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**SEMINAR ON INCOME PROPERTY ANALYSIS AND COMPUTER TECHNIQUES**

**Sponsored jointly by the Hartford, Connecticut Chapters of:**

**The American Institute of Real Estate Appraisers**

**The Society of Real Estate Appraisers**

**Monday, Sept. 14, 1970  
Valle Steak House**

**Presented by**

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# COMPUTER TECHNIQUES TO AID CASH FORECASTING AND AFTER-TAX REAL ESTATE INVESTMENT ANALYSIS

## Introduction

It is widely held that the investment value of any income-producing capital asset is the present value of the net income to be generated. This has been generally true since the days of Alfred Marshall and Irving Fisher.<sup>1</sup>

Frederick Babcock went so far as to maintain that there was only one method of valuing real estate, the discounting of building returns extended to perpetuity with capitalization rates determined in the market.<sup>2</sup> The basic concept of Income/Capitalization Rate equals Value has become a truism for income property appraisal, but the appropriate application of this concept is a matter of considerable debate when forecasting sale price.<sup>3</sup>

The purpose of this article is to suggest how an available computer service can actually apply the theory of the income approach to value to modern real estate investment counseling and appraisal assignments. Because the system relies on a combination of market rents, historical costs, and a present value discounting of returns, it is also possible to comment on the controversial need to use and correlate three approaches to value.

## Redirection of income theory

Over the years the definition of Income has evolved from a simple average annual net income over the full useful life of the investment to a mixed return of periodic incomes and singular reversions, and

most recently, to a further division of returns between vested mortgage interests and equity interests.<sup>4</sup> Concurrently, Capitalization Rate has evolved from a simple straight line concept to elaborate composite, Hoskold, Inwood, or Ellwood configurations. Each refinement has attempted to provide a more realistic allocation of proceeds among cash dividends, mortgage payments, and capital recapture.<sup>5</sup>

In these refinements concern with methodology gradually obscured original present value theory. One school of thought, with its roots in Babcock, seeks an "overall market rate" by analyzing market sales of properties producing known net incomes. However, a cap rate determined by the ratio of income to sale price is nothing more than the reciprocal of a price/earnings ratio, such as used in the stock market. A "market rate" of .085 means a price/earnings ratio of 12, a more accurate representation of market price comparisons than is possible with its cousin, the gross rent multiplier. Insurance companies and banks frequently determine loan value basis as some multiple of a normalized or average net income expectation. For smaller income properties the market may well operate on net income multipliers.<sup>6</sup> A multiplier is a market comparison approach and not specifically a present value factor, however.

Another approach to cap rate, such as the Ellwood method present value annuity, would construct a factor as a function of loan ratio, interest rate, mortgage term, equity yield, and depreciation. A single composite discount rate requires that Income in the present value equation be constant at an average figure. Any leveling or averaging of income to achieve conformity with the single variable truism  $I/C = V$  does

violence to the proposition that present dollars are worth more than future dollars and avoids the need to place returns to investor in specific time periods. All of the scholarly concern with the Capitalization Rate misses the point that the income received by the investor is uneven and erratic in amount and of differing investment quality due to varying degrees of penetration in income taxes on these receipts. Nonetheless, the income schedule, not the capitalization rate, is the root of all value.

Therefore, the basic proposition of this essay is that, if the income approach to value is to be salvaged as an appraisal tool, then attention must be redirected to the problems of:

1. Redefinition of the income returns to the investor.
2. Placement of returns in specific periods of time.
3. Accounting for each type of return to reflect exposure to income tax confiscation.
4. Reliance on simple, compound-interest, reversion discounts only rather than all-encompassing fictional annuity factors.
5. Redirection of appraisal methodology to reflect investor logic and motivation.

#### Redefinition of income returns

It must be recognized by now that the productivity of any real estate investment is not only shared between mortgage and equity interests but is also distributed among local governments via real estate taxes and the national government in the form of income taxes. Therefore, if it is acceptable to value returns to equity after debt service, it should be

acceptable to value returns to equity after partnership shares have been taken by local and federal government. The stream of returns, measurable in money terms, received by the beneficiary of certain vested rights in income-producing real estate must therefore be the after-tax spendable cash which he enjoys attributable to the real estate. The investment value of the equity is the present value of after-tax spendable cash from the point in time when the initial commitment of funds is made to the time that the equity commitment is withdrawn through sale, abandonment, or reorganization of the legal entity of ownership. The after-tax cash received in each period is discounted back to the point of initial investment as a simple Inwood reversion, and the series of reversions is then totaled to measure the present value of equity returns. The total investment value of the private vested interests (as contrasted to the public vested interest in real estate and income taxes) is then the present value of the after-tax cash benefits to equity and the present value of payments to the mortgage interests.

After-tax spendable cash in real estate may come to the investor over time from four sources in varying amounts:

1. Positive cash flows remaining from normal operational revenues over successive periods of time.
2. Positive net worth received as proceeds on sale of the property after debt and capital gain tax claims have been paid at a single point in time.
3. Surplus proceeds not subject to tax derived from refinancing

of an existing mortgage balance with a larger loan balance at infrequent points in time.

4. Spendable cash salvaged from other income subject to income taxation unless shielded by tax losses generated from real estate ownership over successive periods of time.

Positive cash flows from operations and spendable cash salvaged from other income each period must be scheduled for the anticipated time sequence. Proceeds from sale or a refinancing must be given assumed but specific calendar dates. In addition cash flow from operations or other income must be permitted to vary in each period of time because, at the very least, interest and depreciation deductions to determine taxable income will vary and over the long run most revenue and expense factors will shift in amount for a variety of reasons.

Month by month determinations of after-tax cash flows is a tedious and repetitious task well suited to the abilities of electronic data processing machines. Indeed, the accurate and extensive accounting required of this method may be a major factor in explaining the willingness of practicing appraisers to accept normalized income for appraisal purposes while paying their own CPA to calculate after-tax cash flow for the appraisers' own real estate investments.

It is recognized that determination of spendable after-tax cash involves assumptions which can be unique to a single investor or characteristic of a class of investors. If these assumptions must always be unique to one taxpayer, then any valuation of after-tax income is appropriate to investment counsel but not to appraisal. But, if certain

assumptions can be modified to reflect probable group behavior, then after-tax benefits are not only benefits to the user but marketable benefit streams appropriate to appraisal consideration. Consequently this study will first describe a valuation model for the investor and then suggest the extension of the method to appraisal.

General structure of an  
investment model

Investment models for the computer can be designed to produce alternative results of given actions with measures of the chance of varying degrees of success and failure,<sup>8</sup> a single result with a stated probable standard error, or a single result which is simply the mechanical and mathematical result of one set of numerical assumptions.<sup>9</sup> The investment model described in this paper is one of the latter types, a "heuristic model" say the decision theory people, for it runs through a single set of inputs and stops without searching for an optimal solution. Since the combination of alternative inputs is infinite, it is presumed that the analyst has narrowed his choices to a limited set of practical alternatives on the basis of his own judgment and experience. The product of the model is an extension of decisions already made by the investor or appraiser or modified as a result of previous runs on the computer. It lacks the glamour of an optimizing model or decision-making model, but it is doubtful that the art of real estate investment can either be made conclusively mechanistic or would be accepted as such by practitioners if it were. Any model builder must anticipate the resentment any computer system generates among real estate practitioners, and this model deliberately avoids infringing on matters of "judgment."

Reference to the simplified flow chart of inputs and outputs in Figure 1 will suggest the type of input information which presumes an extensive market and cost study by the investor or appraiser prior to bringing all these factors to bear in the valuation process. The gross annual rent roll, current operating expenses and real estate taxes, and the type and terms of financing all require full knowledge of the market if the data provided are to be realistic and are to justify sophisticated analysis. Depreciation assumptions, income tax decisions, and choice of discount rates require explicit choices by the investor or professional analyst. Time index adjustments of each input factor to anticipate changing market, cost, and money factors in future years require an understanding of the dynamics of real estate appropriate to the professional ideals of realtor, appraiser, or counselor. Once the analyst has made these assumptions and communicated these to the machine, the computer simply does the tedious arithmetic to produce the annual summaries of operations computed monthly as outlined in the box of Figure 1 designated "cash flow data printouts." The teaching model which follows is one of a family of alternative programs which each follow the general format of cash flow analysis but vary the degree of detail in the initial inputs to focus application to the objectives of the architect, the land planner, the tax assessor, the lender, or the appraiser.

It is important to distinguish between a model which provides financial profiles with investment valuations and an appraisal model intended to forecast purchase price in the market. The investment model must presume at the start a purchase price which is then allocated to different capital

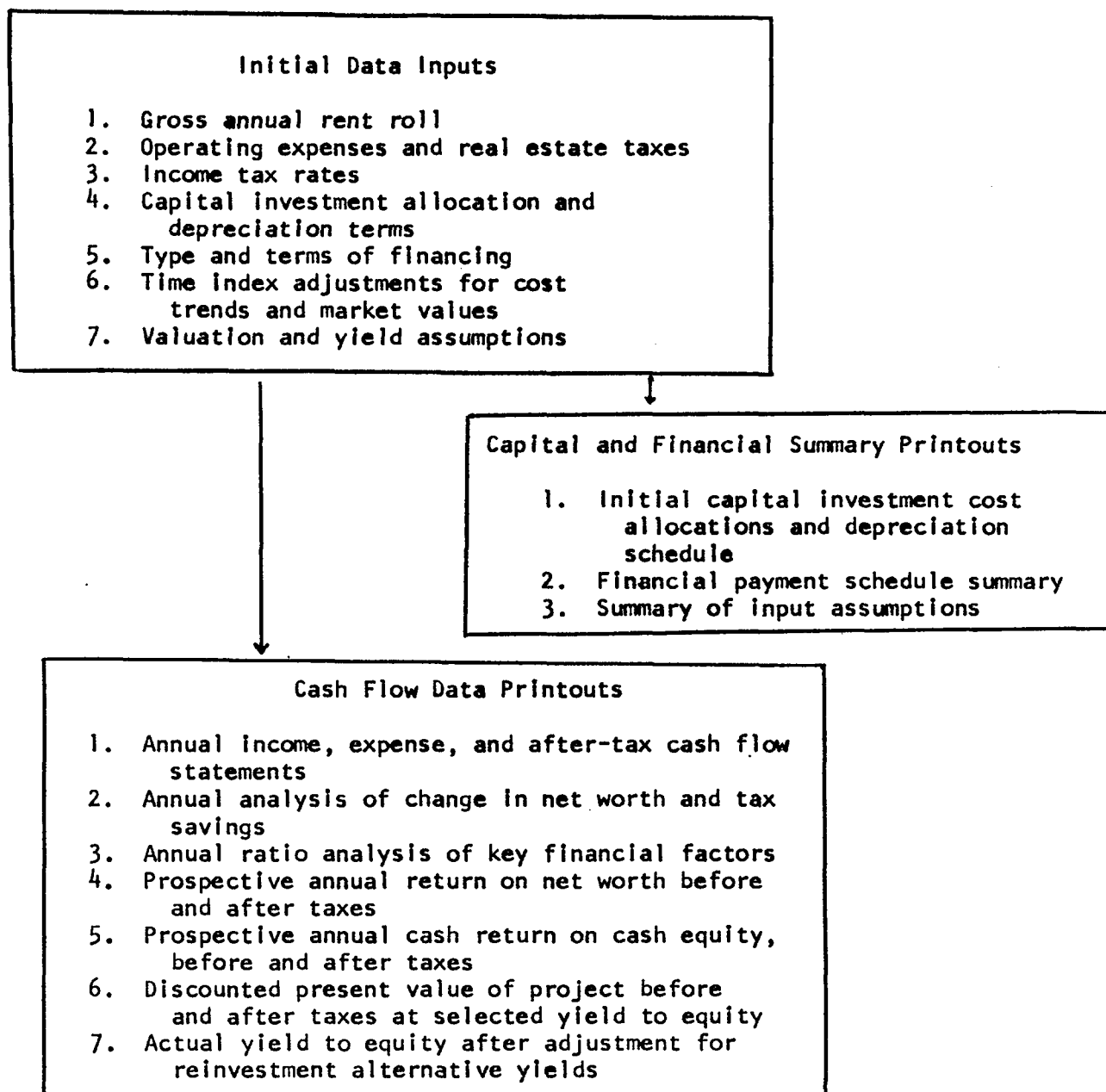


FIGURE 1: Simplified Flow Chart of Cash-Flow Investment Simulation Model

classes for depreciation calculations for purposes of measuring taxable income. Cash returns could be valued by an array of capitalization rates to permit equivalent comparisons of mortgage-equity and after-tax investment valuation results. However, the appraisal is attempting to forecast a price, not assuming one from the start. Moreover, the appraisal must presume group behavior patterns if it is to infer a price the sub-group may typically pay. If there is group behavior, there should be only one discount rate or, more realistically, a narrow range of capitalization bracketed by two related discount rates. Therefore, for an appraisal model there must be further processing of original acquisition cost allocations to bring after-tax cash flows as discounted by the market expectation of return into balance with the forecasted purchase price. An investment model is not an appraisal technique for estimating probable selling price until it can be proven that a certain group of buyers has a certain pattern of analysis of cash flows or that these buyers rely on the results of the specific investment models in question. Thus the presentation which follows must be thought of as an investment model until the modifications necessary to reflect market behavior have been introduced or buyers in the market generally follow the output of an investment model.

To illustrate both the theory of spendable after-tax cash-flow as the basic tool of real estate finance and the application of computer techniques to simplify analysis, the forms and outputs of the University of Wisconsin Mini-Model for rental properties are used in Illustrations 1 and 2 or a computer terminal which asks for the required information in a dialogue with the analyst. The sample data

February, 1970

Student's Name																														Last 2 Digits of Social Security #										Course & Section #'s										Equity Discount Rate	Income Tax Rate	Cards #3	Cards #4
Card Type 1																																																					
GRAASKAMP																														77										520-1										1800	3000		64

Project Description										Extraordinary Expenses										Staging Multiplier										Staging Year																																		
Card Type 2																																																																
24 UNIT APT - CASE 1										7625																																																						
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65

Component Description						Original Cost	Percent Depreciable	Depreciation Method	Starting Year	Useful Life
Card Type 3										
LAND						40000	0.0000	.		100
BUILDING						177500	1.0000	.		135
PARKING						7500	0.5000	.		110
FURNISHINGS						13200	1.0000	.		107
TRANSACTION COST						1800	1.0000	.		135
7 TH YR REFURBISHING						10000	1.0000	.		807

CHECK CARD 1 COL. 61

CHECK CARD 1 COL. 61																																																																
Mortgage Description																Principal Amount				Monthly Payment				Interest Rate				Bonus Interest Rate				Start		End		Term		By		Refinanced																								
Card Type 4																																																																
FIRST ASSUMED MORTG.																180000								.0775								01		05		20		03																										
SELLERS 2ND MORTG.																15000								.0850								01		05		10		03																										
REFINANCED FIRST																190000								.0800				0.0400				06		10		20																												
REFURBISH CHATTEL																10000				150				.0900								08		10																														
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65

CHECK CARD 1 COL. 64

### Illustration #2

UNIVERSITY OF WISCONSIN SCHOOL OF BUSINESS

## Real Estate Investment Teaching Model

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February, 1970

Card Type 5

Card Type 5						Gross Rent						Expenses						Rental Growth Rate						Expense Growth Rate																																								
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65
																							46080						8400						.0200						.0200																							

Card Type b

Card Type b

R E Taxes		R E Tax Growth Rate	Project Value Rate of Growth
9000		.0500	.0100

Card Type 7

Card Type 7

																																								Vacancy Rate	Working Capital Loan Interest Rate
																																								.0500	.0900

To code Depreciation Method, use the following code no's.

- 0 = no depreciation
- 1 = sum of the digits
- 2 = straight line depreciation
- 3 = 125% declining balance
- 4 = 150% declining balance
- 5 = 200% declining balance

HAVE YOU CHECKED CARD 1 COLS. 61 and 64?

is based on the investment case of a 24-unit Apartment Building described in Appendix A. The output is found in Illustrations 3 and 4. A more elaborate cash-flow simulation model for land development is provided in Appendix B to suggest how capabilities of a model can be expanded to include fancy timetables for development, detailed capital budget assumptions, and a great variety of financing packages. These models and many variations are available commercially and are in use by a variety of real estate analysts today including major sources of mortgage money.

#### General Explanation of Inputs

Most of the information in regard to the 24-unit Apartment Building is clearly transcribed from the data in Appendix A to the input forms of Illustrations 1 and 2. Note that each is described in English so that the output form is identified in a fashion custom tailored to the property to be analyzed. A general description of what can or cannot be done with these input forms is always attached to the input form or available by inquiry on the computer terminal, and these instructions are found in Figures 2 and 3. However, several items need additional explanation:

Card type 1 - provides for student identification by name and number should there be two "John Smith's" in a class while the course and section number is for internal administration purposes. Of relevance to the real estate question is the decision by the investor that he wishes to receive a minimum of 18% per annum compounded on the Inwood basis and his determination that he will be an average or marginal income tax level of 30%. The last two items in columns 61 and 64 simply inform the computer how many cards to read for Card types 3 and 4 which are the only multiple cards in the program.

FIGURE 2:

UNIVERSITY OF WISCONSIN SCHOOL OF BUSINESS  
Real Estate Investment Teaching Model  
February, 1970  
Instructions For Use of the Coding Form

GENERAL

1. Cards were designed to require no change in field spacing stops set on the keypunching machine so that large batches of input forms may be done at once and so that a student may keypunch single cards to alter one or more assumptions for a second or third run. All decimal points and dashes must be punched where indicated on the coding form.
2. One character or number for each blank. Decimal points and dashes may not be altered or written over.
3. All dollar amounts must be coded in the rightmost portion of the allowed space - do not include dollar signs. Decimal figures must be corrected to the left relative to pre-printed decimal point.
4. For numerical inputs blank spaces will be read as a zero (0); for alphabetical inputs, blank spaces will provide white space on the output.

CARD 1

1. Last two digits of social security number required to differentiate between those with the same name.
2. Course and section number required for internal school accounting.
3. The equity discount rate is the yield rate at which the investor wishes to determine the present value of the project, discounting all cash returns to the beginning of the first period.
4. The income tax rate is the marginal rate assumed by the investor.
5. "// cards #3" indicates the number of component description cards (1-6) in column 61. "# cards #4" indicates the number of mortgage cards (1-4) in column 64. Failure to code these properly will terminate processing of your data and you will receive no output.

CARD 2

1. Project description can be an address, firm name, or description of project and run such as "24 Unit Apart. - 90% loan".
2. Extraordinary expenses can be used to deduct for high vacancies in first year, to eliminate excess rents in the first year, to recognize commissions for leasing space, to permit higher operating costs during a "shake down" year, etc.
3. The staging multiplier permits an optional increase in gross rent, expenses, and real estate taxes due to an increase in rentable area provided for in the Component Description and Mortgage Description cards Starting Year column. Indicate year increase is to take effect in column marked "Staging Year" (1-9) DO NOT STAGE IN TENTH YEAR! Both year and multiplier must be coded but if staging option is not used leave both coding spaces blank.

CARD 3

1. Component description might be land, structure, and furnishings and you would repeat these categories if you wished to build a second stage.
2. % depreciable is 100% minus % of salvage.
3. Depreciation method code:
  - 0 = no depreciation
  - 1 = sum of the digits
  - 2 = straight line depreciation
  - 3 = 125% declining balance
  - 4 = 150% declining balance
  - 5 = 200% declining balance

4. Starting year is always a 1 for the original investment components and the staging year for any additions or replacement of such short-lived items as furniture.
5. Useful life is number of years over which component will be depreciated (0-99).

CARD 4

1. Mortgage description may include any type of financial instrument. For example, a land lease could be defined as a site worth \$300,000, monthly payment would be 1/12 of annual rent and interest rate would be the annual rent divided by the indicated value of the land.
2. Monthly payment will be computed if not indicated.
3. Interest rates are constant annual rates. 8.5% interest = .0850.
4. Bonus interest should be stated as a percent of gross rents which must be paid to the lender. Bonus interest paid only if cash flow is positive.
5. Starting and Ending years are the first and last years payments are to be made.
6. If mortgage term is longer than ten years or is not refinanced, place a 10 in the column "Ending Year".
7. Indicate full amortization term in years of mortgage in column "Term".
8. You must indicate which new mortgage will replace a specific old mortgage. Otherwise if a loan matures during a projection period, final balance will appear in cash flow statement as "Principal Payment" and if it exceeds available cash, there will be an automatic working capital loan.
9. If loan for staging is less than cost of capital component for that stage required, cash is charged to working capital loan.

CARD 5

1. Expenses do not include real estate taxes. Expenses may include only cash outlay items or may include reserves for replacement and redecorating. In the first case you may wish to include several incremental cost component outlays for remodeling and refurnishing as an alternative to regular maintenance and reserve allocation.
2. All growth rates are constant annual rates. 5% growth rate = .05  
-5% growth rate = -.05  
Patterns of growth rates should be consistent; if rents are constant and expenses are expected to increase, project value rate of growth should probably decline.

CARD 6

1. Real estate taxes are for the first year. In Madison the average annual growth in real estate taxes is exceeding 6% and an average increase of 5% a year is the typical minimum rate of tax increase in cities throughout Wisconsin.
2. Project value rate of growth is a constant annual rate.

CARD 7

1. The vacancy rate is the percent of rent lost due to vacancy and turnover. For example, if an apartment has 10 units it has 120 monthly rental units. If 6 units turn over and are vacant 1 month the vacancy rate is 6/120 or 5%.
2. The working capital loan interest rate is either the 90 day note rate at the bank or the equity discount rate reflecting the yield required on short-term advances of equity money.

- Card type 2 - provides not only a title for the output but several special features as well. The item "extraordinary expenses" permits recognition of first-year variations in rent levels, vacancy rates or expenses which may characterize a project. In this case the facts indicated that there would be additional expenditures of \$2,100 in the first year and that there would be additional vacancies of 12% during the refurbishing and re-leasing of apartments during the first year. These adjustments combined mean that net cash income in the first year will be \$7,625 less than what might otherwise be expected. This device is therefore a method of modifying the simple linear time indexes for rents, expenses and taxes which are offered on card types 5 and 6. The staging multiplier and the staging year were not used in this case but permit the student one expansion of his project. For example the project might be doubled in size in the third year and the staging multiplier would multiply rents and expenses and real estate taxes by a multiplier of two. The simplification permits the student to phase capital investment to anticipate absorption rates of space but leads to some oversimplification of variable cost relationships which may exist with scale.
- Card type 3 - itemizes 6 classes of assets according to their depreciation group or starting year. It is more than adequate for a single investment but it should be expanded for elaborate staging. The arbitrary limit was to control key-punching and computer time expenses for the department.
- Card type 4 - The method of mortgage payment can be stated as a fixed dollar amount, as a level amortized mortgage if the number of months in the term of the mortgage is known, or as an annual constant rate a percentage of the mortgage amount converted to a monthly payment. To permit periodic refinancing, it is possible to start and stop mortgage obligation in any given month. For example, a first mortgage may be acquired at the time of purchase and a second mortgage then defined which begins 6 months later, with both mortgage balances replaced by a new first mortgage in the sixth year. With this device it is possible to test the impact of alternative financial loans on investment value and equity yield or to measure the influence on investment value of a loan closed to repayment for 10 years instead of 5 during an inflationary period. The bonus interest provision allows the investor to measure the true cost of his financing over time relative to mortgage

balance, to cash-flow, and to after-tax investment value. Because the repayment method is not tied directly to the mortgage due date, it is possible to finance with notes such as a 10-year mortgage, amortized on a 25-year basis, and ballooned for the balance at the end of 10 years. Payment of a mature mortgage balance is made directly from after-tax cash, and proceeds from new loans also go to the same account. Therefore, if the refinancing provides additional cash to the investor, it is recognized as a return, while deficit cash is first covered by operational income and then by an automatic working capital loan, a feature to be discussed when describing Card type 7. Since value can be created by the form and pattern of financing available to the investor and since mortgage credit is becoming so elastic in its terms and costs, complete flexibility is needed for sophisticated investment planning. The computations by the computer eliminate the need for the investor using any complex set of tables for a single result, while at the same time they reveal to the investor the exact cash-flow implications of the finance plan for each year under study.

- Card type 5 - begins with the so-called normalized gross rent and operating expenses (excluding real estate taxes). When calculating after-tax spendable cash, it is obvious that taxable income must change, even when the net income before tax and debt service is a constant dollar amount. However, it is likely that over the life of any particular investment this net income figure will also tend to shift as the elements which constitute revenue and expenses alter over time. Therefore, a time schedule or index of change permits the analyst to make explicit assumptions in regard to the future in order to test the sensitivity of his yield expectations to changes in the time-line of developments in rents or occupancy, real estate taxes and expenses, or resale price of his investment. One might test three sets of assumptions in regard to the future by holding the elements of net income constant in one case, inflating costs and prices in a second case, or perhaps inflating costs and deflating rents and resale to have a picture of the slope of downside risk as a third alternative.
- Card type 6 - Project value growth rate is a resale price index which provides an opportunity to produce true depreciation, defined as the difference between original outlays and net recapture on resale. Inflation should be understated to reflect commissions and other claims on resale models permit alternative adjustments for resale costs or the curve of property value change. Time indexes are a simple way of

probing the investment significance of trends and future events. It is too early to find much acceptance of probability and risk models of real estate investment among those who make the market. Much real estate investment is made in anticipation of inflation, and this index model would provide an opportunity to measure just how inflation should affect purchase price limits currently. Gross rents must rise faster than taxes and expenses if resale price is to rise without a change in market discount factors. The reasonable expectations of profits due to inflationary price rise when converted to indexes in this section may not justify a contemplated purchase price when yield is actually measured for this set of assumptions. The use of an explicit cash-flow model, even though the indexes are only "guesstimates," may underscore the character of excessive asking prices. It is still true in real estate that most profits are made with a good buy rather than a lucky sale.

Card type 7 - Requires only a statement of vacancy rate and the interest cost of short term money required to cover operating deficits or refinancing shortages. The 9% rate in this case indicates the investor expects to use bank money, for if he used his own cash it would be necessary to indicate a minimum of 18% just as he required on his original investment. These interest costs are added to working capital loan balance due and are not subtracted at tax deductible interest rates by the model.

#### General Explanation of Outputs

The teaching model provides two pages of output, Illustration #3 which summarizes assumptions and financing repayment schedule, and Illustration #4 which provides four types of information, a 10 year cash-flow forecast, a 10 year net worth analysis, a 10 year ratio analysis, and the present value of the project as a total of the present value of each investment interest discounted at the appropriate rate. In short, each source of spendable dollars for the investor is identified, given a dollar payment and scheduled for the fiscal year in which the outlay or receipt would occur. Present value concepts of money at work are meaningless without a reasonable effort to establish or assume the

COMPONENTS	PCT. DEPR	BEGIN USE	USEFUL LIFE	DEPR METHOD	COST	GROSS RENT		RATE OF GROWTH OF GROSS RENT	
LAND	.00	1	.	0	\$ 40000.	\$ 46080.		.0200	
BUILDING	1.00	1	35.	4	\$ 177500.	\$ 8400.		.0200	
PARKING	.50	1	10.	4	\$ 7500.	\$ 9000.		.0500	
FURNISHINGS	1.00	1	7.	1	\$ 13200.	INCOME TAX RATE	.3000	RATE OF GROWTH OF PROJECT VALUE	.0100
TRANSACTION COST	1.00	1	35.	4	\$ 1800.	VACANCY RATE	.0500	WORKING CAPITAL LOAN RATE	.0900
7 TH YR REFURBIS	1.00	8	7.	1	\$ 10000.	EQUITY DISCOUNT RATE	.1800	EXTRAORDINARY EXPENSES	\$ 7625.
TOTAL INITIAL INVESTMENT					\$ 240000.				
CASH EQUITY REQUIRED					\$ 45000.				

## FINANCING PLAN

FIRST ASSUMED MORTG. \$ 180000.

	MONTHLY PAYMENT \$ 1477.	INTEREST RATE .0775	STARTS	1	ENDS	5	BONUS	INTEREST .0000	OF GROSS RENT	
	1	2	3	4	5	6	7	8	9	10
PRINCIPAL	3919.	4234.	4574.	4942.	5339.	.	.	.	.	.
INTEREST	13812.	13497.	13157.	12790.	12393.	.	.	.	.	.
BALANCE	176080.	171845.	167270.	162328.	156989.	.	.	.	.	.

SELLERS 2ND MORTG. \$ 15000.

	MONTHLY PAYMENT \$ 185.		INTEREST RATE .0850		STARTS	1	ENDS	5	BONUS	INTEREST .0000	OF GROSS RENT
	1	2	3	4	5	6	7	8	9	10	
PRINCIPAL	994.	1082.	1178.	1282.	1396.	.	.	.	.	.	.
INTEREST	1236.	1148.	1053.	948.	835.	.	.	.	.	.	.
BALANCE	14005.	12922.	11743.	10460.	9064.	.	.	.	.	.	.

REFINANCED FIRST \$ 190000.

	MONTHLY PAYMENT \$	1589.	INTEREST RATE	.0800	STARTS	6	ENDS	10	BONUS	INTEREST	.0400	OF GROSS RENT
	1	2	3	4	5	6	7	8	9	10		
PRINCIPAL	.	.	.	.	.	4016.	4349.	4710.	5101.	5524.		
INTEREST	.	.	.	.	.	15054.	14721.	14360.	13969.	13546.		
BALANCE	.	.	.	.	.	185983.	181634.	176924.	171822.	166297.		

REFURBISH CHATTEL \$ 10000.

	MONTHLY PAYMENT \$	150.	INTEREST RATE	.0900	STARTS	8	ENDS	10	BONUS	INTEREST	.0000	OF GROSS RENT
	1	2	3	4	5	6	7	8	9	10		
PRINCIPAL	.	.	.	.	.	.	.	.	938.	1026.	1122.	
INTEREST	.	.	.	.	.	.	.	.	861.	773.	677.	
BALANCE	.	.	.	.	.	.	.	.	9061.	8035.	6913.	

	1	2	3	4	5	6	7	8	9	10
GROSS RENT	46080.	47001.	47923.	48844.	49766.	50688.	51609.	52531.	53452.	54374.
LESS VACANCY ALLOWANCE	2304.	2350.	2396.	2442.	2488.	2534.	2580.	2626.	2672.	2718.
EFFECTIVE GROSS INCOME	43776.	44651.	45527.	46402.	47278.	48153.	49029.	49904.	50780.	51655.
LESS REAL ESTATE TAXES	9000.	9450.	9900.	10350.	10800.	11250.	11700.	12150.	12600.	13050.
LESS EXPENSES	16025.	8568.	8736.	8904.	9072.	9240.	9408.	9576.	9744.	9912.
NET INCOME	18751.	26633.	26891.	27148.	27406.	27663.	27921.	28178.	28436.	28693.
LESS DEPRECIATION	11546.	10661.	9803.	8969.	8157.	7365.	6591.	8335.	7708.	7096.
LESS INTEREST	15049.	14646.	14210.	13739.	13229.	17082.	16785.	17323.	16881.	16398.
TAXABLE INCOME	-7845.	1325.	2876.	4439.	6019.	3215.	4543.	2519.	3845.	5198.
PLUS DEPRECIATION	11546.	10661.	9803.	8969.	8157.	7365.	6591.	8335.	7708.	7096.
LESS PRINCIPAL PAYMENTS	4914.	5317.	5753.	6224.	6735.	4016.	4349.	5648.	6127.	6647.
CASH THROW-OFF	-1213.	6669.	6926.	7184.	7441.	6565.	6785.	5206.	5427.	5647.
LESS TAXES	.	397.	863.	1331.	1805.	964.	1362.	755.	1153.	1559.
CASH FROM OPERATIONS	-1213.	6271.	6063.	5852.	5635.	5600.	5422.	4450.	4273.	4088.
WORKING CAPITAL LOAN(CUM BALANCE)	1213.	.	.	.	.	.	.	.	.	.
SPENDABLE CASH AFTER TAXES	.	4949.	6063.	5852.	5635.	29546.	5422.	4450.	4273.	4088.
TAX SAVINGS ON OTHER INCOME	2353.	.	.	.	.	.	.	.	.	.
* * * * *	* * * * *	* * * * *	* * * * *	* * * * *	* * * * *	* * * * *	* * * * *	* * * * *	* * * * *	* * * * *
MARKET VALUE	240000.	242400.	244800.	247200.	249600.	252000.	254400.	256800.	269200.	271600.
BALANCE OF LOANS	191298.	184767.	179014.	172789.	166054.	185983.	181634.	185985.	179858.	173211.
NET WORTH OF PROPERTY	48701.	57632.	65785.	74410.	83545.	66016.	72765.	80814.	89341.	98388.
CAPITAL GAIN	7383.	17167.	26950.	36734.	46517.	56301.	66084.	77297.	88421.	99427.
TAXES ON SALE	2356.	4807.	7000.	8944.	10643.	12105.	13335.	14874.	16238.	17436.
* * * * *	* * * * *	* * * * *	* * * * *	* * * * *	* * * * *	* * * * *	* * * * *	* * * * *	* * * * *	* * * * *
AFT TAX CASH RECOVERED-CASH EQUITY RATIO	.0523	.1622	.2970	.4270	.5523	1.2089	1.3294	1.4283	1.5232	1.6141
NET INCOME-MARKET VALUE RATIO	.0781	.1098	.1098	.1098	.1098	.1097	.1097	.1056	.1056	.1056
RETURN ON NET WORTH BEFORE TAXES	.0552	.3203	.2616	.2403	.2227	-.1312	.2050	.1821	.1726	.1644
RETURN ON NET WORTH AFTER TAXES	.0821	.2466	.2276	.2132	.1996	.1447	.2029	.1844	.1734	.1632
CASH RETURN ON ORIG CASH EQUITY BEF TAX	-.0269	.1482	.1539	.1596	.1653	.1313	.1357	.1041	.1085	.1129
CASH RETURN ON ORIG CASH EQUITY AFT TAX	.0523	.1099	.1347	.1300	.1252	.5909	.1084	.0890	.0854	.0817
DEFAULT RATIO	.9763	.8339	.8054	.8029	.8004	.8204	.8185	.8508	.8484	.8461
LENDER BONUS INTEREST RATE	.0000	.0000	.0000	.0000	.0000	.0122	.0110	.0115	.0114	.0120
* * * * *	* * * * *	* * * * *	* * * * *	* * * * *	* * * * *	* * * * *	* * * * *	* * * * *	* * * * *	* * * * *
PRESENT VALUE OF PROJECT BEFORE TAXES	236272.	241180.	244044.	246091.	247482.	237850.	238369.	238410.	238277.	238012.
PRESENT VALUE OF PROJECT AFTER TAXES	236269.	238486.	240017.	241024.	241587.	240636.	241025.	241095.	240997.	240764.

the time-line of financial events related to the project.

NET INCOME in Illustration #4 represents the traditional method of real estate productivity although it is "not normalized" for the projection period. This net income must be adjusted for deductible DEPRECIATION AND INTEREST to determine TAXABLE INCOME, and if taxable income is negative there can be TAX SAVINGS ON OTHER INCOME. Net income less interest and principal payments determines CASH THROWOFF before income taxes and if cash throwoff is negative it is necessary to replenish cash with a short-term WORKING CAPITAL LOAN. The term "cash throwoff" represents a pre-tax but after debt service item and is standard terminology in the new income property manual published by the Society of Real Estate Appraisers. The estimated INCOME TAXES are then subtracted to determine cash from operations which must first be applied to working capital loan balances due before dropping through to SPENDABLE CASH AFTER TAXES. Spendable cash after taxes includes surplus proceeds for refinancing and measures the yearly cash dividend to the investor, the income stream which so many theorists have generalized. It is highly unlikely that the curve of this cash flow would permit any averaging (ie, normalizing) for valuation purposes since an annual forecast already represents an average of monthly receipts. At current interest rates and required equity yields a difference of one month means a difference of 12% per annum or more.

In addition to cash dividends there is the potential benefit of equity enhancement due to appreciation in the market value of the property or repayment of loans in excess of market value decline so the investor is concerned with the changing position of the net worth of the property. Cash realized on resale would be net worth less capital

gains taxes and deferred income taxes on excess depreciation and these computations are made as a preliminary to valuation of all cash returns to the investor assuming ownership for a given period of years and then resale at the market value for the year specified as the resale date. Computation of the capital gain and taxes on sale is explained in Figures 4 and 5.

#### Analytical Ratios

To measure risk for the mortgage investor and the equity investor two ratios are provided. For the lender the DEFAULT RATIO indicates the cash breakeven point as a % of gross rent as defined in Fig. 4. The lender views this as the variation in the income stream which would affect repayment of the loan according to the terms. The equity investor has a more static view of risk for he is concerned with rapid recovery of his original cash investment. In Illustration 4 the apartment case indicates that considering all AFTER-TAX CASH RECEIVED AS A RATIO OF INITIAL CASH EQUITY, the equity investor has no cash risk after 5 1/2 years have passed while the lender after the refinancing still faces an exposure of \$185,983. Risk stated in terms of loss of the original investment is therefore much higher for the lender than for the equity investor, a fact which runs counter to the traditional viewpoint but which explains the economic logic of higher mortgage yields and equity participation.

BONUS INTEREST paid is converted to an interest cost by dividing the payments by the average loan balance outstanding during each fiscal year. A bonus interest stated as 4% of gross rent appears far more injurious to the equity position than restatement as % of loan balance

FIGURE 4:

UNIVERSITY OF WISCONSIN SCHOOL OF BUSINESS  
Real Estate Investment Teaching Model  
February, 1970  
Basic Definitions of Model Outputs

- 1) Current period return on Net Worth before taxes =

$$\frac{\text{Cash Throw-off} + \text{Change in Net Worth}}{\text{Net Worth at End of Previous Year}}$$

- 2) Current period return on net worth after taxes =

$$\frac{\begin{array}{l} \text{Spendable cash} + \text{tax savings on other income} + \\ (\text{change in net worth} - \text{change in cap. gains tax}) \end{array}}{\text{Net worth at the end of previous year less capital gains tax of previous year}}$$

- 3) Cash Return on original cash equity before taxes =

$$\frac{\text{Cash throw-off}}{\text{Total initial Investment less Initial Mortgage Debt}} \\ \text{(This is adjusted for staged projects)}$$

- 4) Cash Return on original equity cash after taxes =  
(This is adjusted for staged projects)

$$\frac{\text{Spendable Cash after taxes} + \text{Tax savings on other income}}{\text{Total initial investment cost less initial mtge. debt}}$$

- 5) Net income - market value ratio

$$\frac{\text{Net Income}}{\text{Market Value for the same period}}$$

- 6) After tax cash recovered - cash equity ratio (payback) =

$$\frac{\text{Accumulated spendable cash after taxes} + \text{accumulated tax savings on other income}}{\text{Cash equity required}}$$

- 7) Default ratio =

$$\frac{\text{Operating Exp.} + \text{R. E. Taxes} + \text{Prin. \& Interest on Mtge.} + \text{Working Cap. Loan Prin. Repayment}}{\text{Gross Income}}$$

8) Lender Bonus Interest Rate =

$$\frac{\% \text{ of effective gross (not to exceed cash throw-off for period)}}{\text{Balance due on loan at beginning of period}}$$

9) Resale Market Value at End of Year

$$\frac{\text{Total Initial Investment Cost} + \text{Additional staged investment} \times \text{Index for Year}}{\text{Index for Year}}$$

10) Net worth of property =

$$\text{Market value less balance of loans less working capital loans}$$

11) A. Sales proceeds subject to capital gains tax =

$$\text{Market value} - (\text{Total Capital Investment} - \text{Straight-line depreciation} - \text{Allowed excess depreciation})$$

B. Sales proceeds subject to income tax =

$$\text{Cumulative depreciation taken} - \text{Straight-line depreciation} - \text{Allowed excess depreciation}$$

$$\text{C. Taxes on sale} = (\text{A} \times 1/2 \text{ Income Tax rate}^*) + (\text{B} \times \text{Income Tax Rate})$$

\* Not to exceed 25%

12) Present value of project before taxes =

$$\text{Original mortgage balance} + \text{PV of received stream of cash throw-off} + \text{PV of net worth if sold at end of year indicated by column number.}$$

13) Present value of project after taxes =

$$\text{Original mortgage balance} + \text{present value of received stream of spendable cash after taxes} + \text{PV of received tax savings on other income} + \text{PV of (net worth less capital gains tax) if sold at end of year indicated by column number.}$$

on standard as in year 6 of Illustration 4 where the effective additional interest cost was 1.22%.

The universal interest in participations in future increases in gross rent, cash throwoff or net worth demands that the mortgage lender make the spendable cash-flow forecast advocated a necessity. Otherwise any lender estimate of yield is simply crapshooting finance. More sophisticated computer programs are available to compute yield from any alternative combination of participation loan formulas. The ratio of cash throwoff returns to original cash equity or spendable cash and tax savings as a ratio of original cash equity is a method by which many investors analyze their returns. For example, the drop of after-tax cash below before tax cash indicates a sell point in the 7th year of the investment which is confirmed by valuation analysis below.

#### Valuation of Cash Returns to the Investor

The real estate fraternity is accustomed to discounting future returns by the Inwood Tables and the mortgage equity approach continues this tradition. The teaching model therefore uses Inwood despite the fact that it is misleading and fallacious when applied to equity positions or loans from non-financial institutions. For the 24-unit Apartment Case the investment value of the entire project has been computed by determining the sum of the present values of the initial interests in the project. Reference to Figure 5 will show that the computation involves the original mortgage balances which represent the present value to the lender of debt service payments plus the present value of cash throwoff for before tax value or the present value of spendable cash after taxes plus tax savings on other income discounted

at the minimum acceptable equity return rate, in this case 18%.

The sum of these present values must equal or exceed the total initial investment in the project to justify the project from a rate of return viewpoint. Thus in Illustration #4, on the bottom line, purchase and sale at the end of the first year or at the end of the second year at the market value indicated for these years would not justify the total initial investment. It would be necessary to buy and hold until the third year or preferably until the 7th year to maximize yield and to achieve 18% compounded after taxes.

It is recognized that the assumptions of Inwood discounting do not hold true in most real estate situations. Inwood assumes immediate reinvestment of cash received from interest and recapture of principal at the same rate. Most equity investors make discrete investments from time to time using short term investments in the interim. Secondly, alternative investments to real estate in terms of liquidity, security, management, or portfolio diversification may have priority at the time of reinvestment. Then, again, the relative attractiveness of a real estate property will vary from year to year as the yields of alternative investments or tax laws change. Therefore it is much more realistic to assume reinvestment of future receipts or postponed equity commitments at an average rate of return for the portfolio investor or a specific rate of return for short term funds. The computer would discount to the present future commitments for capital outlays of a staged investment and compound to the end of the forecast period the receipts as they became available for reinvestment. It would then search for the discount factor which makes the present value of future

outlays equivalent to the future value of expected returns. A demonstration of this technique appears on the last page of Appendix B, the land development model. On the last two lines on that page note that Inwood discounting at 25% indicates the project is feasible while the real return on investment never exceeds 18%. Model building for investment valuation of real estate is hampered by traditional real estate discounting methods which are appropriate to large portfolio, instant reinvestment mortgage lending but not appropriate to equity investors in real estate.

#### An Investment Model as an Appraisal Technique

Professor R. U. Ratcliff<sup>10</sup> has strongly stated the case that in the majority of assignments, the task of the appraiser is to forecast the probable sales price of a specific property. This objective is the premise of discussion regarding conversion of investment models to an appraisal method to forecast the central tendency of price negotiations for a specific property. The concept of market action implies group behavior, knowledgeable buyers and sellers with alternative courses of action open to each, striking a bargain only when their respective self-interests will agree to buy and sell, Professor Ratcliff has stated: "There are only two devices open to the appraiser for predictive purposes -- statistical inference and simulation."<sup>11</sup> Market comparison as an approach to value is a rough form of statistical inference and more recently much has been written on statistical regression analysis of sales prices of residential properties. Simulation is a twenty-five cent word for describing what an appraiser does to predict value, most specifically when using the income approach. However, present income approach methods are challenged because they do not accurately simulate

how sophisticated investors value income streams. Spendable after-tax cash flow analysis is far more representative of at least real estate investment counseling techniques and therefore a more precise simulation approach to value.

The spendable cash simulation approach is only an investment valuation model when the inputs for time index dynamics and tax computations characterize a specific investor. However, Professor William Kinnard has underscored<sup>12</sup> the fact that when the appraiser has made a determination on highest and best use, he has also implied the probable group of buyers who would make such use of the property. In that case an appraiser, knowledgeable in regard to the decision-making logic and probable financial and tax pattern of the group of investors inferred by a statement on highest and best use, can produce an investment value from simulation that is the most probable sales price for the investment opportunity in question. A computer cash flow model only relieves the appraiser of clerical and computational responsibility while permitting him to stress his professional understanding of economic and investment research and analysis.

Within the implications of the above proposition, there are four means by which the investment model may become an appraisal model:

1. Widespread use of spendable cash models by investors in different parts of the country would mean that the model does simulate and direct investor behavior.
2. Research of the pattern of investor assumptions and expectations in different areas of the country would produce aggregate averages similar in concept to the data provided by

nationwide standardized accounting systems for industries like the motel-hotel business. Careful study of sales prices on properties thus analyzed for the perspective buyer might suggest the statistical dispersion of price around value. In addition, appraisers would have incentive to analyze investor group patterns in their areas to establish parameters for the dynamic assumptions of a cash flow model.

3. Eventual agreement on a cash flow model format will one day permit widespread use of a risk model in which revenues, expenses financing, and resale estimates can be stated in ranges. The computer would then determine the distribution of alternative results and the probability of given yields being achieved at alternative purchase prices. The price which had the highest probability of achieving a yield acceptable to investors might be defined as the most probable sales price of the property.

By whatever means spendable cash computer models influence investor behavior and appraisal simulation to predict sales price, with time it should be possible to relate the variation in sales prices to values simulated in the bargaining process. The range of prices relative to values as a result of better investment simulation today will permit introduction of statistical inference methods tomorrow. Spendable cash flow models indirectly advance both the concepts of Babcock in the thirties and Ratcliff in the sixties.

#### A Final Thought

As a final thought on the use of computer simulation models, one could argue that it may lead to resolution of a basic dilemma in appraisal theory for income properties. If rental income power is a measure

of market demand, and if historical costs are necessary to measure capital and operating tax deductible budget items, and if financial and yield patterns represent price to income relationships in investor markets--might it be that an after-tax spendable cash income approach represents a synthesis of the three approaches to value. Such a synthesis would eliminate the necessity of the more awkward process of correlation. In any even model input and output material permits the appraiser and the mortgage banker to demonstrate a professional understanding of real estate investment dynamics appropriate to the modern trend toward participation loans and hybrid financing which strive to trade-off the 4 sources of cash between different types of investor objectives. The model suggests that the stylized ritual of the present income approach can be modified so that Income (I) and Capitalization Rate (C) can be factual data rather than abstract fictional concepts.

## Notes

<sup>1</sup>Arthur M. Weimer, "History of Value Theory for the Appraiser," The Appraisal Journal, October, 1960, pp. 469-83.

<sup>2</sup>Frederick M. Babcock, Evaluation of Real Estate (New York: McGraw-Hill, 1932).

<sup>3</sup>Richard U. Ratcliff, "Capitalized Income Is Not Market Value," The Appraisal Journal, January, 1968, pp. 33-42.

<sup>4</sup>James E. Gibbons, "Mortgage-Equity Capitalization: Ellwood Method," The Appraisal Journal, April, 1966, pp. 196-203.

<sup>5</sup>Paul F. Wendt, "Ellwood, Inwood, and the Internal Rate of Return," The Appraisal Journal, October, 1967, pp. 561-601.

<sup>6</sup>Ratcliff, p. 36.

<sup>7</sup>Spendable cash is recognized by investment counselors but not appraisers. Consider James M. McMichael, Real Estate Investment Analysis and Programming (Los Angeles: California Real Estate Association, 1965).

<sup>8</sup>The Harvard Group, Inc. "A Risk Model for Real Estate Investment Analysis," (A mimeographed business prospectus traced to the Harvard School of Business but authors are unknown).

<sup>9</sup>For other discussions of real estate investment models, see: Richard U. Ratcliff (ed.), Colloquium on Computer Application in Real Estate Investment Analysis, (Faculty of Commerce and Business Administration, University of British Columbia, 1968).

<sup>10</sup>Richard U. Ratcliff, Modern Real Estate Valuation (Madison, Wisconsin: Democratic Press, 1965).

<sup>11</sup>Ibid., p. 56.

<sup>12</sup>William N. Kinnard, Jr., "New Thinking in Appraisal Theory," The Real Estate Appraiser, August, 1968.

## Appendix A

### UNIVERSITY OF WISCONSIN Real Estate Investment Teaching Model Demonstration Case Study #1

#### ANALYSIS FOR PURCHASE OF APARTMENT HOUSE INVESTMENT

1. Assume you wish to analyze the investment value at alternative purchase prices of a 24 unit apartment building, located at 2575 University Avenue, Madison, Wisconsin. The building has twelve two-bedroom apartments that each rent furnished for \$140 per month and twelve one-bedroom apartments that rent each for \$125 per month. The building is five years old, unfurnished, in need of maintenance and available as is for about \$225,000.
2. The building is well located and vacant land in the area is selling for about \$1700 per unit. This means that \$40,000 of the purchase price could be designated as land value. In addition to the land and building, the purchase price could be allocated to include \$12,500 for the elevator and \$7,200 to the parking stalls.
3. Market analysis indicates that the building would rent very well if all the units were carpeted and furnished. For this work it is estimated that it would cost \$600 per two-bedroom unit and \$500 for each one-bedroom unit or a total investment of \$13,200 by the prospective buyer.
4. The total capital expenditures could be allocated for depreciation purposes as follows, keeping in mind that the prospect would be a second user and therefore only entitled to a maximum of 150% declining balance except for his new investment in furnishing. The percent depreciable and the number of years of remaining useful life are reasonable estimates given some knowledge of the practices of the Internal Revenue Service and the condition of the building:

land	\$40,000	No depreciation allowed
parking	7,500	50% 10 years 150%
furnishings	13,200	100% 7 years sum of the digits
building	177,500	100% 35 years 150%
transaction costs	1,800	100% 35 years 150%

5. After completion of repairs and refurbishing it is anticipated that the two-bedroom apartments will rent for \$170 a month and the one-bedrooms \$150 per month. The gross rent roll of the building would then be:

$$\$170 \times 12 \times 12 = 24,480$$

$$\$150 \times 12 \times 12 = 21,600$$

$$\underline{\$46,080}$$

6. During the first year of changeover in ownership, refurbishing and re-leasing you estimate that each unit will be vacant about two months, that is about one-sixth of the time, (i.e. a vacancy of 17%) so that your average occupancy will

## APARTMENT CASE STUDY #1

be 83% of potential for the first year. Thereafter you anticipate a normal vacancy rate of 5%, or an occupancy of 95%.

7. The current real estate and personal property taxes to be paid in the first year following purchase are estimated to be \$9,000. The normal current operating expenses, excluding real estate taxes but including management fees, are determined to be \$8,400.
8. The property has been poorly maintained and will require additional expenditures of \$2100 in the first year to justify the new rent schedule. This deferred maintenance charge will be added to the normal operating expenses of the first year.
9. The buyer is considering this property because his accountant suggested that with his 30% tax bracket, including state and federal taxes, he should look for some tax shelter to offset some of his other current income. Using the accelerated method of depreciation, this real estate project should satisfy this requirement.
10. The investor feels that while the normal ratio of market value to income in his community ranges between 8% and 11%, proper financing should raise the pre-tax yield on his cash equity to at least 18%. The accountant suggest that if the investor considers the cash saved on deferred income taxes due to depreciation, the investor should seek at least 18% to 22% on his investment annually on an after-tax basis.
11. The financing available to the investor would initially combine the assumption of a first mortgage with a balance of \$180,000 with 240 months to run and a second mortgage taken back by the seller to be repaid in ten years, in monthly payments. The investor would plan to refinance both loans at the end of the sixth year of ownership when the prepayment penalty would lapse on the first mortgage. The seller feels he should receive \$1,000 as points on the second mortgage since that is the discount he will take when he sells the note.
 

1st Mortgage	180,000	20 year	7 3/4%
		5 year	balloon
Private loan	15,000	10 year	8 1/2% \$1000 discount
		5 year	balloon
12. While the seller will pay for title insurance, a survey, and related items the buyer expects to pay about \$800 in professional appraisal and legal fees related to this transaction. These fees plus points in #11 equal transaction costs of \$1800 which increase original cash required and must be amortized over life of structure.
13. Temporary cash deficits at the end of any month can be covered with bank notes at a rate of 9% per annum and repaid out of positive cash flows when available.
14. The financial plan is to maintain a highly leveraged position and therefore pay-off the original loans at the end of the fifth year by obtaining a new mortgage. To discover some measure of influence of such refinancing on yield to equity and cash flows, the investor will assume that in five years the best loan he could obtain would equal \$190,000 for 20 year term at 8% interest. The age of the building at that time would require granting a bonus interest feature equal to 4% of gross rent as of the beginning of sixth year when the loan begins.

## APARTMENT CASE STUDY #1

15. In the seventh year it is anticipated that additional refurbishing would be required in addition to ordinary annual replacement expenses. \$10,000 is budgeted as additional refurbishing component to start for the eighth year and it is expected that appliance dealer terms will be at 9% interest and 18% constant, that is \$150 a month.
16. With time, rents, expenses, real estate taxes, and resale value of the property could be expected to shift due to age of the property and inflation.
  - a. Rents are determined to increase at a rate of 2% per year of first year rents thus indicating a relative loss of growth as the property ages.
  - b. Operating expenses excluding real estate taxes have also generally increased in the community at a rate of 2% per year relative to first year costs.
  - c. Real estate taxes, however, have increased at a rate of at least 5% per year for the last five years in the community and no relief is immediately in sight.
  - d. Extraordinary expenses in the first year will include \$2100 of deferred maintenance which can be deducted as an expense rather than capitalized. In addition rents are over-stated pending completion of remodeling in the first year and a return to normal vacancy of 5% of gross. The difference between an expected vacancy of 17% and 5% is 12% of gross or \$5525. To adjust net income accordingly extraordinary expenses are therefore the sum of \$2100 + \$5525 or \$7625.
17. A conservative expectation for resale price of this apartment building which will be 15 years old at the end of the ten-year forecast is \$275,00 or about 115% of the original investment in the property. However, the cost of sale for brokers fees, etc. would be at least 5% so that the investor might receive net liquidating sale proceeds of about 110% of the original investment. Thus the growth rate in liquidating sale proceeds is assumed to be about 1% a year. For example at the end of the second year it is assumed tht the investor could sell at 106% but considering a 5% transaction cost he would realize a net market value of 101% of his original investment. It should be pointed out that while such a factor for inflation seems modest, in a highly leveraged position the impact of a optimistic resale price on equity yield can be very misleading in the early years. (Caveat: If the building is a good investment under conservative assumptions it is a better investment if more capital gains and income are realized than anticipated. It is less risky to make money with sound buys than with dreams of good sales.)

## Appendix B

### A COMPUTER MODEL FOR THE FINANCIAL ANALYSIS OF LAND DEVELOPMENT

For financial planning of a land development project timing is one of the critical factors. The land development model recognizes this important factor and analyzes the land development process as to the timing of improvements and their cost outlays and the timing of unit sales and sales revenue. Financial planning must combine four flows of cash:

1. Expenditures made on improvements either (a.) general to the project or (b.) those specific to an individual sales unit.
2. Operating outlays for real estate taxes, carrying costs of both raw land and sales inventories, and administrative costs.
3. Financing flows of cash in the form of loan funds received and the payment of both principal and interest on all debt incurred.
4. Revenue from cash sales and downpayments on land contracts plus future principal and interest owed net of commissions and closing costs.

The four flows and the year of their receipt or outlay can mean the difference between financial success or failure in land development. The model offers a comprehensive forecast of these flows of cash for a ten year period.

Additional features of the model include a comprehensive annual accounting of land usage by acres covering the assembly of different type sales units, dedications of streets, parks, and school sites and the remaining undedicated raw land that must be carried for an additional year. Capital costs and sales unit data may be inputted in rough form (such as improvements of \$3000 per lot) for preliminary analysis or can be comprehensive in detail for individual improvement items (such as cost per lineal foot of sewer, per foot of street, etc.,) covering all details of the land plan.

The outputs are of five types:

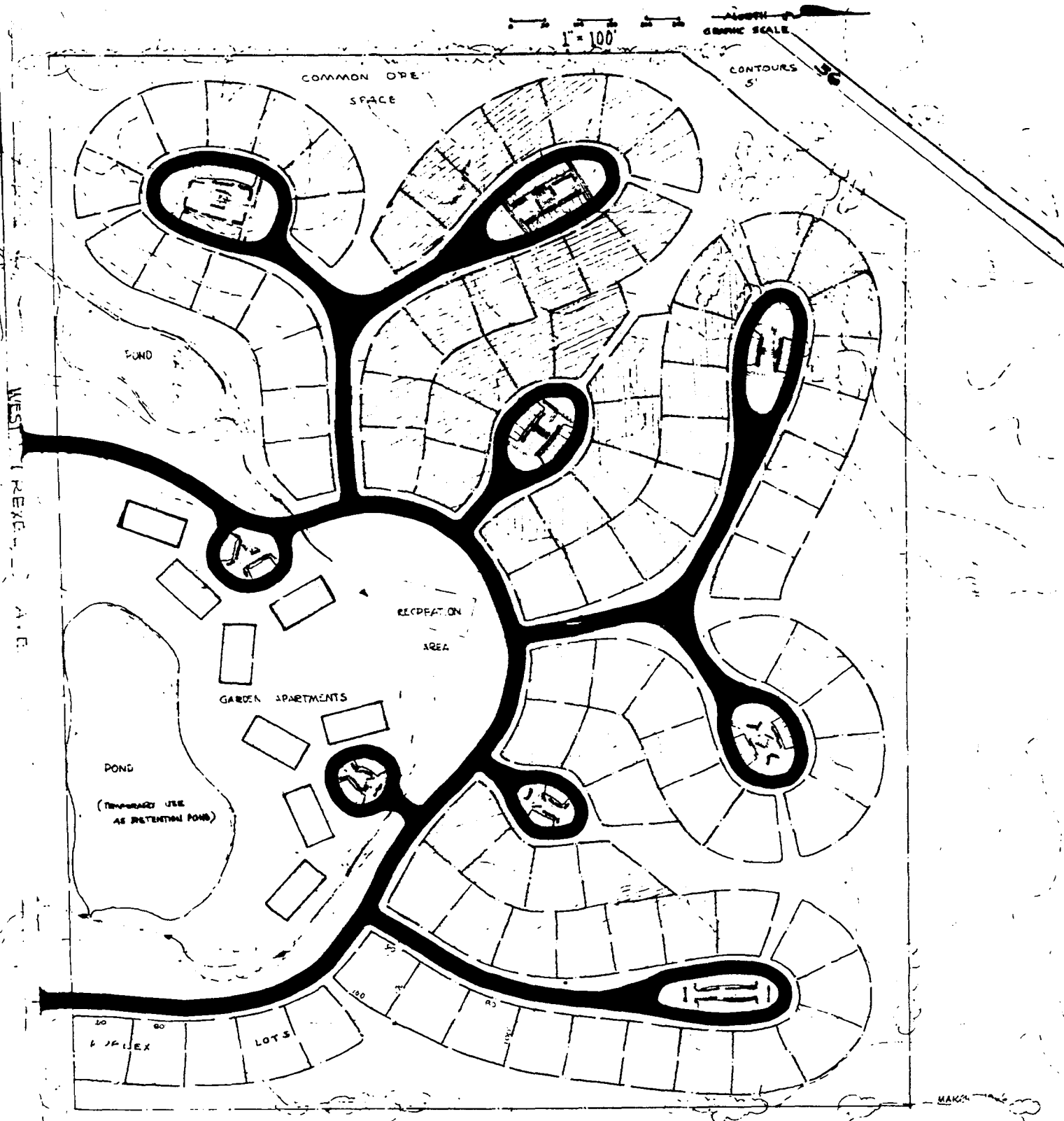
1. Summary of inputs--all important inputs are listed on the first three pages so that they can be easily checked for accuracy or changed for future runs under altered assumptions.
2. Land usages--mentioned above.
3. Financing proposals--basic forms of financing are built into the model including conventional mortgages, land contracts with principal paid by release clauses, and construction loans with principal received with capital expenditures and principal payments in the form of release payments. Realizing the multitude of financing possibilities along with joint ventures this section of the program is very well documented and can be easily modified to cover all financing plans.
4. Individual sales unit analysis--for each of the sales units a one page summary is given, showing inputs and the cash effect the one unit type has upon the development process for each of the ten years. It is at this point that profit potential for the proposed sales units can be checked varying prices, costs, and absorption rates as well as terms of financing made available to customers. Analysis of each unit type proposed is essential if profits are to be optimized. This section treats each land use type available for sale as a profit center.

5. General summary and rate of return analysis--the aggregate results are shown on the final page of output. Combining each profit center into aggregate cash flows, this is a summary of all receipts and expenditures as well as tax implications of the plan for each year. In addition a present value figure of the equity portion of the project is calculated at an inputed capitalization rate. An internal rate of return is also calculated using the individual portfolio rate of return for comparison between this venture and his overall return or for comparison between differing assumptions.

The Land Development Model was created on the University of Wisconsin, School of Business IBM-1410 computer under the direction of Professor James A. Graaskamp. The program can be easily adapted to most computers that have a standard fortran or basic language compiler. The documented card deck, program listing, input forms, instructions and further explanations are presently being marketed both for in house use and on a time sharing basis, price to be negotiated. Consulting in the use of the program as well as programming assistance is available on a per diem basis if needed.

For further information write to:

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Madison, Wisconsin 53711



# DATA:

165 FAMILY UNITS

91 SINGLE FAMILY LOTS

5 DUPLEX LOTS

8 EIGHT FAMILY GARDEN APARTMENTS

TOTAL LAND AREA PER FAMILY - 10,000 SQ. FT.

TYPICAL LOT SIZE - 80 FT. AVERAGE WIDTH

\*8,000 SQ. FT. TYPICAL LOT AREA

## SUMMARY OF INPUTS

## CAPITAL COST COMPONENTS

## ANNUAL PERCENTAGE INDEXES

NAME	PRICE PER UNIT	LAND COVERED	TYPE	YEAR	LAND	R.E. TAXES	CAPITAL COSTS	CASH
SITE GRADING	27.00	.00	0	1	100.	100.	100.	999.
SANITARY SEWERS	12.00	.00	0	2	102.	103.	101.	999.
SANITARY LATERAL	100.00	.00	0	3	104.	106.	102.	100.
SEWAGE PLANT	30000.00	1.00	1	4	106.	109.	103.	70.
DETENTION POND	10000.00	1.00	1	5	108.	112.	104.	70.
LAGOON	4000.00	2.00	1	6	110.	115.	105.	.
DEEP WELL + PUMP	30000.00	.00	0	7	112.	118.	106.	.
WATER MAINS	11.00	.00	0	8	114.	121.	107.	.
WATER LATERALS	100.00	.00	0	9	116.	124.	108.	.
STORM SEWERS	9675.00	.00	0	10	118.	127.	109.	.
ROAD GRADING	1.00	.00	0					
CURB + GUTTER	21500.00	.00	0					
COLLECTOR STREET	8.00	70.00	2					
COURT STUB ST.	7.00	60.00	2					
COURT LOOP ST.	5.50	50.00	2					
STREET TREES	20.00	.00	0					
SIDEWALKS	2.50	5.00	2					
COURT LANDSCAPE	.20	1.00	2					
RECREATION AREA	2000.00	1.50	1					
OPEN SPACE	.03	1.00	2					
STREET LIGHTING	1.50	.00	0					
ENGINEERING COST	37000.00	.00	0					

## TYPE CODES

0=NO LAND COVERED

1=LAND COVERED IN ACRES

2=LAND COVERED IN SQUARE FEET

MARGINAL TAX RATE	.3500	CARRYING COST PER RAW ACRE OF LAND	25.00
WORKING CAPITAL INTEREST RATE	.1200	EQUITY RATE OF RETURN--USED IN PRESENT VALUE CALCULATIONS	25.00
REAL ESTATE TAX EQUALIZATION RATE	50.00	PORTFOLIO RATE OF RETURN--OR OPPORTUNITY COST	15.00
REAL ESTATE TAXES PER THOUSAND OF VALUE	42.06	FIXED ADMINISTRATIVE + GENERAL EXPENSES PER YEAR	7200.
PRORATION FORMULA 0/0 TO LAND AREA	50.00	ADMIN. + GENERAL EXPENSES AS A 0/0 OF SALES VALUE	.00
PRORATION FORMULA 0/0 TO SALES VALUE	50.00	ADMIN. + GENERAL EXPENSES AS A 0/0 OF CAPITAL EXPENDITURES	.00

COSTS OF GENERAL IMPROVEMENTS	1	2	3	4	5	6	7	8	9	10
SANITARY SEWERS	7692.	7647.	.	.	.	.	.	.	.	.
SEWAGE PLANT	18000.	12120.	.	.	.	.	.	.	.	.
DETENTION POND	.	10100.	.	.	.	.	.	.	.	.
LAGOON	.	4040.	.	.	.	.	.	.	.	.
DEEP WELL + PUMP	18000.	12120.	.	.	.	.	.	.	.	.
WATER MAINS	9878.	9987.	.	.	.	.	.	.	.	.
STORM SEWERS	2902.	3908.	2960.	.	.	.	.	.	.	.
ROAD GRADING	1000.	883.	.	.	.	.	.	.	.	.
CURB + GUTTER	8600.	8686.	4386.	.	.	.	.	.	.	.
COLLECTOR STREET	7000.	8080.	.	.	.	.	.	.	.	.
STREET TREES	2000.	1010.	1020.	.	.	.	.	.	.	.
COURT LANDSCAPE	6400.	4040.	4080.	.	.	.	.	.	.	.
RECREATION AREA	.	2020.	.	.	.	.	.	.	.	.
OPEN SPACE	2100.	1818.	1836.	.	.	.	.	.	.	.
STREET LIGHTING	1537.	1515.	.	.	.	.	.	.	.	.
ENGINEERING COST	22200.	14948.	.	.	.	.	.	.	.	.
TOTAL	107310.	102924.	14282.	.	.	.	.	.	.	.

ACRES DEDICATED	1	2	3	4	5	6	7	8	9	10
GENERAL USE										
SEWAGE PLANT	.00	1.00	.00	.00	.00	.00	.00	.00	.00	.00
DETENTION POND	.00	1.00	.00	.00	.00	.00	.00	.00	.00	.00
LAGOON	.00	.00	2.00	.00	.00	.00	.00	.00	.00	.00
COLLECTOR STREET	.00	1.40	1.60	.00	.00	.00	.00	.00	.00	.00
COURT LANDSCAPE	.00	.73	.45	.45	.00	.00	.00	.00	.00	.00
RECREATION AREA	.00	1.50	.00	.00	.00	.00	.00	.00	.00	.00
OPEN SPACE	.00	1.60	1.37	1.37	.00	.00	.00	.00	.00	.00
SPECIFIC USE										
COURT STUB ST.	.13	.26	.52	.79	.52	.15	.00	.00	.00	.00
COURT LOOP ST.	.16	.61	1.09	1.42	.66	.19	.00	.00	.00	.00
SIDEWALKS	.05	.16	.30	.41	.22	.06	.00	.00	.00	.00
TOTAL	.35	8.29	7.37	4.46	1.41	.42	.00	.00	.00	.00

INITIAL RAW LAND AVAILABLE--	44.35 ACRES
LAND FOR SINGLE FAM. LOT	16.75
LAND FOR DUPLEX LOTS	1.00
LAND FOR MULTI-FAMILY LOT	4.00
LAND DEDICATED	22.32
LAND LEFT FOR OPEN SPACE	.27

PURCHASE BASIS OF RAW LAND FOR DEVELOPER 115200.  
 DEBT OUTSTANDING ON RAW LAND AT START OF DEVELOPMENT 100000.  
 BOOK EQUITY IN RAW LAND AT START OF DEVELOPMENT 15200.

RESALE VALUE OF RAW LAND NET OF TRANSFER COSTS 115200.  
 RESALE EQUITY IN RAW LAND 15200.

INITIAL EQUITY CASH IN DEVELOPMENT ENTITY 35000.  
 TOTAL EQUITY IN DEVELOPMENT ENTITY 50200.

CASH EXPENSES OF ORGANIZATION 20625. AMORTIZED FOR 5 YEARS--RECOGNIZED IN TAXABLE INCOME  
 NET CASH FOR DEVELOPMENT 14375. INCLUDED IN YEAR 1 NET CASH AFTER TAXES

FINANCING FOR LAND DEVELOPMENT

LAND CONTRACT	AMOUNT--	100000.	INTEREST RATE--	.0600	MONTHLY PAYMENT--	.RELEASE PAYMENT--	1000.			
	1	2	3	4	5	6	7	8	9	10
PRINCIPAL PAID	3000.	9000.	18000.	27000.	22000.	17500.	3500.	.	.	.
INTEREST	6000.	5820.	5280.	4200.	2580.	1260.	210.	.	.	.
BALANCE	97000.	88000.	70000.	43000.	21000.	3500.	.	.	.	.

NOTE	AMOUNT--	360000.	INTEREST RATE--	.0975	MONTHLY PAYMENT--	7612.	.RELEASE PAYMENT--	.		
	1	2	3	4	5	6	7	8	9	10
PRINCIPAL PAID	58831.	64829.	71440.	78725.	86195.	.	.	.	.	.
INTEREST	32516.	26518.	19907.	12623.	4595.	.	.	.	.	.
BALANCE	301176.	236351.	164916.	86195.	.	.	.	.	.	.

## SINGLE FAM. LOT

## SUMMARY OF INPUTS

		YEAR	SALES PRICE	NO. UNITS SOLD
LOT SIZE--SQUARE FEET	8000.	1	9000.	5.
LOT SIZE--ACRES	.18	2	9450.	10.
PERCENT SOLD FOR CASH EACH YEAR	60.00	3	9900.	20.
O/O DOWN REQUIRED ON LAND CONTRACT SALES	20.00	4	10080.	30.
INTEREST RATE ON LAND CONTRACT SALES	.09	5	10260.	20.
TERM IN YEARS ON LAND CONTRACT SALES	2.00	6	10440.	6.
CARRYING COST PER UNIT OF SALES INVENTORY	25.00	7	.	.
SALES COMMISSIONS O/O OF SALES PRICE	6.00	8	.	.
CLOSING COSTS PER UNIT	100.00	9	.	.
CAPITAL COST PER UNIT	1501.25	10	.	.

DEVELOPMENT PERIOD	1	2	3	4	5	6	7	8	9	10
BEGINNING INVENTORY	.	7.	9.	1.	7.	6.	.	.	.	.
PRODUCTION STARTS	12.	12.	12.	36.	19.	.	.	.	.	.
PRODUCTION COMPLETIONS	12.	12.	12.	36.	19.	.	.	.	.	.
SALES IN UNITS	5.	10.	20.	30.	20.	6.	.	.	.	.
UNITS SOLD FOR CASH	3.	6.	12.	18.	12.	4.	.	.	.	.
PRICE PER UNIT	9000.	9450.	9900.	10080.	10260.	10440.	.	.	.	.
REVENUE FROM CASH SALES	27000.	56700.	118800.	181440.	123120.	41760.	.	.	.	.
UNITS SOLD ON LAND CONTRACTS	2.	4.	8.	12.	8.	2.	.	.	.	.
DOWN PAYMENT RECEIVED	3600.	7560.	15840.	24192.	16416.	4176.	.	.	.	.
ACCOUNTS RECEIVABLE ADDED	14400.	30240.	63360.	96768.	65664.	16704.	.	.	.	.
SALES COSTS										
COMMISSIONS PAID	2700.	5670.	11880.	18144.	12312.	3758.	.	.	.	.
CLOSING COSTS	300.	600.	1400.	2200.	2000.	1600.	800.	200.	.	.
NET CASH GENERATED FROM SALES	27600.	57990.	121360.	185288.	125224.	40577.	-800.	-200.	-.	-.
RUNOFF OF LAND CONTRACT SALES										
INTEREST	.	1296.	3369.	7063.	11560.	10264.	4458.	751.	.	.
PRINCIPAL	.	7200.	22320.	46800.	80064.	81216.	41184.	8352.	.	.
PERIOD END ACCOUNTS RECEIVABLE	14400.	37440.	78480.	128448.	114048.	49536.	8352.	.	.	.
REAL ESTATE TAXES ON INVENTORY	662.	1589.	1040.	847.	1402.	658.	.	.	.	.
CARRYING COST OF INVENTORY	87.	200.	125.	100.	162.	75.	.	.	.	.
CAPITAL COST OF IMPROVEMENTS	18015.	18195.	18375.	55666.	29664.	.	.	.	.	.
TOTAL CASH REVENUE	8835.	46501.	127509.	182538.	185620.	131324.	44842.	8903.	-.	-.

## DUPLEX LOTS

## SUMMARY OF INPUTS

		YEAR	SALES PRICE	NO. UNITS SOLD
LOT SIZE--SQUARE FEET	8000.	1	12500.	1.
LOT SIZE--ACRES	.18	2	13000.	2.
PERCENT SOLD FOR CASH EACH YEAR	.00	3	13500.	2.
Q/O DOWN REQUIRED ON LAND CONTRACT SALES	25.00	4	.	.
INTEREST RATE ON LAND CONTRACT SALES	.09	5	.	.
TERM IN YEARS ON LAND CONTRACT SALES	2.00	6	.	.
CARRYING COST PER UNIT OF SALES INVENTORY	20.00	7	.	.
SALES COMMISSIONS O/O OF SALES PRICE	6.00	8	.	.
CLOSING COSTS PER UNIT	280.00	9	.	.
CAPITAL COST PER UNIT	2107.00	10	.	.

DEVELOPMENT PERIOD	1	2	3	4	5	6	7	8	9	10
BEGINNING INVENTORY	.	4.	2.	.	.	.	.	.	.	.
PRODUCTION STARTS	5.	.	.	.	.	.	.	.	.	.
PRODUCTION COMPLETIONS	5.	.	.	.	.	.	.	.	.	.
SALES IN UNITS	1.	2.	2.	.	.	.	.	.	.	.
UNITS SOLD FOR CASH	.	.	.	.	.	.	.	.	.	.
PRICE PER UNIT	12500.	13000.	13500.	.	.	.	.	.	.	.
REVENUE FROM CASH SALES	.	.	.	.	.	.	.	.	.	.
UNITS SOLD ON LAND CONTRACTS	1.	2.	2.	.	.	.	.	.	.	.
DOWN PAYMENT RECEIVED	3125.	6500.	6750.	.	.	.	.	.	.	.
ACCOUNTS RECEIVABLE ADDED	9375.	19500.	20250.	.	.	.	.	.	.	.
SALES COSTS										
COMMISSIONS PAID	750.	1560.	1620.	.	.	.	.	.	.	.
CLOSING COSTS	.	.	280.	560.	560.	.	.	.	.	.
NET CASH GENERATED FROM SALES	2375.	4940.	4850.	-560.	-560.	.	.	.	.	.
RUNOFF OF LAND CONTRACT SALES										
INTEREST	.	843.	2176.	2700.	911.	.	.	.	.	.
PRINCIPAL	.	4687.	14437.	19875.	10125.	.	.	.	.	.
PERIOD END ACCOUNTS RECEIVABLE	9375.	24187.	30000.	10125.	.	.	.	.	.	.
REAL ESTATE TAXES ON INVENTORY	525.	820.	283.	.	.	.	.	.	.	.
CARRYING COST OF INVENTORY	40.	60.	20.	.	.	.	.	.	.	.
CAPITAL COST OF IMPROVEMENTS	10535.	.	.	.	.	.	.	.	.	.
TOTAL CASH REVENUE	-8725.	9591.	21160.	22015.	10476.	.	.	.	.	.

## MULTI-FAMILY LOT

## SUMMARY OF INPUTS

		YEAR	SALES PRICE	NO. UNITS SOLD
LOT SIZE--SQUARE FEET	21780.	1	.	.
LOT SIZE--ACRES	.50	2	22000.	2.
PERCENT SOLD FOR CASH EACH YEAR	80.00	3	23100.	3.
0/0 DOWN REQUIRED ON LAND CONTRACT SALES	25.00	4	24200.	3.
INTEREST RATE ON LAND CONTRACT SALES	.09	5	.	.
TERM IN YEARS ON LAND CONTRACT SALES	3.00	6	.	.
CARRYING COST PER UNIT OF SALES INVENTORY	40.00	7	.	.
SALES COMMISSIONS 0/0 OF SALES PRICE	6.00	8	.	.
CLOSING COSTS PER UNIT	480.00	9	.	.
CAPITAL COST PER UNIT	4301.50	10	.	.

DEVELOPMENT PERIOD	1	2	3	4	5	6	7	8	9	10
BEGINNING INVENTORY	.	.	2.	3.	.	.	.	.	.	.
PRODUCTION STARTS	4.	4.	.	.	.	.	.	.	.	.
PRODUCTION COMPLETIONS	.	4.	4.	.	.	.	.	.	.	.
SALES IN UNITS	.	2.	3.	3.	.	.	.	.	.	.
UNITS SOLD FOR CASH	.	2.	2.	2.	.	.	.	.	.	.
PRICE PER UNIT	.	22000.	23100.	24200.	.	.	.	.	.	.
REVENUE FROM CASH SALES	.	44000.	46200.	48400.	.	.	.	.	.	.
UNITS SOLD ON LAND CONTRACTS	.	.	1.	1.	.	.	.	.	.	.
DOWN PAYMENT RECEIVED	.	.	5775.	6050.	.	.	.	.	.	.
ACCOUNTS RECEIVABLE ADDED	.	.	17325.	18150.	.	.	.	.	.	.
SALES COSTS										
COMMISSIONS PAID	.	2640.	4158.	4356.	.	.	.	.	.	.
CLOSING COSTS	.	960.	960.	960.	.	480.	480.	.	.	.
NET CASH GENERATED FROM SALES	.	40400.	46857.	49134.	.	-480.	-480.	.	.	.
RUNOFF OF LAND CONTRACT SALES										
INTEREST	.	.	.	1559.	2673.	1608.	544.	.	.	.
PRINCIPAL	.	.	.	5775.	11825.	11825.	6050.	.	.	.
PERIOD END ACCOUNTS RECEIVABLE	.	.	17325.	29700.	17875.	6050.	.	.	.	.
REAL ESTATE TAXES ON INVENTORY	.	462.	1214.	763.	.	.	.	.	.	.
CARRYING COST OF INVENTORY	.	40.	100.	60.	.	.	.	.	.	.
CAPITAL COST OF IMPROVEMENTS	17206.	17378.	.	.	.	.	.	.	.	.
TOTAL CASH REVENUE	-17206.	22519.	45542.	55644.	14498.	12953.	6114.	.	.	.

## AGGREGATE RESULTS

DEVELOPMENT PERIOD	1	2	3	4	5	6	7	8	9	10
REVENUE FROM CASH SALES	27000.	100700.	165000.	229840.	123120.	41760.	.	.	.	.
DOWNPAYMENT RECEIVED	6725.	14060.	28365.	30242.	16416.	4176.	.	.	.	.
ACCOUNTS RECEIVABLE ADDED	23775.	49740.	100935.	114318.	65664.	16704.	.	.	.	.
SALES COSTS										
COMMISSIONS PAID	3450.	9870.	17658.	22500.	12312.	3758.	.	.	.	.
CLOSING COSTS	300.	1560.	2640.	3720.	2560.	2080.	1280.	200.	.	.
RUNOFF OF LAND CONTRACT SALES										
INTEREST	.	2139.	5546.	11322.	15144.	11873.	5002.	751.	.	.
PRINCIPAL	.	11887.	36757.	72450.	102014.	93041.	47234.	8352.	.	.
PERIOD END ACCOUNTS RECEIVABLE	23775.	61627.	125805.	168273.	131923.	55586.	8352.	.	.	.
CASH FROM OPERATIONS	29975.	113078.	204278.	294990.	211534.	121265.	40951.	7400.	.	.
LESS CASH OUTLAYS										
CARRYING COSTS--RAW LAND	554.	.	.	.	.	.	.	.	.	.
CARRYING COSTS--INVENTORY	127.	300.	245.	160.	162.	75.	.	.	.	.
REAL ESTATE TAX--RAW LAND	1211.	.	.	.	.	.	.	.	.	.
REAL ESTATE TAXES--INVENTORY	1188.	2872.	2539.	1611.	1402.	658.	.	.	.	.
MANAGEMENT + ADMIN. COSTS	.	.	.	.	.	.	.	.	.	.
NEW ALLOCATED CAPITAL OUTLAYS	45756.	35573.	18375.	55666.	29664.	.	.	.	.	.
NEW GENERAL CAPITAL OUTLAYS	107310.	102924.	14282.	.	.	.	.	.	.	.
NET CASH REVENUE	-126172.	-28591.	168837.	237553.	180306.	120532.	40951.	7400.	-.	-.
PROJECT DEBT STRUCTURE										
TOTAL INITIAL BALANCE 460000.										
BALANCE END OF YEAR	398176.	324351.	234916.	129195.	21000.	3500.	.	.	.	.
TOTAL PRINCIPAL PAYMENTS	61831.	73829.	89440.	105725.	108195.	17500.	3500.	.	.	.
TOTAL INTEREST PAID ON PROJ.	38516.	32338.	25187.	16823.	7175.	1260.	210.	.	.	.
INTEREST ADDED TO LOAN BAL.	.	.	.	.	.	.	.	.	.	.
NET CASH FROM DEBT INCURRED	360000.	.	.	.	.	.	.	.	.	.
CASH AVAILABLE BEFORE TAXES	133481.	-134758.	54209.	115005.	64935.	101772.	37241.	7400.	-.	-.
CAPITAL COST OF IMPROVEMENTS										
PRORATED TO UNITS SOLD	5631.	20669.	39286.	54138.	36620.	19962.	7090.	1484.	.	.
GENERAL CAPITAL COST										
PRORATED TO UNITS SOLD	3223.	22069.	47024.	67809.	47254.	25959.	9207.	1960.	.	.
LAND COST PRORATED TO UNITS SOLD	3460.	12373.	24036.	33664.	23339.	12812.	4544.	967.	.	.
TAXABLE INCOME FROM OPERATIONS	-28061.	18331.	61836.	116660.	91456.	60538.	19899.	2987.	.	-.
ESTIMATED INCOME TAXES	.	6415.	21642.	40831.	32009.	21188.	6964.	1045.	.	.
TAX SAVINGS ON OTHER INCOME	9821.	.	.	.	.	.	.	.	.	.
NET CASH AFTER TAXES	147856.	-141173.	32566.	74174.	32926.	80584.	30276.	6354.	-.	-.
REINVESTED EARNINGS	.	147856.	6683.	39249.	35000.	35000.	.	.	.	.
WORKING CAPITAL LOAN BALANCE	.	.	.	.	.	.	.	.	.	.
CASH AFTER TAXES FOR DIVIDENDS OR REINVESTMENT	147856.	6683.	39249.	113423.	67926.	115584.	30276.	6354.	.	.
DIVIDENDS PAID	.	.	.	78423.	32926.	115584.	30276.	6354.	.	.
NET AFTER TAX + DEBT REPAYMENT	-250698.	-54650.	38374.	106566.	137446.	54140.	9092.	10.	10.	9.
ON BULK SALES										
P.V. AT 25.0/0 OF EQUITY RETURNS	-74417.	-22841.	47601.	97965.	107276.	95260.	89324.	88485.	88485.	88484.
INTERNAL RATE OF RETURN	-11.12	9.62	16.64	19.16	19.04	18.24	17.65	17.30	17.04	16.84