

JAMES A. GRAASKAMP COLLECTION OF TEACHING MATERIALS

II. CLASSES AT THE UNIVERSITY OF WISCONSIN--MADISON

- M. Business 856: Advanced Appraisal Theory and Practice
  - 4. Miscellaneous Samples of Class Handouts, Problem Sets, and Mathematical/Computer Models e.g. Ellwood, Quantitative Point, and Regression Analysis

## MARKET COMP THEORY COMPARED TO REGRESSION

### I. Common Requirements to be Determined

- A. Variables to survey
- B. Sales comparables available for analysis
- C. Variables which relate to value
- D. Rates of adjustment for difference in variable factors
- E. Comparable sales which are best related to subject property

### II. Prediction of Price Through Regression Analysis

$$V_p = b + X_s (A) + \dots X_{n,s} (A_n)$$

$$V_s = b_0 + \sum_f A_f X_{f,s}$$

$$V_k = b_0 + \sum_f A_f X_{f,k}$$

$$V'_k = P_k + V_s - V_k$$

$$= P_k + A_1 X_{1s} - A_1 X_{1k} + A_2 X_{2s} - A_2 X_{2k}$$

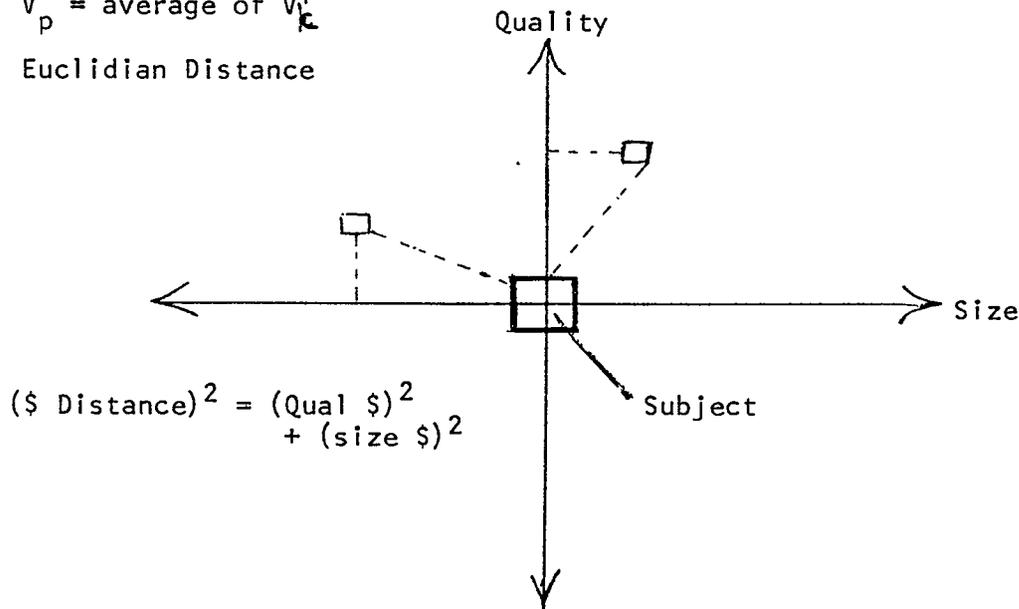
$$= P_k + A_1 (X_{1s} - X_{1k}) + A_2 (X_{2s} - X_{2k})$$

### III. Market Comparison

$$V_k = A_1 \times (X_s - X_k) + A_2 \times (X_{s2} - X_{k2})$$

$$V_p = \text{average of } V'_k$$

### IV. Euclidian Distance



Scale requires conversion of factors to \$'s per unit

Market comp permits conversion with:

\$/unit

\$/as % of sale price/unit

\$'s/ transformation unit

# Using Regression in Appraisal

$$\begin{aligned}\Sigma Y &= na + b\Sigma X \\ \Sigma XY &= a\Sigma X + b\Sigma X^2\end{aligned}$$

1. Compute the product  $XY$ , and calculate or look up the squares  $X^2$  and  $Y^2$  in Appendix C, for each original pair of observations.
2. Sum these columns. (Steps 1 and 2 can be combined in a single operation on a calculating machine.)
3. Subtract from each sum the mean times the sum of the respective variables to get the adjusted sums of the  $x$ 's and  $y$ 's expressed as deviations from their means. That is,

$$\begin{array}{l} \text{Sum} \\ \text{Less mean times sum} \\ \text{Equals adjusted sum} \end{array} \quad \begin{array}{l} \Sigma XY \\ \frac{-\bar{Y}\Sigma X}{=\Sigma xy} \end{array} \quad \begin{array}{l} \Sigma X^2 \\ \frac{-\bar{X}\Sigma X}{=\Sigma X^2} \end{array} \quad \begin{array}{l} \Sigma Y^2 \\ \frac{-\bar{Y}\Sigma Y}{=\Sigma Y^2} \end{array}$$

The sum of the deviations around the means,  $\Sigma x$  and  $\Sigma y$ , must equal zero, so they drop out of the two normal equations above, which reduce to

$$b = \frac{\Sigma xy}{\Sigma x^2}$$

$$a = \bar{Y} - b\bar{X}$$

<u>House No.</u>	<u>Points</u>	<u>Price</u>	<u>XY</u>	<u>X<sup>2</sup></u>	<u>Y<sup>2</sup></u>
Sum	1,101	1,122			
Mean	55.05	56.10			
Less mean times sum					
Equals adjusted sum					
This is			$\Sigma xy$	$\Sigma x^2$	$\Sigma y^2$

$$b = \frac{\Sigma xy}{\Sigma x^2} = \frac{6,974}{7,395} = 0.943$$

$$a = \bar{Y} - b\bar{X} = 56.10 - 0.943(55.05) = 4.2$$

Hence, the regression line is  $Y_c = 4.2 + 0.943X$

1  
1  
1  
1  
1

821 Minakwa St.

3120 Gregory St.

645 Sheldon St.

636 Crandell St.

628 Crandell St.

640 Knicherbocker

657 Knicherbocker

SUBJECT

Rating / Weighted Ratings

Features	Weight	821 Minakwa St.	3120 Gregory St.	645 Sheldon St.	636 Crandell St.	628 Crandell St.	640 Knicherbocker	657 Knicherbocker	SUBJECT
Location & Neighborhood	25	2/50	6/150	4/100	2/50	2/50	4/100	4/100	2/50
Lot	5	2/10	4/20	4/20	6/30	4/20	4/20	4/20	4/20
Financial Burden	15	4/60	2/30	4/60	6/90	4/60	4/60	4/60	6/90
Exterior Architecture	15	4/60	4/60	4/60	6/90	6/90	6/90	6/90	4/60
Mechanical	10	2/20	2/20	4/40	6/60	6/60	4/40	4/40	6/60
Physical Condition	10	2/20	4/40	4/40	4/40	4/40	4/40	4/40	4/40
Interior Attractiveness	20	2/40	2/40	4/80	4/80	6/120	6/120	6/120	4/80
TOTAL	100	260	360	400	440	440	470	470	400
PRICE		\$26,300	\$24,500	\$23,800	\$22,900	\$22,900	\$21,900	\$21,900	???

Ratcliff Linear Regression

EXHIBIT B

$$Y = a + bx$$

$$b = \frac{n(\sum xy) - (\sum x)(\sum y)}{n(\sum x^2) - \sum(x)^2}$$

$$a = \frac{Y - b(\sum x)}{n}$$

$$n = 7$$

The number of comparables.

$$\sum Y = 164,200$$

The sum of the seven actual prices paid for the comparables.

(\$26,300) + (\$24,500) + (\$23,800).....

$$(\sum y) = 164,200$$

$$(\sum x) = 2840$$

The sum of the total weighs for the comparables.

(260) + (360) + (400) + (440) + .....

$$(\sum xy) = 65,916,000$$

(260)(26,300) + (360)(24,500) + .....

$$(\sum x)(\sum y) = 465,328,000$$

(2840)(164,200)

$$\sum(x)^2 = 8,065,600$$

(2840)<sup>2</sup>

$$(\sum x^2) = 1,186,200$$

(260)<sup>2</sup> + (360)<sup>2</sup> + (400)<sup>2</sup> + (440)<sup>2</sup> + ..

$$b = \frac{7(65,916,000) - (465,328,000)}{7(1,186,200) - (8,065,600)} = -16.467619 \approx -16.5$$

$$a = \frac{164,200 - (-16.5)(2840)}{7} = 30,151.428 \approx \$30,151.$$

$$Y = a + bx$$

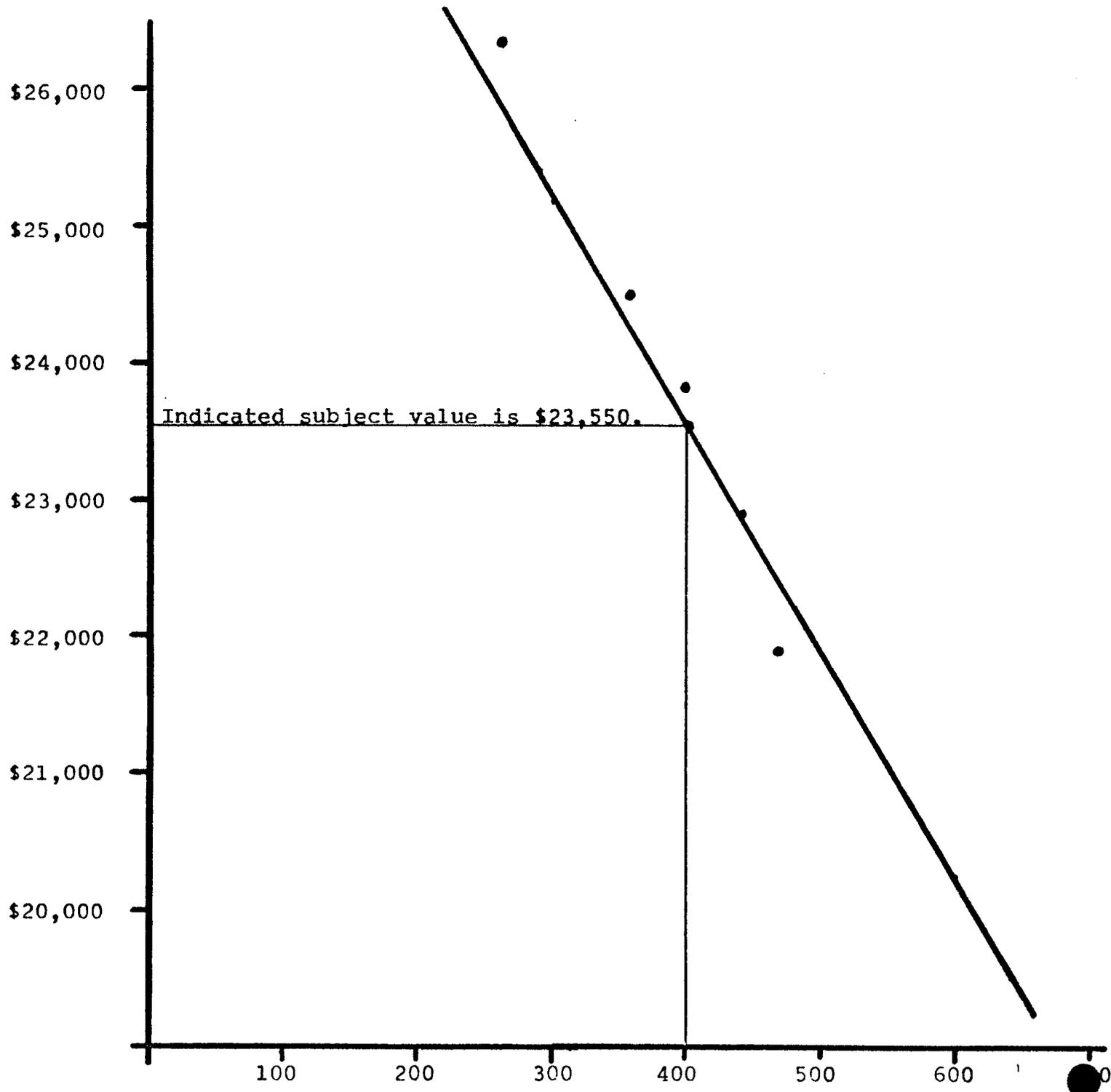
$$Y = 30,151 + (-16.5)(x)$$

'x' for the subject property was 400

$$Y = 30,151 + (-16.5)(400)$$

$$Y = \$23,550$$

EXHIBIT 2



COMPARISON OF RATGRAM/DILMORE

MARKET COMPARISON MODEL

EXCERPTS FROM GRAASKAMP SEMINARS  
(1984-1985)

## RATGRAM STYLE

WOOLWORTH BUILDING  
 SCALE FOR SCORING COMPARABLES ON  
 IMPORTANT INVESTOR CONSIDERATIONS FOR  
 OFFICE - RETAIL SPACE IN MADISON  
 C-4 ZONING

LOCATION 10%	5 = High visibility 3 = Corner visibility limited 1 = Inside lot
EXPANSION POTENTIAL 30%	5 = Potential for significant increases of floor space 3 = Flexible layouts due to bay spacing and elevator position 1 = Inflexibility of layout due to old bearing walls and elevator shafts
CONDITION AT TIME OF PURCHASE 25%	5 = Fully renovated and leased 3 = Long-term retail leases in place. Serviceable as retail in tired space. 1 = Vacant and in need of total rehabilitation. Short-term lease or large vacancy in need of total rehabilitation.
ELEVATORS AT TIME OF PURCHASE 20%	5 = Two passenger and freight 3 = Two passenger 1 = One passenger
FENESTRATION ON UPPER LEVEL 15%	5 = Large windows facing the Square 3 = Limited window area 1 = No windows

WOOLWORTH BUILDING  
 WEIGHTED MATRIX FOR COMPARABLE PROPERTIES  
 SCORE/WEIGHTED SCORE

ATTRIBUTE	WEIGHT	COMPARABLE NO. 1 30 N. CARROLL WOLFF KUBLY	COMPARABLE NO. 2 14 W. MIFFLIN	COMPARABLE NO. 3 5 & 7 E. MIFFLIN CENTRE SEVEN	COMPARABLE NO. 4 50 E. MIFFLIN EMPORIUM	COMPARABLE NO. 5 2 W. MIFFLIN WOOLWORTH	SUBJECT
LOCATION	10%	3/0.30	1/0.10	1/0.10	3/0.30	5/0.50	5/0.50
EXPANSION POTENTIAL AT TIME OF SALE	30%	3/0.90	1/0.30	1/0.30	5/1.50	3/0.90	3/0.90
CONDITION AT TIME OF SALE	25%	1/0.25	5/1.25	1/0.25	3/0.75	3/0.75	1/0.25
ELEVATORS IN PLACE	20%	5/1.00	3/0.60	1/0.20	3/0.60	1/0.20	1/0.20
FENESTRATION ON UPPER FLOORS	15%	1/0.15	5/0.75	5/0.75	1/0.15	3/0.45	3/0.45
TOTAL WEIGHTED SCORE	100%	2.60	3.00	1.60	3.30	2.80	2.30
ADJUSTED SELLING PRICE [1]		\$625,000	\$750,000	\$240,000	\$850,000	\$662,500	
DATE OF SALE		7/17/80	2/27/84	12/31/77	4/30/78	7/31/78	
GROSS BUILDING AREA (GBA)		41,000 SF	40,000 SF	26,000 SF	42,500 SF	39,000 SF	39,000 SF
ADJUSTED PRICE/GBA		\$15.24	\$18.75	\$ 9.23	\$20.00	\$16.99	
ADJUSTED PRICE/GBA/ WEIGHTED POINT SCORE		\$5.86	\$6.25	\$5.77	\$6.06	\$6.08	

[1] See Appendix \_ for assumptions and calculations to determine adjusted selling price.

RATGRAM STYLE

EXHIBIT 13

EXHIBIT 14  
 WOOLWORTH - RATGRAM STYLE  
 1ST RUN

\*\*\*\* WOOLWORTH DEMONSTRATION \*\*\*\*

# Attributes = 5

Attribute Names, Prelim. Weights  
 LOCATION 20  
 EXPANSION POTENTIAL 20  
 CONDITION AT TIME OF SALE 20  
 ELEVATORS IN PLACE 20  
 FENESTRATION ON UPPER FLOORS 20

# of Observations = 5

Observ. # 1 WOLFF-KUBLY-30 N. CARROLL Price 15.24  
 LOCATION 3  
 EXPANSION POTENTIAL 3  
 CONDITION AT TIME OF SALE 1  
 ELEVATORS IN PLACE 5  
 FENESTRATION ON UPPER FLOORS 1  
 Observ. # 2 14 W. MIFFLIN Price 18.75  
 LOCATION 1  
 EXPANSION POTENTIAL 1  
 CONDITION AT TIME OF SALE 5  
 ELEVATORS IN PLACE 3  
 FENESTRATION ON UPPER FLOORS 5  
 Observ. # 3 CENTRE SEVEN-5 & 7 N. PINCKNEY Price 9.23  
 LOCATION 1  
 EXPANSION POTENTIAL 1  
 CONDITION AT TIME OF SALE 1  
 ELEVATORS IN PLACE 1  
 FENESTRATION ON UPPER FLOORS 5  
 Observ. # 4 EMPORIUM-50 E. MIFFLIN Price 20  
 LOCATION 3  
 EXPANSION POTENTIAL 5  
 CONDITION AT TIME OF SALE 3  
 ELEVATORS IN PLACE 3  
 FENESTRATION ON UPPER FLOORS 1  
 Observ. # 5 WOOLWORTH-2 W. MIFFLIN Price 16.99  
 LOCATION 5  
 EXPANSION POTENTIAL 3  
 CONDITION AT TIME OF SALE 3  
 ELEVATORS IN PLACE 1  
 FENESTRATION ON UPPER FLOORS 3

The Matrix:

20	20	20	20	20
10	10	10	10	10
15	15	15	15	15
25	25	25	25	25
30	30	30	30	30

Median = 5.861538  
 Mean = 5.913863  
 Standard Deviation = .5837666

Weights:

LOCATION = 20  
 EXPANSION POTENTIAL = 20  
 CONDITION AT TIME OF SAL = 20  
 ELEVATORS IN PLACE = 20  
 FENESTRATION ON UPPER FL = 20

Final Results:

Number of Combinations = 3125  
 Number of Combinations Adding to 100% = 381

Median = 6.060606  
 Mean = 6.00175  
 Standard Deviation = .1893479

Weights:

LOCATION = 10  
 EXPANSION POTENTIAL = 30  
 CONDITION AT TIME OF SAL = 25  
 ELEVATORS IN PLACE = 20  
 FENESTRATION ON UPPER FL = 15

EXHIBIT 14 (Continued)  
 WOOLWORTH - RATGRAM STYLE  
 2ND RUN

\*\*\*\* WOOLWORTH DEMONSTRATION \*\*\*\*

# Attributes = 5

Attribute Names, Prelim. Weights  
 LOCATION 20  
 EXPANSION POTENTIAL 20  
 CONDITION AT TIME OF SALE 20  
 ELEVATORS IN PLACE 20  
 FENESTRATION ON UPPER FLOORS 20

# of Observations = 5

Observ. # 1 WOLFF-KUBLY-30 N. CARROLL Price 15.24  
 LOCATION 3  
 EXPANSION POTENTIAL 3  
 CONDITION AT TIME OF SALE 1  
 ELEVATORS IN PLACE 5  
 FENESTRATION ON UPPER FLOORS 1  
 Observ. # 2 14 W. MIFFLIN Price 18.75  
 LOCATION 1  
 EXPANSION POTENTIAL 1  
 CONDITION AT TIME OF SALE 5  
 ELEVATORS IN PLACE 3  
 FENESTRATION ON UPPER FLOORS 5  
 Observ. # 3 CENTRE SEVEN-5 & 7 N. PINCKNEY Price 9.23  
 LOCATION 1  
 EXPANSION POTENTIAL 1  
 CONDITION AT TIME OF SALE 1  
 ELEVATORS IN PLACE 1  
 FENESTRATION ON UPPER FLOORS 5  
 Observ. # 4 EMPORIUM-50 E. MIFFLIN Price 20  
 LOCATION 3  
 EXPANSION POTENTIAL 5  
 CONDITION AT TIME OF SALE 3  
 ELEVATORS IN PLACE 3  
 FENESTRATION ON UPPER FLOORS 1  
 Observ. # 5 WOOLWORTH-2 W. MIFFLIN Price 16.99  
 LOCATION 5  
 EXPANSION POTENTIAL 3  
 CONDITION AT TIME OF SALE 3  
 ELEVATORS IN PLACE 1  
 FENESTRATION ON UPPER FLOORS 3

The Matrix:

10	30	25	20	15
0	20	15	10	5
5	25	20	15	10
15	35	30	25	20
20	40	35	30	25

Median = 6.060606  
 Mean = 6.00175  
 Standard Deviation = .1893479

Weights:  
 LOCATION = 10  
 EXPANSION POTENTIAL = 30  
 CONDITION AT TIME OF SAL = 25  
 ELEVATORS IN PLACE = 20  
 FENESTRATION ON UPPER FL = 15

Final Results:

Number of Combinations = 3125  
 Number of Combinations Adding to 100% = 381

Median = 6.060606  
 Mean = 6.00175  
 Standard Deviation = .1893479

Weights:  
 LOCATION = 10  
 EXPANSION POTENTIAL = 30  
 CONDITION AT TIME OF SAL = 25  
 ELEVATORS IN PLACE = 20  
 FENESTRATION ON UPPER FL = 15

EXHIBIT 15

WOOLWORTH - RATGRAM STYLE

CALCULATION OF MOST PROBABLE PRICE USING  
MEAN PRICE PER POINT EQUATION METHOD

COMPARABLE PROPERTY	SELLING PRICE PER SF OF GBA	POINT SCORE	PRICE PER SF OF GBA/ TOTAL WEIGHTED SCORE (x)
1	\$15.24	2.60	\$5.86
2	18.75	3.00	6.25
3	9.23	1.60	5.77
4	20.00	3.30	6.06
5	16.99	2.80	<u>6.08</u>
		TOTAL	\$30.02 =====

Total of Price Per SF of GBA = \$30.02  
Total Weighted Score

Mean Value ( $\bar{x}$ ) = 30.02/5 = \$6.00

Standard Deviation =  $\sqrt{\frac{\sum (x-\bar{x})^2}{n-1}}$  = \$0.19 where:

x	$\bar{x}$	$(x-\bar{x})$	$(x-\bar{x})^2$	n	n-1
\$5.86	- \$6.00	= -\$0.14	0.0196	5	4
6.25	- 6.00	= 0.25	0.0625		
5.77	- 6.00	= - 0.23	0.0529		
6.06	- 6.00	= 0.06	0.0036		
6.08	- 6.00	= 0.08	<u>0.0064</u>		
			0.1450		

$$\sqrt{\frac{0.1450}{4}} = \sqrt{0.03625} = 0.190394 \text{ or } \$0.19$$

## EXHIBIT 15 (Continued)

Value Range of Price/Point Score:  $\$6.00 \pm \$0.19$

Since GBA of subject is 39,000 square feet and total weighted point score of subject is 2.3, then:

High

Estimate:  $\$6.19 \times 2.3 \times 39,000 \text{ SF} = \$555,243$  or  $\$560,000$   
( $\$14.23/\text{SF}$ )

Central

Tendency:  $\$6.00 \times 2.3 \times 39,000 \text{ SF} = \$538,200$  or  $\$540,000$   
( $\$13.80/\text{SF}$ )

Low

Estimate:  $\$5.81 \times 2.3 \times 39,000 \text{ SF} = \$521,159$  or  $\$520,000$   
( $\$13.36/\text{SF}$ )

JUSTIFICATION OF COMPARABLE PRICE FORMULA FOR  
 WOOLWORTH BUILDING  
 BY MEANS OF ANALYSIS OF VARIANCE OF ACTUAL SALE PRICE VS. PREDICTED PRICE  
 OF COMPARABLES USING MEAN PRICE PER POINT EQUATION METHOD

NO.	COMPARABLE PROPERTY	WEIGHTED POINT SCORE	MEAN PRICE PER POINT SCORE	PREDICTED PRICE/ SF GBA	ACTUAL PRICE/ SF GBA	VARIANCE	% OF VARIANCE TO ACTUAL PRICE
1	WOLFF KUBLY 30 N. Carroll Street	2.60	\$6.00	\$15.60	\$15.24	\$ 0.36	2.4%
2	14 W. Mifflin Street	3.00	6.00	18.00	18.75	- 0.75	4.0
3	CENTRE SEVEN 5 & 7 N. Pinckney Street	1.60	6.00	9.60	9.23	0.37	4.0
4	EMPORIUM 50 E. Mifflin Street	3.30	6.00	19.80	20.00	- 0.20	1.0
5	WOOLWORTH 2 W. Mifflin Street	2.80	6.00	16.80	16.99	- 0.19	1.1
					NET VARIANCE	\$ - 0.41	

RATGRAM STYLE  
EXHIBIT 16

WOOLWORTH BUILDING  
SCALE FOR SCORING COMPARABLES ON  
IMPORTANT INVESTOR CONSIDERATIONS FOR  
OFFICE - RETAIL SPACE IN MADISON  
C-4 ZONING  
DILMORE STYLE

LOCATION  
15%

26 = High visibility  
15 = Corner visibility limited  
10 = Inside lot

EXPANSION POTENTIAL  
30%

26 = Potential for significant increases of floor space  
15 = Flexible layouts due to bay spacing and elevator position  
10 = Inflexibility of layout due to old bearing walls and elevator shafts

CONDITION AT  
TIME OF PURCHASE  
40%

26 = Fully renovated and leased  
15 = Long-term retail leases in place. Serviceable as retail in tired space.  
10 = Vacant and in need of total rehabilitation. Short-term lease or large vacancy in need of total rehabilitation.

ELEVATORS AT  
TIME OF PURCHASE  
15%

26 = Two passenger and freight  
15 = Two passenger  
10 = One passenger

WOOLWORTH BUILDING  
 WEIGHTED MATRIX FOR COMPARABLE PROPERTIES  
 SCORE/WEIGHTED SCORE

ATTRIBUTE	WEIGHT	COMPARABLE NO. 1 30 N. CARROLL WOLFF KUBLY	COMPARABLE NO. 2 14 W. MIFFLIN	COMPARABLE NO. 3 5 & 7 E. MIFFLIN CENTRE SEVEN	COMPARABLE NO. 4 50 E. MIFFLIN EMPORIUM	COMPARABLE NO. 5 2 W. MIFFLIN WOOLWORTH	SUBJECT
LOCATION	15%	15/2.25	10/1.50	10/1.50	15/2.25	26/3.90	26/3.90
EXPANSION POTENTIAL AT TIME OF SALE	30%	15/4.50	10/3.00	10/3.00	26/7.80	15/4.50	15/4.50
CONDITION AT TIME OF SALE	40%	10/4.00	26/10.40	10/4.00	15/6.00	15/6.00	10/4.00
ELEVATORS IN PLACE	15%	26/3.90	15/2.25	10/1.50	15/2.25	10/1.50	10/1.50
TOTAL WEIGHTED SCORE	100%	14.65	17.15	10.00	18.30	15.90	13.90
ADJUSTED SELLING PRICE [1]		\$625,000	\$750,000	\$240,000	\$850,000	\$662,500	
DATE OF SALE		7/17/80	2/27/84	12/31/77	4/30/78	7/31/78	
GROSS BUILDING AREA (GBA)		41,000 SF	40,000 SF	26,000 SF	42,500 SF	39,000 SF	39,000 SF
ADJUSTED PRICE/GBA		\$15.24	\$18.75	\$ 9.23	\$20.00	\$16.99	
ADJUSTED PRICE/GBA * WEIGHTED POINT SCORE		\$1.04	\$1.09	\$0.92	\$1.09	\$1.07	

[1] See Appendix \_ for assumptions and calculations to determine adjusted selling price.

EXHIBIT 18  
DILMORE STYLE

EXHIBIT 19  
 WOOLWORTH - DILMORE STYLE  
 1ST RUN

\*\*\*\* WOOLWORTH-DILMORE STYLE \*\*\*\*

# Attributes = 5

Attribute Names, Prelim. Weights

LOCATION 20  
 EXPANSION POTENTIAL 20  
 CONDITION AT TIME OF SALE 20  
 ELEVATORS IN PLACE 20  
 FENESTRATION ON UPPER FLOORS 20

# of Observations = 5

Observ. # 1 WOLFF-KUBLY Price 15.24  
 LOCATION 15  
 EXPANSION POTENTIAL 15  
 CONDITION AT TIME OF SALE 10  
 ELEVATORS IN PLACE 26  
 FENESTRATION ON UPPER FLOORS 10  
 Observ. # 2 14 W. MIFFLIN Price 18.75  
 LOCATION 10  
 EXPANSION POTENTIAL 10  
 CONDITION AT TIME OF SALE 26  
 ELEVATORS IN PLACE 15  
 FENESTRATION ON UPPER FLOORS 26  
 Observ. # 3 CENTRE SEVEN Price 9.23  
 LOCATION 10  
 EXPANSION POTENTIAL 10  
 CONDITION AT TIME OF SALE 10  
 ELEVATORS IN PLACE 10  
 FENESTRATION ON UPPER FLOORS 26  
 Observ. # 4 EMPORIUM Price 20  
 LOCATION 15  
 EXPANSION POTENTIAL 26  
 CONDITION AT TIME OF SALE 15  
 ELEVATORS IN PLACE 15  
 FENESTRATION ON UPPER FLOORS 10  
 Observ. # 5 WOOLWORTH Price 16.99  
 LOCATION 26  
 EXPANSION POTENTIAL 15  
 CONDITION AT TIME OF SALE 15  
 ELEVATORS IN PLACE 10  
 FENESTRATION ON UPPER FLOORS 15

The Matrix:

20	20	20	20	20
10	10	10	10	10
15	15	15	15	15
25	25	25	25	25
30	30	30	30	30

Median = 1.048765  
 Mean = 1.012559  
 Standard Deviation = .1956356

Weights:

LOCATION = 20  
 EXPANSION POTENTIAL = 20  
 CONDITION AT TIME OF SAL = 20  
 ELEVATORS IN PLACE = 20  
 FENESTRATION ON UPPER FL = 20

Final Results:

Number of Combinations = 3125  
 Number of Combinations Adding to 100% = 381

Median = 1.068553  
 Mean = 1.024281  
 Standard Deviation = .1314307

Weights:

LOCATION = 15  
 EXPANSION POTENTIAL = 30  
 CONDITION AT TIME OF SAL = 30  
 ELEVATORS IN PLACE = 15  
 FENESTRATION ON UPPER FL = 10

EXHIBIT 19 (Continued)  
 WOOLWORTH - DILMORE STYLE  
 2ND RUN

\*\*\*\* WOOLWORTH-DILMORE STYLE \*\*\*\*

# Attributes = 5

Attribute Names, Prelim. Weights  
 LOCATION 20  
 EXPANSION POTENTIAL 20  
 CONDITION AT TIME OF SALE 20  
 ELEVATORS IN PLACE 20  
 FENESTRATION ON UPPER FLOORS 20

# of Observations = 5

Observ. # 1 WOLFF-KUBLY Price 15.24  
 LOCATION 15  
 EXPANSION POTENTIAL 15  
 CONDITION AT TIME OF SALE 10  
 ELEVATORS IN PLACE 26  
 FENESTRATION ON UPPER FLOORS 10  
 Observ. # 2 14 W. MIFFLIN Price 18.75  
 LOCATION 10  
 EXPANSION POTENTIAL 10  
 CONDITION AT TIME OF SALE 26  
 ELEVATORS IN PLACE 15  
 FENESTRATION ON UPPER FLOORS 26  
 Observ. # 3 CENTRE SEVEN Price 9.23  
 LOCATION 10  
 EXPANSION POTENTIAL 10  
 CONDITION AT TIME OF SALE 10  
 ELEVATORS IN PLACE 10  
 FENESTRATION ON UPPER FLOORS 26  
 Observ. # 4 EMPORIUM Price 20  
 LOCATION 15  
 EXPANSION POTENTIAL 26  
 CONDITION AT TIME OF SALE 15  
 ELEVATORS IN PLACE 15  
 FENESTRATION ON UPPER FLOORS 10  
 Observ. # 5 WOOLWORTH Price 16.99  
 LOCATION 26  
 EXPANSION POTENTIAL 15  
 CONDITION AT TIME OF SALE 15  
 ELEVATORS IN PLACE 10  
 FENESTRATION ON UPPER FLOORS 15

The Matrix:

15	30	30	15	10
5	20	20	5	0
10	25	25	10	5
20	35	35	20	15
25	40	40	25	20

Median = 1.068553  
 Mean = 1.024281  
 Standard Deviation = .1314307

Weights:  
 LOCATION = 15  
 EXPANSION POTENTIAL = 30  
 CONDITION AT TIME OF SAL = 30  
 ELEVATORS IN PLACE = 15  
 FENESTRATION ON UPPER FL = 10

Final Results:  
 Number of Combinations = 3125  
 Number of Combinations Adding to 100% = 381

Median = 1.068553  
 Mean = 1.043603  
 Standard Deviation = 7.084803E-02

Weights:  
 LOCATION = 15  
 EXPANSION POTENTIAL = 30  
 CONDITION AT TIME OF SAL = 40  
 ELEVATORS IN PLACE = 15  
 FENESTRATION ON UPPER FL = 0

EXHIBIT 19 (Continued)  
 WOOLWORTH - DILMORE STYLE  
 3RD RUN

\*\*\*\* WOOLWORTH-DILMORE STYLE \*\*\*\*

# Attributes = 5

Attribute Names, Prelim. Weights

LOCATION 20  
 EXPANSION POTENTIAL 20  
 CONDITION AT TIME OF SALE 20  
 ELEVATORS IN PLACE 20  
 FENESTRATION ON UPPER FLOORS 20

# of Observations = 5

Observ. # 1 WOLFF-KUBLY Price 15.24  
 LOCATION 15  
 EXPANSION POTENTIAL 15  
 CONDITION AT TIME OF SALE 10  
 ELEVATORS IN PLACE 26  
 FENESTRATION ON UPPER FLOORS 10  
 Observ. # 2 14 W. MIFFLIN Price 18.75  
 LOCATION 10  
 EXPANSION POTENTIAL 10  
 CONDITION AT TIME OF SALE 26  
 ELEVATORS IN PLACE 15  
 FENESTRATION ON UPPER FLOORS 26  
 Observ. # 3 CENTRE SEVEN Price 9.23  
 LOCATION 10  
 EXPANSION POTENTIAL 10  
 CONDITION AT TIME OF SALE 10  
 ELEVATORS IN PLACE 10  
 FENESTRATION ON UPPER FLOORS 26  
 Observ. # 4 EMPORIUM Price 20  
 LOCATION 15  
 EXPANSION POTENTIAL 26  
 CONDITION AT TIME OF SALE 15  
 ELEVATORS IN PLACE 15  
 FENESTRATION ON UPPER FLOORS 10  
 Observ. # 5 WOOLWORTH Price 16.99  
 LOCATION 26  
 EXPANSION POTENTIAL 15  
 CONDITION AT TIME OF SALE 15  
 ELEVATORS IN PLACE 10  
 FENESTRATION ON UPPER FLOORS 15

The Matrix:

15	30	40	15	0
5	20	30	5	-10
10	25	35	10	-5
20	35	45	20	5
25	40	50	25	10

Median = 1.068553  
 Mean = 1.043603  
 Standard Deviation = 7.084803E-02

Weights:

LOCATION = 15  
 EXPANSION POTENTIAL = 30  
 CONDITION AT TIME OF SAL = 40  
 ELEVATORS IN PLACE = 15  
 FENESTRATION ON UPPER FL = 0

Final Results:

Number of Combinations = 3125  
 Number of Combinations Adding to 100% = 233

Median = 1.068553  
 Mean = 1.043603  
 Standard Deviation = 7.084803E-02

Weights:

LOCATION = 15  
 EXPANSION POTENTIAL = 30  
 CONDITION AT TIME OF SAL = 40  
 ELEVATORS IN PLACE = 15  
 FENESTRATION ON UPPER FL = 0

## EXHIBIT 20

WOOLWORTH BUILDING  
 CALCULATION OF MOST PROBABLE PRICE USING  
 MEAN PRICE PER POINT EQUATION METHOD  
 DILMORE STYLE

COMPARABLE PROPERTY	SELLING PRICE PER SF OF GBA	POINT SCORE	PRICE PER SF OF GBA/ TOTAL WEIGHTED SCORE (x)
1	\$15.24	14.65	\$1.04
2	18.75	17.15	1.09
3	9.23	10.00	0.92
4	20.00	18.30	1.09
5	16.99	15.90	<u>1.07</u>
TOTAL			\$5.21

Total of  $\frac{\text{Price Per SF of GBA}}{\text{Total Weighted Score}} = \$5.21$

Mean Value ( $\bar{x}$ ) =  $\$5.21 \div 5 = \$1.04$

Standard Deviation of the Mean =  $\sqrt{\frac{\sum (x - \bar{x})^2}{n-1}} = \$0.07$  where:

x	$\bar{x}$	$(x - \bar{x})$	$\frac{(x - \bar{x})^2}{n-1}$	n	n-1
\$1.04	\$1.04	= \$0.00	0.0000	5	4
1.09	1.04	= 0.05	0.0025		
0.92	1.04	= - 0.12	0.0144		
1.09	1.04	= 0.05	0.0025		
1.07	1.04	= 0.03	<u>0.0009</u>		
			0.0203		

$$\sqrt{\frac{0.0203}{4}} = \sqrt{0.005075} = 0.071239 \text{ or } \$0.07$$

## EXHIBIT 20 (Continued)

Value Range of Price/Point Score: \$1.04 ± \$0.07

Since GBA of subject is 39,000 square feet and total weighted point score of subject is 13.90, then:

High

Estimate: \$1.11 x 13.90 x 39,000 SF = \$601,731 or \$600,000  
(\$15.43/SF)

Central

Tendency: \$1.04 x 13.90 x 39,000 SF = \$563,784 or \$560,000  
(\$14.46/SF)

Low

Estimate: \$0.97 x 13.90 x 39,000 SF = \$525,837 or \$530,000  
(\$13.48/SF)

COMPARISON OF WOOLWORTH DEMONSTRATION -  
RATGRAM STYLE  
AND WOOLWORTH - DILMORE STYLE

	RATGRAM STYLE	DILMORE STYLE	% VARIANCE RATGRAM TO DILMORE
Estimated Value			
Central Tendency	\$540,000	\$560,000	3.7%

JUSTIFICATION OF COMPARABLE PRICE FORMULA FOR  
 WOOLWORTH BUILDING  
 BY MEANS OF ANALYSIS OF VARIANCE OF ACTUAL SALE PRICE VS. PREDICTED PRICE  
 OF COMPARABLES USING MEAN PRICE PER POINT EQUATION METHOD

NO.	COMPARABLE PROPERTY	WEIGHTED POINT SCORE	MEAN PRICE PER POINT SCORE	PREDICTED PRICE/ SF GBA	ACTUAL PRICE/ SF GBA	VARIANCE	% OF VARIANCE TO ACTUAL PRICE
1	WOLFF KUBLY 30 N. Carroll Street	14.65	\$1.04	\$15.24	\$15.24	\$ 0.00	0.0%
2	14 W. Mifflin Street	17.15	1.04	17.84	18.75	- 0.91	4.9
3	CENTRE SEVEN 5 & 7 N. Pinckney Street	10.00	1.04	10.40	9.23	1.17	12.7
4	EMPORIUM 50 E. Mifflin Street	18.30	1.04	19.03	20.00	- 0.97	4.9
5	WOOLWORTH 2 W. Mifflin Street	15.90	1.04	16.54	16.99	<u>- 0.45</u>	2.6
NET VARIANCE						\$ - 1.16	

DILMORE STYLE  
EXHIBIT 21

SAMPLE OF EXPERIMENTAL  
AUTOMATED MARKET COMPARISON PROCESS

DILMORE  
AND  
GRAASKAMP

EXHIBIT IV-9

SCALE FOR SCORING COMPARABLE SALES  
BASED UPON PRICE SENSITIVE ATTRIBUTES

ATTRIBUTE	WEIGHT	SCORE
GROSS BUILDING AREA	30%	5 = Building less than 15,000 SF of GBA 3 = Building between 15,000 SF to 40,000 SF of GBA 1 = Building greater than 40,000 SF of GBA
LOCATION	30%	5 = Located in South Madison Industrial Park area with or without rail siding or along major highway with rail siding 3 = Located along or visible from a major road such as Highways 51, 151, 113, or 30 in a mixed use area without rail siding. 1 = Located in more isolated commercial mixed use area without rail siding
RATIO OF LAND TO GBA	10%	5 = Greater than 4:1 3 = Between 4:1 and 2.5:1 1 = Less than 2.5:1
EFFICIENCY OF BUILDING DESIGN FOR STORAGE AND DISTRIBUTION USES	10%	5 = Efficient layout for accessibility of stored goods with adequate number of overhead doors and truck height loading docks 3 = Adequate layout with limited number of overhead doors and truck height docks 1 = Deep space with inadequate number of overhead doors and truck height doors
QUALITY OF HVAC SYSTEM	20%	5 = Fully insulated with heat in warehouse and office area 3 = Partially heated warehouse space and adequate heated office space 1 = Minimal heat, if any, in warehouse area and small heated office space

WEIGHTED MATRIX FOR COMPARABLE PROPERTIES  
SCORE/WEIGHTED SCORE

	COMPARABLE NO. 1	COMPARABLE NO. 2	COMPARABLE NO. 3	COMPARABLE NO. 4	COMPARABLE NO. 5	COMPARABLE NO. 6	SUBJECT
ATTRIBUTE	1115 O'Neill St.	2810 Brynant St.	910 Watson Ave.	4401 Cottage Grove Rd.	4610 - 4822 Ferrice Rd.	3103 Mecford Way	2422 Pennsylvania
GROSS BUILDING AREA (GMA)	304 5/1.50	3/0.90	1/0.30	3/0.90	5/1.50	5/1.50	3/0.90
LOCATION	304 1/0.30	3/0.90	5/1.50	5/1.50	3/0.90	5/1.50	3/0.90
RATIO OF LAND TO GMA	104 3/0.30	1/0.10	1/0.10	5/0.50	3/0.30	1/0.10	1/0.10
EFFICIENCY OF BUILDING DESIGN	104 3/0.30	1/0.10	1/0.10	5/0.50	5/0.50	3/0.30	1/0.10
QUALITY OF HVAC SYSTEM	204 5/1.00	3/0.60	3/0.60	1/0.20	5/1.00	1/0.20	5/1.00
TOTAL WEIGHTED SCORE	1004 3.40	2.60	2.60	3.60	4.20	3.60	3.00
CASH SELLING PRICE	\$200,000	\$212,000	\$625,000	\$525,000	\$301,000	\$209,000	
DATE OF SALE	6/27/84	6/12/83	6/30/83	1/4/82	2/29/84	6/30/82	
GROSS BUILDING AREA (GMA)	13,832 SF	19,760 SF	57,800 SF	34,517 SF	17,300 SF	14,000 SF	30,195 SF
CASH PRICE/SF OF GMA	\$14.46	\$10.73	\$10.81	\$15.21	\$17.40	\$14.94	
CASH PRICE PER SF/WEIGHTED POINT SCORE	\$4.2529	\$4.1269	\$4.1577	\$4.2250	\$4.1429	\$4.1500	

JUSTIFICATION OF COMPARABLE PRICE FORMULA  
 FOR THE GOODWILL BUILDING  
 BY MEANS OF ANALYSIS OF VARIANCE OF ACTUAL SALE PRICE  
 VS. PREDICTED PRICE OF COMPARABLES  
 USING MEAN PRICE PER POINT EQUATION METHOD

NO.	COMPARABLE SALE	WEIGHTED POINT SCORE	MEAN PRICE PER POINT SCORE	PREDICTED PRICE PER SF OF GBA	ACTUAL PRICE PER SF OF GBA	VARIANCE	% OF VARIANCE TO ACTUAL PRICES
1	1115 O'Neill Street	3.40	\$4.18	14.21	14.46	- 0.25	1.7%
2	2810 Bryant Street	2.60	4.18	10.87	10.73	0.14	1.3%
3	901 Watson Avenue	2.60	4.18	10.87	10.81	0.06	0.6%
4	4401 Cottage Grove Road	3.60	4.18	15.05	15.21	- 0.16	1.1%
5	4610-22 Femrite Road	4.20	4.18	17.56	17.40	0.16	0.9%
6	3103 Watford Way	3.60	4.18	15.05	14.94	0.11	0.7%
<b>NET VARIANCE</b>						<b>\$ 0.06</b>	

3

EXHIBIT IV-11

EXHIBIT IV-12

GOODWILL BUILDING

CALCULATION OF MOST PROBABLE PRICE USING  
MEAN PRICE PER POINT EQUATION METHOD

COMPARABLE PROPERTY	CASH SELLING PRICE PER SF OF GBA	WEIGHTED POINT SCORE	PRICE PER SF OF GBA/TOTAL WEIGHTED SCORE (x)
1	\$14.46	3.40	\$4.25
2	10.73	2.60	4.13
3	10.81	2.60	4.16
4	15.21	3.60	4.23
5	17.40	4.20	4.14
6	14.94	3.60	<u>4.15</u>
TOTAL			\$25.06

Total of Price per SF of GBA = \$25.06  
Total Weighted Score

Mean Value (x) = \$25.06/6 = \$4.18

Standard Deviation =  $\sqrt{\frac{\sum(x - \bar{x})^2}{n - 1}}$  = \$0.05 where:

<u>x</u>	<u><math>\bar{x}</math></u>	<u>(x - <math>\bar{x}</math>)</u>	<u>(x - <math>\bar{x}</math>)<sup>2</sup></u>	<u>n</u>	<u>n - 1</u>
4.25	4.18	0.07	0.0049	6	5
4.13	4.18	= - 0.05	0.0025		
4.16	4.18	= - 0.02	0.0004		
4.23	4.18	= 0.05	0.0025		
4.14	4.18	= - 0.04	0.0016		
4.15	4.18	= - 0.03	<u>0.0009</u>		
			0.0128		

$$\sqrt{\frac{0.0128}{5}} = 0.050596$$

ESTIMATED RANGE OF MOST PROBABLE SELLING PRICE  
OF THE GOODWILL BUILDING

	SCORE FOR SUBJECT	MEAN VALUE +/- \$0.05/POINT SCORE	PRICE/SF OF GBA	GBA OF SUBJECT	ESTIMATED VALUE
LOW ESTIMATE	3.00	\$4.13	\$12.39	30,195 SF	\$374,116 or \$374,000
CENTRAL TENDENCY	3.00	\$4.18	\$12.54	30,195 SF	\$378,645 or \$379,000
HIGH ESTIMATE	3.00	\$4.23	\$12.69	30,195 SF	\$383,175 or \$383,000

EXHIBIT IV-12 (Continued)

APPENDIX E

COMPUTER OUTPUT OF DILMORE QUANTITATIVE  
POINT WEIGHTING PROGRAM

\*\*\*\* GOODWILL 3 \*\*\*\*

# Attributes = 5

Attribute Names, Prelim. Weights ← Preliminary weights selected by the appraisers

GROSS BUILDING AREA (GBA) 20

LOCATION 20

RATIO OF LAND TO GBA 20

EFFICIENCY OF BUILDING DESIGN FOR STORAGE AND DISTRIBUTION 20

QUALITY OF HVAC SYSTEM 20

# of Observations = 6 ← Comparable sales with score for each comparable

Observ. # 1 1115 O'NEILL ST Price 14.46

GROSS BUILDING AREA (GBA) 5

LOCATION 1

RATIO OF LAND TO GBA 3

EFFICIENCY OF BUILDING DESIGN FOR STORAGE AND DISTRIBUTION 3

QUALITY OF HVAC SYSTEM 5

Observ. # 2 2810 BRYANT ST Price 10.73

GROSS BUILDING AREA (GBA) 3

LOCATION 3

RATIO OF LAND TO GBA 1

EFFICIENCY OF BUILDING DESIGN FOR STORAGE AND DISTRIBUTION 1

QUALITY OF HVAC SYSTEM 3

Observ. # 3 901 WATSON AVE Price 10.81

GROSS BUILDING AREA (GBA) 1

LOCATION 5

RATIO OF LAND TO GBA 1

EFFICIENCY OF BUILDING DESIGN FOR STORAGE AND DISTRIBUTION 1

QUALITY OF HVAC SYSTEM 3

Observ. # 4 4401 COTTAGE GROVE RD Price 15.21

GROSS BUILDING AREA (GBA) 3

LOCATION 5

RATIO OF LAND TO GBA 5

EFFICIENCY OF BUILDING DESIGN FOR STORAGE AND DISTRIBUTION 5

QUALITY OF HVAC SYSTEM 1

Observ. # 5 4610-22 FERMITE RD Price 17.4

GROSS BUILDING AREA (GBA) 5

LOCATION 3

RATIO OF LAND TO GBA 3

EFFICIENCY OF BUILDING DESIGN FOR STORAGE AND DISTRIBUTION 5

QUALITY OF HVAC SYSTEM 5

Observ. # 6 3103 WATFORD WAY Price 14.94

GROSS BUILDING AREA (GBA) 5

LOCATION 5

RATIO OF LAND TO GBA 1

EFFICIENCY OF BUILDING DESIGN FOR STORAGE AND DISTRIBUTION 3

QUALITY OF HVAC SYSTEM 1

The Matrix: ← Test matrix to select optimal combination of weights

20	20	20	20	20
10	10	10	10	10
15	15	15	15	15
25	25	25	25	25
30	30	30	30	30

Median = 4.565106 ← Initial results using  
Mean = 4.528223 appraiser's weights  
Standard Deviation = .441591

Weights: ← Appraiser's initial weights  
GROSS BUILDING AREA (GBA = 20  
LOCATION = 20  
RATIO OF LAND TO GBA = 20  
EFFICIENCY OF BUILDING D = 20  
QUALITY OF HVAC SYSTEM = 20

Final Results: ← Iterations to  
Number of Combinations = 3125 select optimal  
Number of Combinations Adding to 100% = 381 weight

Median = 4.153846 ← Final results using  
Mean = 4.175902 optimal weights  
Standard Deviation = 5.067353E-02

Weights: ← Optimal weights  
GROSS BUILDING AREA (GBA = 30  
LOCATION = 30  
RATIO OF LAND TO GBA = 10  
EFFICIENCY OF BUILDING D = 10  
QUALITY OF HVAC SYSTEM = 20

COMPUTERIZATION OF ALL MARKET COMPARISON CALCULATIONS

14112 G.S.

-----  
Program Choices Are:

- 1. Enter/edit/display/file input data
- 2. Analyze quality point ratings
- 3. Display output to screen
- 4. Print output to printer
- 5. Select options
- 6. Quit

-----  
Enter your choice: ? 1

----- Load/edit file options      Current disk file: None

- 1. Create new data file
- 2. Load existing disk file for editing
- 3. Display current data
- 4. Edit current data
- 5. Save current data to disk file
- 6. Clear (erase) all current data
- 7. Quit load/edit options; return to main program

-----  
Enter selection number:

-----  
Enter selection number: 1

-----  
Enter new data

-----  
Enter heading for output: INDUSTRIAL WAREHOUSE

-----  
Enter number of attributes: ? 5

-----  
Enter name for attribute: 1 ? GROSS BUILDING AREA (GBA)

-----  
Preliminary weight: 1 ? 20

-----  
Enter name for attribute: 2 ? LOCATION

-----  
Preliminary weight: 2 ? 20

-----  
Enter name for attribute: 3 ? RATIO OF LAND TO GBA

-----  
Preliminary weight: 3 ? 20

-----  
Enter name for attribute: 4 ? EFFICIENCY OF BUILDING DESIGN

-----  
Preliminary weight: 4 ? 20

-----  
Enter name for attribute: 5 ? QUALITY OF HVAC SYSTEM

-----  
Weight for QUALITY OF HVAC SYSTEM is 20, so that total of weights is 100.

Enter number of observations: ? 6  
Do you want to <1> Enter a unit price or  
<2> Enter a total price & size  
Enter your choice: ? 1

Observation number 1 :  
Enter name 1 ? 1115 O'NEILL ST.  
Enter price 1 ? 14.46

Score for GROSS BUILDING AREA (GBA)? 5  
Score for LOCATION? 1  
Score for RATIO OF LAND TO GBA? 3  
Score for EFFICIENCY OF BUILDING DESIGN? 3  
Score for QUALITY OF HVAC SYSTEM? 5

Observation number 2 :  
Enter name 2 ? 2810 BRYANT ST.  
Enter price 2 ? 10.73

Score for GROSS BUILDING AREA (GBA)? 3  
Score for LOCATION? 3  
Score for RATIO OF LAND TO GBA? 1  
Score for EFFICIENCY OF BUILDING DESIGN? 1  
Score for QUALITY OF HVAC SYSTEM? 3

Observation number 3 :  
Enter name 3 ?

Score for QUALITY OF HVAC SYSTEM? 3

Observation number 3 :  
Enter name 3 ? 910 WATSON AVE.  
Enter price 3 ? 10.81

Score for GROSS BUILDING AREA (GBA)? 1  
Score for LOCATION? 5  
Score for RATIO OF LAND TO GBA? 1  
Score for EFFICIENCY OF BUILDING DESIGN? 1  
Score for QUALITY OF HVAC SYSTEM? 3

Observation number 4 :  
Enter name 4 ? 4401 COTTAGE GROVE RD.  
Enter price 4 ? 15.21

Score for GROSS BUILDING AREA (GBA)? 3  
Score for LOCATION? 5  
Score for RATIO OF LAND TO GBA? 5  
Score for EFFICIENCY OF BUILDING DESIGN? 5  
Score for QUALITY OF HVAC SYSTEM? 1

Observation number 5 :  
Enter name 5 ?

Score for QUALITY OF HVAC SYSTEM? 1

Observation number 5 :  
Enter name 5 ? 4610-22 FEMRITE RD.  
Enter price 5 ? 17.40

Score for GROSS BUILDING AREA (GBA)? 5  
Score for LOCATION? 3  
Score for RATIO OF LAND TO GBA? 3  
Score for EFFICIENCY OF BUILDING DESIGN? 5  
Score for QUALITY OF HVAC SYSTEM? 5

Observation number 6 :  
Enter name 6 ? 3103 WATFORD WAY  
Enter price 6 ? 14.94

Score for GROSS BUILDING AREA (GBA)? 5  
Score for LOCATION? 5  
Score for RATIO OF LAND TO GBA? 1  
Score for EFFICIENCY OF BUILDING DESIGN? 3  
Score for QUALITY OF HVAC SYSTEM? 1

Enter subject property name:? INDUSTRIAL WAREHOUSE

Enter the name of the designated unit of comparison  
(acre, square foot, etc.) ? SQUARE FOOT

Enter number of units of comparison for subject  
(acres, square feet, etc.) ? 30195

Enter attribute scores for subject property  
GROSS BUILDING AREA (GBA) ? 3  
LOCATION ? 3  
RATIO OF LAND TO GBA ? 1  
EFFICIENCY OF BUILDING DESIGN? 1  
QUALITY OF HVAC SYSTEM ? 5

Load/edit file options Current disk file: None

1. Create new data file
2. Load existing disk file for editing
3. Display current data
4. Edit current data
5. Save current data to disk file
6. Clear (erase) all current data
7. Quit load/edit options, return to main program

Enter selection number: 5

Enter name for data file: ? SAMPLE

Load/edit file options Current disk file: SAMPLE

1. Create new data file
2. Load existing disk file for editing
3. Display current data
4. Edit current data
5. Save current data to disk file
6. Clear (erase) all current data
7. Quit load/edit options, return to main program

Enter selection number: 3

Project title: INDUSTRIAL WAREHOUSE

Unit prices Search interval = 5

	GROSS	LOCAT	RATIO	EFFIC	QUALI	Price
Prel. wts.	20	20	20	20	20	-
1115 O'NEIL	5	1	3	3	5	\$14.46
2810 BRYANT	3	3	1	1	3	\$10.73
910 WATSON	1	5	1	1	3	\$10.81
4401 COTTAG	3	5	5	5	1	\$15.21
4610-22 FEM	5	3	3	5	5	\$17.40
3103 WATFOR	5	5	1	3	1	\$14.94
INDUSTRIAL	3	3	1	1	5	-

Press any key to continue

QP

Version 2.1

Program Choices Are:

1. Enter/edit/display/file input data
2. Analyze quality point ratings
3. Display output to screen
4. Print output to printer
5. Select options
6. Quit

Enter your choice: ? 2

Pass # 1      Combination # 6

Standard deviation = .4693161      Mean = 4.497911

Status	GROSS	LOCAT	RATIO	EFFIC	QUALI	S.D.	Mean
Prelim. Wts.	20	20	20	20	0	.441591	4.528223

QP

Version 2.1

## Program Choices Are:

1. Enter/edit/display/file input data
2. Analyze quality point ratings
3. Display output to screen
4. Print output to printer
5. Select options
6. Quit

Enter your choice: ? 3

## Display Output to Screen

## Select output to be displayed:

1. Weighted matrix for properties
2. Value range determination: mean price per point method
3. Value range per unit of dispersion
4. Transaction zone: mean price per point method
5. Transaction zone: linear regression method
6. Mean price per point method: predicted vs. actual price for comparables
7. Linear regression method: predicted vs. actual price for comparables
8. Input data
9. Computation matrix

&lt;Return&gt; to quit

Enter your choice: 1

Weighted Matrix

Feature/ Attribute	GROSS BU LOCATION RATIO OF EFFICIEN QUALITY					Wtd. score
Initial weights	20	20	20	20	0	100
Final weights	30	30	10	10	20	100
1115 O'NEILL S	5/ 1.50	1/ 0.30	3/ 0.30	3/ 0.30	5/ 1.00	3.40
2810 BRYANT ST	3/ 0.90	3/ 0.90	1/ 0.10	1/ 0.10	3/ 0.60	2.60
910 WATSON AVE	1/ 0.30	5/ 1.50	1/ 0.10	1/ 0.10	3/ 0.60	2.60
4401 COTTAGE G	3/ 0.90	5/ 1.50	5/ 0.50	5/ 0.50	1/ 0.20	3.60
4610-22 FEMRIT	5/ 1.50	3/ 0.90	3/ 0.30	5/ 0.50	5/ 1.00	4.20
3103 WATFORD W	5/ 1.50	5/ 1.50	1/ 0.10	3/ 0.30	1/ 0.20	3.60
INDUSTRIAL WAR	3/ 0.90	3/ 0.90	1/ 0.10	1/ 0.10	5/ 1.00	3.00

Press any key to continue

Display Output to Screen

Select output to be displayed:

1. Weighted matrix for properties
2. Value range determination: mean price per point method
3. Value range per unit of dispersion
4. Transaction zone: mean price per point method
5. Transaction zone: linear regression method
6. Mean price per point method: predicted vs. actual price for comparables
7. Linear regression method: predicted vs. actual price for comparables
8. Input data
9. Computation matrix

<Return> to quit

Enter your choice: 2

*(and 3)*

Value Range Determination: Mean Price Per Point Method

Mean price per point: \$4.18  
Dispersion About the Mean: \$0.05  
Coefficient of Dispersion: 0.0121

Value Range Per Unit of Dispersion

	Subject Point Score		Mean (+/- One Standard Deviation)		Price Per Unit
Low Estimate	3.00	X	\$4.13	=	\$12.38
Central Tendency	3.00	X	\$4.18	=	\$12.53
High Estimate	3.00	X	\$4.23	=	\$12.68

Press any key to continue

Display Output to Screen

Select output to be displayed:

1. Weighted matrix for properties
2. Value range determination: mean price per point method
3. Value range per unit of dispersion
4. Transaction zone: mean price per point method
5. Transaction zone: linear regression method
6. Mean price-per point method: predicted vs. actual price for comparables
7. Linear regression method: predicted vs. actual price for comparables
8. Input data
9. Computation matrix

<Return> to quit

Enter your choice: 4

(and 5)

Transaction Zone: Mean Price Per Point Method

Number of units in subject property: 30195

Low Estimate	\$373,679	or	\$374,000
Central Tendency	\$378,274	or	\$378,000
High Estimate	\$382,869	or	\$383,000

Transaction Zone: Linear Regression Method

a = -7.505322E-02      Standard Error of the Forecast = .2056632  
b = 4.200016

Prediction equation: price =

30195 units X [-7.505322E-02 + ( 4.200016 +/- .2056632 ) X 3 ]

Low Estimate	\$359,562	or	\$360,000
Central Tendency	\$378,192	or	\$378,000
High Estimate	\$396,822	or	\$397,000

Press any key to continue

Display Output to Screen

Select output to be displayed:

1. Weighted matrix for properties
2. Value range determination: mean price per point method
3. Value range per unit of dispersion
4. Transaction zone: mean price per point method
5. Transaction zone: linear regression method
6. Mean price per point method: predicted vs. actual price for comparables
7. Linear regression method: predicted vs. actual price for comparables
8. Input data
9. Computation matrix

<Return> to quit  
Enter your choice: 6

Mean Price Per Point Method: Predicted vs. Actual Price for Comparables

	Predicted Price	Actual price	Error
1115 O'NEILL ST.	\$14.20	\$14.46	-\$0.26
2810 BRYANT ST.	\$10.86	\$10.73	\$0.13
910 WATSON AVE.	\$10.86	\$10.81	\$0.05
4401 COTTAGE GROVE	\$15.03	\$15.21	-\$0.18
4610-22 FEMRITE RD	\$17.54	\$17.40	\$0.14
3103 WATFORD WAY	\$15.03	\$14.94	\$0.09

Press any key to continue



CONTEMPORARY APPRAISAL SEMINAR

Supplementary Tables

Prepared by James A. Graaskamp

Salem, Oregon

Saturday, May 3, 1980

EXHIBIT #1

Basic Information of residential Multi-Family Land Sales Comparables

Factors	420 W. Wilson No. 1	219=N. Frances No. 2	102 N. Franklin No. 3	434 W. Mifflin No. 4	427 W. Main No. 5
Sales Price	\$ 84,950	\$48,000	\$86,900	\$160,000	\$53,000
Sales Date	'73	'72	'72	'72	'72
Type of Deed	WD	WD	WD	WD	WD
Volume and Page	403/510	346/561	334/ 23	337/215	342/113
Grantor	R.A. Paape Co.Inc.	Work of God, Inc.	Brown, Emily	Voss, Rob't	Miller + wife
Grantee	Hillmark,Dev. Corp.	Hillmark Corp.	Courtyard Assoc.	American United Investment	Hillmark Corp.
Land Area	13,068	7,920	15,246	26,400	8,712
Zoning	R-6	R-6	R-6	R-6	R-6

All have city services, sidewalk and street improvements  
 No adjustment for time required as residential economics would not permit inflation of land prices.

Sardinas Research, Inc.

EXHIBIT #2

Vacant Land Market Comparison  
Residential Use Land Price: Mean

Comparable Sales

Factors	420 W. Wilson No. 1	219 N. Frances No. 2	102 N. Franklin N. 3	434 W. Mifflin N. 4	427-31 W. Main No. 5	Mean (X) 1-5
Sales Price	\$84950	\$48000	\$86900	\$160000	\$53000	\$432850
Date of Sale	'73	'72	'72	'72	'72	
Land Area (sq.ft.)	13068	7920	15246	26400	8712	71346
No. of Dwelling Units Built	43	24	43	73	24	207
Total Gross Bldg.	20070	12670	24364	43040	10900	111044
Total # Rms Blt.	65.5	38	65.5	130.5	40	339.5

Mean Land Price - \$/per:

1. Square Ft. of Land	\$6.50	\$6.06	\$5.60	\$6.06	\$6.08	\$6.06
2. Dwelling Unit Blt.	\$1976	\$2000	\$2020	\$2192	\$2208	\$2079
3. Total Gross Bldg. Floor Area	\$4.23	\$3.79	\$3.79	\$3.72	\$4.86	\$4.08
4. Total # Rms Blt.	1297	1263	1327	1226	1325	1288

Landmark Research, Inc.

EXHIBIT #5

Industrial Land Sales Selected as Comparables  
to MG & E Subject Parcel

	Date of Sale	Price	Public Record	Square Feet	(Acres)	\$/Sq. Ft.
1. MATC	6/8/67	\$108,750	Confirmed by MATC Finance Director	152,460	(3.5)	.71
2. MATC	1/23/67	75,000	Vol. 828, p. 280	81,828	(1.88)	.92
3. Gorman	12/20/65	17,500	Vol. 436, p. 463	21,060	(.48)	.83
4. Holfman	6/5/64	15,000	Vol. 779, p. 558	17,050	(.39)	.88
5. Garrett	5/31/63	12,000	Vol. 758, p. 226	13,932	(.32)	.86
6. Madison Transit	1/4/68	55,000	Vol. 4, p. 358	211,701	(4.86)	.26
7. Madison Trust	12/28/66	45,000	Vol. 828, p. 204	67,900	(1.56)	.66
8. NW Mutual	9/9/66	117,500	Vol. 824, p. 144	138,521	(3.18)	.85

EXHIBIT #7

Quality Scores & Weight Per Category

1. Size (Marketability Factor)	<u>Weight</u>
0 - 1 acre = 5	20
over 1 - 3 = 4	
over 3.5 - 10 = 3	
over 10 - 20 acre = 2	
over 20 acre = 1	
2. Accessibility to all areas (in terms of distance and time) 1-5 where 5 = premium + 3 = average	20
3. Visibility from major artery 1-5	15
4. Availability of sewer/water at site 1-5	15
5. Availability of rail 1-5	10
6. Soils and topography	<u>20</u>
	100%

Exhibit 16

Table of Scores for Comparable Properties

	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>Subject</u>
Size	3	4	5	5	5	3	4	4	1
Access	4	4	4	4	4	2	3	3	4
Visibility	5	5	5	5	4	1	1	2	5
Sewer/water	5	5	5	5	5	2	5	5	5
Rail	1	1	1	1	3	1	2	2	4
Soils	2	3	2	2	2	4	5	5	1

<u>Feature</u>	<u>Weight</u>	<u>Weighted Ratings</u>								<u>Subj</u>
		<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	
Size	20	60	80	100	100	100	60	80	80	20
Access	20	80	80	80	80	80	40	60	60	80
Visibility	15	75	75	75	75	60	15	15	30	75
Sewer/water	15	75	75	75	75	75	30	75	75	75
Rail	10	10	10	10	10	30	10	20	100	40
Soils	20	40	60	40	40	40	80	100	100	20
Total		340	380	380	380	385	235	350	365	310
Price/Sq. Ft.		.71	.92	.83	.88	.86	.26	.66	.85	

EXHIBIT #10

Basic Information on Restaurant-Commercial Land Sale Comparables

	Barnaby's East	Barnaby's West	Bud's West	Pigs Ear East	Marc's Big Boy South	Marc's Big Boy East
Sales Price	\$92,000 <sup>±</sup>	\$89,000	\$75,700	\$91,000	\$87,500	\$85,000
Sales Date	10-6-70	6-30-70	6-29-71	5-20-72	9-3-69	3-15-68
Type of Deed	Lease with Option	WD	WD	WD	WD	WD
Volume & Page	209-455	184-75	264-173	344-385	130-463	15-108
Grantee	Barnaby's Inc.	Barnaby's Inc.	Clyde Chamberlain	Poole, Inc.	B & G Realty	B & G Realty
Area	38,211	32,900	45,236	141,570	38,327	30,237
Zoning	C-2	C-3-L	C-3-L	M-1	C-2	C-2
Principal Business Frontage	E. Washington Ave.	Mineral Point & Grand Canyon Roads	Odana Rd.	Cottage Grove Road & Atlas Avenue	S. Park Street	E. Washington Ave.
Position on Block	Inside lot	Corner lot	Inside lot	Corner lot	Corner lot	Inside lot

All have city services, Pigs Ear did not have curb and gutter

No adjustment of time required as restaurant economics would not permit inflation of land prices.

EXHIBIT #11

Attribute Point and Weight Comparison  
Of Restaurant-Commercial Land Sales and Subject Property

(See Exhibit #8)	Barnaby's East	Barnaby's West	Bud's West	Pigs Ear East	Marc's Big Boy South	Marc's Big Boy East	Subject
30 *Site	Points Wgt'd Pts						
Shape	5	1	5	3	5	3	5
% Usable	3	3	5	5	5	5	1
Site Preparation	3	1	5	5	5	5	5
Visibility	3	5	5	3	5	3	3
Access							
Left & Right Turn	5	5	5	3	3	3	1
Frontage Road	3	5	5	1	5	5	5
Total	<u>18</u>	<u>20</u>	<u>25</u>	<u>20</u>	<u>28</u>	<u>24</u>	<u>20</u>
Weight	540	600	750	600	840	720	600
50	Linkages						
Traffic Volume	5	5	3	3	5	5	3
Supportive Retail/Serv.	5	5	3	1	1	3	1
Proximity to Multi-Family Residential	1	5	5	1	3	3	3
Proximity to Employm.	3	3	3	1	1	5	3
**Interstate-Beltline	<u>2</u>	<u>1</u>	<u>1</u>	<u>3</u>	<u>2</u>	<u>2</u>	<u>1</u>
Total	<u>15</u>	<u>18</u>	<u>15</u>	<u>9</u>	<u>12</u>	<u>18</u>	<u>11</u>
Weight							
20 Image	Development Activity						
Prestige of Street Address	5	5	3	1	1	3	1
	<u>5</u>	<u>5</u>	<u>3</u>	<u>1</u>	<u>3</u>	<u>5</u>	<u>1</u>
100 Total	10	10	6	2	4	8	2
	<u>200</u>	<u>200</u>	<u>120</u>	<u>40</u>	<u>80</u>	<u>160</u>	<u>40</u>
*Scale 1,3,5 Except **	<u>1490</u>	<u>1700</u>	<u>1620</u>	<u>1090</u>	<u>1520</u>	<u>1780</u>	<u>1190</u>

EXHIBIT #12

Determination of Linear Regression  
Weighted Mean Value of Land/sf  
Commercial-Restaurant

Comparable	1 Land \$/sf	2 Total Wgtd. Pts.	3 (Land \$/sf) <sup>2</sup>	4 (Wgtd.Pts) <sup>2</sup>	5 (3 x 4)
	Y <sub>i</sub>	X <sub>i</sub>	Y <sub>i</sub> <sup>2</sup>	X <sub>i</sub> <sup>2</sup>	X <sub>i</sub> Y <sub>i</sub>
1	\$2.40	1490	5.76	2220100	3575
2	2.73	1700	7.45	2890000	4641
3	1.67	1620	2.79	2624000	2705
4	.64	1090	.41	1881000	698
5	2.28	1520	5.20	2310400	3466
6	2.81	1780	7.90	3168400	5002
TOTAL	\$12.53	9200	29.51	15093000	20087
Mean	(Y)=\$2.09	(X)=1533			

Calculations of Mean, Standard Deviation

$$\begin{aligned} \text{Sum } y^2 &= Y^2 - n(Y)^2 \\ &= (29.51)^2 - 6(2.09)^2 \\ &= 845 \end{aligned}$$

$$\begin{aligned} \text{Sum } x^2 &= X^2 - n(X)^2 \\ &= 1509300 - 6(1533)^2 \\ &= 993366 \end{aligned}$$

$$\begin{aligned} \text{Sum } xy &= XY - n(x)(Y) \\ &= 20087 - 6(1533)(2.09) \\ &= 863 \end{aligned}$$

$$Y' = a + bX_{\text{subject}}$$

$$b = \frac{\text{Sum } xy}{\text{Sum } x^2} = \frac{863}{993366} = .00087$$

$$a = (Y) - b(X) = \$2.09 - .00087(1533)$$

SALES PRICE/SUBJECT SITE

$$\begin{aligned} Y' &= a + bX_{\text{subject}} \\ &= -\$ .76 + .00087(1190) = \underline{\underline{\$ 1.80}} \end{aligned}$$

STANDARD DEVIATION

$$\begin{aligned} S_{xy} &= \frac{\text{Sum } y^2 - b(\text{Sum } xy)}{n-2} \\ &= \$ \underline{\underline{.15}} \end{aligned}$$

APPENDIX II

Vacant Land Market Comparison  
Office Use  
Subject - Fauerbach Property

Weight Total	Factor Sub Total		CMI		VIP		Doty School		WPS-1		IBM		WPS-2		Subject	
			Wgt	Wgt*	Wgt	Wgt*	Wgt	Wgt*	Wgt	Wgt*	Wgt	Wgt*	Wgt	Wgt*	Wgt	Wgt*
30		Site														
	10**	Intensity of Land Use	8	80	10	100	6	60	4	40	2	20	2	20	6	60
	10**	Topography	10	100	8	80	6	60	4	40	1	10	4	40	6	60
	10**	Views	8	80	6	60	4	40	8	80	4	40	4	40	6	60
25		Image														
	10**	Lineal Ft Lake/Park	10	100	4	40	4	40	8	80	6	60	1	10	8	80
	5	Lake Exposure	5	25	3	15	3	15	3	15	1	5	1	5	3	15
	10**	Community Recognition	10	100	8	80	8	80	6	60	4	40	2	20	2	20
35		Linkages														
	15**	Downtown	8	120	10	150	8	120	4	60	1	15	1	15	4	60
	5	Auto Approach Zone	5	25	3	15	3	25	2	10	2	10	1	5	3	15
	5	Ancillary Uses	3	15	5	25	3	15	3	15	1	5	2	10	1	5
	5	Employee--Housing & Transportation	3	15	3	15	3	15	1	5	3	15	3	15	3	15
	5	Protection from adverse Contiguous Uses	5	25	4	20	3	15	3	15	4	20	2	10	1	5
10		Construction Suitability														
	5	Depth to Ground water/ Soils	5	25	5	25	3	15	1	5	1	5	2	10	3	15
	5	Drainage	5	25	5	25	3	15	3	15	1	5	3	10	3	15
100	100	Totals	735		650		515		440		225		210		425	

\* Weight x Scale  
\*\* 10 Point Scale

$$b = \frac{\text{Sum } xy}{\text{Sum } x^2} = .0249$$

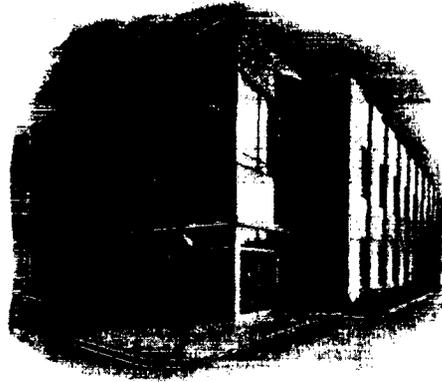
$$a = Y - bX = -\$5.75$$

$$Y' = a + bX_{\text{subject}}$$

$$= -\$5.75 + .0249(425)$$

$$= \underline{\$4.83} \text{ per sq. ft. } \pm \$ .08 \text{ (standard deviation)}$$

SACKMAN-GILLILAND  
CORPORATION



260 - 68TH STREET  
BROOKLYN, N. Y. 11220  
TELEPHONE: 833-2700

November 28th, 1967

Dr. James Graaskamp  
202A Breese Terrace  
Madison, Wisconsin

Dear Jim:

I am looking forward to the opportunity to work with you in the Seminar in Milwaukee December 8th through December 10th. At our meetings in Washington I advised Bill Crouch that I would contact you. We should have some general ideas concerning an appropriate teaching schedule. I had the opportunity to conduct a two day seminar on mortgage equity capitalization for the Institute's grading sub-committees of the admissions committee. This experience provided me with certain conclusions about the manner of handling a short period of instruction.

In brief, I would suggest the following arrangements:

1. There should be an opening statement outlining the rationale and objectives of the mortgage equity method. This presentation should be quite full and should set forth all the steps involved. I would suggest that I handle this part of the program, and I find that it generally requires an hour and a half.
2. We should have a discussion of the tools utilized in working with the mortgage equity method. The development, nature, and use of the compound interest tables should be covered. In this connection I really believe the emphasis should be on the nature of the functions and their applications. Only a slight amount of attention should be devoted to derivation; just enough to demonstrate that the key to all is  $(1 + i)^n$ . I would hope that you would be agreeable to handling this part of the instruction.
3. Effects of depreciation and appreciation in the overall rate, calculation of recapture through amortization, and development of the mortgage coefficient. I would suggest that I handle this part of the course.

(continued)

Dr. James Graaskamp

11/28/67

4. Investment analysis and in particular, graphic analysis of overall rates. Perhaps you would handle this section.

5. Yield calculations. I will take this section.

6. Frequently the balance of the time can be devoted to drill problems and special situations.

I would be grateful for your suggestions and comments about the arrangement of our schedule. Any items you would like to include, please advise and we can make necessary provisions. To the fullest extent possible I would like to have this be a seminar in which substantial discussion takes place. Interchange between the students and instructors is a most effective method of teaching, and I hope we can bring about such a situation.

I will arrive in Milwaukee on the evening of the 7th of December and will be available any time thereafter. Please let me have your views.

Cordially,



James E. Gibbons,  
Executive Vice President

JEG/sab

UNIVERSITY OF WISCONSIN EXTENSION

Department of Commerce

Ellwood Tables

Drill Problem No. 1

The legal limit for life insurance company mortgage loans on income or business properties has been increased from 66 1/3% to 75% of acceptable appraisal. This means a thinner equity position. Which in turn means greater risk for each dollar of equity investment. And, since risk is one of the most important factors in determining the rate of interest that will attract investment capital, it follows that prospective equity yield should increase as the risk increases.

In theory, the increased legal limit will make more mortgage money available to help finance purchase of individual properties. On the other hand, it would be foolish to use increased mortgage ratios as an excuse for increasing appraisals. It is obvious that the mortgage investor assumes greater risk by increasing the loan without increasing the appraisal. It is also clear that the equity buyer increases his risk by taking a thinner equity position. Both risks will be increased to an even greater extent if we use the higher mortgage ratio to increase appraisals.

When you must use capitalization as a direct or independent approach because the absence of comparable sales makes it impossible to select a proper overall capitalization rate from the market, we suggest the following general rules.

- (1) Base the overall capitalization rate on the maximum mortgage to value ratio and the maximum amortization term available to a typical buyer.
- (2) If the 75% ratio is available, increase the prospective equity yield rate from 1% to 2% over what would normally be attractive with a mortgage ratio of 66 2/3%.

The following problem will indicate about what you can expect from the application of these rules in most cases.

- (a) Average, net cash flow income projected 10 years at \$48,743 per year. Mortgage money available up to 66 2/3% of acceptable appraisal to be fully amortized in 20 years by level monthly installments including interest at 5 1/4% per annum.

Allow for a 15% value decline in 10 years and appraise the property to yield 10% on equity.

- (b) Increase the mortgage ratio to 75% of acceptable appraisal and appraise it to yield 11% on equity using Table C.
- (c) Also appraise it to yield 20% on equity with a 90% mortgage ratio, and 15% value decline in 10 years.

UNIVERSITY OF WISCONSIN EXTENSION

Department of Commerce

Ellwood Tables

Drill Problem No. 2

Graph prospects for yield on equity investment between an annual rate of 6% minimum and 16% potential maximum assuming purchase of an existing apartment building, 10 years old, presently grossing \$72,000, indicating a 50% expense ratio and an offering price of \$300,000. Assume financing is available with a 75% ratio mortgage, 25 year monthly level payment plan, at 7% interest, and using a 5- and 10-year projection. Is 16% on equity a reasonable hope?

UNIVERSITY OF WISCONSIN EXTENSION

Department of Commerce

Ellwood Tables  
Solution  
Drill Problem No. 1

(a) Factor from Table, Page 347

Basic rate	.07180
Plus depreciation .5 x .0628	<u>.00942</u>
Overall cap. rate	.08122
Valuation; $\$48,732 / .08122 = \$600,000$	

(b) Factors from Table, Page 305 or Table C, Page. 247

Y	.110000
Less M C; .75 x .0513	<u>.038475</u>
Basic rate:	.071525
Plus depreciation: .15 x .0598	<u>.008970</u>
Overall cap. rate	.080495
SAY:	.0805
Valuation; $\$48,732 / .0805 = \$603,366$	

Y	.20000
Less M C; .9 x .1334	.12006
Basic rate	.07994
Plus depreciation .15 x .0385	.005775
Overall cap. rate	.125835
SAY:	.1258
Valuation: $\$48,732 / .1258 = \$387,376$	

Approved \$560  
Ellwood  
8-15

ELLWOOD EXAMPLES

- A. Price this property to yield 7% on a 1/3rd equity allowing for a decline of 25% in value at the end of 10 years.
- B. Price it to yield 12% on a 1/3rd equity assuming a 10% increase in value in 10 years.
- C. Select one of these prices, assume the property is bought at that price and compute the range within which its market must be in 10 years to produce any equity yield from 7% to 12%.

Solution:

(a) Basic Capitalization Rate,..... .0611  
 Plus allowance for depreciation,  $25 \times .0724$ ,... .0181

Complete Capitalization Rate,..... .0792  
 Valuation,  $\$18,200 / .0792 = \$229,798$  round to \$230,000

(b) Basic Capitalization Rate,..... .0837  
 Less adjustment for appreciation,  $.10 \times .0570$ ,... .0057

Complete Capitalization Rate,;..... .0780  
 Valuation,  $\$18,200 / .0780 = \$233,333$  round to \$233,000

- D. Retaining the 25% depreciation allowance as a safe guard, it is possible to analyze the .0792 cap rate to find out change in property value necessary to produce a 12% yield.

Subtract .0792 from the base rate at 12%, .0837. Divide the difference by the appreciation factor at 12%, .0570

$.0045 / .0570 = .078947$ , Say 8% appreciation.

At a price of \$230,000 equity yield will range between 7-12% if the reversion remains from 75 to 108% of that price in 10 years.

## BUSINESS 528--REAL ESTATE APPRAISAL

## ELLWOOD PROBLEM

FALL 1968

Graph prospects for yield on equity investment between an annual rate of 6% minimum and 16% potential maximum assuming purchase of an existing apartment building, 10 years old, presently grossing \$56,000, indicating a 50% expense ratio and an offering price of \$300,000. Assume financing is available with a 75% ratio mortgage, 25 year monthly level payment plan, at 6% interest, and using a 5- and a 10-year projection. Is 15% on equity a reasonable hope over 10 years?

$$\frac{2800}{300,000} = .00934$$

$$r = 5 \quad R = .0934$$

$$= .06 - (.75 \times .0005) = .0596$$

$$R = .0934$$

$$= .06 - (.75 \times .0006) = .0597$$

$$r = 5$$

$$= .15 - (.75 \times .0876) = .0843$$

$$\frac{.0934 - .0843}{.1483} = .0613 = 6\% \text{ depreciation}$$

$$1 - mC = r$$

$$.15 - (.75)(.0843) = .0887$$

$$\frac{.0934 - .0887}{.0443} = .0953 = 9\frac{1}{2}\%$$

$$\frac{R-r}{.1774} = \frac{.0934 - .0596}{.1774} = .1905 = 19\%$$

$$\frac{.0934 - .0597}{.0259} = .4440 = 44\%$$

at 6%

at 15%

COMMERCE 279

PROBLEM SHEET #2

Real Estate Investment

J. A. Graaskamp

1. A large industrial firm occupies a regional plant under a twenty-five year net lease with two ten year renewal options. Rent during the initial term is \$480,000 net per annum, payable \$40,000 monthly in advance. Ten years of the initial term have expired. Ownership of the fee is subject to a current mortgage balance of \$2,400,000 and is subject to a repayment penalty of 2%. The owner wished to sell, and a trust fund offers to purchase it outright to yield 5%, with full recovery and balance of the initial term. What was the purchase price? How much cash will the owner realize if he has \$1.5 million basis and a capital gains rate of 25%?
  2. What is the annual rent requirement on a monthly and quarterly advance basis where cost is budgeted at \$3,000,000 for industrial park when all units are financed under a 30 year initial lease providing a 5% return to the fee holder together with recovery of capital in the initial lease term.
  3. How much less would it cost over a 30 year span to set the initial term at 15 years with a 4½% interest yield to the fee holder if renewal options were priced at a cost of \$30,000 for a 15 year renewal?
  4. A corporation is formed to finance the acquisition of a store and office building, with the following financial structure. Estimated net annual income is \$415,000. Sources of capital were as follows:
    - 55% by first lease hold mortgage at 5½% to be fully amortized in 20 years
    - 15% from a second mortgage at 8% interest to be amortized in 10 years
    - 12% by sale and leaseback of site on long term basis with ground rent at 5% of the sales price.
    - 18% by sale of corporate stock. Investors were told to expect an effective return of 12% on their money despite 15% depreciation of the initial price.
- What price was paid for the property assume mortgage money was available for 2/3 of the price for 20 years at 5%.
5. An independent super market is purchased subject to a net lease which will fully amortize the investment in 20 years at 5½%. The seller wants an option to repurchase at the end of 15 years and the buyer is willing to provide such an option at a price which would give him an effective yield of 8%. What price should be quoted for repurchase option?
  6. A property is purchased subject to a 30 year net lease which will fully amortize the investment at 6%. The lessee wants an option for, an additional 20 years at reduced rent which would provide a 7% investment yield at the end of 50 years even if there were no residual value. Extension rent should be what % of the initial investment?

PROBLEMS IN REAL ESTATE INVESTMENT

- I. What does Ellwood mean by a properly correlated appraisal supported by the cost approach and market comparison methods?
- II. Graph prospects for yield on equity investment assuming purchase at appraised value when financed by a  $66 \frac{2}{3}\%$  mortgage, 25 year level payment loan, at  $6 \frac{1}{4}\%$  interest using a 10 year projection.
- III. Suppose you have an equitable 25 year net lease to an AAA tenant. Suppose further you have purchased this situation with one third equity having an assured yield of 8%, with the balance supplied by a 25 year level payment mortgage at 6%. What proportion of the original purchase price must you recover upon sale of the reversion to achieve a 15% effective yield?
- IV. Suppose you purchase a commercial property to yield 8% on one third equity when the balance was financed by a 25 year mortgage at  $5 \frac{1}{4}\%$ . At the end of 5 years you have an opportunity to refinance at a better ratio with a new 25 year mortgage at  $5 \frac{1}{2}\%$ . Assume further the building has depreciated 10% of its original appraised value just as you anticipated when you purchased the structure. What mortgage ratio is necessary to achieve a yield of 10% by refinancing?
- V. Assume a property can be purchased with \$50,000 mortgage to be amortized in 15 years with interest of  $5 \frac{3}{4}\%$ . Average annual income for the next 10 years has been estimated at \$5,800. Price this property to yield 9% on the equity investment allowing for 15% depreciation in 10 years.
- VI. Assume you are able to purchase a property for which \$8,000 per annum is projected as income for the next 10 years. Assume further that you may finance with a 70% ratio loan to be amortized in 15 years at a rate of  $6 \frac{1}{2}\%$ . The cap rate indicated by the standard appraisal is 8%. If an alternative investment in U.S. Government Bonds would provide a guaranteed 5% return, what decline in value would be necessary to reduce the effective yield in 10 years below the bond rate? Assuming the investment has some speculative attributes beyond the control of the equity investor, would you buy?
- VII. An office building is for sale but subject to a prime lease with 7 years to run providing a net rental of \$7,800. The buyer must further assume a 20 year level payment mortgage at  $5 \frac{1}{2}\%$  with 10 years to run and with a balance of \$62,780 to be paid. For how much was the original mortgage? Price the property to yield 9% on the equity on the basis of the 7 year income projection and 10% appreciation in the value of the remainder due to an improving neighborhood situation.
- VIII. Assume the same set of facts in Number VII, expect that the mortgage was a 7% annual constant loan at  $5 \frac{1}{2}\%$ . Price the property to yield 9% with no assumption of any appreciation or depreciation in 7 years.
- IX. Assume a 100% location downtown property is burdened by a long term lease with 10 years to run paying \$5,000 a year for property which should be leased at a minimum of \$10,000 per year. Moreover, it would be possible to use the property for 20 years following expiration of the lease, and secure at the minimum the full \$10,000 each year. Suppose further that mortgage money is available at two thirds of present value for 25 year term at  $5 \frac{1}{2}\%$ . Assume the property will depreciate at a rate of 1% per year. Further assume an 8% return on equity is desired. What is the maximum amount the equity holder might pay the lease holder to break this unfavorable lease to make it available to an alternative tenant for 20 years at market rent level?

C. cont. Cap rate at 7% with 25% decline in 10 years

Basic Capitalization Rate,..... .0611  
 Plus allowance for depreciation, 125 x .0724,..... .0181  
 Complete Capitalization Rate,..... .0792

Valuation, \$18,200/.0792 = \$229,798 round to \$230,000

Cap rate at 12% with 10% increase in 10 years

Basic Capitalization Rate,..... .0837  
 Less adjustment for appreciation, .10 x .0570,..... .0057  
 Complete Capitalization Rate,..... .0780

Valuation, \$18,200/.0780 = \$233,333 round to \$233,000

D. Retaining the 25% depreciation allowance as a safe guard, it is possible to analysis the .0792 cap rate to find out change in property value necessary to produce a 12% yield.

Subtract .0792 from the base rate at 12%, .0837. Divide the difference by the appreciation factor at 12%, .0570

.0045/.0570 = .078947, Say 8% appreciation.

At a price of \$23,000 equity yield will range between 7-12% if the reversion remains from 75 to 108% of that price in 10 years.

E. Ellwood then uses a graph to illustrate the prospects for acceptable yields assuming sale at various prices during the 10 year span.

This graph is determined by calculating the outer limit which depreciation and still maintain a 5% yield although original evaluation contemplated a 7% yield.

This kind of graph making is simplified by Table 1 A.

F. Test class members on problem: \$20,000 net income before debt service. Mortgage rate 5 3/4% for 20 years. Minimum acceptable yield 8%; desired yield 14%. Estimated depreciation in 20 years is 20%.

Sold at the end of 20 years--

Basic cap rate at 8% .0684 - Depreciation factor .0219  
 Basic cap rate at 14% .0956 - Depreciation factor .0110

$\frac{.0219}{5}$	plus	.0684/20,000	.0044	274,725
			<u>.0684</u>	
			.0728	
$\frac{.0110}{5}$	plus	.0956/20,000	.0022	204,500
			<u>.0956</u>	
			.0978	

.0956  
-.0728  
 .0228/.0110 207%

Sold at the end of 10 years--

Basic cap rate at 8% .0663 - Depreciation factor .0690  
 Basic cap rate at 14% .0905 - Depreciation factor .0517  
 Assumption 10% decline

.0069		.0052	
<u>.0663</u>	273,000	<u>.0905</u>	209,000
.0732		.0957	

.0905  
 - .0732  
.0233 / .0517      45%

Sold at the end of 5 years-- 5% Decline

Basic cap rate at 8% .0653 - Depreciation factor .1705  
 Basic cap rate at 14% .0873 - Depreciation factor .1513

.0653		.0873	
<u>.0085</u>	271,000	<u>.0075</u>	211,000
.0738		.0948	

.0873  
 - .0738  
.0135 / .1513      9%

- V. This kind of work is done for you in Table 1A for selected capitalization rates. Refer to problem 2 on page 45
- A. First note the estimate of rate indicated by dividing cost by net net income.
  - B. Next note conversion of gross multiplier by dividing by the net income ratio to an indication of acceptable market capitalization rate. Note that a market cap rate is selected which will provide a value in line with duplication cost. Cap rate selected is .0825 .
  - C. Reference to Table 1A under mortgage rate 5½% to determine how far values may decline in a 20 year span and still assure a given yield of 5, 10, and 15%.

How do you explain an increase in yield despite a decline in value?

Again note the emphasis on page 51 "With very rare exception high yields are realized only when the term of ownership is of comparibly short duration.

Also note, that the rate of capital recovery through amortization between 5 and 10% yields affects things very little the longer the term of the mortgage. While a reduction in mortgage service payments means a higher income value, it also means a greater mortgage charge to lessen the value of the reversion.

Even the columns which are blank suggest useful information. It means 100% depreciation has been reached at a yield higher than the indicated rate of 5, 10, or 15%. This is particularly true for long-term projections in the case of long-term leases on a net basis to the better tennant.

Problem Sheet No. 1 Key

I. Ellwood establishes a indicated cap rate by dividing net income by the cost summation value.

Cap rates are also determined from comparative sales by dividing the net income ratio by the gross multiplier, using the net income ratio of the given property and a range of multipliers from comparable properties. He then selects a cap rate which is within the range indicated by market ratio data but high enough to produce a value no higher than a careful estimate of the cost approach.

In this way Ellwood sees the cost and market approach as coorelated.

His capitalization approach then assumes a mortgage of 2/3 of the purchase price with an appropriate amorization period and interest rate, referring to table IA for a convenient source of cap rates at the prescribed mortgage terms. Below this rate he finds a projection of yield given basic depreciation of appreciation assumptions.

II. Assumption of a nine, twelve, or fifteen per cent equity yield suggests a basic cap rate of .0727, .0841, or .0952. In this event a 10 year projection curve would intersect right axis at the following points:

5%	-19%	at low
10%	+ 6%	cap rate
15%	+ 46%	of \$7.25
		.0725
5%	-35%	at mid
10%	-14%	point .0850
15%	+21%	
5%	-54%	at cap rate
10%	-37%	of 10%
15%	-10%	

Analysis of prospects depends on the judgement as to the proable decline in value, or the prospects for dollar appreciation due to inflation, increasing land value, etc. Note that the higher the cap rate assumed the more leaway or greater safety factor is available to the investor.

III. ~~Basic cap rate .0691 (25 year mortgage at 6%, 8% equity yield page 33)~~  
~~Depreciation factor .0137~~  
~~Cap rate .0828~~      720%

Necessary appreciation in reversion to achieve 15% yield is 119% of purchase price.

IV. Cap rate of present project is:

+ 340 - p .64

Equity yield	.08
.0269 mortgage coefficient x 2/3	.0179
Basis cap rate	.0621
Credit for depylation	.0170
Complete cap rate	.0791

V. Desired cap rate :

Equity Yield	.10	
Adjustment for depreciation factor	.0164	.0373
Rate before mortgage	.1164	.0439
Less Cap rate from previous project	.0791	
Mortgage contribution	.0373	85%

new mortgag  
coeffielen



## Ellwood Analysis

2e

A program to perform Ellwood computations using formula specified by Dr. L. W. Ellwood in Ellwood Tables for Real Estate Appraising and Financing, Third Edition. The program is not constrained to the projection periods and rates tabulated but may be used for fractional periods and rates.

Program Name: ELLWOOD

Inputs Required:

NOTE: Entry of a question mark in response to any request by the program for data will cause a more elaborate explanation of the required entry to be printed.

EQ YLD? (Required) Equity Yield rate stated either as a percentage or a decimal fraction. All values which are rates may be specified in this manner. If a value larger than one is entered the program assumes that the entry is stated as a percentage and will be divided by 100 to obtain the decimal rate.

PROJ PD? (Required) Projection period stated in years.

For each mortgage the following data is required:

MTG INTR? (Optional) The mortgage interest rate stated as a percentage or decimal fraction. If data for all mortgages have already been entered then the proper response is no entry followed by a carriage return. The program will request no further mortgage data, and proceed with the analysis.

MTG PD? (Optional) Remaining mortgage period in years. If the mortgage is unknown the annual constant will subsequently be required and requested. Press return without entering data if period is unknown.

MTG CON? (Optional) The mortgage constant; the total annual payments for principal and interest as a fraction of the current mortgage balance should be entered here. If no entry is made the program will repeat the request for mortgage period above.

- PMT PDS/YR? (Required) The number of payment periods per year for a monthly payment mortgage enter 12. For a quarterly payment mortgage enter 4.
- M? (Optional) The fraction of value which is mortgaged by the current mortgage. If no entry is made program will request the dollar amount of the mortgage below.
- M\$? (Optional) The dollar value of the current principal outstanding on the mortgage. If no entry is made the program will again request the mortgage as a fraction of the value of the property above.

The following data is requested after all mortgage data above has been entered.

- %DEPR (-APPR) (Required) The percent of depreciation over the projection period on the basis of the current value. If property value is expected to increase, that is appreciate, enter the amount of appreciation as a negative percentage. If property value is to remain constant enter zero.
- INC? (Required) The annual income derived from the investment.
- %INCR INCOME (Required) The amount by which the annual income is to increase during the projection period on the basis of the currently stated income above. If income is to remain constant enter zero.
- EF.R.E.TX.R? The annual real estate tax payment expressed as a percent of market value.

MODE?

Enter one of the following:

r

R Restart; return to the beginning of the program requesting equity yield.

C Provide a mechanism for making changes. Program will continue with the change option described below.

Q Quit; the program will terminate.

P Proof; the program will printout a complete description of the analysis showing the computations normally used in an Ellwood analysis to arrive at the value stated.

T Table; the program will request additional data so as to prepare a table of appreciation or depreciation associated with various choices of projection periods and equity rates. This table may be used to prepare the "Ellwood graphical analysis". In this table negative entries denote depreciation (and, optionally, income decline). This notation agrees with the (inconsistent) notation in the Ellwood text.

#,NEW VAL

(Optional) Enter the number of the item which is to be corrected and its new value. The numbers associated with data items previously entered will have been printed ahead of the abbreviated request for input. These numbers may be used at this point. The number must be followed by a comma and the new value to be used. Upon making one entry the program will again request another number and new value. To terminate this mode make no entry and press return.

## Introductory Ellwood Case #1

The Old Dog Appraisal Company has been asked to provide an income appraisal, complete with an Ellwood graph of possible yields and a proof, to value an investment in a well-built industrial building yielding a net income of \$36,000 per year. The investor feels a 5-year projection is sufficient. The client-investor wants the analysis in 30 minutes so that he can make an offer that afternoon. Investors expect a 20% yield to equity before taxes on this type of investment and the appraiser anticipates a 2% decline in resale value of the property each year. Financing includes both a first and a second mortgage as follows:

	1st Mortgage	2nd Mortgage
Interest Rate	.085	.09
Term	20	
Debt Service Constant		.123
M (Mortgage Ratio)	.60	
M\$ (Mortgage Amount)		20,000
Payment Periods/Year	4	12
%Depreciation	.10	

Fortunately Old Dog has a smart son home from college who runs the problem for him on the terminal and provides the output which follows this explanation. Later in the dead of night, Old Dog decides to see if he can repeat the results by doing the very same routine himself.

### Instructions:

- Step 1 - Find a terminal and if its not connected to a telephone adopt a smart son-of-an-assistant.
- Step 2 - Have assistant guide you in "logging in" (details and drill on this step will be provided Monday morning).
- Step 3 - As the terminal asks questions, make all the entries indicated on the example in hand.
- Step 4 - When you have completed the entire run, read back through the program to see if you can crack the code or cryptic notations:
  - a. For example: What is the purpose of entering a question mark (?)?
  - b. What is "mode"?
  - c. Did you enter any percentages as 9 instead of .09? Did it work? Why?
  - d. Does typing 0 (zero) mean the same thing as entering nothing?

- e. How do you indicate the number of mortgages to the program?
- f. How do you specify a mortgage as a % of valuation vs. a particular dollar amount?

Step 5 - Rest on your laurels. Tomorrow is another day!

OLD ELLWOOD

(Terminal inputs are underlined)

READY  
RUN-10

ELLWOOD 17:10CST 02/20/76

REVISED 6/17/75

You may enter a "?" to get a more complete description of any of these questions.

Examples →

```

1 EQ YLD? ?
EQUITY YIELD RATE DESIRED
1 EQ YLD? .20
2 PROJ PD? 5
MORTGAGE 1 DATA
4 MTG INTR? .085
5 MTG PD? 20
7 PMT PDS/YR? 4
10 M? ?
MORTGAGE AMT AS A % OF VALUE, IF UNKNOWN PRESS RETURN
10 M? .60
MORTGAGE 2 DATA
14 MTG INTR? .09
15 MTG PD?      ←
16 MTG CON? .123 ←
17 PMT PDS/YR? 12 ←
20 M?      ←
21 M$? 20000
MORTGAGE 3 DATA
24 MTG INTR?      ←
52 %DEPR(-APPR)? .10
55 INC? 36000
53 % INCR INCOME? 0
58 EF.R.E.TX.R.? .195
.1116310 = MTG 1 C
.1048726 = MTG 2 C
.1249581 = BASIC RATE
.3333960 = OVERALL RATE
107979 = VALUATION

```

indicates that only "return" was entered

MODE? P

MORTGAGE1	60%	64788 AT .1044	6765
MORTGAGE2	19%	20000 AT .1230	2460
EQUITY	21%	23191 AT .2466	5718
		R.E.TAXES	21056
TOTAL		107979	36000 INCOME

107979 ORIGINAL PRICE  
107977 LESS 10.% DEPRECIATION

-----  
97181 PROPERTY REVERSION, DEFERRED 5 YEARS  
64788 MORTGAGE 1  
57050 7738 LESS 5 YEAR AMORTIZATION; (0.119433)  
20000 MORTGAGE 2  
15852 4148 LESS 5 YEAR AMORTIZATION; (0.207416)

-----  
24279 EQUITY REVERSION, DEFERRED 5 YEARS

PRESENT VALUE OF EQUITY INCOME AND REVERSION AT 20.%

17103 INCOME, 5718.91 X 2.99061  
9757 REVERSION, 24279.7 X 0.401878  
-----  
26860 TOTAL

MODE? I

IS INCOME CONSTANT? YES  
ENTER OVERALL RATE FOR ANAL.? .138396  
ENTER 1 TO 4 PROJ. PDS? 2,5,8,10  
ENTER 1 TO 6 EQ. YLDS? 5,10,15,20,25

YIELD ANALYSIS WITH  
CONSTANT INCOME, .1383960 = R

YRS	2	5	8	10
YIELD				
.0500	-.1341	-.3699	-.6499	-.8653
.1000	-.1020	-.2939	-.5471	-.7594
.1500	-.0700	-.2044	-.3967	-.5696
.2000	-.0381	-.1000	-.1839	-.2565
.2500	-.0063	.0211	.1094	.2336

MODE? T  
 IS INCOME CONSTANT? NO  
 ENTER OVERALL RATE FOR ANAL.? .138396  
 ENTER 1 TO 4 PROJ. PDS? 2,5,8,10,15  
 ENTER 1 TO 6 EQ. YLDS? 5,10,15,20,25

YIELD ANALYSIS WITH  
 VARIABLE INCOME, .1383960 = R  
 YRS                    2                    5                    8                    10                    15  
 YIELD  
   .0500    -.1109    -.2589    -.3919    -.4763    -.6847  
   .1000    -.0842    -.2039    -.3234    -.4064    -.6391  
   .1500    -.0577    -.1406    -.2303    -.2974    -.5089  
   .2000    -.0314    -.0683    -.1051    -.1309    -.2078  
   .2500    -.0052    .0143    .0615    .1170    .4132

MODE? C  
 #,NEWVAL? 53,.025  
 #,NEWVAL?             
   .1116310 = MTG 1 C  
   .1048726 = MTG 2 C  
   .1249581 = BASIC RATE  
   .3306836 = OVERALL RATE  
   108865 = VALUATION

MODE? Q

USED            8.61 UNITS

RUN COST

COST            17:21CST        02/20/76

ACCRUED CHARGES SINCE SIGNIN

\$ 1.05 COMPUTER  
   1.94 CONNECT  
   0.47 CHARACTERS  
 \$ 3.46 TOTAL  
 EFFICIENCY = 24.4

USED            .39 UNITS

BYE

00010.18 CRU        0000.19 TCH        0004.66 KC

OFF AT 17:21CST 02/20/76

SHOPPING CENTER CAPITAL STRUCTURE ILLUSTRATION

Net income before recapture: \$100,000.

Sale and Leaseback of land for 10% of purchase price--rent 7% per year.

First mortgage on leasehold--70% of purchase price, 8% interest, 20-year term.

Preferred stock for 10% of price with 12% dividend.

10% common stock with 30% dividend.

10-year projection.

50-year lease on land--no option to repurchase.

$$OAR = Y - MC \pm \text{depreciation}$$

$$MC = MC_L + MC_P + MC_M$$

$$C = Y - I \text{ or } C = \text{Ellwood coefficient}$$

$$Y = .30$$

$$-MC_L = (.30 - .07)(.10) = .023$$

$$-MC_P = (.30 - .12)(.10) = .018$$

$$-MC_M = (.2068)(.7) = \underline{.14476}$$

(p. 249)

$$.18576$$

$$\underline{-.18576}$$

$$Y - MC = .11424$$

$$\text{Depr} = (.0235)(.20) =$$

$$\underline{.00470}$$

$$.11894$$

$$100,000 / .11894 = 840,000$$

MORTGAGE SCREEN TEST  
NEW APARTMENT BUILDING MORTGAGE APPLICATION

Total cost estimate: \$300,000.

Net income before recapture (forecast): \$25,000.

Loan requested: \$250,000 at 7 1/2% for 25 years, 10-year closed.

$$Y - M \quad C \quad \pm \quad \text{Depr} \quad = \quad OAR$$

$$.15 - \left( \frac{250,000}{300,000} \right) (.0713) + (.0493)(.10) = .0955371$$

(p. 255)

$$\frac{I}{OAR} = \text{sound value}$$

$$\frac{\$250,000}{.0955371} = \$261,600$$

PRO FORMA INCOME PROPERTY FORMAT

(Cash Accounting Basis)

- I. Expected Receipt
  - Base rent (Monthly)
  - Index to base rent (Annual adjustment to monthly base)
  - Percentage rent (Quarterly estimate with fifth quarter adjustment)
  - Amortized tenant improvements (Monthly, fixed)
  - CAM (Monthly average with 14th month adjustment)
  - Reimburseables (Annual pass through)
  - Escalators with stop (Annual review)
  - Interest on reserves (Quarterly sweep)
  - Government transfer payments (Negotiated and deferred)
  - Total receipts
  
- II. Loss of Potential Receipts
  - Vacancy losses
  - Rent collection losses
  - Reimbursement collection losses
  - Receivables
  - Concessions
  - Total reduction in expected receipts
  
- III. Actual Revenues for Operations
  
- IV. Gross Outlays for Operations
  - CAM items
  - Reimburseables
  - Escalator items
  - Owner costs
  - Refurbishment
  - Renewal tenant improvements
  - Renewal lease commissions
  - Total operating outlays
  
- V. Total Cash from Operations
  
- VI. Capital Charges
  - Interest payments
  - Principal payments
  - Capital improvements
  
- VII. Net Cash from Operations before Taxes
  - + Transfers from cash reserves from previous period
  - + Net increases in loan balances outstanding
  
- VIII. Cash Available for Distribution and/or Taxes
  - Less distribution and taxes
  - = Net addition to cash reserves in following period

## ASSUMPTIONS AND LIMITING CONDITIONS OF APPRAISAL THEORY MODEL

- I. ONE APPROACH TO SOLVING PROBLEMS OR REACHING DECISIONS IS BY MAKING A MODEL TO STRUCTURE FACTS AND RELATIONSHIPS IN A MANNER WITHIN THE CONTEXT OF THE DECISION MAKING CIRCUMSTANCES.
  - A. THREE TYPES OF SCIENTIFIC MODEL BUILDING ARE COMMON IN REAL ESTATE ANALYSIS.
    1. PHYSICAL MODELS - SAND TABLES TO UNDERSTAND BUILDING MASS, AND SHAPE.
    2. ABSTRACT MODELS SUCH AS FLOW CHARTS OF INDUSTRIAL PROCESS OR TRAFFIC PATTERNS.
    3. SYMBOLIC MODELS RELATE ITEMS WITH MATHEMATICAL <sup>or logic</sup> CONCEPTS.  $I/C = V$  IS A SYMBOLIC MODEL OF THE RELATIONSHIP BETWEEN INCOME PRODUCTIVITY. ~~RECENTLY I SAW A MATHEMATICAL MODEL FOR TESTING THE FINANCIAL FEASIBILITY OF A 236 PROJECT WHICH REDUCED THE ISSUE THROUGH FACTORING TO ONLY A FEW COEFFICIENTS AND SENSITIVE COST AND REVENUE COMPONENTS.~~
  - B. <sup>6</sup>ADVANTAGES OF MODEL BUILDING FOR THE REAL ESTATE ANALYST
    1. MODEL PROVIDES A PRELIMINARY REFERENCE FOR ANALYSIS.
    2. A MODEL BRINGS INTO FOCUS THE PROBLEMS OF ABSTRACTION, TO CHOOSE FACTORS RELEVANT TO PROBLEMS UNDER CONSIDERATION.
    3. FAILURE OF A MODEL TO PREDICT REVEALS FLAWS IN DATA OR LOGIC.
    4. MODELING IN SYNBOLIC LANGUAGE PERMITS USE OF MATHEMATICAL TOOLS.
    5. MODELS OFTEN PROVIDE THE CHEAPEST WAY TO MAKE A PREDICTION AS WELL AS THE QUICKEST. THE GROSS-RENT MULTIPLIER TECHNIQUE IS AN APPRAISAL MODEL.
  - C. DISADVANTAGES AND DANGERS OF MODEL BUILDING FOR THE REAL ESTATE ANALYST.
    1. THE DANGER OF ABSTRACTION IS GROSS X OVERSIMPLIFICATION AND LOSS OF CRITICAL DATA.
    2. THE PROBLEM OF RELATING THE MODEL TO THE COMPLEXITY OF THE REAL WORLD.
    3. INFATUATION WITH THE MODEL IS A PRODUCT OF THE INTELLECT RATHER THAN AS A PRACTICAL TOOL.
  - D. THE VARIETY OF RELATIONSHIPS IN THE REAL WORLD EXCEED THE CAPACITY OF THE MATHEMATICIANS TO DESCRIBE IT OR DATE ACCUMULATION METHODS TO MAINTAIN THE RIGHT MODE OF DATA. MODELS MUST FIT THE DATA THAT IS AVAILABLE.
    1. IN MEDICAL RESEARCH MILLIONS ARE SPENT ON COLLECTING DATA TO TEST THE HYPOTHESIS DREAMED UP ON A SUNNY AFTERNOON. SO IT IS AN APPRAISAL - MOST OF THE TIME IS SPENT ON COLLECTING INFORMATION TO FIT YOUR MODEL OF WHAT YOUR APPRAISAL SHOULD BE AND TO SIMPLIFY THE DATA COLLECTION PROCESS THE APPRAISAL MODEL HAS BEEN SIMPLIFIED.
    2. THUS, THERE IS A CONSTANT INTERPLAY BETWEEN THE MODELS WE USE AND THE KIND OF DATA WHICH WE HAVE AVAILABLE WHICH WE CAN TEST WITH SOME PRACTICAL CONVENIENCE.

Communication  
Abstract of

- E. THE CAREFUL DILINEATION OF THE VALUE DECISION TO BE SOLVED AND THE DATA WHICH IS APPROPRIATE CAN BE FOUND IN THE THEORETICAL RELATIONSHIPS AND ECONOMIC THEORY ON WHICH IT IS BUILT.
1. A PRICE THEORY OF A FIRM
  2. A PERFECT MARKET
  3. MARSHALLIAN ECONOMICS OF THE SHORT, INTERMEDIATE, AND LONG TERM VIEW, I.E. MARKET, CAPITALIZED INCOME AND COST
- F. PROFESSIONS ALSO HAVE THE PROBLEM OF INTERFACING WITH OTHER PROFESSIONS AND AVOIDING PROFESSIONAL LIABILITY ON THOSE MATTERS ON WHICH THEY ARE NOT PROFESSIONALLY CONFIDENT. THUS THERE IS A SIGNIFICANT NUMBER OF LIMITING CONDITIONS RELATIVE TO THE DATA AND CIRCUMSTANCES OF THE MARKET TRANSACTION. THESE WOULD INCLUDE:
1. TITLE
  2. ENGINEERING FACTORS
  3. FINANCE AND TAXATION MATTERS
  4. RELIABILITY OF DATA
  5. SURVEYS, DIMENSIONS, ETC.
  6. LEGAL CHARACTER OF LEASES, CONTRACTS, ETC.

Real Estate is valued in terms of its highest and best use. The highest and best use of the *land* (or site) if vacant and available for use may be different from the highest and best use of the *improved property*. This will be true when the improvement is not an appropriate use and yet makes a contribution to total property value in excess of the value of the site.

1. Definition: Highest and Best Use (Highest and Most Profitable Use; Optimum Use) is that reasonable and probable use which will support the highest present value as of the date of the appraisal. Alternatively, it is the most profitable *likely* use to which a property can be put. It may be *measured* in terms of the present worth of the highest net return that the property can be expected to produce over a stipulated long run period of time.
2. The Principle: The principle of highest and best use, as indicated in Session 4, is that urban space (land or improved properties) tends to be put to its highest and best use in a competitive

## The definitions

Proposed FHLBB definition. Market value shall mean the price in terms of cash, or in terms reasonably equivalent to cash, which a property will bring, if exposed for sale on an open market by an informed seller with a reasonable time to find a purchaser buying with full knowledge of all the uses and purposes to which it is adapted and for which it is capable of being used, with neither the buyer nor the seller being under compulsion to buy or sell.

SREA reference. Market value: The price which the property will bring in a competitive market under all conditions requisite to fair sale, which would result from negotiations between a buyer and a seller, each acting prudently, with knowledge, and without undue stimulus.

Regardless of the exact wording of the definition, market value contemplates the consummation of a sale and the passing of full title from seller to buyer by deed, under conditions whereby: (1) buyer and seller are free of undue stimulus and are motivated by no more than the reactions of typical owners; (2) both parties are well-informed or well-advised and act prudently, each for what he considers his own best interest; (3) a reasonable time is allowed to test the market; and (4) payment is made in cash or in accordance with financing terms available in the community for the property type in its locale.

### 1. Definition of Market Value.

- a. Society of Real Estate Appraisers: "The price which a property will bring in a competitive market under all conditions requisite to a fair sale, which would result from negotiations between a buyer and a seller, each acting prudently, with knowledge, and without undue stimulus." (SREA, Real Estate Appraisal Principles and Terminology [Chicago, The Author, 1960], p. 85).
- b. American Institute of Real Estate Appraisers: "The highest price estimated in terms of money which a property will bring if exposed for sale in the open market allowing a reasonable time to find a purchaser who buys with knowledge of all the uses to which it is adapted and for which it is capable of being used." (AIREA, Appraisal Terminology and Handbook, 5th Edition [Chicago, The Author, 1967], p. 131).

### 2. The wording can vary in the definition of Market Value, but the following conditions are always assumed to prevail:

- a. Competitive market conditions.

"The most probable price is that selling price which is most likely to emerge from a transaction involving the subject property if it were to be exposed for sale in the current market for a reasonable time at terms of sale which are currently predominant for properties of the subject type." R. U. Ratcliff.

*Data Given To Bus. 856 for Class Appraisal  
Assignment*

Business 856

Notes on East Washington Property

1. Legal Description: Lots 5 through 10 and 15 through 22, Block 1, Clyde A. Gallagher Subdivision, in the City of Madison, subject to dedication of southeast 16.5 feet to the City of Madison for street purposes. \*Some documents also mention Township of Burke.
2. Purchased on a land contract June 15, 1983 by MADISON CELEBRATION STATION, INC. from Theodore A. Vail and Mary Jane E. Vail, his wife, of Sun Prairie, Wisconsin.
3. Purchase price was \$500,000, \$90,000 down and \$410,000 on a land contract. Interest rate is 11% per annum. Monthly installments of \$4,000 per month beginning July 15, 1983, with payments first applied to interest and then to principal. Performance guaranteed by Gustavs M. Martinsons and Dwight Zeck, stockholders of purchaser, by separate document. Land contract balance is due on the 15th day of June 1988. Prepayment permitted without penalty.
4. At the time of sale title was encumbered by "Mortgage from Vendor to Security Marine Bank of Madison in the original amount of \$258,000.00, dated January 10, 1978, recorded January 11, 1978, in Volume 903 of Records, page 452, as document number 1555374 ; and  
Mortgage from Vendor to Security Marine Bank for \$75,000.00 dated January 21, 1980, recorded January 21, 1980, in Volume 1582 of Records, page 59, as document number 1655426.
5. \$75,000 mortgage to Security Marine Bank was satisfied on January 19, 1984 by Theodore and Mary Jane Vail by document #1817753, Volume 5298, page 94, in Dane County.

PARKWOOD PLAZA APPRAISAL - 1987

GENERAL COMMENTS

- (1). The client is Alfred E. Anding, Jr.; partner, Anding Enterprises.
- (2). Define specific property interest to be appraised. Don't confuse property with specific interest in property.
- (3). Round to nearest \$10,000 or 1% of value.
- (4). Most probable price must have defined range in terms of sale, but range is not a function of terms of sale when you are talking a cash transaction.
- (5). Assessed value should be followed by equalization ratio, mil rate, and most recent taxes plus special assessment.
- (6). Building was expanded in 1968 for Borman's Dress Shop on a 15 year lease. This space was subdivided in 1983 when Borman's moved out.
- (7). Property encumbered by a vendor interest while Anding has a vendee interest.
- (8). Owner had indicated he bought out Coast to Coast for \$25,000 on or about October 1, 1987.
- (9). Store fronts have masonry knee wall; Walgreen's and new tenants on west end have insulated glass. Old tenants have single sheet panes and some wood paneling over window frames to reduce heat loss.
- (10). Section called "application to subject property" should indicate appraisal methods chosen and why and the fact that you will determine full fee value first and then deduct for leasehold and Zevnick interest. Tell the reader the valuation logic to be followed in very summary form.
- (11). Building codes, etc. should be in appendix except for short quotations directly relevant to subject property.
- (12). Lease abstracts and CACI data should be included in appendices.
- (13). The letter of transmittal, the value conclusions and the certification of value should all be identical in defining the date of appraisal, the legal interests appraised, the central tendency and range and any increments to value as the result of special financing or other concessions which deviate from cash value. Each section is a stand-alone section.
- (14). Since value is a function of square footage and income, once you have chosen GLA as a base for comparison then the attributes to be weighted should include average gross rent or net income per square foot of GLA.
- (15). Identify source and author of each computer software program. Tie tables produced by computer directly into your prose.
- (16). If you use DFC to establish most probable price, you need to do a

sensitivity table of critical assumptions (best case-worst case) to establish a range. As rents assumed are lower risk drops along with the equity discount rates. Hard to do if you use somebody else's FINSIM output!

(17). Linear regression of point score against price per square foot is obsolete. It leaves only two degrees of freedom so the standard error is unreliable. Use QP 2.5 for your market comparison quality score method.