
Residential Revaluation

Summary Report

2023 Mass Appraisal of All Regions for 2024 Property Taxes

Prepared For
Steven J. Drew
Thurston County Assessor

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Certificate of Appraisal

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

- The statements of fact contained in this report are true and correct.
- The reported analyses, opinions, and conclusions are limited only by the reported assumptions and limiting conditions, and are my personal, impartial, and unbiased professional analysis, opinions, and conclusions.
- I have no present or prospective interest in the property that is the subject of this report, and I have no personal interest with respect to the parties involved.
- I have performed no services, as an appraiser or in any other capacity, regarding the property that is the subject of this report within the three-year period immediately preceding acceptance of this assignment.
- I have no bias with respect to any property that is the subject of this report or to the parties involved with this assignment.
- My engagement in this assignment was not contingent upon developing or reporting predetermined results.
- My compensation for completing this assignment is not contingent upon the reporting of a predetermined value or direction in value that favors the cause of the client, the amount of the value opinion, the attainment of a stipulated result, or the occurrence of a subsequent event directly related to the intended use of this appraisal.
- My analyses, opinions, and conclusions were developed, and this report has been prepared, in conformity with *the Uniform Standards of Professional Appraisal Practice 2020-2021 edition through December 31, 2023*.
- I have not personally inspected all the properties that are the subject of this report. Other appraisers involved in the review of property are listed on the following page.
- No one provided significant analytical assistance to the person(s) signing this certification in the final opinion and conclusions of this report. However, mass appraisal requires a division and specialization of some tasks. I may or may not have been involved in some specific tasks. Although, I did review the conclusions included in this report.

Appraisal Team

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

Physical Inspection:

042 - Senior Appraiser
069 - Senior Appraiser
071 - Senior Appraiser
073 - Senior Appraiser
074 - Senior Appraiser
075 - Senior Appraiser
076 - Appraiser Assistant
077 - Appraiser Assistant
078 - Appraiser Assistant
079 - Senior Appraiser
081 - Senior Appraiser
082 - Appraiser Assistant

Sales Validation:

007 - Appraiser Analyst
035 - Appraiser Analyst
056 - Appraiser Analyst
065 - Appraiser Analyst
072 - Appraiser Analyst
083 - Appraiser Analyst

Land Model Building:

007 - Appraiser Analyst
035 - Appraiser Analyst
056 - Appraiser Analyst
065 - Appraiser Analyst
072 - Appraiser Analyst
083 - Appraiser Analyst

Final Review:

080 - Appraiser Supervisor

MASS APPRAISAL CONCLUSIONS

Appraisal Date: January 1, 2023

Area Name / Number: County Wide all Regional Summary

Physical Inspection: Active Inspections of 18,511 parcels in Region 4

Non-inspected Updates: Non-Inspected Updates 92,426 parcels. Regions 1,2
5,6,7,8,9,10,11,13,14,15,16, 17

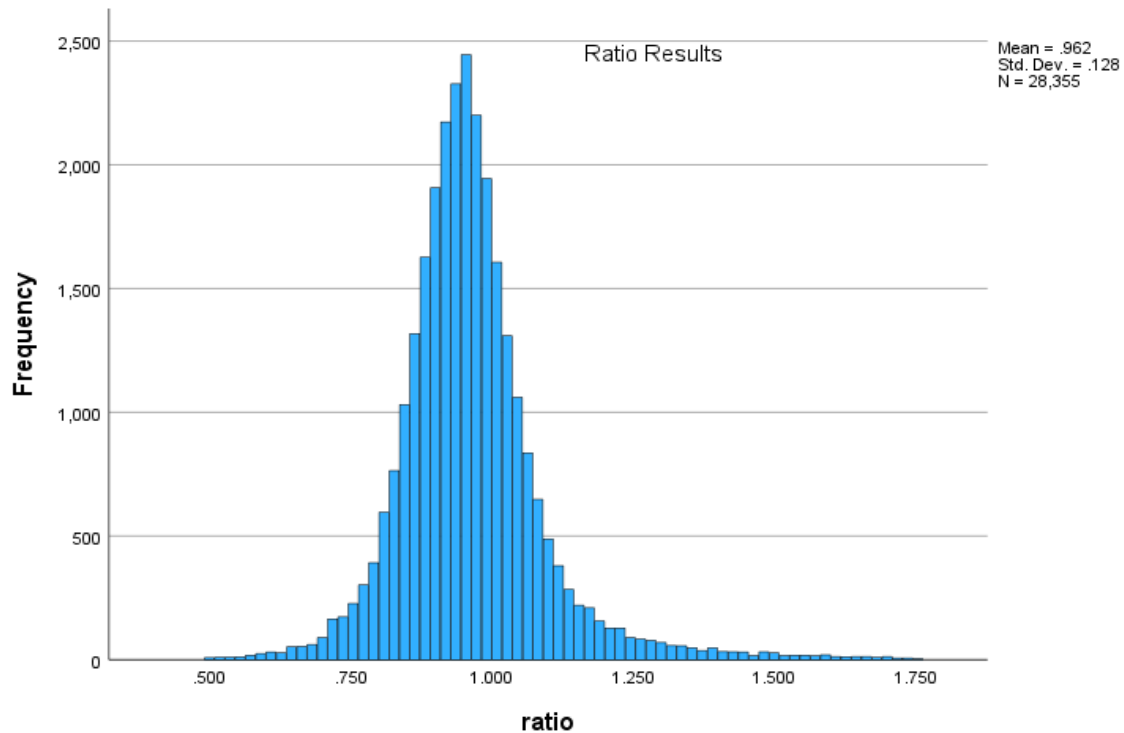
Summary of Regional Sales Ratios

Region	Mean	Median	Weighted Mean	Average Absolute Deviation	Price Related Differential	Coefficient of Dispersion	Coefficient of Variation
2	0.984	0.973	0.969	0.101	1.016	0.104	14.00%
3	0.961	0.953	0.958	0.076	1.003	0.079	11.90%
4	0.966	0.956	0.963	0.102	1.004	0.106	14.60%
5	0.955	0.946	0.946	0.084	1.01	0.089	12.70%
6	0.955	0.945	0.948	0.071	1.008	0.075	10.60%
7	0.978	0.962	0.968	0.084	1.01	0.087	12.80%
8	0.979	0.966	0.969	0.086	1.011	0.089	12.90%
9	0.979	0.957	0.963	0.117	1.017	0.123	17.60%
10	0.972	0.953	0.955	0.118	1.018	0.124	17.60%
11	0.964	0.954	0.96	0.129	1.005	0.136	18.30%
14	0.952	0.946	0.95	0.068	1.002	0.072	10.00%
15	0.952	0.947	0.949	0.047	1.003	0.049	7.00%
16	0.964	0.959	0.96	0.063	1.003	0.066	9.10%
17	0.994	0.98	0.976	0.124	1.019	0.127	17.40%
Overall	0.962	0.951	0.955	0.087	1.007	0.092	13.30%

Sales used in Analysis: Sales used in the analysis are validated following the guidelines laid out in the Sales Verification Procedure. Multi-parcel and multi-building sales are generally excluded as not being representative of this market area. Mobile home, saltwater and condominium sales are analyzed separately for the purpose of appraising these property types. **Listings of the individual sales used in the analysis for any parcel can be found by utilizing the *Parcel Search (A+)* link on the Assessor's website at <http://www.co.thurston.wa.us/Assessor/>.**

Number of Parcels in the Sales Sample: The population of residential vacant land and standard single-family residences in the county over a 5-year period was approximately 28,355 parcels. Adding sales of

manufactured homes, saltwater and condos brings the final sample to 31,818 total sales. Ratios are represented by properties which have not had a change in use.



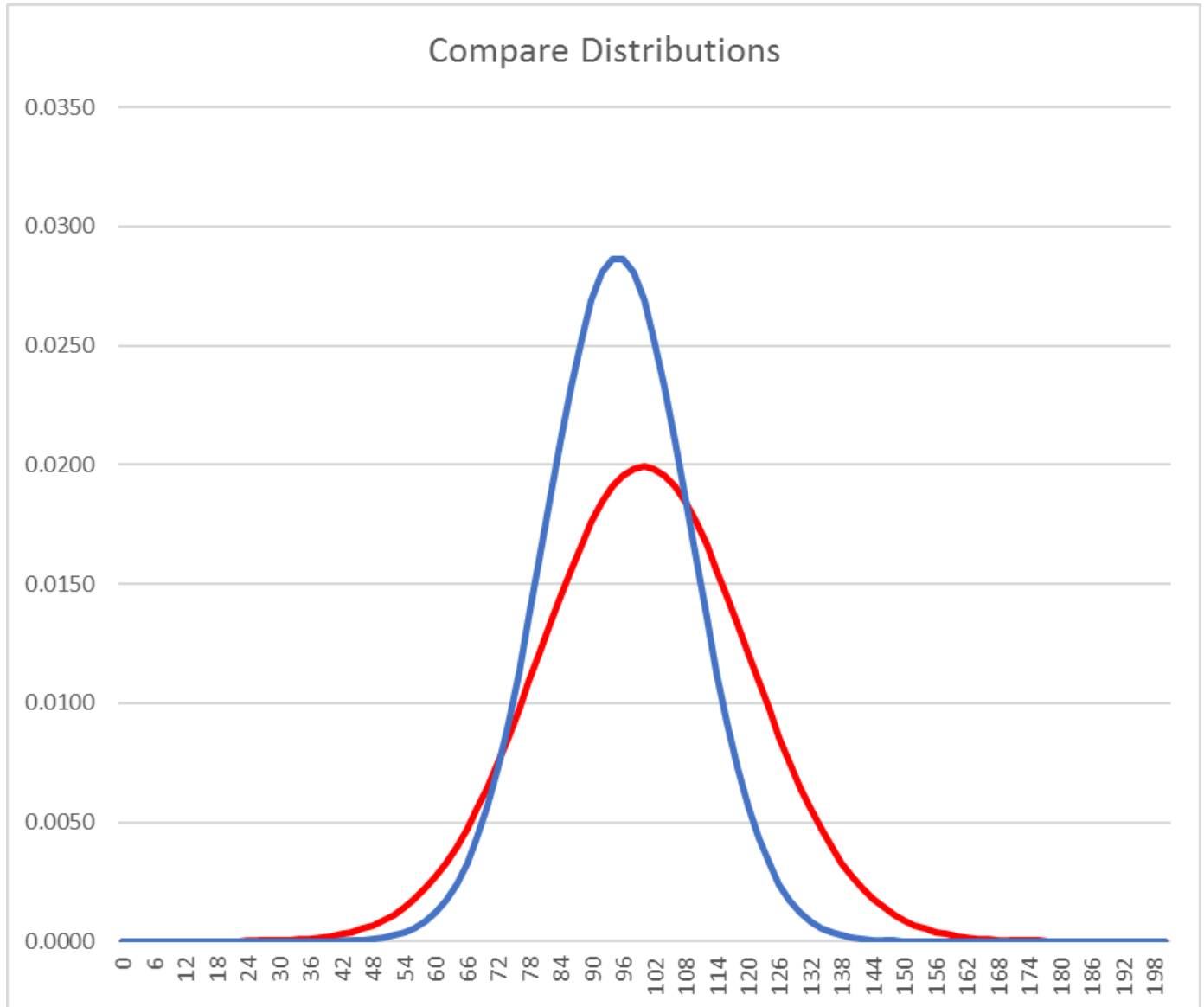
Property Type	Mean	Median	Weighted Mean	Average Absolute Deviation	Price Related Differential	Coefficient of Dispersion
CNU	0.966	0.958	0.955	0.081	1.012	0.084
LND	1.029	0.998	0.972	0.221	1.059	0.221
MOB	0.962	0.938	0.926	0.189	1.04	0.202
RES	0.96	0.95	0.955	0.082	1.005	0.087
Overall	0.962	0.951	0.955	0.09	1.007	0.094

Conclusion and Recommendation: The assessment department has achieved its constitutional and statutory requirements to appraise, on a mass basis, all residential properties at market value. Additionally, the required ratios which represent good quality results per the standards published in the STANDARDS ON RATIO STUDIES 2020 by the International Association of Assessing Officers, has been met.

Since the values recommended in this report improve uniformity, assessment level, and equity, we recommend posting them for the 2024 Tax Roll.

Thurston County's Performance Relative to Standards

The table on the previous page indicates the levels which are considered professionally a representation of the tolerances for best practices. Thurston County has features of both an urban and suburban county, which would indicate that our Coefficient of Dispersion should be between 15 to 20%, extrapolating that a Gaussian distribution would indicate a standard deviation of 20% at the minimum. The chart below is an example of these standards.



CHECK FOR SALES CHASING

So, how do we know if these ratios are honest and correct? If a jurisdiction engages in such a practice, it is called sales chasing. If that occurs, then the validity of their ratios will be false and no conclusion about bias and results can be drawn. There are several methodologies which appraisal practices permit and are outlined in IAAO Standard of Ratio Studies published in 2013. One of the most common methods is to check the average change in value between sold and unsold properties. If adjustments are properly applied between these two groups with near the same mean, the distribution should be similar.

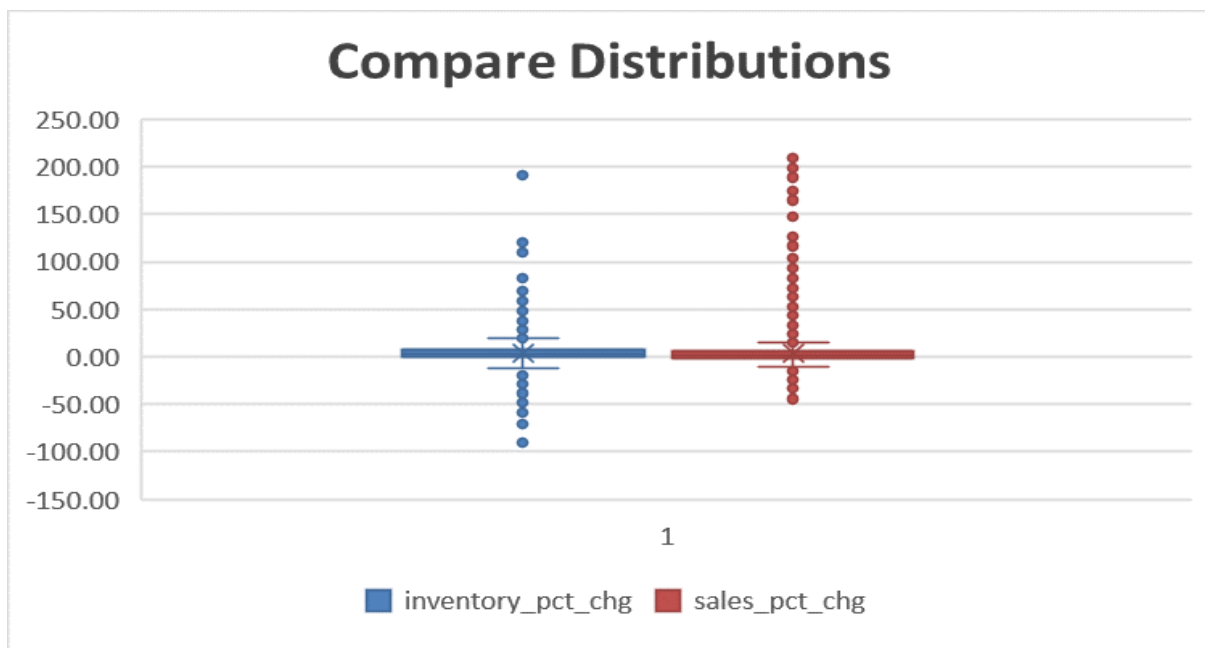
This is accomplished by drawing a RANDOM sample of properties which have sold in the last five years and another RANDOM sample of properties which have not sold (without replacement of the observation). The sample size was about 30,113 for sold properties and 11,207 inventory parcels that have not had a sale in 5 years, no use change or addition.

To strongly quote IAAO Standards on Ratio Studies, page 59:

“Statistical significance in the absence of practical significance may be moot. In large samples, small differences in the magnitude of assessed value changes on sold and unsold parcels can be proven to be statistically significant, yet the actual difference may be slight. Therefore, it is prudent to establish some reasonable tolerance, such as 3 percentage [difference]...before concluding that a meaningful problem exists.”

The summary statistics are indicated in the table below and the distributions of these samples are exhibited in the following chart.

Percentage Change in Value		
	Mean	Std. Dev
Inventory	4.1	11.1
Sales	3.5	10.1



PREMISE OF THE APPRAISAL

Supporting Documents Used in the Mass Appraisal

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

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

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

The Appraisal Standards Board of the Appraisal Foundation biennially publishes *the Uniform Standards of Professional Appraisal Practice* (USPAP). This cycle is subject to the 2020-2021 edition and the recent updates for the 2016-2017. These standards are written by appraisers to regulate their profession and are the minimum standards for the conduct of property appraisal in the United States. They cover real, personal, and business property. We rely upon these standards in the development and reporting of our assessed values.

¹ USPAP, Appraisal Standards Board of the Appraisal Foundation, p. 3

CLIENT AND INTENDED USERS

This report was prepared for **Steven J. Drew, Thurston County Assessor.**

The primary intended users are the governing board and levy authority for:

Thurston County
Thurston County Roads
Timberland Regional Library
Medic One
Port of Olympia
PUD 1
Washington State Schools
Washington State Schools 2
Conservation Futures
Tanglewilde Park District
Tumwater Metropolitan Park District
Olympia Metropolitan Park District
North Thurston SD 3
Olympia SD 111
Rainier SD 307
Rochester SD 401
Tenino SD 402
Tumwater SD 33
Yelm SD 2
Centralia SD 401-L
Griffin SD 324
Town of Bucoda
City of Lacey
City of Olympia
City of Rainier
City of Tumwater
City of Tenino
City of Yelm
Fire District 1 Rochester/Grand Mound
Fire District 2 Yelm
Fire District 3 Lacey
Fire District 4 Rainier
Fire District 6 East Olympia
Fire District 8 South Bay
Fire District 9 McLane/Black Lake
Fire District 11 Littlerock
Fire District 12 South Thurston
Fire District 13 Griffin
Fire District 17 Bald Hills
SE Thurston Regional Fire Authority
West Thurston Regional Fire Authority
Cemetery District 1
Cemetery District 2

Other intended users include the County Board of Equalization and the State Board of Tax Appeals.

ASSUMPTIONS AND LIMITING CONDITIONS

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

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

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

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

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

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

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

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

All properties are considered to be conveyed in fee simple with the full bundle, with the exception of separate leasehold accounts. Exceptions will be noted on their individual records.

Generally, the appraiser does not have the benefit of an interior inspection. As a result, it is assumed that the interior condition mimics the exterior. On those occasions in which an interior inspection is granted, the condition is reflective of the overall property. Those parcels which have had an interior inspection are noted on their individual records.

SPECIAL ASSUMPTIONS, LIMITING AND HYPOTHETICAL CONDITIONS

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

Unless otherwise noted on the individual property record, we assume that the property is not adversely affected by neighboring properties or other external environmental factors.

We assume that the interior of residences and structures are the same as the exterior visual review.

We assume that the current condition and features of the property are the same as of the date of its last inspection.

It is assumed that the property is at its highest and best use as improved.

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

We believe that our screening process is adequate to capture arm's-length property sales. Some arm's-length transactions do not actually reflect their market value and were not used for either modeling or ratio studies per trimming guidelines of IAAO.

JURISDICTIONAL EXCEPTION

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

PURPOSE AND INTENDED USE

The intended use of this appraisal is for administration of ad valorem taxation. After certification by the Assessor, these values will be used as the basis for assessment of real estate taxes payable in 2024. We do not intend the values to be used for or relied upon for any other purpose.

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

TRUE AND FAIR VALUE

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

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

DATE OF APPRAISAL

Properties are appraised as of January 1, 2023.

This report was completed as of **May 31, 2023.**

PROPERTY RIGHTS APPRAISED

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

PERSONAL PROPERTY NOT INCLUDED IN THE APPRAISAL

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

MARKET AREA AND PROPERTIES APPRAISED

The subject of this mass appraisal report are residential properties throughout Thurston County. Properties in Region 4 were physically inspected and their physical features recorded as of the effective date of January 1, 2023. All other properties are assumed to have the same physical features as were noted during their last inspection.

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

INSPECTED REGIONS BOUNDARY DESCRIPTION

Physical inspections for the 2023 assessment year were of residential parcels located within Region 4. Inspections were conducted from September 2022 through March 2023.

Region 4 includes portions of the cities of Olympia and Tumwater as well as areas within their Urban Growth Areas (UGAs). The northern boundary on the east side of Budd Inlet is around 26th Ave NE. The eastern boundary runs along Friendly Grove Rd NE and Wilson St NE, extending to the I-5 corridor. It then runs along the north and west side of I-5 until 2nd Ave SW where it extends east of I-5, encompassing the "alphabet" streets in Tumwater along Capitol Blvd S. It then runs south along Old Hwy 99 SE to the southern border of 93rd Ave SE, which extends north at Jones Rd SW, then continues westerly at around 81st Ave SW to the base of Black Lake. The western boundary extends north by the Evergreen Shores subdivision and continues across the US 101 to Evergreen Parkway NW, (does not include parcels on the west side of the Parkway, and continues east to northern boundary of Kaiser Rd NW. The northern boundary continues along Kaiser Rd NW (includes the five subdivisions north of Kaiser) and then on to French Rd NW where it becomes Crestline Dr NW (only includes parcels on the west side of Crestline until just past 24th Ave NW). The border continues down West Bay Dr NW and across Budd Inlet to East Bay Dr NE and north to 26th Ave NE.

² *The Dictionary of Real Estate Appraisal. 3rd Ed. Appraisal Institute, p.140*

ZONING

Thurston County exercises jurisdiction over land use and community planning. The regulations for use and development can be found in its ordinances. We show property zoning as a land characteristic on our digital maps.

HIGHEST AND BEST USE

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

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

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

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

The highest and best use of the land or site if vacant and available for use may be different from the highest and best use of the improved property. This is true when the improvement is not an appropriate use, but it contributes to the total property value.

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

SCOPE OF THE APPRAISAL

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

Thurston County is on a six-year revaluation cycle. Every property is revalued annually. At least once each six years, each property is inspected, and its data refreshed. The assessor collects property characteristic data as discussed in our Residential Data Standards Manual. Other than new construction, physical inspections in Region 4 began in August 2022 and extended through the second quarter of 2023. All neighborhood and regional maps are included in this report, beginning on page 50.

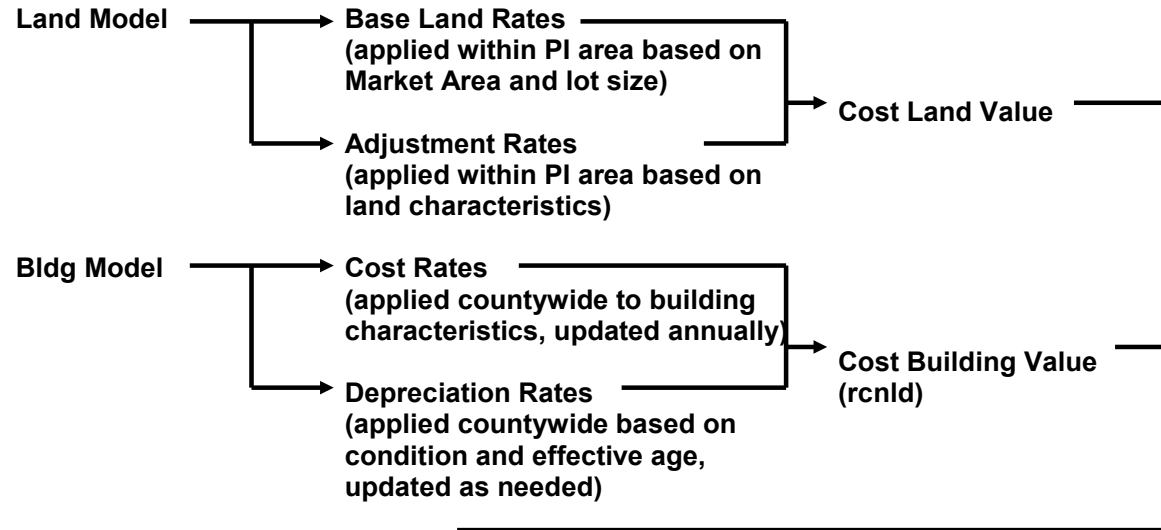
The appraisal considers the cost approach to value with sales used to calibrate the model to a specific neighborhood. Neighborhood adjustments are widely used to adjust for time and location and are a normal and standard part of the cost approach to value. The Marshall Swift cost manual provides what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

A market model (strict sales approach) has not been developed for 2023 assessment year due to time and budget limitations. The use of an income approach was not considered to be applicable because homes in this area are not typically purchased for their income potential.

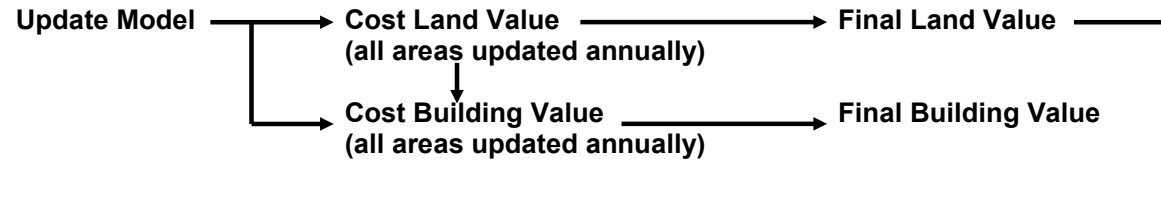
The flow chart on the next page describes the land model developed as part of the mass appraisal process and how it is used in the sales adjusted cost approach. The page following the flow chart begins to discuss the model in more detail.

Residential Valuation Process

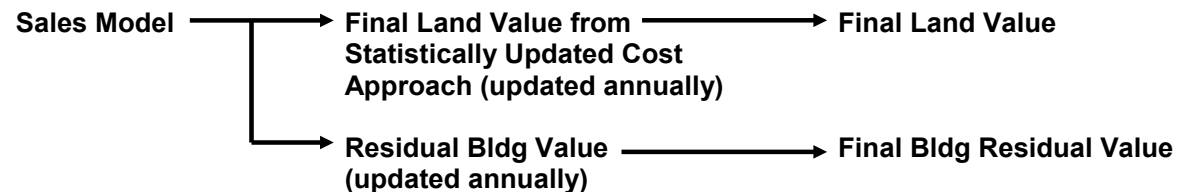
Cost Approach



Statistical Update of Cost Approach by Nbhd



Sales Approach



COST APPROACH

Land Model Specification

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

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

All variables are scaled and continuous. Variables with actual scalar values were converted to logarithms.

Land Model Calibration

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

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

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

- Logarithmic equations have the same form as a standard linear equation:

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

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

$$EXP[LN(SP)] = EXP[LN(a) + (b \times LN(SQFT))]$$

Due to the limited number of land sales available, 5 years of data was utilized. The results of the model are applied on a regional basis for base land values. Most of the properties in the county are based on square footage and acreages. With the exception of salt waterfront properties, a model was developed utilizing the sale price of vacant land as the dependent variable. The major independent variables (as measured by the beta coefficient) were the square foot of land, region, time and other site-specific variables. 61 candidate variables were presented to the model and a backward regression was utilized, with 40 variables being statistically significant. There were 1163 sale observations available, dated from January 2, 2018 to January 13, 2023.

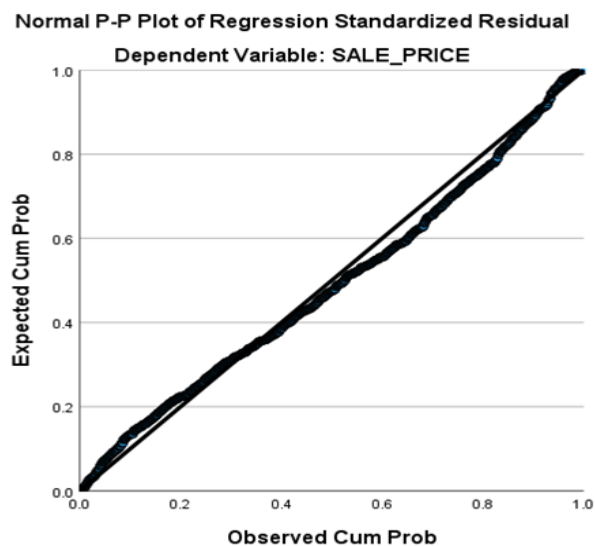
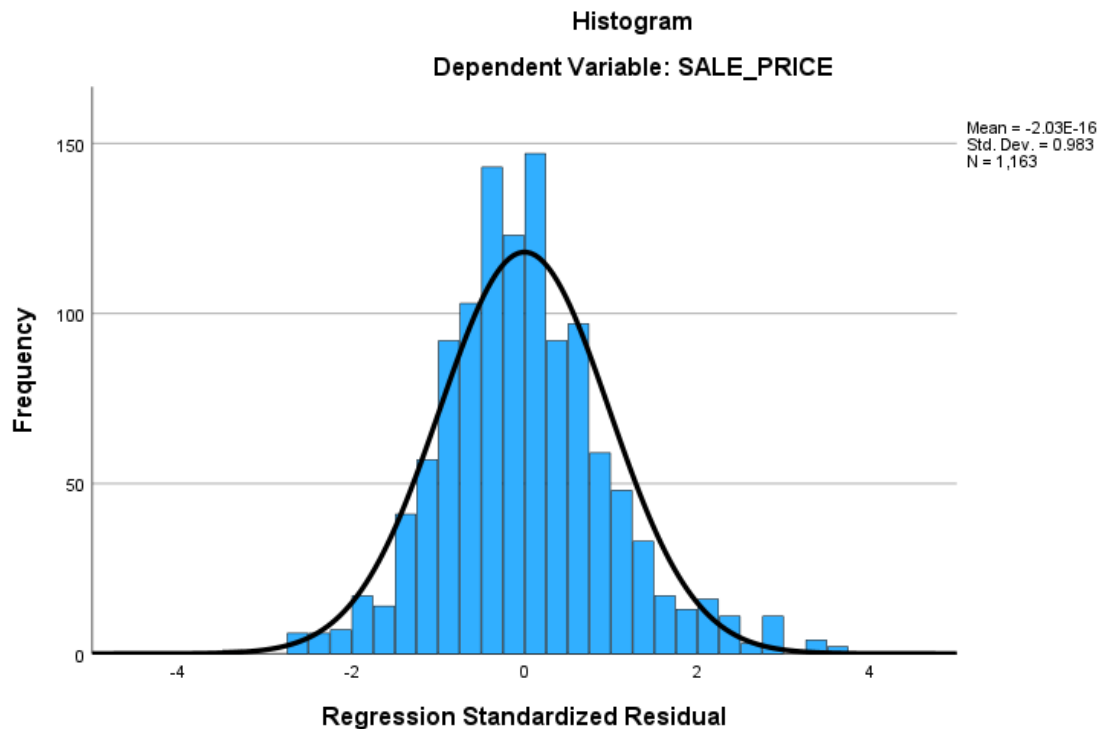
For salt waterfront properties, a forced regression model was utilized using 39 variables land variable. The dependent variable was a trended sale price, with the major independent variable being the natural log of the front footage as well as other control variables for region, market conditions (time) and site influences. The sales observations were a combination of vacant land sales, as well as model extracted land values of sold improved properties utilizing regression. There was a total of 335 sale observations, dated from January 2, 2018 to February 21, 2023.

Each region was controlled for by using a variable for that region, time, and other control variables. The model at this point has been maximized at the regional level. However, stochastic errors have not yet been controlled for at the neighborhood level. An analysis of the residuals at the neighborhood will maximize the predictability of values as well as minimize any stochastic errors.

Multiple Regression Analysis Assumptions

Multiple regression analysis is based on several assumptions regarding the data going into the model and the output from the calibration process. These assumptions are validated to determine the accuracy of the model and identify any limitations that may exist. Checks were conducted for specification errors, multicollinearity, autocorrelation (time), and heteroscedasticity. A detailed discussion of the MRA assumptions is included in the Appendix.

Square Footage Model Normal Distribution of the Residual Errors

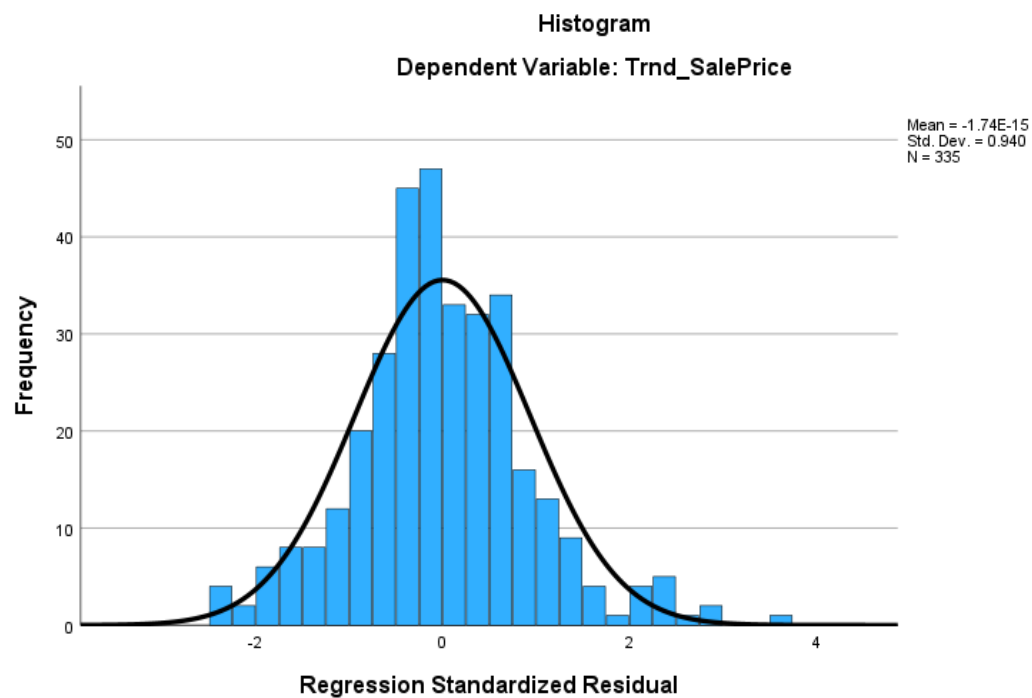


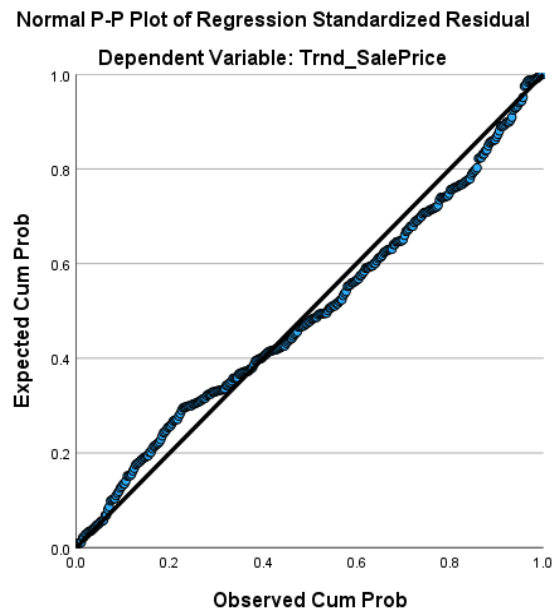
Scatterplot of Residual to Price as check for systemic bias



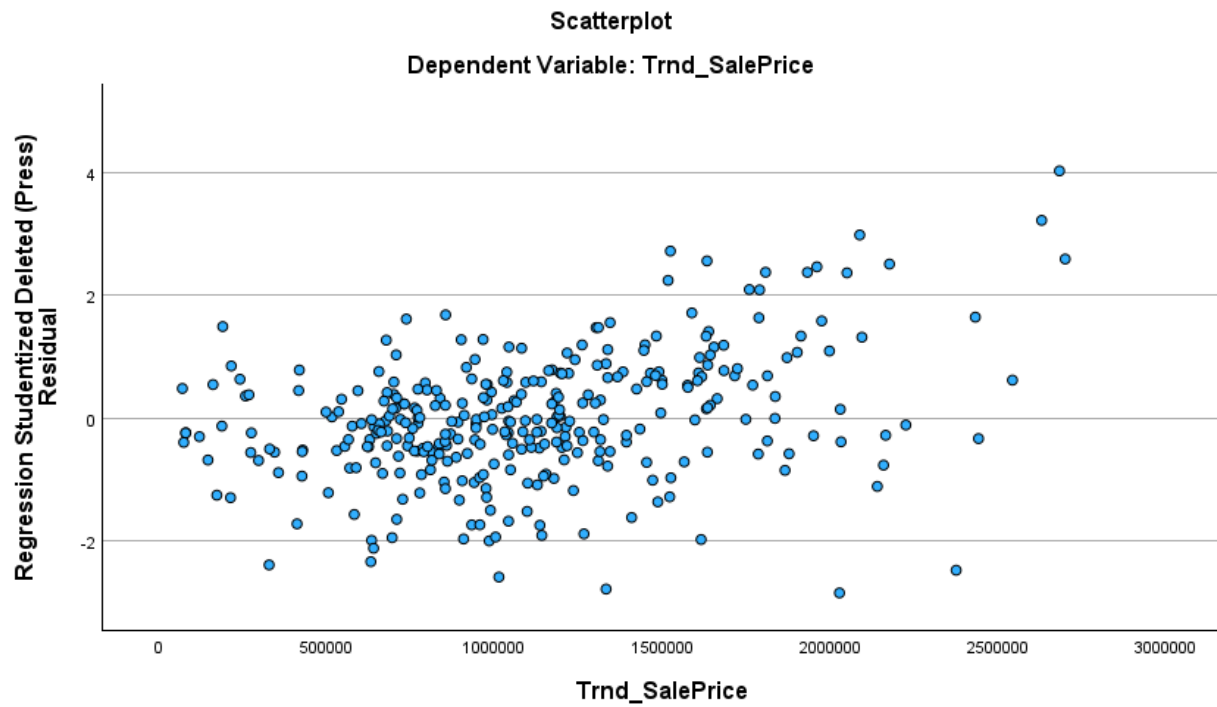
- The plot indicates that there is no systemic bias with respect to predicted value.

Front Footage Model Normal Distribution of the Residual Errors





Scatterplot of Residual to Price as check for systemic bias



Example of Land Square Feet Table Base Area Region 4 & 5

SQUARE FOOT TABLE					
Site Square Feet	Value	Base / Sq Ft	Act Price / Sq Ft	Size Factor	Value Factor
2500	53072.5	11.227	21.229	0.200	1.891
5000	106145	11.227	21.229	0.400	1.891
7500	117548	11.227	15.673	0.600	1.396
10000	128940	11.227	12.894	0.800	1.148
12500	140338	11.227	11.227	1.000	1.000
15000	146580	11.227	9.772	1.200	0.870
17500	151708	11.227	8.669	1.400	0.772
20000	156840	11.227	7.842	1.600	0.698
22500	161978	11.227	7.199	1.800	0.641
25000	166950	11.227	6.678	2.000	0.595
27500	169840	11.227	6.176	2.200	0.550
30000	172770	11.227	5.759	2.400	0.513
32500	175663	11.227	5.405	2.600	0.481
35000	178570	11.227	5.102	2.800	0.454
37500	181463	11.227	4.839	3.000	0.431
40000	184400	11.227	4.61	3.200	0.411
42500	187298	11.227	4.407	3.400	0.393
45000	187875	11.227	4.175	3.600	0.372
47500	188908	11.227	3.977	3.800	0.354
50000	189900	11.227	3.798	4.000	0.338
52500	190890	11.227	3.636	4.200	0.324
55000	191895	11.227	3.489	4.400	0.311
57500	192913	11.227	3.355	4.600	0.299
60000	193920	11.227	3.232	4.800	0.288
62500	194938	11.227	3.119	5.000	0.278
65000	195975	11.227	3.015	5.200	0.269
67500	196965	11.227	2.918	5.400	0.260
70000	197960	11.227	2.828	5.600	0.252
72500	199013	11.227	2.745	5.800	0.244
75000	200025	11.227	2.667	6.000	0.238
77500	201035	11.227	2.594	6.200	0.231
80000	202000	11.227	2.525	6.400	0.225
82500	203033	11.227	2.461	6.600	0.219
85000	204000	11.227	2.4	6.800	0.214
87500	205013	11.227	2.343	7.000	0.209

Example of Acreage Table Base Regions 4 & 5

ACRES						
Acres	Site Square Feet	Value	Base / Acre	Act Price / Acre	Size Factor	Value Factor
1	43560	187586	49563	187,586	0.2	3.785
2	87120	205,187	49563	102,593	0.4	2.070
3	130680	222,787	49563	74,262	0.6	1.498
4	174240	236,997	49563	59,249	0.8	1.195
BASE 5	217800	247,818	49563	49,564	1	1.000
6	261360	258,638	49563	43,106	1.2	0.870
7	304920	269,458	49563	38,494	1.4	0.777
8	348480	280,279	49563	35,035	1.6	0.707
9	392040	285,449	49563	31,717	1.8	0.640
10	435600	290,619	49563	29,062	2	0.586
11	479160	295,790	49563	26,890	2.2	0.543
12	522720	300,960	49563	25,080	2.4	0.506
13	566280	306,131	49563	23,549	2.6	0.475
14	609840	311,301	49563	22,236	2.8	0.449
15	653400	316,472	49563	21,098	3	0.426
16	696960	321,642	49563	20,103	3.2	0.406
17	740520	326,813	49563	19,224	3.4	0.388
18	784080	331,983	49563	18,443	3.6	0.372
19	827640	337,153	49563	17,745	3.8	0.358
20	871200	342,324	49563	17,116	4	0.345
40	1742400	388,277	49563	9,707	8	0.196
60	2613600	468,683	49563	7,811	12	0.158
80	3484800	549,088	49563	6,864	16	0.138
100	4356000	629,493	49563	6,295	20	0.127
200	8712000	1,031,520	49563	5,158	40	0.104
400	17424000	1,835,574	49563	4,589	80	0.093

Example of Land Influences

LAND INFLUENCE ADJUSTMENT FACTORS (Non-Saltwater Parcels)

Flood Area - FL	20% Wetland - W2	40% Wetland - W4	60% Wetlands - W6	80% Wetlands - W8	100% Wetlands - W0
0.50*	0.93	0.86	0.79	0.60	0.30
Limited View - LV	Good View - GV	Very-Good View - VV	Excellent View - EV	Fair Nbhd Appeal - FR	Good Nbhd Appeal - GD
\$12,000	\$30,000	\$50,000	\$90,000	0.90	1.20
Restrictions - RS	Shape - SP	Steep Topography - ST	Unbuildable - UN	Unusable - US	No Electric - NE
0.50*	0.85*	0.85*	0.30	0.05*	0.489**
Loc. on Golf Course - GC	Avg. Lakefront - LA	Below Avg. Lakefront - LB	No Road - NR	No Site Improve. - NS	Prelim. Plat - PL
\$85,000*	2.50*	2.00*	0.80*	0.50*	3.00*

The above are the conversion of the unbiased parameters. Although generally applied, specific features of an individual may result in deviations for these parameters. Items with single asterisks are more commonly adjusted to the parcel in particular neighborhoods, or individual parcels with appraiser judgement. Double asterisks may alternatively use lump sum adjustment for the cost to cure. Some parcels may have a cascading effect of multiple influences, and potentially could be over adjusted if the two influence intersect in their impact on the parcel. Although checks for multicollinearity were conducted in building a model, some parcels may require individualized adjustments.

Example of Saltwater Front Foot & Depth Tables

STEAMBOAT

	Front Feet	FF Value	Base Rate	FF Rate Group	FF Adj Group	Size Adj. Ratio	FF Adj Factor
	50	10,801	4,208	3525	2525	0.500	1.728
	75	7,767	4,208	3525	2525	0.750	1.243
BASE>>>>>	100	6,250	4,208	3525	2525	1.000	1.000
	150	4,208	4,208	3525	2525	1.500	0.673
	200	3,187	4,208	3525	2525	2.000	0.510
	250	2,574	4,208	3525	2525	2.500	0.412
	300	2,166	4,208	3525	2525	3.000	0.347
	350	1,874	4,208	3525	2525	3.500	0.300
	400	1,656	4,208	3525	2525	4.000	0.265
	Lot Depth	FF Value	Base Rate		Depth Adj Group	Size Adj. Ratio	Depth Adj Factor
	100	5,600	6,250		2530	0.286	0.896
	200	5,860	6,250		2530	0.571	0.938
BASE>>>>>	350	6,250	6,250		2530	1.000	1.000
	500	6,252	6,250		2530	1.429	1.000
	650	6,253	6,250		2530	1.857	1.000
	800	6,254	6,250		2530	2.286	1.001
	950	6,256	6,250		2530	2.714	1.001
	1100	6,257	6,250		2530	3.143	1.001

Saltwater Specific Influences

<u>Mean Influence</u>	<u>Description</u>
.77	No Access
.90	Moderate Access
1.00	Superior Access
.80	Salt High
.95	Salt Medium
\$15,000	Rec1st class
\$15,000	Rec2nd class
-120,000	No View
-75,000	Salt Limited View
-25,000	Salt Good View
Base (no adj)	Salt Very Good View
+25,000	Salt Excellent View
1.20	Good Quality NBHD
Variable	Restrictions
Variable	Lagoon

Restricted and Multiple Negative Influence View Adjustments	
<u>Mean Influence</u>	<u>Description</u>
0.60	Salt No View
0.80	Salt Limited View
0.90	Good View
Base (no adj)	Very Good View
1.05	Excellent View

Building Cost Specification

Model Format for RCNLD:

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

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

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

2023 COST TABLE CALIBRATION

Introduction

Thurston County uses construction cost data from Marshall & Swift as the basis for our cost approach. While these rates include local area and current cost multipliers to produce a cost estimate that is more tailored to our market area, a cost calibration analysis is performed to produce more uniform results. One way to calibrate the cost tables to the local market is to use actual construction costs obtained from local builders to compare to the replacement cost new calculated from the Marshall & Swift rates. Another alternative is to use sales of new construction to measure the actual cost new to compare to the RCN calculated from our Marshall & Swift cost tables. For residential property new construction was used to calculate a calibration factor. For commercial structures and detached structures there were no actual sales of new construction. For these structure types builder cost estimates were obtained and used to determine cost table calibration factor.

These initial costs are a base cost that is adjusted to market value in the last step of developing neighborhood factors that brings the base cost of land and base cost of building to market value when used with trended sales.

Residential Structures

Procedure/Methodology

All new construction sales were queried for 2021 through 2022. These sales were used to refine the vendor provided base costs. These base cost do not constitute a market value. That is determined later in the final neighborhood analysis. A total of 906 new homes sales were used in the analysis and dated from January 4, 2021 to December 16, 2022. Using a form of the extraction method, a residual building market price was calculated by subtracting the 2022 land value from the new home sale price. This building market price was compared to the cost table replacement cost new to calibrate our cost table to recent new construction. This analysis indicated that overall, the new cost tables were approximately 20% low.

Two primary drivers of value are quality of construction and size. This is what the cost tables account for in various characteristics of construction. Analysis of different home qualities and size groups indicated that an adjustment to our various sizes would assist the most in overall uniformity for our final residential cost calibration.

Sales Analysis

The descriptive table on the next page demonstrates that the supplied cost table rates did not match our actual construction costs within our local market. The Marshall & Swift building cost are good proxies for actual local building cost. The overall computed median (replacement cost new/ residual building value) was approximately 0.80. Therefore the cost tables were adjusted upward accordingly.

Conclusion

The cost index as supplied by Marshall & Swift was not sufficiently representative of our current cost in their present state on an aggregate scale. This market calibrated cost table then provides a better starting point for the determination of value at the neighborhood level. Sales are further analyzed to determine final land and building adjustments that take into consideration locational differences between neighborhoods.

Construction Cost Tables

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

The complete set of rate tables is too lengthy to include here. However, an example of the rates for a 2-Story residence by quality grade is shown below. The complete set of rate tables is stored within the Sigma CAMA System.

STRUCTURE TYPE	SFLA	LOW	FAIR	AVG	GOOD	V-GD	EXC	EXCP
BASE-2STY-SS	900	145.82	158.05	178.78	218.4	251.51	336.74	464.71
BASE-2STY-SS	1000	142.25	155.86	175.73	218.4	251.51	336.74	464.71
BASE-2STY-SS	1200	137.35	151.67	172.07	217.26	251.51	336.74	464.71
BASE-2STY-SS	1400	132.94	147.77	167.39	213.85	251.51	336.74	464.71
BASE-2STY-SS	1600	126.19	141.07	160.1	207.75	245.71	328.97	453.99
BASE-2STY-SS	1800	120.43	136.23	155.54	200.69	240.04	323.79	446.84
BASE-2STY-SS	2000	114.59	130.24	148.68	193.25	231.52	315.83	435.86
BASE-2STY-SS	2200	110.57	126.13	143.8	188.72	225.95	310.48	428.46
BASE-2STY-SS	2400	108.36	124.08	141.22	187.04	223.64	308.05	425.11
BASE-2STY-SS	2600	104.34	120.74	137.02	182.03	217.24	299.89	413.84
BASE-2STY-SS	2800	100.29	115.59	131.66	175.35	210.4	290.41	400.78
BASE-2STY-SS	3000	98.88	114.25	129.71	173.16	208.83	288.18	397.68
BASE-2STY-SS	3200	95.64	110.98	126.28	169.42	203.45	282.22	389.47
BASE-2STY-SS	3600	90.45	105.82	120.38	161.73	194.21	270.64	373.49
BASE-2STY-SS	4000	82.46	97.18	110.62	148.19	179.25	250.36	345.5
BASE-2STY-SS	4400	75.26	88.69	99.19	133.47	160.93	225.26	310.86
BASE-2STY-SS	4800	75.26	88.69	97.6	131.85	158.78	223	307.74
BASE-2STY-SS	5200	75.26	88.69	97.6	131.85	158.78	220.49	304.27
BASE-2STY-SS	5400	75.26	88.69	95.49	129.64	155.82	219.15	302.43
BASE-2STY-SS	5600	75.26	88.69	95.49	129.64	155.82	217.77	300.53
BASE-2STY-SS	6000	75.26	88.69	95.49	127.57	152.95	214.89	296.56
BASE-2STY-SS	6200	75.26	88.69	95.49	127.57	152.18	213.93	295.23
BASE-2STY-SS	6400	75.26	88.69	95.49	127.57	151.39	213.17	294.18
BASE-2STY-SS	7000	75.26	88.69	95.49	127.57	151.39	210.49	290.48
ASE-2STY-SS	7600	75.26	88.69	95.49	127.57	151.39	208.13	287.21
BASE-2STY-SS	8000	75.26	88.69	95.49	127.57	151.39	208.13	287.21

Depreciation Analysis

Effective Age

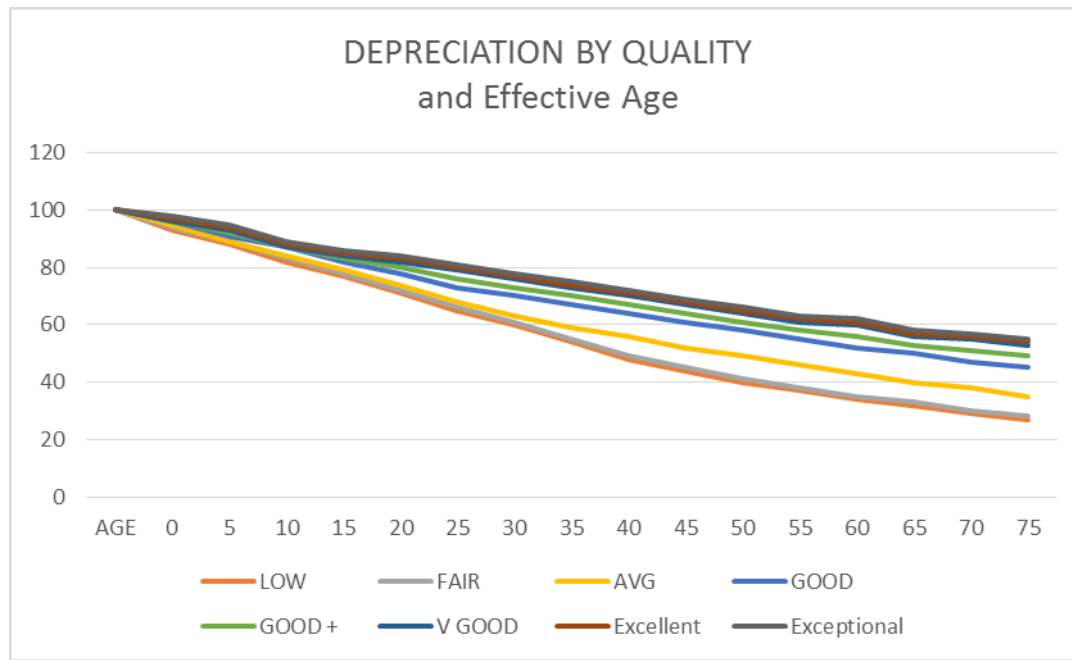
The effective age of a building is largely based on its overall condition. It is a measure of how old a building looks and not how old it actually is. As a result, any type of maintenance, repair, remodel, or renovation will tend to reduce the effective age. The more extensive the maintenance or repair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

Depreciation Rate Tables

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

SELECTED DEPRECIATION PERCENT GOOD BY EFFECTIVE AGE								
AGE	LOW	FAIR	AVG	GOOD	GOOD +	V GOOD	Excellent	Exceptional
0	100	100	100	100	100	100	100	100
5	93	94	95	96	96	96	97	98
10	88	89	89	91	92	93	94	95
15	82	83	84	87	87	87	88	89
20	77	78	79	82	83	84	85	86
25	71	72	74	78	80	82	83	84
30	65	66	68	73	76	79	80	81
35	60	61	63	70	73	76	77	78
40	54	55	59	67	70	73	74	75
45	48	49	56	64	67	70	71	72
50	44	45	52	61	64	67	68	69
55	40	41	49	58	61	64	65	66
60	37	38	46	55	58	61	62	63
65	34	35	43	52	56	60	61	62
70	32	33	40	50	53	56	57	58
75	29	30	38	47	51	55	56	57
80	27	28	35	45	49	53	54	55

The graph below shows the relationship between the percent good by quality and effective age.



Condition

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

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

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

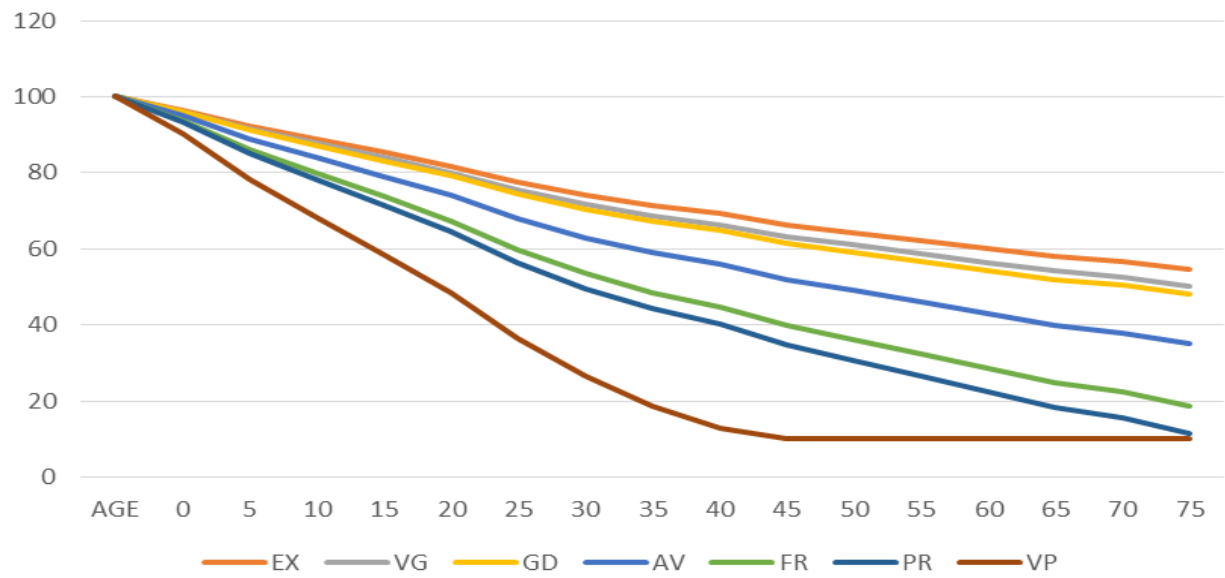
Generally, the appraiser does not have the benefit of an interior inspection. As a result, it is assumed that the interior inspection is the same as the exterior. On those occasions in which an interior inspection is granted, the condition is reflective of the overall property. Those parcels which have had an interior inspection are noted on their individual records.

The graph on the following page is an example of average quality with the different condition ratings on the percent good curve. It summarizes the relationship between effective age, building condition, and the rate of depreciation.

The CAMA system calculates depreciation by the following formula:

$$\text{Phy-Pct_Good} = 100 - (\text{Cond-Factor} \times (100 - \text{Pct_Gd_Table}))$$

AVG QUALITY CONDITION ADJUSTMENT by Selective Effective Age



Neighborhood Adjustment Model Specification

The equation for the neighborhood adjustment is an additive model.

$$V = b_1(LV) + b_2(BV) + \text{systemic and random error}$$

- Where:
 - b_1 and b_2 are based on a combination of regression analysis and appraiser judgment
 - 1. Systemic errors would be bias introduced by neighborhood influence and their impact can be extracted by residual analysis.
 - 2. Other random sampling errors are a result of market imperfections and difference occur because of consumer taste.

Neighborhood Adjustment Calibration

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

After making the initial adjustment to the land value, the coefficient for the building value (RCNLD) can be determined. This again produces a preliminary adjustment or starting point for determining the final neighborhood building trend. The residuals produced by the regionalized model will indicate a systemic difference between neighborhoods. These residuals become the basis for developing a neighborhood factor. These factors are scalar values, as opposed to qualitative estimates often employed by fee appraisers and can be reintroduced in an MRA model. These factors are analogous to a positivist economist market model, it provides a statistically valid measurable solution based upon observable data. These positivist models are not normative, they do not attempt to answer why. These positivist assumptions and methodology are employed in the cost approach. In this mass appraisal methodology, a group of sales is normalized on a neighborhood level to determine the best factor to meet the statutory requirement and minimize variance.

Specifically, each neighborhood within the region is analyzed to consider its unique characteristics, amenities, and market conditions. This final adjustment to the neighborhood land and building values are largely based on the appraiser's analysis of individual sales ratios guided by the region wide sales analysis. An iterative process of adjusting the initial coefficients is applied to each neighborhood to reach the desired level of assessment, PRD, and COD. The Assessor's target level of assessment for 2023 is 95%. This level was chosen to reflect that the majority of residences are not 'market ready' compared to the properties that sold at 100% of their market value. There were 26,634 sales used to do develop these neighborhood ratios.

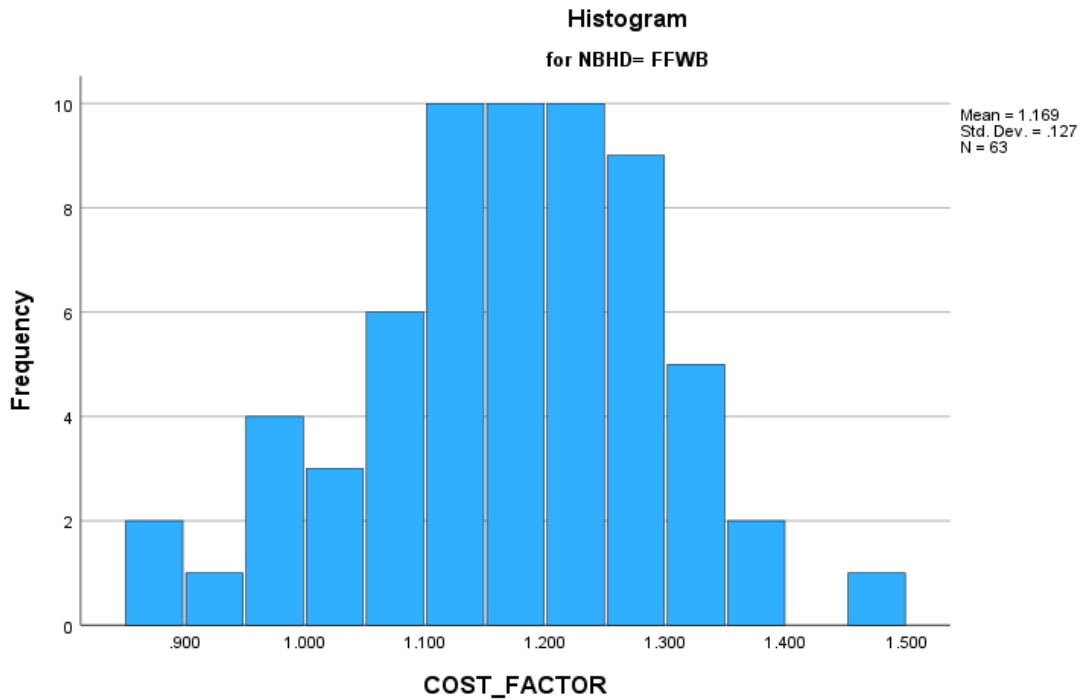
On the following page is an example: neighborhood "FFWB" with the original system cost to adjusted market value and the development of a market location adjustment.

IMPORTANT CONSIDERATION: Why do different types of properties (Single Family, Manufactured Homes, and Condominiums) have different neighborhood factors? The answer is quite simple. They have a different original cost basis. The important goal is to achieve equity and equality as to market value. In other words, the final assessment ratios need to be in compliance with medians between 90 to 110%.

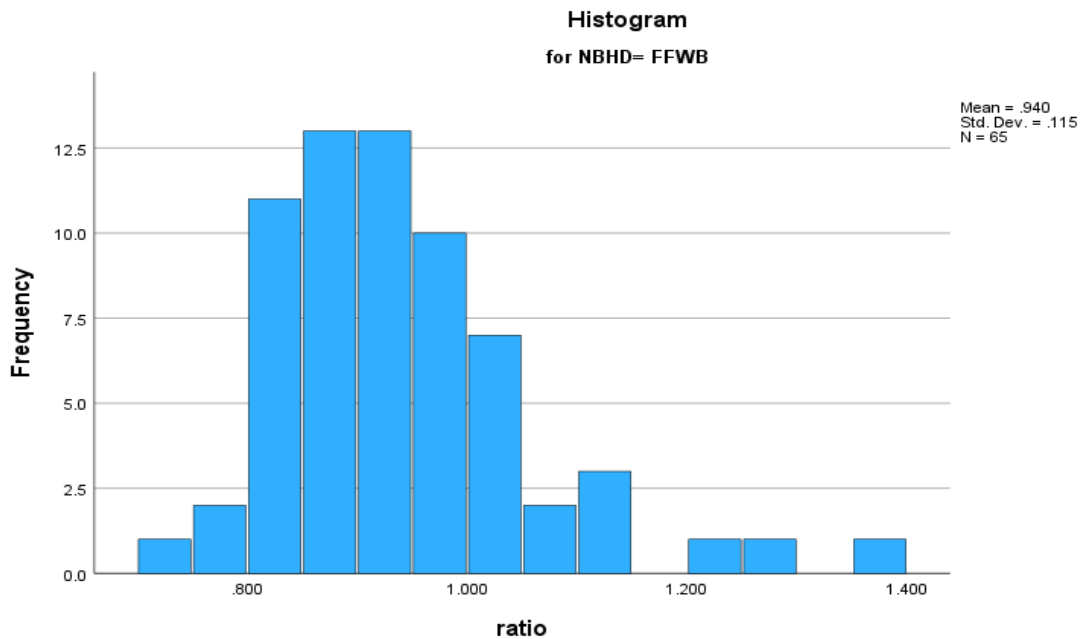
Below is the example neighborhood "FFWB" indicating the raw ratio data distribution, also the post treatment ratio.

EXAMPLE

Distribution of Raw Ratio for FFWB



Distribution of Ratio for FFWB after neighborhood adjustments.



Post Treatment of Residential FFWB

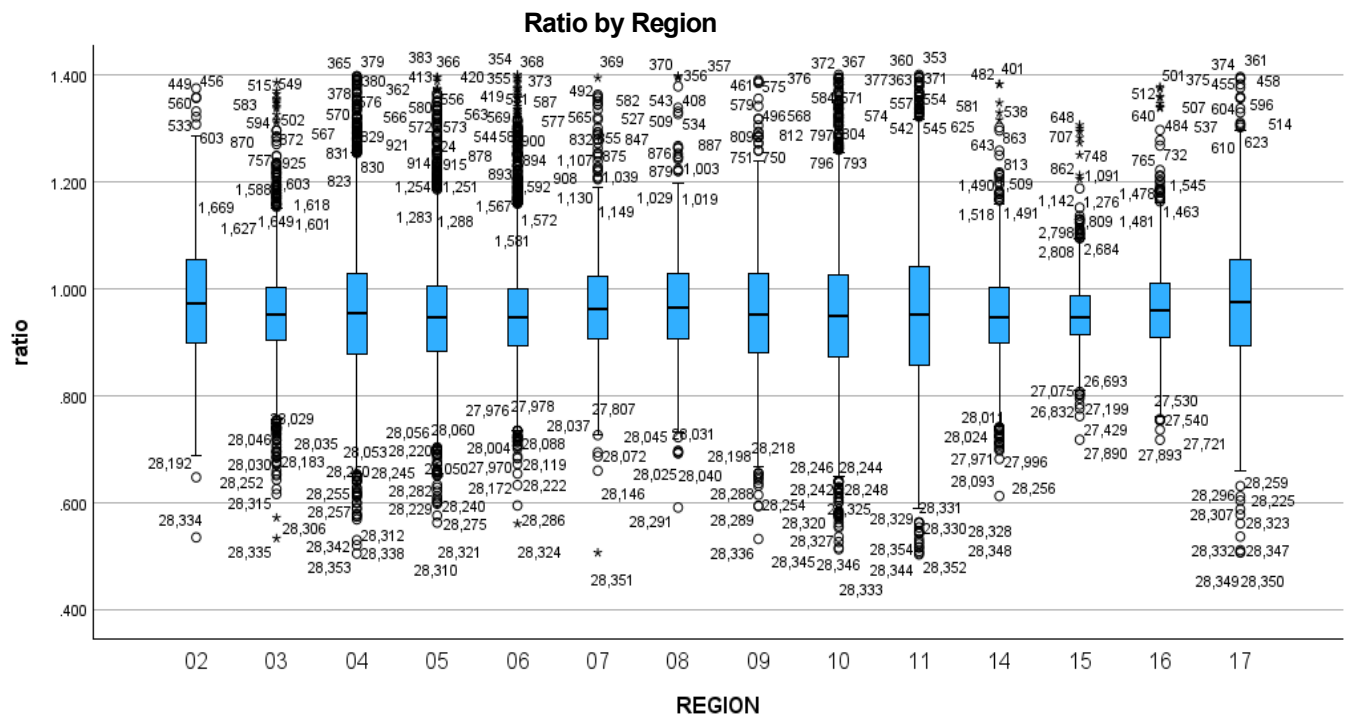
Median	0.923
Coefficient of Dispersion	0.091
Price Related Differential	1.009

Residential Adjustment Model Validation

Neighborhood trends were calibrated using 28,354 sales that took place between 1/1/2018 to 3/31/2023. Because multiyear sales are utilized, a check for consistency of that estimate is required. In other words, the mean and median ratios for each year should be in the range of 90 to 110% and be consistent across all years. To achieve this, the comparable sales can be time adjusted to the current year and unbiased estimates achieved. The boxplot below provides graphical verification this has been achieved. For information on time trending of sales, refer to the *Market/Time Adjustment* document in the Appendix.

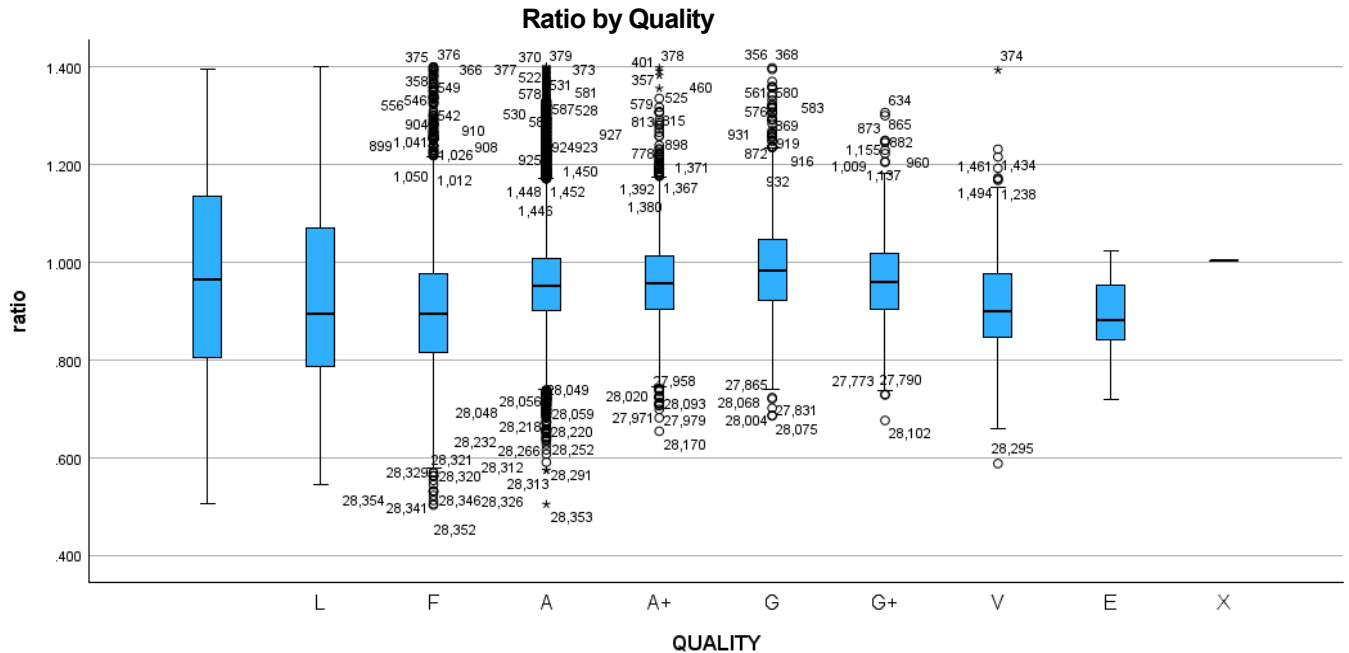


Assessment Uniformity by Region

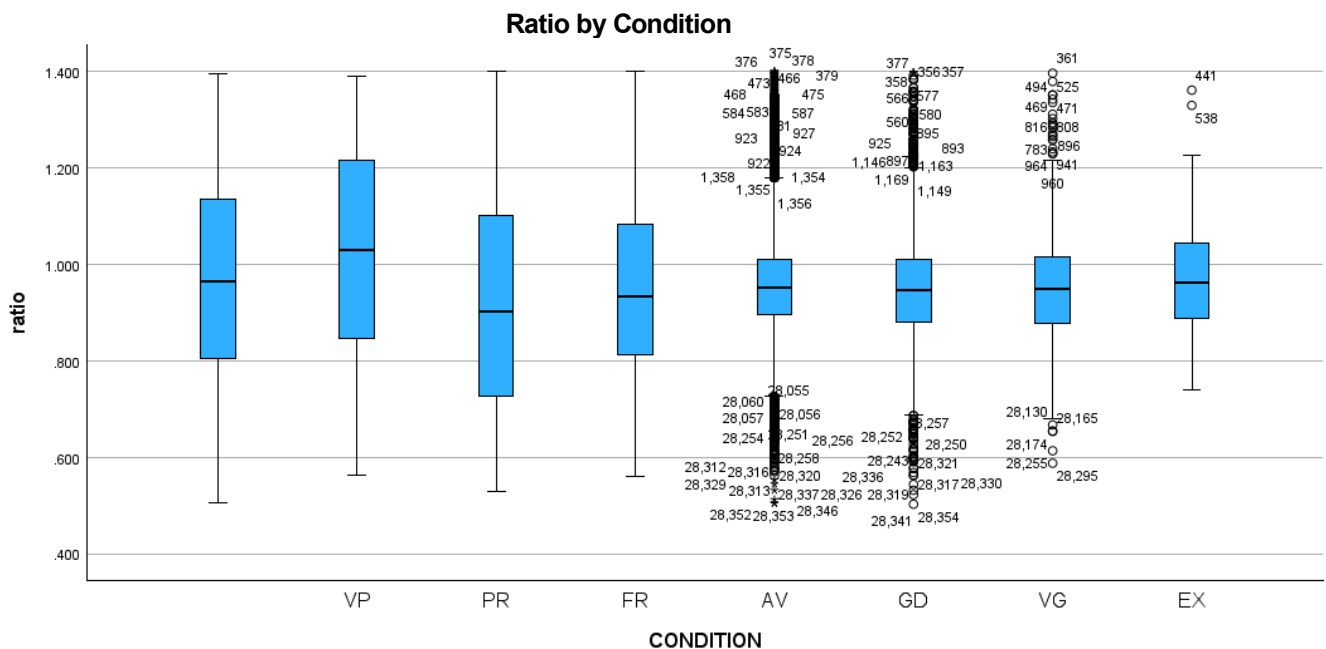


Assessment Uniformity by Quality Grade

Total square feet of gross living area, quality and size are major value drivers. The median level between quality grades is fairly consistent at about the 95.1% level and the interquartile ranges are fairly consistent. The county is in the process of consolidating and creating better consistency between quality levels. While compliant, continuous improvement is expected.



Assessment Uniformity by Condition



RECONCILIATION AND CONCLUSION

Considering the quantity and quality of data and the reliability of the various models as shown in the performance tests above, we have concluded that the Sales Adjusted Cost Approach produces an accurate estimate of market value. There is no evidence of a systemic bias between or within the sample.

APPENDIX

Multiple Regression Analysis Assumptions

Complete and Accurate Data:

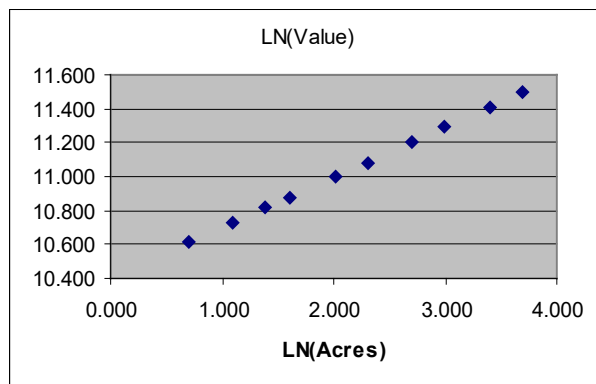
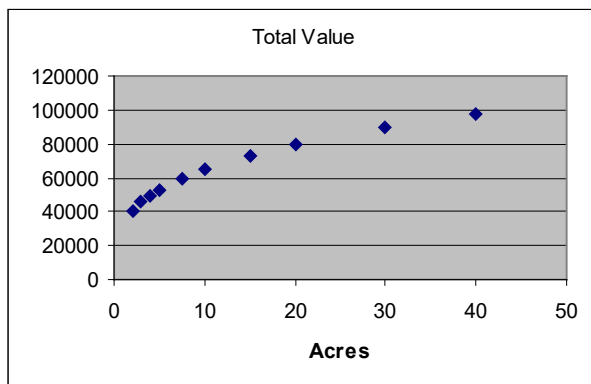
- Data definitions and standards have been developed to ensure our data is as complete and accurate as possible.
- A procedure has been established to ensure sales are properly verified.
- Annual training is conducted to remind appraisers of the standards that have been developed.

Representativeness:

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

Linearity:

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



Additivity:

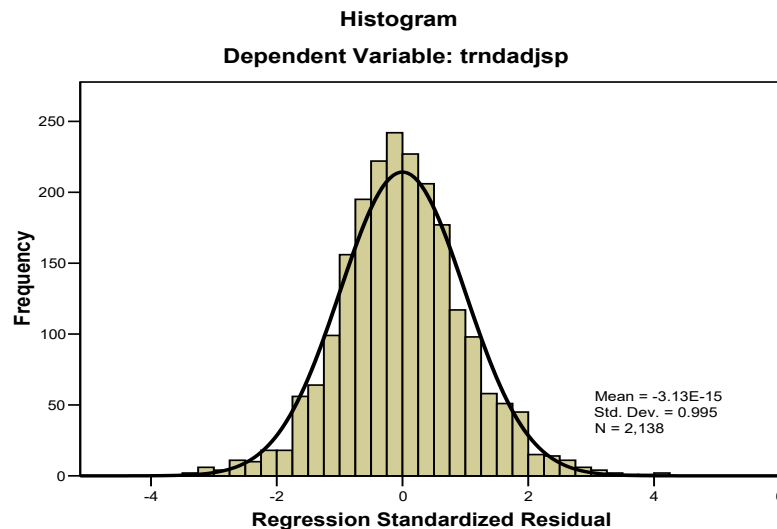
- It is assumed that the marginal contribution of one independent variable is not affected by the changes in other variables.
- The assumption is violated when one independent variable interacts with another.
- This assumption generally does not hold for land models.
- Land characteristics are often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

No Correlation between Independent Variables:

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

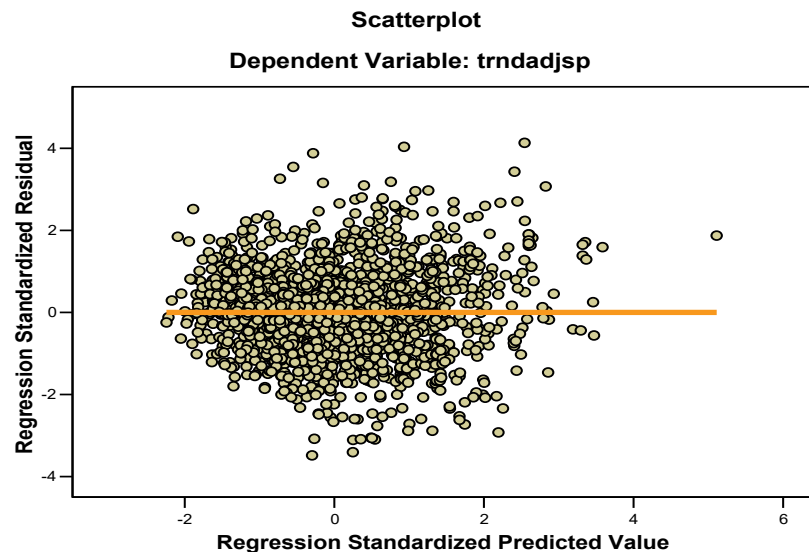
Normal Distribution of Residual Errors:

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



Constant Variance of the Error Term (homoscedasticity):

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



MARKET / TIME ADJUSTMENT AND MODEL SUMMARIES

For any statistical estimate to be valid, it must be representative of the population. In theory, under ideal circumstances, the sample should be an adequate size and randomized. However, in the real world, convenience samples are utilized. A convenience sample is one where the units that are selected for inclusion in the sample are, in this instance, the best available sales. Although these samples lack randomness, there is no other methodology available but to use actual sales. If the sample is large enough to represent the population value, then estimates can be developed which should reflect true market action.

So how does one increase the sample size? One method would be to expand the area, however, since real estate is highly dependent upon location that methodology would result in failure. The only other option is to extend the time frame (sale date range) in which to select observations. This methodology is quite accurate when properly controlled. The following explains the rationale for this decision and the results.

Values in all economic markets change over the course of time. The changes in values can occur as rapidly as second by second as in securities trading, or have slower movement which occurs over months, quarters, or even years as is more typical in real estate. The reader is cautioned to remember that it is not time itself which accounts for the change, but changes in supply and demand factors. These changes can be due to abstract things such as public sentiment and taste, to physical features such as weather conditions and natural aging of a depreciating asset, and to changes in economic conditions, to name just a few.

Real estate prices are subject to many factors and when analyzed in sequence can exhibit predictable patterns. These patterns are generally seasonal and cyclical. For residential properties these values tend to peak in late spring/early summer and bottom out around mid-November to early-February. However, these patterns do not perfectly repeat so there can be differences in the magnitudes in common seasons. Besides the seasonal influences, cyclical influences also occur. These can be due to a sudden exogenous shock, such as the World Trade Center Attack and the beginning of the War on Terror, or more likely due to economic upheavals such as the Great Recession. The 2020 Covid-19 lockdown did not slow the residential sales market; the market actually had unprecedented increases in value. **During 2022, rising interest rates to counter inflation initially brought a slight drop in the market for non-saltwater properties, midyear, as indicated in the time trends. However, continued low supply and reduced but moderate demand brought sales prices back to the approximately the same level as January of 2022. As a result there are mixed results in neighborhood value changes with most showing minimal to moderate increases in value.**

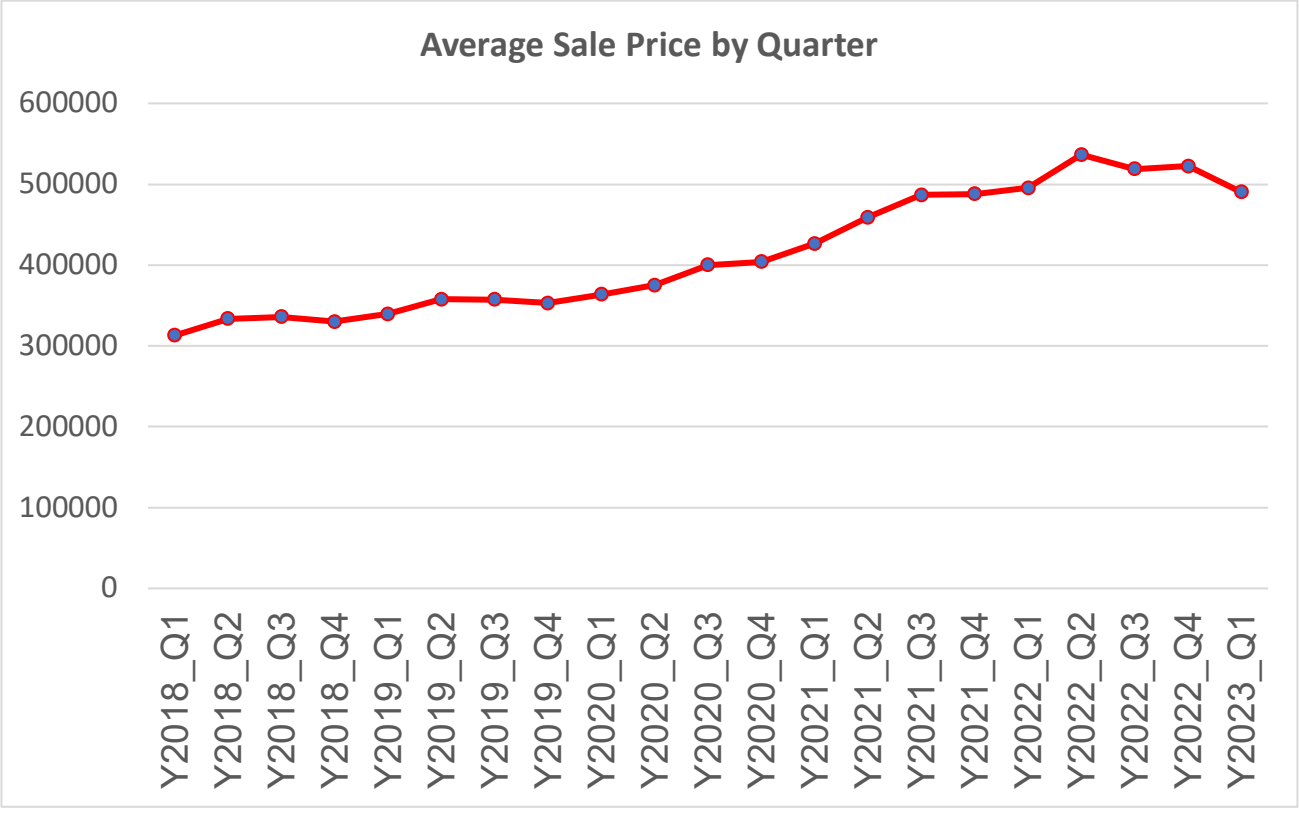
For residential real estate, when other variables are controlled for such as size, quality, condition, age, and site value time patterns can be seen, and their influence determined. This is standardized research methodology that is used in academic, medical, social, and economic studies.

These time variables were determined by using 25,462 observations which occurred from January 2, 2018 to January 12, 2023. A total of 59 variables were presented for backward regression modeling of which 54 were found to be statistically valid. To minimize the impact of a random outlier as well as to create an efficient model, time adjustments were categorized on a quarterly basis:

Year_Quarter	Factor	Year_Quarter	Factor	Year_Quarter	Factor	Year_Quarter	Factor	Year_Quarter	Factor
Y2018_Q1	1.553243	Y2019_Q1	1.459736	Y2020_Q1	1.348081	Y2021_Q1	1.156276	Y2022_Q1	0.961061
Y2018_Q2	1.499455	Y2019_Q2	1.419249	Y2020_Q2	1.306951	Y2021_Q2	1.062216	Y2022_Q2	0.919666
Y2018_Q3	1.477823	Y2019_Q3	1.405065	Y2020_Q3	1.25534	Y2021_Q3	1.026705	Y2022_Q3	0.951099
Y2018_Q4	1.483852	Y2019_Q4	1.387807	Y2020_Q4	1.215789	Y2021_Q4	1.014875	Y2022_Q4	1

Saltwater sales (Region 01) had roughly similar trends, however, without the market slump due to the rising interest rate. These trends are available in our yearly, Overview Of The Appraisal Process.

Thurston County's residential values exhibit a strong pattern. Historic analysis revealed that the residential market exhibits an upward trend over the five-year period. This can be seen graphically below.



At this point the reader is wondering, how we know if those numbers are accurate? The proof can be determined by four features. Does the model have predictive ability, do the variables used “explain” the variance in values, is the model structurally correct, and when analyzed in isolation is there an indication of systematic bias?

The predictive ability of a model is determined by utilizing an Analysis of Variance (ANOVA) technique with an F-test. The regression utilized 54 variables with 25,462 observations used. The F-test value was 1.602 which is highly significant ($t < .001$). This would indicate that the model has high predictive ability as a whole.

The next step is to determine if the chosen variables (including market/time) explain the dependent variable, in this case its value. This is accomplished by determining the Coefficient of Determination (R^2) and the Adjusted Coefficient of Determination (adj. R^2). The Raw R square results in a value of .868. One way to imagine this is that 86.8% of the variance is accounted for by the variables, even without specific neighborhood influences considered.

A common concern is the “usefulness” of the number of variables used. In other words, does the increase in the number of variables result in a general improvement of the model? The method to estimate this is by the adjusted R square. In this case the model still renders good results with a value of .868, or effectively, that these chosen variables explain 86.8% of the variance.

Of utmost importance, is the model correctly structured or is there a systemic bias. The most critical and rudimentary check is whether the model is misspecified. A misspecification results when the coefficients' value is beyond what would be a reasonable estimate or the directionality of the variable is opposite of what is expected by theory and established practice: for example, if the square footage adjustment is a minus \$90.00 per square foot, or the value was \$34,000 per square foot, either would be clearly misspecified rates or values for the variables. Of the 54 variables utilized in the model, none are misspecified, in other words, the resulting values made good appraisal sense.

When two independent variables which affect the dependent variables similarly and to a high degree, it produces another possibility of systematic bias called multicollinearity. For example, total rooms and square feet both refer to size, both are highly correlated to each other, and both affect home prices in nearly the same way. If both are introduced into the same model, their parameter values would be incorrect and quite likely would bias all other estimates as well. The most common check to avoid such a result would be to run a correlation matrix between all independent variables and assure that no correlation exceeded ± 0.60 . This was achieved in the model, so there is no indication of multicollinearity.

While we do not need the assumption of homoscedasticity for a model to create unbiased estimators, it is critical to the predictability of the model and the resulting standard error of the estimate. The ideal is to have the errors of the estimate to be consistent along the value range. When this occurs the model exhibits homoscedasticity, when it does not it is said to be heteroscedasticity. When heteroscedasticity is present, as the values move away from the mean, the error rate increases. While there are several tests for this, the easiest review is to plot the estimates for the actual value. We have achieved a homoscedastic distribution if the error is consistent along the value range. This can be seen in the graph below.



The results indicate that the model is systematically unbiased, and the time adjustments accurately reflect the market conditions.

Model Summary ^f										
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
5	.932 ^e	0.868	0.868	55189.110	0.000	1.602	1	25406	0.206	1.873

ANOVA ^a						
Model		Sum of Squares	df	Mean Square	F	Sig.
5	Regression	509286303478174.000	54	9431227842188.410	3096.431	<.001
	Residual	77385601366061.200	25407	3045837815.014		
	Total	586671904844235.000	25461			

a. Dependent Variable: SALE PRICE

This model is a hybrid model with the dependent variable being the sales price. A backward regression methodology was utilized. The independent variables are a combination of size, region, and site influences. 40 variables were considered statistically significant.

Land Model Summary										
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
20	.872 ¹	0.761	0.753	41711.484	-0.001	2.536	1	1121	0.112	1.830

ANOVA ^a						
Model		Sum of Squares	df	Mean Square	F	Sig.
20	Regression	6224456094507.310	40	155611402362.683	89.440	<.001
	Residual	1952109331879.440	1122	1739847889.376		
	Total	8176565426386.750	1162			

a. Dependent Variable: SALE PRICE

SALT WATERFRONT LAND MODEL SUMMARY

This model uses a forced regression technique with the independent variable being the residual land value. The independent variables are a combination of size, region, site influences and 3 time splines. 43 variables were statistically significant to predict value. The reference group for this single region is for very good view, medium bank, properties.

Salt Land Model Summary					
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.928	.861	.843	200327.202	1.741

ANOVA

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	73373455239014.23	39	1881370647154.21	46.881	<.001 ^b
	Residual	11838641372198.54	295	40130987702.368		
	Total	85212096611212.78	334			

NEIGHBORHOOD RATIO STATISTICS

SINGLE FAMILY RESIDENCES & LAND

NBHD	Mean	Median	Weighted Mean	Average Absolute Deviation	Price Related Differential	Coefficient of Dispersion	Coefficient of Variation Mean Centered
03U1	0.990	1.001	0.988	0.105	1.002	0.105	13.7%
06E2	0.958	0.952	0.943	0.118	1.016	0.124	17.8%
06U1	0.957	0.954	0.950	0.155	1.007	0.163	21.8%
06U2	1.033	0.999	1.004	0.145	1.029	0.145	18.9%
07E2	0.950	0.950	0.945	0.104	1.006	0.109	15.2%
08B2	0.946	0.914	0.960	0.121	0.985	0.132	18.4%
08H1	0.993	0.973	0.982	0.082	1.011	0.084	12.4%
08L1	0.983	0.971	0.976	0.084	1.007	0.087	12.8%
08N1	0.987	0.959	0.973	0.122	1.014	0.128	16.3%
09S1	0.985	0.967	0.960	0.100	1.026	0.103	15.4%
10G2	0.961	0.952	0.954	0.114	1.007	0.120	17.2%
10I1	0.930	0.943	0.926	0.095	1.004	0.101	13.6%
10O1	0.979	0.930	0.961	0.120	1.018	0.129	18.7%
10P1	0.950	0.950	0.933	0.119	1.018	0.125	15.7%
10P2	0.942	0.920	0.913	0.133	1.032	0.145	18.9%
11E1	0.932	0.946	0.924	0.110	1.008	0.116	16.1%
11F1	0.948	0.956	0.960	0.105	0.988	0.110	13.8%
11K1	0.941	0.947	0.940	0.053	1.001	0.056	7.2%
11L1	1.055	1.014	1.032	0.137	1.022	0.135	17.8%
11O1	0.988	0.973	0.984	0.081	1.004	0.084	10.2%
11U1	0.997	0.976	0.977	0.120	1.020	0.123	15.6%
12O1	0.977	0.933	0.965	0.081	1.013	0.087	11.9%
12P1	0.952	0.952	0.955	0.081	0.998	0.085	12.1%
12Q1	1.011	0.993	1.004	0.129	1.006	0.130	16.8%
12S2	0.991	0.971	0.984	0.094	1.007	0.097	12.5%
12U1	0.941	0.946	0.941	0.126	1.000	0.133	18.2%
12V3	0.961	0.958	0.966	0.068	0.995	0.071	8.8%
12W2	0.995	0.980	0.961	0.098	1.036	0.100	13.0%
13K1	0.971	0.949	0.946	0.129	1.026	0.136	19.5%
13R1	0.952	0.954	0.955	0.072	0.997	0.076	9.8%
13R2	0.942	0.946	0.946	0.100	0.996	0.106	13.0%
13T1	0.977	0.965	0.971	0.109	1.007	0.113	16.5%
13U1	0.973	0.953	0.966	0.091	1.008	0.095	13.2%
13V1	0.956	0.947	0.940	0.115	1.017	0.121	16.7%
13W1	0.980	0.989	0.972	0.070	1.008	0.071	9.3%

NBHD	Mean	Median	Weighted Mean	Average Absolute Deviation	Price Related Differential	Coefficient of Dispersion	Coefficient of Variation Mean Centered
13X1	0.974	0.949	0.970	0.076	1.004	0.080	12.0%
13Y1	0.993	0.972	0.991	0.116	1.001	0.120	16.5%
13Z1	0.952	0.944	0.954	0.102	0.998	0.108	14.7%
14H1	0.943	0.943	0.942	0.122	1.002	0.130	17.5%
14N1	0.958	0.951	0.940	0.100	1.019	0.105	16.3%
14P1	0.964	0.948	0.955	0.111	1.010	0.117	16.4%
14Q1	0.970	0.957	0.970	0.123	1.000	0.128	16.3%
14S2	0.952	0.941	0.955	0.118	0.997	0.125	15.2%
14T1	0.988	0.959	0.973	0.143	1.015	0.149	19.3%
14U2	0.957	0.961	0.944	0.117	1.014	0.122	17.3%
15K1	0.980	0.955	0.968	0.105	1.013	0.110	15.9%
15R2	0.946	0.939	0.941	0.118	1.006	0.126	16.8%
15S1	1.003	0.984	0.993	0.126	1.010	0.128	16.8%
15T1	1.015	0.971	1.012	0.142	1.003	0.146	18.4%
15T2	0.985	0.952	0.974	0.122	1.012	0.128	17.4%
15U1	0.967	0.962	0.973	0.112	0.995	0.116	15.5%
15U2	0.959	0.958	0.954	0.131	1.006	0.137	16.4%
15X1	0.961	0.956	0.978	0.111	0.983	0.116	14.4%
15XS	1.036	1.036	1.001	0.129	1.034	0.124	17.6%
16B1	0.983	0.956	0.971	0.167	1.012	0.175	23.1%
16F1	0.970	0.956	0.966	0.108	1.005	0.113	15.5%
16P1	0.951	0.946	0.947	0.066	1.005	0.069	9.5%
16Q1	0.967	0.948	0.944	0.103	1.024	0.109	15.6%
16Q2	0.944	0.940	0.941	0.074	1.003	0.078	9.5%
16R1	0.954	0.943	0.948	0.093	1.006	0.098	12.8%
16S1	0.970	0.937	0.954	0.126	1.017	0.135	18.5%
16S2	0.994	0.971	0.980	0.136	1.014	0.140	18.3%
16T1	0.897	0.933	0.909	0.138	0.987	0.148	18.9%
16W1	0.961	0.948	0.952	0.115	1.010	0.121	15.9%
17C1	1.005	1.001	1.001	0.157	1.004	0.157	21.2%
17G1	1.004	0.987	1.017	0.192	0.987	0.195	23.3%
17L1	0.962	0.949	0.929	0.130	1.036	0.137	20.0%
17Q1	0.953	0.946	0.946	0.060	1.007	0.064	9.9%
17R1	0.950	0.954	0.927	0.112	1.025	0.117	16.7%
17S1	0.947	0.941	0.946	0.068	1.001	0.073	9.8%
17S2	0.923	0.933	0.921	0.081	1.003	0.086	11.7%
17T1	0.968	0.948	0.938	0.138	1.032	0.146	19.5%
17U1	0.970	0.953	0.964	0.095	1.007	0.099	14.2%
17U2	0.967	0.949	0.962	0.079	1.005	0.083	12.2%

NBHD	Mean	Median	Weighted Mean	Average Absolute Deviation	Price Related Differential	Coefficient of Dispersion	Coefficient of Variation Mean Centered
17U3	0.952	0.950	0.949	0.062	1.003	0.065	7.8%
17Y1	0.976	0.955	0.969	0.121	1.007	0.127	17.2%
17Z1	0.997	0.970	0.974	0.121	1.023	0.125	16.1%
18L1	0.973	0.949	0.964	0.107	1.009	0.113	16.7%
18N1	0.986	0.984	0.976	0.085	1.010	0.086	13.1%
18P1	0.954	0.948	0.933	0.075	1.022	0.079	11.2%
18Q1	0.953	0.951	0.951	0.045	1.001	0.047	6.4%
18U2	0.949	0.951	0.949	0.031	1.001	0.032	4.0%
18U3	0.950	0.928	0.952	0.074	0.998	0.079	10.4%
18U4	0.949	0.946	0.945	0.051	1.005	0.054	6.6%
18W1	0.944	0.928	0.943	0.123	1.001	0.132	17.4%
19H1	0.992	0.976	0.977	0.146	1.016	0.150	19.3%
19P1	0.976	0.973	0.974	0.052	1.002	0.053	6.9%
19P2	0.957	0.942	0.954	0.069	1.004	0.073	9.9%
19Q1	0.969	0.952	0.967	0.066	1.002	0.069	9.5%
19Q2	0.983	0.953	0.975	0.076	1.009	0.080	13.2%
19Q3	0.937	0.935	0.935	0.051	1.001	0.055	6.9%
19R2	0.945	0.940	0.945	0.043	1.000	0.046	5.6%
19R3	0.943	0.939	0.939	0.067	1.003	0.071	9.4%
19R4	0.974	0.961	0.972	0.121	1.002	0.125	16.8%
19W1	0.935	0.927	0.931	0.083	1.005	0.089	12.0%
19Z1	0.979	0.945	0.972	0.117	1.007	0.124	18.0%
20P2	0.945	0.955	0.945	0.069	1.001	0.072	9.7%
20P3	0.949	0.944	0.953	0.101	0.995	0.107	12.8%
20Q1	0.961	0.920	0.940	0.098	1.023	0.106	12.5%
20R1	0.956	0.942	0.949	0.069	1.007	0.074	10.4%
20S1	0.967	0.950	0.961	0.082	1.006	0.087	11.4%
20T1	0.952	0.932	0.952	0.049	1.000	0.053	6.7%
20U1	0.944	0.927	0.936	0.087	1.008	0.094	13.2%
20V1	0.963	0.951	0.965	0.079	0.998	0.083	10.7%
20V2	0.952	0.955	0.953	0.046	0.999	0.048	6.7%
20W1	1.027	0.991	1.013	0.118	1.014	0.119	18.3%
20W2	0.991	0.958	0.992	0.098	1.000	0.102	14.0%
21H2	0.926	0.858	0.892	0.193	1.038	0.225	25.5%
21O1	0.978	0.967	0.977	0.072	1.001	0.074	9.3%
21Q3	0.949	0.945	0.948	0.051	1.002	0.054	6.8%
21R1	0.972	0.962	0.946	0.112	1.028	0.116	15.4%
21R2	0.960	0.952	0.954	0.072	1.007	0.075	10.2%
21S1	0.959	0.952	0.960	0.061	0.999	0.064	7.9%

NBHD	Mean	Median	Weighted Mean	Average Absolute Deviation	Price Related Differential	Coefficient of Dispersion	Coefficient of Variation Mean Centered
21T4	0.965	0.945	0.953	0.108	1.013	0.114	14.9%
22N1	0.993	0.976	0.982	0.105	1.011	0.108	15.8%
22Q1	0.964	0.938	0.956	0.089	1.009	0.094	14.0%
22Q2	0.965	0.951	0.957	0.067	1.009	0.070	10.9%
22T1	0.982	0.951	0.973	0.082	1.010	0.087	13.0%
22T2	0.978	0.966	0.969	0.101	1.009	0.105	14.5%
22T3	0.964	0.951	0.957	0.063	1.007	0.066	10.1%
23T2	0.975	0.974	0.968	0.060	1.008	0.062	7.8%
23U1	0.949	0.950	0.946	0.058	1.003	0.061	7.4%
23W1	0.973	0.962	0.966	0.082	1.007	0.086	13.1%
24I1	0.945	0.944	0.943	0.092	1.001	0.097	13.7%
24P1	1.033	0.982	1.012	0.146	1.021	0.149	19.6%
24Q1	0.997	0.966	0.987	0.087	1.010	0.090	13.6%
24Q2	0.963	0.956	0.950	0.129	1.014	0.134	17.8%
25I1	0.961	0.953	0.953	0.119	1.008	0.125	18.0%
25I2	0.940	0.944	0.936	0.065	1.004	0.068	9.8%
25J1	0.951	0.951	0.948	0.102	1.003	0.107	14.5%
25S1	0.971	0.950	0.973	0.077	0.998	0.081	11.3%
27H1	0.968	0.921	0.924	0.133	1.048	0.144	20.7%
27J1	1.007	0.960	0.973	0.130	1.035	0.135	20.8%
28F1	0.998	0.975	0.958	0.136	1.041	0.140	20.4%
28M1	0.967	0.935	0.947	0.119	1.020	0.127	19.5%
28N1	0.977	0.953	0.935	0.140	1.045	0.147	22.1%
29I1	0.985	0.965	0.965	0.107	1.021	0.111	16.1%
29K1	0.982	0.951	0.970	0.129	1.012	0.136	17.8%
29M1	0.985	0.982	0.988	0.144	0.997	0.147	18.8%
29M2	0.953	0.947	0.951	0.059	1.001	0.062	8.5%
29N1	0.962	0.950	0.959	0.074	1.004	0.078	10.7%
29N2	0.942	0.950	0.941	0.025	1.001	0.026	3.7%
30G1	0.934	0.916	0.915	0.151	1.021	0.165	22.1%
30G2	0.982	0.951	0.974	0.101	1.008	0.106	14.2%
30N1	0.966	0.955	0.951	0.112	1.016	0.117	16.6%
31K1	0.975	0.971	0.963	0.088	1.013	0.091	13.4%
32E1	1.035	0.996	1.008	0.227	1.027	0.228	27.1%
32I1	0.997	0.959	0.971	0.104	1.026	0.109	16.1%
34F1	1.003	0.972	0.941	0.181	1.067	0.186	24.6%
35E1	0.964	0.956	0.952	0.120	1.013	0.125	17.5%
DGBA	0.973	0.956	0.976	0.082	0.997	0.085	11.4%
DHBA	0.964	0.941	0.949	0.077	1.017	0.082	13.8%

NBHD	Mean	Median	Weighted Mean	Average Absolute Deviation	Price Related Differential	Coefficient of Dispersion	Coefficient of Variation Mean Centered
DHBB	0.949	0.967	0.944	0.109	1.006	0.113	15.0%
DHBC	0.969	0.958	0.964	0.055	1.005	0.058	9.8%
DHBD	0.985	0.976	0.987	0.058	0.997	0.059	7.3%
DHBE	0.953	0.934	0.956	0.072	0.996	0.077	9.2%
DHBF	0.968	0.968	0.967	0.046	1.002	0.047	7.3%
DUNA	0.951	0.952	0.946	0.072	1.005	0.075	9.1%
EUFA	0.984	0.957	0.977	0.090	1.007	0.094	13.6%
FCZG	0.957	0.945	0.946	0.077	1.012	0.082	10.4%
FD1A	0.952	0.950	0.947	0.066	1.005	0.069	8.5%
FD1B	0.912	0.905	0.901	0.068	1.013	0.075	8.9%
FD4A	0.946	0.947	0.944	0.039	1.002	0.041	5.8%
FD4B	0.946	0.942	0.945	0.048	1.001	0.051	6.8%
FDRA	0.950	0.946	0.946	0.051	1.004	0.054	8.5%
FDU1	0.954	0.949	0.979	0.096	0.974	0.101	13.4%
FDWA	0.959	0.948	0.946	0.071	1.014	0.075	11.2%
FDWB	0.961	0.949	0.957	0.072	1.004	0.076	9.9%
FDYA	0.968	0.952	0.959	0.087	1.009	0.092	12.6%
FDYB	0.963	0.950	0.957	0.091	1.007	0.096	12.8%
FFHA	0.944	0.942	0.941	0.049	1.003	0.052	6.6%
FFHB	0.946	0.947	0.945	0.049	1.001	0.052	6.6%
FFKA	0.957	0.946	0.946	0.078	1.011	0.082	10.3%
FFKB	0.939	0.940	0.938	0.040	1.001	0.042	5.4%
FFMA	0.976	0.983	0.965	0.065	1.012	0.066	9.7%
FFWA	0.941	0.939	0.939	0.051	1.002	0.055	7.6%
FFWB	0.940	0.923	0.932	0.084	1.009	0.091	12.2%
FFWC	0.943	0.940	0.942	0.049	1.001	0.053	6.6%
FFXA	0.936	0.941	0.928	0.037	1.009	0.040	5.5%
FFXB	0.959	0.952	0.957	0.056	1.002	0.059	7.3%
GCF1	1.023	0.968	0.979	0.064	1.045	0.066	11.2%
GTUE	0.954	0.949	0.952	0.053	1.002	0.056	7.7%
GTUF	0.944	0.947	0.942	0.054	1.003	0.057	7.8%
GTUG	0.944	0.953	0.942	0.056	1.003	0.058	7.2%
GTUH	0.991	0.965	0.981	0.092	1.011	0.095	15.8%
HTW1	0.966	0.946	0.963	0.067	1.004	0.071	10.3%
HTW2	0.953	0.955	0.953	0.046	1.000	0.048	5.7%
HTW3	0.996	0.985	0.994	0.084	1.002	0.086	11.1%
HTW4	0.946	0.963	0.946	0.054	1.000	0.056	7.6%
LXQA	0.935	0.928	0.931	0.055	1.004	0.059	7.6%
LXQB	0.900	0.906	0.903	0.049	0.996	0.054	7.4%

NBHD	Mean	Median	Weighted Mean	Average Absolute Deviation	Price Related Differential	Coefficient of Dispersion	Coefficient of Variation Mean Centered
LXWA	0.942	0.952	0.941	0.054	1.001	0.056	7.7%
LXWB	0.968	0.944	0.964	0.066	1.003	0.070	9.3%
LXWC	0.991	1.004	0.988	0.073	1.003	0.073	9.4%
LXWD	1.008	1.013	1.007	0.040	1.000	0.039	5.2%
LXWE	0.987	0.984	0.986	0.043	1.000	0.044	5.3%
NDAA	0.961	0.949	0.959	0.050	1.002	0.052	8.3%
NDAB	0.942	0.941	0.941	0.049	1.001	0.052	6.4%
NDFA	0.952	0.949	0.946	0.053	1.006	0.056	7.1%
NDFB	0.950	0.943	0.944	0.045	1.005	0.048	7.4%
NDFC	0.954	0.948	0.954	0.041	1.000	0.043	5.1%
NDUA	0.947	0.945	0.947	0.030	1.000	0.032	4.3%
NDWA	0.951	0.948	0.950	0.047	1.001	0.049	6.9%
NDWB	0.950	0.944	0.950	0.056	1.000	0.059	7.0%
NDWC	0.957	0.946	0.954	0.067	1.002	0.071	8.7%
NDXA	0.962	0.947	0.955	0.061	1.007	0.065	9.9%
OCUA	0.992	0.975	0.979	0.083	1.013	0.085	10.7%
OD1A	0.967	0.943	0.956	0.078	1.011	0.082	12.9%
ODEA	0.954	0.945	0.952	0.052	1.002	0.055	8.4%
ODWA	0.943	0.945	0.942	0.045	1.002	0.048	6.1%
ODXA	0.958	0.949	0.956	0.056	1.002	0.059	8.1%
OFFA	0.949	0.947	0.946	0.059	1.002	0.063	8.8%
OFUA	0.943	0.945	0.939	0.062	1.003	0.065	7.7%
QZA1	1.025	1.009	0.998	0.127	1.027	0.126	17.2%
QZA4	1.054	1.016	1.023	0.111	1.029	0.109	15.3%
QZU1	1.000	0.962	0.954	0.124	1.048	0.129	19.6%
QZU4	1.002	0.997	0.953	0.130	1.051	0.131	17.2%
T14A	0.954	0.913	0.939	0.153	1.016	0.168	20.2%
TDFA	0.953	0.950	0.953	0.053	1.000	0.056	7.2%
TDFB	0.955	0.952	0.954	0.043	1.002	0.045	6.0%
TDKA	0.964	0.966	0.964	0.066	1.000	0.068	8.7%
TDTA	0.931	0.937	0.930	0.062	1.001	0.066	8.3%
TEAA	0.970	0.950	0.964	0.062	1.006	0.065	10.0%
TFFA	0.901	0.901	0.903	0.076	0.998	0.084	11.3%
TFWA	0.945	0.943	0.942	0.049	1.003	0.052	6.8%
TFZA	0.918	0.918	0.917	0.057	1.001	0.062	8.1%
THUA	0.948	0.948	0.946	0.048	1.002	0.051	6.7%
THUB	0.949	0.940	0.948	0.061	1.001	0.065	8.6%
THUC	0.949	0.948	0.949	0.059	1.000	0.062	7.2%
TJ2A	0.930	0.948	0.928	0.031	1.002	0.033	4.4%

NBHD	Mean	Median	Weighted Mean	Average Absolute Deviation	Price Related Differential	Coefficient of Dispersion	Coefficient of Variation Mean Centered
XC2A	0.985	0.999	0.982	0.077	1.003	0.078	10.0%
Overall	0.962	0.951	0.955	0.087	1.007	0.092	13.3%

CONDOMINIUMS

NBHD	Mean	Median	Weighted Mean	Average Absolute Deviation	Price Related Differential	Coefficient of Dispersion	Coefficient of Variation Mean Centered
CN01	0.951	0.947	0.956	0.061	0.994	0.065	7.9%
CN02	0.946	0.946	0.946	0.011	1.000	0.012	1.7%
CN03	0.931	0.910	0.931	0.063	1.000	0.069	10.1%
CN04	0.992	0.979	0.974	0.105	1.018	0.107	14.1%
CN05	0.985	0.958	0.970	0.111	1.016	0.116	15.2%
CN06	0.970	0.953	0.960	0.077	1.011	0.080	10.8%
CN07	0.996	0.970	0.976	0.121	1.020	0.124	17.8%
CN08	0.952	0.950	0.954	0.057	0.998	0.060	8.3%
CN09	0.991	0.998	0.987	0.043	1.003	0.043	6.2%
CN10	0.929	0.948	0.928	0.053	1.002	0.055	6.7%
CN11	0.978	0.952	0.971	0.086	1.007	0.091	12.6%
CN12	0.942	0.949	0.940	0.057	1.003	0.060	7.4%
CN13	0.957	0.918	0.956	0.053	1.001	0.058	7.0%
CN14	0.961	0.953	0.940	0.148	1.022	0.155	19.2%
CN15	0.946	0.949	0.944	0.034	1.002	0.036	4.8%
CN16	0.949	0.948	0.949	0.067	1.000	0.071	9.3%
CN17	0.938	0.929	0.935	0.043	1.003	0.047	6.7%
CN18	0.920	0.915	0.892	0.081	1.030	0.089	11.1%
CN20	0.911	0.930	0.911	0.044	1.000	0.047	6.6%
CN21	0.992	0.990	0.987	0.053	1.005	0.054	7.5%
CN22	0.947	0.950	0.945	0.065	1.003	0.069	9.1%
CN23	0.959	0.958	0.958	0.035	1.001	0.036	5.3%
CN24	0.987	0.967	0.977	0.085	1.011	0.088	11.0%
CN25	0.907	0.941	0.884	0.166	1.026	0.176	22.3%
CN27	1.039	1.025	1.017	0.096	1.021	0.094	15.1%
CN28	0.950	0.950	0.947	0.048	1.003	0.051	6.8%
CN29	0.966	0.944	0.924	0.128	1.046	0.136	20.7%
CN30	0.919	0.934	0.913	0.068	1.007	0.073	9.0%
CN32	0.965	0.950	0.963	0.037	1.001	0.039	4.7%
CN33	0.974	0.910	0.955	0.103	1.020	0.113	15.4%
CN34	1.006	1.020	1.000	0.066	1.006	0.065	9.0%
CN35	0.953	0.952	0.949	0.049	1.003	0.052	7.1%

Overall	0.963	0.956	0.952	0.086	1.011	0.090	12.6%
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MANUFACTURED HOMES ON LAND

Region	Mean	Median	Weighted Mean	Average Absolute Deviation	Price Related Differential	Coefficient of Dispersion	Coefficient of Variation Mean Centered
01	0.978	0.907	0.955	0.107	1.024	0.118	17.5%
03	0.980	0.951	0.955	0.139	1.026	0.146	20.0%
04	0.981	0.930	0.936	0.158	1.048	0.170	22.3%
05	0.936	0.947	0.928	0.096	1.008	0.102	15.2%
06	0.950	0.921	0.938	0.134	1.013	0.146	20.0%
07	0.989	0.972	0.955	0.137	1.036	0.142	18.4%
08	0.939	0.933	0.920	0.091	1.021	0.097	17.2%
09	0.928	0.904	0.917	0.156	1.012	0.173	21.8%
10	0.921	0.891	0.900	0.134	1.023	0.150	19.8%
11	0.954	0.907	0.925	0.157	1.031	0.174	22.5%
14	0.980	0.898	0.940	0.186	1.042	0.207	26.3%
16	0.991	0.991	0.973	0.126	1.019	0.127	16.8%
17	0.969	0.913	0.950	0.138	1.020	0.151	20.3%
Overall	0.947	0.916	0.924	0.145	1.025	0.158	20.9%

MANUFACTURED HOMES IN PARKS

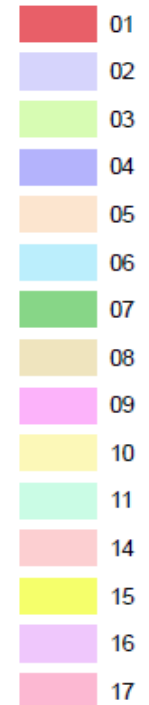
NBHD	Mean	Median	Weighted Mean	Average Absolute Deviation	Price Related Differential	Coefficient of Dispersion	Coefficient of Variation Mean Centered
MBLK	1.102	1.027	1.036	0.276	1.064	0.269	29.6%
MHPR	1.032	0.991	1.014	0.297	1.018	0.300	34.6%
MLLK	1.116	1.009	0.839	0.268	1.330	0.266	30.6%
MMC1	0.931	0.943	0.776	0.228	1.200	0.241	30.1%
MMC2	0.947	0.927	0.856	0.276	1.106	0.298	34.4%
MMR1	1.020	0.977	1.004	0.215	1.016	0.220	29.9%
MMT1	0.953	0.940	0.921	0.161	1.035	0.171	24.9%
MRGD	0.940	0.923	0.939	0.166	1.001	0.180	23.3%
MRR1	0.856	0.868	0.834	0.148	1.027	0.170	20.3%
MRT1	1.011	0.928	0.870	0.211	1.162	0.227	25.1%
MTRY	0.980	0.951	0.890	0.256	1.101	0.269	33.2%
MUE1	0.969	0.939	0.943	0.143	1.028	0.152	20.6%
MUE2	0.954	0.950	0.946	0.096	1.009	0.101	12.0%

NBHD	Mean	Median	Weighted Mean	Average Absolute Deviation	Price Related Differential	Coefficient of Dispersion	Coefficient of Variation Mean Centered
MUG1	0.938	0.922	0.926	0.125	1.012	0.136	17.1%
MUG2	0.924	0.946	0.911	0.117	1.015	0.124	16.5%
MUL1	0.950	0.946	0.916	0.199	1.037	0.210	25.8%
MUL2	0.982	0.939	0.834	0.266	1.177	0.283	34.3%
MUL3	0.920	0.892	0.930	0.118	0.990	0.133	20.0%
MUL4	0.907	0.868	0.788	0.196	1.152	0.226	29.4%
MUL5	0.911	0.908	0.883	0.187	1.033	0.206	24.2%
MUL6	0.906	0.922	0.804	0.206	1.127	0.223	27.9%
MUO1	0.977	0.965	0.939	0.178	1.041	0.185	24.5%
MUO2	0.952	0.925	0.940	0.076	1.013	0.083	10.6%
MUT1	1.013	0.916	0.944	0.222	1.073	0.242	34.4%
MUT2	0.977	0.943	0.943	0.191	1.036	0.202	24.8%
MUY1	0.961	0.937	0.962	0.132	0.999	0.140	17.0%
MWLY	0.942	0.902	0.876	0.224	1.075	0.248	28.7%
Overall	0.961	0.938	0.925	0.188	1.040	0.201	25.5%

SALTWATER

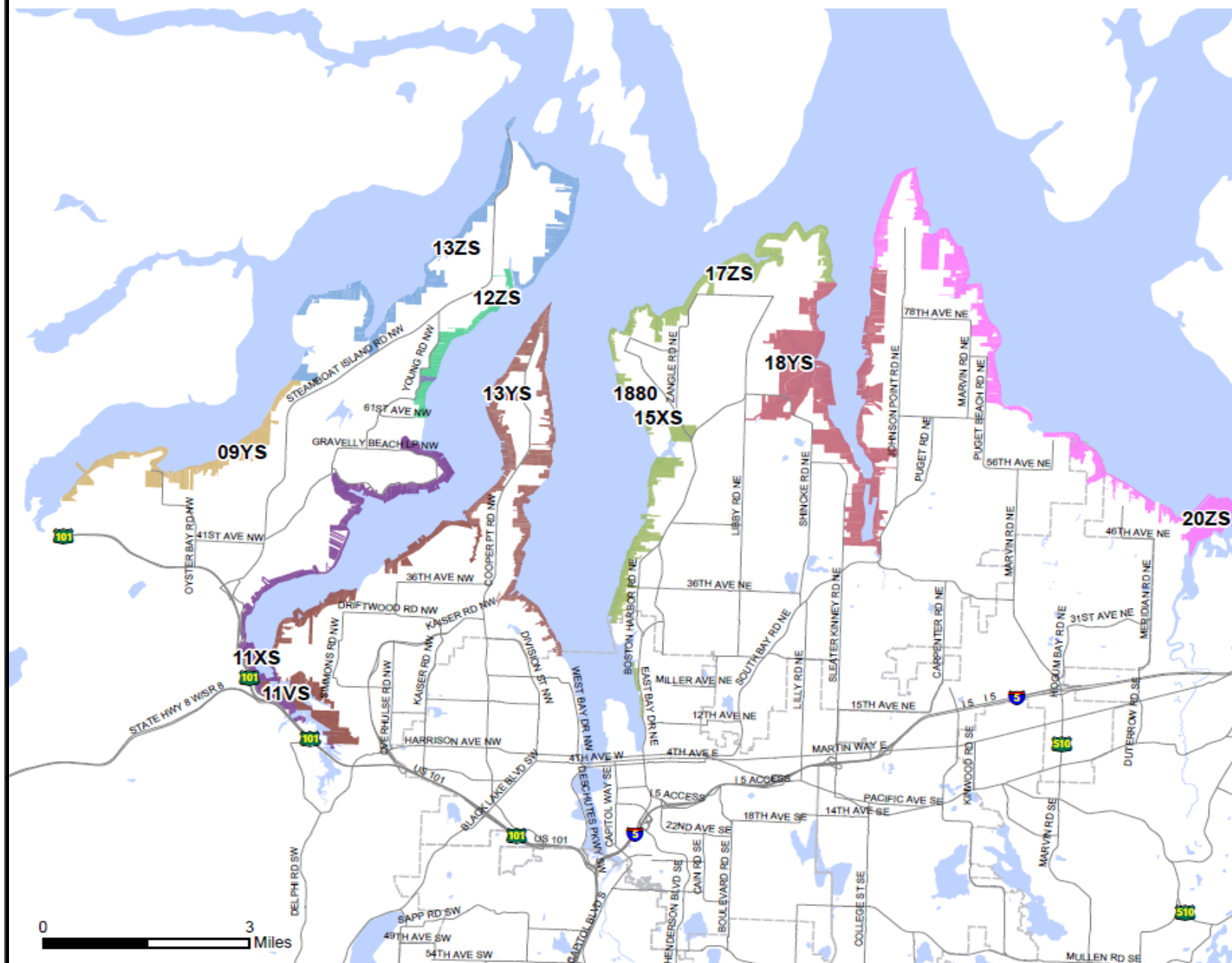
NBHD	Mean	Median	Weighted Mean	Average Absolute Deviation	Price Related Differential	Coefficient of Dispersion	Coefficient of Variation Mean Centered
09YS	0.900	0.911	0.936	0.142	0.962	0.156	20.8%
11VS	0.982	0.957	0.949	0.120	1.036	0.126	14.6%
11XS	0.981	0.952	0.977	0.152	1.004	0.160	20.4%
12ZS	1.013	0.987	1.035	0.174	0.979	0.176	21.9%
13YS	0.986	0.975	0.969	0.164	1.017	0.169	22.6%
13ZS	0.971	0.972	0.959	0.131	1.013	0.134	17.3%
15XS	0.975	0.945	0.970	0.104	1.006	0.110	14.6%
17ZS	0.920	0.949	0.935	0.136	0.984	0.143	19.3%
18YS	1.028	1.027	1.036	0.185	0.992	0.180	22.7%
20ZS	0.930	0.937	0.934	0.115	0.996	0.122	15.9%
Overall	0.967	0.951	0.962	0.140	1.005	0.147	19.1%

Residential Regions



Residential Neighborhoods Region 01

09YS
11VS
11XS
12ZS
13YS
13ZS
15XS
17ZS
1880
18YS
20ZS



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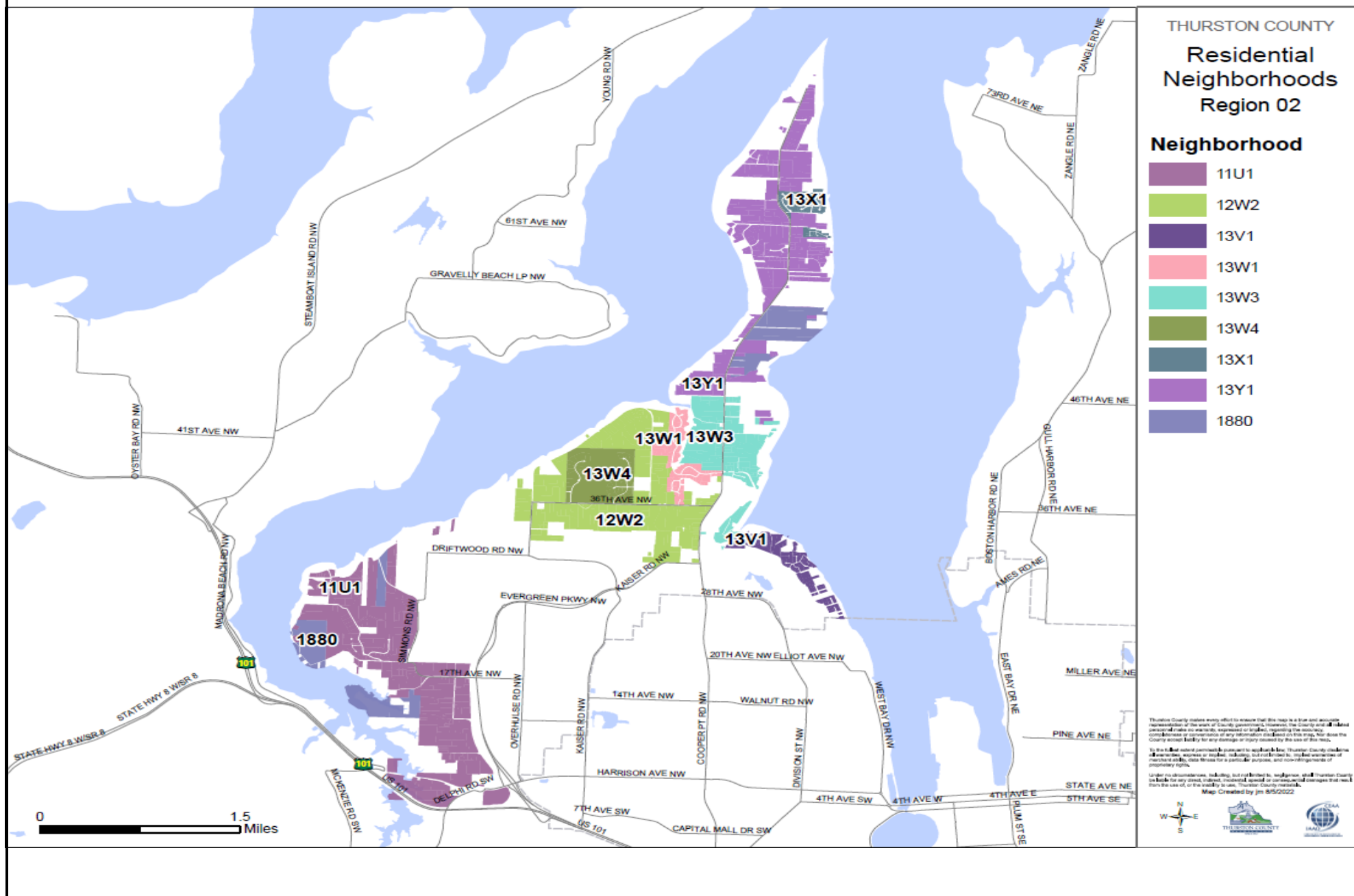
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Region 2



THURSTON COUNTY

Residential Neighborhoods Region 03

Neighborhood

- 15X1
- 16W1
- 17Y1
- 17Z1
- 1880
- 18W1
- 19W1
- 19Z1
- 20V1
- 20V2
- 20W1
- 20W2
- 23W1
- TDFA
- TDFB

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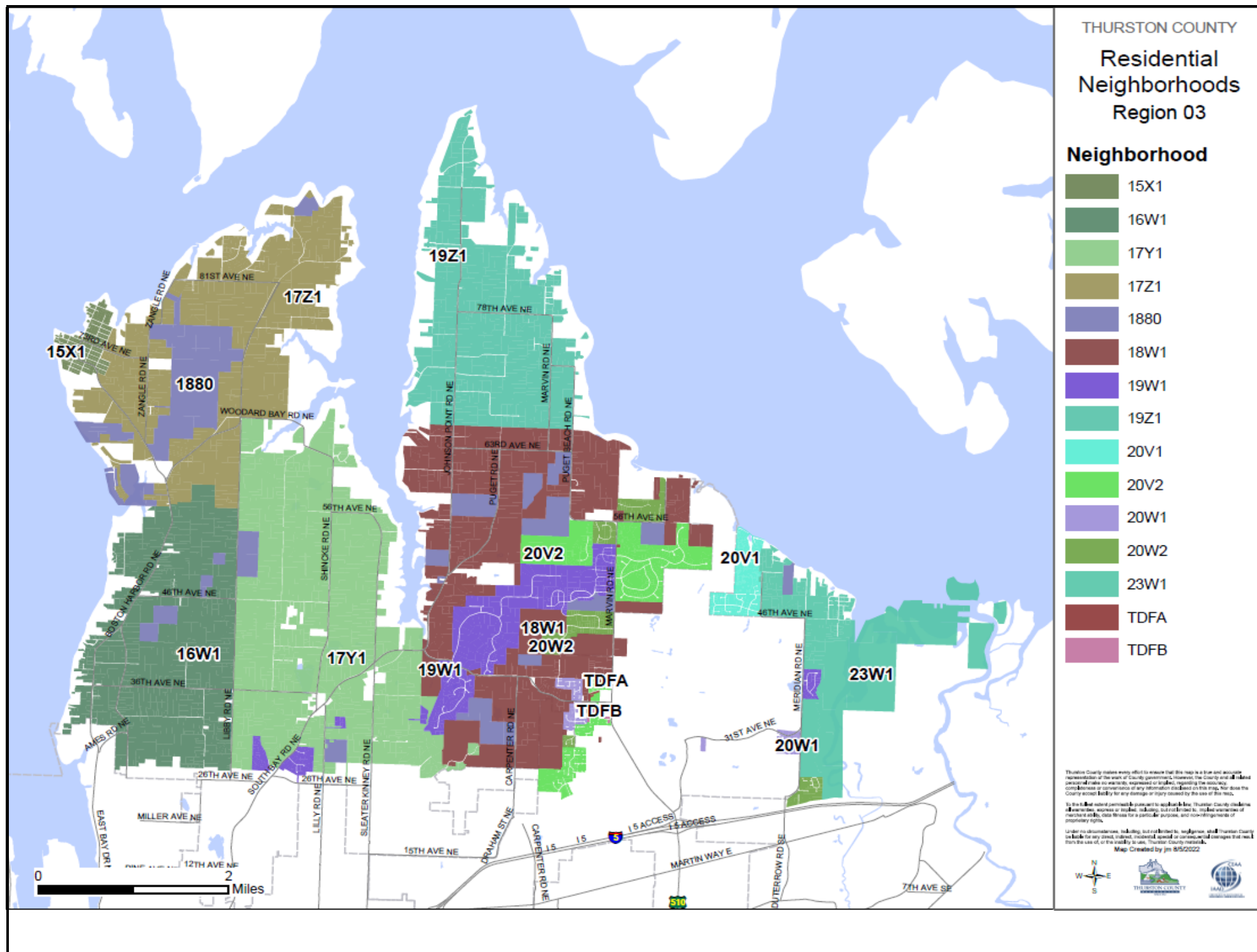
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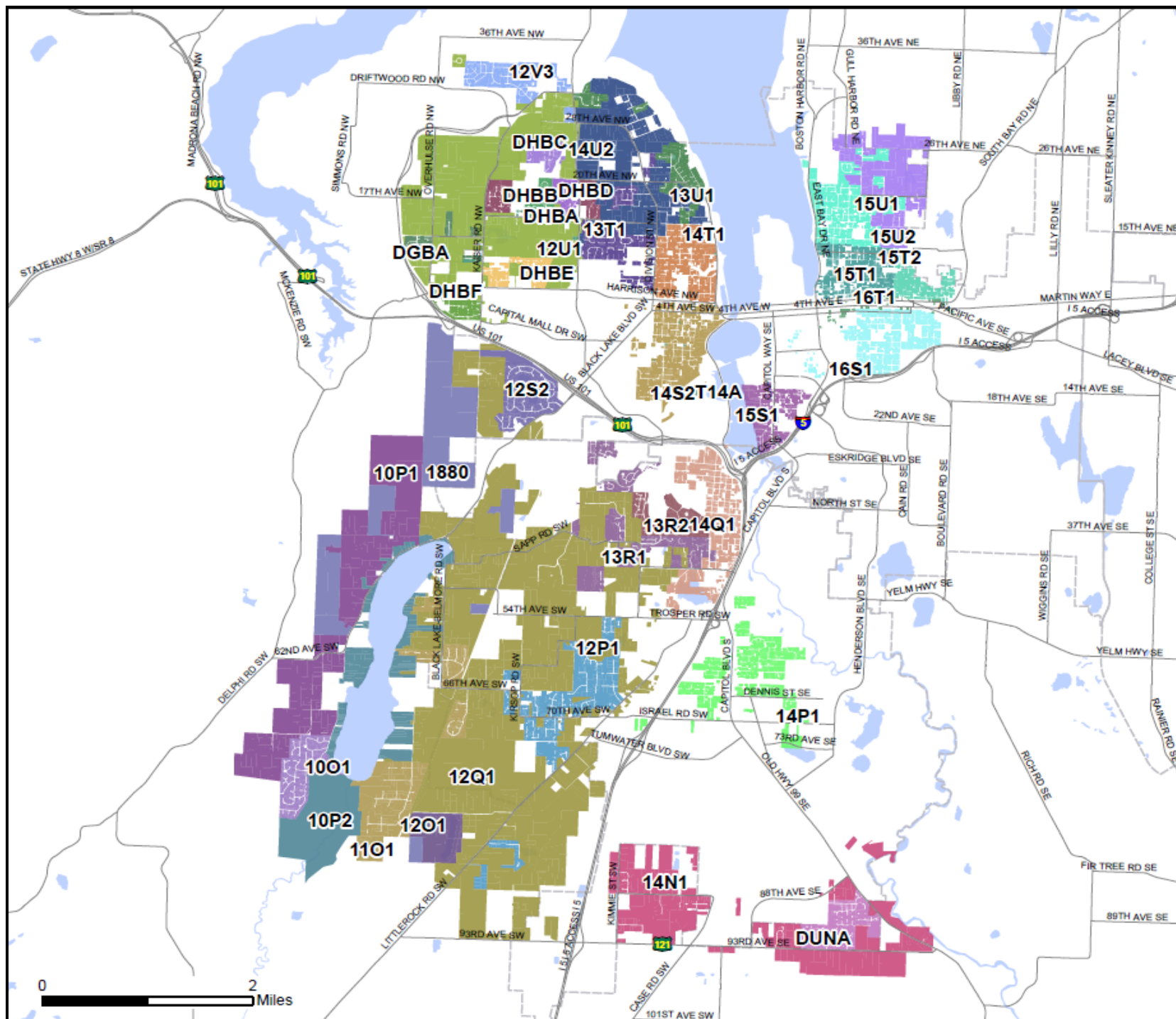
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THURSTON COUNTY

Residential Neighborhoods Region 04

Neighborhood		14T1
10O1		14U2
10P1		15S1
10P2		15T1
11O1		15T2
12O1		15U1
12P1		15U2
12Q1		16S1
12S2		16T1
12U1		1880
12V3		DGBA
13R1		DHBA
13R2		DHBB
13T1		DHBC
13U1		DHBD
14N1		DHBE
14P1		DHBF
14Q1		DUNA
14S2		T14A



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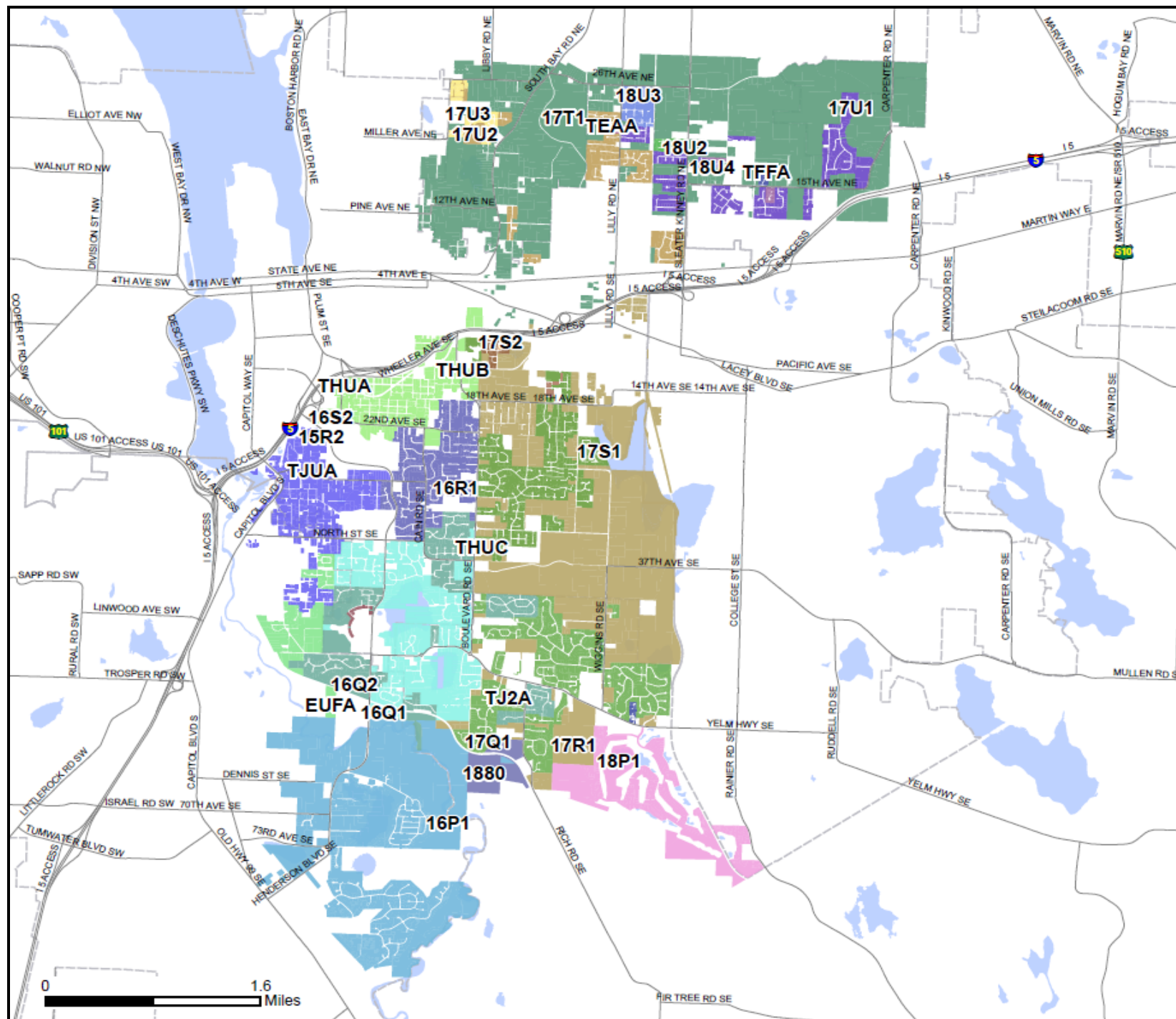
Map Created by Jim 8/5/2022



THURSTON COUNTY

Residential Neighborhoods Region 05

Neighborhood	17U3
15R2	1880
16P1	18P1
16Q1	18U2
16Q2	18U3
16R1	18U4
16S2	EUFA
17Q1	TEAA
17R1	TFFA
17S1	THUA
17S2	THUB
17T1	THUC
17U1	TJ2A
17U2	TJUA



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THURSTON COUNTY

Residential Neighborhoods Region 06

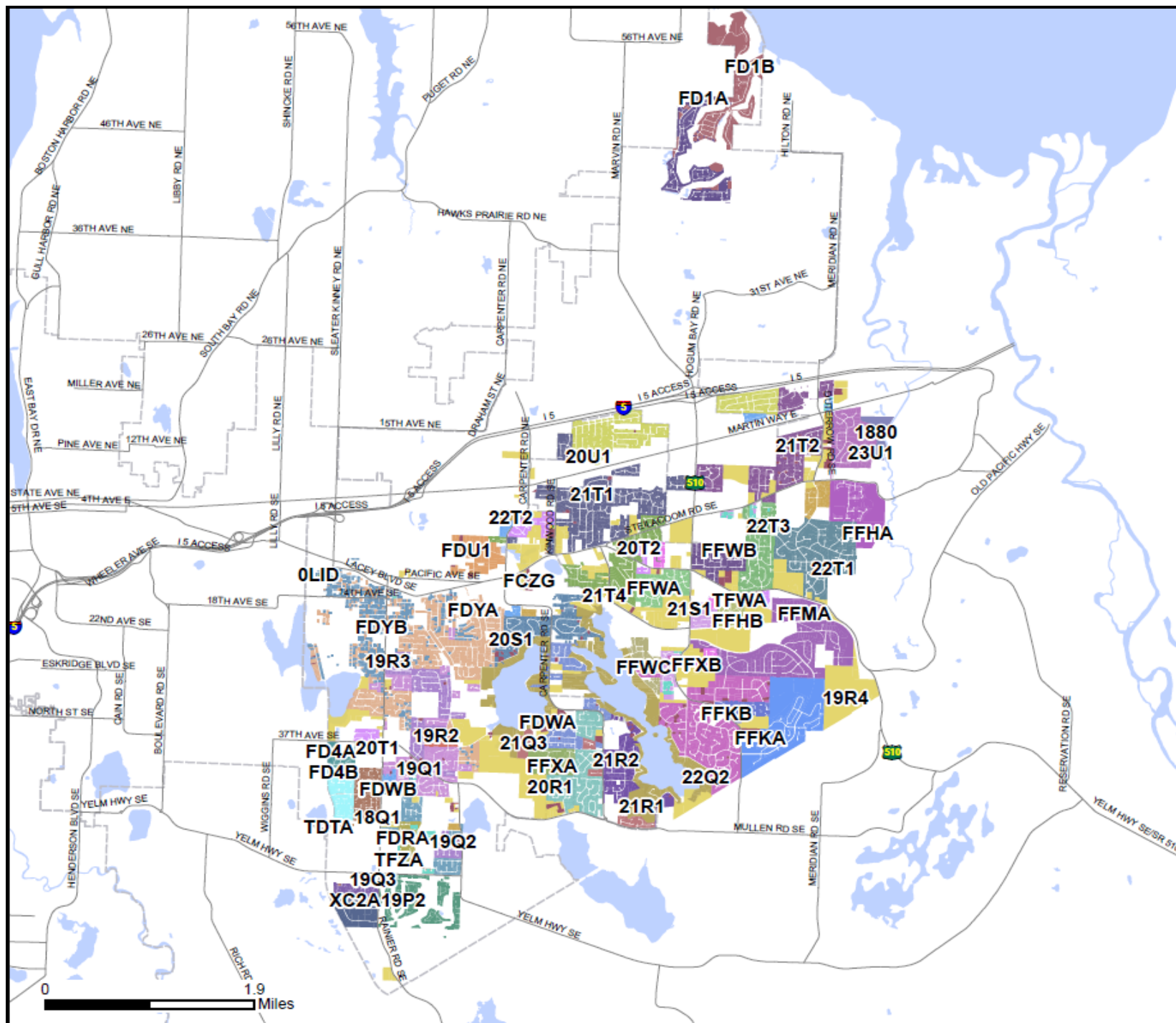
Neighborhood	23U1
0LID	FCZG
1880	FD1A
18Q1	FD1B
19P2	FD4A
19Q1	FD4B
19Q2	FDRA
19Q3	FDU1
19R2	FDWA
19R3	FDWB
19R4	FDYA
20R1	FDYB
20S1	FFHA
20T1	FFHB
20T2	FFKA
20U1	FFKB
21Q3	FFMA
21R1	FFWA
21R2	FFWB
21S1	FFWC
21T1	FFXA
21T2	FFXB
21T4	TDTA
22Q2	TFWA
22T1	TFZA
22T2	XC2A
22T3	

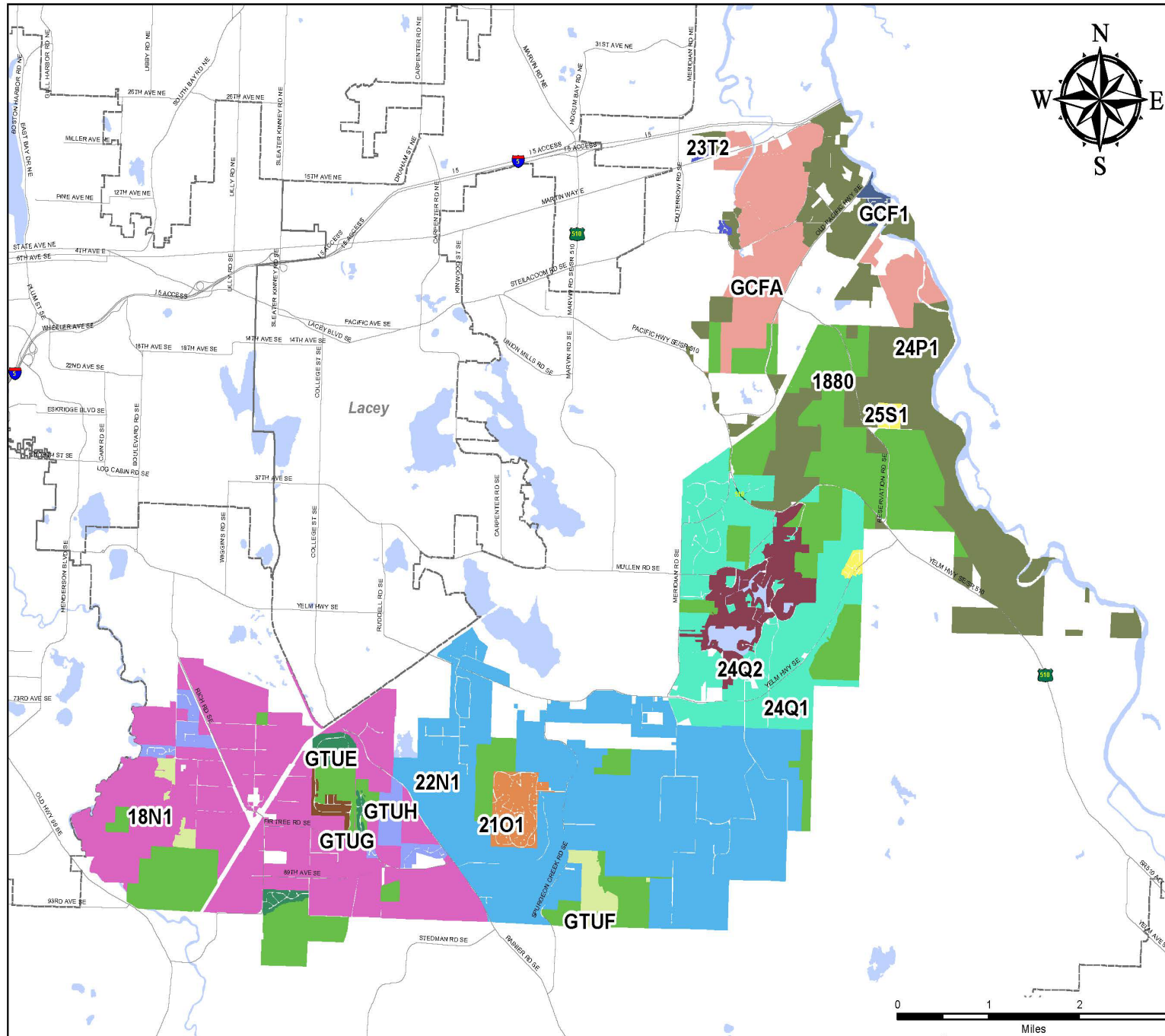
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Map Created by Jim 8/5/2022





THURSTON COUNTY
Residential
Neighborhoods
Region 07

Neighborhood

- 1880
- 18N1
- 21O1
- 22N1
- 23T2
- 24P1
- 24Q1
- 24Q2
- 25S1
- GCF1
- GCFA
- GTUE
- GTUF
- GTUG
- GTUH



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Map Created by dq on 5/31/2023

THURSTON COUNTY

Residential Neighborhoods Region 08

Neighborhood

- 06N1
- 08H1
- 08L1
- 08N1
- 09S1
- 1880
- HTW1
- HTW2
- HTW3
- HTW4

0 3 Miles

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Map Created by Jim 8/5/2022

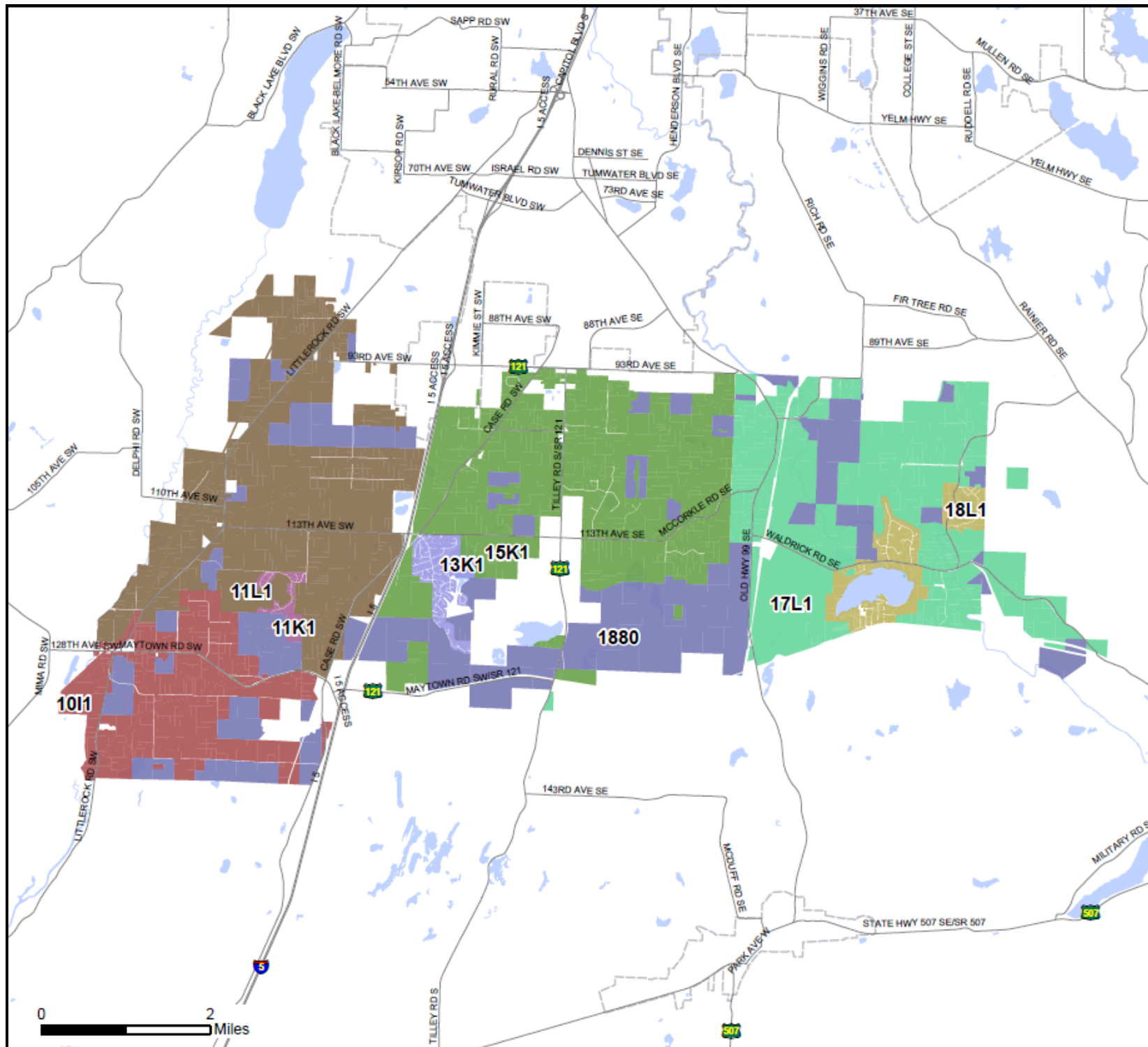


THURSTON COUNTY

Residential Neighborhoods Region 09

Neighborhood

- 10I1
- 11K1
- 11L1
- 13K1
- 15K1
- 17L1
- 1880
- 18L1



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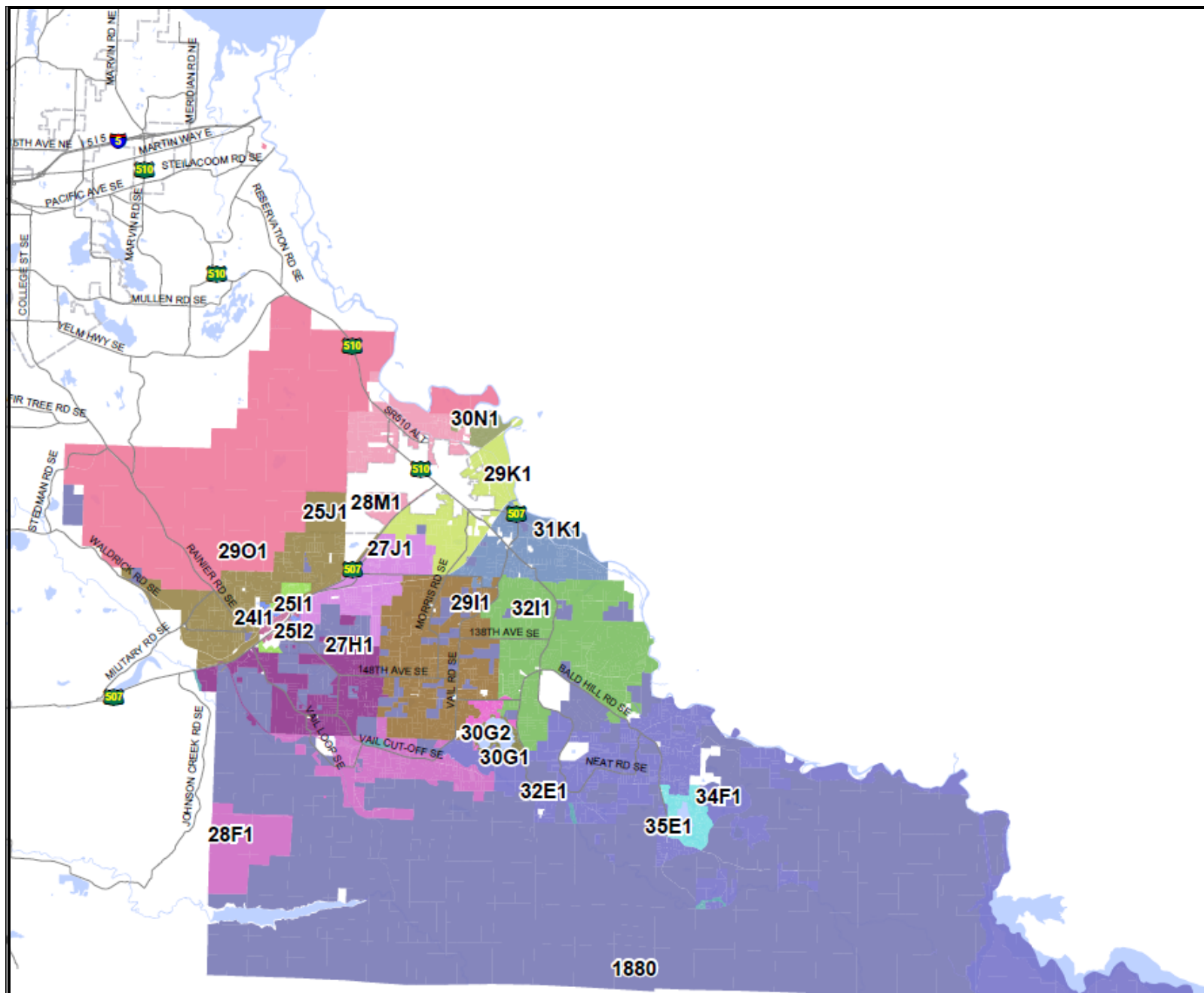


THURSTON COUNTY

Residential Neighborhoods Region 10

Neighborhood

- 1880
- 2411
- 2511
- 2512
- 25J1
- 27H1
- 27J1
- 28F1
- 28M1
- 2911
- 29K1
- 29O1
- 30G1
- 30G2
- 30N1
- 31K1
- 32E1
- 3211
- 34F1
- 35E1



0 5 Miles

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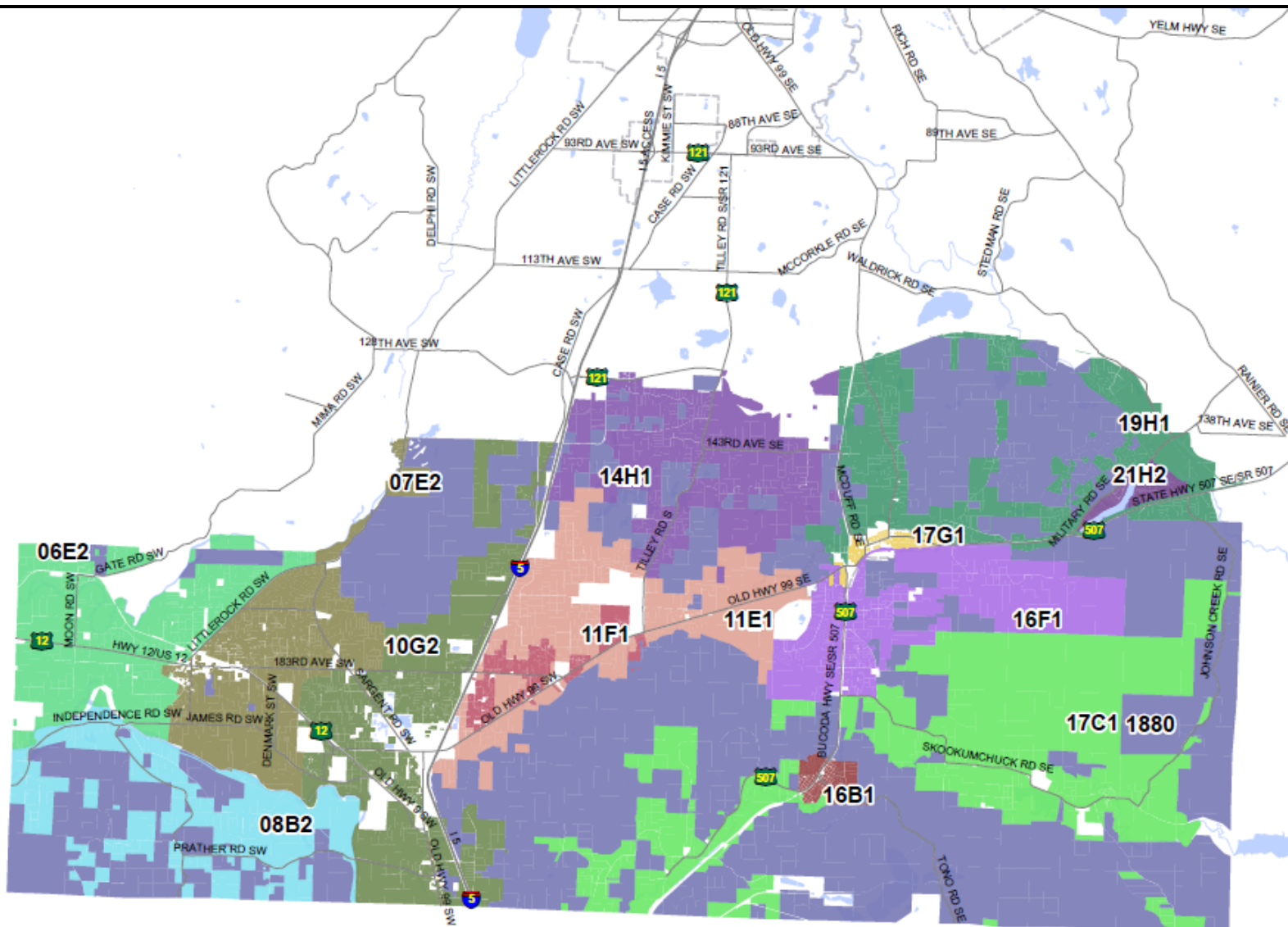


THURSTON COUNTY

Residential Neighborhoods Region 11

Neighborhood

- 06E2
- 07E2
- 08B2
- 10G2
- 11E1
- 11F1
- 14H1
- 16B1
- 16F1
- 17C1
- 17G1
- 1880
- 19H1
- 21H2



0 4 Miles

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It is the intent of this map to provide a general overview of the County's residential neighborhoods. It is not intended to be used for legal purposes. For more information, please contact the County's Planning Department.

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Map Created by Jim 8/5/2022



THURSTON COUNTY

Residential Neighborhoods Region 14

Neighborhood

- 28N1
- 29M1
- 29M2
- 29N1
- 29N2
- LXQA
- LXQB
- LXWA
- LXWB
- LXWC
- LXWD
- LXWE

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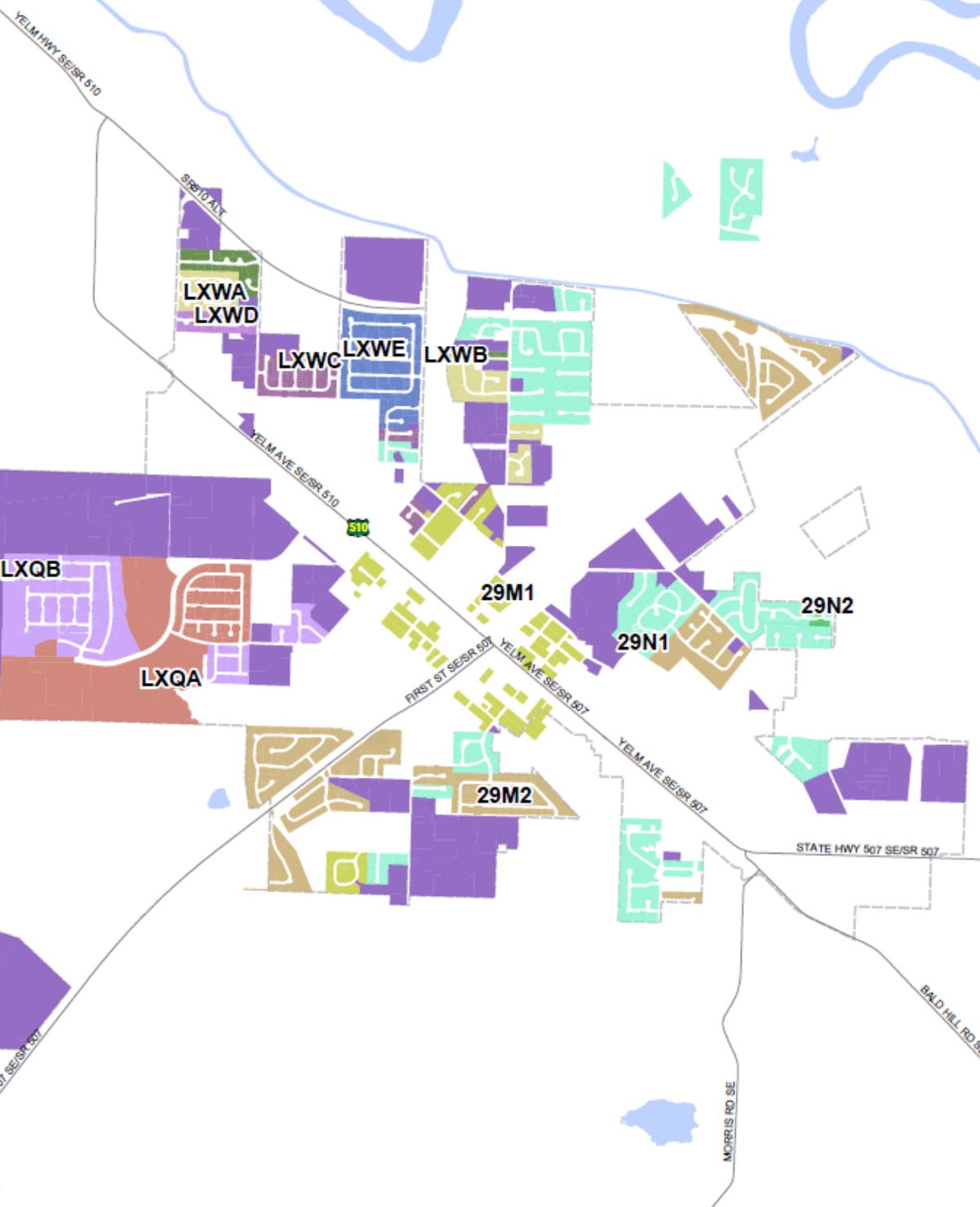
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Map Created by Jen 8/5/2022



0 0.7 Miles



THURSTON COUNTY

Residential Neighborhoods Region 15

Neighborhood

- NDAA
- NDAB
- NDFA
- NDFB
- NDFC
- NDUA
- NDWA
- NDWB
- NDWC
- NDXA
- TFZA

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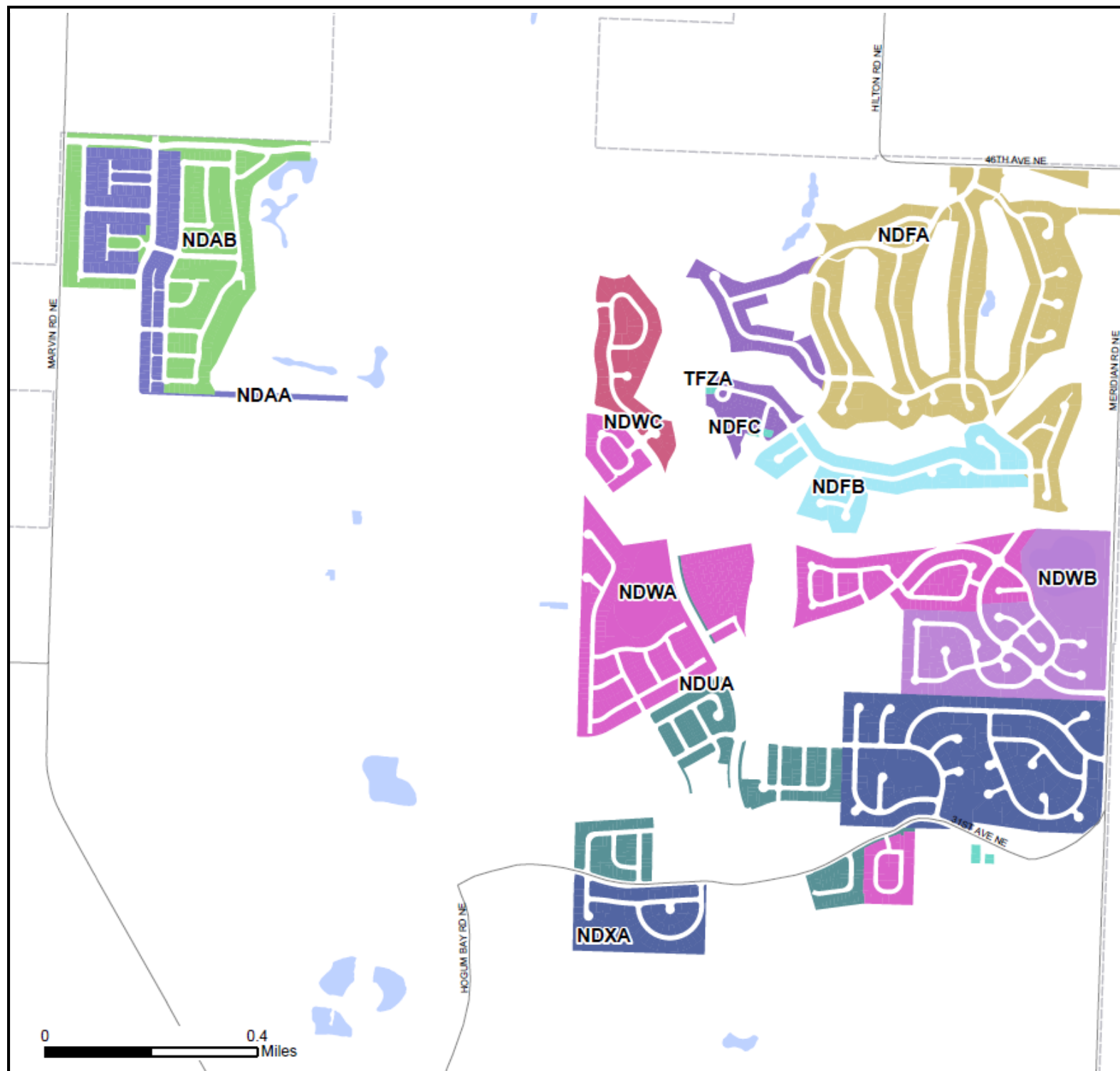
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0 0.4 Miles

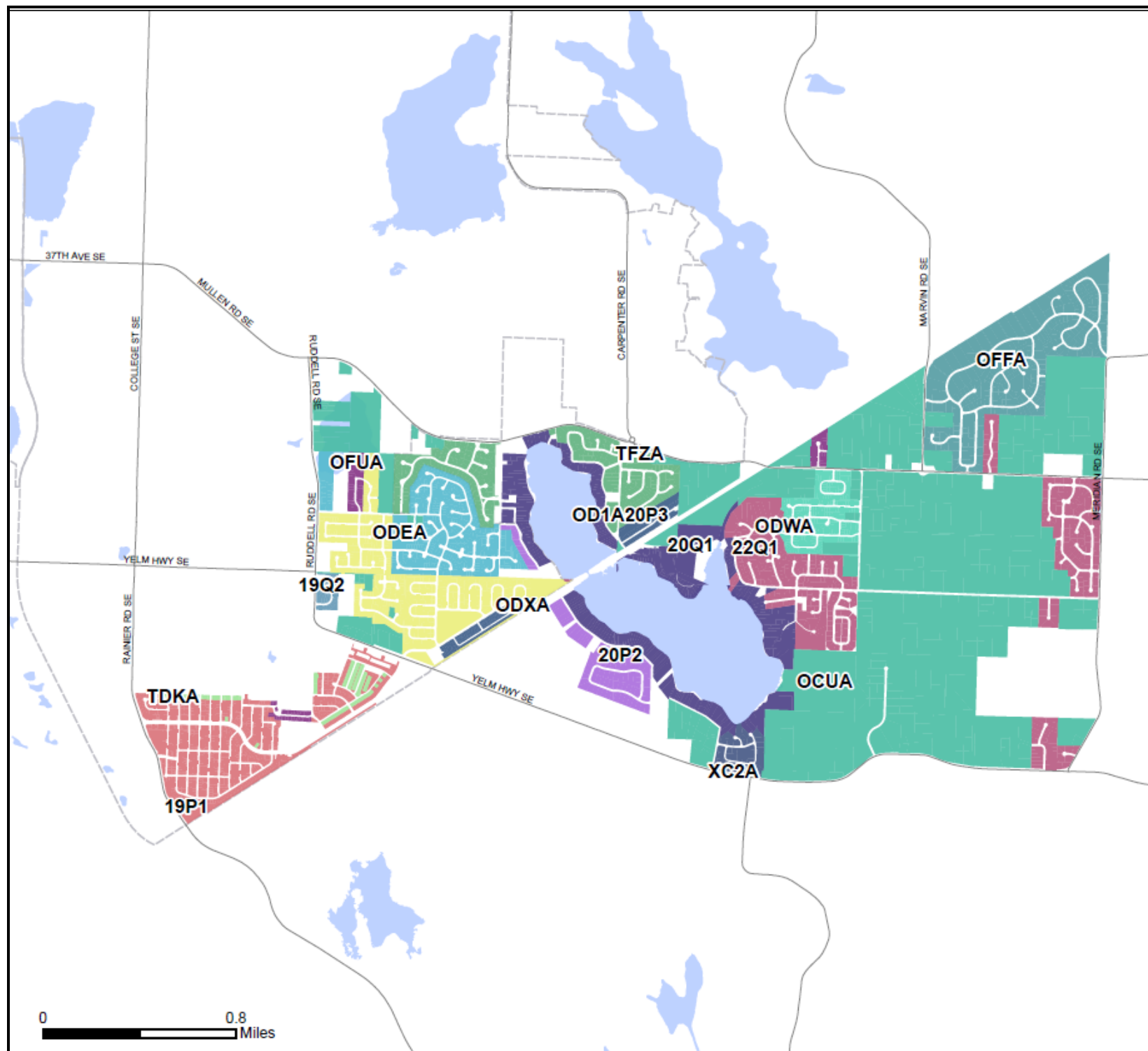


THURSTON COUNTY

Residential Neighborhoods Region 16

Neighborhood

- 19P1
- 19Q2
- 20P2
- 20P3
- 20Q1
- 22Q1
- OCUA
- OD1A
- ODEA
- ODWA
- ODXA
- OFFA
- OFUA
- TDKA
- TFZA
- XC2A



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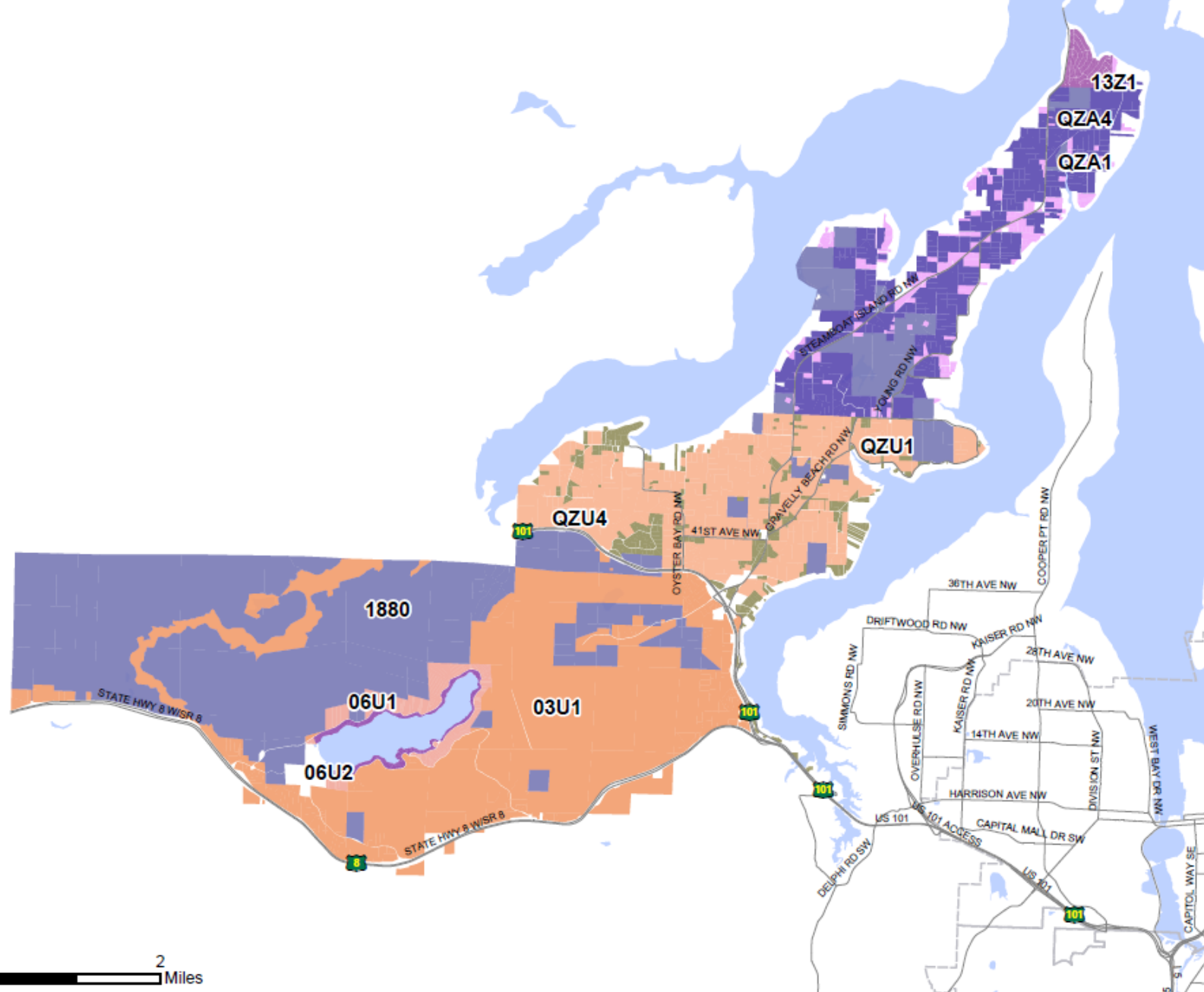
0 0.8 Miles

THURSTON COUNTY

Residential Neighborhoods Region 17

Neighborhood

- 03U1
- 06U1
- 06U2
- 13Z1
- 1880
- QZA1
- QZA4
- QZU1
- QZU4



0 2 Miles

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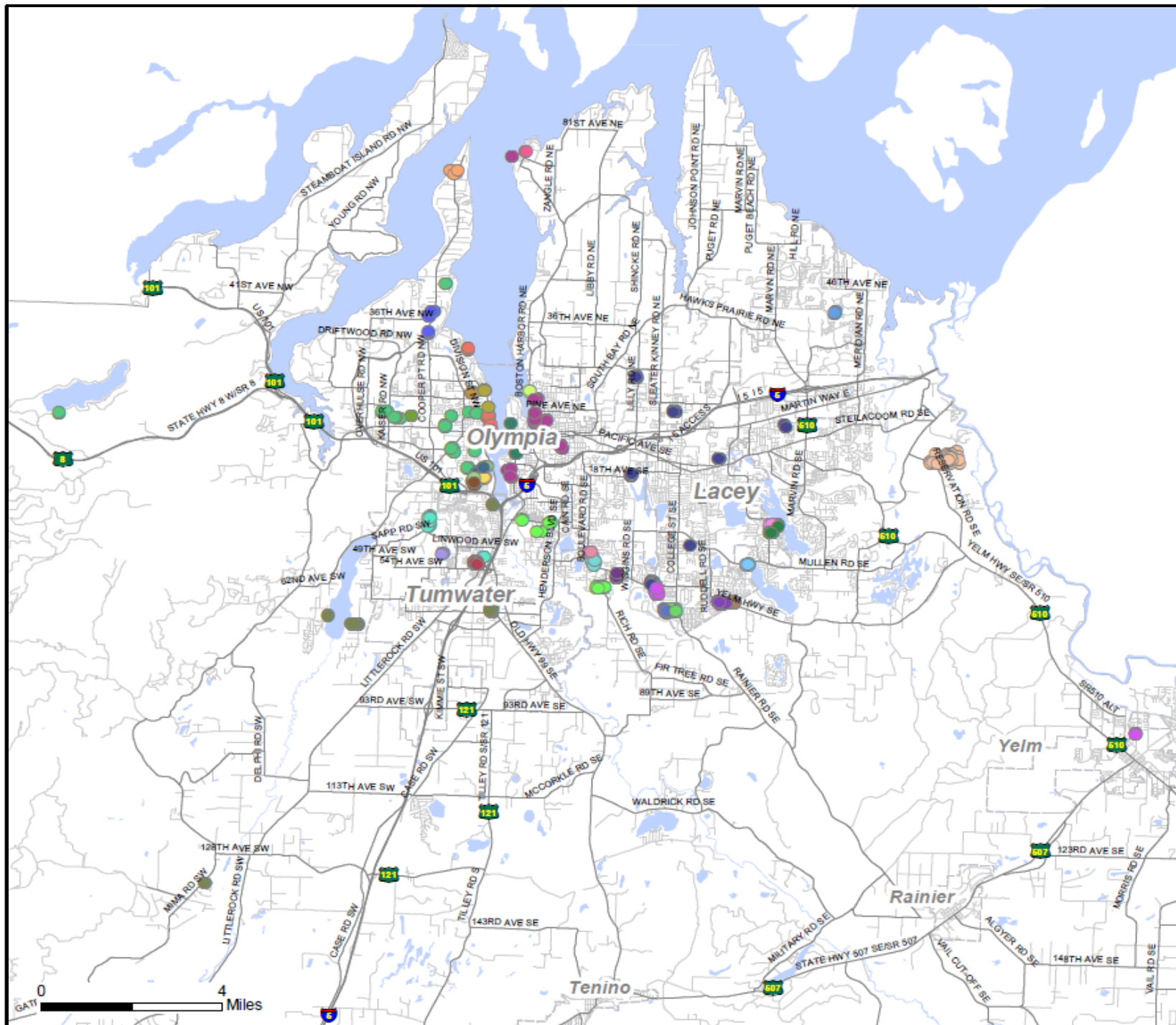
Map Created by Jim 8/5/2022



THURSTON COUNTY

Condominium Neighborhoods Region 13

- | | |
|--------|--------|
| ● CN01 | ● CN19 |
| ● CN02 | ● CN20 |
| ● CN03 | ● CN21 |
| ● CN04 | ● CN22 |
| ● CN05 | ● CN23 |
| ● CN06 | ● CN24 |
| ● CN07 | ● CN25 |
| ● CN08 | ● CN26 |
| ● CN09 | ● CN27 |
| ● CN10 | ● CN28 |
| ● CN11 | ● CN29 |
| ● CN12 | ● CN30 |
| ● CN13 | ● CN31 |
| ● CN14 | ● CN32 |
| ● CN15 | ● CN33 |
| ● CN16 | ● CN34 |
| ● CN17 | ● CN35 |
| ● CN18 | |



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Map Created by jrm 5/25/2019



Mobile Home Neighborhoods

MBLK	MRT1	MUL4
MHPR	MSLT	MUL5
MLLK	MTRY	MUL6
MMC1	MUE1	MUO1
MMC2	MUE2	MUO2
MMM1	MUG1	MUT1
MMR1	MUG2	MUT2
MMT1	MUL1	MUY1
MRGD	MUL2	MWLY
MRR1	MUL3	

