



## *Measuring Obsolescence*



**A study of aging, downtown properties**



# *Making Sense of Downtown*

- Historic downtown areas can be quite a challenge to appraise
- How do you make sense of it all?
  - Field Review
  - Sales Analysis
  - Income Analysis
  - Obsolescence Factor



## *Depreciation Generally*

- Depreciation is the loss in value to an improvement
  - From all causes
  - Applies to a property having a limited economic life
  - Relative to its replacement cost new



## *Depreciation Generally*

- Depreciation may also be described as a loss in value from any cause, except depletion.
  - Depletion is the loss of value due to consumption.
    - Applies only to land
    - Examples: oil, gas, minerals, coal, precious metals, timber, etc.



# *Depreciation and Value Loss*

- As improvements age
  - They may suffer physical deterioration, functional and external (economic) obsolescence
  - They lose value relative to newer structures as potential buyers perceive that older improvements have diminished utility.
    - Principle of substitution



# *Depreciation and Demand*

- Depreciation is driven by consumer demand
- As demand for older properties decreases
  - Sale prices for properties with older improvements fall below those of properties with new improvements
  - Depreciation is the result



## *Depreciation Measured*

- The true measure of depreciation is the effect on marketability and sales prices.



## *Three Types of Depreciation*

- Physical Deterioration
- External (Economic) Obsolescence
- Functional Obsolescence



## *Physical Deterioration*

- The loss in value due to wear and tear and the forces of nature
  - All man made objects begin to deteriorate as soon as they are created
  - Decay may result from normal chemical changes in the material's composition or from mechanical causes
- May be curable or incurable



## *Physical Deterioration*

- Common causes of physical deterioration are:
  - Wear and tear through use
  - Breakage
  - Negligent use
  - Termite infestation
  - Dry rot
  - Moisture
  - The elements



# Measuring Obsolescence

## Physical Deterioration





# Measuring Obsolescence

## *Physical Deterioration*





# Measuring Obsolescence

## *Physical Deterioration*





## *External (Economic) Obsolescence*

- The loss in value from diminished utility and desirability caused by factors external to the property's boundaries.
- Generally deemed incurable
- Often caused by:
  - Non-complementary land use
  - Traffic volume
  - Inadequacy of essential services

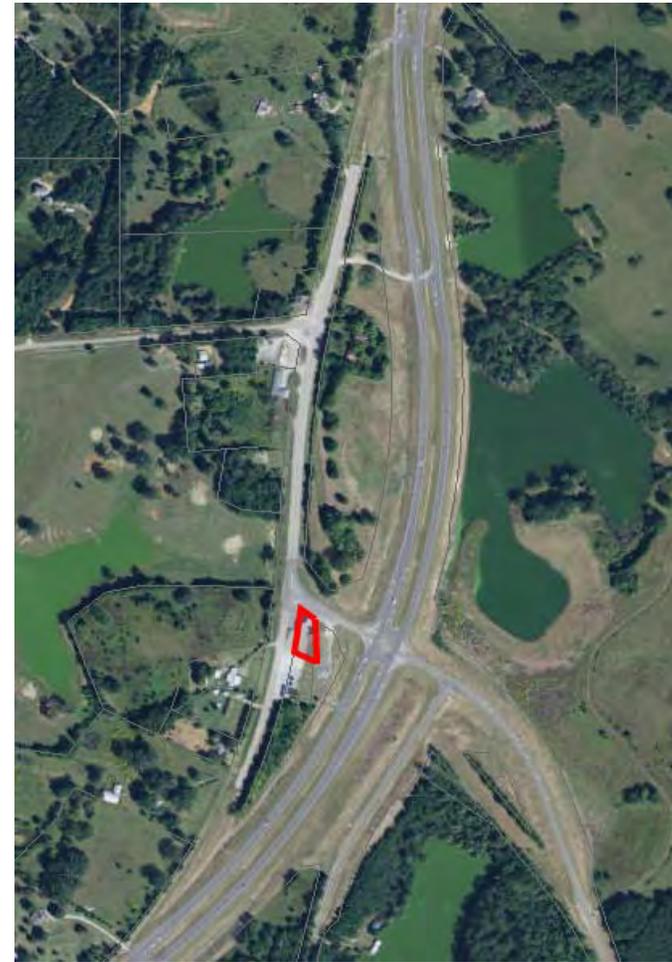


### *External (Economic) Obsolescence*

- May be caused by a change in highest and best use due to market shifts or governmental actions
  - Economic conditions (nationally & locally)
  - Closure of heavy industry nearby
  - Neighborhood decline
    - Median household income
    - Crime rates
  - Highway relocation
  - Zoning



## *Economic Obsolescence*





## *Economic Obsolescence*





## Measuring Obsolescence

# *Economic Obsolescence*





### *Functional Obsolescence*

- The loss in value due to the inability of the structure to adequately perform the function for which it is currently used – loss of utility.
- May be curable or incurable



## *Functional Obsolescence*

- Loss of value results from changes in:
  - Design
    - Style
    - Taste
  - Demands (needs)
  - Technology



## *Forms of Functional Obsolescence*

- Three forms of functional obsolescence:
  - Deficiency
  - Need for modernization
  - Superadequacy



## *Forms of Functional Obsolescence*

- Deficiency
  - Insufficient number of bathrooms
  - Low ceiling height (factories & warehouses)
  - Insufficient electrical capacity or number of outlets
  - No central heat & air
  - No fire suppression system
  - No elevator in a multi-story commercial building



## Functional – Deficiency (Cured)





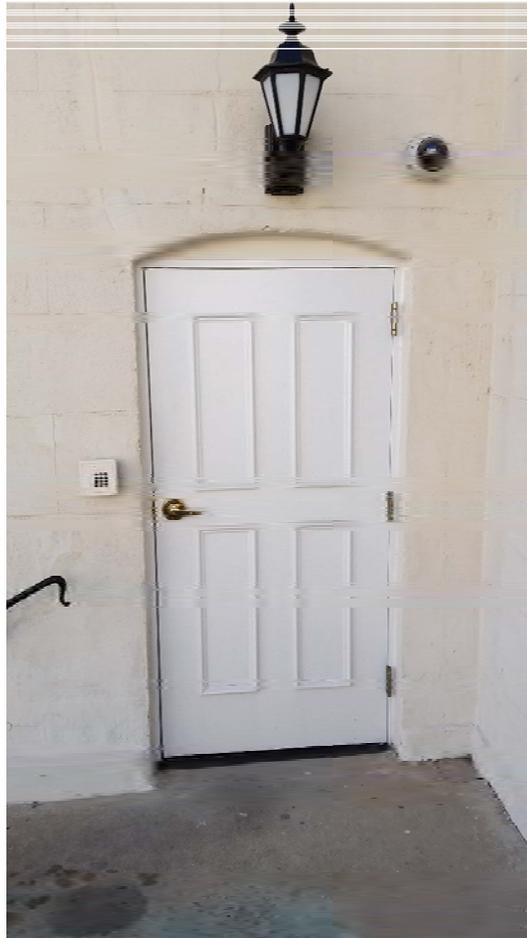
# Measuring Obsolescence

## Functional - Deficiency





## Functional - Deficiency





# Measuring Obsolescence

## *Functional - Deficiency*



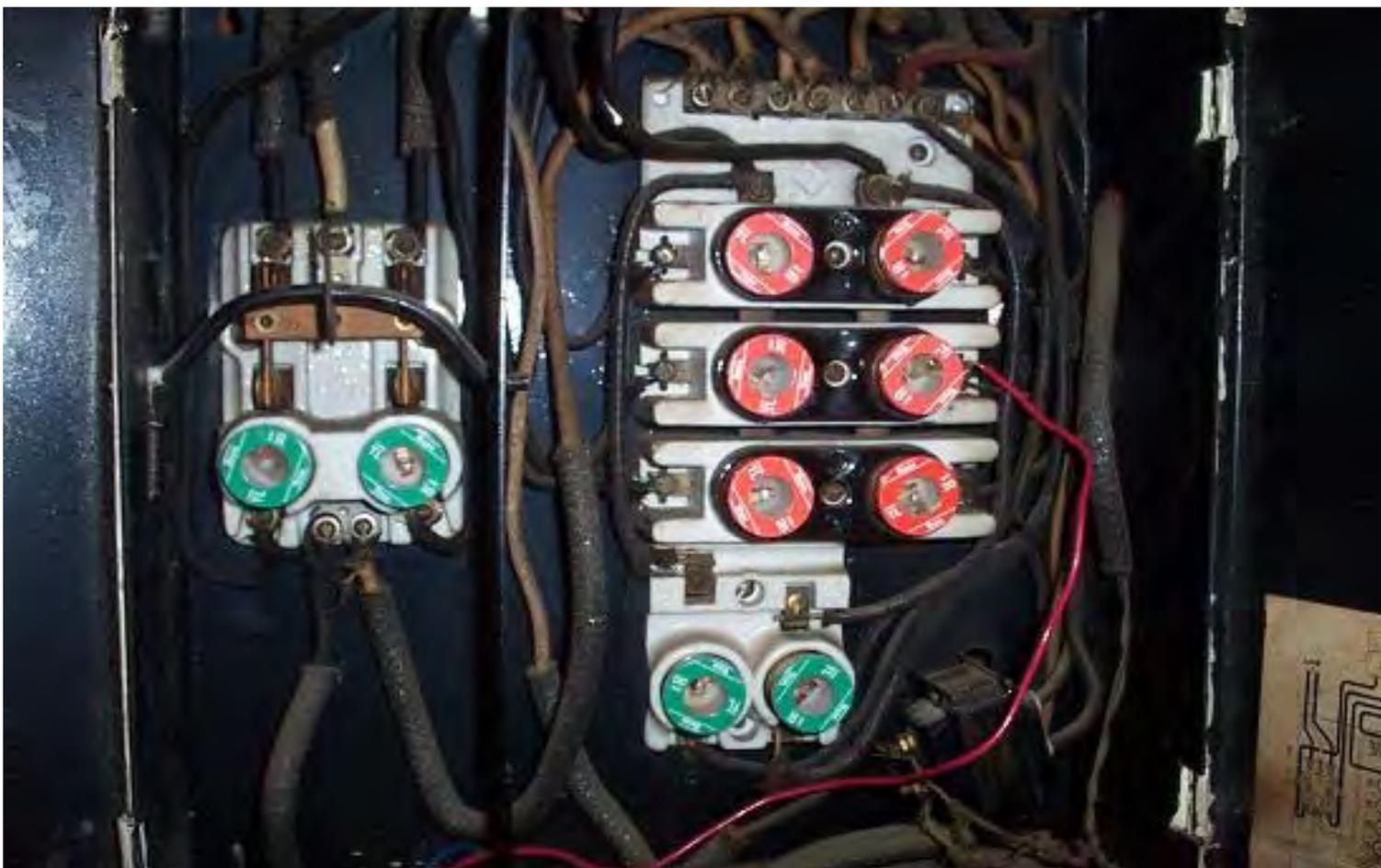


## *Forms of Functional Obsolescence*

- Need for modernization
  - Outdated electrical components
    - Old aluminum wiring
    - Fuse box
  - Narrow column spacing in a warehouse
  - Lead pipes
  - Brightly colored bathroom fixtures (1930's – 1970's)
  - “Shotgun” style houses



## Functional - Modernization





# Measuring Obsolescence

## *Functional - Modernization*





# Measuring Obsolescence

## Functional – Modernization





# Measuring Obsolescence

## *Functional – Modernization*





# Measuring Obsolescence

## *Functional - Modernization*





## *Forms of Functional Obsolescence*

- Superadequacy - A component of the property that exceeds market expectations, and where cost does not equal value.
  - Examples:
    - Sauna in an office building
    - Excessive building height
    - Twenty dock doors on a 10,000 square foot warehouse
    - Four car garage
    - Large custom-built home in a modest neighborhood



## Functional - Superadequacy





## Measuring Obsolescence

# Functional - Superadequacy





# Measuring Obsolescence

## Functional - Superadequacy





## Measuring Obsolescence

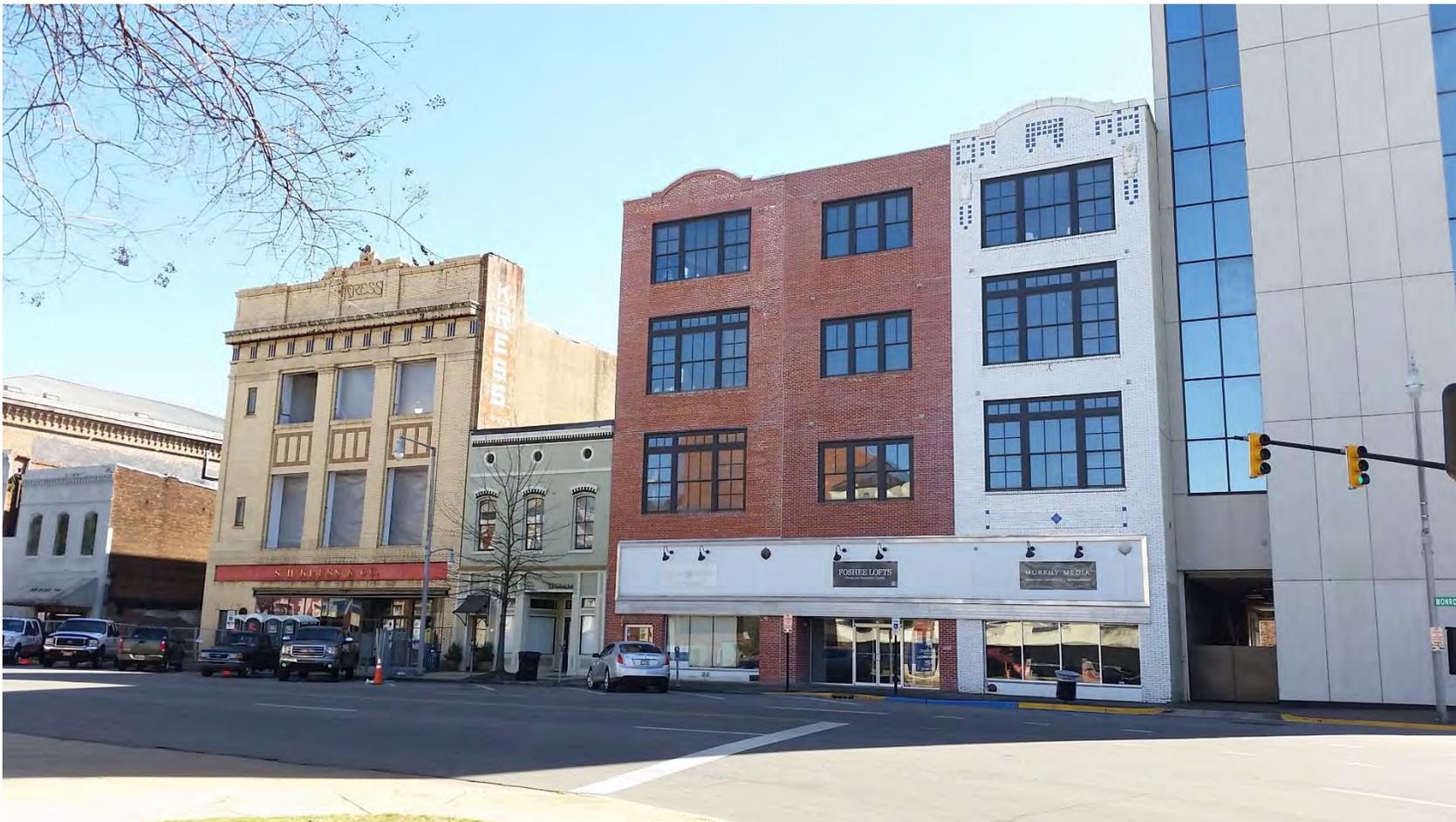
# Functional - Superadequacy





# Measuring Obsolescence

## Practical Application





## *The Process*

- Planning
- Field Review
- Sales Analysis
- Income Analysis
- Apply Obsolescence Factor



## *Planning*

- Identify the core historic downtown areas
- Divide the area into small sections for thorough review
- Prepare spreadsheets to capture and stratify field data.



## Field Review

- Exterior review
  - Corrections to sketches
  - Corrections to construction units
  - Height adjustments
    - Beware of the facade
    - Use technology
      - GIS (aerials & oblique aerials)
      - Laser measuring devices





## *Field Review*

- Interior inspections
  - Record materials by floor
    - **Reconcile units & assign based on total building area**
  - Update extra features
    - Plumbing Features
    - Heating & Cooling
    - Fire Suppression Systems
  - Correct use codes
  - Class properties consistently



# Measuring Obsolescence

## *Composite of Upper & Lower*



**Base Area**



**Upper Area**

**Int. Finish:**             $\frac{1}{4}$  Drywall,  $\frac{1}{4}$  Acoustic,  $\frac{1}{4}$  Plywood,  $\frac{1}{4}$  Unfinished  
**Floors:**                  $\frac{1}{2}$  Hardwood,  $\frac{1}{2}$  Double Pine  
**Heat & Cooling:**    3,000 Sq. Ft. FHA / AC, 3,000 Sq. Ft. Suspended Heat



## *Field Review*

- Estimate physical condition
  - Reasonable estimate of **physical percent good**
    - Unfinished areas will be accounted for through construction units
  - Total physical condition
    - Composite of interior & exterior
    - Composite of all floors
  - Equity is key



## *Sales Analysis*

- The true measure of depreciation is the effect on marketability and sales prices
- Sales can accurately measure depreciation levels
  - Keys to the analysis
    - Accurate land values
    - Correct property inventory
    - Sufficient sales data



## *Sales Analysis Case Study*

- Required Data
  - Sale information
  - Land value
  - Building area (base, upper, total living)
  - Replacement cost new
  - Condition



## Sales Analysis Case Study

- Initial Data Sort

Parcel Number	Sale Price	Land Value	Class	Yr Blt	Build Type	RCN	Base Area	UFA	Total Living Area	Obs Cond
15-02-04-4-000-181.001	\$124,000	\$41,600	D0	1914	500	\$292,000	5,779	0	5,779	45%
15-02-04-4-000-071.000	\$165,000	\$45,200	D0	1945	500	\$356,500	8,239	0	8,239	40%
15-02-04-4-000-170.000	\$130,000	\$22,800	D0	1920	500	\$262,400	5,693	0	5,693	50%
15-02-04-4-000-165.000	\$75,000	\$15,700	D0	1910	500	\$144,800	2,946	0	2,946	40%
15-02-04-4-000-072.000	\$97,000	\$14,500	D0	1930	500	\$150,800	2,619	0	2,619	55%
15-02-04-3-000-055.001	\$255,600	\$57,200	D0	1914	500	\$356,400	7,459	0	7,459	50%
15-02-04-4-000-181.000	\$85,000	\$9,600	D0	1914	500	\$131,200	2,461	0	2,461	60%
15-02-04-4-000-164.000	\$80,000	\$14,500	D0	1910	500	\$109,900	2,407	0	2,407	50%
15-02-04-4-000-179.000	\$184,600	\$23,600	D0	1922	500	\$206,200	4,240	0	4,240	35%
15-02-04-4-000-124.000	\$552,170	\$58,100	C0	1901	610	\$693,900	12,224	6,500	18,724	60%
15-02-04-4-000-135.000	\$250,000	\$52,500	C0	1910	500	\$871,500	12,400	7,600	20,000	45%
15-02-04-4-000-174.000	\$226,250	\$29,100	D0	1925	500	\$686,800	6,218	5,596	11,814	50%
15-02-04-4-000-130.000	\$219,600	\$53,200	D0	1959	610	\$947,800	10,126	10,250	20,376	60%
15-02-04-4-000-127.000	\$150,000	\$29,100	D0	1920	500	\$589,100	6,250	12,500	18,750	50%



## Sales Analysis Case Study

- Calculate: % UFA to Total Area (UFA / Total Living)

Parcel Number	Sale Price	Land Value	Class	Yr Blt	Build Type	RCN	Base Area	UFA	Total Living Area	% UFA to Total Area	Obs Cond
15-02-04-4-000-181.001	\$124,000	\$41,600	D0	1914	500	\$292,000	5,779	0	5,779	0%	45%
15-02-04-4-000-071.000	\$165,000	\$45,200	D0	1945	500	\$356,500	8,239	0	8,239	0%	40%
15-02-04-4-000-170.000	\$130,000	\$22,800	D0	1920	500	\$262,400	5,693	0	5,693	0%	50%
15-02-04-4-000-165.000	\$75,000	\$15,700	D0	1910	500	\$144,800	2,946	0	2,946	0%	40%
15-02-04-4-000-072.000	\$97,000	\$14,500	D0	1930	500	\$150,800	2,619	0	2,619	0%	55%
15-02-04-3-000-055.001	\$255,600	\$57,200	D0	1914	500	\$356,400	7,459	0	7,459	0%	50%
15-02-04-4-000-181.000	\$85,000	\$9,600	D0	1914	500	\$131,200	2,461	0	2,461	0%	60%
15-02-04-4-000-164.000	\$80,000	\$14,500	D0	1910	500	\$109,900	2,407	0	2,407	0%	50%
15-02-04-4-000-179.000	\$184,600	\$23,600	D0	1922	500	\$206,200	4,240	0	4,240	0%	35%
15-02-04-4-000-124.000	\$552,170	\$58,100	C0	1901	610	\$693,900	12,224	6,500	18,724	35%	60%
15-02-04-4-000-135.000	\$250,000	\$52,500	C0	1910	500	\$871,500	12,400	7,600	20,000	38%	45%
15-02-04-4-000-174.000	\$226,250	\$29,100	D0	1925	500	\$686,800	6,218	5,596	11,814	47%	50%
15-02-04-4-000-130.000	\$219,600	\$53,200	D0	1959	610	\$947,800	10,126	10,250	20,376	50%	60%
15-02-04-4-000-127.000	\$150,000	\$29,100	D0	1920	500	\$589,100	6,250	12,500	18,750	67%	50%



## Sales Analysis Case Study

- Calculate: Indicated Imp. Value (SP – LV)

Parcel Number	Sale Price	Land Value	Class	Yr Blt	Build Type	RCN	Base Area	UFA	Total Living Area	% UFA to Total Area	Indicated Imp Value	Obs Cond
15-02-04-4-000-181.001	\$124,000	\$41,600	D0	1914	500	\$292,000	5,779	0	5,779	0%	\$82,400	45%
15-02-04-4-000-071.000	\$165,000	\$45,200	D0	1945	500	\$356,500	8,239	0	8,239	0%	\$119,800	40%
15-02-04-4-000-170.000	\$130,000	\$22,800	D0	1920	500	\$262,400	5,693	0	5,693	0%	\$107,200	50%
15-02-04-4-000-165.000	\$75,000	\$15,700	D0	1910	500	\$144,800	2,946	0	2,946	0%	\$59,300	40%
15-02-04-4-000-072.000	\$97,000	\$14,500	D0	1930	500	\$150,800	2,619	0	2,619	0%	\$82,500	55%
15-02-04-3-000-055.001	\$255,600	\$57,200	D0	1914	500	\$356,400	7,459	0	7,459	0%	\$198,400	50%
15-02-04-4-000-181.000	\$85,000	\$9,600	D0	1914	500	\$131,200	2,461	0	2,461	0%	\$75,400	60%
15-02-04-4-000-164.000	\$80,000	\$14,500	D0	1910	500	\$109,900	2,407	0	2,407	0%	\$65,500	50%
15-02-04-4-000-179.000	\$184,600	\$23,600	D0	1922	500	\$206,200	4,240	0	4,240	0%	\$161,000	35%
15-02-04-4-000-124.000	\$552,170	\$58,100	C0	1901	610	\$693,900	12,224	6,500	18,724	35%	\$494,070	60%
15-02-04-4-000-135.000	\$250,000	\$52,500	C0	1910	500	\$871,500	12,400	7,600	20,000	38%	\$197,500	45%
15-02-04-4-000-174.000	\$226,250	\$29,100	D0	1925	500	\$686,800	6,218	5,596	11,814	47%	\$197,150	50%
15-02-04-4-000-130.000	\$219,600	\$53,200	D0	1959	610	\$947,800	10,126	10,250	20,376	50%	\$166,400	60%
15-02-04-4-000-127.000	\$150,000	\$29,100	D0	1920	500	\$589,100	6,250	12,500	18,750	67%	\$120,900	50%



## Sales Analysis Case Study

- Calculate: Ind. Pct. Good (Ind. Imp Value / RCN)

Parcel Number	Sale Price	Land Value	Class	Yr Blt	Build Type	RCN	Base Area	UFA	Total Living Area	% UFA to Total Area	Indicated Imp Value	Ind Pct Good	Obs Cond
15-02-04-4-000-181.001	\$124,000	\$41,600	D0	1914	500	\$292,000	5,779	0	5,779	0%	\$82,400	28%	45%
15-02-04-4-000-071.000	\$165,000	\$45,200	D0	1945	500	\$356,500	8,239	0	8,239	0%	\$119,800	34%	40%
15-02-04-4-000-170.000	\$130,000	\$22,800	D0	1920	500	\$262,400	5,693	0	5,693	0%	\$107,200	41%	50%
15-02-04-4-000-165.000	\$75,000	\$15,700	D0	1910	500	\$144,800	2,946	0	2,946	0%	\$59,300	41%	40%
15-02-04-4-000-072.000	\$97,000	\$14,500	D0	1930	500	\$150,800	2,619	0	2,619	0%	\$82,500	55%	55%
15-02-04-3-000-055.001	\$255,600	\$57,200	D0	1914	500	\$356,400	7,459	0	7,459	0%	\$198,400	56%	50%
15-02-04-4-000-181.000	\$85,000	\$9,600	D0	1914	500	\$131,200	2,461	0	2,461	0%	\$75,400	57%	60%
15-02-04-4-000-164.000	\$80,000	\$14,500	D0	1910	500	\$109,900	2,407	0	2,407	0%	\$65,500	60%	50%
15-02-04-4-000-179.000	\$184,600	\$23,600	D0	1922	500	\$206,200	4,240	0	4,240	0%	\$161,000	78%	35%
15-02-04-4-000-124.000	\$552,170	\$58,100	C0	1901	610	\$693,900	12,224	6,500	18,724	35%	\$494,070	71%	60%
15-02-04-4-000-135.000	\$250,000	\$52,500	C0	1910	500	\$871,500	12,400	7,600	20,000	38%	\$197,500	23%	45%
15-02-04-4-000-174.000	\$226,250	\$29,100	D0	1925	500	\$686,800	6,218	5,596	11,814	47%	\$197,150	29%	50%
15-02-04-4-000-130.000	\$219,600	\$53,200	D0	1959	610	\$947,800	10,126	10,250	20,376	50%	\$166,400	18%	60%
15-02-04-4-000-127.000	\$150,000	\$29,100	D0	1920	500	\$589,100	6,250	12,500	18,750	67%	\$120,900	21%	50%



## Sales Analysis Case Study

- Analyze: Indicated percent good by story height

Parcel Number	Base Area	UFA	Total Living Area	% UFA to Total Area	Indicated Imp Value	Ind Pct Good	Obs Cond
15-02-04-4-000-181.001	5,779	0	5,779	0%	\$82,400	28%	45%
15-02-04-4-000-071.000	8,239	0	8,239	0%	\$119,800	34%	40%
15-02-04-4-000-170.000	5,693	0	5,693	0%	\$107,200	41%	50%
15-02-04-4-000-165.000	2,946	0	2,946	0%	\$59,300	41%	40%
15-02-04-4-000-072.000	2,619	0	2,619	0%	\$82,500	55%	55%
15-02-04-3-000-055.001	7,459	0	7,459	0%	\$198,400	56%	50%
15-02-04-4-000-181.000	2,461	0	2,461	0%	\$75,400	57%	60%
15-02-04-4-000-164.000	2,407	0	2,407	0%	\$65,500	60%	50%
15-02-04-4-000-179.000	4,240	0	4,240	0%	\$161,000	78%	35%
15-02-04-4-000-124.000	12,224	6,500	18,724	35%	\$494,070	71%	60%
15-02-04-4-000-135.000	12,400	7,600	20,000	38%	\$197,500	23%	45%
15-02-04-4-000-174.000	6,218	5,596	11,814	47%	\$197,150	29%	50%
15-02-04-4-000-130.000	10,126	10,250	20,376	50%	\$166,400	18%	60%
15-02-04-4-000-127.000	6,250	12,500	18,750	67%	\$120,900	21%	50%

### Range of Observed Percent Good

#### All Samples

Median One Story	50%	50%
Average One Story	47%	50%
Median with Upper	50%	50%
Average with Upper	53%	50%
Difference bt One story & w/ Upper		0%

### Range of Indicated Percent Good from the Market

#### All Samples

Median One Story	55%	55%
Average One Story	50%	55%
Median with Upper	23%	23%
Average with Upper	32%	23%
Difference bt One story & w/ Upper		32%



## Sales Analysis Case Study

- Calculate: Indicated obsolescence for each sample

Parcel Number	Sale Price	Land Value	Class	Yr Blt	Build Type	RCN	Base Area	UFA	Total Living Area	% UFA to Total Area	Indicated Imp Value	Ind Pct Good	Obs Cond	Obsolescence (Ind Pct Good - Obs Cond)
15-02-04-4-000-181.001	\$124,000	\$41,600	D0	1914	500	\$292,000	5,779	0	5,779	0%	\$82,400	28%	45%	-17%
15-02-04-4-000-071.000	\$165,000	\$45,200	D0	1945	500	\$356,500	8,239	0	8,239	0%	\$119,800	34%	40%	-6%
15-02-04-4-000-170.000	\$130,000	\$22,800	D0	1920	500	\$262,400	5,693	0	5,693	0%	\$107,200	41%	50%	-9%
15-02-04-4-000-165.000	\$75,000	\$15,700	D0	1910	500	\$144,800	2,946	0	2,946	0%	\$59,300	41%	40%	1%
15-02-04-4-000-072.000	\$97,000	\$14,500	D0	1930	500	\$150,800	2,619	0	2,619	0%	\$82,500	55%	55%	0%
15-02-04-3-000-055.001	\$255,600	\$57,200	D0	1914	500	\$356,400	7,459	0	7,459	0%	\$198,400	56%	50%	6%
15-02-04-4-000-181.000	\$85,000	\$9,600	D0	1914	500	\$131,200	2,461	0	2,461	0%	\$75,400	57%	60%	-3%
15-02-04-4-000-164.000	\$80,000	\$14,500	D0	1910	500	\$109,900	2,407	0	2,407	0%	\$65,500	60%	50%	10%
15-02-04-4-000-179.000	\$184,600	\$23,600	D0	1922	500	\$206,200	4,240	0	4,240	0%	\$161,000	78%	35%	43%
15-02-04-4-000-124.000	\$552,170	\$58,100	C0	1901	610	\$693,900	12,224	6,500	18,724	35%	\$494,070	71%	60%	11%
15-02-04-4-000-135.000	\$250,000	\$52,500	C0	1910	500	\$871,500	12,400	7,600	20,000	38%	\$197,500	23%	45%	-22%
15-02-04-4-000-174.000	\$226,250	\$29,100	D0	1925	500	\$686,800	6,218	5,596	11,814	47%	\$197,150	29%	50%	-21%
15-02-04-4-000-130.000	\$219,600	\$53,200	D0	1959	610	\$947,800	10,126	10,250	20,376	50%	\$166,400	18%	60%	-42%
15-02-04-4-000-127.000	\$150,000	\$29,100	D0	1920	500	\$589,100	6,250	12,500	18,750	67%	\$120,900	21%	50%	-29%



## Sales Analysis Case Study

- Analyze: Indicated obsolescence by UFA

Parcel Number	Base Area	UFA	Total Living Area	% UFA to Total Area	Indicated Imp Value	Ind Pct Good	Obs Cond	Obsolescence (Ind Pct Good - Obs Cond)
15-02-04-4-000-181.001	5,779	0	5,779	0%	\$82,400	28%	45%	-17%
15-02-04-4-000-071.000	8,239	0	8,239	0%	\$119,800	34%	40%	-6%
15-02-04-4-000-170.000	5,693	0	5,693	0%	\$107,200	41%	50%	-9%
15-02-04-4-000-165.000	2,946	0	2,946	0%	\$59,300	41%	40%	1%
15-02-04-4-000-072.000	2,619	0	2,619	0%	\$82,500	55%	55%	0%
15-02-04-3-000-055.001	7,459	0	7,459	0%	\$198,400	56%	50%	6%
15-02-04-4-000-181.000	2,461	0	2,461	0%	\$75,400	57%	60%	-3%
15-02-04-4-000-164.000	2,407	0	2,407	0%	\$65,500	60%	50%	10%
15-02-04-4-000-179.000	4,240	0	4,240	0%	\$161,000	78%	35%	43%
15-02-04-4-000-124.000	12,224	6,500	18,724	35%	\$494,070	71%	60%	11%
15-02-04-4-000-135.000	12,400	7,600	20,000	38%	\$197,500	23%	45%	-22%
15-02-04-4-000-174.000	6,218	5,596	11,814	47%	\$197,150	29%	50%	-21%
15-02-04-4-000-130.000	10,126	10,250	20,376	50%	\$166,400	18%	60%	-42%
15-02-04-4-000-127.000	6,250	12,500	18,750	67%	\$120,900	21%	50%	-29%

**Indicated Obsolescence: Difference b/t Market Indicated Percent Good and Observed Condition**

All Samples

Median One Story	0%	0%
Average One Story	3%	0%
Median with Upper	-22%	-22%
Average with Upper	-21%	-22%
Difference bt One story & w/ Upper		22%



## Sales Analysis Case Study

- Reconcile the data & Determine Obsolescence Factor:

### Measured Obsolescence by Upper Floor Area

#### All Samples

Median One Story	0%	0%
Average One Story	3%	
Median with Upper	-22%	-22%
Average with Upper	-21%	
Difference bt One story & w/ Upper		22%

### Range of Indicated Percent Good from the Market

#### All Samples

Median One Story	55%	55%
Average One Story	50%	
Median with Upper	23%	23%
Average with Upper	32%	
Difference bt One story & w/ Upper		32%

**Selected Functional Obsolescence Factor: 22%**



## Sales Analysis Case Study

- Sales Ratio Before Obsolescence Factor Applied:

Parcel Number	Sale Price	Land Value	Class	Yr Bit	Build Type	RCN	Base Area	UFA	Total Living Area	% UFA to Total Area	Indicated Imp Value	Ind Pct Good	Obs Cond	Total Percent Good	Imp Value	Total Value	Ratio
15-02-04-4-000-181.001	\$124,000	\$41,600	D0	1914	500	\$292,000	5,779	0	5,779	0%	\$82,400	28%	45%	45%	\$131,400	\$173,000	139.52%
15-02-04-4-000-071.000	\$165,000	\$45,200	D0	1945	500	\$356,500	8,239	0	8,239	0%	\$119,800	34%	40%	40%	\$142,600	\$187,800	113.82%
15-02-04-4-000-170.000	\$130,000	\$22,800	D0	1920	500	\$262,400	5,693	0	5,693	0%	\$107,200	41%	50%	50%	\$131,200	\$154,000	118.46%
15-02-04-4-000-165.000	\$75,000	\$15,700	D0	1910	500	\$144,800	2,946	0	2,946	0%	\$59,300	41%	40%	40%	\$57,920	\$73,620	98.16%
15-02-04-4-000-072.000	\$97,000	\$14,500	D0	1930	500	\$150,800	2,619	0	2,619	0%	\$82,500	55%	55%	55%	\$82,940	\$97,440	100.45%
15-02-04-3-000-055.001	\$255,600	\$57,200	D0	1914	500	\$356,400	7,459	0	7,459	0%	\$198,400	56%	50%	50%	\$178,200	\$235,400	92.10%
15-02-04-4-000-181.000	\$85,000	\$9,600	D0	1914	500	\$131,200	2,461	0	2,461	0%	\$75,400	57%	60%	60%	\$78,720	\$88,320	103.91%
15-02-04-4-000-164.000	\$80,000	\$14,500	D0	1910	500	\$109,900	2,407	0	2,407	0%	\$65,500	60%	50%	50%	\$54,950	\$69,450	86.81%
15-02-04-4-000-179.000	\$184,600	\$23,600	D0	1922	500	\$206,200	4,240	0	4,240	0%	\$161,000	78%	35%	35%	\$72,170	\$95,770	51.88%
15-02-04-4-000-124.000	\$552,170	\$58,100	C0	1901	610	\$693,900	12,224	6,500	18,724	35%	\$494,070	71%	60%	60%	\$416,340	\$474,440	85.92%
15-02-04-4-000-135.000	\$250,000	\$52,500	C0	1910	500	\$871,500	12,400	7,600	20,000	38%	\$197,500	23%	45%	45%	\$392,175	\$444,675	177.87%
15-02-04-4-000-174.000	\$226,250	\$29,100	D0	1925	500	\$686,800	6,218	5,596	11,814	47%	\$197,150	29%	50%	50%	\$343,400	\$372,500	164.64%
15-02-04-4-000-130.000	\$219,600	\$53,200	D0	1959	610	\$947,800	10,126	10,250	20,376	50%	\$166,400	18%	60%	60%	\$568,680	\$621,880	283.19%
15-02-04-4-000-127.000	\$150,000	\$29,100	D0	1920	500	\$589,100	6,250	12,500	18,750	67%	\$120,900	21%	50%	50%	\$294,550	\$323,650	215.77%

Functional Obs Factor 0%

Median 108.86%  
COD 38.98%



## Sales Analysis Case Study

- Sales Ratio After Obsolescence Factor Applied:

Parcel Number	Sale Price	Land Value	Class	Yr Blt	Build Type	RCN	Base Area	UFA	Total Living Area	% UFA to Total Area	Indicated Imp Value	Ind Pct Good	Obs Cond	Total Percent Good	Imp Value	Total Value	Ratio
15-02-04-4-000-181.001	\$124,000	\$41,600	D0	1914	500	\$292,000	5,779	0	5,779	0%	\$82,400	28%	45%	45%	\$131,400	\$173,000	139.52%
15-02-04-4-000-071.000	\$165,000	\$45,200	D0	1945	500	\$356,500	8,239	0	8,239	0%	\$119,800	34%	40%	40%	\$142,600	\$187,800	113.82%
15-02-04-4-000-170.000	\$130,000	\$22,800	D0	1920	500	\$262,400	5,693	0	5,693	0%	\$107,200	41%	50%	50%	\$131,200	\$154,000	118.46%
15-02-04-4-000-165.000	\$75,000	\$15,700	D0	1910	500	\$144,800	2,946	0	2,946	0%	\$59,300	41%	40%	40%	\$57,920	\$73,620	98.16%
15-02-04-4-000-072.000	\$97,000	\$14,500	D0	1930	500	\$150,800	2,619	0	2,619	0%	\$82,500	55%	55%	55%	\$82,940	\$97,440	100.45%
15-02-04-3-000-055.001	\$255,600	\$57,200	D0	1914	500	\$356,400	7,459	0	7,459	0%	\$198,400	56%	50%	50%	\$178,200	\$235,400	92.10%
15-02-04-4-000-181.000	\$85,000	\$9,600	D0	1914	500	\$131,200	2,461	0	2,461	0%	\$75,400	57%	60%	60%	\$78,720	\$88,320	103.91%
15-02-04-4-000-164.000	\$80,000	\$14,500	D0	1910	500	\$109,900	2,407	0	2,407	0%	\$65,500	60%	50%	50%	\$54,950	\$69,450	86.81%
15-02-04-4-000-179.000	\$184,600	\$23,600	D0	1922	500	\$206,200	4,240	0	4,240	0%	\$161,000	78%	35%	35%	\$72,170	\$95,770	51.88%
15-02-04-4-000-124.000	\$552,170	\$58,100	C0	1901	610	\$693,900	12,224	6,500	18,724	35%	\$494,070	71%	60%	38%	\$263,682	\$321,782	58.28%
15-02-04-4-000-135.000	\$250,000	\$52,500	C0	1910	500	\$871,500	12,400	7,600	20,000	38%	\$197,500	23%	45%	23%	\$200,445	\$252,945	101.18%
15-02-04-4-000-174.000	\$226,250	\$29,100	D0	1925	500	\$686,800	6,218	5,596	11,814	47%	\$197,150	29%	50%	28%	\$192,304	\$221,404	97.86%
15-02-04-4-000-130.000	\$219,600	\$53,200	D0	1959	610	\$947,800	10,126	10,250	20,376	50%	\$166,400	18%	60%	38%	\$360,164	\$413,364	188.23%
15-02-04-4-000-127.000	\$150,000	\$29,100	D0	1920	500	\$589,100	6,250	12,500	18,750	67%	\$120,900	21%	50%	28%	\$164,948	\$194,048	129.37%
<b>Median</b>																<b>100.82%</b>	
<b>Functional Obs Factor -22%</b>																<b>COD</b>	<b>21.89%</b>



## *Income Analysis*

- Functional obsolescence is measured by rent loss due to the deficiency
- A survey of local market rents should indicate lower rents for obsolete properties
- Obsolescence is taken into account when developing the rental rate



## Obsolescence Reflected in Rental Rates

- Example:  $\$82 - \$57 = \$25$  then  $\$25 / \$82 = 30\%$





# *Testing via Income Analysis*

- Case Study:
  - Developed rental rates for one story, but no information available for buildings with upper floor
  - Tested the obsolescence factor that was derived from sales analysis in the income method
  - Factored rental rates by the indicated obsolescence factor for buildings with upper floor area



## Testing via Income Analysis

- Sales Ratio Before Obsolescence

Parcel Number	Base Area	UFA	Total Living Area	Market Rent	PGI	V&C	EGI	Expenses	NOI at Market	Value at Market Rent	Sale Price	New Sales Ratio
15-02-04-4-000-181.001	5,779	0	5,779	\$5.00	\$28,895	\$5,779	\$23,116	\$9,246	\$13,870	\$129,260.02	\$124,000	104.24%
15-02-04-4-000-071.000	8,239	0	8,239	\$4.50	\$37,076	\$7,415	\$29,660	\$11,864	\$17,796	\$165,854.99	\$165,000	100.52%
15-02-04-4-000-170.000	5,693	0	5,693	\$5.00	\$28,465	\$5,693	\$22,772	\$9,109	\$13,663	\$127,336.44	\$130,000	97.95%
15-02-04-4-000-165.000	2,946	0	2,946	\$8.00	\$23,568	\$4,714	\$18,854	\$7,542	\$11,313	\$105,430.01	\$75,000	140.57%
15-02-04-4-000-072.000	2,619	0	2,619	\$8.00	\$20,952	\$4,190	\$16,762	\$6,705	\$10,057	\$93,727.49	\$97,000	96.63%
15-02-04-3-000-055.001	7,459	0	7,459	\$5.00	\$37,295	\$7,459	\$29,836	\$11,934	\$17,902	\$166,836.91	\$255,600	65.27%
15-02-04-4-000-181.000	2,461	0	2,461	\$8.00	\$19,688	\$3,938	\$15,750	\$6,300	\$9,450	\$88,073.07	\$85,000	103.62%
15-02-04-4-000-164.000	2,407	0	2,407	\$8.00	\$19,256	\$3,851	\$15,405	\$6,162	\$9,243	\$86,140.54	\$80,000	107.68%
15-02-04-4-000-179.000	4,240	0	4,240	\$6.50	\$27,560	\$5,512	\$22,048	\$8,819	\$13,229	\$123,287.98	\$184,600	66.79%
15-02-04-4-000-124.000	12,224	6,500	18,724	<b>\$5.10</b>	\$95,492	\$19,098	\$76,394	\$30,558	\$45,836	\$427,179.42	\$552,170	77.36%
15-02-04-4-000-135.000	12,400	7,600	20,000	\$3.50	\$70,000	\$14,000	\$56,000	\$22,400	\$33,600	\$313,140.73	\$250,000	125.26%
15-02-04-4-000-174.000	6,218	5,596	11,814	\$4.00	\$47,256	\$9,451	\$37,805	\$15,122	\$22,683	\$211,396.83	\$226,250	93.44%
15-02-04-4-000-130.000	10,126	10,250	20,376	<b>\$4.20</b>	\$85,579	\$17,116	\$68,463	\$27,385	\$41,078	\$382,833.33	\$219,600	174.33%
15-02-04-4-000-127.000	6,250	12,500	18,750	\$3.50	\$65,625	\$13,125	\$52,500	\$21,000	\$31,500	\$293,569.43	\$150,000	195.71%
											<b>Median</b>	<b>102.07%</b>
											<b>COD</b>	<b>24.74%</b>



## Testing via Income Analysis

- Sales Ratio After Obsolescence

Parcel Number	Base Area	UFA	Total Living Area	Factored Market Rent	PGI	V&C	EGI	Expenses	NOI at Market	Value at Market Rent	Sale Price	New Sales Ratio
15-02-04-4-000-181.001	5,779	0	5,779	\$5.00	\$28,895	\$5,779	\$23,116	\$9,246	\$13,870	\$129,260.02	\$124,000	104.24%
15-02-04-4-000-071.000	8,239	0	8,239	\$4.50	\$37,076	\$7,415	\$29,660	\$11,864	\$17,796	\$165,854.99	\$165,000	100.52%
15-02-04-4-000-170.000	5,693	0	5,693	\$5.00	\$28,465	\$5,693	\$22,772	\$9,109	\$13,663	\$127,336.44	\$130,000	97.95%
15-02-04-4-000-165.000	2,946	0	2,946	\$8.00	\$23,568	\$4,714	\$18,854	\$7,542	\$11,313	\$105,430.01	\$75,000	140.57%
15-02-04-4-000-072.000	2,619	0	2,619	\$8.00	\$20,952	\$4,190	\$16,762	\$6,705	\$10,057	\$93,727.49	\$97,000	96.63%
15-02-04-3-000-055.001	7,459	0	7,459	\$5.00	\$37,295	\$7,459	\$29,836	\$11,934	\$17,902	\$166,836.91	\$255,600	65.27%
15-02-04-4-000-181.000	2,461	0	2,461	\$8.00	\$19,688	\$3,938	\$15,750	\$6,300	\$9,450	\$88,073.07	\$85,000	103.62%
15-02-04-4-000-164.000	2,407	0	2,407	\$8.00	\$19,256	\$3,851	\$15,405	\$6,162	\$9,243	\$86,140.54	\$80,000	107.68%
15-02-04-4-000-179.000	4,240	0	4,240	\$6.50	\$27,560	\$5,512	\$22,048	\$8,819	\$13,229	\$123,287.98	\$184,600	66.79%
15-02-04-4-000-124.000	12,224	6,500	18,724	<b>\$4.00</b>	\$74,896	\$14,979	\$59,917	\$23,967	\$35,950	\$335,042.68	\$552,170	60.68%
15-02-04-4-000-135.000	12,400	7,600	20,000	\$2.75	\$55,000	\$11,000	\$44,000	\$17,600	\$26,400	\$246,039.14	\$250,000	98.42%
15-02-04-4-000-174.000	6,218	5,596	11,814	\$3.10	\$36,623	\$7,325	\$29,299	\$11,719	\$17,579	\$163,832.54	\$226,250	72.41%
15-02-04-4-000-130.000	10,126	10,250	20,376	<b>\$3.30</b>	\$67,241	\$13,448	\$53,793	\$21,517	\$32,276	\$300,797.61	\$219,600	136.98%
15-02-04-4-000-127.000	6,250	12,500	18,750	\$2.75	\$51,563	\$10,313	\$41,250	\$16,500	\$24,750	\$230,661.70	\$150,000	153.77%
											<b>Median</b>	<b>99.47%</b>
											<b>COD</b>	<b>20.99%</b>

**22% Functional Obs. Factor**



## Conclusion

- “Although it may not always be necessary to distinguish and label different forms and causes of depreciation, it is essential to account for *all* depreciation. The depreciation estimate must be supported by current market data.” (IAAO, 1990, pg. 225-226)\*

\* The International Association of Assessing Officers. (1990). *Property Appraisal and Assessment Administration*. Chicago, IL: IAAO.