



2018

# ARAPAHOE COUNTY PROPERTY ASSESSMENT STUDY

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**WILDROSE**  
APPRAISAL INCORPORATED  
Audit Division



September 15, 2018

Mr. Mike Mauer  
Director of Research  
Colorado Legislative Council  
Room 029, State Capitol Building  
Denver, Colorado 80203

**RE: Final Report for the 2018 Colorado Property Assessment Study**

Dear Mr. Mauer:

Wildrose Appraisal Inc.-Audit Division is pleased to submit the Final Reports for the 2018 Colorado Property Assessment Study.

These reports are the result of two analyses: A procedural audit and a statistical audit.

The procedural audit examines all classes of property. It specifically looks at how the assessor develops economic areas, confirms and qualifies sales, develops time adjustments and performs periodic physical property inspections. The audit reviews the procedures for determining subdivision absorption and subdivision discounting. Valuation methodology is examined for residential properties and commercial properties. Procedures are reviewed for producing mines, oil and gas leaseholds and lands producing, producing coal mines, producing earth and stone products, severed mineral interests, and non-producing patented mining claims.

Statistical audits are performed on vacant land, residential properties, commercial/industrial properties and agricultural land. A statistical analysis is performed for personal property compliance on the eleven largest counties: Adams, Arapahoe, Boulder, Denver, Douglas, El Paso, Jefferson, Larimer, Mesa, Pueblo and Weld. The remaining counties receive a personal property procedural study.

Wildrose Appraisal Inc. – Audit Division appreciates the opportunity to be of service to the State of Colorado. Please contact us with any questions or concerns.

A handwritten signature in black ink that reads "Harry J. Fuller". The signature is written in a cursive style.

Harry J. Fuller  
Project Manager  
Wildrose Appraisal Inc. – Audit Division

## TABLE OF CONTENTS

Introduction .....	3
Regional/Historical Sketch of Arapahoe County.....	4
Ratio Analysis.....	6
Time Trending Verification .....	8
Sold/Unsold Analysis .....	9
Agricultural Land Study .....	11
<i>Agricultural Land</i> .....	11
<i>Agricultural Outbuildings</i> .....	12
<i>Agricultural Land Under Improvements</i> .....	13
Sales Verification.....	14
Economic Area Review and Evaluation .....	16
Natural Resources .....	17
<i>Earth and Stone Products</i> .....	17
<i>Producing Oil and Gas</i> .....	17
Vacant Land.....	18
Possessory Interest Properties .....	19
Personal Property Audit .....	20
Wildrose Auditor Staff.....	22
Appendices.....	23

# INTRODUCTION

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## Colorado

The State Board of Equalization (SBOE) reviews assessments for conformance to the Constitution. The SBOE will order revaluations for counties whose valuations do not reflect the proper valuation period level of value.

The statutory basis for the audit is found in C.R.S. 39-1-104 (16)(a)(b) and (c).

The legislative council sets forth two criteria that are the focus of the audit group:

To determine whether each county assessor is applying correctly the constitutional and statutory provisions, compliance requirements of the State Board of Equalization, and the manuals published by the State Property Tax Administrator to arrive at the actual value of each class of property.

To determine if each assessor is applying correctly the provisions of law to the actual values when arriving at valuations for assessment of all locally valued properties subject to the property tax.

The property assessment audit conducts a two-part analysis: A procedural analysis and a statistical analysis.

The procedural analysis includes all classes of property and specifically looks at how the assessor develops economic areas, confirms and qualifies sales, and develops time adjustments. The audit also examines the procedures for adequately discovering, classifying and valuing agricultural outbuildings, discovering subdivision build-out and subdivision discounting procedures. Valuation methodology for vacant land, improved residential properties and commercial properties is examined. Procedures for producing mines, oil and gas leaseholds and lands producing, producing coal mines, producing earth and stone products, severed mineral interests and non-producing patented mining claims are also reviewed.

Statistical analysis is performed on vacant land, residential properties, commercial/industrial properties, agricultural land, and personal property. The statistical study results are compared with State Board of Equalization compliance requirements and the manuals published by the State Property Tax Administrator.

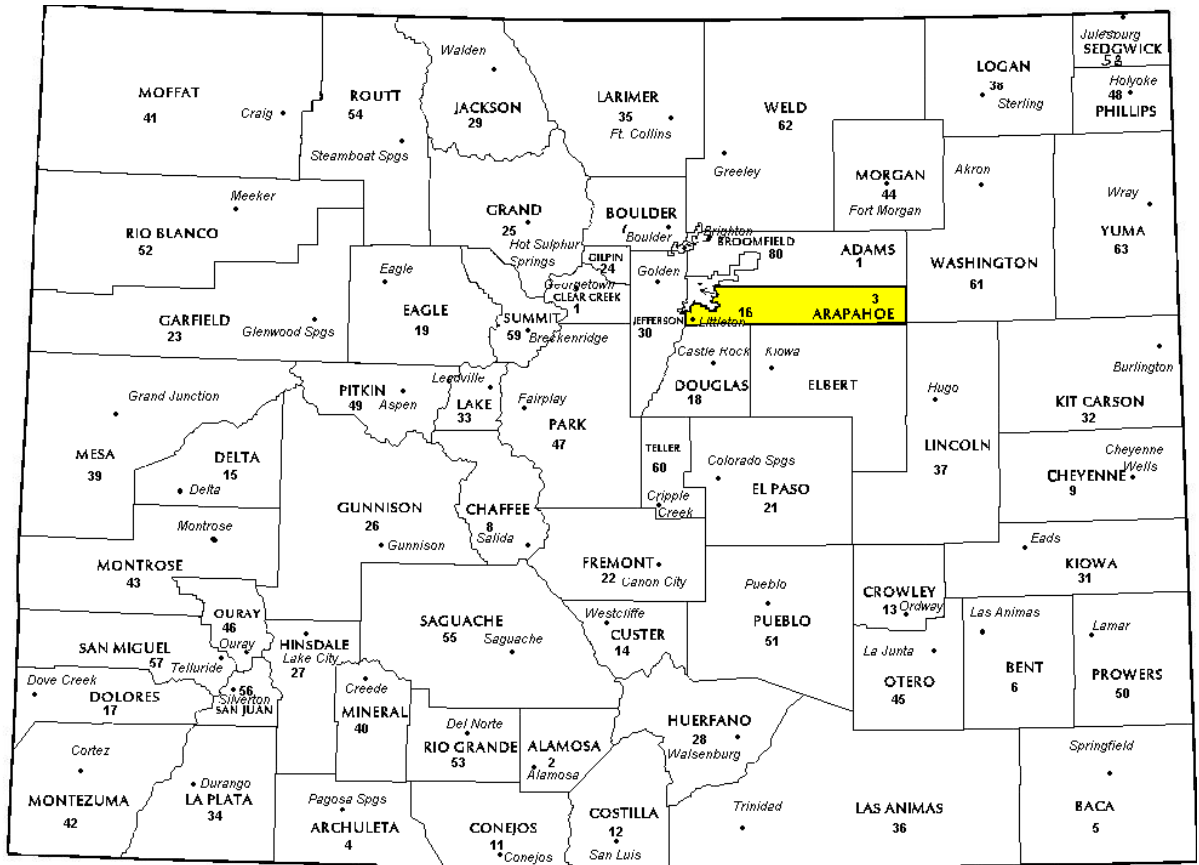
Wildrose Audit has completed the Property Assessment Study for 2018 and is pleased to report its findings for Arapahoe County in the following report.

# REGIONAL/HISTORICAL SKETCH OF ARAPAHOE COUNTY

## Regional Information

Arapahoe County is located in the Front Range region of Colorado. The Colorado Front Range is a colloquial geographic term for the populated areas of the State that are just east of the foothills of the Front Range. It includes

Adams, Arapahoe, Boulder, Broomfield, Denver, Douglas, El Paso, Jefferson, Larimer, Pueblo, and Weld counties.



## Historical Information

Arapahoe County had an estimated population of approximately 637,068 people with 797.3 people per square mile, according to the U.S. Census Bureau's 2016 estimated census data. This represents a 11.4 percent change from April 1, 2010 to July 1, 2016.

Arapahoe County is the third most populous of the 64 Colorado counties. The county seat is Littleton and the most populous city is Aurora. Arapahoe County is part of the Denver-Aurora Metropolitan Statistical Area and the Denver-Aurora-Boulder Combined Statistical Area. Arapahoe County calls itself "Colorado's First County" since its origins predate the Pike's Peak Gold Rush.

On August 25, 1855, the Kansas Territorial Legislature created a huge Arapahoe County to govern the entire western portion of the Territory of Kansas. The county was named for the Arapaho Nation of Native Americans that lived in the region.

In July 1858, gold was discovered along the South Platte River in Arapahoe County (in present day Englewood). This discovery precipitated the Pike's Peak Gold Rush. Many residents of the mining region felt disconnected from the remote territorial governments of Kansas and Nebraska, so they voted to form their own Territory of Jefferson on October 24, 1859. The following month, the Jefferson Territorial Legislature organized 12 counties for the new territory, including a new

Arapahoe County. Denver City served as the county seat of Arapahoe County.

The Jefferson Territory never received federal sanction, but on February 28, 1861, U.S. President James Buchanan signed an act organizing the Territory of Colorado. On November 1, 1861, the Colorado General Assembly organized the 17 original counties of Colorado including a new Arapahoe County. Arapahoe County originally stretched from the line of present-day Sheridan Boulevard 160 miles east to the Kansas state border, and from the line of present-day County Line Road 30 miles north to the Parallel 40° North (168th Avenue). Denver City served as the county seat of Arapahoe County until 1902.

In 1901, the Colorado General Assembly voted to split Arapahoe County into three parts: a new consolidated City and County of Denver, a new Adams County, and the remainder of the Arapahoe County to be renamed South Arapahoe County. A ruling by the Colorado Supreme Court, subsequent legislation, and a referendum delayed the reorganization until November 15, 1902. Governor James Bradley Orman designated Littleton as the temporary county seat of South Arapahoe County. On April 11, 1903, the Colorado General Assembly changed the name of South Arapahoe County back to Arapahoe County. On November 8, 1904, Arapahoe County voters chose Littleton over Englewood by a vote of 1310 to 829 to be the permanent county seat.

*(Wikipedia.org)*



# RATIO ANALYSIS

## Methodology

All significant classes of properties were analyzed. Sales were collected for each property class over the appropriate sale period, which was typically defined as the 18-month period between January 1, 2015 and June 30, 2016. Counties with less than 30 sales typically extended the sale period back up to 5 years prior to June 30, 2016 in 6-month increments. If there were still fewer than 30 sales, supplemental appraisals were performed and treated as proxy sales. Residential sales for all counties using this method totaled at least 30 per county. For commercial sales, the total number analyzed was allowed, in some cases, to fall below 30. There were no sale quantity issues for counties requiring vacant land analysis or condominium analysis. Although it was required that we examine the median and coefficient of dispersion for all counties, we also calculated the weighted mean and price-related differential for each class of property. Counties were not passed or failed by these

latter measures, but were counseled if there were anomalies noted during our analysis. Qualified sales were based on the qualification code used by each county, which were typically coded as either “Q” or “C.” The ratio analysis included all sales. The data was trimmed for counties with obvious outliers using IAAO standards for data analysis. In every case, we examined the loss in data from trimming to ensure that only true outliers were excluded. Any county with a significant portion of sales excluded by this trimming method was examined further. No county was allowed to pass the audit if more than 5% of the sales were “lost” because of trimming. For the largest 11 counties, the residential ratio statistics were broken down by economic area as well.

## Conclusions

For this final analysis report, the minimum acceptable statistical standards allowed by the State Board of Equalization are:

ALLOWABLE STANDARDS RATIO GRID		
Property Class	Unweighted Median Ratio	Coefficient of Dispersion
Commercial/Industrial	Between .95-1.05	Less than 20.99
Condominium	Between .95-1.05	Less than 15.99
Single Family	Between .95-1.05	Less than 15.99
Vacant Land	Between .95-1.05	Less than 20.99

The results for Arapahoe County are:

Arapahoe County Ratio Grid					
Property Class	Number of Qualified Sales	Unweighted Median Ratio	Price Related Differential	Coefficient of Dispersion	Time Trend Analysis
Commercial/Industrial	408	0.992	1.049	7.4	Compliant
Condominium	N/A	N/A	N/A	N/A	N/A
Single Family	26,050	1.001	1.004	2.4	Compliant
Vacant Land	100	1.000	1.264	16.6	Compliant

Ratio Statistics for Curr Tot / TASP			
Group	Median	Price Related Differential	Coefficient of Dispersion
0	.996	1.000	.007
1	1.002	1.004	.023
2	1.000	1.003	.020
3	1.002	1.009	.030
4	1.000	1.002	.023
5	1.001	1.003	.026
6	1.004	1.009	.043
7	1.001	1.003	.024
8	1.001	1.004	.025
9	1.001	1.006	.037
10	1.000	1.004	.022
11	1.001	1.003	.021
12	1.000	1.006	.019
13	1.000	1.004	.023
14	1.000	.996	.034
15	1.000	1.003	.023
16	1.000	1.000	.023
17	1.000	1.004	.020
18	1.000	1.003	.023
19	1.001	1.000	.017
Overall	1.001	1.004	.024

After applying the above described methodologies, it is concluded from the sales ratios that Arapahoe County is in compliance

with SBOE, DPT, and Colorado State Statute valuation guidelines.

**Recommendations**

None





## TIME TRENDING VERIFICATION

### Methodology

While we recommend that counties use the inverted ratio regression analysis method to account for market (time) trending, some counties have used other IAAO-approved methods, such as the weighted monthly median approach. We are not auditing the methods used, but rather the results of the methods used. Given this range of methodologies used to account for market trending, we concluded that the best validation method was to examine the sale ratios for each class across the appropriate sale period. To be specific, if a county has considered and adjusted correctly for market trending, then the sale ratios should remain stable (i.e. flat) across the sale period. If a residual market trend is detected, then the county may or may not have addressed market trending adequately, and a further examination

is warranted. This validation method also considers the number of sales and the length of the sale period. Counties with few sales across the sale period were carefully examined to determine if the statistical results were valid.

### Conclusions

After verification and analysis, it has been determined that Arapahoe County has complied with the statutory requirements to analyze the effects of time on value in their county. Arapahoe County has also satisfactorily applied the results of their time trending analysis to arrive at the time adjusted sales price (TASP).

### Recommendations

None

## SOLD / UNSOLD ANALYSIS

### Methodology

Arapahoe County was tested for the equal treatment of sold and unsold properties to ensure that “sales chasing” has not occurred. The auditors employed a multi-step process to determine if sold and unsold properties were valued in a consistent manner.

We test the hypothesis that the assessor has valued unsold properties consistent with what is observed with the sold properties based on several units of comparison and tests. The units of comparison include the actual value per square foot and the change in value from the previous base year period to the current base year. The first test compares the actual value per square foot between sold and unsold properties by class. The median and mean value per square foot is compared and tested for any significant difference. This is tested using non-parametric methods, such as the Mann-Whitney test for differences in the distributions or medians between sold and unsold groups. It is also examined graphically and from an appraisal perspective. Data can be stratified based on location and subclass. The second test compares the difference in the median change in value from the previous base year to the current base year between sold and unsold properties by class. The same combination of non-parametric and appraisal testing is used as with the first test. A third test employing a valuation model testing a sold/unsold binary variable while controlling for property attributes such as location, size, age and other attributes. The model determines if the sold/unsold variable is statistically and empirically significant. If all three tests indicate a significant difference between sold and unsold properties for a given class, the Auditor may meet with the county to determine if sale chasing is actually occurring,

or if there are other explanations for the observed difference.

If the unsold properties have a higher median value per square foot than the sold properties, or if the median change in value is greater for the unsold properties than the sold properties, the analysis is stopped and the county is concluded to be in compliance with sold and unsold guidelines. All sold and unsold properties in a given class are first tested, although properties with extreme unit values or percent changes can be trimmed to stabilize the analysis. The median is the primary comparison metric, although the mean can also be used as a comparison metric if the distribution supports that type of measure of central tendency.

The first test (unit value method) is applied to both residential and commercial/industrial sold and unsold properties. The second test is applied to sold and unsold vacant land properties. The second test (change in value method) is also applied to residential or commercial sold and unsold properties if the first test results in a significant difference observed and/or tested between sold and unsold properties. The third test (valuation modeling) is used in instances where the results from the first two tests indicate a significant difference between sold and unsold properties. It can also be used when the number of sold and unsold properties is so large that the non-parametric testing is indicating a false rejection of the hypothesis that there is no difference between the sold and unsold property values.

These tests were supported by both tabular and graphics presentations, along with written documentation explaining the methodology used.

<b>Sold/Unsold Results</b>	
<b>Property Class</b>	<b>Results</b>
Commercial/Industrial	Compliant
Condominium	N/A
Single Family	Compliant
Vacant Land	Compliant

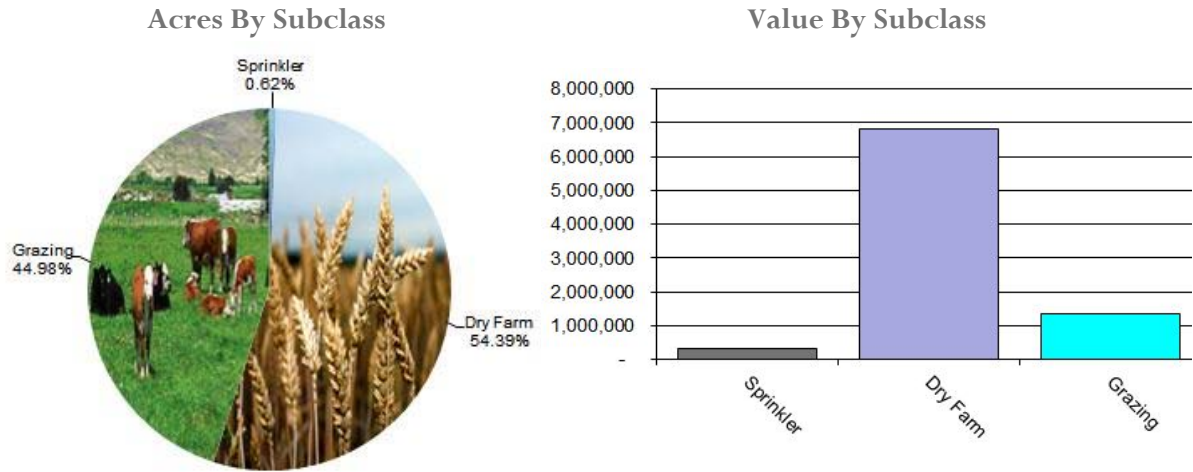
### **Conclusions**

After applying the above described methodologies, it is concluded that Arapahoe County is reasonably treating its sold and unsold properties in the same manner.

### **Recommendations**

None

# AGRICULTURAL LAND STUDY



## Agricultural Land

County records were reviewed to determine major land categories such as irrigated farm, dry farm, meadow hay, grazing and other lands. In addition, county records were reviewed in order to determine if: Aerial photographs are available and are being used; soil conservation guidelines have been used to classify lands based on productivity; crop rotations have been documented; typical commodities and yields have been determined; orchard lands have been properly classified and valued; expenses reflect a ten year average and are typical landlord expenses; grazing lands have been properly classified and valued; the number of acres in each class and subclass have been determined; the capitalization rate was properly applied. Also, documentation was required for the valuation methods used and any locally developed yields, carrying capacities, and expenses. Records were also checked to ensure that the commodity prices and expenses, furnished by the Property Tax Administrator (PTA), were applied properly.

(See Assessor Reference Library Volume 3 Chapter 5.)

### Conclusions

An analysis of the agricultural land data indicates an acceptable appraisal of this property type. Directives, commodity prices and expenses provided by the PTA were properly applied. County yields compared favorably to those published by Colorado Agricultural Statistics. Expenses used by the county were allowable expenses and were in an acceptable range. Grazing lands carrying capacities were in an acceptable range. The data analyzed resulted in the following ratios:

Arapahoe County Agricultural Land Ratio Grid						
Abstract Code	Land Class	Number Of Acres	County Value Per Acre	County Assessed Total Value	WRA Total Value	Ratio
4107	Sprinkler	1,924	173.65	334,079	345,881	0.97
4127	Dry Farm	168,315	40.48	6,813,563	6,638,327	1.03
4147	Grazing	139,198	9.83	1,368,638	1,368,638	1.00
<b>Total/Avg</b>		<b>309,436</b>	<b>27.52</b>	<b>8,516,279</b>	<b>8,352,846</b>	<b>1.02</b>

### Recommendations

None

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## Agricultural Outbuildings

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### Methodology

Data was collected and reviewed to determine if the guidelines found in the Assessor's Reference Library (ARL) Volume 3, pages 5.74 through 5.77 were being followed.

of Property Taxation for the valuation of agricultural outbuildings.

### Recommendations

None

### Conclusions

Arapahoe County has substantially complied with the procedures provided by the Division

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## Agricultural Land Under Improvements

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### Methodology

Data was collected and reviewed to determine if the guidelines found in the Assessor's Reference Library (ARL) Volume 3, pages 5.19 and 5.20 were being followed.

### Conclusions

Arapahoe County has used the following methods to discover land under a residential improvement on a farm or ranch that is determined to be not integral under 39-1-102, C.R.S.:

- Questionnaires
- Field Inspections
- Phone Interviews
- In-Person Interviews with Owners/Tenants
- Written Correspondence other than Questionnaire
- Personal Knowledge of Occupants at Assessment Date
- Aerial Photography/Pictometry

Arapahoe County has used the following methods to discover the land area under a residential improvement that is determined to be not integral under 39-1-102, C.R.S.:

- Property Record Card Analysis
- Questionnaires
- Field Inspections
- Phone Interviews
- In-Person Interviews with Owners/Tenants
- Written Correspondence other than Questionnaire
- Personal Knowledge of Occupants at Assessment Date
- Aerial Photography/Pictometry

Arapahoe County has substantially complied with the procedures provided by the Division of Property Taxation for the valuation of land under residential improvements that may or may not be integral to an agricultural operation.

### Recommendations

None



## SALES VERIFICATION

According to Colorado Revised Statutes:

*A representative body of sales is required when considering the market approach to appraisal.*

*(8) In any case in which sales prices of comparable properties within any class or subclass are utilized when considering the market approach to appraisal in the determination of actual value of any taxable property, the following limitations and conditions shall apply:*

*(a)(I) Use of the market approach shall require a representative body of sales, including sales by a lender or government, sufficient to set a pattern, and appraisals shall reflect due consideration of the degree of comparability of sales, including the extent of similarities and dissimilarities among properties that are compared for assessment purposes. In order to obtain a reasonable sample and to reduce sudden price changes or fluctuations, all sales shall be included in the sample that reasonably reflect a true or typical sales price during the period specified in section 39-1-104 (10.2). Sales of personal property exempt pursuant to the provisions of sections 39-3-102, 39-3-103, and 39-3-119 to 39-3-122 shall not be included in any such sample.*

*(b) Each such sale included in the sample shall be coded to indicate a typical, negotiated sale, as screened and verified by the assessor. (39-1-103, C.R.S.)*

*The assessor is required to use sales of real property only in the valuation process.*

*(8)(f) Such true and typical sales shall include only those sales which have been determined on an individual basis to reflect the selling price of the real property only or which have been adjusted on an individual basis to reflect the selling price of the real property only. (39-1-103, C.R.S.)*

Part of the Property Assessment Study is the sales verification analysis. WRA has used the above-cited statutes as a guide in our study of the county's procedures and practices for verifying sales.

WRA reviewed the sales verification procedures in 2018 for Arapahoe County. This study was conducted by checking selected sales from the master sales list for the current valuation period. Specifically WRA selected 60 sales listed as unqualified.

All but five of the sales selected in the sample gave reasons that were clear and supportable. Five sales had insufficient reason for disqualification.

For residential, commercial, and vacant land sales with considerations over \$500, the contractor has examined and reported the ratio of qualified sales to total sales by class and performed the following analyses of unqualified sales:

The contractor has examined the manner in which sales have been classified as qualified or unqualified, including a listing of each step in the sales verification process, any adjustment procedures, and the county official responsible for making the final decision on qualification.

The contractor has reviewed with the assessor any analysis indicating that sales data are inadequate, fail to reflect typical properties, or have been disqualified for insufficient cause. In addition, the contractor has reviewed the disqualified sales by assigned code.

If there appears to be any inconsistency in the coding, the contractor has conducted further analysis to determine if the sales included in that code have been assigned appropriately.

### **Conclusions**

Arapahoe County appears to be doing a good job of verifying their sales.

### **Recommendations**

None

# ECONOMIC AREA REVIEW AND EVALUATION

## **Methodology**

Arapahoe County has submitted a written narrative describing the economic areas that make up the county's market areas. Arapahoe County has also submitted a map illustrating these areas. Each of these narratives have been read and analyzed for logic and appraisal sensibility. The maps were also compared to the narrative for consistency between the written description and the map.

## **Conclusions**

After review and analysis, it has been determined that Arapahoe County has

adequately identified homogeneous economic areas comprised of smaller neighborhoods. Each economic area defined is equally subject to a set of economic forces that impact the value of the properties within that geographic area and this has been adequately addressed. Each economic area defined adequately delineates an area that will give "similar values for similar properties in similar areas."

## **Recommendations**

None

# NATURAL RESOURCES

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## Earth and Stone Products

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### Methodology

Under the guidelines of the Assessor's Reference Library (ARL), Volume 3, Natural Resource Valuation Procedures, the income approach was applied to determine value for production of earth and stone products. The number of tons was multiplied by an economic royalty rate determined by the Division of Property Taxation to determine income. The income was multiplied by a recommended Hoskold factor to determine the actual value. The Hoskold factor is determined by the life of the reserves or the lease. Value is based on two variables: life and tonnage. The operator determines these since there is no other means to obtain production data through any state or private agency.

### Conclusions

The County has applied the correct formulas and state guidelines to earth and stone production.

### Recommendations

None

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## Producing Oil and Gas

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### Methodology

Assessors Reference Library (ARL) Volume 3, Chapter 6: Valuation of Natural Resources

### STATUTORY REFERENCES

Section § 39-1-103, C.R.S., specifies that producing oil or gas leaseholds and lands are valued according to article 7 of title 39, C.R.S.

### Actual value determined - when.

(2) The valuation for assessment of leaseholds and lands producing oil or gas shall be determined as provided in article 7 of this title.

### § 39-1-103, C.R.S.

Article 7 covers the listing, valuation, and assessment of producing oil and gas leaseholds and lands.

### Valuation:

#### Valuation for assessment.

(1) Except as provided in subsection (2) of this section, on the basis of the information contained in such statement, the assessor shall value such oil and gas leaseholds and lands for assessment, as real property, at an amount equal to eighty-seven and one-half percent of:

(a) The selling price of the oil or gas sold there from during the preceding calendar year, after excluding the selling price of all oil or gas delivered to the United States government or any agency thereof, the state of Colorado or any agency thereof, or any political subdivision of the state as royalty during the preceding calendar year;

(b) The selling price of oil or gas sold in the same field area for oil or gas transported from the premises which is not sold during the preceding calendar year, after excluding the selling price of all oil or gas delivered to the United States government or any agency thereof, the state of Colorado or any agency thereof, or any political subdivision of the state as royalty during the preceding calendar year.

### § 39-7-102, C.R.S.

### Conclusions

The county applied approved appraisal procedures in the valuation of oil and gas.

### Recommendations

None

## VACANT LAND

### **Subdivision Discounting**

Subdivisions were reviewed in 2018 in Arapahoe County. The review showed that subdivisions were discounted pursuant to the Colorado Revised Statutes in Article 39-1-103 (14) and by applying the recommended methodology in ARL Vol 3, Chap 4. Subdivision Discounting in the intervening year can be accomplished by reducing the absorption period by one year. In instances where the number of sales within an approved plat was less than the absorption rate per year calculated

for the plat, the absorption period was left unchanged.

### **Conclusions**

Arapahoe County has implemented proper procedures to adequately estimate absorption periods, discount rates, and lot values for qualifying subdivisions.

### **Recommendations**

None

# POSSESSORY INTEREST PROPERTIES

## Possessory Interest

Possessory interest property discovery and valuation is described in the Assessor's Reference Library (ARL) Volume 3 section 7 in accordance with the requirements of Chapter 39-1-103 (17)(a) (II) C.R.S. Possessory Interest is defined by the Property Tax Administrator's Publication ARL Volume 3, Chapter 7: A private property interest in government-owned property or the right to the occupancy and use of any benefit in government-owned property that has been granted under lease, permit, license, concession, contract, or other agreement.

Arapahoe County has been reviewed for their procedures and adherence to guidelines when assessing and valuing agricultural and

commercial possessory interest properties. The county has also been queried as to their confidence that the possessory interest properties have been discovered and placed on the tax rolls.

## Conclusions

Arapahoe County has implemented a discovery process to place possessory interest properties on the roll. They have also correctly and consistently applied the correct procedures and valuation methods in the valuation of possessory interest properties.

## Recommendations

None



# PERSONAL PROPERTY AUDIT

Arapahoe County was studied for its procedural compliance with the personal property assessment outlined in the Assessor's Reference Library (ARL) Volume 5, and in the State Board of Equalization (SBOE) requirements for the assessment of personal property. The SBOE requires that counties use ARL Volume 5, including current discovery, classification, documentation procedures, current economic lives table, cost factor tables, depreciation table, and level of value adjustment factor table.

The personal property audit standards narrative must be in place and current. A listing of businesses that have been audited by the assessor within the twelve-month period reflected in the plan is given to the auditor. The audited businesses must be in conformity with those described in the plan.

Aggregate ratio will be determined solely from the personal property accounts that have been physically inspected. The minimum assessment sample is one percent or ten schedules, whichever is greater, and the maximum assessment audit sample is 100 schedules.

For the counties having over 100,000 population, WRA selected a sample of all personal property schedules to determine whether the assessor is correctly applying the provisions of law and manuals of the Property Tax Administrator in arriving at the assessment levels of such property. This sample was selected from the personal property schedules audited by the assessor. In no event was the sample selected by the contractor less than 30 schedules. The counties to be included in this study are Adams, Arapahoe, Boulder, Denver, Douglas, El Paso, Jefferson, Larimer, Mesa, Pueblo, and Weld. All other counties received a procedural study.

Arapahoe County is compliant with the guidelines set forth in ARL Volume 5 regarding discovery procedures, using the following methods to discover personal property accounts in the county:

- Public Record Documents
- Chamber of Commerce/Economic Development Contacts
- Personal Observation, Physical Canvassing or Word of Mouth
- Physically verifying 1/3 of county annually
- Physically verifying all businesses in TIF locations

The county uses the Division of Property Taxation (DPT) recommended classification and documentation procedures. The DPT's recommended cost factor tables, depreciation tables and level of value adjustment factor tables are also used.

Arapahoe County submitted their personal property written audit plan and was current for the 2018 valuation period. The number and listing of businesses audited was also submitted and was in conformance with the written audit plan. The following audit triggers were used by the county to select accounts to be audited:

- Accounts with obvious discrepancies
- Incomplete or inconsistent declarations
- Businesses with no deletions or additions for 2 or more years
- Non-filing Accounts - Best Information Available
- Accounts protested with substantial disagreement
- New businesses if a non-filer and a BIA is placed on the account

Arapahoe County's median ratio is 1.00. This is in compliance with the State Board of Equalization (SBOE) compliance requirements which range from .90 to 1.10 with no COD requirements.

### **Conclusions**

Arapahoe County has employed adequate discovery, classification, documentation, valuation, and auditing procedures for their personal property assessment and is in statistical compliance with SBOE requirements.

### **Recommendations**

None

## WILDROSE AUDITOR STAFF

**Harry J. Fuller**, *Audit Project Manager*

**Suzanne Howard**, *Audit Administrative Manager*

**Steve Kane**, *Audit Statistician*

**Carl W. Ross**, *Agricultural / Natural Resource Analyst*

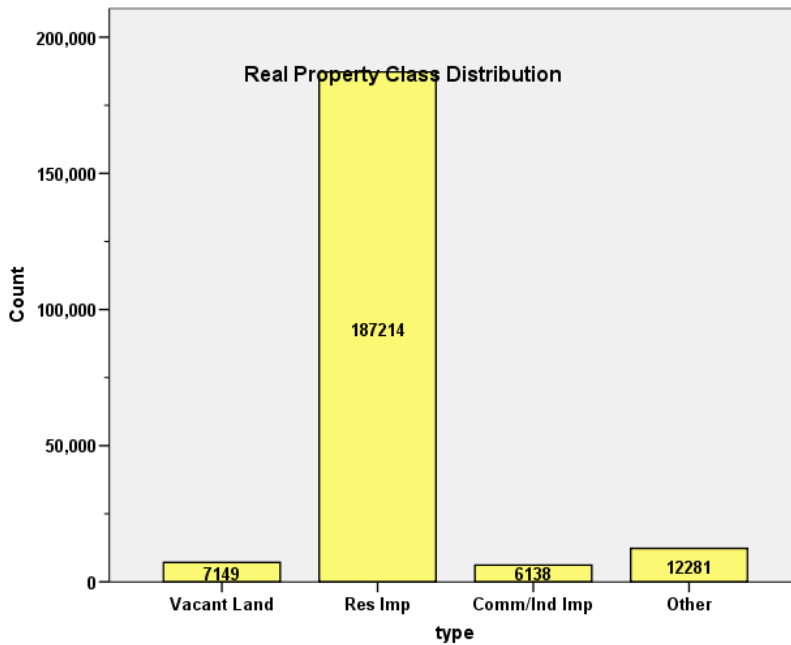
**J. Andrew Rodriguez**, *Field Analyst*

# APPENDICES

## STATISTICAL COMPLIANCE REPORT FOR ARAPAHOE COUNTY 2018

### I. OVERVIEW

Arapahoe County is an urban county that is part of the Denver metropolitan area. The county has a total of 212,782 real property parcels, according to data submitted by the county assessor’s office in 2018. The following provides a breakdown of property classes for this county:



The vacant land class of properties was dominated by residential land. Residential and PUD lots (coded 100 and 400) accounted for 78.1% of all vacant land parcels.

For residential improved properties, single family properties accounted for 84.4% of all residential properties. The next significant subclass of properties was condominiums (coded 1230), which accounted for 14.5% of all properties.

Commercial and industrial properties represented a much smaller proportion of property classes in comparison. Commercial/industrial sales accounted for 2.9% of all such properties in this county.

## II. DATA FILES

The following sales analyses were based on the requirements of the 2018 Colorado Property Assessment Study. Information was provided by the Arapahoe Assessor's Office in April 2018. The data included all 5 property record files as specified by the Auditor.

## III. RESIDENTIAL SALES RESULTS

There were 26,050 qualified residential sales for the 24-month sale period ending June 30, 2016. The sales ratio analysis was as follows:

### Ratio Statistics

<b>Median</b>	<b>1.001</b>
<b>Price Related Differential</b>	<b>1.004</b>
<b>Coefficient of Dispersion</b>	<b>2.4</b>

### Case Processing Summary

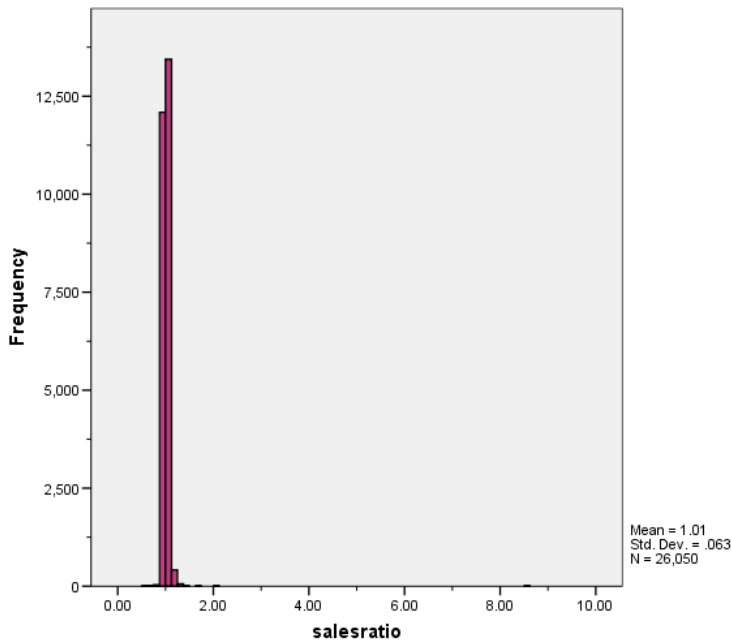
	Count	Percent
ECONAREA 0	2	0.0%
1	47	0.2%
2	83	0.3%
3	943	3.6%
4	567	2.2%
5	1046	4.0%
6	421	1.6%
7	1063	4.1%
8	5027	19.3%
9	360	1.4%
10	2985	11.5%
11	4751	18.2%
12	327	1.3%
13	874	3.4%
14	977	3.8%
15	215	0.8%
16	234	0.9%
17	533	2.0%
18	5411	20.8%
19	184	0.7%
Overall	26050	100.0%
Excluded	0	
Total	26050	

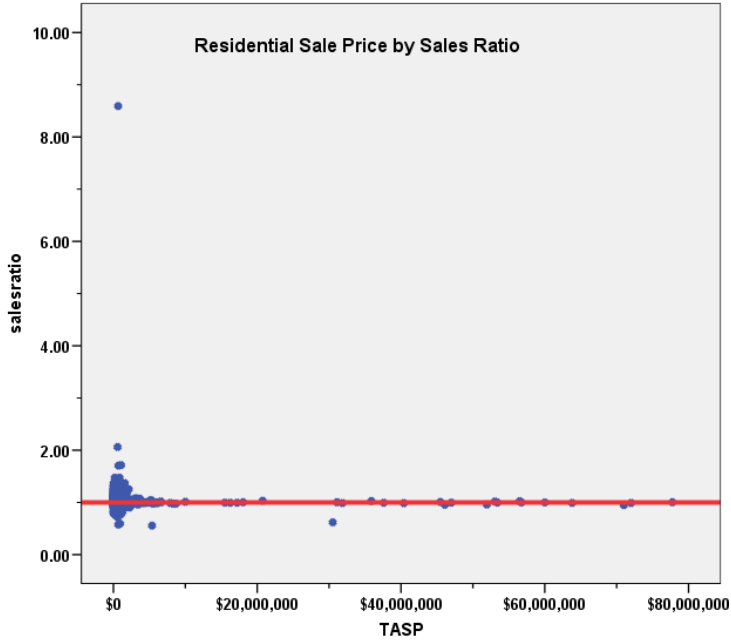


**Ratio Statistics for CurrTot / TASP**

Group	Median	Price Related Differential	Coefficient of Dispersion
0	.996	1.000	.007
1	1.002	1.004	.023
2	1.000	1.003	.020
3	1.002	1.009	.030
4	1.000	1.002	.023
5	1.001	1.003	.026
6	1.004	1.009	.043
7	1.001	1.003	.024
8	1.001	1.004	.025
9	1.001	1.006	.037
10	1.000	1.004	.022
11	1.001	1.003	.021
12	1.000	1.006	.019
13	1.000	1.004	.023
14	1.000	.996	.034
15	1.000	1.003	.023
16	1.000	1.000	.023
17	1.000	1.004	.020
18	1.000	1.003	.023
19	1.001	1.000	.017
<b>Overall</b>	<b>1.001</b>	<b>1.004</b>	<b>.024</b>

The above ratio statistics, stratified by economic area, were in compliance with the standards set forth by the Colorado State Board of Equalization (SBOE) for the overall residential sales. The following graphs describe further the sales ratio distribution for all of these properties:





The above graphs indicate that the distribution of the sale ratios was within state mandated limits.

### Residential Market Trend Analysis

We next analyzed the residential dataset using the 18-month sale period, with the following results:

#### Coefficients<sup>a</sup>

ECONAREA	Model		Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	t	Sig.
1	1	(Constant)	.993	.009		113.284	.000
		SalePeriod	.001	.001	.305	2.149	.037
2	1	(Constant)	.998	.008		126.136	.000
		SalePeriod	.001	.001	.109	.990	.325
3	1	(Constant)	.989	.003		316.636	.000
		SalePeriod	.002	.000	.266	8.471	.000
4	1	(Constant)	.997	.003		313.049	.000
		SalePeriod	.001	.000	.139	3.332	.001
5	1	(Constant)	.990	.002		415.161	.000
		SalePeriod	.002	.000	.271	9.089	.000
6	1	(Constant)	.992	.006		154.112	.000
		SalePeriod	.003	.000	.263	5.583	.000
7	1	(Constant)	.997	.002		438.731	.000
		SalePeriod	.001	.000	.136	4.477	.000
8	1	(Constant)	.997	.001		901.000	.000
		SalePeriod	.001	.000	.174	12.541	.000
9	1	(Constant)	.987	.005		191.742	.000
		SalePeriod	.002	.000	.291	5.747	.000
10	1	(Constant)	1.000	.001		795.480	.000
		SalePeriod	.000	.000	.082	4.505	.000

11	1	(Constant)	1.002	.001		997.656	.000
		SalePeriod	.000	.000	.071	4.889	.000
12	1	(Constant)	1.018	.007		140.140	.000
		SalePeriod	-.001	.001	-.069	-1.246	.213
13	1	(Constant)	.997	.002		403.584	.000
		SalePeriod	.001	.000	.163	4.875	.000
14	1	(Constant)	1.013	.015		66.639	.000
		SalePeriod	.000	.001	.003	.097	.923
15	1	(Constant)	.998	.005		219.921	.000
		SalePeriod	.001	.000	.143	2.103	.037
16	1	(Constant)	1.015	.007		137.922	.000
		SalePeriod	.000	.001	-.054	-.818	.414
17	1	(Constant)	1.000	.003		393.775	.000
		SalePeriod	.001	.000	.119	2.752	.006
18	1	(Constant)	.997	.001		1014.906	.000
		SalePeriod	.001	.000	.156	11.600	.000
19	1	(Constant)	1.009	.004		229.194	.000
		SalePeriod	.000	.000	-.100	-1.360	.176

a. Dependent Variable: salesratio

The above analysis indicated that no significant residential market trend was present in the sale data within each economic area. While there was a statistically significant trend for most economic areas, the actual trend in each was insignificant. We concluded that the assessor has adequately dealt with market trending for residential properties.

### Sold/Unsold Analysis

In terms of the valuation consistency between sold and unsold residential properties, we compared the median actual value per square foot for 2018 between each group. The following results present the overall results, as well as by residential subclass, for sold and unsold properties:

#### Report

VALSF		N	Median	Mean
UNSOLD	160,700	\$191	\$208	
SOLD	25,908	\$192	\$207	

#### Report

VALSF		N	Median	Mean
1	UNSOLD	283	\$254	\$248
	SOLD	47	\$251	\$253
2	UNSOLD	973	\$251	\$253
	SOLD	83	\$257	\$269
3	UNSOLD	4,227	\$180	\$193
	SOLD	934	\$188	\$200
4	UNSOLD	5,038	\$197	\$198
	SOLD	567	\$204	\$208
5	UNSOLD	7,807	\$165	\$174
	SOLD	1,046	\$166	\$173

6	UNSOLD	3,265	\$148	\$156
	SOLD	421	\$147	\$151
7	UNSOLD	7,169	\$162	\$166
	SOLD	1,063	\$166	\$169
8	UNSOLD	25,827	\$165	\$174
	SOLD	5,027	\$172	\$178
9	UNSOLD	2,066	\$166	\$172
	SOLD	360	\$170	\$173
10	UNSOLD	22,728	\$215	\$225
	SOLD	2,985	\$231	\$244
11	UNSOLD	24,928	\$194	\$205
	SOLD	4,751	\$194	\$206
12	UNSOLD	3,468	\$366	\$394
	SOLD	324	\$391	\$408
13	UNSOLD	5,799	\$234	\$238
	SOLD	874	\$239	\$247
14	UNSOLD	7,462	\$287	\$342
	SOLD	974	\$295	\$297
15	UNSOLD	2,093	\$252	\$249
	SOLD	215	\$257	\$259
16	UNSOLD	2,056	\$245	\$271
	SOLD	234	\$266	\$285
17	UNSOLD	4,493	\$218	\$227
	SOLD	533	\$227	\$232
18	UNSOLD	28,065	\$178	\$186
	SOLD	5,411	\$185	\$193
19	UNSOLD	1,151	\$199	\$197
	SOLD	184	\$170	\$183

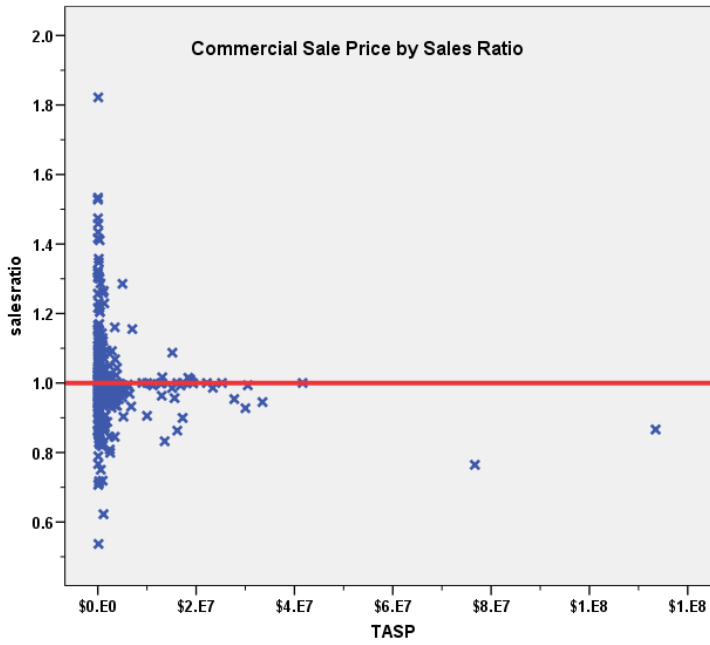
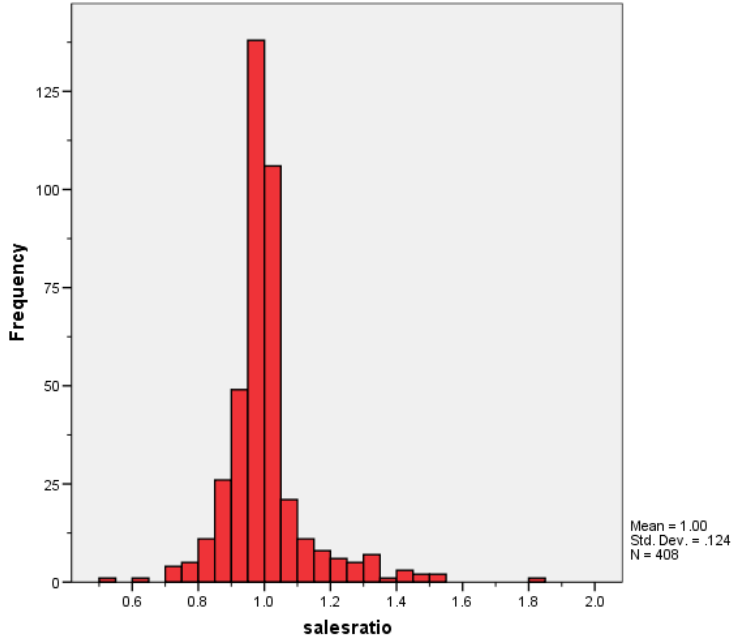
Based on the above results, we concluded that the assessor has valued sold and unsold residential properties in a similar manner.

#### IV. COMMERCIAL/INDUSTRIAL SALE RESULTS

There were 408 qualified commercial/industrial sales for the 24-month sale period ending June 30, 2016. The sales ratio analysis was as follows:

<b>Ratio Statistics</b>	
<b>Median</b>	<b>0.992</b>
<b>Price Related Differential</b>	<b>1.049</b>
<b>Coefficient of Dispersion</b>	<b>7.4</b>

The above ratio statistics were in compliance overall with the standards set forth by the Colorado State Board of Equalization (SBOE) for the overall commercial sales. The following histogram describes further the sales ratio distribution for these properties:



The above histogram indicates that the distribution of the sale ratios was within state mandated limits. No sales were trimmed.

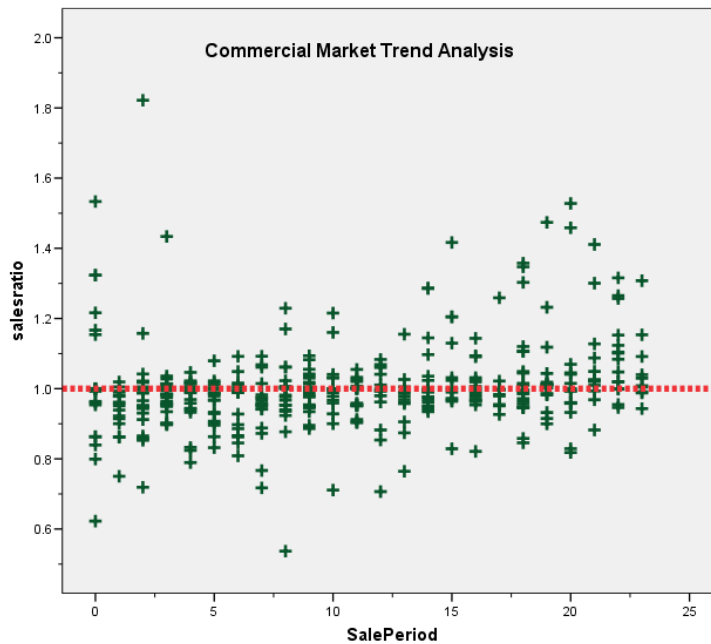
## Commercial Market Trend Analysis

We next analyzed the commercial dataset using the 24-month sale period, with the following results:

### Coefficients<sup>a</sup>

Model		Unstandardized Coefficients		Standardized	t	Sig.
		B	Std. Error	Coefficients Beta		
1	(Constant)	.959	.011		87.832	.000
	SalePeriod	.004	.001	.224		

a. Dependent Variable: salesratio



Although there was a statistically significant trend, the magnitude of that trend was not significant. We concluded that the assessor has adequately dealt with market trending for commercial properties.

### Sold/Unsold Analysis

In terms of the valuation consistency between sold and unsold commercial properties, we first compared the median value per square foot between sold and unsold commercial properties, as follows:

#### Report

VALSF			
sold	N	Median	Mean
UNSOLD	5,709	\$110	\$146
SOLD	408	\$125	\$151



### Hypothesis Test Summary

	Null Hypothesis	Test	Sig.	Decision
1	The distribution of VALSF is the same across categories of sold.	Independent-Samples Mann-Whitney U Test	.000	Reject the null hypothesis.

Asymptotic significances are displayed. The significance level is .01.

Although there was overlap between sold and unsold commercial values, the results from the Mann-Whitney test indicated that there was a statistically significant difference between each group. We next examined the difference between the change in actual value for taxable years 2016 and 2018 as follows:

#### Report

DIFF	sold	N	Median	Mean
UNSOLD	4,695	1.13	1.17	
SOLD	329	1.15	1.25	

We next compared the median change in value by subclass and economic area, as follows:

#### Report

DIFF	ABSTRIMP	ECONAREA	sold	N	Median	Mean
2212.00	102.00	UNSOLD	44	1.1653	1.2229	
		SOLD	1	1.0467	1.0467	
	106.00	UNSOLD	38	1.0977	1.2028	
		SOLD	2	1.1187	1.1187	
	107.00	UNSOLD	76	1.1548	1.2983	
		SOLD	4	1.1199	1.2503	
	108.00	UNSOLD	60	1.1013	1.1735	
		SOLD	2	1.2830	1.2830	
	109.00	UNSOLD	120	1.1297	1.1982	
		SOLD	6	1.4183	1.5619	
	115.00	UNSOLD	258	1.1186	1.2423	
		SOLD	15	1.3015	1.3473	
	116.00	UNSOLD	13	1.1883	1.2445	
		SOLD	2	1.3084	1.3084	
	117.00	UNSOLD	65	1.1167	1.1303	
		SOLD	3	1.3515	1.4100	
2216.00	Total	UNSOLD	1	1.1339	1.1339	
		SOLD	1	.9201	.9201	
2220.00	102.00	UNSOLD	18	1.0764	1.1326	
		SOLD	2	1.0787	1.0787	
	104.00	UNSOLD	17	1.1263	1.3892	
		SOLD	1	1.1238	1.1238	

	107.00	UNSOLD	9	1.1250	1.2251
		SOLD	2	1.3090	1.3090
	109.00	UNSOLD	81	1.0435	1.1150
		SOLD	5	1.1486	1.3643
	110.00	UNSOLD	34	1.2321	1.2911
		SOLD	9	1.3958	1.5350
	112.00	UNSOLD	103	1.1000	1.1988
		SOLD	19	1.5021	1.5067
	113.00	UNSOLD	39	1.1279	1.1920
		SOLD	4	1.5968	1.6634
	114.00	UNSOLD	7	1.1685	1.1393
		SOLD	2	1.7054	1.7054
	115.00	UNSOLD	105	1.0504	1.1405
		SOLD	9	1.4345	1.3297
	116.00	UNSOLD	20	1.0696	1.0975
		SOLD	1	.9310	.9310
	117.00	UNSOLD	80	1.0755	1.2069
		SOLD	8	1.7613	2.0642
	119.00	UNSOLD	2	1.0681	1.0681
		SOLD	1	2.1858	2.1858
2230.00	102.00	UNSOLD	76	1.1796	1.2963
		SOLD	1	1.6029	1.6029
	104.00	UNSOLD	71	1.1507	1.1856
		SOLD	4	1.1972	1.2464
	106.00	UNSOLD	85	1.1524	1.2099
		SOLD	2	2.5107	2.5107
	107.00	UNSOLD	54	1.1525	1.1847
		SOLD	5	2.0533	2.2347
	108.00	UNSOLD	66	1.1182	1.1300
		SOLD	1	1.8873	1.8873
	109.00	UNSOLD	141	1.1527	1.2313
		SOLD	10	1.9697	1.9534
	110.00	UNSOLD	30	1.1442	1.2007
		SOLD	2	2.1986	2.1986
	111.00	UNSOLD	5	1.0889	1.1069
		SOLD	1	2.4818	2.4818
	112.00	UNSOLD	26	1.0614	1.3513
		SOLD	2	1.4268	1.4268
	114.00	UNSOLD	14	1.1846	1.3847
		SOLD	1	1.5199	1.5199
	115.00	UNSOLD	333	1.1339	1.2008
		SOLD	15	1.2842	1.3530
	116.00	UNSOLD	15	1.1473	1.1762
		SOLD	4	1.4921	1.4671
	117.00	UNSOLD	96	1.1399	1.1998
		SOLD	1	1.9208	1.9208
2235.00	102.00	UNSOLD	16	1.2085	1.3001
		SOLD	1	1.2661	1.2661
	109.00	UNSOLD	210	1.2086	1.2442
		SOLD	14	1.3140	1.4465
	113.00	UNSOLD	27	1.2903	1.3340
		SOLD	1	1.5884	1.5884
	115.00	UNSOLD	74	1.1570	1.1746
		SOLD	3	1.1611	1.2307
	116.00	UNSOLD	46	1.1572	1.2158
		SOLD	2	1.5737	1.5737
	117.00	UNSOLD	215	1.2485	1.3022

		SOLD	20	1.2478	1.3144
	118.00	SOLD	1	2.1073	2.1073
2245.00	104.00	UNSOLD	25	1.5714	1.4186
		SOLD	3	1.0000	1.1602
	108.00	UNSOLD	15	.9000	.8986
		SOLD	2	.8947	.8947
	109.00	UNSOLD	69	1.0000	1.1013
		SOLD	8	.9091	1.0227
	110.00	UNSOLD	92	1.0256	1.0574
		SOLD	15	1.1538	1.1113
	112.00	UNSOLD	121	.9706	1.0176
		SOLD	11	.9429	1.0315
	113.00	UNSOLD	148	1.0811	1.1539
		SOLD	9	1.0811	1.4520
	114.00	UNSOLD	5	1.0000	.8933
		SOLD	3	1.0000	1.0000
	115.00	UNSOLD	310	1.3496	1.3370
		SOLD	29	1.1600	1.3734
	116.00	UNSOLD	30	1.2618	1.3444
		SOLD	2	1.3963	1.3963
	117.00	UNSOLD	443	1.0375	1.1429
		SOLD	81	1.1538	1.1259
3215.00	109.00	UNSOLD	2	1.1745	1.1745
		SOLD	1	1.2250	1.2250
	Total	UNSOLD	6	1.1617	1.1652
		SOLD	1	1.2250	1.2250

Based on the above results, we concluded that the assessor has valued sold and unsold commercial properties in a similar manner.

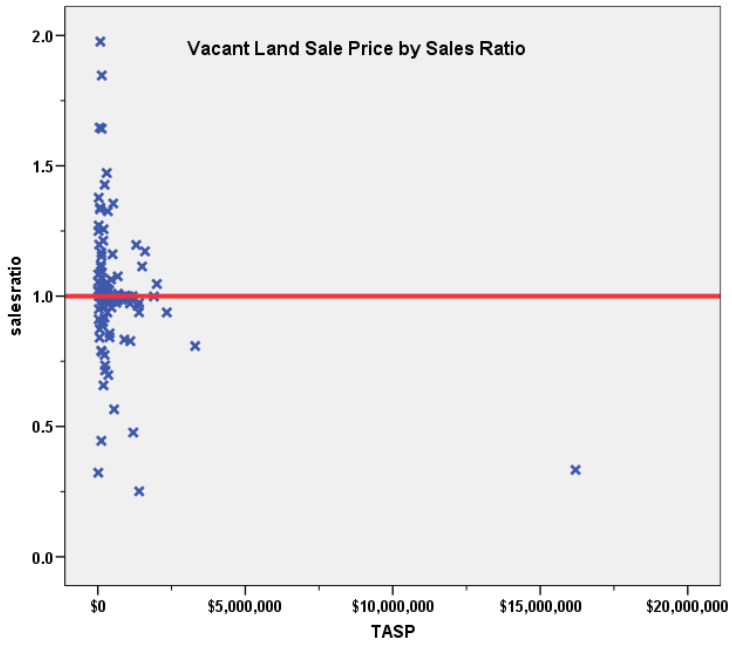
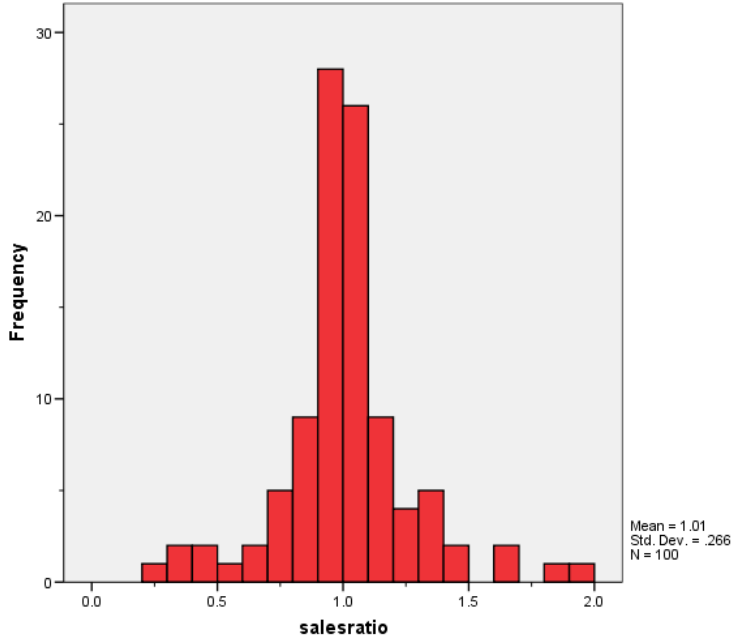
## V. VACANT LAND SALE RESULTS

There were 100 qualified vacant land sales for the 24-month sale period ending June 30, 2016. The sales ratio analysis was as follows:

### Ratio Statistics

<b>Median</b>	<b>1.000</b>
<b>Price Related Differential</b>	<b>1.264</b>
<b>Coefficient of Dispersion</b>	<b>16.6</b>

The above ratio statistics were in compliance overall with the standards set forth by the Colorado State Board of Equalization (SBOE) for the overall vacant land sales. The following graphs describe further the sales ratio distribution for all of these properties:



The above histogram indicates that the distribution of the vacant land sale ratios was within state mandated limits, while the above scatter plot indicated that there was no price related differential issues. No sales were trimmed.

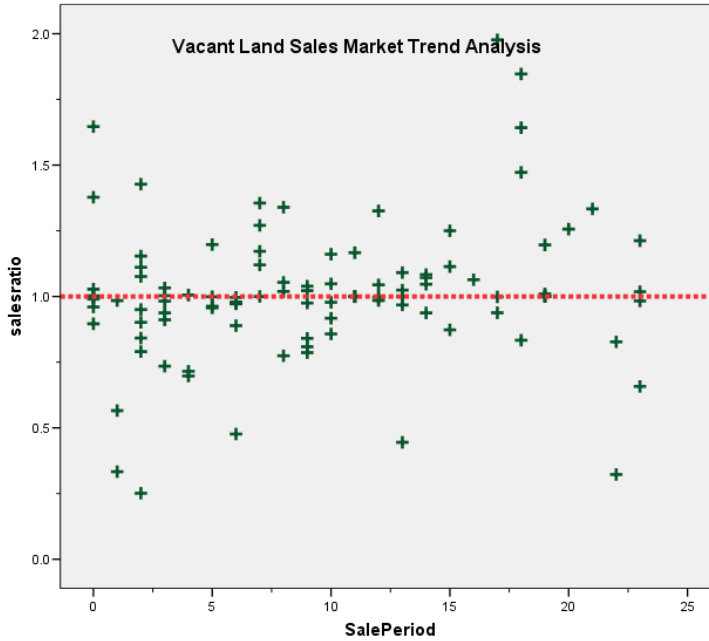
### Vacant Land Market Trend Analysis

We next analyzed the vacant land dataset using the 24-month sale period, with the following results:

**Coefficients<sup>a</sup>**

Model		Unstandardized Coefficients	Std. Error	Standardized Coefficients	t	Sig.
		B		Beta		
1	(Constant)	.949	.045		21.107	.000
	SalePeriod	.007	.004	.172	1.729	.087

a. Dependent Variable: salesratio



The above analysis indicated that no significant market trending was present in the vacant land sale data. We concluded that the assessor has adequately dealt with market trending for vacant land properties.

**Sold/Unsold Analysis**

In terms of the valuation consistency between sold and unsold vacant land properties, we compared the median change in actual value for taxable years 2016 and 2018 between each group. The following were the results:

<b>Report</b>			
DIFF			
	N	Median	Mean
UNSOLD	2,890	1.00	1.10
SOLD	70	1.10	1.26

### Hypothesis Test Summary

	Null Hypothesis	Test	Sig.	Decision
1	The distribution of DIFF is the same across categories of sold.	Independent-Samples Mann-Whitney U Test	.000	Reject the null hypothesis.

Asymptotic significances are displayed. The significance level is .05.

We next examined the change in value for subdivisions with at least 2 sales:

#### Report

DIFF	Subdivision	Category	N	Median	Mean
SUBDIVNO	ANTELOPE HILLS 1ST FLG	UNSOLD	61	2.08	2.23
		SOLD	2	1.99	1.99
AURORA CENTRETECH PARK SUB 10T		UNSOLD	4	1.11	1.11
		SOLD	2	1.11	1.11
CENTENNIAL EAST CORPORATE CENT		UNSOLD	5	1.33	1.20
		SOLD	3	1.94	1.94
DOVE VALLEY BUSINESS PARK SUB		UNSOLD	7	1.33	1.60
		SOLD	2	1.75	1.75
HIGH PLAINS COUNTRY CLUB SUB 1		UNSOLD	9	1.40	1.36
		SOLD	4	1.50	1.48
HILLTOP ACRES 2ND FLG		UNSOLD	1	4.40	4.40
		SOLD	2	2.93	2.93
SOUTHFIELD PARK		UNSOLD	20	1.00	.99
		SOLD	2	1.00	1.00
SPRINGHILL IND PARK SUB 1ST FL		UNSOLD	6	1.00	1.00
		SOLD	2	1.02	1.02
TALLYN'S REACH SUB 15TH FLG		UNSOLD	1	2.00	2.00
		SOLD	3	3.20	3.47

Based on the comparison between sold and unsold properties at the subdivision level, we concluded that the county assessor valued sold and unsold vacant land properties consistently.

## **VI. AGRICULTURAL IMPROVEMENTS ANALYSIS**

Based on the parameters of the 2018 Colorado Property Assessment Audit, this county was excluded from the Agricultural Improvement portion of the statistical compliance audit.

## **VII. CONCLUSIONS**

Based on this statistical analysis, there were no significant compliance issues concluded for Arapahoe County as of the date of this report.

**STATISTICAL ABSTRACT**

**Residential**

ECONAREA	Mean			95% Confidence Interval for Median				Weighted Mean	Weighted Mean		Price Related Differential	Coefficient of Dispersion	V
	Mean	Lower Bound	Upper Bound	Median	Lower Bound	Upper Bound	Actual Coverage		Lower Bound	Upper Bound			
0	.996	.910	1.083	.996	.990	1.003	100.0%	.997	.910	1.083	1.000	.007	
1	1.008	.999	1.018	1.002	.995	1.013	96.0%	1.005	.994	1.015	1.004	.023	
2	1.005	.997	1.013	1.000	.998	1.002	95.2%	1.002	.994	1.011	1.003	.020	
3	1.012	1.008	1.015	1.002	1.000	1.004	95.7%	1.003	.999	1.006	1.009	.030	
4	1.006	1.003	1.009	1.000	1.000	1.001	95.6%	1.004	1.001	1.007	1.002	.023	
5	1.008	1.006	1.011	1.001	1.000	1.002	95.6%	1.006	1.004	1.008	1.003	.026	
6	1.022	1.016	1.029	1.004	1.000	1.007	95.9%	1.013	1.009	1.017	1.009	.043	
7	1.006	1.003	1.008	1.001	1.000	1.002	95.0%	1.003	1.001	1.005	1.003	.024	
8	1.009	1.007	1.010	1.001	1.001	1.002	95.2%	1.004	1.003	1.005	1.004	.025	
9	1.012	1.006	1.017	1.001	.999	1.005	96.0%	1.006	1.001	1.011	1.006	.037	
10	1.005	1.004	1.006	1.000	1.000	1.000	95.2%	1.001	1.000	1.002	1.004	.022	
11	1.006	1.005	1.007	1.001	1.000	1.001	95.2%	1.003	1.002	1.004	1.003	.021	
12	1.010	1.002	1.018	1.000	1.000	1.001	95.4%	1.005	.995	1.014	1.006	.019	
13	1.007	1.004	1.010	1.000	1.000	1.001	95.4%	1.003	1.001	1.005	1.004	.023	
14	1.014	.999	1.029	1.000	1.000	1.001	95.3%	1.018	.988	1.048	.996	.034	
15	1.006	1.001	1.011	1.000	.999	1.002	95.9%	1.003	.999	1.008	1.003	.023	
16	1.010	1.002	1.017	1.000	1.000	1.000	95.8%	1.009	.999	1.019	1.000	.023	
17	1.006	1.003	1.009	1.000	1.000	1.001	95.4%	1.002	1.000	1.005	1.004	.020	
18	1.007	1.006	1.008	1.000	1.000	1.001	95.3%	1.004	1.003	1.005	1.003	.023	
19	1.004	1.000	1.008	1.001	.999	1.002	95.4%	1.004	1.000	1.008	1.000	.017	

The confidence interval for the median is constructed without any distribution assumptions. The actual coverage level may be greater than the specified level. Other confidence intervals are constructed by assuming a Normal distribution for the ratios.



**Commercial/Industrial**

**Ratio Statistics for CurrTot / TASP**

Mean	95% Confidence Interval for Mean		Median	95% Confidence Interval for Median			Actual Coverage	Weighted Mean	95% Confidence Interval for Weighted Mean		Price Related Differential	Coefficient of Dispersion	Coefficient of Variation Mean Centered
	Lower Bound	Upper Bound		Lower Bound	Upper Bound	Lower Bound			Upper Bound				
1.001	.989	1.013	.992	.985	.998	95.8%	.954	.921	.988	1.049	.074	12.4%	

The confidence interval for the median is constructed without any distribution assumptions. The actual coverage level may be greater than the specified level. Other confidence intervals are constructed by assuming a Normal distribution for the ratios.

**Vacant Land**

**Ratio Statistics for CurrLnd / TASP**

Mean	95% Confidence Interval for Mean		Median	95% Confidence Interval for Median			Actual Coverage	Weighted Mean	95% Confidence Interval for Weighted Mean		Price Related Differential	Coefficient of Dispersion	Coefficient of Variation Mean Centered
	Lower Bound	Upper Bound		Lower Bound	Upper Bound	Lower Bound			Upper Bound				
1.013	.960	1.065	1.000	.983	1.018	96.5%	.801	.559	1.044	1.264	.166	26.3%	

The confidence interval for the median is constructed without any distribution assumptions. The actual coverage level may be greater than the specified level. Other confidence intervals are constructed by assuming a Normal distribution for the ratios.



**Residential Median Ratio Stratification**

**Sale Price**

**Case Processing Summary**

		Count	Percent
SPRec	\$25K to \$50K	22	0.1%
	\$50K to \$100K	547	2.1%
	\$100K to \$150K	1253	4.8%
	\$150K to \$200K	2487	9.5%
	\$200K to \$300K	7815	30.0%
	\$300K to \$500K	10516	40.4%
	\$500K to \$750K	2329	8.9%
	\$750K to \$1,000K	540	2.1%
	Over \$1,000K	541	2.1%
Overall		26050	100.0%
Excluded		0	
Total		26050	

**Ratio Statistics for CurrTot / TASP**

Group	Median	Price Related Differential	Coefficient of Dispersion	Coefficient of Variation Median Centered
\$25K to \$50K	1.016	1.002	.056	8.1%
\$50K to \$100K	1.027	1.001	.069	9.6%
\$100K to \$150K	1.012	1.000	.046	6.6%
\$150K to \$200K	1.009	1.000	.036	5.5%
\$200K to \$300K	1.002	1.001	.023	3.6%
\$300K to \$500K	1.000	1.000	.017	2.8%
\$500K to \$750K	.999	1.000	.021	16.2%
\$750K to \$1,000K	.999	1.000	.020	4.2%
Over \$1,000K	1.000	1.002	.019	5.6%
Overall	1.001	1.004	.024	6.3%

**Subclass**

**Case Processing Summary**

		Count	Percent
ABSTRIMP	1212	20714	79.5%
	1215	117	0.4%
	1225	3	0.0%
	1230	5216	20.0%
Overall		26050	100.0%
Excluded		0	
Total		26050	

### Ratio Statistics for CurrTot / TASP

Group	Median	Price Related Differential	Coefficient of Dispersion	Coefficient of Variation Median Centered
1212	1.000	1.002	.021	3.6%
1215	1.001	1.002	.017	2.7%
1225	1.003	3.427	2.526	534.8%
1230	1.003	1.008	.037	5.8%
Overall	1.001	1.004	.024	6.3%

### Improvement Age

#### Case Processing Summary

		Count	Percent
AgeRec	Over 100	86	0.3%
	75 to 100	285	1.1%
	50 to 75	2614	10.0%
	25 to 50	11969	45.9%
	5 to 25	8656	33.2%
	5 or Newer	2440	9.4%
Overall		26050	100.0%
Excluded		0	
Total		26050	

### Ratio Statistics for CurrTot / TASP

Group	Median	Price Related Differential	Coefficient of Dispersion	Coefficient of Variation Median Centered
Over 100	1.003	1.003	.024	3.6%
75 to 100	.999	1.004	.027	4.5%
50 to 75	1.000	1.001	.022	4.2%
25 to 50	1.001	1.004	.027	4.8%
5 to 25	1.001	1.004	.021	3.4%
5 or Newer	1.000	1.001	.025	15.7%
Overall	1.001	1.004	.024	6.3%

### Improved Area

#### Case Processing Summary

		Count	Percent
ImpSFRRec	LE 500 sf	57	0.2%
	500 to 1,000 sf	3584	13.8%
	1,000 to 1,500 sf	8664	33.3%
	1,500 to 2,000 sf	6311	24.2%
	2,000 to 3,000 sf	5634	21.6%
	3,000 sf or Higher	1800	6.9%
Overall		26050	100.0%
Excluded		0	
Total		26050	

### Ratio Statistics for CurrTot / TASP

Group	Median	Price Related Differential	Coefficient of Dispersion	Coefficient of Variation Median Centered
LE 500 sf	1.000	1.004	.041	7.1%
500 to 1,000 sf	1.003	1.006	.038	6.2%
1,000 to 1,500 sf	1.001	1.003	.026	4.2%
1,500 to 2,000 sf	1.000	1.002	.019	3.1%
2,000 to 3,000 sf	1.000	1.001	.017	2.9%
3,000 sf or Higher	1.000	1.004	.025	18.7%
Overall	1.001	1.004	.024	6.3%

### Improvement Quality

#### Case Processing Summary

		Count	Percent
QUALITY	Average	9272	35.6%
	Average Minus	480	1.8%
	Average Plus	4558	17.5%
	Economy	23	0.1%
	Excellent	161	0.6%
	Excellent Minus	137	0.5%
	Excellent Plus	72	0.3%
	Fair	154	0.6%
	Fair Minus	99	0.4%
	Fair Plus	413	1.6%
	Good	2467	9.5%
	Good Minus	3131	12.0%
	Good Plus	2809	10.8%
	Non Contributory Value	15	0.1%
	Premier	10	0.0%
	Premier Minus	29	0.1%
	Premier Plus	11	0.0%
	Very Good	671	2.6%
Very Good Minus	1084	4.2%	
Very Good Plus	454	1.7%	
Overall		26050	100.0%
Excluded		0	
Total		26050	

### Ratio Statistics for CurrTot / TASP

Group	Median	Price Related Differential	Coefficient of Dispersion	Coefficient of Variation Median Centered
Average	1.001	1.004	.027	4.4%
Average Minus	1.006	1.008	.040	6.4%
Average Plus	1.000	1.002	.020	3.5%
Economy	1.012	1.001	.034	4.6%
Excellent	1.000	1.000	.030	8.0%
Excellent Minus	1.000	1.002	.014	2.6%
Excellent Plus	1.000	.998	.015	2.6%
Fair	1.012	1.006	.059	8.8%
Fair Minus	1.021	1.007	.064	8.8%
Fair Plus	1.001	1.006	.051	7.8%
Good	1.000	1.000	.023	15.7%
Good Minus	1.001	1.002	.019	3.1%
Good Plus	1.000	1.003	.022	4.1%
Non Contributory Value	1.000	.951	.049	8.6%
Premier	.998	1.025	.050	14.8%
Premier Minus	1.000	.996	.016	2.6%
Premier Plus	.999	1.001	.009	1.5%
Very Good	.999	1.000	.018	3.8%
Very Good Minus	1.000	1.000	.020	3.1%
Very Good Plus	1.000	1.000	.017	3.2%
Overall	1.001	1.004	.024	6.3%

### Commercial Median Ratio Stratification

#### Sale Price

#### Case Processing Summary

		Count	Percent
SPRec	LT \$25K	5	1.2%
	\$25K to \$50K	9	2.2%
	\$50K to \$100K	50	12.3%
	\$100K to \$150K	31	7.6%
	\$150K to \$200K	44	10.8%
	\$200K to \$300K	27	6.6%
	\$300K to \$500K	42	10.3%
	\$500K to \$750K	40	9.8%
	\$750K to \$1,000K	23	5.6%
	Over \$1,000K	137	33.6%
Overall		408	100.0%
Excluded		0	
Total		408	

### Ratio Statistics for CurrTot / TASP

Group	Median	Price Related Differential	Coefficient of Dispersion	Coefficient of Variation Median Centered
LT \$25K	1.417	1.002	.061	8.0%
\$25K to \$50K	1.216	1.004	.131	18.1%
\$50K to \$100K	.996	1.002	.102	17.6%
\$100K to \$150K	.973	1.000	.082	13.1%
\$150K to \$200K	1.006	1.002	.062	10.3%
\$200K to \$300K	.990	.997	.076	10.6%
\$300K to \$500K	1.000	1.000	.073	11.5%
\$500K to \$750K	.993	1.001	.041	7.5%
\$750K to \$1,000K	.983	.999	.063	10.7%
Over \$1,000K	.978	1.027	.052	8.2%
Overall	.992	1.049	.074	12.6%

### Subclass

#### Case Processing Summary

	Count	Percent
ABSTRIMP	2212	45
	2215	1
	2216	1
	2218	1
	2220	71
	2230	52
	2235	56
	2245	179
	3215	2
Overall	408	100.0%
Excluded	0	
Total	408	

### Ratio Statistics for CurrTot / TASP

Group	Median	Price Related Differential	Coefficient of Dispersion	Coefficient of Variation Median Centered
2212	.991	1.005	.039	5.9%
2215	1.285	1.000	.000	.
2216	1.049	1.000	.000	.
2218	.963	1.000	.000	.
2220	.993	1.037	.039	6.5%
2230	.960	1.011	.048	8.8%
2235	1.000	1.017	.057	9.7%
2245	1.000	1.029	.106	16.5%
3215	.993	.987	.098	13.9%
Overall	.992	1.049	.074	12.6%

## Improvement Age

### Case Processing Summary

		Count	Percent
AgeRec	Over 100	3	0.7%
	75 to 100	5	1.2%
	50 to 75	38	9.3%
	25 to 50	182	44.6%
	5 to 25	124	30.4%
	5 or Newer	56	13.7%
Overall		408	100.0%
Excluded		0	
Total		408	

### Ratio Statistics for CurrTot / TASP

Group	Median	Price Related Differential	Coefficient of Dispersion	Coefficient of Variation Median Centered
Over 100	1.040	1.047	.038	6.0%
75 to 100	.987	1.000	.035	5.7%
50 to 75	.992	1.070	.106	18.6%
25 to 50	.993	1.010	.070	12.6%
5 to 25	.993	1.095	.068	10.4%
5 or Newer	.986	1.138	.086	12.9%
Overall	.992	1.049	.074	12.6%

## Improved Area

### Case Processing Summary

		Count	Percent
ImpSFRec	LE 500 sf	13	3.2%
	500 to 1,000 sf	77	18.9%
	1,000 to 1,500 sf	57	14.0%
	1,500 to 2,000 sf	17	4.2%
	2,000 to 3,000 sf	40	9.8%
	3,000 sf or Higher	204	50.0%
Overall		408	100.0%
Excluded		0	
Total		408	

### Ratio Statistics for CurrTot / TASP

Group	Median	Price Related Differential	Coefficient of Dispersion	Coefficient of Variation Median Centered
LE 500 sf	1.257	1.133	.148	18.5%
500 to 1,000 sf	.983	1.020	.088	13.5%
1,000 to 1,500 sf	.999	1.006	.067	11.0%
1,500 to 2,000 sf	.986	1.039	.107	23.3%
2,000 to 3,000 sf	1.004	1.018	.083	12.4%
3,000 sf or Higher	.990	1.036	.055	9.0%
Overall	.992	1.049	.074	12.6%

### Improvement Quality

#### Case Processing Summary

		Count	Percent
QUALITY	Average	315	77.2%
	Fair	42	10.3%
	Good	46	11.3%
	Very Good	5	1.2%
Overall		408	100.0%
Excluded		0	
Total		408	

### Ratio Statistics for CurrTot / TASP

Group	Median	Price Related Differential	Coefficient of Dispersion	Coefficient of Variation Median Centered
Average	.990	1.023	.079	12.9%
Fair	1.000	1.006	.059	14.5%
Good	.992	1.012	.055	8.2%
Very Good	.964	1.093	.097	13.4%
Overall	.992	1.049	.074	12.6%



## Vacant Land Median Ratio Stratification

### Sale Price

#### Case Processing Summary

		Count	Percent
SPRec	LT \$25K	4	4.0%
	\$25K to \$50K	7	7.0%
	\$50K to \$100K	10	10.0%
	\$100K to \$150K	17	17.0%
	\$150K to \$200K	8	8.0%
	\$200K to \$300K	11	11.0%
	\$300K to \$500K	13	13.0%
	\$500K to \$750K	7	7.0%
	\$750K to \$1,000K	5	5.0%
	Over \$1,000K	18	18.0%
Overall		100	100.0%
Excluded		0	
Total		100	

#### Ratio Statistics for CurrLnd / TASP

Group	Median	Price Related Differential	Coefficient of Dispersion	Coefficient of Variation Median Centered
LT \$25K	1.036	1.056	.192	39.9%
\$25K to \$50K	1.198	1.005	.124	16.1%
\$50K to \$100K	1.060	1.000	.255	37.7%
\$100K to \$150K	1.039	.993	.191	30.3%
\$150K to \$200K	.999	.999	.118	18.5%
\$200K to \$300K	1.003	.991	.172	24.8%
\$300K to \$500K	.979	.998	.103	15.6%
\$500K to \$750K	1.005	1.000	.130	23.1%
\$750K to \$1,000K	.997	1.000	.037	8.2%
Over \$1,000K	.973	1.277	.171	28.9%
Overall	1.000	1.264	.166	26.6%

### Subclass

#### Case Processing Summary

		Count	Percent
ABSTRLND	0	10	10.0%
	100	35	35.0%
	200	12	12.0%
	300	7	7.0%
	400	31	31.0%
	1000	3	3.0%
	2230	1	1.0%
	2235	1	1.0%
	Overall	100	100.0%
Excluded		0	
Total		100	

### Ratio Statistics for CurrLnd / TASP

Group	Median	Price Related Differential	Coefficient of Dispersion	Coefficient of Variation Median Centered
0	1.001	1.014	.065	13.4%
100	.990	1.102	.183	29.9%
200	1.015	1.055	.146	21.9%
300	.960	.968	.131	20.2%
400	1.000	1.541	.180	28.8%
1000	1.054	.939	.047	7.9%
2230	.697	1.000	.000	.
2235	.323	1.000	.000	.
Overall	1.000	1.264	.166	26.6%