

# Assignment 5 WriteUp

**1a). Describe the type of patterns or trends you might look for and how you plan to explore and model them. Min. 3 sentences (0%)**

For question 1 I made a subset of the NYC sales data for sales in the Manhattan borough. I plan to explore how different property characteristics relate to the sale prices. These property characteristics include gross square feet, land square feet, zip code, and year built. I also plan to perform an exploratory data analysis, identify outliers, show the relationships through histograms and scatterplots, build regression models for sales price, and build supervised learning models to predict neighborhoods.

**1b). Perform exploratory data analysis (variable distributions, etc.) and describe what you did including plots and other descriptions. Identify the outlier values in the data for Sale Price and generate suitable plots to demonstrate the outliers relative to the other data points. Min. 5 sentences (2%)**

I created functions `create_histogram_plot()`, `create_lm_plot()`, and `removeOutliers()`. In these functions, I make sure to remove all “na” values for relevant variables to prevent nonnumeric errors. First, I created histograms for sale price, gross square feet, and land square feet with outliers included. Second, I created scatterplots that included outliers and showed the relationship between the characteristic variables (gross square feet and land square feet) with sale price. Third, I removed outliers from all variables, including sales price. Fourth, I created more histograms for sale price, gross square feet, and land square feet with outliers excluded to show the difference that the outliers made. Finally, I created more scatterplots that excluded outliers that showed the relationship between the characteristic variables (gross square feet and land square feet) with sale price. These scatterplots also showed the differences the outliers made. Across the board it seemed that there were heavy right skews, with outliers typically being related to luxury properties. I used the IQR method to remove outliers and replot the filtered data, showing the true patterns that existed.

See tab “1B - Exploratory Data Analysis Results” for output

**1c). Conduct regression analysis on the 1 borough dataset to predict the Sale Price using other variables. You may have to try multiple models and drop variables with very low significance. Explain the results. Describe any cleaning you had to do and why. Min. 5 sentences (2%)**

I fitted 3 regression models to predict sale price using other variables. The first model used gross square feet, land square feet, year built, and zip code to predict the sale price. The second model was the same as the first except it did not use zip code, and the third model was the same as the first except it did not use year built. Before making these models I made sure to remove any instances where any of the 5 variables had “na” values to prevent nonnumeric errors. Gross square footage and land square footage seemed to have the strongest positive relationships. Year built was less consistent, and zip code yielded no large improvements. The

model summaries and scatterplots indicated multicollinearity between the 2 square footage measures. The results of each model seemed to be similar, so model 1 was deemed the “best performing”.

*See tab “1C - Regression Analysis Results” for output*

**1d). Using the same 1 borough dataset, train and evaluate 3 supervised learning models e.g., k-NN, Random Forest to predict the neighborhood based on the quantitative variables (price, area). Evaluate the results using contingency tables & precision/recall/F1 metrics. Describe any cleaning you had to do and why. Min. 5 sentences (2%)**

I trained 3 different supervised learning models (KNN, SVM, and Random Forest) to predict the neighborhood based on the quantitative variables (gross square feet, land square feet, sale price, year built, zip code). Before performing the models I cleaned the data by removing any instances of “na” from the variables to avoid any nonnumeric errors. I also dropped unused factor levels to prevent classification errors. In the KNN model, I standardized the predictors to ensure there was equal weighting. The confusion matrix showed 30-40% accuracy, likely due to having issues distinguishing between so many different neighborhoods.  $K = 3$  was the number of layers I settled on because any higher further decreased the accuracy. The SVM model had a slight performance improvement but still had issues with classification, likely due to overlapping values across neighborhoods. The random forest model had the best performance since this model is better equipped to handle mixed scaled variables. The precision, recall, and F1 for each class showed that the performance had a wide variety due to the large number of neighborhoods.

*See tab “1D - Supervised Learning Model Results” for output*

**2a). Apply the best performing regression model(s) from 1.c to the new dataset to predict Sale Price based on the variables you chose. Plot the predictions and residuals. Explain how well (or not) the models generalize to the new dataset and speculate as to the reason. Min. 3-4 sentences (4000-level 5%, 6000-level 3%)**

I applied the first regression model from 1.c to a new dataset, which only consisted of sales in the Staten Island borough. I removed all “na” values from the data to prevent any nonnumeric errors. The model was not able to perform as well on the Staten Island dataset, likely because of factors like larger land areas, lower overall prices, and different zip code patterns. The residual plots exhibited large errors and showed that predictions were very off from the true values. This outcome shows that the model does not work on all property datasets (or even boroughs in New York City) since they have a different set of characteristic trends for property sales.

*See tab “2A - Best Regression Model Results” for output*

**2b). Apply the classification model(s) from 1.d to predict the neighborhood in the new dataset. Evaluate the results (contingency tables & metrics). Explain how well (or not) the models generalize to the new dataset and speculate as to the reason. Min. 3-4 sentences (4000-level 4%, 6000-level 3%)**

I applied the same 3 classification models from 1.d to predict the neighborhood in the Staten Island dataset. Just like before, I removed any “na” values to prevent nonnumeric errors and split the data into training (80%) and testing (20%) datasets. The results were significantly weaker when using the Staten Island dataset. KNN did not do well since the Staten Island data had different distributions, which made the scaling behave differently than before. SVM did not do well because Staten Island has many overlapping neighborhoods that cannot be separated through linear boundaries. Random Forest performed the best once more, but still did much worse than before in all metrics due to the differences in the quantitative features. Once again we can show that models that performed well on a Manhattan dataset may not do as well on a Staten Island dataset.

See tab “2B - SLM Staten Island Results” for output

**2c). Discuss any observations you had about the datasets/ variables, other data in the dataset and/or your confidence in the result. Min 1-2 sentences (0%)**

I can confidently say that the Manhattan and Staten Island boroughs had drastic differences in standard sale price, square footage, and years built, which would have caused a change in behavior in the models. Manhattan had a lot of outliers due to luxury properties while Staten Island had a stronger standard of pricing and land areas. I feel as though the neighborhoods were not able to be accurately modeled since the provided information had a lot of overlap. Other quantitative factors, like school quality, transit access, zoning, and street level info, would have been helpful in classifying the neighborhoods. I felt somewhat confident in the Manhattan dataset results, particularly with the Random Forest model since it performed decently well. However, I was much less confident in the Staten Island dataset results because the models were much worse at classifying neighborhoods than before, which already wasn't a high enough margin to simply say “Yes I am confident in the results”. If more information was provided regarding the neighborhood characteristics, I feel that the models would be more accurate.

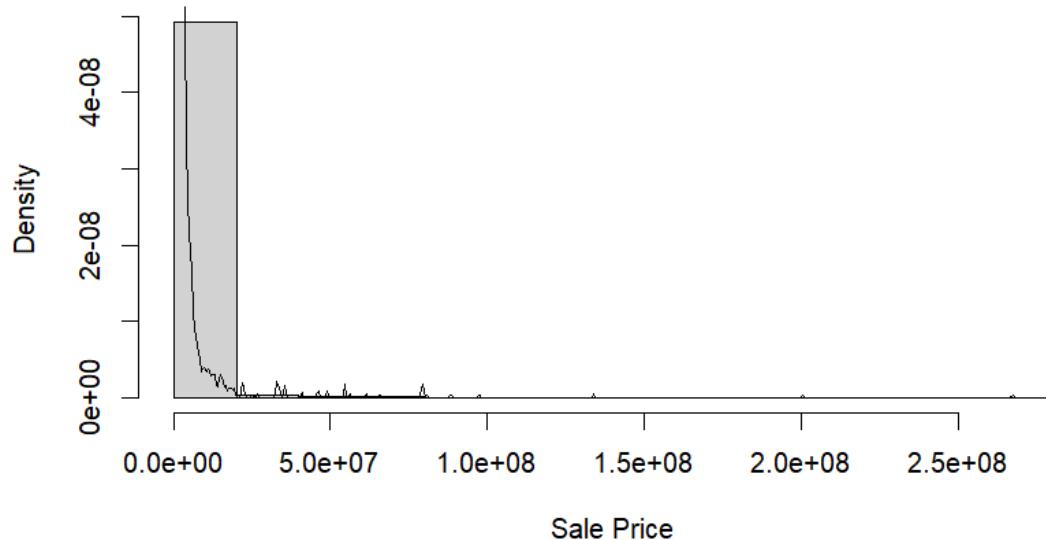
**3. 6000-level question (3%). Draw conclusions from this study – about the model type and suitability/ deficiencies. Describe what worked and why/ why not. Min. 5 sentences.**

There were clear limitations due to relying on quantitative characteristics to predict neighborhoods and sale prices across the 2 boroughs. It also did not help that there were a large number of neighborhoods and outliers in the sale price data. I found that the Random Forest model was able to provide the strongest performance in both boroughs since it is a tree based method that better captures nonlinear relationships between variables. All classification

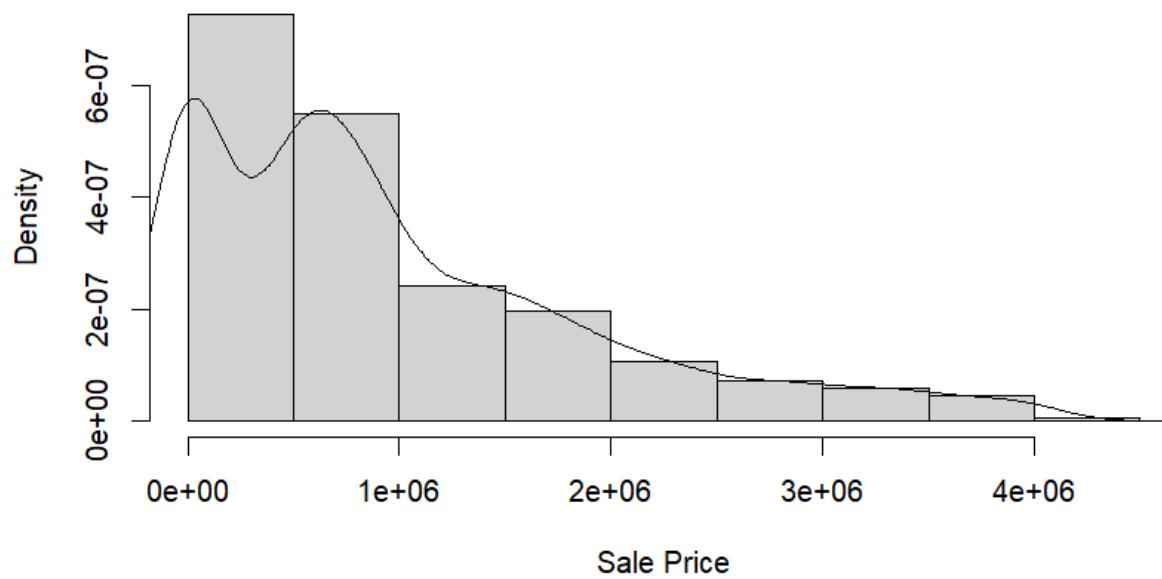
models suffered in performance when they were used on the Staten Island data, showing that models based upon one geographic area likely will not work on another without tweaks. As stated before, other quantitative factors like school quality, transit access, zoning, and street level info would have been helpful in classifying the neighborhoods. Without this extra data, I felt that the models were heavily limited in their capabilities, even if a new model were to be tailored to each geographic area separately.

# 1B - Exploratory Data Analysis Results

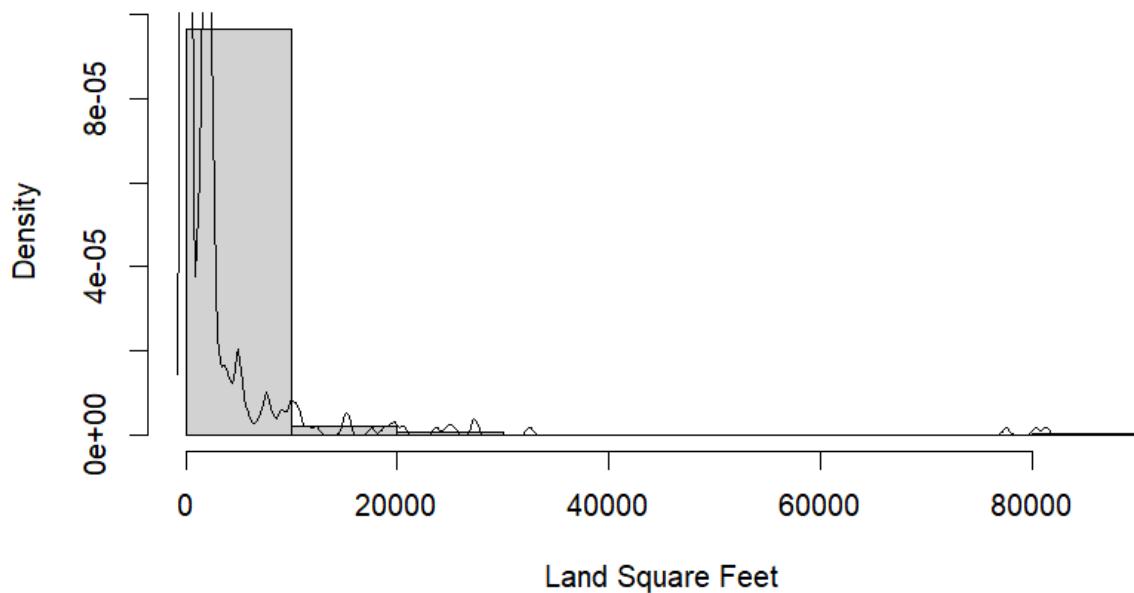
**Histogram of Sale Price in Manhattan (with outliers)**



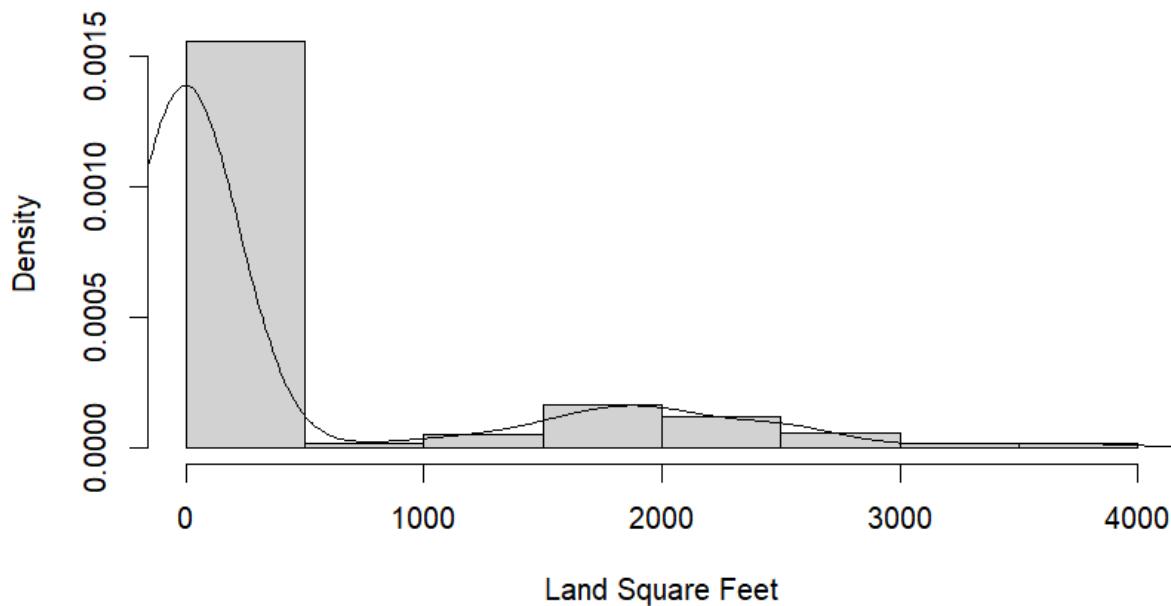
**Histogram of Sale Price in Manhattan (with NO outliers)**



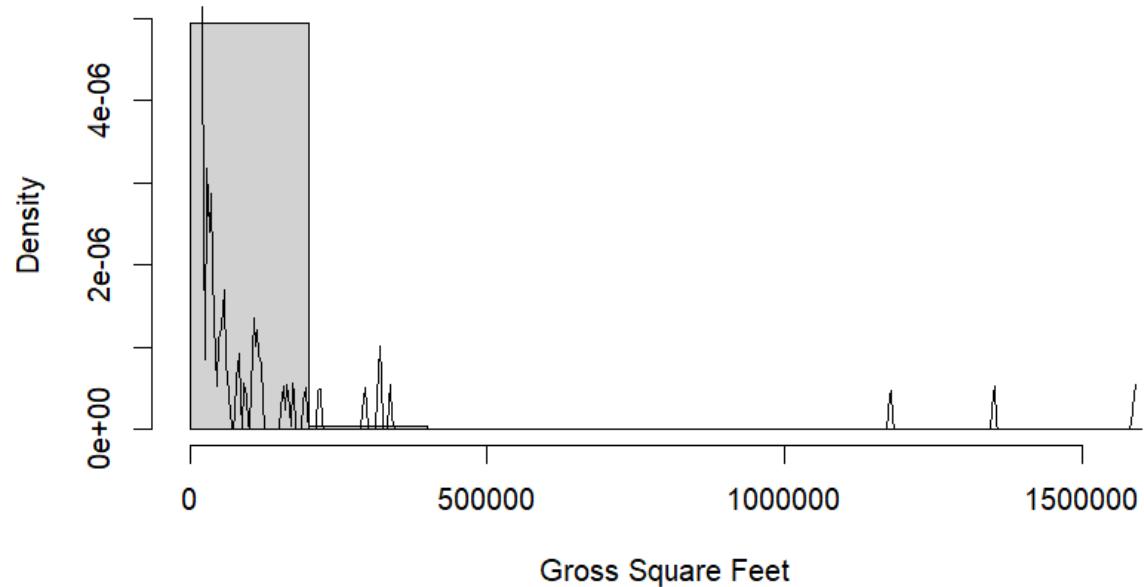
**Histogram of Land Square Feet in Manhattan (with outliers)**



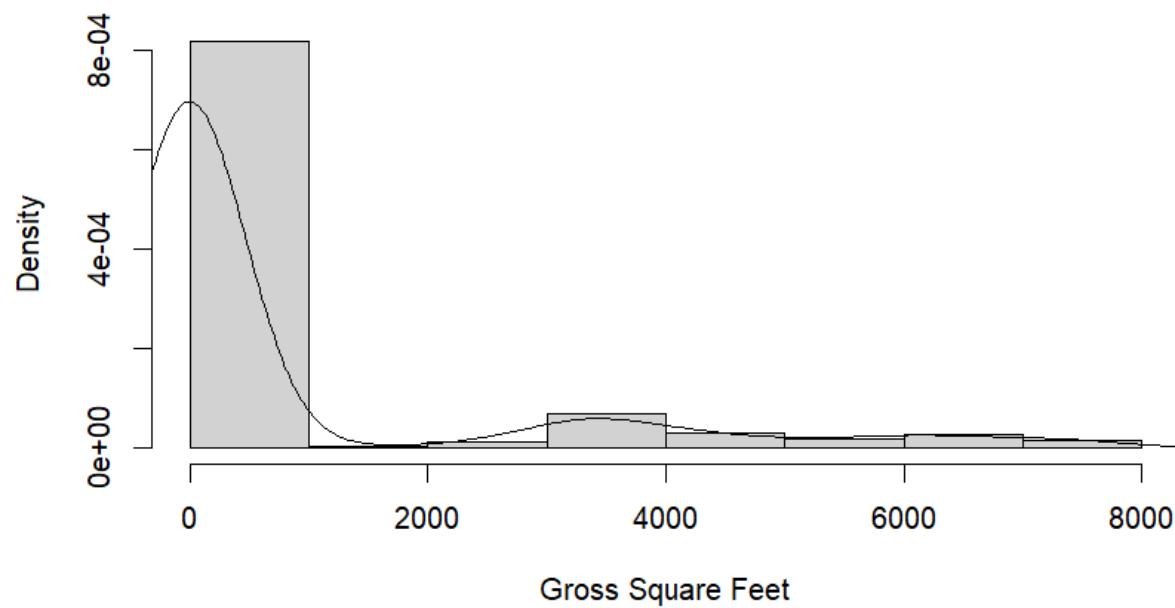
**Histogram of Land Square Feet in Manhattan (with NO outliers)**



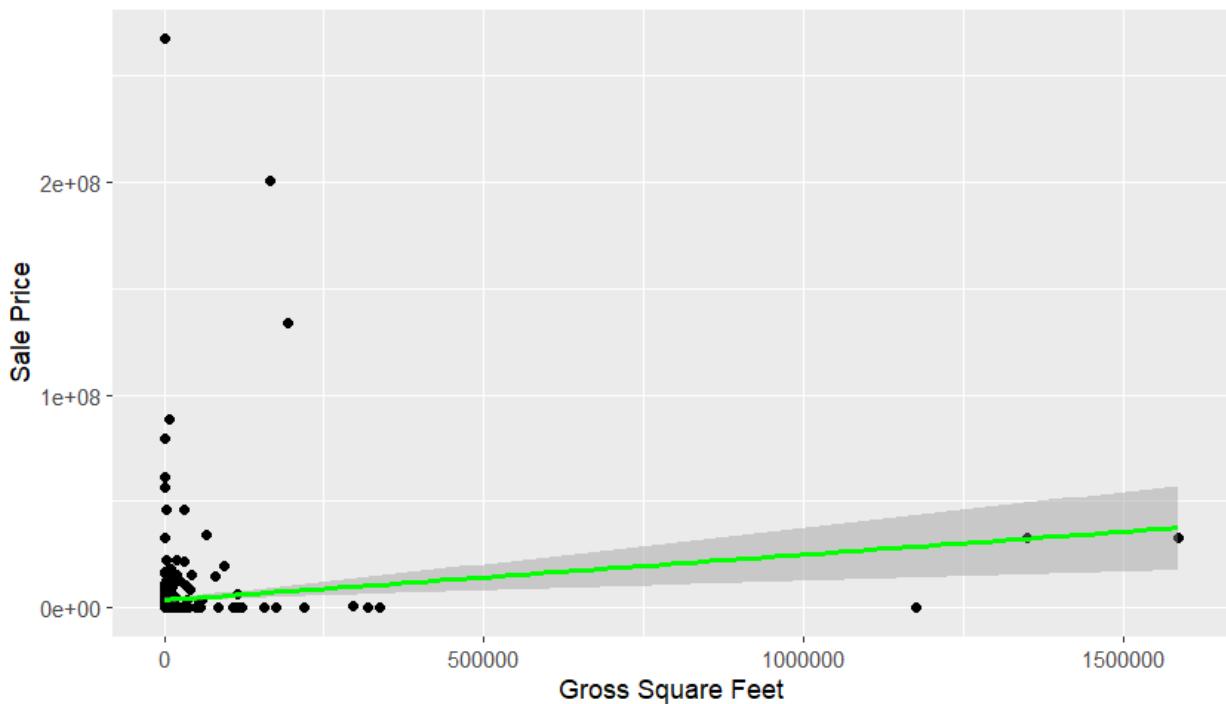
**Histogram of Gross Square Feet in Manhattan (with outliers)**



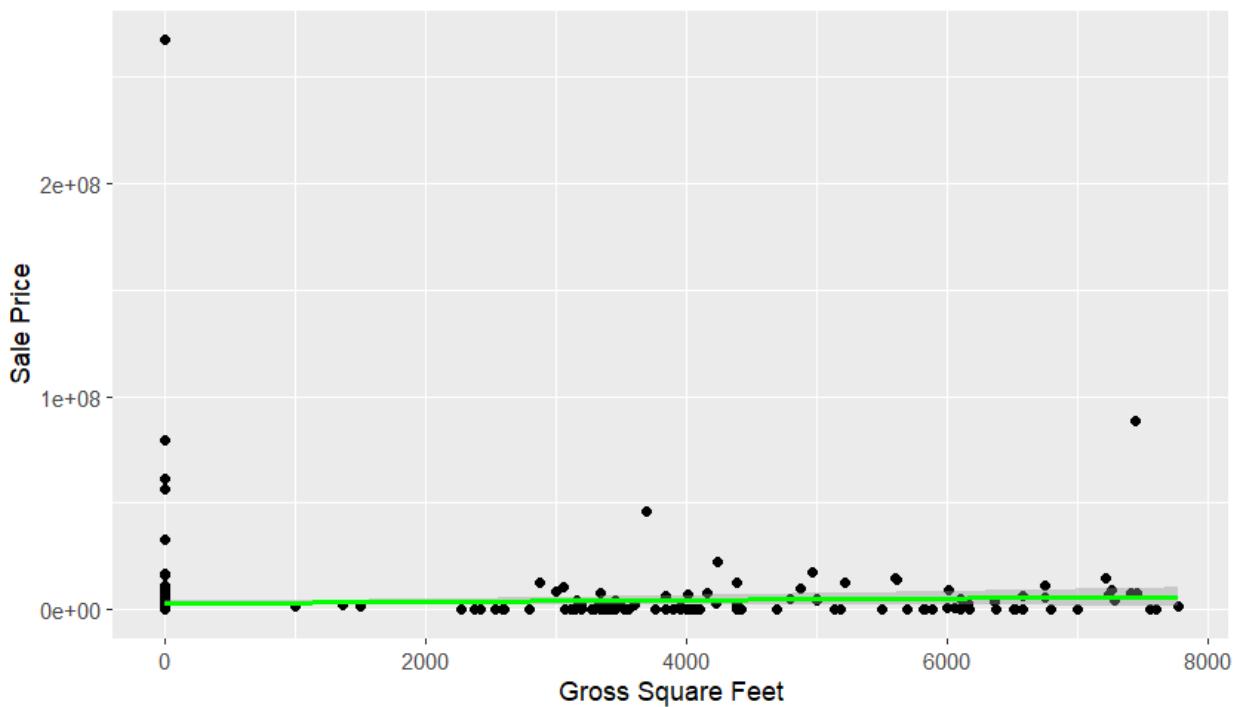
**Histogram of Gross Square Feet in Manhattan (with NO outliers)**



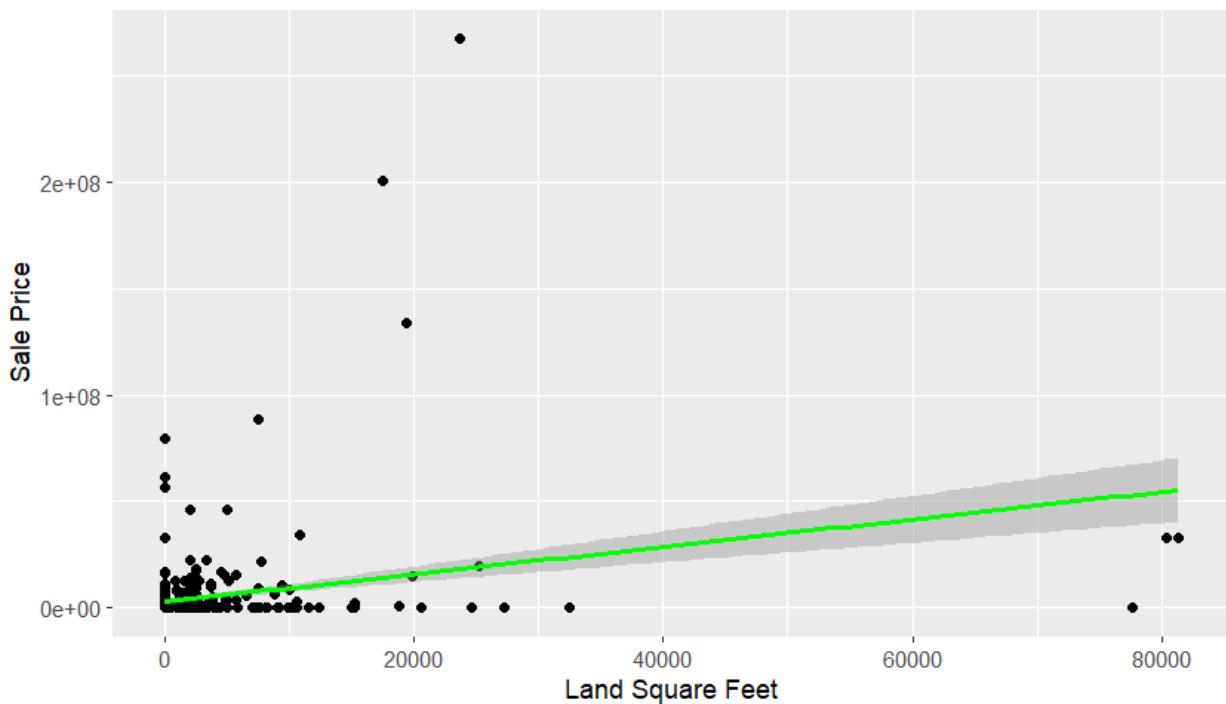
Sale Price vs Gross Square Feet in Manhattan (with outliers)



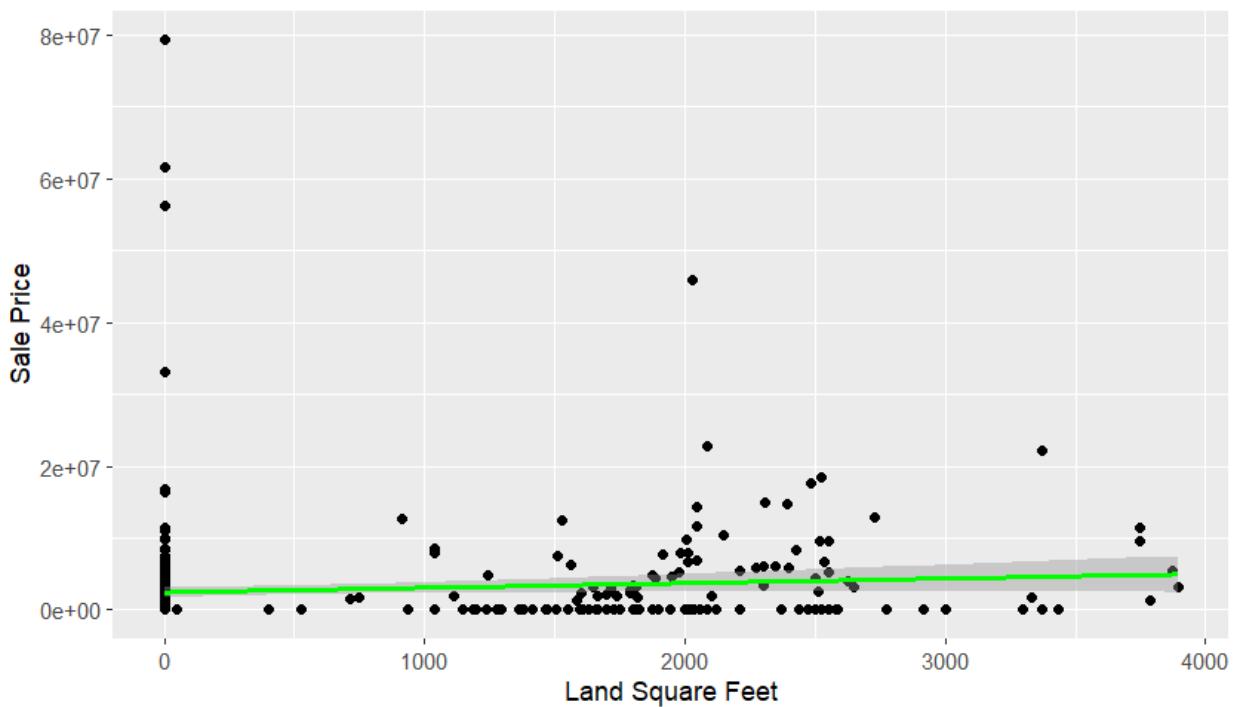
Sale Price vs Gross Square Feet in Manhattan (with NO outliers)



Sale Price vs Land Square Feet in Manhattan (with outliers)



Sale Price vs Land Square Feet in Manhattan (with NO outliers)



# 1C - Regression Analysis Results

**Linear Model 1 Data (Sale Price predicted based on gross square feet, land square feet, year built, and zip code)**

Residuals:

	Min	1Q	Median	3Q	Max
	-37373227	-2421498	-1537066	280456	184695015

Coefficients:

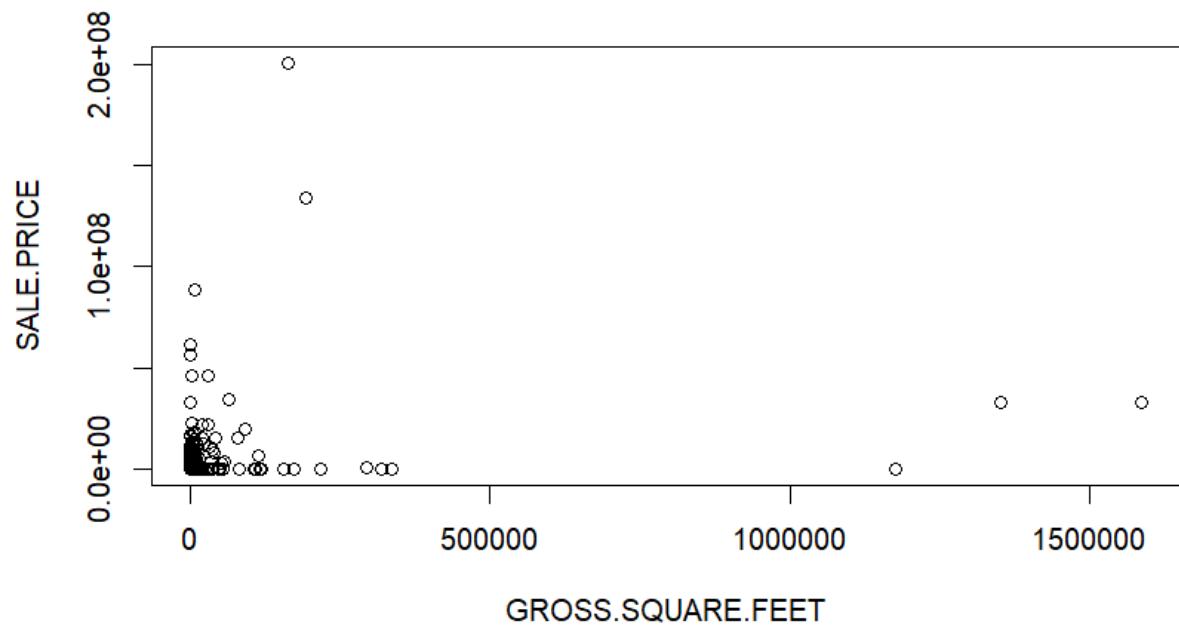
	Estimate	Std. Error	t value	Pr(> t )	
(Intercept)	-2.873e+07	1.339e+08	-0.215	0.830176	
GROSS.SQUARE.FEET	-5.933e+01	1.559e+01	-3.806	0.000158	***
LAND.SQUARE.FEET	1.359e+03	2.486e+02	5.464	7.13e-08	***
YEAR.BUILT	7.701e+03	1.198e+04	0.643	0.520547	
ZIP.CODE	1.564e+03	1.328e+04	0.118	0.906284	
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Signif. codes: 0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1					

Residual standard error: 12030000 on 537 degrees of freedom

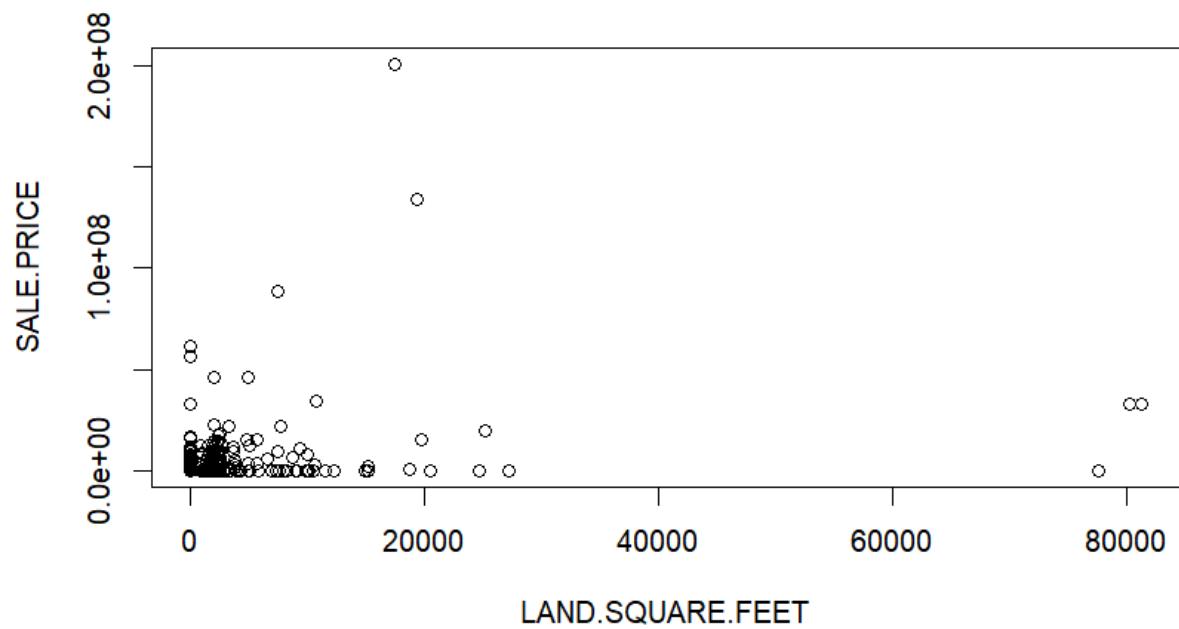
Multiple R-squared: 0.08885, Adjusted R-squared: 0.08206

F-statistic: 13.09 on 4 and 537 DF, p-value: 3.512e-10

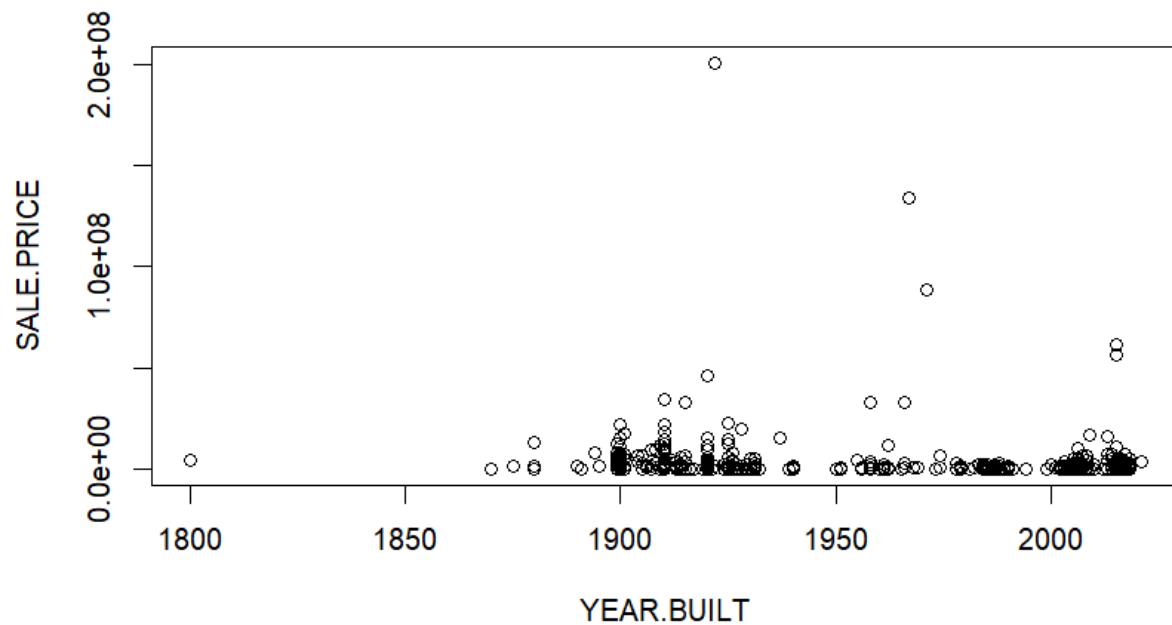
**Linear Model of Manhattan Property Sales**



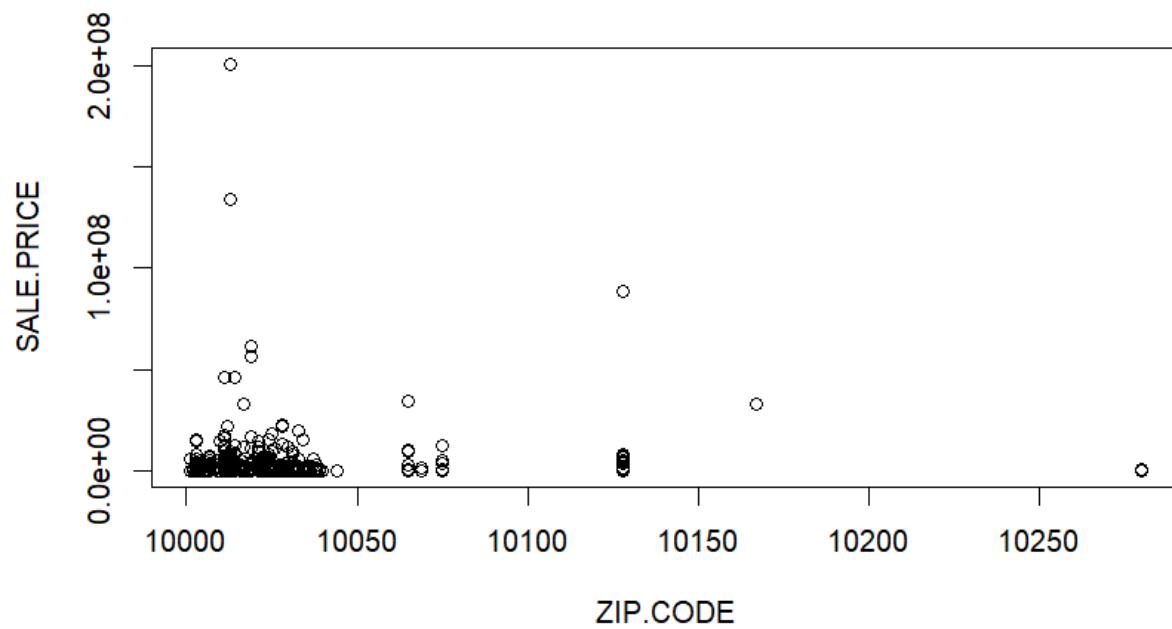
**Linear Model of Manhattan Property Sales**



### Linear Model of Manhattan Property Sales



### Linear Model of Manhattan Property Sales



Linear Model 2 Data (Sale Price predicted based on gross square feet, land square feet, year built - NO zip code)

Residuals:

	Min	1Q	Median	3Q	Max
	-37437754	-2431926	-1532416	263443	184674601

Coefficients:

	Estimate	Std. Error	t value	Pr(> t )
(Intercept)	-1.320e+07	2.345e+07	-0.563	0.573671
GROSS.SQUARE.FEET	-5.923e+01	1.555e+01	-3.809	0.000156 ***
LAND.SQUARE.FEET	1.357e+03	2.482e+02	5.469	6.96e-08 ***
YEAR.BUILT	7.783e+03	1.195e+04	0.651	0.515035

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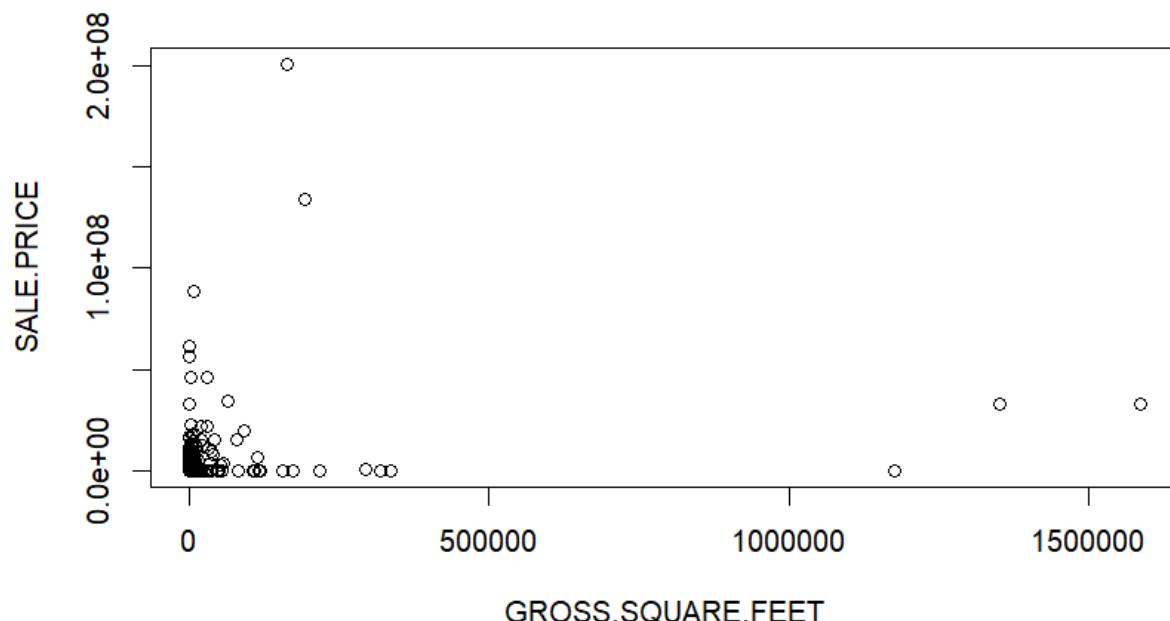
Signif. codes: 0 ‘\*\*\*’ 0.001 ‘\*\*’ 0.01 ‘\*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 12020000 on 538 degrees of freedom

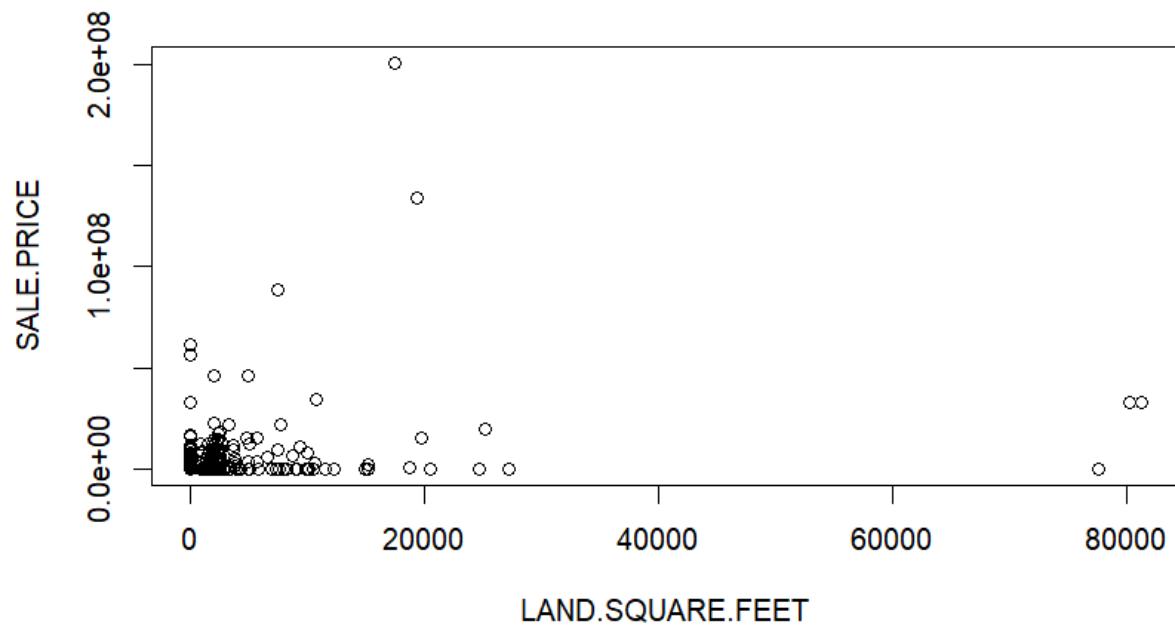
Multiple R-squared: 0.08882, Adjusted R-squared: 0.08374

F-statistic: 17.48 on 3 and 538 DF, p-value: 7.642e-11

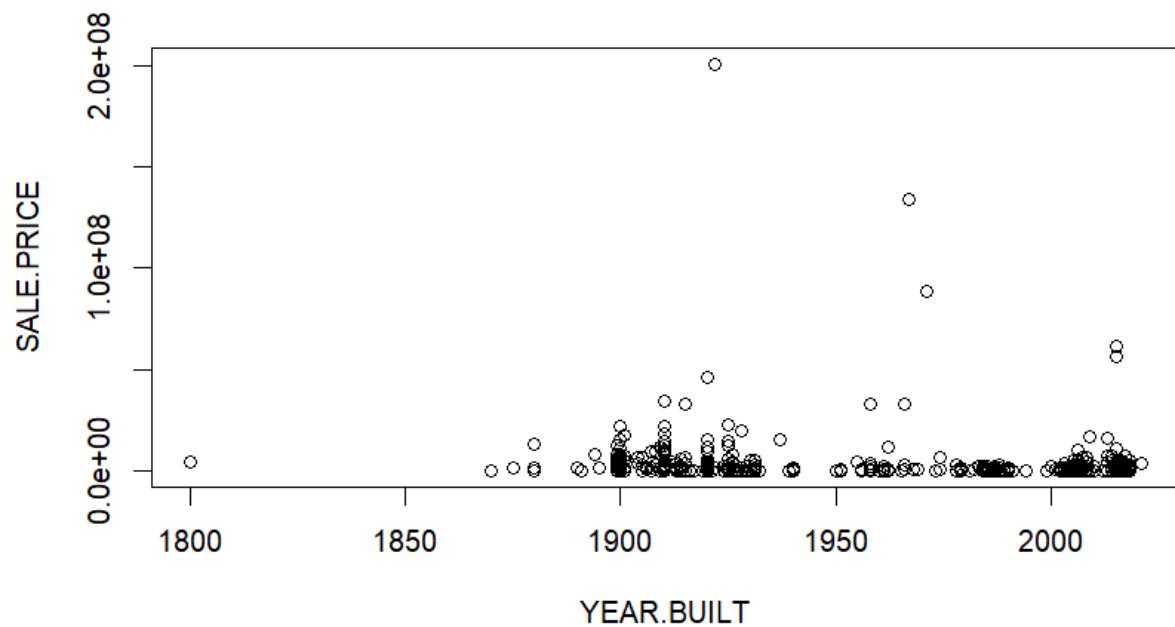
### Linear Model of Manhattan Property Sales (No Zipcode)



**Linear Model of Manhattan Property Sales (No Zipcode)**



**Linear Model of Manhattan Property Sales (No Zipcode)**



**Linear Model 3 Data (Sale Price predicted based on gross square feet, land square feet, zip code - NO year built)**

Residuals:

	Min	1Q	Median	3Q	Max
	-36983019	-2067926	-1428742	310891	184823873

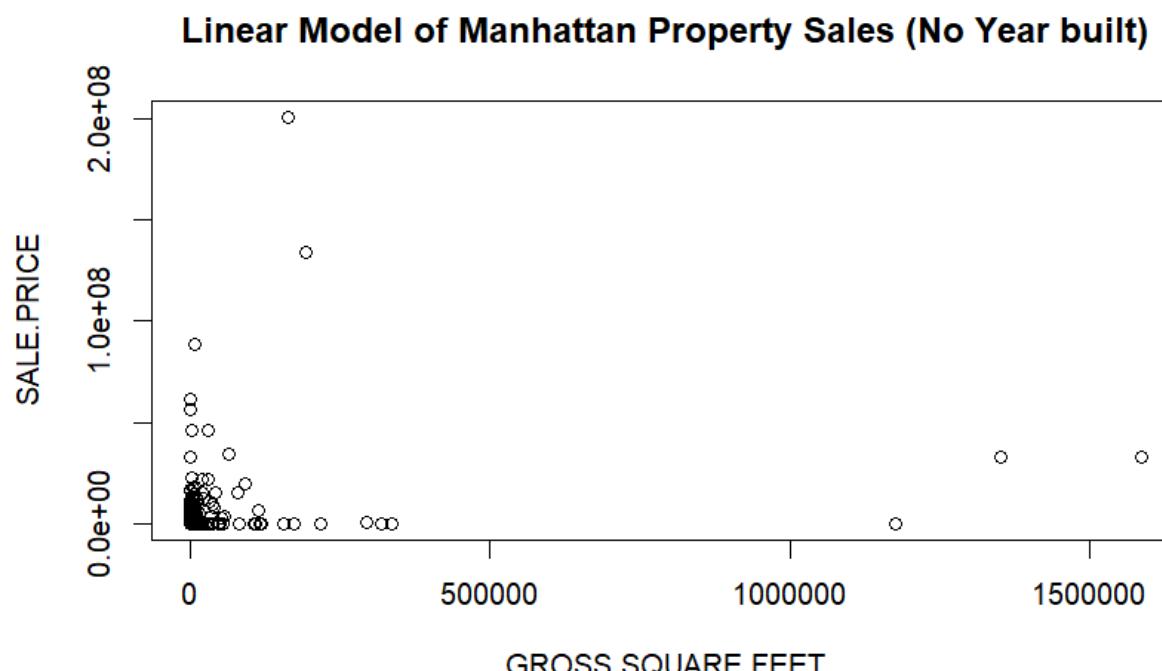
Coefficients:

	Estimate	Std. Error	t value	Pr(> t )		
(Intercept)	-1.858e+07	1.329e+08	-0.140	0.888845		
GROSS.SQUARE.FEET	-5.644e+01	1.492e+01	-3.783	0.000172 ***		
LAND.SQUARE.FEET	1.307e+03	2.351e+02	5.558	4.3e-08 ***		
ZIP.CODE	2.059e+03	1.325e+04	0.155	0.876555		
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Signif. codes:	0 ‘***’	0.001 ‘**’	0.01 ‘*’	0.05 ‘.’	0.1 ‘ ’	1

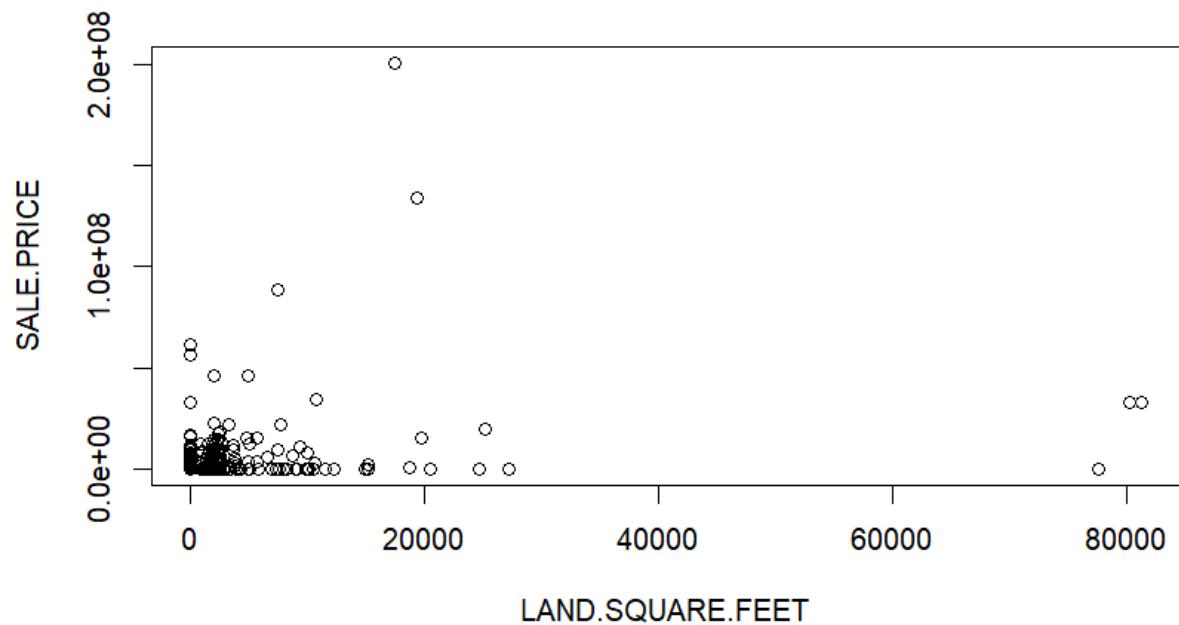
Residual standard error: 12030000 on 538 degrees of freedom

Multiple R-squared: 0.08815, Adjusted R-squared: 0.08306

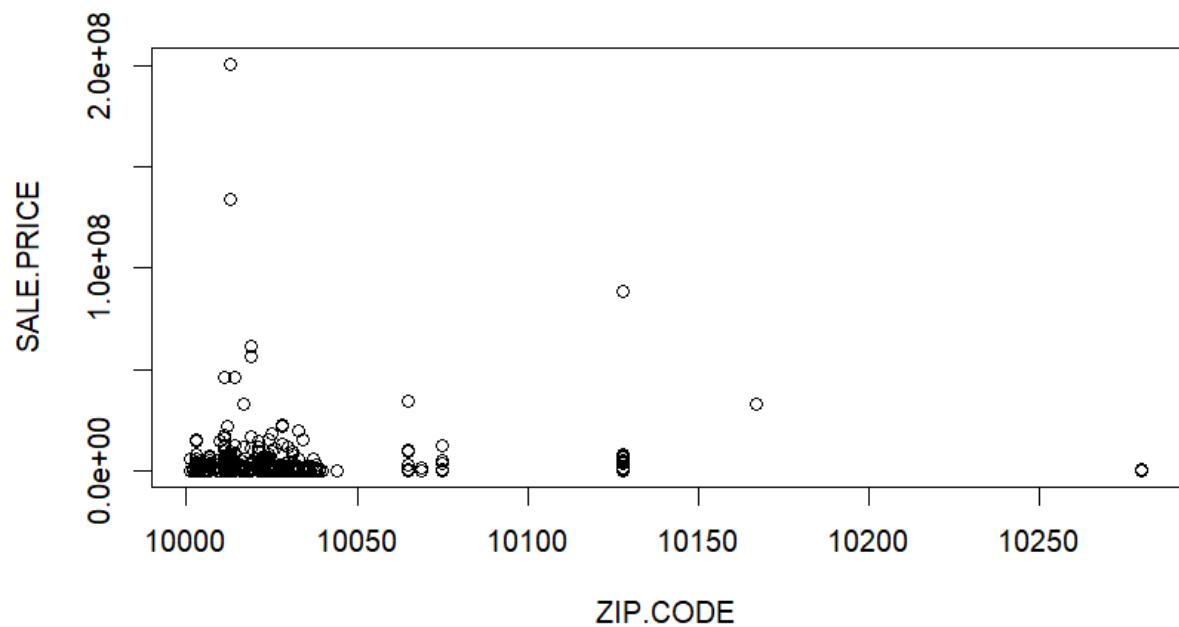
F-statistic: 17.34 on 3 and 538 DF, p-value: 9.3e-11



**Linear Model of Manhattan Property Sales (No Year built)**



**Linear Model of Manhattan Property Sales (No Year built)**



# 1D - Supervised Learning Model Results

## KNN Results (Confusion Matrix and Metrics Table):

Confusion Matrix and Statistics

Prediction	Reference						
	ALPHABET CITY	CITY	CHELSEA	CHINATOWN	CIVIC CENTER	CLINTON	EAST VILLAGE
ALPHABET CITY	0	0	0	0	0	0	1
CHELSEA	1	0	0	0	0	0	0
CHINATOWN	0	0	0	0	0	0	0
CIVIC CENTER	1	0	0	0	1	0	0
CLINTON	0	0	0	0	0	0	0
EAST VILLAGE	1	1	0	0	0	0	0
FASHION	0	1	0	0	0	0	0
FINANCIAL	0	0	0	0	0	1	0
FLATIRON	0	0	0	0	0	0	0
GRAMERCY	0	1	0	0	0	0	0
GREENWICH VILLAGE-CENTRAL	0	0	0	0	0	0	0
GREENWICH VILLAGE-WEST	0	2	0	0	0	0	1
HARLEM-CENTRAL	0	0	0	0	0	0	0
HARLEM-EAST	0	0	0	0	0	0	0
HARLEM-UPPER	0	0	0	0	0	0	0
HARLEM-WEST	0	0	0	0	0	0	0
INWOOD	0	0	0	0	0	0	0
JAVITS CENTER	0	0	0	0	0	0	0
KIPS BAY	0	0	0	0	0	0	0
LITTLE ITALY	0	0	0	0	0	0	0
LOWER EAST SIDE	0	0	0	0	0	0	0
MANHATTAN VALLEY	0	0	0	0	0	2	0
MIDTOWN CBD	0	0	0	0	0	0	0
MIDTOWN EAST	0	0	0	0	0	0	0
MIDTOWN WEST	0	0	0	0	0	1	0
MURRAY HILL	0	0	0	0	0	0	0
Prediction	Reference						
	FASHION	FINANCIAL	FLATIRON	GRAMERCY	GREENWICH VILLAGE-CENTRAL		
ALPHABET CITY	0	0	0	0	0	0	
CHELSEA	0	0	2	0	0	0	
CHINATOWN	0	0	0	0	0	0	
CIVIC CENTER	0	0	0	0	0	0	
CLINTON	0	0	0	0	0	0	
EAST VILLAGE	0	0	0	0	0	1	
FASHION	0	0	0	0	0	0	
FINANCIAL	0	0	0	0	0	0	
FLATIRON	0	0	2	0	0	0	
GRAMERCY	0	0	0	2	0	0	
GREENWICH VILLAGE-CENTRAL	0	0	0	0	0	0	
GREENWICH VILLAGE-WEST	0	0	1	0	0	2	
HARLEM-CENTRAL	0	0	0	0	0	0	
HARLEM-EAST	0	0	0	0	0	0	
HARLEM-UPPER	0	0	0	0	0	0	
HARLEM-WEST	0	0	0	0	0	0	
INWOOD	0	0	0	0	0	0	
JAVITS CENTER	0	0	0	0	0	0	
KIPS BAY	0	0	0	0	0	2	
LITTLE ITALY	0	0	0	0	0	0	
LOWER EAST SIDE	0	0	0	0	0	1	
MANHATTAN VALLEY	0	0	0	0	0	0	
MIDTOWN CBD	0	0	0	0	0	0	
MIDTOWN EAST	0	0	0	0	0	0	
MIDTOWN WEST	0	0	0	0	0	0	
MURRAY HILL	0	0	0	0	0	0	
Prediction	Reference						
	GREENWICH VILLAGE-WEST	HARLEM-CENTRAL	HARLEM-EAST	HARLEM-UPPER			
ALPHABET CITY	0	0	0	0			
CHELSEA	1	0	0	0			
CHINATOWN	0	0	0	0			
CIVIC CENTER	1	0	0	0			
CLINTON	0	0	0	0			
EAST VILLAGE	0	0	0	0			
FASHION	0	0	0	0			
FINANCIAL	0	0	0	0			
FLATIRON	0	0	0	0			
GRAMERCY	0	0	0	0			
GREENWICH VILLAGE-CENTRAL	0	0	0	0			
GREENWICH VILLAGE-WEST	1	0	0	0			
HARLEM-CENTRAL	0	4	3	0			
HARLEM-EAST	0	0	0	0			
HARLEM-UPPER	0	0	0	0			
HARLEM-WEST	0	0	0	0			
INWOOD	0	0	0	0			
JAVITS CENTER	0	0	0	0			
KIPS BAY	0	0	0	0			

LITTLE ITALY	0	0	0	0
LOWER EAST SIDE	0	0	0	0
MANHATTAN VALLEY	0	0	0	0
MIDTOWN CBD	1	0	0	0
MIDTOWN EAST	0	0	0	0
MIDTOWN WEST	1	0	0	0
MURRAY HILL	1	0	0	0

Reference

Prediction	HARLEM-WEST	INWOOD	JAVITS CENTER	KIPS BAY	LITTLE ITALY
ALPHABET CITY	0	0	0	0	0
CHELSEA	0	0	0	0	0
CHINATOWN	0	0	0	0	0
CIVIC CENTER	0	0	0	0	0
CLINTON	0	0	0	0	0
EAST VILLAGE	0	0	0	0	0
FASHION	0	0	0	1	0
FINANCIAL	0	0	0	0	0
FLATIRON	0	0	0	0	0
GRAMERCY	0	0	0	0	0
GREENWICH VILLAGE-CENTRAL	0	0	0	0	0
GREENWICH VILLAGE-WEST	0	0	0	0	1
HARLEM-CENTRAL	0	0	0	0	0
HARLEM-EAST	0	0	0	0	0
HARLEM-UPPER	0	1	0	0	0
HARLEM-WEST	0	0	0	0	0
INWOOD	0	0	0	0	0
JAVITS CENTER	0	0	0	0	0
KIPS BAY	0	0	0	2	0
LITTLE ITALY	0	0	0	0	0
LOWER EAST SIDE	0	0	0	0	0
MANHATTAN VALLEY	0	0	0	0	0
MIDTOWN CBD	0	0	0	0	0
MIDTOWN EAST	0	0	0	0	0
MIDTOWN WEST	0	0	0	0	0
MURRAY HILL	0	0	0	0	0

Reference

Prediction	LOWER EAST SIDE	MANHATTAN VALLEY	MIDTOWN	CBD	MIDTOWN EAST
ALPHABET CITY	0	0	0	0	0
CHELSEA	0	0	0	0	0
CHINATOWN	0	0	0	0	0
CIVIC CENTER	0	0	0	0	0
CLINTON	0	0	0	0	0
EAST VILLAGE	0	0	0	0	0
FASHION	0	0	0	0	0
FINANCIAL	0	0	0	0	0
FLATIRON	0	0	0	0	0
GRAMERCY	0	0	0	0	0
GREENWICH VILLAGE-CENTRAL	0	0	0	0	0
GREENWICH VILLAGE-WEST	0	0	0	0	0
HARLEM-CENTRAL	0	0	0	0	0
HARLEM-EAST	0	0	0	0	0
HARLEM-UPPER	0	0	0	0	0
HARLEM-WEST	0	0	0	0	0
INWOOD	0	0	0	0	0
JAVITS CENTER	0	0	0	0	0
KIPS BAY	0	0	0	0	0
LITTLE ITALY	0	0	0	0	0
LOWER EAST SIDE	2	0	0	0	0
MANHATTAN VALLEY	0	2	0	0	0
MIDTOWN CBD	0	0	0	0	0
MIDTOWN EAST	0	0	0	0	0
MIDTOWN WEST	0	0	0	0	1
MURRAY HILL	0	0	0	0	0

Reference

Prediction	MIDTOWN WEST	MURRAY HILL	ROOSEVELT ISLAND	SOHO	SOUTHBOROUGH	TRIBECA
ALPHABET CITY	0	0	0	0	0	0
CHELSEA	0	0	0	0	0	0
CHINATOWN	0	0	0	0	0	0
CIVIC CENTER	0	0	0	0	0	0
CLINTON	0	0	0	0	0	0
EAST VILLAGE	0	0	0	0	0	0
FASHION	0	0	0	0	0	0
FINANCIAL	0	0	0	0	1	0
FLATIRON	0	0	0	0	0	0
GRAMERCY	0	0	0	0	0	0
GREENWICH VILLAGE-CENTRAL	0	0	0	2	0	0
GREENWICH VILLAGE-WEST	0	0	0	2	0	0
HARLEM-CENTRAL	0	0	0	0	0	0
HARLEM-EAST	0	0	0	0	0	0
HARLEM-UPPER	0	0	0	0	0	0
HARLEM-WEST	0	0	0	0	0	0
INWOOD	0	0	0	0	0	0
JAVITS CENTER	0	0	0	0	0	0

KIPS BAY	0	1	0	0	0	0
LITTLE ITALY	0	0	0	0	0	0
LOWER EAST SIDE	0	0	0	0	0	0
MANHATTAN VALLEY	0	0	0	0	0	0
MIDTOWN CBD	0	0	0	0	0	0
MIDTOWN EAST	0	0	0	0	0	0
MIDTOWN WEST	4	0	0	0	0	0
MURRAY HILL	1	0	0	0	0	0

Reference

Prediction	UPPER EAST SIDE (59-79)	UPPER EAST SIDE (79-96)
ALPHABET CITY	0	0
CHELSEA	0	0
CHINATOWN	0	0
CIVIC CENTER	0	0
CLINTON	0	0
EAST VILLAGE	0	0
FASHION	0	0
FINANCIAL	0	0
FLATIRON	0	0
GRAMERCY	0	0
GREENWICH VILLAGE-CENTRAL	0	0
GREENWICH VILLAGE-WEST	0	0
HARLEM-CENTRAL	0	0
HARLEM-EAST	0	0
HARLEM-UPPER	0	0
HARLEM-WEST	0	0
INWOOD	0	0
JAVITS CENTER	0	0
KIPS BAY	0	0
LITTLE ITALY	0	0
LOWER EAST SIDE	0	0
MANHATTAN VALLEY	0	0
MIDTOWN CBD	0	0
MIDTOWN EAST	0	0
MIDTOWN WEST	0	0
MURRAY HILL	0	0

Reference

Prediction	UPPER EAST SIDE (96-110)	UPPER WEST SIDE (59-79)
ALPHABET CITY	0	0
CHELSEA	0	0
CHINATOWN	0	0
CIVIC CENTER	0	0
CLINTON	0	0
EAST VILLAGE	0	0
FASHION	0	0
FINANCIAL	0	0
FLATIRON	0	0
GRAMERCY	0	0
GREENWICH VILLAGE-CENTRAL	0	0
GREENWICH VILLAGE-WEST	0	0
HARLEM-CENTRAL	1	2
HARLEM-EAST	0	0
HARLEM-UPPER	0	0
HARLEM-WEST	0	0
INWOOD	0	0
JAVITS CENTER	0	0
KIPS BAY	0	0
LITTLE ITALY	0	0
LOWER EAST SIDE	0	0
MANHATTAN VALLEY	0	0
MIDTOWN CBD	0	0
MIDTOWN EAST	0	1
MIDTOWN WEST	0	0
MURRAY HILL	0	1

Reference

Prediction	UPPER WEST SIDE (79-96)	UPPER WEST SIDE (96-116)
ALPHABET CITY	0	0
CHELSEA	0	0
CHINATOWN	0	0
CIVIC CENTER	0	0
CLINTON	0	0
EAST VILLAGE	0	0
FASHION	0	0
FINANCIAL	0	0
FLATIRON	0	0
GRAMERCY	0	0
GREENWICH VILLAGE-CENTRAL	0	0
GREENWICH VILLAGE-WEST	0	0
HARLEM-CENTRAL	0	0
HARLEM-EAST	0	0
HARLEM-UPPER	0	0
HARLEM-WEST	0	0
INWOOD	0	0

JAVITS CENTER	0	0	
KIPS BAY	0	0	
LITTLE ITALY	0	0	
LOWER EAST SIDE	0	0	
MANHATTAN VALLEY	0	0	
MIDTOWN CBD	0	0	
MIDTOWN EAST	0	0	
MIDTOWN WEST	0	0	
MURRAY HILL	0	0	
Reference			
Prediction	WASHINGTON HEIGHTS	LOWER WASHINGTON HEIGHTS	UPPER
ALPHABET CITY	0	0	
CHELSEA	0	0	
CHINATOWN	0	0	
CIVIC CENTER	0	0	
CLINTON	0	0	
EAST VILLAGE	0	0	
FASHION	0	0	
FINANCIAL	0	0	
FLATIRON	0	0	
GRAMERCY	0	0	
GREENWICH VILLAGE-CENTRAL	0	0	
GREENWICH VILLAGE-WEST	0	0	
HARLEM-CENTRAL	0	1	
HARLEM-EAST	0	0	
HARLEM-UPPER	0	0	
HARLEM-WEST	0	0	
INWOOD	0	0	
JAVITS CENTER	0	0	
KIPS BAY	0	0	
LITTLE ITALY	0	0	
LOWER EAST SIDE	0	0	
MANHATTAN VALLEY	0	0	
MIDTOWN CBD	0	0	
MIDTOWN EAST	0	0	
MIDTOWN WEST	0	0	
MURRAY HILL	0	0	

[ reached 'max' / getOption("max.print") -- omitted 12 rows ]

#### Overall Statistics

Accuracy : 0.3761  
95% CI : (0.2852, 0.474)  
No Information Rate : 0.0917  
P-Value [Acc > NIR] : 8.736e-16

Kappa : 0.3475

McNemar's Test P-Value : NA

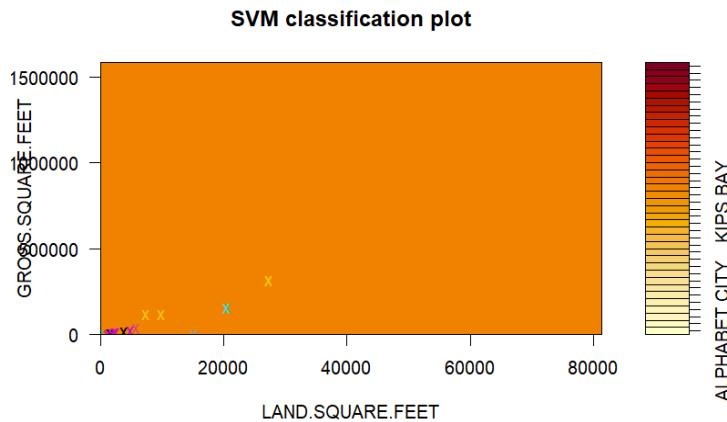
#### Statistics by Class:

	Class: ALPHABET CITY	Class: CHELSEA	Class: CHINATOWN	Class: CIVIC CENTER
Sensitivity	0.000000	0.00000	NA	0.333333
Specificity	0.990566	0.96154	1	0.981132
Pos Pred Value	0.000000	0.00000	NA	0.333333
Neg Pred Value	0.972222	0.95238	NA	0.981132
Prevalence	0.027523	0.04587	0	0.027523
Detection Rate	0.000000	0.00000	0	0.009174
Detection Prevalence	0.009174	0.03670	0	0.027523
Balanced Accuracy	0.495283	0.48077	NA	0.657233
	Class: CLINTON	Class: EAST VILLAGE	Class: FASHION	Class: FINANCIAL
Sensitivity	0.0000	0.00000	NA	NA
Specificity	1.0000	0.97196	0.98165	0.98165
Pos Pred Value	NaN	0.00000	NA	NA
Neg Pred Value	0.9633	0.98113	NA	NA
Prevalence	0.0367	0.01835	0.00000	0.00000
Detection Rate	0.0000	0.00000	0.00000	0.00000
Detection Prevalence	0.0000	0.02752	0.01835	0.01835
Balanced Accuracy	0.5000	0.48598	NA	NA
	Class: FLATIRON	Class: GRAMERCY	Class: GREENWICH VILLAGE-CENTRAL	
Sensitivity	0.40000	0.66667	0.00000	
Specificity	1.00000	0.99057	0.98058	
Pos Pred Value	1.00000	0.66667	0.00000	
Neg Pred Value	0.97196	0.99057	0.94393	
Prevalence	0.04587	0.02752	0.05505	
Detection Rate	0.01835	0.01835	0.00000	
Detection Prevalence	0.01835	0.02752	0.01835	
Balanced Accuracy	0.70000	0.82862	0.49029	
	Class: GREENWICH VILLAGE-WEST	Class: HARLEM-CENTRAL	Class: HARLEM-EAST	
Sensitivity	0.166667	0.57143	0.00000	
Specificity	0.912621	0.93137	1.00000	
Pos Pred Value	0.100000	0.36364	NaN	

Neg Pred Value	0.949495	0.96939	0.97248
Prevalence	0.055046	0.06422	0.02752
Detection Rate	0.009174	0.03670	0.00000
Detection Prevalence	0.091743	0.10092	0.00000
Balanced Accuracy	0.539644	0.75140	0.50000
Class: HARLEM-UPPER Class: HARLEM-WEST Class: INWOOD Class: JAVITS CENTER			
Sensitivity	NA	NA	NA
Specificity	0.990826	1	1.00000
Pos Pred Value	NA	NA	NaN
Neg Pred Value	NA	NA	0.98165
Prevalence	0.000000	0	0.01835
Detection Rate	0.000000	0	0.00000
Detection Prevalence	0.009174	0	0.00000
Balanced Accuracy	NA	NA	0.50000
Class: KIPS BAY Class: LITTLE ITALY Class: LOWER EAST SIDE			
Sensitivity	0.66667	0.000000	1.00000
Specificity	0.97170	1.000000	0.99065
Pos Pred Value	0.40000	NaN	0.66667
Neg Pred Value	0.99038	0.990826	1.00000
Prevalence	0.02752	0.009174	0.01835
Detection Rate	0.01835	0.000000	0.01835
Detection Prevalence	0.04587	0.000000	0.02752
Balanced Accuracy	0.81918	0.500000	0.99533
Class: MANHATTAN VALLEY Class: MIDTOWN CBD Class: MIDTOWN EAST			
Sensitivity	1.00000	0.000000	0.000000
Specificity	0.98131	0.990741	0.990566
Pos Pred Value	0.50000	0.000000	0.000000
Neg Pred Value	1.00000	0.990741	0.972222
Prevalence	0.01835	0.009174	0.027523
Detection Rate	0.01835	0.000000	0.000000
Detection Prevalence	0.03670	0.009174	0.009174
Balanced Accuracy	0.99065	0.495370	0.495283
Class: MIDTOWN WEST Class: MURRAY HILL Class: ROOSEVELT ISLAND Class: SOHO			
Sensitivity	0.57143	0.000000	NA 0.000000
Specificity	0.97059	0.972222	1 0.990476
Pos Pred Value	0.57143	0.000000	NA 0.000000
Neg Pred Value	0.97059	0.990566	NA 0.962963
Prevalence	0.06422	0.009174	0 0.036697
Detection Rate	0.03670	0.000000	0 0.000000
Detection Prevalence	0.06422	0.027523	0 0.009174
Balanced Accuracy	0.77101	0.486111	NA 0.495238
Class: SOUTHERBRIDGE Class: TRIBECA Class: UPPER EAST SIDE (59-79)			
Sensitivity	0.000000	1.00000	0.80000
Specificity	1.000000	0.99057	0.96154
Pos Pred Value	NaN	0.75000	0.50000
Neg Pred Value	0.990826	1.00000	0.99010
Prevalence	0.009174	0.02752	0.04587
Detection Rate	0.000000	0.02752	0.03670
Detection Prevalence	0.000000	0.03670	0.07339
Balanced Accuracy	0.500000	0.99528	0.88077
Class: UPPER EAST SIDE (79-96) Class: UPPER EAST SIDE (96-110)			
Sensitivity	0.85714	0.000000	0.000000
Specificity	0.98039	1.000000	NaN
Pos Pred Value	0.75000	NaN	NaN
Neg Pred Value	0.99010	0.990826	0.99010
Prevalence	0.06422	0.009174	0.009174
Detection Rate	0.05505	0.000000	0.000000
Detection Prevalence	0.07339	0.000000	0.000000
Balanced Accuracy	0.91877	0.500000	0.500000
Class: UPPER WEST SIDE (59-79) Class: UPPER WEST SIDE (79-96)			
Sensitivity	0.50000	0.50000	0.50000
Specificity	0.95960	0.98095	0.50000
Pos Pred Value	0.55556	0.95000	0.98095
Neg Pred Value	0.95000	0.09174	0.03670
Prevalence	0.09174	0.04587	0.01835
Detection Rate	0.04587	0.08257	0.03670
Detection Prevalence	0.08257	0.72980	0.74048
Class: UPPER WEST SIDE (96-116) Class: WASHINGTON HEIGHTS LOWER			
Sensitivity	0.250000	NA	NA
Specificity	0.980952	0.97248	0.97248
Pos Pred Value	0.333333	NA	NA
Neg Pred Value	0.971698	NA	NA
Prevalence	0.036697	0.00000	0.00000
Detection Rate	0.009174	0.00000	0.00000
Detection Prevalence	0.027523	0.02752	0.02752
Balanced Accuracy	0.615476	NA	NA
Class: WASHINGTON HEIGHTS UPPER			
Sensitivity	0.000000	0.990741	0.990741
Specificity	0.990741	0.000000	0.000000
Pos Pred Value	0.000000	0.990741	0.990741
Neg Pred Value	0.000000	0.009174	0.009174

Detection Rate	0.000000
Detection Prevalence	0.009174
Balanced Accuracy	0.495370

### SVM Results (Classification Plot, Confusion Matrix, Metrics Table):



actual	ALPHABET CITY	CHELSEA	CHINATOWN	CIVIC CENTER	CLINTON	EAST VILLAGE
predicted	ALPHABET CITY	0	0	0	0	0
ALPHABET CITY	0	0	0	0	0	0
CHELSEA	0	1	0	0	0	0
CHINATOWN	0	1	0	0	0	0
CIVIC CENTER	0	4	0	0	0	0
CLINTON	0	0	0	0	0	1
EAST VILLAGE	0	1	0	0	0	0
FASHION	0	1	0	0	0	0
FINANCIAL	0	5	0	0	0	0
FLATIRON	0	1	0	0	0	0
GRAMERCY	0	3	0	0	0	0
GREENWICH VILLAGE-CENTRAL	0	1	0	0	0	0
GREENWICH VILLAGE-WEST	0	2	0	0	0	0
HARLEM-CENTRAL	0	0	0	0	0	0
HARLEM-EAST	0	0	0	0	0	0
HARLEM-UPPER	0	0	0	0	0	0
HARLEM-WEST	0	0	0	0	0	0
INWOOD	0	0	0	0	0	0
JAVITS CENTER	0	2	0	0	0	0
KIPS BAY	0	0	0	0	0	0
LITTLE ITALY	0	0	0	0	0	0
LOWER EAST SIDE	0	5	0	0	0	0
MANHATTAN VALLEY	0	0	0	0	0	0
MIDTOWN CBD	0	0	0	0	0	0
MIDTOWN EAST	0	0	0	0	0	0
MIDTOWN WEST	0	0	0	0	0	0
MURRAY HILL	0	0	0	0	0	0
actual	FASHION	FINANCIAL	FLATIRON	GRAMERCY	GREENWICH VILLAGE-CENTRAL	
predicted	ALPHABET CITY	0	0	0	0	0
ALPHABET CITY	0	0	0	0	0	0
CHELSEA	0	0	0	0	0	0
CHINATOWN	0	0	0	0	0	0
CIVIC CENTER	0	0	0	0	0	0
CLINTON	0	0	0	0	0	0
EAST VILLAGE	0	0	0	0	0	0
FASHION	3	0	1	0	0	0
FINANCIAL	0	1	0	0	0	0
FLATIRON	0	0	3	0	0	0
GRAMERCY	0	0	0	0	0	0
GREENWICH VILLAGE-CENTRAL	0	0	0	0	0	0
GREENWICH VILLAGE-WEST	0	0	0	0	0	0
HARLEM-CENTRAL	0	0	0	0	0	0
HARLEM-EAST	0	0	0	0	0	0
HARLEM-UPPER	0	0	0	0	0	0
HARLEM-WEST	0	0	0	0	0	0
INWOOD	0	0	0	0	0	0
JAVITS CENTER	0	0	0	0	0	0
KIPS BAY	0	0	0	0	0	0
LITTLE ITALY	0	0	0	0	0	0

LOWER EAST SIDE	0	0	0	0	0
MANHATTAN VALLEY	0	0	0	0	0
MIDTOWN CBD	0	0	0	0	0
MIDTOWN EAST	0	0	0	0	0
MIDTOWN WEST	0	0	1	0	0
MURRAY HILL	0	0	0	0	0

actual

predicted	GREENWICH VILLAGE-WEST	HARLEM-CENTRAL	HARLEM-EAST	HARLEM-UPPER
ALPHABET CITY	3	0	0	0
CHELSEA	6	0	0	0
CHINATOWN	0	0	0	0
CIVIC CENTER	4	0	0	0
CLINTON	0	1	0	0
EAST VILLAGE	5	0	0	0
FASHION	1	0	0	0
FINANCIAL	2	6	0	0
FLATIRON	4	0	0	0
GRAMERCY	5	0	0	0
GREENWICH VILLAGE-CENTRAL	4	0	0	0
GREENWICH VILLAGE-WEST	16	0	0	0
HARLEM-CENTRAL	0	25	0	0
HARLEM-EAST	0	8	0	0
HARLEM-UPPER	0	8	0	0
HARLEM-WEST	0	2	0	0
INWOOD	0	0	0	0
JAVITS CENTER	0	0	0	0
KIPS BAY	0	0	0	0
LITTLE ITALY	2	0	0	0
LOWER EAST SIDE	3	0	0	0
MANHATTAN VALLEY	0	2	0	0
MIDTOWN CBD	1	0	0	0
MIDTOWN EAST	1	4	0	0
MIDTOWN WEST	0	2	0	0
MURRAY HILL	4	0	0	0

actual

predicted	HARLEM-WEST	INWOOD	JAVITS CENTER	KIPS BAY	LITTLE ITALY
ALPHABET CITY	0	0	0	0	0
CHELSEA	0	0	0	0	0
CHINATOWN	0	0	0	0	0
CIVIC CENTER	0	0	0	0	0
CLINTON	0	0	0	0	0
EAST VILLAGE	0	0	0	0	0
FASHION	0	0	0	0	0
FINANCIAL	0	0	0	0	0
FLATIRON	0	0	0	0	0
GRAMERCY	0	0	0	0	0
GREENWICH VILLAGE-CENTRAL	0	0	0	0	0
GREENWICH VILLAGE-WEST	0	0	0	0	0
HARLEM-CENTRAL	0	0	0	0	0
HARLEM-EAST	0	0	0	0	0
HARLEM-UPPER	0	0	0	0	0
HARLEM-WEST	0	0	0	0	0
INWOOD	0	0	0	0	0
JAVITS CENTER	0	0	0	0	0
KIPS BAY	0	0	0	0	0
LITTLE ITALY	0	0	0	0	0
LOWER EAST SIDE	0	0	0	0	0
MANHATTAN VALLEY	0	0	0	0	0
MIDTOWN CBD	0	0	0	0	0
MIDTOWN EAST	0	0	0	0	0
MIDTOWN WEST	0	0	0	0	0
MURRAY HILL	0	0	0	0	0

actual

predicted	LOWER EAST SIDE	MANHATTAN VALLEY	MIDTOWN CBD	MIDTOWN EAST
ALPHABET CITY	0	0	0	0
CHELSEA	0	0	0	0
CHINATOWN	0	0	0	0
CIVIC CENTER	0	0	0	0
CLINTON	0	0	0	0
EAST VILLAGE	0	0	0	0
FASHION	0	0	0	0
FINANCIAL	0	0	0	0
FLATIRON	0	0	0	0
GRAMERCY	0	0	0	0
GREENWICH VILLAGE-CENTRAL	0	0	0	0
GREENWICH VILLAGE-WEST	0	0	0	0
HARLEM-CENTRAL	0	0	0	0
HARLEM-EAST	0	0	0	0
HARLEM-UPPER	0	0	0	0
HARLEM-WEST	0	0	0	0
INWOOD	0	0	0	0
JAVITS CENTER	0	0	0	0
KIPS BAY	0	0	0	0

LITTLE ITALY	0	0	0	0
LOWER EAST SIDE	0	0	0	0
MANHATTAN VALLEY	0	0	0	0
MIDTOWN CBD	0	0	2	0
MIDTOWN EAST	0	0	0	4
MIDTOWN WEST	0	0	0	0
MURRAY HILL	0	0	0	0

actual

predicted	MIDTOWN WEST	MURRAY HILL	ROOSEVELT ISLAND	SOHO	SOUTHBRIDGE	TRIBECA
ALPHABET CITY	0	0	0	0	0	0
CHELSEA	11	0	0	0	0	0
CHINATOWN	0	0	0	0	0	0
CIVIC CENTER	2	0	0	0	0	0
CLINTON	0	0	0	0	0	0
EAST VILLAGE	0	0	0	0	0	0
FASHION	0	0	0	0	0	0
FINANCIAL	0	0	0	0	0	0
FLATIRON	1	0	0	0	0	0
GRAMERCY	1	0	0	0	0	0
GREENWICH VILLAGE-CENTRAL	4	0	0	0	0	0
GREENWICH VILLAGE-WEST	4	0	0	0	0	0
HARLEM-CENTRAL	0	0	0	0	0	0
HARLEM-EAST	0	0	0	0	0	0
HARLEM-UPPER	0	0	0	0	0	0
HARLEM-WEST	0	0	0	0	0	0
INWOOD	0	0	0	0	0	0
JAVITS CENTER	0	0	0	0	0	0
KIPS BAY	13	0	0	0	0	0
LITTLE ITALY	0	0	0	0	0	0
LOWER EAST SIDE	0	0	0	0	0	0
MANHATTAN VALLEY	0	0	0	0	0	0
MIDTOWN CBD	0	0	0	0	0	0
MIDTOWN EAST	0	0	0	0	0	0
MIDTOWN WEST	2	0	0	0	0	0
MURRAY HILL	12	0	0	0	0	0

actual

predicted	UPPER EAST SIDE (59-79)	UPPER EAST SIDE (79-96)
ALPHABET CITY	0	0
CHELSEA	0	0
CHINATOWN	0	0
CIVIC CENTER	0	0
CLINTON	0	0
EAST VILLAGE	0	0
FASHION	0	0
FINANCIAL	0	0
FLATIRON	0	0
GRAMERCY	0	0
GREENWICH VILLAGE-CENTRAL	0	0
GREENWICH VILLAGE-WEST	0	0
HARLEM-CENTRAL	0	1
HARLEM-EAST	0	0
HARLEM-UPPER	0	0
HARLEM-WEST	0	0
INWOOD	0	0
JAVITS CENTER	0	0
KIPS BAY	0	0
LITTLE ITALY	0	0
LOWER EAST SIDE	0	0
MANHATTAN VALLEY	0	0
MIDTOWN CBD	0	0
MIDTOWN EAST	0	0
MIDTOWN WEST	0	0
MURRAY HILL	0	0

actual

predicted	UPPER EAST SIDE (96-110)	UPPER WEST SIDE (59-79)
ALPHABET CITY	0	0
CHELSEA	0	0
CHINATOWN	0	0
CIVIC CENTER	0	0
CLINTON	0	4
EAST VILLAGE	0	0
FASHION	0	1
FINANCIAL	0	1
FLATIRON	0	0
GRAMERCY	0	0
GREENWICH VILLAGE-CENTRAL	0	0
GREENWICH VILLAGE-WEST	0	0
HARLEM-CENTRAL	0	7
HARLEM-EAST	0	4
HARLEM-UPPER	0	1
HARLEM-WEST	0	0
INWOOD	0	0
JAVITS CENTER	0	0

KIPS BAY	0	0
LITTLE ITALY	0	0
LOWER EAST SIDE	0	0
MANHATTAN VALLEY	0	5
MIDTOWN CBD	0	4
MIDTOWN EAST	0	11
MIDTOWN WEST	0	17
MURRAY HILL	0	0
	actual	
predicted	UPPER WEST SIDE (79-96)	UPPER WEST SIDE (96-116)
ALPHABET CITY	0	0
CHELSEA	0	0
CHINATOWN	0	0
CIVIC CENTER	0	0
CLINTON	0	0
EAST VILLAGE	0	0
FASHION	0	0
FINANCIAL	0	0
FLATIRON	0	0
GRAMERCY	0	0
GREENWICH VILLAGE-CENTRAL	0	0
GREENWICH VILLAGE-WEST	0	0
HARLEM-CENTRAL	0	0
HARLEM-EAST	0	0
HARLEM-UPPER	0	0
HARLEM-WEST	0	0
INWOOD	0	0
JAVITS CENTER	0	0
KIPS BAY	0	0
LITTLE ITALY	0	0
LOWER EAST SIDE	0	0
MANHATTAN VALLEY	0	0
MIDTOWN CBD	0	0
MIDTOWN EAST	0	0
MIDTOWN WEST	2	0
MURRAY HILL	0	0
	actual	
predicted	WASHINGTON HEIGHTS LOWER WASHINGTON HEIGHTS UPPER	
ALPHABET CITY	0	0
CHELSEA	0	0
CHINATOWN	0	0
CIVIC CENTER	0	0
CLINTON	0	0
EAST VILLAGE	0	0
FASHION	0	0
FINANCIAL	0	0
FLATIRON	0	0
GRAMERCY	0	0
GREENWICH VILLAGE-CENTRAL	0	0
GREENWICH VILLAGE-WEST	0	0
HARLEM-CENTRAL	0	0
HARLEM-EAST	0	0
HARLEM-UPPER	0	0
HARLEM-WEST	0	0
INWOOD	0	1
JAVITS CENTER	0	0
KIPS BAY	0	0
LITTLE ITALY	0	0
LOWER EAST SIDE	0	0
MANHATTAN VALLEY	0	0
MIDTOWN CBD	0	0
MIDTOWN EAST	0	0
MIDTOWN WEST	0	0
MURRAY HILL	0	0

[ reached 'max' /getOption("max.print") -- omitted 12 rows ]

	precision	recall	f1
ALPHABET CITY	NaN 0.0000000	NaN	
CHELSEA	0.03125000 0.0555556	0.04000000	
CHINATOWN	NaN 0.0000000	NaN	
CIVIC CENTER	NaN 0.0000000	NaN	
CLINTON	1.00000000 0.16666667	0.28571429	
EAST VILLAGE	NaN 0.0000000	NaN	
FASHION	1.00000000 0.42857143	0.60000000	
FINANCIAL	1.00000000 0.06666667	0.12500000	
FLATIRON	0.50000000 0.33333333	0.40000000	
GRAMERCY	NaN 0.0000000	NaN	
GREENWICH VILLAGE-CENTRAL	NaN 0.0000000	NaN	
GREENWICH VILLAGE-WEST	0.23188406 0.72727273	0.35164835	
HARLEM-CENTRAL	0.25000000 0.75757576	0.37593985	
HARLEM-EAST	NaN 0.0000000	NaN	
HARLEM-UPPER	NaN 0.0000000	NaN	

HARLEM-WEST		NaN 0.0000000	NaN
INWOOD		NaN 0.0000000	NaN
JAVITS CENTER		NaN 0.0000000	NaN
KIPS BAY		NaN 0.0000000	NaN
LITTLE ITALY		NaN 0.0000000	NaN
LOWER EAST SIDE		NaN 0.0000000	NaN
MANHATTAN VALLEY		NaN 0.0000000	NaN
MIDTOWN CBD	1.0000000	0.28571429 0.4444444	
MIDTOWN EAST	1.0000000	0.2000000 0.3333333	
MIDTOWN WEST	0.03508772	0.08333333 0.04938272	
MURRAY HILL		NaN 0.0000000	NaN
ROOSEVELT ISLAND		NaN 0.0000000	NaN
SOHO	1.0000000	0.2000000 0.3333333	
SOUTHBIDGE		NaN 0.0000000	NaN
TRIBECA		NaN 0.0000000	NaN
UPPER EAST SIDE (59-79)	0.90909091	0.34482759 0.5000000	
UPPER EAST SIDE (79-96)	0.60714286	0.62962963 0.61818182	
UPPER EAST SIDE (96-110)		NaN NaN	NaN
UPPER WEST SIDE (59-79)	0.27102804	0.69047619 0.38926174	
UPPER WEST SIDE (79-96)	0.00000000	0.00000000	NaN
UPPER WEST SIDE (96-116)		NaN 0.0000000	NaN
WASHINGTON HEIGHTS LOWER		NaN 0.0000000	NaN
WASHINGTON HEIGHTS UPPER	0.5000000	0.5000000 0.5000000	

### Random Forest Results (Confusion Matrix, Metrics Table):

actual	ALPHABET CITY	CITY	CHELSEA	CHINATOWN	CIVIC CENTER	CLINTON	EAST VILLAGE
predicted	ALPHABET CITY	0	0	0	0	0	0
CHELSEA		0	3	0	0	0	0
CHINATOWN		0	0	0	0	0	0
CIVIC CENTER		0	0	0	2	0	0
CLINTON		0	0	0	0	1	0
EAST VILLAGE		1	0	0	0	0	2
FASHION		0	1	0	0	0	0
FINANCIAL		1	0	0	0	0	0
FLATIRON		0	0	0	0	0	0
GRAMERCY		1	0	0	0	0	0
GREENWICH VILLAGE-CENTRAL		0	1	0	0	0	0
GREENWICH VILLAGE-WEST		0	0	0	0	0	0
HARLEM-CENTRAL		0	0	0	0	0	0
HARLEM-EAST		0	0	0	0	0	0
HARLEM-UPPER		0	0	0	0	0	0
HARLEM-WEST		0	0	0	0	0	0
INWOOD		0	0	0	0	0	0
JAVITS CENTER		0	0	0	0	0	0
KIPS BAY		0	0	0	0	0	0
LITTLE ITALY		0	0	0	0	0	0
LOWER EAST SIDE		0	0	0	0	0	0
MANHATTAN VALLEY		0	0	0	0	0	0
MIDTOWN CBD		0	0	0	0	0	0
MIDTOWN EAST		0	0	0	0	0	0
MIDTOWN WEST		0	0	0	0	1	0
MURRAY HILL		0	0	0	0	0	0
ROOSEVELT ISLAND		0	0	0	0	0	0
actual	FASHION	FINANCIAL	FLATIRON	GRAMERCY	GREENWICH VILLAGE-CENTRAL		
predicted	ALPHABET CITY	0	0	0	0	0	
CHELSEA		0	0	2	0	3	
CHINATOWN		0	0	0	0	0	
CIVIC CENTER		0	0	0	0	0	
CLINTON		0	0	0	0	0	
EAST VILLAGE		0	0	0	0	1	
FASHION		0	0	0	0	0	
FINANCIAL		0	0	1	0	0	
FLATIRON		0	0	2	0	0	
GRAMERCY		0	0	0	3	1	
GREENWICH VILLAGE-CENTRAL		0	0	0	0	1	
GREENWICH VILLAGE-WEST		0	0	0	0	0	
HARLEM-CENTRAL		0	0	0	0	0	
HARLEM-EAST		0	0	0	0	0	
HARLEM-UPPER		0	0	0	0	0	
HARLEM-WEST		0	0	0	0	0	
INWOOD		0	0	0	0	0	
JAVITS CENTER		0	0	0	0	0	
KIPS BAY		0	0	0	0	0	
LITTLE ITALY		0	0	0	0	0	
LOWER EAST SIDE		0	0	0	0	0	
MANHATTAN VALLEY		0	0	0	0	0	
MIDTOWN CBD		0	0	0	0	0	
MIDTOWN EAST		0	0	0	0	0	

MIDTOWN WEST	0	0	0	0	0
MURRAY HILL	0	0	0	0	0
ROOSEVELT ISLAND	0	0	0	0	0

actual

predicted	GREENWICH VILLAGE-WEST	HARLEM-CENTRAL	HARLEM-EAST	HARLEM-UPPER
ALPHABET CITY	0	0	0	0
CHELSEA	1	0	0	0
CHINATOWN	0	0	0	0
CIVIC CENTER	0	0	0	0
CLINTON	0	0	0	0
EAST VILLAGE	0	0	0	0
FASHION	0	0	0	0
FINANCIAL	0	0	0	0
FLATIRON	0	0	0	0
GRAMERCY	0	0	0	0
GREENWICH VILLAGE-CENTRAL	0	0	0	0
GREENWICH VILLAGE-WEST	5	0	0	0
HARLEM-CENTRAL	0	7	1	0
HARLEM-EAST	0	0	0	0
HARLEM-UPPER	0	0	0	0
HARLEM-WEST	0	0	0	0
INWOOD	0	0	0	0
JAVITS CENTER	0	0	0	0
KIPS BAY	0	0	0	0
LITTLE ITALY	0	0	0	0
LOWER EAST SIDE	0	0	0	0
MANHATTAN VALLEY	0	0	0	0
MIDTOWN CBD	0	0	0	0
MIDTOWN EAST	0	0	0	0
MIDTOWN WEST	0	0	0	0
MURRAY HILL	0	0	0	0
ROOSEVELT ISLAND	0	0	0	0

actual

predicted	HARLEM-WEST	INWOOD	JAVITS CENTER	KIPS BAY	LITTLE ITALY
ALPHABET CITY	0	0	0	0	0
CHELSEA	0	0	0	0	0
CHINATOWN	0	0	0	0	0
CIVIC CENTER	0	0	0	0	0
CLINTON	0	0	0	0	0
EAST VILLAGE	0	0	0	0	0
FASHION	0	0	0	0	0
FINANCIAL	0	0	0	0	0
FLATIRON	0	0	0	0	0
GRAMERCY	0	0	0	0	0
GREENWICH VILLAGE-CENTRAL	0	0	0	0	0
GREENWICH VILLAGE-WEST	0	0	0	0	1
HARLEM-CENTRAL	0	0	0	0	0
HARLEM-EAST	0	1	0	0	0
HARLEM-UPPER	0	0	0	0	0
HARLEM-WEST	0	0	0	0	0
INWOOD	0	0	0	0	0
JAVITS CENTER	0	0	0	0	0
KIPS BAY	0	0	0	2	0
LITTLE ITALY	0	0	0	0	0
LOWER EAST SIDE	0	0	0	0	0
MANHATTAN VALLEY	0	0	0	0	0
MIDTOWN CBD	0	0	0	0	0
MIDTOWN EAST	0	0	0	0	0
MIDTOWN WEST	0	0	0	0	0
MURRAY HILL	0	0	0	1	0
ROOSEVELT ISLAND	0	0	0	0	0

actual

predicted	LOWER EAST SIDE	MANHATTAN VALLEY	MIDTOWN CBD	MIDTOWN EAST
ALPHABET CITY	0	0	0	0
CHELSEA	0	0	0	0
CHINATOWN	0	0	0	0
CIVIC CENTER	0	0	0	0
CLINTON	0	0	0	0
EAST VILLAGE	0	0	0	0
FASHION	0	0	0	0
FINANCIAL	0	0	0	0
FLATIRON	0	0	0	0
GRAMERCY	0	0	0	0
GREENWICH VILLAGE-CENTRAL	0	0	0	0
GREENWICH VILLAGE-WEST	0	0	0	0
HARLEM-CENTRAL	0	0	0	0
HARLEM-EAST	0	0	0	0
HARLEM-UPPER	0	0	0	0
HARLEM-WEST	0	0	0	0
INWOOD	0	0	0	0
JAVITS CENTER	0	0	0	0
KIPS BAY	0	0	0	0
LITTLE ITALY	0	0	0	0

LOWER EAST SIDE	2	0	0	0
MANHATTAN VALLEY	0	2	0	0
MIDTOWN CBD	0	0	1	0
MIDTOWN EAST	0	0	0	1
MIDTOWN WEST	0	0	0	0
MURRAY HILL	0	0	0	0
ROOSEVELT ISLAND	0	0	0	0

actual

predicted	MIDTOWN WEST	MURRAY HILL	ROOSEVELT ISLAND	SOHO	SOUTHBRIDGE	TRIBECA
ALPHABET CITY	0	0	0	0	0	0
CHELSEA	0	0	0	0	0	0
CHINATOWN	0	0	0	0	0	0
CIVIC CENTER	0	0	0	0	0	0
CLINTON	0	0	0	0	0	0
EAST VILLAGE	0	0	0	0	0	0
FASHION	0	0	0	0	0	0
FINANCIAL	0	0	0	0	0	0
FLATIRON	0	0	0	0	0	0
GRAMERCY	0	0	0	0	0	0
GREENWICH VILLAGE-CENTRAL	0	0	0	0	0	0
GREENWICH VILLAGE-WEST	0	0	0	1	0	0
HARLEM-CENTRAL	1	0	0	0	0	0
HARLEM-EAST	0	0	0	0	0	0
HARLEM-UPPER	0	0	0	0	0	0
HARLEM-WEST	0	0	0	0	0	0
INWOOD	0	0	0	0	0	0
JAVITS CENTER	0	0	0	0	0	0
KIPS BAY	0	1	0	0	0	0
LITTLE ITALY	0	0	0	0	0	0
LOWER EAST SIDE	0	0	0	0	0	0
MANHATTAN VALLEY	0	0	0	0	0	0
MIDTOWN CBD	0	0	0	0	0	0
MIDTOWN EAST	0	0	0	0	0	0
MIDTOWN WEST	6	0	0	0	0	0
MURRAY HILL	0	0	0	0	0	0
ROOSEVELT ISLAND	0	0	0	0	0	0

actual

predicted	UPPER EAST SIDE (59-79)		UPPER EAST SIDE (79-96)	
ALPHABET CITY	0	0	0	0
CHELSEA	0	0	0	0
CHINATOWN	0	0	0	0
CIVIC CENTER	0	0	0	0
CLINTON	0	0	0	0
EAST VILLAGE	0	0	0	0
FASHION	0	0	0	0
FINANCIAL	0	0	0	0
FLATIRON	0	0	0	0
GRAMERCY	0	0	0	0
GREENWICH VILLAGE-CENTRAL	0	0	0	0
GREENWICH VILLAGE-WEST	0	0	0	0
HARLEM-CENTRAL	0	0	0	0
HARLEM-EAST	0	0	0	0
HARLEM-UPPER	0	0	0	0
HARLEM-WEST	0	0	0	0
INWOOD	0	0	0	0
JAVITS CENTER	0	0	0	0
KIPS BAY	0	0	0	0
LITTLE ITALY	0	0	0	0
LOWER EAST SIDE	0	0	0	0
MANHATTAN VALLEY	0	0	0	0
MIDTOWN CBD	0	0	0	0
MIDTOWN EAST	0	0	0	0
MIDTOWN WEST	0	0	0	0
MURRAY HILL	0	0	0	0
ROOSEVELT ISLAND	0	0	0	0

actual

predicted	UPPER WEST SIDE (59-79)		UPPER WEST SIDE (79-96)	
ALPHABET CITY	0	0	0	0
CHELSEA	0	0	0	0
CHINATOWN	0	0	0	0
CIVIC CENTER	0	0	0	0
CLINTON	0	0	0	0
EAST VILLAGE	0	0	0	0
FASHION	0	0	0	0
FINANCIAL	0	0	0	0
FLATIRON	0	0	0	0
GRAMERCY	0	0	0	0
GREENWICH VILLAGE-CENTRAL	0	0	0	0
GREENWICH VILLAGE-WEST	0	0	0	0
HARLEM-CENTRAL	0	0	0	0
HARLEM-EAST	0	0	0	0
HARLEM-UPPER	0	0	0	0
HARLEM-WEST	0	0	0	0

INWOOD	0	0
JAVITS CENTER	0	0
KIPS BAY	0	0
LITTLE ITALY	0	0
LOWER EAST SIDE	0	0
MANHATTAN VALLEY	0	0
MIDTOWN CBD	0	0
MIDTOWN EAST	0	0
MIDTOWN WEST	1	0
MURRAY HILL	0	0
ROOSEVELT ISLAND	0	0
actual		
predicted	UPPER WEST SIDE (96-116)	WASHINGTON HEIGHTS LOWER
ALPHABET CITY	0	0
CHELSEA	0	0
CHINATOWN	0	0
CIVIC CENTER	0	0
CLINTON	0	0
EAST VILLAGE	0	0
FASHION	0	0
FINANCIAL	0	0
FLATIRON	0	0
GRAMERCY	0	0
GREENWICH VILLAGE-CENTRAL	0	0
GREENWICH VILLAGE-WEST	0	0
HARLEM-CENTRAL	0	0
HARLEM-EAST	0	0
HARLEM-UPPER	0	0
HARLEM-WEST	0	0
INWOOD	0	0
JAVITS CENTER	0	0
KIPS BAY	0	0
LITTLE ITALY	0	0
LOWER EAST SIDE	0	0
MANHATTAN VALLEY	0	0
MIDTOWN CBD	0	0
MIDTOWN EAST	0	0
MIDTOWN WEST	0	0
MURRAY HILL	0	0
ROOSEVELT ISLAND	0	0
actual		
predicted	WASHINGTON HEIGHTS UPPER	
ALPHABET CITY	0	
CHELSEA	0	
CHINATOWN	0	
CIVIC CENTER	0	
CLINTON	1	
EAST VILLAGE	0	
FASHION	0	
FINANCIAL	0	
FLATIRON	0	
GRAMERCY	0	
GREENWICH VILLAGE-CENTRAL	0	
GREENWICH VILLAGE-WEST	0	
HARLEM-CENTRAL	0	
HARLEM-EAST	0	
HARLEM-UPPER	0	
HARLEM-WEST	0	
INWOOD	0	
JAVITS CENTER	0	
KIPS BAY	0	
LITTLE ITALY	0	
LOWER EAST SIDE	0	
MANHATTAN VALLEY	0	
MIDTOWN CBD	0	
MIDTOWN EAST	0	
MIDTOWN WEST	0	
MURRAY HILL	0	
ROOSEVELT ISLAND	0	

[ reached 'max' / getOption("max.print") -- omitted 10 rows ]

	precision	recall	f1
ALPHABET CITY	0.000000	NaN	NaN
CHELSEA	0.600000	0.333333	0.4285714
CHINATOWN	NaN	NaN	NaN
CIVIC CENTER	0.6666667	1.000000	0.8000000
CLINTON	0.250000	0.500000	0.333333
EAST VILLAGE	1.000000	0.500000	0.6666667
FASHION	NaN	0.000000	NaN
FINANCIAL	NaN	0.000000	NaN
FLATIRON	0.400000	1.000000	0.5714286
GRAMERCY	1.000000	0.600000	0.7500000

GREENWICH VILLAGE-CENTRAL	0.1666667	0.5000000	0.2500000
GREENWICH VILLAGE-WEST	0.8333333	0.7142857	0.7692308
HARLEM-CENTRAL	1.0000000	0.7777778	0.8750000
HARLEM-EAST	0.0000000	0.0000000	NaN
HARLEM-UPPER	NaN	NaN	NaN
HARLEM-WEST	NaN	NaN	NaN
INWOOD	0.0000000	NaN	NaN
JAVITS CENTER	NaN	NaN	NaN
KIPS BAY	0.6666667	0.6666667	0.6666667
LITTLE ITALY	0.0000000	NaN	NaN
LOWER EAST SIDE	1.0000000	1.0000000	1.0000000
MANHATTAN VALLEY	1.0000000	1.0000000	1.0000000
MIDTOWN CBD	1.0000000	1.0000000	1.0000000
MIDTOWN EAST	0.3333333	1.0000000	0.5000000
MIDTOWN WEST	0.8571429	0.7500000	0.8000000
MURRAY HILL	0.0000000	0.0000000	NaN
ROOSEVELT ISLAND	NaN	NaN	NaN
SOHO	0.7500000	1.0000000	0.8571429
SOUTHBRIDGE	1.0000000	0.5000000	0.6666667
TRIBECA	1.0000000	0.7500000	0.8571429
UPPER EAST SIDE (59-79)	0.6000000	0.3333333	0.4285714
UPPER EAST SIDE (79-96)	0.4285714	0.3333333	0.3750000
UPPER WEST SIDE (59-79)	0.8000000	0.8888889	0.8421053
UPPER WEST SIDE (79-96)	0.7500000	0.5000000	0.6000000
UPPER WEST SIDE (96-116)	0.2500000	1.0000000	0.4000000
WASHINGTON HEIGHTS LOWER	NaN	0.0000000	NaN
WASHINGTON HEIGHTS UPPER	0.0000000	NaN	NaN

## 2A - Best Regression Model Results

Residuals:

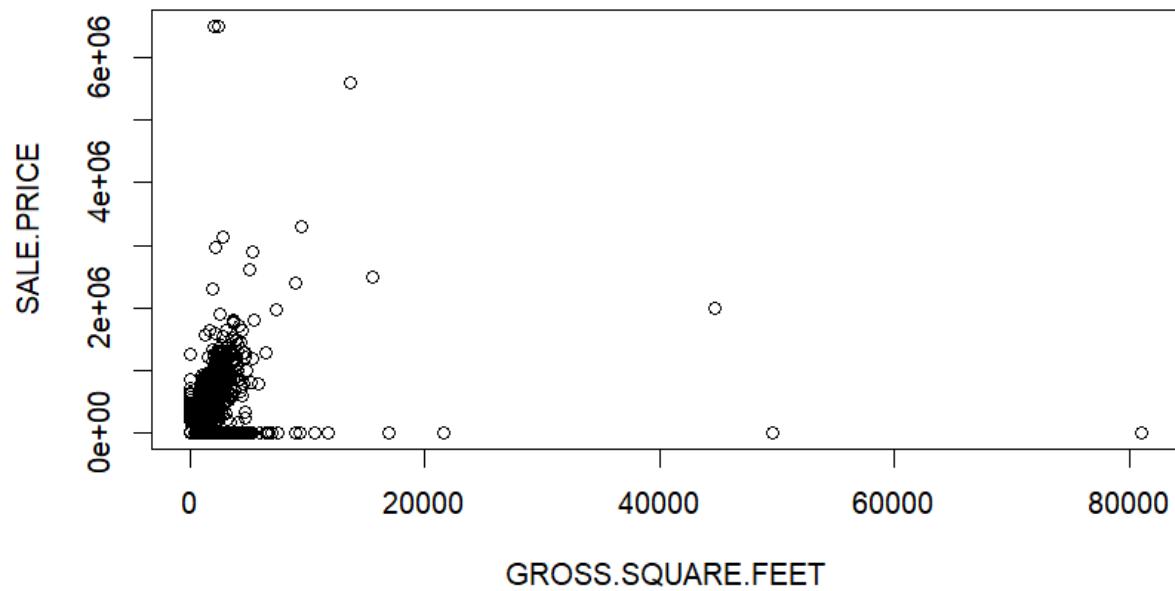
Min	1Q	Median	3Q	Max
-3156434	-399958	60613	220868	5792299

Coefficients:

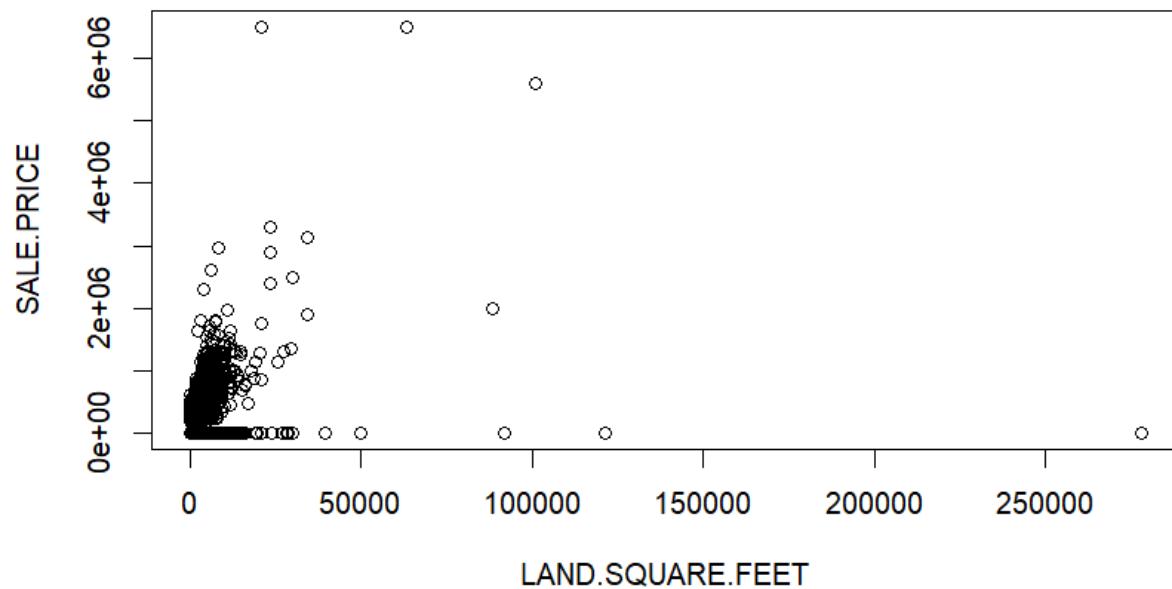
	Estimate	Std. Error	t value	Pr(> t )
(Intercept)	2.459e+06	2.300e+07	0.107	0.915
GROSS.SQUARE.FEET	-3.834e+01	6.895e+00	-5.561	3.00e-08 ***
LAND.SQUARE.FEET	2.086e+01	2.118e+00	9.850	< 2e-16 ***
YEAR.BUILT	1.523e+03	3.086e+02	4.935	8.61e-07 ***
ZIP.CODE	-4.883e+02	2.241e+03	-0.218	0.828
---				
Signif. codes:	0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1			

Residual standard error: 424400 on 2182 degrees of freedom  
Multiple R-squared: 0.05928, Adjusted R-squared: 0.05755  
F-statistic: 34.37 on 4 and 2182 DF, p-value: < 2.2e-16

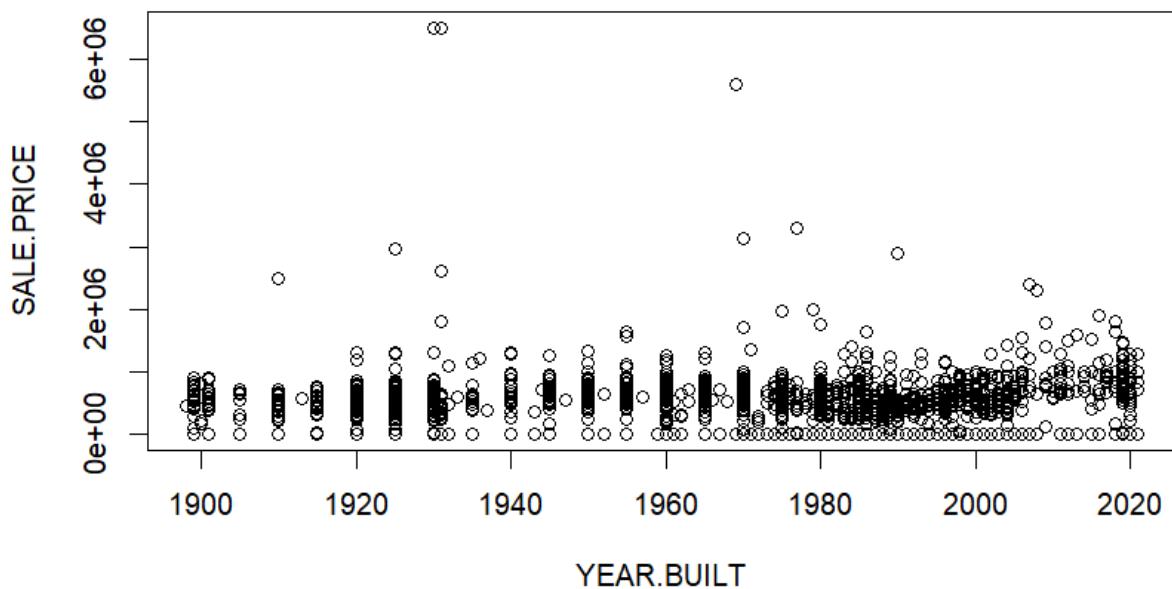
### Linear Model of Staten Island Property Sales (All stats)



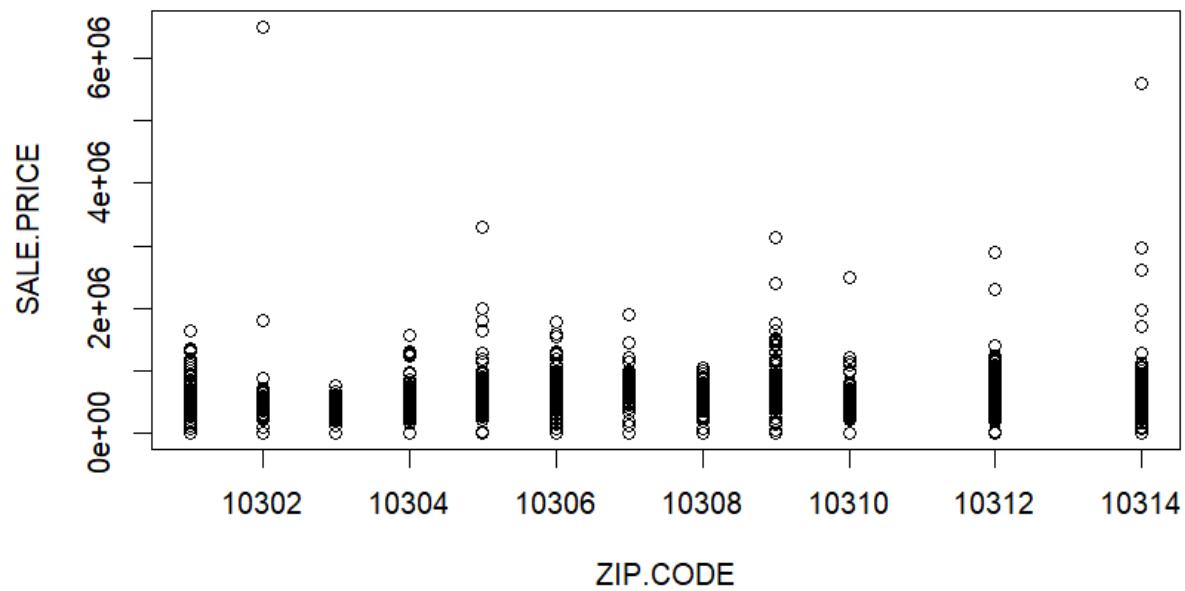
**Linear Model of Staten Island Property Sales (All stats)**



**Linear Model of Staten Island Property Sales (All stats)**



### Linear Model of Staten Island Property Sales (All stats)



## 2B - SLM Staten Island Results

## KNN Results (Confusion Matrix and Metrics Table):

Confusion Matrix and Statistics

Prediction	Reference					
	ANNDALE	ARDEN HEIGHTS	ARROCHAR	ARROCHAR-SHORE ACRES	ACRES	BLOOMFIELD
ANNDALE	8	0	0		0	0
ARDEN HEIGHTS	2	8	0		0	0
ARROCHAR	0	0	0		1	0
ARROCHAR-SHORE ACRES	0	0	0		0	0
BLOOMFIELD	0	0	0		0	0
BULLS HEAD	0	0	0		0	0
CASTLETON CORNERS	0	0	0		0	0
CLOVE LAKES	0	0	0		0	0
CONCORD	0	0	0		0	0
CONCORD-FOX HILLS	0	0	0		0	0
DONGAN HILLS	0	0	0		0	0
DONGAN HILLS-COLONY	0	0	1		0	0
DONGAN HILLS-OLD TOWN	0	0	0		0	0
ELTINGVILLE	2	4	0		0	0
EMERSON HILL	0	0	0		0	0
FRESH KILLS	0	0	0		0	0
GRANT CITY	0	0	0		0	0
Prediction	Reference					
	BULLS HEAD	CASTLETON CORNERS	CLOVE LAKES	CONCORD	CONCORD-FOX HILLS	
ANNDALE	0	0	0	0		0
ARDEN HEIGHTS	0	0	0	0		0
ARROCHAR	0	0	0	0		0
ARROCHAR-SHORE ACRES	0	0	0	0		0
BLOOMFIELD	0	0	0	0		0
BULLS HEAD	5	1	0	0		0
CASTLETON CORNERS	0	5	0	0		0
CLOVE LAKES	0	0	0	0		0
CONCORD	0	0	0	1		1
CONCORD-FOX HILLS	0	0	0	1		1
DONGAN HILLS	0	0	0	0		0
DONGAN HILLS-COLONY	0	0	0	0		0
DONGAN HILLS-OLD TOWN	0	0	0	0		0
ELTINGVILLE	0	0	0	0		0
EMERSON HILL	0	0	0	0		0
FRESH KILLS	0	0	0	0		0
GRANT CITY	0	0	0	0		0
Prediction	Reference					
	DONGAN HILLS	DONGAN HILLS-COLONY	DONGAN HILLS-OLD TOWN	ELTINGVILLE		
ANNDALE	0	0	0	2		
ARDEN HEIGHTS	0	0	0	7		
ARROCHAR	0	0	0	0		
ARROCHAR-SHORE ACRES	0	0	0	0		
BLOOMFIELD	0	0	0	0		
BULLS HEAD	0	0	0	0		
CASTLETON CORNERS	0	0	0	0		
CLOVE LAKES	0	0	0	0		
CONCORD	1	0	0	0		
CONCORD-FOX HILLS	0	0	0	0		
DONGAN HILLS	1	1	0	0		
DONGAN HILLS-COLONY	2	2	0	0		
DONGAN HILLS-OLD TOWN	0	0	0	0		
ELTINGVILLE	0	0	0	19		
EMERSON HILL	0	1	0	0		
FRESH KILLS	0	0	0	0		
GRANT CITY	1	0	0	0		
Prediction	Reference					
	EMERSON HILL	FRESH KILLS	GRANT CITY	GRASMERE	GREAT KILLS	
ANNDALE	0	0	0	0	2	
ARDEN HEIGHTS	0	0	0	0	1	
ARROCHAR	0	0	0	0	0	
ARROCHAR-SHORE ACRES	0	0	0	1	0	
BLOOMFIELD	0	0	0	0	0	
BULLS HEAD	0	0	0	0	0	
CASTLETON CORNERS	0	0	0	0	0	
CLOVE LAKES	0	0	0	0	0	
CONCORD	0	0	0	0	0	
CONCORD-FOX HILLS	0	0	0	1	0	
DONGAN HILLS	0	0	0	0	0	
DONGAN HILLS-COLONY	0	0	0	1	0	
DONGAN HILLS-OLD TOWN	0	0	0	0	0	
ELTINGVILLE	0	0	0	0	2	
EMERSON HILL	0	0	0	0	0	
FRESH KILLS	0	0	0	0	0	
GRANT CITY	0	0	0	0	0	
Prediction	Reference					
	GREAT KILLS-BAY TERRACE	GRYMES HILL	HUGUENOT	LIVINGSTON		
ANNDALE	0	0	2	0		

ARDEN HEIGHTS	0	0	0	0
ARROCHAR	0	0	0	0
ARROCHAR-SHORE ACRES	0	0	0	0
BLOOMFIELD	0	0	0	0
BULLS HEAD	0	0	0	0
CASTLETON CORNERS	0	0	0	0
CLOVE LAKES	0	0	0	0
CONCORD	0	0	0	0
CONCORD-FOX HILLS	0	0	0	0
DONGAN HILLS	0	0	0	0
DONGAN HILLS-COLONY	0	0	0	0
DONGAN HILLS-OLD TOWN	0	0	0	0
ELTINGVILLE	0	0	1	0
EMERSON HILL	0	0	0	0
FRESH KILLS	0	0	0	0
GRANT CITY	0	0	0	0

Reference

Prediction	MANOR HEIGHTS	MARINERS HARBOR	MIDLAND BEACH	NEW BRIGHTON
ANNADALE	0	0	0	0
ARDEN HEIGHTS	0	0	0	0
ARROCHAR	0	0	0	0
ARROCHAR-SHORE ACRES	0	0	1	0
BLOOMFIELD	0	0	0	0
BULLS HEAD	0	1	0	0
CASTLETON CORNERS	5	0	0	0
CLOVE LAKES	0	0	0	0
CONCORD	0	2	0	0
CONCORD-FOX HILLS	0	0	0	0
DONGAN HILLS	0	0	0	0
DONGAN HILLS-COLONY	0	0	1	0
DONGAN HILLS-OLD TOWN	0	0	0	0
ELTINGVILLE	0	0	0	0
EMERSON HILL	0	0	0	0
FRESH KILLS	0	0	0	0
GRANT CITY	0	0	1	0

Reference

Prediction	NEW BRIGHTON-ST.	GEORGE NEW DORP	NEW DORP-BEACH	NEW DORP-HEIGHTS
ANNADALE	0	0	0	0
ARDEN HEIGHTS	0	0	0	0
ARROCHAR	0	0	0	0
ARROCHAR-SHORE ACRES	0	0	0	0
BLOOMFIELD	0	0	0	0
BULLS HEAD	0	0	0	0
CASTLETON CORNERS	0	0	0	0
CLOVE LAKES	0	0	0	0
CONCORD	0	0	0	0
CONCORD-FOX HILLS	0	0	0	0
DONGAN HILLS	0	0	0	0
DONGAN HILLS-COLONY	0	0	0	0
DONGAN HILLS-OLD TOWN	0	0	0	0
ELTINGVILLE	0	0	0	0
EMERSON HILL	0	0	0	0
FRESH KILLS	0	0	0	0
GRANT CITY	0	2	0	1

Reference

Prediction	NEW SPRINGVILLE	OAKWOOD OAKWOOD-BEACH	PLEASANT PLAINS	PORT IVORY
ANNADALE	1	0	0	0
ARDEN HEIGHTS	0	0	0	0
ARROCHAR	0	0	0	0
ARROCHAR-SHORE ACRES	0	0	0	0
BLOOMFIELD	0	0	0	0
BULLS HEAD	4	0	0	0
CASTLETON CORNERS	0	0	0	0
CLOVE LAKES	0	0	0	0
CONCORD	0	0	0	0
CONCORD-FOX HILLS	0	0	0	0
DONGAN HILLS	0	0	0	0
DONGAN HILLS-COLONY	0	0	0	0
DONGAN HILLS-OLD TOWN	0	0	0	0
ELTINGVILLE	0	0	0	0
EMERSON HILL	0	0	0	0
FRESH KILLS	0	0	0	0
GRANT CITY	0	0	0	0

Reference

Prediction	PORT RICHMOND	PRINCES BAY	RICHMONDTOWN	RICHMONDTOWN-LIGHTHS HILL
ANNADALE	0	0	0	0
ARDEN HEIGHTS	0	0	0	0
ARROCHAR	0	0	0	0
ARROCHAR-SHORE ACRES	0	0	0	0
BLOOMFIELD	0	0	0	0
BULLS HEAD	0	0	0	0
CASTLETON CORNERS	0	0	0	0
CLOVE LAKES	0	0	0	0

CONCORD	0	0	0	0
CONCORD-FOX HILLS	0	0	0	0
DONGAN HILLS	0	0	0	0
DONGAN HILLS-COLONY	0	0	0	0
DONGAN HILLS-OLD TOWN	0	0	0	0
ELTINGVILLE	0	0	0	0
EMERSON HILL	0	0	0	0
FRESH KILLS	0	0	0	0
GRANT CITY	0	0	0	0

Reference

Prediction	ROSEBANK	ROSSVILLE	ROSSVILLE-CHARLESTON	ROSSVILLE-PORT MOBIL
ANNADALE	0	0	0	0
ARDEN HEIGHTS	0	0	0	0
ARROCHAR	0	0	0	0
ARROCHAR-SHORE ACRES	0	0	0	0
BLOOMFIELD	0	0	0	0
BULLS HEAD	0	0	0	0
CASTLETON CORNERS	0	0	0	0
CLOVE LAKES	0	0	0	0
CONCORD	0	0	0	0
CONCORD-FOX HILLS	0	0	0	0
DONGAN HILLS	0	0	0	0
DONGAN HILLS-COLONY	0	0	0	0
DONGAN HILLS-OLD TOWN	0	0	0	0
ELTINGVILLE	0	0	0	0
EMERSON HILL	0	0	0	0
FRESH KILLS	0	0	0	0
GRANT CITY	1	0	0	0

Reference

Prediction	ROSSVILLE-RICHMOND VALLEY	SILVER LAKE	SOUTH BEACH	STAPLETON
ANNADALE	0	0	0	0
ARDEN HEIGHTS	0	0	0	0
ARROCHAR	0	0	0	0
ARROCHAR-SHORE ACRES	0	0	0	0
BLOOMFIELD	0	0	0	0
BULLS HEAD	0	0	0	0
CASTLETON CORNERS	0	0	0	0
CLOVE LAKES	0	0	0	0
CONCORD	0	0	0	0
CONCORD-FOX HILLS	0	0	0	0
DONGAN HILLS	0	0	1	0
DONGAN HILLS-COLONY	0	0	1	0
DONGAN HILLS-OLD TOWN	0	0	0	0
ELTINGVILLE	0	0	0	0
EMERSON HILL	0	0	0	0
FRESH KILLS	0	0	0	0
GRANT CITY	0	0	0	0

Reference

Prediction	STAPLETON-CLIFTON	SUNNYSIDE	TODT HILL	TOMPKINSVILLE	TOTTENVILLE
ANNADALE	0	0	0	0	0
ARDEN HEIGHTS	0	0	0	0	0
ARROCHAR	0	0	0	0	0
ARROCHAR-SHORE ACRES	0	0	0	0	0
BLOOMFIELD	0	0	0	0	0
BULLS HEAD	0	0	0	0	0
CASTLETON CORNERS	0	0	0	0	0
CLOVE LAKES	0	0	0	0	0
CONCORD	0	0	0	0	0
CONCORD-FOX HILLS	0	0	0	0	0
DONGAN HILLS	0	0	0	0	0
DONGAN HILLS-COLONY	0	0	0	0	0
DONGAN HILLS-OLD TOWN	0	0	0	0	0
ELTINGVILLE	0	0	0	0	0
EMERSON HILL	0	0	0	0	0
FRESH KILLS	0	0	0	0	0
GRANT CITY	0	0	0	0	0

Reference

Prediction	TRAVIS WEST	NEW BRIGHTON	WESTERLEIGH	WILLOWBROOK	WOODROW
ANNADALE	0	0	0	0	0
ARDEN HEIGHTS	0	0	0	0	0
ARROCHAR	0	0	0	0	0
ARROCHAR-SHORE ACRES	0	0	0	0	0
BLOOMFIELD	0	0	0	0	0
BULLS HEAD	1	0	1	1	0
CASTLETON CORNERS	1	1	3	0	0
CLOVE LAKES	0	1	0	0	0
CONCORD	0	0	0	0	0
CONCORD-FOX HILLS	0	0	0	0	0
DONGAN HILLS	0	0	0	0	0
DONGAN HILLS-COLONY	0	0	0	0	0
DONGAN HILLS-OLD TOWN	0	0	0	0	0
ELTINGVILLE	0	0	0	0	0
EMERSON HILL	0	0	0	0	0

```

FRESH KILLS          0          0          0          0          0
GRANT CITY          0          0          0          0          0
[ reached 'max' / getOption("max.print") -- omitted 41 rows ]

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#### Overall Statistics

```

Accuracy : 0.363
95% CI : (0.3179, 0.41)
No Information Rate : 0.0913
P-Value [Acc > NIR] : < 2.2e-16

```

Kappa : 0.3398

McNemar's Test P-Value : NA

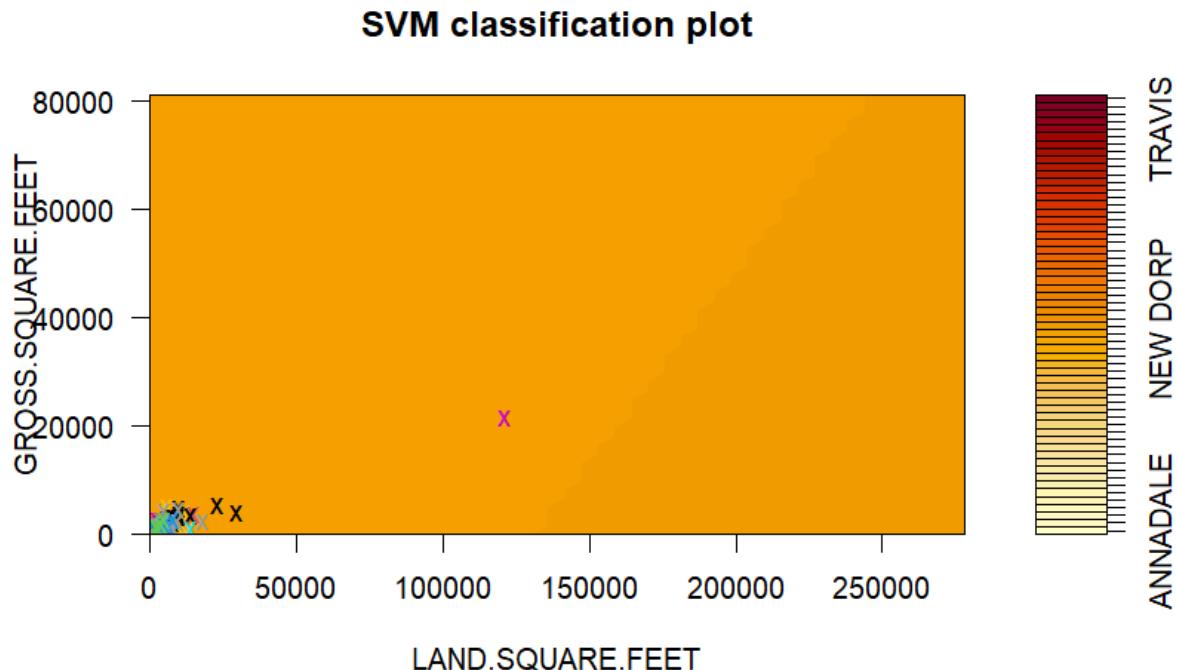
#### Statistics by Class:

	Class: ANNADALE	Class: ARDEN HEIGHTS	Class: ARROCHAR
Sensitivity	0.50000	0.53333	0.000000
Specificity	0.98341	0.97636	0.997712
Pos Pred Value	0.53333	0.44444	0.000000
Neg Pred Value	0.98109	0.98333	0.997712
Prevalence	0.03653	0.03425	0.002283
Detection Rate	0.01826	0.01826	0.000000
Detection Prevalence	0.03425	0.04110	0.002283
Balanced Accuracy	0.74171	0.75485	0.498856
	Class: ARROCHAR-SHORE ACRES	Class: BLOOMFIELD	Class: BULLS HEAD
Sensitivity	0.000000	NA	0.25000
Specificity	0.995413	1	0.97847
Pos Pred Value	0.000000	NA	0.35714
Neg Pred Value	0.995413	NA	0.96462
Prevalence	0.004566	0	0.04566
Detection Rate	0.000000	0	0.01142
Detection Prevalence	0.004566	0	0.03196
Balanced Accuracy	0.497706	NA	0.61423
	Class: CASTLETON CORNERS	Class: CLOVE LAKES	Class: CONCORD
Sensitivity	0.45455	0.000000	0.166667
Specificity	0.97658	0.997680	0.990741
Pos Pred Value	0.333333	0.000000	0.200000
Neg Pred Value	0.98582	0.983982	0.988453
Prevalence	0.02511	0.015982	0.013699
Detection Rate	0.01142	0.000000	0.002283
Detection Prevalence	0.03425	0.002283	0.011416
Balanced Accuracy	0.71556	0.498840	0.578704
	Class: CONCORD-FOX HILLS	Class: DONGAN HILLS	Class: DONGAN HILLS-COLONY
Sensitivity	0.500000	0.100000	0.285714
Specificity	0.995413	0.995327	0.986079
Pos Pred Value	0.333333	0.333333	0.250000
Neg Pred Value	0.997701	0.979310	0.988372
Prevalence	0.004566	0.022831	0.015982
Detection Rate	0.002283	0.002283	0.004566
Detection Prevalence	0.006849	0.006849	0.018265
Balanced Accuracy	0.747706	0.547664	0.635897
	Class: DONGAN HILLS-OLD TOWN	Class: ELTINGVILLE	Class: EMERSON HILL
Sensitivity	NA	0.55882	0.000000
Specificity	1	0.97772	0.997712
Pos Pred Value	NA	0.67857	0.000000
Neg Pred Value	NA	0.96341	0.997712
Prevalence	0	0.07763	0.002283
Detection Rate	0	0.04338	0.000000
Detection Prevalence	0	0.06393	0.002283
Balanced Accuracy	NA	0.76827	0.498856
	Class: FRESH KILLS	Class: GRANT CITY	Class: GRASMERE
Sensitivity	NA	0.00000	0.00000
Specificity	1	0.98608	0.98361
Pos Pred Value	NA	0.00000	0.00000
Neg Pred Value	NA	0.98380	0.97448
Prevalence	0	0.01598	0.02511
Detection Rate	0	0.00000	0.00000
Detection Prevalence	0	0.01370	0.01598
Balanced Accuracy	NA	0.49304	0.49180
	Class: GREAT KILLS-BAY TERRACE	Class: GRYMES HILL	Class: HUGUENOT
Sensitivity	0.000000	0.000000	0.250000
Specificity	0.997691	1.000000	0.983721
Pos Pred Value	0.000000	NaN	0.222222
Neg Pred Value	0.988558	0.995434	0.986014
Prevalence	0.011416	0.004566	0.018265
Detection Rate	0.000000	0.000000	0.004566
Detection Prevalence	0.002283	0.000000	0.020548
Balanced Accuracy	0.498845	0.500000	0.616860
	Class: LIVINGSTON	Class: MANOR HEIGHTS	Class: MARINERS HARBOR
Sensitivity	0.000000	0.111111	0.55556
Specificity	0.990826	0.990676	0.98368

Pos Pred Value	0.000000	0.200000	0.41667
Neg Pred Value	0.995392	0.981524	0.99061
Prevalence	0.004566	0.020548	0.02055
Detection Rate	0.000000	0.002283	0.01142
Detection Prevalence	0.009132	0.011416	0.02740
Balanced Accuracy	0.495413	0.550894	0.76962
Class: MIDLAND BEACH Class: NEW BRIGHTON Class: NEW BRIGHTON-ST. GEORGE			
Sensitivity	0.33333	0.571429	NA
Specificity	0.97857	0.988399	1
Pos Pred Value	0.40000	0.444444	NA
Neg Pred Value	0.97163	0.993007	NA
Prevalence	0.04110	0.015982	0
Detection Rate	0.01370	0.009132	0
Detection Prevalence	0.03425	0.020548	0
Balanced Accuracy	0.65595	0.779914	NA
Class: NEW DORP Class: NEW DORP-BEACH Class: NEW DORP-HEIGHTS			
Sensitivity	0.230769	0.000000	0.000000
Specificity	0.978824	0.988506	0.981567
Pos Pred Value	0.250000	0.000000	0.000000
Neg Pred Value	0.976526	0.993072	0.990698
Prevalence	0.029680	0.006849	0.009132
Detection Rate	0.006849	0.000000	0.000000
Detection Prevalence	0.027397	0.011416	0.018265
Balanced Accuracy	0.604796	0.494253	0.490783
Class: NEW SPRINGVILLE Class: OAKWOOD Class: OAKWOOD-BEACH			
Sensitivity	0.54545	NA	0.333333
Specificity	0.95673	0.9863	0.988506
Pos Pred Value	0.40000	NA	0.166667
Neg Pred Value	0.97549	NA	0.995370
Prevalence	0.05023	0.0000	0.006849
Detection Rate	0.02740	0.0000	0.002283
Detection Prevalence	0.06849	0.0137	0.013699
Balanced Accuracy	0.75109	NA	0.660920
Class: PLEASANT PLAINS Class: PORT IVORY Class: PORT RICHMOND			
Sensitivity	0.000000	0.000000	0.41667
Specificity	0.990783	0.995402	0.98826
Pos Pred Value	0.000000	0.000000	0.50000
Neg Pred Value	0.990783	0.993119	0.98364
Prevalence	0.009132	0.006849	0.02740
Detection Rate	0.000000	0.000000	0.01142
Detection Prevalence	0.009132	0.004566	0.02283
Balanced Accuracy	0.495392	0.497701	0.70246
Class: PRINCES BAY Class: RICHMONDTOWN Class: RICHMONDTOWN-LIGHTHS HILL			
Sensitivity	0.444444	0.000000	0.000000
Specificity	0.979021	0.993088	1.000000
Pos Pred Value	0.307692	0.000000	NaN
Neg Pred Value	0.988235	0.990805	0.997717
Prevalence	0.020548	0.009132	0.002283
Detection Rate	0.009132	0.000000	0.000000
Detection Prevalence	0.029680	0.006849	0.000000
Balanced Accuracy	0.711733	0.496544	0.500000
Class: ROSEBANK Class: ROSSVILLE Class: ROSSVILLE-CHARLESTON			
Sensitivity	0.166667	0.375000	NA
Specificity	0.983568	0.997674	0.997717
Pos Pred Value	0.222222	0.750000	NA
Neg Pred Value	0.976690	0.988479	NA
Prevalence	0.027397	0.018265	0.000000
Detection Rate	0.004566	0.006849	0.000000
Detection Prevalence	0.020548	0.009132	0.002283
Balanced Accuracy	0.575117	0.686337	NA
Class: ROSSVILLE-PORT MOBIL Class: ROSSVILLE-RICHMOND VALLEY			
Sensitivity		NA	NA
Specificity		1	1
Pos Pred Value		NA	NA
Neg Pred Value		NA	NA
Prevalence		0	0
Detection Rate		0	0
Detection Prevalence		0	0
Balanced Accuracy		NA	NA
Class: SILVER LAKE Class: SOUTH BEACH Class: STAPLETON			
Sensitivity	0.000000	0.45455	1.000000
Specificity	0.995423	0.96487	0.990826
Pos Pred Value	0.000000	0.25000	0.333333
Neg Pred Value	0.997706	0.98565	1.000000
Prevalence	0.002283	0.02511	0.004566
Detection Rate	0.000000	0.01142	0.004566
Detection Prevalence	0.004566	0.04566	0.013699
Balanced Accuracy	0.497712	0.70971	0.995413
Class: STAPLETON-CLIFTON Class: SUNNYSIDE Class: TODT HILL			
Sensitivity	0.000000	0.500000	0.333333
Specificity	0.997712	0.986175	0.995402
Pos Pred Value	0.000000	0.250000	0.333333
Neg Pred Value	0.997712	0.995349	0.995402

Prevalence	0.002283	0.009132	0.006849
Detection Rate	0.000000	0.004566	0.002283
Detection Prevalence	0.002283	0.018265	0.006849
Balanced Accuracy	0.498856	0.743088	0.664368
Class: TOMPKINSVILLE Class: TOTTENVILLE Class: TRAVIS			
Sensitivity	0.000000	0.69231	0.250000
Specificity	0.993135	0.99529	0.990783
Pos Pred Value	0.000000	0.81818	0.200000
Neg Pred Value	0.997701	0.99063	0.993072
Prevalence	0.002283	0.02968	0.009132
Detection Rate	0.000000	0.02055	0.002283
Detection Prevalence	0.006849	0.02511	0.011416
Balanced Accuracy	0.496568	0.84380	0.620392
Class: WEST NEW BRIGHTON Class: WESTERLEIGH Class: WILLOWBROOK			
Sensitivity	0.50000	0.200000	0.200000
Specificity	0.99296	0.983254	0.981308
Pos Pred Value	0.66667	0.363636	0.200000
Neg Pred Value	0.98601	0.962529	0.981308
Prevalence	0.02740	0.045662	0.022831
Detection Rate	0.01370	0.009132	0.004566
Detection Prevalence	0.02055	0.025114	0.022831
Balanced Accuracy	0.74648	0.591627	0.590654
Class: WOODROW			
Sensitivity	0.250000		
Specificity	0.981395		
Pos Pred Value	0.200000		
Neg Pred Value	0.985981		
Prevalence	0.018265		
Detection Rate	0.004566		
Detection Prevalence	0.022831		
Balanced Accuracy	0.615698		

### SVM Results (Classification Plot, Confusion Matrix, and Metrics Table)



actual	ANNADALE	ARDEN HEIGHTS	ARROCHAR	ARROCHAR-SHORE ACRES	BLOOMFIELD
predicted					
ANNADALE	16	6	0	0	0
ARDEN HEIGHTS	1	41	0	0	0
ARROCHAR	0	0	0	0	0
ARROCHAR-SHORE ACRES	0	0	0	0	0
BLOOMFIELD	0	0	0	0	0
BULLS HEAD	0	0	0	0	0
CASTLETON CORNERS	0	0	0	0	0
CLOSE LAKES	0	0	0	0	0

CONCORD	0	0	0	0	0
CONCORD-FOX HILLS	0	0	0	0	0
DONGAN HILLS	0	0	0	0	0
DONGAN HILLS-COLONY	0	0	0	0	0
DONGAN HILLS-OLD TOWN	0	0	0	0	0
ELTINGVILLE	3	21	0	0	0
EMERSON HILL	0	0	0	0	0
FRESH KILLS	0	0	0	0	0
GRANT CITY	0	0	0	0	0

actual

predicted	BULLS HEAD	CASTLETON CORNERS	CLOVE LAKES	CONCORD	CONCORD-FOX HILLS
ANNADALE	0	0	0	0	0
ARDEN HEIGHTS	0	0	0	0	0
ARROCHAR	0	0	0	0	0
ARROCHAR-SHORE ACRES	0	0	0	0	0
BLOOMFIELD	0	1	0	0	0
BULLS HEAD	1	3	0	0	0
CASTLETON CORNERS	0	28	0	0	0
CLOVE LAKES	0	0	0	0	0
CONCORD	0	0	0	0	0
CONCORD-FOX HILLS	0	0	0	0	0
DONGAN HILLS	0	0	0	0	0
DONGAN HILLS-COLONY	0	0	0	0	0
DONGAN HILLS-OLD TOWN	0	0	0	0	0
ELTINGVILLE	0	0	0	0	0
EMERSON HILL	0	0	0	0	0
FRESH KILLS	0	0	0	0	0
GRANT CITY	0	0	0	0	0

actual

predicted	DONGAN HILLS	DONGAN HILLS-COLONY	DONGAN HILLS-OLD TOWN	ELTINGVILLE
ANNADALE	0	0	0	20
ARDEN HEIGHTS	0	0	0	23
ARROCHAR	0	0	0	0
ARROCHAR-SHORE ACRES	0	0	0	0
BLOOMFIELD	0	0	0	0
BULLS HEAD	0	0	0	0
CASTLETON CORNERS	0	0	0	0
CLOVE LAKES	0	0	0	0
CONCORD	0	0	0	0
CONCORD-FOX HILLS	0	0	0	0
DONGAN HILLS	0	0	0	0
DONGAN HILLS-COLONY	0	0	0	0
DONGAN HILLS-OLD TOWN	0	0	1	0
ELTINGVILLE	0	0	0	66
EMERSON HILL	0	0	0	0
FRESH KILLS	0	0	0	0
GRANT CITY	0	0	0	0

actual

predicted	EMERSON HILL	FRESH KILLS	GRANT CITY	GRASMERE	GREAT KILLS
ANNADALE	0	0	0	0	3
ARDEN HEIGHTS	0	0	0	0	0
ARROCHAR	0	0	0	0	0
ARROCHAR-SHORE ACRES	0	0	0	0	0
BLOOMFIELD	0	0	0	0	0
BULLS HEAD	0	0	0	0	0
CASTLETON CORNERS	0	0	0	0	3
CLOVE LAKES	0	0	0	0	12
CONCORD	0	0	0	0	0
CONCORD-FOX HILLS	0	0	0	0	0
DONGAN HILLS	0	0	0	0	0
DONGAN HILLS-COLONY	0	0	0	0	0
DONGAN HILLS-OLD TOWN	0	0	0	0	0
ELTINGVILLE	0	0	0	0	3
EMERSON HILL	3	0	0	0	0
FRESH KILLS	0	1	0	0	0
GRANT CITY	0	0	2	0	0

actual

predicted	GREAT KILLS-BAY TERRACE	GRYMES HILL	HUGUENOT	LIVINGSTON
ANNADALE	0	0	0	0
ARDEN HEIGHTS	0	0	0	0
ARROCHAR	0	0	0	0
ARROCHAR-SHORE ACRES	0	0	0	0
BLOOMFIELD	0	0	0	0
BULLS HEAD	0	0	0	0
CASTLETON CORNERS	0	0	0	0
CLOVE LAKES	0	0	0	0
CONCORD	0	0	0	0
CONCORD-FOX HILLS	0	0	0	0
DONGAN HILLS	0	0	0	0
DONGAN HILLS-COLONY	0	0	0	0
DONGAN HILLS-OLD TOWN	0	0	0	0
ELTINGVILLE	0	0	0	0
EMERSON HILL	0	0	0	0

FRESH KILLS	0	0	0	0
GRANT CITY	0	0	0	0

actual

predicted	MANOR HEIGHTS	MARINERS HARBOR	MIDLAND BEACH	NEW BRIGHTON
ANNADALE	0	0	0	0
ARDEN HEIGHTS	0	0	0	0
ARROCHAR	0	0	1	0
ARROCHAR-SHORE ACRES	0	0	0	0
BLOOMFIELD	0	0	0	0
BULLS HEAD	0	21	0	0
CASTLETON CORNERS	2	0	0	0
CLOVE LAKES	0	0	0	4
CONCORD	0	0	0	0
CONCORD-FOX HILLS	0	1	0	0
DONGAN HILLS	0	1	1	0
DONGAN HILLS-COLONY	0	0	0	1
DONGAN HILLS-OLD TOWN	0	0	1	0
ELTINGVILLE	0	0	0	0
EMERSON HILL	0	0	0	0
FRESH KILLS	0	0	0	0
GRANT CITY	0	0	4	0

actual

predicted	NEW BRIGHTON-ST.	GEORGE NEW DORP	NEW DORP-BEACH	NEW DORP-HEIGHTS
ANNADALE	0	0	0	0
ARDEN HEIGHTS	0	0	0	0
ARROCHAR	0	0	0	0
ARROCHAR-SHORE ACRES	0	0	0	0
BLOOMFIELD	0	0	0	0
BULLS HEAD	0	0	0	0
CASTLETON CORNERS	0	0	0	0
CLOVE LAKES	0	0	0	0
CONCORD	0	0	0	0
CONCORD-FOX HILLS	0	0	0	0
DONGAN HILLS	0	0	0	0
DONGAN HILLS-COLONY	0	0	0	0
DONGAN HILLS-OLD TOWN	0	0	0	0
ELTINGVILLE	0	0	0	0
EMERSON HILL	0	0	0	0
FRESH KILLS	0	0	0	0
GRANT CITY	0	7	0	2

actual

predicted	NEW SPRINGVILLE	OAKWOOD	OAKWOOD-BEACH	PLEASANT PLAINS	PORT IVORY
ANNADALE	0	0	0	0	0
ARDEN HEIGHTS	1	0	0	0	0
ARROCHAR	0	0	0	0	0
ARROCHAR-SHORE ACRES	0	0	0	0	0
BLOOMFIELD	0	0	0	0	0
BULLS HEAD	42	0	0	0	0
CASTLETON CORNERS	11	0	0	0	0
CLOVE LAKES	1	0	0	0	0
CONCORD	0	0	0	0	0
CONCORD-FOX HILLS	0	0	0	0	0
DONGAN HILLS	0	0	0	0	0
DONGAN HILLS-COLONY	0	0	0	0	0
DONGAN HILLS-OLD TOWN	0	0	0	0	0
ELTINGVILLE	0	0	0	0	0
EMERSON HILL	0	0	0	0	0
FRESH KILLS	0	0	0	0	0
GRANT CITY	0	0	0	0	0

actual

predicted	PORT RICHMOND	PRINCES BAY	RICHMONDTOWN	RICHMONDTOWN-LIGHTHS	HILL
ANNADALE	0	0	0	0	0
ARDEN HEIGHTS	0	0	0	0	0
ARROCHAR	0	0	0	0	0
ARROCHAR-SHORE ACRES	0	0	0	0	0
BLOOMFIELD	0	0	0	0	0
BULLS HEAD	0	0	0	0	0
CASTLETON CORNERS	0	0	0	0	0
CLOVE LAKES	0	2	0	0	0
CONCORD	0	0	0	0	0
CONCORD-FOX HILLS	0	0	0	0	0
DONGAN HILLS	0	0	0	0	0
DONGAN HILLS-COLONY	0	0	0	0	0
DONGAN HILLS-OLD TOWN	0	0	0	0	0
ELTINGVILLE	0	0	0	0	0
EMERSON HILL	0	0	0	0	0
FRESH KILLS	0	0	0	0	0
GRANT CITY	0	0	0	0	0

actual

predicted	ROSEBANK	ROSSVILLE	ROSSVILLE-CHARLESTON	ROSSVILLE-PORT MOBIL
ANNADALE	0	0	0	0
ARDEN HEIGHTS	0	0	0	0
ARROCHAR	1	0	0	0

ARROCHAR-SHORE ACRES	2	0	0	0
BLOOMFIELD	0	0	0	0
BULLS HEAD	0	0	0	0
CASTLETON CORNERS	0	0	0	0
CLOVE LAKES	0	0	0	0
CONCORD	2	0	0	0
CONCORD-FOX HILLS	1	0	0	0
DONGAN HILLS	4	0	0	0
DONGAN HILLS-COLONY	8	0	0	0
DONGAN HILLS-OLD TOWN	0	0	0	0
ELTINGVILLE	0	0	0	0
EMERSON HILL	1	0	0	0
FRESH KILLS	0	0	0	0
GRANT CITY	4	0	0	0

actual

predicted	ROSSVILLE-RICHMOND VALLEY	SILVER LAKE	SOUTH BEACH	STAPLETON
ANNADEALE	0	0	0	0
ARDEN HEIGHTS	0	0	0	0
ARROCHAR	0	0	2	0
ARROCHAR-SHORE ACRES	0	0	2	0
BLOOMFIELD	0	0	0	0
BULLS HEAD	0	0	0	0
CASTLETON CORNERS	0	0	0	0
CLOVE LAKES	0	0	0	0
CONCORD	0	0	5	8
CONCORD-FOX HILLS	0	0	5	0
DONGAN HILLS	0	0	12	4
DONGAN HILLS-COLONY	0	0	5	3
DONGAN HILLS-OLD TOWN	0	0	1	0
ELTINGVILLE	0	0	0	0
EMERSON HILL	0	0	0	0
FRESH KILLS	0	0	0	0
GRANT CITY	0	0	2	1

actual

predicted	STAPLETON-CLIFTON	SUNNYSIDE	TODT HILL	TOMPKINSVILLE	TOTTENVILLE
ANNADEALE	0	0	0	0	0
ARDEN HEIGHTS	0	0	0	0	0
ARROCHAR	0	0	0	0	0
ARROCHAR-SHORE ACRES	0	0	0	0	0
BLOOMFIELD	0	0	0	0	0
BULLS HEAD	0	0	0	0	0
CASTLETON CORNERS	0	0	0	0	0
CLOVE LAKES	0	1	0	0	0
CONCORD	0	0	0	0	0
CONCORD-FOX HILLS	0	0	0	0	0
DONGAN HILLS	0	0	0	0	0
DONGAN HILLS-COLONY	0	0	0	0	0
DONGAN HILLS-OLD TOWN	0	0	0	0	0
ELTINGVILLE	0	0	0	0	0
EMERSON HILL	0	0	0	0	0
FRESH KILLS	0	0	0	0	0
GRANT CITY	0	0	0	0	0

actual

predicted	TRAVIS	WEST NEW BRIGHTON	WESTERLEIGH	WILLOWBROOK	WOODROW
ANNADEALE	0	0	0	0	0
ARDEN HEIGHTS	0	0	0	0	0
ARROCHAR	0	0	0	0	0
ARROCHAR-SHORE ACRES	0	0	0	0	0
BLOOMFIELD	0	0	0	0	0
BULLS HEAD	0	0	0	4	0
CASTLETON CORNERS	0	0	0	5	0
CLOVE LAKES	0	3	0	0	0
CONCORD	0	0	0	0	0
CONCORD-FOX HILLS	0	0	0	0	0
DONGAN HILLS	0	0	0	0	0
DONGAN HILLS-COLONY	0	0	0	0	0
DONGAN HILLS-OLD TOWN	0	0	0	0	0
ELTINGVILLE	0	0	0	0	0
EMERSON HILL	0	0	0	0	0
FRESH KILLS	0	0	0	0	0
GRANT CITY	0	0	0	0	0

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precision	recall	f1
ANNADEALE	0.5333333	0.35555556
ARDEN HEIGHTS	0.4939759	0.62121212
ARROCHAR	Nan	0.0000000
ARROCHAR-SHORE ACRES	Nan	0.0000000
BLOOMFIELD	Nan	0.0000000
BULLS HEAD	1.0000000	0.01408451
CASTLETON CORNERS	0.3733333	0.57142857
CLOVE LAKES	Nan	0.0000000

CONCORD	NaN	0.0000000	NaN
CONCORD-FOX HILLS	NaN	0.0000000	NaN
DONGAN HILLS	NaN	0.0000000	NaN
DONGAN HILLS-COLONY	0.0000000	0.0000000	NaN
DONGAN HILLS-OLD TOWN	1.0000000	0.33333333	0.50000000
ELTINGVILLE	0.4489796	0.70967742	0.55000000
EMERSON HILL	0.7500000	0.7500000	0.7500000
FRESH KILLS	1.0000000	1.0000000	1.0000000
GRANT CITY	1.0000000	0.09090909	0.16666667
GRASMERE	NaN	0.0000000	NaN
GREAT KILLS	0.4347826	0.68783069	0.53278689
GREAT KILLS-BAY TERRACE	NaN	0.0000000	NaN
GRIMES HILL	NaN	0.0000000	NaN
HUGUENOT	NaN	0.0000000	NaN
LIVINGSTON	NaN	0.0000000	NaN
MANOR HEIGHTS	0.6000000	0.07692308	0.13636364
MARINERS HARBOR	0.5319149	0.98039216	0.68965517
MIDLAND BEACH	0.2013423	0.6000000	0.30150754
NEW BRIGHTON	0.5625000	0.97826087	0.71428571
NEW BRIGHTON-ST. GEORGE	NaN	0.0000000	NaN
NEW DORP	0.3750000	0.6000000	0.46153846
NEW DORP-BEACH	NaN	0.0000000	NaN
NEW DORP-HEIGHTS	0.1739130	0.14285714	0.15686275
NEW SPRINGVILLE	0.3578431	0.94805195	0.51957295
OAKWOOD	NaN	0.0000000	NaN
OAKWOOD-BEACH	NaN	0.0000000	NaN
PLEASANT PLAINS	NaN	0.0000000	NaN
PORT IVORY	NaN	0.0000000	NaN
PORT RICHMOND	0.7500000	0.86666667	0.80412371
PRINCES BAY	0.3636364	0.17777778	0.23880597
RICHMONDTOWN	0.8571429	0.33333333	0.48000000
RICHMONDTOWN-LIGHTHS HILL	NaN	0.0000000	NaN
ROSEBANK	0.1791045	0.33333333	0.23300971
ROSSVILLE	NaN	0.0000000	NaN
ROSSVILLE-CHARLESTON	NaN	0.0000000	NaN
ROSSVILLE-PORT MOBIL	1.0000000	1.0000000	1.0000000
ROSSVILLE-RICHMOND VALLEY	NaN	0.0000000	NaN
SILVER LAKE	NaN	0.0000000	NaN
SOUTH BEACH	0.2327586	0.58695652	0.33333333
STAPLETON	0.3783784	0.58333333	0.45901639
STAPLETON-CLIFTON	NaN	0.0000000	NaN
SUNNYSIDE	0.5416667	0.54166667	0.54166667
TODT HILL	1.0000000	0.44444444	0.61538462
TOMPKINSVILLE	NaN	0.0000000	NaN
TOTTENVILLE	1.0000000	0.89041096	0.94202899
TRAVIS	NaN	0.0000000	NaN
WEST NEW BRIGHTON	0.6578947	0.50000000	0.56818182
WESTERLEIGH	NaN	0.0000000	NaN
WILLOWBROOK	0.3125000	0.23255814	0.26666667
WOODROW	0.2702703	0.20000000	0.22988506

## Random Forest Results (Confusion Matrix and Metrics Table)

actual	ANNADALE	ARDEN HEIGHTS	ARROCHAR	ARROCHAR-SHORE ACRES	ACRES	BLOOMFIELD
predicted	4	0	0	0	0	0
ANNADALE	4	0	0	0	0	0
ARDEN HEIGHTS	3	10	0	0	0	0
ARROCHAR	0	0	0	0	0	0
ARROCHAR-SHORE ACRES	0	0	0	0	0	0
BLOOMFIELD	0	0	0	0	0	0
BULLS HEAD	0	0	0	0	0	0
CASTLETON CORNERS	0	0	0	0	0	0
CLOVE LAKES	0	0	0	0	0	0
CONCORD	0	0	0	0	0	0
CONCORD-FOX HILLS	0	0	0	0	0	0
DONGAN HILLS	0	0	0	0	0	0
DONGAN HILLS-COLONY	0	0	0	0	0	0
DONGAN HILLS-OLD TOWN	0	0	0	0	0	0
ELTINGVILLE	4	4	0	0	0	0
EMERSON HILL	0	0	0	0	0	0
FRESH KILLS	0	0	0	0	0	0
GRANT CITY	0	0	0	0	0	0
actual	BULLS HEAD	CASTLETON CORNERS	CLOVE LAKES	CONCORD	CONCORD-FOX HILLS	
predicted	0	0	0	0	0	0
ANNADALE	0	0	0	0	0	0
ARDEN HEIGHTS	0	0	0	0	0	0
ARROCHAR	0	0	0	0	0	0
ARROCHAR-SHORE ACRES	0	0	0	0	0	0
BLOOMFIELD	0	0	0	0	0	0
BULLS HEAD	7	1	0	0	0	0

CASTLETON CORNERS	0	5	0	0	0
CLOVE LAKES	0	0	2	0	0
CONCORD	0	0	0	2	0
CONCORD-FOX HILLS	0	0	0	1	2
DONGAN HILLS	0	0	0	0	0
DONGAN HILLS-COLONY	0	0	0	0	0
DONGAN HILLS-OLD TOWN	0	0	0	0	0
ELTINGVILLE	0	0	0	0	0
EMERSON HILL	0	0	0	0	0
FRESH KILLS	0	0	0	0	0
GRANT CITY	0	0	0	0	0

actual

predicted	DONGAN HILLS	DONGAN HILLS-COLONY	DONGAN HILLS-OLD TOWN	ELTINGVILLE
ANNADALE	0	0	0	2
ARDEN HEIGHTS	0	0	0	4
ARROCHAR	0	0	0	0
ARROCHAR-SHORE ACRES	0	0	0	0
BLOOMFIELD	0	0	0	0
BULLS HEAD	0	0	0	0
CASTLETON CORNERS	0	0	0	0
CLOVE LAKES	0	0	0	0
CONCORD	1	1	0	0
CONCORD-FOX HILLS	0	0	0	0
DONGAN HILLS	0	0	0	0
DONGAN HILLS-COLONY	2	2	0	0
DONGAN HILLS-OLD TOWN	0	0	0	0
ELTINGVILLE	0	0	0	27
EMERSON HILL	0	0	0	0
FRESH KILLS	0	0	0	0
GRANT CITY	0	0	0	0

actual

predicted	EMERSON HILL	FRESH KILLS	GRANT CITY	GRASMERE	GREAT KILLS
ANNADALE	0	0	0	0	2
ARDEN HEIGHTS	0	0	0	0	2
ARROCHAR	0	0	0	0	0
ARROCHAR-SHORE ACRES	0	0	0	0	0
BLOOMFIELD	0	0	0	0	0
BULLS HEAD	0	0	0	0	0
CASTLETON CORNERS	0	0	0	0	0
CLOVE LAKES	0	0	0	0	0
CONCORD	0	0	0	1	0
CONCORD-FOX HILLS	0	0	0	0	0
DONGAN HILLS	0	0	0	1	0
DONGAN HILLS-COLONY	0	0	0	0	0
DONGAN HILLS-OLD TOWN	0	0	0	0	0
ELTINGVILLE	0	0	0	0	1
EMERSON HILL	0	0	0	0	0
FRESH KILLS	0	0	0	0	0
GRANT CITY	0	0	0	0	0

actual

predicted	GREAT KILLS-BAY TERRACE	GRYMES HILL	HUGUENOT	LIVINGSTON
ANNADALE	0	0	2	0
ARDEN HEIGHTS	0	0	0	0
ARROCHAR	0	0	0	0
ARROCHAR-SHORE ACRES	0	0	0	0
BLOOMFIELD	0	0	0	0
BULLS HEAD	0	0	0	0
CASTLETON CORNERS	0	0	0	0
CLOVE LAKES	0	0	0	0
CONCORD	0	0	0	0
CONCORD-FOX HILLS	0	0	0	0
DONGAN HILLS	0	0	0	0
DONGAN HILLS-COLONY	0	0	0	0
DONGAN HILLS-OLD TOWN	0	0	0	0
ELTINGVILLE	0	0	3	0
EMERSON HILL	0	0	0	0
FRESH KILLS	0	0	0	0
GRANT CITY	0	0	0	0

actual

predicted	MANOR HEIGHTS	MARINERS HARBOR	MIDLAND BEACH	NEW BRIGHTON
ANNADALE	0	0	0	0
ARDEN HEIGHTS	0	0	0	0
ARROCHAR	0	0	0	0
ARROCHAR-SHORE ACRES	0	0	0	0
BLOOMFIELD	0	0	0	0
BULLS HEAD	0	1	0	0
CASTLETON CORNERS	5	0	0	0
CLOVE LAKES	0	0	0	0
CONCORD	0	0	0	0
CONCORD-FOX HILLS	0	0	0	0
DONGAN HILLS	0	0	0	0
DONGAN HILLS-COLONY	0	0	0	0
DONGAN HILLS-OLD TOWN	0	0	0	0

ELTINGVILLE	0	0	0	0
EMERSON HILL	0	0	0	0
FRESH KILLS	0	0	0	0
GRANT CITY	0	0	0	0

actual

	NEW BRIGHTON-ST.	GEORGE NEW DORP	NEW DORP-BEACH	NEW DORP-HEIGHTS
predicted				
ANNADALE	0	0	0	0
ARDEN HEIGHTS	0	0	0	0
ARROCHAR	0	0	0	0
ARROCHAR-SHORE ACRES	0	0	0	0
BLOOMFIELD	0	0	0	0
BULLS HEAD	0	0	0	0
CASTLETON CORNERS	0	0	0	0
CLOVE LAKES	0	0	0	0
CONCORD	0	0	0	0
CONCORD-FOX HILLS	0	0	0	0
DONGAN HILLS	0	0	0	0
DONGAN HILLS-COLONY	0	0	0	0
DONGAN HILLS-OLD TOWN	0	0	0	0
ELTINGVILLE	0	0	0	0
EMERSON HILL	0	0	0	0
FRESH KILLS	0	0	0	0
GRANT CITY	0	2	0	0

actual

	NEW SPRINGVILLE	OAKWOOD	OAKWOOD-BEACH	PLEASANT PLAINS	PORT IVORY
predicted					
ANNADALE	0	0	0	0	0
ARDEN HEIGHTS	0	0	0	0	0
ARROCHAR	0	0	0	0	0
ARROCHAR-SHORE ACRES	0	0	0	0	0
BLOOMFIELD	0	0	0	0	0
BULLS HEAD	3	0	0	0	0
CASTLETON CORNERS	1	0	0	0	0
CLOVE LAKES	0	0	0	0	0
CONCORD	0	0	0	0	0
CONCORD-FOX HILLS	0	0	0	0	0
DONGAN HILLS	0	0	0	0	0
DONGAN HILLS-COLONY	0	0	0	0	0
DONGAN HILLS-OLD TOWN	0	0	0	0	0
ELTINGVILLE	0	0	0	0	0
EMERSON HILL	0	0	0	0	0
FRESH KILLS	0	0	0	0	0
GRANT CITY	0	0	0	0	0

actual

	PORT RICHMOND	PRINCES BAY	RICHMONDTOWN	RICHMONDTOWN-LIGHTHS	HILL
predicted					
ANNADALE	0	0	0	0	0
ARDEN HEIGHTS	0	0	0	0	0
ARROCHAR	0	0	0	0	0
ARROCHAR-SHORE ACRES	0	0	0	0	0
BLOOMFIELD	0	0	0	0	0
BULLS HEAD	0	0	0	0	0
CASTLETON CORNERS	0	0	0	0	0
CLOVE LAKES	0	0	0	0	0
CONCORD	0	0	0	0	0
CONCORD-FOX HILLS	0	0	0	0	0
DONGAN HILLS	0	0	0	0	0
DONGAN HILLS-COLONY	0	0	0	0	0
DONGAN HILLS-OLD TOWN	0	0	0	0	0
ELTINGVILLE	0	0	0	0	0
EMERSON HILL	0	0	0	0	0
FRESH KILLS	0	0	0	0	0
GRANT CITY	0	0	0	0	0

actual

	ROSEBANK	ROSSVILLE	ROSSVILLE-CHARLESTON	ROSSVILLE-PORT MOBIL
predicted				
ANNADALE	0	0	0	0
ARDEN HEIGHTS	0	0	0	0
ARROCHAR	0	0	0	0
ARROCHAR-SHORE ACRES	0	0	0	0
BLOOMFIELD	0	0	0	0
BULLS HEAD	0	0	0	0
CASTLETON CORNERS	0	0	0	0
CLOVE LAKES	0	0	0	0
CONCORD	0	0	0	0
CONCORD-FOX HILLS	0	0	0	0
DONGAN HILLS	0	0	0	0
DONGAN HILLS-COLONY	0	0	0	0
DONGAN HILLS-OLD TOWN	0	0	0	0
ELTINGVILLE	0	0	0	0
EMERSON HILL	0	0	0	0
FRESH KILLS	0	0	0	0
GRANT CITY	0	0	0	0

actual

	ROSSVILLE-RICHMOND VALLEY	SILVER LAKE	SOUTH BEACH	STAPLETON
predicted				
ANNADALE	0	0	0	0

ARDEN HEIGHTS	0	0	0	0
ARROCHAR	0	0	0	0
ARROCHAR-SHORE ACRES	0	0	0	0
BLOOMFIELD	0	0	0	0
BULLS HEAD	0	0	0	0
CASTLETON CORNERS	0	0	0	0
CLOVE LAKES	0	0	0	0
CONCORD	0	0	0	0
CONCORD-FOX HILLS	0	0	0	0
DONGAN HILLS	0	0	0	0
DONGAN HILLS-COLONY	0	0	0	0
DONGAN HILLS-OLD TOWN	0	0	1	0
ELTINGVILLE	0	0	0	0
EMERSON HILL	0	0	0	0
FRESH KILLS	0	0	0	0
GRANT CITY	0	0	1	0

actual

predicted	STAPLETON-CLIFTON SUNNYSIDE TODT HILL TOMPKINSVILLE TOTTENVILLE
ANNADALE	0 0 0 0 0
ARDEN HEIGHTS	0 0 0 0 0
ARROCHAR	0 0 0 0 0
ARROCHAR-SHORE ACRES	0 0 0 0 0
BLOOMFIELD	0 0 0 0 0
BULLS HEAD	0 0 0 0 0
CASTLETON CORNERS	0 0 0 0 0
CLOVE LAKES	0 0 0 0 0
CONCORD	0 0 0 0 0
CONCORD-FOX HILLS	0 0 0 0 0
DONGAN HILLS	0 0 0 0 0
DONGAN HILLS-COLONY	0 0 0 0 0
DONGAN HILLS-OLD TOWN	0 0 0 0 0
ELTINGVILLE	0 0 0 0 0
EMERSON HILL	0 0 0 0 0
FRESH KILLS	0 0 0 0 0
GRANT CITY	0 0 0 0 0

actual

predicted	TRAVIS WEST NEW BRIGHTON WESTERLEIGH WILLOWBROOK WOODROW
ANNADALE	0 0 0 0 0
ARDEN HEIGHTS	0 0 0 0 0
ARROCHAR	0 0 0 0 0
ARROCHAR-SHORE ACRES	0 0 0 0 0
BLOOMFIELD	0 0 0 0 0
BULLS HEAD	0 0 0 2 0
CASTLETON CORNERS	1 0 5 0 0
CLOVE LAKES	0 1 0 0 0
CONCORD	0 0 0 0 0
CONCORD-FOX HILLS	0 0 0 0 0
DONGAN HILLS	0 0 0 0 0
DONGAN HILLS-COLONY	0 0 0 0 0
DONGAN HILLS-OLD TOWN	0 0 0 0 0
ELTINGVILLE	0 0 0 0 0
EMERSON HILL	0 0 0 0 0
FRESH KILLS	0 0 0 0 0
GRANT CITY	0 0 0 0 0

[ reached 'max' /getOption("max.print") -- omitted 41 rows ]

precision	recall	f1
ANNADALE	0.2500000	0.4000000 0.3076923
ARDEN HEIGHTS	0.6666667	0.5263158 0.5882353
ARROCHAR	0.0000000	NaN NaN
ARROCHAR-SHORE ACRES	0.0000000	NaN NaN
BLOOMFIELD	NaN	NaN NaN
BULLS HEAD	0.3500000	0.5000000 0.4117647
CASTLETON CORNERS	0.4545455	0.2941176 0.3571429
CLOVE LAKES	0.2857143	0.6666667 0.4000000
CONCORD	0.3333333	0.4000000 0.3636364
CONCORD-FOX HILLS	1.0000000	0.6666667 0.8000000
DONGAN HILLS	0.0000000	0.0000000 NaN
DONGAN HILLS-COLONY	0.2857143	0.5000000 0.3636364
DONGAN HILLS-OLD TOWN	NaN	0.0000000 NaN
ELTINGVILLE	0.7941176	0.6923077 0.7397260
EMERSON HILL	0.0000000	NaN NaN
FRESH KILLS	NaN	NaN NaN
GRANT CITY	0.0000000	0.0000000 NaN
GRASMERE	0.0000000	0.0000000 NaN
GREAT KILLS	0.8250000	0.8684211 0.8461538
GREAT KILLS-BAY TERRACE	0.2000000	0.3333333 0.2500000
GRYMES HILL	0.0000000	NaN NaN
HUGUENOT	0.0000000	0.0000000 NaN
LIVINGSTON	0.0000000	0.0000000 NaN
MANOR HEIGHTS	0.3333333	0.3000000 0.3157895
MARINERS HARBOR	0.8888889	0.7272727 0.8000000

MIDLAND BEACH	0.3333333	0.3529412	0.3428571
NEW BRIGHTON	1.0000000	0.5384615	0.7000000
NEW BRIGHTON-ST. GEORGE	NaN	NaN	NaN
NEW DORP	0.2307692	0.2307692	0.2307692
NEW DORP-BEACH	0.0000000	0.0000000	NaN
NEW DORP-HEIGHTS	0.2500000	0.1250000	0.1666667
NEW SPRINGVILLE	0.6818182	0.4838710	0.5660377
OAKWOOD	NaN	0.0000000	NaN
OAKWOOD-BEACH	0.6666667	0.6666667	0.6666667
PLEASANT PLAINS	0.0000000	0.0000000	NaN
PORT IVORY	0.3333333	1.0000000	0.5000000
PORT RICHMOND	0.6666667	0.8000000	0.7272727
PRINCES BAY	0.6666667	0.6000000	0.6315789
RICHMONDTOWN	0.5000000	0.2857143	0.3636364
RICHMONDTOWN-LIGHTHS HILL	0.0000000	NaN	NaN
ROSEBANK	0.2500000	0.3333333	0.2857143
ROSSVILLE	0.3750000	0.7500000	0.5000000
ROSSVILLE-CHARLESTON	NaN	NaN	NaN
ROSSVILLE-PORT MOBIL	NaN	NaN	NaN
ROSSVILLE-RICHMOND VALLEY	NaN	NaN	NaN
SILVER LAKE	0.0000000	0.0000000	NaN
SOUTH BEACH	0.2727273	0.1250000	0.1714286
STAPLETON	1.0000000	0.2500000	0.4000000
STAPLETON-CLIFTON	0.0000000	0.0000000	NaN
SUNNYSIDE	0.2500000	0.2000000	0.2222222
TODT HILL	0.6666667	0.3333333	0.4444444
TOMPKINSVILLE	0.0000000	0.0000000	NaN
TOTTENVILLE	1.0000000	1.0000000	1.0000000
TRAVIS	0.2500000	0.5000000	0.3333333
WEST NEW BRIGHTON	0.8333333	0.6666667	0.7407407
WESTERLEIGH	0.1500000	0.6000000	0.2400000
WILLOWBROOK	0.3000000	0.2142857	0.2500000
WOODROW	0.6250000	0.3571429	0.4545455