FRANKLIN COUNTY

2024 Statistical Study

VISION
GOVERNMENT SOLUTIONS

2024 Statistical Study: Executive Summary

Drawing on our extensive background in mass appraisal, Vision Government Solutions Inc. (Vision) conducted an extensive third-party examination of the 2023 Revaluation of Franklin County.

The scope of our study involved evaluating the typical statistical measures of central tendency that are regularly employed by the State of Ohio's Department of Taxation. Specifically, we focused on the median of sales ratios (MSR), the Coefficient of Dispersion (COD), and the Price Related Differential (PRD).

Conducting additional statistical tests beyond the standard practices offers insight and enhances the overall analysis. As a result, we performed supplementary, less conventional statistical analyses, the findings of which are detailed in this report.

Relying on our experience performing similar reappraisals, we have also investigated and identified areas of potential concern within Franklin County's property data and CAMA system structure.

Through our comprehensive analysis and review, we have concluded **the 2023 Revaluation was a tremendous success**.

The measured levels of equity that have been achieved not only reach but far surpass the minimum acceptable thresholds. Vision compliments the county staff and appraisal team involved in the tangible improvements made during the 2023 revaluation.

The impressive outcomes are a testament to the Auditor, Auditor's Staff, and the vendor's hard work and dedication to ensuring high standards in the assessment process. Our detailed findings can be found on the pages that follow this executive summary.

Table of Contents

Introduction

The purpose of this document is to serve as a performance audit of the 2023 Revaluation of Franklin County. Additionally, a thorough review of parcel data and rate structure is included.

Background

In order to maintain equitable values throughout time, the Ohio Revised Code mandates that each parcel be inspected and revalued every 6 years. This is known as the revaluation, or "reval". Franklin County's reval occurred in 2023, with the next reval occurring in 2029.

As 6 years can be quite a long time when it comes to real-estate market fluctuations, an update is performed between the revaluations.

This interim update is known as the triennial update, or "tri".

During both "reval" and "tri" updates, a process known as mass appraisal is performed.

Mass appraisal is a systematic process of valuing a group of properties at a given date, using standardized procedures and statistical techniques. Unlike single-property appraisal, which evaluates one property at a time, mass appraisal assesses many properties simultaneously. This method typically involves the development of a valuation model, which is a mathematical expression that represents the relationship between property values and various influencing factors such as location, size, use, and market conditions. The data collected is analyzed and processed to ensure accuracy and consistency, with the goal of producing fair and equitable property assessments.

Franklin County Auditor Michael Stinziano contracted with our appraisal firm to conduct an independent and extensive performance audit of the 2023 Revaluation.

Background

The goal of this study is to ensure equitable values were achieved during the update as well as identify data discrepancies that may ultimately lead to inaccurate value at the parcel level.

In order to perform such a review, we will rely on accuracy and fairness measures that have been developed over time by the International Association of Assessing Officers (IAAO). From the IAAO website,

" *IAAO is a nonprofit, educational, and research association. It is a professional membership organization of government assessment officials and others interested in the administration of the property tax. IAAO was founded in 1934, and now has a membership of more than 8,500 members worldwide from governmental, business, and academic communities.* "

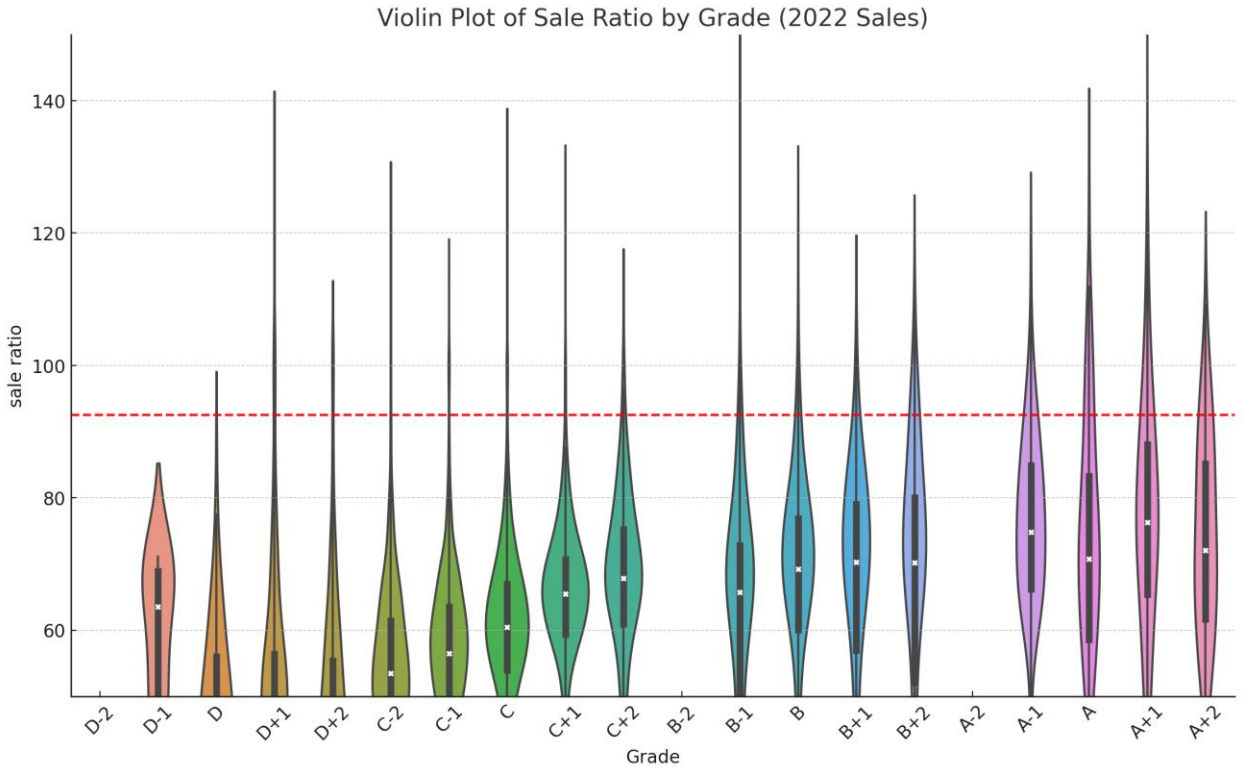
One of the key metrics provided to us by the IAAO is the sale ratio. A sale ratio is a key metric used to assess the accuracy and fairness of property valuations. The sales ratio is calculated by dividing the assessed value of a property by its actual sale price. This ratio helps to determine how close the assessed values are to the market values. A sales ratio of 100% indicates that the assessed value is equal to the sale price, suggesting an accurate appraisal.

Ratios above 100% indicate over-assessment, while ratios below 100% indicate under-assessment.

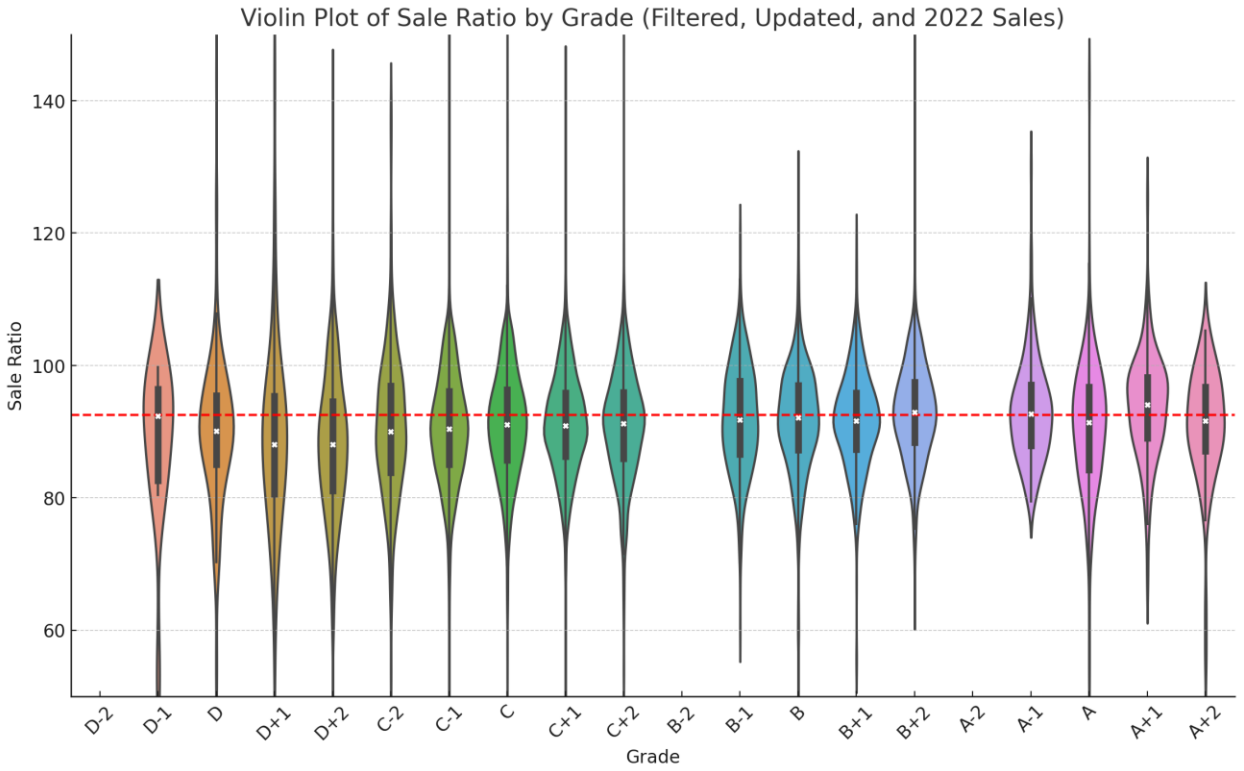
It is not uncommon for the median assessment level to be below 100%. A 90-94% sale ratio is typically targeted, with 90% being the Ohio Department of Taxation (DTE)'s minimum acceptable assessment level.

The definitions section at the end of this document contains more information on other IAAO metrics and charts used throughout this study.

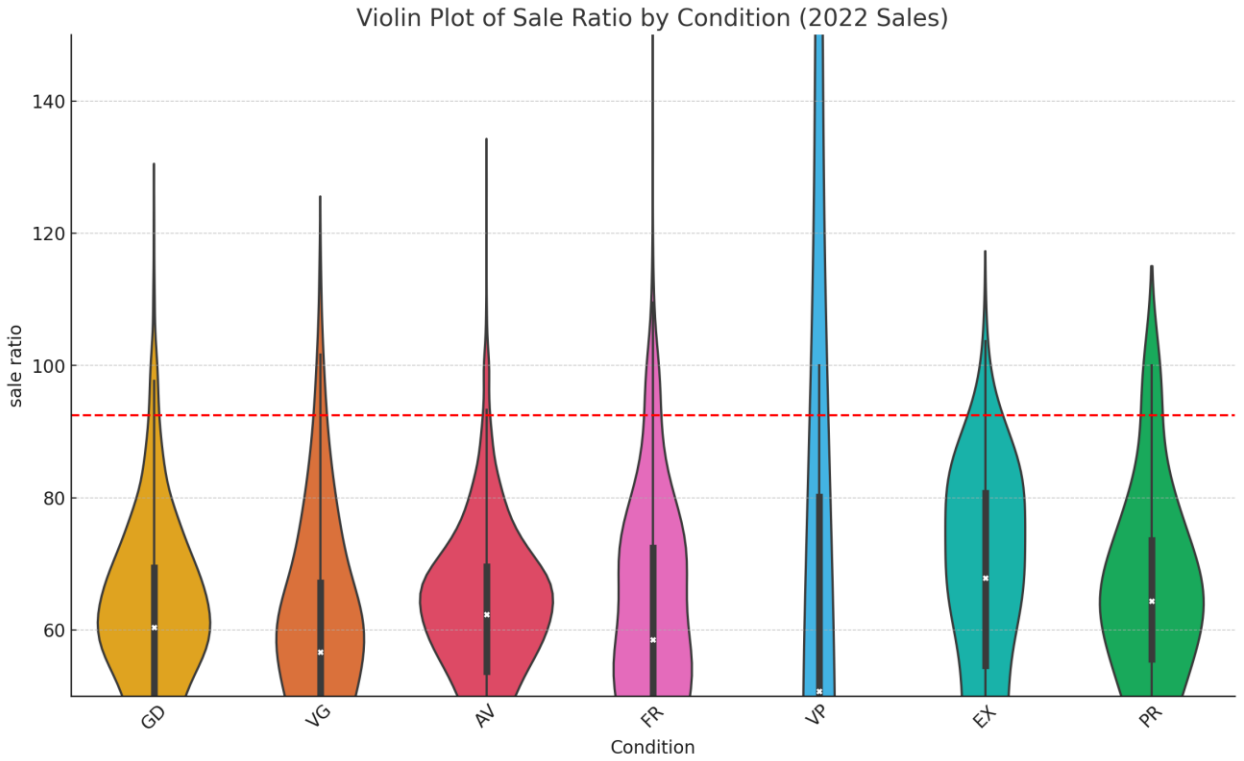
Pre-Revaluation



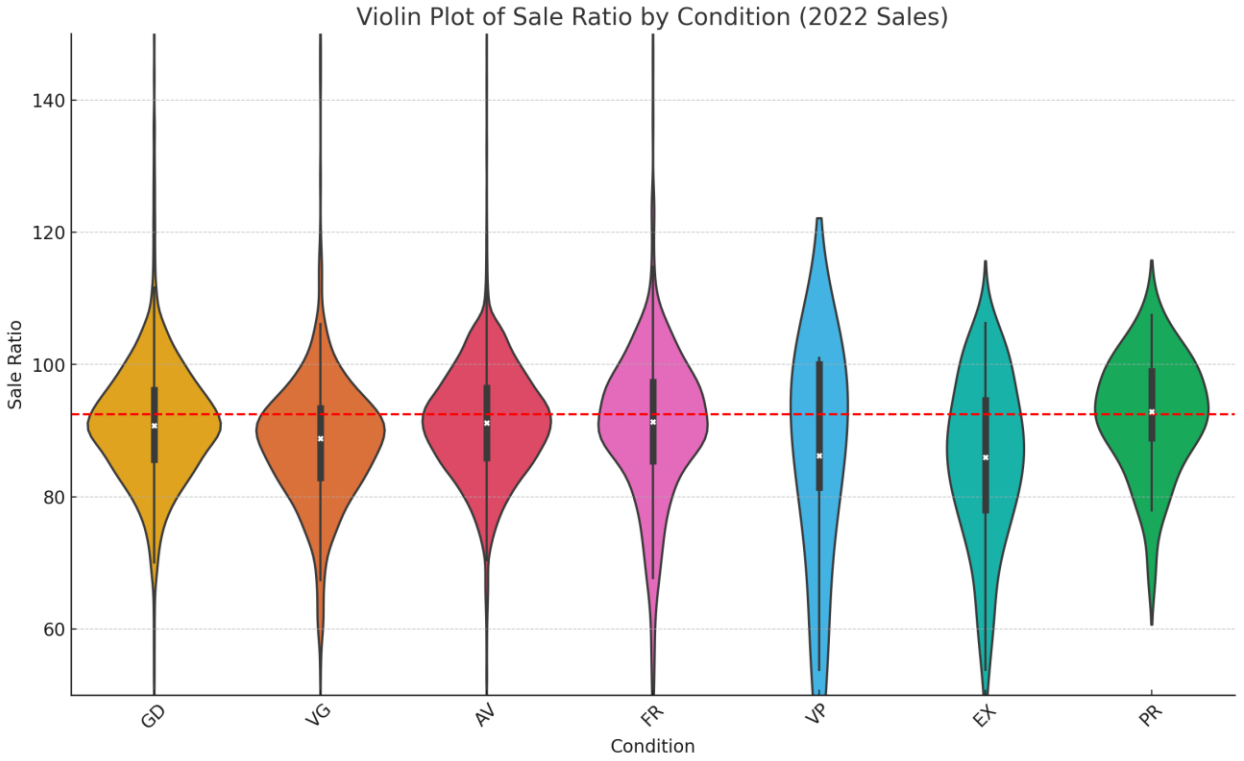
Post-Revaluation



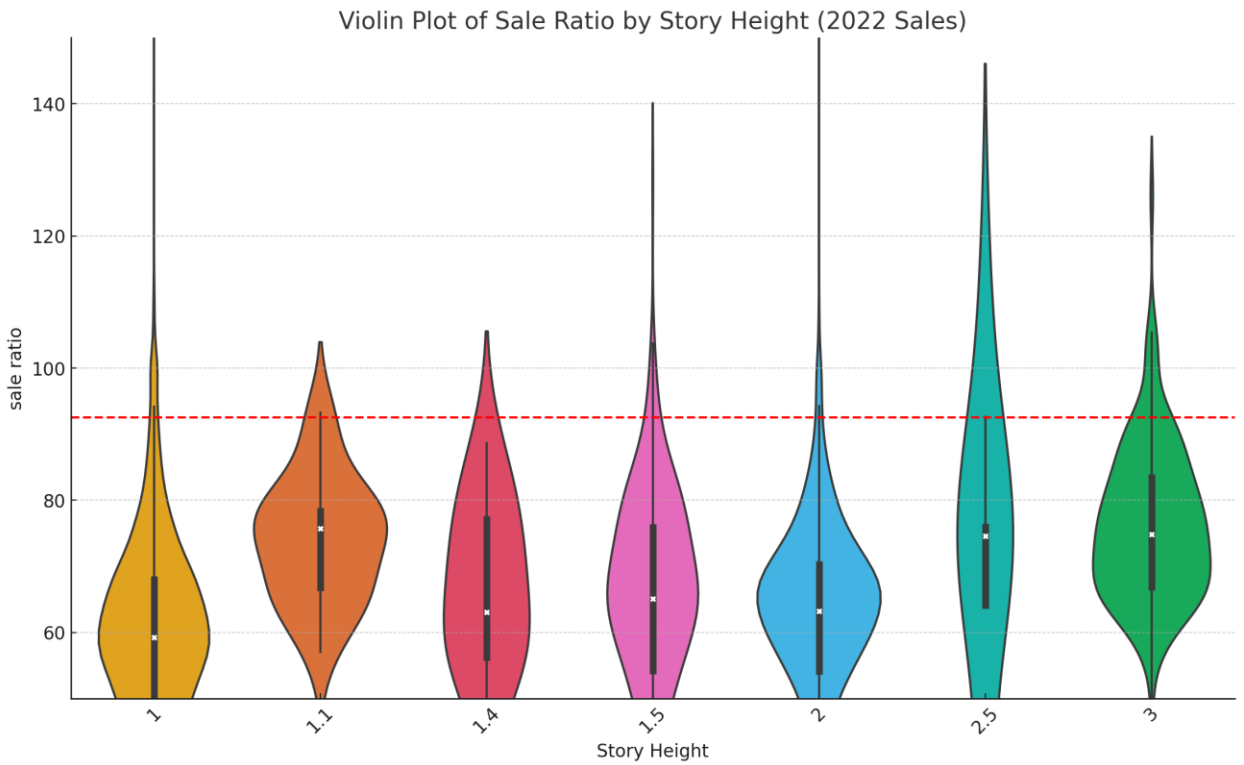
Pre-Revaluation



Post-Revaluation

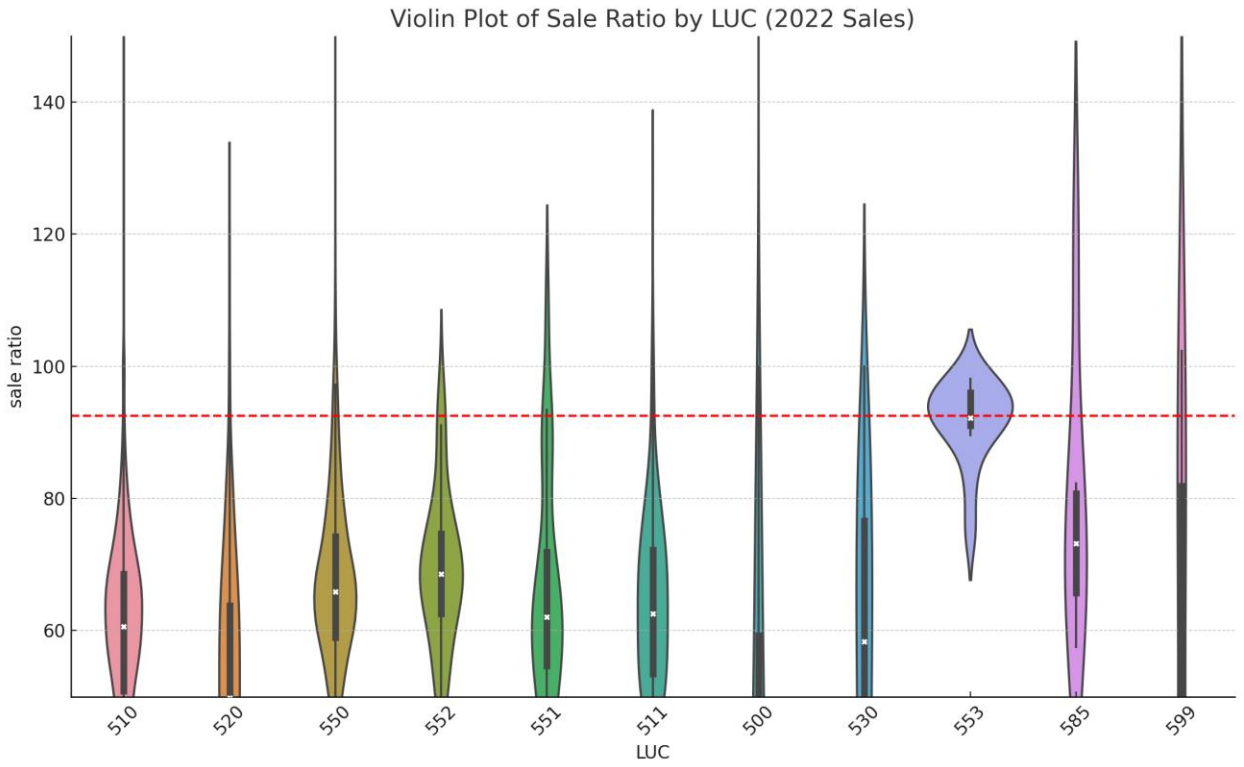


Pre-Revaluation

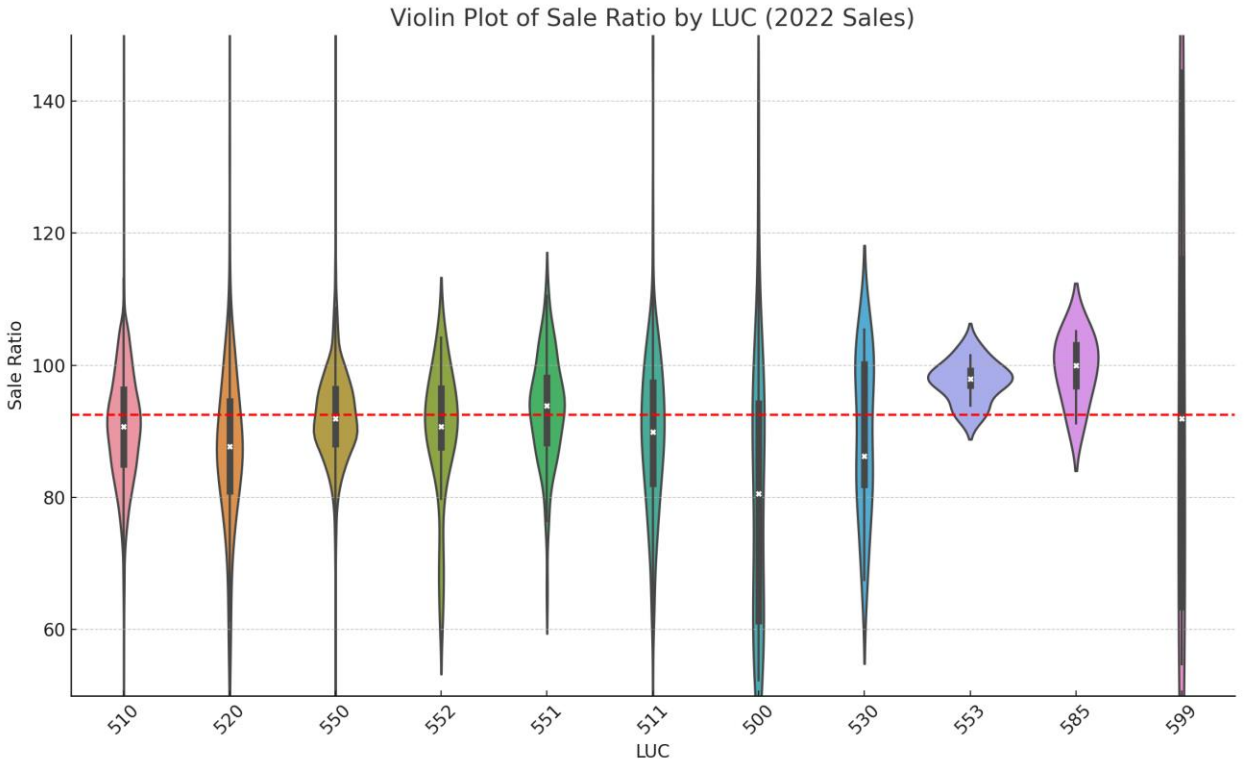


Post-Revaluation

Pre-Revaluation

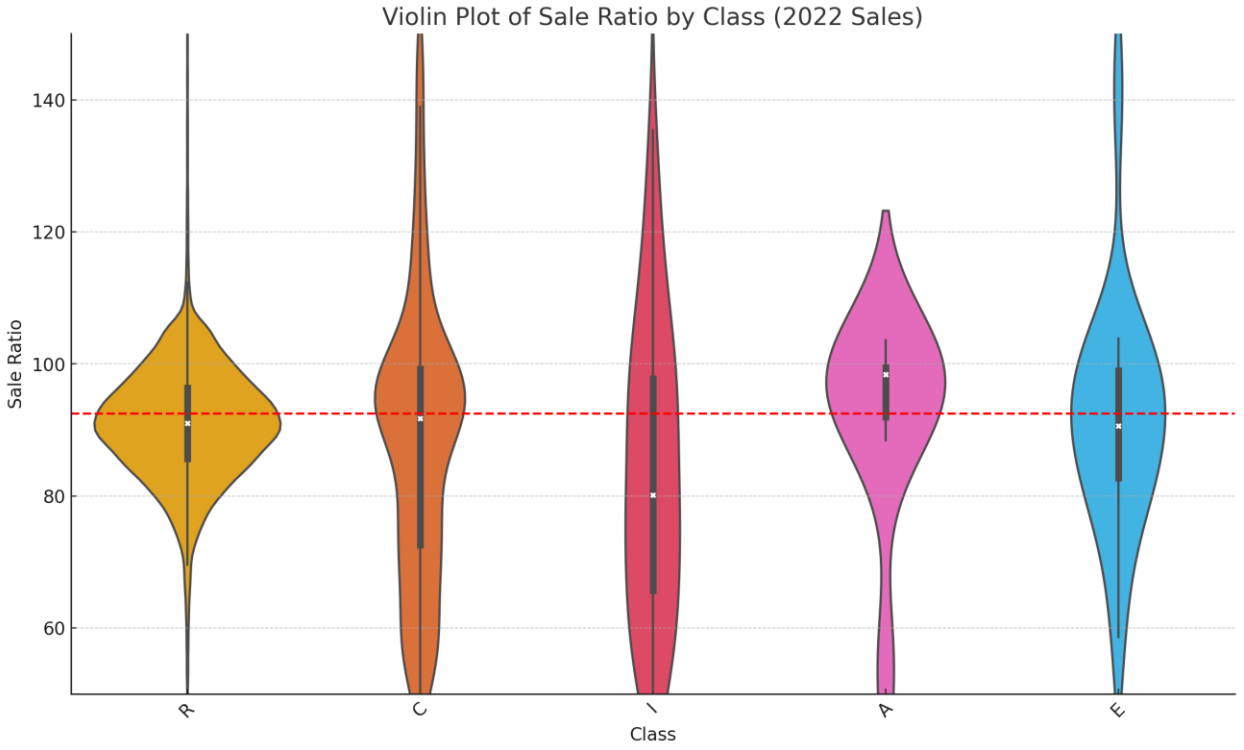


Post-Revaluation

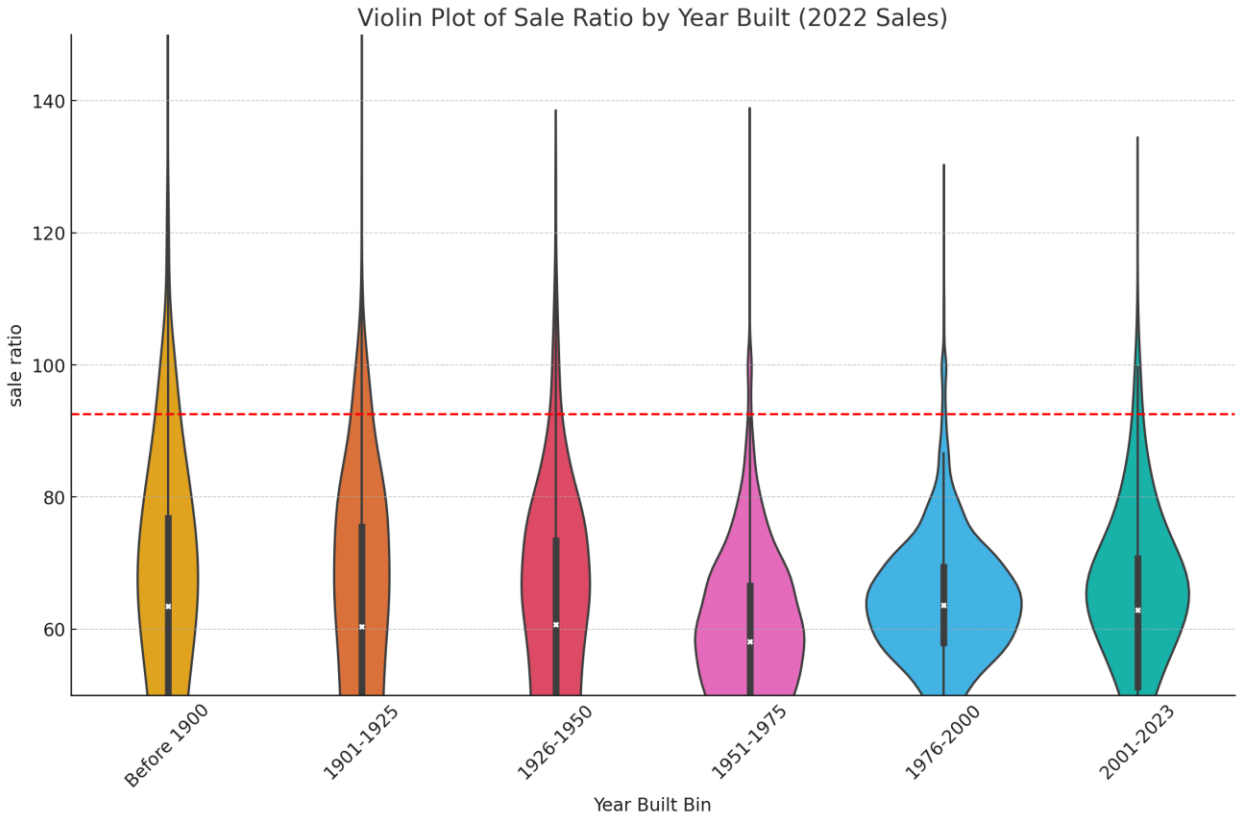


Pre-Revaluation

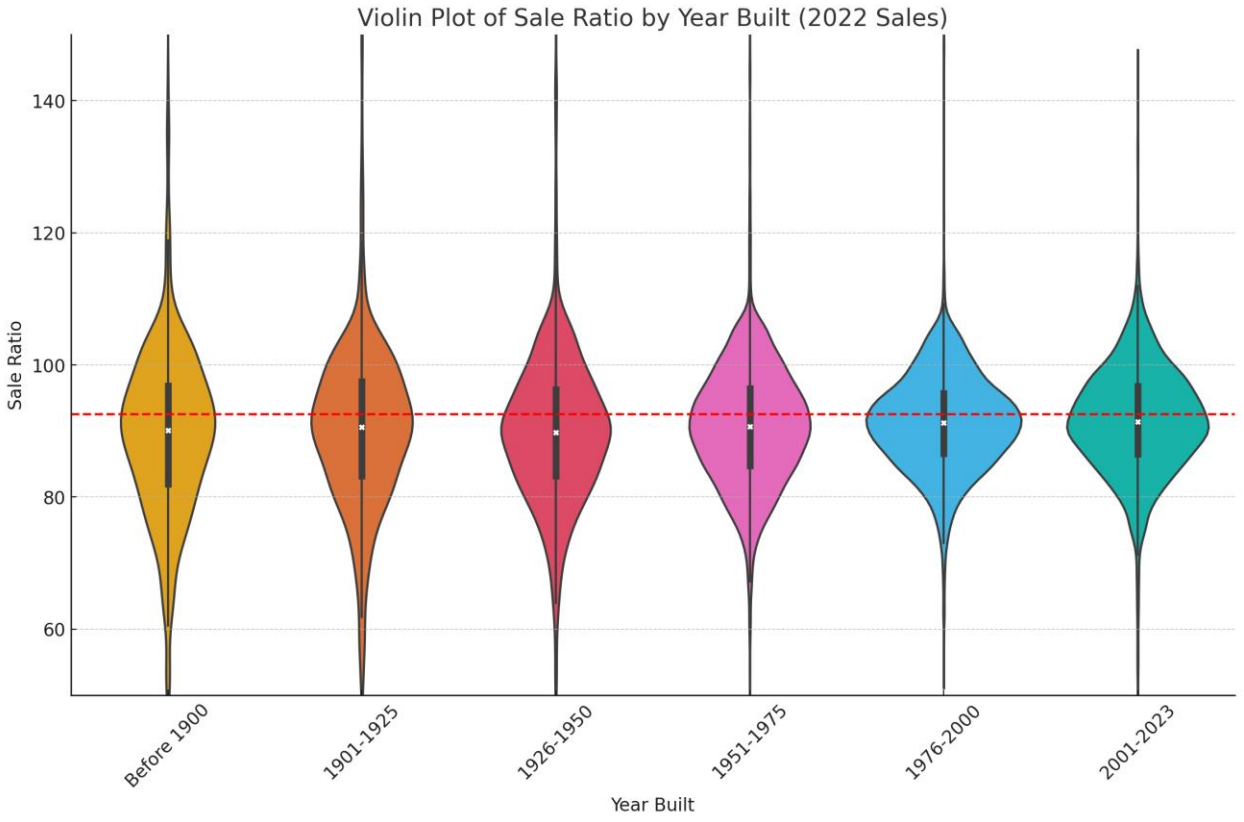
Post-Revaluation



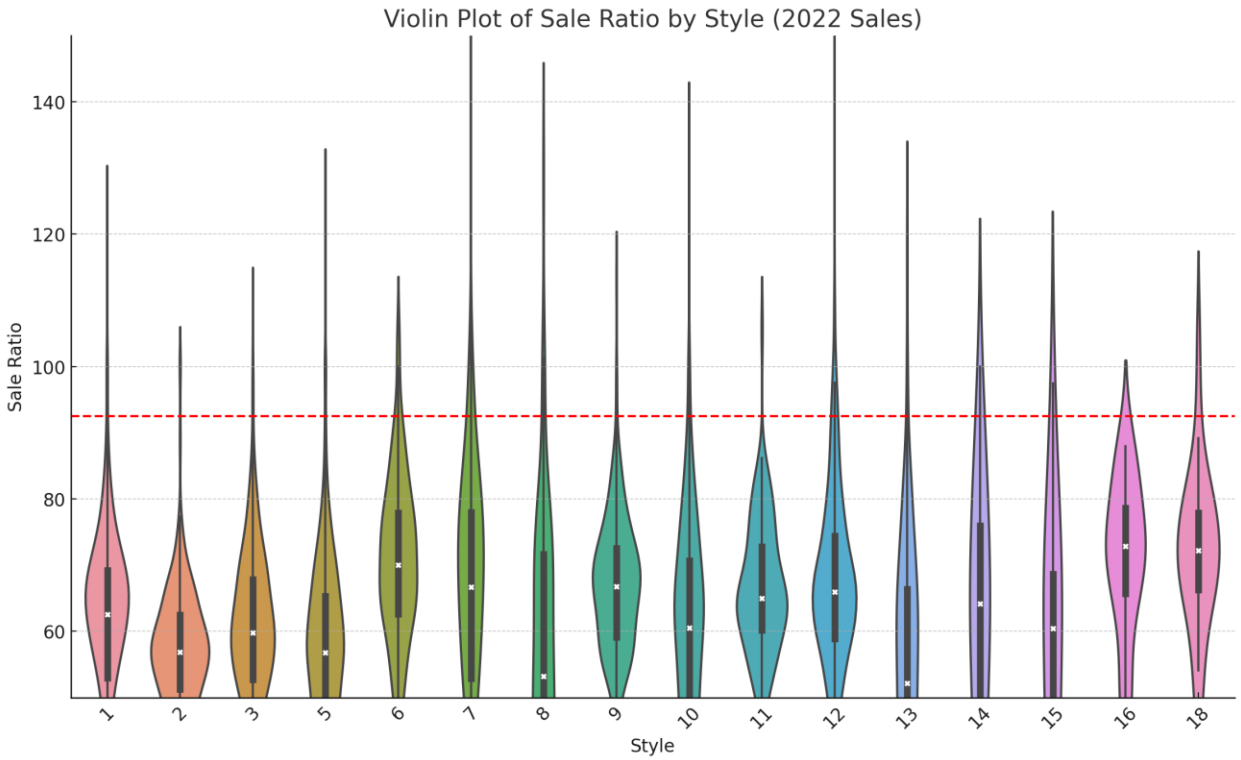
Pre-Revaluation



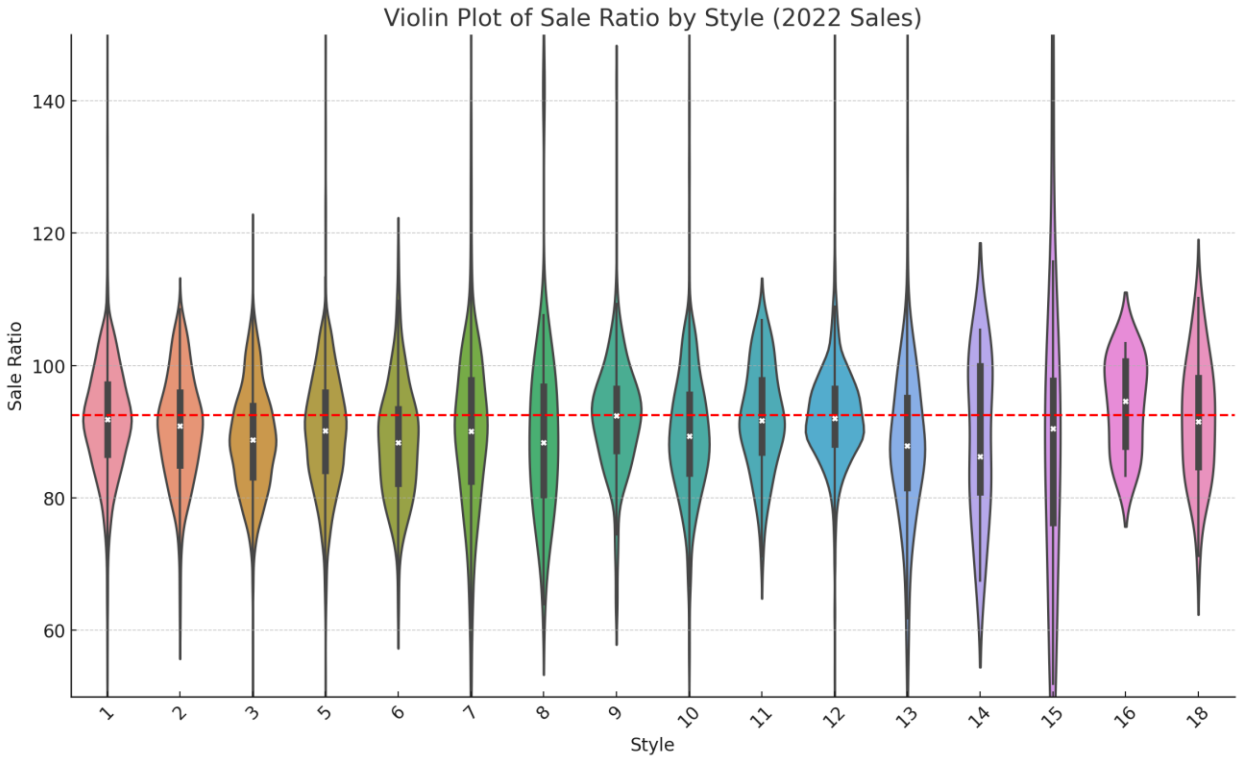
Post-Revaluation



Pre-Revaluation



Post-Revaluation



Base Cost Model Analysis

So far we have visually taken a look at the impact of the 2023 revaluation in terms of sale ratio. We next study the model that produced the new appraised values. The following parameters exist in CAMA (version 23):

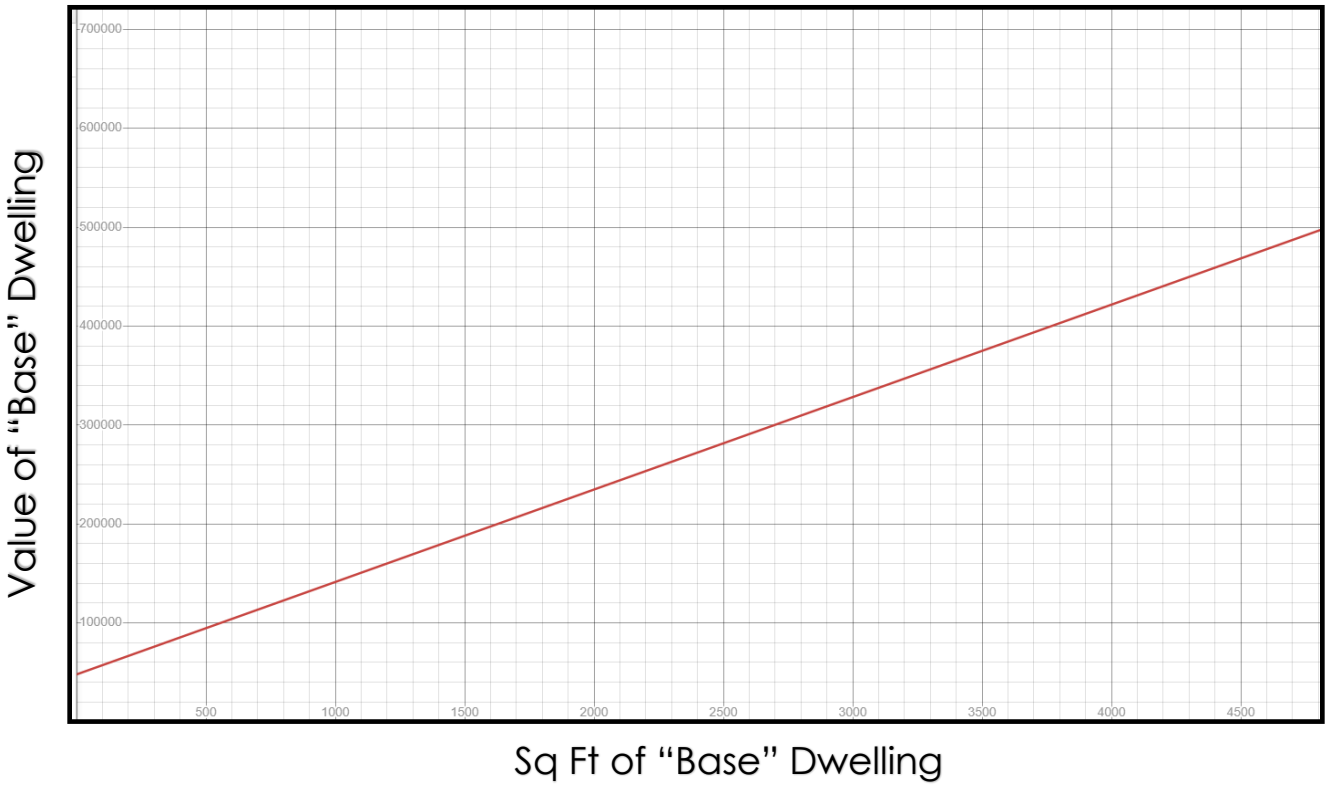
Version *	Model	Factor Name *	Variable C...	Description	Rate for Valua...
23	1	AREA	COEFF	AREA FACTOR=AREA*COEFF+C...	0.000584
23	1	AREA	CONST	AREA FACTOR=AREA*COEFF+C...	0.2992

Version *	Model	Factor Name *	Variable C...	Description	Rate for Valua...
23	1	COST	BASE	BASE COST VALUE	160,000
23	1	COST	VALYR	VALUATION YEAR	2,023

Vision has implemented very similar rate structures in other jurisdictions. The value curve produced reacts quite well to sales data and is shown below. The x-axis represents the size of the home, while the y-axis represents the value of the "base" home.

Individual characteristics of the home such as age, quality of construction, additions, etc. will contribute to uniquely assigned values. We do have some additional factors to consider in the next few pages.

Current Cost Table



Base Cost Model Analysis

Our factor spot check reveals that the residential tables have been made current, individually, resulting in no global factors. Adjusting each piece and part of the rate tables allows for more fine-tuning of appraised values.

23	1	LEVEL	COM	COMM COST LEVEL FACTOR	150
23	1	LEVEL	OBY	OBY COST LEVEL FACTOR	100
23	1	LEVEL	RES	RES COST LEVEL FACTOR	100

We do also notice a 150% global factor on all commercial tables. We measured the aggregate change level to be under 20% for the commercial class, indicating that this factor's initial placement did not occur during this update. If, after a revaluation has been completed, a denial is received from the DTE – it may not be uncommon to place a small global factor in order to satisfy the necessary increase.

Investigation and possible distribution of this factor into the individual tables is warranted during the next revaluation event. If each rate that is being altered by 50% was increased by 50%, we could remove the factor. At this time, the tables in place are producing equitable values. We do not want to allow software limitations to inhibit our ability to properly assign property values.

Another of the characteristics mentioned that can drastically alter the calculated appraised value is the age of a building. In order to account for differences in age, a depreciation table is used. By using a table, we ensure consistency across different age groups.

The CAMA system contains several different depreciation tables. Outbuildings, commercial, and industrial buildings can also be assigned depreciation.

The next two pages contain line graphs that allow us to visually inspect a selection of these tables. Table 02, in particular, is assigned to a considerable number of neighborhoods. Each of these tables represents a different expected life and range from but are not limited to 9-year life to 100-year life.

Base Cost Model Analysis

Table 00

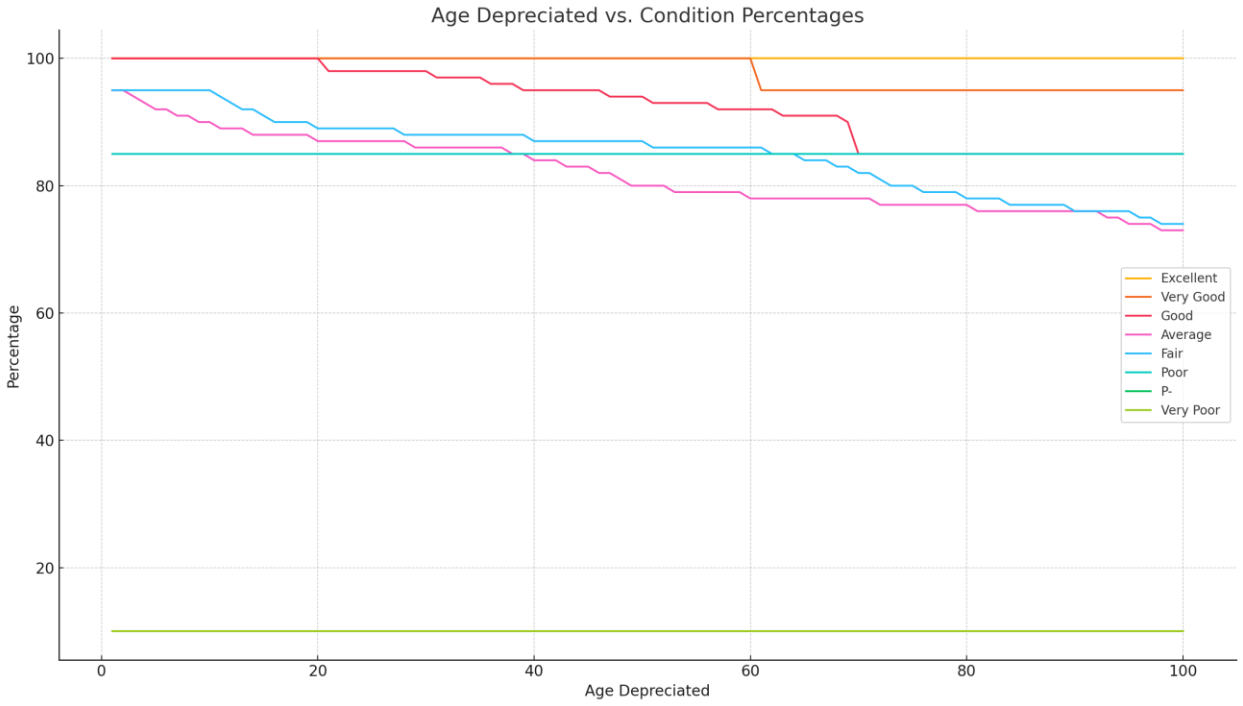
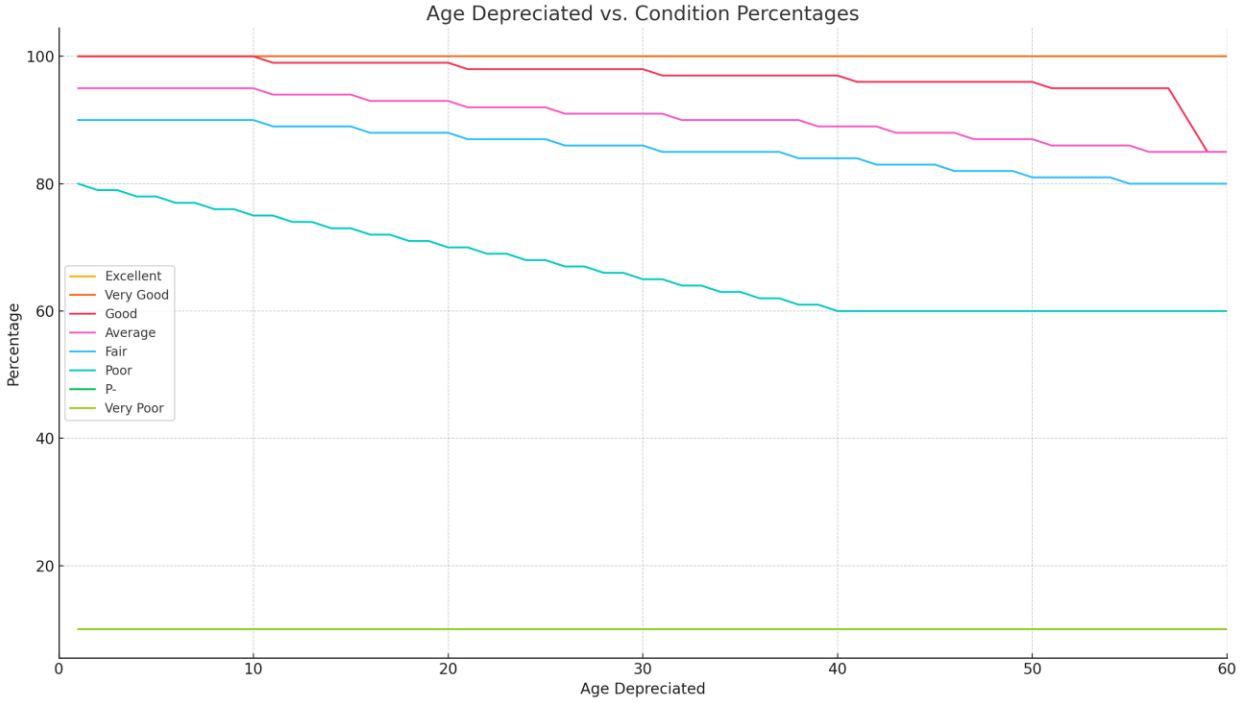


Table 01



Base Cost Model Analysis

Table 02

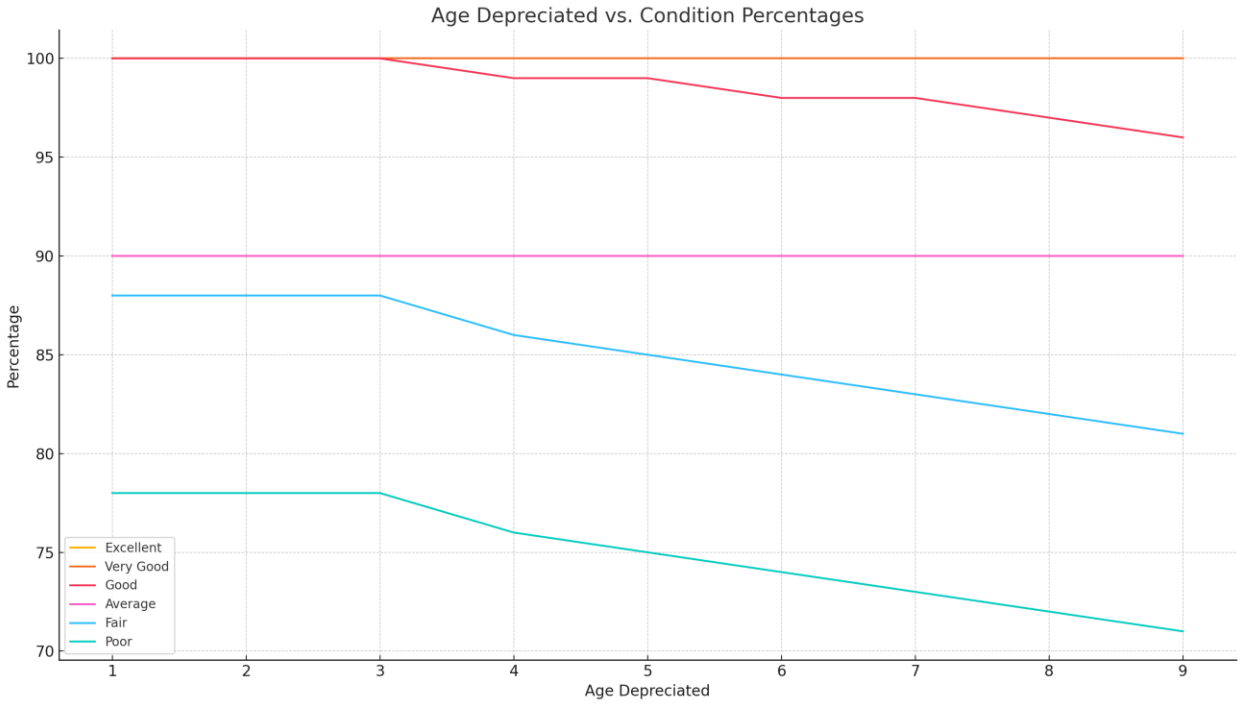
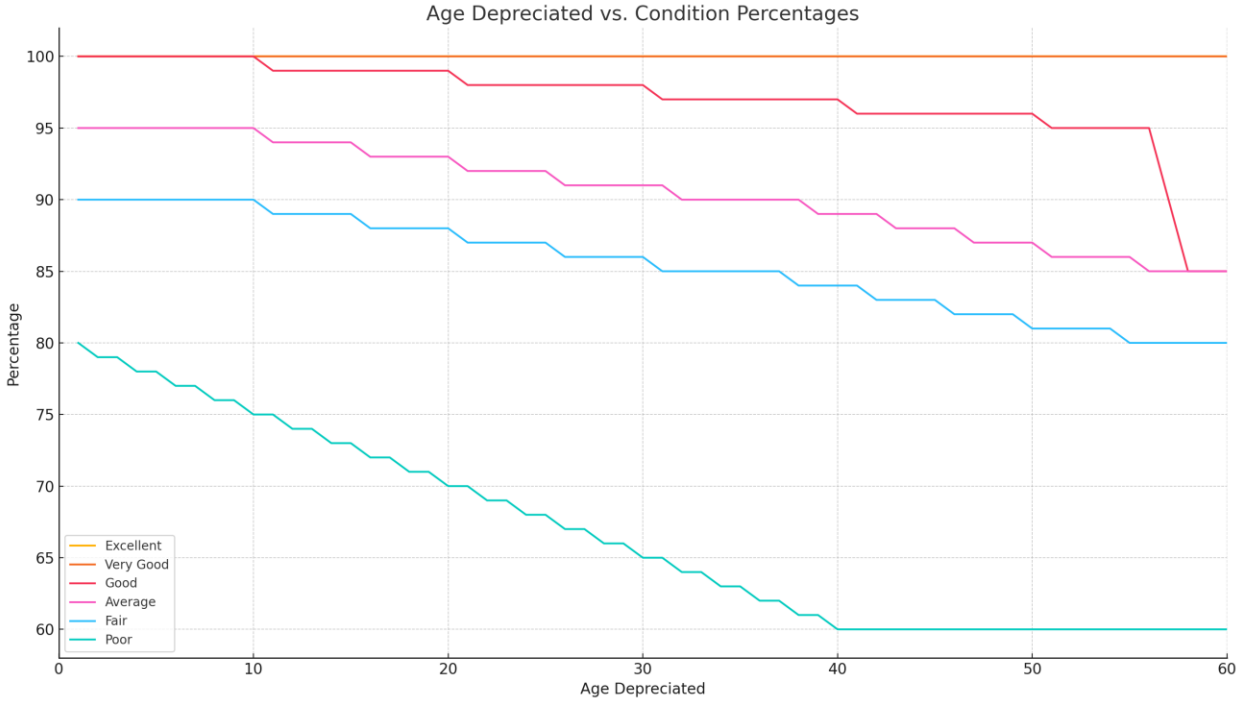
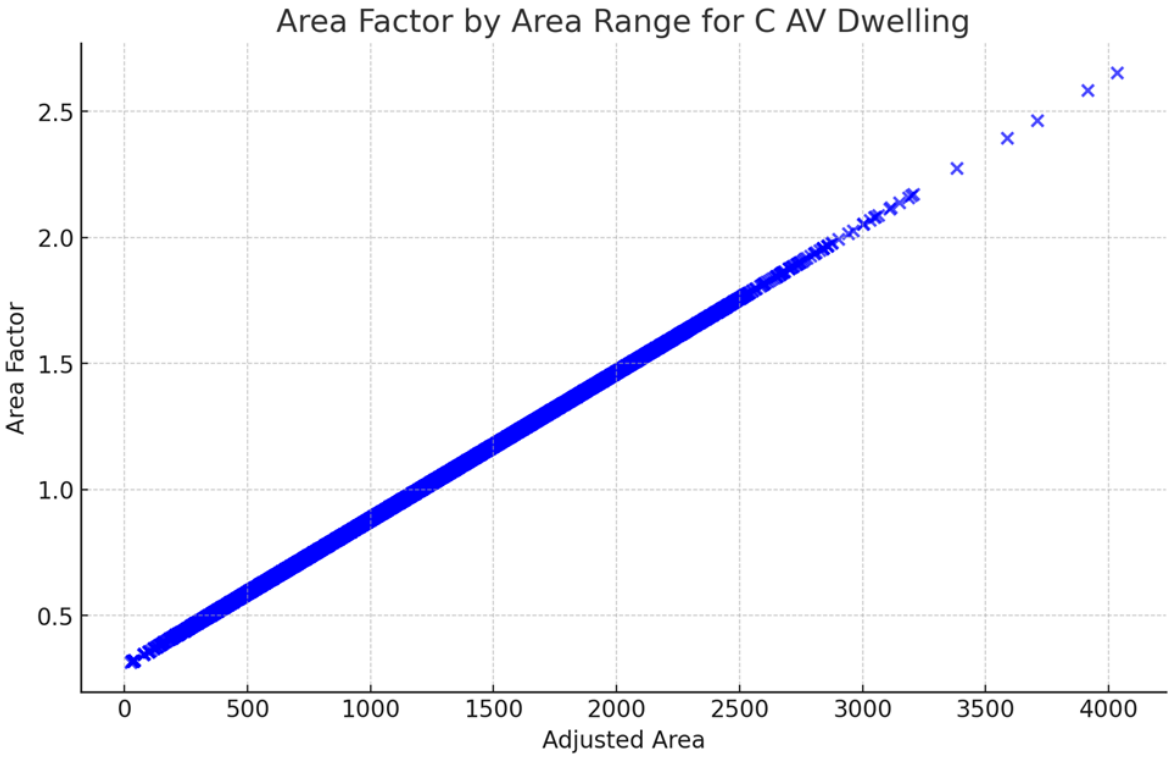


Table 03

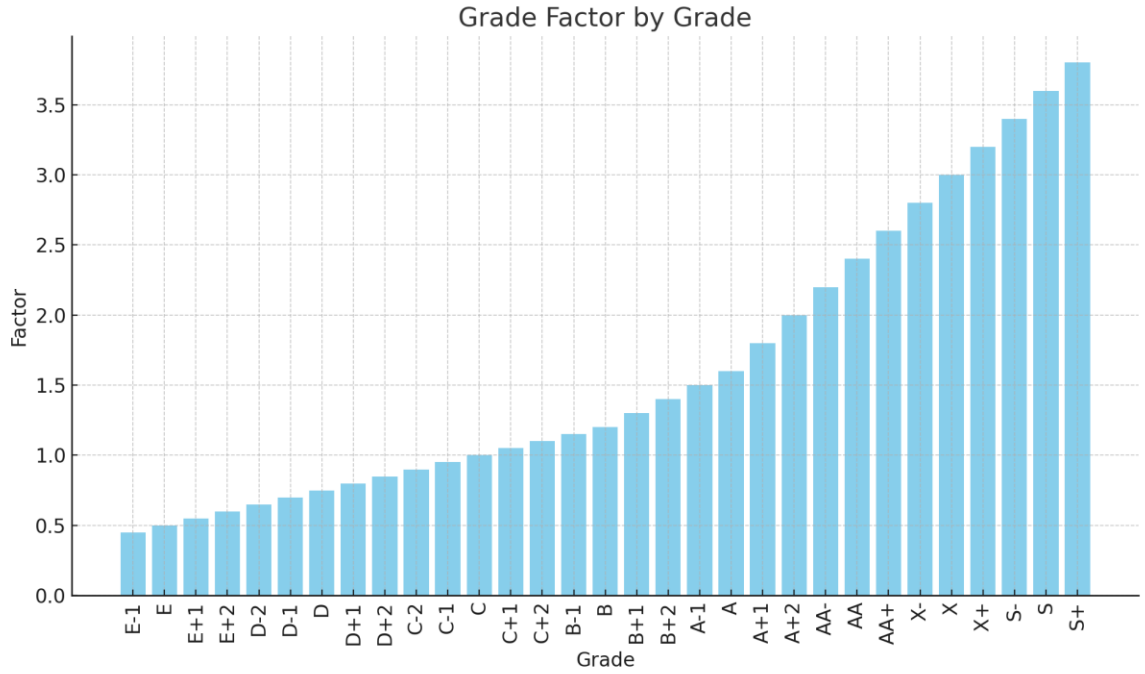


Dwelling Analysis

Continuing our analysis of base rates, we see the following size adjustment table that is in place:

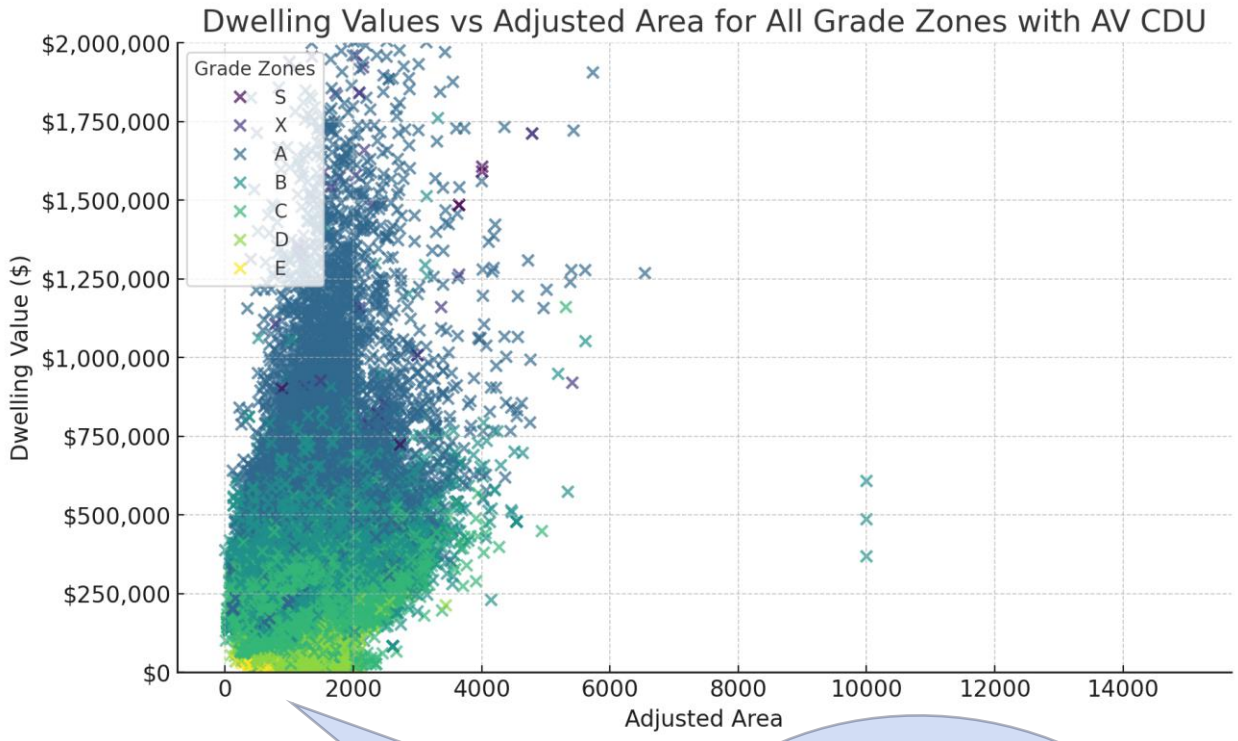


Grade, meant to represent the quality of construction, is another variable that has an impact on appraised value. The following grade factors are currently in place:

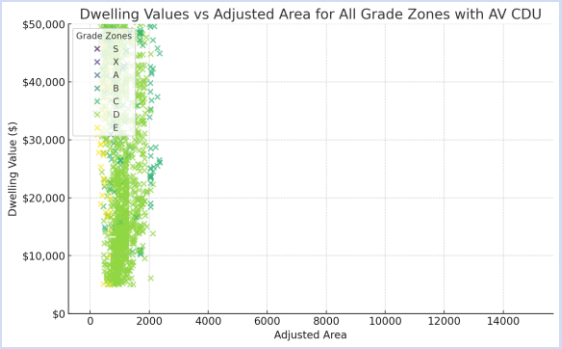


Dwelling Analysis

Combining the size and characteristic data of a given dwelling will result in a calculated appraised value. Again, it may be best to visualize these values. The scatterplot shown below gives us dwelling value by grade and size. The dwellings shown are only those that have been assigned average condition.



If we zoom in to see values that are 50k and lower, we notice similar grades – illustrating the impact that grades have on appraised value. We continue this investigation of grade and value on the next few pages with a series of boxplots. The definitions section at the end of this document contains a bit more information on each graph type shown.



Dwelling Analysis

Graphing all of the grades together results in scaling issues. It is difficult to compare dwellings valued near or over $2 million in the same chart as dwellings valued near or under $50,000. However, if we split the grades into three groups – lower, middle, and upper – we can visualize clear distinctions in value at the grade level. We begin with the lower tier, grades under C:

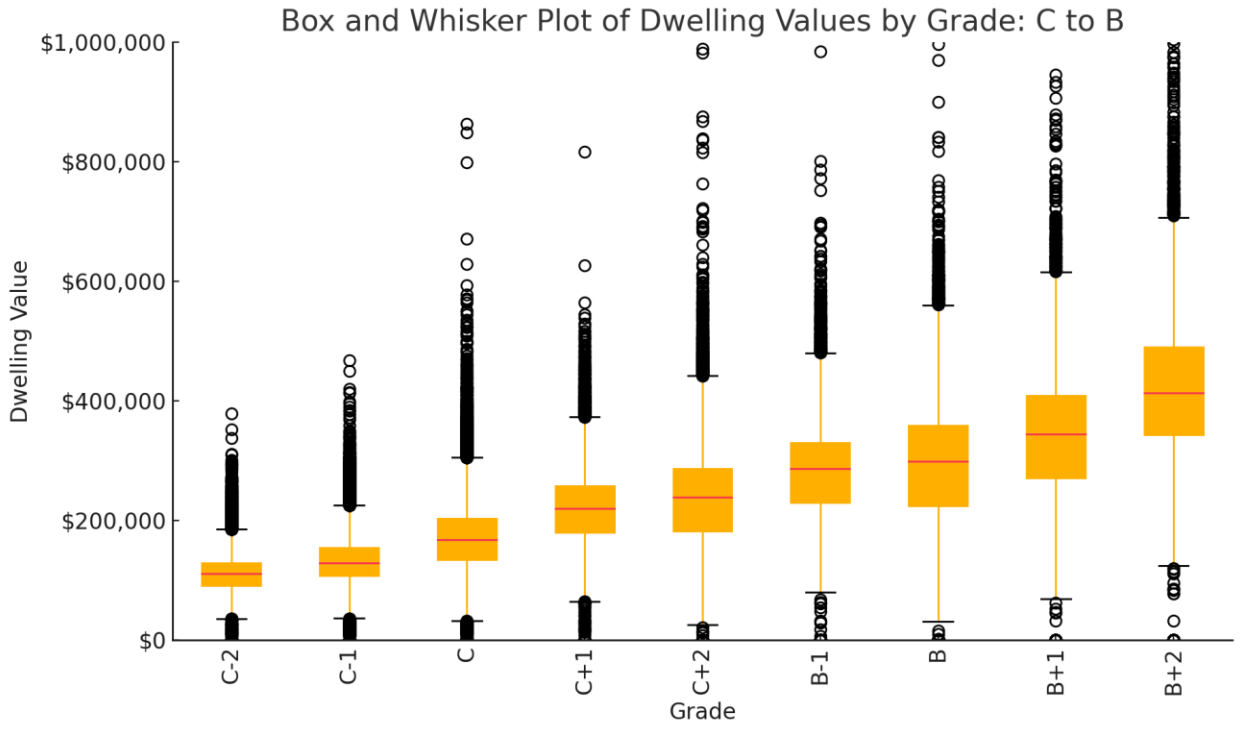
This box and whisker plot illustrates the distribution of dwelling values across different grades, ranging from E-1 to D+2.

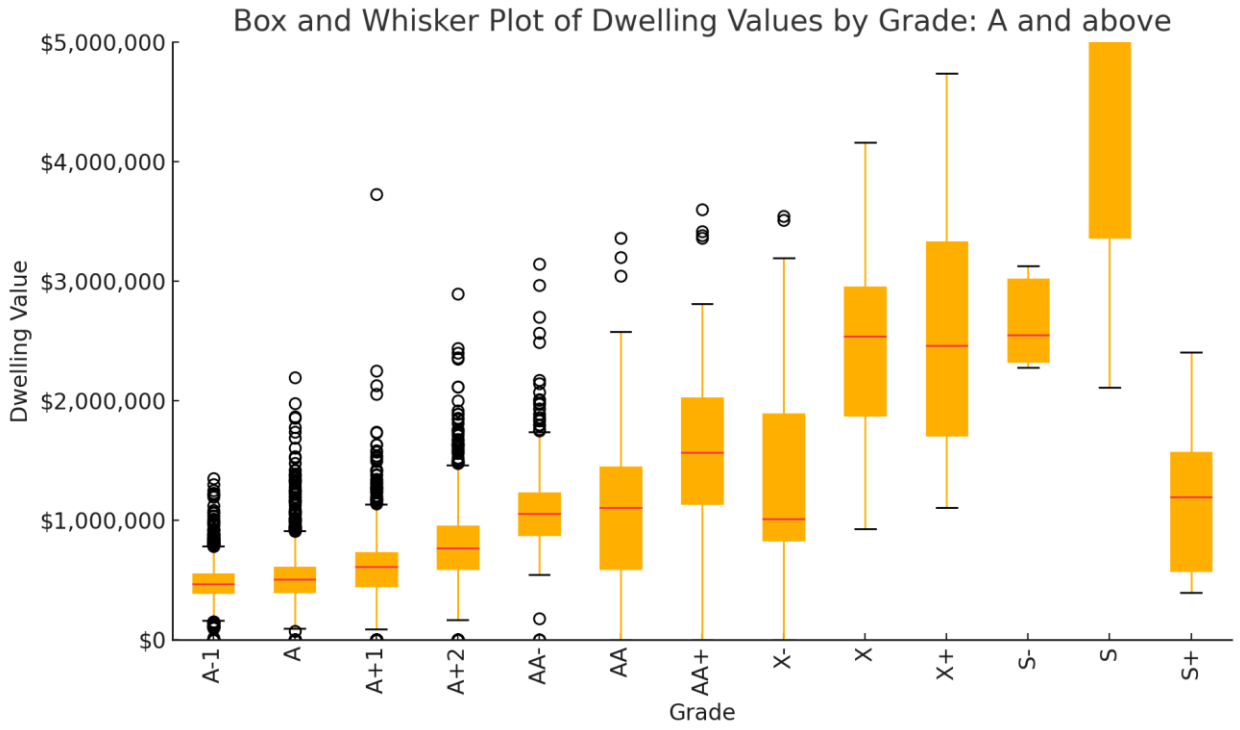
E-1 to E+2 grades represent the lower end of dwelling values. The median values are relatively low, and the boxes are tightly grouped, indicating less variability in dwelling values within these grades. Outliers are minimal.

D-2 to D+2 grades show a higher range of dwelling values compared to the E grades. The median values increase progressively, and there is greater variability within each grade, as indicated by the taller boxes and longer whiskers. The presence of numerous outliers suggests that while most dwellings fall within a certain range, there are a few properties with significantly higher values.

Dwelling Analysis

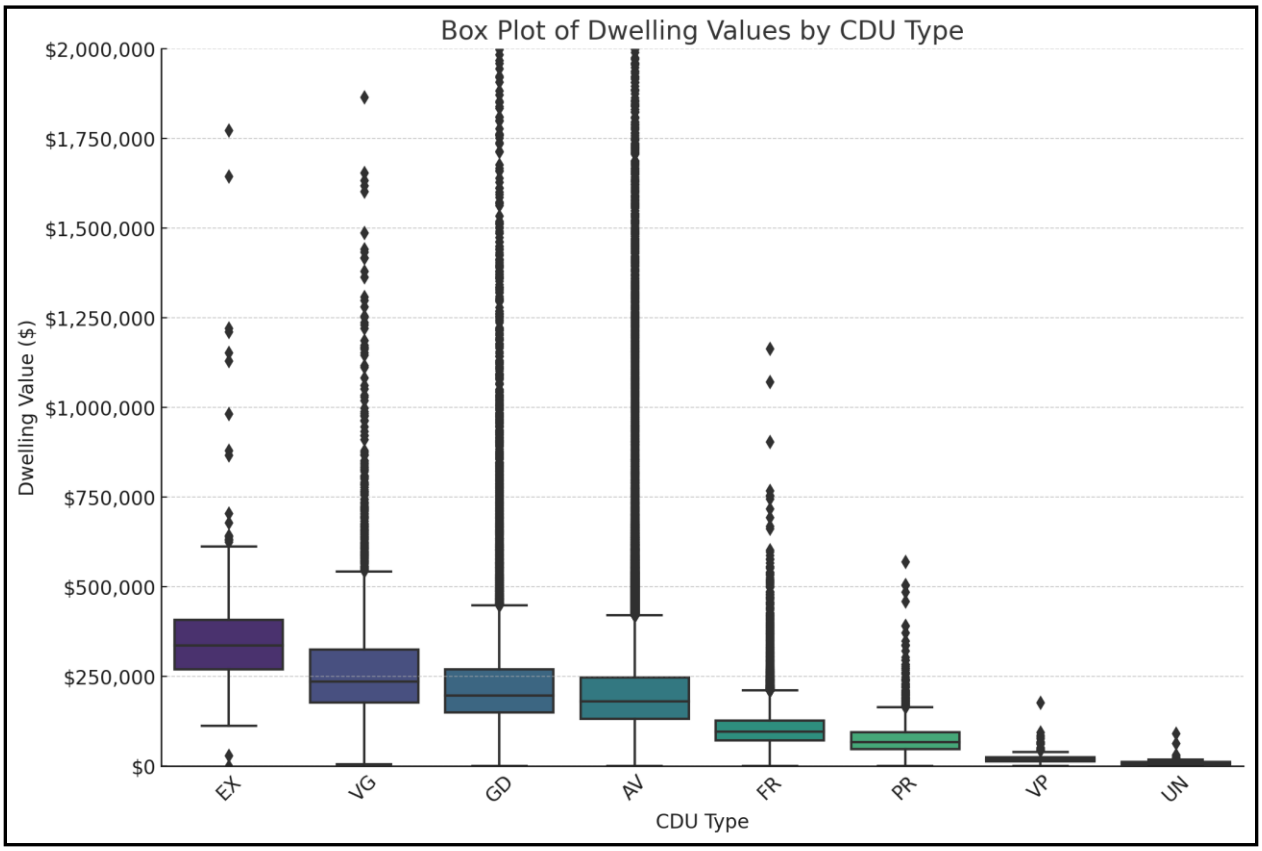
Continue with our other two groups, C's & B's as well as A's and above, we get the following two box and whisker plots:



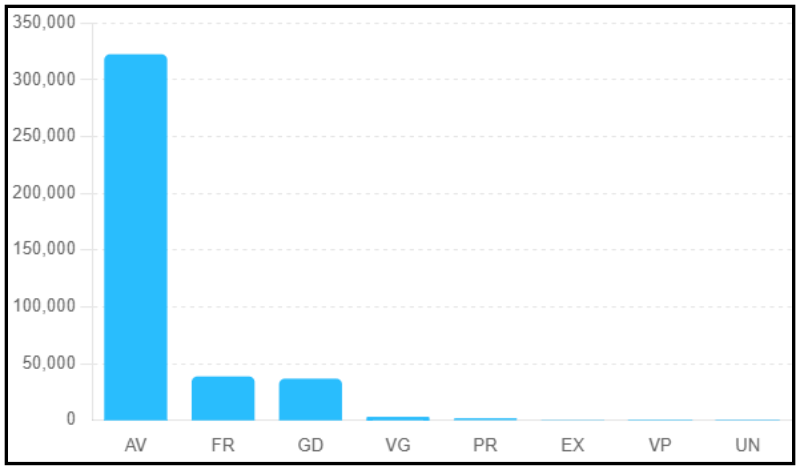


Dwelling Analysis

Along with grade, CDU of a dwelling – meant to represent the condition, desirability, and utility – plays a significant role in the calculated value of a dwelling. While no direct factor exists for this field, it does help determine how much a dwelling is depreciated, along with age, as shown in the depreciation charts on the previous pages. We notice a distinct drop in value when the CDU of a dwelling is lowered a tier level.

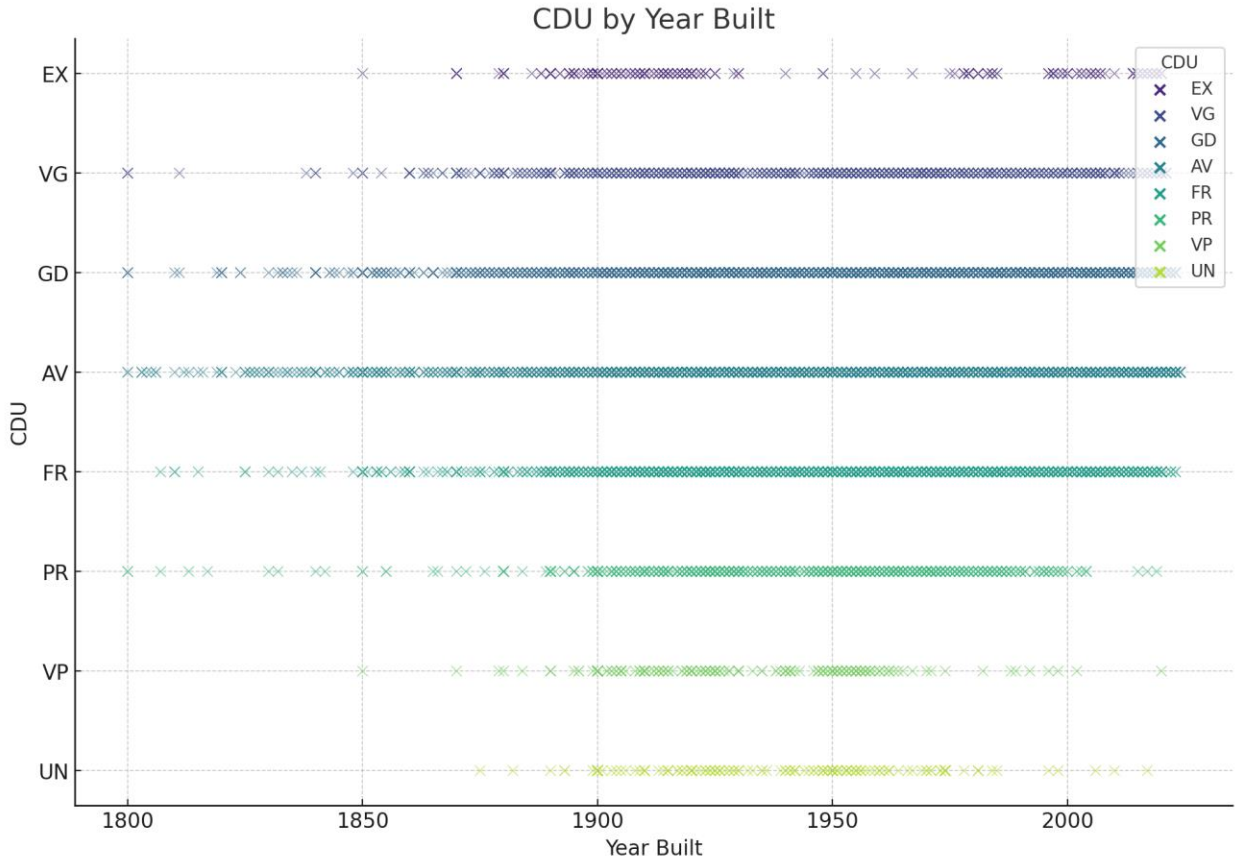


Average CDU is by far the most commonly assigned. This is to be expected. As these fields have such an impact on value, we will inspect the CDU field as well as age further in the next several pages.



Dwelling Analysis

In the stratified scatter plot shown below, we notice a few things. Average conditions are not age dependent and are assigned to dwellings at every age. The unsounds conditions seem to have been placed accordingly and represent homes that were built quite some time ago and have likely received minimal maintenance. Very poor and fair conditions follow a similar pattern.

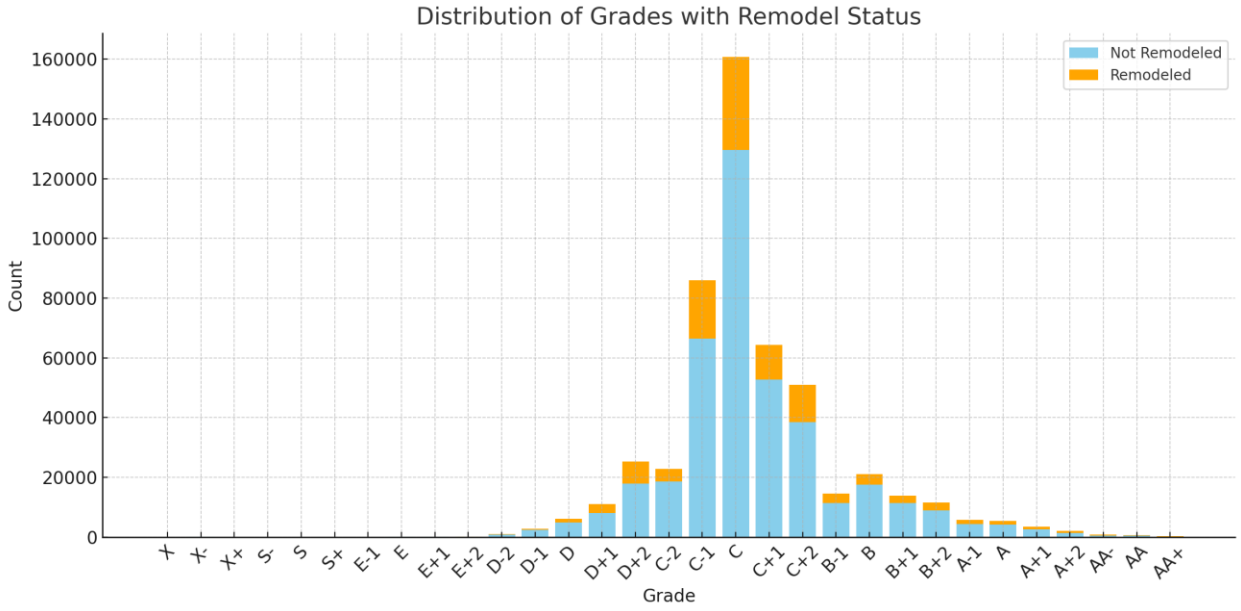


Excellent conditions seem to have a few bands. One of these bands occurs in the early 1900's and another occurs in the 1980's as well as on new construction homes. These bands bring to light another feature of the base cost model for dwellings, namely – remodels. The remodel system in CAMA is currently a free form system and is prone to potential inconsistencies when it comes to assigned effective age. These inconsistencies affect value and deserve attention.

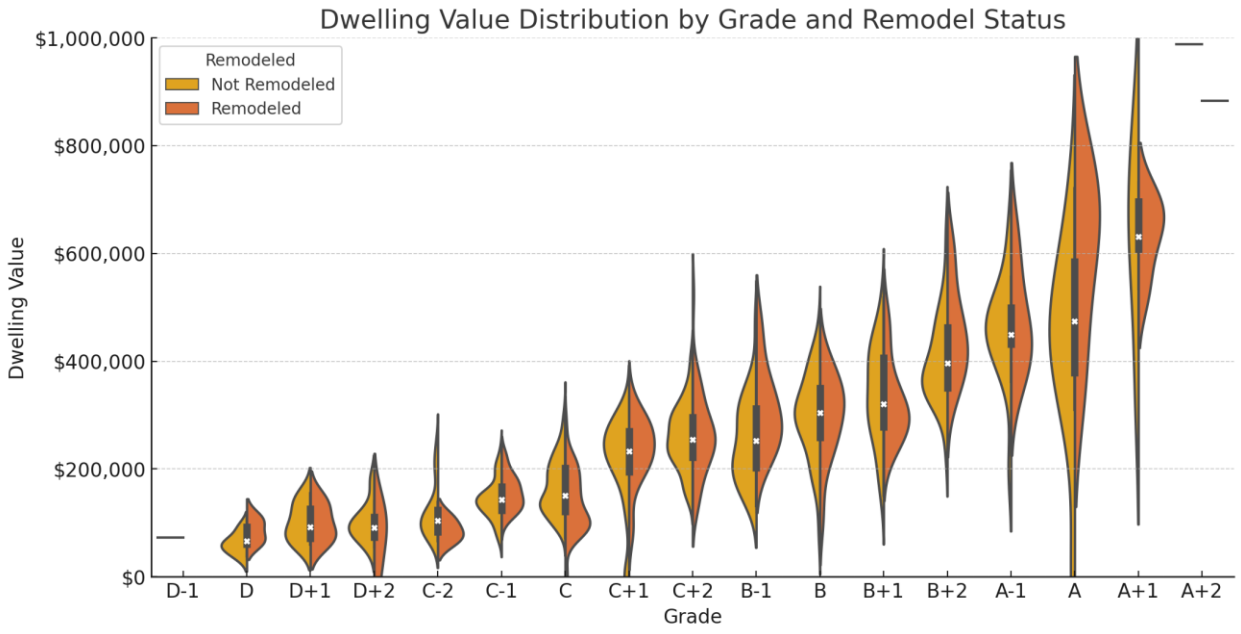
Vision has recommended and implemented alterations to the remodel structure in other jurisdictions. A preliminary recommendation is provided In the pages to come.

Dwelling Analysis

In our pursuit of investigating remodel status, we begin with grade. The following chart visually shows us, by grade, the number of properties that have been given a remodel year:



We should expect remodeled homes to become more valuable than non-remodeled homes. The following graph displays, again by grade, the difference in value between remodeled homes and those that have not experienced (or not assigned) a remodel year.



Dwelling Analysis

Interestingly enough, remodel year has no effect on calculated value in the CAMA (computer aided mass appraisal) system. The field that will change value is called Effective Year. Effective year replaces year built in dwelling depreciation calculations.

The violin plots below give us an idea of when homes were built, when homes were remodeled, and the effective year that has been assigned in CAMA.

Through our study of depreciation, we run into a few potential situations that are cause for concern:

- A dwelling has been remodeled but no effective year was assigned in CAMA.
- An effective year was assigned in CAMA, but the dwelling was not remodeled.
- If not standardized, dwellings with the same year built and same remodel year may have different effective years.

Dwelling Analysis

Taking a look at the first two situations mentioned, "A dwelling has been remodeled but no effective year was assigned in CAMA" and "An effective year was assigned in CAMA, but the dwelling was not remodeled" – we begin with some descriptive statistics.

- We have 404,433 dwellings with a year-built in our dataset.
- 106,958 dwellings have been assigned a remodel year, roughly 1 out of 4 homes.
- 328,589 dwellings have been assigned an effective year, more than 3 out of 4 homes.
- 7,968 dwellings have a remodel year but do not have an effective year assigned.
- 229,599 dwellings have an effective year but do not have a remodel year assigned, a little more than half.

Identifying remodels in properties can be challenging due to several factors. Firstly, remodels often vary widely in scope and scale, from minor cosmetic updates to extensive structural changes, making it difficult to standardize the criteria for identifying and recording them.

Moreover, remodels are not always formally documented or reported, especially in older properties or in areas with less stringent building code enforcement.

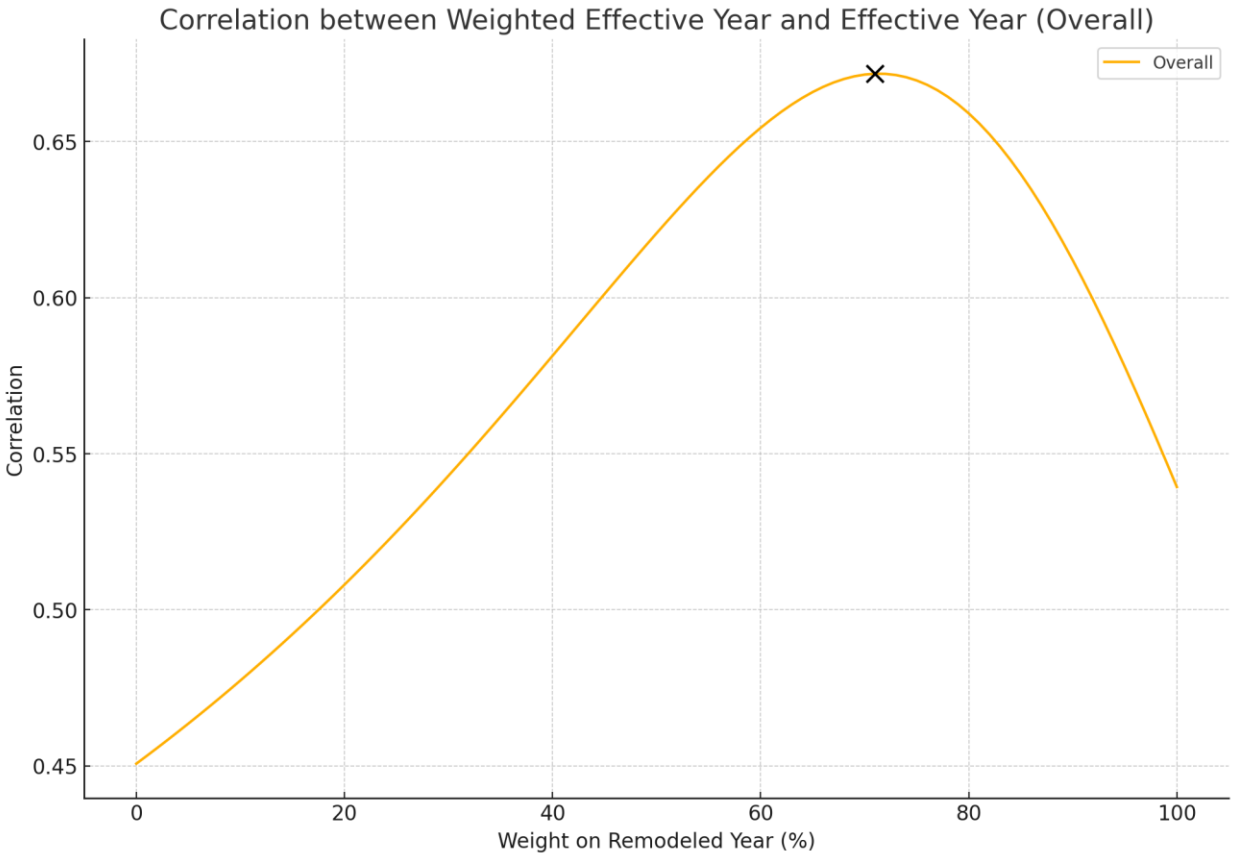
This leads to incomplete or inconsistent records in public databases. Properties may undergo multiple remodels over time, further complicating the tracking of changes. The lack of uniformity in how remodels are recorded, along with potential gaps in historical data, makes it difficult to accurately identify and account for all remodels in a given dataset.

We dive into a few potential solutions / discussion points for remodels on the next few pages.

Dwelling Analysis

The last situation mentioned, "…If not standardized, dwellings with the same year built and same remodel year may have different effective years" – can be handled in a few different ways.

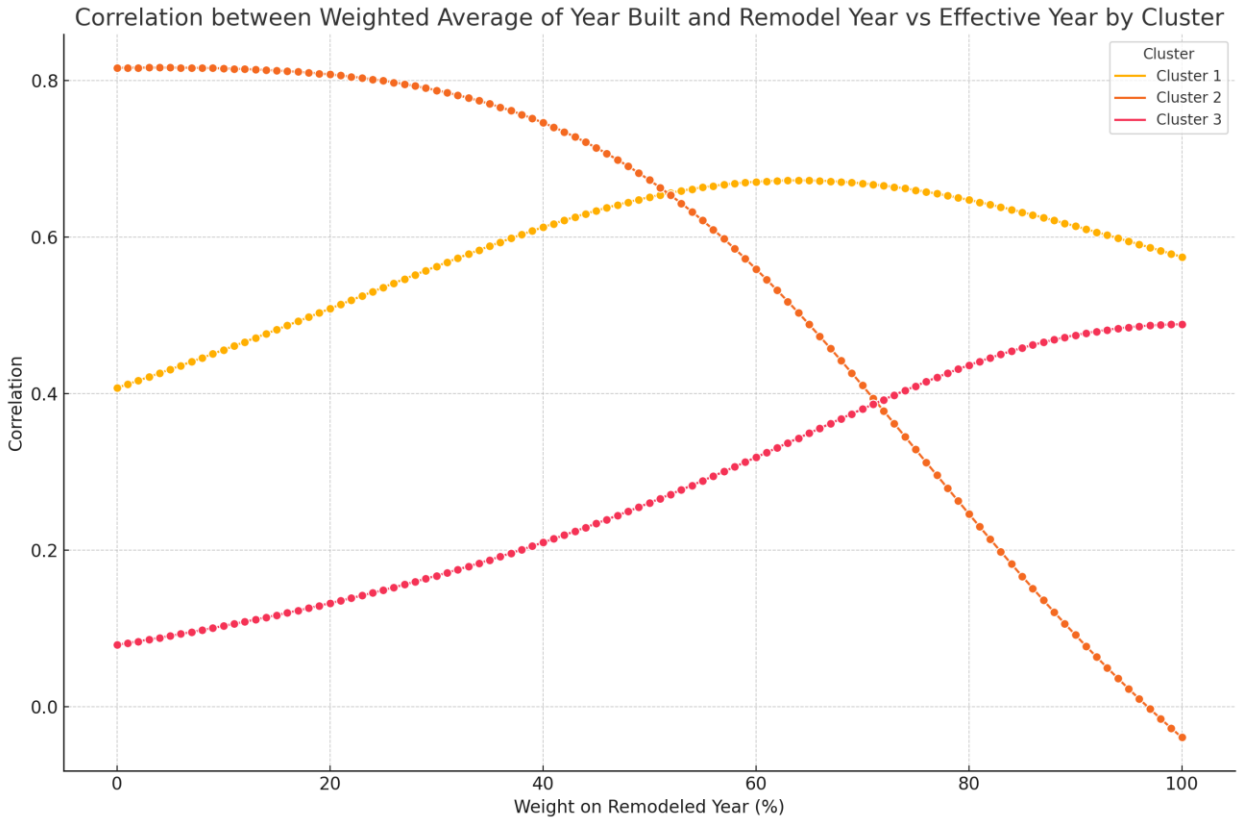
If we wanted to determine one formula in order to determine the effective year, we could rely on the data. The current assigned effective years likely have built up over time and many have likely been hand entered or recommended by those physically visiting a given property. The best fit match appears to be a 70% weight on remodel year.



At the aggregate level, it appears that giving the year in which the dwelling was remodeled a 70-30 weight when compared to year built – and assigning that as the effective year – most closely matches the current method, with a consistent method. As always, an intricate combination of other factors exists. Let us take a look at another possible solution to the value contributing free form field.

Dwelling Analysis

If instead of using one weight for each extent of remodel, a different weight could be established for different levels of remodels. If we look at the current CAMA data and establish a "test" effective year based upon a 3-tiered weight corresponding to the extent of remodel, we receive encouraging results.

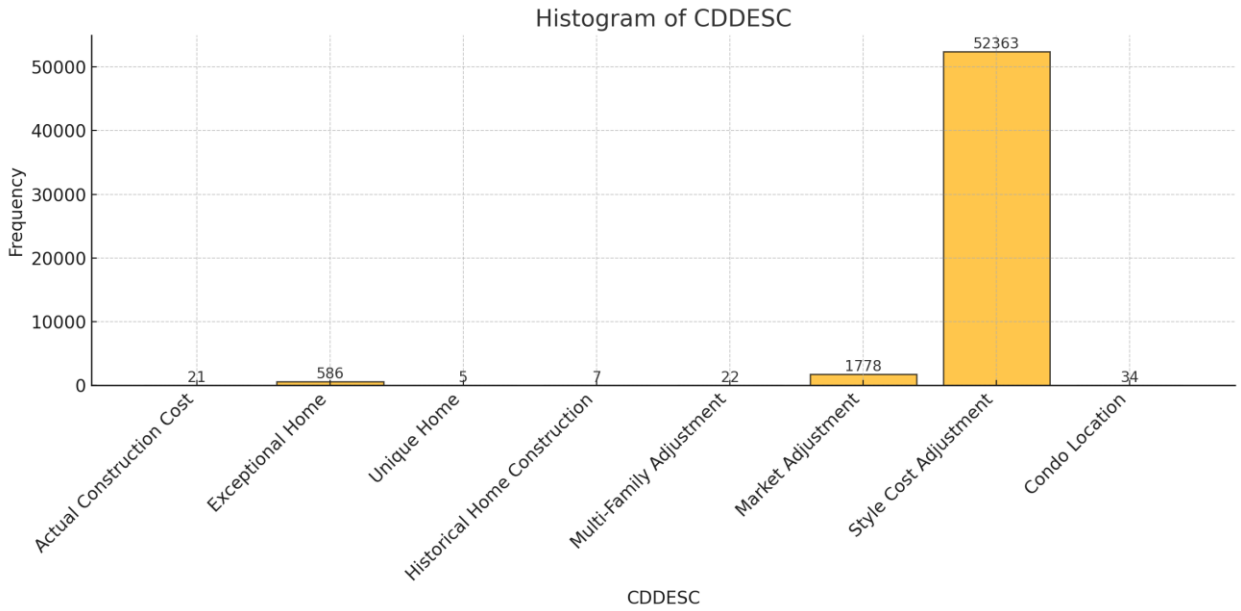


The maximum of each of the lines above corresponds to a peak in correlation. It appears as though a 25,50,75% weight could be considered to capture the extent of remodel. Breaking into more than 3 groups does not yield much improvement. It may also be difficult to classify 4 or more levels of remodeling.

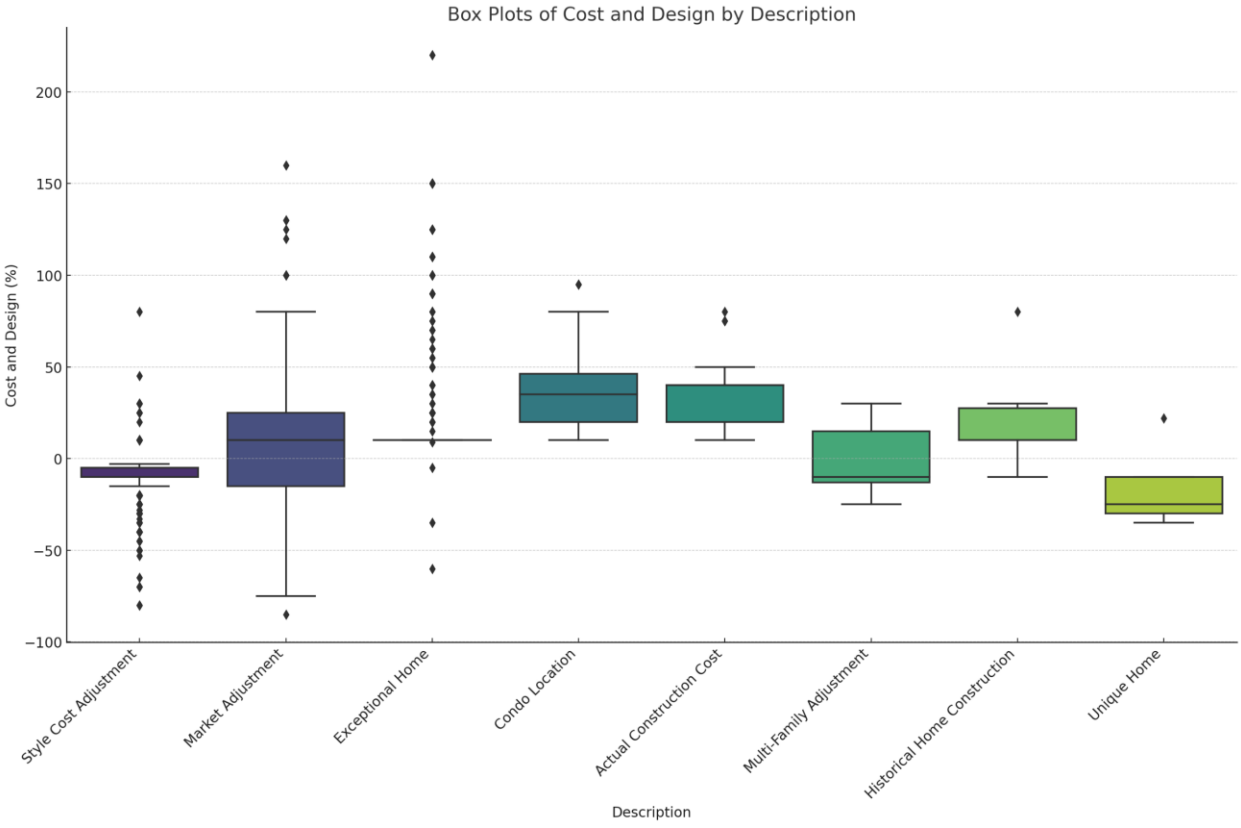
Another option in order to obtain uniformity in these data fields is to create a regression model that contains additional information such as dwelling grade, size, etc. in order to establish an effective year. This regression model could be trained on sales data or historical CAMA data.

Dwelling Analysis

Another free form field in CAMA that can be used to alter a dwelling's value is the C&D or Cost and Design factor. The histogram below shows the available types and the amount of each in CAMA:



The level of impact that each of these factor types has on dwelling value depends upon the assigned factor. The box plot below provides a visual of these assigned factors:



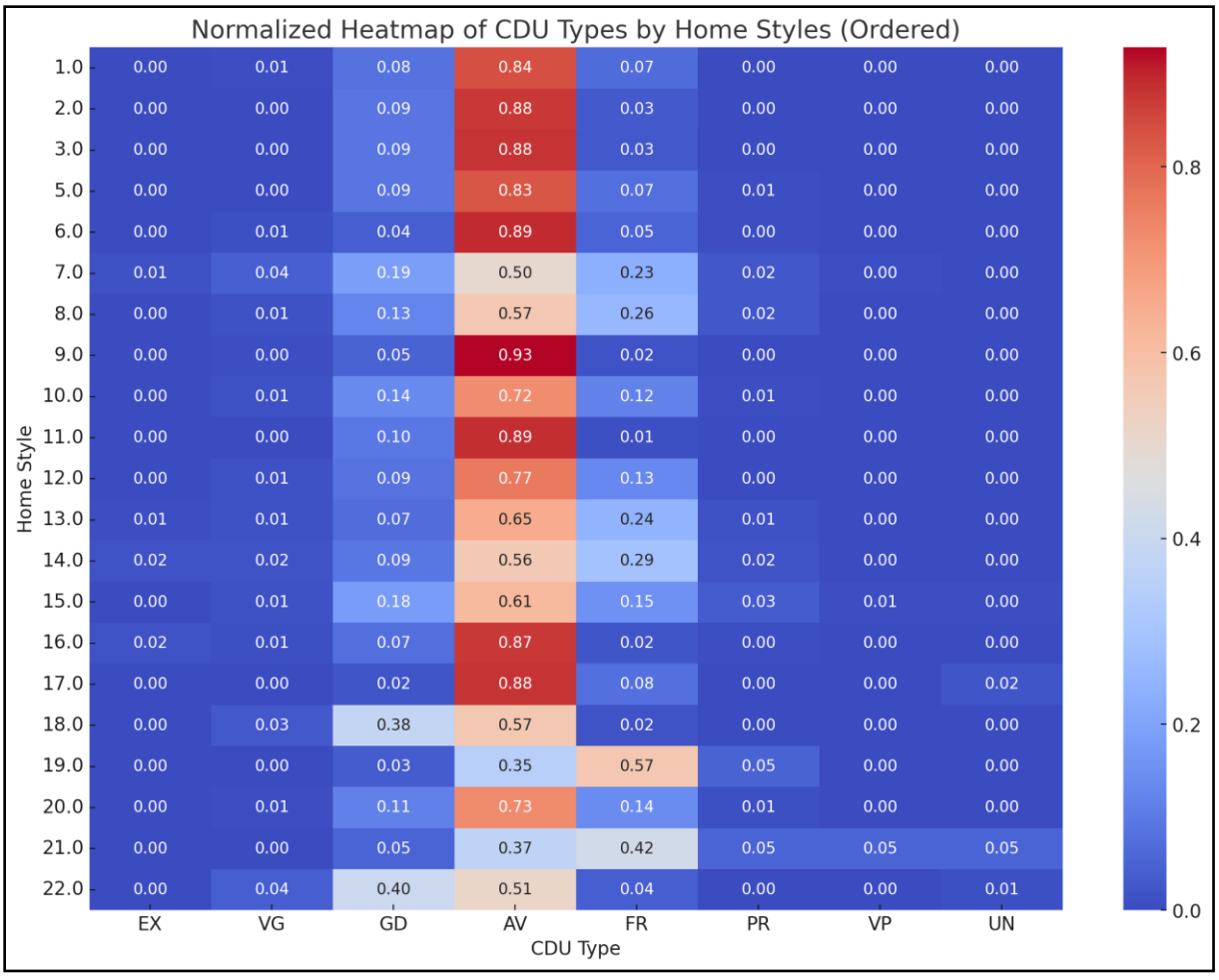
Dwelling Analysis

Style	Description	Count
01	Conventional	113,975
02	Bi-Level	11,302
03	Multi-Level	29,499
05	Ranch	90,254
06	Townhouse/Rowhouse/Stacked	3,054
07	Old Style	9,316
08	Bungalow	2,208
09	Colonial	7,005
10	Cape Cod	28,819
11	Modern	2,344
12	Condominium	85,413
13	Duplex	13,441
14	Triplex	593
15	Other/Conversion	985
16	Contemporary	644
17	Log	52
18	Tudor	1,081
19	Mobile Home Single Wide	3,263
20	Mobile Home Doujble Wide	696
21	Cabin/Cottage	19
22	Architectural	109

Style cost adjustment is the most commonly assigned cost and design factor type. The chart on the left shows the currently assigned CAMA style types.

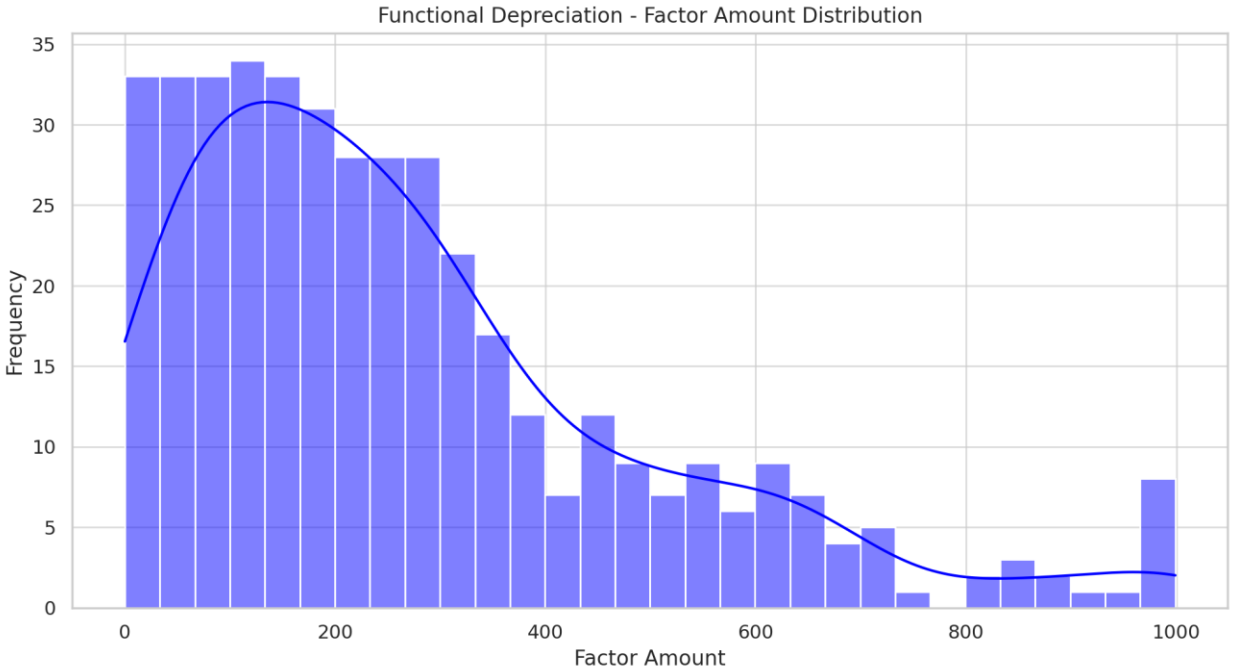
Conventional and ranch style homes make up a majority of the sample, with condos not far behind.

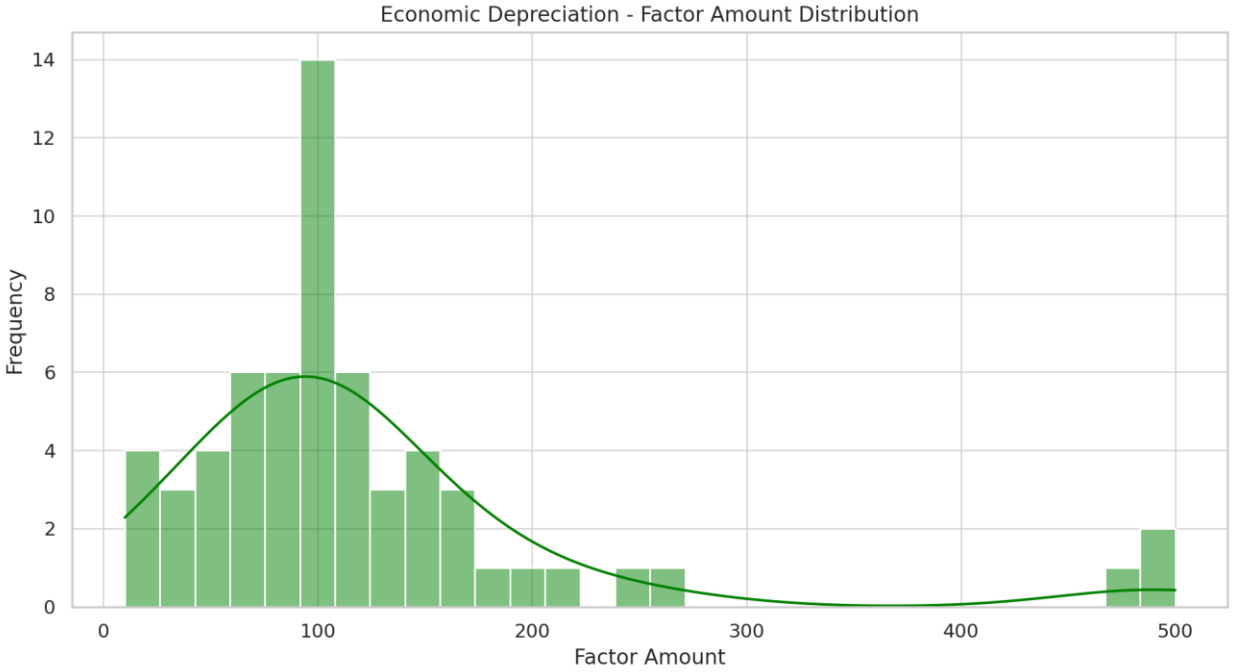
The frequency heat map below gives us a visual representation of the dwelling styles, in terms of condition. We notice a lean towards "good" condition on architectural style homes as well as a lean towards "fair" on single-wide mobile homes.



Dwelling Analysis

Additional fields for adjustments exist in the CAMA system. These fields are free form similar to effective year and cost and design factors. These are functional depreciation and economic depreciation. The graphs below show us counts for each type.

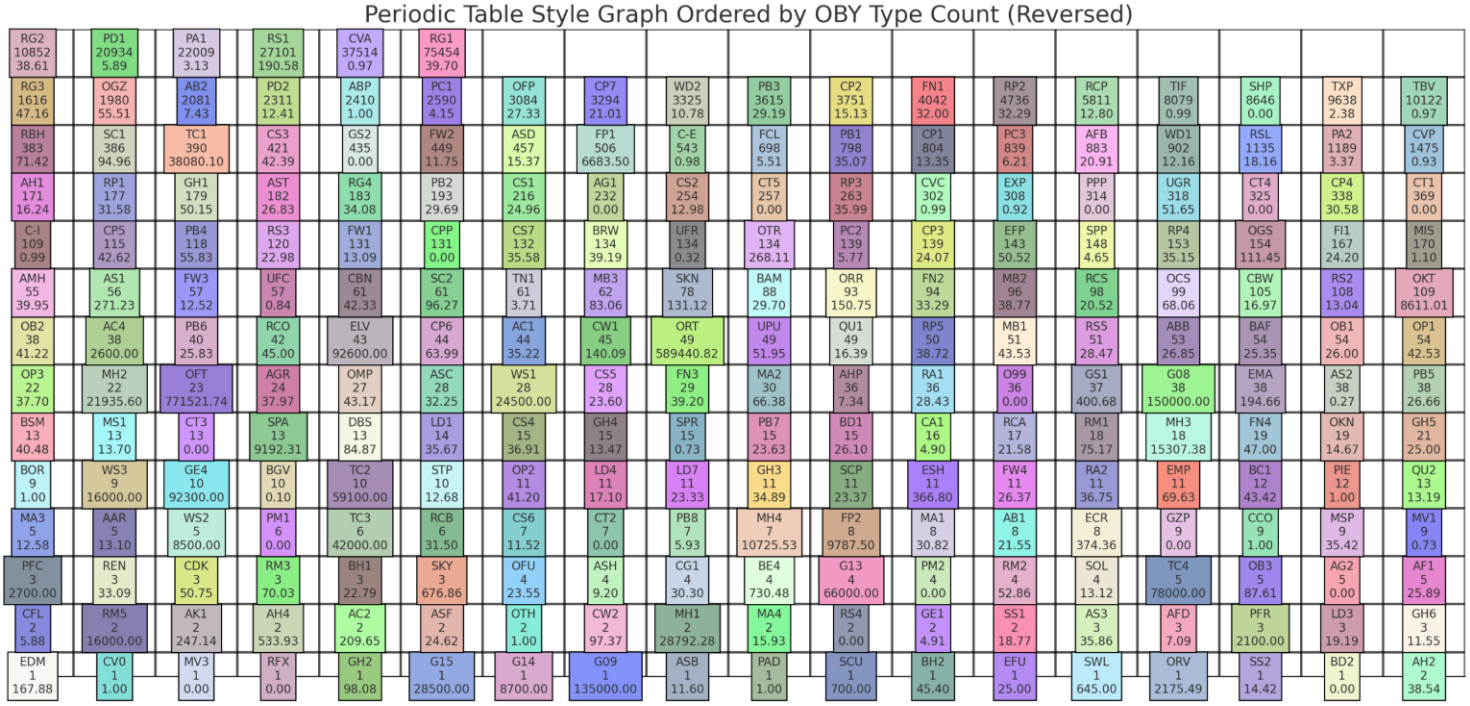


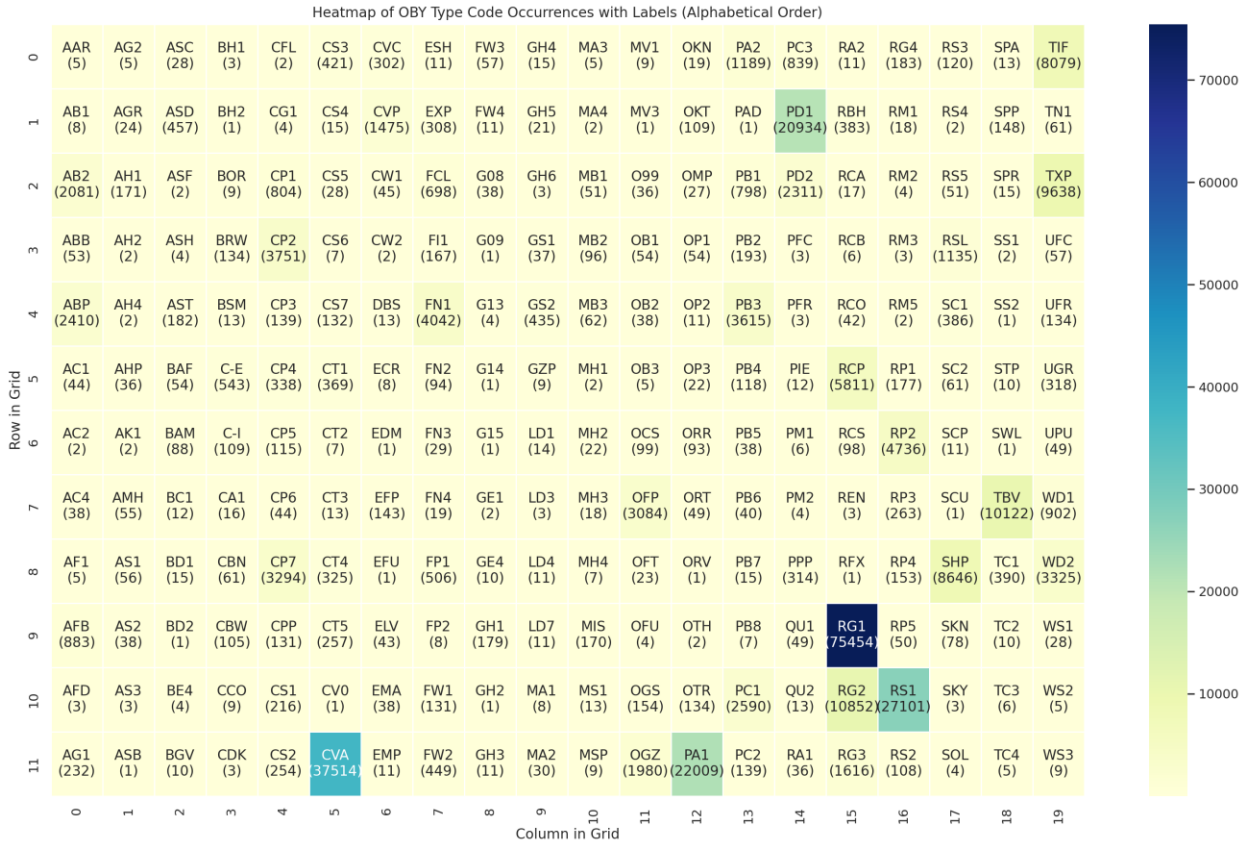


Factors that are less than 100 will lower a dwelling's value while factors greater than one hundred will increase a dwelling's value. These adjustments range from 0 to 1,000+.

Outbuilding Analysis

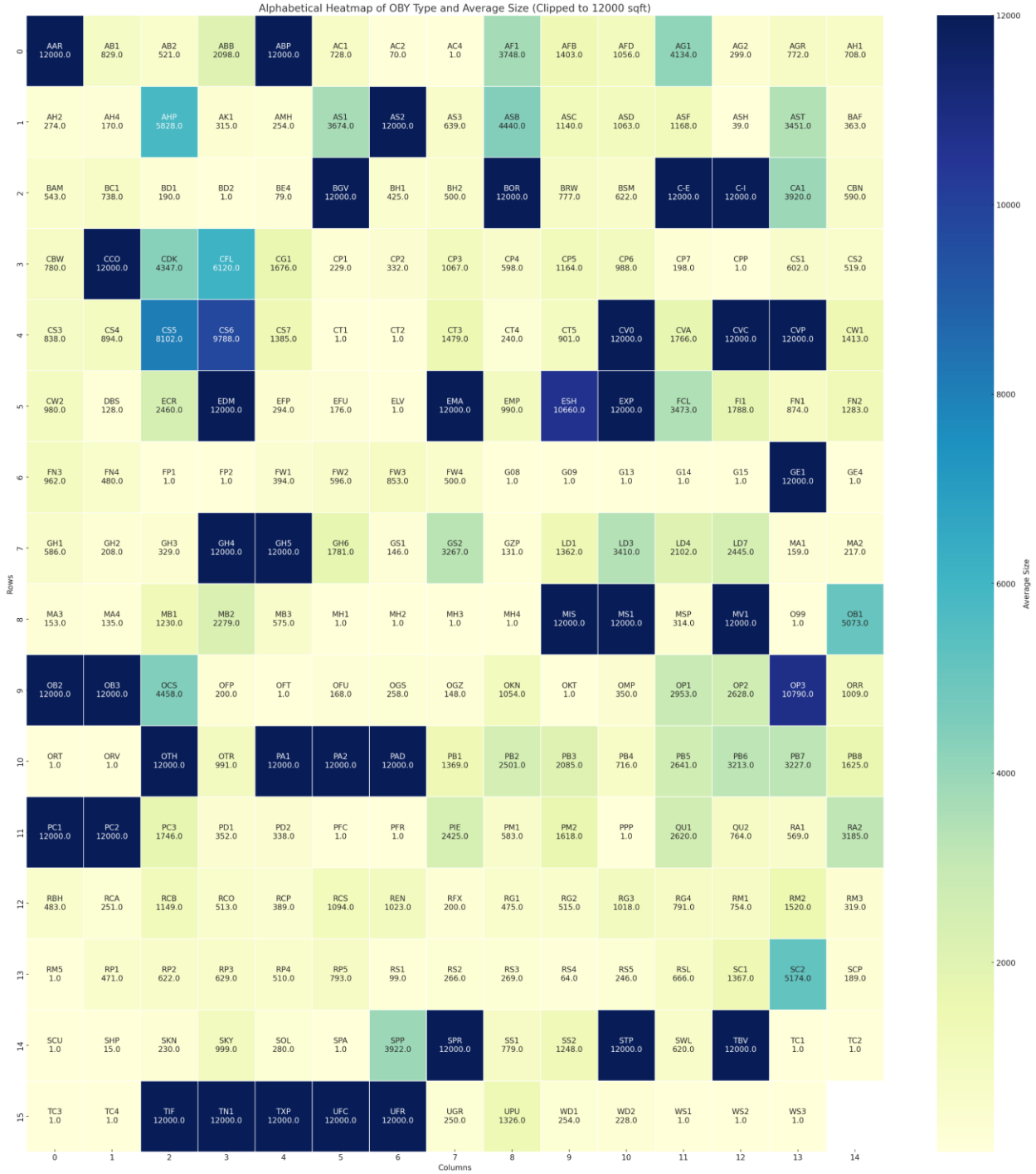
In this section of the analysis, we take a look at a different type of building, outbuildings. Here we have two different visuals to give us an idea of the structure of this dataset:





Outbuilding Analysis

Furthering our visual approach to understanding the dataset structure, we have included a heat map displaying the average size of outbuildings. Darker shades of blue indicate larger areas. While outbuildings typically only contribute a small percentage to total parcel value, larger outbuildings may contribute more. We provide descriptions and continue our outbuilding analysis on the next few pages.



Outbuilding Analysis

CODE	DESCRIPTION
AAR	ARENA
AB1	BANK BARN ADDITION
AB2	1S LEAN TO
ABB	BANK BARN
ABG	BARN CLEANER GUTTER
ABP	ABATED PART
AC1	WOOD BOARD CORN CRIB
AC2	WELDED WIRE CORN CRIB
AC3	ROOF 5 GAUGE WIRE CRIB
AC4	ROOF 5 GAUGE WIRE CRIB
AC5	ROOF 2 GAUGE WIRE CRIB
AC6	ROOF 2 GAUGE WIRE CRIB
ADB	DAIRY BARN
AF1	FLAT BARN ADDITION
AFB	FLAT BARN
AFC	CONCRETE FEED BUNK
AFD	FEED BARN
AFW	WOOD FEED BUNK
AG1	GRAIN BIN
AG2	GRAIN BIN W DRYING BIN
AGR	GRAINARY
AH1	1S FRAME OR METAL POULTRY HSE
AH2	2S FRAME OR METAL POULTRY HSE
AH4	1S CONCRETE BLOCK POULTRY HSE
AH5	2S CONCRETE BLOCK POULTRY HSE
AHP	HOOP BLDG
AK1	BUNKER SILO
AMH	MILK HOUSE
AMP	MILK PARLOR
AS1	CONCRETE STAVE WITH ROOF
AS2	PREFABRICATED STEEL SILO
AS3	STL SILO W/PORCELAIN LINED
ASB	SWINE FINISHING BARN
ASC	SWINE CONFINEMENT BARN
ASD	FR IMPLEMENT SHED
ASF	SWINE FARROWING BARN
ASH	SMOKE HSE
ASM	HORSE STABLE- MASONRY
AST	HORSE STABLE- FRAME
AT1	CONCRETE OR PLANK TRENCH SILO
AT2	DIRT TRENCH SILO
AY1	CIRCULAR SLURRY SYSTEM
AY2	RECTANGULAR SLURRY SYSTEM
BAF	FR BALCONY
BAM	MASONARY BALCONY
BC1	BANK CANOPY - DRIVE IN
BD1	BOAT DOCK (WOOD TRIM)
BD2	MED. WOOD DOCK, WD GIRDERS BOL

CODE	DESCRIPTION
BD3	HEAVY WOOD DOCK, HEAVY PILING
BE1	BANK VAULT - NO DOOR
BE2	BANK VAULT RECSTOR/NO DOOR
BE3	BANK NIGHT DEPOSITORY
BE4	BANK DRIVE IN TELLER BOOTH
BGV	BLDG MISCEL GV
BH1	BOATHOUSE OPEN
BH2	FRAME OR CB BOAT HOUSE
BH3	BOATHOUSE MASONRY ENCLOSED
BKH	BULKHEAD
BOR	BOR VALUE ADJUSTMENT
BRW	BRICK/STONE WALL/SF
BS1	BOAT SLIP ECONOMY
BS2	BOAT SLIP AVERAGE
BS3	BOAT SLIP GOOD
BSM	BASEMENT UNF
BTP	BASEMENT TOP
C-E	COMM EXEMPT
C-I	COMM INDUSTRIAL
CA1	COMM CENTRAL AIR
CA2	RES CENTRAL AIR
CBN	CABIN
CBW	CONCRETE BLOCK WALL/SF
CCO	COMMERCIAL CONDO
CDK	COVERED DOCK
CFL	CONC FLOOR
CG1	CONDO GARAGE
CP1	CANOPY- WD ONLY
CP2	CANOPY-WD, ROOF/SLAB
CP3	CANOPY-ECONOMY
CP4	CANOPY-AVERAGE
CP5	CANOPY-GOOD
CP6	CANOPY-VG
CP7	PERGOLA
CPP	PORTABLE CARPORT
CS1	COM FR SHED
CS2	COM MTL SHED
CS3	PE UTIL/STGE SHED
CS4	PB UTIL/STGE SHED
CS5	LUMBER SHED 1 SIDE OPEN
CS6	LUMBER SHED 4 SIDE OPEN
CS7	BRICK/STONE UTILITY SHED
CT1	CELL TWR FDN MP
CT2	CELL TWR FDN LT
CT3	CELL PAVING
CT4	CELL FENCING
CT5	CELL EQUIP BLDG
CV0	CONDO VALUE

Outbuilding Analysis

CODE	DESCRIPTION
CVA	AMMENITIES
CVC	CONDO COMMON AREA
CVP	PARKING SPACE
CW1	CAR WASH DR THRU
CW2	CAR WASH SS
DBS	BASEMENT DWELLING
EAD	AUDITORIUM
EAR	ARMORY
ECH	COURTHOUSE
ECL	COLLEGE CLASSROOM
ECR	CHURCH
EDM	DORMITORY
EFP	ENCLOSED FRAME PORCH
EFS	FIRE STATION
EFU	ENCLOSED FR PORCH UP
EG1	SCHOOL GYMNASIUM
EG2	COLLEGE GYMNASIUM
EHP	HOSPITAL
EJL	JAIL
ELB	LIBRARY
ELV	ELEVATOR 2STP
EMA	MAUSOLEUM
EMP	ENCLOSED MASONARY PORCH
EMU	ENCLOSED MAS PORCH UP
ENH	NURSING HOME
EPO	POST OFFICE
ESH	SCHOOL
EXP	EXEMPT PART
FCL	FENCE CHAIN LINK PER SF
FI1	FENCE WROUGHT IRON
FLT	FEED LOT
FN1	FENCE CHAIN LINK LF -6
FN2	FENCE CHAIN LINK LF -8
FN3	FENCE CHAIN LINK LF -10
FN4	FENCE CHAIN LINK LF -12
FP1	FIREPLACE - 1 S
FP2	FIREPLACE - 2 S
FRM	FLORIDA RM
FW1	PICKET FENCE
FW2	STOCKADE FENCE
FW3	POST RAIL
FW4	BASKETWEAVE
G01	GOLF COURSE AAAA
G02	GOLF COURSE AAAA-
G03	GOLF COURSE AAA+
G04	GOLF COURSE AAA
G05	GOLF COURSE AAA-
G06	GOLF COURSE AA+

CODE	DESCRIPTION
G07	GOLF COURSE AA
G08	GOLF COURSE A
G09	GOLF COURSE B
G10	GOLF COURSE C
G11	GOLF COURSE D
G12	EXECUTIVE GC
G13	GOLF COURSE PAR 3
G14	MINIATURE GOLF
G15	MINI GOLF ELAB
GE1	GRAIN ELEVATOR FR/MTL
GE2	GRAIN ELEVATOR CONC
GE3	GRAIN ELEVATOR ANNEX
GE4	GR ELE ANNEX CONC
GH1	GREENHOUSE-RES AV
GH2	GREENHOUSE-RES GD
GH3	GREENHOUSE-RES FR
GH4	COM GREENHSE AV
GH5	COM GREENHSE GD
GH6	COM GREENHSE FR
GS1	GAS STATION BOOTH
GS2	CANOPY-PP(GAS PUMP)
GZP	PORTABLE GAZEBO
LD1	LOADING DOCK CONC OR STL
LD2	LOADING DOCK WOOD
LD3	LOADING DOCK INTERIOR
LD4	TRUCK WELL
LD5	TRAIN WELL
LD7	CONCRETE RAMP
MA0	MH MASONRY STOOP
MA1	MH OFF
MA2	MH WD/MTL/GL ADDITION
MA3	MH COVERED PATIO/CARPORT
MA4	MH WOOD DECK
MA5	MH BASEMENT CB
MA6	CB FOUNDATION
MA7	MH SCREENED PORCH
MA8	SKIRTING
MB1	MODULAR OFFICE
MB2	MODULAR CLASS RM
MB3	MODULAR EQUIP BLDG
MH1	M.H. PARK IMP GD
MH2	M.H. PARK IMP. AV
MH3	M.H. PARK IMP. FR
MH4	M.H. PARK IMP. PR
MIS	MISCELLANEOUS BLDG
MS1	MISCELLANEOUS
MSP	MASONRY STOOP
MV1	SOUND VALUE OF MISC. STRUCTURE

Outbuilding Analysis

CODE	DESCRIPTION
MV2	SOUND VALUE OF MISC. STRUCTURE
MV3	SOUND VALUE OF MISC. STRUCTURE
MV4	SOUND VALUE OF MISC. STRUCTURE
MV5	SOUND VALUE OF MISC. STRUCTURE
MV6	SOUND VALUE OF MISC. STRUCTURE
MV7	SOUND VALUE OF MISC. STRUCTURE
MV8	SOUND VALUE OF MISC. STRUCTURE
O99	MISC
OB1	BLEACHER
OB2	GRANSTND BLEACHR
OB3	GRANSTND BLEACHR CONC
OB4	STADIUM
OCS	CONCESSION STAND
OFP	OPEN FRAME PORCH
OFT	ATHL FIELD - FIELD TURF
OFU	OPEN FR PORCH UP
OGS	GUARD HSE
OGZ	GAZEBO
OKN	KENNEL RUN
OKT	BUILT IN OUTDOOR KITCHEN
OMP	OPEN MASONRY PORCH
OMU	OPEN MAS PORCH UP
OP1	PE MTL BLDG CF 12
OP2	PE MTL BLDG CF 14
OP3	PE MTL BLDG CF 16
ORR	RAIL SPUR
ORT	RUNNING TRACK
ORV	RV HOOK-UP
OTH	OTHER
OTR	RESTROOM FR-CB
PA1	PAVING ASPHALT
PA2	PAVING ASPHALT/CONCRETE
PAD	MFG HOME PAD
PB1	FR/MTL POLE BLDG 12FT HGT
PB2	FR/MTL POLE BLDG 14FT HGT
PB3	FR/MTL POLE BLDG 16FT HGT
PB4	WD POLE BLDG 1S OPEN 12
PB5	WD POLE BLDG 1S OPEN 14
PB6	WD POLE BLDG 1S OPEN 16
PB7	POLE BLDG 4S OPEN 14
PB8	POLE BLDG LOFT FLOOR
PC1	PAVING CONCRETE
PC2	PAVING CONCRETE HEAVY DUTY
PC3	PAVING CONCRETE MAT/SLAB
PD1	DET CONC PATIO
PD2	DET BRICK/STONE PATIO
PFC	PLBG FIXTURES COM
PFR	PLBG FIXTURES RES

CODE	DESCRIPTION
PIE	PIER
PM1	PP MOBILE HOME SINGLE WIDE
PM2	PP MOBILE HOME DBL WIDE
PM3	MOBILE HOME ADDITION - PP
PP1	PP POOL
QU1	QUONSET BLDG
QU2	QUONSET SHED
RA1	ATTACHED FRAME GARAGE
RA2	ATTACHED MASONRY GARAGE
RBH	BATH HOUSE
RCA	CABANA
RCB	RETAINING WALL CB-4
RCO	RETAINING WALL CONC-4
RCP	CARPORT
RCS	CAR SHED 1S OPEN
REN	RES ENCL FINISH FD
RFX	ROOF EXTENSION
RG1	DETACHED FRAME GARAGE
RG2	DETACHED CONC BLK GARAGE
RG3	DETACHED MAS GARAGE
RG4	DETACHED METAL GARAGE
RM1	SINGLE WIDE MOBILE HOME
RM2	DOUBLE WIDE MOBILE HOME
RM3	MOBILE HOME ADDITION - REAL
RM4	MH 2 STORY ADD REAL
RM5	MH WELL SEPTIC
RP1	PLASTIC/VINYL LINER POOL
RP2	PREFABRICATED VINYL POOL
RP3	REINFORCED CONCRETE POOL
RP4	FIBERGLASS POOL
RP5	GUNITE POOL
RS1	FRAME UTILITY SHED
RS2	METAL UTILITY SHED
RS3	BRICK/STN UTILITY SHED
RS4	OUTHOUSE
RS5	WELLHOUSE
RSL	SHELTER/SLAB
SC1	COMM POOL APT/MOTEL
SC2	COMM POOL C CLUB
SCP	SCREEN PORCH
SGB	SCRN PORCH BRICK UP
SK1	SHED ON SKIDS-PP
SKW	SUMMER KITCHEN
SKY	SKYWAY (ELVE WALK)
SOL	SOLAR RM
SPA	INGROUND SPA
SPK	SWIMMING POOL PATIO
SPR	SEE SPECIAL REPORT

Outbuilding Analysis

As the visuals have shown, we have several types of outbuildings that could be assigned during data entry. Outbuildings should be examined for low- and no- use types. Reassigning and subsequently removing unused outbuilding types limits the branches on the decision tree during data entry, leading to greater consistency.

We have 36 "MISC" and 2 "OTHER" outbuildings that do not fall into any other of the given types. An additional ten outbuildings reside in the MV series – sound valued miscellaneous structures. Another ten parcels are labeled BGV, another miscellaneous type. A couple of other low-use types, and a potential mapping of these types is provided below.

CFL – "Concrete Floor": 2 occurrences could be migrated to an outbuilding mod factor for the associated type. If this pricing does not exist, it could be installed. After migration, this outbuilding type could be deactivated.

BD2 – "Med. Wood Dock, WD Girders BOL": this outbuilding could potentially be migrated to BD1 for Wood Dock. If this outbuilding differs significantly from the average wood dock, a grade adjustment may be necessary for accurate pricing.

We also notice 10,122 with a label of "Total Building Value". If systematically applied, these may be perfectly valid. Investigation into this type is warranted during the next revaluation event. Vision remapped 80+ types in a similar jurisdiction.

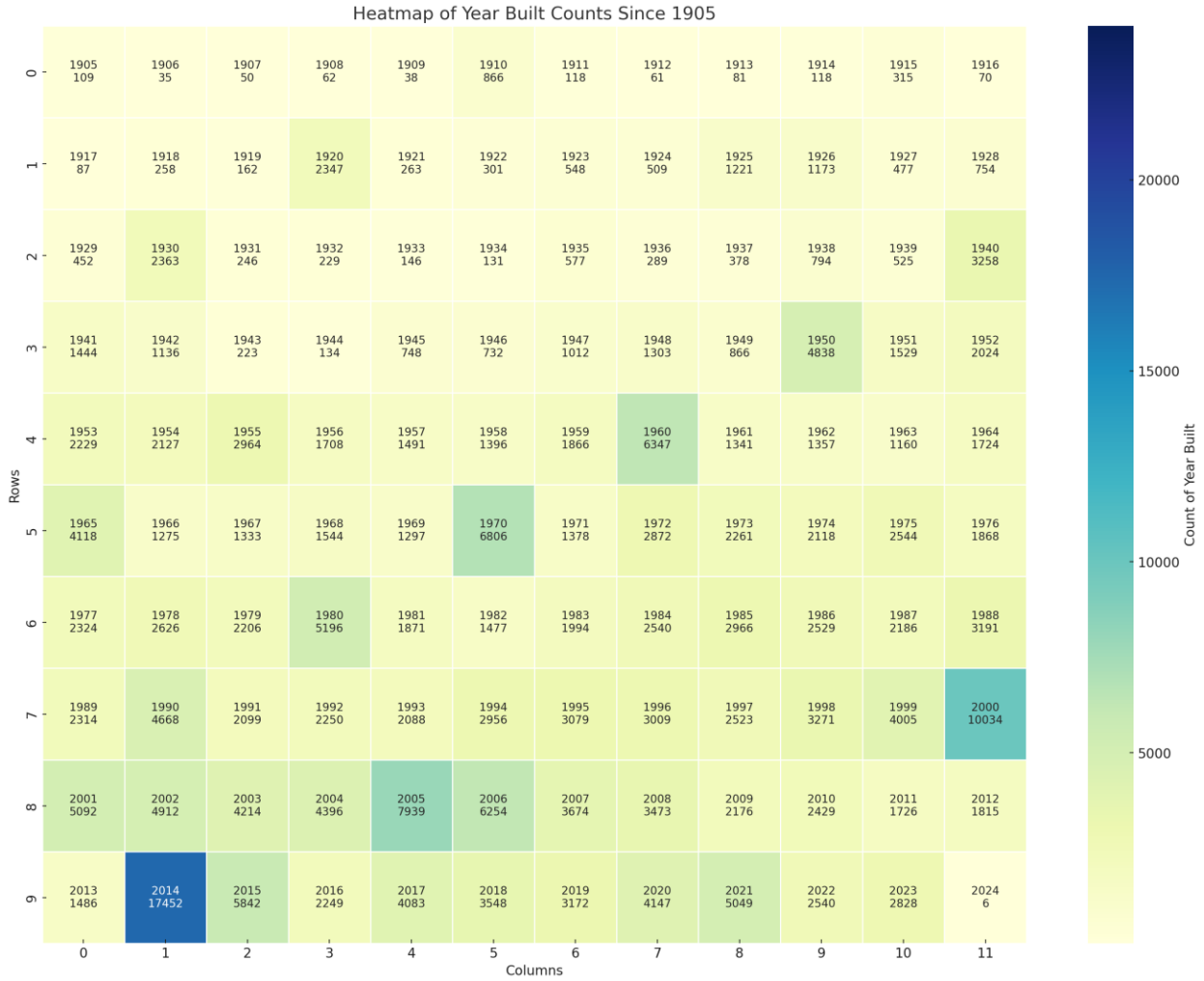
Outbuildings should be examined for low- and no- use types. Reassigning and subsequently removing unused outbuilding types limits the branches on the decision tree during data entry, leading to greater consistency.

Outbuilding Analysis

While looking at the year-built field of outbuildings, we notice the "signals" of data entry. When selecting a year-built for an outbuilding, when that information is unknown, may result in a tendency to round. Years ending in 5 and 0 have been assigned to outbuildings slightly more frequently.

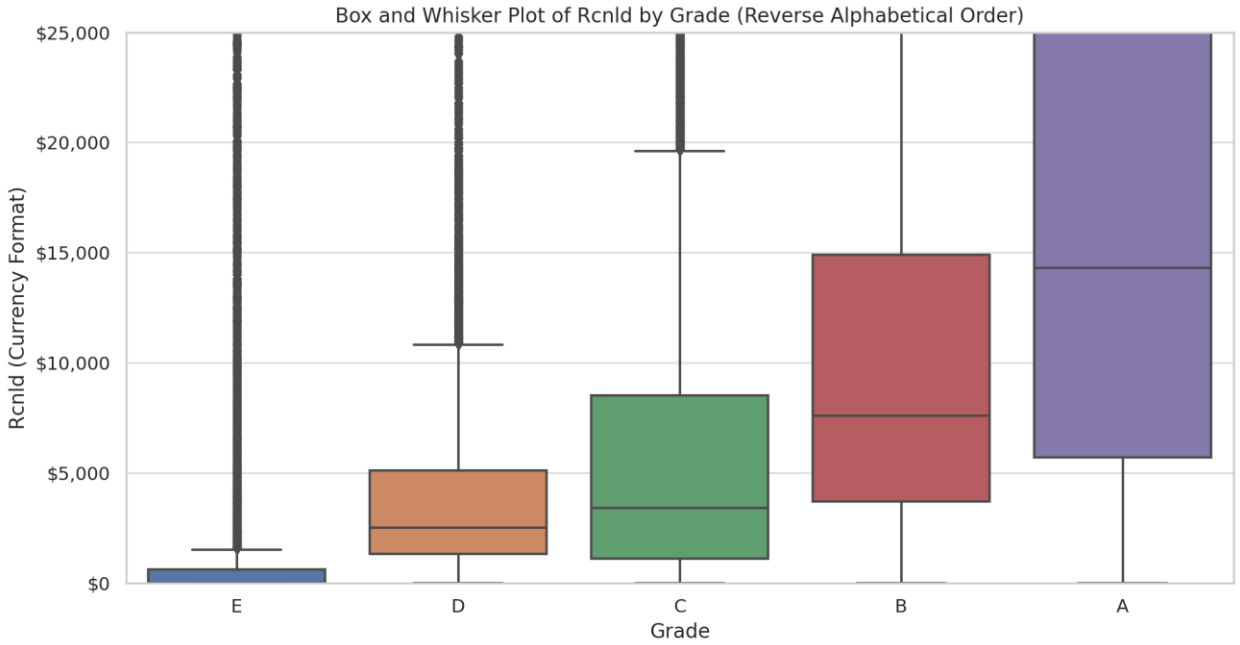
2014, in particular, stands out as the most frequently assigned year-built for outbuildings. This could be the result of CAMA conversion, a mapping of data to this year-built for depreciation purposes, or a strong outbuilding market one decade ago.

The heatmap shown below provides a visual of our findings. Years that are sharded darker blue are assigned more frequently than those that are shaded towards the other side of the color ramp.

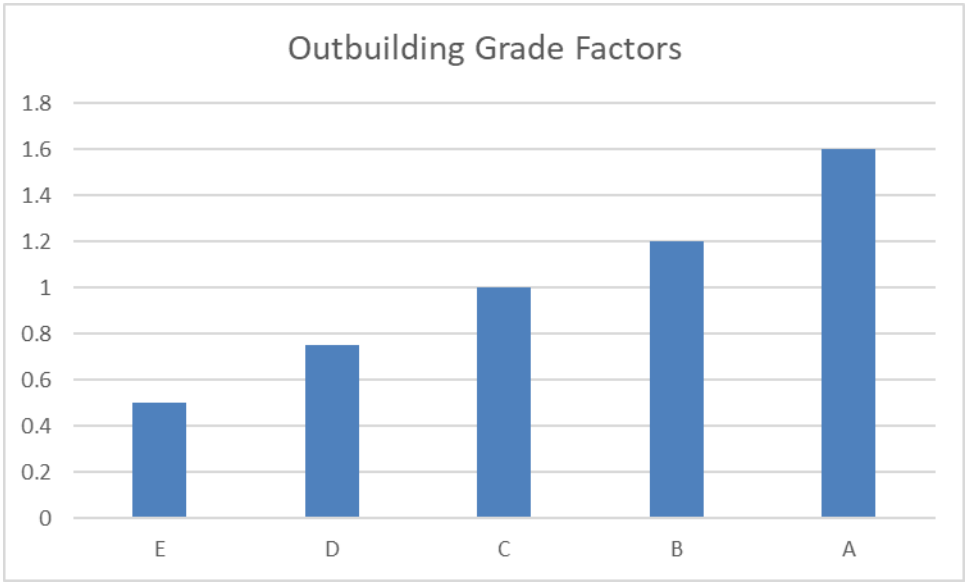


Outbuilding Analysis

Grades play a significant role in determining the final value of a dwelling. This is also the case when it comes to outbuildings. Though typically of smaller value, outbuildings react similarly to grades. The box and whisker plot shown below gives us an idea of how a particular grade affects the value of an outbuilding.

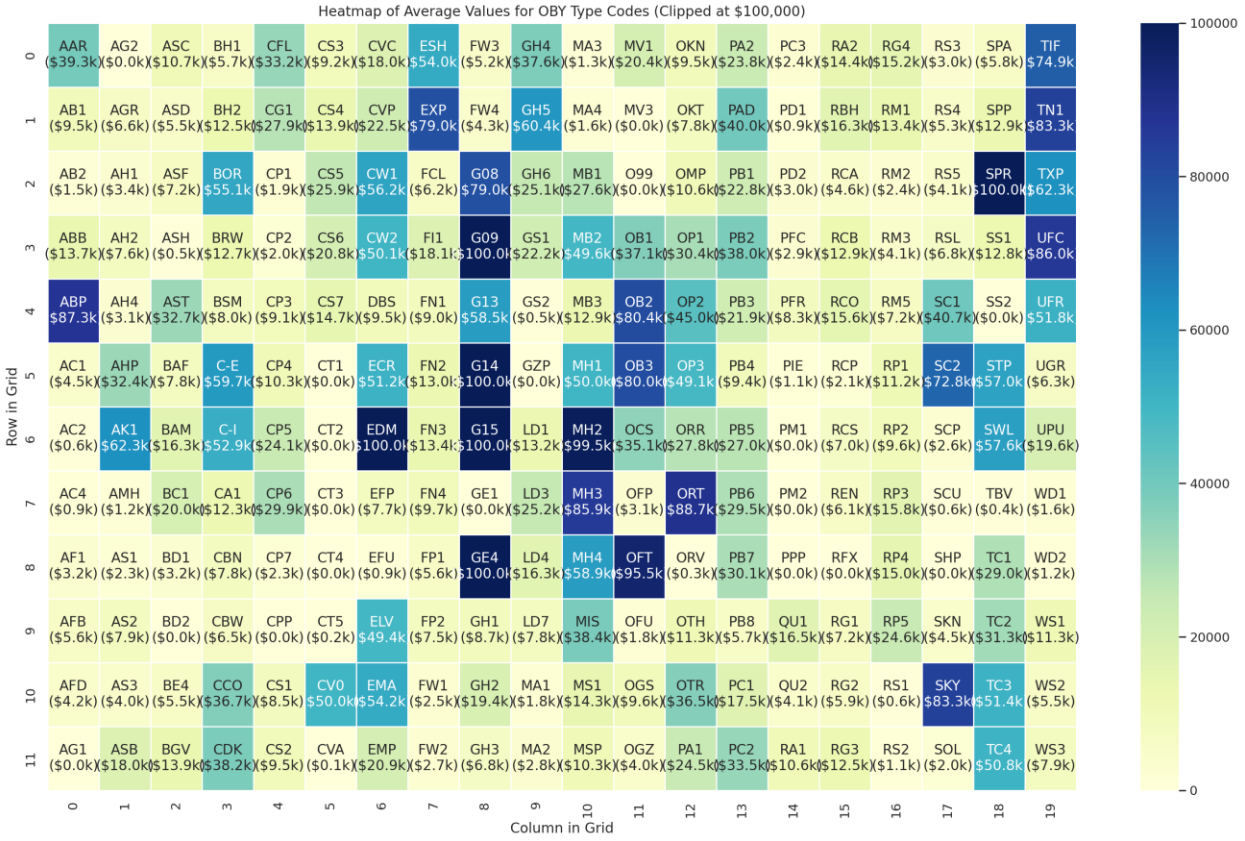


The grade factor chart varies from the dwelling schedule in a few ways. Firstly, each type of outbuilding can be assigned a unique grade factor distribution. The most commonly used grade factor distribution is shown below and mirrors what we see in the data:



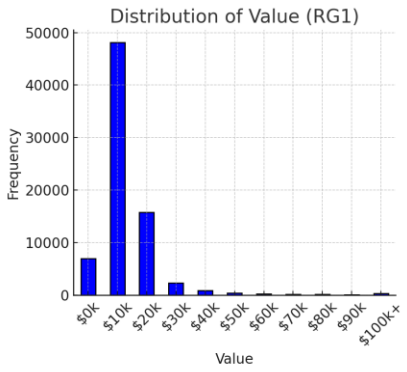
Outbuilding Analysis

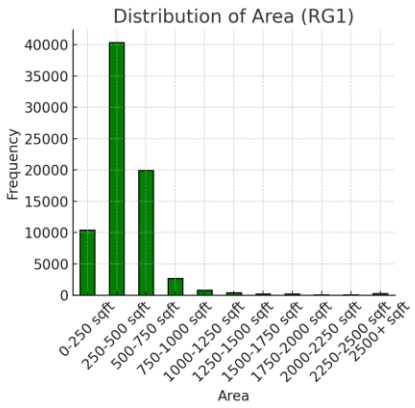
With one last heatmap for outbuildings, we see the relative average value between the different outbuilding types:

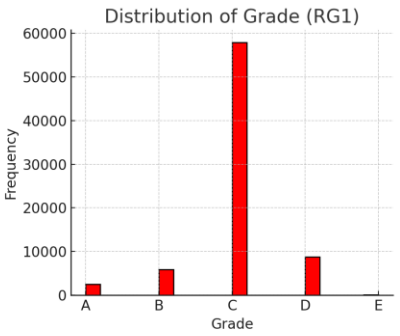


Switching from low-use to high-use types, we begin with a series of charts for what was the first element on our periodic table of outbuildings - RG1: Detached Frame Garage. The histogram with blue bars details value, green indicates area, and lastly red gives is a visually breakdown of the assigned grades.

For the garages, the most common is a C grade under 250 sq ft.

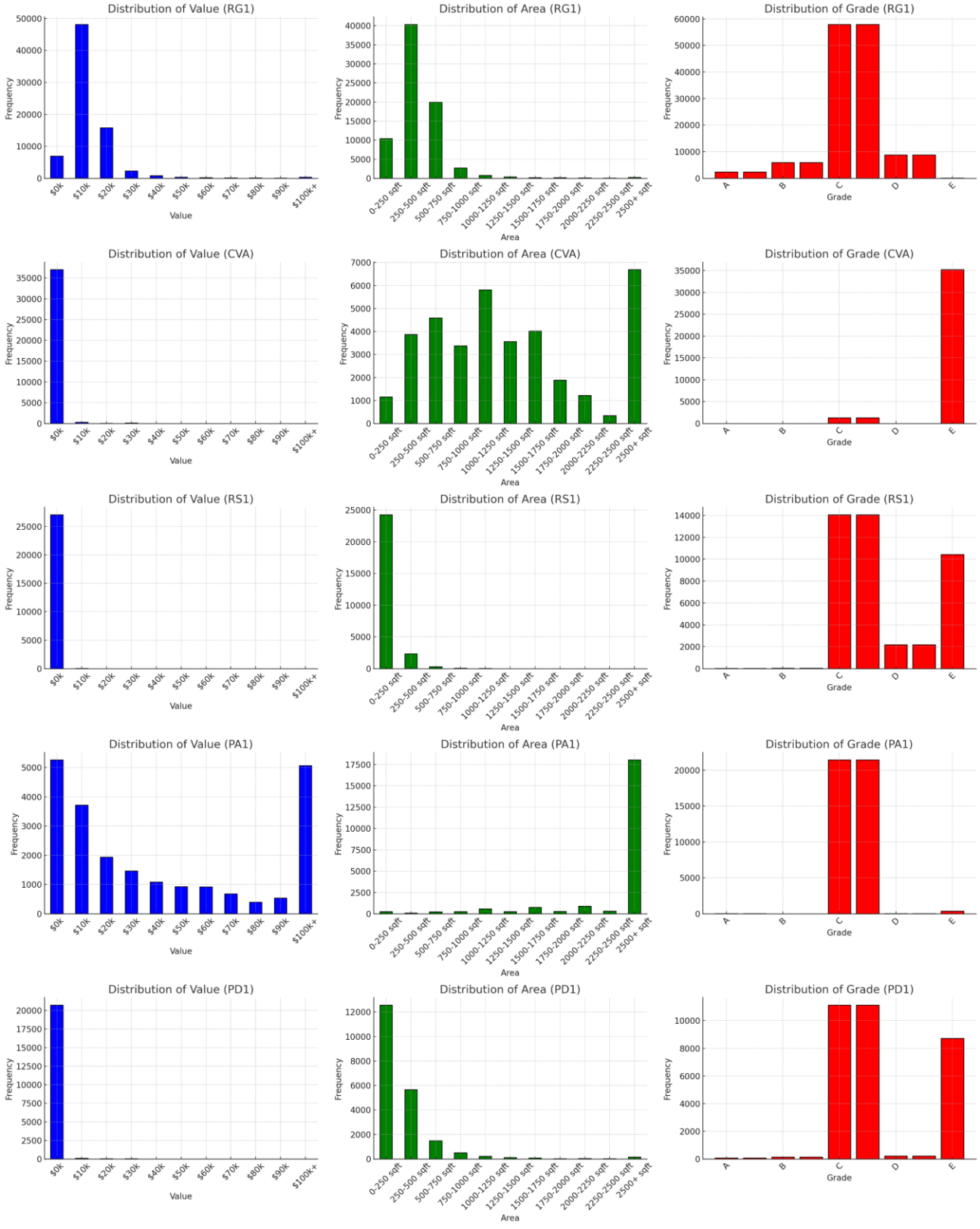






Outbuilding Analysis

We continue our outbuilding analysis with another value, area, and grade chart for a selection of the most commonly assigned types:



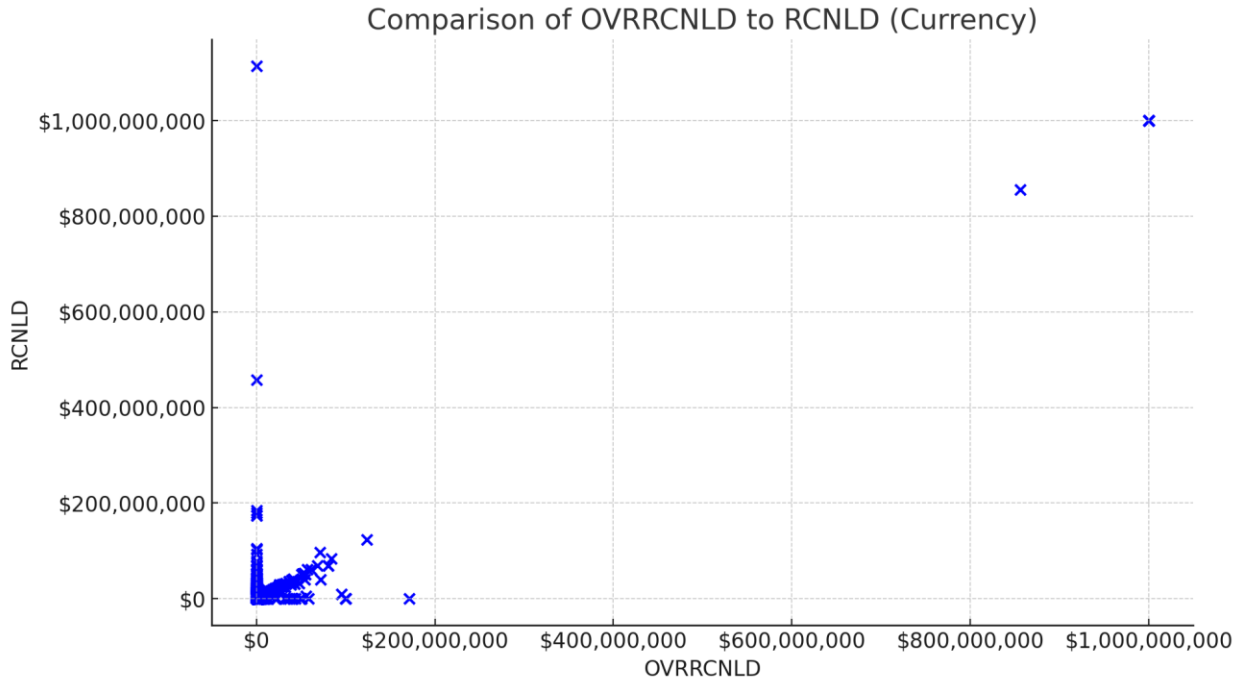
Outbuilding Analysis

Similar to dwellings, a few free form fields exist that have the ability to alter the calculated value. While there is nothing explicitly incorrect about manually assigning parcel values, it does come with a couple of consequences.

The first of these is inconsistency. If several people have the ability to make these adjustments, and a standardized procedure for this process is not in place – adjustments may be placed in a way that allows for similar circumstances to receive different treatment.

Another potential downfall of having overrides or adjustments in place relates to updateability. When priced with rate tables, buildings are assigned systematic values based on trackable and categorical data. These rate tables can be adjusted after analysis and the entire population of buildings can be assigned new values. When we have several adjustments or overrides in place, we lose confidence that our rate tables behave in the intended manner.

We begin our adjustment analysis by taking a look at the OVRRNCLD field, which stands for "override replacement cost new less depreciation" and replaces the calculated value of an outbuilding. While the zoom on the following graph may be deceiving, we have 87,003 of these:

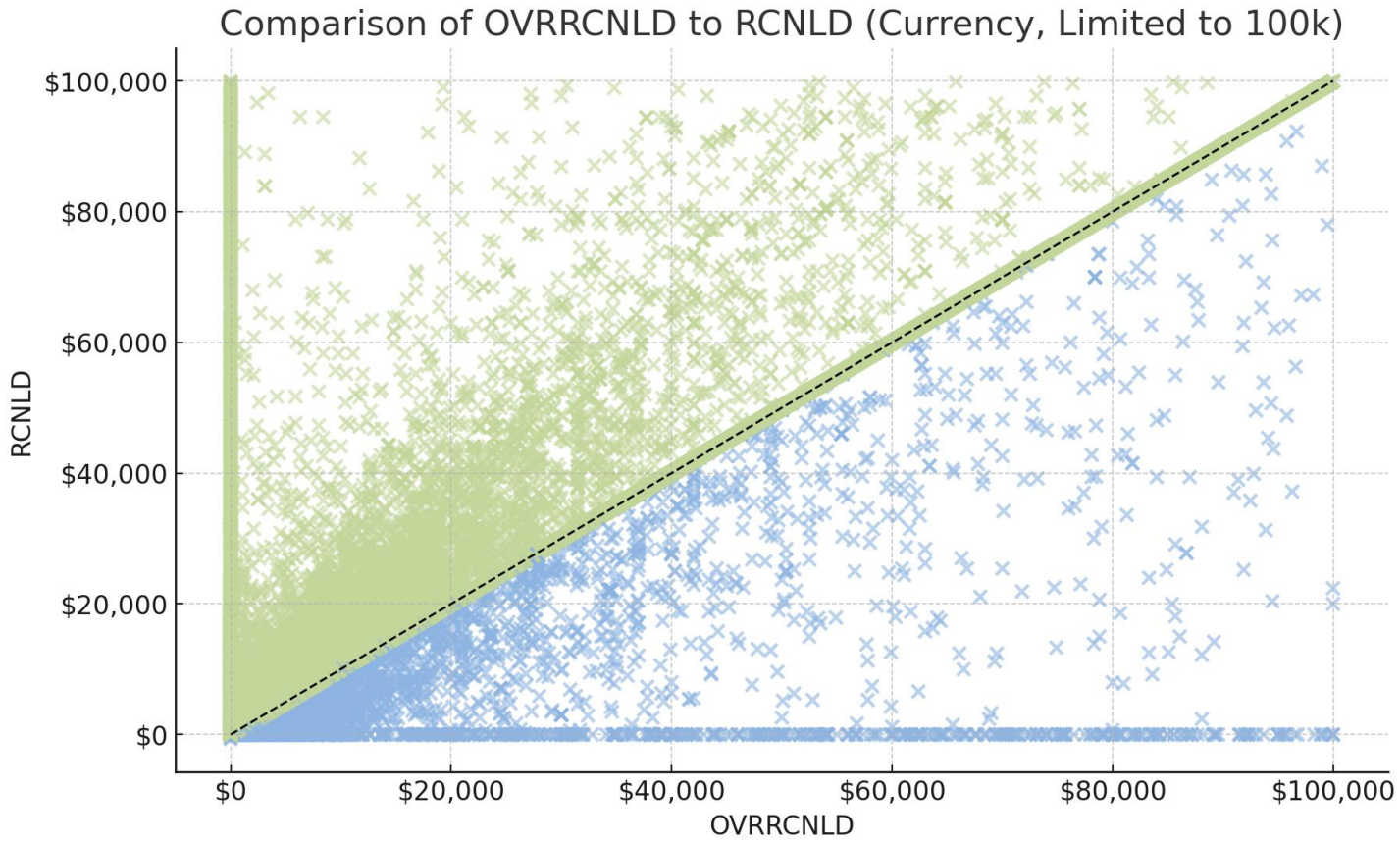


Zooming in a bit to those values under 100k, we notice a few things. Firstly, 3 distinct bands appear. We have a band at y=0 (vertical); x=0 (horizontal); and y=x (diagonal). Areas in the chart below that appear green receive a discount from the calculated value.

The vertical line indicates those outbuildings in which the value has been overridden to zero. Potential reasons for this include certain types of tax incentive programs in which values may be carried on another parcel.

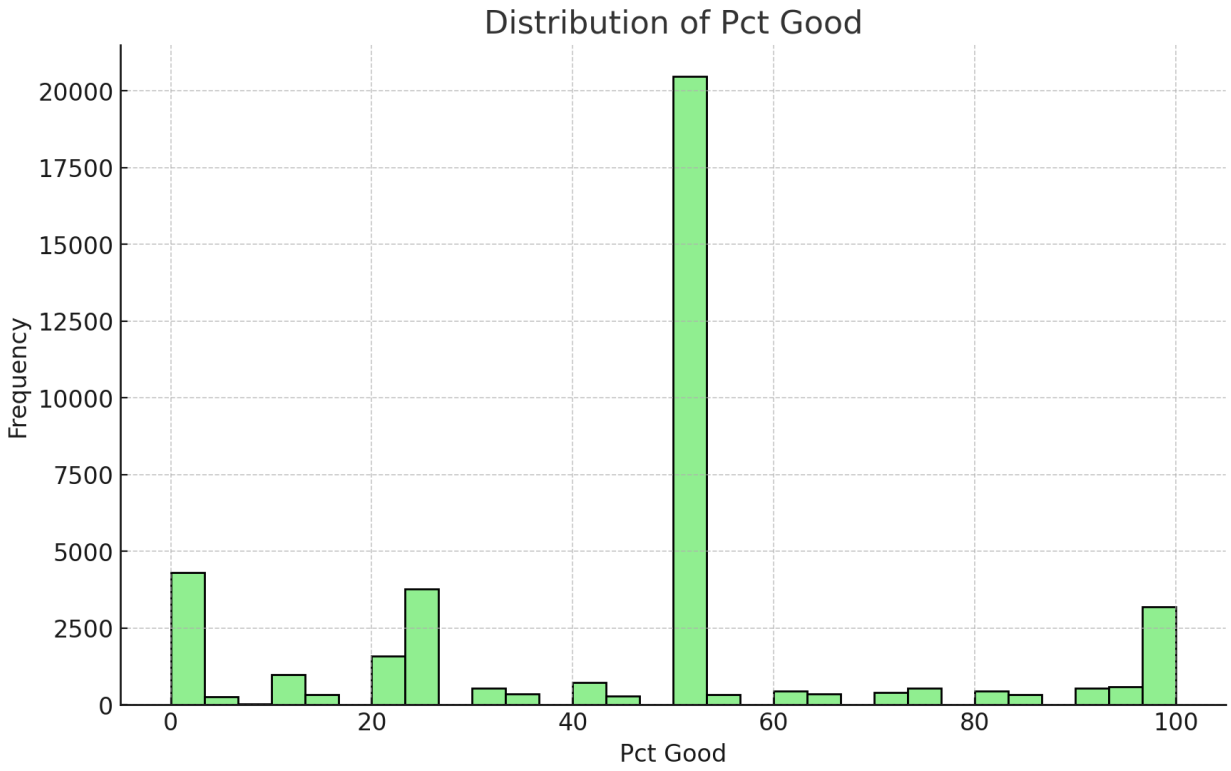
The diagonal line indicates those outbuildings in with the adjusted value matches the calculated value. This group could be removed without any value impact.

The horizontal line indicates those outbuildings in which a calculated value does not exist. In these instances, the ideal fix would be to address the pricing issue within the CAMA system, installing the necessary pricing.



Outbuilding Analysis

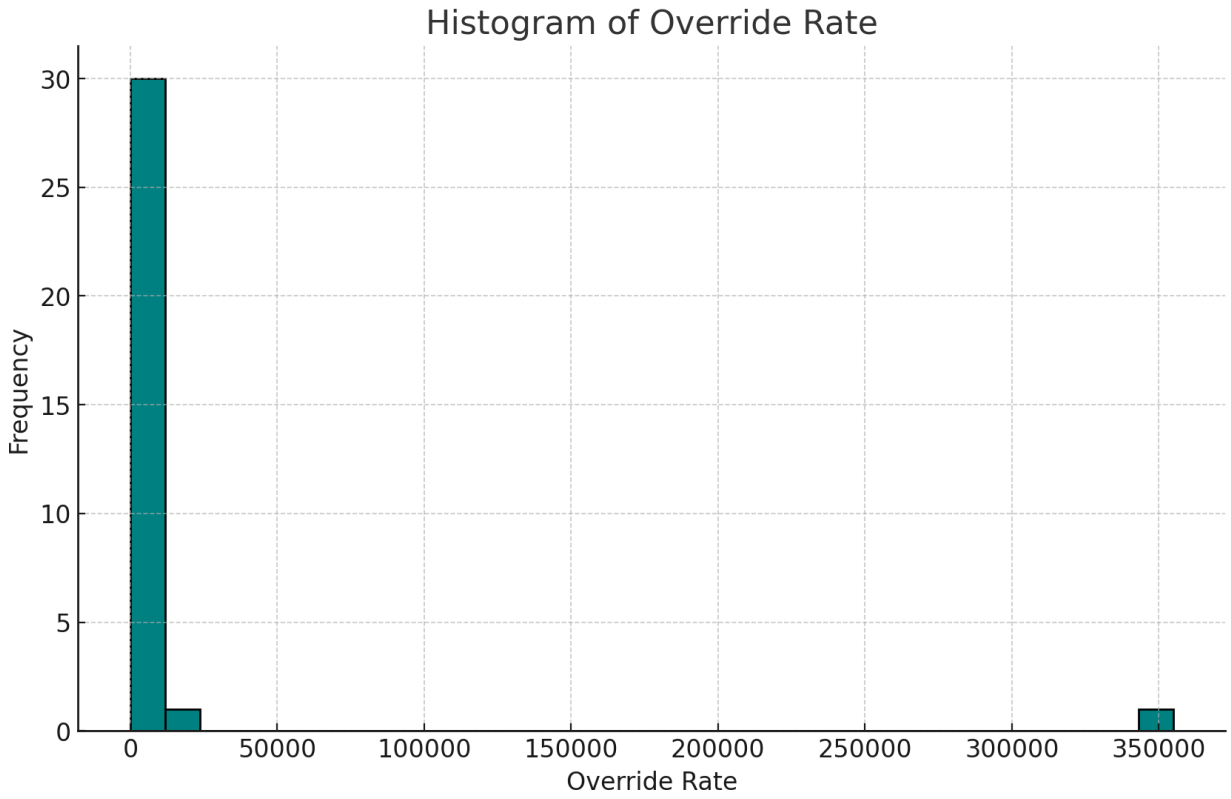
Another field that has the potential to alter the value calculation is an overridden depreciation, represented in the graph below by Pct Good. The histogram provides a visual representation of the frequency in which each factor range is assigned.



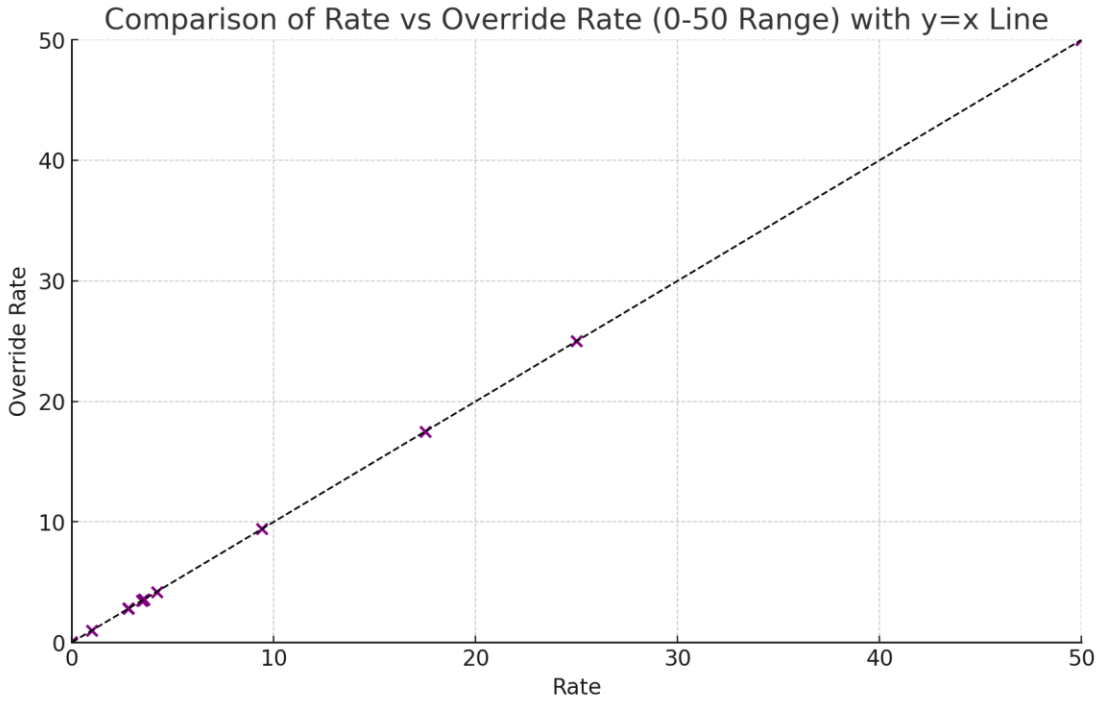
The 2024 database contains 40,854 of these adjustments, out of our measure of just under 300k total outbuildings. One difficulty with the removal of such type factors is the percentage change that it can cause. For example, if we come across a 10 "percent good" factor with the intention of removing it – the resulting change would be a 10-fold increase in value. A 10-fold increase corresponds to a 900% increase. Percentage change and dollar change represent different ways of measuring differences between values. Percentage change expresses how much a value has increased or decreased relative to its original amount, providing a sense of proportion or significance. In contrast, dollar change measures the absolute difference between two values in monetary terms, showing the exact amount gained or lost. While dollar change gives the precise increase or decrease, percentage change contextualizes that difference, making it easier to compare across different scales or scenarios.

Outbuilding Analysis

Taking a look at one more of these adjustment fields, we see 30 overridden rates in the graphs below.



It appears as though the overridden rates are similar to the table rates. This is encouraging and is a sign of properly pricing tables.



Land Analysis

Ohio County Boundary Lines in 1803.

The graphic on the right shows a Map of Ohio when Franklin County was created, while the graphic below shows the current county structure.

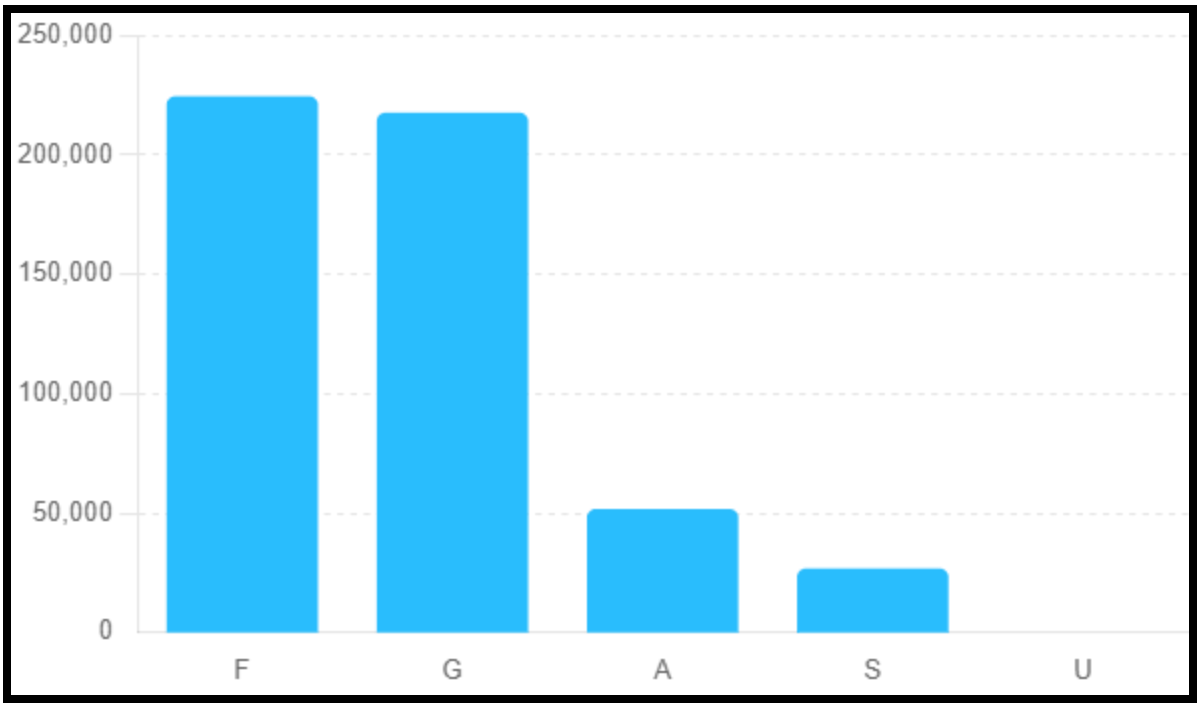
Just as Ohio itself has been split into smaller counties over time, Franklin County now has more parcels measured by the foot than any other type.

Ohio's counties were established during the late 18th and early 19th centuries.

The process began with the Northwest Ordinance of 1787, which provided a framework for the creation of new states, including Ohio, from the Northwest Territory. As settlers moved into the area, there was a need for local governance, and the first counties were formed. By 1851, Ohio had established its current 88 counties, reflecting the state's growth.

Land Analysis

In the following section, we dive into the land valuation method that has been implemented as a result of the 2023 revaluation. Starting with some descriptive statistics, we see counts for the five different land calculation methods that exist in CAMA. These pricing methods are for parcels assigned to the following data types: Front Foot, Gross, Acreage, Square Foot, Unit.



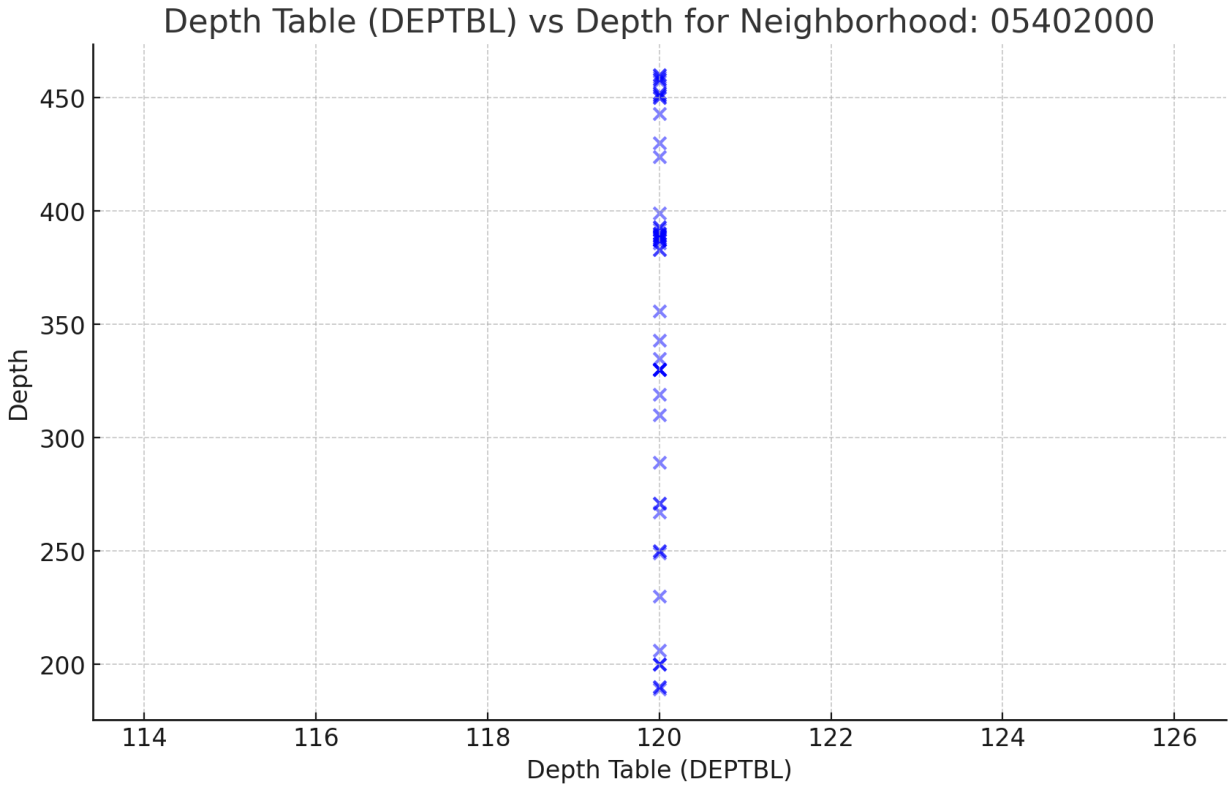
Front footage pricing relies on frontage and depth measurements. The depth of the parcel is then compared against the depth chart assigned to its neighborhood. A depth factor may be applied if the depth varies significantly from the average depth.

Gross land types are those in which values are assigned at times without given land measurements, perhaps in the instance of condos. We have more than expected of this type, an analysis on this type can be found in the pages to come.

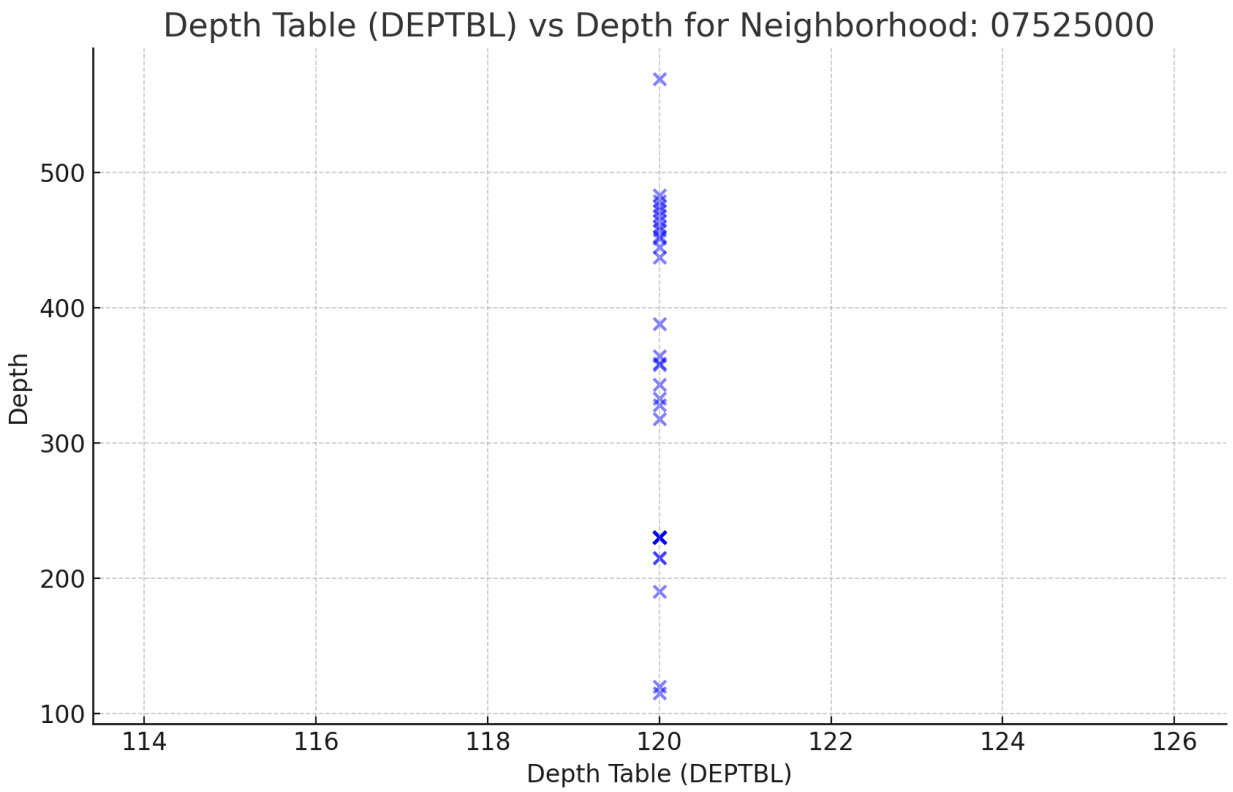
Acreage and square footage pricing we may be most familiar with while unit pricing indicates a "count". This type is sometimes used in place of the gross type, but in this instance – unit is not used.

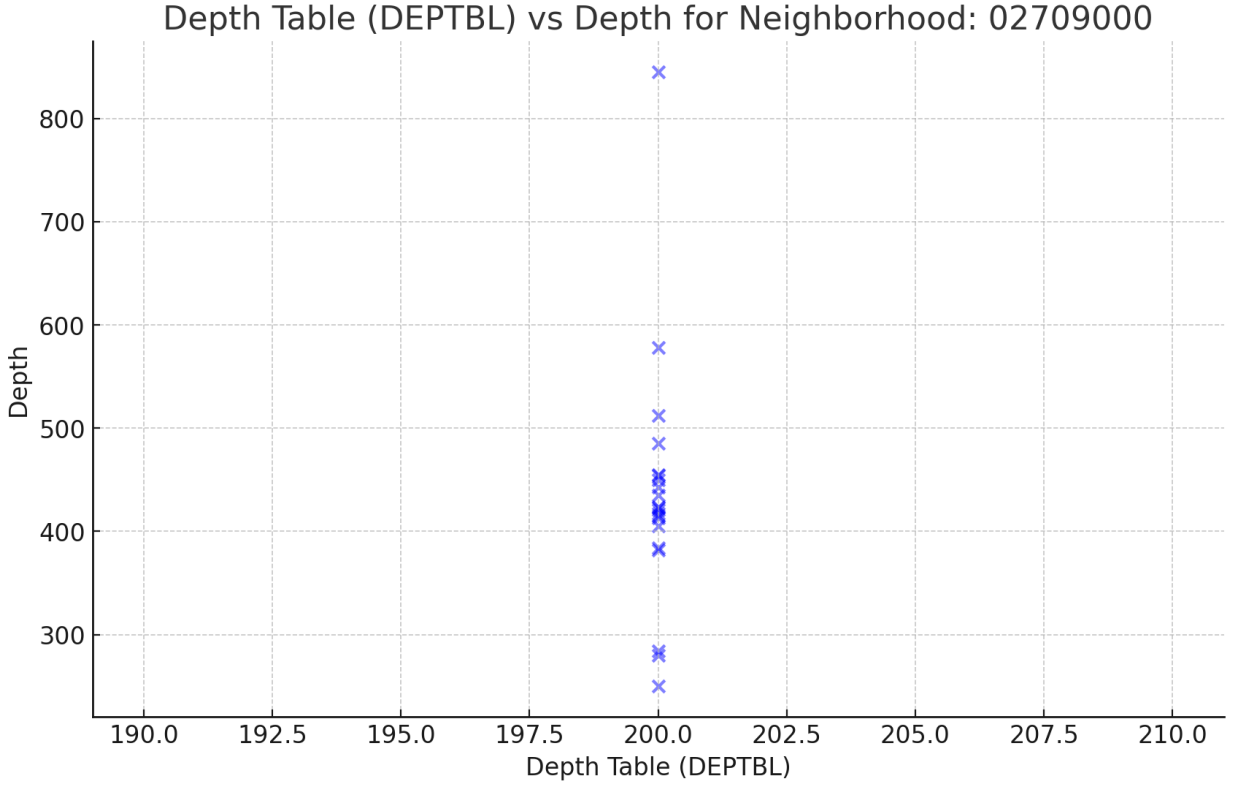
Looking more deeply into the front footage type, we look for neighborhoods in which the assigned depth table may deserve attention. A depth table is a built-in price adjustment intended to differentiate the value between deeper and shallower lots in a systematic manner. In general, these factors allow for more uniform pricing, which reflects reality as most lost sell in a tight price range. A parcel that is doubly deep may only be 50% more valuable, depending on the neighborhood. Depth factors capture this aspect of the market.

The scatterplot below gives us a neighborhood that stands out as having several parcels with depths considerably larger than the assigned depth table. We notice that while the depth table representing a 120-foot standard depth is assigned, we have parcels in which the actual depth exceeds this amount by in some cases double. This results in a depth factor being assigned (and potentially accounted for in the rates making the rates seem relatively high) that may not be necessary.



Two additional neighborhoods with a significant number of depths that differ from the assigned table, are presented on the next page.





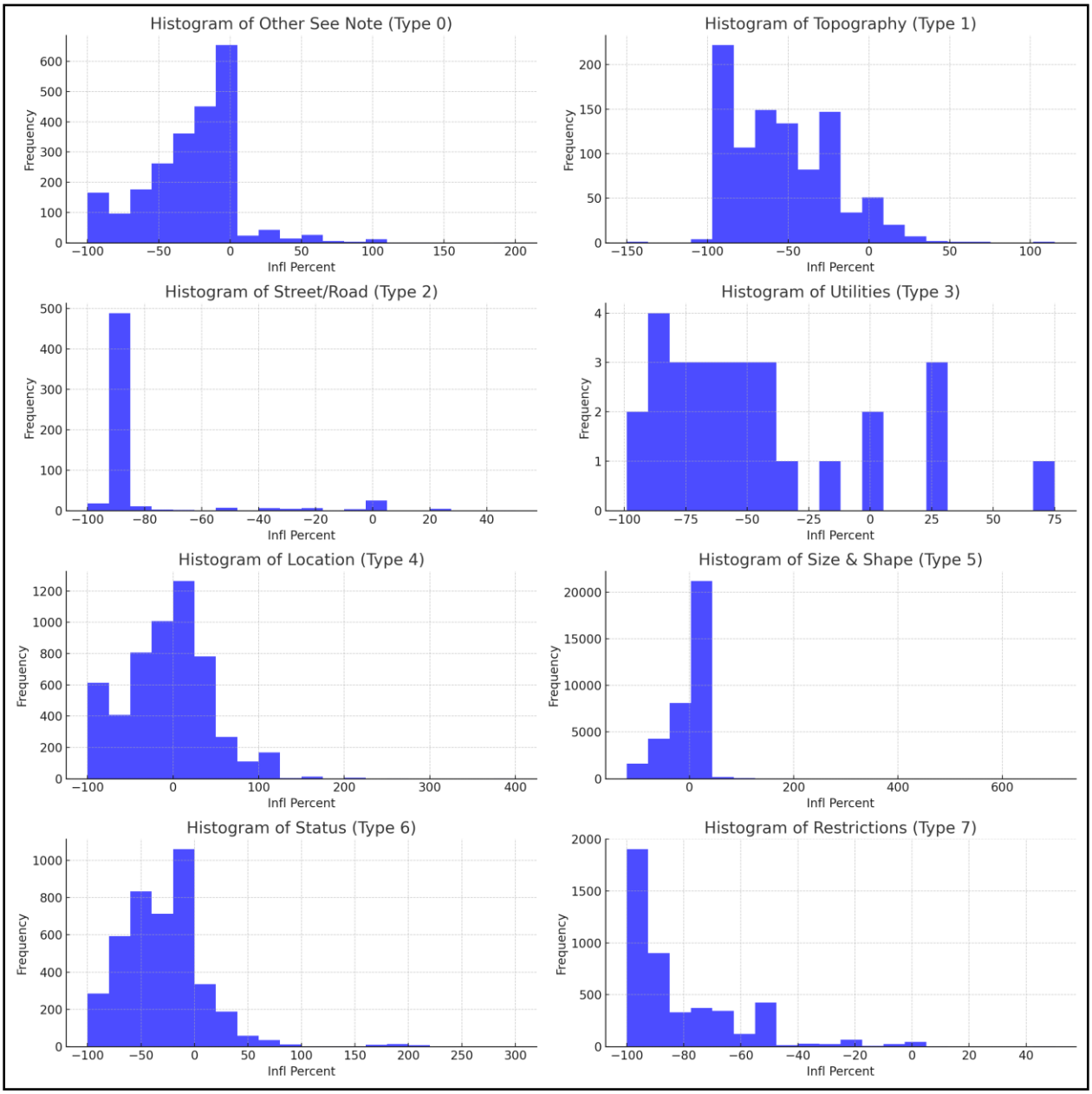
For these select neighborhoods, investigations are warranted for possible delineation or new depth table assignment during the next revaluation event.

Land Analysis

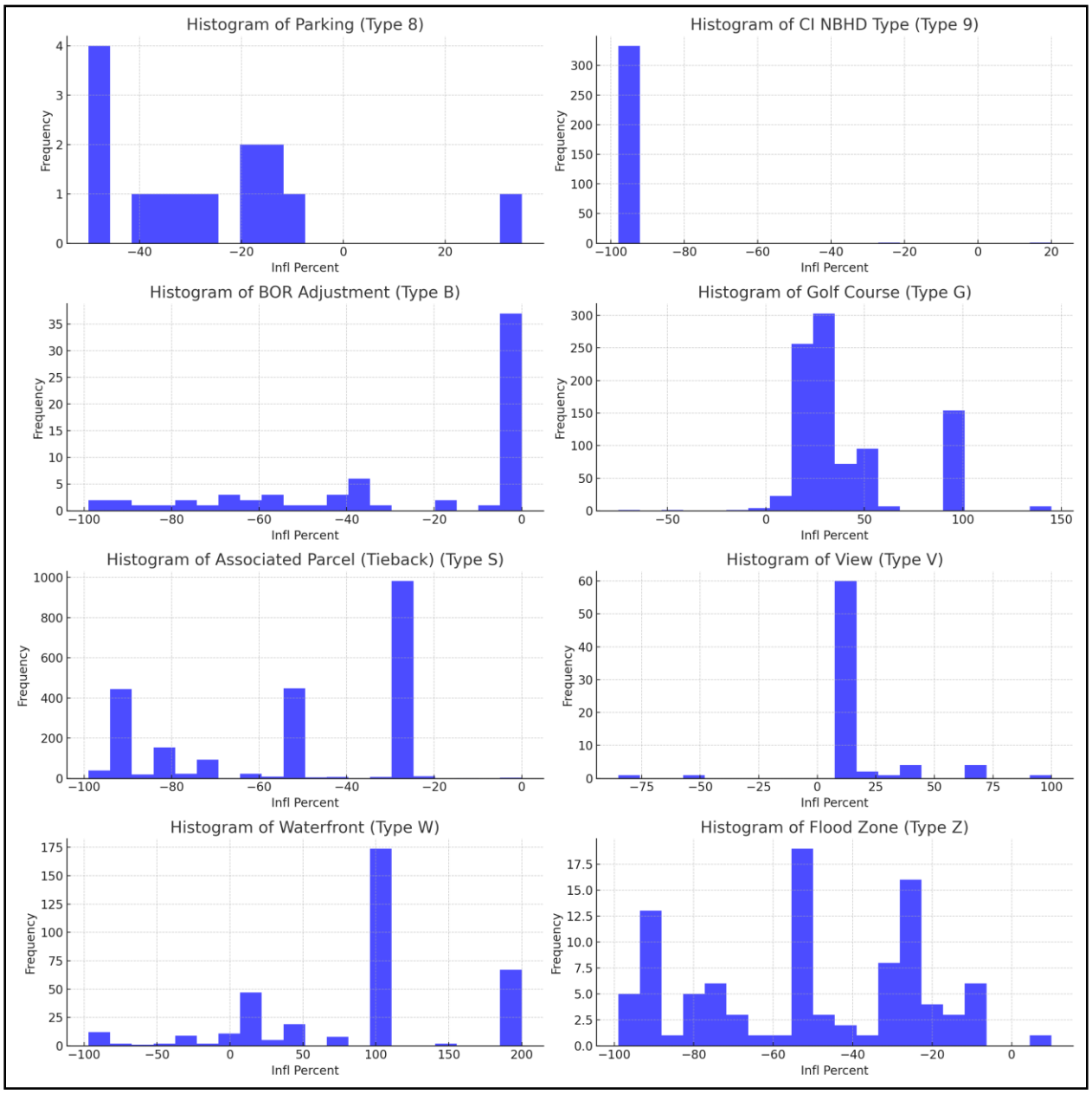
Type	Description	Count
0	Other See Note	150
1	Topography	108
2	Street/Road	13
3	Utilities	7
4	Location	364
5	Size & Shape	1,683
6	Status	2,805
7	Restrictions	449
8	Parking	21
9	CI NBHD Type	2
B	BOR Adjustment	4
G	Golf Course	94
S	Associated Parcel (Tieback)	1,315
V	View	1
W	Waterfront	21
Z	Flood Zone	16

One of the main adjustments to the value of land can be made in a field named "**Land Influence Factor**".

Similar to the other factors we have seen, these adjust land value, up or down, by a given percentage. Of these, we have 16 types for which histograms are provided. These histograms give us a count of each type by the range in which the factor resides.

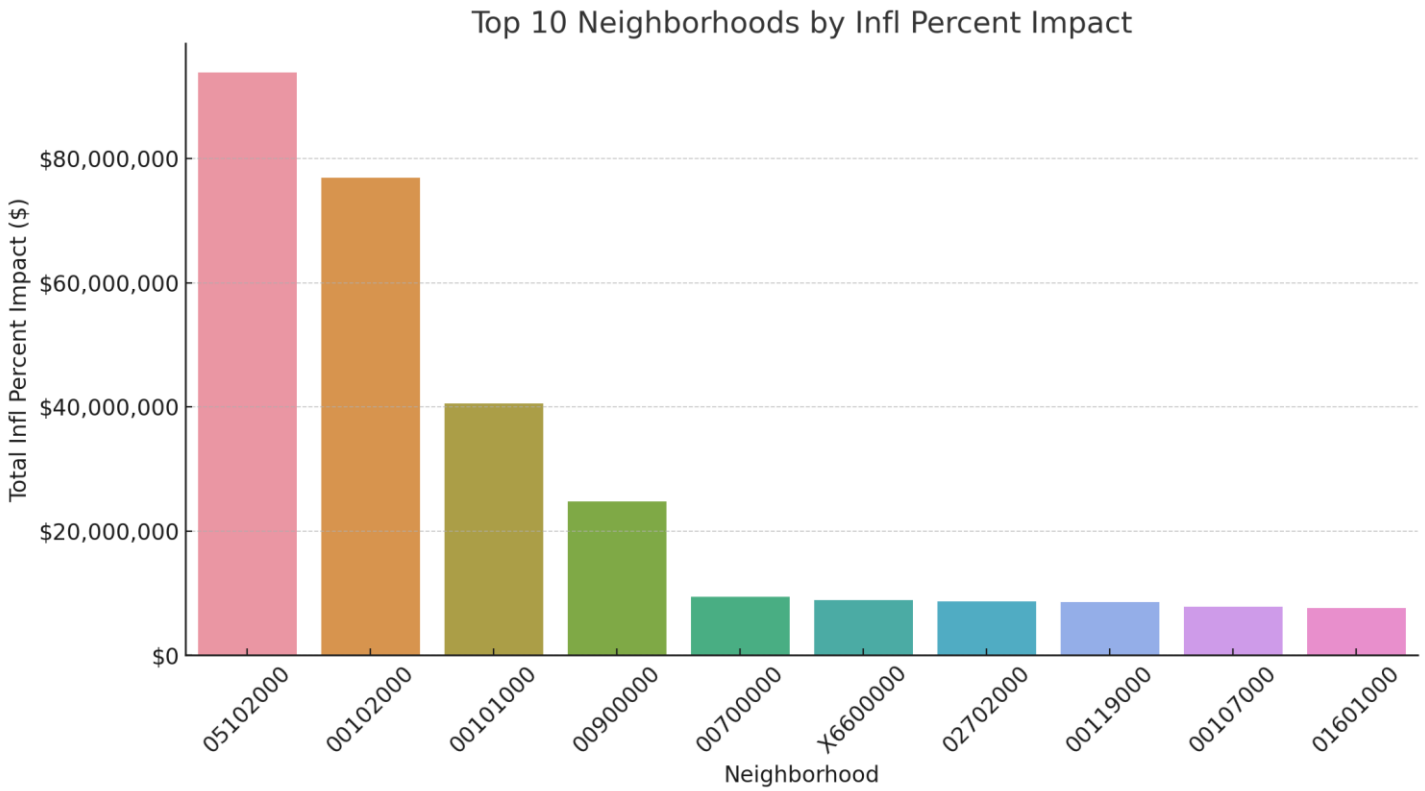


Land Analysis



Vision recommends creating a standardized method for assigning land influence factors. In a similar jurisdiction, Vision implemented a list of values to replace the free form entry. In this list of values, we allowed for 25, 50, and 75 percent reductions based upon the percentage of the property that was unusable. Additionally, we implemented a 25% positive influence factor that is intended to be used on commercial corner lot properties with double access. Cleaning up this field could result in potentially extreme percentage change at the parcel level, referring back to our 10% good 10-fold increase discussion from the outbuilding section.

Land Analysis



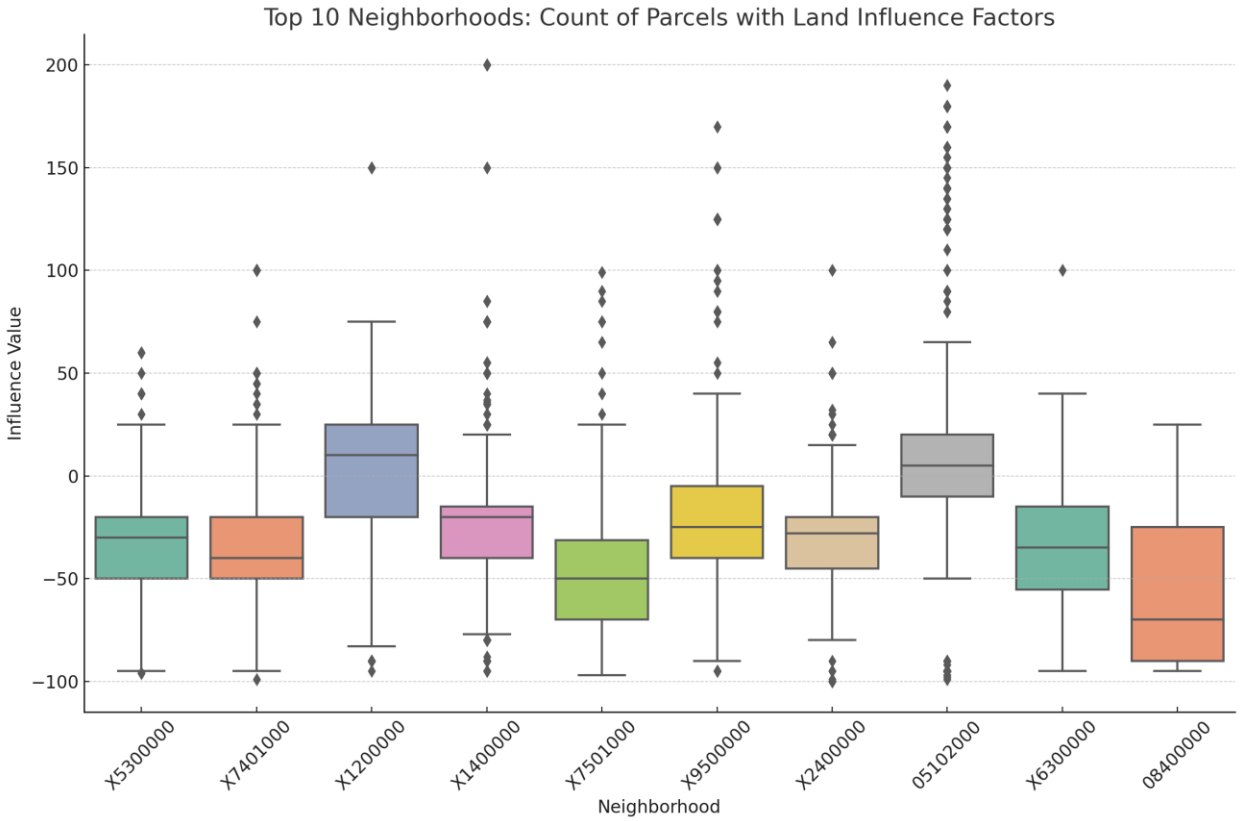
This chart illustrates the Top 10 Neighborhoods ranked by the total Infl Percent Impact on cost value. The x-axis represents the neighborhoods; the y-axis shows the total impact in dollar amounts.

The Infl Percent acts as a percentage adjustment applied to the land value of parcels, either increasing or decreasing their assessed values. Neighborhood 05102000 has the highest impact, with over $93.81 million in adjustments, followed by 00102000 with $76.92 million.

These values represent the cumulative effect of inflation percentage adjustments across the parcels within each neighborhood, providing insight into how property value adjustments are distributed geographically.

The total impact is close to -$2.5 billion in appraised value. This chart helps identify neighborhoods where cost values have been most significantly affected by Infl Percent adjustments.

Land Analysis



This box plot visualizes the distribution of influence values for the top 10 neighborhoods based on the count of parcels with land influence factors. Each neighborhood on the x-axis represents a group of parcels, while the y-axis shows the range of influence percentages applied to these parcels.

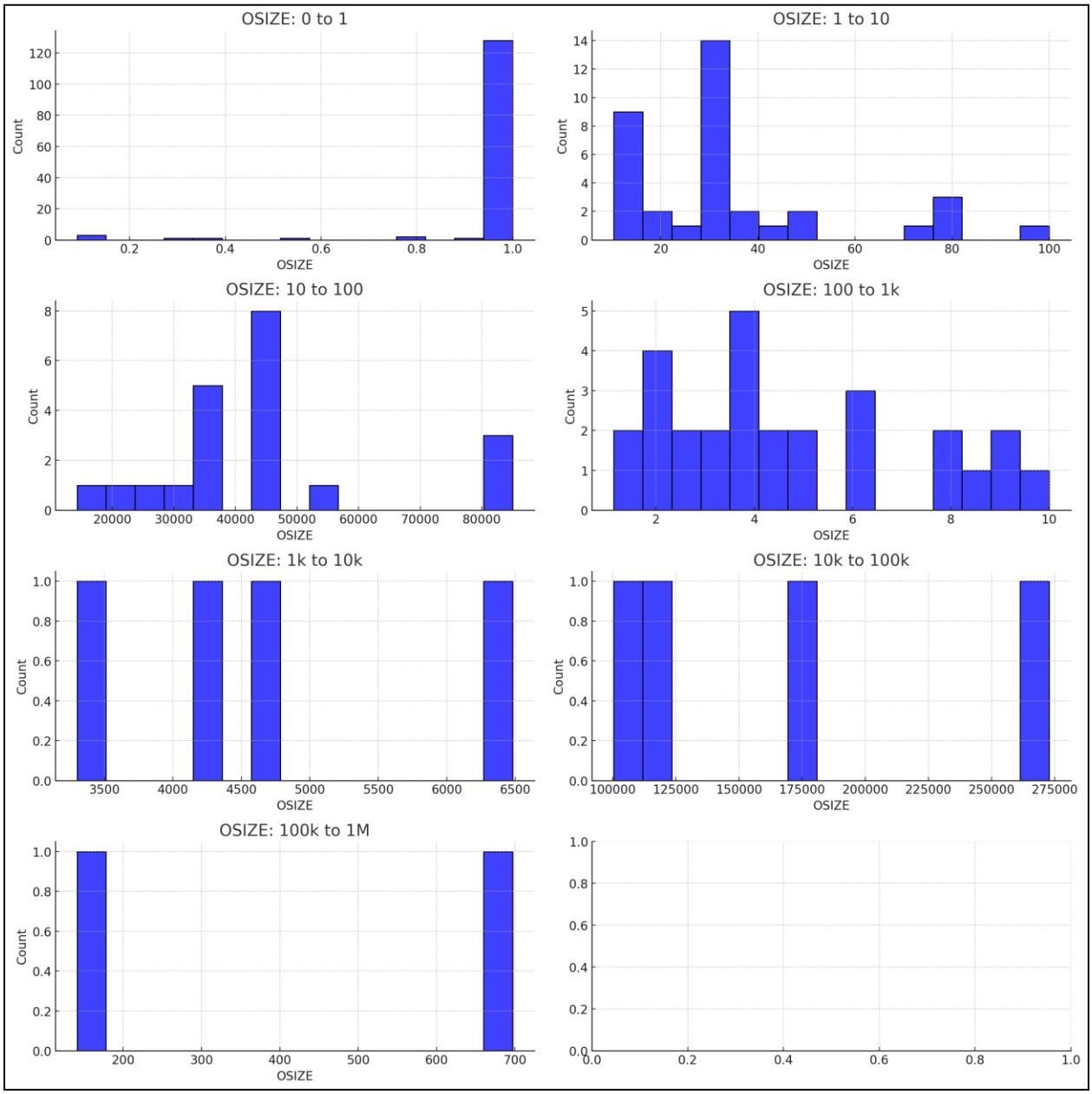
The box plot illustrates the spread of influence values within each neighborhood, where the middle line represents the median influence value, and the boxes encompass the interquartile range. The whiskers extend to show the range of the data, excluding outliers.

This visualization helps to compare how land influence factors are distributed across different neighborhoods, highlighting potential variations in property valuation adjustments within each area. Further details on this graph type, as well as all others shown in this document – can be found in the definitions section.

Land Analysis

Continuing our land analysis, we take a look at another stored data point, OSIZE (override size). We have a relatively small number of these with 232. Counts are shown below for different orders of magnitude.

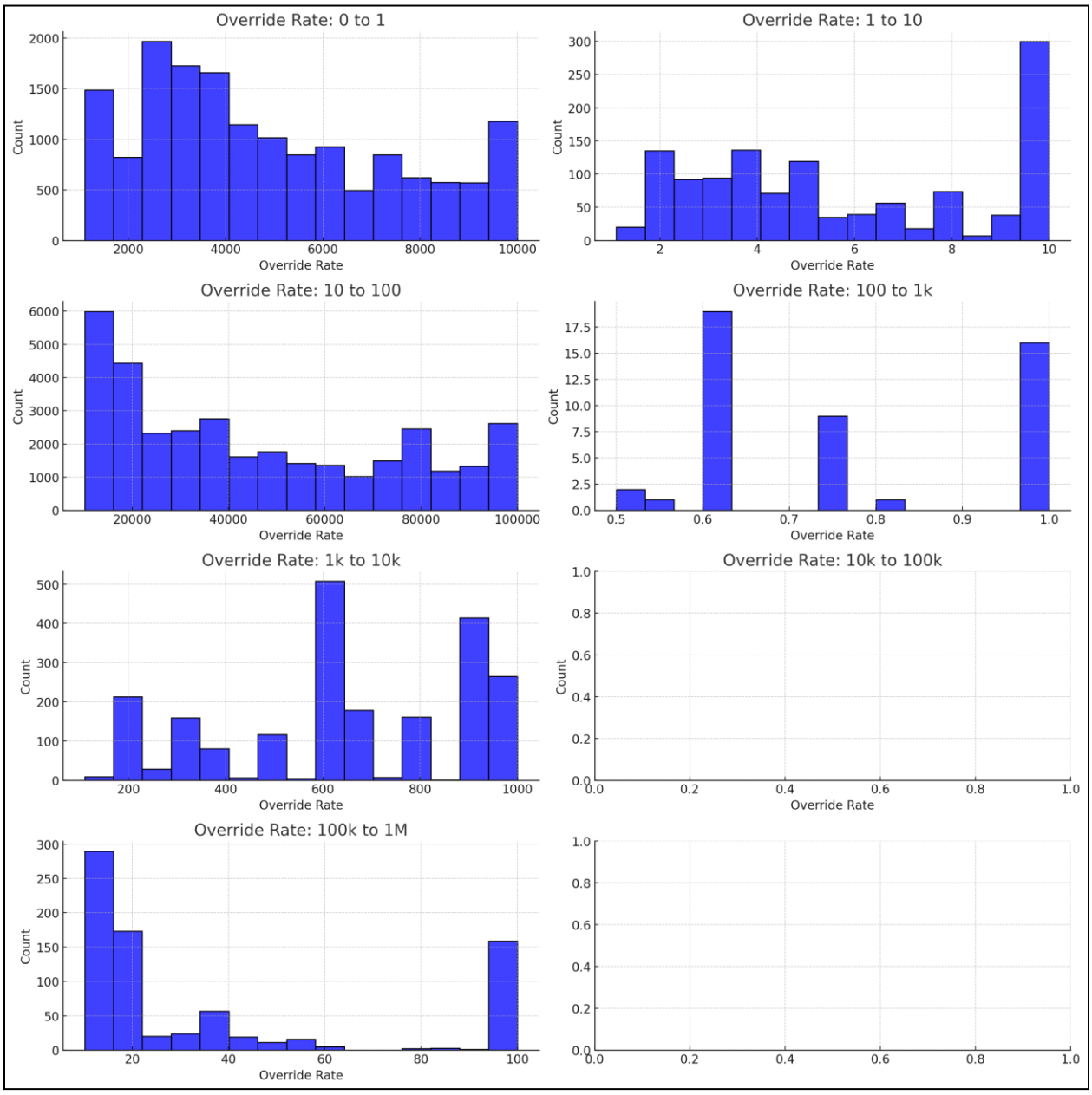
The "OSIZE" values in the dataset are mostly concentrated in the lower ranges, with a significant number of entries falling between 1 and 100. The data shows a peak in the range from 1 to 10, where most observations cluster around a value of 1. This may indicate OSIZE being used as a means to produce unit type pricing.



Land Analysis

Similarly displayed, ORATE (override rate) may be applied to a parcel in order to produce a specific value. As the system contains many options for potential rate structures, these ORATES are a sub-optimal approach. Updating rate tables will have no effect on these values in future updates. We have 71,007 ORATES in the dataset.

The visual below shows the counts for each order of magnitude up to 1 million:



Land Analysis

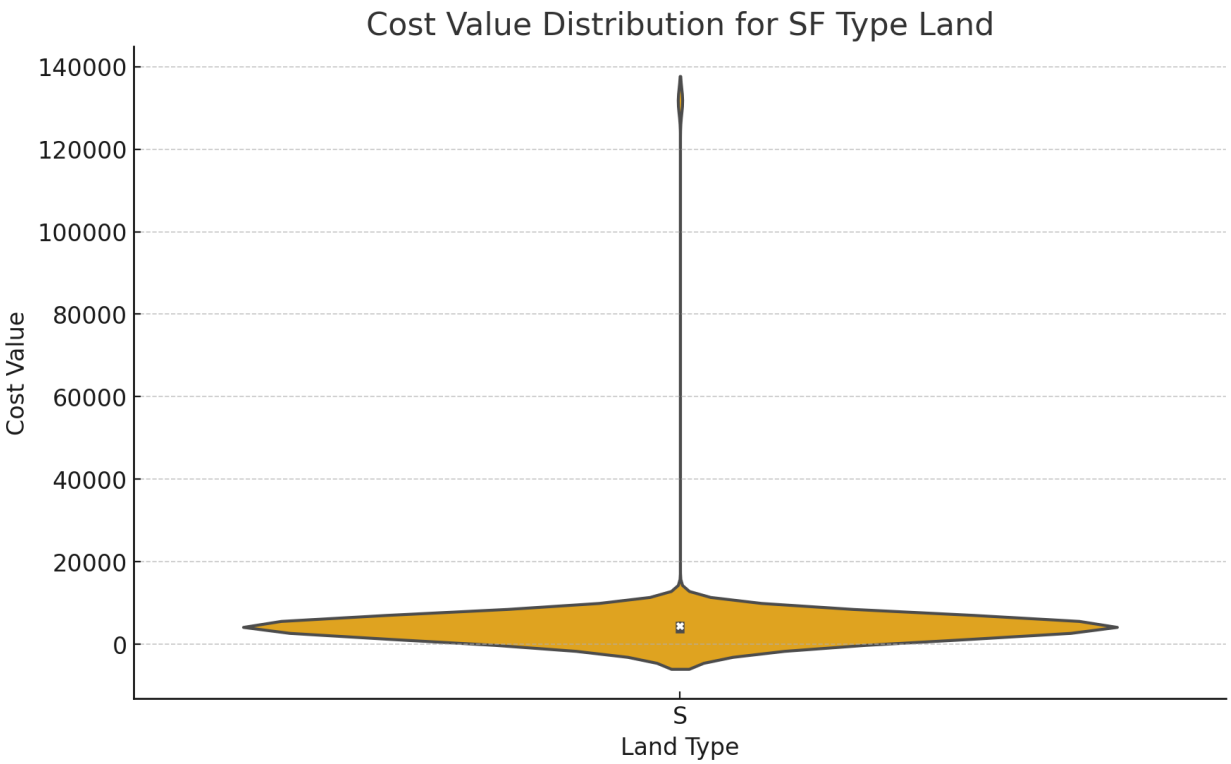
Continuing our land analysis, we next dive into the land value of **condominium style parcels**. Most often, these are identified with a 550 Land Use Code (LUC). Looking at just this class, we notice a few items that stand out.

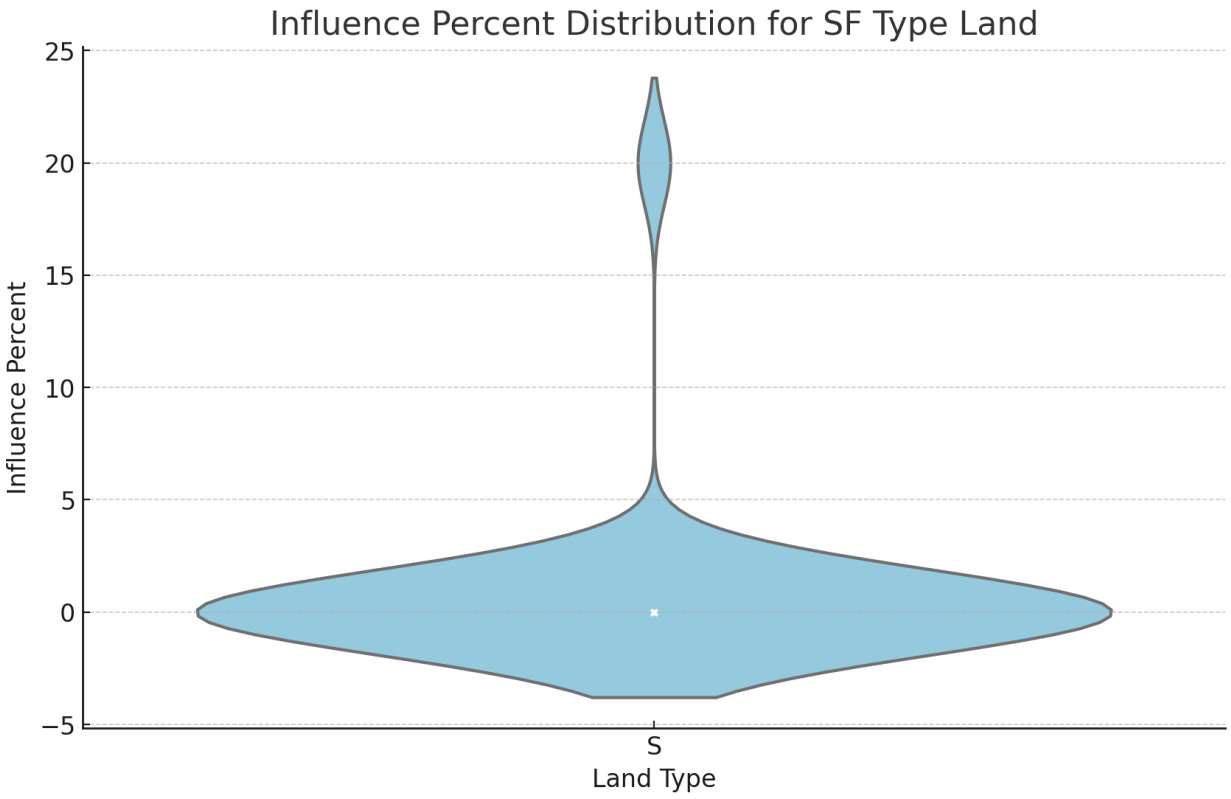
First, beginning with data exploration - we have slightly more than 51k land lines associated with condos. 1 of these is listed as acreage and 218 of these are listed as SF. These low count instances take away from the consistency of the other 51k gross type land lines. The non-gross value driven land types with 550 LUCs should be investigated for accurate listing.

The graph above warms us up for the other land types. We notice a flat line distribution just shy of 54k. This is to be expected as only one parcel falls in the group. Interestingly enough, this acreage parcel is also receiving a significant land influence factor. (600O004E 01502)

We next look at the 218 condo parcels that are listed as SF.

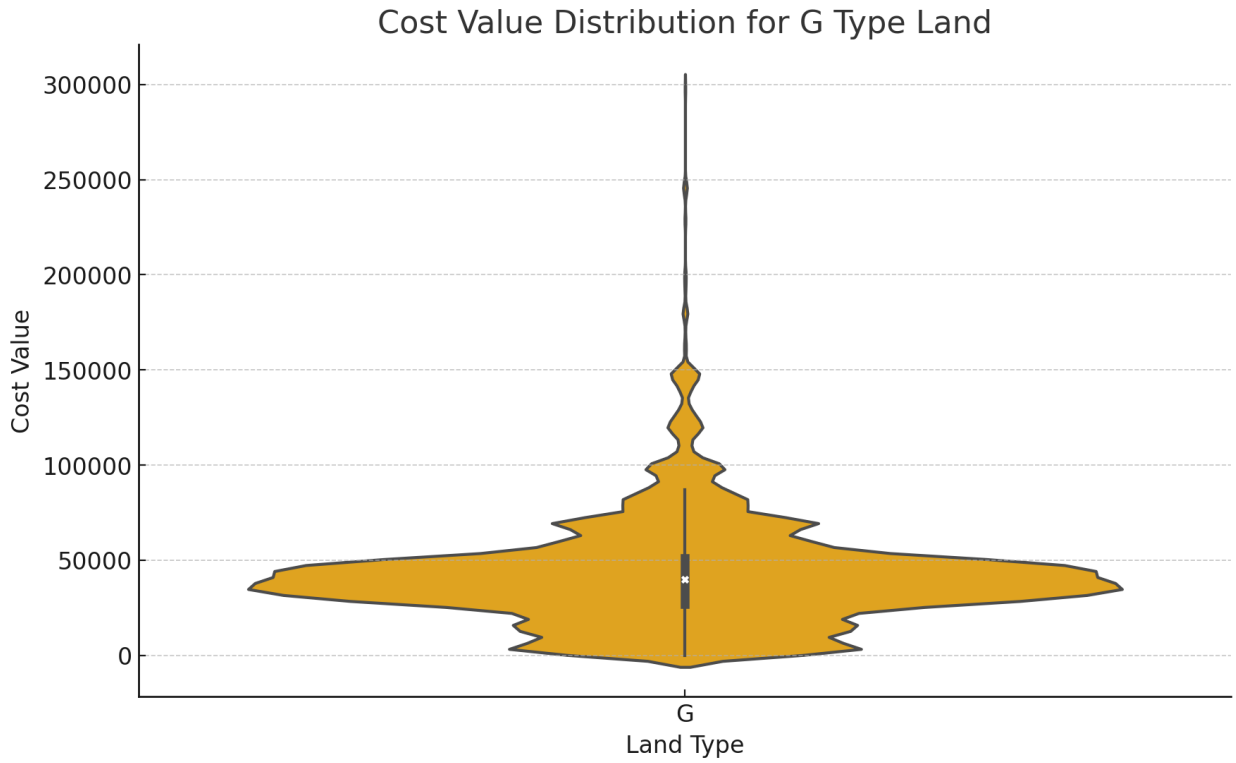
Land Analysis



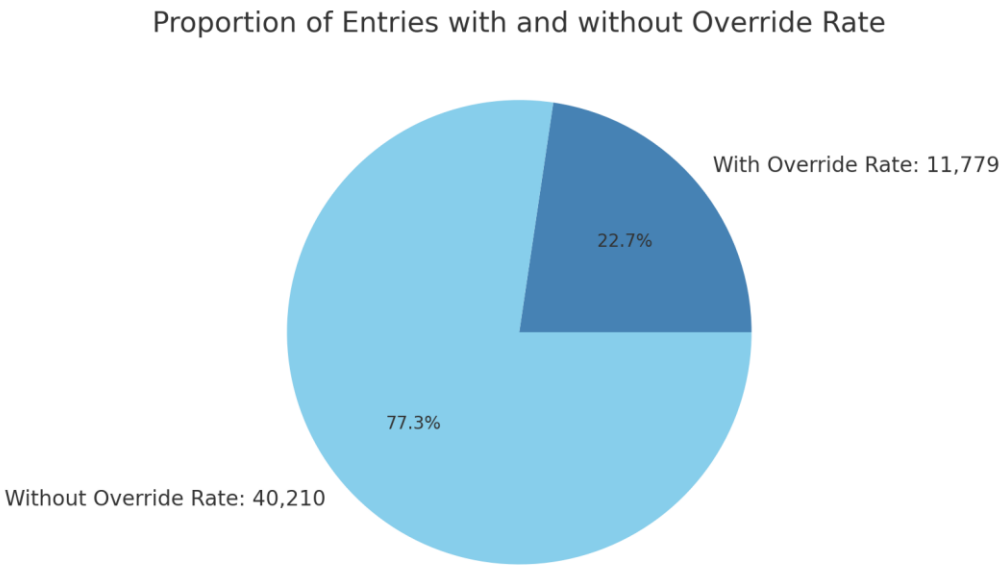


Land Analysis

We notice relatively low calculated values for the SF type. This group of 218 parcels may deserve review. A query of current 550 LUC parcels with SF land type would produce the necessary parcel list for review.

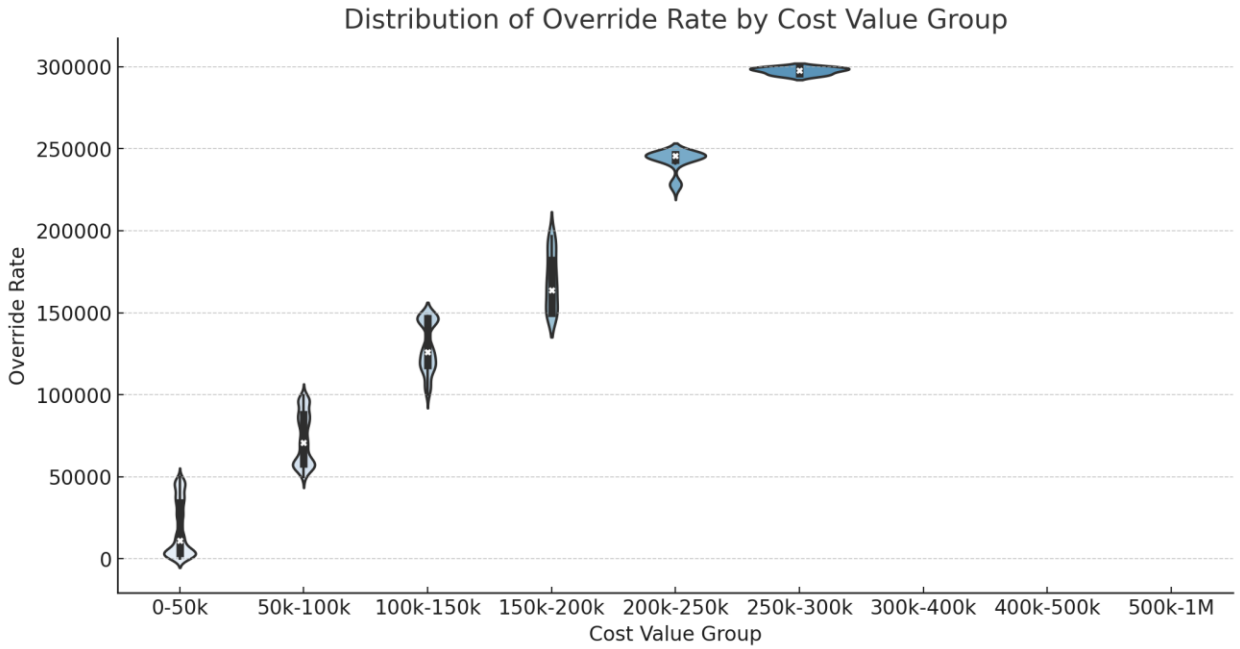


Switching gears to the largest assigned group, the "Gross" type – we can see the distribution of values in the violin plot above. Most *calculated* values are close to but sub 50k.



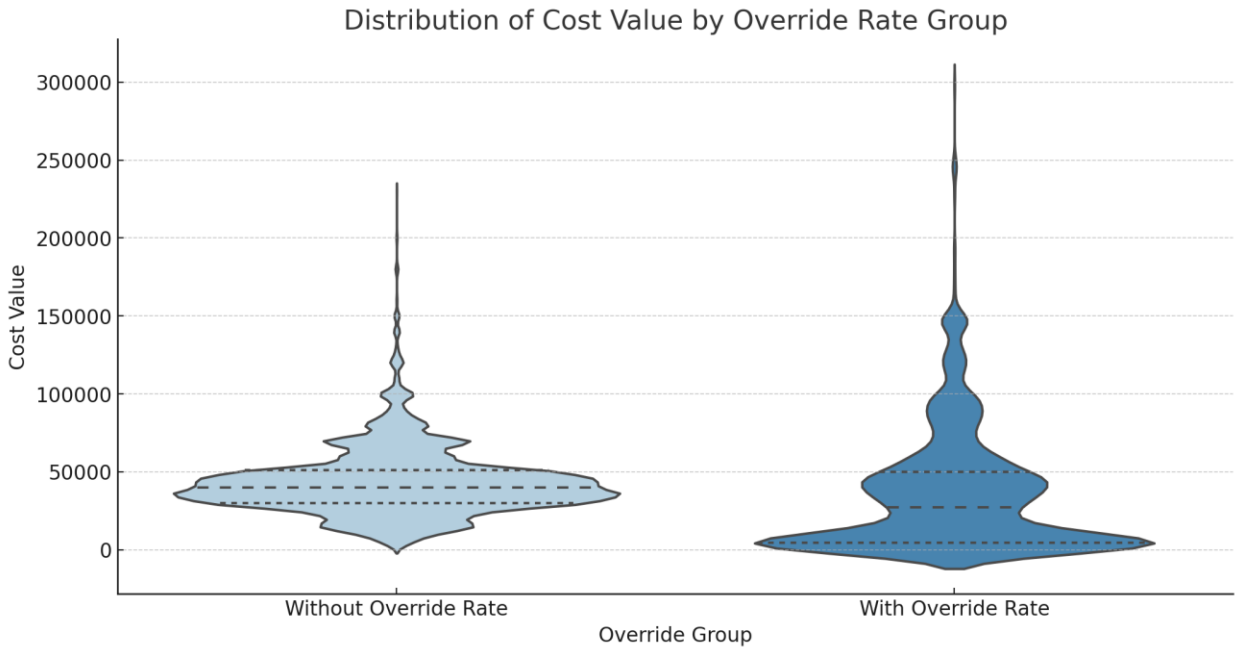
Notice that the calculated value was mentioned on the previous page. The second graph shows us that almost 1 out of 4 land lines on condo parcels receive an overridden rate. This "ORATE" acts similarly to a "gross" value in the way that they are size related. The number entered becomes the value. Even though the pricing methods result in similar values, the ORATES are not table driven which makes updating these values very tedious.

Let's dive into the overridden rates, by first taking a look at what the values would be – if not overridden. The graph below shows the would-be value, in groups, on the horizontal axis. The y axis represents the actual value. We notice that the overridden rates do not appear to differ from the actual values extremely – good news.

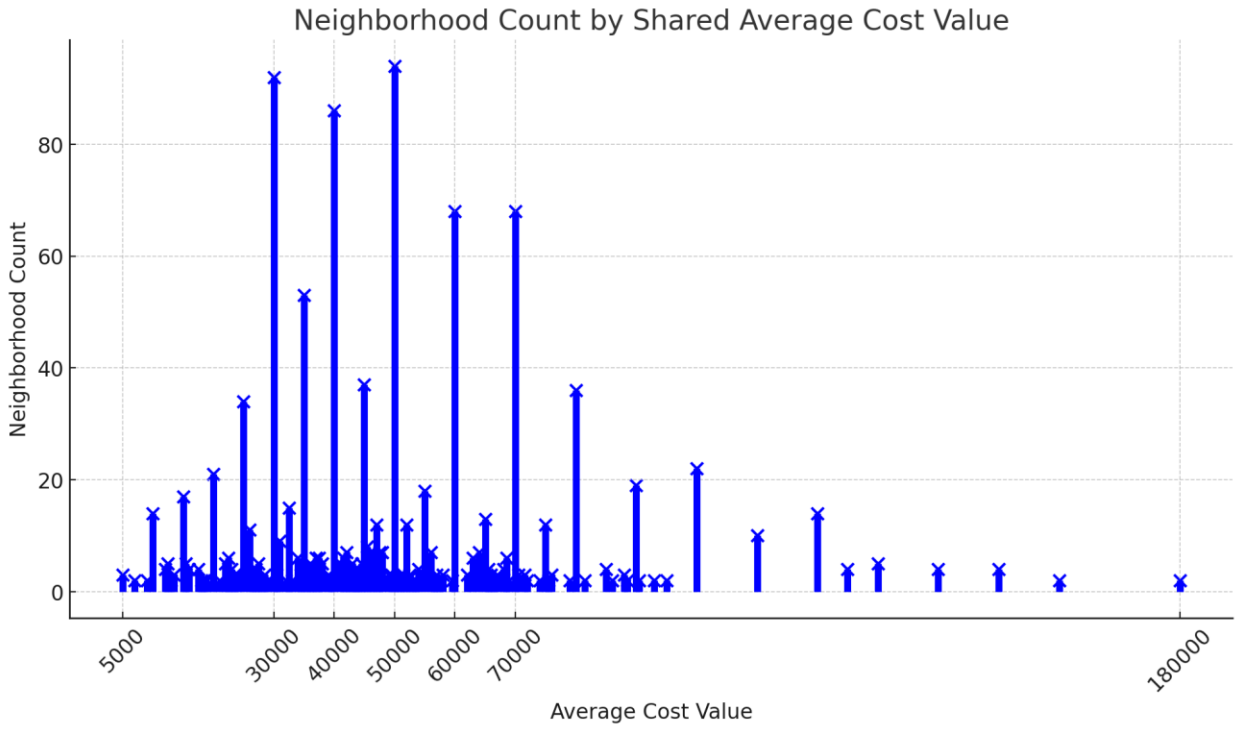


These findings lead us to believe that the overridden rates may be mostly placed purposefully, perhaps cleaning up parcels that do not calculate properly. Some of the improperly calculated values may be zero, or close to zero – as the graph on the next page illustrates. The parcels with 0 cost value do stand out on the "with overridden rate" half of the graph.

Land Analysis



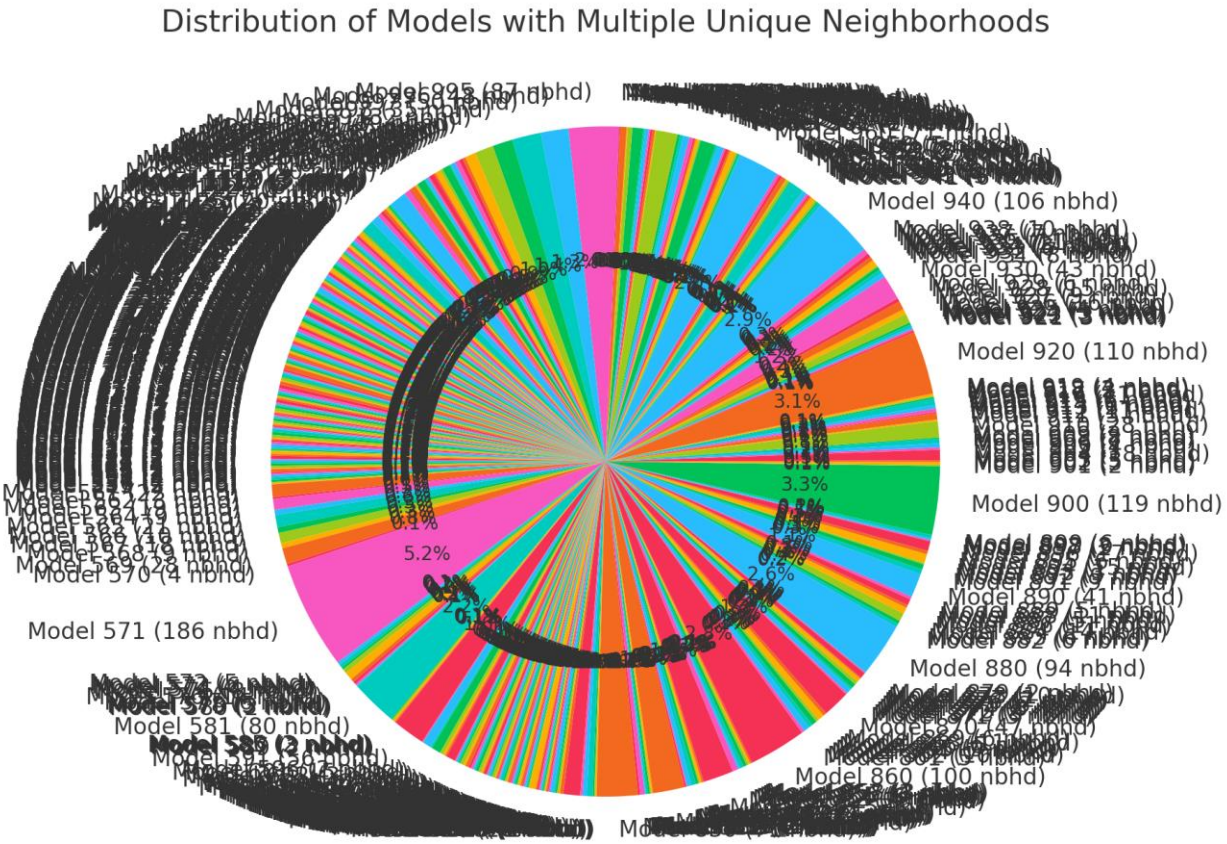
The graph below breaks out the violin plots into a histogram. We can see the spikes that are present in the violin plots. Notice the signals that come through – 30k, 40k, 50k…. these are our most common calculated values for condo land.



Land Analysis

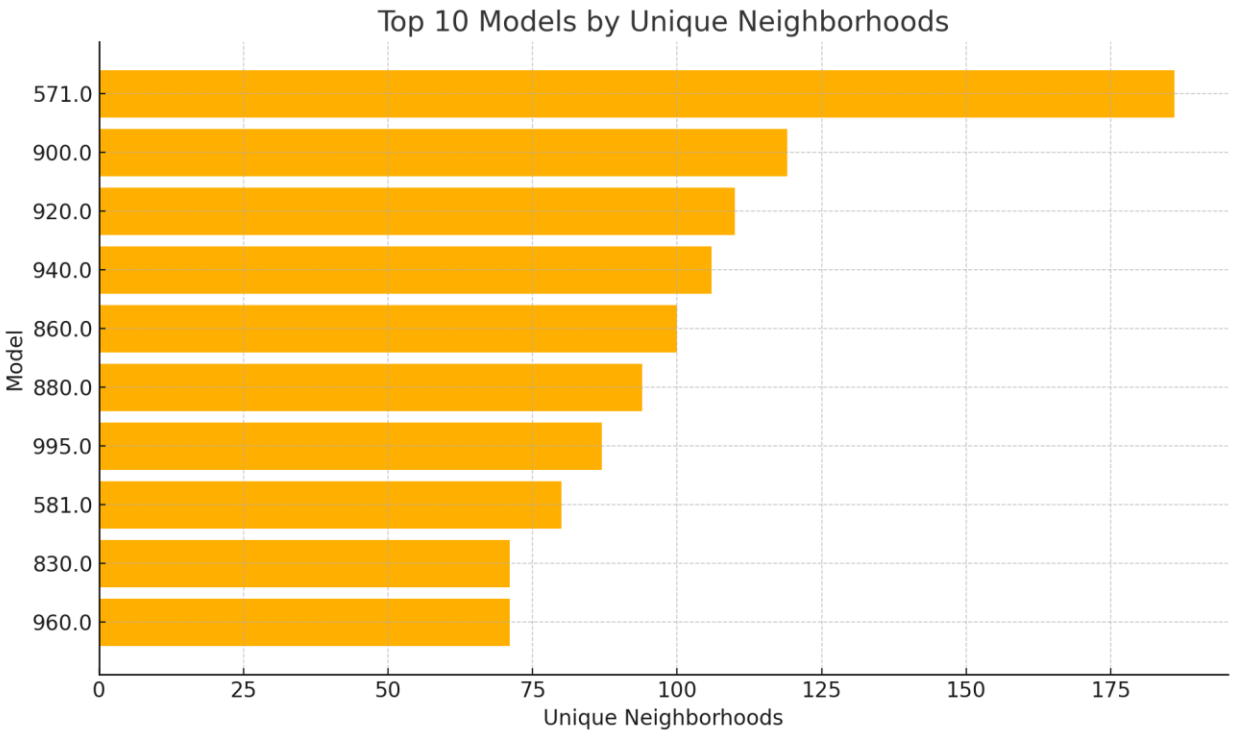
Where do these calculated values come from? Each neighborhood is assigned a model for each land type. The pricing for these gross land types goes from neighborhood to model to value.

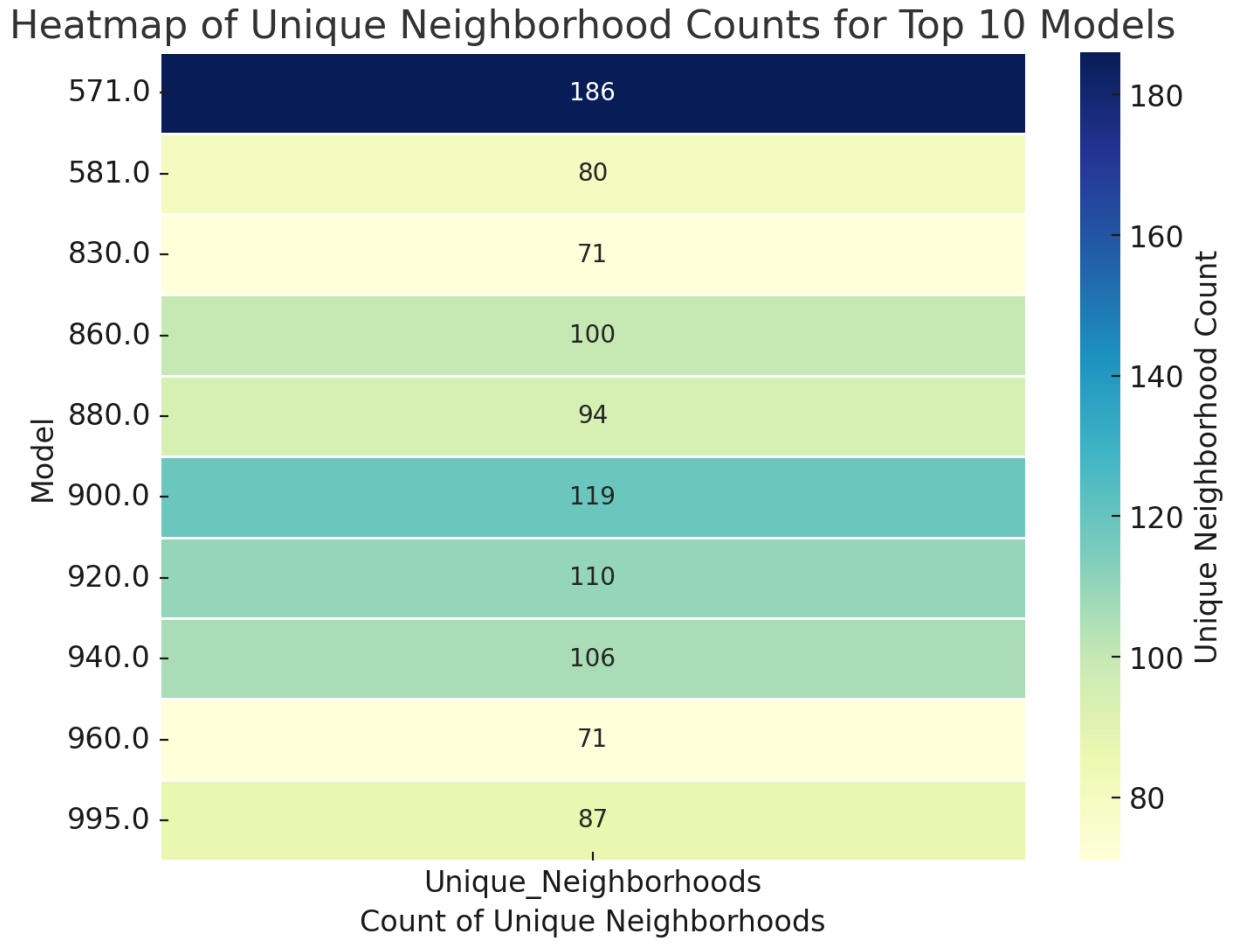
nbhd → model → value



When we look at the gross land type models, some have several neighborhoods assigned. Model 571 has 186 neighborhoods assigned to it, making it quite an impactful model.

The chart above contains many elements and may be a bit visually taxing but shows the underlying theme. We have broken this chart into more visible versions, which can be found on the next page.

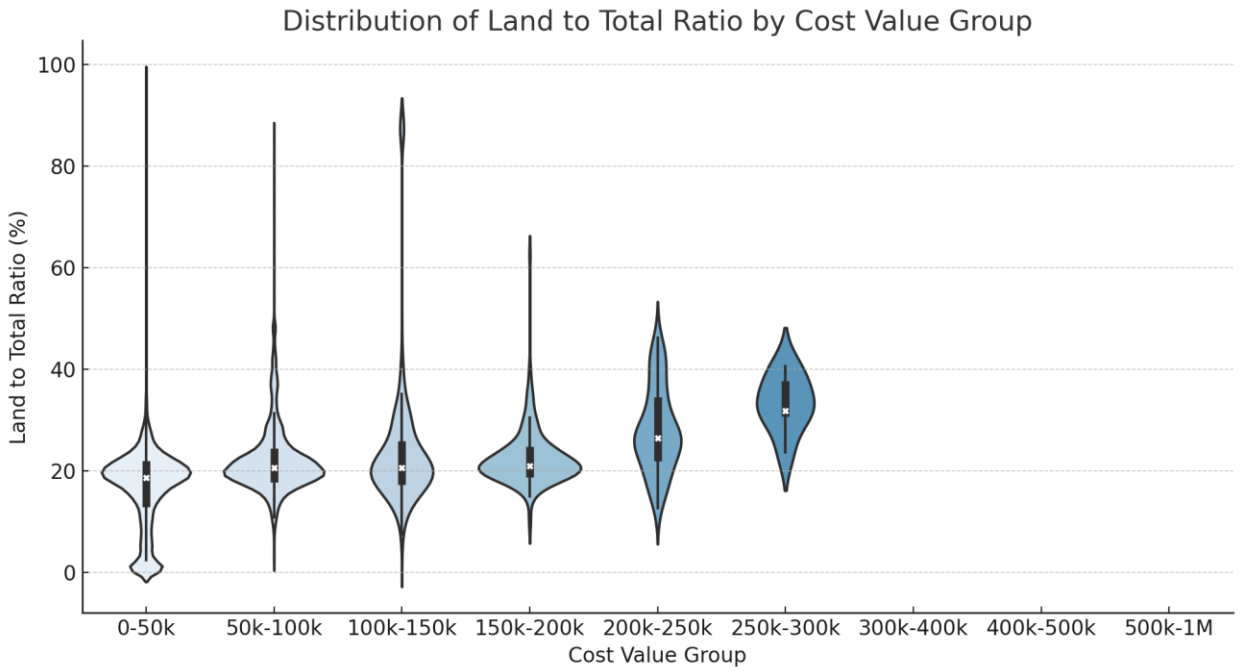

Top 10 Models by Unique Neighborhoods
Model
571.0
900.0
920.0
940.0
860.0
880.0
995.0
581.0
830.0
960.0
0
25
50
75
100
125
150
175
Unique Neighborhoods

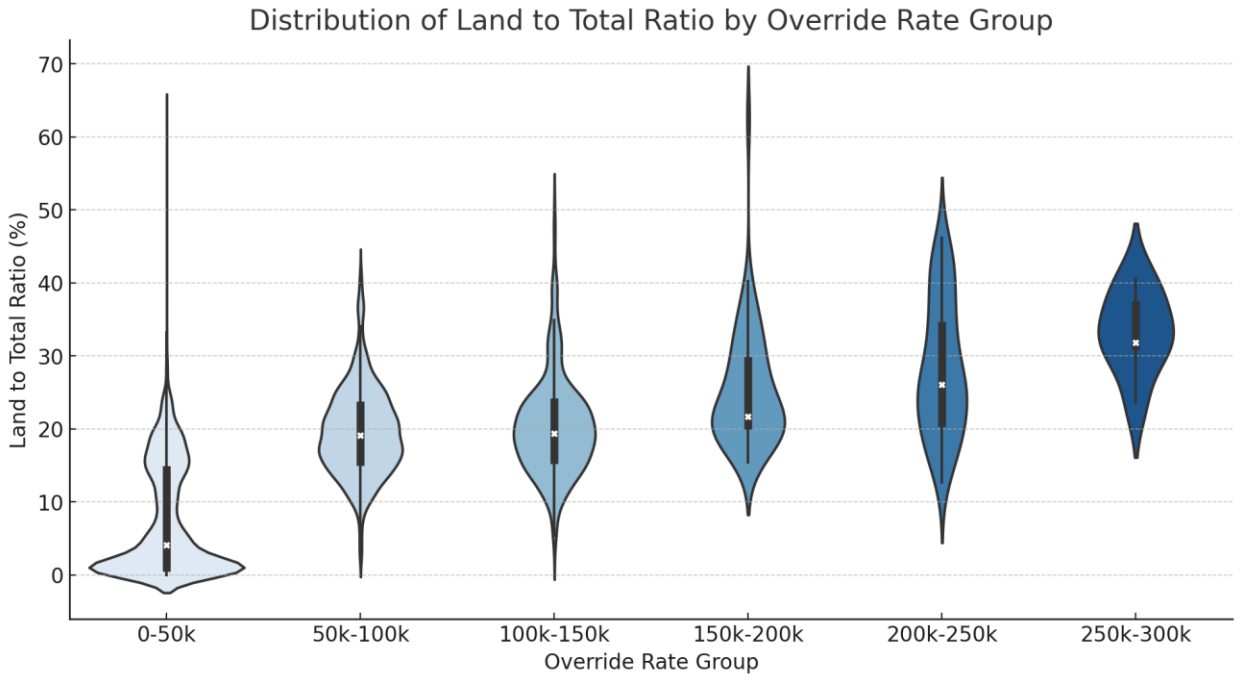

Heatmap of Unique Neighborhood Counts for Top 10 Models
Model
571.0
581.0
830.0
860.0
880.0
900.0
920.0
940.0
960.0
995.0
186
80
71
100
94
119
110
106
71
87
Unique Neighborhood Count
180
160
140
120
100
80
Unique_Neighborhoods
Count of Unique Neighborhoods

Land Analysis

Taking a look at each group (calculated and overridden values) – we notice a theme that may help future pricing.

Using a 20% Land to Total Ratio for the Condo Land Value is not only an acceptable level in the mass appraisal industry but also closely matches the historical county data, i.e. 1/5 of the total value assigned to land.





Land Analysis

In our land analysis, we have delved into several key data points related to land valuation factors and override mechanisms. Below is a summary of the findings from the analysis.

Land Influence Factors

The majority of influence factors fall within moderate ranges, though a few outliers are present, which might suggest specific parcels receiving unique adjustments. This value contributing data field should receive further review in future update events.

Depth Table Assignments

Vision examined the neighborhood depth table assignments relationship with data. A few examples where adjustments could potentially be made are provided.

Override Size (OSIZE)

We examined the dataset's "OSIZE" values, which represent override sizes applied to parcels, typically for unit-type pricing adjustments. The data shows a concentration of OSIZE values between 1 and 100, with the largest cluster in the range of 1 to 10. This could indicate that override sizes are primarily used for small or unit-type adjustments to the land value. The relatively small number of entries, totaling 232, suggests that OSIZE is used sparingly across parcels.

Override Rate (ORATE)

The dataset contains 71,007 ORATES, highlighting their widespread use. Unlike OSIZE, ORATE values can have significant implications for future updates, as they remain static despite updates to rate tables.

Condo Land

Switching from overridden to table driven rates will make future updates significantly easier to implement. Using a 20% land to total ratio for land values (or close to it) should provide consistent and equitable land values.

Commercial/Industrial Review

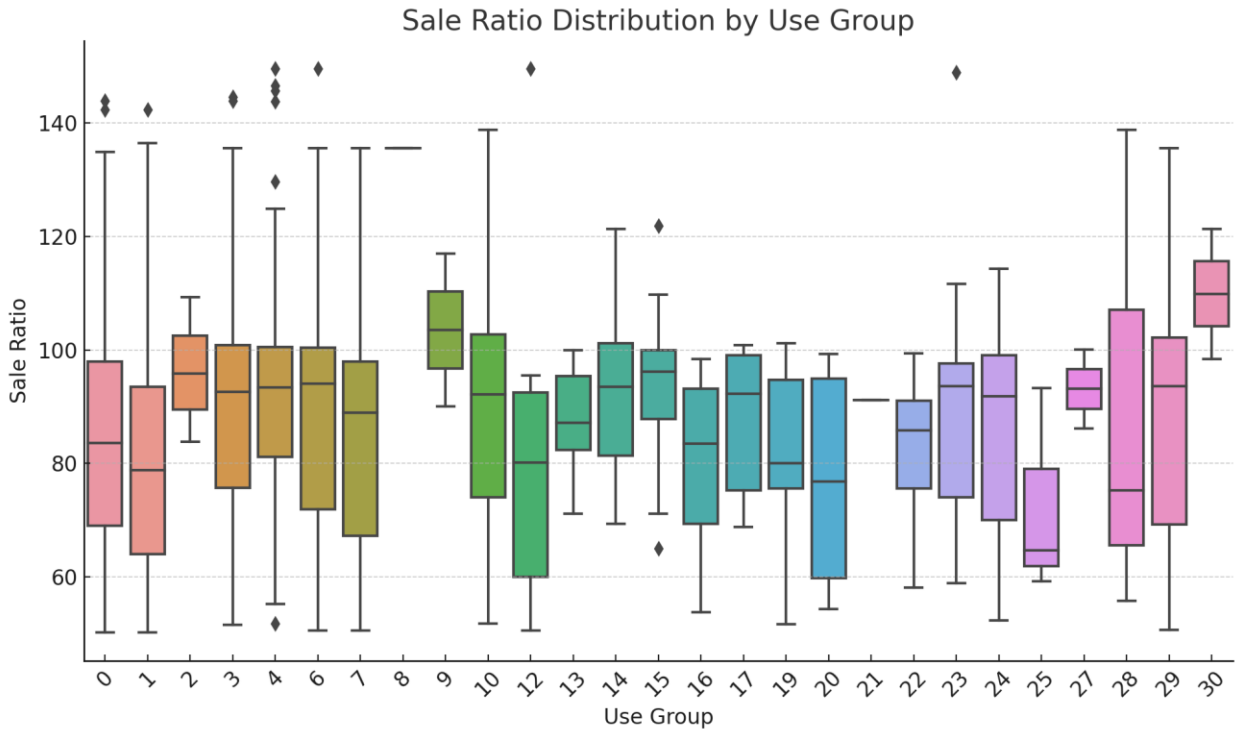
Commercial and industrial property taxes play a critical role in supporting the financial health of local governments. These taxes fund essential services such as schools, infrastructure maintenance, law enforcement, and emergency services, which are vital to the overall economic and social well-being of a community.

In many regions, commercial and industrial properties represent a significant portion of the tax base, contributing more in property taxes than residential properties due to their typically larger footprints and higher assessed values. This makes the proper appraisal and taxation of such properties an important element in ensuring equitable and adequate revenue generation for municipalities.

Accurate appraisal of commercial and industrial properties ensures fairness in the distribution of tax burdens. When properties are not appraised correctly, it can lead to either over taxation or under taxation, both of which have broader economic implications. Over-assessment may discourage investment and economic growth, as businesses are forced to allocate more resources to taxes rather than expansion or job creation. On the other hand, under-assessment results in a loss of potential revenue for local governments, potentially shifting the tax burden onto residential properties or forcing cutbacks in critical public services.

Assessing commercial and industrial properties accurately requires a comprehensive understanding of market values, income potential, and property-specific characteristics such as location, size, and condition. Studies like sales ratio analyses help appraisers and policymakers evaluate how well properties are being appraised compared to actual market transactions. These analyses can reveal trends such as regressivity or progressivity in assessments, where higher or lower-value properties are systematically over or under-assessed. By analyzing appraisal accuracy, municipalities can make data-driven decisions to improve equity and ensure that property taxes are fairly distributed, maintaining a stable and transparent tax system.

Commercial/Industrial Review



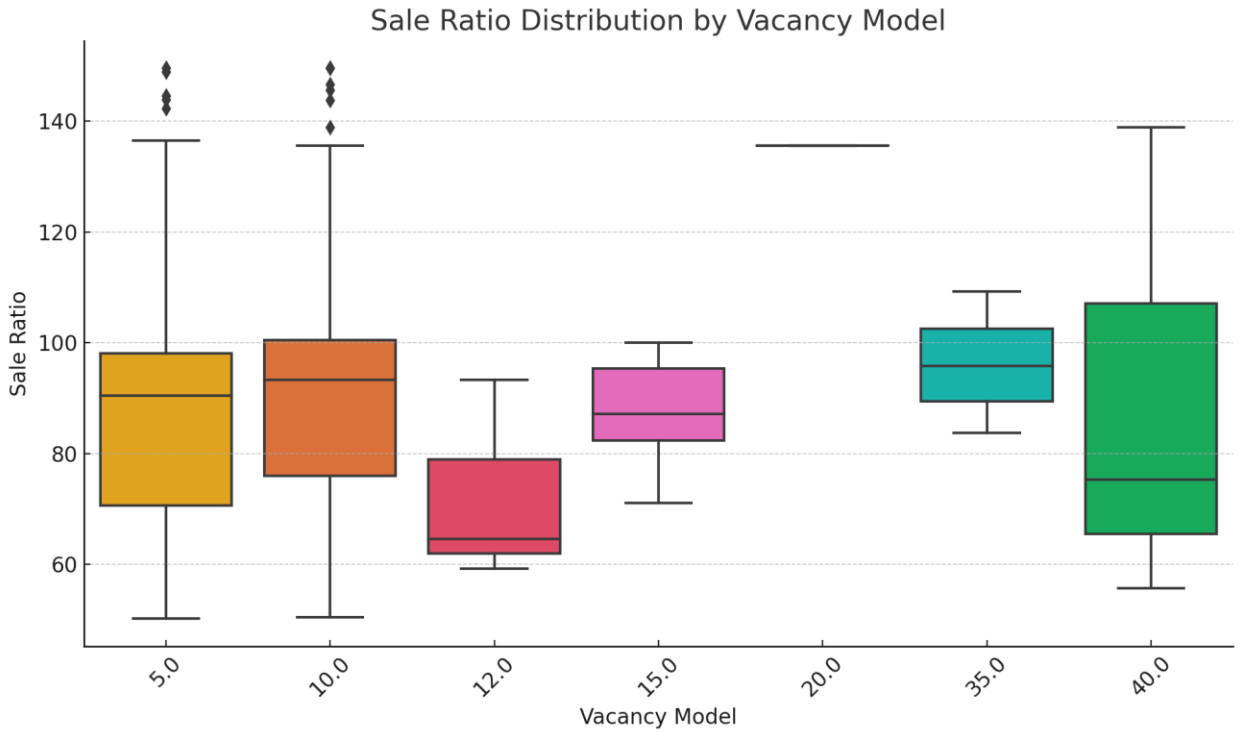
As we dive into the analysis, we begin by looking at use group. The boxplot above displays the distribution of sale ratios by use group, showing how different types of properties (categorized by their use type) compare in terms of sale price relative to appraised values.

Each use group has its own unique spread, with some groups, such as 0 and 1, displaying tighter interquartile ranges around the median, meaning sale prices are more consistent in relation to their appraised values. Others, like 6 and 14, have a wider range of sale ratios, indicating greater variability.

The distribution shows that certain use groups, particularly those associated with commercial or industrial uses, may have more unpredictable sale ratios, while other categories, possibly residential or less commercialized properties, tend to have more stable sale-to-appraisal ratios.

Outliers in multiple groups suggest some properties sold far above or below their appraised values, possibly due to market conditions, property specifics, or other factors affecting the sale.

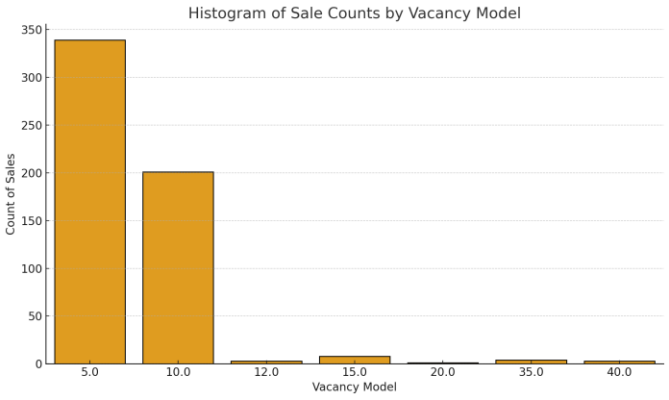
Commercial/Industrial Review



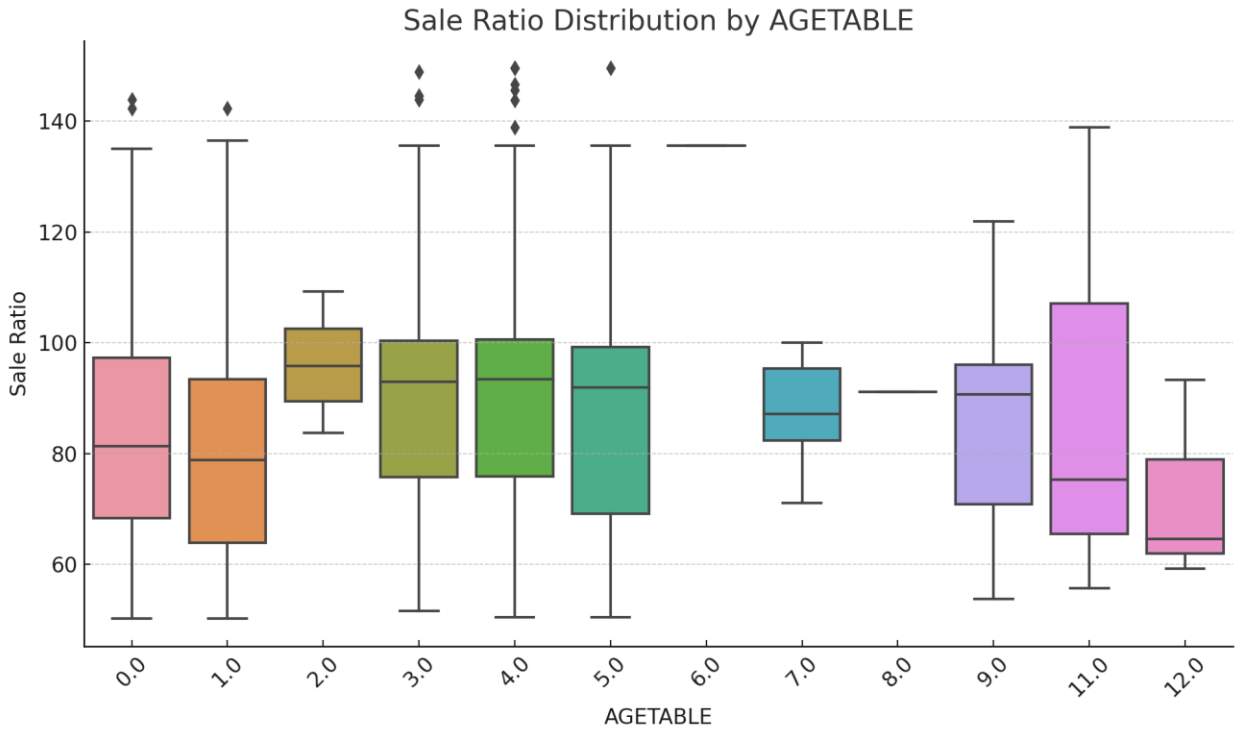
The boxplot shows the distribution of sale ratios across different vacancy model categories. Each box represents the interquartile range of sale ratios for properties within a specific vacancy model, with the median marked by a horizontal line. The whiskers extend to show the full range of the data, excluding outliers, which are indicated by individual points beyond the whiskers.

Categories like 5.0 and 10.0 exhibit a wide range of sale ratios, with a significant number of outliers, especially in the upper sale ratio values. In contrast, vacancy models like 12.0 and 35.0 show tighter distributions, indicating more consistent sale ratios within these categories.

One important thing to keep in mind is the number of sales in each category – as shown in the histogram to the right. Low sale counts may cause certain statistics to not reflect the 'heart' of the data.

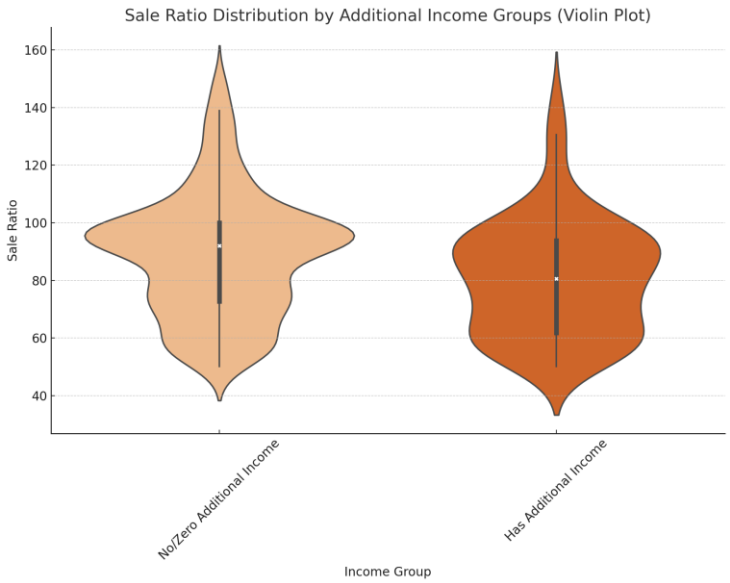


Commercial/Industrial Review

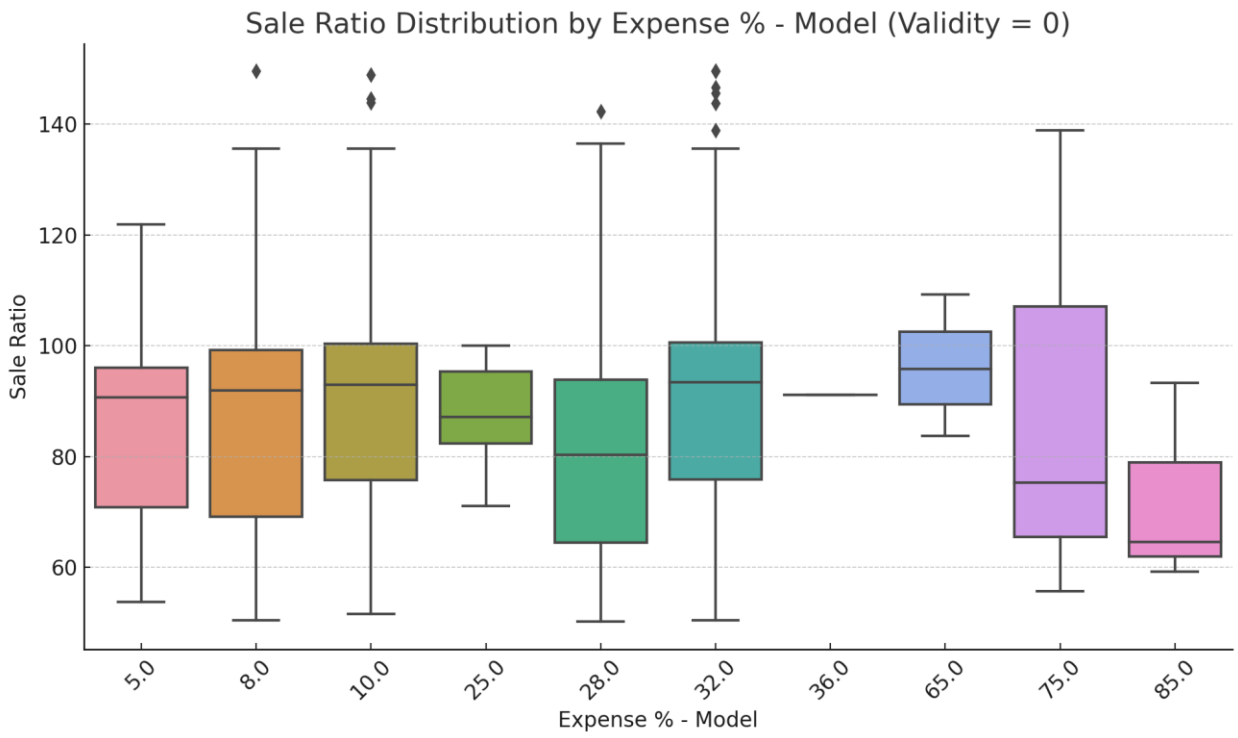


The boxplot above shows the distribution of sale ratios across different AGETABLE categories. Each box depicts the interquartile range, with the horizontal line indicating the median sale ratio for that category. The whiskers represent the overall range of sale ratios within each group, excluding outliers, which are displayed as individual points beyond the whiskers. Most categories fall well within acceptable ranges.

Another data point stored in CAMA is "Additional Income". The violin plot to the right provides a quick ratio distribution visual that allows us to see the 90% medians. Sales included in this graph as well as all other commercial/industrial review graphs are from 2022, valid, with a 50-150 trim level applied.



Commercial/Industrial Review



This boxplot above illustrates the distribution of sale ratios across various Expense % - Model categories, with the x-axis representing different expense models and the y-axis showing the sale ratio.

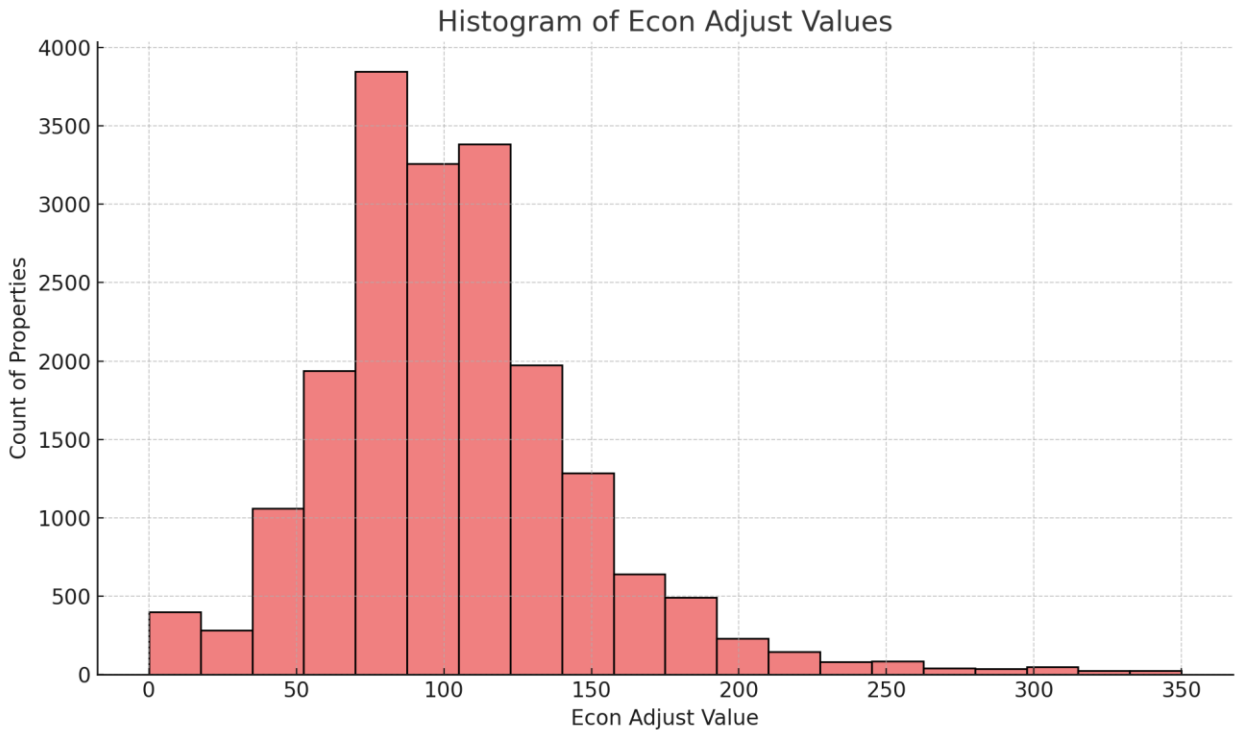
Models such as 5.0, 8.0, and 10.0 show relatively symmetrical distributions around a median close to 100%, suggesting that sale prices are more consistent with appraised values.

Models like 25.0 and 28.0 exhibit more variation, with broader IQRs and lower median sale ratios, indicating greater deviation in sale prices compared to appraised values.

The 75.0 and 85.0 models have wider distributions, suggesting more variability in sale prices. Particularly in the 75.0 model, sale ratios vary significantly, which could imply inconsistent sales behavior within this group.

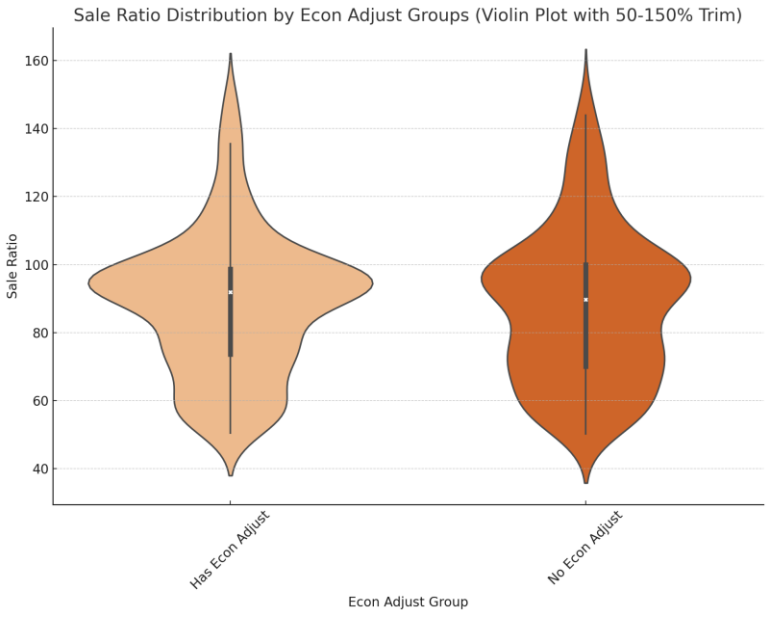
This visualization helps identify which expense models are more closely aligned with appraised values and where discrepancies in sale prices are more prevalent.

Commercial/Industrial Review

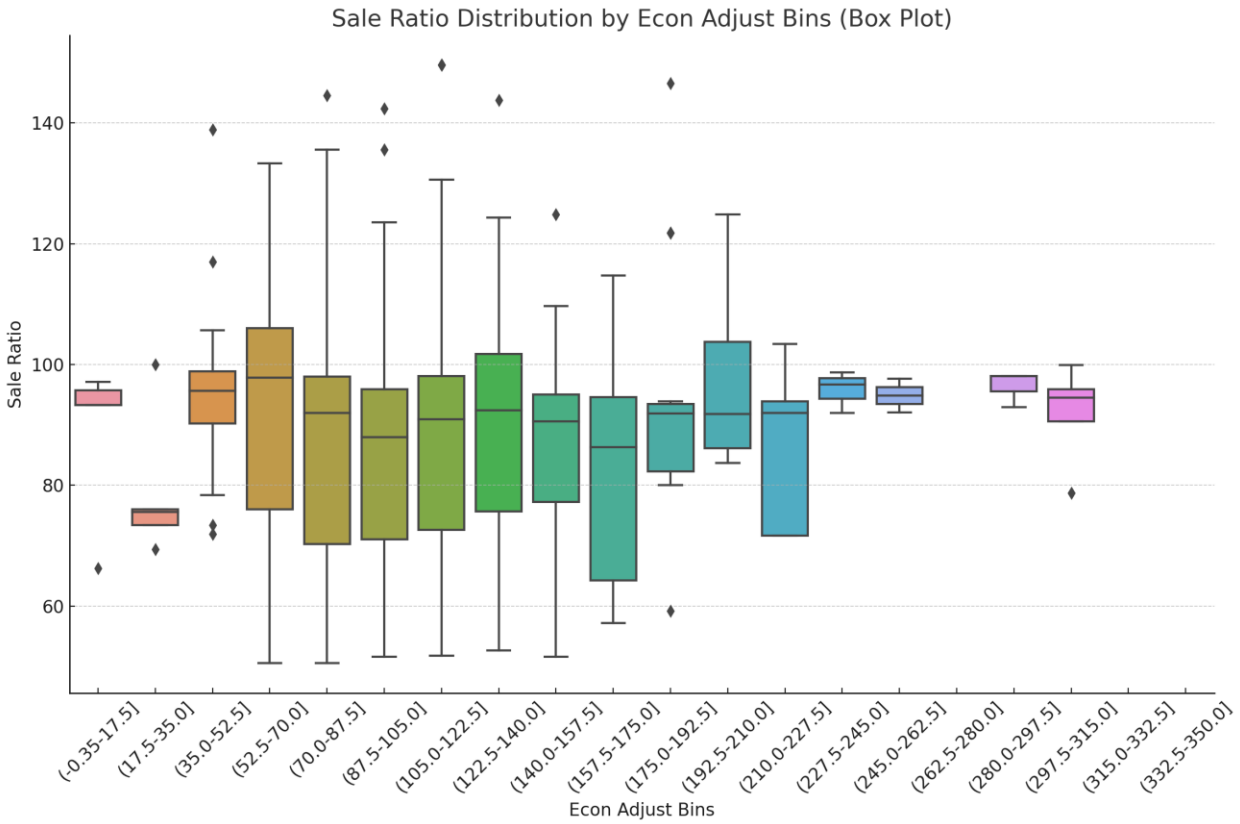


Economic Adjustments (Econ Adjust) are used in property valuation to account for external factors that might affect the market value of a property. These adjustments can reflect changes in the local economy, demand shifts, or broader market conditions that impact property values beyond their physical characteristics or location. For instance, properties in regions with declining economic activity might receive downward adjustments to reflect reduced demand, while properties in booming areas could see upward adjustments.

We have 18,913 of these currently applied in the CAMA system. The violin plot on the right explores the sale ratios for those parcels with and without an economic adjustment applied. We do notice a slight bulge near target sale price on those with economic adjustments applied.



Commercial/Industrial Review

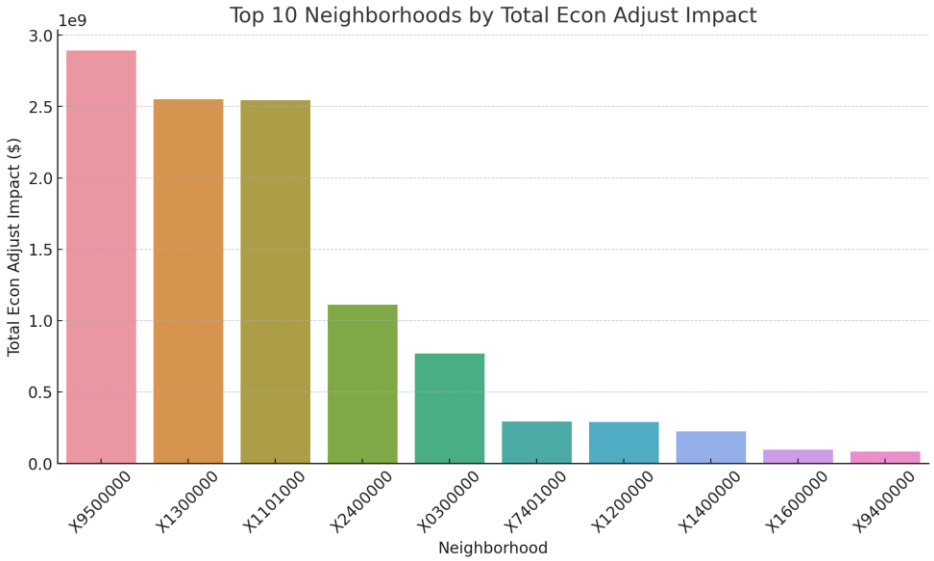


This boxplot above dives deeper into the economic adjustments and visualizes the distribution of sale ratios across various Econ Adjust Bins. The x-axis lists the different bins, and the y-axis shows the corresponding sale ratios.

Most of the bins, such as (52.5-70.0] and (87.5-105.0], show relatively symmetrical distributions around a median sale ratio close to 100%, suggesting that sale prices are generally aligned with appraised values. Bins like (175.0-192.5] and (210.0-227.5] exhibit narrower ranges, suggesting more consistent sale ratios within these economic adjustments.

This plot provides insight into how different economic adjustments impact the relationship between sale prices and appraised values, with some bins showing more stability while others exhibit greater variability.

Commercial/Industrial Review



As commercial and industrial properties can have relatively large values as compared to the residential or agricultural class, factors applied to these properties may have large impact. Our histogram on the right shows "1e9" on the y axis – a scientific notation for billions in appraised value.

Percent change and dollar change are two metrics that should be analyzed hand in hand. In our analysis of the econ adjust data point stored in CAMA, we have made an extrapolation on the impact that these factors could have. Overestimates are provided in the histogram and table below.

Our simplified projection does not consider multiple buildings on properties or outbuilding value leading these numbers to not be true representations of the impact. However, while not fully accurate, these should be reasonably close and have been provided to show the large impact that these adjustments could possibly create.

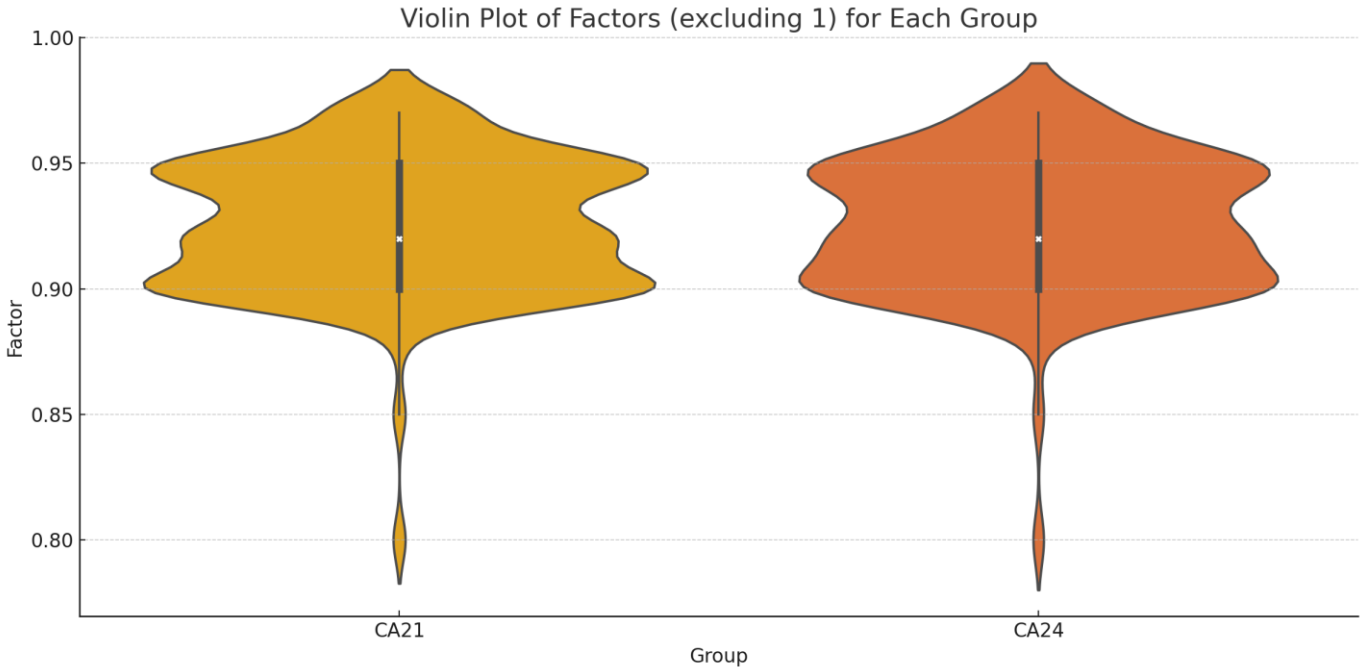
Neighborhood	Parcel_Count	Econ_Adjust_Count	Total_Econ_Adjust_Impact
X9500000	827	362	$2,891,165,364.20
X1300000	1828	1103	$2,552,300,009.40
X1101000	718	360	$2,543,843,177.90
X2400000	1465	584	$1,110,710,423.20
X0300000	641	465	$769,188,139.00
X7401000	595	181	$292,333,113.60
X1200000	742	351	$289,919,504.70
X1400000	895	413	$223,480,279.90
X1600000	841	329	$95,761,792.20
X9400000	657	222	$83,581,505.80

Neighborhoods

Land, outbuilding, and building values vary significantly depending on location. Some realtors may claim that location is the top three most important factors in a property's value. These adjustments are built in at the neighborhood level and may be called neighborhood factors or locational adjustments.

During the statistical update that occurs between revaluations (triennial update), locational adjustments are placed in order to adjust for changes that have occurred in the market. The reason that this is mentioned is that these neighborhood factors are necessary and should not be blindly removed.

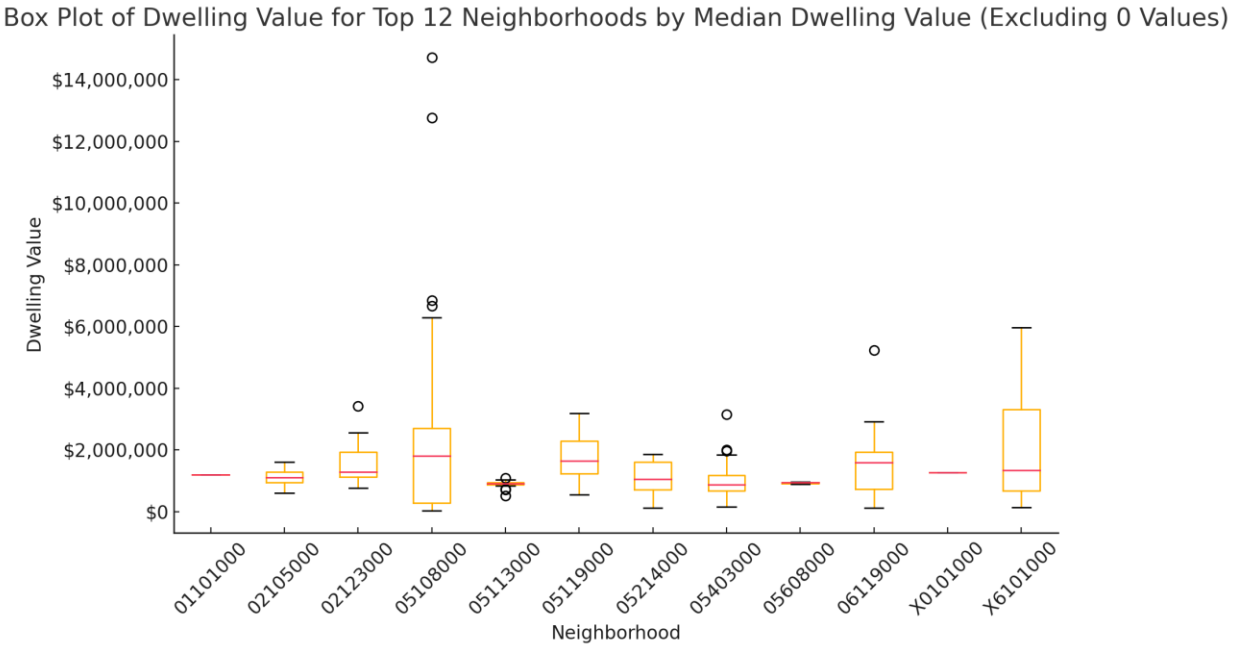
However, similar to the 150% commercial factor that exists in CAMA, large factors that may have compounded over time should be investigated. The violin plot gives us a visual representation of the current neighborhood factors.



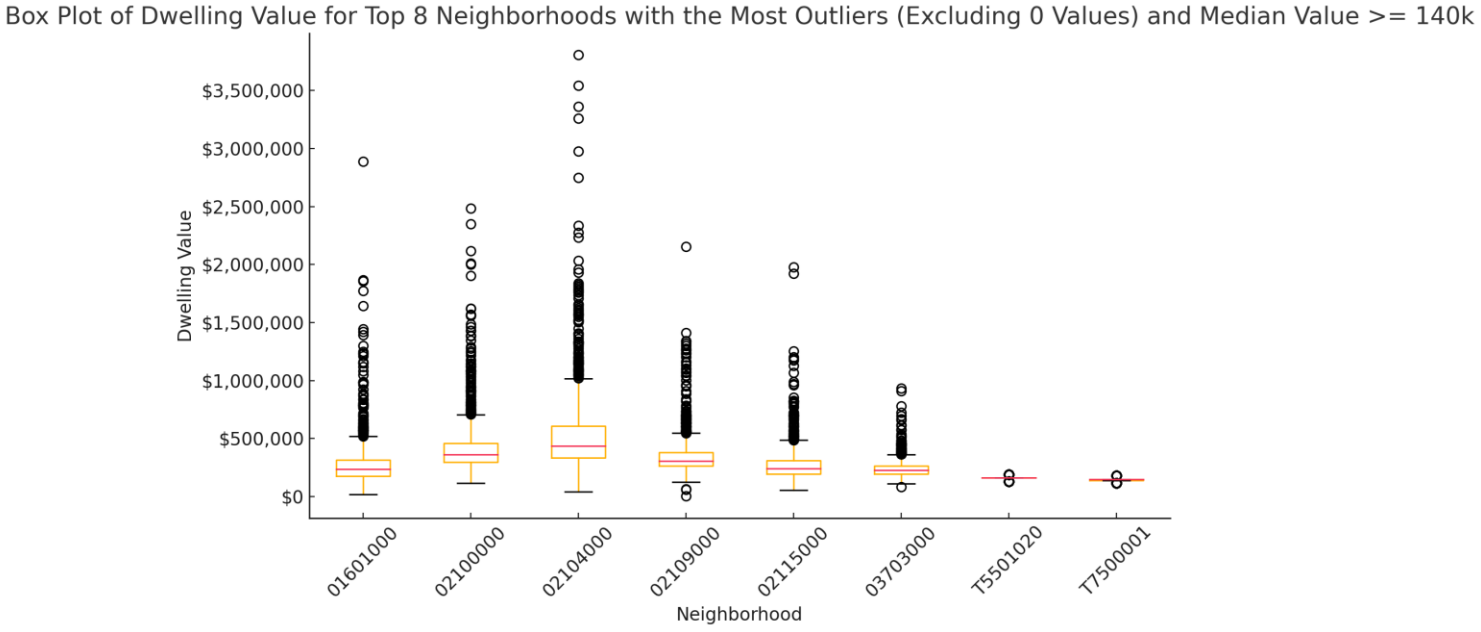
CA21 and CA21 factors refer to dwellings and outbuildings respectively. Interestingly, each of these factors is below 1. The ideal setup is in place. Having neighborhood factors greater than 1 may lead to inconsistencies in the pricing of new construction. No land factors exist indicating that the corresponding land models have been optimized – quality work has been performed in this area.

Neighborhoods

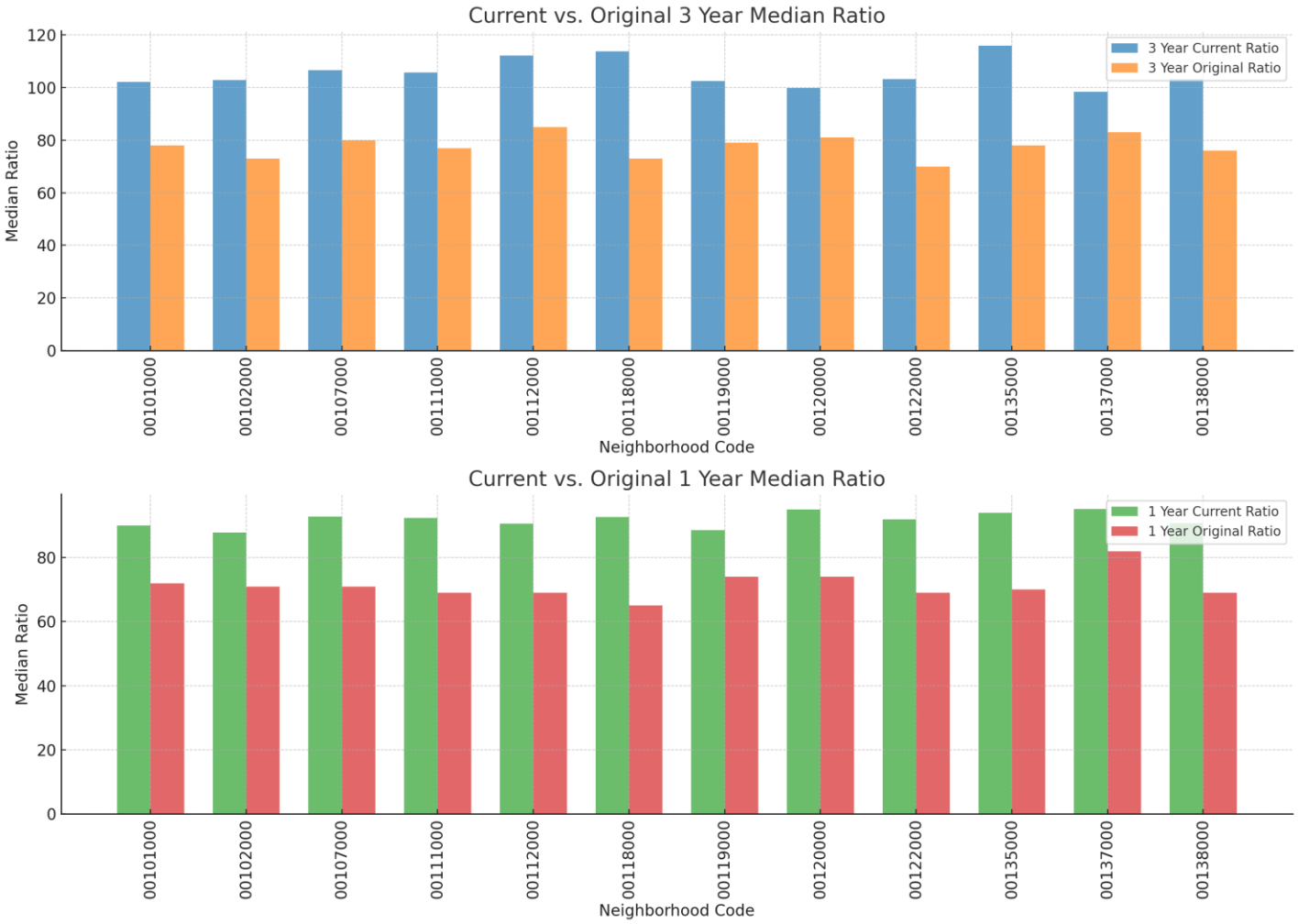
The box plot shown below shows us the top 12 neighborhoods in terms of dwelling value. We have neighborhoods in which the median value is approaching $2 million.



At times, factors are placed at the neighborhood level. Therefore, it is important that neighborhoods contain similar parcels. The chart below shows the top 8 neighborhoods in terms of value outliers, with a few filters in place. These select neighborhoods may merit a deeper look during the next triennial update.



Neighborhoods



These charts compare the current and original median ratios for a different group of randomly selected neighborhoods. The neighborhoods are displayed along the x-axis, with the y-axis representing the median ratios. The chart is divided into two sections:

Current vs. Original 3-Year Median Ratio:

The **blue** bars represent the current 3-year median ratios.
The **orange** bars represent the original 3-year median ratios.

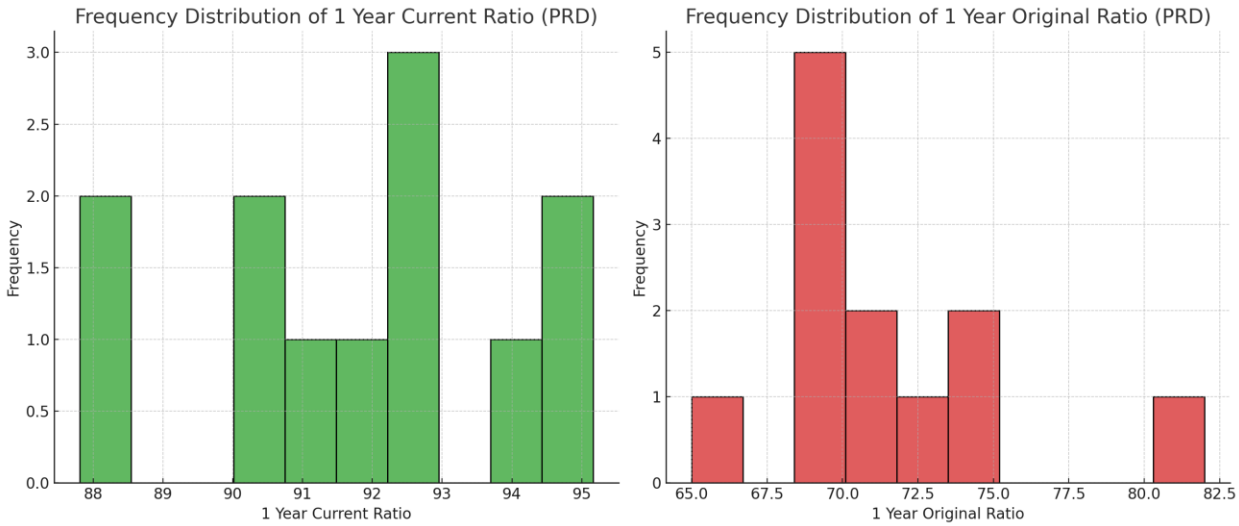
Current vs. Original 1-Year Median Ratio:

The **green** bars represent the current 1-year median ratios.
The **red** bars represent the original 1-year median ratios.

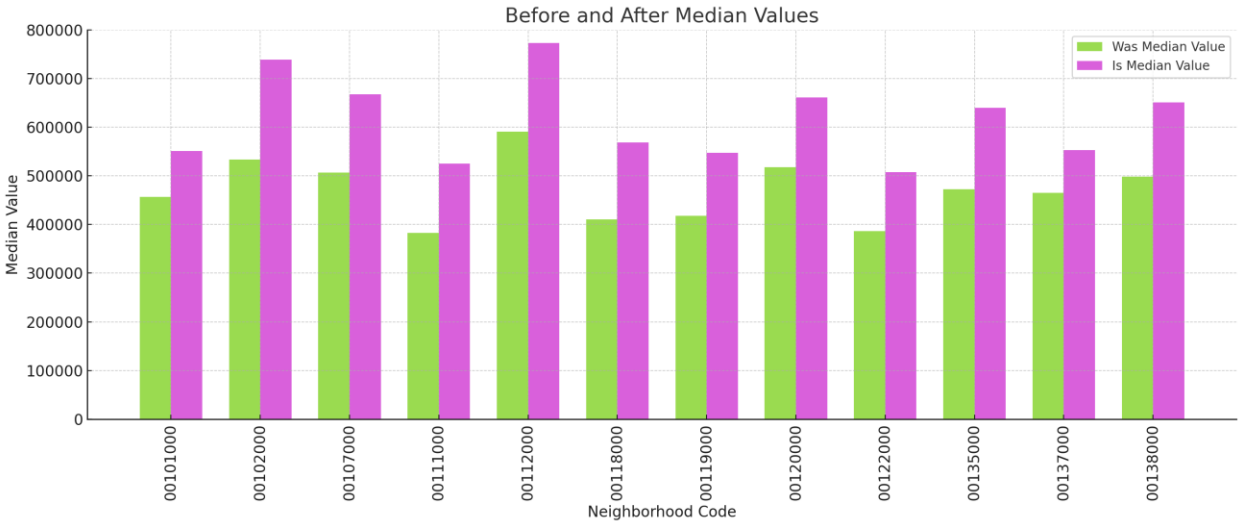
Neighborhoods

We continue our bird's eye view of neighborhood level changes with another visual. In the frequency chart shown below, we notice a significant improvement in the assessment level.

The x axis can be roughly thought of here as – percent of sale price. Using this framework, we see an improvement in assessed values from <70% of sale price to >90% of sale price.

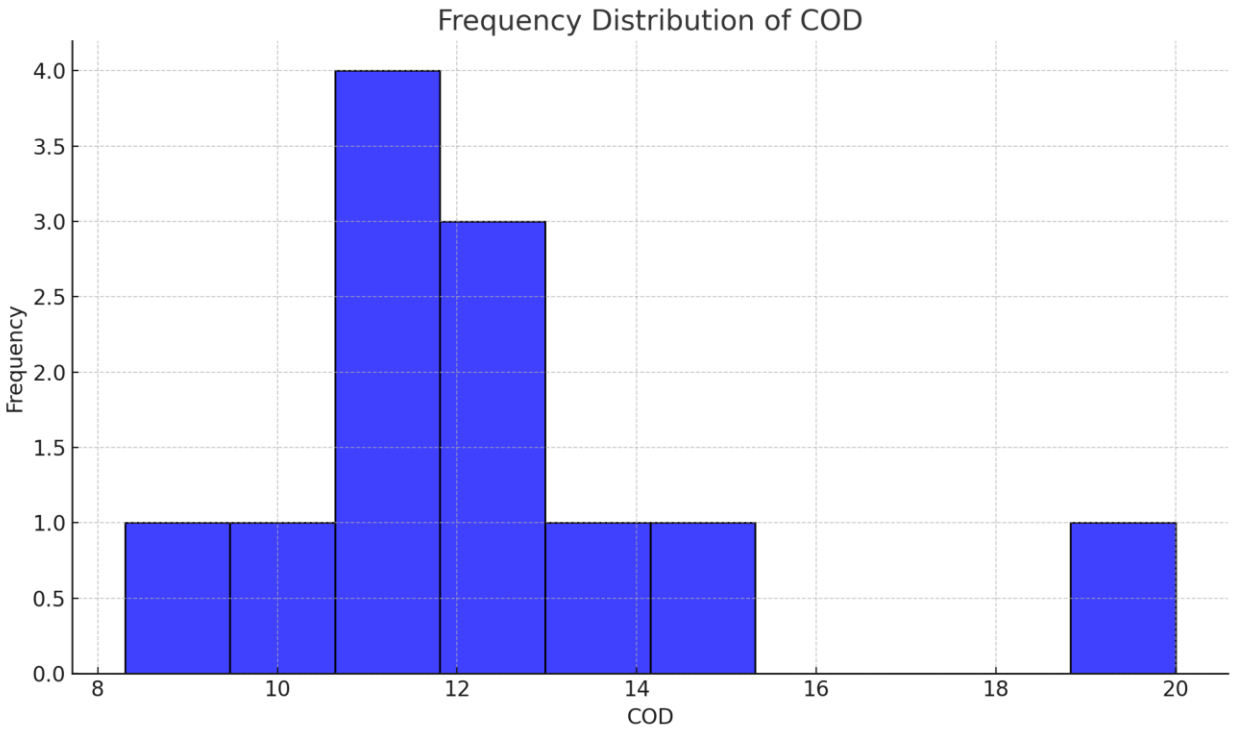


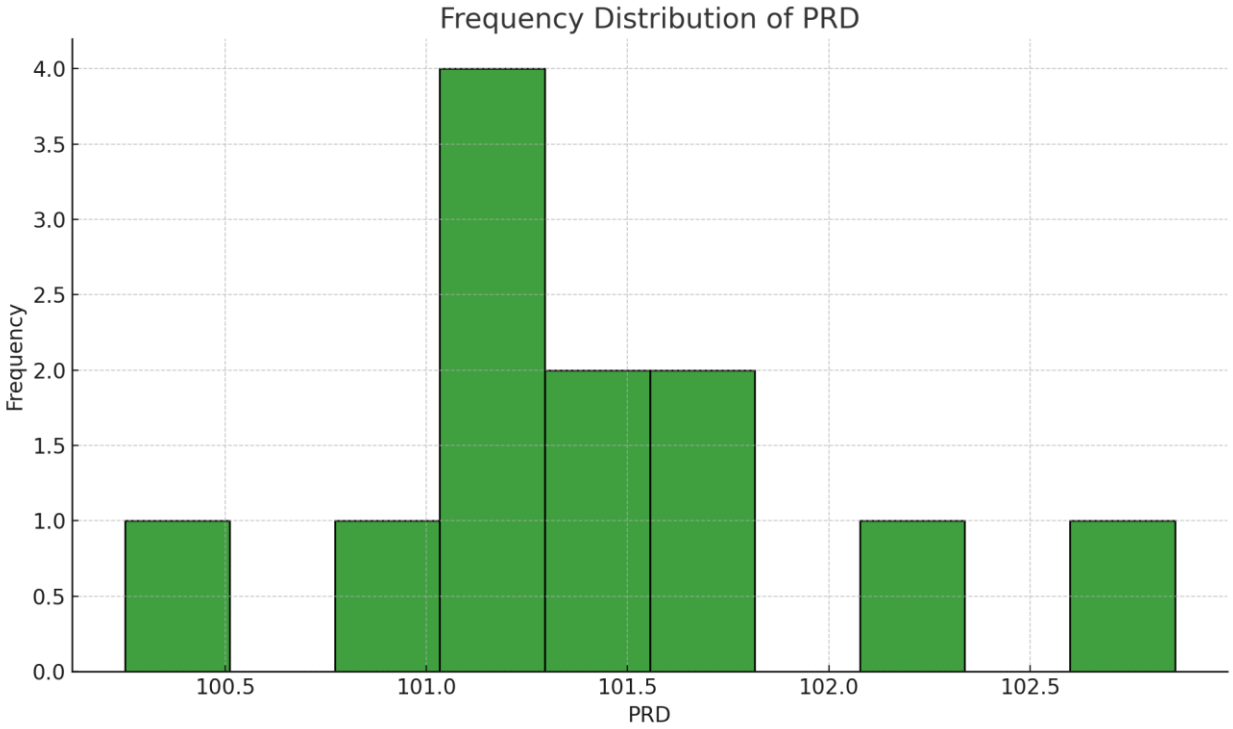
The next chart compares the "Was Median Value" and "Is Median Value" for the same neighborhoods. The neighborhoods are displayed along the x-axis, with the y-axis representing the median values.



Neighborhoods

Using neighborhood as our delimiter, we see similar graphs for COD and PRD. Both metrics fall well within acceptable parameters. This data is based on 2022 sales. More information on COD and PRD be found in the definitions section of this document.





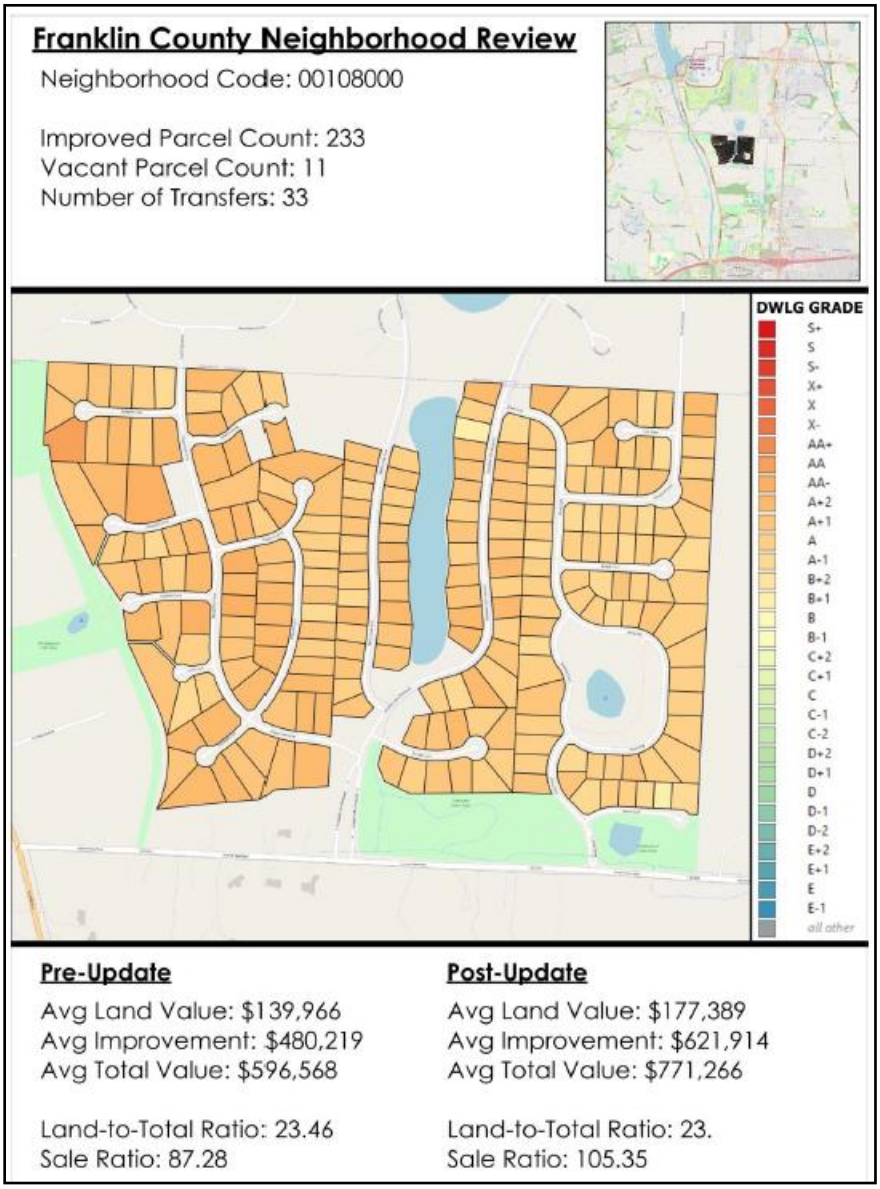
Neighborhoods

The distribution of unique grades within neighborhoods shows that most neighborhoods tend to have a limited variety of grades.

1498 neighborhoods have only 1 unique grade.

251 neighborhoods have 2 unique grades.

The remaining neighborhoods have a wider variety of grades, with a few having up to 23 unique grades. *(05400000)* This indicates that many neighborhoods tend to have homes with the same grade, suggesting a certain level of homogeneity in housing quality within those areas.



As a supplement to this analysis, Vision has provided a series of neighborhood maps. An example map is shown on the right. These visuals allow us to see the assigned grades, as well as provide parcel counts, land-to-building ratios, transfer counts and ratio data, as well as before and after aggregate values. By reviewing visually, we can quickly spot areas that may need attention. A full set of neighborhood maps has been provided.

Neighborhoods should be delineated in a way that makes sense and is helpful, both Residential and Commercial.

Percent Change and Sale Ratio Analysis

We begin to pivot our analysis to study the impact that the 2023 revaluation had on appraised property values.

The last update occurring in 2020 allowed for three years of potential appreciation to accumulate. The following few pages contain a series of reports that detail the aggregate level change experienced by each class as a result of the 2023 revaluation.

When it comes to measuring change, we must keep both the percentage and the actual dollar amount in mind. A parcel that goes from 500 to 1,000 in appraised value will experience the same percentage change as a parcel moving from 500k to 1 million. However, we have one parcel moving 500 dollars and the other moving 500,000 dollars. We show both metrics in the following Parcel Impact Reports. We first look at the **residential** class land use codes.

Franklin County
Sale Ratio Study: Land Use Level

ALL	Selected MSR:	96.36
	% Change:	41.96%

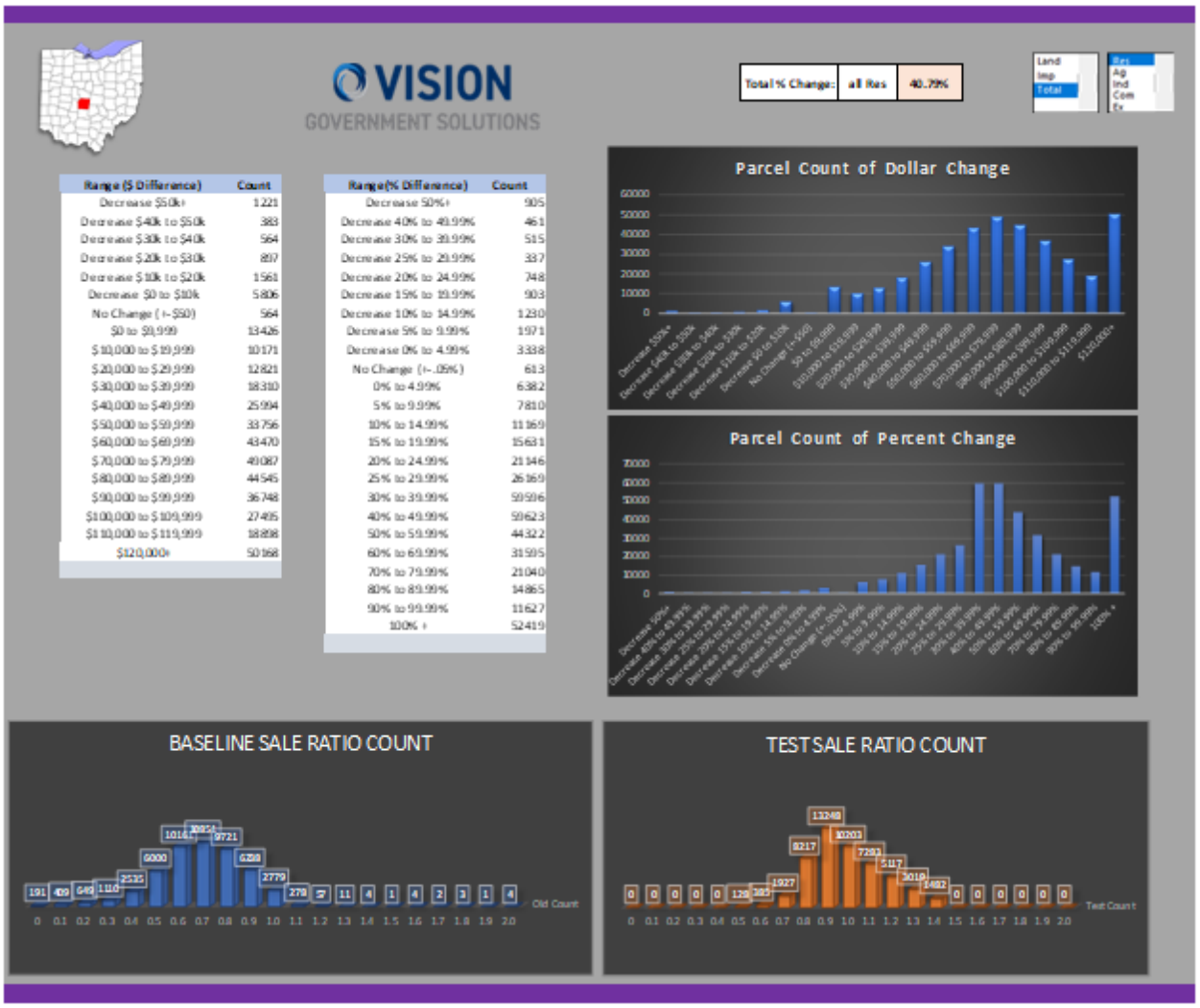
ALL	Selected MSR:	90.98
	% Change:	41.96%

								3yr Selected Sales Data				1yr Selected Sales Data			
LUC	Parcel Count	Land Value Is	Impr Value Is	Total Value Is	Land Change	Impr Change	Total Change	Sales Count	Median Ratio	COD	PRD	Sales Count	Median Ratio	COD	PRD
500	10,560	478,635,800	139,400	478,775,200	208.52%	-98.46%	191.58%	130	95.39	21.64	105.47	49	80.60	20.30	98.96
501	2,025	138,520,300	578,300	139,098,600	44.30%	-83.09%	39.91%	41	90.67	18.49	100.24	13	90.23	11.11	101.62
502	133	57,740,400	13,700	57,754,100	23.06%	-95.72%	22.26%	1	53.10	0.00	100.00				
503	40	30,534,600	75,300	30,609,900	31.35%	59.87%	31.41%	1	107.74	0.00	100.00				
504	29	37,670,200		37,670,200	55.94%	-100.00%	54.88%								
505	46	97,262,200	55,800	97,318,000	43.66%	-89.96%	42.57%	1	89.44	0.00	100.00				
510	288,682	25,818,755,900	62,604,278,700	88,423,034,600	71.66%	32.30%	41.80%	38,041	101.50	13.60	102.03	12,017	90.76	7.60	100.45
511	11,277	1,315,178,600	2,761,014,100	4,076,192,700	38.44%	36.15%	36.88%	902	98.20	16.04	102.25	258	89.70	10.56	100.91
512	305	94,766,200	142,717,100	237,483,300	35.52%	42.34%	39.54%	13	97.21	13.66	100.22	4	88.26	8.50	98.44
513	49	28,124,200	19,257,500	47,381,700	64.20%	39.08%	52.97%	2	108.79	11.89	103.52	2	108.79	11.89	103.52
514	12	8,689,500	14,948,800	23,638,300	57.50%	19.09%	30.82%								
515	17	26,755,100	44,810,500	71,565,600	10.80%	5.09%	7.16%								
517					0.00%	0.00%	0.00%								
518					0.00%	0.00%	0.00%								
520	12,426	1,008,263,700	2,400,221,900	3,408,485,600	101.89%	41.05%	54.86%	1,299	97.55	16.86	103.45	403	87.73	10.22	100.76
521	55	6,634,700	20,559,900	27,194,600	39.55%	44.93%	43.58%	4	105.96	13.48	91.63				
522	1	542,500	1,796,000	2,338,500	1.84%	2.66%	2.47%								
524					0.00%	0.00%	0.00%								
530	647	70,828,400	155,323,900	226,152,300	98.33%	22.92%	39.54%	54	97.70	16.99	103.20	23	86.26	11.88	101.94
531	3	381,700	603,000	984,700	285.56%	14.97%	57.93%								
535					0.00%	0.00%	0.00%								
540	18	2,546,700	6,566,000	9,112,700	20.05%	19.04%	19.32%								
550	46,216	2,176,832,000	8,687,347,300	10,864,179,300	69.19%	30.92%	37.13%	10,294	101.30	12.22	102.49	3,281	91.91	6.01	100.25
560	101	3,283,100	7,504,900	10,788,000	51.05%	30.46%	36.11%	3	82.63	8.89	100.51	2	80.06	13.77	100.61
565					0.00%	0.00%	0.00%								
569					0.00%	0.00%	0.00%								
580					0.00%	0.00%	0.00%								
599	1,737	184,649,100	173,178,800	357,827,900	89.68%	268.92%	147.99%	18	89.95	23.74	105.19	11	84.00	33.70	112.20

Descriptions for each of the land use codes shown in the charts and graphics as well as definitions for each of the statistical measures can be found at the end of this document. The median ratio, COD, and PRD are included for both one and three years of sales data.

Percent Change and Sale Ratio Analysis

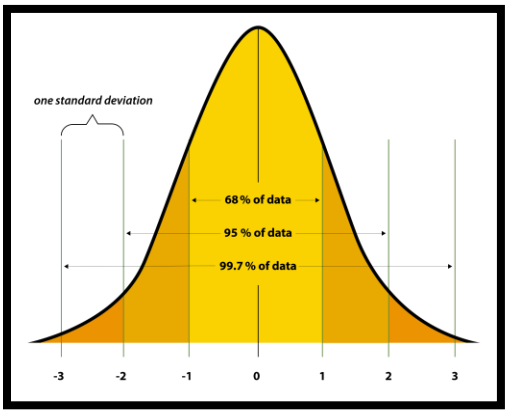
If we conglomerate the results into a few visuals, we get the following Parcel Impact Report for the **residential** class:



Range ($ Difference)	Count
Decrease $50k+	1221
Decrease $40k to $50k	383
Decrease $30k to $40k	564
Decrease $20k to $30k	897
Decrease $10k to $20k	1561
Decrease $0 to $10k	5806
No Change (+-$50)	564
$0 to $9,999	13426
$10,000 to $19,999	10171
$20,000 to $29,999	12821
$30,000 to $39,999	18310
$40,000 to $49,999	25994
$50,000 to $59,999	33756
$60,000 to $69,999	43470
$70,000 to $79,999	49087
$80,000 to $89,999	44545
$90,000 to $99,999	36748
$100,000 to $109,999	27495
$110,000 to $119,999	18898
$120,000+	50168

Range(% Difference)	Count
Decrease 50%+	905
Decrease 40% to 49.99%	461
Decrease 30% to 39.99%	515
Decrease 25% to 29.99%	337
Decrease 20% to 24.99%	748
Decrease 15% to 19.99%	903
Decrease 10% to 14.99%	1230
Decrease 5% to 9.99%	1971
Decrease 0% to 4.99%	3338
No Change (+-.05%)	613
0% to 4.99%	6382
5% to 9.99%	7810
10% to 14.99%	11169
15% to 19.99%	15631
20% to 24.99%	21346
25% to 29.99%	26169
30% to 39.99%	59596
40% to 49.99%	59623
50% to 59.99%	44322
60% to 69.99%	31595
70% to 79.99%	21040
80% to 89.99%	14865
90% to 99.99%	11627
100% +	52419

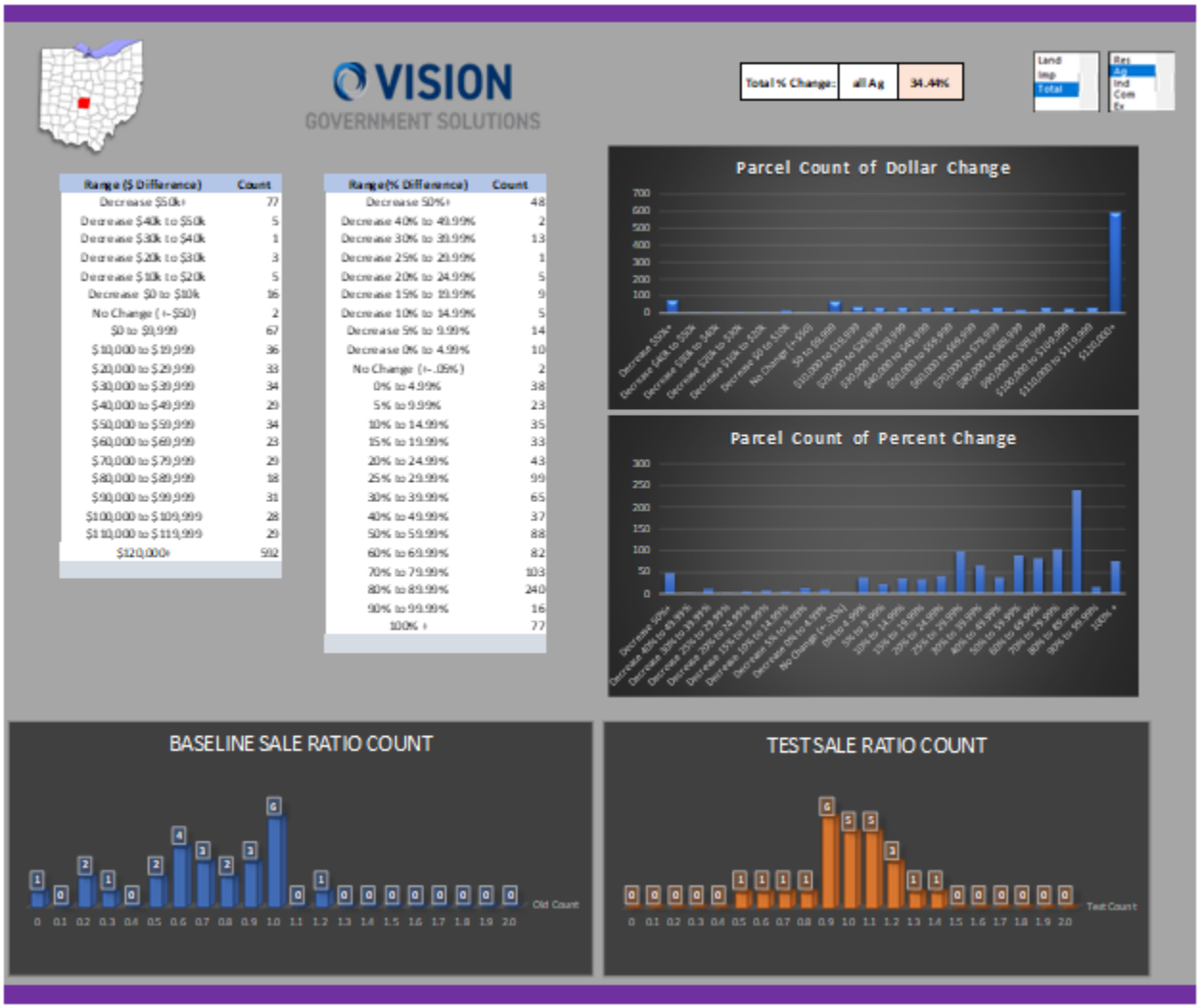
The before-and-after histogram tends towards "normalcy". A brief visual of a normal curve is shown on the right. Most sales occur in the residential class, and therefore normalcy is most apparent. We should still expect to see normal curves, or the beginning of – in the other classes, which are shown on the following pages.



Percent Change and Sale Ratio Analysis

We notice far fewer parcels in the **agricultural** class.

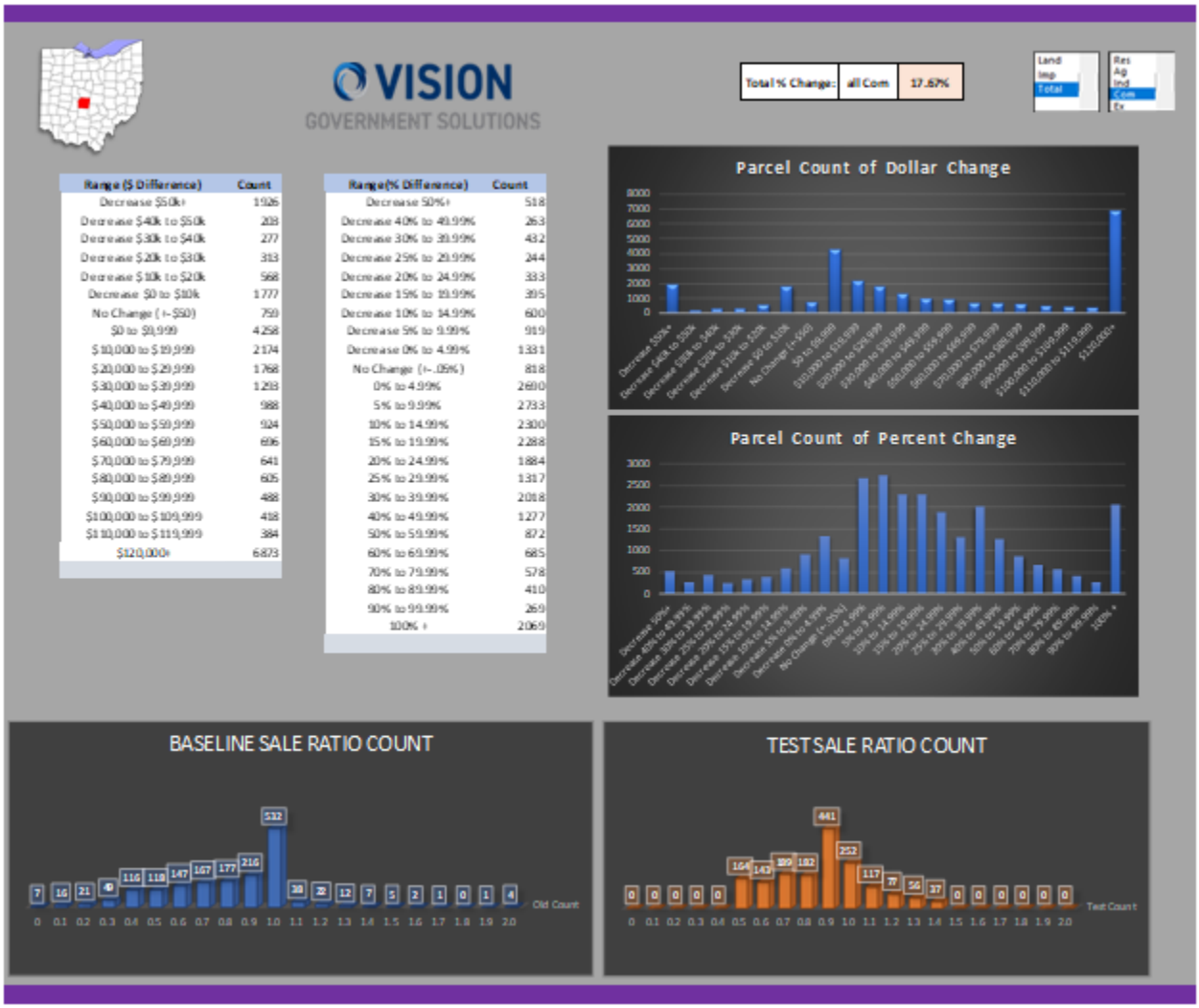
Franklin County, Ohio, is a highly urbanized and densely populated area, home to the state capital, Columbus. The county's extensive urban and suburban development has significantly reduced the availability of land for agricultural purposes. The growth of residential, commercial, and industrial sectors has taken precedence over agricultural land use, driven by the demand for housing, businesses, and infrastructure to support the growing population. Additionally, the economic opportunities in urban settings often surpass those in agriculture, leading landowners to sell or develop their properties for more profitable uses. This urban expansion and economic shifts result in fewer agricultural parcels in a county like Franklin.



Range ($ Difference)	Count
Decrease $50k+	77
Decrease $40k to $50k	5
Decrease $30k to $40k	1
Decrease $20k to $30k	3
Decrease $10k to $20k	5
Decrease $0 to $10k	16
No Change (+-$50)	2
$0 to $9,999	67
$10,000 to $19,999	36
$20,000 to $29,999	33
$30,000 to $39,999	34
$40,000 to $49,999	29
$50,000 to $59,999	34
$60,000 to $69,999	23
$70,000 to $79,999	29
$80,000 to $89,999	18
$90,000 to $99,999	31
$100,000 to $109,999	28
$110,000 to $119,999	29
$120,000+	592

Range(% Difference)	Count
Decrease 50%+	48
Decrease 40% to 49.99%	2
Decrease 30% to 39.99%	13
Decrease 25% to 29.99%	1
Decrease 20% to 24.99%	5
Decrease 15% to 19.99%	9
Decrease 10% to 14.99%	5
Decrease 5% to 9.99%	14
Decrease 0% to 4.99%	10
No Change (+-.05%)	2
0% to 4.99%	38
5% to 9.99%	23
10% to 14.99%	35
15% to 19.99%	33
20% to 24.99%	43
25% to 29.99%	99
30% to 39.99%	65
40% to 49.99%	37
50% to 59.99%	88
60% to 69.99%	82
70% to 79.99%	103
80% to 89.99%	240
90% to 99.99%	16
100% +	77

Percent Change and Sale Ratio Analysis



Range ($ Difference)	Count
Decrease $50k+	1926
Decrease $40k to $50k	208
Decrease $30k to $40k	277
Decrease $20k to $30k	313
Decrease $10k to $20k	568
Decrease $0 to $10k	1777
No Change (+-$50)	759
$0 to $9,999	4258
$10,000 to $19,999	2174
$20,000 to $29,999	1768
$30,000 to $39,999	1293
$40,000 to $49,999	988
$50,000 to $59,999	924
$60,000 to $69,999	696
$70,000 to $79,999	641
$80,000 to $89,999	605
$90,000 to $99,999	488
$100,000 to $109,999	418
$110,000 to $119,999	384
$120,000+	6873

Range(% Difference)	Count
Decrease 50%+	518
Decrease 40% to 49.99%	263
Decrease 30% to 39.99%	432
Decrease 25% to 29.99%	244
Decrease 20% to 24.99%	333
Decrease 15% to 19.99%	395
Decrease 10% to 14.99%	600
Decrease 5% to 9.99%	919
Decrease 0% to 4.99%	1331
No Change (+-.05%)	818
0% to 4.99%	2690
5% to 9.99%	2733
10% to 14.99%	2300
15% to 19.99%	2288
20% to 24.99%	1884
25% to 29.99%	1317
30% to 39.99%	2018
40% to 49.99%	1277
50% to 59.99%	872
60% to 69.99%	685
70% to 79.99%	578
80% to 89.99%	410
90% to 99.99%	269
100% +	2069

In the **commercial** class, we notice a bit more variability in the distribution of change. Franklin County is the most populous county in Ohio, with a population of over 1.3 million as of the 2020 census. This population drives the demand for commercial properties, especially in retail and services sectors.

Although not explicitly shown in this document, the industrial and exempt classes each experienced a 15% change in aggregate value as a result of the 2023 revaluation. For these types, the shape of the percent and dollar change graphs is quite similar to the one shown above. We will take a look at the residential class as well as the commercial class, at the county district level – on the next few pages.

Percent Change and Sale Ratio Analysis

Res
Ag
Ind
Com
Ex

Franklin County
District Level Sale Ratio Study

VISION GOVERNMENT SOLUTIONS

Res	Selected MSR:	101.30
	% Change:	40.79%

Res	Selected MSR:	90.99
	% Change:	40.79%

Class (All)

					3yr Selected Sales Data				1yr Selected Sales Data			
District	Parcel Count	Land Change	Impr Change	Total Change	Sales Coun	Median Ratio	COD	PRD	Sales Coun	Median Ratio	COD	PRD
01	161,405	86.11%	35.55%	46.81%	20,290	100.34	14.11	102.82	6,385	90.77	8.21	100.67
02	16,112	65.31%	24.18%	33.57%	1,851	101.28	12.59	101.62	596	91.16	7.04	100.07
03	2,704	49.94%	1.53%	17.58%	422	98.91	10.71	101.89	96	92.47	9.20	103.43
04	15,136	71.08%	35.31%	43.15%	2,458	100.80	12.07	101.77	840	91.70	6.85	100.38
05	10,741	57.94%	23.25%	31.33%	1,534	103.66	11.48	101.33	429	91.42	6.30	100.38
06	8,690	99.81%	41.21%	53.57%	1,146	102.94	14.28	102.28	414	92.16	7.26	100.31
07	13,070	45.43%	17.06%	26.38%	1,553	99.97	12.24	101.90	456	90.92	6.99	101.34
08	10,031	50.64%	29.74%	34.68%	1,207	99.65	12.67	102.02	378	91.07	6.13	100.16
09	4,922	113.60%	56.51%	68.26%	412	102.20	16.32	102.55	149	92.11	9.41	99.97
10	5,571	46.64%	24.59%	31.37%	555	99.71	12.66	102.22	171	90.38	7.37	101.00
11	4,027	62.17%	31.70%	38.79%	491	103.26	13.06	101.63	147	90.37	6.96	99.64
12	937	13.87%	36.66%	27.35%	70	92.73	14.03	99.78	18	94.26	7.50	101.19
13	1,622	37.45%	64.21%	55.59%	144	95.43	15.92	104.17	45	88.43	10.04	101.40
14	3,985	46.80%	56.25%	53.50%	283	99.06	16.07	101.21	88	90.49	8.25	100.68
15	4,077	162.07%	48.98%	70.14%	360	103.79	14.06	101.73	107	89.58	7.86	100.45
16	2,572	51.03%	37.30%	41.54%	163	98.03	14.82	101.84	45	89.41	10.10	101.96
17	5,899	48.56%	28.55%	32.99%	1,231	103.11	12.17	101.62	381	91.17	6.93	100.47
18	10,088	104.90%	39.66%	53.27%	1,436	100.92	14.73	102.20	516	89.75	7.68	100.61
19	1,596	145.03%	114.74%	122.22%	79	97.88	18.99	102.14	32	89.75	15.46	100.03
20	1,499	24.85%	24.40%	24.55%	118	94.22	10.76	100.28	29	86.26	7.34	100.26
21	1,613	46.53%	37.10%	39.86%	230	103.36	11.12	101.80	49	92.06	6.04	100.02
22	4,656	33.68%	40.61%	38.66%	712	100.86	14.10	100.27	242	90.43	7.48	100.23
23	3,032	37.46%	38.11%	37.92%	184	94.87	16.49	100.56	56	88.62	11.17	100.87
24	6,282	111.65%	47.33%	61.26%	662	102.72	14.24	102.05	199	90.36	7.32	100.02
25	1,322	58.45%	18.53%	31.02%	130	100.14	12.98	101.86	46	89.05	8.36	101.30
26	486	122.87%	47.96%	65.22%	56	103.52	14.00	102.01	19	90.32	8.40	100.31
27	12,950	53.07%	24.13%	30.92%	1,603	104.19	11.73	101.41	458	92.79	5.83	100.28
42	175	99.47%	25.48%	39.80%								
43	294	88.21%	27.20%	39.76%	50	104.09	11.71	101.49	17	91.47	6.00	100.35
44	63	26.37%	16.84%	18.84%	4	98.47	7.84	103.91				
45	1	99.87%	18.13%	43.76%								
46	14	-4.55%	3187.14%	177.49%	1	97.36	0.00	100.00	1	97.36	0.00	100.00
47	29	79.39%	3.56%	16.83%	3	109.83	6.80	102.19	1	87.80	0.00	100.00
48		0.00%	0.00%	0.00%								
49	2,276	86.75%	42.91%	52.24%	463	107.25	12.49	101.49	121	92.00	5.69	100.34
51	4,899	113.19%	39.99%	54.26%	897	105.66	14.19	102.89	308	93.26	6.95	100.80
52	1,535	72.38%	26.88%	35.84%	205	106.85	12.63	100.93	42	88.91	5.77	100.62
53	7,037	132.13%	50.43%	65.62%	986	103.49	14.09	102.04	357	90.35	7.63	100.66
54	2,475	50.08%	38.02%	40.60%	312	110.34	13.70	101.42	85	91.79	6.32	100.49
55	1,159	40.94%	37.92%	38.77%	133	101.39	14.06	101.08	30	90.25	5.95	100.56
56	13,193	92.84%	25.03%	38.65%	1,961	102.98	11.59	101.36	610	91.36	5.49	100.19
57	16,036	127.64%	40.81%	56.98%	2,246	102.14	13.32	102.00	726	90.88	7.00	100.47
58	162	23.02%	38.52%	34.43%	35	97.93	8.29	100.00	8	95.82	3.40	100.76
59	9,657	54.81%	26.53%	33.29%	1,350	99.16	12.65	101.01	434	90.00	6.18	99.80
60	8,966	71.99%	40.68%	47.37%	1,333	99.89	12.41	102.39	456	91.34	5.99	100.69
61	12,889	71.21%	26.79%	36.67%	1,650	103.98	13.31	101.44	479	90.70	6.03	100.09
Grand Tot	**395,885**	**69.45%**	**31.80%**	**40.79%**	**51,009**	**101.30**	**13.48**	**102.10**	**16,066**	**90.99**	**7.43**	**100.46**

The chart above details the **residential** class, identified in this instance by 2024 land use codes that begin with 5. More information on the classification of properties can be found at the end of this document. The chart illustrates the increase that was required in order to achieve acceptable levels of assessment.

The manner in which these parcels are stratified falls in line with a majority of Ohio counties' district structure – the first two digits of the parcel number. The chart splits parcels in this manner. We continue this analysis on the pages to come with a look at each class.

Percent Change and Sale Ratio Analysis

Res
Ag
Ind
Com
Ex

VISION GOVERNMENT SOLUTIONS

Ag	Selected MSR:	102.46
	% Change:	34.44%

Ag	Selected MSR:	99.16
	% Change:	34.44%

Class (All)

					3yr Selected Sales Data				1yr Selected Sales Data			
District	Parcel Count	Land Change	Impr Change	Total Change	Sales Coun	Median Ratio	COD	PRD	Sales Coun	Median Ratio	COD	PRD
01	39	52.28%	2.42%	39.77%	2	92.26	42.06	98.03	1	53.46	0.00	100.00
02	4	57.35%	0.00%	57.35%								
04	20	18.28%	-7.51%	17.54%								
05	8	50.34%	27.40%	49.57%								
06	1	-10.49%	27.89%	-3.91%								
08	1	-36.51%	-100.00%	-36.60%								
11	3	62.00%	34.52%	44.18%								
12	131	24.26%	48.77%	26.65%	6	101.23	6.32	100.49	4	99.42	1.61	100.74
14	1	64.42%	-24.07%	10.04%								
15	33	83.72%	67.57%	82.19%								
16	72	51.44%	38.35%	49.90%	2	106.60	10.81	97.15	1	95.08	0.00	100.00
17	47	12.47%	33.12%	15.37%								
18	150	55.70%	46.73%	54.28%	4	93.51	13.68	106.81	1	88.45	0.00	100.00
20	13	-47.02%	-17.09%	-46.69%								
22	76	-10.93%	15.01%	-7.71%								
23	284	70.02%	41.93%	65.64%	6	111.53	13.84	101.65	2	106.85	13.92	106.41
24	101	64.59%	34.28%	57.98%	3	100.33	4.70	93.59	2	106.55	6.64	94.38
26	2	10.57%	53.53%	15.20%								
27	35	37.65%	25.55%	37.25%	2	129.51	12.06	90.36	1	145.13	0.00	100.00
43	3	70.22%	20.24%	65.00%								
47	1	92.01%	57.45%	91.78%								
49	15	1.60%	22.05%	5.54%								
51	4	65.61%	-12.78%	-6.10%								
53	13	87.06%	26.99%	80.59%								
54	6	33.57%	0.00%	33.57%								
55	1	-5.66%	0.00%	-5.66%								
56	1	177.55%	0.00%	177.55%								
57	7	17.71%	200.00%	17.89%								
61	20	34.07%	71.84%	35.51%								
Grand Total	**1,092**	**40.86%**	**12.21%**	**34.44%**	**25**	**102.46**	**14.49**	**88.71**	**12**	**99.16**	**13.23**	**84.54**

As we noticed in the parcel impact reports, far fewer parcels exist in the **agricultural** class; these are often eligible for tax relief programs. Agricultural parcels are According to the Ohio Department of Taxation:

"For property tax purposes, farmland devoted exclusively to commercial agriculture may be valued according to its current use rather than at its "highest and best" potential use. This provision of Ohio law is known as the Current Agricultural Use Value (CAUV) program. By permitting values to be set well below true market values, the CAUV normally results in a substantially lower tax bill for working farmers.

To qualify for the CAUV, land must meet one of the following requirements during the three years preceding an application for the CAUV:

Ten or more acres must be devoted exclusively to commercial agricultural use; or
If under ten acres are devoted exclusively to commercial agricultural use, the farm must produce an average yearly gross income of at least $2,500."

Percent Change and Sale Ratio Analysis

Res
Ag
Ind
Com
Ex

VISION GOVERNMENT SOLUTIONS

Ind	Selected MSR:	92.10
	% Change:	15.28%

Ind	Selected MSR:	79.45
	% Change:	15.28%

Class (All)

					3yr Selected Sales Data				1yr Selected Sales Data			
District	Parcel Count	Land Change	Impr Change	Total Change	Sales Coun	Median Ratio	COD	PRD	Sales Coun	Median Ratio	COD	PRD
01	1,853	26.02%	16.51%	18.44%	83	89.46	21.62	117.93	22	78.77	26.58	114.35
02	130	39.02%	39.13%	39.10%	10	101.03	20.20	103.52	1	63.91	0.00	100.00
03	10	55.61%	-0.49%	17.40%								
04	104	-4.44%	17.18%	14.12%	9	89.92	14.89	107.10	2	72.73	2.91	97.57
05	129	11.73%	25.78%	23.33%	11	98.92	12.86	107.55	1	102.18	0.00	100.00
06	10	49.44%	20.73%	25.34%	1	77.93	0.00	100.00				
08	48	58.09%	2.29%	14.38%	2	100.08	4.16	103.96				
09	27	45.25%	26.37%	29.45%	1	94.90	0.00	100.00				
10	62	53.88%	10.28%	20.49%	6	83.28	21.63	113.17				
13	32	59.84%	-5.33%	17.47%	3	95.20	19.22	109.06	1	95.20	0.00	100.00
14	98	7.67%	5.27%	5.83%	7	72.38	16.24	95.75	1	77.88	0.00	100.00
15	83	19.15%	10.13%	11.14%	4	93.80	10.31	109.55	1	93.72	0.00	100.00
16	38	2.12%	9.35%	8.33%	4	84.36	20.60	118.95				
17	14	35.99%	20.14%	24.24%	1	82.10	0.00	100.00				
18	213	11.46%	9.54%	9.76%	17	90.35	13.06	104.85	4	78.90	7.69	90.94
19	7	73.22%	-0.95%	26.47%								
20	2	-1.44%	0.00%	-1.44%								
21	4	38.62%	-2.19%	9.94%								
22	27	31.02%	15.00%	18.74%	2	79.90	22.24	99.16	2	79.90	22.24	99.16
24	13	-44.24%	20.48%	-27.46%								
26	2	3.73%	7.22%	5.52%								
27	72	0.76%	25.08%	19.96%	5	102.24	3.51	100.01				
42	3	29.56%	-4.58%	6.86%								
43	12	29.39%	11.96%	14.40%	1	93.99	0.00	100.00	1	93.99	0.00	100.00
44	3	-22.24%	0.00%	-22.24%								
47	1	-71.58%	0.00%	-71.58%								
49	52	18.41%	34.93%	32.68%	8	97.35	5.50	98.79	1	107.21	0.00	100.00
51	36	1.78%	15.70%	12.93%	2	64.03	16.20	118.76	1	74.40	0.00	100.00
52	32	34.22%	26.97%	28.15%	5	99.76	14.01	107.39	1	73.96	0.00	100.00
53	31	11.76%	20.03%	18.65%	3	111.88	12.09	105.16	1	119.88	0.00	100.00
54	13	26.32%	15.39%	18.21%	1	123.54	0.00	100.00	1	123.54	0.00	100.00
55	6	-45.50%	32.99%	1.25%								
56	251	-17.57%	17.13%	9.64%	16	93.45	10.12	104.86	3	60.27	24.72	117.72
57	238	1.56%	-2.22%	-1.38%	15	83.26	19.21	112.48	5	92.08	10.65	99.31
59	1	-13.05%	0.33%	-10.87%								
60	25	34.56%	-10.96%	-1.42%								
61	50	48.37%	11.16%	20.34%	3	65.82	14.87	85.57	1	65.82	0.00	100.00
Grand Total	**3,526**	**12.81%**	**15.80%**	**15.28%**	**220**	**92.10**	**17.97**	**108.01**	**50**	**79.45**	**22.44**	**101.33**

We measure close to 15% aggregate change for the **industrial** class. Our traditional sale ratio measure loses a bit of reliability with these complex transactions that often include personal property.

Franklin County, Ohio, is a significant hub for industrial activities due to its strategic location, well-developed infrastructure, and robust workforce. The county's industrial sector is diverse, encompassing manufacturing, logistics, distribution, and technology. Key industries include automotive manufacturing, food processing, pharmaceuticals, and consumer goods.

The presence of educational institutions such as The Ohio State University contributes to a skilled labor pool, fostering innovation and providing research and development support to local industries.

Percent Change and Sale Ratio Analysis

Res
Ag
Ind
Com
Ex

VISION GOVERNMENT SOLUTIONS

Com	Selected MSR:	93.40
	% Change:	17.45%

Com	Selected MSR:	91.20
	% Change:	17.45%

Class (All)

					3yr Selected Sales Data				1yr Selected Sales Data			
District	Parcel Count	Land Change	Impr Change	Total Change	Sales Coun	Median Ratio	COD	PRD	Sales Coun	Median Ratio	COD	PRD
01	16,049	22.27%	15.41%	16.62%	931	92.98	17.49	108.01	295	91.64	17.25	104.18
02	778	23.70%	28.44%	27.30%	63	95.94	20.26	103.83	26	93.27	22.14	106.33
03	294	39.95%	22.42%	25.74%	7	79.23	16.03	106.64	2	57.48	11.92	102.66
04	634	8.09%	14.58%	12.81%	49	91.15	16.37	107.91	16	90.34	11.48	105.28
05	526	4.34%	17.74%	14.54%	31	93.04	15.25	104.70	9	70.57	16.83	103.26
06	616	50.30%	24.65%	32.43%	65	105.78	18.30	110.93	27	92.14	15.18	106.96
07	513	22.60%	34.85%	31.65%	27	86.79	15.52	98.43	7	73.22	22.20	84.21
08	673	24.15%	11.83%	14.60%	42	92.28	18.66	103.29	10	95.56	16.89	105.99
09	565	64.76%	20.40%	31.20%	30	91.12	21.59	101.92	10	80.35	19.55	99.09
10	451	31.49%	26.78%	28.08%	19	92.19	16.27	109.62	5	78.96	15.87	106.81
11	221	11.35%	-2.65%	1.51%	9	82.67	19.41	112.52	5	82.67	17.18	108.89
12	5	12.54%	37.52%	16.71%								
13	199	45.49%	12.13%	23.23%	6	78.58	39.66	110.25	2	78.58	24.37	118.72
14	352	16.02%	-6.59%	-2.42%	15	90.96	24.11	96.24	8	85.51	26.28	95.06
15	182	3.48%	-6.89%	-3.29%	9	87.45	17.45	95.12	3	66.27	13.92	86.74
16	116	18.77%	19.66%	19.37%	1	85.70	0.00	100.00	1	85.70	0.00	100.00
17	66	92.14%	-7.02%	21.06%	1	70.25	0.00	100.00	1	70.25	0.00	100.00
18	464	23.26%	22.60%	22.78%	25	94.16	11.50	127.72	9	90.68	10.35	134.87
19	136	37.96%	11.78%	21.19%	2	88.99	38.78	94.31				
20	6	66.83%	118.97%	107.79%								
21	32	46.43%	17.02%	27.03%								
22	301	25.45%	26.05%	25.84%	20	97.19	20.47	108.26	12	87.40	17.62	101.33
23	69	1.27%	-28.82%	-21.29%	3	99.64	12.14	103.67	2	82.06	21.42	119.31
24	338	9.61%	15.60%	13.48%	25	98.16	12.65	99.32	9	98.16	11.71	95.46
25	52	31.65%	22.77%	24.33%	2	60.73	1.82	100.00				
26	39	16.41%	37.50%	31.89%								
27	823	3.50%	18.83%	14.81%	66	96.07	15.48	106.91	23	91.71	14.70	105.00
42	53	25.23%	29.77%	29.05%	3	99.10	0.00	100.00	3	99.10	0.00	100.00
43	6	-5.75%	11.02%	8.70%								
44	23	49.83%	36.31%	39.01%	2	95.53	26.74	112.97	1	69.99	0.00	100.00
47	4	-7.20%	7.24%	5.83%								
48	1	4.15%	25.63%	11.38%								
49	23	28.49%	11.06%	13.05%	4	80.43	19.66	112.83	1	76.93	0.00	100.00
51	48	28.37%	60.19%	48.79%	2	100.42	3.69	98.77	1	96.71	0.00	100.00
52	99	2.58%	11.77%	9.55%	7	91.40	20.88	94.06	3	91.40	18.75	110.68
53	229	7.56%	18.97%	16.09%	17	96.14	14.40	107.38	4	88.32	21.61	122.97
54	96	16.97%	18.50%	18.04%	8	75.19	22.65	114.13	3	58.07	26.47	108.31
55	46	37.73%	12.06%	16.26%	2	108.70	28.13	85.90				
56	320	12.39%	22.44%	19.47%	26	95.77	8.17	99.54	8	94.10	2.18	97.94
57	523	12.14%	18.62%	17.10%	27	90.41	20.55	100.84	10	93.99	19.27	93.69
58	10	64.04%	13.99%	29.30%	3	98.93	0.28	100.00	1	98.11	0.00	100.00
59	447	8.41%	12.08%	11.04%	33	96.53	17.30	94.30	6	101.80	21.95	109.40
60	386	19.79%	26.32%	24.70%	32	96.64	22.30	119.07	14	94.24	13.82	104.58
61	521	21.18%	22.20%	21.95%	44	100.48	25.38	93.28	16	67.62	26.73	95.33
Grand Total	**26,464**	**19.83%**	**16.81%**	**17.45%**	**1,658**	**93.40**	**18.15**	**106.47**	**553**	**91.20**	**17.68**	**103.81**

The chart shown above details the **commercial** class. In each of the previous and following "district" reports, strata without parcels are not shown. A ~17% aggregate increase was required in order to achieve the 91% median sale ratio on the sales that occurred one year prior to the lien date of appraisal.

For the 2023 revaluation, the one-year sales shown above are those that occurred in 2022. The three-year sales reflect those sales that have occurred in the years 2020, 2021, and 2022. Areas in which sales count are sufficient for study appear well within acceptable tolerances.

Percent Change and Sale Ratio Analysis

Res
Ag
Ind
Com
Ex

VISION GOVERNMENT SOLUTIONS

Ex	Selected MSR:	98.44
	% Change:	15.57%

Ex	Selected MSR:	97.70
	% Change:	15.57%

Class (All)

					3yr Selected Sales Data				1yr Selected Sales Data			
District	Parcel Count	Land Change	Impr Change	Total Change	Sales Coun	Median Ratio	COD	PRD	Sales Coun	Median Ratio	COD	PRD
01	6,552	20.15%	16.02%	16.38%	28	96.08	14.68	105.93	15	94.65	14.72	98.25
02	543	32.32%	18.58%	21.40%	2	102.31	5.87	103.07				
03	58	34.01%	10.35%	15.11%								
04	276	9.82%	6.77%	7.00%	2	106.68	13.83	113.66				
05	251	58.68%	7.75%	16.45%	1	105.39	0.00	100.00				
06	146	18.96%	17.77%	18.02%	2	87.77	14.81	107.98				
07	124	8.25%	4.87%	5.61%	1	100.00	0.00	100.00	1	100.00	0.00	100.00
08	369	2.59%	21.91%	19.00%	3	91.44	8.75	98.57	1	91.44	0.00	100.00
09	162	21.38%	9.54%	10.38%	1	146.83	0.00	100.00				
10	174	4.19%	7.76%	6.75%								
11	76	4.90%	36.46%	26.11%	1	134.87	0.00	100.00				
12	44	-15.92%	6.07%	-6.36%								
13	90	36.85%	21.96%	23.40%								
14	143	6.22%	9.06%	8.67%								
15	192	9.81%	-0.54%	2.02%	1	112.34	0.00	100.00				
16	147	19.22%	1.82%	12.42%	1	57.85	0.00	100.00				
17	119	45.88%	17.66%	28.54%								
18	360	11.38%	1.71%	4.07%								
19	175	18.27%	29.40%	22.88%	1	141.50	0.00	100.00	1	141.50	0.00	100.00
20	22	-12.97%	-10.05%	-10.90%								
21	15	-4.14%	3.80%	2.34%								
22	221	12.06%	11.77%	11.84%	1	104.99	0.00	100.00				
23	232	2.45%	8.95%	5.31%								
24	222	51.90%	10.48%	17.93%	1	133.26	0.00	100.00				
25	92	15.85%	-0.46%	12.17%								
26	21	19.53%	28.90%	26.69%								
27	598	40.89%	29.02%	33.50%	1	97.57	0.00	100.00	1	97.57	0.00	100.00
42	11	16.92%	17.15%	17.12%								
43	5	14.85%	-10.04%	-7.38%								
44	8	7.07%	3.91%	5.14%								
45	1	40.60%	0.00%	40.60%								
47	2	12.95%	9.89%	10.30%								
48	2	14.23%	0.00%	14.23%								
49	24	8.33%	10.69%	10.47%	1	69.60	0.00	100.00				
51	32	0.11%	25.17%	19.87%								
52	95	15.35%	22.45%	20.81%								
53	82	16.07%	19.33%	17.63%								
54	33	13.88%	12.34%	13.08%								
55	15	20.39%	19.97%	20.05%								
56	244	32.27%	6.40%	11.99%	1	107.54	0.00	100.00				
57	151	12.79%	-1.63%	1.50%	3	121.46	14.94	111.78	1	148.91	0.00	100.00
58	2	12.03%	8.03%	11.23%								
59	50	81.52%	24.37%	40.79%								
60	362	16.68%	39.51%	32.53%	1	103.03	0.00	100.00				
61	142	3.48%	8.27%	6.99%	1	55.77	0.00	100.00				
Grand Total	**12,685**	**20.68%**	**14.86%**	**15.57%**	**54**	**98.44**	**16.85**	**105.53**	**20**	**97.70**	**16.16**	**100.17**

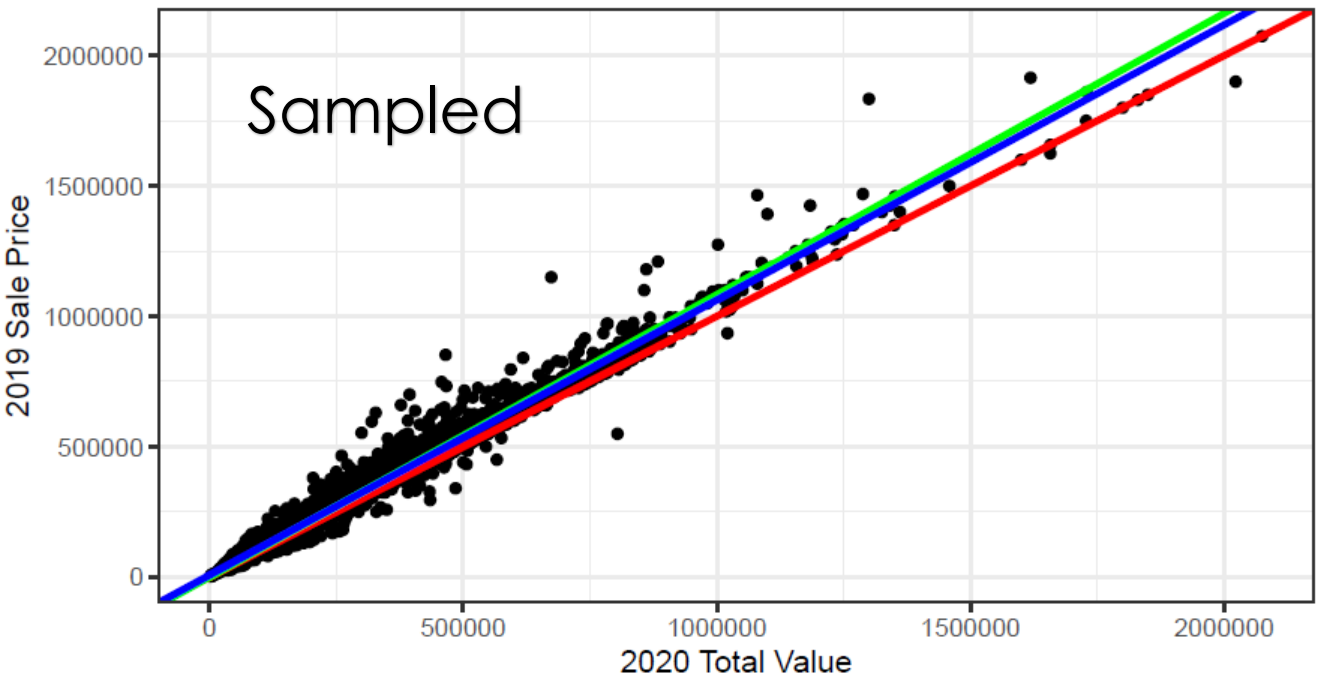
Lastly in our "district" style reports is the **exempt** class. Types of exempt properties include religious properties, educational institutions, charitable organizations, public and governmental properties, as well as nonprofit Hospitals and Medical Facilities.

The ratios on the transfers that have occurred behave well. However, transfers that occur in this class should receive scrutiny. The transfer may indicate potential change in usage for a property. If the change in use no longer falls under exemption, a class change may be necessary.

Performance Audit Revisited

During the 2020 triennial update, a similar performance audit was performed. This audit contained some insightful graphs that we have leveraged in our study. The first graph shows the relationship between sale price and appraised value. The original is shown below:

Figure 1: 2020 Total Value vs 2019



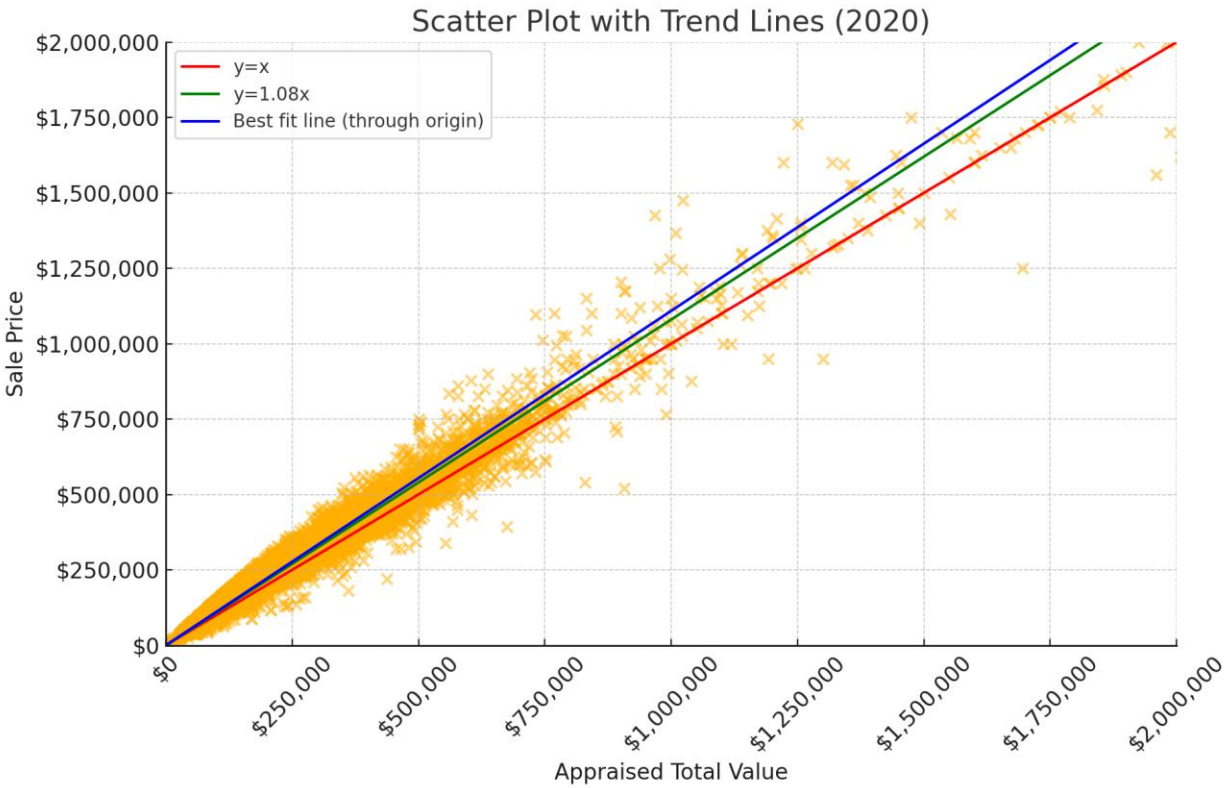
Total sale price taken from the 2020 dataset. The **red line** is a reference line where the Total Value is equal to Sale Price reference. Points above the red line have a sale price greater than the total value, e.g. ratio < 100, whereas points below the red line have a total value greater than the sale price, e.g. ratio > 100. As an additional reference, the **green line** represents an ideal situation where all parcels have a ratio of 92.5. The **blue** line represents the best fit for the observed data and can be thought of as the estimated ratio.

The graph shows 2019 sale prices after the triennial update. The following 8 graphs show the 2020, 2021, 2022, and 2023 sale prices both pre- and post-revaluation.

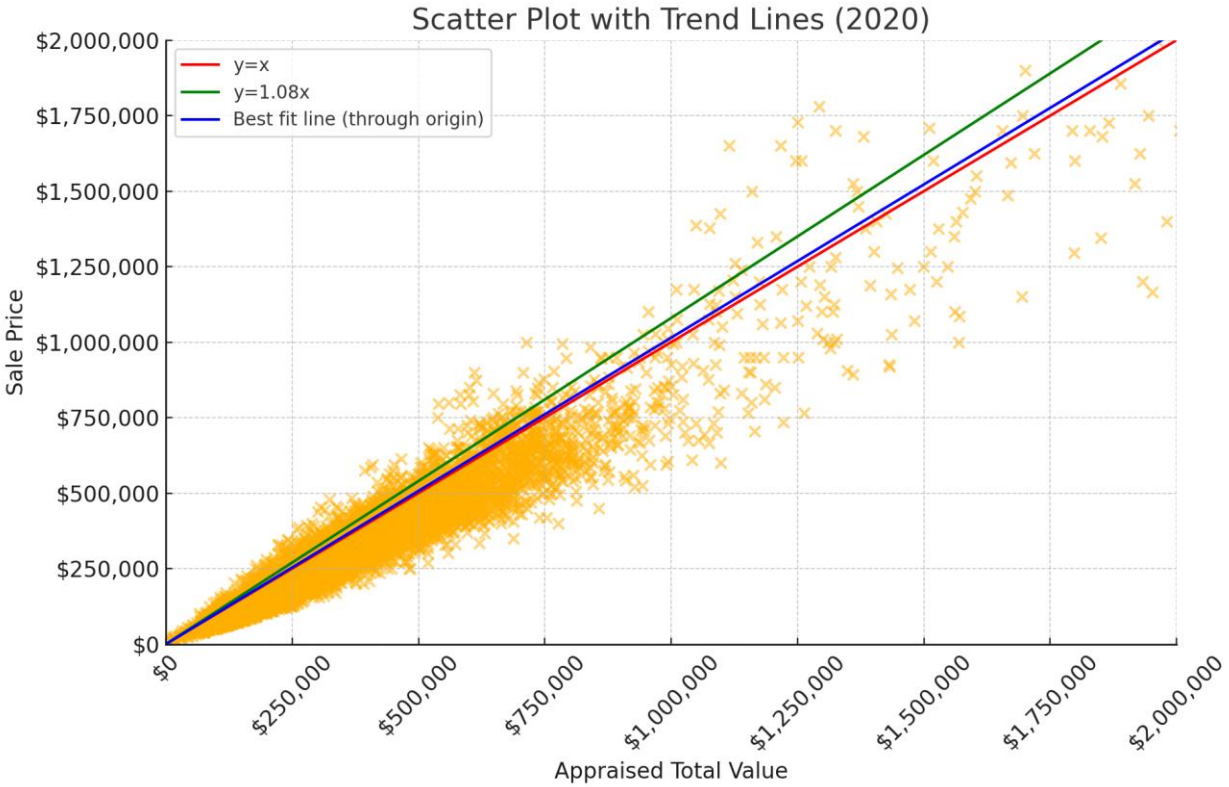
The sales that occur in the year prior to the lien date are heavily weighed by the DTE. For the 2023 revaluation, the 2022 sales would have been used to calculate the "one-year ratio".

We should expect values to be slightly higher than older sale prices, just as we expect current values to be eventually under appraised.

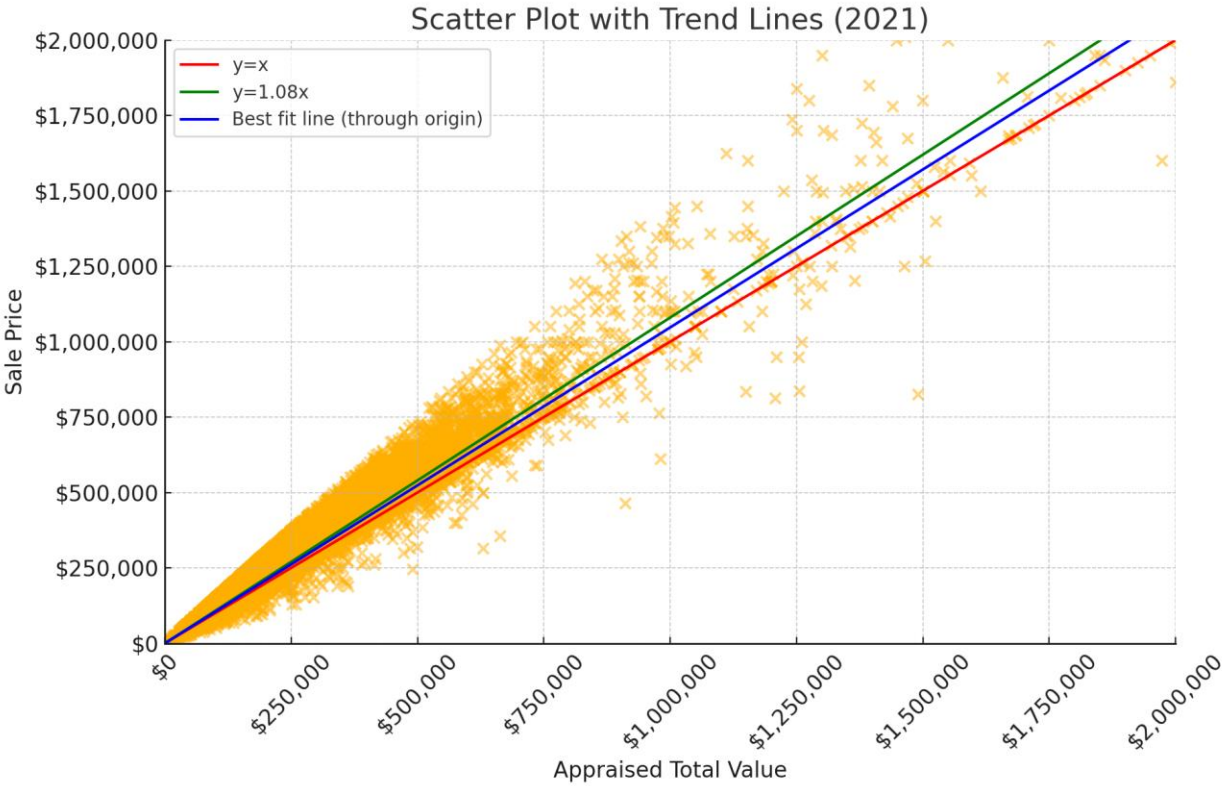
Pre-Revaluation



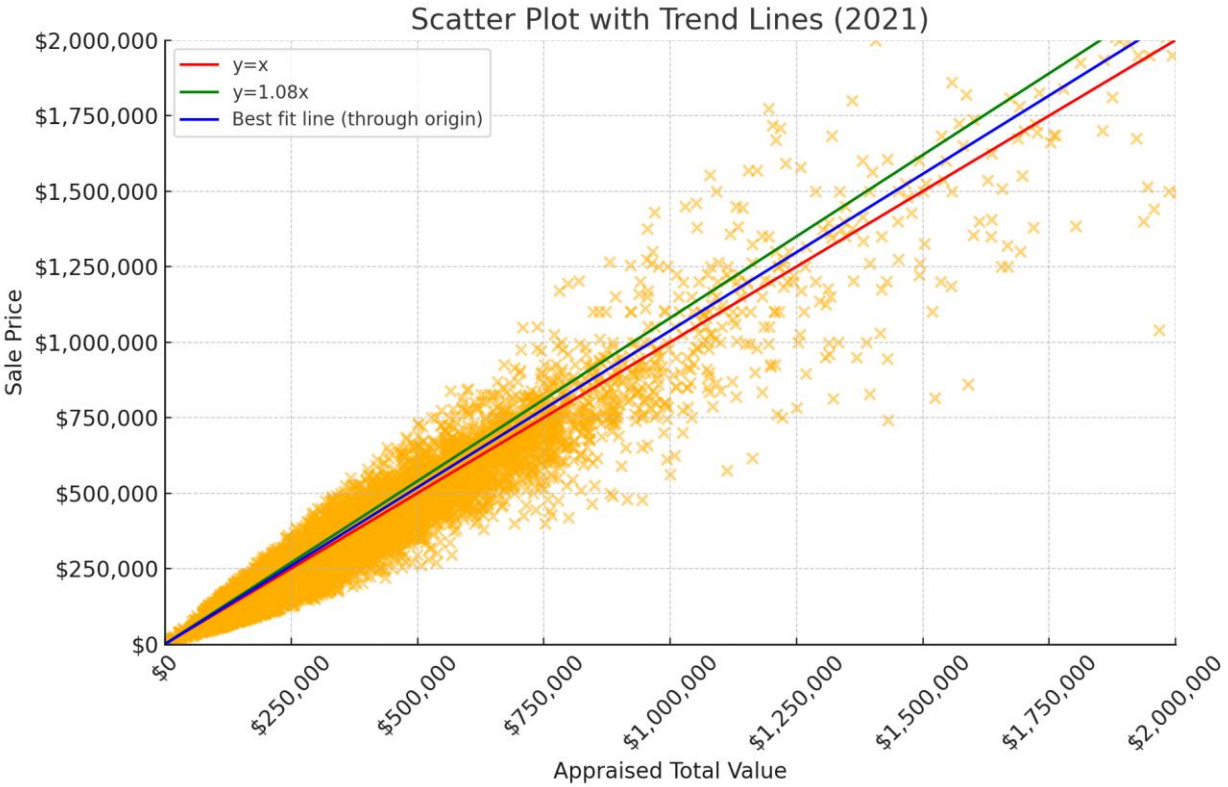
Post-Revaluation



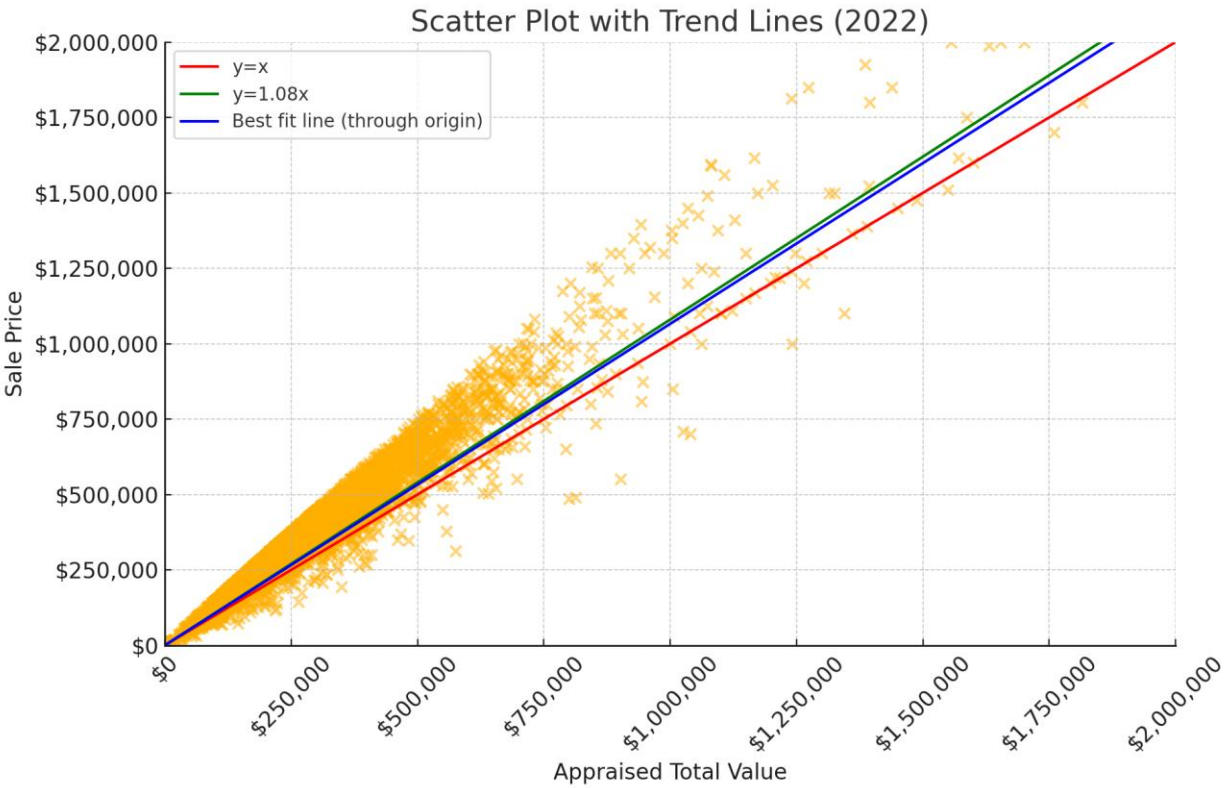
Pre-Revaluation



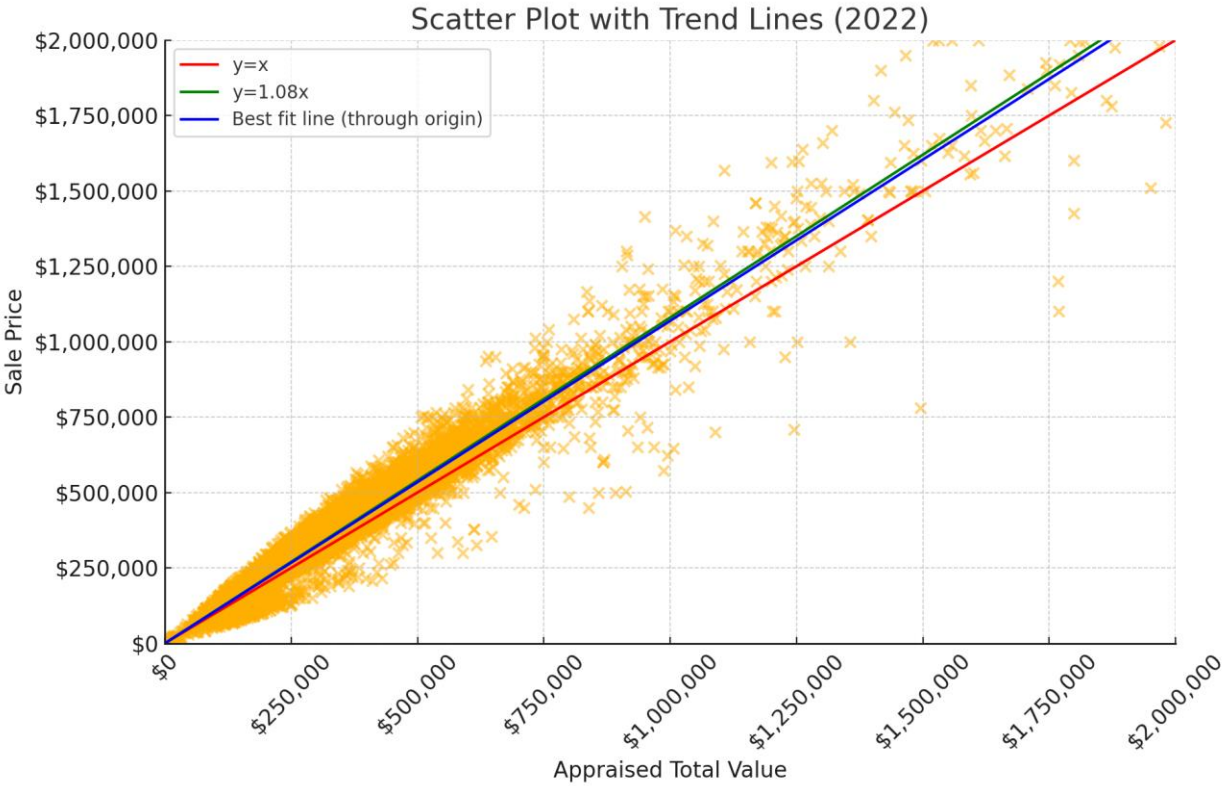
Post-Revaluation



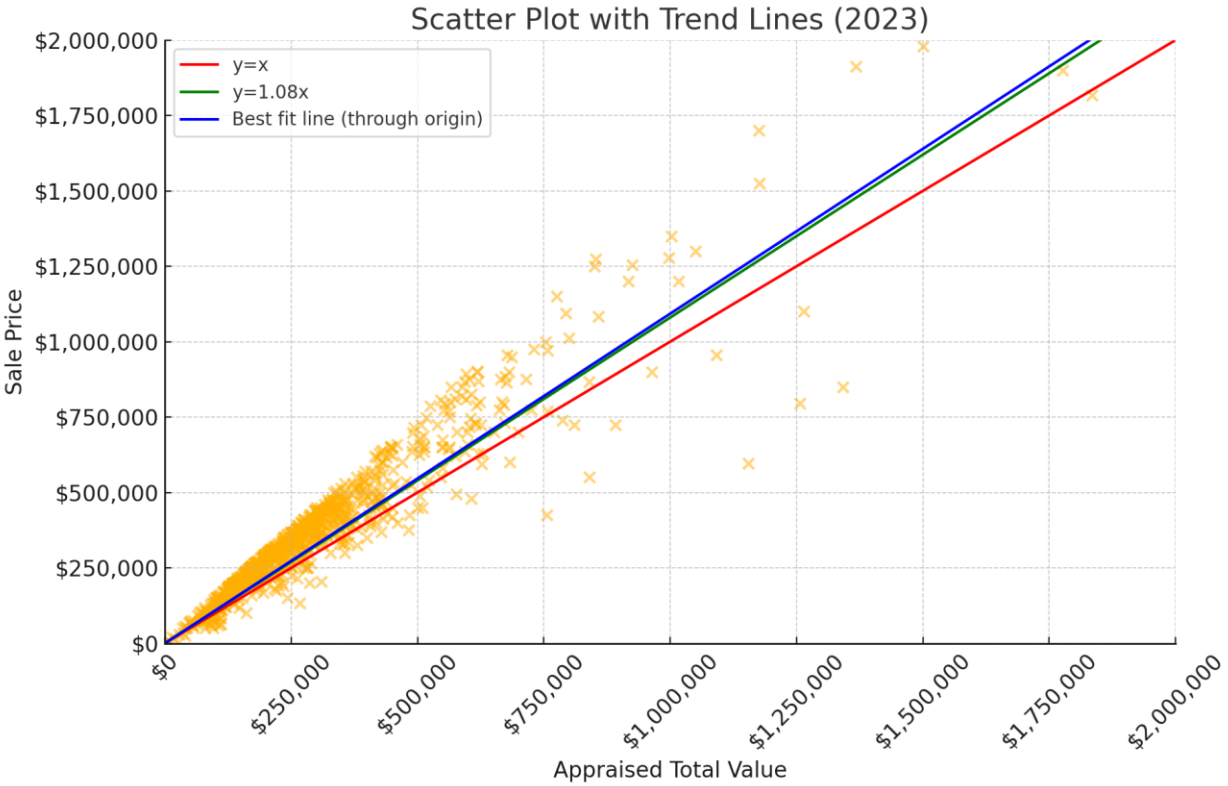
Pre-Revaluation



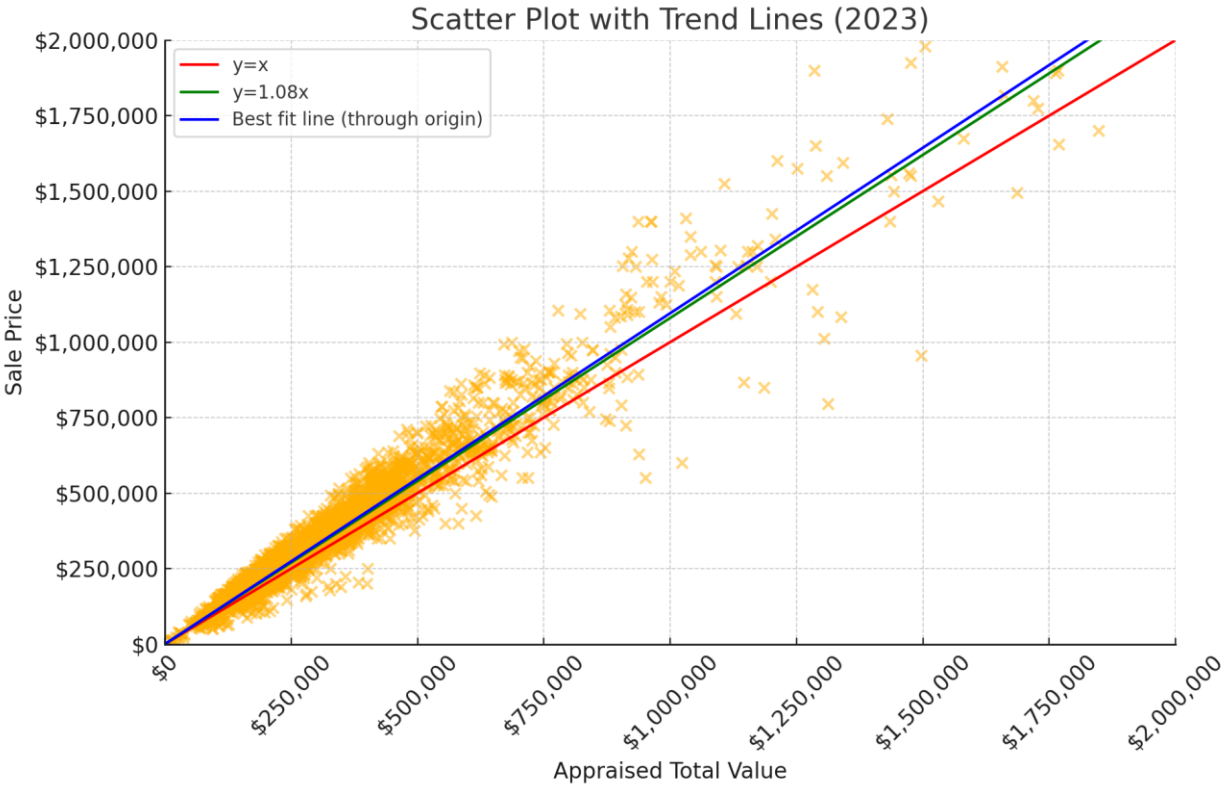
Post-Revaluation



Pre-Revaluation

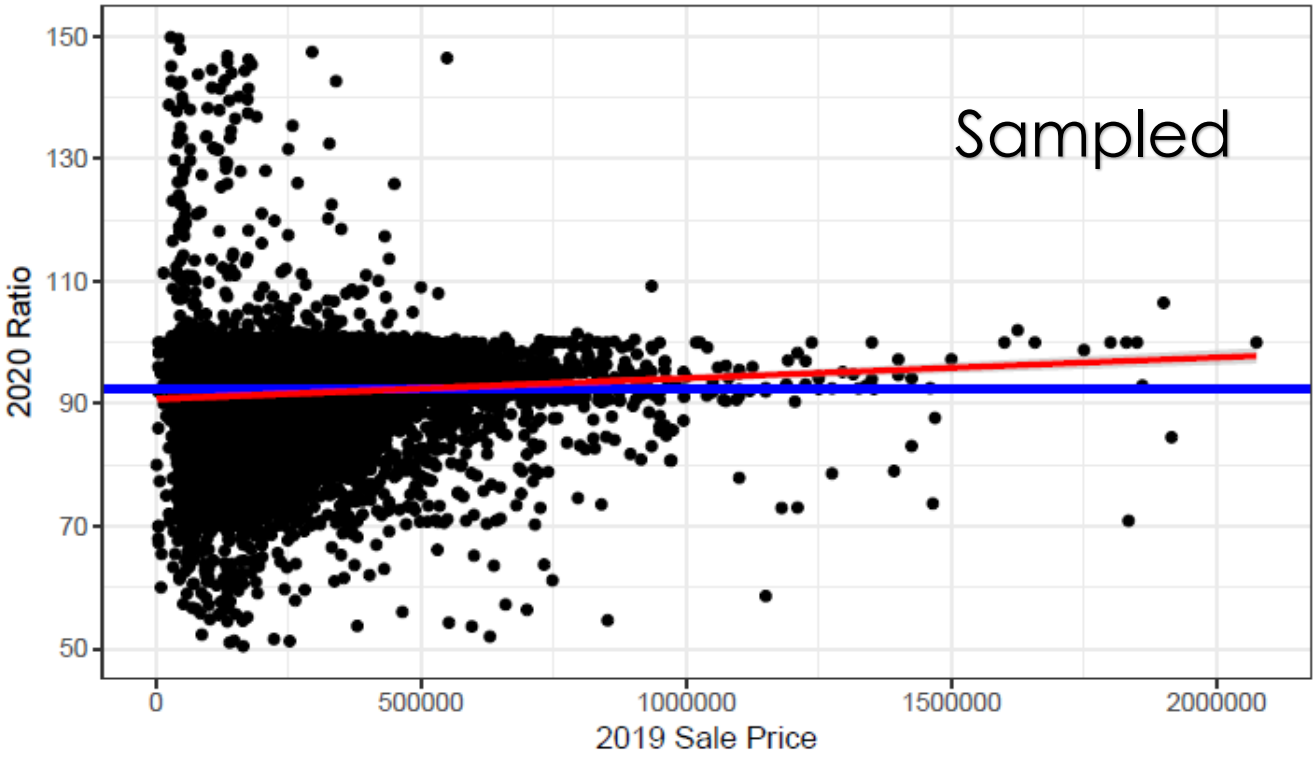


Post-Revaluation



We take a look at the sales data in another way, this time we look at the sale ratio vs. sale price. This allows us to measure how our sale ratios react as sale prices change.

Figure 2: 2019 Sale Price vs 2020 Ratio

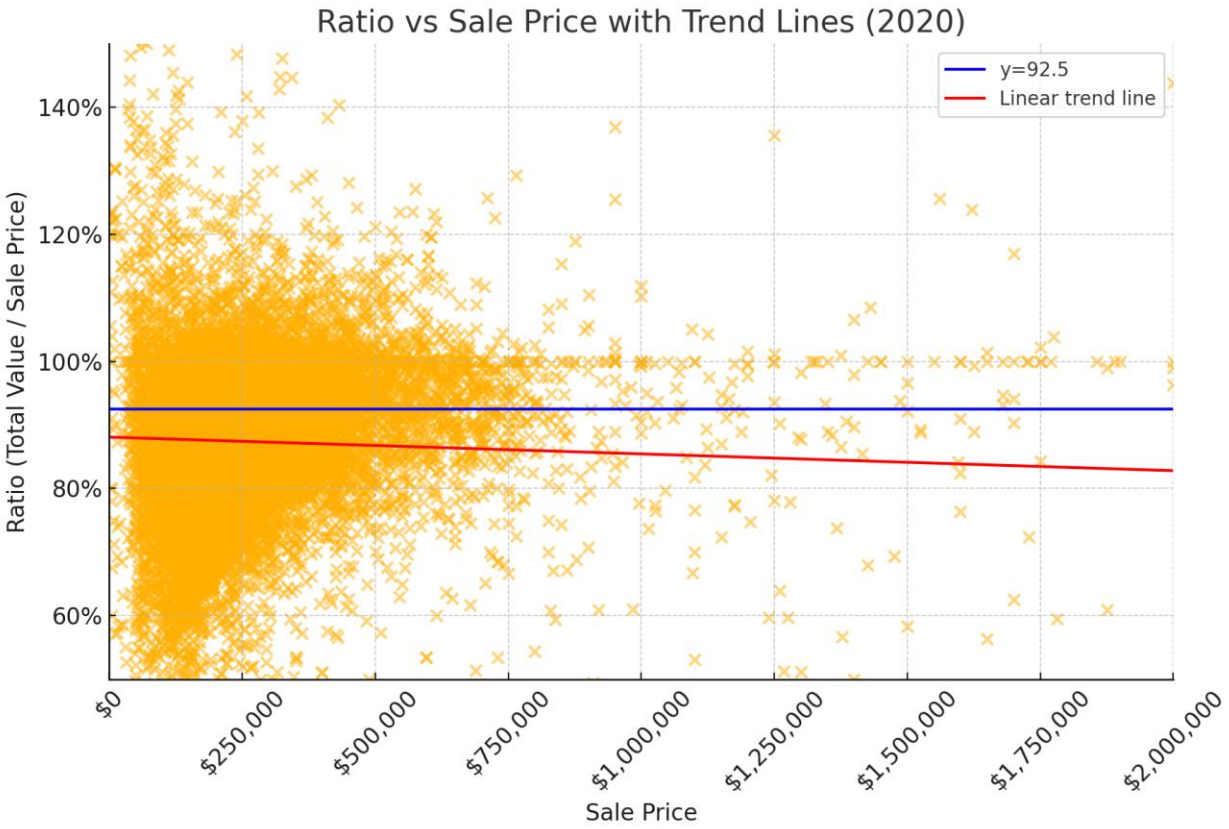


The blue line represents the ideal ratio of 92.5 and the red line is the estimated ratio based on analysis. The positive slope of the red line indicates a very small increase in ratio as 2019 sale price increases.

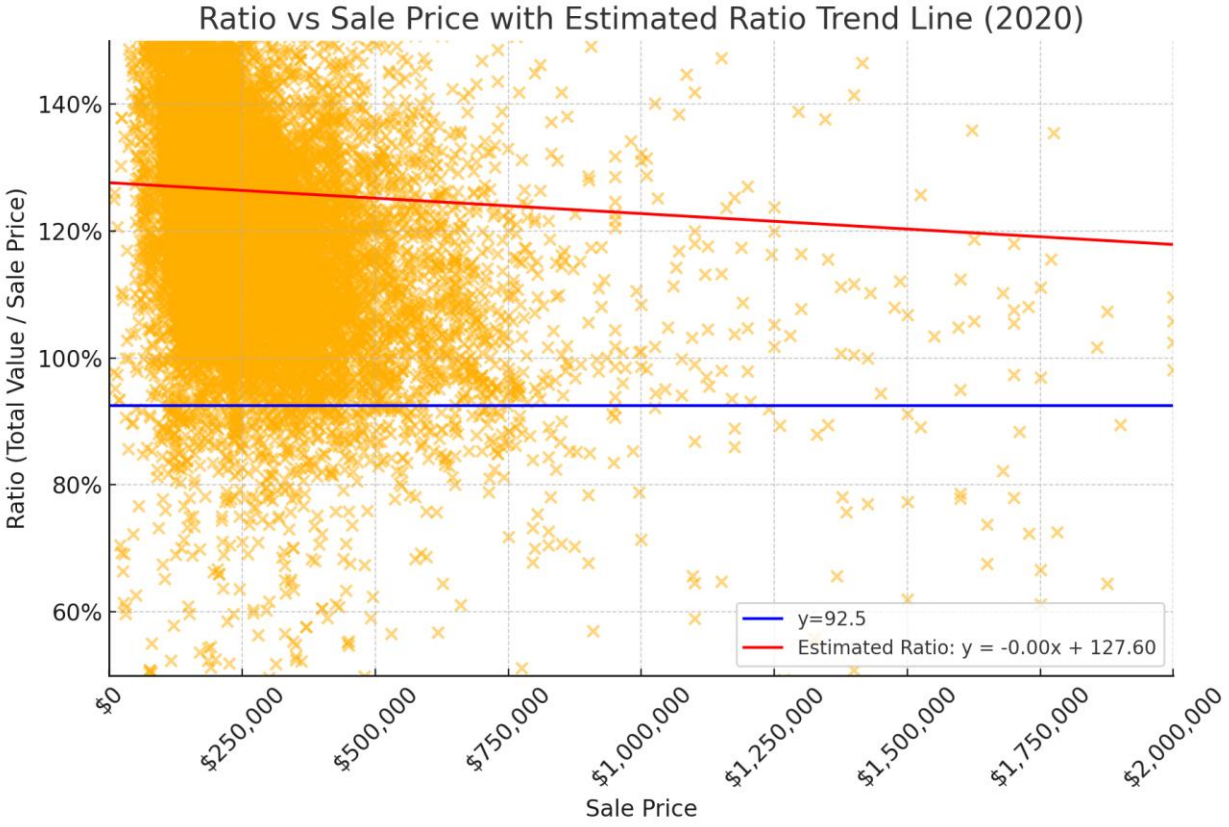
Similar to previous samples, we have extended this study four years, namely 2020-2023. Additionally, we can study the impact that the revaluation had by looking at the before-and-after.

While 2020 sales may seem slightly overvalued with 2024 values, this is to be expected. A booming real-estate market would result in these conditions – the real estate market in central Ohio certainly is a booming market. We see a very similar graph to the above when we look at the 2022 sales, post-reval.

Pre-Revaluation

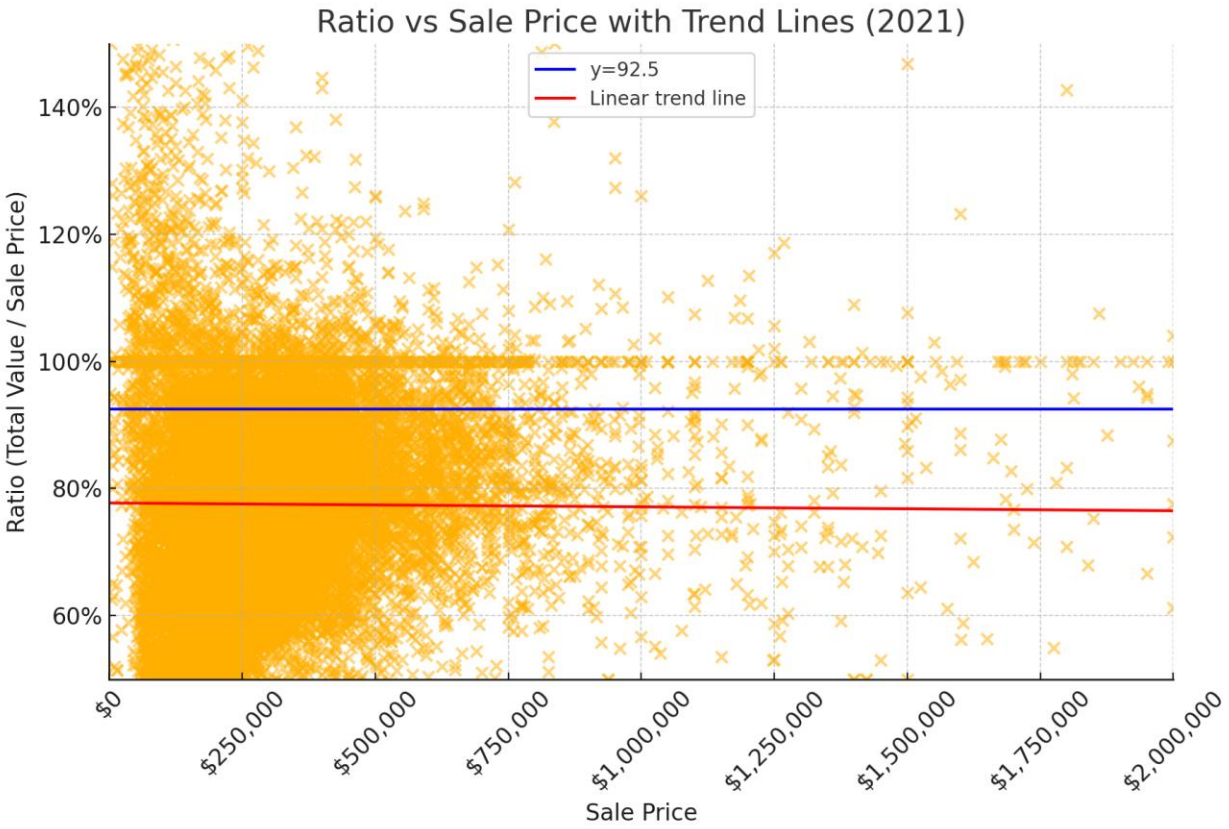


Post-Revaluation

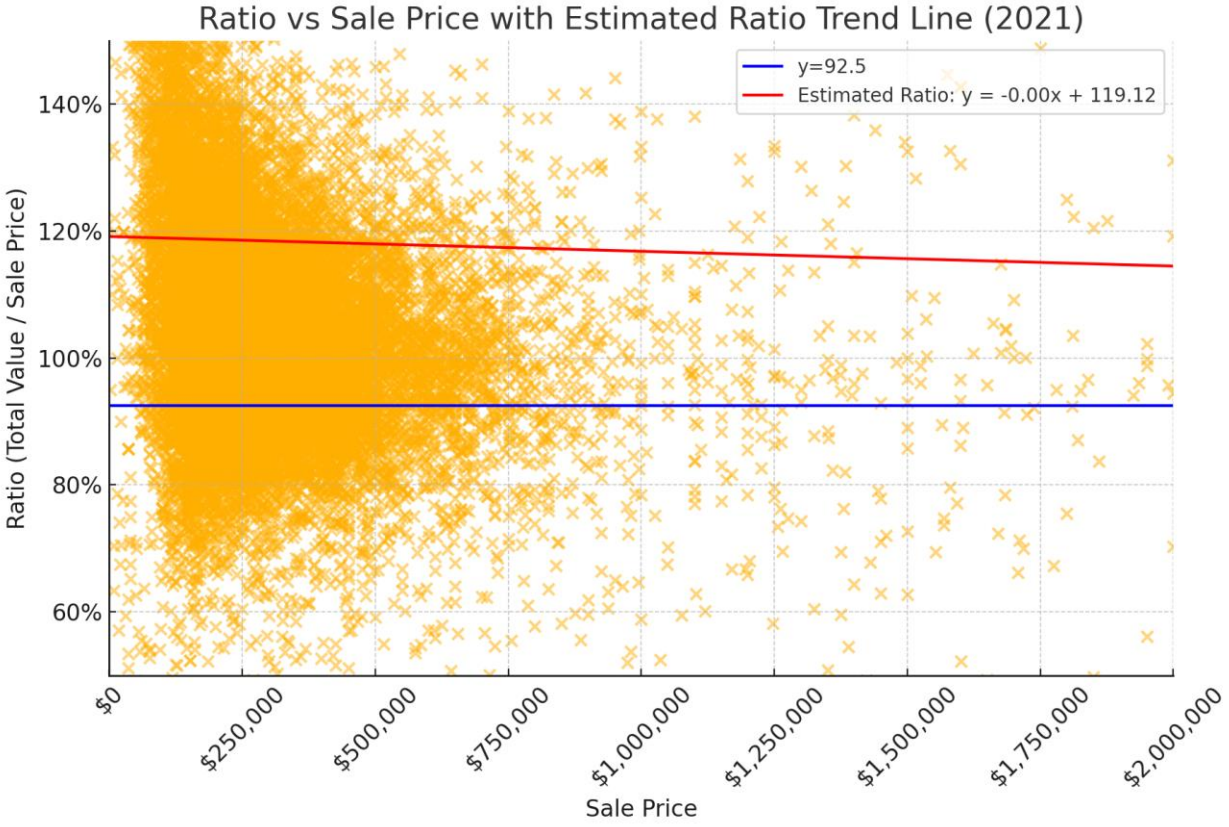


Performance Audit Revisited

Pre-Revaluation

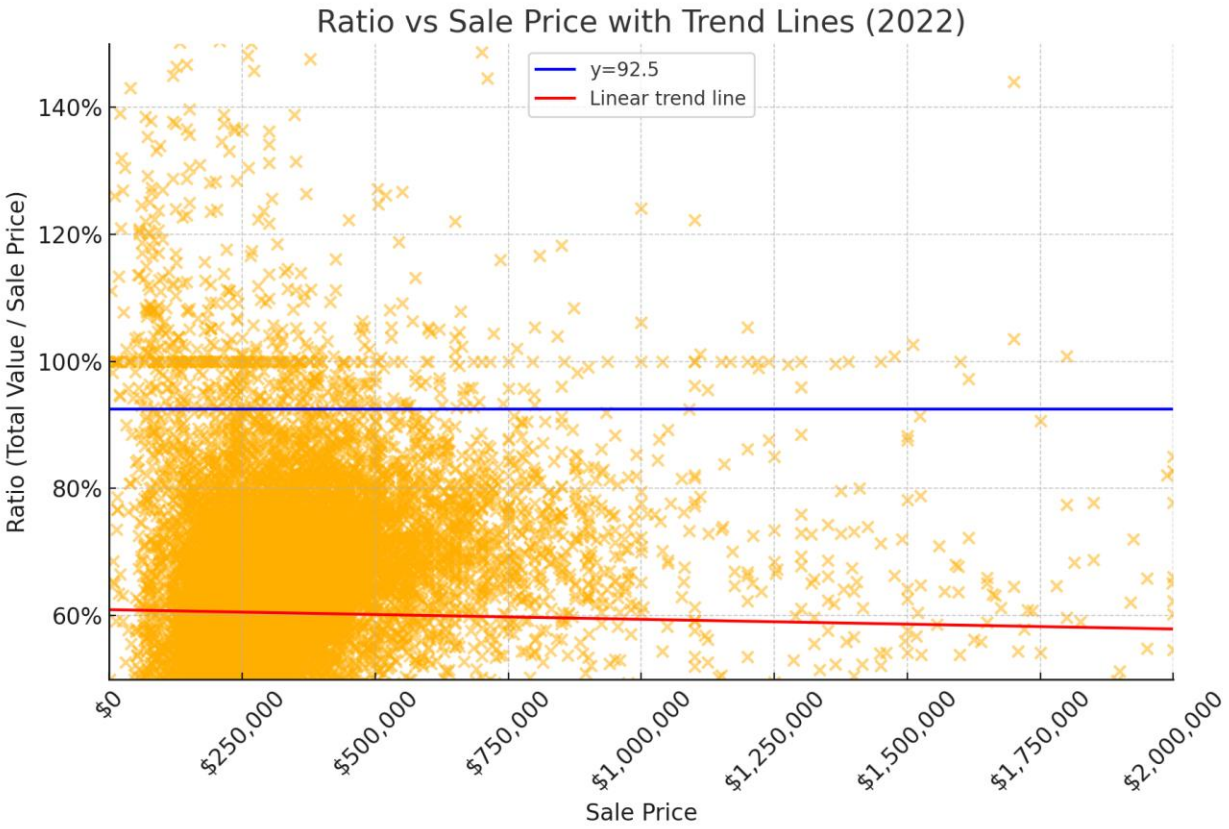


Post-Revaluation

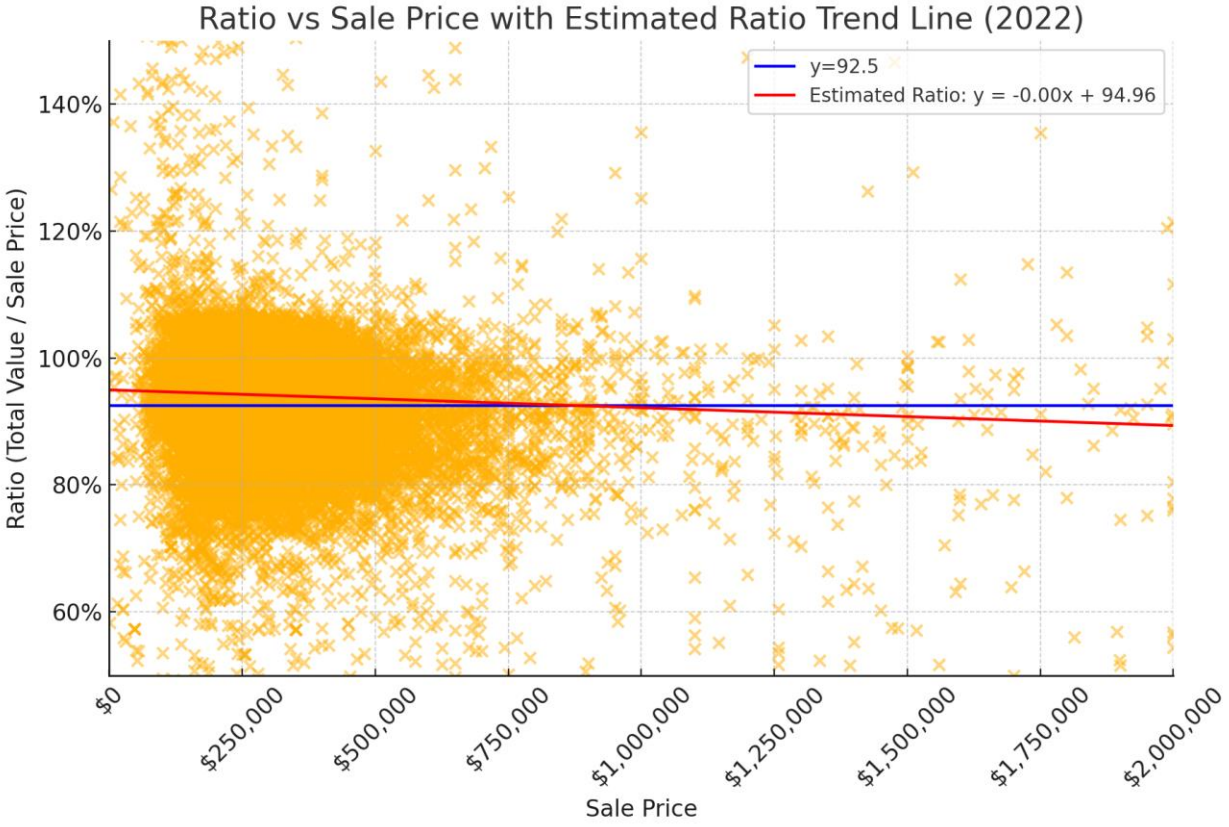


Performance Audit Revisited

Pre-Revaluation

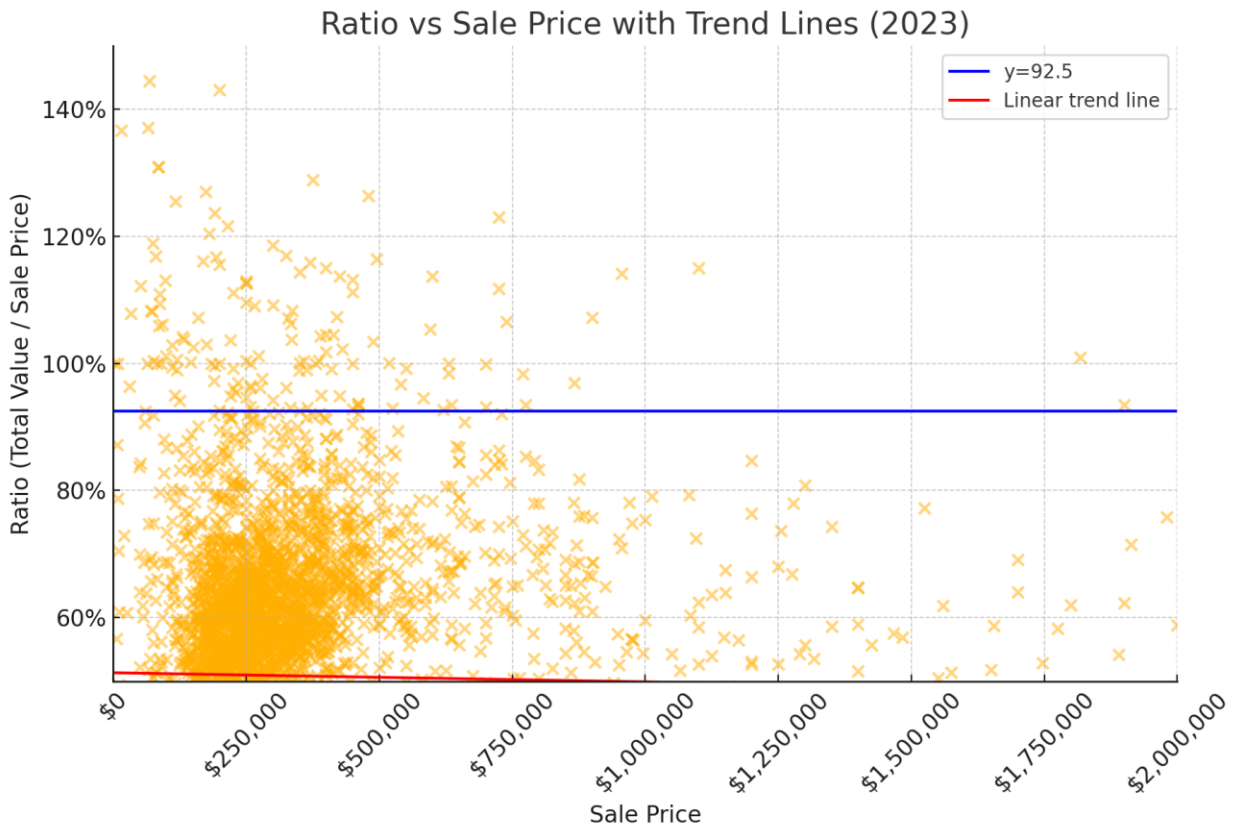


Post-Revaluation

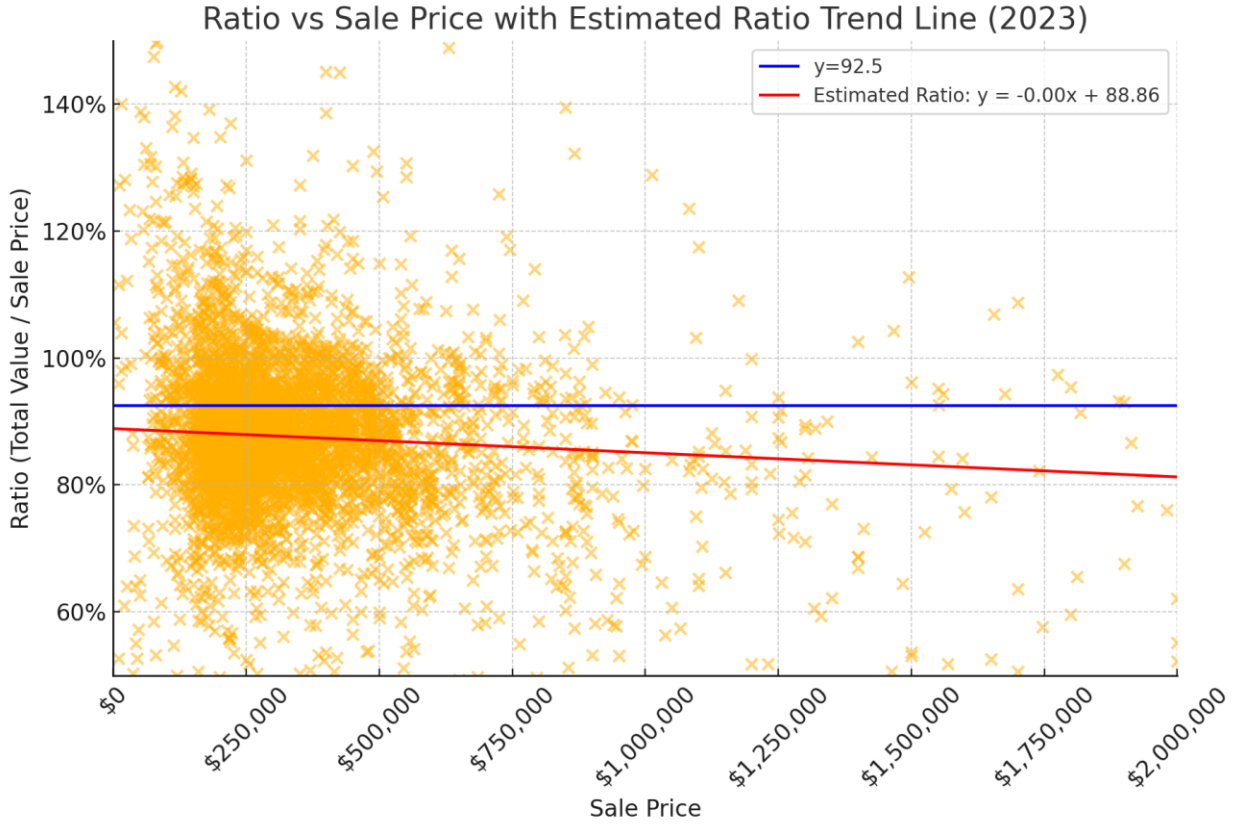


Performance Audit Revisited

Pre-Revaluation

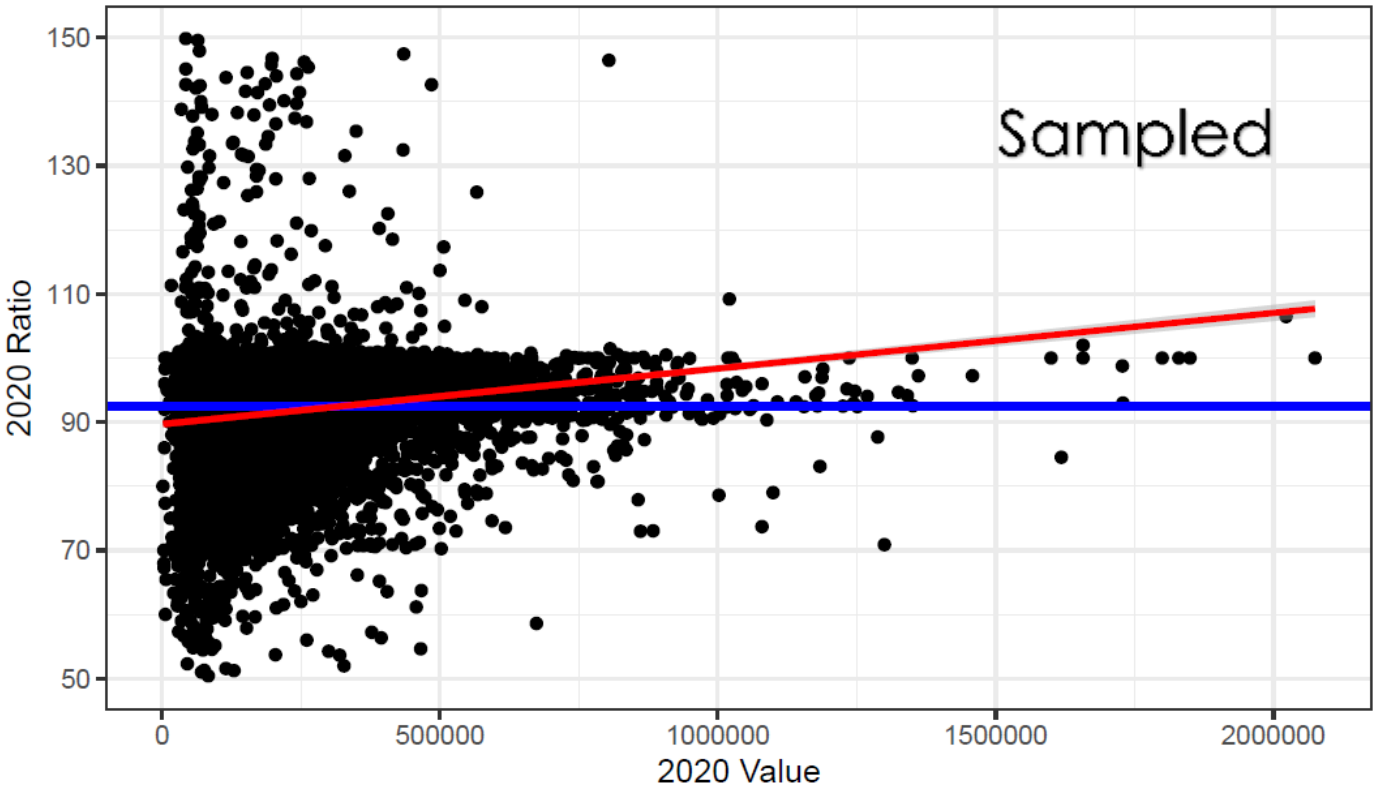


Post-Revaluation



The next sampled graph is similar to the previous but has a key difference. Instead of sale price as our horizontal axis – we look at appraised value. The ultimate goal behind this type of graph is to study vertical equity. How do the ratios behave as we scale the appraised value up or down?:

Figure 3: 2020 Value vs 2020 Ratio

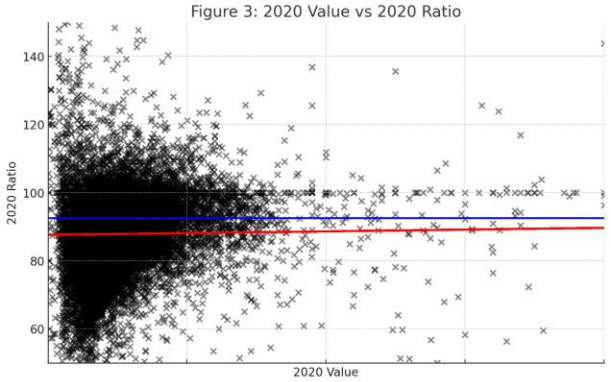


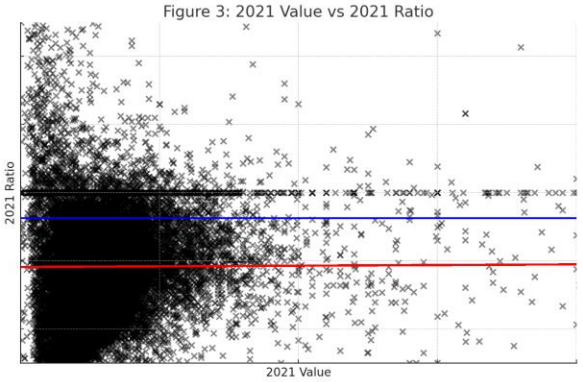
The blue line represents the ideal ratio of 92.5 and the red line is the estimated ratio based on analysis. The positive slope of the red line indicates an increase in ratio as 2020 assessed value increases.

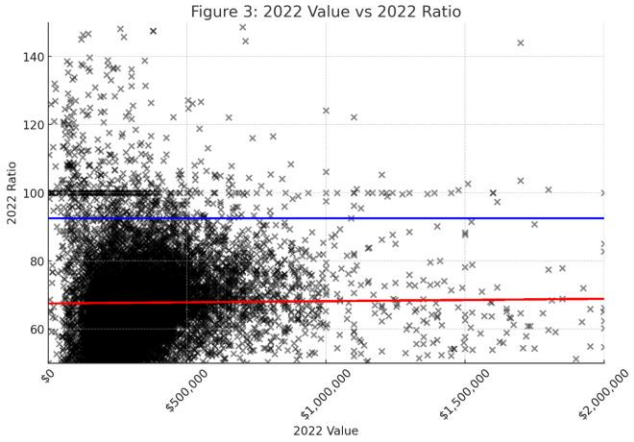
The graphs on the next page are a continuation of this analysis. In particular, the top left graph is most related to the one above. The remaining graphs show both before-and-after for 2020, 2021, 2022, and 2023 sales.

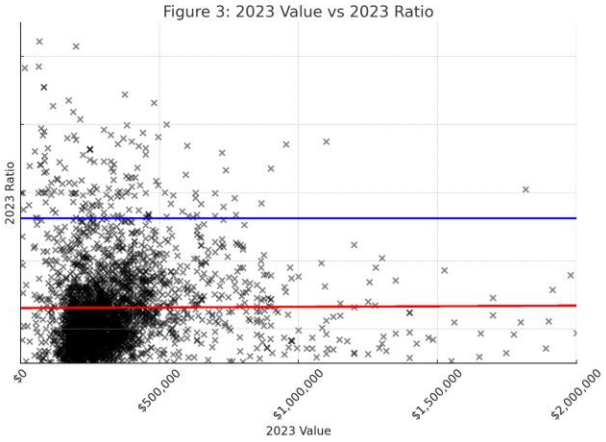
A few things stick out. We can see a band around 100% in the pre-revaluation graphs. This could be indicative of BORs or hearings in which values were set to sale price. Also, noticeable – different sets of sales were used in the production of these graphs. We have extracted all sales and rely on the validity of the sale in CAMA.

Pre-Revaluation

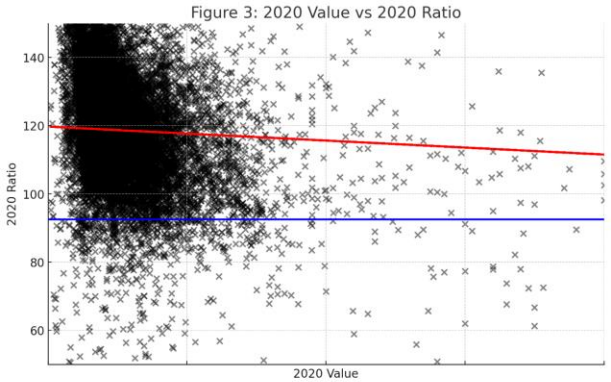


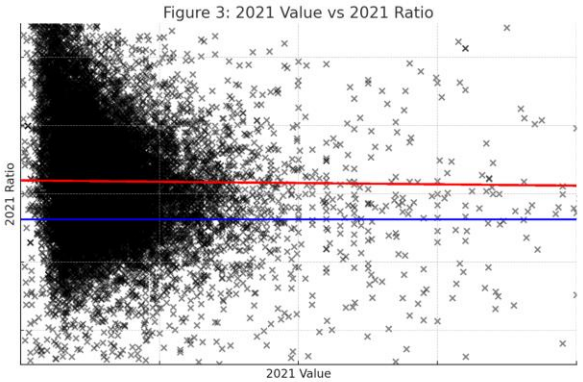


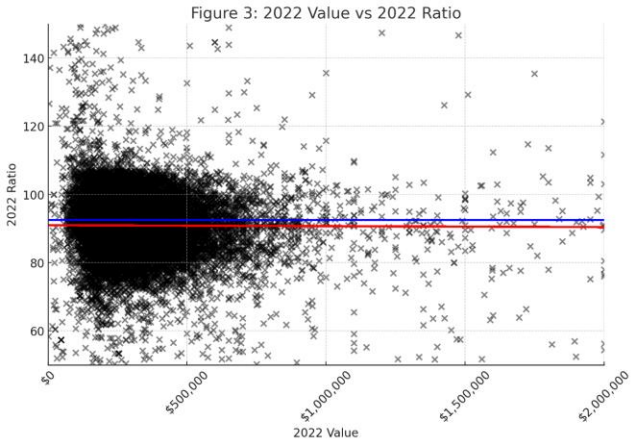


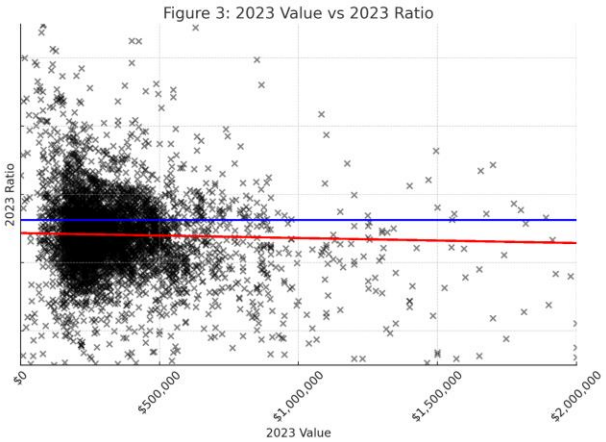


Post-Revaluation









Performance Audit Revisited

We continue our analysis by performing a study on ratios at the neighborhood level. Similar to the previous examples, we will begin by taking a look at the two sampled graphs below that were created, as a performance check, during the last update:

Figure 5: Median Sale Price vs Median Ratio

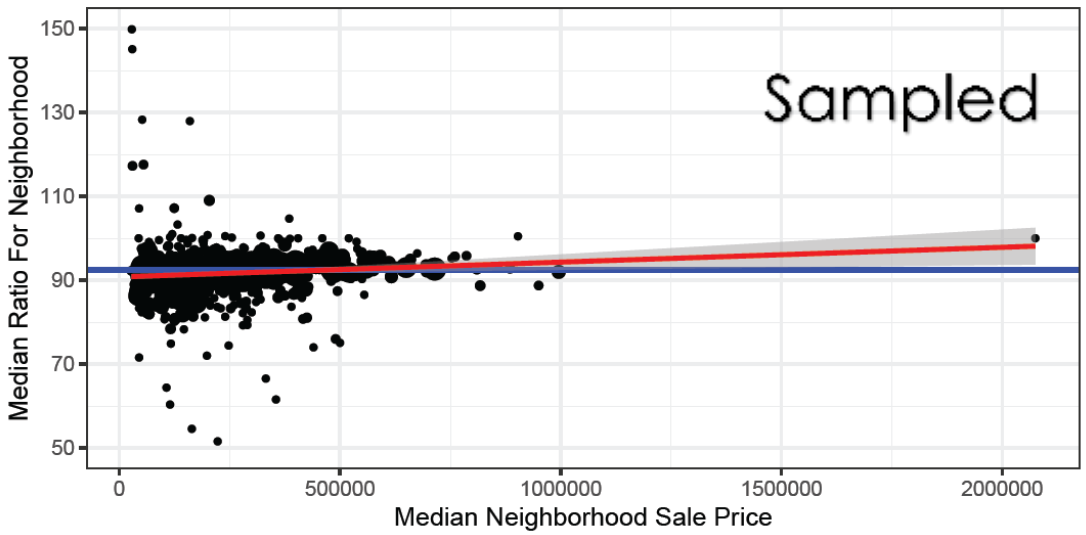
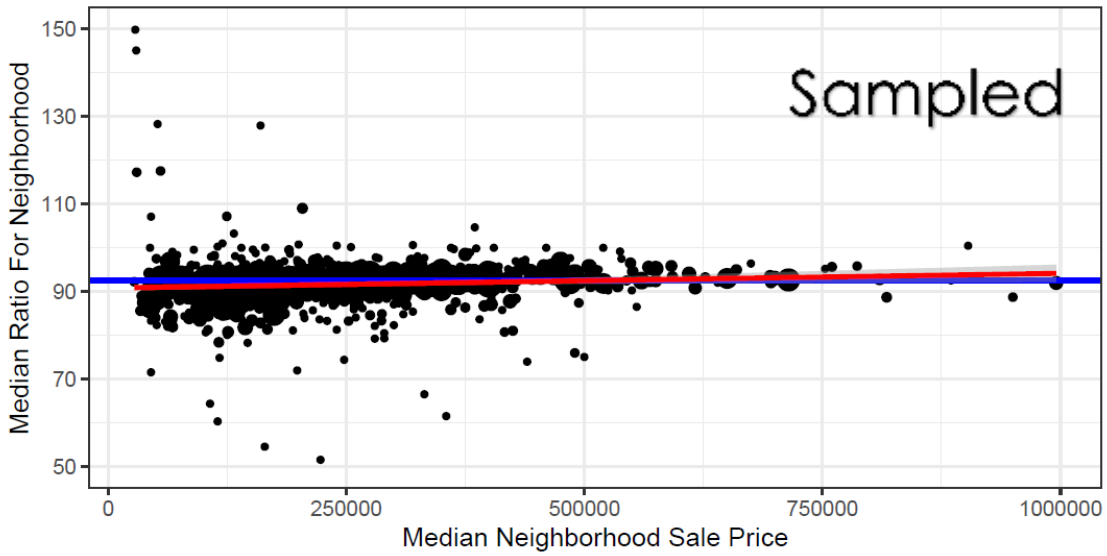


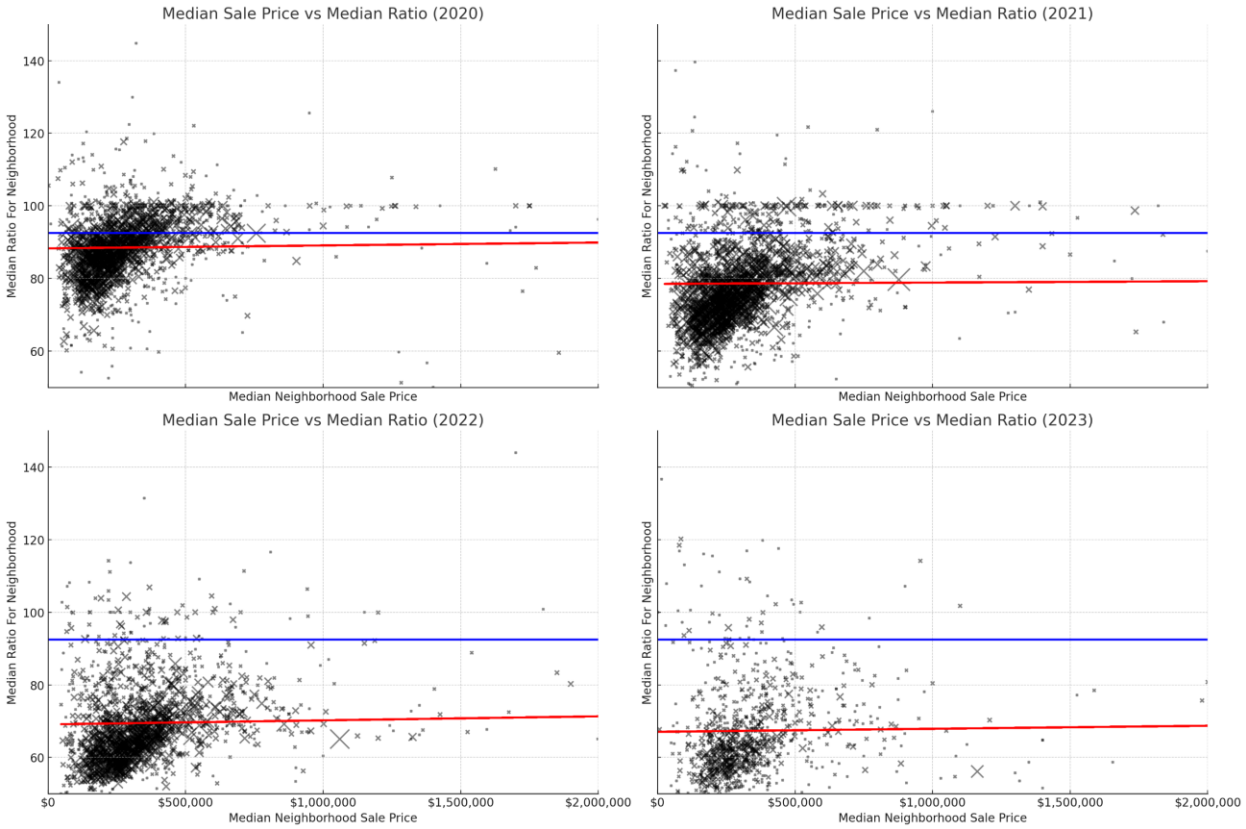
Figure 6: Median Sale Price vs Median Ratio
Excluding Neighborhood With Sale Price > $2,000,000



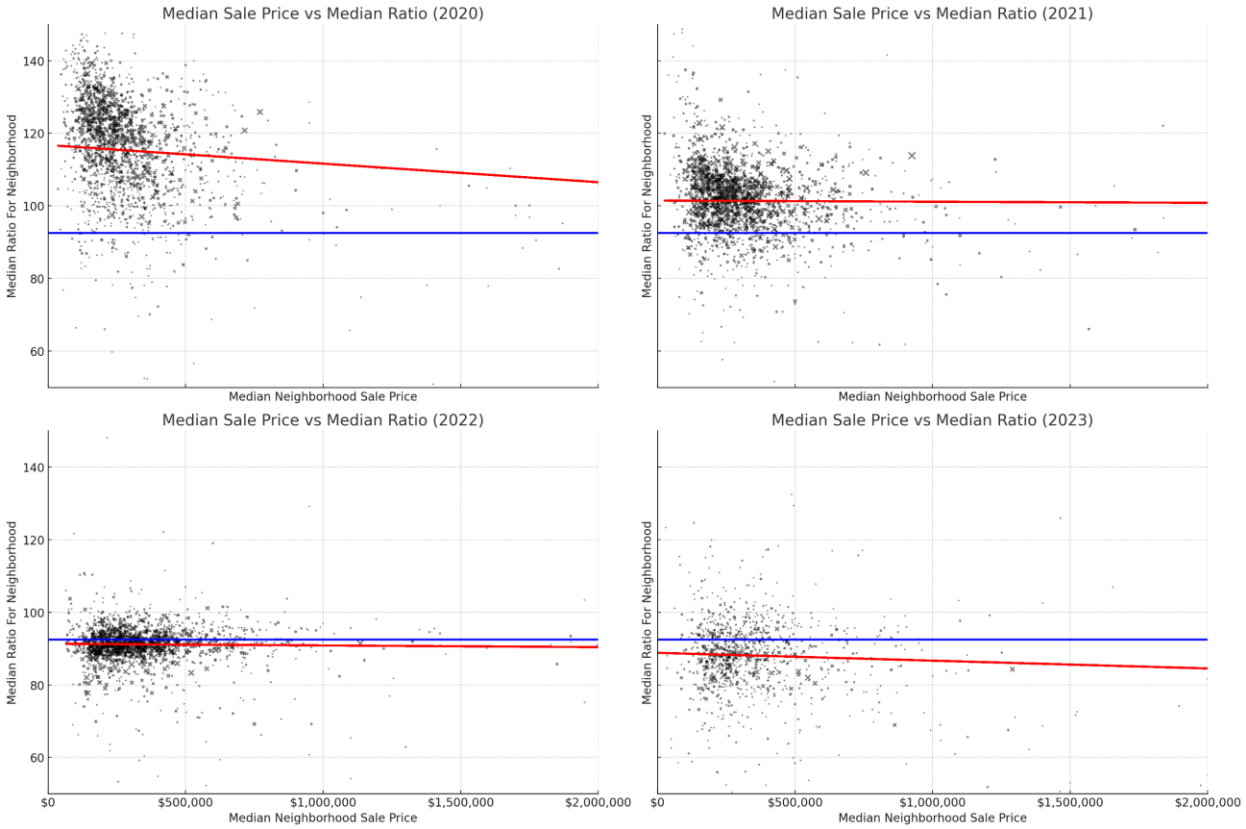
The next two pages take slight creative freedom in the reproduction of the above graphs. Even with adjusted graphs and different sets of sales data, similar trends prove to be true. Horizontal red lines indicate that the sale ratio by neighborhood remains steady as the median sale price in that neighborhood goes up.

Performance Audit Revisited

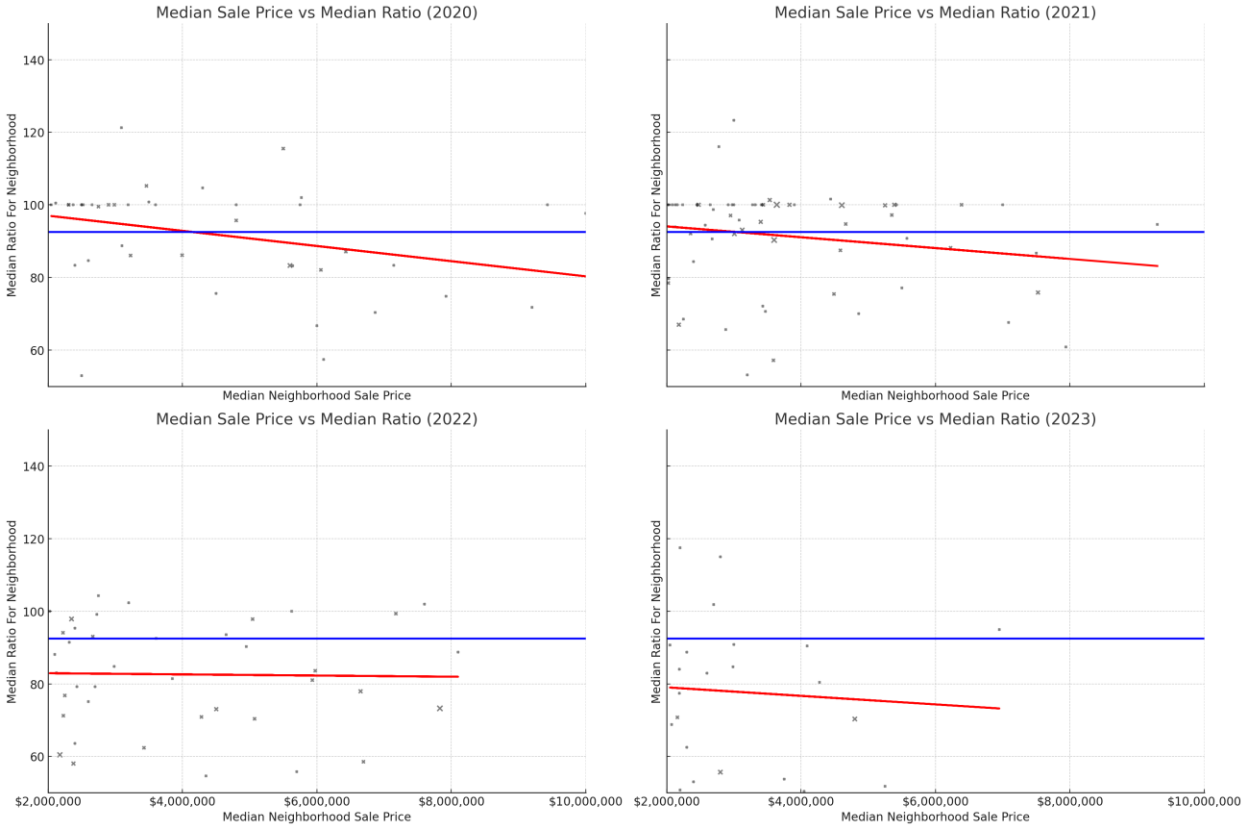
Pre-Revaluation



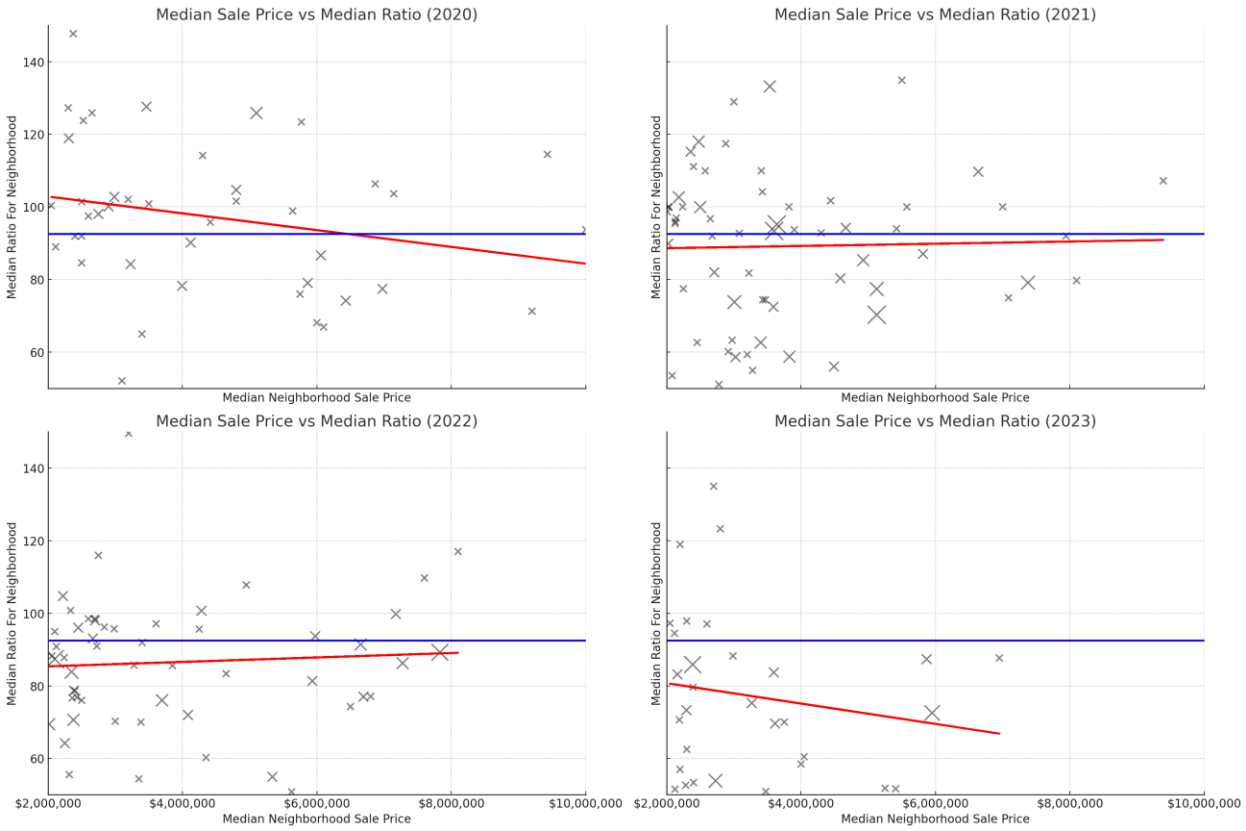
Post-Revaluation



Pre-Revaluation

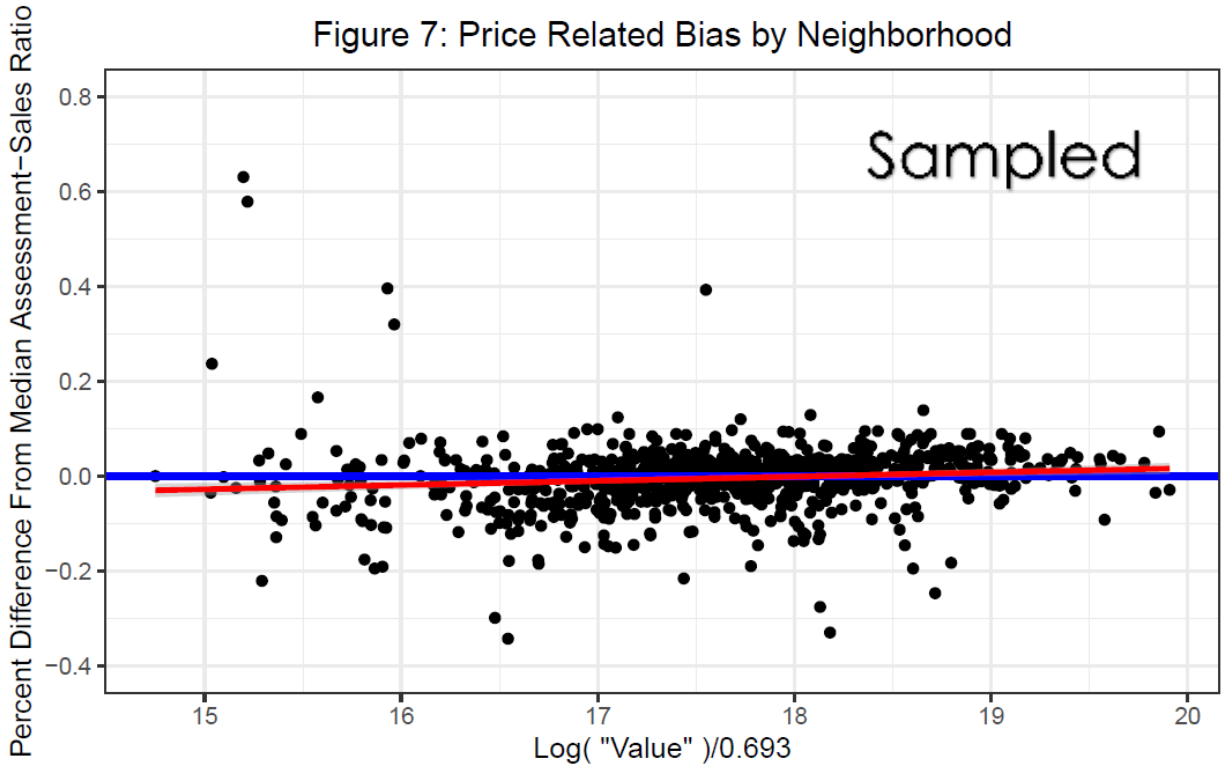


Post-Revaluation



We continue our study with another measure of vertical equity, carrying on a similar theme – neighborhood level.

Figure 7: Price Related Bias by Neighborhood



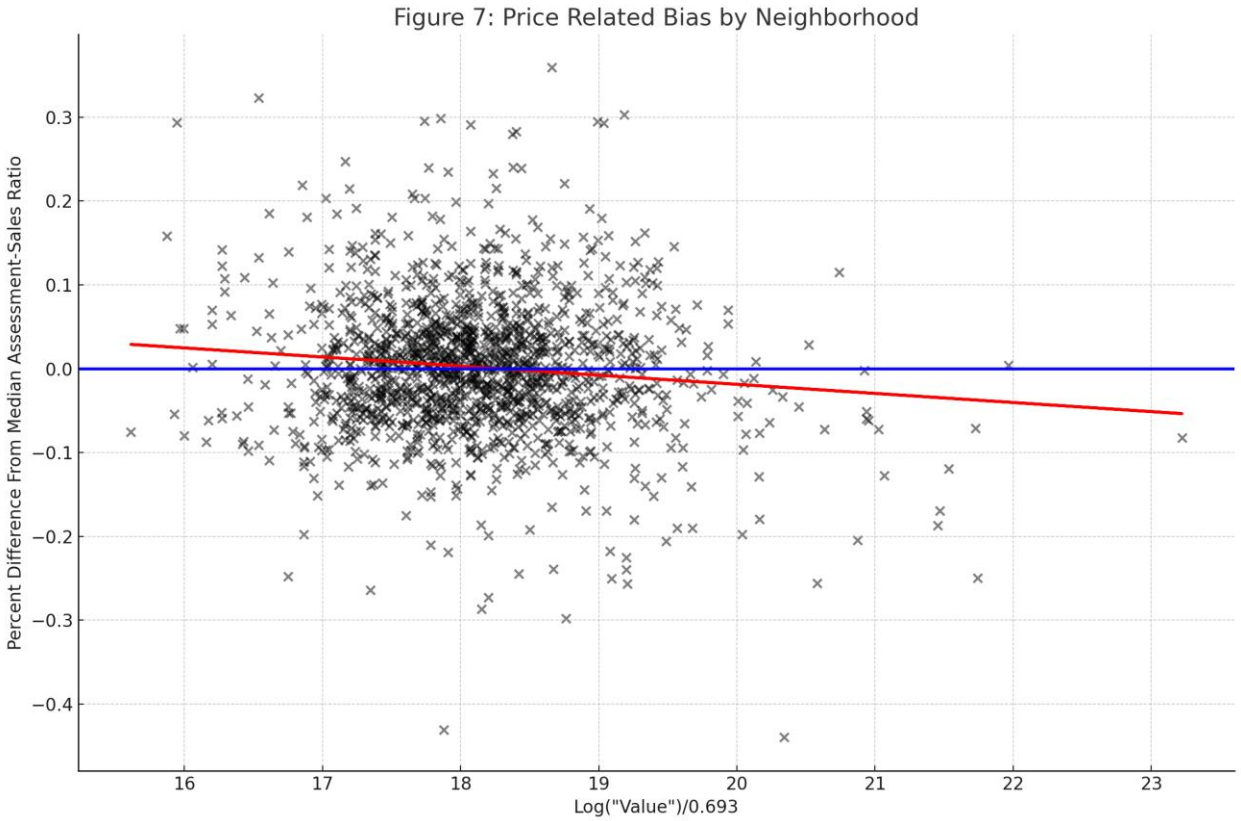
The estimated price related bias is given by the red line which indicates if a parcel value doubles the ratio increases by less than 1%, on average. The blue line represents an ideal situation where there is no bias.

The sampled graph above visually shows us how ratios act when appraised values increase on a logarithmic scale. In particular, this graph is set up to show what happens to sale ratios when values double. We will broaden our sales base to include all single parcel CAMA valid sales in the next two graphs. As shown in the previous examples, we are able to visually see the impact of the 2023 revaluation by taking a look at a before-and-after style analysis.

What we see is a very noticeable improvement. One of the greatest challenges in mass appraisal is maintaining a balanced sale ratio between high- and low-value parcels, which these graphs measure. Sale ratio reports will also capture this progressive/regressive nature numerically, later in this document.

Pre-Revaluation

Post-Revaluation



Performance Audit Revisited

As previously mentioned in the executive summary, the assessment levels for each of the categories shown in the visuals are exemplary.

These visuals help us "see" the data in a new way. While we have examined each slice of data numerically, the insights that visuals provide cannot be understated.

Each individual category or type of property may behave in a unique way. One type of property may experience higher or lower demand or availability, each of which alters our supply-and-demand curve. Market conditions change and evolve over time, and we must be diligent in our efforts to maintain fair and equitable property values.

The visuals shown on the previous pages provide clear evidence that this due diligence has been taken by all parties involved in the 2023 revaluation. The County Auditor, Auditor's Staff, and appraisal team clearly possess a thorough understanding of the key property features that are most appealing to buyers in today's real estate market.

They have skillfully utilized valuation methods that precisely capture these critical factors. Although we aimed to identify any areas where the significance of certain property features might have been undervalued, we found no issues in the results.

The Auditor's office has carefully considered all significant property features, employing techniques that give them the proper consideration. The overall findings of our review, considering various property characteristics, are exceptionally impressive and reassuring.

A brief appendix capturing the numerical data from which the previous plots were generated can be found on the next few pages.

Grade	count	mean	std	min	0.25	0.50	0.75	max
A	206	90.62	9.76	52.42	84.28	91.35	96.74	142.64
A+1	128	93.56	8.01	67.11	89.05	94.04	98.22	125.37
A+2	69	91.07	8.48	56.30	87.11	91.61	96.70	105.26
A-1	170	92.96	7.55	79.42	87.85	92.72	97.07	129.97
AA	30	92.96	11.00	57.39	89.89	95.99	99.81	104.85
AA-	21	93.05	12.04	76.00	86.24	91.15	101.86	126.22
B	722	91.67	8.11	51.68	87.23	92.13	96.99	128.06
B+1	524	91.62	7.33	54.73	87.32	91.60	95.87	118.63
B+2	463	93.11	8.26	64.94	88.37	92.89	97.48	148.09
B-1	478	91.92	8.05	59.91	86.56	91.78	97.60	119.62
C	5269	90.98	8.87	51.50	85.69	91.03	96.32	149.71
C+1	2225	91.05	7.86	51.48	86.24	90.90	95.82	144.89
C+2	1467	90.70	8.43	53.26	85.96	91.20	95.92	148.95
C-1	2441	90.67	9.46	50.32	85.02	90.41	96.10	148.96
C-2	664	90.58	11.04	51.94	83.82	90.00	96.92	139.67
D	133	89.94	11.38	52.24	85.06	90.09	95.42	143.60
D+1	228	89.23	14.31	53.32	80.59	88.03	95.34	149.83
D+2	582	88.12	11.09	50.29	81.11	88.02	94.52	141.53
D-1	16	88.80	11.52	53.19	82.64	92.37	96.40	99.74
not in data	624	87.52	21.05	50.20	70.87	90.94	98.44	149.60

Condition	count	mean	std	min	25%	50%	75%	max
AV	11329	91.14	8.62	51.48	85.89	91.17	96.48	148.96
EX	123	85.42	12.29	52.42	78.07	85.99	94.61	106.27
FR	1070	90.71	11.26	50.29	85.45	91.34	97.34	148.30
GD	2691	91.06	9.28	52.69	85.68	90.76	96.10	149.83
PR	34	92.39	8.40	69.00	88.92	92.85	99.01	107.47
VG	588	88.19	9.51	54.21	82.93	88.81	93.34	148.09
VP	9	85.69	16.43	53.82	81.43	86.25	100.00	100.97

Story Height	count	mean	std	min	25%	50%	75%	max
1	6893	90.10	9.15	50.29	84.44	90.11	95.53	148.96
1.1	17	93.23	7.48	75.10	92.47	93.94	97.78	103.09
1.4	13	89.29	8.13	76.72	85.63	88.91	95.44	102.32
1.5	350	90.16	10.69	51.94	84.14	90.74	96.51	147.15
2	8422	91.63	8.82	50.32	86.68	91.71	96.82	149.83
2.5	13	95.51	9.42	82.36	90.66	95.23	101.41	111.76
3	129	92.73	8.54	63.56	87.94	94.27	98.62	109.76

LUC	count	mean	std	min	25%	50%	75%	max
500	49	80.65	19.61	52.31	61.33	80.60	94.22	137.14
510	11832	90.71	9.03	50.29	85.05	90.76	96.30	149.83
511	249	89.75	12.43	53.26	82.15	89.93	97.34	148.53
520	396	87.65	12.34	50.32	81.00	87.73	94.54	148.30
530	23	89.57	11.88	67.53	81.95	86.26	100.12	105.43
550	3115	92.30	7.50	51.48	88.13	91.94	96.40	148.09
551	84	93.49	7.93	65.93	88.32	93.88	98.11	110.54
552	47	90.00	9.83	62.36	87.64	90.69	96.46	104.17
553	13	97.57	3.05	92.44	96.93	97.93	99.19	102.67
585	6	99.38	5.15	91.22	96.88	99.96	103.07	105.20
599	10	94.07	33.79	54.73	63.42	91.91	116.16	144.61

Class	count	mean	std	min	25%	50%	75%	max
A	9	92.15	15.21	53.46	91.97	98.40	99.47	103.64
C	541	88.31	20.79	50.20	72.62	91.79	99.26	149.60
E	19	91.48	16.92	58.63	82.75	90.61	98.98	141.50
I	51	83.90	21.88	50.51	65.72	80.12	97.76	135.41
R	15849	90.92	9.08	50.29	85.65	90.99	96.35	149.83

Year Built Bin	count	mean	std	min	25%	50%	75%	max
Before 1900	544	89.60	12.53	50.32	82.00	90.07	96.88	143.01
1901-1925	987	90.17	12.07	51.50	83.24	90.61	97.47	149.83
1926-1950	1294	89.75	11.00	50.48	83.21	89.81	96.26	147.15
1951-1975	4234	90.73	9.23	50.29	84.76	90.65	96.47	148.53
1976-2000	4548	91.21	7.41	53.81	86.63	91.24	95.70	148.96
2001-2023	4238	91.59	8.32	51.48	86.55	91.44	96.72	144.61

Style	count	mean	std	min	25%	50%	75%	max
01	5133	91.77	8.72	51.50	86.55	91.86	97.15	149.71
02	490	90.55	8.12	60.39	84.94	90.86	95.93	108.52
03	1266	88.78	7.95	53.26	83.19	88.74	93.93	119.04
05	3168	90.08	9.48	50.29	84.13	90.16	95.95	148.96
06	151	88.41	8.57	63.56	82.20	88.39	93.43	116.04
07	353	89.80	12.73	51.68	82.55	90.11	97.81	149.83
08	83	89.61	12.91	63.97	80.50	88.39	96.81	141.94
09	237	92.07	8.50	63.54	87.19	92.43	96.47	142.64
10	1084	89.79	10.27	54.88	83.75	89.35	95.59	147.15
11	97	92.03	7.90	71.14	86.90	91.68	97.77	106.86
12	3259	92.33	7.55	51.48	88.15	92.00	96.47	148.09
13	428	87.97	12.13	50.32	81.57	87.89	95.07	148.30
14	21	88.99	12.04	67.53	80.92	86.26	99.89	105.43
15	16	87.93	23.00	51.94	76.28	90.49	97.66	143.59
16	19	94.19	6.93	83.36	87.82	94.62	100.62	103.38
18	36	91.79	9.07	71.24	84.68	91.54	98.12	110.17

Ohio Land Use Codes

Residential Assignments

500 Residential vacant land
510 Single family dwelling
520 Two family dwelling
530 Three family dwelling
550 Condominium residential unit
560 House trailers or mobile homes affixed to real estate
599 Other residential structures

3rd Digit's Significance

0 Platted Lot
1 Unplatted -0 to 9.99 acres
2 " 10 to 19.99 acres
3 " 20 to 29.99 acres
4 " 30 to 39.99 acres
5 " 40 or more acres

The following graphic can be found online at:

https://codes.ohio.gov/ohio-administrative-code/rule-5703-25-10

Code No. Group	Use
100 to 199 Incl.	Taxable agricultural real property
200 to 299 Incl.	Taxable mineral lands and rights
300 to 399 Incl.	Taxable industrial real property
400 to 499 Incl.	Taxable commercial real property
500 to 599 Incl.	Taxable residential real property
600 to 699 Incl.	Exempt real property
700 to 799 Incl.	Special tax abatements for improvements
800 to 899	Public Utilities

Definitions

Through the analysis of sales ratio reports and other measures, we can identify ways in which we can achieve market value.

Notes on reports:

The previous pages contain a series of sales ratio reports. We have "sliced and diced" the sales data into several different categories. These include variables such as grade, story height, location, etc. While looking at the reports, you may notice 4 statistical measures.

First, the **sales count**. This will tell us how many sales have occurred in that slice during the time frame of the report, in this case, since the last update. The more sales that are in the sample, the more reliable will be the statistics. In areas with less than 5 sales, reliability falls sharply. It is important to keep in mind the number of sales as compared to the total number of parcels in that group.

MSR or Median Sale Ratio – A sale ratio is the ratio of the county value vs. sale price. If a property sells for 100k and has a taxable value of 90k, it will have a 90% sale ratio. When we list all of the ratios of all of the sales in order, the MSR is the sale in the middle. We use the median as it is less prone to be influenced by outliers that may occur in the data. Sale ratios between 89-93 can be considered to be the "low side of right". To capture the heart of the data, sales ratio reports are typically trimmed to include only sales in the 50-150 range. This keeps out sales that are way off the mark when compared to the county listing.

If a certain area (with several sales) shows a ratio of 80%, and we want to achieve 90%, we would have to increase that area by 12.5%. We can find this number by taking Target / Current.

Definitions

COD or coefficient of dispersion – The COD is a measure of horizontal equity. Roughly, it is how spread out the sale ratios are from the median. High COD's (20+) indicate inconsistent values. Low COD's (0-5) indicate sales chasing. A balance between the two extremes (5-20) is desired. This target changes based on the similarity of the homes in the strata.

PRD or price related differential – vertical equity measure. This is a weighted average based on the stratum being studied. Values should range between .98 and 1.03. An appraisal bias such that high-value properties are appraised higher (or lower) than low-value properties in relation to market values. The PRD is similar to a study on sale ratios by price-point, but it is calculated by taking the mean sales ratio and dividing it by the quotient of the sum of appraised values and sum of the sale prices. When we look at the price point strata on the stratified study to follow, we get a clear idea of the vertical equity by studying the PRD across multiple price-points. Further notes on the COD and PRD measures from the IAAO:

Table 1-3. Ratio Study Uniformity Standards indicating acceptable general quality*

Type of property—General	Type of property—Specific	COD Range**
Single-family residential (including residential condominiums)	Newer or more homogeneous areas	5.0 to 10.0
Single-family residential	Older or more heterogeneous areas	5.0 to 15.0
Other residential	Rural, seasonal, recreational, manufactured housing, 2–4 unit family housing	5.0 to 20.0
Income-producing properties	Larger areas represented by large samples	5.0 to 15.0
Income-producing properties	Smaller areas represented by smaller samples	5.0 to 20.0
Vacant land		5.0 to 25.0
Other real and personal property		Varies with local conditions

These types of property are provided for guidance only and may not represent jurisdictional requirements.

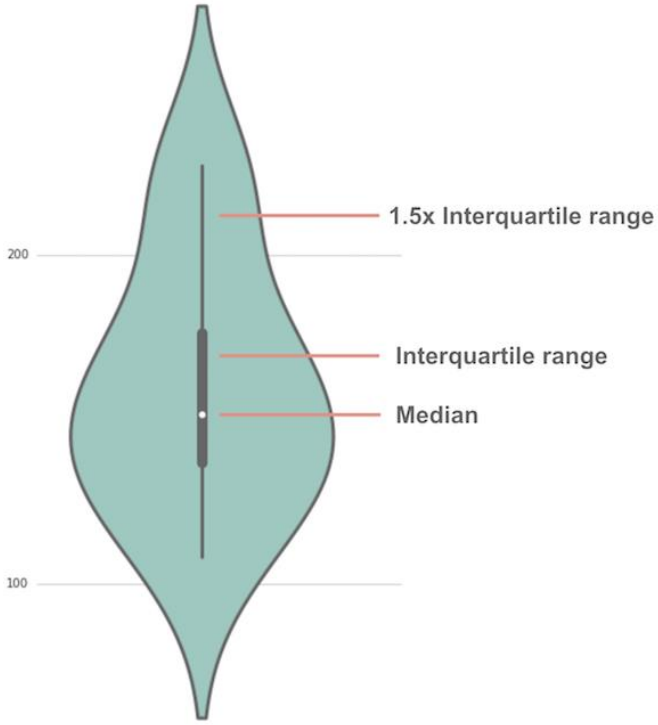
** Appraisal level for each type of property shown should be between 0.90 and 1.10, unless stricter local standards are required.*

PRD's for each type of property should be between 0.98 and 1.03 to demonstrate vertical equity.

PRD standards are not absolute and may be less meaningful when samples are small or when wide variation in prices exist. In such cases, statistical tests of vertical equity hypotheses should be substituted (see table 1-2).

*** CODs lower than 5.0 may indicate sales chasing or non-representative samples.*

Introduction to Violin Plots



A violin plot is a graphical method used to visualize the distribution of numerical data. It combines a box plot with a density plot to provide a detailed summary of the data.

Shape is a key feature of violin plots. The width of the plot at different values shows data density. Wider sections indicate where data points are more concentrated.

Why Use Violin Plots?

Violin plots are useful for visualizing the distribution and density of data, and they are particularly effective for comparing multiple groups side-by-side. They provide a clear picture of where data points are concentrated and can indicate the skewness of the data.

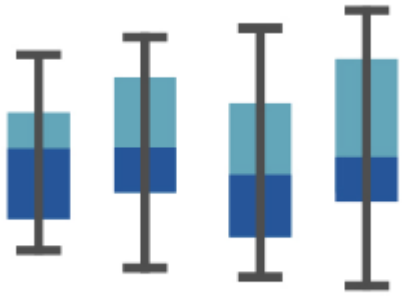
Example

For instance, if we want to compare sale ratios across different eras, a violin plot can show the distribution and density of sale ratios for each period, as well as the median and variability within each period.

Violin plots offer a detailed view of data distribution, making them a valuable tool for understanding and comparing data sets. They help in identifying patterns, trends, and outliers, which are essential for informed decision-making.

Introduction to Box-and-Whisker Plots

Key Components:



Box: Represents the interquartile range (IQR), which is the distance between the first quartile (Q1) and the third quartile (Q3). It contains the middle 50% of the data.

Median Line: A line inside the box indicates the median (Q2) of the data.

Whiskers: Lines extending from the box to the smallest and largest values within 1.5 times the IQR from the first and third quartiles, respectively. These represent the range of the majority of the data.

Outliers: Points outside the whiskers are considered outliers and are often plotted as individual points.

Interpretation:

Box Length: The length of the box (IQR) indicates the spread of the middle 50% of the data. A longer box signifies more variability.

Median Line Position: If the median line is not centered in the box, it indicates skewness in the data. If it's closer to Q1, the data is positively skewed; if closer to Q3, it's negatively skewed.

Whisker Length: The length of the whiskers gives an idea of the variability outside the middle 50%. Longer whiskers indicate more spread in the data.

Outliers: Points outside the whiskers indicate outliers. These are data points that are significantly higher or lower than the rest of the data.

Introduction to Heat Maps

A heat map is a graphical representation of data where individual values are represented as colors. It provides a way to visualize data density and variations across a two-dimensional space. Heat maps are commonly used to display the intensity of data points in a grid format, where the color of each cell indicates the magnitude of the value.

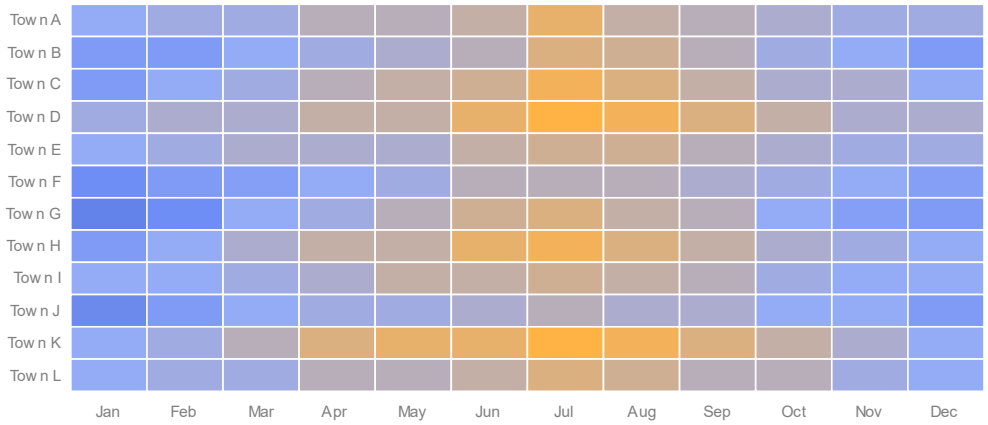
Why Use Heat Maps?

Heat maps are useful for visualizing the distribution and intensity of data. They allow for quick identification of patterns, trends, and anomalies within the data. Heat maps are particularly effective for large datasets where individual data points would be difficult to interpret. By using color gradients, heat maps provide an intuitive way to understand complex data sets.

Example

For instance, if we want to analyze the performance of different regions based on sales data, a heat map can show the intensity of sales across various regions. Each cell in the grid represents a region, with the color indicating the level of sales performance. This helps in quickly identifying regions with high or low sales, making it easier to make informed business decisions.

Heat maps offer a detailed view of data distribution, making them a valuable tool for data analysis. They help in identifying patterns, trends, and outliers, which are essential for understanding and interpreting complex data sets.



Introduction to Histograms

A histogram is a graphical representation of the distribution of numerical data. It displays data using bars of different heights, where each bar groups numbers into ranges. Taller bars show that more data falls in that range.

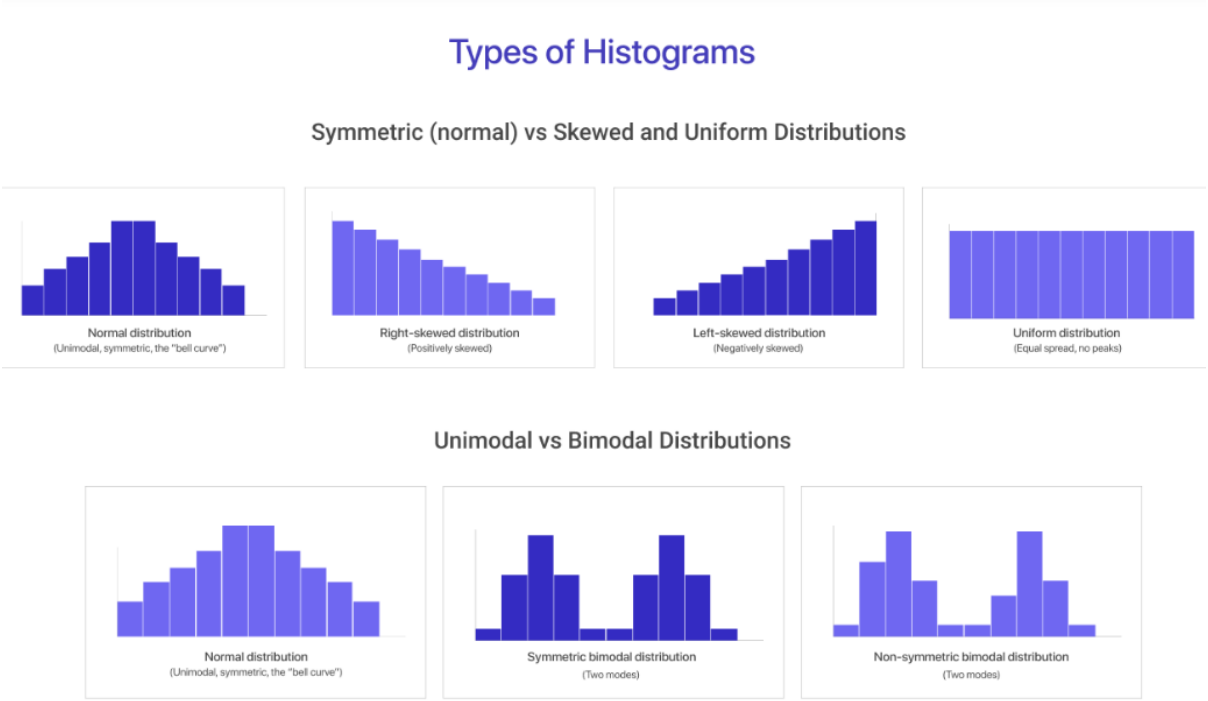
Height is a key feature of histograms. The height of each bar indicates the frequency of data points within that range.

Why Use Histograms?

Histograms are useful for visualizing the distribution of data and identifying patterns, trends, and outliers. They are particularly effective for understanding the shape of the data distribution, whether it is symmetric, skewed, or bimodal.

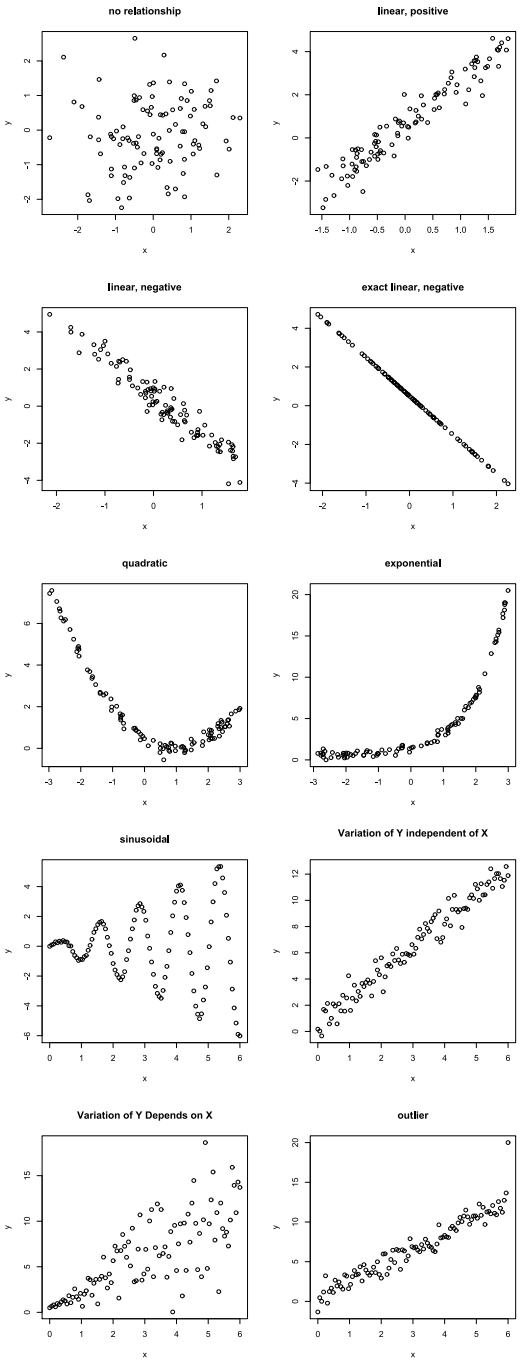
Example

For instance, if we want to compare sale ratios across different periods, a histogram can show the frequency distribution of sale ratios for each period. This helps in understanding how often certain values occur and the overall spread of the data.



Introduction to Scatter Plots

A scatter plot is a graphical representation that uses dots to display values for two different numerical variables. Each dot's position on the horizontal and vertical axes indicates values for an individual data point.



Scatter plots are effective for visualizing the relationship or correlation between two variables.

Why Use Scatter Plots?

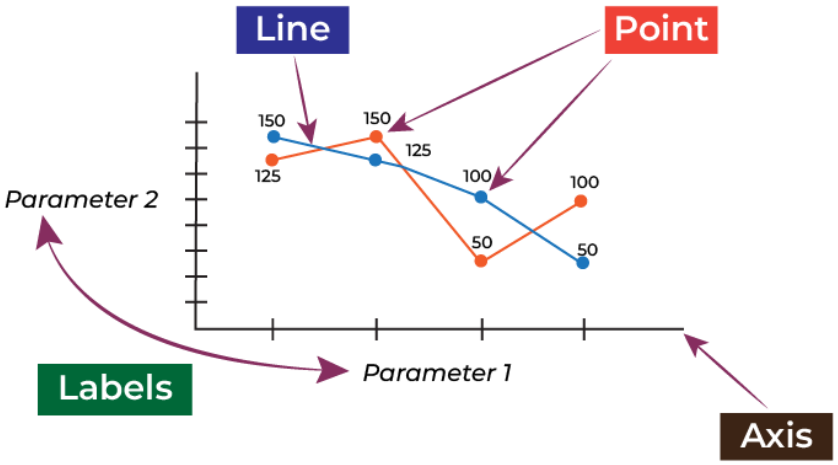
Scatter plots are useful for identifying patterns, trends, and correlations in data. They can reveal relationships between variables, such as positive or negative correlations, clusters, and potential outliers. Scatter plots are particularly effective for comparing large sets of data and exploring complex relationships between variables.

Example

For instance, if we want to compare sale prices and square footage of properties, a scatter plot can show how these two variables are related. Each dot represents a property, with its position on the x-axis showing the square footage and on the y-axis showing the sale price.

Scatter plots offer a clear and concise way to visualize relationships between variables, making them a valuable tool for data analysis and decision-making. They help in identifying trends, clusters, and outliers, which are essential for understanding complex data sets.

Introduction to Line Charts



A line chart is a type of graph that displays information as a series of data points called 'markers' connected by straight line segments. It is a basic type of chart commonly used in many fields to show trends over time.

Why Use Line Charts?

Line charts are useful for visualizing data trends over periods. They are particularly effective for comparing multiple data sets and identifying patterns, trends, and fluctuations. Line charts provide a clear and simple way to observe how data changes over intervals, making them ideal for time-series data analysis.

Example

For instance, if we want to track the stock prices of a company over a year, a line chart can show the daily closing prices. Each point on the chart represents the closing price on a given day, and the line connects these points, revealing the overall trend in the stock price over the year.

Line charts offer an easy-to-understand visual representation of data, making them a valuable tool for analysis and decision-making. They help in identifying trends, making forecasts, and comparing different data sets.

Additional Notes