



# CHICAGO NEIGHBORHOOD ANALYSIS PROJECT

The Development Company

Date: July 14, 2019

# Introduction

- ▶ New Chicago-area Developer, The Development Company (TDC), is looking to determine which up-and-coming neighborhoods are likely to experience enough price appreciation to support new-construction residential housing.
- ▶ TDC would like to work in the historically underserved South and West areas of the city, but they need to understand the underlying market dynamics in these areas.
- ▶ TDC's business plan is looking for neighborhoods where their finished products can sell for at least \$200 per square foot and within 120 days of being listed for sale.

# Data Acquisition & Cleaning

# Data Sources

| Data  | Link to Data  | Use Case to Solve Problem  |
|---|---|--|
| Chicago Community Area Snapshot Dataset from June 2019                  | <a href="https://datahub.cmap.illinois.gov/dataset/community-data-snapshots-raw-data">https://datahub.cmap.illinois.gov/dataset/community-data-snapshots-raw-data</a> | This data set from the Chicago Metropolitan Agency for Planning (CMAP) is a snapshot of demographics for each of Chicago's 77 neighborhoods. This will allow for obtaining a complete listing of all the neighborhoods in Chicago to conduct analysis activities (i.e. Clustering, Geocoding) at the Neighborhood level. |
| Google Geocoding API  | <a href="https://developers.google.com/maps/documentation/geocoding/start">https://developers.google.com/maps/documentation/geocoding/start</a>                       | This data source will allow for identifying the center of each Chicago neighborhood for map plotting and retrieval of nearby venues via FourSquare.  |
| FourSquare Explore Venues API   | <a href="https://developer.foursquare.com/docs/api">https://developer.foursquare.com/docs/api</a>   | This data source will allow for obtaining data on venues in Chicago neighborhoods that are closest to the center of the neighborhood area for a given distance. This will be used to determine what basic features each neighborhood has that may be of interest to potential buyers of TDCs products.                   |
| Redfin Data Center - Days on Market & Price Per Square Foot 2012 - 2019 | <a href="https://www.redfin.com/blog/data-center/">https://www.redfin.com/blog/data-center/</a>   | This data source will allow for obtaining insights into real estate market activity occurring in the Chicago neighborhoods.  |

# Data Cleaning

- ▶ *CMAP Chicago Community Area Snapshot*
  - ▶ The Original CMAP Dataset contained 231 columns of data for each Chicago neighborhood. Using the Data Dictionary from the CMAP Data Hub, MS Excel was used to drop columns deemed least applicable to the analysis of inherent market value. 108 columns were retained as they were the type of data points that would most contribute to inherent market value (i.e. demographics, proportion of owner-occupants to renters, proportion of vacant land to overall land use).

# Results & Discussion

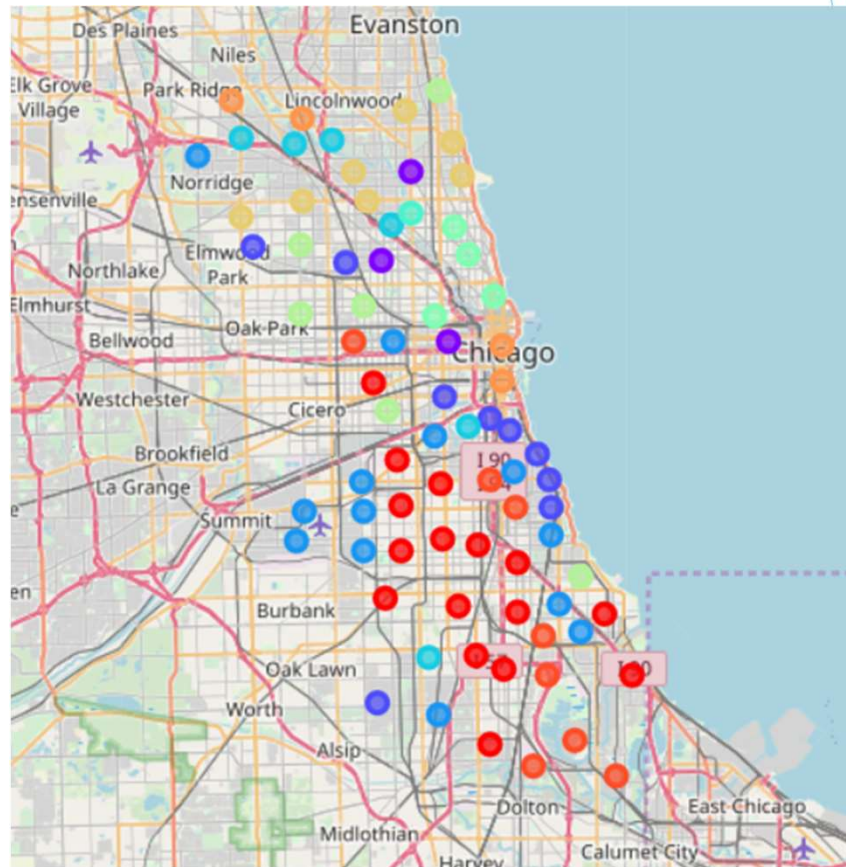
# Population Results from K- means Algorithm

The K-Means Algorithm was used to group the 77 Chicago neighborhoods into 11 clusters based on the CMAP data set.

The picture depicts the distribution of the 11 clusters.

The profile of Cluster 2 (Dark Blue) best matched TDC's business plan and will be used from this point forward.

One observation of note was North Center in Cluster 5 (Aqua Green) that had median home values over \$100,000 more in home value than traditionally expensive neighborhood such as Lincoln Park and Lakeview in Cluster 6.



# Population Review Results from K-means Algorithm

| Cluster # | Cluster Color | Neighborhoods   | Cluster Profile  |
|-----------|---------------|---|--|
| 0         | Red           | Ashburn<br>Auburn Gresham<br>Brighton Park<br>Chatham<br>Chicago Lawn<br>East Side<br>Englewood<br>Gage Park<br>Greater Grand Crossing<br>New City<br>North Lawndale<br>Roseland<br>South Chicago<br>Washington Heights<br>West Englewood<br>West Pullman | South and Southwest side neighborhoods with low median home values with declining population.                              |
| 1         | Purple        | Lincoln Square<br>Logan Square<br>Near West Side  | Northwest and West side neighborhoods with high median home values and increasing population.                              |
| 2         | Dark Blue     | Armour Square<br>Douglas<br>Hermosa<br>Hyde Park<br>Kenwood<br>Lower West Side<br>Montclare<br>Mount Greenwood<br>Oakland   | South, Southwest, and Northwest side neighborhoods with moderately high median home values and increasing population.      |
| 3         | Medium Blue   | Archer Heights<br>Avalon Park<br>Calumet Heights<br>Clearing<br>East Garfield Park<br>Garfield Ridge<br>Grand Boulevard<br>McKinley Park<br>Morgan Park<br>O'Hare<br>West Elsdon<br>West Lawn<br>Woodlawn   | Northwest, West, South, and Southwest side neighborhoods with moderately low median home values and increasing population. |

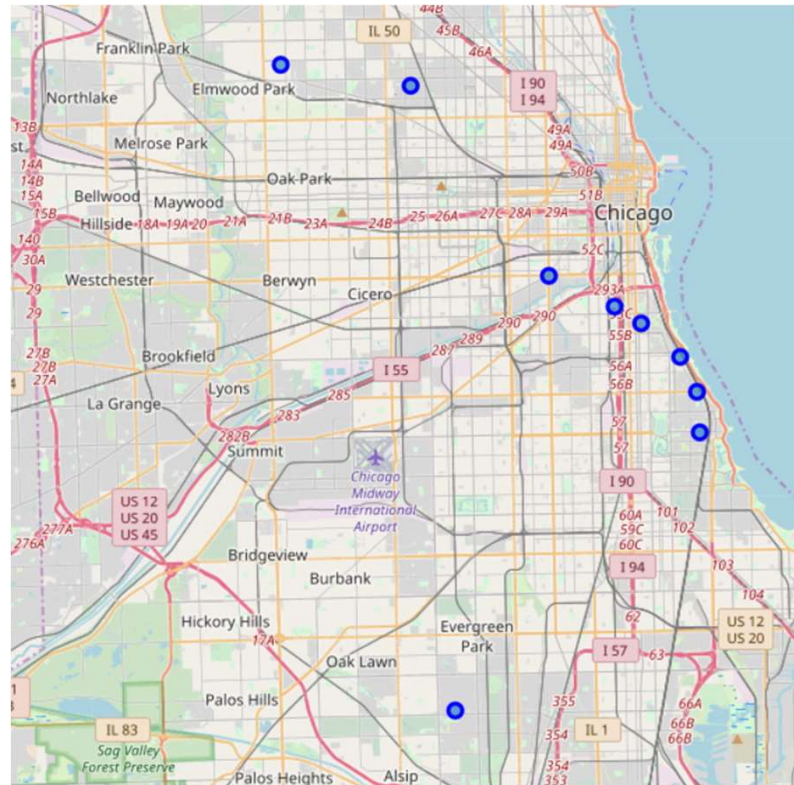


# Population Results from K- means Algorithm

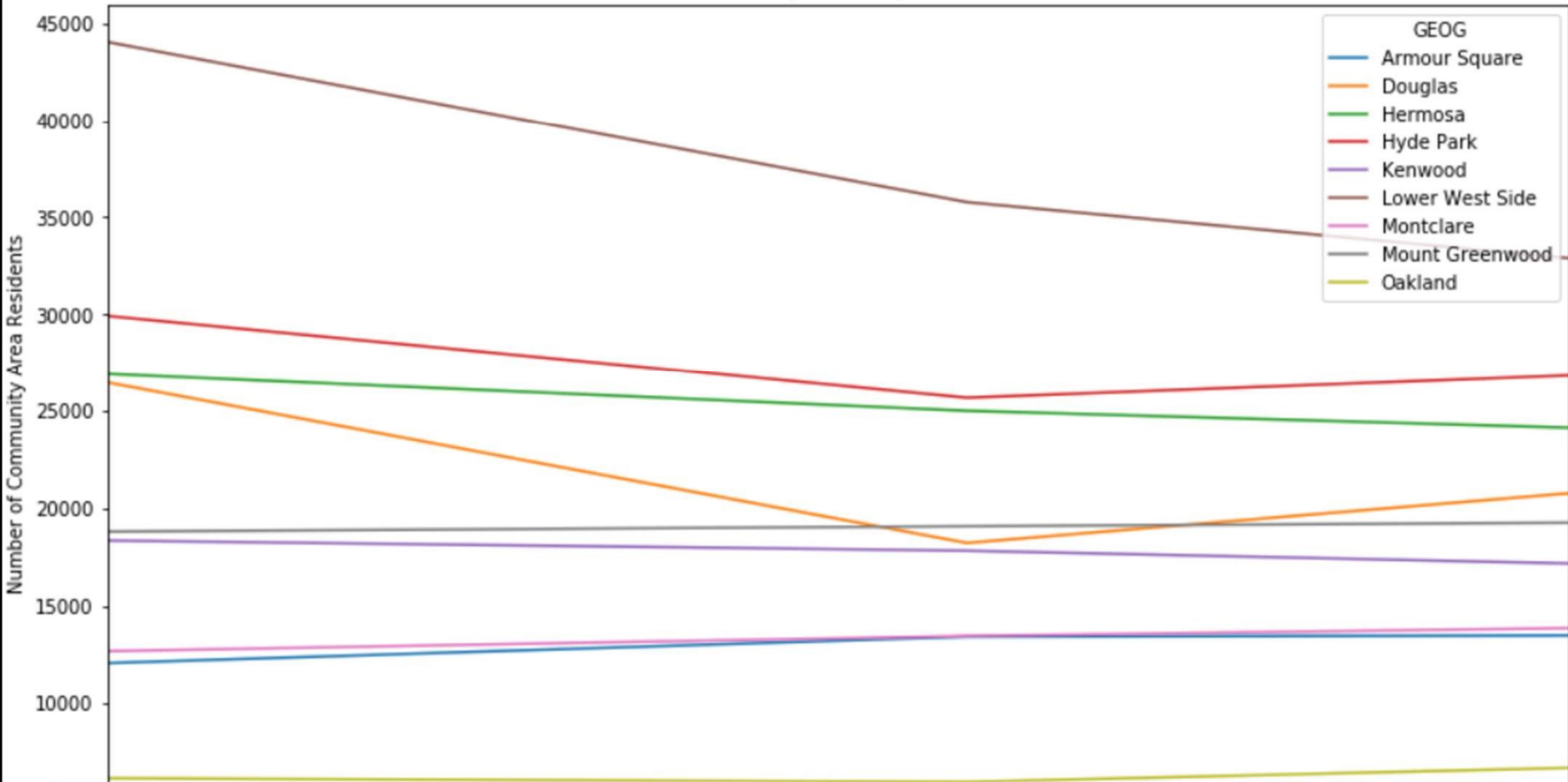
| Cluster # | Cluster Color | Neighborhoods  | Cluster Profile   |
|-----------|---------------|--|---|
| 4         | Sky Blue      | Avondale<br>Beverly<br>Bridgeport<br>Jefferson Park<br>North Park<br>Norwood Park                                      | Northwest and South side neighborhoods with high median home values and increasing population.            |
| 5         | Aqua Green    | North Center   | North side neighborhood with very high median home values and increasing population.                      |
| 6         | Light Green   | Lake View<br>Lincoln Park<br>Near North Side<br>West Town  | North and West side neighborhoods with high median home values and increasing population.                 |
| 7         | Medium Green  | Austin<br>Belmont Cragin<br>Humboldt Park<br>Rogers Park<br>South Lawndale<br>South Shore                              | North, West, and South side neighborhoods with low median home values and declining population.           |
| 8         | Dark Yellow   | Albany Park<br>Dunning<br>Edgewater<br>Irving Park<br>Portage Park<br>Uptown<br>West Ridge                             | North and Northwest side neighborhoods with moderately high median home values and increasing population. |
| 9         | Orange        | Edison Park<br>Forest Glen<br>Near South Side<br>The Loop  | Northwest, Central, and South side neighborhoods with high median home values and increasing population.  |
| 10        | Dark Orange   | Burnside<br>Fuller Park<br>Hegewisch<br>Pullman<br>Riverdale<br>South Deering<br>Washington Park<br>West Garfield Park | South and West side neighborhoods with very low median home values and declining population.              |

# Review of Cluster 2

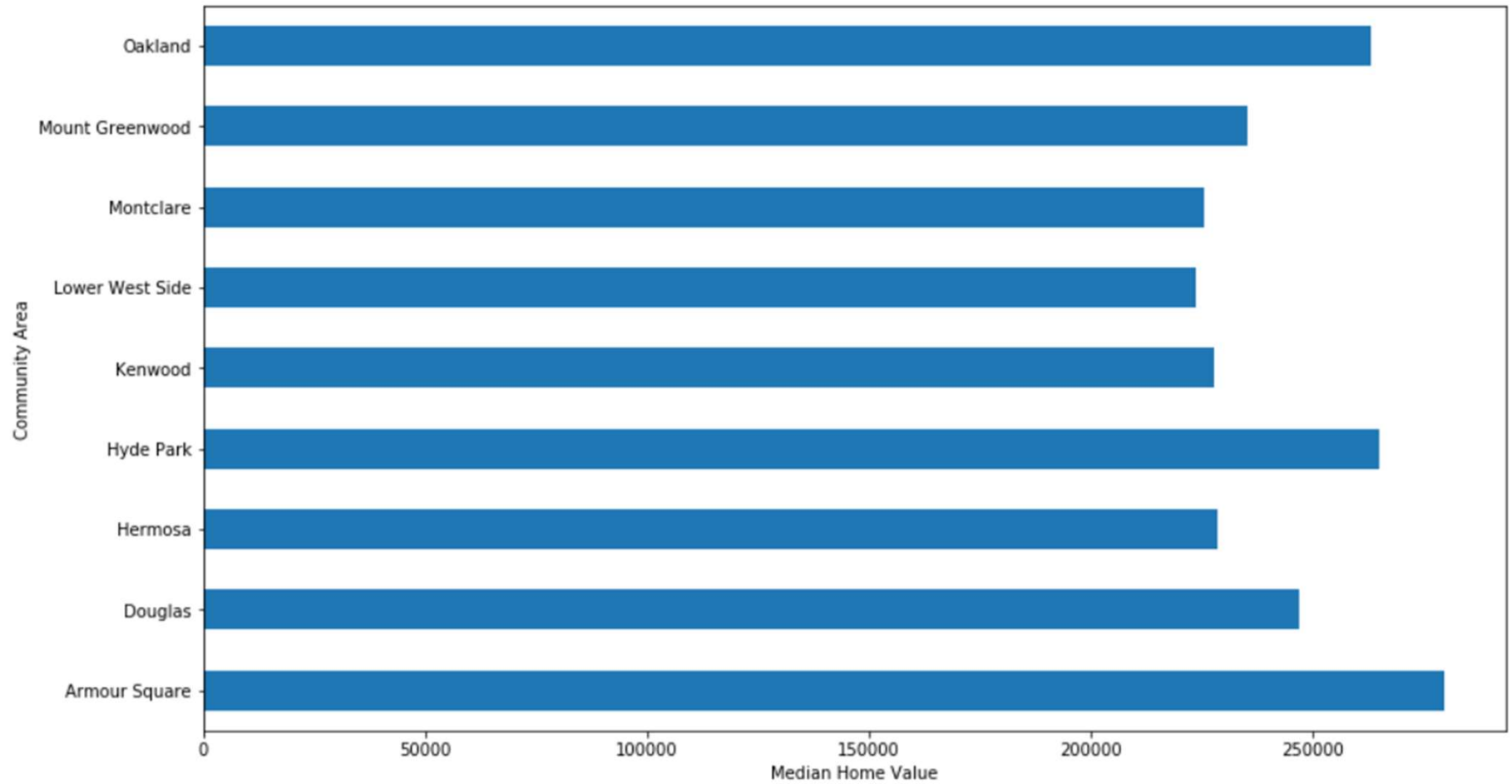
- ▶ This picture shows the distribution of the Chicago neighborhoods in Cluster 2: Armour Square, Douglas, Hermosa, Hyde Park, Kenwood, Lower West Side, Montclare, Mount Greenwood, Oakland
- ▶ In the following slides, we'll further explore these neighborhoods through visuals



Cluster 2 Community Area Population Trendlines



Cluster 2 Median Home Values



# Cluster 2 Exploratory Data Analysis

## Observations & Recommendations

| Neighborhood    | Observation  | Recommendation  |
|-----------------|--|---|
| Lower West Side | Downward Trend Line that appears to be due to gentrification and denser housing units being replaced by single-family detached units | Seek to do projects on vacant land before tearing down pre-existing buildings that may have historical significance |
| Armour Square   | Highest median home values in cluster due to either red-line access, access to Guaranteed Rate Field, or both.                       | Prioritize Armour Square for first projects if the cost of land acquisition is reasonable.                          |

## Cluster 2 Neighborhood Deep Dive

|   | Neighborhood    | 1st Most Common Venue | 2nd Most Common Venue | 3rd Most Common Venue | 4th Most Common Venue | 5th Most Common Venue     | 6th Most Common Venue    | 7th Most Common Venue | 8th Most Common Venue | 9th Most Common Venue | 10th Most Common Venue    |
|---|-----------------|-----------------------|-----------------------|-----------------------|-----------------------|---------------------------|--------------------------|-----------------------|-----------------------|-----------------------|---------------------------|
| 0 | Armour Square   | Chinese Restaurant    | Sports Bar            | Italian Restaurant    | Sandwich Place        | Breakfast Spot            | Cosmetics Shop           | Asian Restaurant      | Gas Station           | Hot Dog Joint         | Fried Chicken Joint       |
| 1 | Douglas         | Fast Food Restaurant  | Fried Chicken Joint   | Restaurant            | Cosmetics Shop        | Sandwich Place            | Eye Doctor               | Wings Joint           | Historic Site         | Ice Cream Shop        | Currency Exchange         |
| 2 | Hermosa         | Mexican Restaurant    | Park                  | Greek Restaurant      | Historic Site         | Latin American Restaurant | BBQ Joint                | Arcade                | Gay Bar               | Grocery Store         | French Restaurant         |
| 3 | Hyde Park       | Bookstore             | Sandwich Place        | Café                  | Train Station         | Park                      | Bike Rental / Bike Share | Coffee Shop           | Mexican Restaurant    | Bus Station           | Middle Eastern Restaurant |
| 4 | Kenwood         | Bus Station           | Beach                 | Gym / Fitness Center  | Scenic Lookout        | Boutique                  | Breakfast Spot           | Chinese Restaurant    | Clothing Store        | Cosmetics Shop        | Donut Shop                |
| 5 | Lower West Side | Mexican Restaurant    | Plaza                 | Boat or Ferry         | Music Venue           | Convenience Store         | Pizza Place              | Business Service      | Brewery               | Snack Place           | Supermarket               |
| 6 | Montclare       | Pizza Place           | Flea Market           | Fast Food Restaurant  | Mexican Restaurant    | Dry Cleaner               | Convenience Store        | Cosmetics Shop        | Currency Exchange     | Deli / Bodega         | Diner                     |
| 7 | Mount Greenwood | Park                  | Gym                   | Sports Bar            | Performing Arts Venue | Deli / Bodega             | Dry Cleaner              | Pizza Place           | Convenience Store     | Cosmetics Shop        | Currency Exchange         |
| 8 | Oakland         | Beach                 | Park                  | Yoga Studio           | Eye Doctor            | Cosmetics Shop            | Currency Exchange        | Deli / Bodega         | Diner                 | Dive Bar              | Donut Shop                |

## Cluster 2 Neighborhood Deep Dive Observations & Recommendations

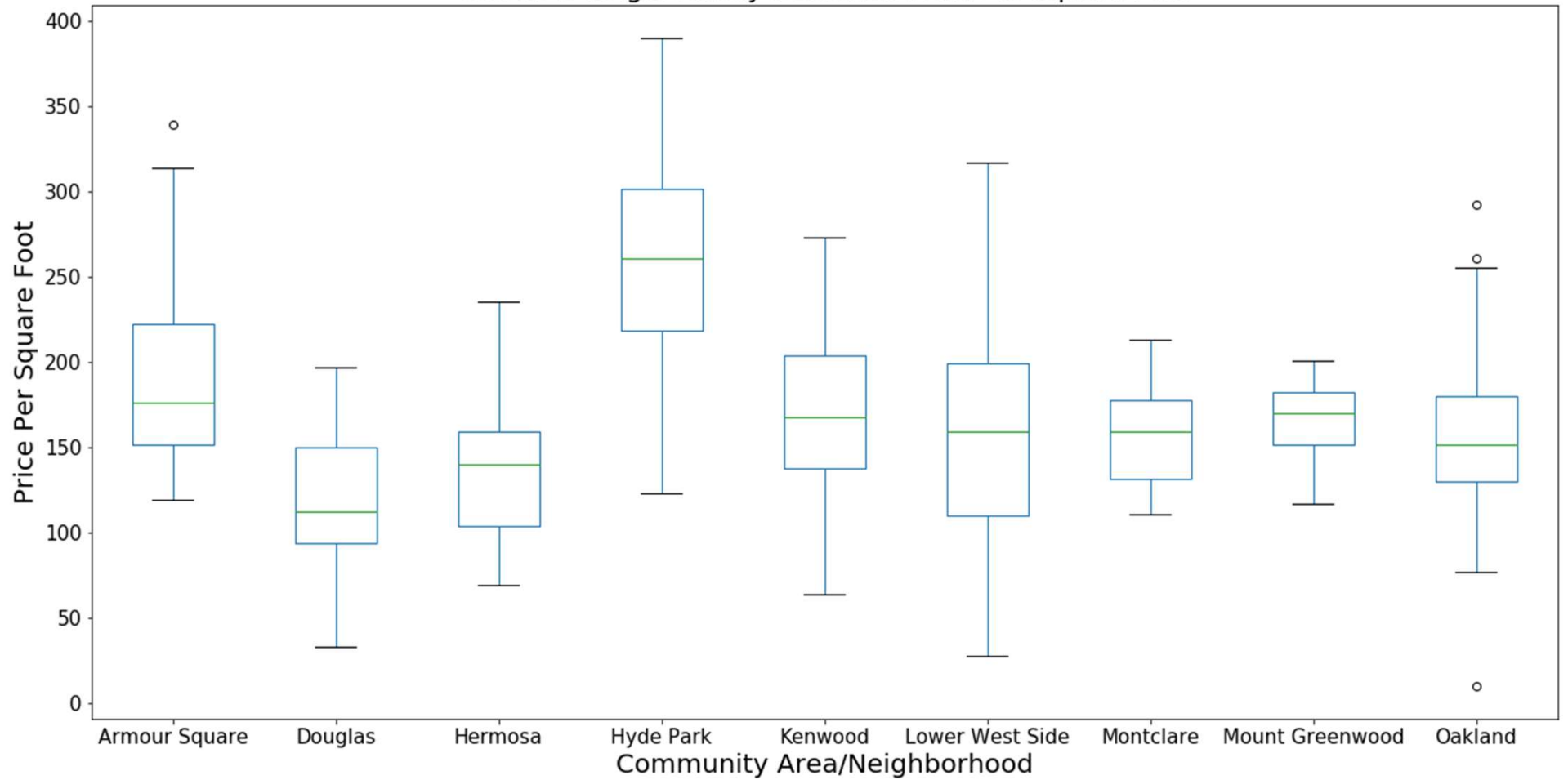
| Neighborhood      | Observation  | Recommendation   |
|-------------------|--|--|
| Oakland / Douglas | This neighborhood has features (beach, parks, yoga studios) that can draw in residents with disposable income and lead to new services that require densely populated areas to thrive. | Purchase land in the Douglas neighborhood that sits near the border of Oakland so those development projects can act as “near-prime” housing that draws neighborhood rebuilding activities westward. |

# Cluster 2 Neighborhood Real Estate Analysis

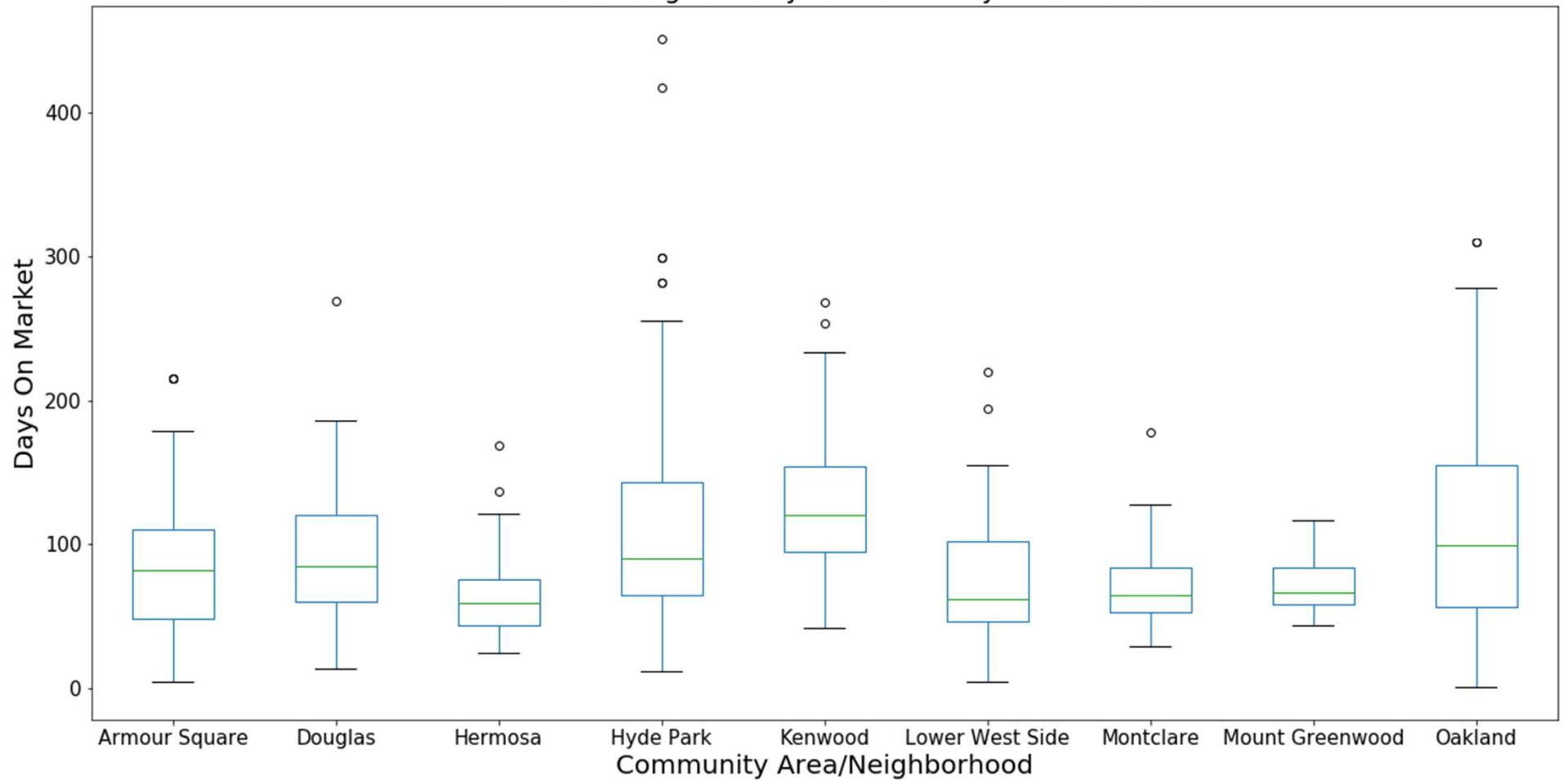
- ▶ The following section will present Box Plots of Price Per Square Foot & Days On Market for the entire cluster and a trend line chart for the Top 3 neighborhoods, for each property type, that best met TDC's business plan.
- ▶ The Box Plots and Trend Line charts for each property type is followed up by a table which recommends priority of neighborhoods and is supported by estimated sales price and days on market



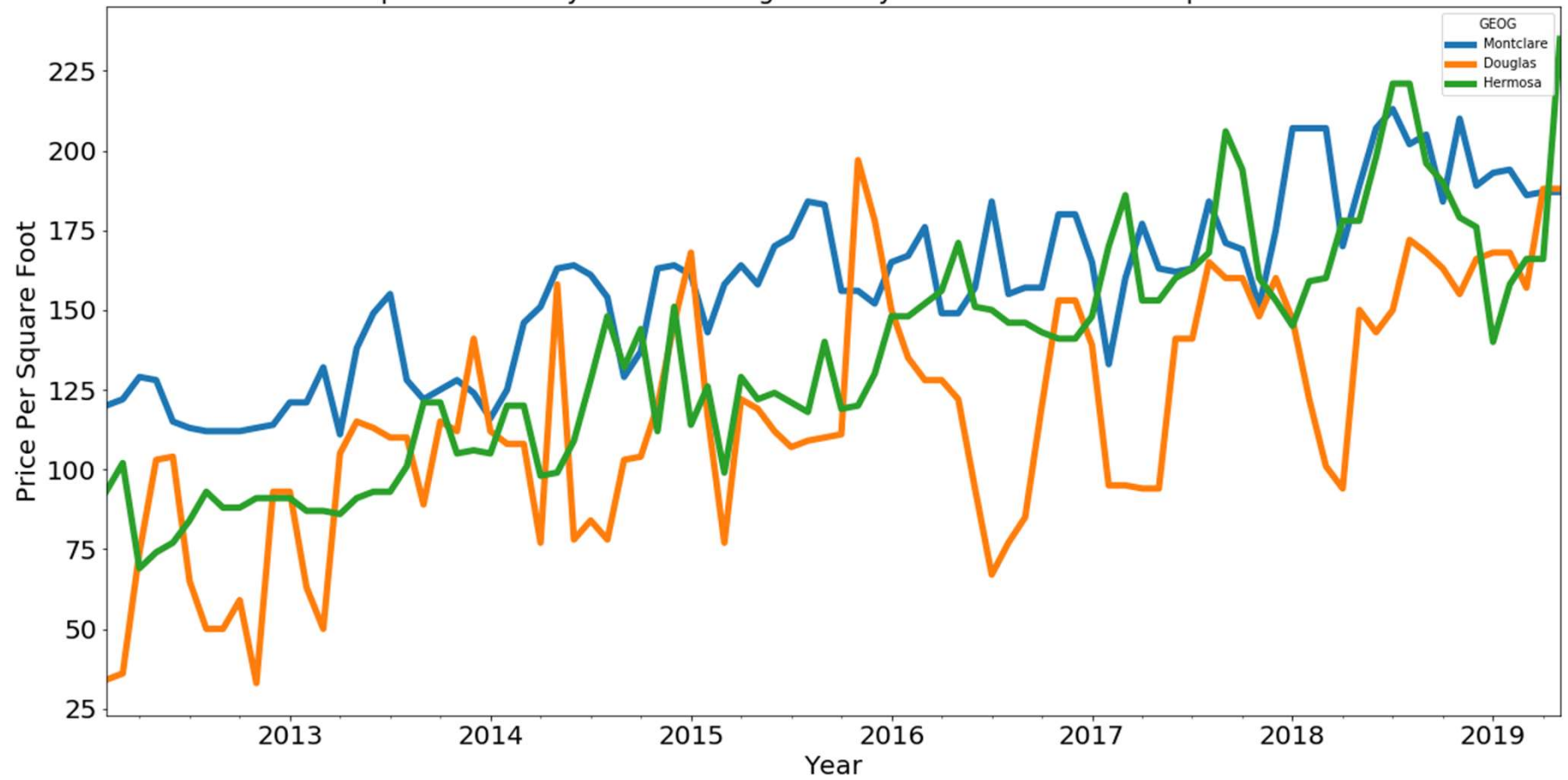
Cluster 2 Single-Family Detached Price Per Square Foot



Cluster 2 Single-Family Detached Days on Market



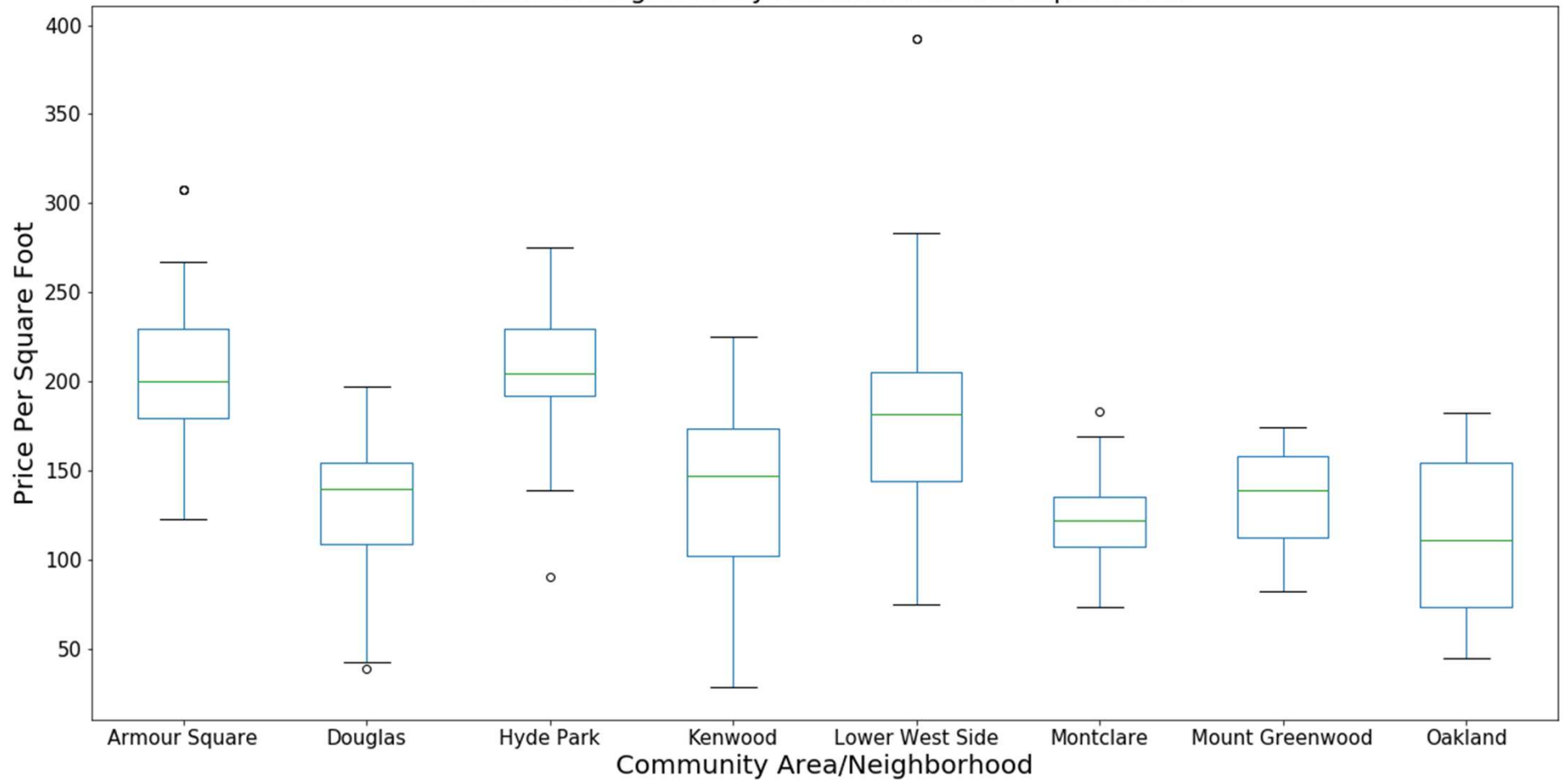
Top 3 Community Areas for Single-Family Detached Price Per Square Foot



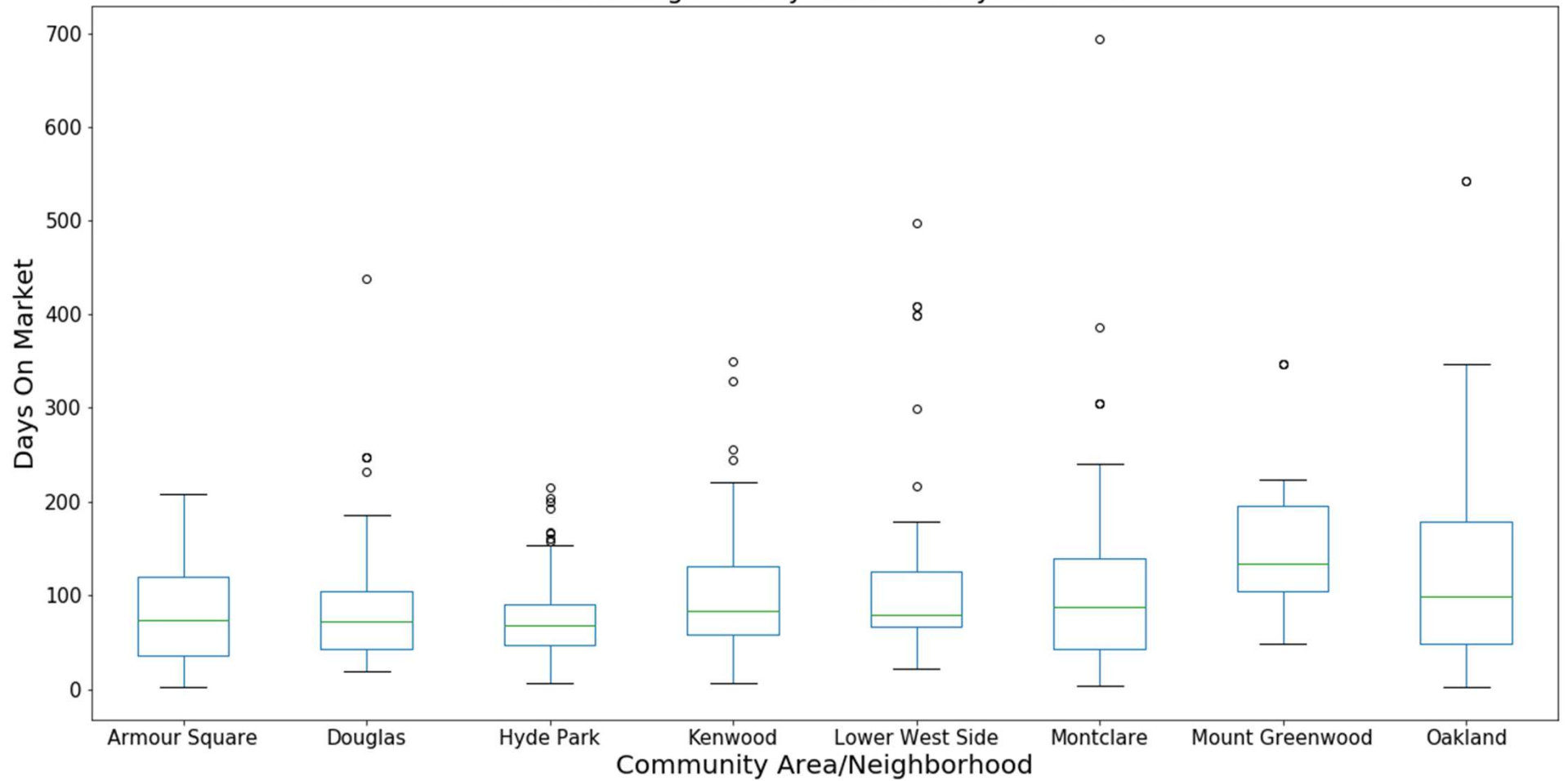
## Top 3 Neighborhoods for Single Family Detached Units Analysis (Based on a 3000 Sq. Ft. Home)

| Priority | Neighborhood | Estimated Sales Price       | Estimated Days on Market |
|----------|--------------|-----------------------------|--------------------------|
| 1        | Hermosa      | \$681,000 @ \$227/sq. ft.   | 150                      |
| 2        | Douglas      | \$562,500 @ \$187.5/sq. ft. | 150                      |
| 3        | Montclare    | \$562,500 @ \$187.5/sq. ft. | 200                      |

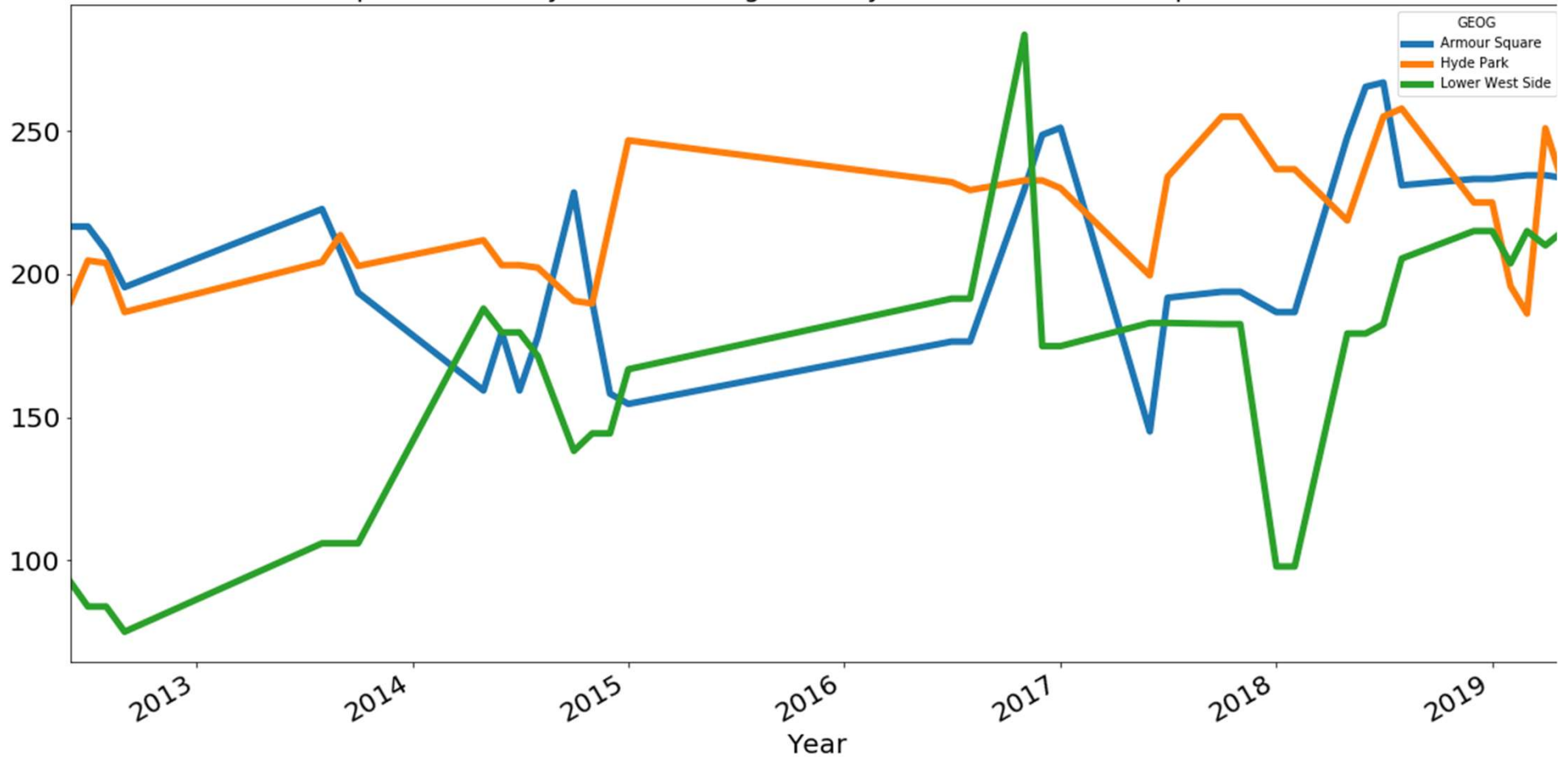
Cluster 2 Single-Family Attached Price Per Square Foot



Cluster 2 Single-Family Attached Days On Market



Top 3 Community Areas for Single-Family Attached Price Per Square Foot

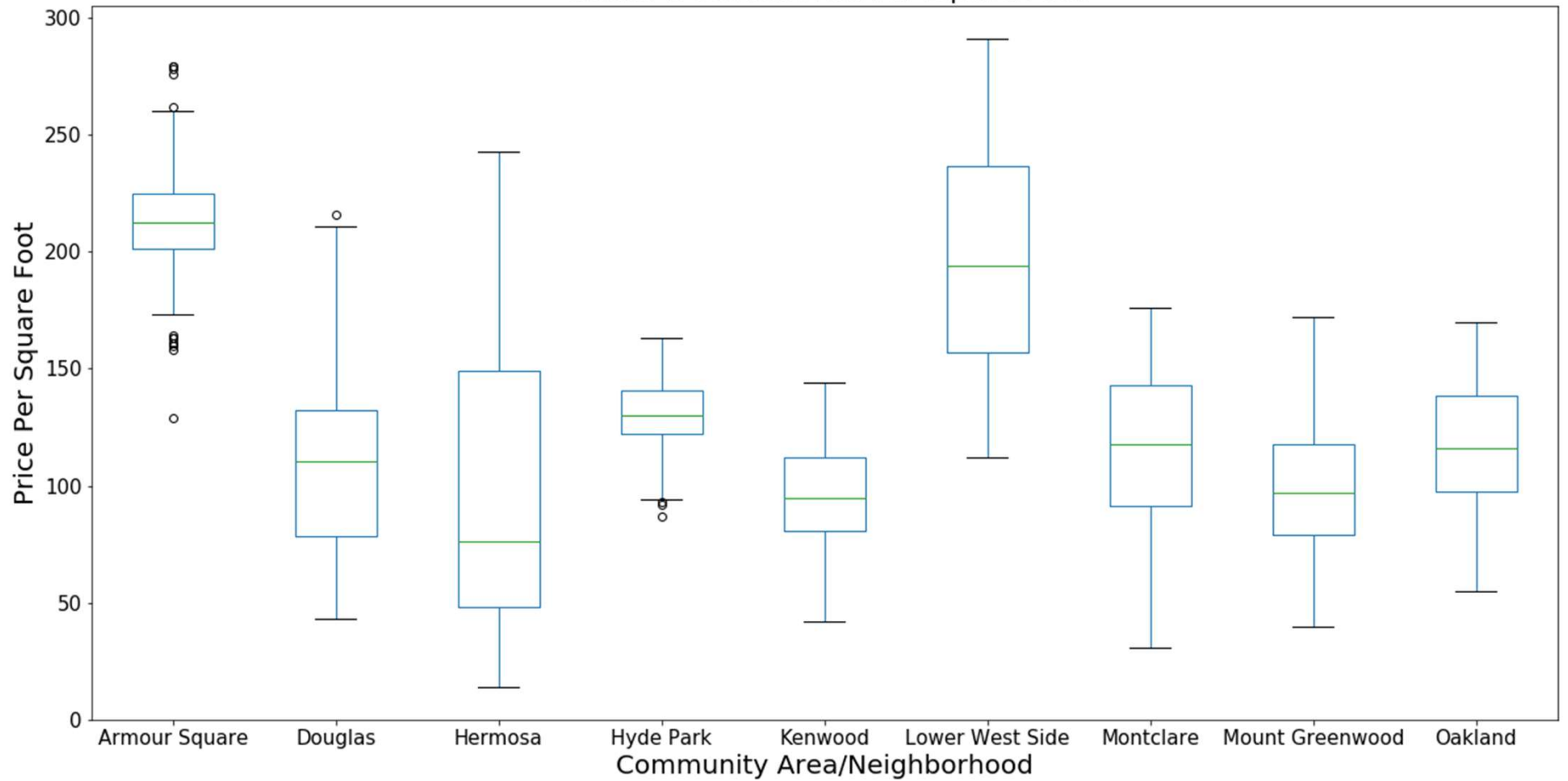


## Top 3 Neighborhoods for Single Family Attached Units Analysis (Based on a 2400 Sq. Ft. Home)

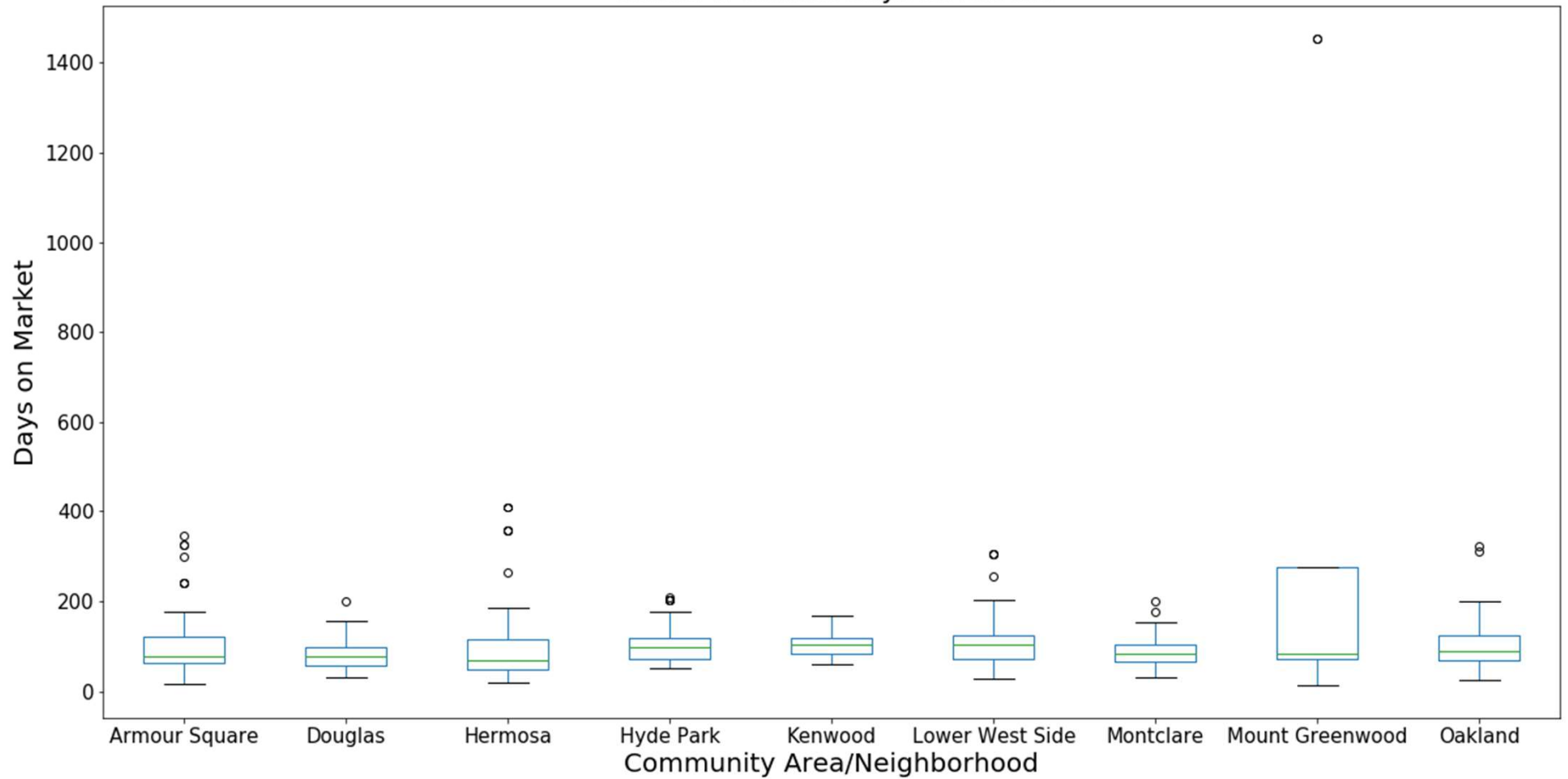
| Priority | Neighborhood    | Estimated Sales Price     | Estimated Days on Market |
|----------|-----------------|---------------------------|--------------------------|
| 1        | Armour Square   | \$576,000 @ \$240/sq. ft. | 150                      |
| 2        | Hyde Park       | \$576,000 @ \$240/sq. ft. | 150                      |
| 3        | Lower West Side | \$528,000 @ \$220/sq. ft. | 150                      |



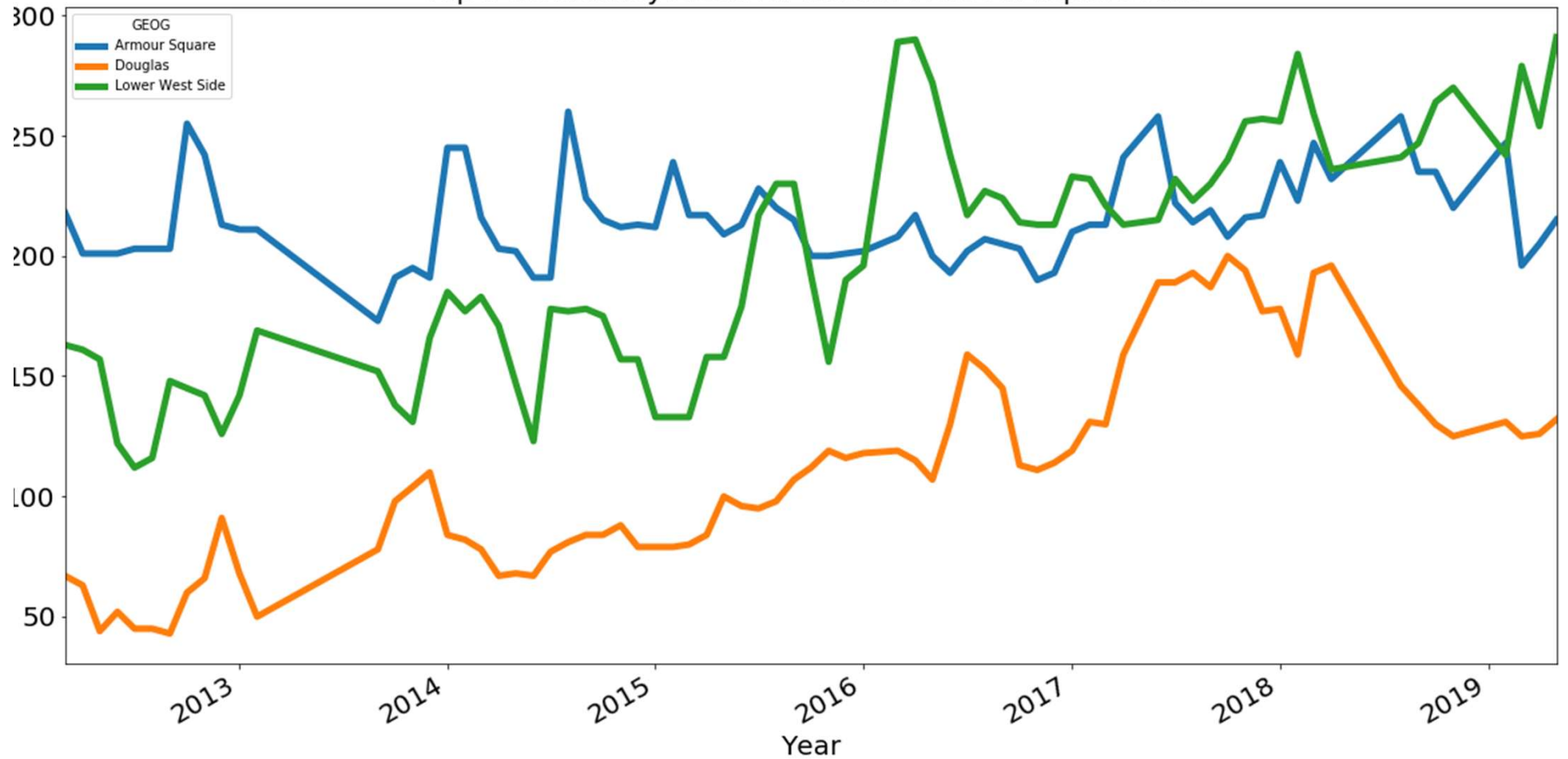
Cluster 2 Condos Price Per Square Foot



Cluster 2 Condos Days on Market



Top 3 Community Areas for Condos Price Per Square Foot



## Top 3 Neighborhoods for Condo Units Analysis (Based on a 1200 Sq. Ft. Home)

| Priority | Neighborhood    | Estimated Sales Price     | Estimated Days on Market |
|----------|-----------------|---------------------------|--------------------------|
| 1        | Armour Square   | \$252,000 @ \$210/sq. ft. | 120                      |
| 2        | Lower West Side | \$336,000 @ \$280/sq. ft. | 120                      |
| 3        | Douglas         | \$168,000 @ \$140/sq. ft. | 90                       |

# Conclusion

## Closing Thoughts

- ▶ Investment in near-prime South and West-side neighborhoods can yield good profit potential while delivering community benefits.
- ▶ Utilizing the popularity of Oakland and Armour Square to re-densify Douglas can be a good investment for Developers (i.e. increasing profit potential) and bring higher-quality services to neighborhood residents.

## Future Projects

- ▶ Logistic Regression models taking in market data for the Cluster 2 neighborhoods and predicts estimated sales price of finished products.