



Time is Money

The Black Art of Discounted Cash Flow Analysis



**Here's my plan to increase the value of our real estate assets -
Discounted Cash Flow Analysis ! "**

Look at all Those Numbers

| Revenues | | | | Multi-Family | | | Single Family | | | Avg SF Lot Value | | |
|---------------------------|-------------|--|--|--------------|---------|----------------|---------------|--|--|------------------|--|--|
| S/large S.F. View Lot | \$2,000,000 | | | Block 1 | 138,738 | 0 | | | | | | |
| S/large S.F. Non View Lot | \$1,500,000 | | | Block 2 | 54,168 | 0 | | | | | | |
| S/small S.F. View Lot | \$1,800,000 | | | Block 3 | 149,897 | 0 | | | | | | |
| S/small S.F. Non View Lot | \$1,000,000 | | | Block 4 | 150,234 | 0 | | | | | | |
| S/sq. ft. of MF Land | \$300 | | | Block 5 | 0 | 36 | \$1,000,000 | | | | | |
| Risk/Profit | 12.5% | | | Block 6 | 146,282 | 0 | | | | | | |
| Financing | 6.5% | | | Block 7 | 72,343 | 18 | \$1,400,000 | | | | | |
| | | | | Block 8 | 0 | 36 | \$1,800,000 | | | | | |
| | | | | Block 9 | 146,285 | 0 | | | | | | |
| | | | | Block 10 | 0 | 24 | \$1,750,000 | | | | | |
| | | | | Block 11 | 0 | 24 | \$2,000,000 | | | | | |
| | | | | Total | 857,949 | 138 | | | | | | |
| | | | | | \$ | 257,384,561.19 | | | | | | |

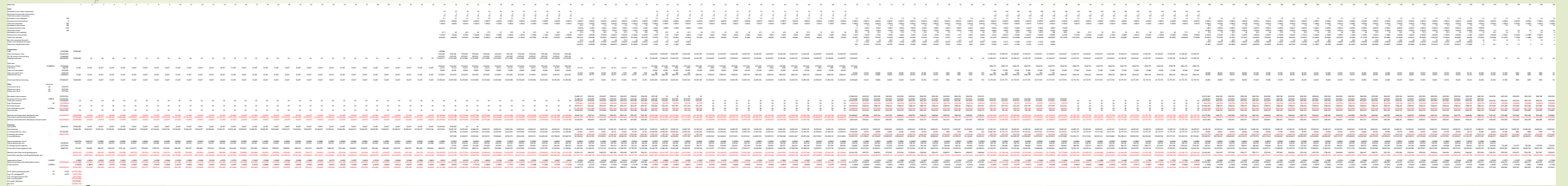
| Other Costs | |
|----------------------------|-------|
| Sale Commissions - SF Lots | 3.50% |
| Sale Commissions - MF Lots | 2.0% |

| Servicing Costs | |
|-------------------------|--------------------|
| Hard Construction Costs | \$6,000,000 |
| Soft Construction Costs | \$862,500 |
| Consultants Fees | \$800,000 |
| Municipal Fees | \$300,000 |
| Survey | \$120,000 |
| Total | \$8,082,500 |

| | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 | Year 7 | Year 8 | Year 9 | Year 10 | Total |
|-----------------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|-----------------------|
| Single Family | | | | | | | | | | | |
| Block 5 - 33' No View | | | | | | | | 20 | | | 20 |
| Block 7 - 33' Part View | | | | | | | 25 | | | | 25 |
| Block 8 - 33' w View | | | | | | | | | 36 | | 36 |
| Block 10 - 50' w View | | | | | | | 12 | 12 | | | 24 |
| Block 11 - 50' w View | | | | | | | | | | 12 | 12 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 37 | 32 | 48 | 12 | 129 |
| Multi Family | | | | | | | | | | | |
| Block 1 | | | | | 138,738 | | | | | | 138,738 |
| Block 2 | | | | | | 54,168 | | | | | 54,168 |
| Block 3 | | | | | | 149,897 | | | | | 149,897 |
| Block 4 | | | | | | | | 150,234 | | | 150,234 |
| Block 6 | | | | | | | 146,282 | | | | 146,282 |
| Block 7 | | | | | | | | | 72,343 | | 72,343 |
| Block 9 | | | | | | | | 146,285 | | | 146,285 |
| Total | 0 | 0 | 0 | 0 | 138,738 | 204,065 | 146,282 | 146,285 | 150,234 | 72,343 | 857,949 |
| Development Revenues | | | | | | | | | | | |
| Single Family Lot Rev. | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$56,000,000 | \$41,000,000 | \$88,800,000 | \$24,000,000 | \$209,800,000 |
| Multi Family Lot Rev. | \$0 | \$0 | \$0 | \$0 | \$41,621,359 | \$61,219,610 | \$43,884,666 | \$43,885,645 | \$45,070,333 | \$21,702,948 | \$257,384,561 |
| Total Revenue | \$0 | \$0 | \$0 | \$0 | \$41,621,359 | \$61,219,610 | \$99,884,666 | \$84,885,645 | \$133,870,333 | \$45,702,948 | \$467,184,561 |
| Less: Developers Profit | \$0 | \$0 | \$0 | \$0 | (\$5,202,670) | (\$7,652,451) | (\$12,485,583) | (\$10,610,706) | (\$16,733,792) | (\$5,712,868) | (\$58,398,070) |
| Less: Sales Commissions | \$0 | \$0 | \$0 | \$0 | (\$832,427) | (\$1,224,392) | (\$2,837,693) | (\$2,312,713) | (\$4,009,407) | (\$1,274,059) | (\$12,490,691) |
| Net Revenue | \$0 | \$0 | \$0 | \$0 | \$35,586,262 | \$52,342,767 | \$84,561,390 | \$71,962,227 | \$113,127,134 | \$38,716,021 | \$396,295,800 |
| Development costs | | | | | | | | | | | |
| Hard Costs | \$0 | \$0 | \$0 | \$0 | \$1,905,375 | \$1,905,375 | \$952,688 | \$952,688 | \$952,688 | \$952,688 | \$7,621,500 |
| Soft Costs | \$0 | \$0 | \$0 | \$0 | \$190,538 | \$190,538 | \$95,269 | \$95,269 | \$95,269 | \$95,269 | \$762,150 |
| Demolition | \$0 | \$0 | \$0 | \$838,811 | \$838,811 | \$0 | \$0 | \$0 | \$0 | \$0 | \$1,677,621 |
| Municipal Fees | \$0 | \$0 | \$75,000 | \$75,000 | \$75,000 | \$75,000 | \$0 | \$0 | \$0 | \$0 | \$300,000 |
| Consultants Fees | \$100,000 | \$100,000 | \$100,000 | \$100,000 | \$100,000 | \$100,000 | \$100,000 | \$100,000 | \$100,000 | \$100,000 | \$800,000 |
| Survey | \$0 | \$0 | \$30,000 | \$30,000 | \$30,000 | \$30,000 | \$0 | \$0 | \$0 | \$0 | \$120,000 |
| DCC's - Regional Only | \$0 | \$0 | \$0 | \$0 | \$122,783 | \$180,598 | \$164,388 | \$159,671 | \$178,269 | \$75,352 | \$881,060 |
| Property Taxes | \$1,020,091 | \$1,020,091 | \$1,020,091 | \$1,020,091 | \$1,020,091 | \$850,075 | \$680,060 | \$510,045 | \$340,030 | \$170,015 | \$7,650,679 |
| Financing | \$0 | \$0 | \$0 | \$0 | \$139,184 | \$108,277 | \$64,753 | \$59,074 | \$50,903 | \$42,093 | \$464,225 |
| Total Costs | (\$1,120,091) | (\$1,120,091) | (\$1,225,091) | (\$2,063,901) | (\$4,421,781) | (\$3,439,862) | (\$2,057,158) | (\$1,876,747) | (\$1,617,159) | (\$1,335,356) | (\$20,277,235) |
| Net Income | (\$1,120,091) | (\$1,120,091) | (\$1,225,091) | (\$2,063,901) | \$31,164,481 | \$48,902,905 | \$82,504,232 | \$70,085,480 | \$111,509,975 | \$37,380,664 | \$376,018,564 |
| | | Residual Before PPT | Residual After PPT | Price per Ac. | Price per Ha. | | | | | | |
| Discounted @ | 6.5% | \$230,222,428 | \$225,715,224 | \$4,328,925 | \$10,696,994 | | | | | | |
| | 7.0% | \$227,032,540 | \$221,680,922 | \$4,174,931 | \$10,316,464 | | | | | | |
| | 7.5% | \$214,177,840 | \$209,980,235 | \$4,027,230 | \$9,951,509 | | | | | | |



Way More Numbers...



The image shows a long, narrow strip of a spreadsheet, likely representing a large dataset. The data is organized into columns and rows, with some cells containing numerical values and others containing text or formulas. The strip is oriented vertically, and the text is small and dense, emphasizing the sheer volume of data points. The background of the slide is a light green color with a dark red arrow pointing to the right, and a dark green curved line on the left side.

What is Discounted Cash Flow Analysis?

- Discounted Cash Flow (DCF) analysis is a procedure in which the cash flow from a project is discounted to the present in order to determine the current property value.
- DCF can be utilized to solve for a property's value (if the required rate of return is known) or the rate of return if the property value is known.
- The DCF approach is an accepted form of analysis within the Income Approach and regularly utilized when appraising large improved properties or large scale proposed projects.



Types of DCF Analysis Utilized for Appraisals

- ▶ Valuation of Complex Improved Assets (Office Buildings, Shopping Malls etc.)
- ▶ Land Residual Analysis
- ▶ We are going to focus on land valuation today



Goals of this Presentation

- ▶ An understanding of the purpose of DCF Analysis
- ▶ An understanding of when DCF analysis should be utilized
- ▶ An understanding of some of the potential pitfalls

Case Study



Case Study – Development Details

- ▶ Project Size: 87 Townhouse Units
- ▶ Average Unit Size: 1,000 sq.ft.
- ▶ Annual Absorption: 10 Units per Year
- ▶ Pre – Development Phase: 1 Year
- ▶ Estimated Revenues: \$500/sq.ft.
- ▶ Construction Hard Costs: \$250/sq.ft.
- ▶ Soft Costs: 20% of Hard Costs
- ▶ Profit Margin: 15% of Revenues
- ▶ Financing: 5% of Construction Costs

Base Case Analysis

| Base Case Analysis | | | | | | | | | | | | |
|---------------------------------|----------------------|------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|---------------------|
| Assumptions | | | | | | | | | | | | |
| Years of Absorption | 10 | | | | | | | | | | | |
| Units Sold per Year | 10 | | | | | | | | | | | |
| Estimated Revenue per Sq.Ft. | 500 | | | | | | | | | | | |
| Hard Costs | 250 | | | | | | | | | | | |
| Financing Rate | 5% | | | | | | | | | | | |
| | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 | Year 7 | Year 8 | Year 9 | Year 10 | Year 11 | Total |
| Saleable Areas | | | | | | | | | | | | |
| Units Sold | 0 | 2 | 5 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 87 |
| Average Unit Size (sq.ft.) | 0 | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 | 10,000 |
| Salable Area (sq.ft.) | 0 | 2,000 | 5,000 | 10,000 | 10,000 | 10,000 | 10,000 | 10,000 | 10,000 | 10,000 | 10,000 | 87,000 |
| Revenues | | | | | | | | | | | | |
| Estimated Revenue per Sq.Ft. | \$500 | \$500 | \$500 | \$500 | \$500 | \$500 | \$500 | \$500 | \$500 | \$500 | \$500 | |
| Total Gross Revenue | \$0 | \$1,000,000 | \$2,500,000 | \$5,000,000 | \$5,000,000 | \$5,000,000 | \$5,000,000 | \$5,000,000 | \$5,000,000 | \$5,000,000 | \$5,000,000 | \$43,500,000 |
| Less: Sale Expense | 2.50% | \$0 | (\$25,000) | (\$62,500) | (\$125,000) | (\$125,000) | (\$125,000) | (\$125,000) | (\$125,000) | (\$125,000) | (\$125,000) | (\$1,087,500) |
| Less: Developers Profit | 15% | \$0 | (\$150,000) | (\$375,000) | (\$750,000) | (\$750,000) | (\$750,000) | (\$750,000) | (\$750,000) | (\$750,000) | (\$750,000) | (\$6,525,000) |
| Net Revenue | \$0 | \$825,000 | \$2,062,500 | \$4,125,000 | \$4,125,000 | \$4,125,000 | \$4,125,000 | \$4,125,000 | \$4,125,000 | \$4,125,000 | \$4,125,000 | \$35,887,500 |
| Costs | | | | | | | | | | | | |
| Off Site Costs | \$1,000,000 | | | | | | | | | | | \$1,000,000 |
| Hard Costs | \$250 | \$0 | \$500,000 | \$1,250,000 | \$2,500,000 | \$2,500,000 | \$2,500,000 | \$2,500,000 | \$2,500,000 | \$2,500,000 | \$2,500,000 | \$21,750,000 |
| Soft Costs | 20% | \$0 | \$100,000 | \$250,000 | \$500,000 | \$500,000 | \$500,000 | \$500,000 | \$500,000 | \$500,000 | \$500,000 | \$4,350,000 |
| Financing | | \$0 | \$18,000 | \$45,000 | \$90,000 | \$90,000 | \$90,000 | \$90,000 | \$90,000 | \$90,000 | \$90,000 | \$783,000 |
| Total Construction Costs | \$1,000,000 | \$618,000 | \$1,545,000 | \$3,090,000 | \$3,090,000 | \$3,090,000 | \$3,090,000 | \$3,090,000 | \$3,090,000 | \$3,090,000 | \$3,090,000 | \$27,883,000 |
| Net Cash Flow | (\$1,000,000) | \$207,000 | \$517,500 | \$1,035,000 | \$1,035,000 | \$1,035,000 | \$1,035,000 | \$1,035,000 | \$1,035,000 | \$1,035,000 | \$1,035,000 | \$8,004,500 |
| Net Present Value | | 5.0% | \$5,460,987 | | 5.5% | \$5,262,236 | | 6.0% | \$5,071,684 | | | |



How is it Done?

- Revenues for the completed end units are estimated, typically based on an analysis of comparable market transactions.
- Costs are calculated, either from quantity survey estimates or cost estimating services such as Marshall & Swift.
- Profit is estimated based on market norms, adjusted for project specific risk.
- The annual cash flow is calculated by subtracting costs and profit from the revenue estimates.
- The cash flow is then discounted back to the present to determine the net present value.
- This is the residual land value (ie. what's left over)

Absorption

| Base Case Analysis | | | | | | | | | | | | | |
|---------------------------------|-------|----------------------|------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|---------------------|
| Assumptions | | | | | | | | | | | | | |
| Years of Absorption | | 10 | | | | | | | | | | | |
| Units Sold per Year | | 10 | | | | | | | | | | | |
| Estimated Revenue per Sq.Ft. | | 500 | | | | | | | | | | | |
| Hard Costs | | 250 | | | | | | | | | | | |
| Financing Rate | | 5% | | | | | | | | | | | |
| | | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 | Year 7 | Year 8 | Year 9 | Year 10 | Year 11 | Total |
| Saleable Areas | | | | | | | | | | | | | |
| Units Sold | | 0 | 2 | 5 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 87 |
| Average Unit Size (sq.ft.) | | 0 | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 | 10,000 |
| Saleable Area (sq.ft.) | | 0 | 2,000 | 5,000 | 10,000 | 10,000 | 10,000 | 10,000 | 10,000 | 10,000 | 10,000 | 10,000 | 87,000 |
| Revenues | | | | | | | | | | | | | |
| Estimated Revenue per Sq.Ft. | | \$500 | \$500 | \$500 | \$500 | \$500 | \$500 | \$500 | \$500 | \$500 | \$500 | \$500 | |
| Total Gross Revenue | | \$0 | \$1,000,000 | \$2,500,000 | \$5,000,000 | \$5,000,000 | \$5,000,000 | \$5,000,000 | \$5,000,000 | \$5,000,000 | \$5,000,000 | \$5,000,000 | \$43,500,000 |
| Less: Sale Expense | 2.50% | \$0 | (\$25,000) | (\$62,500) | (\$125,000) | (\$125,000) | (\$125,000) | (\$125,000) | (\$125,000) | (\$125,000) | (\$125,000) | (\$125,000) | (\$1,087,500) |
| Less: Developers Profit | 15% | \$0 | (\$150,000) | (\$375,000) | (\$750,000) | (\$750,000) | (\$750,000) | (\$750,000) | (\$750,000) | (\$750,000) | (\$750,000) | (\$750,000) | (\$6,525,000) |
| Net Revenue | | \$0 | \$825,000 | \$2,062,500 | \$4,125,000 | \$4,125,000 | \$4,125,000 | \$4,125,000 | \$4,125,000 | \$4,125,000 | \$4,125,000 | \$4,125,000 | \$35,887,500 |
| Costs | | | | | | | | | | | | | |
| Off Site Costs | | \$1,000,000 | | | | | | | | | | | \$1,000,000 |
| Hard Costs | \$250 | \$0 | \$500,000 | \$1,250,000 | \$2,500,000 | \$2,500,000 | \$2,500,000 | \$2,500,000 | \$2,500,000 | \$2,500,000 | \$2,500,000 | \$2,500,000 | \$21,750,000 |
| Soft Costs | 20% | \$0 | \$100,000 | \$250,000 | \$500,000 | \$500,000 | \$500,000 | \$500,000 | \$500,000 | \$500,000 | \$500,000 | \$500,000 | \$4,350,000 |
| Financing | | \$0 | \$18,000 | \$45,000 | \$90,000 | \$90,000 | \$90,000 | \$90,000 | \$90,000 | \$90,000 | \$90,000 | \$90,000 | \$783,000 |
| Total Construction Costs | | \$1,000,000 | \$618,000 | \$1,545,000 | \$3,090,000 | \$3,090,000 | \$3,090,000 | \$3,090,000 | \$3,090,000 | \$3,090,000 | \$3,090,000 | \$3,090,000 | \$27,883,000 |
| Net Cash Flow | | (\$1,000,000) | \$207,000 | \$517,500 | \$1,035,000 | \$1,035,000 | \$1,035,000 | \$1,035,000 | \$1,035,000 | \$1,035,000 | \$1,035,000 | \$1,035,000 | \$8,004,500 |
| Net Present Value | | | | | | | | | | | | | |
| | 5.0% | \$5,460,987 | | | | | | | | | | | |
| | 5.5% | \$5,262,236 | | | | | | | | | | | |
| | 6.0% | \$5,071,684 | | | | | | | | | | | |

- Absorption is derived from other comparable developments.
- Past rates of absorption are assumed to predict future absorption.



Revenue

| Base Case Analysis | | | | | | | | | | | | |
|---------------------------------|--------|----------------------|------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|---------------------|
| Assumptions | | | | | | | | | | | | |
| Years of Absorption | 10 | | | | | | | | | | | |
| Units Sold per Year | 10 | | | | | | | | | | | |
| Estimated Revenue per Sq.Ft. | 500 | | | | | | | | | | | |
| Hard Costs | 250 | | | | | | | | | | | |
| Financing Rate | 5% | | | | | | | | | | | |
| Saleable Areas | | | | | | | | | | | | |
| | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 | Year 7 | Year 8 | Year 9 | Year 10 | Year 11 | Total |
| Units Sold | 0 | 2 | 5 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 87 |
| Average Unit Size (sq.ft.) | 0 | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 | 10,000 |
| Salable Area (sq.ft.) | 0 | 2,000 | 5,000 | 10,000 | 10,000 | 10,000 | 10,000 | 10,000 | 10,000 | 10,000 | 10,000 | 87,000 |
| Revenues | | | | | | | | | | | | |
| Estimated Revenue per Sq.Ft. | \$500 | \$500 | \$500 | \$500 | \$500 | \$500 | \$500 | \$500 | \$500 | \$500 | \$500 | |
| Total Gross Revenue | \$0 | \$1,000,000 | \$2,500,000 | \$5,000,000 | \$5,000,000 | \$5,000,000 | \$5,000,000 | \$5,000,000 | \$5,000,000 | \$5,000,000 | \$5,000,000 | \$43,500,000 |
| Less: Sale Expense | 2.50% | \$0 | (\$25,000) | (\$62,500) | (\$125,000) | (\$125,000) | (\$125,000) | (\$125,000) | (\$125,000) | (\$125,000) | (\$125,000) | (\$1,087,500) |
| Less: Developers Profit | 15% | \$0 | (\$150,000) | (\$375,000) | (\$750,000) | (\$750,000) | (\$750,000) | (\$750,000) | (\$750,000) | (\$750,000) | (\$750,000) | (\$6,525,000) |
| Net Revenue | | \$0 | \$825,000 | \$2,062,500 | \$4,125,000 | \$4,125,000 | \$4,125,000 | \$4,125,000 | \$4,125,000 | \$4,125,000 | \$4,125,000 | \$35,887,500 |
| Costs | | | | | | | | | | | | |
| Off Site Costs | | \$1,000,000 | | | | | | | | | | \$1,000,000 |
| Hard Costs | \$250 | \$0 | \$500,000 | \$1,250,000 | \$2,500,000 | \$2,500,000 | \$2,500,000 | \$2,500,000 | \$2,500,000 | \$2,500,000 | \$2,500,000 | \$21,750,000 |
| Soft Costs | 20% | \$0 | \$100,000 | \$250,000 | \$500,000 | \$500,000 | \$500,000 | \$500,000 | \$500,000 | \$500,000 | \$500,000 | \$4,350,000 |
| Financing | | \$0 | \$18,000 | \$45,000 | \$90,000 | \$90,000 | \$90,000 | \$90,000 | \$90,000 | \$90,000 | \$90,000 | \$783,000 |
| Total Construction Costs | | \$1,000,000 | \$618,000 | \$1,545,000 | \$3,090,000 | \$3,090,000 | \$3,090,000 | \$3,090,000 | \$3,090,000 | \$3,090,000 | \$3,090,000 | \$27,883,000 |
| Net Cash Flow | | (\$1,000,000) | \$207,000 | \$517,500 | \$1,035,000 | \$1,035,000 | \$1,035,000 | \$1,035,000 | \$1,035,000 | \$1,035,000 | \$1,035,000 | \$8,004,500 |
| Net Present Value | | | 5.0% \$5,460,987 | 5.5% \$5,262,236 | 6.0% \$5,071,684 | | | | | | | |

- Estimated from the market.
- Typically using the Direct Comparison Approach.

Profit

| Base Case Analysis | | | | | | | | | | | | | |
|---------------------------------|----------------------|------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|---------------------|--|
| Assumptions | | | | | | | | | | | | | |
| Years of Absorption | 10 | | | | | | | | | | | | |
| Units Sold per Year | 10 | | | | | | | | | | | | |
| Estimated Revenue per Sq.Ft. | 500 | | | | | | | | | | | | |
| Hard Costs | 250 | | | | | | | | | | | | |
| Financing Rate | 5% | | | | | | | | | | | | |
| | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 | Year 7 | Year 8 | Year 9 | Year 10 | Year 11 | Total | |
| Saleable Areas | | | | | | | | | | | | | |
| Units Sold | 0 | 2 | 5 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 87 | |
| Average Unit Size (sq.ft.) | 0 | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 | 10,000 | |
| Saleable Area (sq.ft.) | 0 | 2,000 | 5,000 | 10,000 | 10,000 | 10,000 | 10,000 | 10,000 | 10,000 | 10,000 | 10,000 | 87,000 | |
| Revenues | | | | | | | | | | | | | |
| Estimated Revenue per Sq.Ft. | \$500 | \$500 | \$500 | \$500 | \$500 | \$500 | \$500 | \$500 | \$500 | \$500 | \$500 | | |
| Total Gross Revenue | \$0 | \$1,000,000 | \$2,500,000 | \$5,000,000 | \$5,000,000 | \$5,000,000 | \$5,000,000 | \$5,000,000 | \$5,000,000 | \$5,000,000 | \$5,000,000 | \$43,500,000 | |
| Less: Sale Expense | 2.50% | \$0 | (\$25,000) | (\$62,500) | (\$125,000) | (\$125,000) | (\$125,000) | (\$125,000) | (\$125,000) | (\$125,000) | (\$125,000) | (\$1,087,500) | |
| Less: Developers Profit | 15% | \$0 | (\$150,000) | (\$375,000) | (\$750,000) | (\$750,000) | (\$750,000) | (\$750,000) | (\$750,000) | (\$750,000) | (\$750,000) | (\$6,525,000) | |
| Net Revenue | \$0 | \$825,000 | \$2,062,500 | \$4,125,000 | \$4,125,000 | \$4,125,000 | \$4,125,000 | \$4,125,000 | \$4,125,000 | \$4,125,000 | \$4,125,000 | \$35,887,500 | |
| Costs | | | | | | | | | | | | | |
| Off Site Costs | \$1,000,000 | | | | | | | | | | | \$1,000,000 | |
| Hard Costs | \$250 | \$0 | \$500,000 | \$1,250,000 | \$2,500,000 | \$2,500,000 | \$2,500,000 | \$2,500,000 | \$2,500,000 | \$2,500,000 | \$2,500,000 | \$21,750,000 | |
| Soft Costs | 20% | \$0 | \$100,000 | \$250,000 | \$500,000 | \$500,000 | \$500,000 | \$500,000 | \$500,000 | \$500,000 | \$500,000 | \$4,350,000 | |
| Financing | | \$0 | \$18,000 | \$45,000 | \$90,000 | \$90,000 | \$90,000 | \$90,000 | \$90,000 | \$90,000 | \$90,000 | \$783,000 | |
| Total Construction Costs | \$1,000,000 | \$618,000 | \$1,545,000 | \$3,090,000 | \$3,090,000 | \$3,090,000 | \$3,090,000 | \$3,090,000 | \$3,090,000 | \$3,090,000 | \$3,090,000 | \$27,883,000 | |
| Net Cash Flow | (\$1,000,000) | \$207,000 | \$517,500 | \$1,035,000 | \$1,035,000 | \$1,035,000 | \$1,035,000 | \$1,035,000 | \$1,035,000 | \$1,035,000 | \$1,035,000 | \$8,004,500 | |
| Net Present Value | | 5.0% | \$5,460,987 | 5.5% | \$5,262,236 | 6.0% | \$5,071,684 | | | | | | |

- Profit is the developers reward for taking on the risk of the development.
- Can be calculated as a % of Revenue or a % of Development Costs.
- Risk is impacted by many factors:
 - Absorption risk
 - Revenues risk
 - Cost risk



Costs

| Base Case Analysis | | | | | | | | | | | | | |
|---------------------------------|-------|----------------------|------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|---------------------|
| Assumptions | | | | | | | | | | | | | |
| Years of Absorption | 10 | | | | | | | | | | | | |
| Units Sold per Year | 10 | | | | | | | | | | | | |
| Estimated Revenue per Sq.Ft. | 500 | | | | | | | | | | | | |
| Hard Costs | 250 | | | | | | | | | | | | |
| Financing Rate | 5% | | | | | | | | | | | | |
| | | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 | Year 7 | Year 8 | Year 9 | Year 10 | Year 11 | Total |
| Saleable Areas | | | | | | | | | | | | | |
| Units Sold | | 0 | 2 | 5 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 87 |
| Average Unit Size (sq.ft.) | | 0 | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 | 10,000 |
| Saleable Area (sq.ft.) | | 0 | 2,000 | 5,000 | 10,000 | 10,000 | 10,000 | 10,000 | 10,000 | 10,000 | 10,000 | 10,000 | 87,000 |
| Revenues | | | | | | | | | | | | | |
| Estimated Revenue per Sq.Ft. | | \$500 | \$500 | \$500 | \$500 | \$500 | \$500 | \$500 | \$500 | \$500 | \$500 | \$500 | |
| Total Gross Revenue | | \$0 | \$1,000,000 | \$2,500,000 | \$5,000,000 | \$5,000,000 | \$5,000,000 | \$5,000,000 | \$5,000,000 | \$5,000,000 | \$5,000,000 | \$5,000,000 | \$43,500,000 |
| Less: Sale Expense | 2.50% | \$0 | (\$25,000) | (\$62,500) | (\$125,000) | (\$125,000) | (\$125,000) | (\$125,000) | (\$125,000) | (\$125,000) | (\$125,000) | (\$125,000) | (\$1,087,500) |
| Less: Developers Profit | 15% | \$0 | (\$150,000) | (\$375,000) | (\$750,000) | (\$750,000) | (\$750,000) | (\$750,000) | (\$750,000) | (\$750,000) | (\$750,000) | (\$750,000) | (\$6,525,000) |
| Net Revenue | | \$0 | \$825,000 | \$2,062,500 | \$4,125,000 | \$4,125,000 | \$4,125,000 | \$4,125,000 | \$4,125,000 | \$4,125,000 | \$4,125,000 | \$4,125,000 | \$35,887,500 |
| Costs | | | | | | | | | | | | | |
| Offsite Costs | | \$1,000,000 | | | | | | | | | | | \$1,000,000 |
| Hard Costs | \$250 | \$0 | \$500,000 | \$1,250,000 | \$2,500,000 | \$2,500,000 | \$2,500,000 | \$2,500,000 | \$2,500,000 | \$2,500,000 | \$2,500,000 | \$2,500,000 | \$21,750,000 |
| Soft Costs | 20% | \$0 | \$100,000 | \$250,000 | \$500,000 | \$500,000 | \$500,000 | \$500,000 | \$500,000 | \$500,000 | \$500,000 | \$500,000 | \$4,350,000 |
| Financing | | \$0 | \$18,000 | \$45,000 | \$90,000 | \$90,000 | \$90,000 | \$90,000 | \$90,000 | \$90,000 | \$90,000 | \$90,000 | \$783,000 |
| Total Construction Costs | | \$1,000,000 | \$618,000 | \$1,545,000 | \$3,090,000 | \$3,090,000 | \$3,090,000 | \$3,090,000 | \$3,090,000 | \$3,090,000 | \$3,090,000 | \$3,090,000 | \$27,883,000 |
| Net Cash Flow | | (\$1,000,000) | \$207,000 | \$517,500 | \$1,035,000 | \$1,035,000 | \$1,035,000 | \$1,035,000 | \$1,035,000 | \$1,035,000 | \$1,035,000 | \$1,035,000 | \$8,004,500 |
| NPV | | 5.0% | \$5,460,987 | | | | | | | | | | |
| | | 5.5% | \$5,262,236 | | | | | | | | | | |
| | | 6.0% | \$5,071,684 | | | | | | | | | | |

- Appraisers are not construction cost experts.
- Typically costs are estimated by construction cost professionals (Quantity Surveyors).
- Appraisers often use Marshall & Swift or other Cost Estimating Services. These can be accurate but don't offer much detail.



Discount Rate

Base Case Analysis

| Assumptions | | | | | | | | | | | | | |
|---------------------------------|-------|----------------------|------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|---------------------|
| Years of Absorption | | 10 | | | | | | | | | | | |
| Units Sold per Year | | 10 | | | | | | | | | | | |
| Estimated Revenue per Sq.Ft. | | 500 | | | | | | | | | | | |
| Hard Costs | | 250 | | | | | | | | | | | |
| Financing Rate | | 5% | | | | | | | | | | | |
| | | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 | Year 7 | Year 8 | Year 9 | Year 10 | Year 11 | Total |
| Saleable Areas | | | | | | | | | | | | | |
| Units Sold | | 0 | 2 | 5 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 87 |
| Average Unit Size (sq.ft.) | | 0 | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 | 10,000 |
| Salable Area (sq.ft.) | | 0 | 2,000 | 5,000 | 10,000 | 10,000 | 10,000 | 10,000 | 10,000 | 10,000 | 10,000 | 10,000 | 87,000 |
| Revenues | | | | | | | | | | | | | |
| Estimated Revenue per Sq.Ft. | | \$500 | \$500 | \$500 | \$500 | \$500 | \$500 | \$500 | \$500 | \$500 | \$500 | \$500 | |
| Total Gross Revenue | | \$0 | \$1,000,000 | \$2,500,000 | \$5,000,000 | \$5,000,000 | \$5,000,000 | \$5,000,000 | \$5,000,000 | \$5,000,000 | \$5,000,000 | \$5,000,000 | \$43,500,000 |
| Less: Sale Expense | 2.50% | \$0 | (\$25,000) | (\$62,500) | (\$125,000) | (\$125,000) | (\$125,000) | (\$125,000) | (\$125,000) | (\$125,000) | (\$125,000) | (\$125,000) | (\$1,087,500) |
| Less: Developers Profit | 15% | \$0 | (\$150,000) | (\$375,000) | (\$750,000) | (\$750,000) | (\$750,000) | (\$750,000) | (\$750,000) | (\$750,000) | (\$750,000) | (\$750,000) | (\$6,525,000) |
| Net Revenue | | \$0 | \$825,000 | \$2,062,500 | \$4,125,000 | \$4,125,000 | \$4,125,000 | \$4,125,000 | \$4,125,000 | \$4,125,000 | \$4,125,000 | \$4,125,000 | \$35,887,500 |
| Costs | | | | | | | | | | | | | |
| Off Site Costs | | \$1,000,000 | | | | | | | | | | | \$1,000,000 |
| Hard Costs | \$250 | \$0 | \$500,000 | \$1,250,000 | \$2,500,000 | \$2,500,000 | \$2,500,000 | \$2,500,000 | \$2,500,000 | \$2,500,000 | \$2,500,000 | \$2,500,000 | \$21,750,000 |
| Soft Costs | 20% | \$0 | \$100,000 | \$250,000 | \$500,000 | \$500,000 | \$500,000 | \$500,000 | \$500,000 | \$500,000 | \$500,000 | \$500,000 | \$4,350,000 |
| Financing | | \$0 | \$18,000 | \$45,000 | \$90,000 | \$90,000 | \$90,000 | \$90,000 | \$90,000 | \$90,000 | \$90,000 | \$90,000 | \$783,000 |
| Total Construction Costs | | \$1,000,000 | \$618,000 | \$1,545,000 | \$3,090,000 | \$3,090,000 | \$3,090,000 | \$3,090,000 | \$3,090,000 | \$3,090,000 | \$3,090,000 | \$3,090,000 | \$27,883,000 |
| Net Cash Flow | | (\$1,000,000) | \$207,000 | \$517,500 | \$1,035,000 | \$1,035,000 | \$1,035,000 | \$1,035,000 | \$1,035,000 | \$1,035,000 | \$1,035,000 | \$1,035,000 | \$8,004,500 |
| Net Present Value | | | | | | | | | | | | | |
| | 5.0% | | \$5,460,987 | | | | | | | | | | |
| | 5.5% | | \$5,262,236 | | | | | | | | | | |
| | 6.0% | | \$5,071,684 | | | | | | | | | | |

- The discount rate reflects the time value of money and opportunity cost of alternate investments.



Sensitivity

- A Technique used to determine how different values of an independent variable impact a particular dependent variable under a given set of assumptions.
- What are our Major Assumptions:
 - Absorption
 - Revenues/Costs
 - Discount Rates

Changes in Absorption

Absorption Sensitivity Analysis

| Assumptions | | | | | | | | | | | | | | | | Total | |
|---------------------------------|--------------------|----------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|---------------------|---------------|
| Years of Absorption | 13 | | | | | | | | | | | | | | | | |
| Units Sold per Year | 7 | | | | | | | | | | | | | | | | |
| Estimated Revenue per Sq.Ft. | 500 | | | | | | | | | | | | | | | | |
| Hard Costs | 250 | | | | | | | | | | | | | | | | |
| Financing Rate | 5% | | | | | | | | | | | | | | | | |
| | | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 | Year 7 | Year 8 | Year 9 | Year 10 | Year 11 | Year 12 | Year 13 | Year 14 | Total | |
| Saleable Areas | | | | | | | | | | | | | | | | | |
| Units Sold | 0 | 2 | 5 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 3 | 87 | |
| Average Unit Size (sq.ft.) | 0 | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 | | |
| Total Salable Area (sq.ft.) | 0 | 2,000 | 5,000 | 7,000 | 7,000 | 7,000 | 7,000 | 7,000 | 7,000 | 7,000 | 7,000 | 7,000 | 7,000 | 7,000 | 3,000 | 87,000 | |
| Revenues | | | | | | | | | | | | | | | | | |
| Estimated Revenue per Sq.Ft. | \$500 | \$500 | \$500 | \$500 | \$500 | \$500 | \$500 | \$500 | \$500 | \$500 | \$500 | \$500 | \$500 | \$500 | \$500 | \$500 | |
| Total Gross Revenue | \$0 | \$1,000,000 | \$2,500,000 | \$3,500,000 | \$3,500,000 | \$3,500,000 | \$3,500,000 | \$3,500,000 | \$3,500,000 | \$3,500,000 | \$3,500,000 | \$3,500,000 | \$3,500,000 | \$3,500,000 | \$1,500,000 | \$43,500,000 | |
| Less: Sale Expense | 2.50% | \$0 | (\$25,000) | (\$62,500) | (\$87,500) | (\$87,500) | (\$87,500) | (\$87,500) | (\$87,500) | (\$87,500) | (\$87,500) | (\$87,500) | (\$87,500) | (\$87,500) | (\$87,500) | (\$37,500) | (\$1,087,500) |
| Less: Developers Profit | 15% | \$0 | (\$150,000) | (\$375,000) | (\$525,000) | (\$525,000) | (\$525,000) | (\$525,000) | (\$525,000) | (\$525,000) | (\$525,000) | (\$525,000) | (\$525,000) | (\$525,000) | (\$225,000) | (\$6,525,000) | |
| Net Revenue | \$0 | \$825,000 | \$2,062,500 | \$2,887,500 | \$2,887,500 | \$2,887,500 | \$2,887,500 | \$2,887,500 | \$2,887,500 | \$2,887,500 | \$2,887,500 | \$2,887,500 | \$2,887,500 | \$2,887,500 | \$1,237,500 | \$35,887,500 | |
| Costs | | | | | | | | | | | | | | | | | |
| Off Site Costs | \$1,000,000 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$1,000,000 | |
| Hard Costs | \$250 | \$0 | \$500,000 | \$1,250,000 | \$1,750,000 | \$1,750,000 | \$1,750,000 | \$1,750,000 | \$1,750,000 | \$1,750,000 | \$1,750,000 | \$1,750,000 | \$1,750,000 | \$1,750,000 | \$750,000 | \$21,750,000 | |
| Soft Costs | 20% | \$0 | \$100,000 | \$250,000 | \$350,000 | \$350,000 | \$350,000 | \$350,000 | \$350,000 | \$350,000 | \$350,000 | \$350,000 | \$350,000 | \$350,000 | \$150,000 | \$4,350,000 | |
| Financing | \$0 | \$18,000 | \$45,000 | \$63,000 | \$63,000 | \$63,000 | \$63,000 | \$63,000 | \$63,000 | \$63,000 | \$63,000 | \$63,000 | \$63,000 | \$63,000 | \$27,000 | \$783,000 | |
| Total Construction Costs | \$1,000,000 | \$618,000 | \$1,545,000 | \$2,163,000 | \$2,163,000 | \$2,163,000 | \$2,163,000 | \$2,163,000 | \$2,163,000 | \$2,163,000 | \$2,163,000 | \$2,163,000 | \$2,163,000 | \$2,163,000 | \$927,000 | \$27,883,000 | |
| Net Cash Flow | 5.0% | (\$1,000,000) | \$207,000 | \$517,500 | \$724,500 | \$724,500 | \$724,500 | \$724,500 | \$724,500 | \$724,500 | \$724,500 | \$724,500 | \$724,500 | \$724,500 | \$310,500 | \$8,004,500 | |
| Net Present Value | 5.5% | \$5,030,338 | | | | | | | | | | | | | | | -9% |
| | 6.0% | \$4,810,953 | | | | | | | | | | | | | | | |
| | | \$4,602,516 | | | | | | | | | | | | | | | |

Changes in Revenues

| Revenue Sensitivity Analysis | | | | | | | | | | | | |
|---------------------------------|----------------------|------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|---------------------|
| Assumptions | | | | | | | | | | | | |
| Years of Absorption | 10 | | | | | | | | | | | |
| Units Sold | 10 | | | | | | | | | | | |
| Estimated Revenue per Sq.Ft. | 450 | -10% | | | | | | | | | | |
| Hard Costs | 250 | | | | | | | | | | | |
| Financing Rate | 5% | | | | | | | | | | | |
| | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 | Year 7 | Year 8 | Year 9 | Year 10 | Year 11 | Total |
| Saleable Areas | | | | | | | | | | | | |
| Units Sold | 0 | 2 | 5 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 87 |
| Unit Size (sq.ft.) | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 | 10,000 |
| Salable Area (sq.ft.) | 0 | 2,000 | 5,000 | 10,000 | 10,000 | 10,000 | 10,000 | 10,000 | 10,000 | 10,000 | 10,000 | 87,000 |
| Revenues | | | | | | | | | | | | |
| Estimated Revenue per Sq.Ft. | \$450 | \$450 | \$450 | \$450 | \$450 | \$450 | \$450 | \$450 | \$450 | \$450 | \$450 | |
| Total Gross Revenue | \$0 | \$900,000 | \$2,250,000 | \$4,500,000 | \$4,500,000 | \$4,500,000 | \$4,500,000 | \$4,500,000 | \$4,500,000 | \$4,500,000 | \$4,500,000 | \$39,150,000 |
| Less: Sale Expense | 2.50% | \$0 | (\$22,500) | (\$56,250) | (\$112,500) | (\$112,500) | (\$112,500) | (\$112,500) | (\$112,500) | (\$112,500) | (\$112,500) | (\$978,750) |
| Less: Developers Profit | 15% | \$0 | (\$135,000) | (\$337,500) | (\$675,000) | (\$675,000) | (\$675,000) | (\$675,000) | (\$675,000) | (\$675,000) | (\$675,000) | (\$5,872,500) |
| Net Revenue | \$0 | \$742,500 | \$1,856,250 | \$3,712,500 | \$3,712,500 | \$3,712,500 | \$3,712,500 | \$3,712,500 | \$3,712,500 | \$3,712,500 | \$3,712,500 | \$32,298,750 |
| Costs | | | | | | | | | | | | |
| Off Site Costs | \$1,000,000 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$1,000,000 |
| Hard Costs | \$250 | \$0 | \$500,000 | \$1,250,000 | \$2,500,000 | \$2,500,000 | \$2,500,000 | \$2,500,000 | \$2,500,000 | \$2,500,000 | \$2,500,000 | \$21,750,000 |
| Soft Costs | 20% | \$0 | \$100,000 | \$250,000 | \$500,000 | \$500,000 | \$500,000 | \$500,000 | \$500,000 | \$500,000 | \$500,000 | \$4,350,000 |
| Financing | \$0 | \$18,000 | \$45,000 | \$90,000 | \$90,000 | \$90,000 | \$90,000 | \$90,000 | \$90,000 | \$90,000 | \$90,000 | \$783,000 |
| Total Construction Costs | \$1,000,000 | \$618,000 | \$1,545,000 | \$3,090,000 | \$3,090,000 | \$3,090,000 | \$3,090,000 | \$3,090,000 | \$3,090,000 | \$3,090,000 | \$3,090,000 | \$27,883,000 |
| Net Cash Flow | (\$1,000,000) | \$124,500 | \$311,250 | \$622,500 | \$622,500 | \$622,500 | \$622,500 | \$622,500 | \$622,500 | \$622,500 | \$622,500 | \$5,415,750 |
| Net Present Value | 5.0% | \$2,904,935 | | | | | | | | | | |
| | 5.5% | \$2,787,195 | | | | | | | | | | |
| | 6.0% | \$2,674,369 | | | | | | | | | | |

Changes in Discount Rate

| Discount Rate Sensivity Analysis | | | | | | | | | | | | |
|----------------------------------|----------------------|------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|---------------------|
| Assumptions | | | | | | | | | | | | |
| Years of Absorption | | 10 | | | | | | | | | | |
| Units Sold per Year | | 10 | | | | | | | | | | |
| Estimated Revenue per Sq.Ft. | | 500 | | | | | | | | | | |
| Hard Costs | | 250 | | | | | | | | | | |
| Financing Rate | | 5% | | | | | | | | | | |
| Saleable Areas | | | | | | | | | | | | |
| | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 | Year 7 | Year 8 | Year 9 | Year 10 | Year 11 | Total |
| Units Sold | 0 | 2 | 5 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 87 |
| Unit Size (sq.ft.) | <u>1,000</u> | <u>1,000</u> | <u>1,000</u> | <u>1,000</u> | <u>1,000</u> | <u>1,000</u> | <u>1,000</u> | <u>1,000</u> | <u>1,000</u> | <u>1,000</u> | <u>1,000</u> | |
| Salable Area (sq.ft.) | 0 | 2,000 | 5,000 | 10,000 | 10,000 | 10,000 | 10,000 | 10,000 | 10,000 | 10,000 | 10,000 | 87,000,000 |
| Revenues | | | | | | | | | | | | |
| Estimated Revenue per Sq.Ft. | \$500 | \$500 | \$500 | \$500 | \$500 | \$500 | \$500 | \$500 | \$500 | \$500 | \$500 | |
| Total Gross Revenue | \$0 | \$1,000,000 | \$2,500,000 | \$5,000,000 | \$5,000,000 | \$5,000,000 | \$5,000,000 | \$5,000,000 | \$5,000,000 | \$5,000,000 | \$5,000,000 | \$43,500,000 |
| Less: Sale Expense 2.50% | \$0 | (\$25,000) | (\$62,500) | (\$125,000) | (\$125,000) | (\$125,000) | (\$125,000) | (\$125,000) | (\$125,000) | (\$125,000) | (\$125,000) | (\$1,087,500) |
| Less: Developers Profit 15% | \$0 | (\$150,000) | (\$375,000) | (\$750,000) | (\$750,000) | (\$750,000) | (\$750,000) | (\$750,000) | (\$750,000) | (\$750,000) | (\$750,000) | (\$6,525,000) |
| Net Revenue | \$0 | \$825,000 | \$2,062,500 | \$4,125,000 | \$4,125,000 | \$4,125,000 | \$4,125,000 | \$4,125,000 | \$4,125,000 | \$4,125,000 | \$4,125,000 | \$35,887,500 |
| Costs | | | | | | | | | | | | |
| Offsite Costs | \$1,000,000 | | | | | | | | | | | |
| Hard Costs \$250 | \$0 | \$500,000 | \$1,250,000 | \$2,500,000 | \$2,500,000 | \$2,500,000 | \$2,500,000 | \$2,500,000 | \$2,500,000 | \$2,500,000 | \$2,500,000 | \$21,750,000 |
| Soft Costs 20% | \$0 | \$100,000 | \$250,000 | \$500,000 | \$500,000 | \$500,000 | \$500,000 | \$500,000 | \$500,000 | \$500,000 | \$500,000 | \$4,350,000 |
| Financing | \$0 | \$18,000 | \$45,000 | \$90,000 | \$90,000 | \$90,000 | \$90,000 | \$90,000 | \$90,000 | \$90,000 | \$90,000 | \$783,000 |
| Total Construction Costs | \$1,000,000 | \$618,000 | \$1,545,000 | \$3,090,000 | \$3,090,000 | \$3,090,000 | \$3,090,000 | \$3,090,000 | \$3,090,000 | \$3,090,000 | \$3,090,000 | \$27,883,000 |
| Net Cash Flow | (\$1,000,000) | \$207,000 | \$517,500 | \$1,035,000 | \$1,035,000 | \$1,035,000 | \$1,035,000 | \$1,035,000 | \$1,035,000 | \$1,035,000 | \$1,035,000 | \$8,004,500 |
| NPV | | 6.0% \$5,071,684 | 6.5% \$4,888,935 | 7.0% \$4,713,617 | | | | | | | | |



DCF in an Expropriation Context

- ▶ In the Direct Comparison Approach isolating the impact of one or more changing variables is often difficult due to a lack of market data.
- ▶ DCF analysis can allow an appraiser to describe all of the impacts resulting from a taking in a single analysis.
- ▶ This is especially useful when there are numerous impacts both positive and negative.
- ▶ It can be complicated to explain a DCF analysis in a litigation context.

Before the Taking



- 87 townhouse units
- Three separate buildings
- Access from two streets

After the Taking



- ▶ City proposes to acquire 20% of the property
- ▶ Now there are 58 townhouse units
- ▶ Two separate buildings
- ▶ But now...
- ▶ A rapid transit station will be constructed on site

Before and After Using DCF Analysis

| After the Taking Analysis | | | | | | | | | |
|---------------------------------|----------------------|--|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|---------------------|
| Assumptions | | | | | | | | | |
| Years of Absorption | 7 | | | | | | | | |
| Units Sold per Year | 10 | | | | | | | | |
| Estimated Revenue per Sq.Ft. | \$550 | 10% Increase in Revenues per Square Foot | | | | | | | |
| Hard Costs | \$263 | 5% Increase in Construction Costs | | | | | | | |
| Financing Rate | 5% | | | | | | | | |
| Saleable Areas | | | | | | | | | |
| | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 | Year 7 | Year 8 | Total |
| Units Sold | 0 | 2 | 6 | 10 | 10 | 10 | 10 | 10 | 58 |
| Average Unit Size (sq.ft.) | 0 | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 | 7,000 |
| Salable Area (sq.ft.) | 0 | 2,000 | 6,000 | 10,000 | 10,000 | 10,000 | 10,000 | 10,000 | 58,000 |
| Revenues | | | | | | | | | |
| Estimated Revenue per Sq.Ft. | \$500 | \$550 | \$550 | \$550 | \$550 | \$550 | \$550 | \$550 | |
| Total Gross Revenue | \$0 | \$1,100,000 | \$3,300,000 | \$5,500,000 | \$5,500,000 | \$5,500,000 | \$5,500,000 | \$5,500,000 | \$31,900,000 |
| Less: Sale Expense | 2.50% | \$0 | (\$27,500) | (\$82,500) | (\$137,500) | (\$137,500) | (\$137,500) | (\$137,500) | (\$797,500) |
| Less: Developers Profit | 15% | \$0 | (\$165,000) | (\$495,000) | (\$825,000) | (\$825,000) | (\$825,000) | (\$825,000) | (\$4,785,000) |
| Net Revenue | \$0 | \$907,500 | \$2,722,500 | \$4,537,500 | \$4,537,500 | \$4,537,500 | \$4,537,500 | \$4,537,500 | \$26,317,500 |
| Costs | | | | | | | | | |
| Offsite Costs | | \$1,000,000 | | | | | | | \$1,000,000 |
| Hard Costs | \$263 | \$0 | \$525,000 | \$1,575,000 | \$2,625,000 | \$2,625,000 | \$2,625,000 | \$2,625,000 | \$15,225,000 |
| Soft Costs | 20% | \$0 | \$105,000 | \$315,000 | \$525,000 | \$525,000 | \$525,000 | \$525,000 | \$3,045,000 |
| Financing | | \$0 | \$18,900 | \$56,700 | \$94,500 | \$94,500 | \$94,500 | \$94,500 | \$548,100 |
| Total Construction Costs | \$1,000,000 | \$648,900 | \$1,946,700 | \$3,244,500 | \$3,244,500 | \$3,244,500 | \$3,244,500 | \$3,244,500 | \$19,818,100 |
| Net Cash Flow | (\$1,000,000) | \$258,600 | \$775,800 | \$1,293,000 | \$1,293,000 | \$1,293,000 | \$1,293,000 | \$1,293,000 | \$6,499,400 |
| NPV | | 5.0% | \$4,788,116 | | | | | | |
| | | 5.5% | \$4,647,320 | | | | | | |
| | | 6.0% | \$4,511,192 | | | | | | |

- Base case value was \$5,262,236
- After value is \$4,647,320
- The difference Before vs. After is \$614,916 or a 12% reduction in land value



Concluding Thoughts

- DCF analysis is a useful appraisal tool in the right circumstances.
- There are many properties that cannot be valued on a Direct Comparison basis due to a lack of sufficiently comparable market data and require a cash flow analysis.
- The concluded value is the result of many assumptions and those assumptions can have a profound impact on the estimated value.
- In an expropriation context DCF analysis can be useful to quantify the impact of a taking where there are a number of variables.

What is an Internal Rate of Return (IRR)

- The Discount Rate that makes the Net Present Value (NPV) of the cash flow \$0.
- This is a useful tool to determine the attractiveness (return) of a project if we know all of the inputs (revenues, cost and land value).
- Each market participants IRR will be different depending on their risk tolerance and cost of capital.
- An IRR analysis is very useful for determining the impact of financing (leverage) on a project's overall return

IRR Analysis

| Internal Rate of Return | | | | | | | | | | | | |
|---------------------------------|----------------------|------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|---------------------|
| Assumptions | | | | | | | | | | | | |
| Years of Absorption | 10 | | | | | | | | | | | |
| Units Sold per Year | 10 | | | | | | | | | | | |
| Estimated Revenue per Sq.Ft. | 500 | | | | | | | | | | | |
| Hard Costs | 250 | | | | | | | | | | | |
| Financing Rate | 5% | | | | | | | | | | | |
| | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 | Year 7 | Year 8 | Year 9 | Year 10 | Year 11 | Total |
| Saleable Areas | | | | | | | | | | | | |
| Units Sold | 0 | 2 | 5 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 87 |
| Average Unit Size (sq.ft.) | 0 | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 | 10,000 |
| Saleable Area (sq.ft.) | 0 | 2,000 | 5,000 | 10,000 | 10,000 | 10,000 | 10,000 | 10,000 | 10,000 | 10,000 | 10,000 | 87,000 |
| Revenues | | | | | | | | | | | | |
| Estimated Revenue per Sq.Ft. | \$500 | \$500 | \$500 | \$500 | \$500 | \$500 | \$500 | \$500 | \$500 | \$500 | \$500 | |
| Total Gross Revenue | \$0 | \$1,000,000 | \$2,500,000 | \$5,000,000 | \$5,000,000 | \$5,000,000 | \$5,000,000 | \$5,000,000 | \$5,000,000 | \$5,000,000 | \$5,000,000 | \$43,500,000 |
| Less: Sale Expense | 2.50% | \$0 | (\$25,000) | (\$62,500) | (\$125,000) | (\$125,000) | (\$125,000) | (\$125,000) | (\$125,000) | (\$125,000) | (\$125,000) | (\$1,087,500) |
| Less: Developers Profit | 0% | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 |
| Net Revenue | \$0 | \$975,000 | \$2,437,500 | \$4,875,000 | \$4,875,000 | \$4,875,000 | \$4,875,000 | \$4,875,000 | \$4,875,000 | \$4,875,000 | \$4,875,000 | \$42,412,500 |
| Costs | | | | | | | | | | | | |
| Off Site Costs | \$1,000,000 | | | | | | | | | | | \$1,000,000 |
| Hard Costs | \$250 | \$0 | \$500,000 | \$1,250,000 | \$2,500,000 | \$2,500,000 | \$2,500,000 | \$2,500,000 | \$2,500,000 | \$2,500,000 | \$2,500,000 | \$21,750,000 |
| Soft Costs | 20% | \$0 | \$100,000 | \$250,000 | \$500,000 | \$500,000 | \$500,000 | \$500,000 | \$500,000 | \$500,000 | \$500,000 | \$4,350,000 |
| Land Costs | | \$5,262,236 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$5,262,236 |
| Financing | | \$0 | \$18,000 | \$45,000 | \$90,000 | \$90,000 | \$90,000 | \$90,000 | \$90,000 | \$90,000 | \$90,000 | \$783,000 |
| Total Construction Costs | \$6,262,236 | \$618,000 | \$1,545,000 | \$3,090,000 | \$3,090,000 | \$3,090,000 | \$3,090,000 | \$3,090,000 | \$3,090,000 | \$3,090,000 | \$3,090,000 | \$33,145,236 |
| Net Cash Flow | (\$6,262,236) | \$357,000 | \$892,500 | \$1,785,000 | \$1,785,000 | \$1,785,000 | \$1,785,000 | \$1,785,000 | \$1,785,000 | \$1,785,000 | \$1,785,000 | \$9,267,264 |
| Internal Rate of Return | 17.7% | \$0 | | | | | | | | | | |



To Inflate or Not to Inflate!

- Inflation factors for revenues and costs can be added to the model to reflect projected growth.
- Inflation is an assumption about the future (ie. its unknown) and therefore increases the overall risk which should result in a higher discount rate.
- Key takeaway: an inflated and uninflated model should result in the same land value.



Thank You Very Much

Questions and Comments