

Client Education: Setting Purchase Price Expectations in King County



Specs Consulting Team

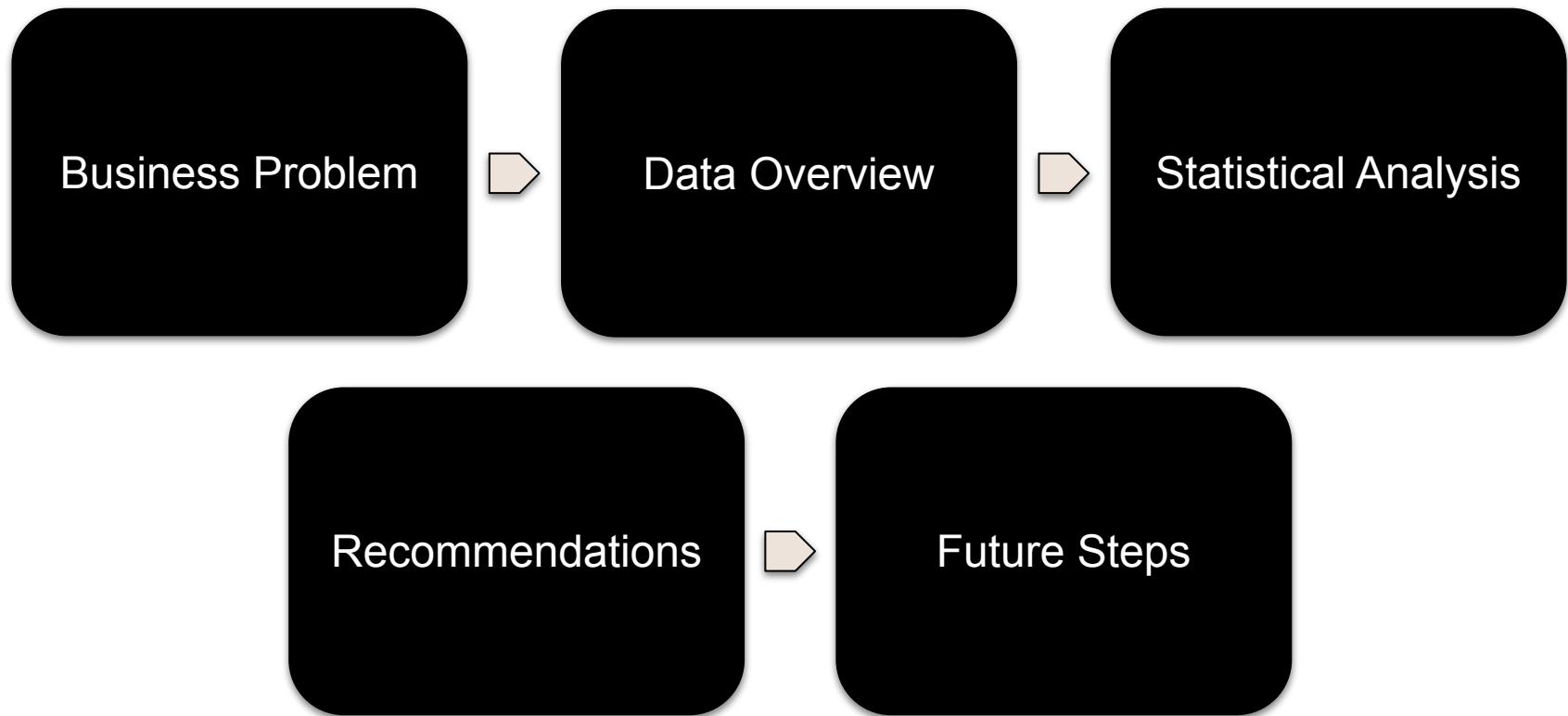


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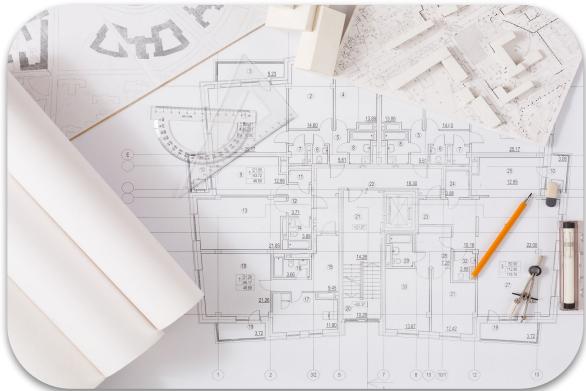


Name: Mackoy Staloch
Role: GitHub Lead /
Presentation Lead
GitHub: [MackoyS](https://github.com/MackoyS)

Agenda



Bottom Line



Construction Grade, Square Footage, Seattle Proper (Zip Codes), Waterfront, and Size of Surrounding Homes:

~52% of Sale Price

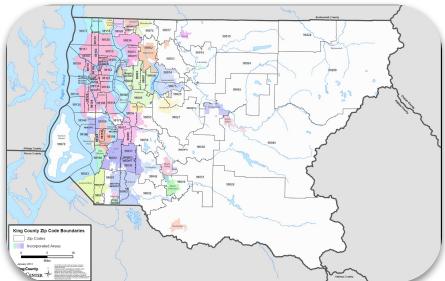
Business Problem



Data Overview

Data Overview

Data



Time Range

2014
|
2015

Unique
Properties

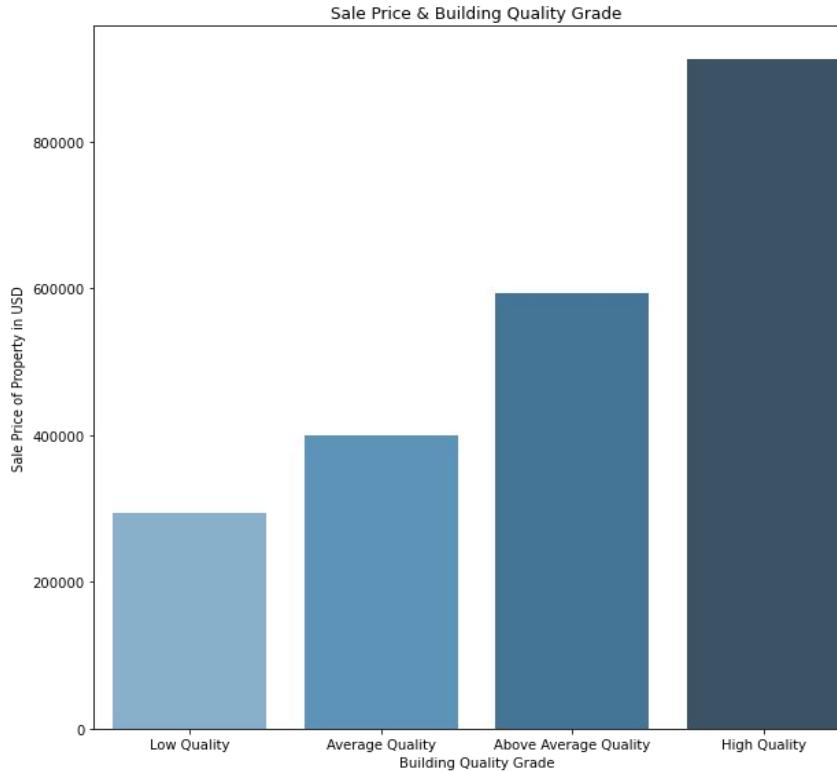
~19k

Limitations

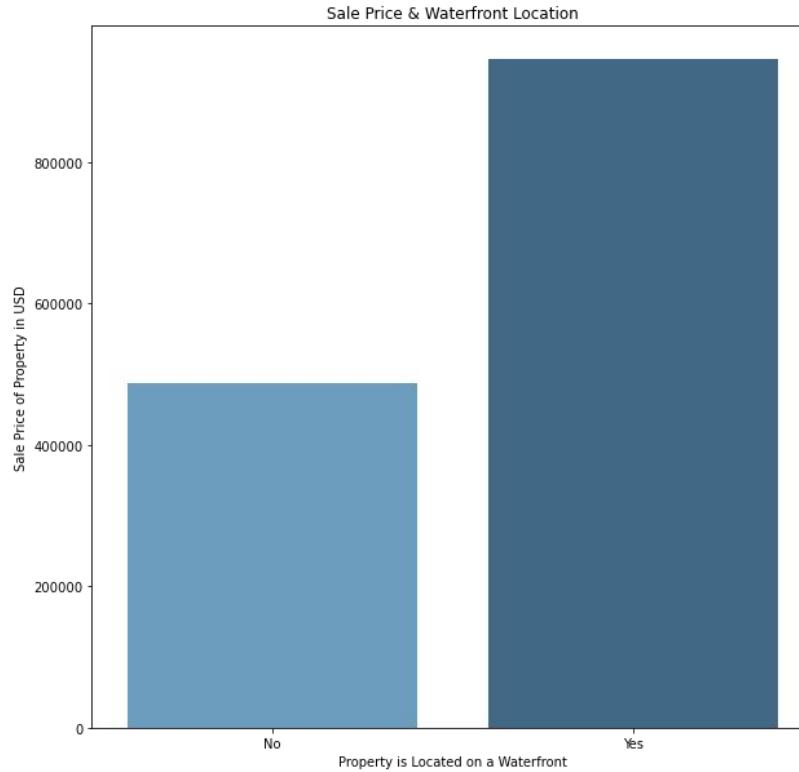
2015



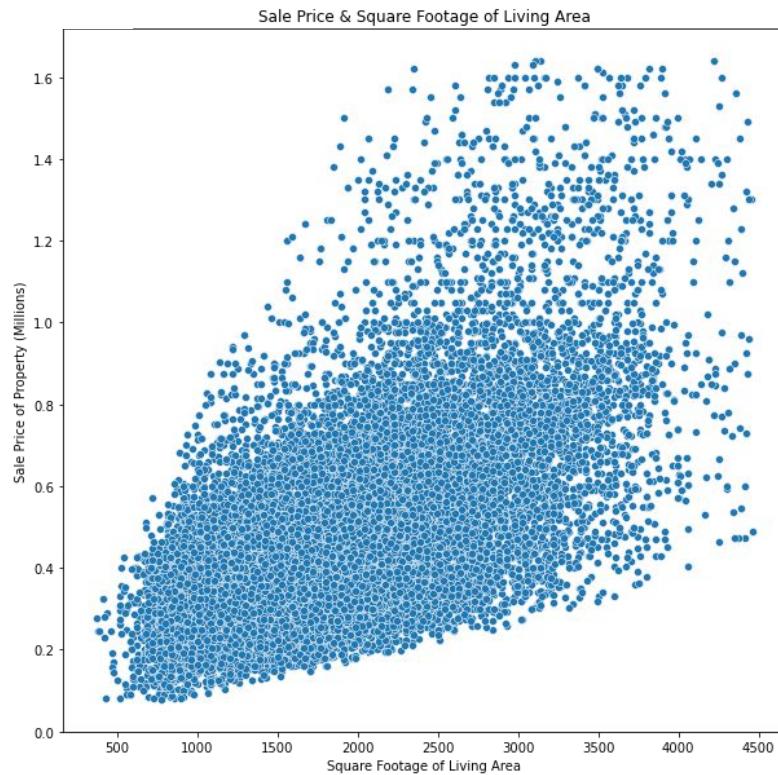
Data Overview - Building Quality Grade



Data Overview - Waterfront

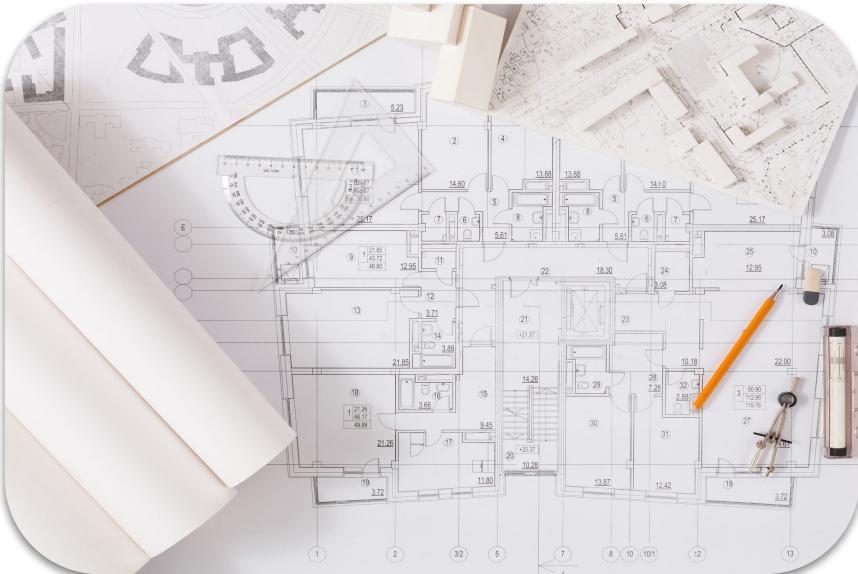


Data Overview - Square Footage of Living Area



Model Analysis

Model Analysis - Grade and Square Footage



Construction Grade:
~\$9k

Square Footage:
~\$115

~44% of Sale Price

Model Analysis - Multiple Attributes



Construction Grade:
~\$8.5k

Square Footage:
~\$130

Seattle Proper (Zip Codes):
~\$12.5k

Waterfront:
~\$38k

Size of Surrounding Homes:
~\$80

~52% of Price

So What If?



So What If?

If the Jones family was approved for a loan of \$170k they could afford a house with the following attributes:



Square Footage:
860



Construction Quality:
Low



Within City Limits:
No

So What If?

If the Jones family was approved for a loan of \$820k they could afford a house with the following attributes:



Square Footage:
1570



Construction Quality:
Above Average



Within City Limits:
Yes

Recommendations

Recommendations



Construction Grade:
~\$8.5k

Square Footage:
~\$130

Seattle Proper (Zip Codes):
~\$12.5k

Waterfront:
~\$38k

Size of Surrounding Homes:
~\$80

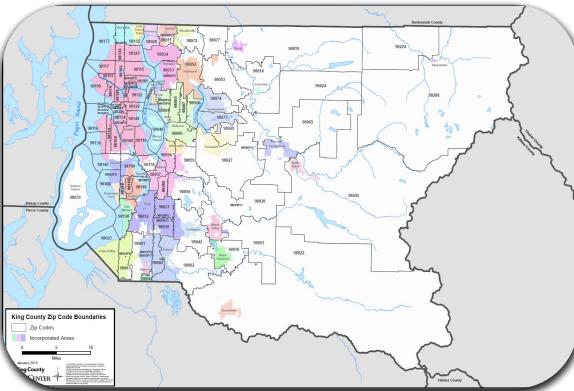
~52% of Price

Future Insights

Future Insights



Incorporate Household Income Information into our Model



Localize Model Down to the Neighborhood



The Relationship Between Remodeling and Sales Price

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Presentation Lead
GitHub: [MackoyS](https://github.com/MackoyS)

Questions?

Appendix

1. <https://www.zipdatamaps.com/zipcodes-seattle-wa>
 - a. Map of City vs Non-City in King County
2. [https://www.thespruce.com/thmb/EENZPLfyzrpWUAIKiPDU_ianJcM=/1856x1392/smart/filters:no_upscale\(\)/Buildingdesigns-GetttyImages-912482942-db55b3af711044a3a42ad1040c6711a9.jpg](https://www.thespruce.com/thmb/EENZPLfyzrpWUAIKiPDU_ianJcM=/1856x1392/smart/filters:no_upscale()/Buildingdesigns-GetttyImages-912482942-db55b3af711044a3a42ad1040c6711a9.jpg)
3. https://upload.wikimedia.org/wikipedia/commons/5/58/Seattle_Center_as_night_falls.jpg,
https://images.seattletimes.com/wp-content/uploads/2021/12/12302021_FYI_GUY_zoning_184451.jpg?d=780x561
4. <https://hips.hearstapps.com/hmg-prod.s3.amazonaws.com/images/tiny-homes-for-sale-1655402819.jpg>
5. https://media.istockphoto.com/photos/interior-of-an-abandoned-ruin-house-kitchen-picture-id1137775027?k=20&m=1137775027&s=612x612&w=0&h=KGV_Mn1x21AUb5GNOj-CZq1CEM5X3j_BYuE3_akvA8A=
6. <https://gethappyathome.com/wp-content/uploads/2020/12/Seattle-Leschi-Neighborhood-Waterfront-Homes-2-scaled.jpg>
7. <https://www.nfcc.org/wp-content/uploads/2020/10/bigstock-Man-and-Woman-Unpacking-Near-O-313449586.jpg>
8. https://media-cldnry.s-nbcnews.com/image/upload/t_nbcnews-fp-1200-630,f_auto,q_auto:best/news cms/2019_06/2746941/190208-stock-money-fanned-out-ew-317p.jpg
9. https://media-cldnry.s-nbcnews.com/image/upload/t_nbcnews-fp-1200-630,f_auto,q_auto:best/news cms/2019_06/2746941/190208-stock-money-fanned-out-ew-317p.jpg
10. https://www.freepik.com/free-photo/happy-family-silhouette-sunset_8380524.htm#query=family%20silhouette&position=0&from_view=keyword

Appendix - Bivariate Model

```
: model24 = ols('price ~ grade_num + sqft_living', data=clean_df)
model24_results = model24.fit()
print(model24_results.summary())
```

OLS Regression Results							
Dep. Variable:	price	R-squared:	0.441	Model:	OLS	Adj. R-squared:	0.441
Method:	Least Squares	F-statistic:	7670.	Date:	Thu, 15 Sep 2022	Prob (F-statistic):	0.00
Time:	15:55:39	Log-Likelihood:	-2.6323e+05	No. Observations:	19479	AIC:	5.265e+05
Df Residuals:	19476	BIC:	5.265e+05	Df Model:	2		
Covariance Type:	nonrobust						
	coef	std err	t	P> t	[0.025	0.975]	
Intercept	-4.074e+05	1.08e+04	-37.706	0.000	-4.29e+05	-3.86e+05	
grade_num	8.913e+04	1790.674	49.773	0.000	8.56e+04	9.26e+04	
sqft_living	115.4321	2.449	47.142	0.000	110.633	120.232	
Omnibus:	3812.448	Durbin-Watson:	1.955				
Prob(Omnibus):	0.000	Jarque-Bera (JB):	9139.157				
Skew:	1.098	Prob(JB):	0.00				
Kurtosis:	5.538	Cond. No.	1.78e+04				

Notes:

[1] Standard Errors assume that the covariance matrix of the errors is correctly specified.
[2] The condition number is large, 1.78e+04. This might indicate that there are strong multicollinearity or other numerical problems.

Appendix - Main Model

```
In [45]: model24 = ols('price ~ grade_num + sqft_living + Waterfront + sqft_living15 + sqft_above + zip_city', data=clean_df)
model24_results = model24.fit()
print(model24_results.summary())
```

OLS Regression Results

Dep. Variable:	price	R-squared:	0.520			
Model:	OLS	Adj. R-squared:	0.519			
Method:	Least Squares	F-statistic:	3510.			
Date:	Thu, 15 Sep 2022	Prob (F-statistic):	0.00			
Time:	15:20:27	Log-Likelihood:	-2.6174e+05			
No. Observations:	19479	AIC:	5.235e+05			
Df Residuals:	19472	BIC:	5.236e+05			
Df Model:	6					
Covariance Type:	nonrobust					
	coef	std err	t	P> t	[0.025	0.975]
Intercept	-5.033e+05	1.03e+04	-48.865	0.000	-5.23e+05	-4.83e+05
grade_num	8.337e+04	1796.458	46.406	0.000	7.98e+04	8.69e+04
sqft_living	131.4684	3.246	40.498	0.000	125.105	137.832
Waterfront	3.803e+05	2.09e+04	18.158	0.000	3.39e+05	4.21e+05
sqft_living15	78.4439	3.248	24.149	0.000	72.077	84.811
sqft_above	-50.6962	3.434	-14.763	0.000	-57.427	-43.965
zip_city	1.24e+05	2713.997	45.689	0.000	1.19e+05	1.29e+05
Omnibus:	3717.740	Durbin-Watson:	1.950			
Prob(Omnibus):	0.000	Jarque-Bera (JB):	9725.191			
Skew:	1.040	Prob(JB):	0.00			
Kurtosis:	5.766	Cond. No.	5.94e+04			

Notes:

- [1] Standard Errors assume that the covariance matrix of the errors is correctly specified.
- [2] The condition number is large, 5.94e+04. This might indicate that there are strong multicollinearity or other numerical problems.