vary month by month. It can be used on any section in a profile.

$$\text{Total \% of Section Total} = (ST_1 \times \%ST_1) + (ST_2 \times \%ST_2) + \dots + (ST_n \times \%ST_n)$$

Where:

ST_1 = Section Total in month 1

$\%ST_1$ = % of Section Total in month 1

Percent of Line Item

The Percent of Line Item calculation is used to multiply a percentage rate against the monthly total of any other revenue or expense item. The percentage rate may be a single rate for all periods, or may vary month by month. It can be used on any line item in any section in the profile.

$$\text{Total \% of Line Item} = (LI_1 \times \%LI_1) + (LI_2 \times \%LI_2) + \dots + (LI_n \times \%LI_n)$$

Where:

LI_1 = Line Item amount in month 1

$\%LI_1$ = % of Line Item amount in month 1

Amount per Occupied Asset

The Amount per Occupied Asset calculation method is used to multiply an amount against the number of times an asset is occupied or used, per day, per week, or, per month.

This calculation method takes as its parameters the number of units entered into the Area Record and a list of tables that define the occupancy or use, a rate type – daily, weekly, or monthly, and a rate. The rate may be constant for all periods, or may vary month by month.

Where the rate is specified as a daily or weekly rate, it will be multiplied by the number of days or weeks in each month to calculate the monthly amount.

$$\text{Total Amount per OA} = \text{Number of Units} \times (U_1 \times O_1 \times R_1) + (U_2 \times O_2 \times R_2) + \dots + (U_n \times O_n \times R_n)$$

Where:

Number of Units = number of units entered into the area record

U_1 = number of units in the first period of Table 1

O_1 = occupancy rate in the first period of Table 2

R_1 = rate per occupied unit in the first period

Amount per Available Asset

The Amount per Available Asset calculation method is used to multiply an amount against the number of times an asset is available per month.

This calculation method takes as its parameters the number of units entered into the Area Record and a table that defines the number of available units, a rate type – daily, weekly, or monthly, and a rate. The rate may be constant for all periods, or may vary month by month.

Where the rate is specified as a daily or weekly rate, it will be multiplied by the number of days or weeks in each month to calculate the monthly amount.

$$\text{Total Amount per AA} = \text{Number of Units} \times (U_1 \times R_1) + (U_2 \times R_2) + \dots + (U_n \times R_n)$$

Where:

Number of units = number of units entered into the area record

U_1 = number of units in the first period of Table 1

R_1 = rate per available unit in the first period

Amount per Unit

The Amount per Unit calculation method is used to multiply a rate against the number of units in each month of the projection.

This calculation method takes as its parameters a table that defines the number of available units and a monthly rate. The rate may be constant for all periods, or may vary month by month.

$$\text{Total Amount per Unit} = (U_1 \times R_1) + (U_2 \times R_2) + \dots + (U_n \times R_n)$$

Where:

U_1 = number of units in the first period of Table 1

R_1 = rate per unit in the first period

Amount per Month

The Amount per Month calculation method is used to place a monthly amount in each month of the cash flow projection. The amount can be constant for all periods, or may vary month by month.

Amount per Week

The Amount per Week calculation method is used to place a weekly amount in each month of the cash flow projection. The amount can be constant for all periods, or may vary month by month.

The Weekly amount will be automatically multiplied by the number of weeks in each month to calculate the monthly amount.

$$\text{Total Amount per Week} = \left(WR_1 \times \frac{Days_1}{7} \right) + \left(WR_2 \times \frac{Days_2}{7} \right) + \dots + \left(WR_n \times \frac{Days_n}{7} \right)$$

Where:

WR_1 = Weekly rate

$Days_1$ = Number of days in the month

Amount per Activity

The Amount per Activity calculation method is used to multiply an amount by the number of activities that take place, daily, weekly or monthly.

This calculation method takes as its parameters a table that defines the number of activities – daily, weekly or monthly, and rate. The rate may be constant for all periods, or may vary month by month.

The calculation will automatically recognize whether the table of activities is specified in terms of daily or weekly activities and will multiply the rate by the number of days or weeks in each month as appropriate.

$$\text{Total Amount per Activity} = (A_1 \times R_1) + (A_2 \times R_2) + \dots + (A_n \times R_n)$$

Where:

A_1 = number of activities in the first period of Table 1

R_1 = rate per activity in the first period

Percent of Section Total (Net)

The Percent of Section Total (Net) calculation is used to multiply a percentage rate against the monthly total of all revenues or expenses held in a Section and where the item itself is included in the total. To be able to calculate the Section Total, there must be at least item whose value is already established and in this calculation method, it is a Base Income that must be present.

A Section is defined on the Operating Revenues/Expenses tab and is used to group similar types of revenues or expenses. The percentage rate may be a single rate for all periods, or may vary month by month. It can be used on any section in a profile.

The calculation for each item is:

$$\text{Total \% of Section Total(Net)} = (BI_1 \div (1 - \sum \%ST_1) \times \%R_1) + (BI_2 \div (1 - \sum \%ST_2) \times \%R_2) + \dots + (BI_n \div (1 - \sum \%ST_n) \times \%R_n)$$

Where:

BI_1 = Base Income in month 1

$\sum \%ST_1 =$ Total % of Section Total in month 1

$\%R_1 =$ % rate in month 1

Rate per Linear foot/meter

The Rate per Linear foot/meter calculation method is used to multiply a rate by the number of linear feet/meters for an asset in each month of the projection. This is typically used in Marina valuations where the berth length, or dock length is used as a basis for calculation.

The units of measurement are the same as those used throughout the system and can be converted between Imperial and metric.

This calculation type takes as its parameters a table of linear measurements and a rate. The rate may be a single rate for all periods, or may vary month by month.

The calculation for each item is:

$$\text{Total Rate per Linear foot} = (A_1 \times R_1) + (A_2 \times R_2) + \dots + (A_n \times R_n)$$

Where:

A_1 = the linear measurement in either feet or metres in the first period of Table 1

R_1 = rate per linear measurement in the first period

Rate per Square foot/meter

The Rate per Square foot/meter calculation method is used to multiply a rate by the number of square feet/meters for an asset in each month of the projection.

The units of measurement are the same as those used throughout the system and can be converted between Imperial and metric.

This calculation type takes as its parameters a table of square measurements and a rate. The rate may be a single rate for all periods, or may vary month by month.

The calculation for each item is:

$$\text{Total Rate per Square foot} = (A_1 \times R_1) + (A_2 \times R_2) + \dots + (A_n \times R_n)$$

Where:

A_1 = the square measurement in either feet or metres in the first period of Table 1

R_1 = rate per square measurement in the first period

Example

To use a simple example for illustrative purposes:

A hotel with 125 double rooms, all of which are available at a rate of \$80 per night. The average occupancy is 70% and the projection period is two years, starting in January. There are no leap years in the projection period. The hotel is sold at the end of the two year projection period.

Operating Revenues are generated at a rate of 50% of Room Revenues and Operating Expenses are incurred at a rate of 35% of Gross Operating Revenue.

The revenue per occupied room per night is calculated as:

Number of Rooms × Room Rate × Occupancy

$$125 \times 80 \times 0.70 = 7,000$$

The Room Revenue per month, say January, is calculated as:

Revenue per night × Number of nights in month

$$(7,000 \times 31) = 217,000$$

And the Room Revenue for the two years' projection is:

$$[(7,000 \times 31) + (7,000 \times 28) + \dots + (7,000 \times 31)] \times 2$$

$$[(217,000) + (196,000) + \dots + (217,000)] \times 2 = 5,110,000$$

Operating Revenues are calculated as:

Room Revenue × Operating Rate

$$[(217,000 \times 0.5) + (196,000 \times 2) + \dots + (217,000 \times 0.5)] \times 2$$

$$[108,500 + 98,000 + \dots + 108,500] \times 2 = 2,555,000$$

So, Gross Operating Revenue is:

$$[(217,000 + 108,500) + (196,000 + 98,000) + \dots + (217,000 + 108,500)] \times 2 = 7,665,000$$

Operating Expenses are calculated as:

Gross Operating Revenue × Operating Rate

$$[((217,000 + 108,500) \times 0.35) + ((196,000 + 98,000) \times 0.35) + \dots + ((217,000 + 108,500) \times 0.35)] \times 2$$

$$[37,975 + 34,300 + \dots + 37,975] \times 2 = 894,250$$

So, Net Operating Income is:

Gross Operating Revenue – Operating Expenses

$$[(325,000 - 37,975) + (294,000 - 34,300) + \dots + (325,000 - 37,975)] \times 2$$

$$[287,525 + 259,700 + \dots + 287,525] \times 2 = 6,770,750$$

The Net Operating Income is capitalized after two years to produce the capital value for the hotel. The method adopted for operated assets is to capitalize the final year's Net Operating Income on an Initial Yield basis.

The Capital Value is calculated as:

NOI from 12 month projection period × 100 ÷ Yield%

$$[287,525 + 259,700 + \dots + 287,525] \times 100 \div 9$$

$$3,385,375 \times 11.1111 = 37,615,278$$

The Capital Value for the hotel is, therefore \$37,615,277

Capitalization Method

A valuation is undertaken for each tenant/unit in the Capitalized Rent form in Argus Developer, provided a cap rate, is entered.

There are three capitalization options available for the valuation. These methods can be selected from the **Capitalization Method** drop-down in the Receipts tab of the Assumptions for Calculation window.

The options are:

- Hardcore;
- Capitalize Sale Date NOI;
- Capitalize 12 month NOI. See
- **Capitalize 12 month NOI” on page 15.**

These methods of calculation are outlined below.

Capitalize Sale Date NOI

The initial yield valuation method capitalizes the net rent at the sale date into perpetuity, as outlined in the Valuation section at the start of this chapter. The basic formula is:

$CR = NI \times \text{Years' Purchase into perpetuity}$

$$CR = NI \times \frac{1}{i}$$

Where:

CR = Gross capital value, or capitalized rent.

NI = Net current rent per annum (net of any deductions and ground rent) i.e. Net Rent.

I = Capitalization rate.

Please note that if the rent is zero at the sale date (for example, if there is a vacancy or a free rent period in effect), then the last known rent before the vacancy or free rent period will be capitalized.

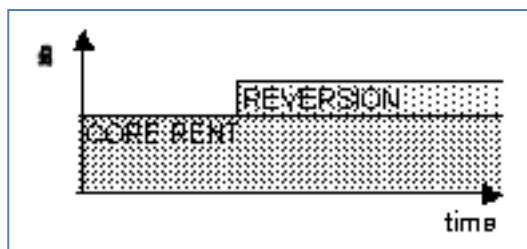
Hardcore Method

When the Hardcore method of valuation is used, ARGUS Developer takes the Net rent at the sale date and the market rental value (MRV) at that date, if different, and applies the appropriate capitalization rate to calculate the capital value.

The Hardcore method values rental income in layers. The **“core” net rental income** is valued into perpetuity at the “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 cap rate and discounted to a present value.

This can be illustrated as follows:



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

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

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

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

n = Number of years from the valuation date to the reversion to market rent

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

Example

As an example, assuming 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:

$$CR = \left[100,000 \times \frac{1}{0.08} \right] + \left[15,000 \times \frac{1}{0.08} \times (1 + 0.08)^{-4} \right]$$

$$CR = 1,250,000 + 137,818 = 1,387,818$$

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

This example valuation is displayed on the Project Pro Forma page of ARGUS Developer as follows:

Project Definition Project Cash Flow Pro Forma Data Checker						
Pro Forma for Part 5 Office Bldg C						
REVENUE						
Rental Area Summary	Units	ft²	Rate ft²	Unit Amount	Rent at Lease Start	
± Office Building C	1	5,000	\$20.00	\$100,000	100,000	
Investment Valuation						
Office Building C						
Capitalized Rent	100,000	Cap Rate	8.0000%	1,250,000		
Reversion	15,000	Cap Rate	8.0000%			
		PV 4yrs @	8.0000%	137,818		
				1,387,818		

Vacancies and Free Rent Periods

The user may specify vacancy and free rent periods in the Capitalized Rent form in ARGUS Developer.

Free rent periods may be applied at the start of the lease and on a renewal lease. A **vacancy period** may be entered on lease expiry (or break) prior to re-letting. 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 vacancy and/or free rent period on lease expiry/break, followed by a reversion to market rent, following the hardcore method of valuation.

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

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

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_d = YP (single rate) for d years

i = Hardcore rate (yield)

n = Number of years from the valuation date to the start of the vacancy or free rent period

d = Total duration of the vacancy and/or free rent period in years

Example

Assuming a rack rented 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 vacancy, before the property is relet at the market rent of \$115,000 per annum with an initial 3 month free rent period. There will therefore be a total period of 9 months during which the property will be non-income-producing.

Adopting a cap rate of 8%, the valuation is as follows:

$$CR = \left[100,000 \times \frac{1}{0.08} \right] - \left[100,000 \times \frac{1 - (1+0.08)^{-0.75}}{0.08} \times (1 + 0.08)^{-4} \right] + \left[15,000 \times \frac{1}{0.08} \times (1 + 0.08)^{-4.75} \right]$$

So

$$CR = 1,250,000 - 51,532 + 130,088 = 1,328,557$$

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

This example valuation is displayed on the Project Pro Forma page of ARGUS Developer as follows:

Project Definition Project Cash Flow Pro Forma Data Checker					
Pro Forma for Part 6 Office Bldg C - Void/RF					
REVENUE					
Rental Area Summary	Units	ft ²	Rate ft ²	Unit Amount	Rent at Lease Start
± Office Building C	1	5,000	\$20.00	\$100,000	100,000
Investment Valuation					
Office Building C					
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	
				1,328,557	

Capitalize 12 month NOI

Calculations

The “Capitalize 12 month NOI” option uses the following calculation methodology:

1. **Base Rental Income** - includes the following:
 - Base Rent from current term at the time of sale and continuing as per the actual term of the lease (such as escalations or steps if any).
 - If the current term ends during the 12 month period, market rental value during any vacant and/ or free rent periods.
 - Renewal rent for any subsequent term(s) that fall within the 12 month period.

All of these are subject to any vacancy percentage or fixed amount that was applied at the point of sale (in other words, under the Capitalization section of the Area form). The sum of these is the basis of capitalization for the base income component. No further adjustment is made where there is rental loss due to vacancies or free rent.

2. **% Rent** - if there is any % rent calculated, it would only apply for the remainder of the term in effect at the time of sale (maximum of 12 months), plus any renewal (only where there is no vacancy or free rent between terms) that falls within the 12 month period. No adjustment would be made for “market” percentage rent or any renewals where there has been a vacancy or free period.
3. **Rent Additions and Costs** - only those that are capitalized are included. Rent Additions and Costs are calculated during free rent periods, so only the treatment of Rent Additions and Costs during vacancies need be considered. Since Base Rent is being calculated during periods of vacancy, Rent Additions and Costs are included also to simulate having a lease in place. Therefore, Rent Additions and Costs are included during the entire 12 month period, with no need to do separate calculations for each base term/vacancy/renewal segment that could be included in the 12 months. These are not subject to vacancy at this time.
4. **TIs and Lease Commissions** - it is possible to have TIs and/or Commission costs payable in respect of a new or renewal lease that would commence during the 12 month projection. On the Receipts tab in the “Capitalization” area, if the **Deduct Post-Sale TI Costs and Lease Commissions from Capital Value** check box is checked on, this reduces the proceeds of sale when this Capitalization method is active.

Escalation and Inflation

During the 12 month run off period, it is assumed that escalation will continue on rent, percentage rent and Additional Rent revenues. Inflation will continue on TI costs and Additional Rent costs.

Historic Data Files

Existing files are defaulted to calculate according to the current calculation methodology, in respect of capitalization (in other words, “off”) so values will not change on existing files.

Gross Development Value

The Gross Development Value is the sum of the following:

- Capitalized Rent: the capitalization of net rental income before deduction of acquisition fees (from the Capitalized Rent form in ARGUS Developer);
- Gross sales receipts (from the Unit Sales forms in ARGUS Developer).

Project Definition Project Cash Flow Pro Forma Data Checker					
Pro Forma for Part 7 Residential & Office					
REVENUE					
Sales Valuation					
Two Bed Apartments	Units	ft ²	Rate ft ²	Unit Price	Gross Sales
	1	20,000	\$250.00	\$5,000,000	5,000,000
Rental Area Summary					
	Units	ft ²	Rate ft ²	Unit Amount	Rent at Lease Start
Office Building	1	50,000	\$30.00	\$1,500,000	1,500,000
Office Building A1 Prelet	1	10,000	\$50.00	\$500,000	500,000
Totals	2	60,000			2,000,000
Investment Valuation					
Office Building					
Capitalized Rent	1,500,000	Cap Rate	8.0000%	18,750,000	
Office Building A1 Prelet					
Capitalized Rent	474,500	Cap Rate	8.0000%	5,885,972	
				24,635,972	
GROSS DEVELOPMENT VALUE				29,635,972	
Purchaser's Costs		5.76%	(1,342,298)		
NET DEVELOPMENT VALUE				28,293,674	

Net Development Value

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

$$NDV = GDV - A$$

where:

NDV = Net Development Value

GDV = Gross Development Value

A = 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 (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' fees, legal fees and any other acquisition costs, totaled to give a single percentage figure.

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

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

where

CR = Capitalized Rent

a = Purchaser's costs, expressed as a percentage

A = Purchaser's costs, expressed as an amount

In ARGUS Developer, in the Expenditure tab of the Assumptions for Calculation form, 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 the Assumptions for Calculation form, 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 percentage of the purchase price. In ARGUS Developer, this is calculated on the Land Acquisition Price.

Land Transfer Tax can be entered as a single percentage rate or amount in the Land Transfer Tax 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 percentage 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.

The screenshot shows the 'Land Transfer Tax Schemes' window. On the left is a 'Land Transfer Tax Scheme Browser' with a list containing 'Canada - British Columbia' and 'Canada - Ontario'. The main area is titled 'Canada - Ontario' and contains the following fields and table:

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

At the bottom right are 'OK' and 'Cancel' buttons.

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 totaled 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
	55,000	0.50%
55,001	250,000	1.00%
250,001	No Limit	1.50%

Tax calculation:

55,000	@ 0.50%	275
195,000	@1.00%	1,950
<u>750,000</u>	<u>@1.50%</u>	<u>11,250</u>
1,000,000		13,475

So the Land Transfer 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, Land Transfer 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
	125,000	0.00%
125,001	250,000	1.00%
250,001	500,000	3.00%
500,001	No Limit	4.00%

Tax is calculated on the whole purchase price at 3.00%, since the property purchase price of 450,000 falls within the band 250,001-500,000.

So the Land Transfer Tax payable is:

$$450,000 \times 3.00\% = \$13,500$$

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_{an} = Valuation net of associated costs

The Cash Flow works through 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 (*producing 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 in 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, the 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 in 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 Pro Forma report.

Interest 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 the Assumptions for Calculation form.

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 34) which is always calculated on the project cash flow excluding interest and fees.

Inflation and Rental Escalation

Inflation and rental 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 of second month of the project), by selecting the required setting in the Inflation/Escalation tab of Assumptions for Calculation.

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

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

Where:

C = Amount to be inflated

i = Annual rate of escalation/inflation

n = Escalation period in months from project/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
Distribution Months	4
Inflation Rate	3%

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

Interest Rates

The interest rate type to be used in ARGUS Developer may be set in the Interest/PR Sets tab of the Assumptions for Calculation form.

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 into 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

It should be noted that the breakdown of interest is provided for information purposes only. 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 Vacancy 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 Vacancy period.

Vacancy Interest

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

Other Interest

This is the interest attributable to all costs from the end of the Letting Vacancy 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 realizes 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 Vacancy. If the phase realizes 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.

Project / Category / Project Cash Flow / Finance Cash Flow	Total	No Finance Date Choice									
		1	2	3	4	5	6	7	8		
		Apr 2012	May 2012	Jun 2012	Jul 2012	Aug 2012	Sep 2012	Oct 2012	Nov 2012		
Finance (Project Cash Flow Pre-Finance)		IRR: 14.2%									
Finance (Land Loan)		IRR: 0.0% Profit Amount: \$0									
Finance (Equity Investor 1)		IRR: 15.0% After Tax IRR: 10.0% ROI: 110.0% After Tax ROI: 77.0% Profit Amount: \$1,322,070 Total After Tax Profit: \$1,641,900									
Titled Contribution: Project	0	0	0	0	0	0	0	0	0	0	
Auto Project Cost - Project Cost	(7,402,200)	(7,584,094)	(26,990)	(6,750)	(6,750)	(6,750)	0	(463,502)	(712,237)	0	
Auto Project Cost - Project Funds	(28,210)	0	0	0	0	0	0	0	0	0	
Auto Project Contribution	(2,432,094)	(1,584,094)	(26,990)	(6,750)	(6,750)	(6,750)	0	(463,502)	(712,237)	0	
Total Contribution	(2,432,094)	(1,584,094)	(26,990)	(6,750)	(6,750)	(6,750)	0	(463,502)	(712,237)	0	
Interest	0	0	0	0	0	0	0	0	0	0	
Titled Repayment: Project	0	0	0	0	0	0	0	0	0	0	
Auto Repayment	3,432,094	0	0	0	0	0	0	0	0	0	
Total Repayment	3,432,094	0	0	0	0	0	0	0	0	0	
Opening Balance	0	(1,584,094)	(1,611,083)	(1,617,750)	(1,624,502)	(1,631,250)	(1,638,002)	(2,654,502)	(2,767,849)	0	
Titled Pre-Tax Profit Participation	0	0	0	0	0	0	0	0	0	0	
Auto Pre-Tax Profit Participation	3,522,070	0	0	0	0	0	0	0	0	0	
Total Pre-Tax Profit Participation	3,522,070	0	0	0	0	0	0	0	0	0	
Net Cash Flow (IRR)	3,522,070	(1,584,094)	(26,990)	(6,750)	(6,750)	(6,750)	0	(463,502)	(712,237)	0	
Cumulative Net Cash Flow	0	(1,584,094)	(1,611,083)	(1,617,750)	(1,624,502)	(1,631,250)	(1,638,002)	(2,654,502)	(2,767,849)	0	
Tax on Profit	(889,310)	0	0	0	0	0	0	0	0	0	
After Tax Profit	2,641,553	0	0	0	0	0	0	0	0	0	
Net Cash Flow After Tax (IRR)	2,641,553	(1,584,094)	(26,990)	(6,750)	(6,750)	(6,750)	0	(463,502)	(712,237)	0	
Cumulative Net Cash Flow After Tax	0	(1,584,094)	(1,611,083)	(1,617,750)	(1,624,502)	(1,631,250)	(1,638,002)	(2,654,502)	(2,767,849)	0	
Finance (Structure)		IRR: 10.4% After Tax IRR: 25.4% ROI: 132.0% After Tax ROI: 97.7% Profit Amount: \$1,367,963 Total After Tax Profit: \$1,617,732									
Finance (Construction Loan)		IRR: 0.7% Profit Amount: \$0									
Finance (Retaining Account)		IRR: 0.0%									
Finance (Combined Sources)		IRR: 9.7% After Tax IRR: 7.0%									

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

Finance Fees

Finance fees may be defined either as fixed amount fees or calculated as a related %. Finance fees calculated as a related amount may be linked to:

- Drawn Amount. The fee is calculated as a percentage of the amount contributed.
- Fixed Loan Amount. The fee is calculated as a percentage of a fixed amount specified by the user.
- Undrawn Amount. The fee is calculated as a percentage of the difference between the amount committed at the start and the amount actually contributed in any period.
- Fixed Undrawn Amount. The fee is calculated as a percentage of a fixed amount specified by the user.

The Finance Fee tab of the Finance form also presents the user with options to specify when fees are first charged and the charging period.

For fees calculated as a percentage of the Undrawn Amount, the user may specify whether this is charged if the loan remains undrawn at the end of the project financing.

Mortgage

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

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

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

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
Quarterly	3	4
Six Monthly	6	2
Annual	12	1

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

The interest payment each period is calculated as follows:

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

This is 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

Cash on Cash Return

The Cash on Cash return for Equity Sources is the ratio of Net Annual Cash Flow to the Total Capital Invested, expressed as a percentage. The formula takes into account the Profit Distribution and the total Equity invested over the life of the project.

The Cash on Cash analysis can be found on the Funding Source Report, available either from the Finance Cash Flow, or from the Report Setup form.

The Cash on Cash analysis begins on one of two dates – either the Mortgage Start Date, if a mortgage has been used, or the Stabilized Income Month for Ratio Analysis date, if a Mortgage has not been used. This Stabilized Income Month can be specified on the General tab in the Finance Setup area.

Beginning on the Cash on Cash analysis date, the calculation works forward through the cash flow in one year cycles, taking the year's Profit and dividing by the total Equity invested. If, in the closing periods of the cash flow, there are not a full 12 months remaining, the program will annualize the return by dividing the part-year's Profit by 12 and multiplying by the number of months remaining. This annualized, final period can give a distorted return where the length of the final period projection is significantly shorter than 12 months.

Chapter 5

Performance Measures

Performance measures are used to assess the return from a project, to analyze the degree of risk associated with a project and to compare returns from different projects. These measures are displayed on the Project Pro Forma page in ARGUS Developer, and can also be viewed in the KPI Dashboard.

The Performance Measures calculated in ARGUS Developer are summarized below, with the exception of the Internal Rate of Return (IRR) which is detailed in ‘**Internal Rate of Return and Net Present Value**’ on page 21.

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 (gross or net development value), as shown below.

Profit on Cost%

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 Total 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 escalation 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 further calculation options on the Calculation Tab of the Assumptions for Calculations form. These options specify whether the calculation of the Development Yield is to include any % Rent and whether it is to be net of non-recoverable costs, ground rent and rent additions/costs.

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 that which is to be let and income-producing. The land cost must then be apportioned between these two phases.

Note: The options to calculate the Development Yield are hidden unless Show Net Development Yield Options has been checked on the Country tab of System Configuration, under Administration in the File menu.

Cap Rent per net sq ft/sq m

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

$$\frac{\text{Capital Value}}{\text{Net Floor Area}}$$

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 KPI Dashboard.

$$\frac{\text{Total Costs}}{\text{Gross Floor Area}}$$

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 KPI Dashboard.

$$\frac{\text{Total Costs}}{\text{Net Floor Area}}$$

Land Cost per Measurement Unit

The Total Land Cost divided by the Site Area in Acres, Hectares, sq ft or sq m. The denominator in this measure is the selection made in the “Land Measured in” option on the General tab in the Options dialog.

If a single phase is selected, the Site Area of the current phase is used. If merged phases are selected, the total Site Area is the sum of all Site Areas in each merged phase. This may be displayed in the KPI Dashboard.

$$\frac{\text{Residual Land Price} + \text{Fixed Land Price}}{\text{Current Land Measurement Units}}$$

Land Cost per Acre

The Total Land Cost divided by the Site Area in Acres.

If a single phase is selected, the Site Area from the current phase is used. If merged phases are selected, the sum of all Site Areas from each merged phase is used. If the Site Area is not currently expressed in Acres, the calculation will automatically convert it to Acres.

This may be displayed in the Result Bar.

$$\frac{\text{Residual Land Price} + \text{Fixed Land Price}}{\text{Site Area in Acres}}$$

Land Cost per Hectare

The Total Land Cost divided by the Site Area in Hectares.

If a single phase is selected, the Site Area from the current phase is used. If merged phases are selected, the sum of all Site Areas from each merged phase is used. If the Site Area is not currently expressed in Hectares, the calculation will automatically convert it to Hectares.

This may be displayed in the Result Bar.

$$\frac{\text{Residual Land Price} + \text{Fixed Land Price}}{\text{Site Area in Hectares}}$$

Land Cost per Square Foot

The Total Land Cost divided by the Site Area in Square Feet.

If a single phase is selected, the Site Area from the current phase is used. If merged phases are selected, the sum of all Site Areas from each merged phase is used. If the Site Area is not currently expressed in Square Feet, the calculation will automatically convert it to Square Feet.

This may be displayed in the Result Bar.

$$\frac{\text{Residual Land Price} + \text{Fixed Land Price}}{\text{Site Area in Square Feet}}$$

Land Cost per Square meter

The Total Land Cost divided by the Site Area in Square meters.

If a single phase is selected, the Site Area from the current phase is used. If merged phases are selected, the sum of all Site Areas from each merged phase is used. If the Site Area is not currently expressed in Square meters, the calculation will automatically convert it to Square Meters.

This may be displayed in the Result Bar.

$$\frac{\text{Residual Land Price} + \text{Fixed Land Price}}{\text{Site Area in Square Metres}}$$

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 KPI Dashboard.

$$\frac{\text{Total Gross Floor Area}}{\text{Total Site Area}}$$

Equity Multiple

The Equity Multiple is calculated over the entire project for all consolidated equity partners. It is defined as:

$$\frac{(\text{Capital Repayments} + \text{Profit})}{(\text{Capital Contributions} + \text{Interest})}$$

Return on Equity (ROE)

This is a measure of the return on capital invested in a project to an individual Equity source, when Structured Finance is applied. This may be displayed on the KPI Dashboard.

$$\frac{\text{Source Profit Share}}{\text{Peak Financing Amount}}$$

Combined Return on Equity (ROE)

This is a measure of the return on capital invested in a project to all Equity sources, when Structured Finance is applied. This may be displayed on the KPI Dashboard.

$$\frac{\text{Total Equity Source Profit Share}}{\text{Total Equity Source Peak Financing Amount}}$$

Pre Finance IRR

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

For further information on the IRR calculation, please see **Internal Rate of Return** and Net Present Value on page 21.

IRR

This is the Internal Rate of Return calculated on the project cash flow after finance i.e. including interest and finance fees.

For further information on the IRR calculation, please see **Internal Rate of Return** and Net Present Value on page 21.

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 cash flow for all Equity funding sources.

For further information on the IRR calculation, please see **Internal Rate of Return** and Net Present Value on page 21.

Peak Financing

This is the point where the highest outstanding balance is reached for each of the structured financing sources in the project. The balance is taken from the Loan Balance cash flow line and includes capital contributions, interest and capital repayments. It is displayed on the Performance Measures tab and the funding source reports.

The peak financing calculation returns the highest balance and the period in which it occurs.

Breakeven Point

This is the point where the costs of constructing the project equal the revenues received from rents, sales or operations. There is no profit made or loss incurred at this point.

In Developer, it is the point at which the cumulative net cash flow turns from a negative balance to a zero or positive balance. Where the balance changes from negative to zero or positive more than once during the course of the project, the Breakeven Point will be the date at which this first occurs.

The Breakeven point is expressed in two different fields on the KPI Dashboard – as a Period and as a Date. Where a Breakeven point cannot be calculated, each of these fields will show 'N/A'.

Chapter 6

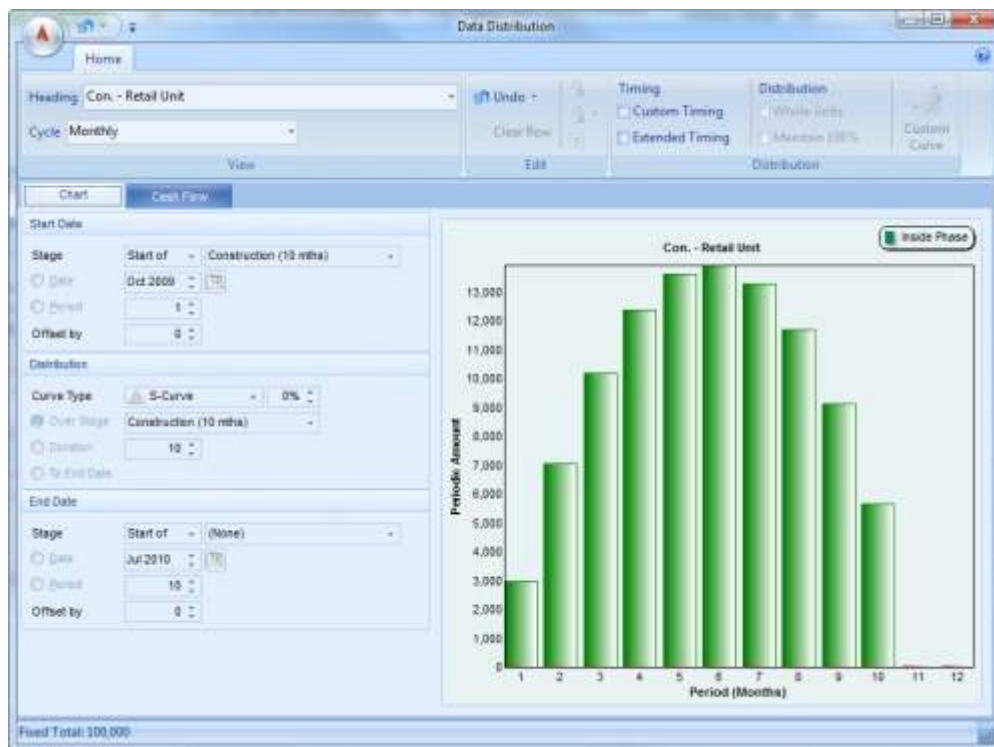
Distribution

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 midpoint 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:

$$Old\ Val = 0$$

Then loop through each period with the following equations:

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

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

$$Period Val = New Val - Old Val$$

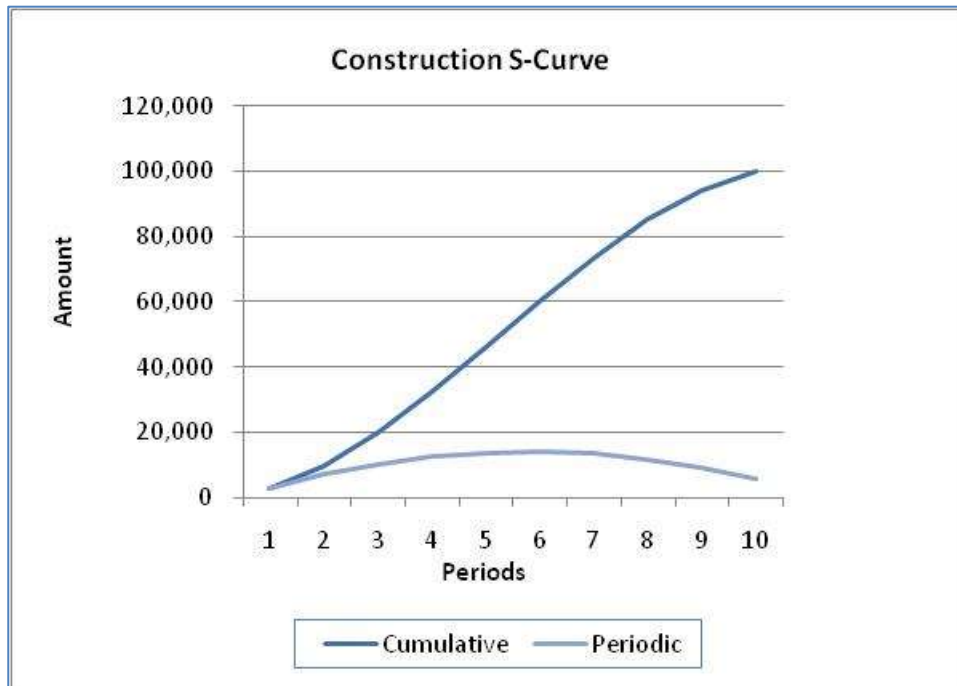
$$Old Val = Period Val$$

Example

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

Total Cost 100,000 Number of Periods 10	Periods	cm Factor	Cumulative	Period Value
	1	0.1	2,966	2,966
	2	0.2	10,021	7,055
	3	0.3	20,218	10,197
	4	0.4	32,611	12,392
	5	0.5	46,250	13,639
	6	0.6	60,189	13,939
	7	0.7	73,482	13,292
	8	0.8	85,179	11,697
	9	0.9	94,334	9,155
	10	1	100,000	5,666
Total S-Curved Amount			100,000	

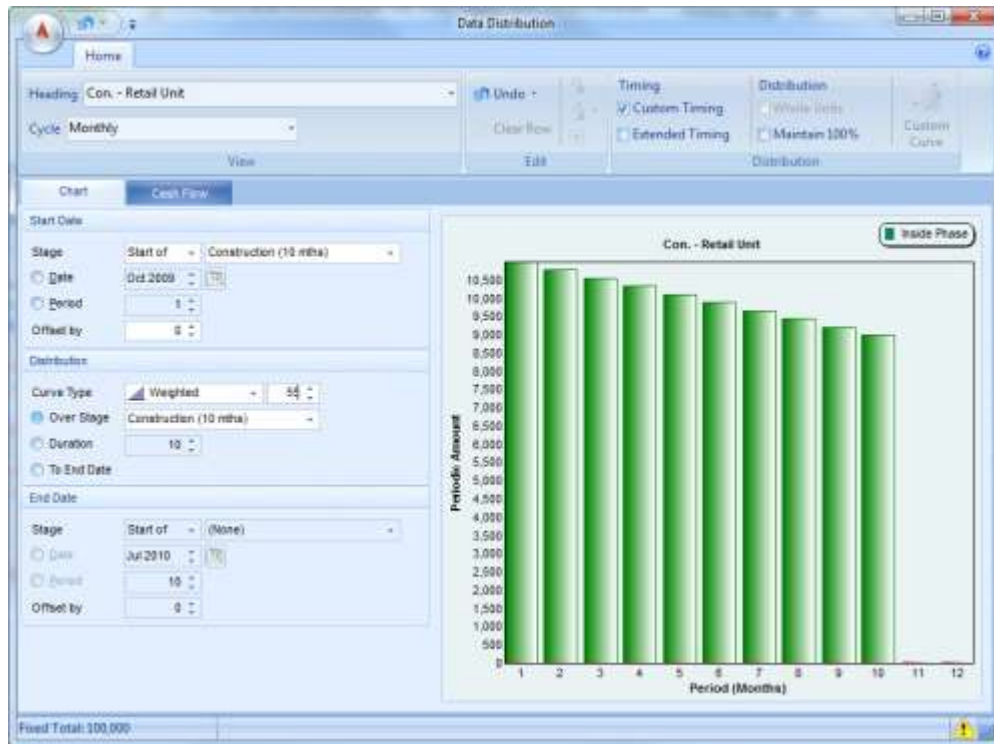
These values can be displayed graphically as follows:



Weighted Curve

Weighted curve distribution apportions the total item cost over a period based upon the % weighting specified.

Weighting at 50% distributes the cost item in even amounts across the specified period. Weighting of greater than 50% produces a “front weighted” distribution where the spend rate falls as the project progresses, whereas weighting of less than 50% produces an “end loaded” distribution with the spend rate increasing during the project.



The formula for the weighted curve is as follows:

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

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

Starting with:

$$\text{Period} = 0$$

Then loop through each period with the following equations:

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

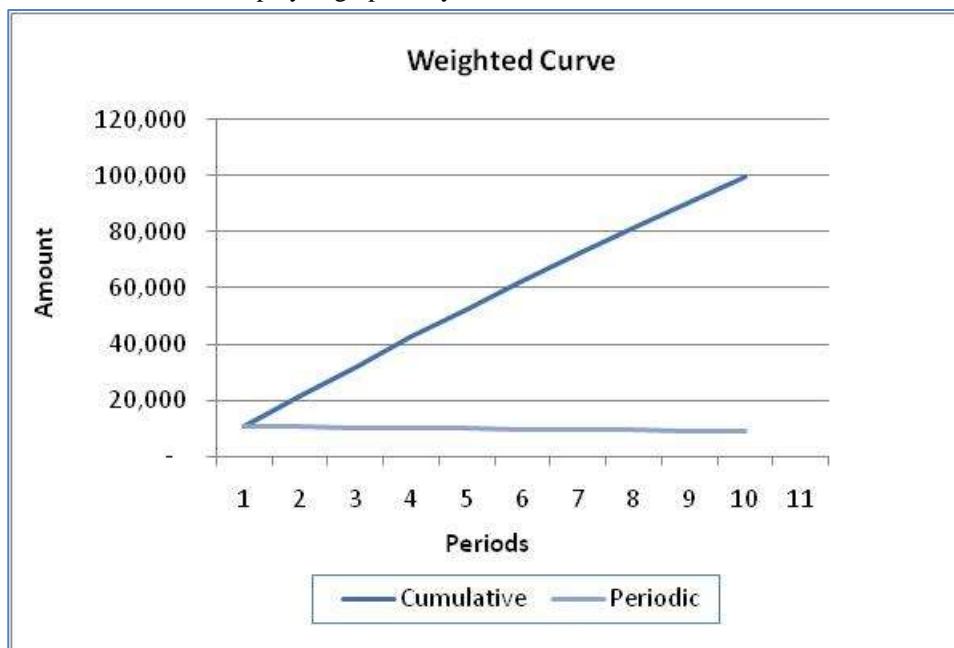
$$\text{Period} = \text{Period} + 1$$

Example

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

		Period	Period Amount	Cumulative
Total Cost	100,000	1	11,000	11,000
Number of Periods	10	2	10,778	21,778
Weighting %	55	3	10,556	32,333
		4	10,333	42,667
Base Amount	11,000	5	10,111	52,778
Period Increment	-222.22	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
Total Weighted Curve Amount				100,000

These values can be displayed graphically as follows:



Chapter 7

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