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# **Residential Revaluation Report**

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2013 Mass Appraisal of Region 11  
for 2014 Property Taxes

**Prepared For**  
**Steven J. Drew**  
**Thurston County Assessor**

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# TABLE of CONTENTS

page

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CERTIFICATE OF APPRAISAL .....	1
APPRAISAL TEAM .....	2
MASS APPRAISAL CONCLUSIONS .....	3
PREMISE OF THE APPRAISAL .....	4
Supporting Documents Used in the Mass Appraisal.....	4
CLIENT AND INTENDED USERS.....	4
ASSUMPTIONS AND LIMITING CONDITIONS.....	4
SPECIAL ASSUMPTIONS, LIMITING, AND HYPOTHETICAL CONDITIONS .....	5
JURISDICTIONAL EXCEPTION .....	5
PURPOSE AND INTENDED USE .....	6
TRUE AND FAIR VALUE .....	6
DATE OF APPRAISAL.....	6
PROPERTY RIGHTS APPRAISED.....	6
PERSONAL PROPERTY NOT INCLUDED IN THE APPRAISAL .....	6
MARKET AREA AND PROPERTIES APPRAISED .....	7
CITY AND NEIGHBORHOOD DESCRIPTION .....	7
ZONING.....	7
HIGHEST AND BEST USE .....	7
SCOPE OF THE APPRAISAL .....	8
REGION 11 MAP.....	9

<b>NEIGHBORHOOD MAP .....</b>	<b>10</b>
<b>RESIDENTIAL VALUATION PROCESS .....</b>	<b>14</b>
<b>COST APPROACH .....</b>	<b>15</b>
Land Model Specification .....	15
Land Model Calibration.....	15
Multiple Regression Analysis Assumptions.....	16
<b>VALIDATION OF REGION 11 LAND MODEL .....</b>	<b>16</b>
Normal Distribution of the Residual Errors.....	16
Constant Variance of the Residual Errors.....	17
Comparison of Predicted and Actual Sale Price per Sq. Ft.....	17
Region 11 Square Foot Rate Table .....	18
Region 11 Acre Rate Table .....	19
<b>BUILDING COST SPECIFICATION .....</b>	<b>20</b>
<b>2013 COST TABLE CALIBRATION .....</b>	<b>20</b>
Residential Structures .....	20
Detached Structures .....	22
Construction Cost Tables.....	23
<b>DEPRECIATION ANALYSIS .....</b>	<b>24</b>
Effective Age.....	24
Depreciation Rate Tables.....	24
Condition .....	25
Neighborhood Adjustment Model Specification.....	26
Neighborhood Adjustment Calibration.....	26
Neighborhood Adjustment Model Validation.....	27
Assessment Uniformity by Neighborhood .....	27
Assessment Uniformity by Quality Grade.....	28
Assessment Uniformity by Building Style .....	28
Assessment Uniformity by Year Built.....	29
Assessment Uniformity by Square Feet of Living Area .....	29
<b>RECONCILIATION AND CONCLUSION.....</b>	<b>30</b>
Summary of Inventory Statistics .....	30
<b>APPENDIX.....</b>	<b>31</b>
Neighborhood 06E2/08B2.....	31
Neighborhood 07E2.....	32
Neighborhood 10G2 .....	34
Neighborhood 11E1 .....	36
Neighborhood 11F1 .....	37
Neighborhood 14H1 .....	38
Neighborhood 16B1.....	39
Neighborhood 16F1 .....	39
Neighborhood 17C1.....	40
Neighborhood 17G1 .....	41
Neighborhood 19H1 .....	42

Neighborhood 21H2 .....42

**OVERALL SALES RATIO FOR REGION 11 .....43**

**MULTIPLE REGRESSION ANALYSIS ASSUMPTIONS.....44**

# Certificate of Appraisal

I certify that, to the best of my knowledge and belief:

- the statements of fact contained in this report are true and correct.
- the reported analyses, opinions, and conclusions are limited only by the reported assumptions and limiting conditions, and are my personal, impartial and unbiased professional analysis, opinions, and conclusions.
- I have no (or the specified) present or prospective interest in the property that is the subject of this report, and I have no (or the specified) personal interest with respect to the parties involved.
- I have no bias with respect to any property that is the subject of this report or to the parties involved with this assignment.
- my engagement in this assignment was not contingent upon developing or reporting predetermined results.
- my compensation for completing this assignment is not contingent upon the reporting of a predetermined value or direction in value that favors the cause of the client, the amount of the value opinion, the attainment of a stipulated result, or the occurrence of a subsequent event directly related to the intended use of this appraisal.
- my analyses, opinions, and conclusions were developed, and this report has been prepared, in conformity with *the Uniform Standards of Professional Appraisal Practice*.
- I have not personally inspected all of the property that is the subject of this report. Other appraisers involved in the review of property are listed on the following page.
- no one provided significant analytical assistance to the person(s) signing this certification.

Appraiser # 054, Appraisal Analyst \_\_\_\_ (signature on file) \_\_\_\_\_ Date \_\_\_\_\_

# Appraisal Team

Often teams of appraisers complete one or more parts of a mass appraisal. Major contributors to this appraisal project include the following:

Physical Inspection Team:                   006 - Residential Appraiser  
  028 - Senior Appraiser  
  029 - Senior Appraiser  
  030 - Senior Appraiser  
  037 - Senior Appraiser  
  042 - Senior Appraiser  
  050 - Senior Appraiser

Sales Validation:                               007 - Lead Appraiser  
  013 - Appraiser Analyst  
  035 - Appraiser Analyst  
  054 - Appraiser Analyst  
  056 - Appraiser Analyst

Analysis and Model Building:               054 - Appraiser Analyst

Final Review:                                   052 - Chief Deputy

# MASS APPRAISAL CONCLUSIONS

**Appraisal Date:** January 1, 2013

**Area Name / Number:** Region 11 and corresponding neighborhoods

**Physical Inspection:** Last inspected in 2009

## Summary of Neighborhood Adjustments, Sales Ratios, and Assessed Value Changes:

2014 Region 11 Summary Statistics															
Nbhd	Region Group	Land Factor	Bldg Factor	New	New	# Sales	Mean Ratio	Median Ratio	WMR	PRD	COD	Avg. \$	Med. \$	Avg. %	Med. %
				Land Adj.	Bldg Adj.							Change	Change	Change	Change
06E2/08B2	01	0.60	0.64	0.60	0.78	9	.947	.948	.917	1.032	.118	\$13,383	\$12,760	8.06%	9.09%
07E2	02	0.70	0.70	0.65	0.82	44	.959	.944	.946	1.014	.095	\$10,378	\$5,126	11.90%	2.89%
10G2	04	0.55	0.66	0.60	0.76	36	.975	.944	.957	1.019	.135	\$16,062	\$9,807	20.83%	7.08%
11E1	11	0.75	0.64	0.65	0.80	18	.918	.947	.916	1.002	.066	\$31,091	\$9,855	26.87%	4.45%
11F1	12	0.80	0.71	0.78	0.72	22	.960	.938	.948	1.012	.081	\$2,119	-\$9,011	9.50%	-5.24%
14H1	14	0.55	0.74	0.60	0.76	14	.937	.943	.881	1.064	.119	\$16,344	\$5,970	23.94%	9.08%
16B1	15	0.60	0.60	0.60	0.58	1	1.021	1.021	1.021	1.000	0.000	-\$9,238	-\$9,238	-7.80%	-7.80%
16F1	16	0.68	0.68	0.68	0.85	3	.936	.940	.931	1.005	.029	\$22,032	\$22,506	10.34%	10.68%
17C1	17	0.60	0.67	0.60	0.77	8	.910	.943	.879	1.035	.092	\$5,979	\$6,016	2.80%	3.07%
17G1	18	0.67	0.70	0.67	0.80	20	.952	.946	.928	1.027	.111	\$3,024	\$3,373	2.36%	3.11%
19H1	19	0.68	0.82	0.72	0.93	9	.949	.944	.925	1.026	.068	\$12,348	\$9,058	6.15%	4.88%
21H2	20	0.72	0.75	0.72	0.78	3	.956	.953	.958	.998	.085	-\$24,367	-\$7,357	-9.44%	-2.90%
<b>Overall</b>						<b>187</b>	<b>.953</b>	<b>.944</b>	<b>.933</b>	<b>1.021</b>	<b>.100</b>	<b>\$11,731</b>	<b>\$5,970</b>	<b>13.33%</b>	<b>4.07%</b>

**Sales used in Analysis:** Sales used in the analysis are validated following the guidelines laid out in the Sales Verification Procedure. Multi-parcel and multi-building sales are generally excluded as not being representative of this market area. Mobile home and condominium sales are also excluded from the analysis and valuation of standard single family residential construction. Mobile home and condominium sales are analyzed separately for the purpose of appraising these property types.

At the direction of the Washington State Department of Revenue, sales of bank and HUD owned property were considered in the analysis of the residential real estate market. Overall, these sales had a minimal effect, reducing assessed values an additional one or two percentage points county wide. However, because sales of repossessed property were not evenly distributed across the County, the effect of including them was more significant in some neighborhoods. The effect on values was greatest in neighborhoods where the percent of bank owned property sales was the largest.

**Number of Parcels in the Population:** The population of residential vacant land and standard single family residences within Region 11 equals approximately 11,000 parcels.

**Conclusion and Recommendation:** Since the values recommended in this report improve uniformity, assessment level, and equity, we recommend posting them for the 2014 Tax Roll.

# PREMISE OF THE APPRAISAL

## **Supporting Documents Used in the Mass Appraisal**

"A mass appraisal is the process of valuing a universe of properties as of a given date using standard methodology, employing common data, and allowing for statistical testing."<sup>1</sup>

A mass appraisal for ad valorem taxes is a complicated process involving large amounts of data, gathered and analyzed by teams of appraisers. We do not intend this document to be a self-contained documentation of the mass appraisal but to summarize our methods, data, and to guide the reader to other documents or files, upon which we relied. These documents may include the following:

- Individual property records maintained in a computer database
- Sales ratios and other statistical studies
- Market studies
- Model building documents
- Real estate sales database.
- Previous studies and reports filed in our office.
- Assessor's manuals for data collection analysis.
- Revaluation and sales verification manuals
- Property Tax Advisory Publications by the Washington State Dept. of Revenue.
- Title 84 RCW Property Tax Laws (Washington State Law)
- WAC 458 (Washington Administrative Code)

The Appraisal Standards Board of the Appraisal Foundation annually publishes the *Uniform Standards of Professional Appraisal Practice* (USPAP). These standards are written by appraisers to regulate their profession and are the minimum standards for the conduct of property appraisal in the United States. They cover real, personal, and business property. We rely upon these standards in the development and reporting of our assessed values.

## CLIENT AND INTENDED USERS

This report was prepared for Steven J. Drew, Thurston County Assessor. Other intended users include the County Board of Equalization and the State Board of Tax Appeals.

## ASSUMPTIONS AND LIMITING CONDITIONS

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<sup>1</sup> USPAP, Appraisal Standards Board of the Appraisal Foundation, p. 3

The Appraisal Report, of which this statement is a part, is expressly subject to the following conditions:

This revaluation is a mass appraisal assignment resulting in conclusions of market value. No one should rely on this study for any purpose other than administration and distribution of ad valorem taxation. The opinion of value on any parcel may not be applicable for any use other than ad valorem taxation.

That the maps and drawings in this report are included to assist the reader in visualizing the property; however, no responsibility is assumed as to their exactness.

That the legal description as given is assumed correct. No survey or search of title of the property has been made for this report, and no responsibility for legal matters is assumed.

The report assumes good merchantable title and any liens or encumbrances that may exist have been disregarded.

The opinions and values shown in the report apply to the subject parcels only. The assessors made no attempt to relate the conclusions of this report to any other revaluations, past, present, or future.

The assumptions governing the use of multiple linear regression analysis have been met unless otherwise stated.

Unless otherwise stated in this report, the existence of hazardous substances, including without limitation asbestos, polychlorinated biphenyl, petroleum leakage, or agricultural chemicals, which may or may not be present on the property, or other environmental conditions, were not called to the attention of nor did the appraiser become aware of such during the appraiser's inspection. The appraiser has no knowledge of the existence of such materials on or in the property unless otherwise stated. The appraiser, however, is not qualified to test such substances or conditions. If the presence of such substances, such as asbestos, urea formaldehyde foam insulation, or other hazardous substances or environmental conditions, may affect the value of the property, the value estimates is predicated on the assumption that there is no such condition on or in the property or in such proximity thereto that it would cause a loss in value. No responsibility is assumed for any such conditions, not for any expertise or engineering knowledge required to discover them.

## SPECIAL ASSUMPTIONS, LIMITING, AND HYPOTHETICAL CONDITIONS

We assume that none of the subject land is contaminated or that any contamination would affect the value except as shown in individual property records or otherwise stated.

Because of budget restraints, we have not inspected all comparable sales. We have inspected the interiors of only a small percentage of the properties.

## JURISDICTIONAL EXCEPTION

Washington exempts all or a portion of the market value on specific types of property including "open space," agricultural, forest, home improvement, and some low-income housing.

## PURPOSE AND INTENDED USE

The intended use of this appraisal is for administration of ad valorem taxation. After certification by the Assessor, these values will be used as the basis for assessment of real estate taxes payable in 2014. We do not intend the values to be used for or relied upon for any other purpose.

This report serves as a record of the revaluation which is subject to review and change by the County Board of Equalization, the Washington State Board of Tax Appeals, and the courts.

## True and Fair Value

The basis of all assessments is the true and fair value of property. True and fair value means market value (Spokane etc. R. Company v. Spokane County, 75 Wash. 72 (1913); Mason County, 62 Wn. 2d (1963); AGO 57-58, No. 1/8/57; AGO 65-66, No. 65, 12/31/65)

The true and fair value of a property in money for property tax valuation purposes is its "market value" or amount of money a buyer willing but not obligated to buy would pay for it to a seller willing but not obligated to sell. In arriving at a determination of such value, the assessing officer can consider only those factors which can within reason be said to affect the price in negotiations between a willing purchaser and a willing seller, and he must consider all of such factors. (AGO 65,66, No. 65, 12/31/65)

## Date of Appraisal

Properties are appraised as of January 1, 2013.

This report was completed May 15, 2013.

## Property Rights Appraised

This appraisal is of the fee simple interest in the real property. The fee simple estate is the absolute ownership unencumbered by any other interest or estate, subject only to the limitations imposed by the governmental powers of taxation, eminent domain, police power, and escheat.<sup>2</sup>

## Personal Property Not Included in the Appraisal

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<sup>2</sup> *The Dictionary of Real Estate Appraisal. 3d ed. Appraisal Institute, p.140*

No personal property was included in the value. Fixtures are generally accepted as real property. Business value is intangible personal property and it is not appraised.

## Market Area and Properties Appraised

The subject of this mass appraisal is the residential property (excluding mobile homes and condominiums) contained in the market area designated as Region 11. Regions are generally influenced by the same broad market trends. This area includes approximately 11,000 properties and is shown on the map on page 9 of this report.

Our property records contain photographs, sketches, legal descriptions and other characteristics of land and buildings on each property.

## City and Neighborhood Description

Region 11 includes Grays Harbor County to the west, Johnson Creek Road to the east, Maytown Road to the north and Lewis County to the south. This region is further broken into 13 residential neighborhoods that are designed to reflect similar land and building characteristics and neighborhood amenities. The neighborhoods and their codes are shown on pages 10 - 13. They are all considered to be stable in terms of the life cycle of a neighborhood.

## Zoning

The cities of Rochester, Tenino, Bucoda and Thurston County exercise jurisdiction over land use and community planning. The regulations for use and development can be found in its ordinances. We show property zoning as a land characteristic on our digital maps.

## Highest and Best Use

**True and fair value -- Highest and best use.** Unless specifically provided otherwise by statute, all property shall be valued on the basis of its highest and best use for assessment purposes. Highest and best use is the most profitable, likely use to which a property can be put. It is the use which will yield the highest return on the owner's investment. Any reasonable use to which the property may be put may be taken into consideration and if it is peculiarly adapted to some particular use, that fact may be taken into consideration. Uses that are within the realm of possibility, but not reasonably probable of occurrence, shall not be considered in valuing property at its highest and best use. [WAC 458-07-30 (3)]

The highest and best use concept is based upon traditional appraisal theory and reflects the attitudes of typical buyers and sellers. The market sets the highest and best use based on the theory of wealth maximization for the owner with consideration given to community goals.

To estimate highest and best use, four elements are considered:

1. Possible use. What uses of the site in question are physically possible?
2. Permissible legal use. What uses of the site are permitted by zoning and deed restrictions?
3. Feasible use. Which possible and permissible uses will produce a net return to the owner of the site?
4. Highest and best use. Among the feasible uses, the use which will produce the highest net return or the highest present worth?

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 is true when the improvement is not an appropriate use, but it contributes to the total property value.

For the purpose of this appraisal the highest and best use of all vacant and improved property is considered to be single family residential or related to a single family use.

## Scope of the Appraisal

Under state law, the assessor receives a copy of each Real Estate Excise Tax Affidavit and is therefore privy to the sale price, date, and description of all real estate sales. Our staff compiles and verifies this data into our sales database as explained in our sales verification procedure.

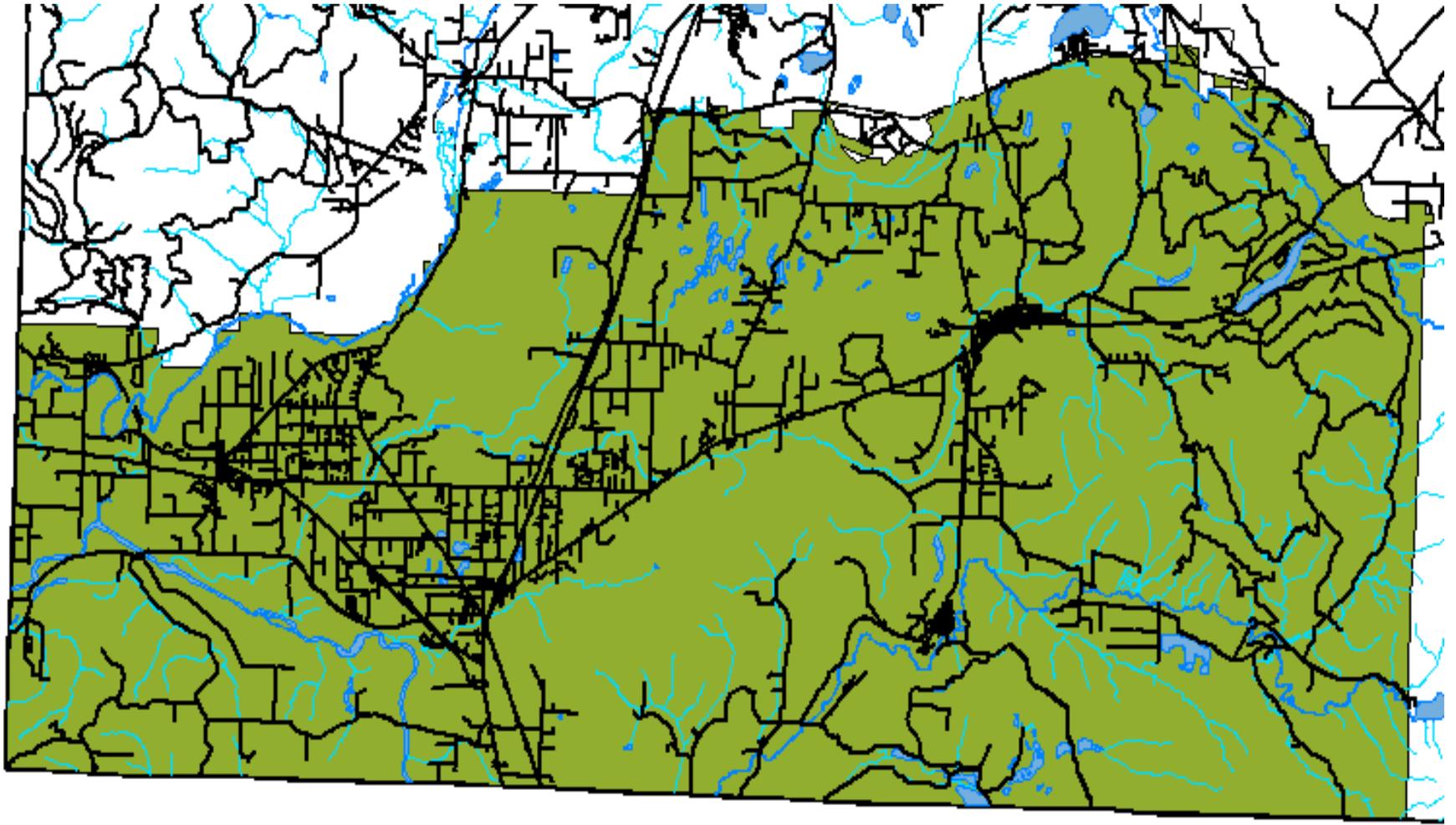
Thurston County is on a six-year revaluation cycle. Every property is revalued annually. At least once each six years, each property is inspected and its data refreshed. The assessor collects property characteristic data as discussed in our Residential Data Standards Manual. Other than new construction, the last physical inspection of residential property in Region 11 was during the first half of 2009. A region map is included on next page followed by a map of the neighborhoods within the region.

The appraisal considers the cost approaches to value with sales used to calibrate the model to a specific neighborhood. Neighborhood adjustments are widely used to adjust for time and location and are a normal and standard part of the cost approach to value. The Marshall Swift cost manual provides what they call current cost multipliers and local area multipliers to adjust for time and location. Because this is a national valuation service, we fine tune their cost rates even further to consider differences between neighborhoods and local market trends. Whether we make these adjustments to the raw land and cost rates or to the preliminary cost values, does not impact the mathematical calculation and does not affect the final result. It is more convenient to apply the time and location adjustments to the preliminary cost values, because it makes the statistical updating of values from year to year much easier.

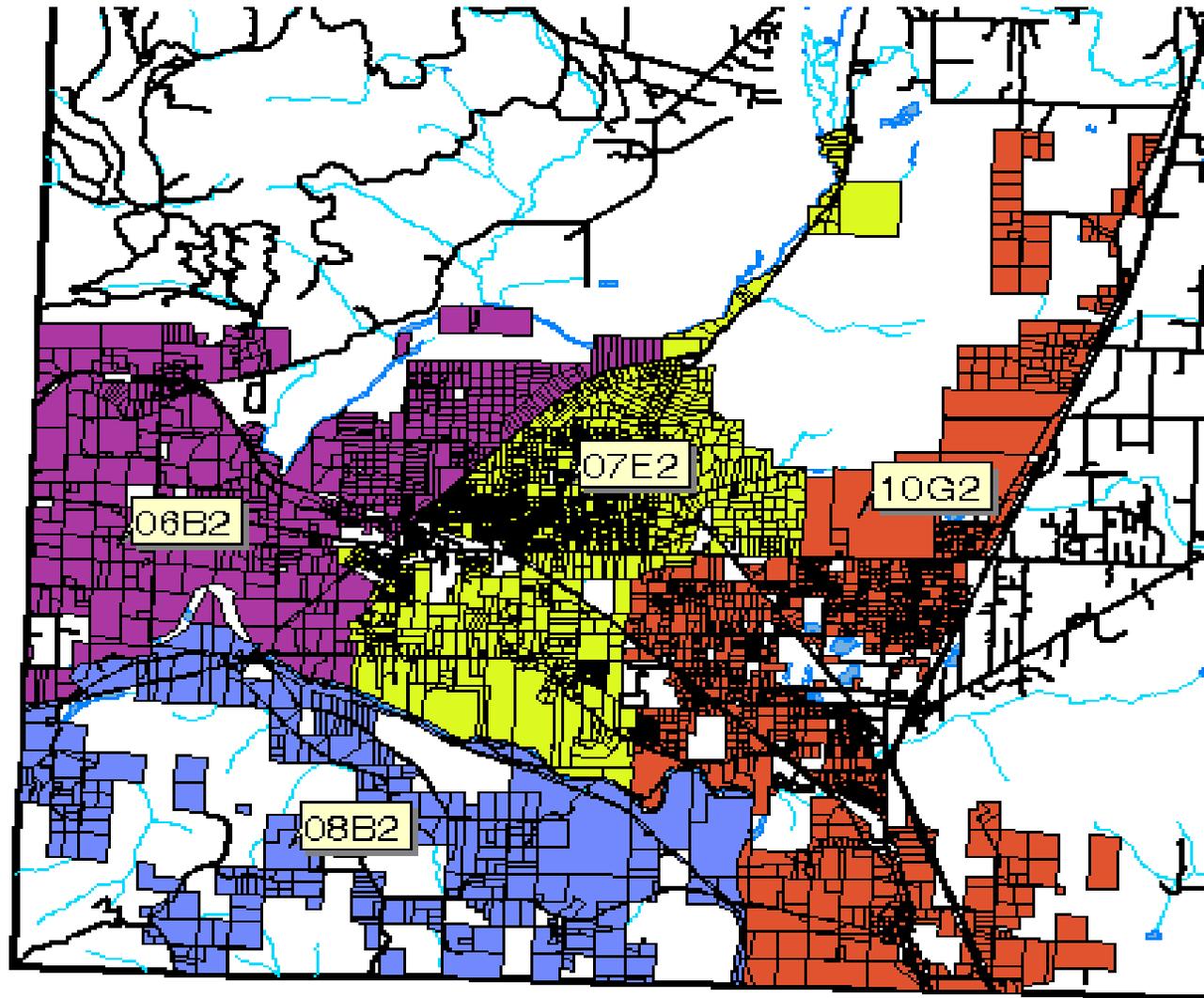
A market model (strict sales approach) has not been developed for 2013 due to time and budget limitations. The use of an income approach was not considered to be applicable because homes in this area are not typically purchased for their income potential.

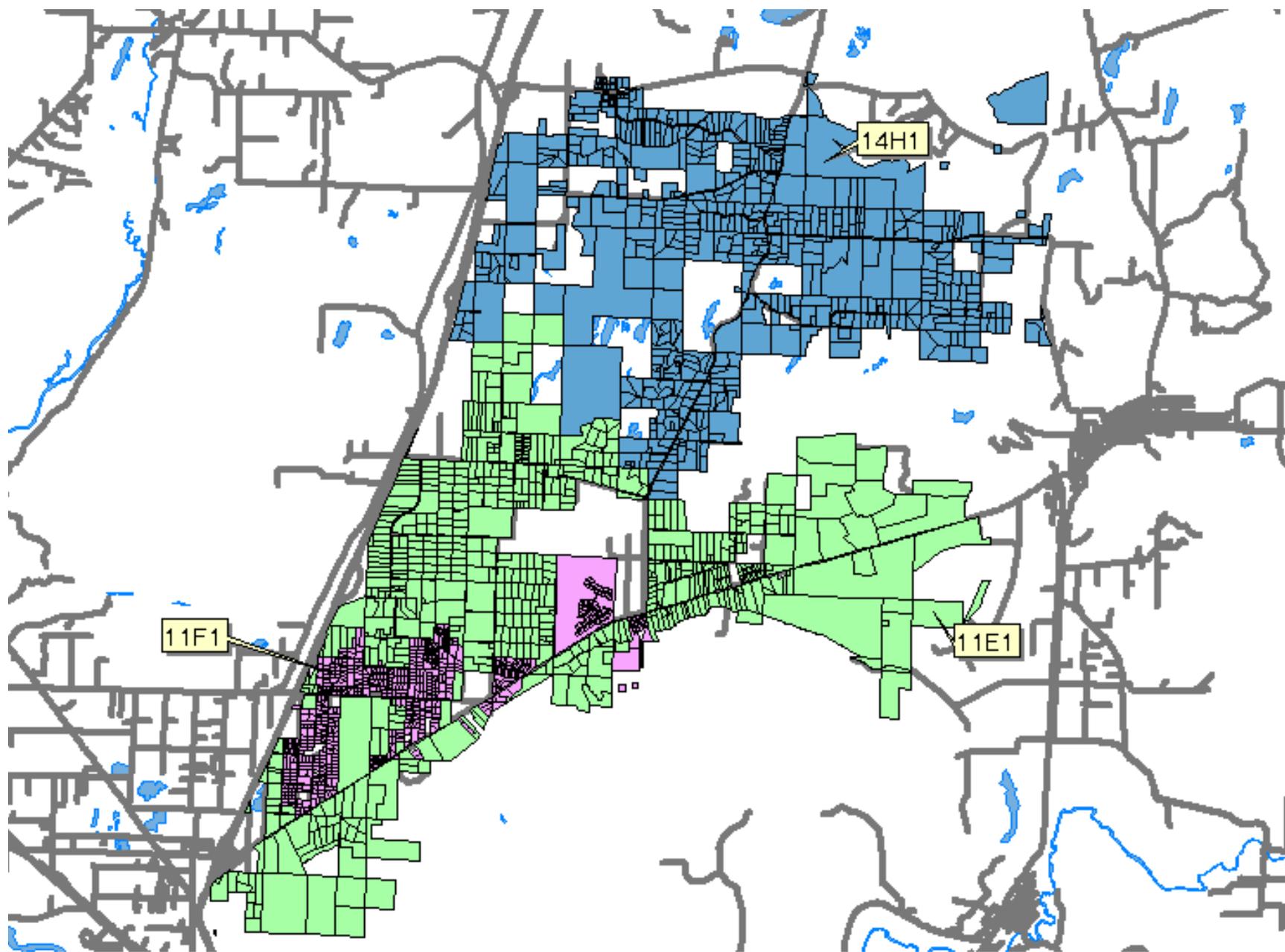
The flow chart on page 15 describes the land model developed as part of the mass appraisal process and how it is used in the sales adjusted cost approach. The model is discussed in more detail starting on page 16.

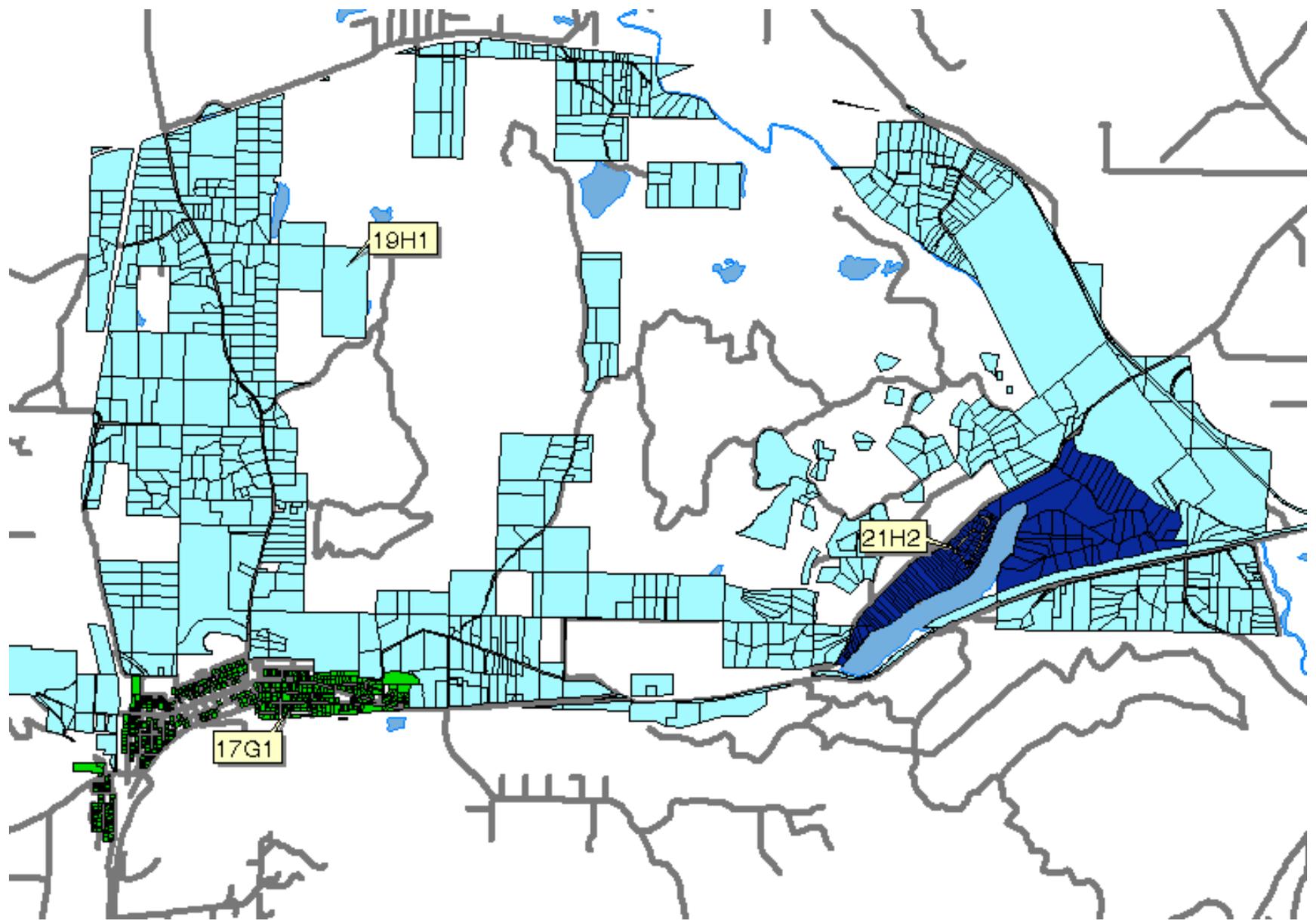
# REGION 11 MAP

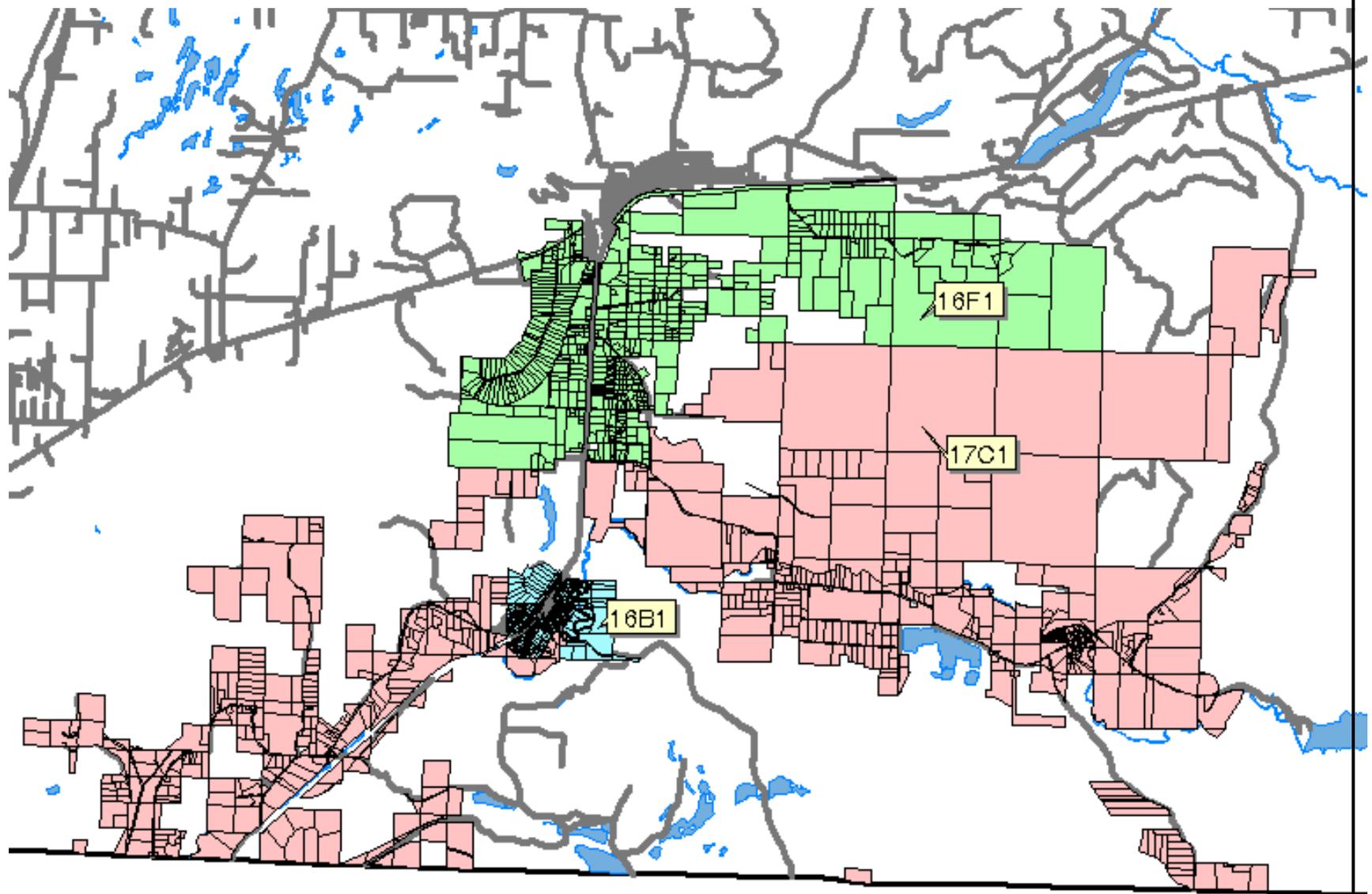


# Neighborhood Map



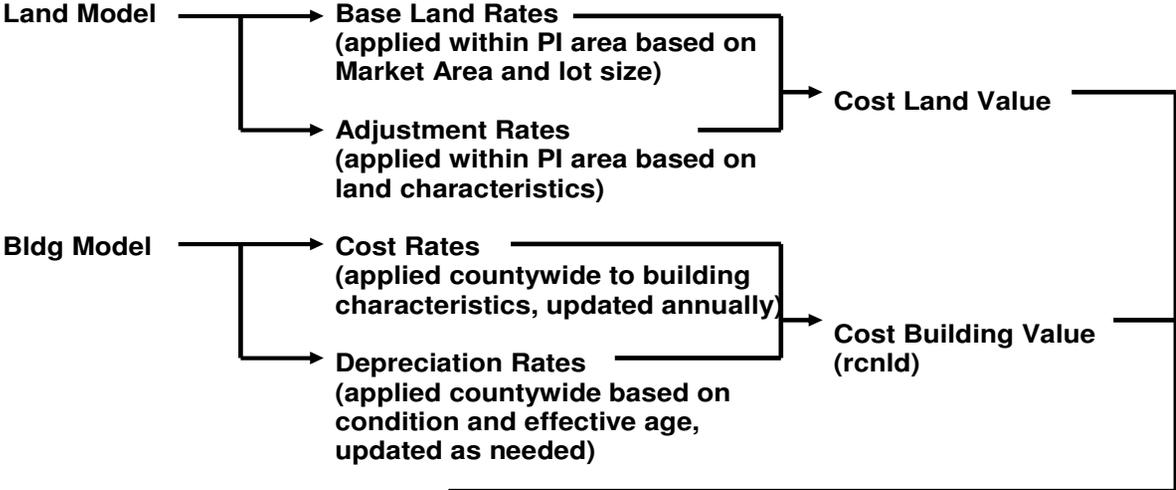




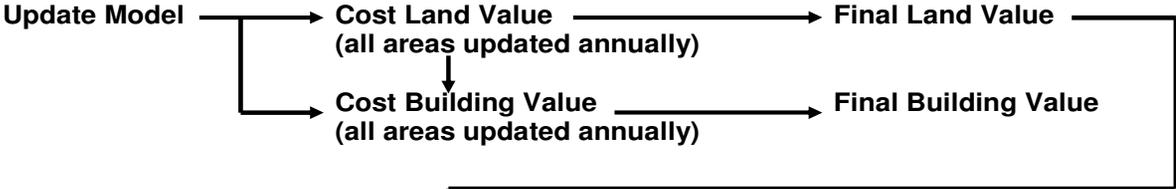


# RESIDENTIAL VALUATION PROCESS

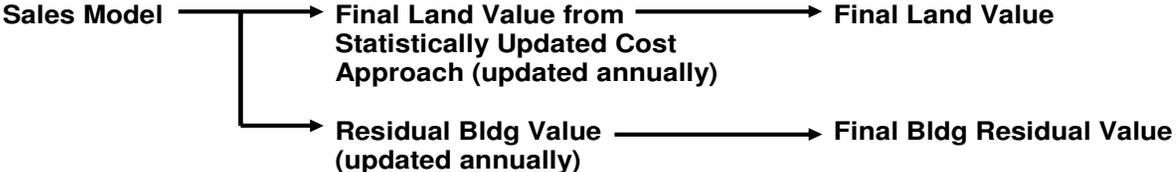
**Cost Approach**



**Statistical Update of Cost Approach by Nbhd**



**Sales Approach**



# COST APPROACH

## Land Model Specification

- A multiplicative model format is used in the development of base land rates and adjustment rates.
- Land Model Format:

$$LV = b_0 \times SQFT^{b_1} \times LINVIEW^{b_2} \times b_3^{LI3} \times b_4^{LI4} \times b_5^{LI5} \times \dots$$

Where: Continuous Variables = SQFT, LINVIEW

Binary Variables LI3, LI4, LI5 . . . = Land Influences (i.e. – region, view, wetlands, etc.)

$b_0, b_1, b_2, b_3, b_4, b_5 \dots$  = Regression Coefficients

## Land Model Calibration

- Multiplicative model calibrated using log-linear MRA
- Logarithms are used to convert a multiplicative equation to a linear form.

Standard Multiplicative form:  $SP/SQFT = a * SQFT^b * c^{NBHD} * \dots$

Log Linear form:  $LN(SP/SQFT) = LN(a) + (b * LN(SQFT)) + (LN(c) * NBHD) + \dots$

- Log Linear form has the same form as a standard linear equation:

Linear equation:  $Y = a + (b * X) + (c * Z)$

- We can then calibrate the Log-Linear form using standard multiple regression analysis.
- The calibrated model is then converted back to its Standard Multiplicative form by applying the anti-log function.

$EXP[LN(SP/SQFT)] = EXP[LN(a) + (b * LN(SQFT))]$

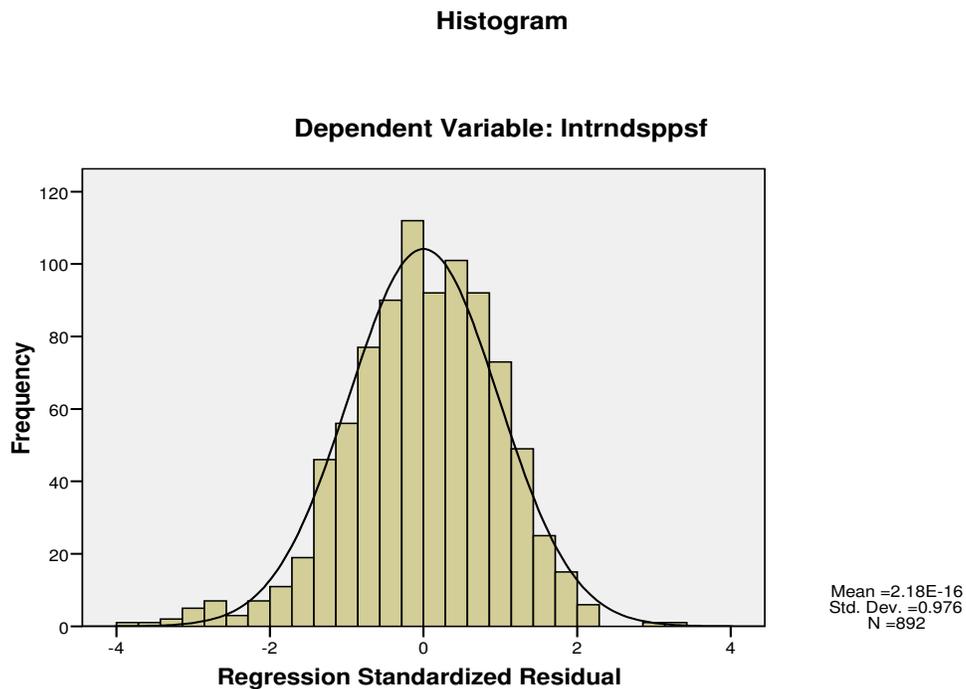
- **Region 11 Land Model** – see Region 11 work files for model coefficients and other output.

## Multiple Regression Analysis Assumptions

Multiple regression analysis is based on several assumptions regarding the data going into the model and the output from the calibration process. These assumptions are validated to determine the accuracy of the model and identify any limitations that may exist. A detailed discussion of the MRA assumptions is included in the Appendix.

## Validation of Region 11 Land Model

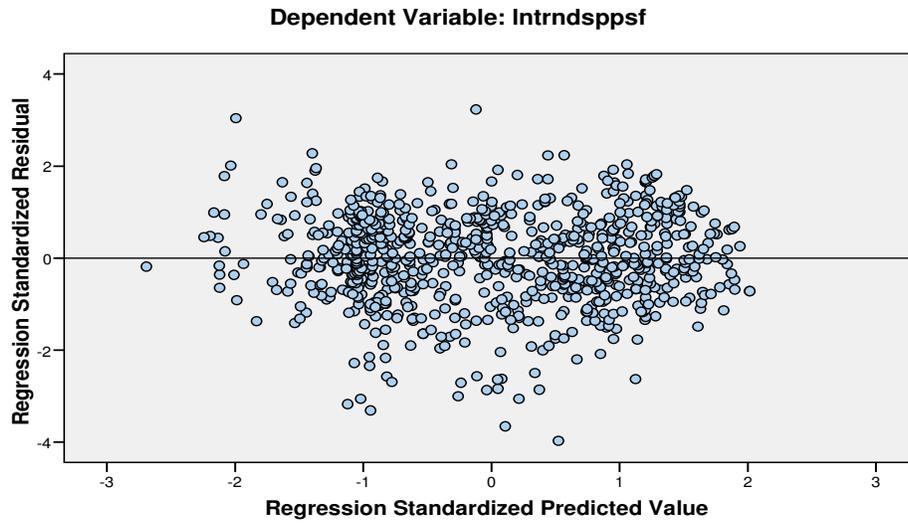
### Normal Distribution of the Residual Errors



- Total number of land sales = 892 (from 1/1/06 – 12/31/08 trended to 1/1/09)
- Region 11 land sales = 164
- The residual errors are for the most part normally distributed.
- While the frequency distribution illustrates output from the square foot land model, similar results were obtained for the acreage model.

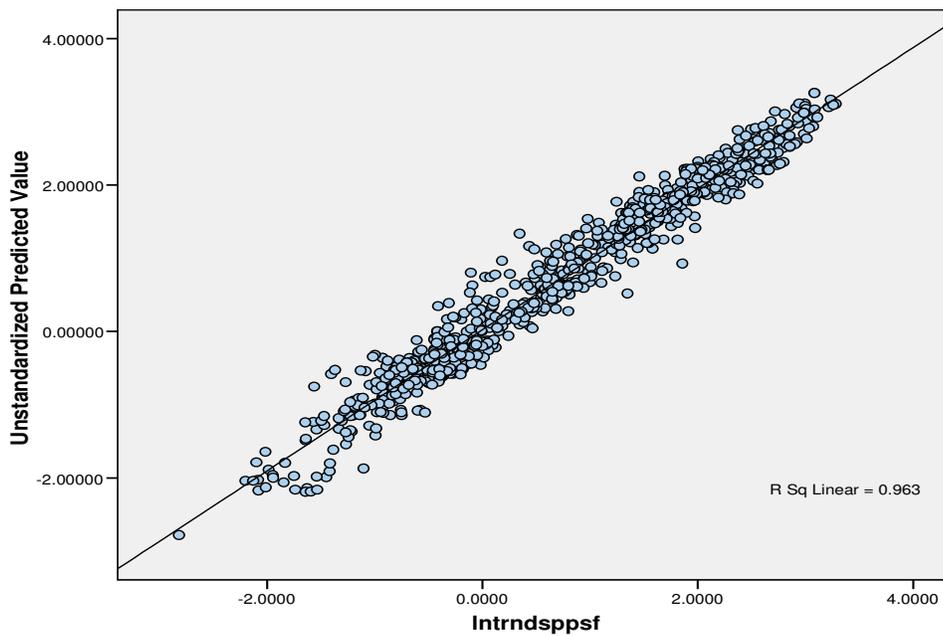
## Constant Variance of the Residual Errors

Scatterplot



- The residual errors are for the most part are distributed evenly along the range of values.
- Similar results were obtained for the acreage model.

## Comparison of Predicted and Actual Sale Price per Sq. Ft.



- The values predicted by the model accurately reflects actual trended sale prices.
- Similar results were obtained for the acreage model.

## Region 11 Square Foot Rate Table

	<u>Land Flag</u>	<u>Square Feet</u>	<u>Square Foot Value</u>	<u>Base Rate</u>	<u>Rate Group</u>	<u>S.F. Adj. Group</u>	<u>Size Adj. Ratio</u>	<u>S.F. Adj. Factor</u>
	1100	2,000	\$16.18	\$2.84	3711	711	0.092	5.697
	1100	2,500	\$13.75	\$2.84	3711	711	0.115	4.842
	1100	3,000	\$12.04	\$2.84	3711	711	0.138	4.240
	1100	3,500	\$10.76	\$2.84	3711	711	0.161	3.789
	1100	4,000	\$9.76	\$2.84	3711	711	0.184	3.438
	1100	4,500	\$8.96	\$2.84	3711	711	0.207	3.155
	1100	5,000	\$8.30	\$2.84	3711	711	0.230	2.922
	1100	5,500	\$7.74	\$2.84	3711	711	0.253	2.726
	1100	6,000	\$7.27	\$2.84	3711	711	0.275	2.559
	1100	6,500	\$6.85	\$2.84	3711	711	0.298	2.414
	1100	7,000	\$6.49	\$2.84	3711	711	0.321	2.287
	1100	7,500	\$6.18	\$2.84	3711	711	0.344	2.175
	1100	8,000	\$5.89	\$2.84	3711	711	0.367	2.075
	1100	9,000	\$5.41	\$2.84	3711	711	0.413	1.904
	1100	10,000	\$5.01	\$2.84	3711	711	0.459	1.763
	1100	12,000	\$4.39	\$2.84	3711	711	0.551	1.544
	1100	14,000	\$3.92	\$2.84	3711	711	0.643	1.380
	1100	16,000	\$3.56	\$2.84	3711	711	0.735	1.252
	1100	18,000	\$3.26	\$2.84	3711	711	0.826	1.149
base size>	1100	21,780	\$2.84	\$2.84	3711	711	1.000	1.000
	1100	24,000	\$2.65	\$2.84	3711	711	1.102	0.932
	1100	27,000	\$2.43	\$2.84	3711	711	1.240	0.855
	1100	30,000	\$2.25	\$2.84	3711	711	1.377	0.792
	1100	35,000	\$2.01	\$2.84	3711	711	1.607	0.708
	1100	40,000	\$1.82	\$2.84	3711	711	1.837	0.642
	1100	43,560	\$1.71	\$2.84	3711	711	2.000	0.603
	1100	50,000	\$1.55	\$2.84	3711	711	2.296	0.546
	1100	55,000	\$1.45	\$2.84	3711	711	2.525	0.509
	1100	65,000	\$1.28	\$2.84	3711	711	2.984	0.451
	1100	75,000	\$1.15	\$2.84	3711	711	3.444	0.406
	1100	87,120	\$1.03	\$2.84	3711	711	4.000	0.364

### Land Influence Adjustments

<b>Variable:</b>	<u>Easement</u>	<u>Fair Nbhd</u>	<u>Good Nbhd</u>	<u>Shape</u>	<u>Steep</u>	<u>Restricted</u>	<u>No Road</u>	<u>Dirt Road</u>	<u>Gravel Road</u>
<b>Multiplier:</b>	0.50 - 0.95	0.80	1.25	0.85	0.30 - 0.85	0.50 - 0.85	0.50 - 0.85	0.85 - 0.90	0.90 - 0.95
<b>Variable:</b>	<u>Golf Course</u>	<u>Golf Com.</u>	<u>Avg Lake</u>	<u>&lt;Avg Lake</u>	<u>20% Wet</u>	<u>40% Wet</u>	<u>60% Wet</u>	<u>80% Wet</u>	<u>100% Wet</u>
<b>Multiplier:</b>	1.15	1.05	2.50	1.50	0.90	0.70	0.55	0.45	0.30
<b>Variable:</b>	<u>Economic</u>	<u>Prelim Plat</u>	<u>High Traffic</u>	<u>Med Traffic</u>	<u>Unblidable</u>	<u>Timber</u>			
<b>Multiplier:</b>	0.75 - 0.95	2.00 - 4.00	0.85	0.95	0.30	1.20			
<b>Variable:</b>	<u>No View</u>	<u>Limited View</u>	<u>Good View</u>	<u>VGd View</u>	<u>Exc View</u>				
<b>Multiplier:</b>	1.00	1.05	1.12	1.20	1.30				



# Building Cost Specification

- **Model Format for RCNLD:**

$$BV = [(c_1 \times Q_1) + (c_2 \times Q_2) + (c_3 \times Q_3) + \dots] \times \text{Pct. Good}$$

Where: Building Components =  $Q_1, Q_2, Q_3 \dots$

Costs per unit =  $c_1, c_2, c_3 \dots$

## 2013 Cost Table Calibration

Thurston County uses construction cost data from Marshall & Swift as the basis for our cost approach. While these rates include local area and current cost multipliers to produce a cost estimate that is more tailored to our market area, they do not produce the level of accuracy that is needed in the appraisal process. One way to calibrate the cost tables to the local market, is to use actual construction costs obtained from local builders to compare to the replacement cost new calculated from the Marshall & Swift rates. Another alternative is to use sales of new construction to measure the actual cost new to compare to the RCN calculated from M&S. For residential property both methods were used to calculate a calibration factor. For commercial structures and detached structures there were no actual sales of new construction. For these structure types builder cost estimates were obtained and used to determine cost table calibration factor.

### Residential Structures

- **Procedure**

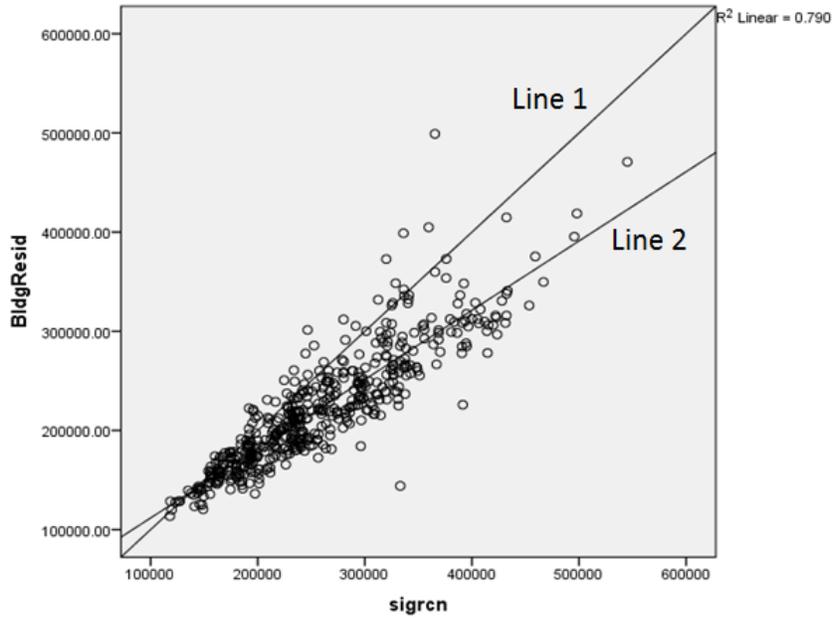
For the 2013 assessment local builders were contacted and asked to share confidential cost data on current or recent construction. Over 60 builders were called, but in the end only two builders followed through with providing their cost breakdown sheets for recent construction. The actual cost that they provided was compared to the RCN produced by the Marshall Swift costs that had been loaded into our CAMA cost tables.

One builder of tract homes supplied costs that produced a factor 0.87 when compared to the M&S cost tables. Another builder of custom homes provided actual costs that produced a calibration factor of 0.98. It is not surprising that custom construction is higher than tract home construction. The profit margin for the custom home builder was higher, and sales tax was paid on the construction material instead of an excise tax on the sale price. Additionally, the custom home was built in an area with the highest impact fees in the county.

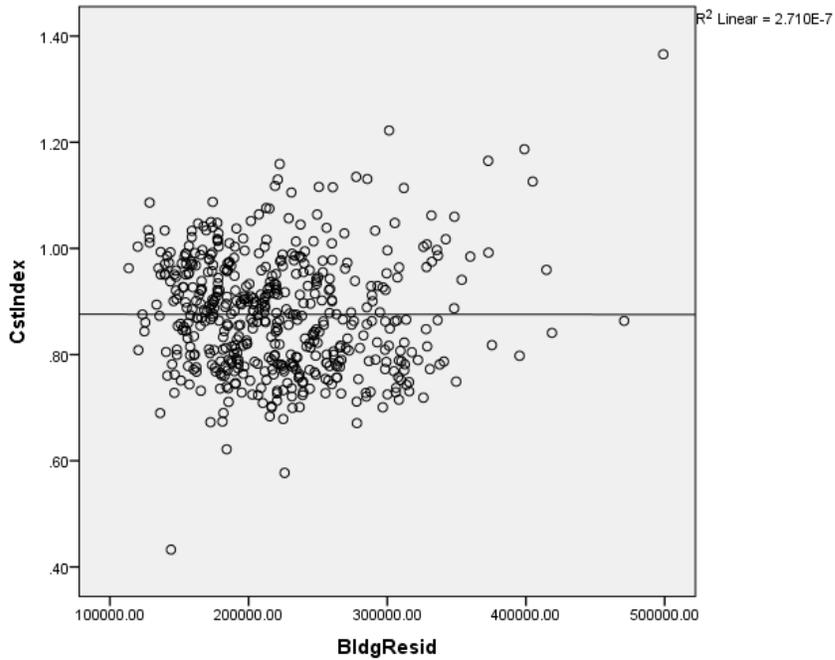
As an alternative, all new construction sales were queried. A total of 512 sales of new homes were used in the analysis. A residual building cost was calculated by subtracting an estimate of the land value from the sale price. The assessed value of the land at the time of the sale was used for this purpose. The resulting building cost estimate was then compared to the system generated RCN (replacement cost new) to produce a cost index.

- **Sales Analysis**

The scatter diagram on the next page compares the system generated cost new (Sigrnc) to the residual cost (BldgResid). Line 1 is the diagonal where Sigrnc would equal BldgResid. Line 2 is the line of best fit through the data. The fit line indicates that the RCN from the M&S cost tables is greater than the building residual calculated from the sale price. The graph demonstrates the need to reduce the cost table rates to produce a better match with the actual construction costs.



The calibration factor (CstIndex) displayed in the next scatter diagram calculated by dividing the BldgResid by the Sigrnc (the building residual divided by our system generated replacement cost new). The line of best fit is drawn through these points to show how much the cost tables would need to be increased to calibrate them to the local market. The fact that the line is nearly horizontal indicates the difference between the residual costs and M&S costs is consistent across a wide range of values.



**Cost Index**

# Sales	Median	Mean
512	0.8730	0.8758

The median and mean cost indexes are 0.8730 and 0.8758 respectively, indicating the need to reduce our cost tables by approximately 13%. This correlates closely with the information provided by the builder of tract homes, which are the most common type of residential new construction.

- Conclusion**

The cost index is rounded to 0.90 and applied county-wide to the residential cost tables. The market calibrated cost tables then provide a starting point for the determination of value at the neighborhood level. Sales are further analyzed to determine final land and building adjustments that take into consideration locational differences between neighborhoods.

## Detached Structures

- Procedure**

There were no sales of property that included only new detached structures or outbuildings. Therefore, the cost index was developed by surveying local contractors to determine actual construction cost. The total cost or per square foot cost rates were obtained for different building types, sizes, and qualities of construction. These costs were then compared to the CAMA system generated costs based on M&S rates to determine a cost index.

- Data Analysis**

<u>Item</u>	<u>Size</u>	<u>Builder Cost</u>	<u>Our Cost</u>	<u>Cost Index</u>	<u>Sources</u>
BAR Gable Breezeway Barn	36x36 or 1296 SF Avg Quality	\$33,000	\$33,683	0.98	Stable Systems
BAR Gable Breezeway Barn	36x36 or 1296 SF Avg Quality	\$32,796	\$33,683	0.97	Stable Systems
Loft Barn WITH SIDE SHEDS	36 x36 Avg Quality	\$51,890	\$52,638	0.99	Stable Systems
Hobby Stable	48 x 24 Fair+ Quality	\$19,584	\$21,957	0.89	
Pole Barn	any size, Avg Quality	\$18.00	\$18.64	0.97	Twin City Metal Buildings
Pole Barn	any size, Avg Quality	\$18.00	\$18.64	0.97	Stable Systems
Pole Barn	840 SF Avg Quality	\$20.11	\$21.76	0.92	F&L Pacific
Pole Barn	576 SF Avg Quality	\$17.98	\$21.76	0.83	F&L Pacific
PBN with upper Living area	any size, Fair Quality	\$50.00	\$87.03	0.57	Stable Systems
ARENA (excl permits & site prep)	60x 100 Avg Quality	\$12.00	\$20.03	0.60	Town and Country
SHOP	24 x 36 AVG Quality	\$25.19	\$32.42	0.78	Johnson Custom Homes
Lean To	any size, Avg Quality	\$10.00	\$9.43	1.06	Stable Systems
Framed Garage	400 SF Excellent Quality	\$75.00	\$78.15	0.96	Olympia Construction
Storage Shed	8 x 8 Avg Quality	\$23.73	\$17.06	1.39	Tuff Sheds Gable Roof
Storage Shed	10 x 12 Avg Quality	\$28.45	\$17.07	1.67	Tuff Sheds <b>Gable Roof</b>
Storage Shed	12 x 20 Avg Quality	\$23.62	\$16.86	1.40	Tuff Sheds Gable Roof
Storage Shed	10 x 12 Avg Quality	\$25.86	\$20.48	1.26	Tuff Sheds <b>Gambrel Roof</b>
			<b>Median</b>	0.97	
			<b>Mean</b>	0.88	
			<b>Median (exluding tuff sheds)</b>	0.96	

The Tuff Shed cost index was consistently higher than it was for other building types. This is understandable considering the fact that the wall and roof components are mass produced at a factory and then delivered and

assembled on site. We want the cost tables to reflect the more traditional method where materials are delivered to the site and the construction occurs from the ground up. The median cost index is not affected by these outliers as much as the mean, and in this case is the better measure to use in determining an appropriate factor to apply to the detached structure cost tables.

- **Conclusion**

The median cost index is rounded to 0.95 and applied county-wide to the detached cost rates.

## **Construction Cost Tables**

Marshall Swift cost rates, adjusted to the current year and local area, are used to determine the replacement cost of each residential improvement. Adjustments can also be made for various structure types and for other building components based on locally advertised building costs.

The complete set of rate tables is too lengthy to include here. However, an example of the rates for the main floor level of a residence by quality grade is shown below. The complete set of rate tables is stored within the Sigma CAMA System.

	SFLA	LOW	FAIR	AVG	GD	VGD	EXC	EXP
Base-1sty-SS	600	66.15	69.84	77.92	90.83	102.39	141.34	197.89
Base-1sty-SS	800	62.60	67.78	76.92	90.83	102.39	141.34	197.89
Base-1sty-SS	1000	59.77	65.88	75.55	91.44	102.39	141.34	197.89
Base-1sty-SS	1200	57.45	64.19	74.15	91.21	102.39	141.34	197.89
Base-1sty-SS	1400	55.50	62.71	72.81	90.60	102.66	141.34	197.89
Base-1sty-SS	1600	53.82	61.38	71.57	89.82	102.48	141.34	197.89
Base-1sty-SS	1800	52.35	60.18	70.42	88.99	102.02	141.43	198.00
Base-1sty-SS	2000	51.04	59.10	69.35	88.11	101.42	141.17	197.64
Base-1sty-SS	2200	49.88	58.12	68.36	87.25	100.74	140.70	196.98
Base-1sty-SS	2400	48.83	57.22	67.43	86.41	100.02	140.10	196.14
Base-1sty-SS	2600	47.87	56.39	66.58	85.60	99.29	139.42	195.20
Base-1sty-SS	2800	46.98	55.62	65.78	84.82	98.55	138.69	194.17
Base-1sty-SS	3000	46.18	54.90	65.03	84.06	97.82	137.92	193.09
Base-1sty-SS	3200	45.44	54.27	64.32	83.34	97.09	137.15	192.01
Base-1sty-SS	3400	44.74	53.66	63.61	82.63	96.39	136.35	190.90
Base-1sty-SS	3600	44.09	53.12	62.97	81.97	95.70	135.58	189.81
Base-1sty-SS	4000	42.87	52.07	61.75	80.71	94.38	134.04	187.66
Base-1sty-SS	4400	42.87	52.07	60.65	79.62	93.15	132.57	185.59
Base-1sty-SS	4800	42.87	52.07	59.65	78.65	91.89	131.15	183.61
Base-1sty-SS	5200	42.87	52.07	58.77	77.69	90.63	129.79	181.71
Base-1sty-SS	5400	42.87	52.07	58.32	77.29	90.14	129.16	180.82
Base-1sty-SS	5600	42.87	52.07	57.94	76.77	89.51	128.50	179.91
Base-1sty-SS	5800	42.87	52.07	57.94	76.39	88.99	127.89	179.05
Base-1sty-SS	6000	42.87	52.07	57.94	75.99	88.44	127.26	178.16

# DEPRECIATION ANALYSIS

## Effective Age

The effective age of a building is largely based on its overall condition. It is a measure of how old a building looks and not how old it actually is. As a result, any type of maintenance, repair, remodel, or renovation will tend to reduce the effective age. The more extensive the maintenance or repair work the more the effective age is reduced. This concept suggests that a very old building can be brought back to almost new condition, thereby reducing the effective age to a level that is typical of much newer construction.

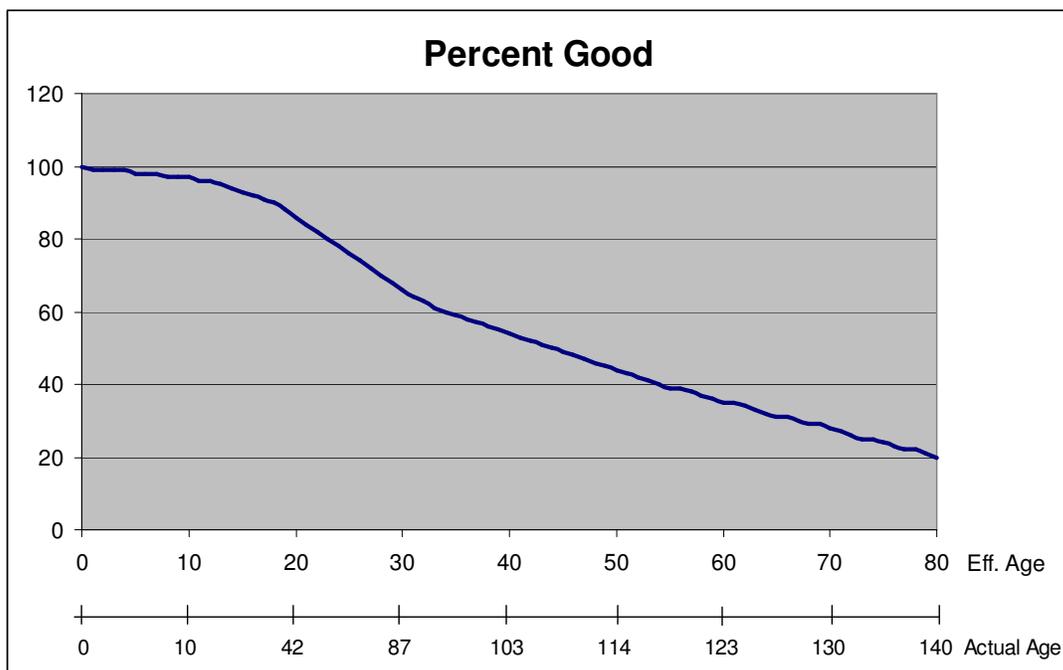
## Depreciation Rate Tables

Periodically, the depreciation tables are calibrated using residential sales representing all years of construction. The most recent estimates of the land values are subtracted from the sale prices to determine the residual building values. These values are compared to the replacement cost new to arrive at an estimate of the percent good, which is then correlated with the effective age of the building to produce a set of depreciation tables. An example table for a stick built house is show below. The depreciation rates are expressed as a percent good.

**DEPRECIATION TABLE 1 (2011DEP)**

Age	Low	Fair	Avg	Good	Vgood	Exc	Exp
0	100	100	100	100	100	100	100
1	99	99	99	99	99	99	99
2	99	99	99	99	99	99	99
3	99	99	99	99	99	99	99
4	99	99	99	99	99	99	99
5	98	98	98	98	98	98	98
6	98	98	98	98	98	98	98
7	98	98	98	98	98	98	98
8	97	97	97	97	97	97	97
9	97	97	97	97	97	97	97
10	97	97	97	97	97	97	97
11	96	96	96	96	96	96	96
12	96	96	96	96	96	96	96
13	95	95	95	95	95	95	95
14	94	94	94	94	94	94	94
15	93	93	93	93	93	93	93
16	92	92	92	92	92	92	92
17	91	91	91	91	91	91	91
18	90	90	90	90	90	90	90
19	88	88	88	88	88	88	88
20	86	86	86	86	86	86	86
.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.
60	35	35	35	35	35	35	35
61	35	35	35	35	35	35	35
62	34	34	34	34	34	34	34
63	33	33	33	33	33	33	33
64	32	32	32	32	32	32	32
65	31	31	31	31	31	31	31
66	31	31	31	31	31	31	31
67	30	30	30	30	30	30	30
68	29	29	29	29	29	29	29
69	29	29	29	29	29	29	29
70	28	28	28	28	28	28	28
71	27	27	27	27	27	27	27
72	26	26	26	26	26	26	26
73	25	25	25	25	25	25	25
74	25	25	25	25	25	25	25
75	24	24	24	24	24	24	24
76	23	23	23	23	23	23	23
77	22	22	22	22	22	22	22
78	22	22	22	22	22	22	22
79	21	21	21	21	21	21	21
80	20	20	20	20	20	20	20

The graph below shows the relationship between the percent good, actual age, and effective age.



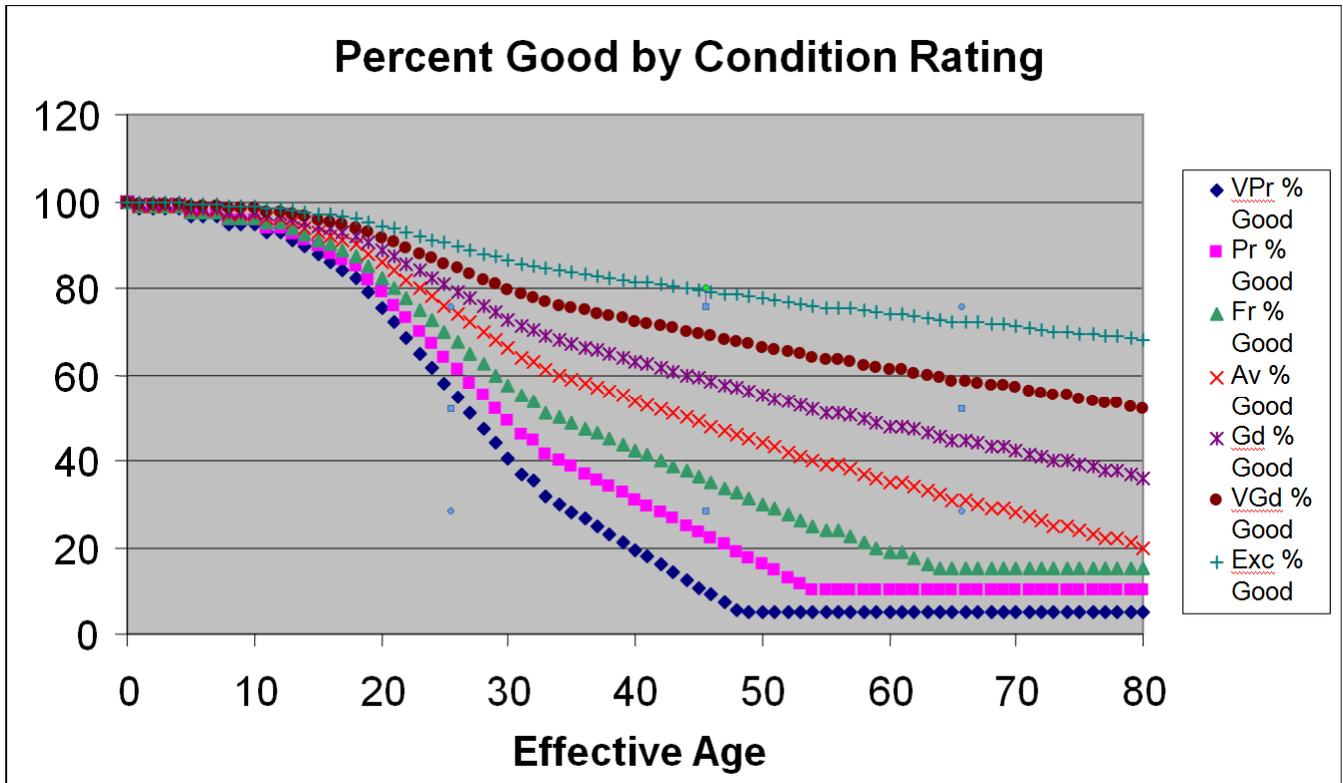
## Condition

Because many properties are in better or worse condition than what is typical for their age, we need a method to adjust the depreciation rate accordingly. There are two ways to accomplish this. One is to adjust the effective age and the other is to adjust the condition rating to raise or lower the amount of depreciation that is applied.

Adjusting the effective age would involve a fairly complex set of instructions and calculations for different situations that may be encountered. Minor remodels, major renovations, and building additions would require different adjustment techniques. Even with these procedures in place, there would be substantial appraiser judgment involved that would open the door for inconsistencies in the way effective age is determined and depreciation is applied.

A better method is to establish guidelines for determining the condition rating to apply to each property. In general, if an improvement to a parcel of land is typical for its age and has received average maintenance, it would be considered to be in average condition. If the improvement has had less than average maintenance, it will be in less than average condition. If the improvement has received better than average maintenance, it will be in better than average condition.

The following graph shows the effect that the condition rating has on the percent good curve. It summarizes the relationship between effective age, building condition, and the rate of depreciation.



## Neighborhood Adjustment Model Specification

The equation for the neighborhood adjustment has an additive model format but without the constant term.

$$V = b_1(LV) + b_2(BV)$$

Where:  $b_1$  and  $b_2$  are based on a combination of regression analysis and appraiser judgment

## Neighborhood Adjustment Calibration

Initially regression coefficients are developed to apply to both land ( $b_1$ ) and building ( $b_2$ ) values within each neighborhood. A preliminary adjustment to the neighborhood land values is determined first by considering only available vacant land sales within the region.

After making the initial adjustment to the land value, the coefficient for the building value ( $rcnld$ ) can be determined. This again produces a preliminary adjustment or starting point for determining the final neighborhood building trend.

Next, each neighborhood within the region is analyzed to consider its unique characteristics, amenities, and market conditions. This final adjustment to the neighborhood land and building values is largely based on the appraiser's analysis of individual sales ratios guided by the region wide sales analysis. An iterative process of adjusting the initial coefficients is applied to each neighborhood to reach the desired level of assessment, PRD, and COD.

As an example, final adjustments for neighborhood "07E2" are shown below.

- **Final Neighborhood adjustments for 07E2:**
  - $b_1 = 0.65$  land value adjustment
  - $b_2 = 0.82$  building value adjustment

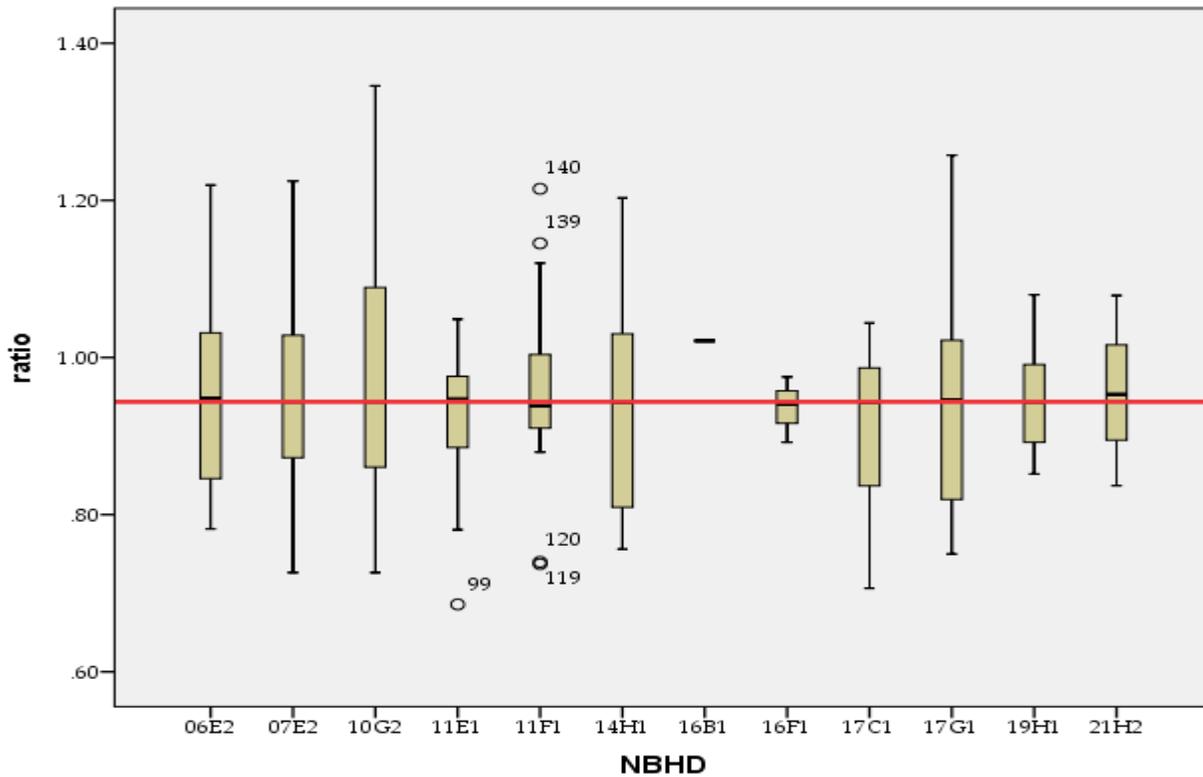
Final Ratios for 07E2	
Mean	.959
Median	.944
Weighted Mean	.946
Price Related Differential	1.014
Coefficient of Dispersion	.095

The sales ratio analysis of each neighborhood in Region 11 is included in the appendix along with the list of the sales that were used in the analysis.

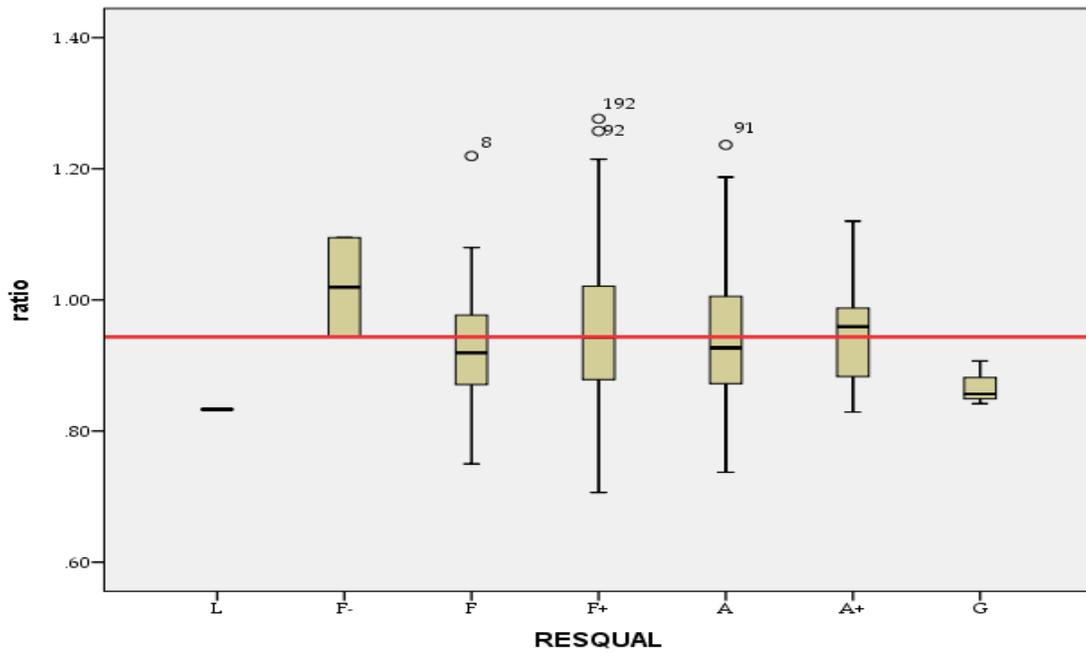
### **Neighborhood Adjustment Model Validation**

Neighborhood trends were calibrated using 187 sales that took place between 01/01/2012 to 03/31/2013 trended to 01/01/2013.

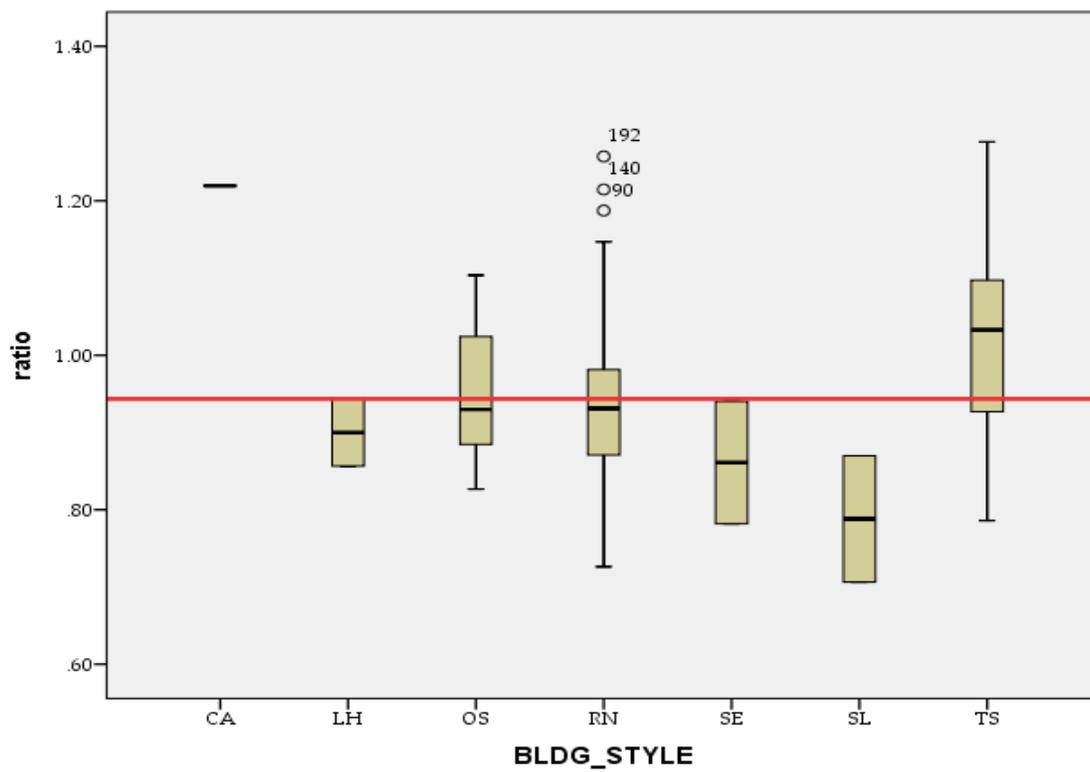
### **Assessment Uniformity by Neighborhood**



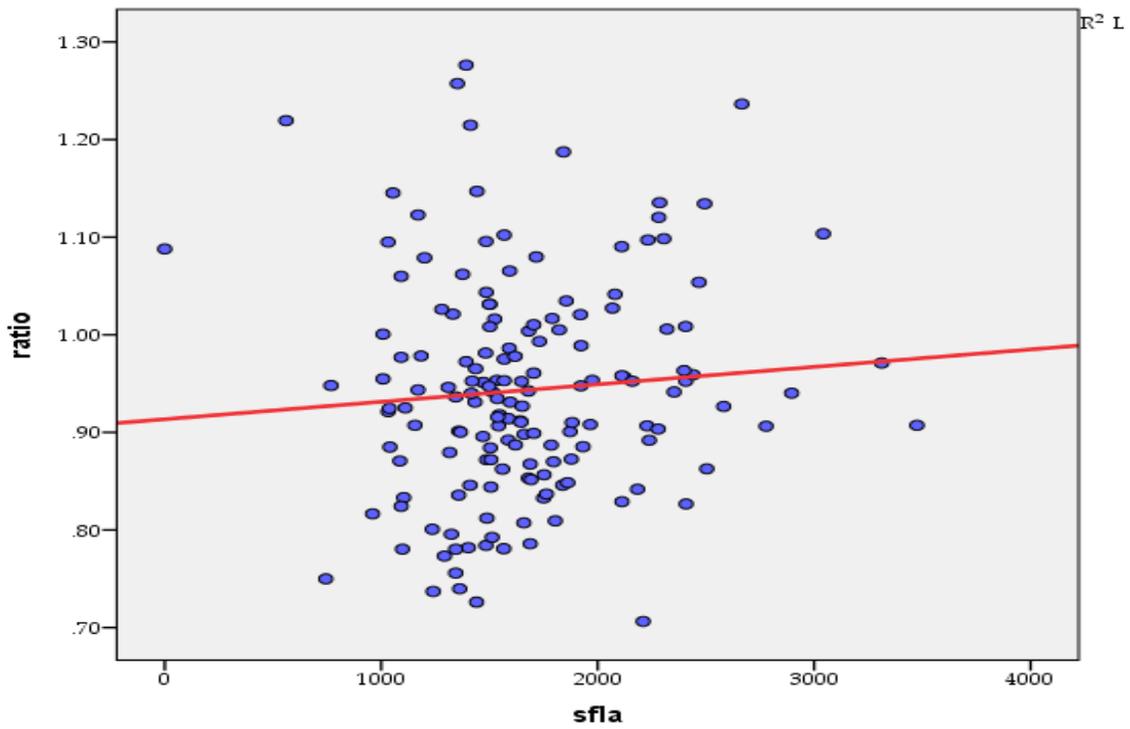
## Assessment Uniformity by Quality Grade



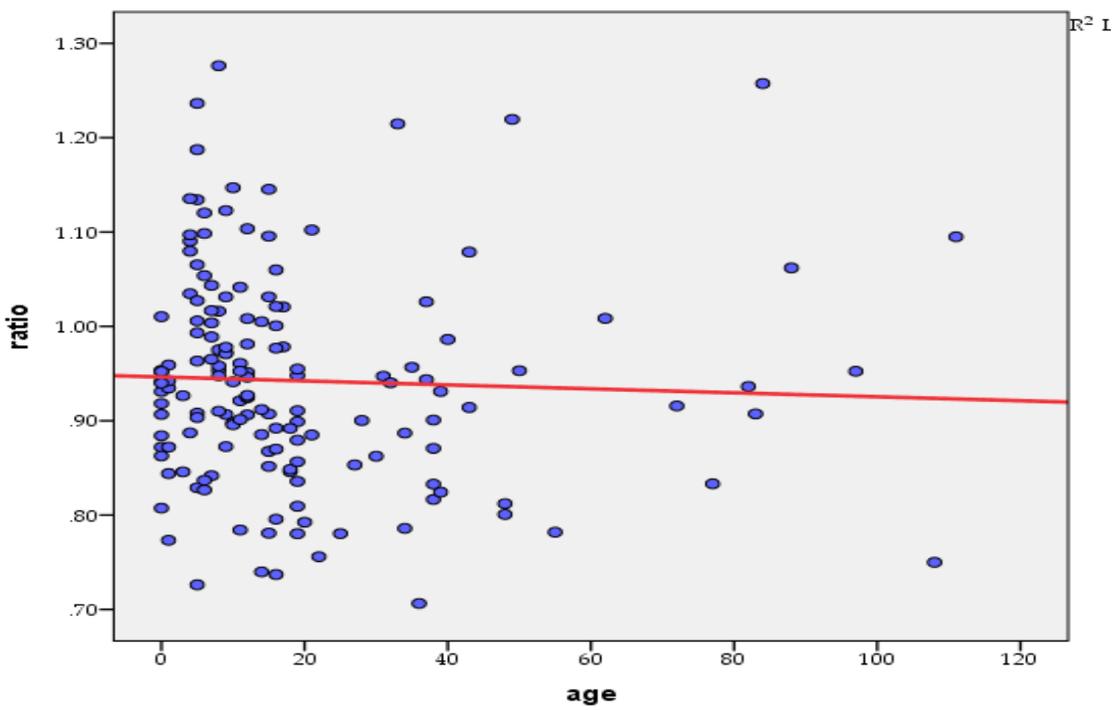
## Assessment Uniformity by Building Style



## Assessment Uniformity by Year Built



## Assessment Uniformity by Square Feet of Living Area



## RECONCILIATION AND CONCLUSION

Considering the quantity and quality of data and the reliability of the various models as shown in the performance tests above, we have concluded that the Sales Adjusted Cost Approach produces an accurate estimate of market value.

### Summary of Inventory Statistics

NBHD		Final Value	Total Chg \$	Total Chg %	Land Chg %	Imp Chg %
06E2	Mean	\$154,388	\$9,676	4.86	0.00	12.26
	Median	\$152,700	\$8,300	5.98	0.00	12.05
07E2	Mean	\$158,697	\$3,605	0.91	-7.14	9.53
	Median	\$167,575	\$3,950	2.44	-7.14	7.51
08B2	Mean	\$151,464	\$12,017	7.92	6.97	10.48
	Median	\$134,675	\$9,750	7.78	7.14	10.18
10G2	Mean	\$141,436	\$9,263	7.34	9.13	5.76
	Median	\$144,150	\$8,950	7.03	9.08	5.64
11E1	Mean	\$191,673	\$2,809	-1.27	-13.34	15.40
	Median	\$191,150	\$4,100	2.34	-13.34	15.12
11F1	Mean	\$173,201	-\$9,711	-5.23	-2.50	-6.74
	Median	\$167,800	-\$9,200	-5.29	-2.50	-6.91
14H1	Mean	\$169,245	-\$530	1.81	9.21	-5.53
	Median	\$166,400	-\$1,450	-0.80	9.09	-5.81
16B1	Mean	\$56,546	-\$3,760	-4.06	0.58	-11.76
	Median	\$54,750	-\$3,300	-5.89	0.00	-11.94
16F1	Mean	\$178,089	\$14,038	6.99	-0.16	14.59
	Median	\$185,050	\$14,500	8.66	0.00	14.65
17C1	Mean	\$126,562	\$3,219	1.53	0.01	5.60
	Median	\$91,625	\$150	0.21	0.00	5.49
17G1	Mean	\$100,010	\$2,802	2.44	-0.09	5.17
	Median	\$102,000	\$2,500	2.54	0.00	4.35
19H1	Mean	\$197,127	\$9,647	5.76	6.35	5.98
	Median	\$181,650	\$7,750	5.31	5.88	4.03
21H2	Mean	\$216,511	-\$5,917	-2.23	-0.35	-5.06
	Median	\$217,050	-\$5,650	-2.46	0.00	-4.71
Total	Mean	\$152,771	\$4,417	2.57	0.56	5.30
	Median	\$146,350	\$4,100	3.42	0.00	5.89

# APPENDIX

## Neighborhood 06E2/08B2

NBHD	Parcel ID	Acres	Style	SFLA	Sale Date	Sale Price	Trended SP
06E2	13631410500	1.08	RN	1502	6/1/2012	\$170,000	\$166,311
06E2	13629330000	9.56	RN	1484	8/9/2012	\$300,000	\$295,350
06E2	13631310300	0.70	RN	1410	7/12/2012	\$184,500	\$181,068
06E2	85200200100	1.43	CA	560	7/19/2012	\$70,000	\$68,698
06E2	13632111201	1.00	RN	1086	10/11/2012	\$146,000	\$144,642
06E2	13632220801	1.00	RN	2468	11/26/2012	\$220,000	\$218,636
06E2	14636210400	3.36	SE	1402	12/7/2012	\$229,000	\$228,290
06E2	13631320401	1.11	RN	768	2/6/2013	\$120,000	\$120,372
08B2	13518410100	12.31	OS	1591	2/24/2012	\$254,000	\$245,339

Sales Ratios for 06E2/08B2 New Value/Trended Sale Price	
Mean	.947
Median	.948
Weighted Mean	.917
Price Related Differential	1.032
Coefficient of Dispersion	.118

## Neighborhood 07E2

NBHD	Parcel ID	Acres	Style	SFLA	Sale Date	Sale Price	Trended SP
07E2	31500600202	0.88	RN	1472	3/26/2012	\$210,000	\$203,490
07E2	71103800300	0.17	RN	960	3/28/2012	\$124,900	\$121,028
07E2	13628311202	2.06	RN	1731	4/13/2012	\$229,900	\$223,486
07E2	13628332102	1.00		0	4/18/2012	\$47,000	\$45,393
07E2	81810000200	1.11	TS	1923	6/20/2012	\$229,927	\$224,938
07E2	13628331802	1.25	RN	1358	7/5/2012	\$187,500	\$184,013
07E2	31860000900	0.92	RN	1878	8/17/2012	\$237,000	\$233,327
07E2	31830000500	0.57	RN	1688	9/6/2012	\$187,500	\$185,175
07E2	31830005400	0.73	TS	3475	12/21/2012	\$289,000	\$288,104
07E2	13504120404	5.00		0	12/18/2012	\$70,000	\$69,734
07E2	13504120403	5.00		0	12/18/2012	\$75,000	\$74,715
07E2	13506440402	1.18	OS	1376	12/18/2012	\$125,000	\$124,613
07E2	56201200000	36.10	RN	1104	1/31/2012	\$271,638	\$261,533
07E2	36700002902	1.18	RN	1484	1/6/2012	\$150,900	\$145,287
07E2	13504340700	1.06	SL	1796	4/5/2012	\$195,900	\$190,434
07E2	13632140101	1.03		0	7/11/2012	\$40,000	\$39,088
07E2	31860000600	0.75	OS	2778	9/5/2012	\$270,000	\$266,652
07E2	13504330204	9.89	RN	2320	9/11/2012	\$273,000	\$269,615
07E2	31830006500	0.69	RN	1642	8/30/2012	\$200,000	\$196,900
07E2	63870001600	1.00	RN	1660	9/10/2012	\$220,000	\$217,272
07E2	36800001208	1.36	RN	1560	9/27/2012	\$215,000	\$212,334
07E2	13632110103	1.46	RN	1040	10/15/2012	\$160,000	\$158,512
07E2	36700000807	1.19	RN	1546	10/23/2012	\$204,900	\$202,994
07E2	13505330300	10.00	RN	1032	1/18/2013	\$111,000	\$111,000
07E2	13506430100	7.99	OS	3042	2/27/2013	\$244,500	\$245,258
07E2	83830000600	0.75	RN	1966	3/6/2013	\$222,000	\$223,376
07E2	31180000800	0.32	RN	1524	4/5/2012	\$170,000	\$165,257
07E2	36700002601	1.63	RN	2406	5/1/2012	\$240,000	\$234,048
07E2	36700000809	1.01	RN	1534	6/6/2012	\$199,000	\$194,682
07E2	13505411400	5.09	TS	1500	5/31/2012	\$200,000	\$195,040
07E2	13634320205	1.12	RN	2306	6/5/2012	\$230,000	\$225,009
07E2	36800000305	1.14	RN	1872	6/28/2012	\$199,000	\$194,682
07E2	76350000800	0.69	RN	1392	9/25/2012	\$178,000	\$175,793
07E2	13504210304	1.00	TS	2080	10/11/2012	\$199,500	\$197,645
07E2	13632110104	1.10		0	10/17/2012	\$45,000	\$44,487
07E2	09800035000	6.20	RN	1838	11/1/2012	\$299,000	\$297,146
07E2	71860000100	1.00	RN	1486	12/6/2012	\$199,900	\$199,280

07E2	46900100400	1.27	RN	1344	12/17/2012	\$161,000	\$160,501
07E2	85420900301	1.38	RN	1442	1/22/2013	\$147,000	\$147,000
07E2	13627240500	5.59	RN	1680	2/15/2013	\$255,000	\$255,791
07E2	31830005900	0.77	RN	1704	2/15/2013	\$177,500	\$178,050
07E2	56201800000	25.50		0	3/7/2013	\$108,000	\$108,821
07E2	83830000200	0.75	TS	2112	3/11/2013	\$279,000	\$280,730
07E2	31501100401	1.57	RN	1920	3/8/2013	\$179,900	\$181,015

Sales Ratios for 07E2	
New Value/Trended Sale Price	
Mean	.959
Median	.944
Weighted Mean	.946
Price Related Differential	1.014
Coefficient of Dispersion	.095

## Neighborhood 10G2

NBHD	Parcel ID	Acres	Style	SFLA	Sale Date	Sale Price	Trended SP
10G2	12518310100	39.43		0	5/4/2012	\$132,000	\$127,987
10G2	51304500000	9.76		0	6/19/2012	\$50,000	\$48,670
10G2	57990001400	0.10	TS	2111	3/28/2012	\$154,500	\$149,711
10G2	58710000100	0.14	TS	2494	3/30/2012	\$168,000	\$162,792
10G2	78660003800	0.91	RN	1515	4/24/2012	\$179,000	\$174,006
10G2	13503110502	1.00	RN	1790	5/18/2012	\$185,000	\$180,412
10G2	83330000200	0.11	RN	1506	6/15/2012	\$171,900	\$168,170
10G2	13502210101	0.53	RN	1092	9/26/2012	\$127,750	\$126,166
10G2	65750001400	0.26		0	11/6/2012	\$35,900	\$35,627
10G2	55803200102	1.88	TS	1392	12/7/2012	\$125,000	\$124,613
10G2	83330001100	0.11	RN	1504	1/23/2013	\$160,000	\$160,000
10G2	55330000600	0.38	RN	1502	2/21/2012	\$150,000	\$144,885
10G2	57990000900	0.10	TS	2232	3/8/2012	\$160,000	\$155,040
10G2	09410003000	3.00	RN	2184	3/30/2012	\$390,000	\$377,910
10G2	31850001100	0.85	RN	1420	4/17/2012	\$164,500	\$159,910
10G2	65750001300	0.28		0	5/8/2012	\$34,900	\$33,839
10G2	31850000100	0.86	RN	1358	5/4/2012	\$157,000	\$153,106
10G2	58710001300	0.22	RN	1842	8/22/2012	\$137,500	\$135,369
10G2	57990000100	0.12	RN	1593	9/27/2012	\$137,000	\$135,301
10G2	13502140500	2.04	OS	1156	1/3/2013	\$140,000	\$140,000
10G2	13502410600	0.96	RN	1498	1/3/2012	\$175,000	\$168,490
10G2	72200101000	4.68	RN	1704	1/11/2012	\$218,000	\$209,890
10G2	57990000800	0.10	TS	2286	2/2/2012	\$156,500	\$151,163
10G2	58710000600	0.13	TS	2666	2/7/2012	\$160,000	\$154,544
10G2	13524230702	1.16		0	2/15/2012	\$45,000	\$43,466
10G2	83330001000	0.11	RN	1506	2/13/2012	\$168,500	\$162,754
10G2	57990001000	0.14	TS	1855	4/3/2012	\$149,500	\$145,329
10G2	56100200100	4.09	RN	1861	4/18/2012	\$260,000	\$252,746
10G2	42910001000	0.88	RN	1310	6/21/2012	\$252,000	\$246,532
10G2	31430200206	1.20	RN	1659	7/23/2012	\$260,000	\$255,164
10G2	32090000600	0.43	RN	1292	10/16/2012	\$170,000	\$168,419
10G2	13502210308	1.56	RN	1440	1/9/2013	\$282,000	\$282,000
10G2	55330000800	0.44	RN	1470	3/5/2013	\$161,000	\$161,998
10G2	69420002100	0.11		0	3/12/2013	\$33,200	\$33,452
10G2	69420002000	0.11		0	3/12/2013	\$33,200	\$33,452
10G2	13501230101	0.57	RN	2122	3/11/2013	\$176,900	\$177,997

Sales Ratios for 10G2 New Value/Trended Sale Price	
Mean	.975
Median	.944
Weighted Mean	.957
Price Related Differential	1.019
Coefficient of Dispersion	.135

## Neighborhood 11E1

NBHD	Parcel ID	Acres	Style	SFLA	Sale Date	Sale Price	Trended SP
11E1	72402101100	5.09	TS	2440	2/10/2012	\$325,000	\$313,918
11E1	12630110600	20.54		0	2/13/2012	\$175,000	\$167,685
11E1	09200011008	15.64		0	2/13/2012	\$100,000	\$95,820
11E1	69340000300	0.88	RN	1366	3/28/2012	\$169,900	\$164,633
11E1	72402103900	5.00	RN	2407	1/14/2013	\$325,000	\$325,000
11E1	80000003205	0.50	RN	1184	6/29/2012	\$139,400	\$136,375
11E1	72402101600	5.10	OS	2504	6/25/2012	\$374,000	\$365,884
11E1	12630110101	4.81		0	7/20/2012	\$75,000	\$73,290
11E1	12507210500	5.68	TS	1932	9/17/2012	\$279,000	\$275,540
11E1	72402100600	5.07	RN	2116	9/24/2012	\$296,000	\$291,501
11E1	72402100500	5.04	RN	2353	10/1/2012	\$325,000	\$321,978
11E1	09040001002	5.30	RN	1566	10/19/2012	\$263,000	\$260,554
11E1	09200011005	4.85		0	2/9/2012	\$90,000	\$86,238
11E1	81200700100	5.02	RN	1975	2/27/2012	\$276,500	\$267,071
11E1	37800000200	5.00	RN	1822	2/23/2012	\$250,000	\$241,475
11E1	37800002701	5.00	RN	1785	9/20/2012	\$238,000	\$235,049
11E1	12621310200	5.06	RN	2228	9/26/2012	\$375,000	\$370,350
11E1	82810100100	4.82	RN	2112	3/7/2013	\$235,500	\$236,960

Sales Ratios for 11E1	
New Value/Trended Sale Price	
Mean	.918
Median	.947
Weighted Mean	.916
Price Related Differential	1.002
Coefficient of Dispersion	.066

## Neighborhood 11F1

NBHD	Parcel ID	Acres	Style	SFLA	Sale Date	Sale Price	Trended SP
11F1	72410003700	0.51	TS	2399	5/8/2012	\$247,500	\$241,362
11F1	80250000400	0.64	RN	1412	5/18/2012	\$122,500	\$119,462
11F1	31411900703	0.94	RN	1433	6/14/2012	\$169,997	\$166,308
11F1	69210002300	0.78	RN	1542	9/28/2012	\$198,850	\$196,384
11F1	57180000100	0.82	RN	1568	10/16/2012	\$137,500	\$136,221
11F1	31412800502	1.18	RN	1316	11/13/2012	\$179,900	\$178,785
11F1	81770002100	0.32	RN	1032	12/10/2012	\$127,500	\$127,105
11F1	31411600103	1.00	RN	1482	2/26/2013	\$160,000	\$160,496
11F1	69210000700	0.75	RN	1680	1/30/2012	\$199,800	\$192,367
11F1	69210001300	0.70	RN	1536	5/11/2012	\$189,900	\$185,190
11F1	72410001700	0.52	RN	2279	6/2/2012	\$272,500	\$266,587
11F1	69210002200	0.96	RN	1596	9/26/2012	\$200,000	\$197,520
11F1	69210000600	0.90	RN	1648	10/26/2012	\$193,500	\$191,700
11F1	31410500700	1.43	RN	1362	4/29/2012	\$235,000	\$228,444
11F1	42970001000	0.74	RN	2282	6/5/2012	\$225,000	\$220,118
11F1	43030001600	0.77	RN	1240	6/28/2012	\$223,000	\$218,161
11F1	81770003500	0.37	RN	1038	7/23/2012	\$128,000	\$125,619
11F1	49160000900	0.33	RN	1882	9/17/2012	\$199,900	\$197,421
11F1	49150001100	0.40	RN	1681	11/15/2012	\$167,000	\$165,965
11F1	12631430109	1.15	RN	1054	11/6/2012	\$120,299	\$119,553
11F1	49160001700	0.33	RN	1922	1/24/2013	\$195,000	\$195,000
11F1	72410003400	0.52	RN	2068	3/7/2013	\$215,920	\$217,259

Sales Ratios for 11F1	
New Value /Trended Sale Price	
Mean	.960
Median	.938
Weighted Mean	.948
Price Related Differential	1.012
Coefficient of Dispersion	.081

## Neighborhood 14H1

NBHD	Parcel ID	Acres	Style	SFLA	Sale Date	Sale Price	Trended SP
14H1	12615420102	7.07		0	11/8/2012	\$80,000	\$79,392
14H1	12622320100	4.50	RN	1512	1/29/2013	\$276,000	\$276,000
14H1	12609440200	6.08		0	1/10/2012	\$69,000	\$65,854
14H1	12616110100	11.90	RN	1750	3/5/2012	\$380,000	\$368,220
14H1	12616110400	5.00		0	4/2/2012	\$50,000	\$48,290
14H1	12622220500	7.98	RN	1804	5/10/2012	\$230,000	\$224,296
14H1	12621130100	5.16	RN	1344	5/30/2012	\$218,000	\$212,594
14H1	12610320304	5.00		0	9/17/2012	\$57,000	\$56,134
14H1	12610130201	1.98	RN	1344	9/22/2012	\$236,000	\$233,074
14H1	12609440300	6.08		0	2/8/2013	\$65,000	\$65,247
14H1	12609440500	6.02		0	5/29/2012	\$75,000	\$72,720
14H1	12609440400	6.07		0	6/21/2012	\$71,150	\$69,257
14H1	12614220200	9.94	RN	2582	9/24/2012	\$304,900	\$301,119
14H1	12610320201	5.01	RN	1704	11/21/2012	\$230,000	\$228,574

Sales Ratios for 14H1 New Value/Trended Sale Price	
Mean	.937
Median	.943
Weighted Mean	.881
Price Related Differential	1.064
Coefficient of Dispersion	.119

## Neighborhood 16B1

NBHD	Parcel ID	Acres	Style	SFLA	Sale Date	Sale Price	Trended SP
16B1	65910001700	0.46	RN	1331	1/29/2013	\$107,000	\$107,000

Sales Ratios for 16B1 New Value/Trended Sale Price	
Mean	1.021
Median	1.021
Weighted Mean	1.021
Price Related Differential	1.000
Coefficient of Dispersion	0.000

## Neighborhood 16F1

NBHD	Parcel ID	Acres	Style	SFLA	Sale Date	Sale Price	Trended SP
16F1	12625140500	5.05	SE	2896	6/1/2012	\$281,800	\$275,685
16F1	09810003001	5.00	RN	1587	10/15/2012	\$294,000	\$291,266
16F1	11628120202	0.95	RN	1568	12/20/2012	\$195,000	\$194,396

Sales Ratios for 16F1 New Value/Trended Sale Price	
Mean	.936
Median	.940
Weighted Mean	.931
Price Related Differential	1.005
Coefficient of Dispersion	.029

## Neighborhood 17C1

NBHD	Parcel ID	Acres	Style	SFLA	Sale Date	Sale Price	Trended SP
17C1	09270009000	0.94	RN	1620	5/24/2012	\$195,000	\$190,164
17C1	12517420100	2.75		0	6/15/2012	\$26,000	\$25,308
17C1	11508130105	5.73	RN	3312	6/20/2012	\$375,000	\$366,863
17C1	11514130200	5.06	TS	1688	2/6/2013	\$264,000	\$264,818
17C1	21519430000	8.16		0	2/25/2013	\$55,000	\$55,209
17C1	12515410301	2.13	RN	1588	4/11/2012	\$165,500	\$160,883
17C1	12515420300	2.30	SL	2210	1/3/2013	\$278,500	\$278,500
17C1	11509320300	5.00	RN	1618	3/4/2013	\$199,000	\$200,234

Sales Ratios for 17C1	
New Value/Trended Sale Price	
Mean	.910
Median	.943
Weighted Mean	.879
Price Related Differential	1.035
Coefficient of Dispersion	.092

## Neighborhood 17G1

NBHD	Parcel ID	Acres	Style	SFLA	Sale Date	Sale Price	Trended SP
17G1	69902200000	0.16	RN	744	1/25/2012	\$79,000	\$76,061
17G1	63700200501	0.26	RN	1416	2/9/2012	\$154,900	\$149,618
17G1	79101000200	0.15	RN	1236	3/6/2012	\$140,000	\$135,660
17G1	09490039001	0.21	TS	1485	4/18/2012	\$142,900	\$138,913
17G1	63700601300	0.17	RN	1538	4/20/2012	\$175,000	\$170,118
17G1	69850000500	0.24	RN	1092	4/25/2012	\$110,000	\$106,931
17G1	69921200100	0.12	OS	2160	7/30/2012	\$112,000	\$109,917
17G1	63700101300	0.51	RN	1352	1/11/2013	\$101,000	\$101,000
17G1	63700301100	0.25	RN	1111	6/2/2012	\$144,000	\$140,875
17G1	54902400100	0.17	TS	1651	7/5/2012	\$169,000	\$165,857
17G1	74902300600	0.25	RN	1170	9/24/2012	\$115,000	\$113,574
17G1	9490022000	0.21	RN	1488	10/4/2012	\$156,900	\$155,441
17G1	63700400500	0.20	RN	1008	11/29/2012	\$105,000	\$104,349
17G1	69901600500	0.41	RN	1324	2/7/2013	\$180,000	\$180,558
17G1	79120000800	0.34	RN	1008	9/24/2012	\$114,000	\$112,586
17G1	63700200500	0.26		0	9/25/2012	\$27,000	\$26,590
17G1	69850000600	0.26	RN	1092	10/11/2012	\$117,500	\$116,407
17G1	09490029000	0.49	OS	2408	10/5/2012	\$269,900	\$267,390
17G1	43600000600	0.22	RN	1098	11/5/2012	\$130,000	\$129,194
17G1	70970500400	0.21	RN	1436	3/12/2013	\$144,900	\$145,798

Sales Ratios for 17G1	
New Value/Trended Sale Price	
Mean	.952
Median	.946
Weighted Mean	.928
Price Related Differential	1.027
Coefficient of Dispersion	.111

## Neighborhood 19H1

NBHD	Parcel ID	Acres	Style	SFLA	Sale Date	Sale Price	Trended SP
19H1	11615430103	5.02		0	7/24/2012	\$100,000	\$97,720
19H1	11602240500	5.02	RN	2238	7/12/2012	\$305,000	\$299,327
19H1	11602240800	5.03	LH	1752	7/27/2012	\$365,000	\$358,211
19H1	74250001200	1.24	RN	1280	10/29/2012	\$145,500	\$144,147
19H1	11621220201	3.33	LH	1170	2/21/2013	\$125,000	\$125,388
19H1	11611430401	5.38		0	1/23/2012	\$105,000	\$100,212
19H1	11604120103	10.05	RN	1645	5/1/2012	\$369,900	\$360,726
19H1	11606430101	2.00	RN	1692	6/20/2012	\$250,000	\$244,575
19H1	11621230400	5.15	RN	1716	7/26/2012	\$187,000	\$183,522

Sales Ratios for 19H1 New Value/Trended Sale Price	
Mean	.949
Median	.944
Weighted Mean	.925
Price Related Differential	1.026
Coefficient of Dispersion	.068

## Neighborhood 21H2

NBHD	Parcel ID	Acres	Style	SFLA	Sale Date	Sale Price	Trended SP
21H2	39350103000	0.55	RN	1763	8/27/2012	\$223,000	\$219,544
21H2	39350102500	0.58	RN	1200	11/6/2012	\$230,000	\$228,574
21H2	11614341100	1.94	RN	1568	9/24/2012	\$219,000	\$216,284

Sales Ratios for 21H2 New Value/Trended Sale Price	
Mean	.956
Median	.953
Weighted Mean	.958
Price Related Differential	.998
Coefficient of Dispersion	.085

## Overall Sales Ratio for Region 11

New Value/Trended Sale Price	
Mean	.953
Median	.944
Weighted Mean	.933
Price Related Differential	1.021
Coefficient of Dispersion	.100

# Multiple Regression Analysis Assumptions

## Complete and Accurate Data:

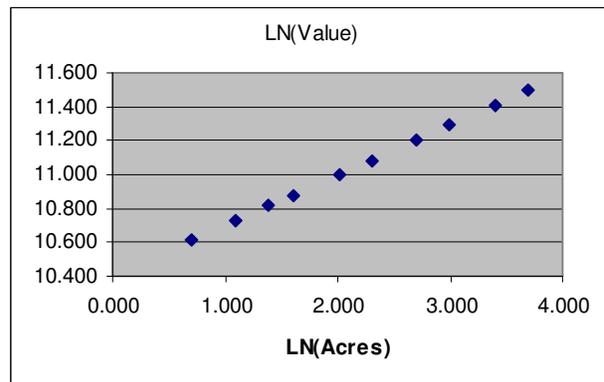
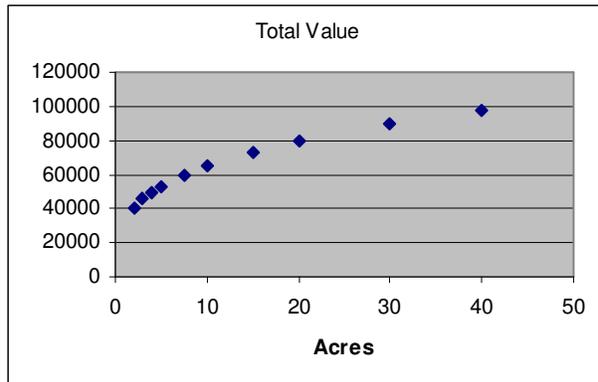
- Data definitions and standards have been developed to ensure our data is as complete and accurate as possible.
- A procedure has been established to ensure sales are properly verified.
- Annual training is conducted to remind appraisers of the standard that have been developed.

## Representativeness:

- It is assumed that the sale sample adequately represents variables in the model.
- Violation of this assumption may affect the accuracy of the model in predicting the value of properties that are under-represented. For example, if there are no sales of “Excellent” view, the model would make no distinction from the typical “Average” view and an “Excellent” view. Using scalar or linearized variables in the model has mitigated this potential problem.

## Linearity:

- It is assumed that the marginal contribution of a variable is constant over the range of values for the variable. Each additional unit of size or quantity adds equally to the value.
- The assumption is violated when economies of scale or other non-linear relationships are present.
- Developing a multiplicative land model has helped to create linear relationships between the dependent variable and independent variables.
- For example, using the natural logarithm of the lot size (acres) addresses the decreasing marginal utility of adding additional units of land. See example below.



## Additivity:

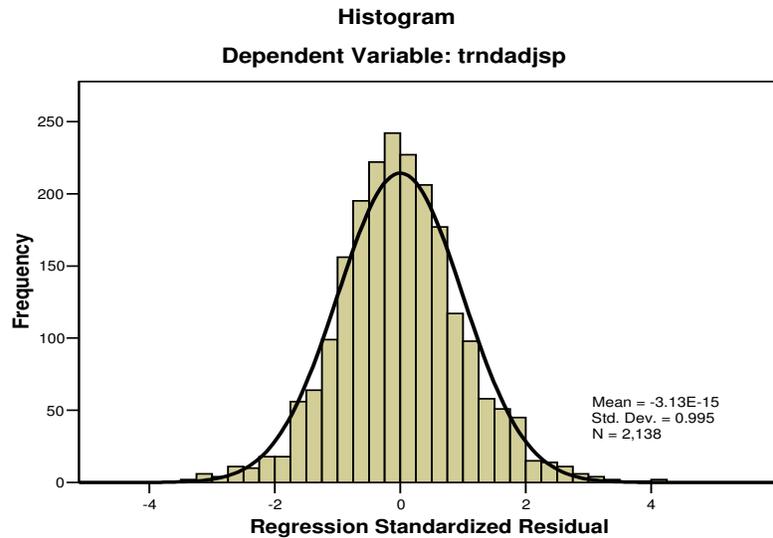
- It is assumed that the marginal contribution of one independent variable is not affected by the changes in other variables.
- The assumption is violated when one independent variable interacts with another.
- This assumption generally does not hold for land models
  - Land characteristics are often interactive. For example, the adjustment for view may be influenced by the size or topography of the land parcel.
- A multiplicative model helps to address this issue but converting the format to log-linear terms.

## No Correlation between Independent Variables:

- It is assumed that there is no correlation between independent variables.
- This assumption is addressed by reviewing the correlation matrix and by either eliminating one of the correlated variables or combining the highly correlated variables.

### Normal Distribution of Residual Errors:

- Violation of this assumption affects the interpretation of the SEE, COV, and t-statistics.
- With large samples and proper screening of the sales, this assumption is typically not a problem.
- The assumption is verified by examining a histogram of residual errors. See example below.



### Constant Variance of the Error Term (homoscedasticity):

- The residual errors should be consistent as prices increase.
- Violation of this assumption implies the residual errors are not evenly distributed (heteroscedasticity).
- As a result the model will chase high priced sales that may not be representative of the market.
- Sales have been properly screened to ensure accuracy of the data, and outliers have been removed to reduce the likelihood of this problem.
- Expressing the sale price (dependent variable) in per square foot or per acre terms has also helped to minimize this potential problem.
- Verified by examining a scatter diagram comparing residual errors to corresponding predicted values. See scatter diagram below as an example. The horizontal line-of-best-fit indicates that the residual errors are evenly distributed among the predicted values.

