A Changing City: Philadelphia

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Introduction

A city's landscape and built environment is constantly changing. Within the same block, there could be a construction of a new sidewalk, the demolition of an old building, or the construction of a new skyscraper. Getting a clear idea of construction activity in a city is often a challenge. This research project aims to see which areas in Philadelphia receive the most construction activity. The project also features an analysis of construction activity by demographic factors such as unemployment, poverty, and minority rates. I found that there is uneven residential construction activity in Philadelphia. Much of the construction activity is in economically well-off areas with few minorities, but there are examples of big residential projects in economically disadvantaged zip codes. Policymakers may want to conduct further analysis to see the factors driving these unequal developments and possibly heighten efforts to increase development activity in economically deprived areas while remaining wary of gentrification.

Data

For the analysis, I utilized administrative data from the City of Philadelphia hosted on OpenDataPhilly. Data for permit activity is from the Department of Licenses and Inspection. The data set includes permit information from 2016 onwards, but only permit activity from 2019 to 2021 were utilized. Data for property value originates from the Office of Property Assessment. Demographic data for Philadelphia zip codes is from the American Community Survey (ACS) 5-year estimates from 2016-2020.

Variables of Interest

Permit Issue Date: The date the permit was issued, the month and year from this variable were utilized for additional analysis.

Permit Description: The purpose of the permit, including whether it was a permit for plumbing, electrical work, residential construction, etc.

Type of Work: This variable details if the permit was for new construction, demolition, etc.

Approved Scope of Work: A long description of what is being worked on, specifications, and additional details.

OPA Account Number: A 9-digit number from the City of Philadelphia Office of Property Assessment that identifies a property.

Estimated Value: This variable provides an estimated value of the property. It is the highest value of either the sale price or the market value from the OPA dataset.

Zip Code: The zip code of the address of the permit from the OpenDataPhilly datasets but also includes ZIP Code Tabulation Areas (ZCTAs) from the Census Bureau.

Unemployment Rate: The percentage of people that are unemployed out of the civilian labor force, which excludes members of the Armed Forces.

Poverty Rate: The percentage of people below the poverty line out of people whose poverty status was able to be determined.

Minority Rate: The percentage of non-white alone individuals out of the total population. White-alone individuals are those who identified both as white and non-Hispanic or Latino in the ACS.

Data Limitations

Efforts have been made to provide entirely accurate information, but the use of administrative data may pose challenges due to data quality issues. Administrative data may feature errors and inconsistencies due to human input and output errors and unclear and inconsistent data standards. A key challenge of the analysis was identifying new residential construction. The permit data set featured variables that identified whether a permit was for residential or commercial use, but many of the permits had missing data for this variable. Also, various words were used to indicate permits as new construction, so there may be an undercount or overcount in the data. A test for coverage indicates that the majority of observations are likely to be residential construction. However, some observations in the data may still be commercial properties or properties that are not identified. The City may need to create better methodologies with high specificity and sensitivity to properly identify new residential construction.

Another possible limitation of the data could be the estimate of the property's value. Since many of the observations are new properties, there may not be a fully accurate estimate of the properties' value. The estimated value for the property variable utilized the parallel maxima to find the highest of either the City's estimate of the property's market value or the sale price. I utilized this methodology to better understand the properties' value since many properties either had market values that were higher than the sale price or vice versa. This likely occurred if the

value of the vacant land that the property is built on is a much lower value than the actual physical structure. The methodology for the estimated value was also meant to deal with the problem of some properties having a low sale price (i.e., $1 or $10). It is not known if this is due to data errors or the fact that the property is being transferred as part of a contract and is sold at a low price for reporting purposes. Furthermore, some permits may be for constructing additional stories or structures to a property, so the estimated value variable may only represent the value of the present property, not the value of the new construction. Thus, these considerations must be taken into account when using the estimated value variable.

There are also some potential limitations in the geographic analysis. I conducted the analysis at the zip code rather than the census tract level because policymakers and residents are more likely to know and understand their zip codes more than their census tract. However, zip codes do pose some challenges as there are contentions about exact boundaries. The Census Bureau does not utilize zip codes but rather an approximation named ZIP Code Tabulation Areas (ZCTAs). These are roughly similar to zip codes, but for some areas they can be different.

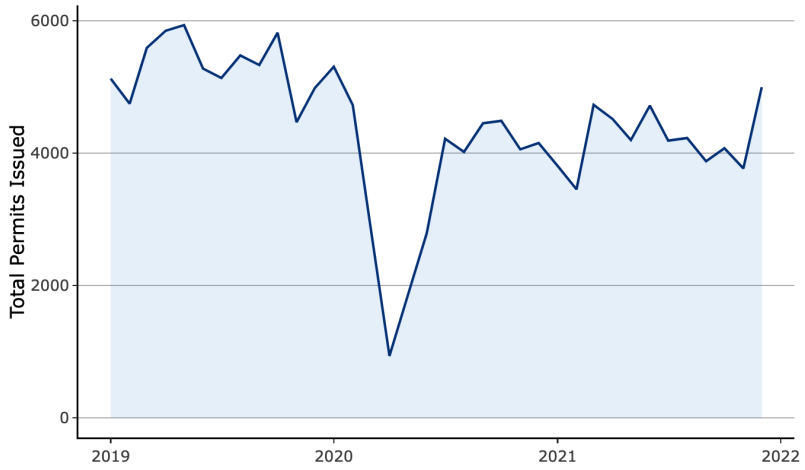
For the ACS data, the ZCTA or zip code level data are based on estimates rather than a total enumeration of the population like the Decennial Census. As a result, there may be sources of sampling error. The ACS provides estimates along with the 90% confidence intervals. The analysis of demographic factors utilized these estimates for the zip codes, but further analysis would need to consider the margin of errors for the demographic variables for each zip code.

Analysis

Permit Activity

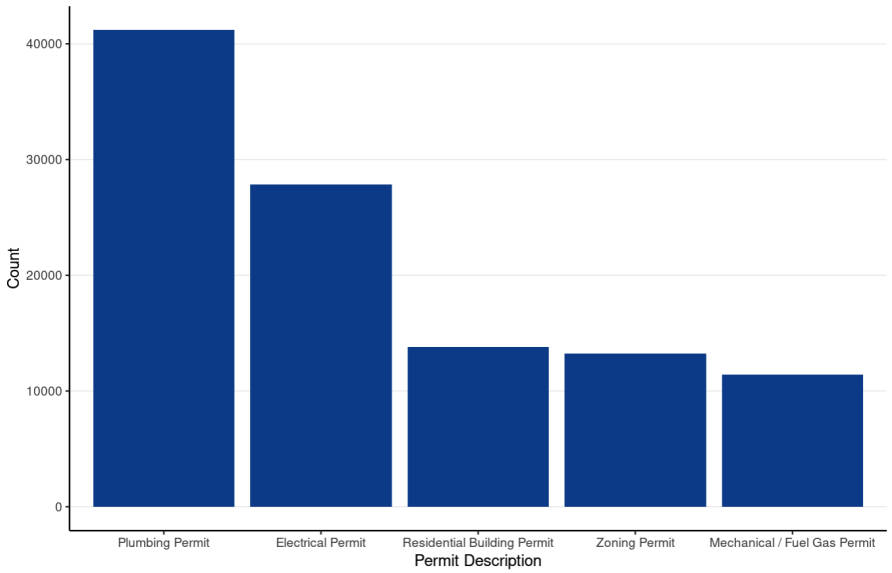
The City of Philadelphia releases information about each building permit that is issued. Permits are required in the city for various activities such as construction, demolition, zoning, and many other activities that affect structures in the city. Permit activity provides a preliminary look at construction and real estate activity. Activity since 2019 shows an estimated 5000 permits issued per month. There is a steep drop at the onset of the Coronavirus pandemic, with the lowest number issued in April 2020. There is a rebound in permits issued in 2021, but the value remains below 2019 levels.

Permit Activity Shows Impacts of the COVID-19 Pandemic



As mentioned, Philadelphia requires permits for a wide variety of construction work. The number of permits issued differs by the permit description. Plumbing and electrical permits lead the way as top permits issued by the city. This makes sense, given that many structures require installation, repair, and replacement of plumbing and electrical materials. Residential building permits are also common, with similar numbers as zoning and mechanical/ fuel gas permits.

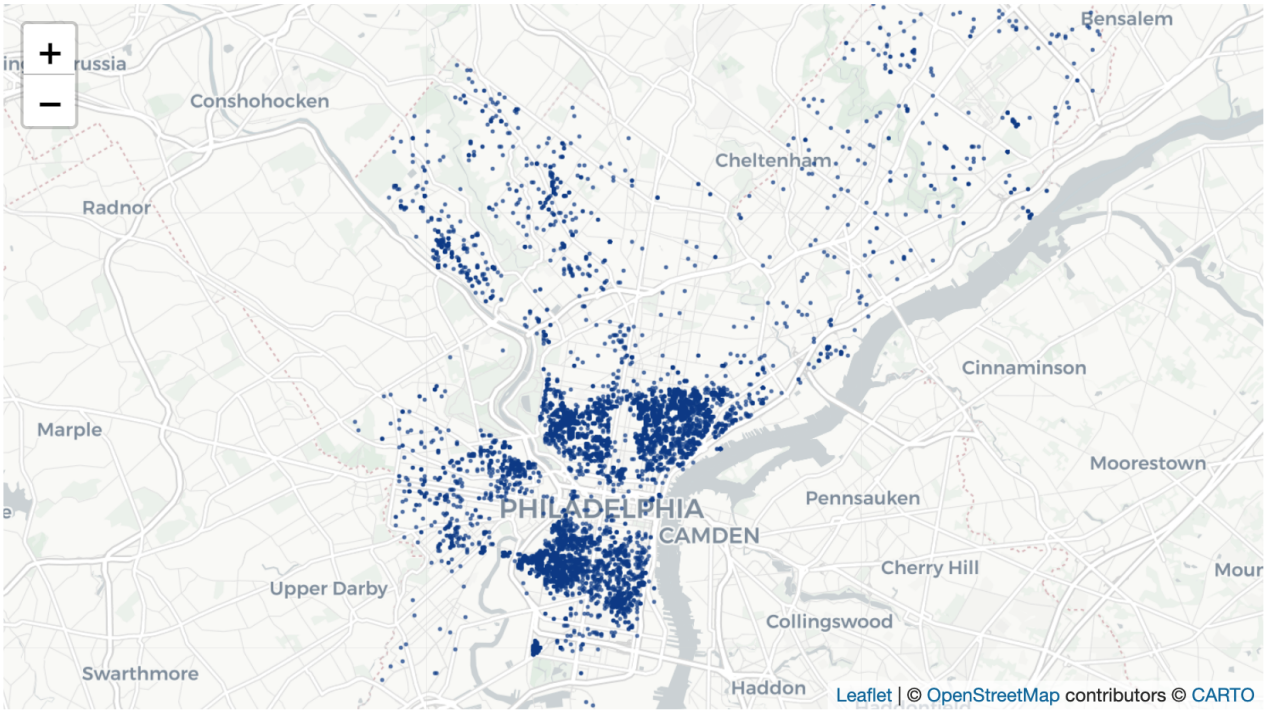
Some Permits Are Much More Common Than Others



Residential Construction Activity

Residential construction activity is one of the primary ways a city landscape changes. From the construction of single-family homes to large multi-unit apartment buildings, residential building activity is shaping the future landscape of the City. One key question is where exactly is this construction activity occurring. Data from permits for new construction can provide a way of analyzing residential construction activity.

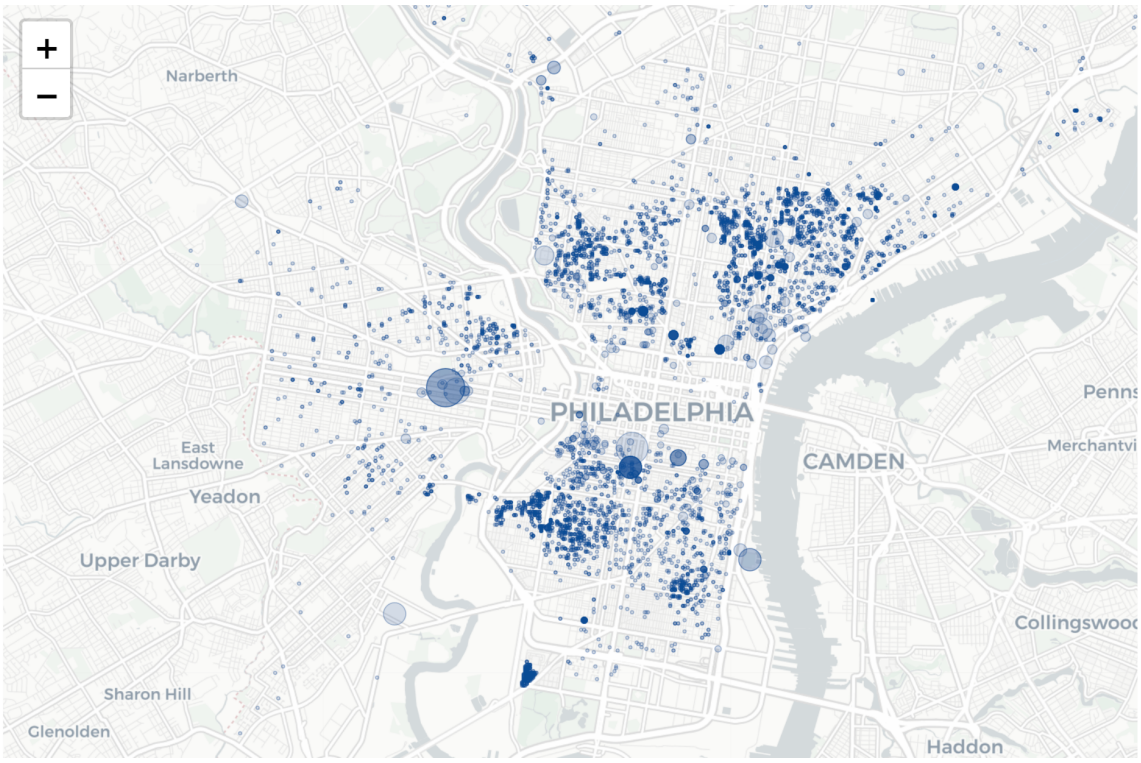
Distribution of New Residential Construction shows Concentrations



A geographic analysis of the residential new construction permits shows some concentration of where new residential properties are being built. Areas in Kensington, lower North Philadelphia, and South Philadelphia receive a high number of permits for new residential construction. Areas such as Northeast Philadelphia and Germantown have scant new residential construction. These areas may have an adequate supply of homes already built, little vacant land, or there may be other factors limiting residential construction. Looking at the number of new permits by zip code shows that some zip codes in the city are receiving more construction activity than others. Zip codes 19125 and 19146 are ahead with the most number of permits. 19122 and 19121 follow closely; 19145 is the lowest of the top 5 with a little over 500 permits

for new construction. This amount is less than half of the top two zip codes, which shows how much of a large share of new construction the two highest zip codes represent.

New Residential Construction With Dot Scaled to Properties' Estimated Value



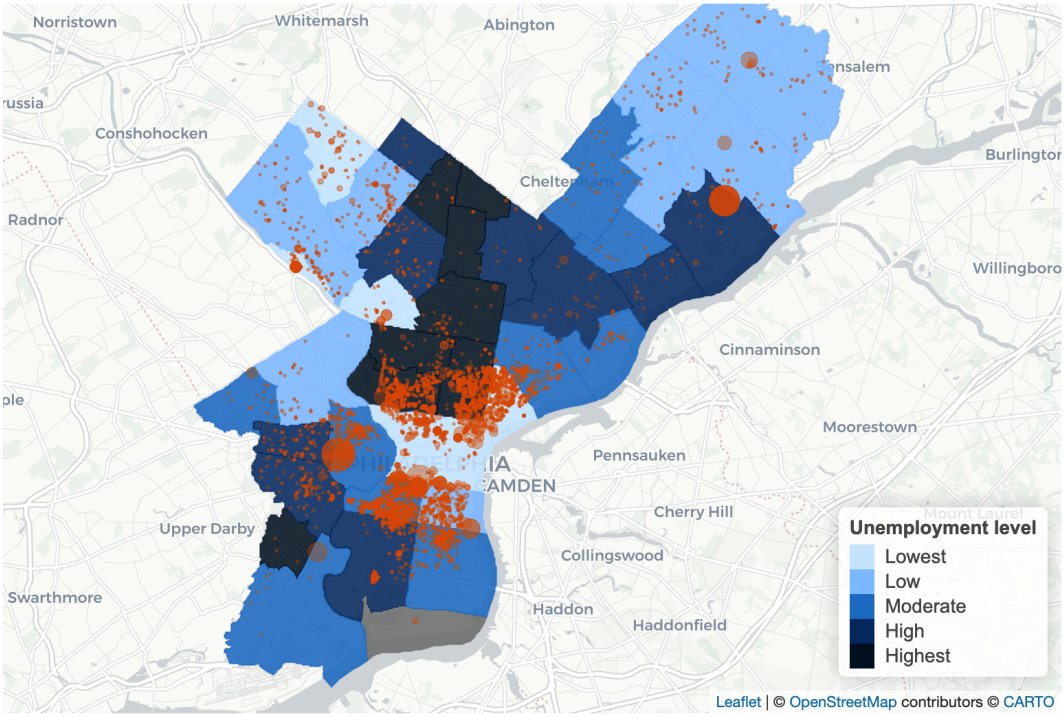
A simple analysis that maps the location of the permits may be inadequate. A single location, or a dot on the map, can represent a permit for the construction of a new house worth $200,000, or it can represent a permit for the construction of a multi-family unit worth multi-millions of dollars. The above figure provides a map of the residential permits but scales the dot with the properties' estimated value. High-value new construction occurs throughout the City but is concentrated in the areas receiving the most activity.

Residential Construction Demographic Analysis

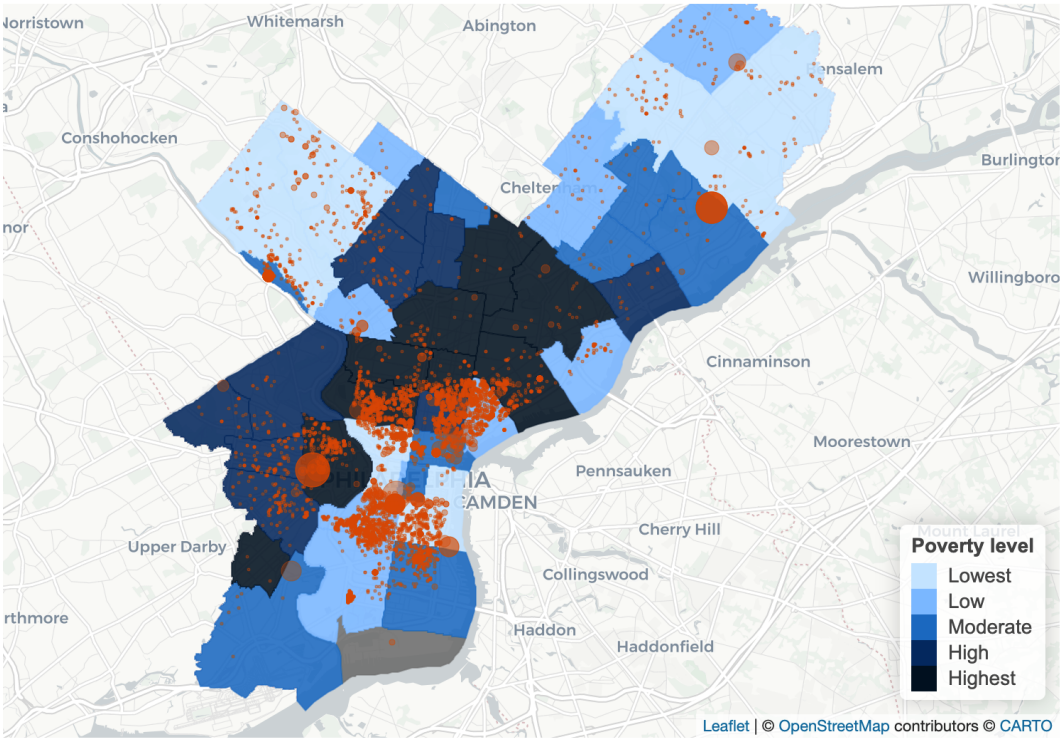
A key motivation of this analysis was to examine if there are patterns in the places receiving or not receiving new construction activity. Factors such as economic strength/weakness and racial composition of an area likely affect new construction activity. These factors are featured in debates about economic development and gentrification. Some government policies aim to spur economic development in low-income areas. Individuals and organizations may also

want to see if there are any racial components to new housing developments. The following maps show new residential construction activity overlaid with information about the Philadelphia zip code's unemployment, poverty, and racial minority rates.

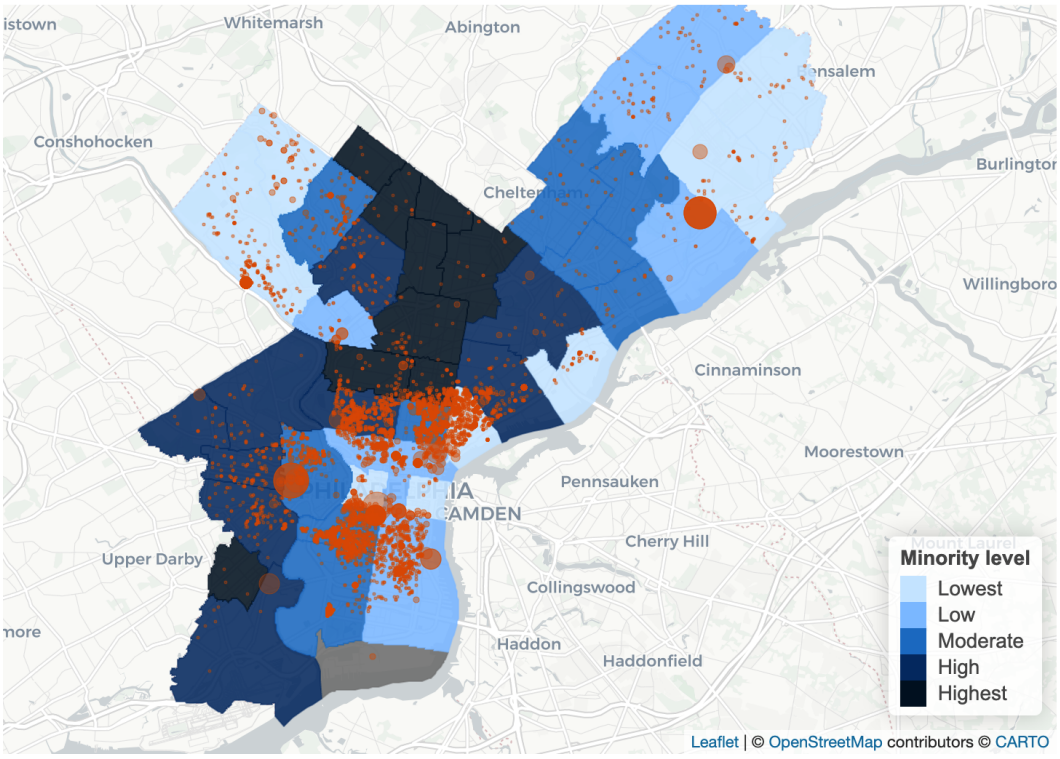
Construction Activity Focused in Low Unemployment Rate Areas but Also in Areas of Highest Unemployment



Much of the New Residential Construction Is in Areas of Low Poverty



Most of the New Residential Construction Is in Areas with Moderate and Low Minorities



The maps above show economic and racial patterns in the geographic distribution of new residential construction activity. Construction activity is primarily concentrated in areas with lower unemployment rates, but there are examples of new construction in some of the zip codes with the highest unemployment rates. Similarly, activity is focused in areas of low poverty. Thus, it seems that much of the new construction is in economically well-off areas. This may be due to economic motives since the real estate market may be better in these areas. However, it may indicate the fact that economically distressed areas are not receiving much investment to build new homes. Nonetheless, there are some examples of high-value properties being built in economically distressed areas. Policymakers can thus dive deeper into whether these properties are affordable for the residents of these zip codes or examine if these new constructions are part of patterns of gentrification.

The map for new construction and racial minority rates is more striking. Nearly all of the new construction is in zip codes with low and moderate percentages of racial minorities. This may be because economic and racial demographics mirror each other in the City, but it can also

indicate racialized patterns in new housing construction. More work would need to be done to uncover the drivers of these patterns and the roles these data points can have in debates about economic development and gentrification in the City of Philadelphia.

Policy Implications

Through the analysis, I found uneven residential construction activity in Philadelphia. New residential construction is located primarily in economically well-off areas with relatively few minorities. The analysis provided a macro-level look at these patterns, but researchers and policymakers may want to conduct further analysis to see the factors driving these unequal developments. Efforts may need to be undertaken to increase development and construction activity in economically deprived areas. In these areas, new construction would include an influx of newer homes that may change the landscape of these blighted areas and increase construction jobs and other positive economic and social benefits. However, the City would need to ensure that new housing construction is affordable for the residents and are not part of patterns of gentrification.