APPENDIX

RAIN CHECK clean water buffalo 2.0

OPPORTUNITY REPORT

Buffalo Sewer Authority | 2019

BUFFALO
SEWER AUTHORITY

APPENDIX A: EQUITY INDEX

Methods

A citywide overview of socio-economic and built environment variables is presented to help identify communities that would most benefit from green infrastructure investment. Using existing indices as models, a "Green Infrastructure Equity Index" was developed for the City of Buffalo at the census block group level that looks specifically at "equity voids" that could be addressed by the indirect benefits provided by investment in green infrastructure. Two types of variables are included in the index: socioeconomic variables related to disadvantage and vulnerability, and environmental factors related to both exposure to environmental risks and access to environmental amenities.

The socioeconomic factors include: (1) percent minority, (2) percent low-income, (3) percent of adults who have not completed high school, (4), percent under age 5, (5) percent over age 64, (6) percent owner-occupancy, (7) percent of households in linguistic isolation, and (8) percent of population (age 16 and up) either unemployed or not in labor force. These factors were chosen to represent at-risk populations who are either expected to have a higher need for green infrastructure or to be differentially impacted by a lack of it and due to their regular inclusion in studies of environmental justice as groups that are often environmentally disadvantaged. These data were downloaded from the U.S. Census Bureau's American Community Survey, 5-year estimates, 2012-2016.

The built environment measures included (9) proximity to traffic, (10) ozone levels, (11) particulate matter, (12) park access, (13) tree canopy cover, (14) percent of impervious surfaces, (15) amount of vacant land, (16) residential vacancies, and (17) commercial vacancies. These factors were chosen because they either can be addressed through green infrastructure or because they represent a direct measure of need for green infrastructure within the community. Traffic, ozone, and particulate matters were downloaded from the U.S. Environmental Protection Agency's EJ Screen Application. A description of their derivation is available in the EJ Screen technical documentation. The data used to calculate park access and vacant land come from Erie County Parcel Data available through NYS GIS Clearinghouse. The tree canopy cover data and the impervious surface data were made available by members of the Rain Check project team. Data on residential vacancies was obtained from the American Community Survey, and data on commercial vacancies was downloaded from the HUD-USPS Administrative Data on Vacancies. While there are certainly other factors that could be incorporated into an index, this set represents a starting point to be used as a proof of concept. This is a flexible framework that would easily enable incorporation of additional measures as warranted.

Each of the measures represents a raw number that indicates some level of disadvantage. However, there are not necessarily benchmarks against which to compare the raw scores. Rather, the raw scores represent a way to compare block groups to each other to determine relative levels of disadvantage. In order to meaningfully combine the variables, we standardized each set of raw values to scores from 0 to 1, where 0 indicated the least disadvantaged score in the city and 1 indicated the most disadvantaged. For tree canopy cover and owner occupancy variables where a high score is not actually disadvantageous, we subtracted the result from 1 to keep a score of 1 consistently indicating highest disadvantage. We then calculated the index value by adding the standardized scores for each of the seventeen variables. An index score of 0 would indicate a single block group that had the most advantageous measure for each variable, while a score of 17 would indicate a single block group that had the least advantageous measure for each variable, though no such block groups exist in reality.

Citywide Overview

When mapped collectively, the seventeen indicators used for the GI Equity Index reveal clear geographic patterns in the distribution of socioeconomic and environmental disadvantage across neighborhoods of Buffalo. Socioeconomic markers of disadvantage, like poverty, educational attainment and workforce participation, are often clustered together in similar parts of the city where adverse environmental factors are also common. A broad overview of how these socioeconomic and environmental indicators of disadvantage are distributed across Buffalo's neighborhoods and the sewer basins targeted for GI investments by Rain Check 2.0 is provided below.

Socioeconomic Measures of Disadvantage

Race and Ethnicity

People of color make up most of the population on the East and West Sides of the city (see figure 1). Buffalo's African American community is centered on the East Side, while the West Side is home to the majority of the city's Hispanic and foreign born residents. Communities of color on the city's East and West Sides are correlated with higher residential vacancy rates and more vacant land. Buffalo neighborhoods with more people of color also tend to have higher shares of low income households and adults who are not employed.

Low Income Households

Low income households are concentrated on the east and west sides of Buffalo (see figure 2). In some areas, like the Broadway-Fillmore district on the East Side and Black Rock on the West Side, more than two-thirds of households have incomes that are less than double the federal poverty line. By comparison, neighborhoods in North and South Buffalo, and the Elmwood Village, typically have less than 30% of households with incomes under that threshold. The presence of low-income households is often tied to higher shares of adults without a high school degree and renter-occupied households, and low workforce participation rates.

Educational Attainment

Areas with the greatest shares of adults without a high school diploma or equivalent are concentrated on the West Side—in neighborhoods such as Front Park, Lakeview, and Black Rock—as well as on the East Side, particularly in the Cold Spring, Emerson, and Broadway-Fillmore neighborhoods. More than 25% of adults age 25 and over in these neighborhoods do not have a high school degree (see figure 3). This is also true for the Perry and First Ward neighborhoods bordering the city's central business district. On the other hand, in most neighborhoods of North Buffalo, South Buffalo and the Elmwood Village, less than 10% of adults lack a high school diploma. The prevalence of adults without a high school diploma is correlated with high shares of unemployed adults, low income households, and limited English speakers.

Young Children and Older Adults

Areas with large shares of young children (under 5 years old) and older adults (over 64 years) are dispersed throughout the City. Parts of South Buffalo have some of the highest shares of population under the age of 5, along with Black Rock on the city's West Side (see figure 4). Parts of the East Side, including Masten Park, Grider and Lovejoy also have relatively high shares of population under the age of 5 (over 8.5%) compared to the city overall (6.7%). Older adults (age 65 and up) are also common on the East Side (see figure 5), making up a relatively large share of the population in the Cold Spring, Fruit Belt, and MLK Park neighborhoods. Many other parts of the city, from the Waterfront neighborhood on the lower West Side, to pockets of North and South Buffalo, also have higher shares of older adults than the city as a whole.

Owner-Occupancy

Neighborhoods made up of mostly renters with low owner-occupancy

rates are another sign of socioeconomic disadvantage. These places are dispersed throughout pockets of Buffalo, including the central business district, as well as Allentown and Elmwood Village where college students and young adults make up larger shares of the population (see figure 6). However, as the prevalence of renter-occupied households is strongly correlated with low incomes, many neighborhoods on the West and East Sides have some of the city's lowest owner-occupancy rates.

Limited English Speakers

Limited English speaking households are most abundant on the city's West Side, where many Hispanic and foreign born residents live (see figure 7). The neighborhoods with the most limited English speakers are in the lower West Side, the heart of Buffalo's Hispanic community. High concentrations of limited-English speakers extend further north on the West Side, from the Grant-Ferry neighborhood to Black Rock and Riverside, where many Hispanics, immigrants and refugees reside. Some neighborhoods on the East Side, like Broadway-Fillmore, Kaisertown, and Perry, also have a higher share of limited English speaking households than the city overall (4.3%). In Buffalo, the presence of limited English speakers is correlated with lower incomes and lower levels of educational attainment.

Unemployment and Labor Force Participation

Low employment levels among the population (age 16 and up), a factor including both unemployed workers as well as those who are not participating in the labor force, is most widespread on the East Side. Most of the neighborhoods with the lowest employment levels fall on the East Side, including the Fruit Belt, Masten Park, Leroy, MLK Park, and Emerson neighborhoods (see figure 8). The University district, around the University at Buffalo's south campus, and the neighborhood around Buffalo State College, where many students live, also have some of the lowest employment levels in the city. Parts of the West Side, including the lower West Side and the Riverside neighborhood have lower workforce participation rates than the city overall (59%). Low employment levels have a relatively strong correlation with high shares of low-income households, people of color, and adults without a high school diploma.

Summary of Socioeconomic Indicators of Disadvantage

When aggregated together, the block groups showing the greatest levels of socioeconomic disadvantage are clustered in Buffalo's East and West sides (see figure 9). Overall, socioeconomic disadvantage is most widespread on the city's East Side. One cluster of high socioeconomic disadvantage exists in areas bordering Main Street, in the Fruit Belt, Masten Park, and Cold Spring neighborhoods. Further into the East Side, the Kingsley, Broadway-Fillmore, MLK Park, and Emerson neighborhoods also reveal some of the city's highest measures of socioeconomic disadvantage. Another pocket of high socioeconomic disadvantage exists just east of the city's downtown, in the Perry and Willert Park neighborhoods. Socioeconomic disadvantage on the city's East Side is triggered by a number of factors that tend to be correlated, including high concentrations of people of color, low income households, populations over 64 years old, adults without a high school diploma and low employment levels.

Areas of high socioeconomic disadvantage also line Buffalo's West Side—from the Columbus neighborhood neighboring the central business district, through the Front Park, Grant-Ferry, Black Rock, and Riverside neighborhoods. Socioeconomic disadvantage on the city's West Side is largely driven by a high concentration of low income households, limited English speakers, adults without a high school diploma, and low owner-occupancy rates. Measures of socioeconomic disadvantage across other parts of the city, in North Buffalo,

South Buffalo, and the Elmwood Village are lower than Buffalo overall. This is due to relatively higher incomes, educational attainment, employment levels, owner-occupancy rates, and concentrations of non-Hispanic white populations.

Environmental Measures of Disadvantage

Traffic Proximity and Volume

Proximity to high volumes of traffic raises environmental concerns for residents nearby, such as noise and air pollution. The proximity to high traffic volumes is highest on the city's West Side, along Interstate 190 beside the Niagara River (see figure 10). The highway bends eastward near downtown, moving high volumes of traffic through parts of South Buffalo, like First Ward, Valley and Seneca neighborhoods. The Kensington Expressway (Route 33) lends relatively high traffic proximity scores to the East Side, most notably in Leroy, Kenfield, and the Hamlin Park neighborhood where Route 33 meets the Scajaquada Expressway (Route 198). Highly-trafficked surface roads also lead to elevated traffic levels—most notably along Bailey Avenue which runs north-south on the East Side, and the northern section of Main Street near the University at Buffalo's south campus.

Air Quality

Ozone levels and particulate matter (PM2.5) concentrations in the air are strongly correlated with one another. Both these indicators follow a simple geographic pattern in Buffalo. Ozone levels (measured in parts per billion) are lowest on the east end of the city, and increase gradually moving west (see figure 11). Similarly, the lowest particulate matter concentrations (PM2.5) (in micrograms per cubic meter) exist in the south-eastern end of the city, and increase moving northwest to the Black Rock and Riverside neighborhoods which have the city's highest levels of particulate matter (see figure 12).

However, the data show little variation in these air quality indicators across Buffalo—the difference between the city's maximum and minimum Ozone levels is only 0.5 parts per billion. Consequently, when normalizing these values and adding them to the GI equity index calculation, these small variations in measured Ozone levels, and particulate matter concentration across the city, can be overemphasized, amplifying high and low scores to appear more extreme when in reality they deviate only slightly from city averages.

Atmospheric concentrations of Ozone and particulate matter do not vary greatly over small areas, like at the scale of a single city, since they can be carried long distances by wind. Also, there are limitations in the EPA EJSCREEN data. The data is created through a combination of modeling and monitor data. There are a limited number of monitors across the country, and near Buffalo. The only active Ozone monitor near Buffalo is by UB North Campus. There is also a PM2.5 monitor here, along with one at 185 Dingens Street in Buffalo and another along I-90 in Cheektowaga. Since the model produces data with a higher level of uncertainty as you move to smaller geographic scales, EPA only provides these indicators at the census tract level, and assigns those values to block groups. For more information, please see the EJSCREEN technical documentation available on the EPA website.

Access to Public Open Space

Access to public parks, recreational spaces, and playgrounds is relatively convenient for most residents throughout the city—an estimated 86% of the population live within a 10-minute walk of a public open space. But looking at the average time it takes for residents of different neighborhoods to walk to the nearest public open space does reveal a few relative gaps in park access across Buffalo (see figure 13). Neighborhoods with relatively limited park access tend to fall in areas with more socioeconomic disadvantages. This includes parts of the East Side—like Kenfield, Genesee-Moselle, Emerson, and Kaisertown—as

well as the West Side, especially Black Rock, Riverside, and Forest. However, some of Buffalo's most advantaged neighborhoods also have longer walks to the nearest public park, including parts of North Buffalo, and the Bryant neighborhood in Elmwood Village.

Tree Canopy and Impervious Surface Coverage

About 15% of Buffalo's land area is covered by tree canopy, while nearly 55% of the city's land is impervious. These factors have an obvious inverse correlation—more pavement in an area likely means fewer trees. With a high density of commercial buildings and surface parking lots, the central business district has the highest impervious surface coverage (86%) in the city along with a low tree canopy coverage (9%). Moving east, a large cluster of neighborhoods with a low tree canopy cover stretches through the southern part of the East Side, from Perry and Willert Park to Kaisertown (see figure 14). Neighborhoods with commercial districts, like North Delaware, Grant-Ferry and Allentown, also have reduced tree canopy cover and larger impervious areas (see figure 15). Meanwhile, some of the most socioeconomically advantaged areas of the city, such as the Elmwood Village and Parkside neighborhood, have some of the lowest levels of impervious surfaces and highest tree canopy coverage across Buffalo. Areas with low tree canopy coverage and a high degree of impervious surfaces are somewhat correlated with concentrations of adults lacking a high school diploma and low-income households.

Vacant Land

Across the city of Buffalo, about 13.5% of land is vacant and unused. Most vacant land lies on the East Side where many vacant homes were demolished. In some East Side neighborhoods, such as Masten Park, Emslie, and Broadway-Fillmore, more than a quarter of land sits vacant (see figure 16). In other East Side neighborhoods, like MLK Park and the Fruit Belt, more than 20% of land is vacant. Parts of South Buffalo, like the Valley neighborhood, also have a greater share of vacant land than the city overall. The prevalence of vacant land is tied to high residential vacancy rates and a number of socioeconomic factors, such as concentrations of people of color, low incomes, and adults without a high school diploma.

Vacancy Rates

Across the city of Buffalo, 10% of residential addresses and 16% of commercial addresses sit vacant, based on data from June, 2018. Overall, the East Side has the most widespread vacancy concerns, where neighborhood vacancy rates on average are about 14% for residential addresses and 21% for commercial spaces. A cluster of neighborhoods surrounding the Fruit Belt, including Johnson, Kingsley and Broadway-Fillmore, own some of the highest residential vacancy rates in Buffalo (see figure 17). Other areas of high residential vacancy exist on the city's West Side, in the Front Park, and Grant-Ferry neighborhoods. Neighborhoods with high commercial vacancy rates are more dispersed, but many exist on the East Side, including the Johnson, Hamlin Park, Lovejoy, and Kensington neighborhoods (see figure 18). High commercial vacancy rates also occur in South Buffalo, near Cazenovia Park, and on the West Side near Front Park and Riverside Park. Commercial and residential vacancy rates are often tied to one another in more distressed parts of the city, but not necessarily. For instance, Riverside has a relatively well-intact residential neighborhood, but owns one of the city's highest commercial vacancy rates (30%). Moreover, high residential vacancy rates are more strongly correlated with high shares of people of color, low incomes, and unemployment than with high rates of commercial vacancy.

Summary of Environmental Indicators of Disadvantage

When aggregating each of these indicators together, the West Side shows the highest level of overall environmental disadvantage (see figure 19). This is largely due to the elevated proximity to high traffic volumes, and greater concentrations of Ozone and particulate matter in the air. The East Side also has a high degree of environmental disadvantage compared to the city as a whole, predominantly due to the abundance of vacant land and higher vacancy rates, both residential and commercial. However, due to limited park access, low tree canopy coverage, and a high percentage of impervious surfaces in some socioeconomically advantaged parts of the city, the overall trend in environmental equity index is not as well-defined as the map of socioeconomic disadvantage.

Green Infrastructure Equity Index

When combined, the socioeconomic and environmental equity indices reveal spatial patterns that echo trends common among most indicators of disadvantage. Specifically, the West and East Sides of the city stand out as areas of greatest disadvantage (see figure 20). Neighborhoods on the city's West Side receive the highest average combined GI equity index score, indicating a greater need for GI investments. This is due to elevated measures of environmental disadvantage, including high vacancy rates, traffic volumes, and Ozone and particulate matter levels, as well as socioeconomic factors, such as low incomes, limited English fluency, low educational attainment, and low owner-occupancy rates.

Overall, the need for GI, as measured by this index, appears most widespread on Buffalo's East Side, where high markers of disadvantage among nearly all of the seventeen distinct factors included in this analysis are shown across many neighborhoods. The most pronounced markers of disadvantage on the East Side include low workforce participation levels, high shares of people of color, high vacancy rates, and an abundance of vacant land.

Outside of the city's East and West sides, few neighborhoods receive overall equity index scores that exceed the citywide average. Notable exceptions include the central business district, which has a small residential population but is relatively disadvantaged due to environmental factors, and the First Ward and Valley neighborhoods of South Buffalo, due to a number of factors including low incomes, nearby traffic levels, vacant land, and unoccupied addresses. Throughout the rest of the city, from North Buffalo, the Elmwood Village, and most parts of South Buffalo, the overall equity index scores fall below the city average, indicating a lower relative need for GI investments in these locations.

Measures of Disadvantage in Target CSO Basins

In general, the sewer basins targeted by Buffalo Sewer through Rain Check 2.0 overlap with areas of high need for GI investments, as suggested by this index. These targeted basins predominantly lie on the city's East Side, which showed the most widespread level of disadvantage of any community in Buffalo. The overall need for GI, as well as the factors that lead to higher measures of disadvantage, vary across these basins.

Priority CSO 14

Covering much of the central business district, CSO basin 14 has a heightened need for GI investments, mainly due to environmental factors. The basin has the highest impervious surface coverage of any target area, along with a small tree canopy footprint. CSO 14 also has the highest traffic volumes of any priority CSO basin, due to commuter traffic and the proximity to major highways. Being in the active downtown area, basin 14 has the smallest share of vacant land cover and lowest vacancy rates of any targeted basin.

Although basin 14 has the fewest number of residents, the population here is more disadvantaged than the city overall. The wide majority of households here are renter-occupied (85%), more than any other targeted basin. As it intersects the city's Hispanic community in the lower West Side, basin 14 also has the highest share of limited English speaking households (9.3%)—more than double the city rate.

While the need for GI in basin 14 is high, based on the high degree of impervious surfaces and presence of disadvantaged population groups, the feasibility of many GI investment options may be relatively limited, due to such factors as low owner-occupancy rates and a smaller amount of vacant land. However, the presence of major employers and large surface parking lots may present alternative prospects for green infrastructure.

Priority CSO 26

Among all targeted basins, the need for GI investments may be highest in CSO 26, as it scores higher in the overall GI equity index than any target basin. CSO 26 falls on the city's East Side in neighborhoods like Emslie, and Broadway-Fillmore, where marginalized population groups are concentrated. Other parts of the basin intersect the First Ward and Valley neighborhoods in South Buffalo, which are also home to socioeconomically disadvantaged populations. Basin 26 has the highest share of low income households (73% with incomes less than double the federal poverty line), and adults without a high school diploma (25%) of any targeted basin. People of color comprise most (82%) of the population in basin 26. Just over half (51%) of people age 16 and over participate in the labor force (compared to 59% for Buffalo overall).

Many neighborhoods in CSO 26 are also marked by environmental concerns, such as limited tree canopy coverage and vacancy. With about 30% of its land area covered by vacant lots, basin 26 has more than double the vacant land coverage of the city overall, indicating an abundance of opportunities for GI investments.

Priority CSO 27

CSO basin 27, lying just east of basin 26, shares many similar disadvantages. Neighborhoods in this basin, like Kaisertown, Valley, and Babcock, are marked by low incomes and educational attainment levels. However, the overall socioeconomic disadvantage falls just under the city average due to the large population of non-Hispanic whites, and higher rates of owner-occupancy, workforce participation, and English fluency than the city overall.

CSO basin 27 stands out for a few environmental indicators of GI need. The basin has the highest vacancy rates, both commercial (16%) and residential (24%), of the six targeted sewer basins, along with a relatively high share of vacant land (15%). Basin 27 also has the lowest tree canopy coverage of any targeted basin—7.4% which is half that of the city as a whole. As Interstate 190 runs through the basin, neighborhoods in CSO 27 also have a notably high proximity to heavy traffic.

Priority CSO 28

Basin 28 lies within South Buffalo where the neighborhoods are generally more socioeconomically advantaged than other targeted investment areas. Of the six basins targeted by Rain Check 2.0, CSO 28 has the highest household incomes, educational attainment levels, workforce participation rates, and shares of non-Hispanic white population.

Basin 28 also ranks positively in terms of environmental concerns—it has the lowest impervious surface coverage (53%) and residential vacancy rate (5%) of any targeted basin. It also has a relatively high tree canopy coverage (16%) and a low share of vacant land area (11%). Due to these relative advantages, basin 28 has the lowest overall need for GI investments as rated by this equity index. Strategies for GI investments that involve residents may be most feasible in this area, since neighborhoods here are well intact with plenty of owner-occupied housing units.

Priority CSO 33

Basin 33 encompasses most of the Schiller Park, Lovejoy, and Kaisertown neighborhoods. Incomes and educational attainment levels are generally lower here than across the city as a whole, but overall, this area is less socioeconomically disadvantaged than most other priority basins. These areas have higher of owner-occupancy rates, employment levels, and a relatively large share of non-Hispanic whites.

The basin also performs relatively well on a few environmental indicators, with 10% of land sitting vacant (compared to 13.5% citywide), and lower Ozone and particulate matter levels in the air than the city overall. But the basin also has less tree canopy and more impervious surface coverage than the city overall.

Although scoring relatively positively in this index, there is still a need for GI investment in basin 33. Like all targeted basins, a diverse portfolio of GI investments and robust engagement strategies are needed in basin 33 to alleviate equity concerns while meeting goals for stormwater management.

Priority CSO 53

The most extensive basin with a population that makes up nearly one-quarter of Buffalo, CSO basin 53 on the East Side has an elevated need for GI investments due to a number of interconnected factors. Covering most of Buffalo's African American community on the East Side, this basin has the largest share of people of color (86%) of any target area. Basin 53 also has lower rates of workforce participation and owner-occupancy, and higher poverty levels than the city overall. From an environmental perspective, the basin is marked by a relatively large share of vacant land (16%) and high vacancy rates, but also has the highest tree canopy coverage (16%) of any priority basin.

Looking at these indicators at a basin-wide level masks some of the significant environmental and socioeconomic disadvantages of neighborhoods within basin 53, like Grider and Masten Park.

As is true for all other targeted areas, equity concerns must be investigated at a neighborhood level when investing in GI in CSO 53.

Conclusion

By aggregating a wide array of socioeconomic and environmental indicators of disadvantage, the GI equity index provides a fair depiction of the relative need for GI investments across the city of Buffalo. While key general considerations for future GI investments can be drawn from these findings, it is critical to reexamine these issues at a more discrete level, and robustly engage the local community when making investment decisions and implementing GI.

Many areas of greatest need for GI, as represented by this equity index, fall within the sewer basins targeted by Rain Check 2.0, and align with other areas targeted for investment by the city and state, such as areas targeted for investment by Empire State Development programs for revitalization on the East Side. While programs like these largely focus on physical improvements, to safeguard the long-term value of green infrastructure investments, it is critical to also invest in building social capital and developing the local workforce in these areas. This will alleviate equity concerns in these communities while improving the overall sustainability of GI projects and building momentum for additional investments.

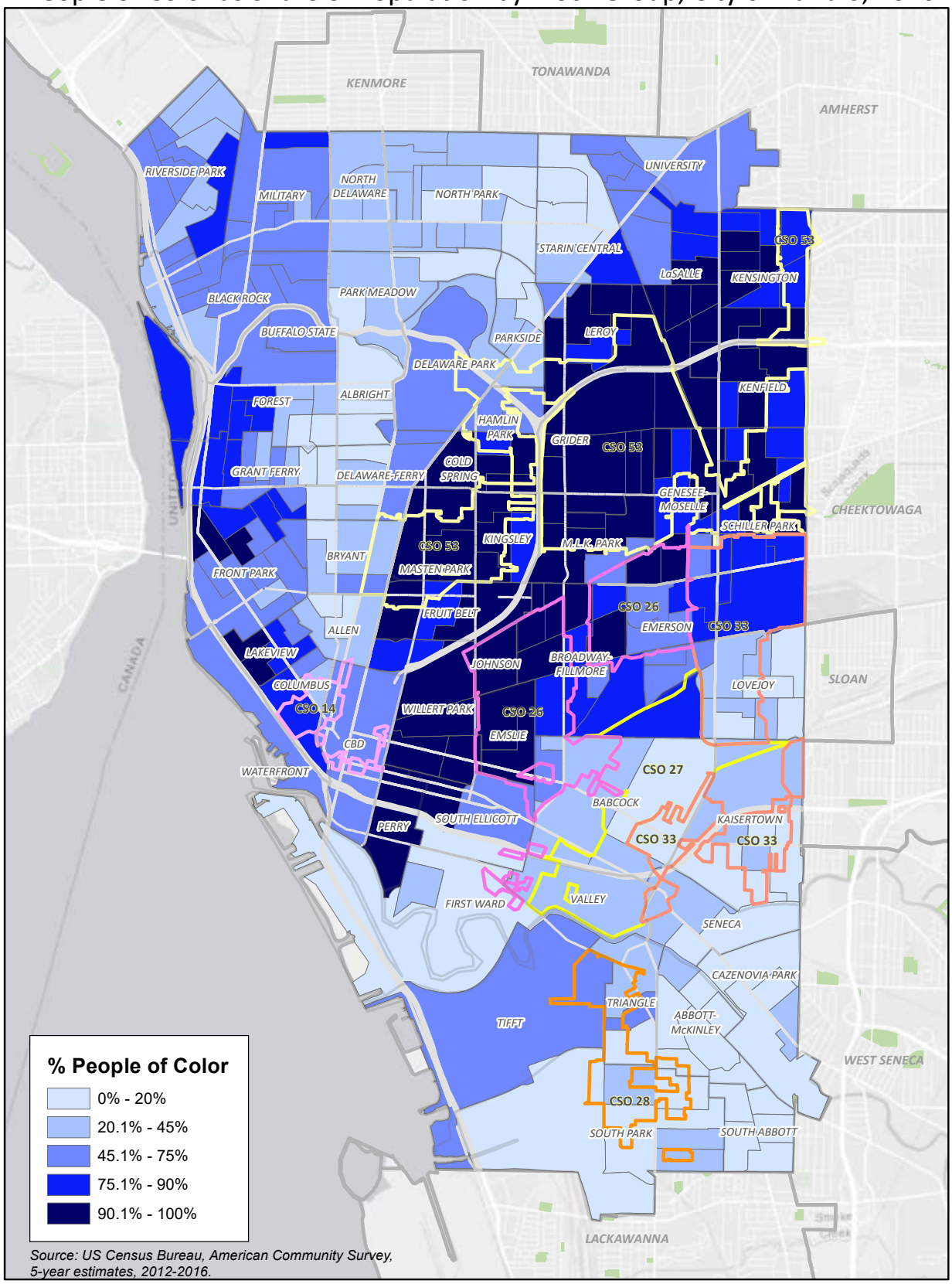
All these factors point to the need for Rain Check 2.0 to pursue a dynamic approach. Reflecting on equity, from citywide issues to neighborhood concerns, can guide the various phases of this approach—when engaging neighborhoods, partnering with diverse stakeholders, collaborating with other strategic initiatives, and incentivizing a wide array of GI investment strategies. Integrating equity considerations into a robust and adaptive Rain Check 2.0 program will help ensure that GI investments have a long-term positive impact on the environment, the economy, and all the communities of Buffalo.

Table 1: Equity Index Indicators

Category	Indicator	Measure	Data Source
Socio-economic Factors	Race and Ethnicity	Percent of population that are not non-Hispanic White	U.S. Census Bureau, 2012-2016 American Community Survey 5-Year Estimates
	Income	Percent of residents living in households with incomes less than twice the federal poverty line	U.S. Census Bureau, 2012-2016 American Community Survey 5-Year Estimates
	Educational Attainment	Percent of adults age 25+ who have not completed high school/ equivalent	U.S. Census Bureau, 2012-2016 American Community Survey 5-Year Estimates
	Young Children	Percent of population under 5 years old	U.S. Census Bureau, 2012-2016 American Community Survey 5-Year Estimates
	Older Adults	Percent of population over 64 years old	U.S. Census Bureau, 2012-2016 American Community Survey 5-Year Estimates
	Limited English Speakers	Percent of households in which no member age 14 and over (1) speaks English at home or (2) speaks a language other than English at home and speaks English "very well"	U.S. Census Bureau, 2012-2016 American Community Survey 5-Year Estimates
	Unemployment and Labor Force Participation	Percent of population (age 16+) that are unemployed or not in the labor force	U.S. Census Bureau, 2012-2016 American Community Survey 5-Year Estimates
Built Environment Factors	Traffic Proximity	Traffic proximity and volume	Environmental Protection Agency, EJScreen, 2018
	Ozone Levels	Ozone level in air (ppb)	Environmental Protection Agency, EJScreen, 2018
	Particulate Matter	PM2.5 level in air (µg/m^3)	Environmental Protection Agency, EJScreen, 2018
	Access to Public Open Space	Average walk time (min.) from homes to a public park or playground	UBRI analysis of parcel data (Erie County Dept. Environment and Planning, 2016), public recreation lands (NYS DEC, 2017), U.S. Census Bureau, (2012-2016 ACS 5 Year Estimates), address points (NYS GIS Program Office, 2017), and streets (NYS DOT, 2017)
	Tree Canopy Cover	Percent of land area covered by tree canopy	evolveEA/Arcadis, 2018
	Impervious Surface Cover	Percent of land area that is impervious	U.S. Geological Survey, National Land Cover Dataset, Impervious Surfaces, 2011
	Vacant Land	Percent of land area that is vacant/ unused land	Erie County Department of Environment and Planning, 2016
	Residential Vacancy Rates	Percent of residential addresses that are vacant	U.S. Department of Housing and Urban Development, U.S. Postal Service Vacant Address Data, June 2018
	Commercial Vacancy Rates	Percent of commercial addresses that are vacant	U.S. Department of Housing and Urban Development, U.S. Postal Service Vacant Address Data, June 2018

Figure 1

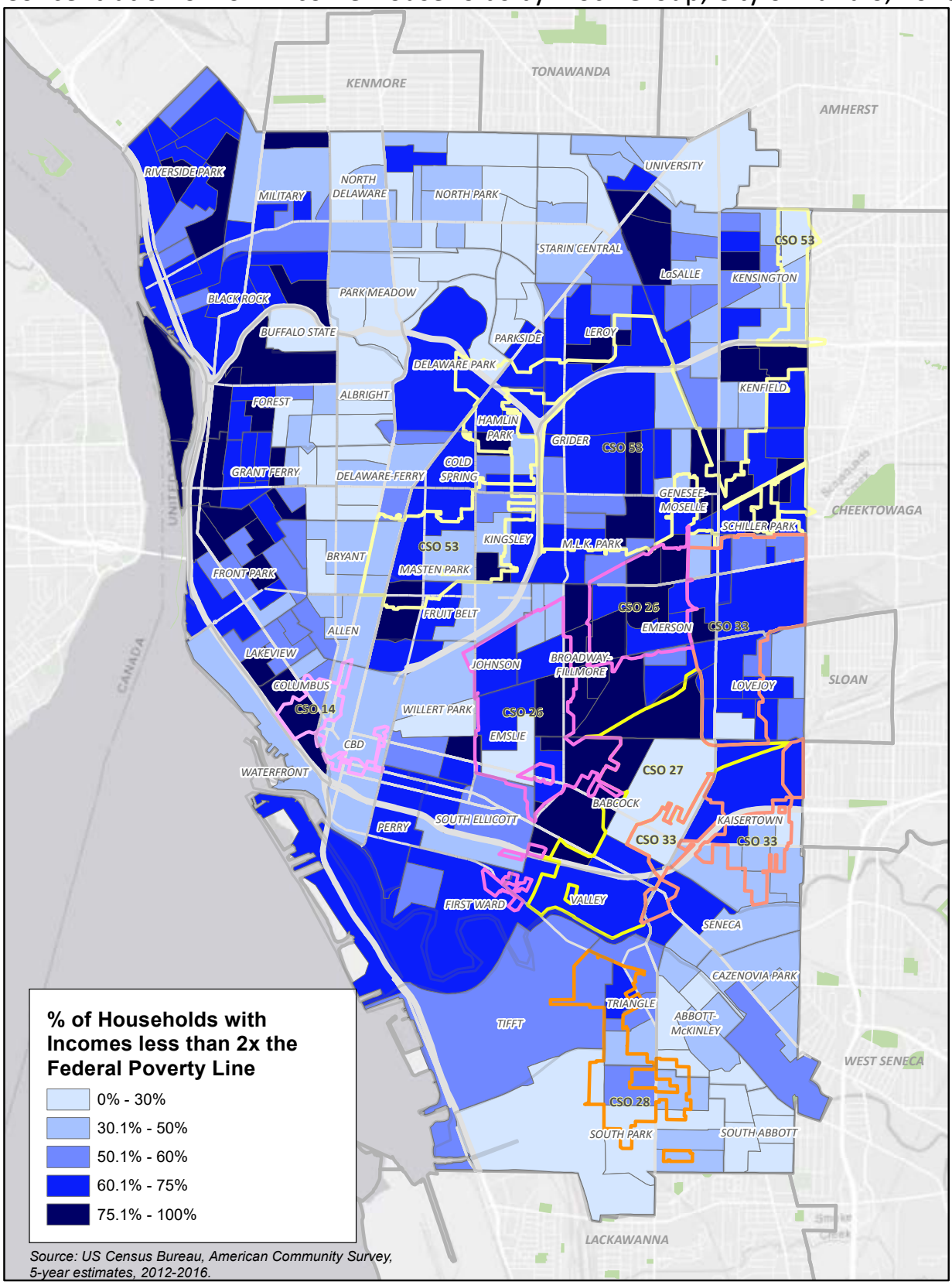
People of Color as Share of Population by Block Group, City of Buffalo, 2016



Source: US Census Bureau, American Community Survey, 5-year estimates, 2012-2016.

Figure 2

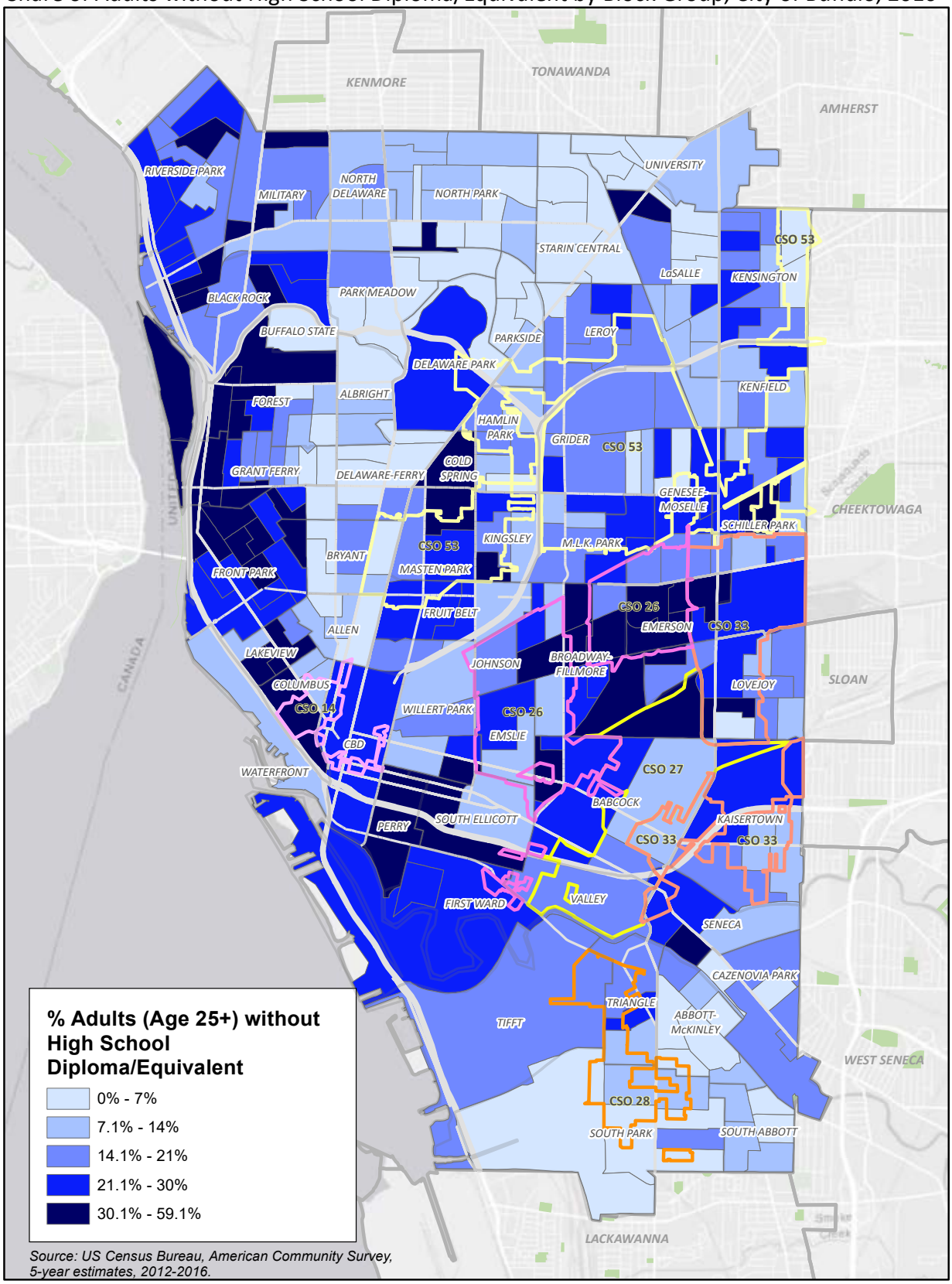
Concentration of Low-Income Households by Block Group, City of Buffalo, 2016



Source: US Census Bureau, American Community Survey, 5-year estimates, 2012-2016.

Figure 3

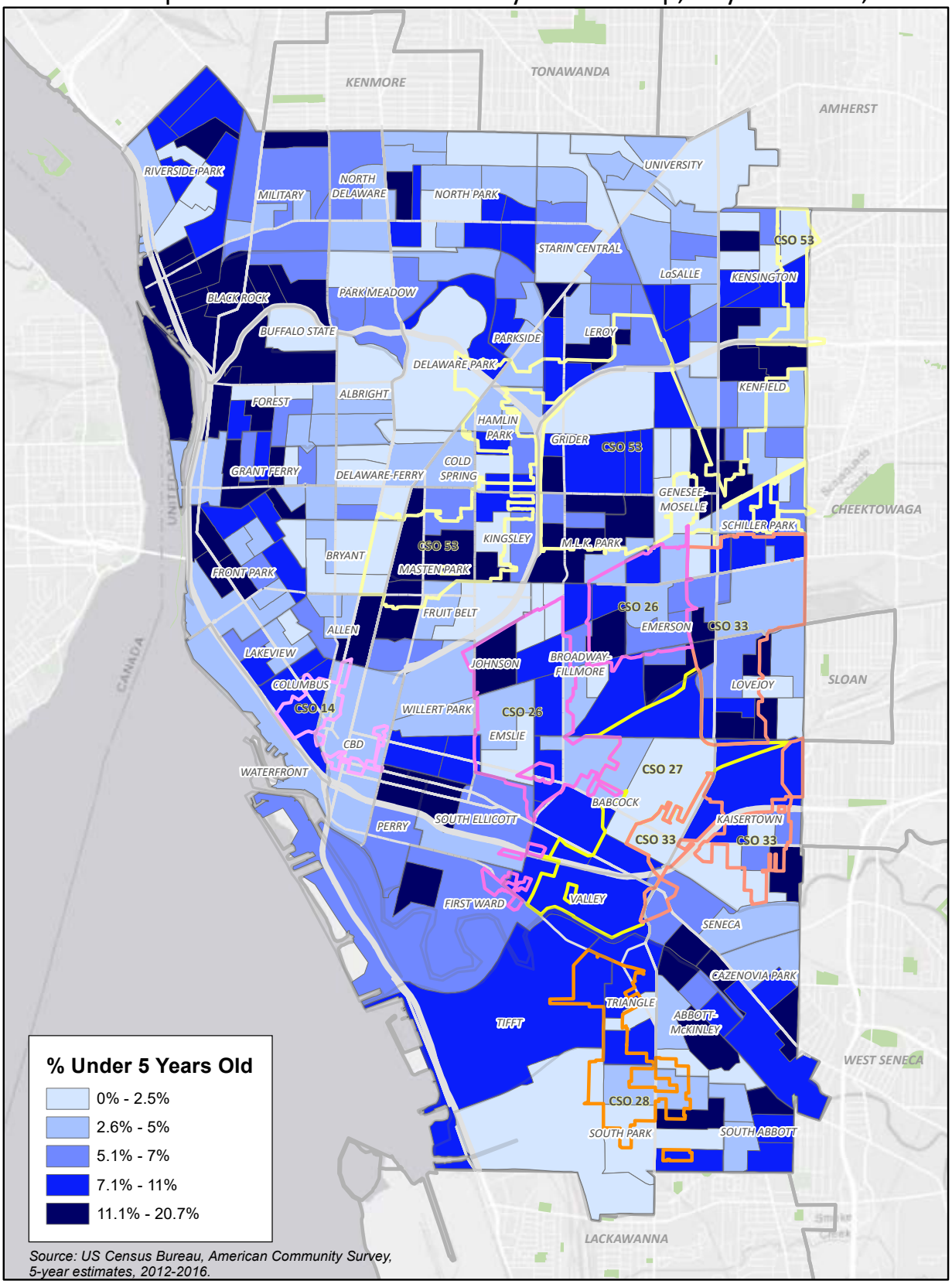
Share of Adults without High School Diploma/Equivalent by Block Group, City of Buffalo, 2016



Source: US Census Bureau, American Community Survey, 5-year estimates, 2012-2016.

Figure 4

Percent of Population Under 5 Years Old by Block Group, City of Buffalo, 2016



Source: US Census Bureau, American Community Survey, 5-year estimates, 2012-2016.

Figure 5

Percent of Population Over 64 Years Old by Block Group, City of Buffalo, 2016

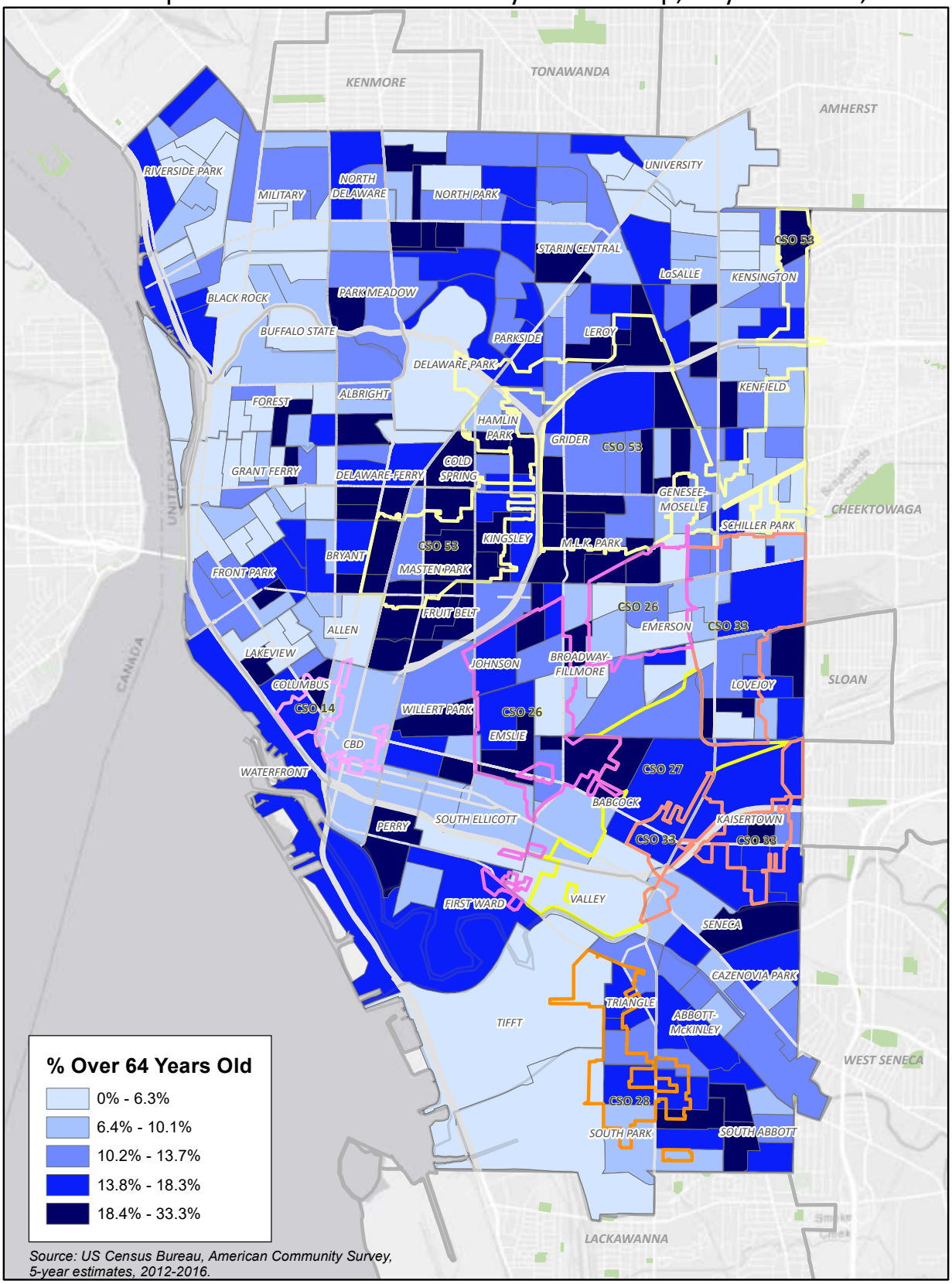
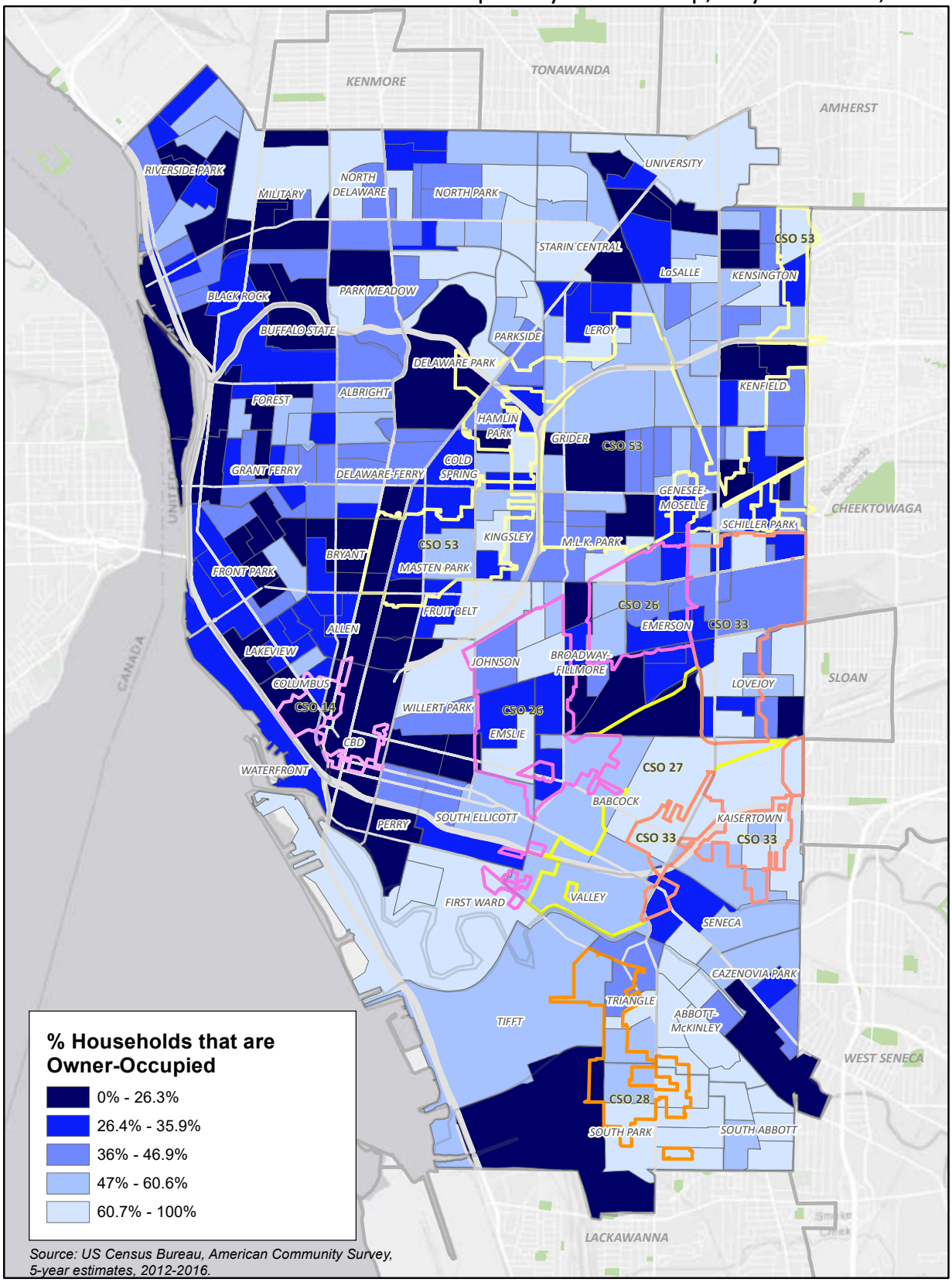


Figure 6

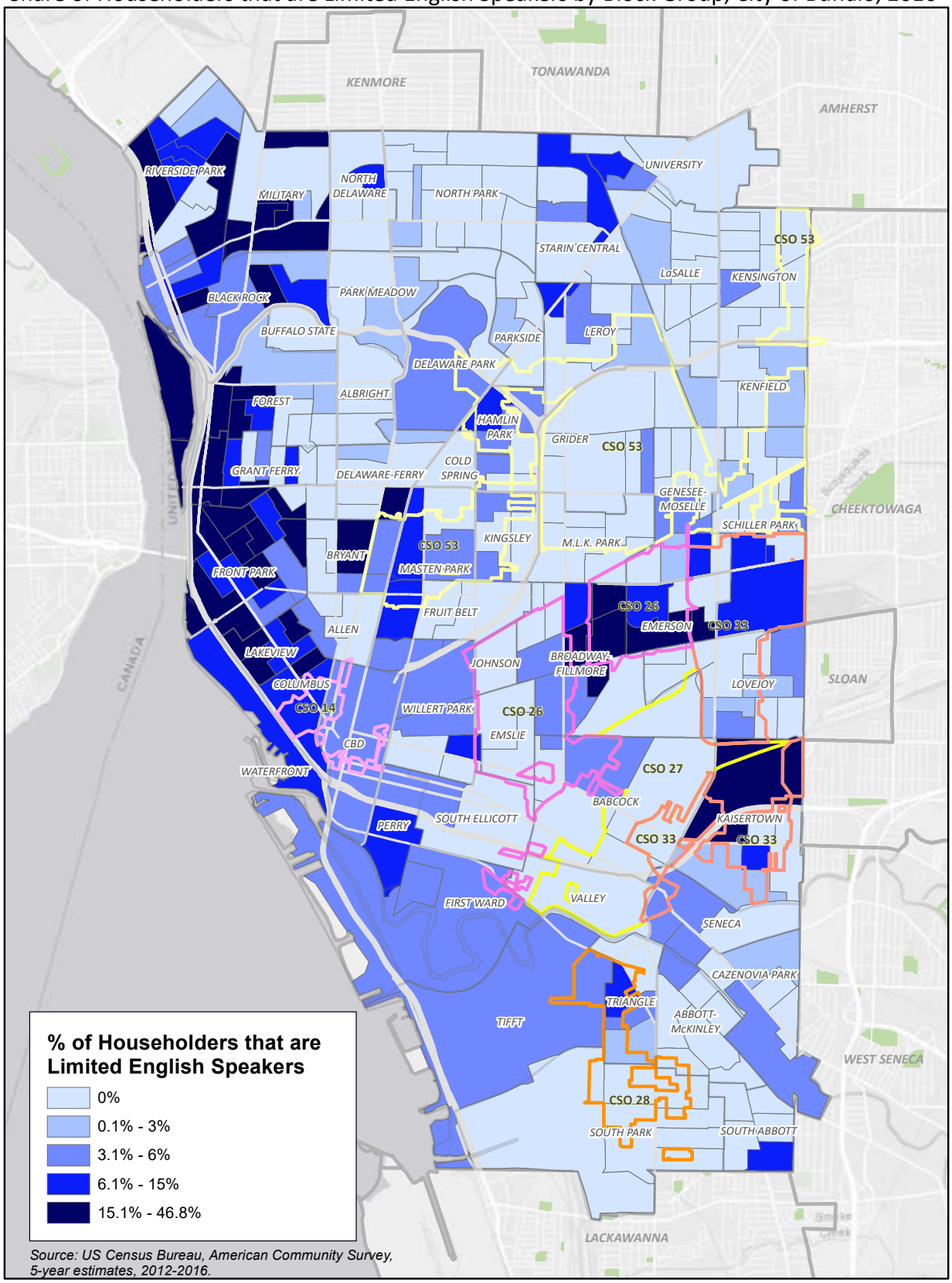
Share of Households that are Owner-Occupied by Block Group, City of Buffalo, 2016



Source: US Census Bureau, American Community Survey, 5-year estimates, 2012-2016.

Figure 7

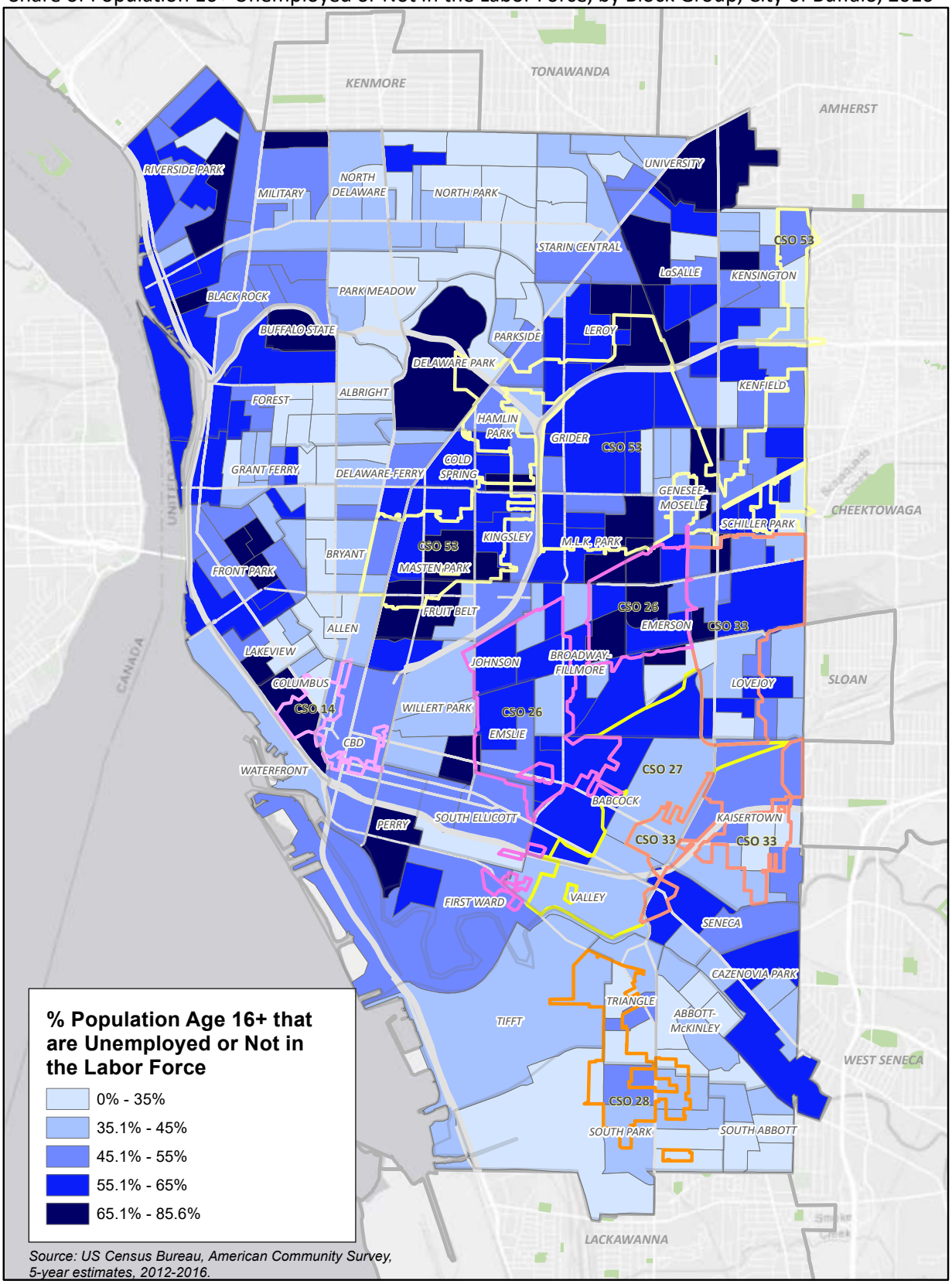
Share of Householders that are Limited English Speakers by Block Group, City of Buffalo, 2016



Source: US Census Bureau, American Community Survey, 5-year estimates, 2012-2016.

Figure 8

Share of Population 16+ Unemployed or Not in the Labor Force, by Block Group, City of Buffalo, 2016



Source: US Census Bureau, American Community Survey, 5-year estimates, 2012-2016.

Figure 9

Socioeconomic Equity Index, Block Groups, City of Buffalo

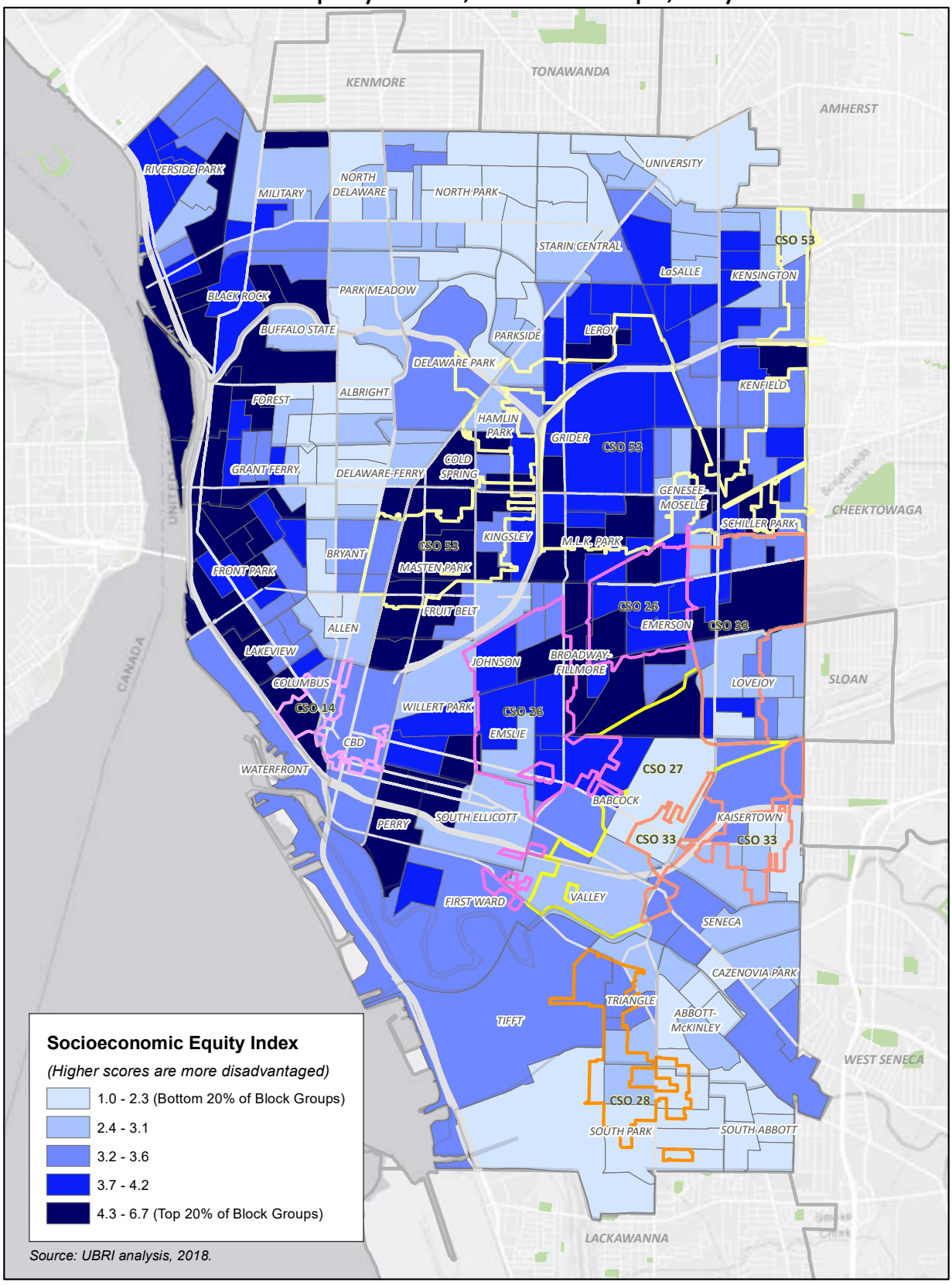
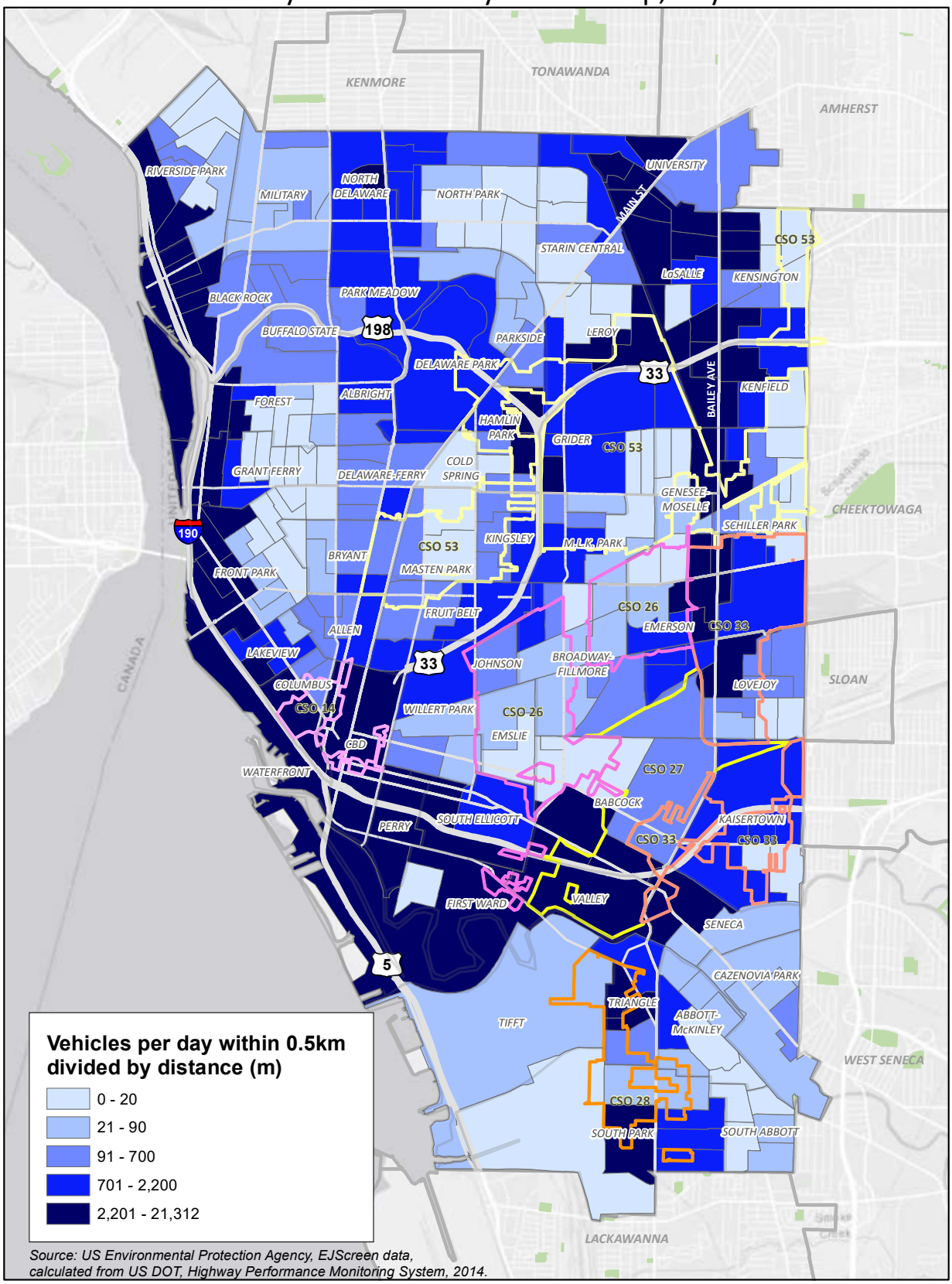


Figure 10

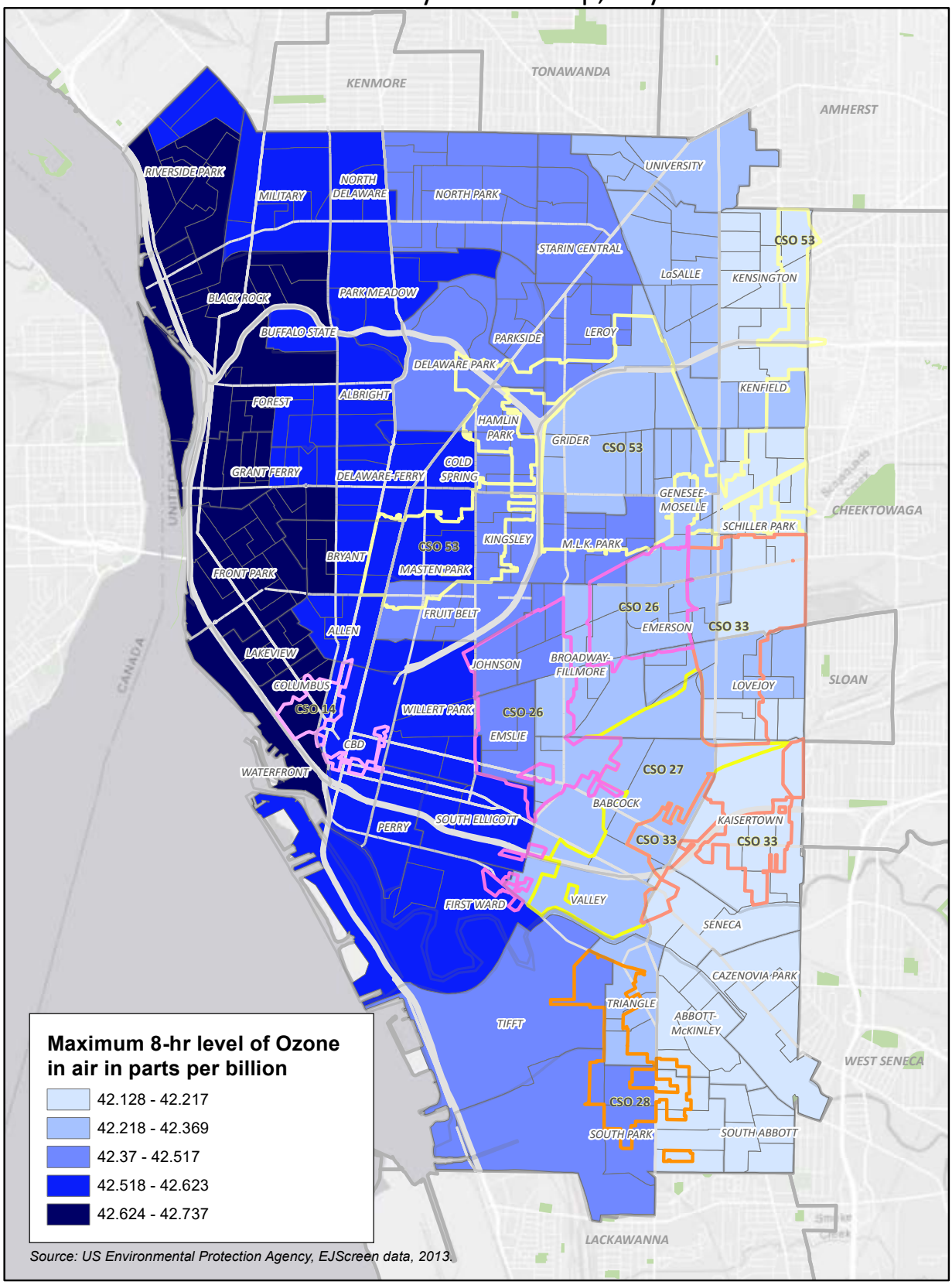
Traffic Proximity and Volume by Block Group, City of Buffalo



Source: US Environmental Protection Agency, EJScreen data, calculated from US DOT, Highway Performance Monitoring System, 2014.

Figure 11

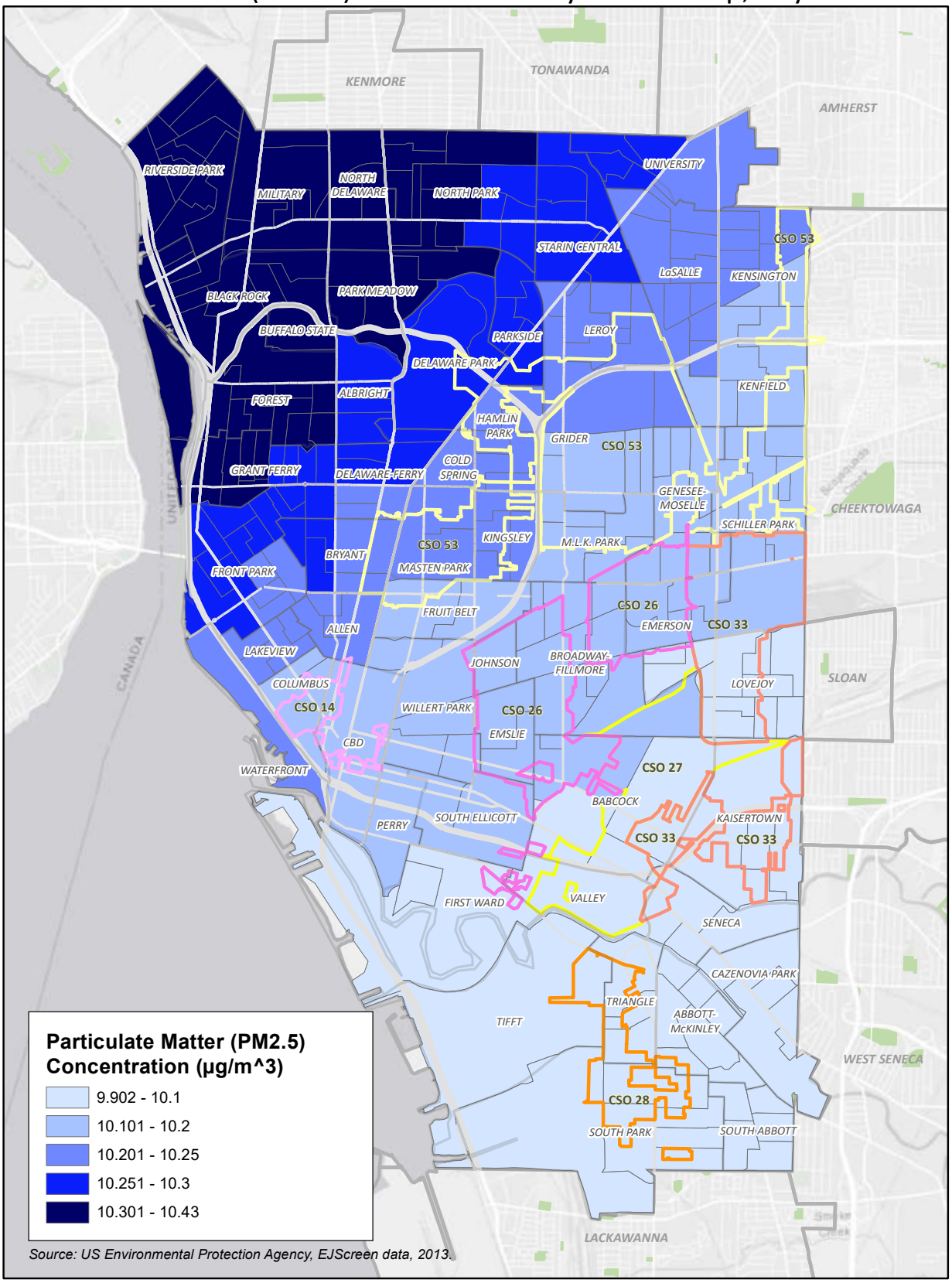
Ozone Levels in Air by Block Group, City of Buffalo



Source: US Environmental Protection Agency, EJScreen data, 2013.

Figure 12

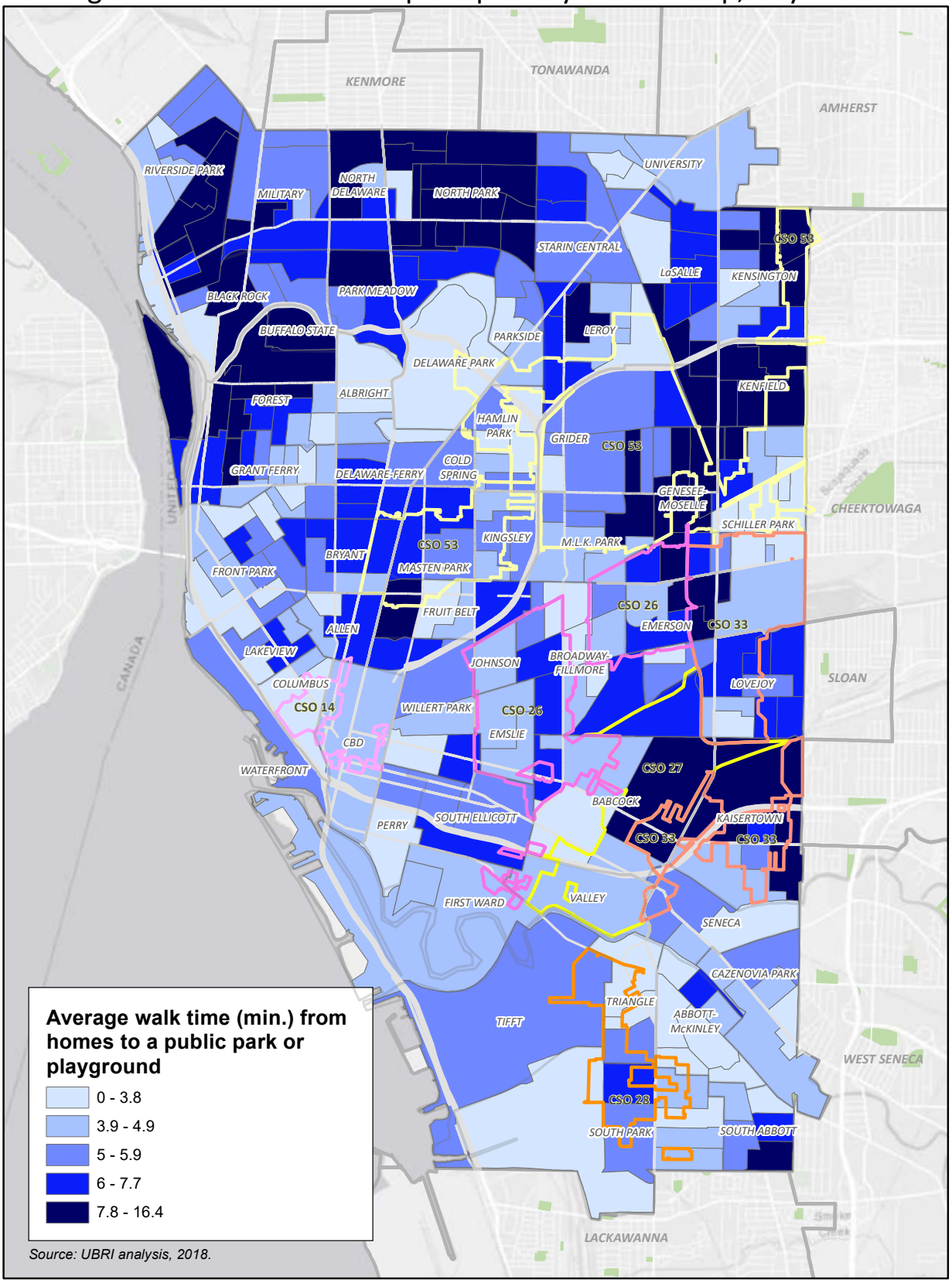
Particulate Matter (PM2.5) Concentration by Block Group, City of Buffalo



Source: US Environmental Protection Agency, EJScreen data, 2013.

Figure 13

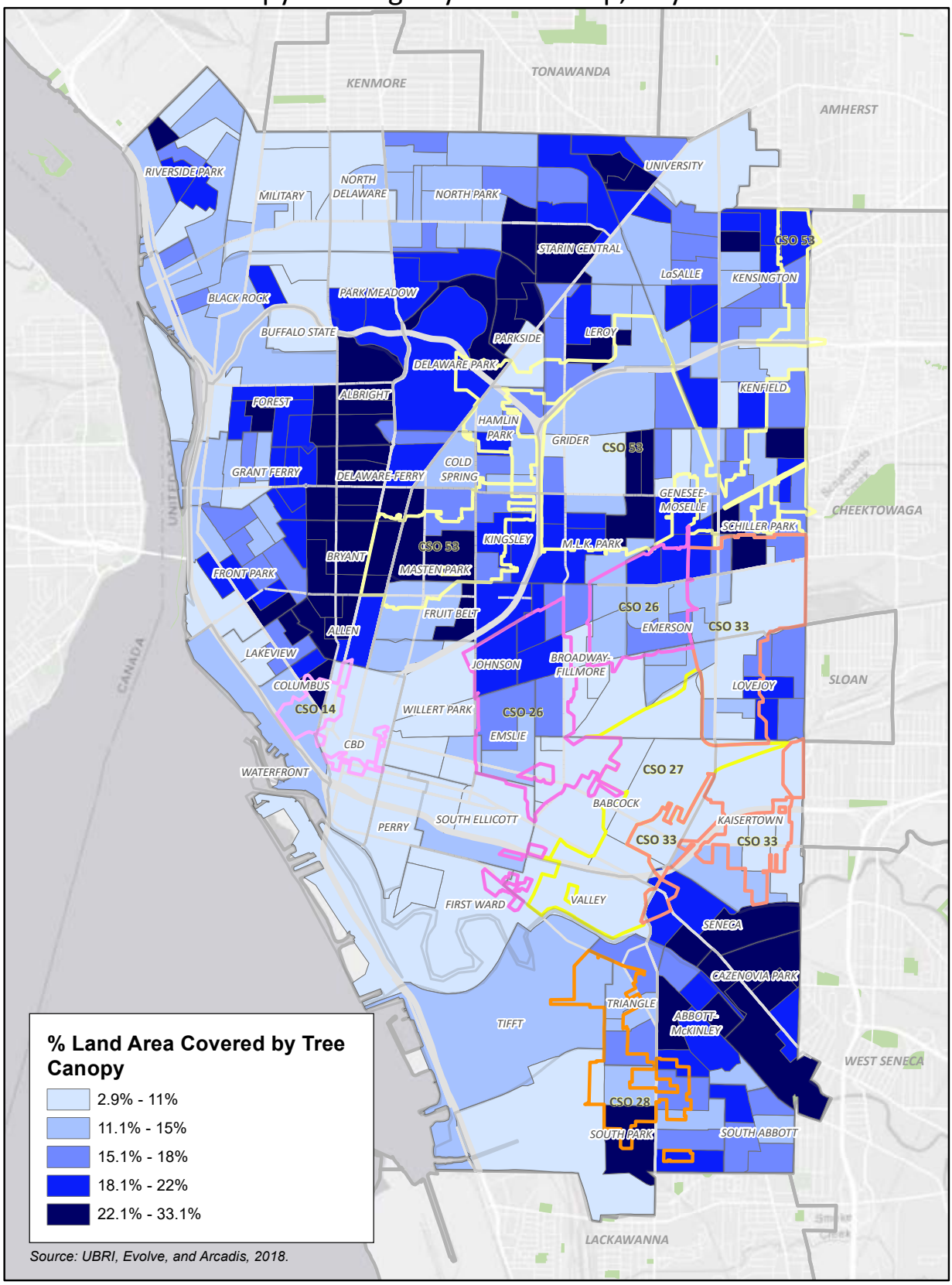
Average Walk Time to Public Open Space by Block Group, City of Buffalo



Source: UBRI analysis, 2018.

Figure 14

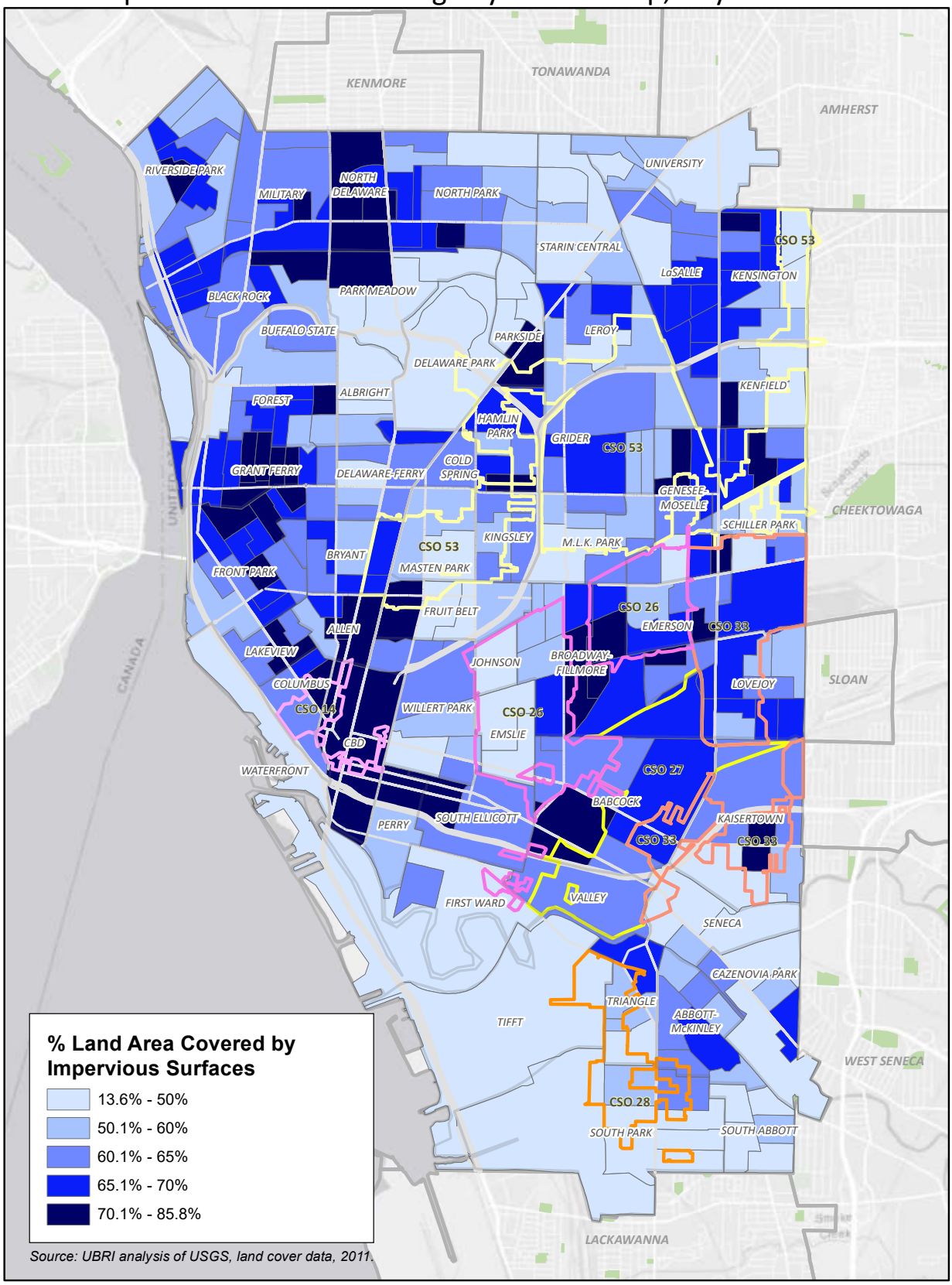
Tree Canopy Coverage by Block Group, City of Buffalo



Source: UBRI, Evolve, and Arcadis, 2018.

Figure 15

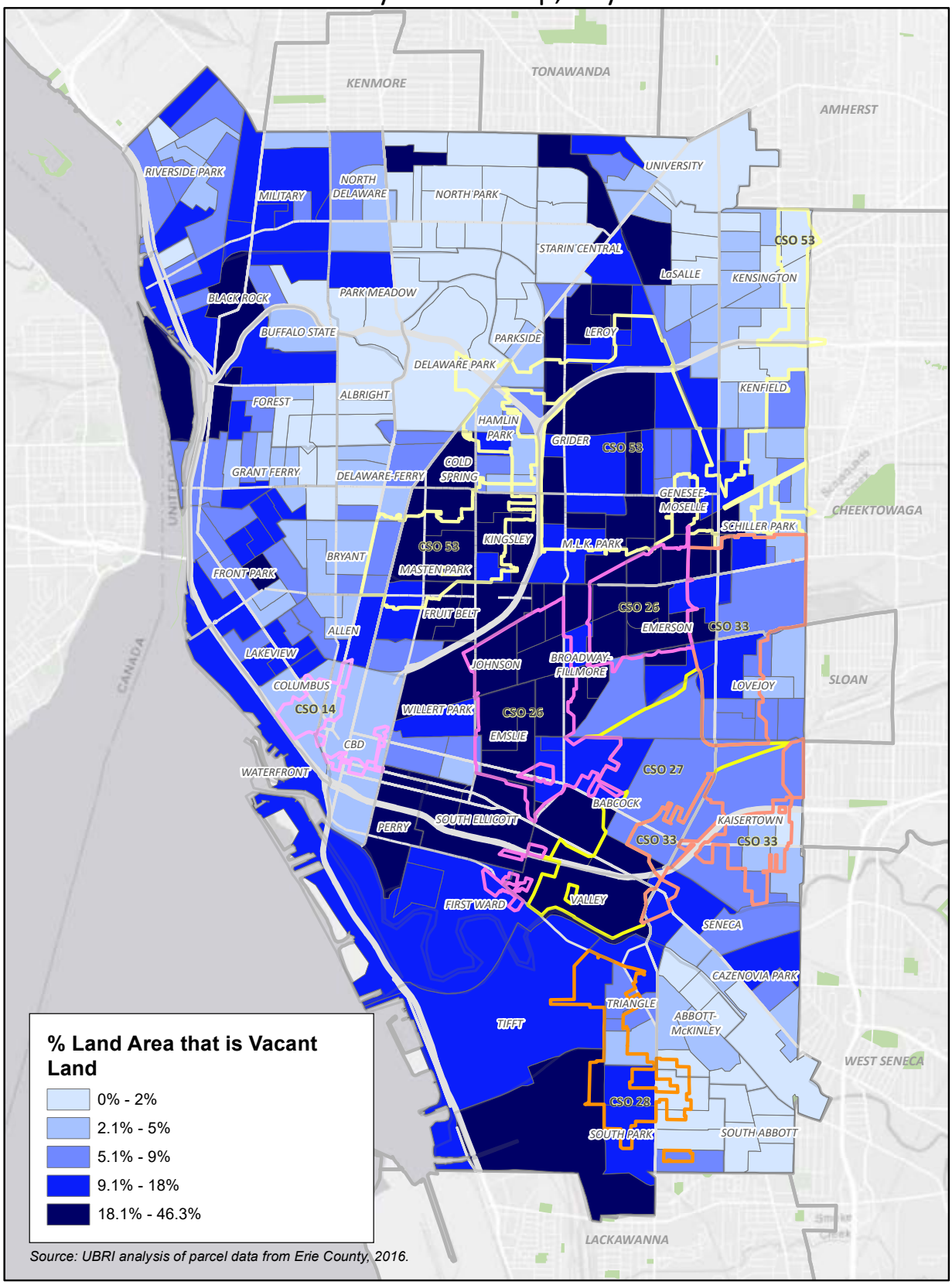
Impervious Surface Coverage by Block Group, City of Buffalo



Source: UBRI analysis of USGS, land cover data, 2011.

Figure 16

Vacant Land by Block Group, City of Buffalo



Source: UBRI analysis of parcel data from Erie County, 2016.

Figure 17

Residential Vacancy Rates, City of Buffalo, June, 2018

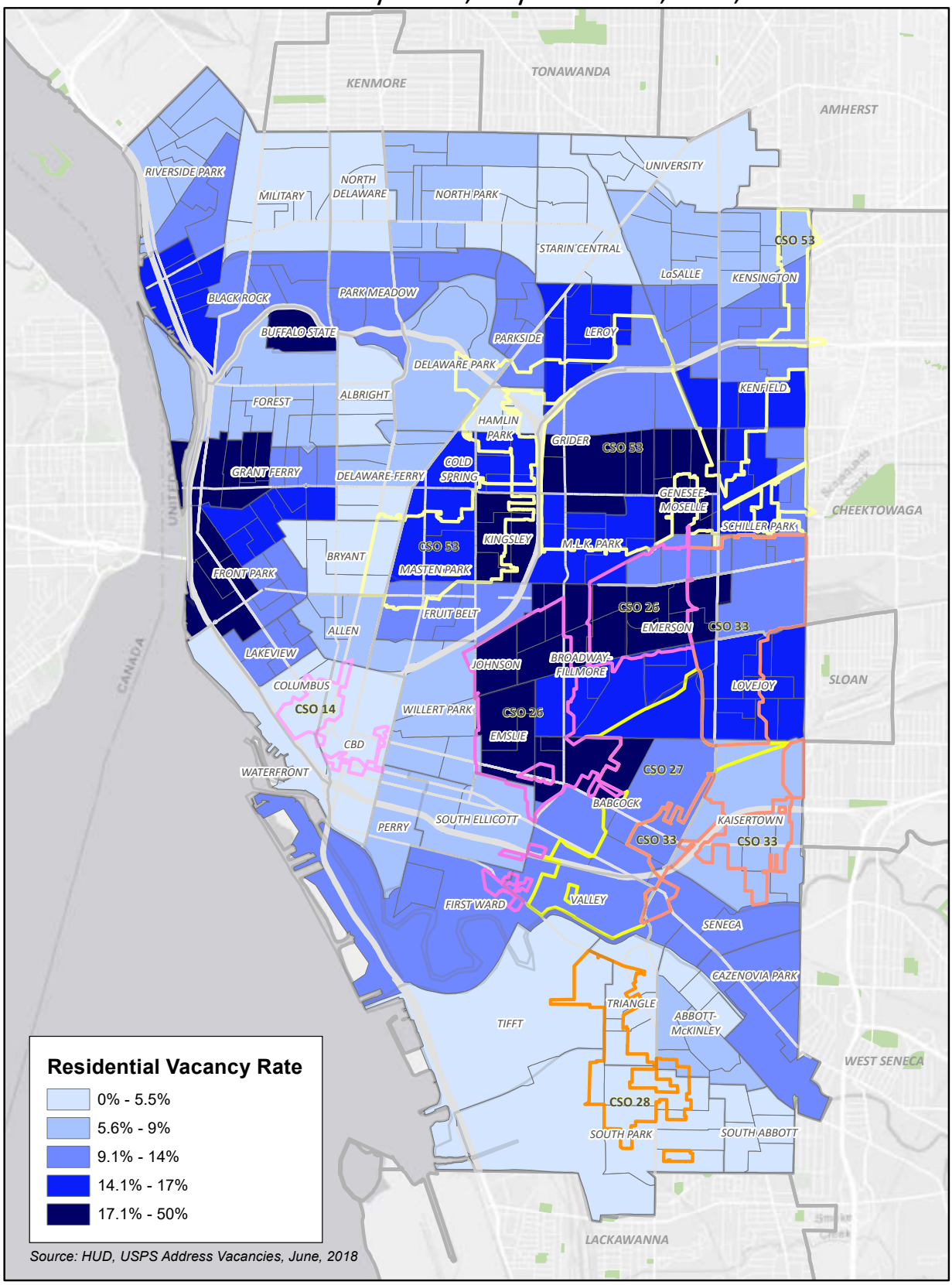
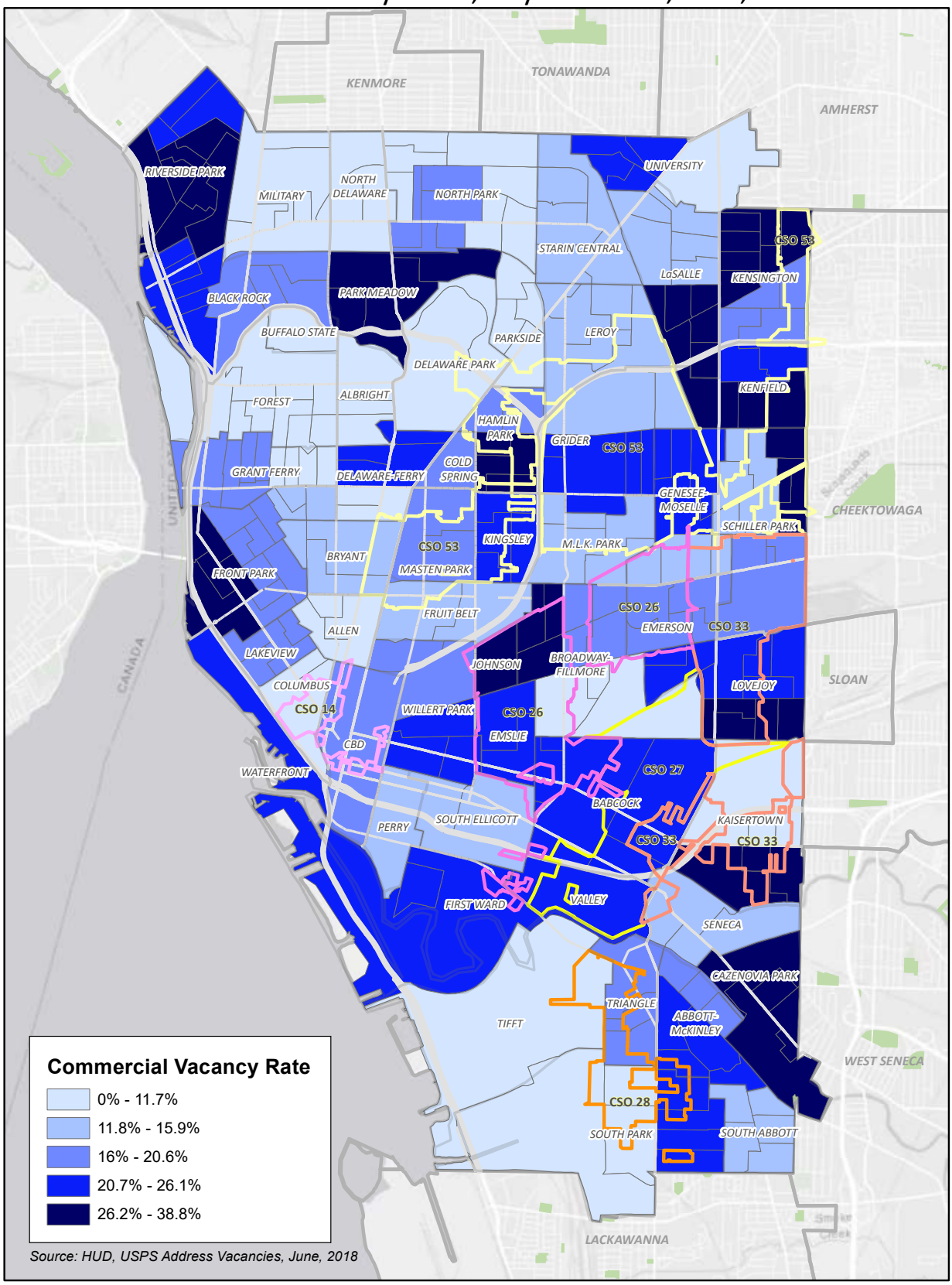


Figure 18

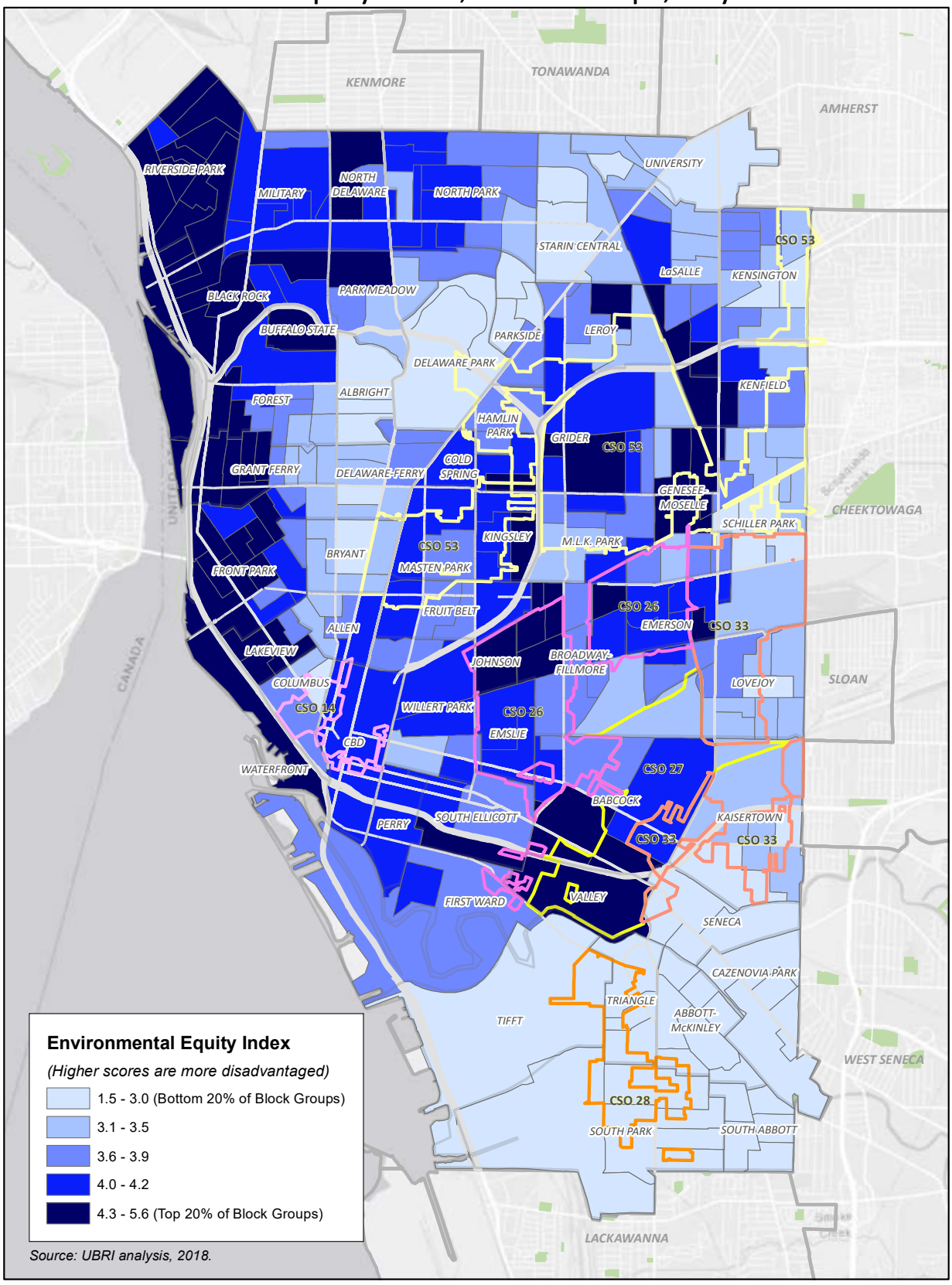
Commercial Vacancy Rates, City of Buffalo, June, 2018



Source: HUD, USPS Address Vacancies, June, 2018

Figure 19

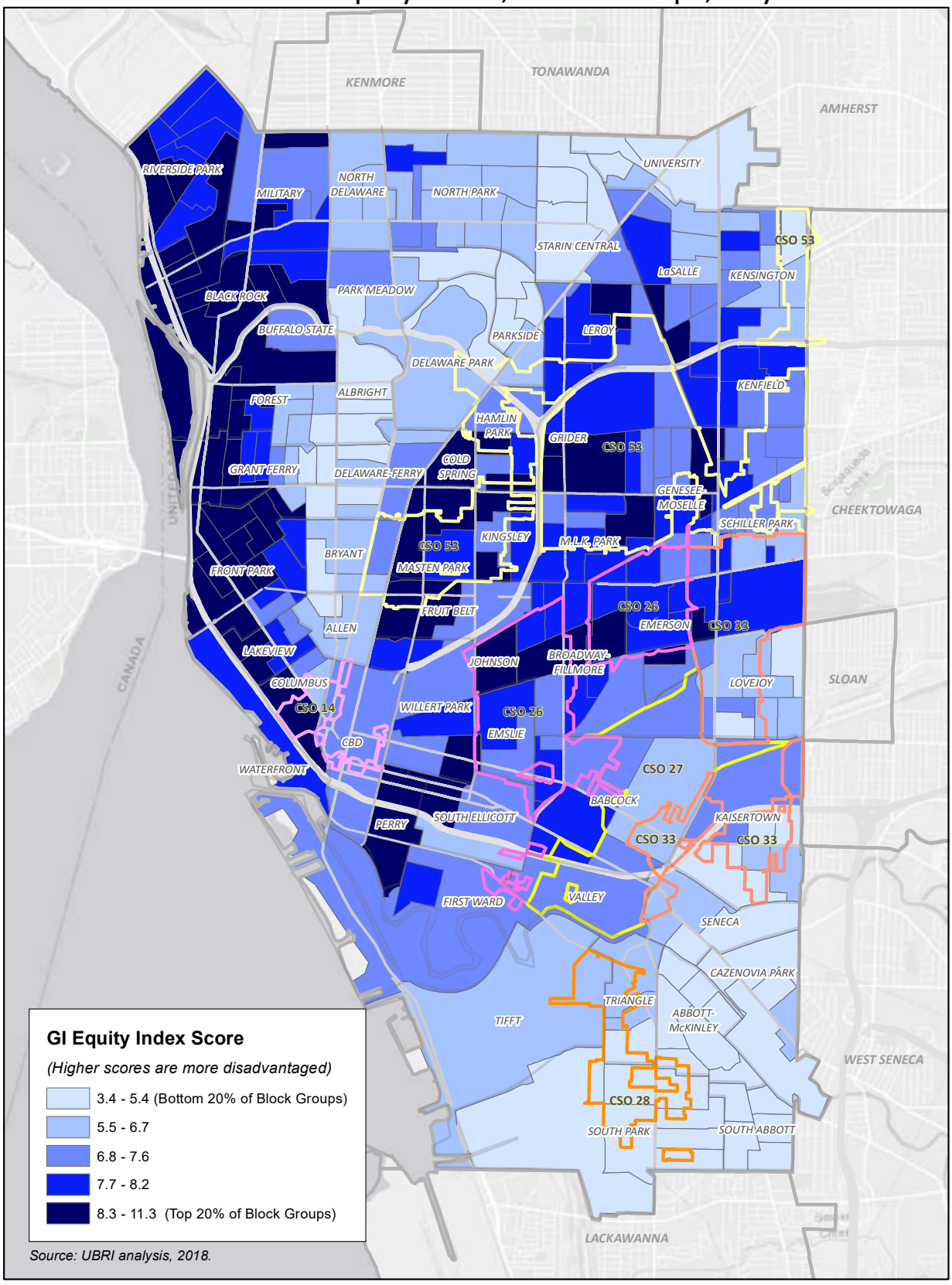
Environmental Equity Index, Block Groups, City of Buffalo



Source: UBRI analysis, 2018.

Figure 20

Green Infrastructure Equity Index, Block Groups, City of Buffalo



Source: UBRI analysis, 2018.

APPENDIX B: COMMUNITY PROFILES

Methods

Understanding demographic, social, economic, and health characteristics of communities is crucial to developing and advancing equitable stormwater management practices. Communities experiencing stormwater challenges are often facing other social, economic, and environmental challenges. By providing an array of benefits beyond stormwater management, green infrastructure development should be contextualized with and connected to these challenges.

The community profiles provide summaries of baseline conditions in the CSO neighborhood areas compared to the city of Buffalo overall. The profiles present data for population, housing, economic, health, and land use characteristics of the broader neighborhood areas that overlap with the CSO basin boundaries. Most of the data are population-level data from government agencies, notably the U.S. Census Bureau (see Table 1 for a full list of indicators and data sources). The profiles offer community context for assessing potential impacts and for project decision-making around green infrastructure, reflecting the interplay between social, economic, and environmental factors affecting a community's well-being.

As part of the Rain Check 2.0 Opportunity Report, the community profiles widen the use of data by Buffalo Sewer and partners to support decision-making, improve policy, and target resources. Bringing together GI performance indicators and community targeted indicators into a single solution can assist with communicating outcome measures to stakeholders, stimulate public discussion, and build confidence in progress towards societal goals.

Note that the community profiles are not intended to be an indicator-based framework for assessing the performance of GI projects. Furthermore, community indicators are distinct from GI performance indicators. Community indicators are the cumulative result of many policies, programs, behaviors, and decisions at individual, institutional, and structural levels, and across households, organizations, and public and private sector institutions. Community indicators may not be quick to move because they are community-level measures that reflect generations of policy and systems failures that have produced inequity.

Finally, there are limitations of community indicators as an approximation of community context. Indicators coupled with community insights gathered through engagement can offer the best understanding of community conditions. The ideas, thoughts, and concerns of residents, workers, and community leaders can enhance understanding of the data, challenge or complicate assumptions that one might be inclined to draw from the data, and reveal issues, concerns, and opportunities not reflected in the data. Next steps might include ground-truthing findings through outreach and engagement with community members and groups, gaining a deeper understanding of community priorities, needs, and aspirations.

Measures

Demographics and Socioeconomic Characteristics

Who lives here? These common demographic and socioeconomic indicators provide a description of who lives in the neighborhoods located within and adjacent to the CSO basins. This information can assist in identifying vulnerable communities that historically or currently face barriers to economic and social inclusion, such as low-income people, communities of color, children, seniors, and people with limited English-speaking ability. This information can also prompt considerations of potential audiences for outreach and engagement activities, as well as enhanced understanding of the city's landscape of racial and economic inequities at the neighborhood level.

Workforce

How prepared are residents to enter the workforce? Workforce development is an emerging priority for Buffalo Sewer's green infrastructure program. These indicators offer insights into educational attainment and labor force participation of residents, as well as the general industry sectors that residents are employed in. This information can be a helpful starting point for thinking about what kinds of jobs and training might benefit residents, given their general educational and employment backgrounds.

Public Health

Are residents healthy? Do they live in health-promoting environments? Green infrastructure in its broadest definition is often about access to green space. Green space, vegetation, and other features of green infrastructure can contribute to health-promoting environments for people to live, work, and shop in. Understanding some of the health conditions and challenges that residents may face is useful context for thinking about the benefits of green infrastructure and making connections between green infrastructure and discussions around healthy communities that are already taking place across the city.

Connectedness

Are residents connected to opportunities? This set of indicators intersects with some of the other categories, offering additional insights into residents' access to opportunity and mobility. While the indicators in the workforce category consider residents' educational and employment opportunities and outcomes, these indicators focus on housing and transportation. This information is useful in thinking about green infrastructure development on residential properties, as well as projects that can enhance transportation corridors and the public realm.

Land Use

How is land being used? Vacant land and vacancy is a major challenge that Buffalo and other cities confront, and is a critical issue to be tackled by neighborhood revitalization efforts. While vacant land and vacancy is considered as part of other analyses for the Rain Check Opportunity Report, it is also included in the community profiles to place the information and discussion around vacancy within the context of neighborhood revitalization, alongside issues of public health and connectedness to promote a more holistic discussion of how the built environment can shape access to opportunity and life outcomes for residents.

Geography

For each of the community indicators, data was collected and analyzed at the census tract level. Using geographic information systems, census tracts that were located within or intersect the CSO basin boundaries were identified (see Table 2 for the census tracts used for each CSO basin). As a result of this method, the data presented in the community profiles reflects slightly larger geographies than the CSO basins. This approach was intentional, as part of an effort to recast the CSO basins as neighborhoods for the purposes of the equity analysis. Census tracts are more familiar geographies for neighborhood data dashboards and they are also the smallest geography at which some of the data indicators included in the profiles are available. A fine-grained analysis of many of these data indicators at the block group level is provided in the equity index.

Table 1: Community Profile Indicators

Category	Indicator	Measure	Data Source
Demographics	Total Population	Total population	U.S. Census Bureau, 2012-2016 American Community Survey 5-Year Estimates
	Age Composition	Total population under age 5 Total population age 65 and over	U.S. Census Bureau, 2012-2016 American Community Survey 5-Year Estimates
	Racial/Ethnic Composition	Racial/ethnic composition	U.S. Census Bureau, 2012-2016 American Community Survey 5-Year Estimates
	Foreign-Born Population	Total population foreign born	U.S. Census Bureau, 2012-2016 American Community Survey 5-Year Estimates
	Limited English Speaking Households	Households in which no member age 14 and over (1) speaks English at home or (2) speaks a language other than English at home and speaks English "very well" Languages spoken by limited English speaking households	U.S. Census Bureau, 2012-2016 American Community Survey 5-Year Estimates
	Median Household Income	Median household income (in 2016 inflation adjusted dollars)	U.S. Census Bureau, 2012-2016 American Community Survey 5-Year Estimates
	Poverty Status by Age Group	Total population under age 18 living below poverty level Total population age 18 to 64 living below poverty level Total population age 65 and over living below poverty level	U.S. Census Bureau, 2012-2016 American Community Survey 5-Year Estimates
Workforce	Educational Attainment	Adults age 25 and over with less than high school graduate Adults age 25 and over with high school diploma (includes equivalency) Adults age 25 and over with some college Adults age 25 and over with bachelor's degree or higher	U.S. Census Bureau, 2012-2016 American Community Survey 5-Year Estimates
	Working-Age Population	Working-age population age 16 to 64 unemployed or not in the labor force	U.S. Census Bureau, 2012-2016 American Community Survey 5-Year Estimates
	Disconnected Youth	Youth age 16 to 19 not enrolled in school (includes high school graduates and not high school graduates) and not working (unemployed or not in the labor force)	U.S. Census Bureau, 2012-2016 American Community Survey 5-Year Estimates
	Employment by Industry	Industry by occupation for employed civilian population age 16 and over	U.S. Census Bureau, 2012-2016 American Community Survey 5-Year Estimates

Category	Indicator	Measure	Data Source
Public Health	Current Asthma	Adults age 18 and over who report being told by a health professional that they had asthma and who currently still have asthma	Centers for Disease Control and Prevention, 500 Cities Project Data, 2016
	Heart Disease	Adults age 18 and over who report being told by a health professional that they had angina or coronary heart disease	Centers for Disease Control and Prevention, 500 Cities Project Data, 2016
	Physical Inactivity	Adults age 18 and over who report that they do not regularly participate in physical activities or exercises outside of their job	Centers for Disease Control and Prevention, 500 Cities Project Data, 2016
	Mental Health	Adults age 18 and over who report that their mental health is not good	Centers for Disease Control and Prevention, 500 Cities Project Data, 2016
	Obesity	Adults age 18 and over that are overweight or obese according to body mass index calculated from self-reported weight and height	Centers for Disease Control and Prevention, 500 Cities Project Data, 2016
Connectedness	Car Access	Occupied housing units with no vehicles available	U.S. Census Bureau, 2012-2016 American Community Survey 5-Year Estimates
	Means of Transportation to Work	Means of transportation to work for workers age 16 and over	U.S. Census Bureau, 2012-2016 American Community Survey 5-Year Estimates
	Housing Tenure	Occupied housing units that are owner occupied Occupied housing units that are renter occupied	U.S. Census Bureau, 2012-2016 American Community Survey 5-Year Estimates
	Housing Cost Burden	Percent of households spending more than 30% of monthly income on housing costs	U.S. Census Bureau, 2012-2016 American Community Survey 5-Year Estimates
Land Use	Vacant Land	Vacant land area	Erie County Department of Environment and Planning, 2016
	Vacancy Rates	Residential vacancy rates Commercial vacancy rates	U.S. Department of Housing and Urban Development, U.S. Postal Service Vacant Address Data, June 2018

Table 2: Census Tracts Assigned to CSO Basins

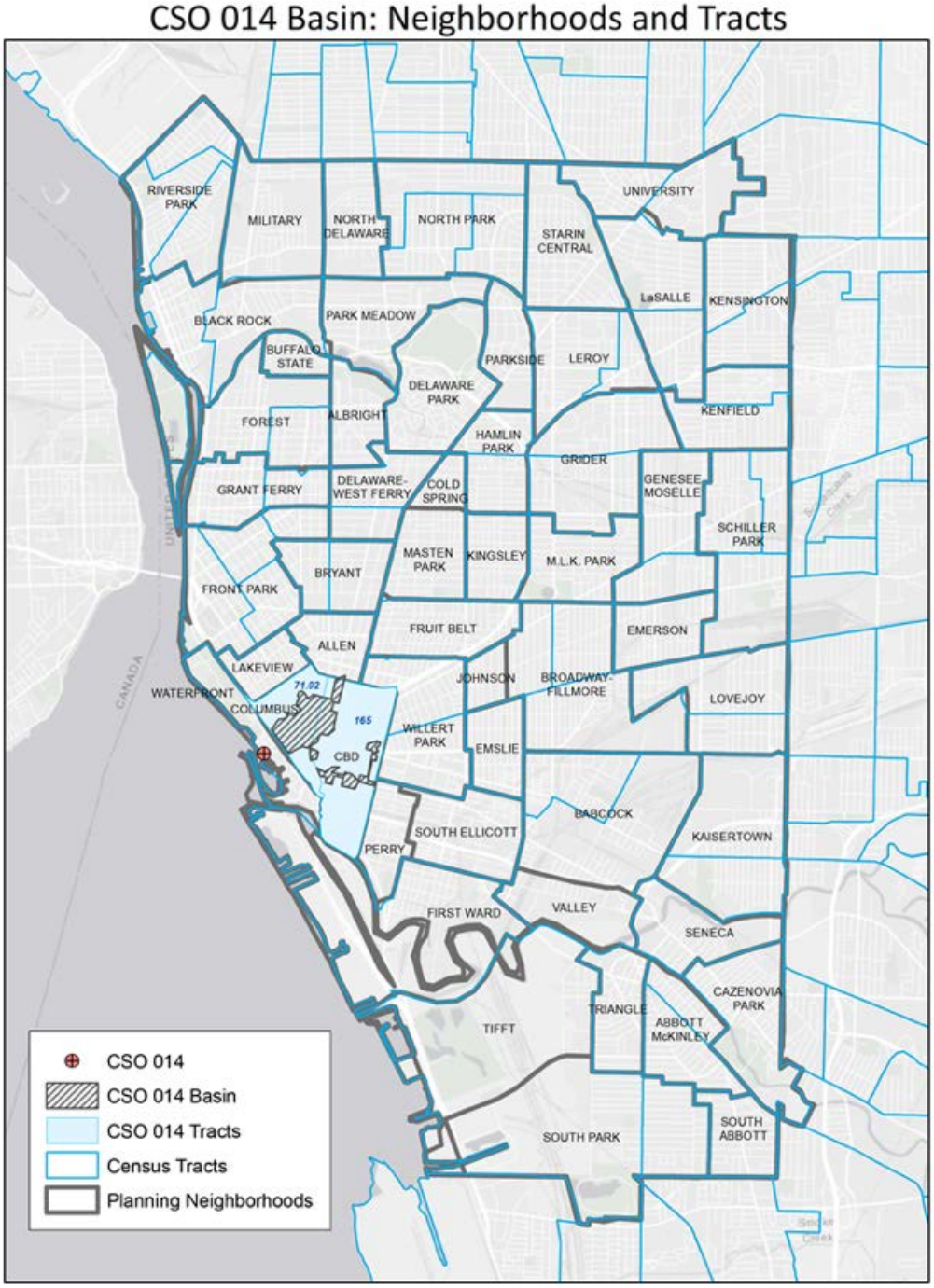
CSO Basin	Census Tract	% of Tract's Residential Addresses* in CSO Basin
CSO 14	Census Tract 71.02	24.9%
	Census Tract 165	0.0%
CSO 26	Census Tract 15	95.0%
	Census Tract 16	35.6%
	Census Tract 17	72.8%
	Census Tract 27.02	55.8%
	Census Tract 28	44.2%
	Census Tract 29	50.0%
	Census Tract 166	85.0%
CSO 27	Census Tract 163	62.5%
CSO 28	Census Tract 1.10	66.7%
	Census Tract 2	46.6%
	Census Tract 6	27.3%
	Census Tract 8	6.5%
CSO 33	Census Tract 11	13.9%
	Census Tract 19	69.6%
	Census Tract 23	57.3%
	Census Tract 24	32.7%
	Census Tract 28	55.8%
	Census Tract 29	33.6%
	Census Tract 30	98.2%
	Census Tract 167	90.5%
CSO 53	Census Tract 31	1.8%
	Census Tract 33.01	55.7%
	Census Tract 33.02	55.0%
	Census Tract 34	100.0%
	Census Tract 35	78.0%
	Census Tract 36	71.3%
	Census Tract 37	71.8%
	Census Tract 38	99.9%
	Census Tract 39.01	96.6%
	Census Tract 40.01	24.2%
	Census Tract 41	29.3%
	Census Tract 43	12.5%
	Census Tract 44.01	24.5%
	Census Tract 44.02	2.0%
	Census Tract 52.02	61.5%
	Census Tract 53	50.8%
	Census Tract 66.02	14.7%
	Census Tract 67.02	40.6%
	Census Tract 168	60.0%
	Census Tract 170	100.0%

*Note: The share of residential addresses in each census tract that fall within each sewer basin is estimated using parcel data from Erie County Department of Environment and Planning (2017) and address points from the NYS GIS Program Office, Street and Address Maintenance Program (2017). Address points within residential parcels were selected and used to estimate the total number of homes within each tract as well as the percentage of those homes in each sewer basin.

EQUITY PROFILE: CSO14

Neighborhood Context

CSO 14 basin boundaries intersect with two City of Buffalo planning neighborhoods adjacent to the central business district in downtown Buffalo, including: Columbus and Waterfront.



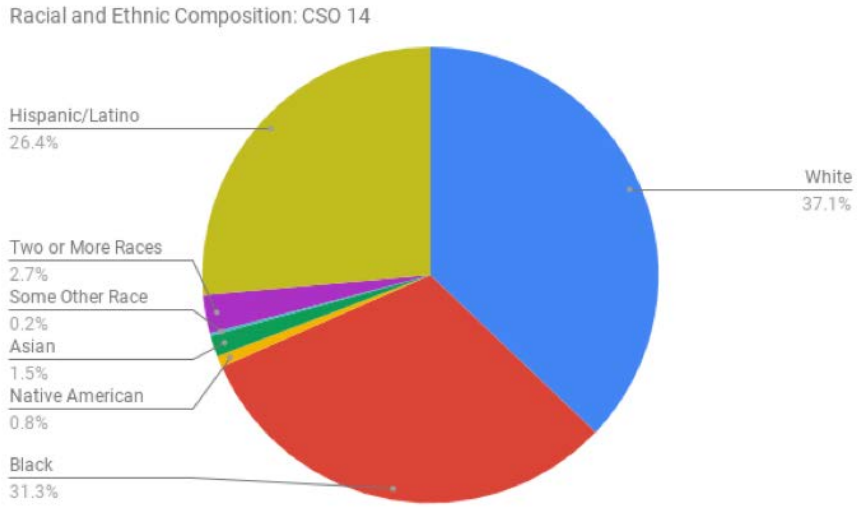
Demographics

Total Population and Age Composition

About 4,375 people live in the CSO 14 neighborhoods, representing about 1.7% of the city's total population. The percentage of residents under age 5 is on par with the city overall, at 6.9% (compared to 6.7% for the city overall). Similarly, the percentage of residents age 65 and over, 12.3%, is on par with the city overall (12.0% across the city).

Racial/Ethnic Composition and Nativity

CSO 14 neighborhoods have a diverse population. The largest racial/ethnic groups include White (37.1%), Black (31.3%), and Hispanic or Latino (26.4%). Unlike other CSO neighborhoods where there is an overwhelming majority or predominance of one particular racial or ethnic group, CSO 14 is notable for its strong representation from multiple groups. Additionally, 6.3% of residents are foreign born.



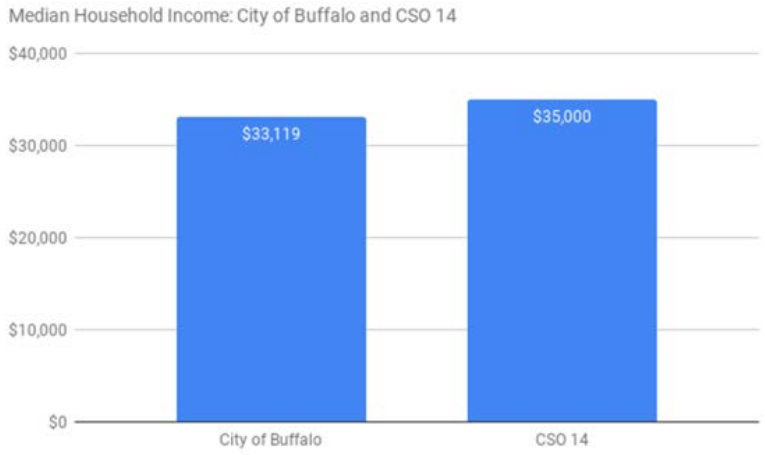
Source: U.S. Census Bureau, American Community Survey 5-Year Estimates (2012-2016)

English-Speaking Ability and Languages Spoken

Nearly one in ten households (9.3%) have limited English proficiency. One in five households (21.3%) speak Spanish, more than double the rate for households across the city. A very small percentage of residents (4.1%) speak other Indo-European languages at home.

Median Household Income

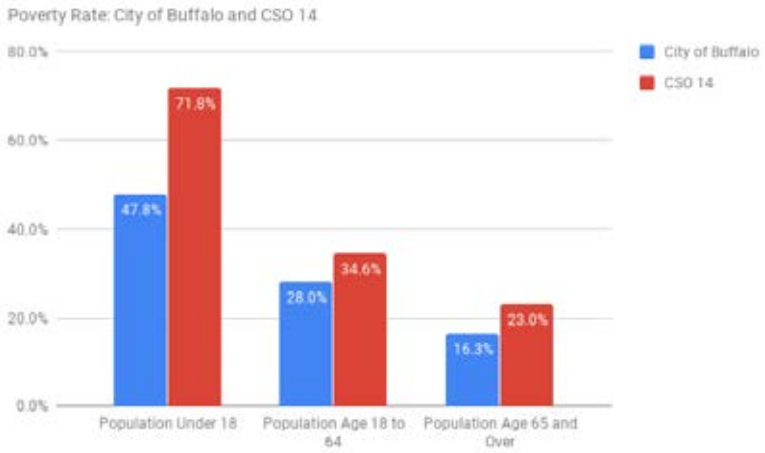
The median household income of residents living in CSO 14 neighborhoods is slightly greater than that of the city of Buffalo overall. The city median household income was $33,119 from 2012-2016, but it was $35,000 for residents in CSO 14 neighborhoods.



Source: U.S. Census Bureau, American Community Survey 5-Year Estimates (2012-2016)

Poverty Status of Households

The poverty status of households living in CSO 14 neighborhoods is higher than for the city of Buffalo overall across multiple age groups. Over 70% of children under age 18 live in poverty, as well as 35% of adults ages 18 to 64, and 23% of older adults.

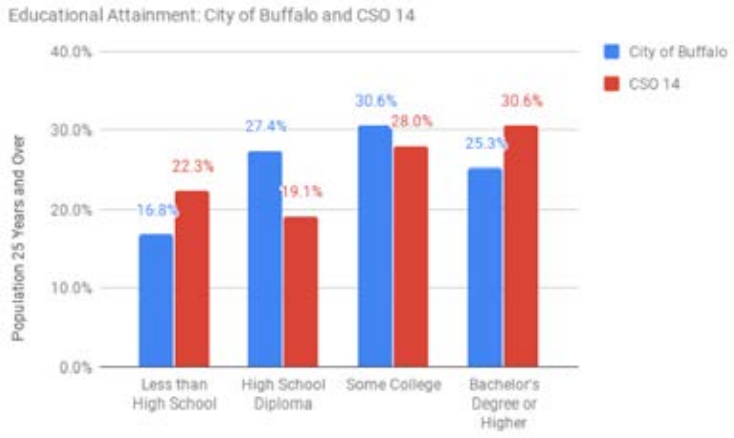


Source: U.S. Census Bureau, American Community Survey 5-Year Estimates (2012-2016)

Workforce

Educational Attainment

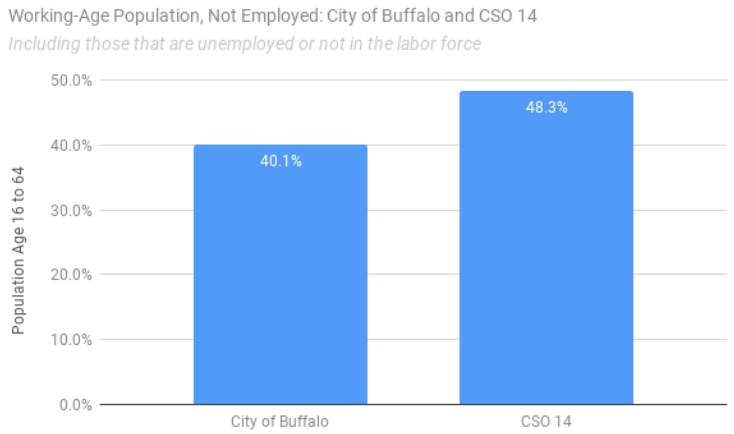
Levels of educational attainment among adults 25 years and over in CSO 14 neighborhoods are comparable to the city overall. Over half of residents in CSO 14 neighborhoods have education beyond a high school diploma, and 30.6% of residents have a bachelor's degree or higher.



Source: U.S. Census Bureau, American Community Survey 5-Year Estimates (2012-2016)

Working-Age Population, Not Employed

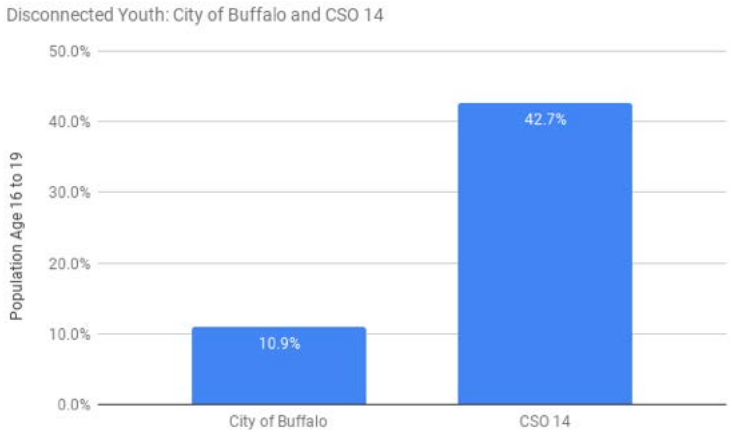
The percentage of the working-age population that is unemployed or not in the labor force is higher in CSO 14 neighborhoods compared to the city overall. Nearly half of residents ages 16 to 64 years in CSO 14 neighborhoods are not employed or in the labor force.



Source: U.S. Census Bureau, American Community Survey 5-Year Estimates (2012-2016)

Disconnected Youth

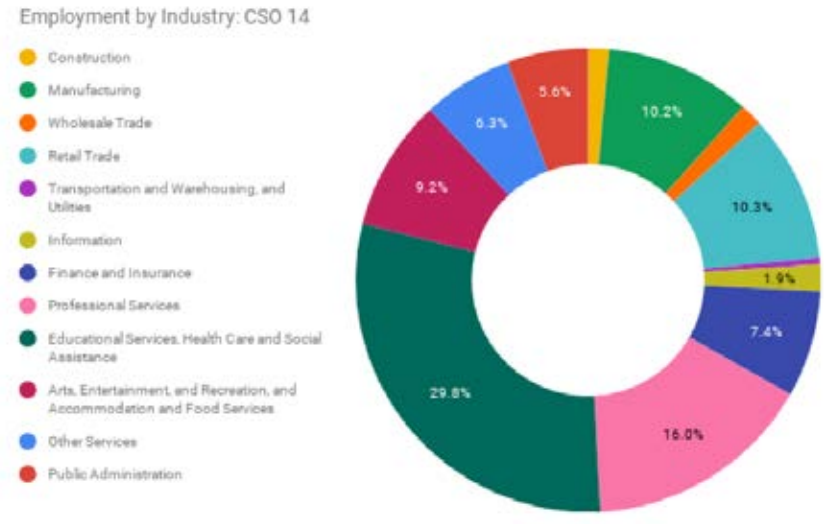
The share of disconnected youth in CSO 14 neighborhoods is extremely high, nearly four times the share across the city. About 43% of young people between the ages of 16 and 19 living in CSO 14 are not enrolled in school and not working.



Source: U.S. Census Bureau, American Community Survey 5-Year Estimates (2012-2016)

Employment by Industry

Residents living in CSO 14 neighborhoods are employed in a wide range of industry sectors. Nearly 30% of residents are employed in educational services, health care and social assistance industries. Other large industry shares include professional services (16.0%) and retail trade (10.3%).



Source: U.S. Census Bureau, American Community Survey 5-Year Estimates (2012-2016)

Public Health

Mental Health

About 15.9% of adults aged 18 years or older living in CSO 14 neighborhoods reported frequent instances of poor mental health. Mental health is an important component of health and quality of life. This proportion is on par with adults across the city overall (15.8%).

Current Asthma

About 11.4% of adults aged 18 years or older living in CSO 14 neighborhoods report having asthma, which can increase likelihood of adverse outcomes such as emergency department visits, hospitalizations, and death and result in missed school or work. This proportion is slightly lower compared to adults across the city overall (12.1%).

Physical Inactivity

About 35.6% of adults aged 18 years or older living in CSO 14 neighborhoods reported that they did not regularly participate in any physical activities or exercises. Regular physical activity can improve health and quality of life. This proportion is on par with adults across the city overall (35.1%).

Obesity

About 38.8% of adults aged 18 years or older living in CSO 14 neighborhoods reported being overweight or obese, which increases the risk for multiple chronic diseases. This proportion is slightly higher compared to adults across the city overall (37.7%).

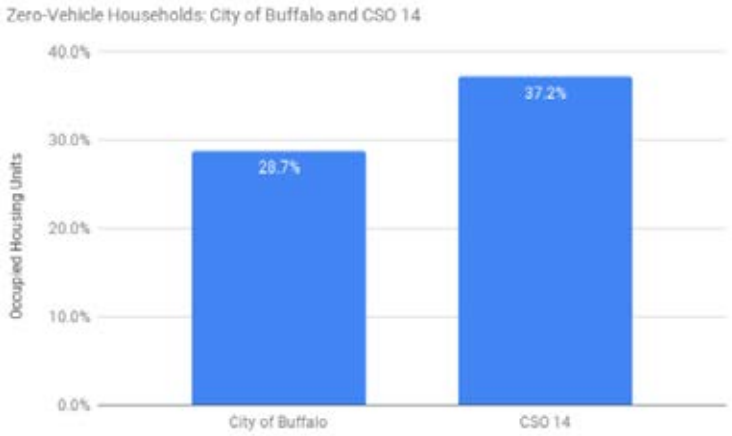
Heart Disease

About 6.2% of adults aged 18 years or older living in CSO 14 neighborhoods reported being told by a health professional that they have coronary heart disease, a leading cause of death in the United States. This proportion is slightly lower compared to adults across the city overall (6.6%).

Connectedness

Car Access

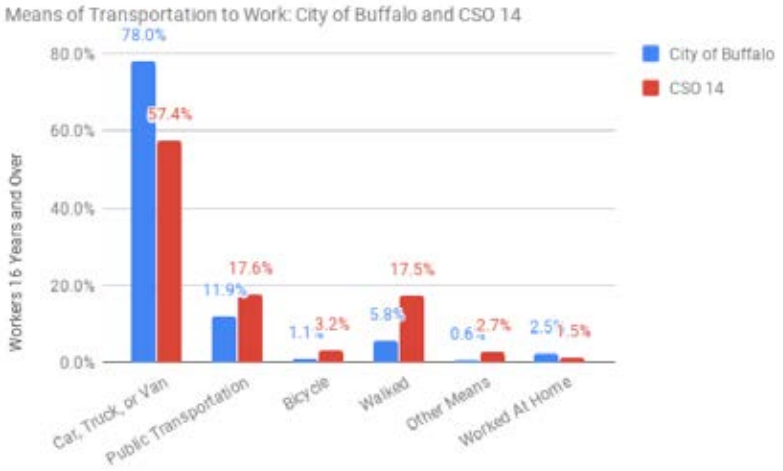
The share of households with no vehicle is greater in CSO 14 neighborhoods than across the city. About 37.2% of households in CSO 14 neighborhoods do not have access to a vehicle, compared to 28.7% of households across the city.



Source: U.S. Census Bureau, American Community Survey 5-Year Estimates (2012-2016)

Means of Transportation to Work

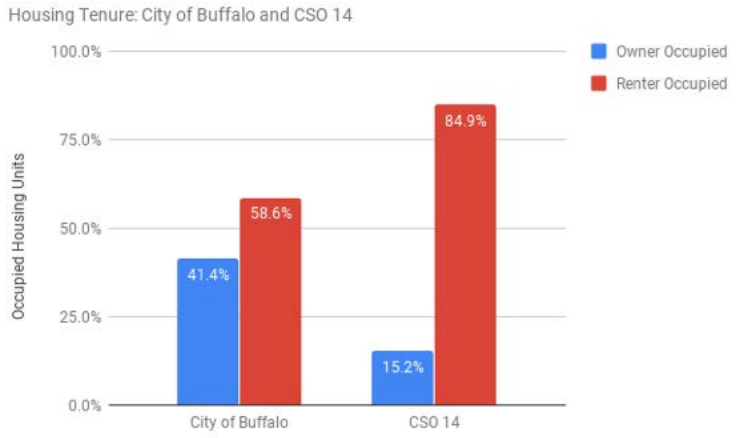
While the majority of workers (57.4%) in CSO 14 neighborhoods commute via car, significant shares of workers use public transportation (17.6%) or walk (17.5%). These trends may be partially explained by the proximity and accessibility of the transit rail system in downtown Buffalo.



Source: U.S. Census Bureau, American Community Survey 5-Year Estimates (2012-2016)

Housing Tenure

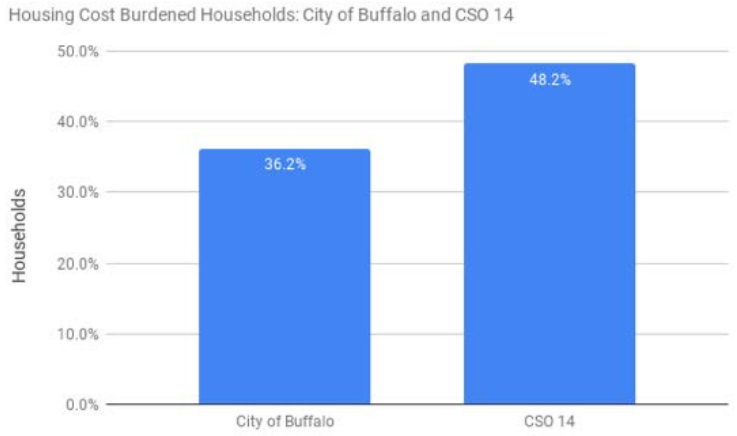
About 85% of occupied housing units in CSO 14 neighborhoods are renter occupied, which likely reflects the predominant rental housing stock in downtown Buffalo. Across the city, 41.4% of occupied housing units are owner occupied and 58.6% are renter occupied.



Source: U.S. Census Bureau, American Community Survey 5-Year Estimates (2012-2016)

Housing Cost Burden

Nearly half of the households in CSO 14 neighborhoods are housing cost burdened, spending more than 30% of their monthly income on housing costs. The share of housing cost burdened households across the city is lower at 36.2%.



Source: U.S. Census Bureau, American Community Survey 5-Year Estimates (2012-2016)

Land Use

Vacant Land

Across the city of Buffalo overall, 13.5% of land area is considered vacant. The share of land area that is vacant in CSO 14 neighborhoods is much smaller than across the city. There are 5.1 acres of vacant land in CSO 14 neighborhoods, representing 3.3% of total land acreage in the area.

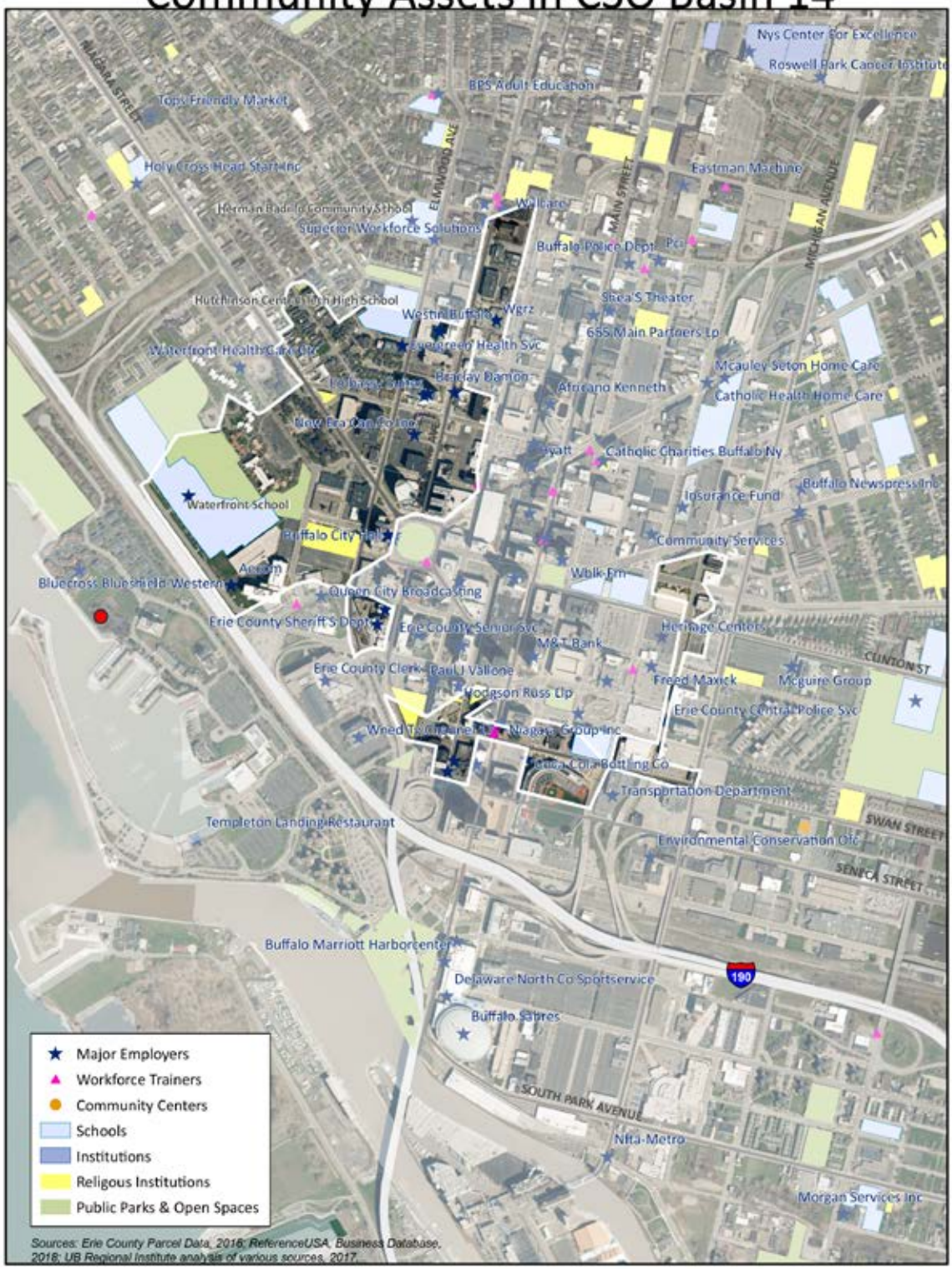
Vacancy Rates

The residential vacancy rate in CSO 14 neighborhoods is nearly half the rate for the city of Buffalo overall. The residential vacancy rate for the city is 10.0%, compared to 5.4% in CSO 14 neighborhoods. Similarly, the commercial vacancy rate in CSO 14 neighborhoods is a quarter of the rate for the city of Buffalo overall. The commercial vacancy rate for the city is 16.1%, compared to 3.9% in CSO 14 neighborhoods.

Engagement

The area is home to a mix of government offices, including Buffalo City Hall, as well as law firms and other professional services, hotels such as Embassy Suites and Westin, and restaurants. There are several schools located in the area, but overall this CSO neighborhood area has a significantly smaller share of neighborhood group and community institutions such as schools, religious buildings, and community centers.

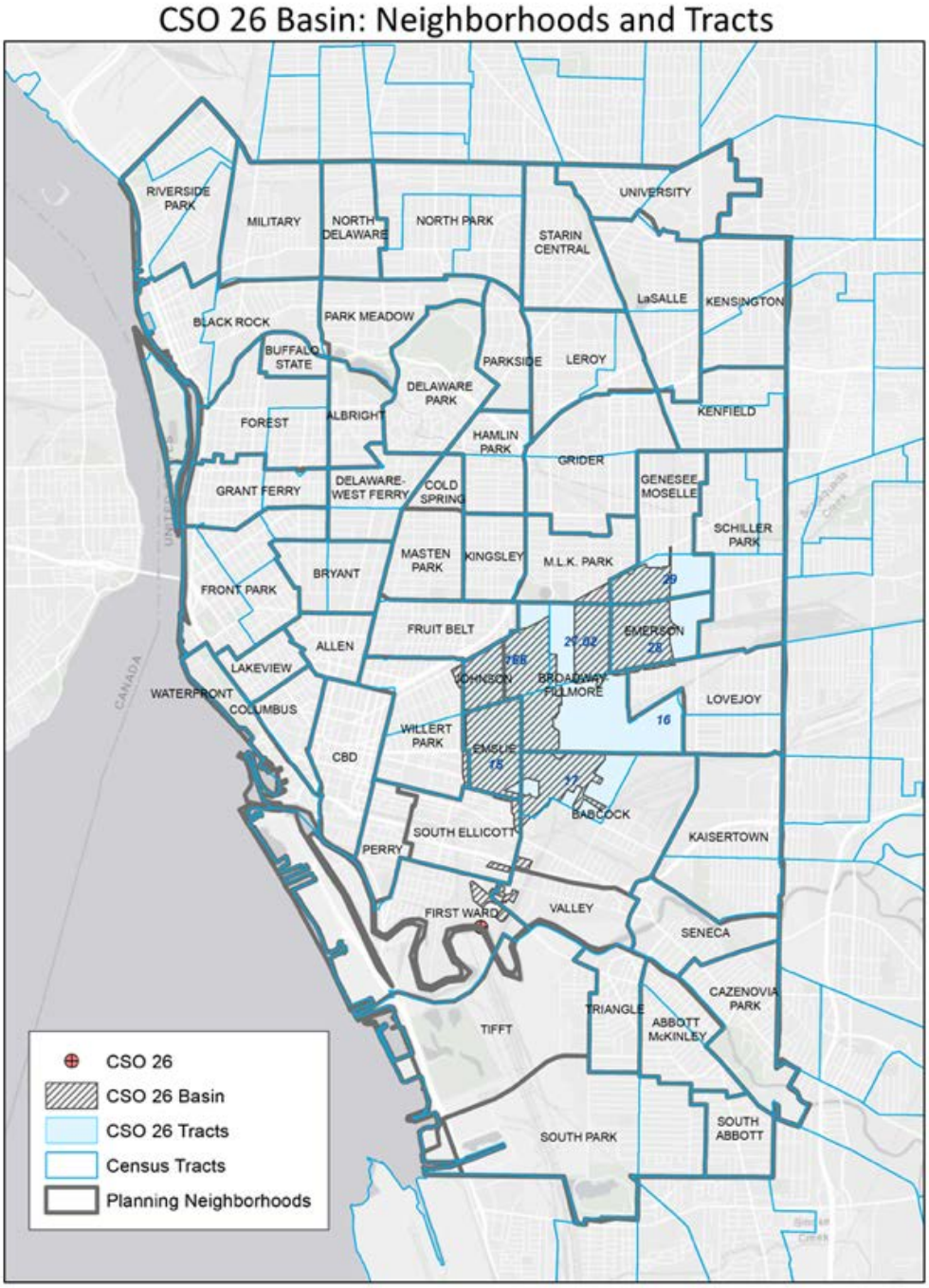
Community Assets in CSO Basin 14



EQUITY PROFILE: CSO26

Neighborhood Context

CSO 26 basin boundaries intersect with several neighborhoods in East and South Buffalo centered around the Broadway-Fillmore neighborhood, including Emslie, Johnson, Emerson, Genesee Moselle, Babcock, and parts of First Ward and Valley.



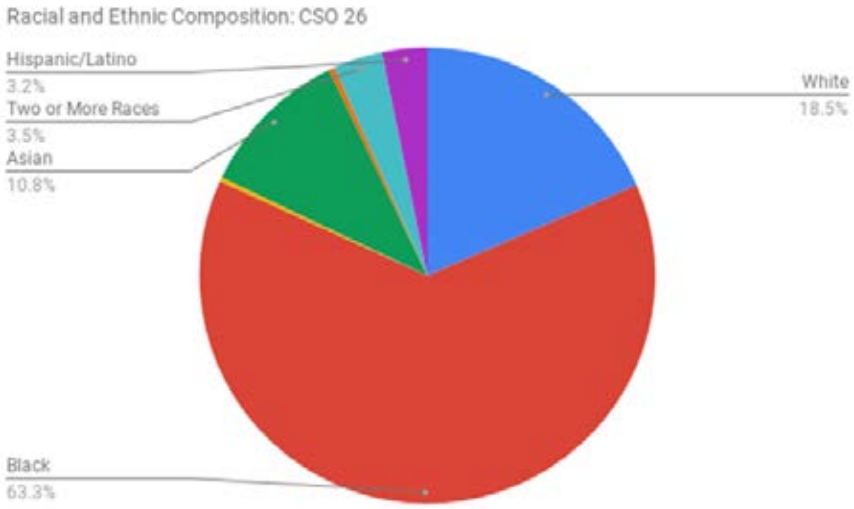
Demographics

Total Population and Age Composition

About 14,349 people live in the CSO 26 neighborhoods, representing about 5.5% of the city's total population. The percentage of residents under age 5 is on par with the city overall, at 7.0% (compared to 6.7% for the city overall). Similarly, the percentage of residents age 65 and over, 11.6%, is on par with the city overall (12.0% across the city).

Racial/Ethnic Composition and Nativity

The majority of residents living in CSO 26 neighborhoods are Black (63.3%). However, 18.5% of residents are White, and 10.8% of residents are Asian. Additionally, 11.4% of residents are foreign born.



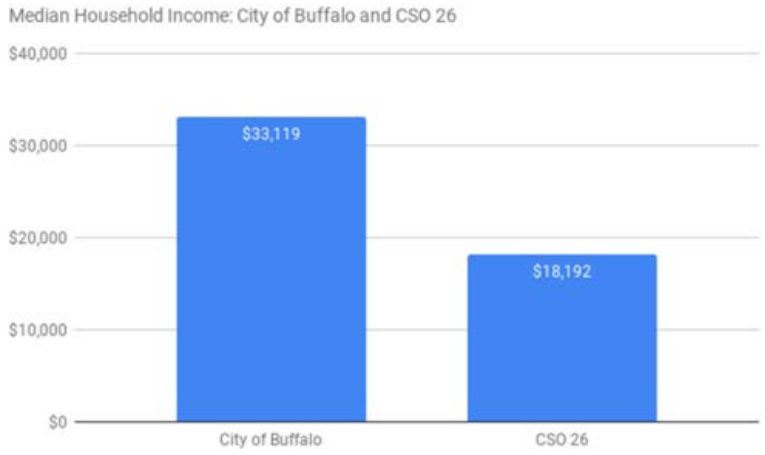
Source: U.S. Census Bureau, American Community Survey 5-Year Estimates (2012-2016)

English-Speaking Ability and Languages Spoken

6.2% of households living in CSO 26 neighborhoods report limited English proficiency. About 12.2% of households in CSO 26 neighborhoods speak Spanish or other Indo-European languages at home.

Median Household Income

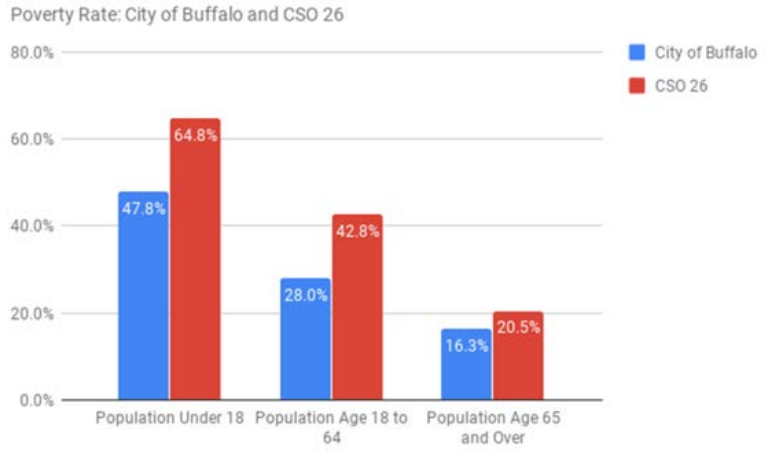
The median household income of residents living in CSO 26 neighborhoods is nearly half that of the city of Buffalo overall. The city median household income was $33,119 from 2012-2016, but it was $18,192 for residents in CSO 26 neighborhoods.



Source: U.S. Census Bureau, American Community Survey 5-Year Estimates (2012-2016)

Poverty Status of Households

The poverty status of households living in CSO 26 neighborhoods is higher than for the city of Buffalo overall. Nearly two thirds of children under age 18 in CSO 26 neighborhoods live in poverty, in addition to 43% of adults ages 18 to 64, and 21% of older adults.

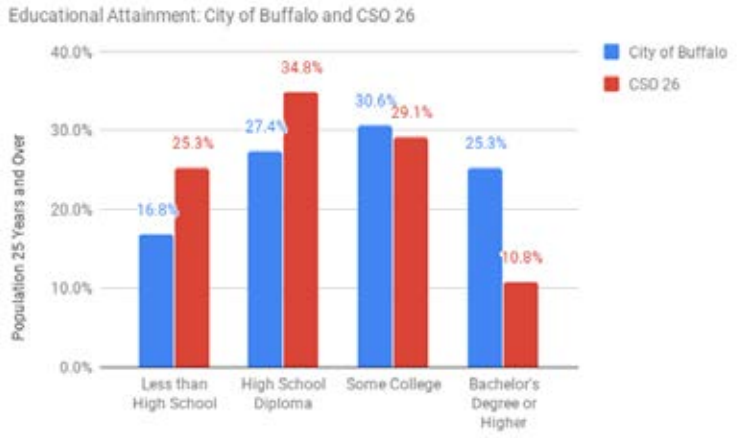


Source: U.S. Census Bureau, American Community Survey 5-Year Estimates (2012-2016)

Workforce

Educational Attainment

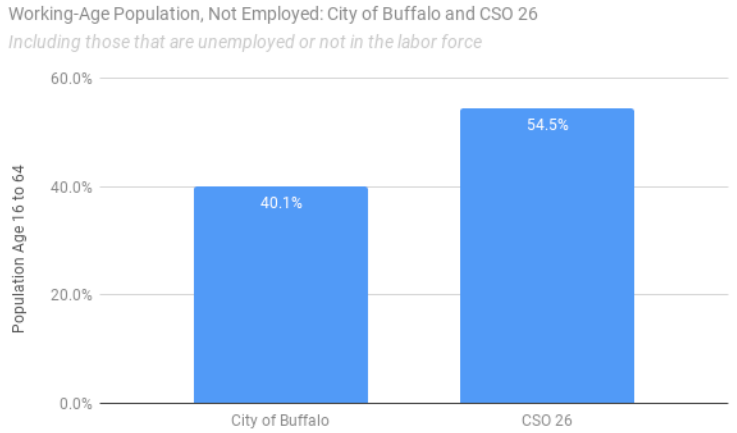
Levels of educational attainment among adults 25 years and over in CSO 26 neighborhoods are comparable to the city of Buffalo overall. About 40% of residents in CSO 26 neighborhoods have education beyond a high school diploma, and 10.8% of residents have a bachelor's degree or higher.



Source: U.S. Census Bureau, American Community Survey 5-Year Estimates (2012-2016)

Working-Age Population, Not Employed

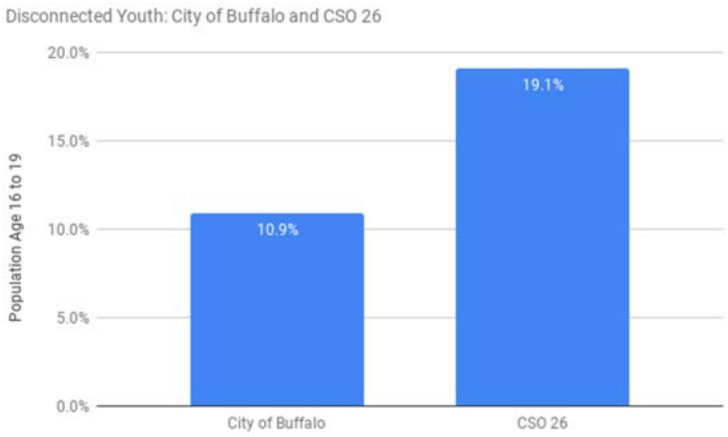
The percentage of the working-age population that is unemployed or not in the labor force is significantly higher in CSO 26 neighborhoods compared to the city overall. Over half of residents ages 16 to 64 years in CSO 26 neighborhoods are not employed or in the labor force.



Source: U.S. Census Bureau, American Community Survey 5-Year Estimates (2012-2016)

Disconnected Youth

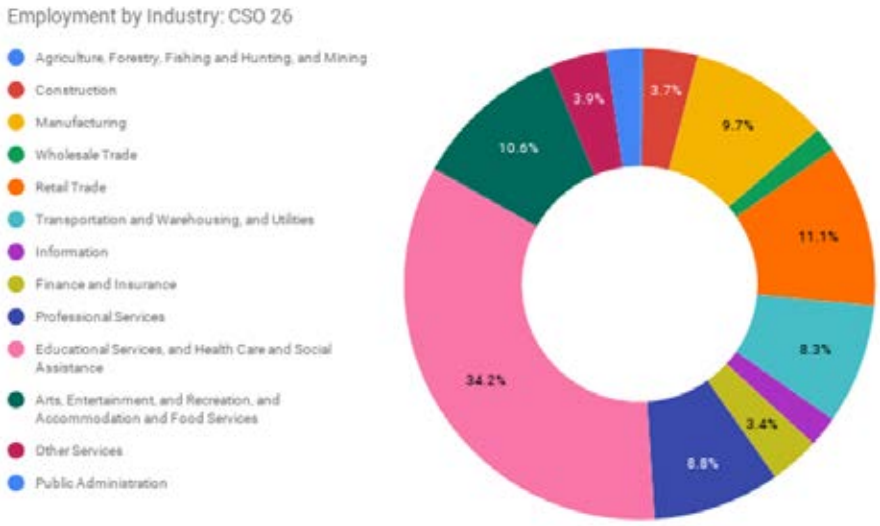
The share of disconnected youth in CSO 26 neighborhoods is higher than the share across the city. The share of youth ages 16 to 19 that are not enrolled in school or working is 10.9% across the city, compared to 19.1% in CSO 26 neighborhoods.



Source: U.S. Census Bureau, American Community Survey 5-Year Estimates (2012-2016)

Employment by Industry

Residents living in CSO 26 neighborhoods are employed in a wide range of industry sectors. More than a third of workers are employed in educational and health services (34.2%), followed by retail trade (11.1%), arts, accommodation and food services (10.6%), and manufacturing (9.7%).



Source: U.S. Census Bureau, American Community Survey 5-Year Estimates (2012-2016)

Public Health

Mental Health

About 19.1% of adults aged 18 years or older living in CSO 26 neighborhoods reported frequent instances of poor mental health. Mental health is an important component of health and quality of life. This proportion is higher compared to adults across the city overall (15.8%).

Current Asthma

About 14.0% of adults aged 18 years or older living in CSO 26 neighborhoods report having asthma, which can increase likelihood of adverse outcomes such as emergency department visits, hospitalizations, and death and result in missed school or work. This proportion is higher compared to adults across the city overall (12.1%).

Physical Inactivity

Nearly 44% of adults aged 18 years or older living in CSO 26 neighborhoods reported that they did not regularly participate in any physical activities or exercises. Regular physical activity can improve health and quality of life. This proportion is higher compared to adults across the city overall (35.1%).

Obesity

About 46% of adults aged 18 years or older living in CSO 26 neighborhoods reported being overweight or obese, which increases the risk for multiple chronic diseases. This proportion is higher compared to adults across the city overall (37.7%).

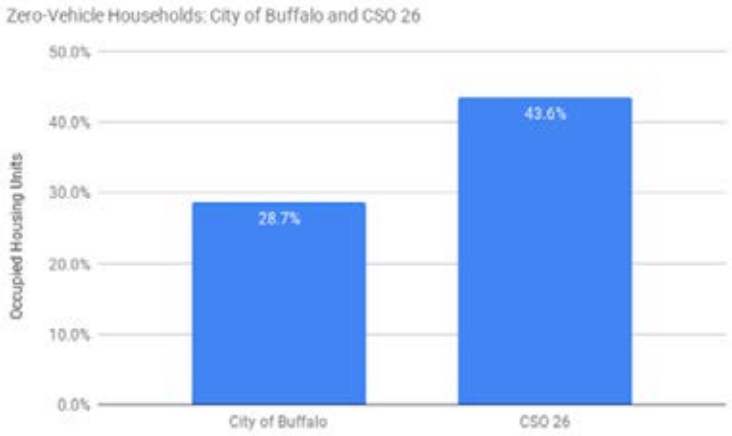
Heart Disease

About 8.8% of adults aged 18 years or older living in CSO 26 neighborhoods reported being told by a health professional that they have coronary heart disease, a leading cause of death in the United States. This proportion is higher compared to adults across the city overall (6.6%).

Connectedness

Car Access

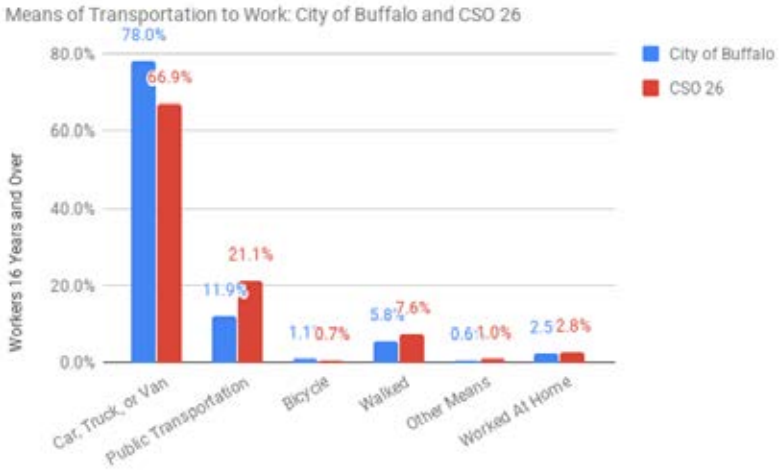
The share of zero-vehicle households is significantly higher in CSO 26 neighborhoods than across the city. About 43.6% of households in CSO 26 neighborhoods do not have access to a vehicle, compared to 28.7% of households across the city.



Source: U.S. Census Bureau, American Community Survey 5-Year Estimates (2012-2016)

Means of Transportation to Work

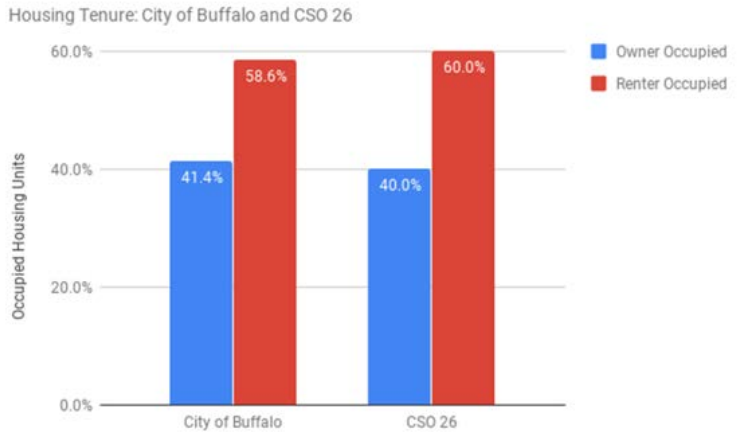
The majority of workers living in CSO 26 neighborhoods commute to work via car, at a rate slightly lower than the city overall. Across the city, 78.0% of workers commute via car, compared to 66.9% for workers in CSO 26 neighborhoods. Additionally, about 21.1% of workers in CSO 26 neighborhoods commute via public transit and 7.6% walk to work.



Source: U.S. Census Bureau, American Community Survey 5-Year Estimates (2012-2016)

Housing Tenure

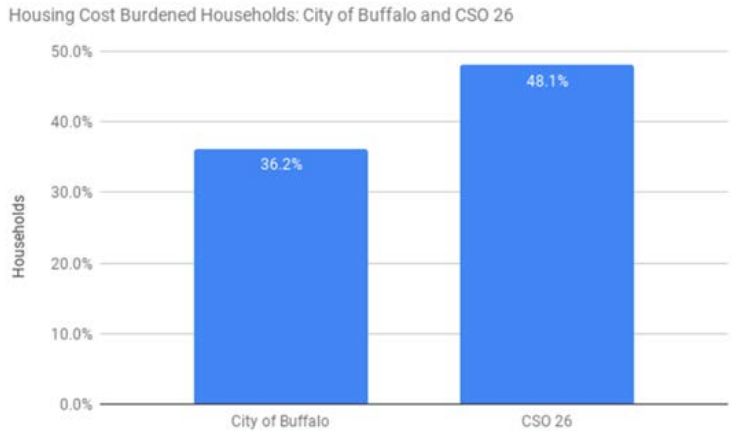
The majority of occupied housing units in CSO 26 neighborhoods are renter occupied, at a share that is significantly higher than for the city of Buffalo overall. Across the city, 58.6% of occupied housing units are renter occupied, compared to 60.0% for housing units in CSO 26 neighborhoods.



Source: U.S. Census Bureau, American Community Survey 5-Year Estimates (2012-2016)

Housing Cost Burden

The share of housing cost burdened households in CSO 26 neighborhoods is higher than the share across the city. The share of housing cost burdened households across the city is 36.2%, compared to 48.1% in CSO 26 neighborhoods.



Source: U.S. Census Bureau, American Community Survey 5-Year Estimates (2012-2016)

Land Use

Vacant Land

Across the city of Buffalo overall, 13.5% of land area is considered vacant. The share of land area that is vacant in CSO 26 neighborhoods is more than double the share across the city. There are 386.1 acres of vacant land in CSO 26 neighborhoods, representing 29.9% of total land acreage in the area.

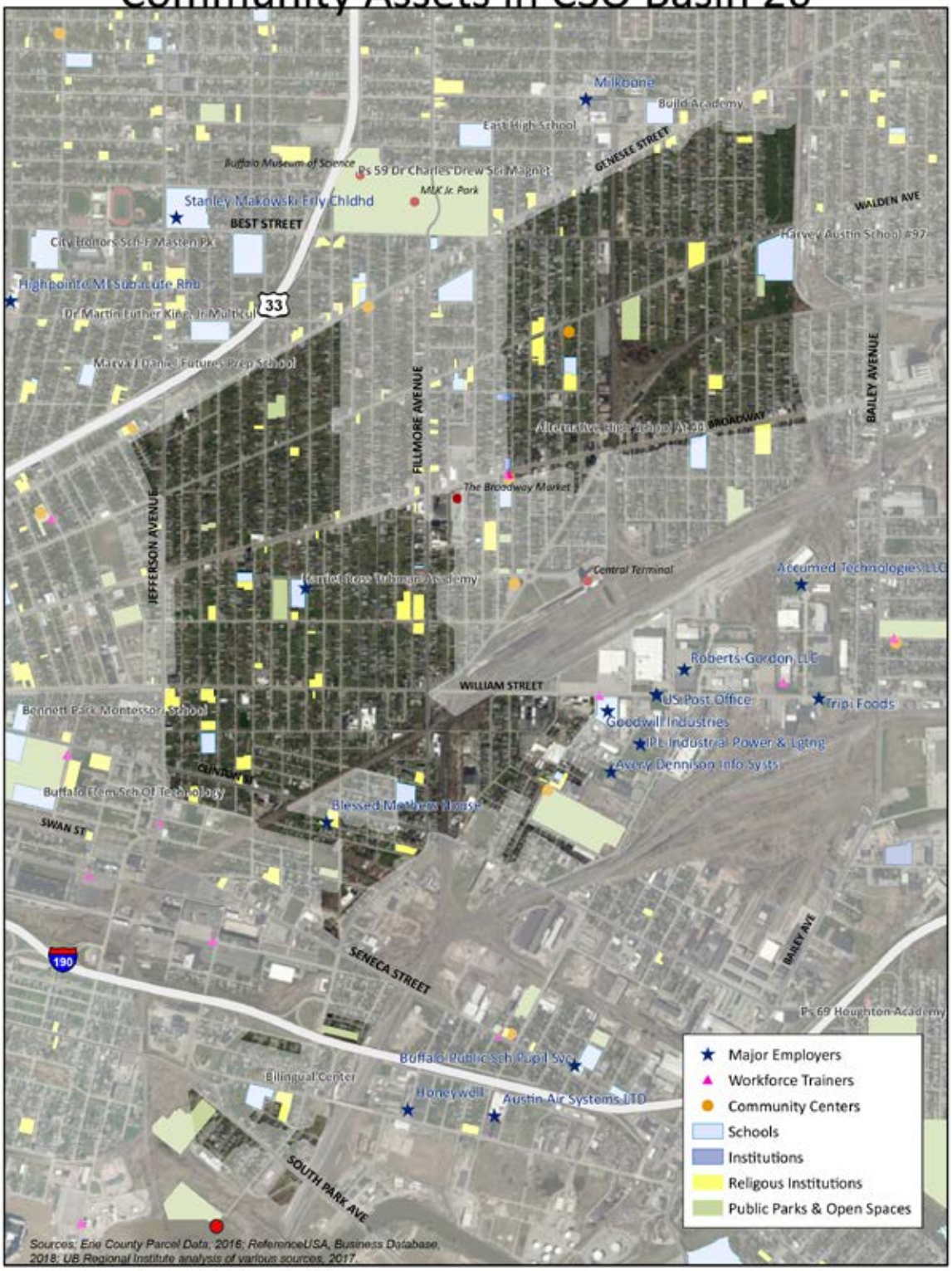
Vacancy Rates

The residential vacancy rate in CSO 26 neighborhoods is slightly higher than the rate for the city of Buffalo overall. The residential vacancy rate for the city is 10.0%, compared to 13.7% in CSO 26 neighborhoods. However, the commercial vacancy rate in CSO 26 neighborhoods is lower than the rate for the city of Buffalo overall. The commercial vacancy rate for the city is 16.1%, compared to 14.4% in CSO 26 neighborhoods.

Engagement

CSO 26 neighborhoods are predominantly residential areas with major commercial corridors like Broadway and Fillmore, and community amenities including parks, schools, and religious institutions. The overall area is also home to several regional assets, most notably the Broadway Market (Buffalo's public market), Buffalo Museum of Science, MLK Jr. Park, and Buffalo Central Terminal.

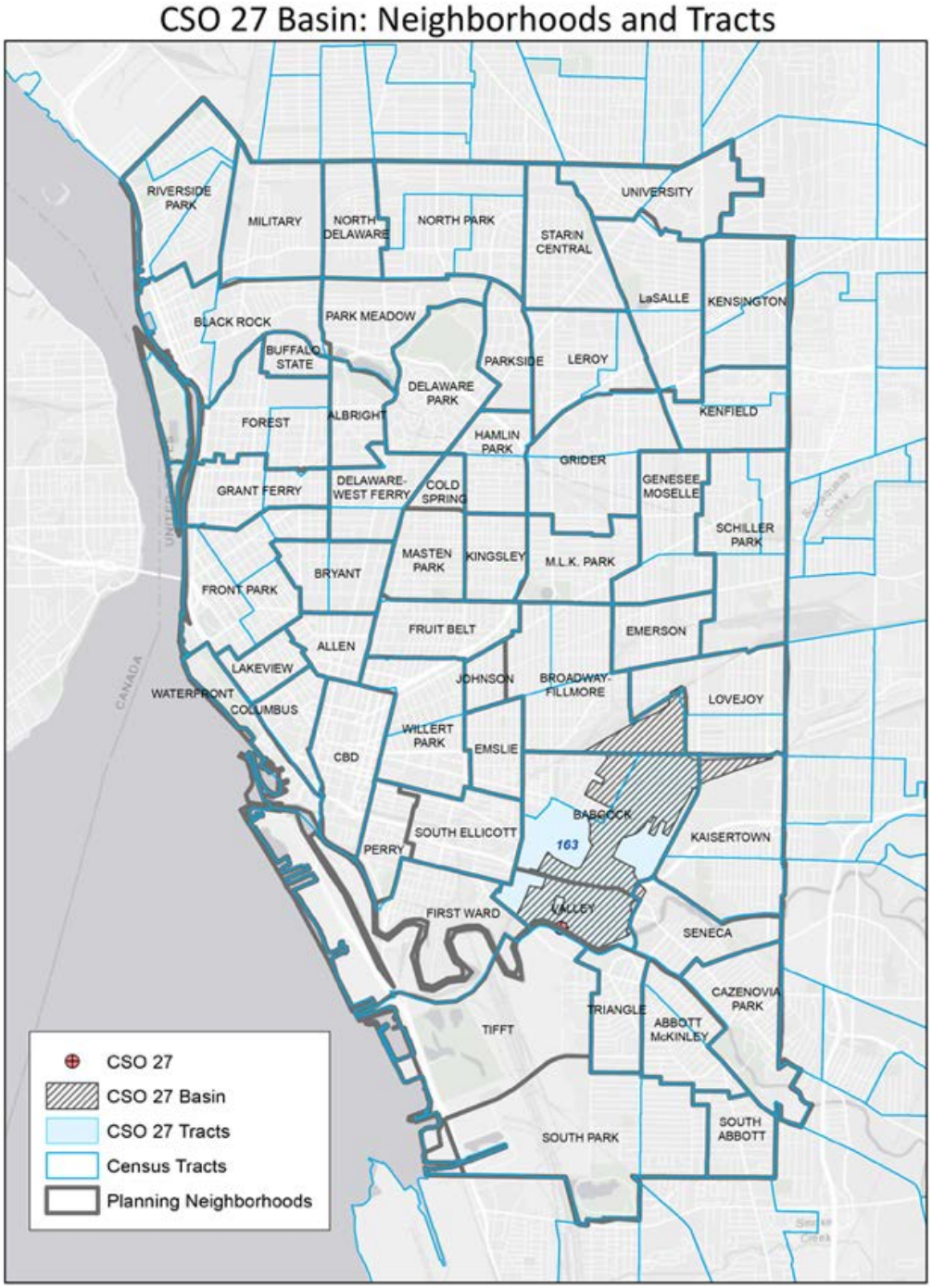
Community Assets in CSO Basin 26



EQUITY PROFILE: CSO27

Neighborhood Context

CSO 27 basin boundaries intersect with a small cluster of neighborhoods in Southeast Buffalo, including: Babcock, Kaisertown, Valley, and Broadway-Fillmore.



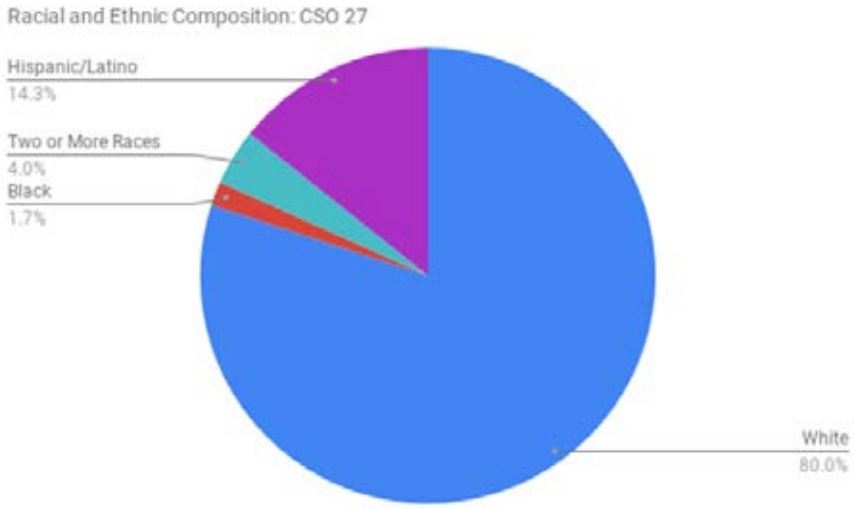
Demographics

Total Population and Age Composition

About 2,425 people live in the CSO 27 neighborhoods, representing less than 1% of the city's total population. The percentage of residents under age 5 is on par with the city overall, at 7.4% (compared to 6.7% for the city overall). The percentage of residents age 65 and over, 7.7%, is relatively lower than the share across the city (12.0%).

Racial/Ethnic Composition and Nativity

The majority of residents living in CSO 27 neighborhoods are White (80.0%). However, 14.3% of residents are Hispanic or Latino, and 4.0% of residents are two or more races. Additionally, less than 1.0% of residents are foreign born.



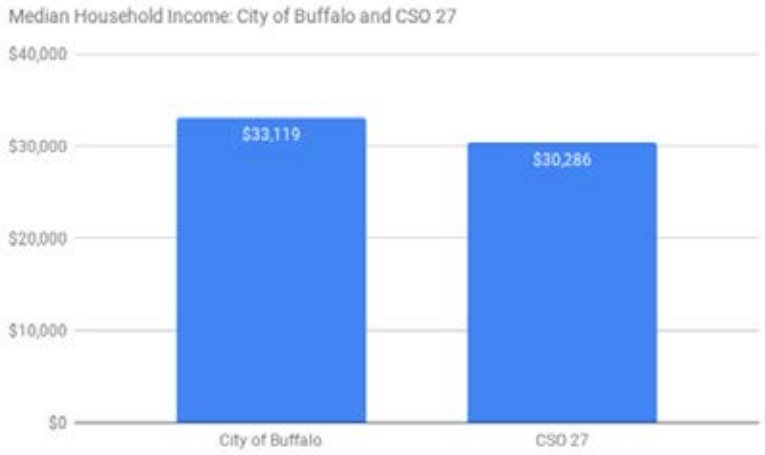
Source: U.S. Census Bureau, American Community Survey 5-Year Estimates (2012-2016)

English-Speaking Ability and Languages Spoken

Almost no households living in CSO 27 neighborhoods report limited English proficiency. About 5.0% of households in CSO 27 neighborhoods speak Spanish at home, but there are relatively few languages outside of English reported by households in the area compared to the city overall.

Median Household Income

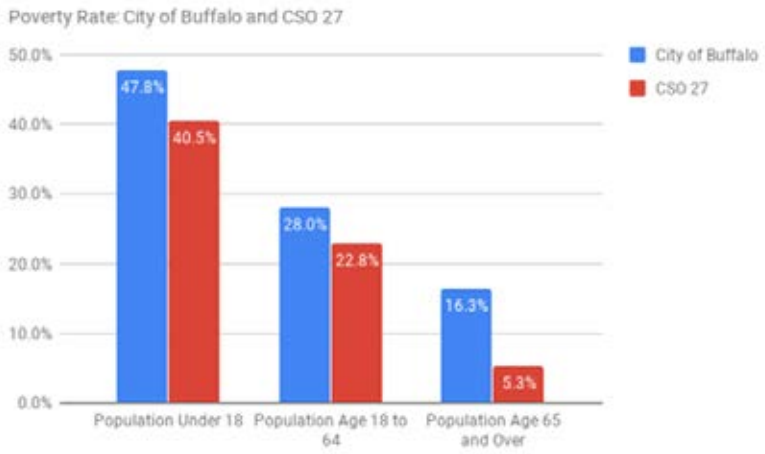
The median household income of residents living in CSO 27 neighborhoods is slightly lower than that of the city of Buffalo overall. The city median household income was $33,119 from 2012-2016, but it was $30,286 for households in CSO 27 neighborhoods.



Source: U.S. Census Bureau, American Community Survey 5-Year Estimates (2012-2016)

Poverty Status of Households

The poverty status of households living in CSO 27 neighborhoods is lower than for the city of Buffalo overall, but is still high compared to the region and nation. Over 40% of children under age 18 in CSO 27 neighborhoods live in poverty, in addition to 23% of adults ages 18 to 64, and 5% of older adults.

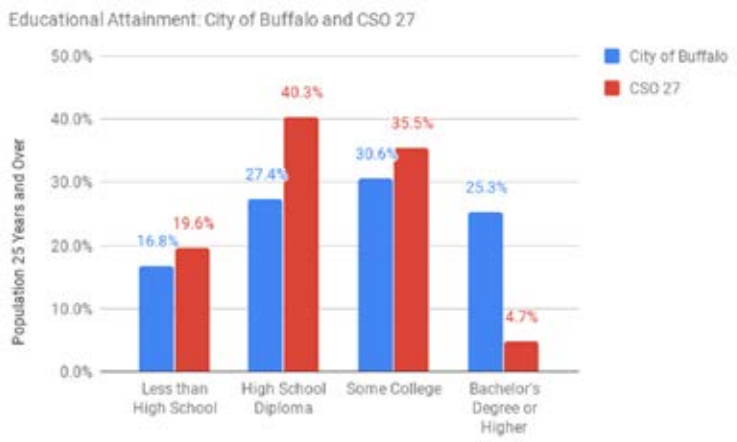


Source: U.S. Census Bureau, American Community Survey 5-Year Estimates (2012-2016)

Workforce

Educational Attainment

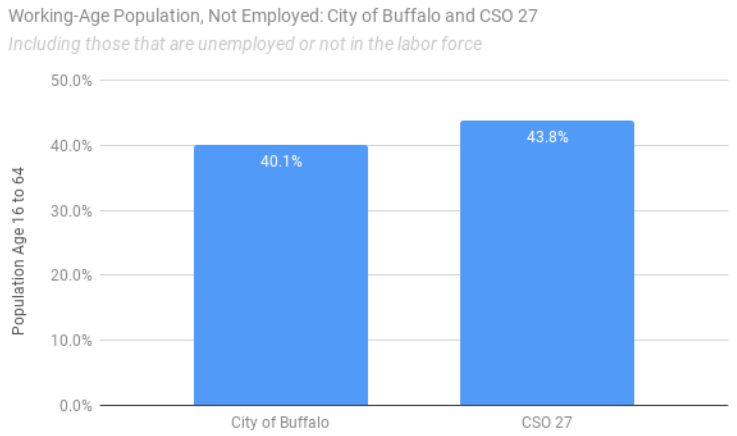
Levels of educational attainment among adults 25 years and over in CSO 27 neighborhoods are comparable to the city of Buffalo overall. About 40% of residents in CSO 27 neighborhoods have education beyond a high school diploma, but only 4.7% of residents have a bachelor's degree or higher.



Source: U.S. Census Bureau, American Community Survey 5-Year Estimates (2012-2016)

Working-Age Population, Not Employed

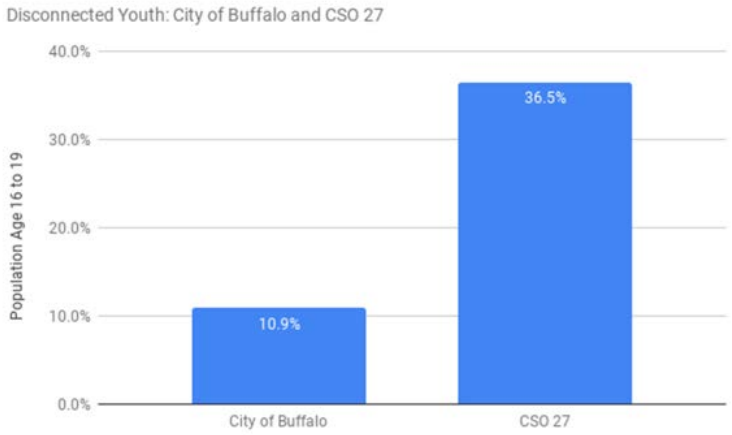
The percentage of the working-age population that is unemployed or not in the labor force is slightly higher in CSO 27 neighborhoods compared to the city overall. The share of the working-age population (age 16 to 64) in CSO 27 neighborhoods that is not employed or not in the labor force is 43.8%, compared to 40.1% of residents across the city.



Source: U.S. Census Bureau, American Community Survey 5-Year Estimates (2012-2016)

Disconnected Youth

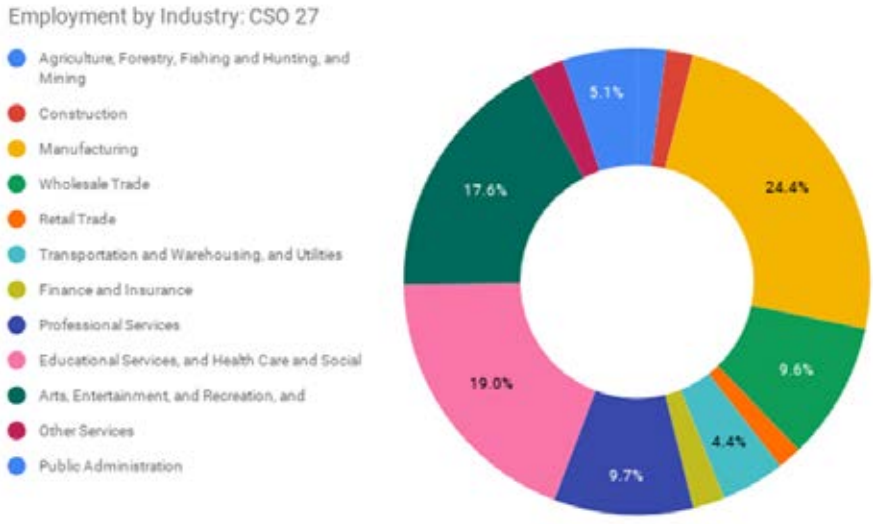
The share of disconnected youth in CSO 27 neighborhoods is significantly higher than the share across the city. The share of youth ages 16 to 19 that are not enrolled in school or working is 10.9% across the city, compared to 36.5% in CSO 27 neighborhoods.



Source: U.S. Census Bureau, American Community Survey 5-Year Estimates (2012-2016)

Employment by Industry

Residents living in CSO 27 neighborhoods are employed in a wide range of industry sectors. About a quarter of workers are employed in manufacturing (24.4%), followed by educational and health services (19.0%), arts, accommodation and food services (17.6%), and professional services (9.7%).



Source: U.S. Census Bureau, American Community Survey 5-Year Estimates (2012-2016)

Public Health

Mental Health

About 19.1% of adults aged 18 years or older living in CSO 27 neighborhoods reported frequent instances of poor mental health. Mental health is an important component of health and quality of life. This proportion is slightly higher compared to adults across the city overall (15.8%).

Current Asthma

About 12.5% of adults aged 18 years or older living in CSO 27 neighborhoods report having asthma, which can increase likelihood of adverse outcomes such as emergency department visits, hospitalizations, and death and result in missed school or work. This proportion is slightly higher compared to adults across the city overall (12.1%).

Physical Inactivity

About 39.3% of adults aged 18 years or older living in CSO 27 neighborhoods reported that they did not regularly participate in any physical activities or exercises. Regular physical activity can improve health and quality of life. This proportion is slightly higher compared to adults across the city overall (35.1%).

Obesity

About 38.7% of adults aged 18 years or older living in CSO 27 neighborhoods reported being overweight or obese, which increases the risk for multiple chronic diseases. This proportion is slightly higher compared to adults across the city overall (37.7%).

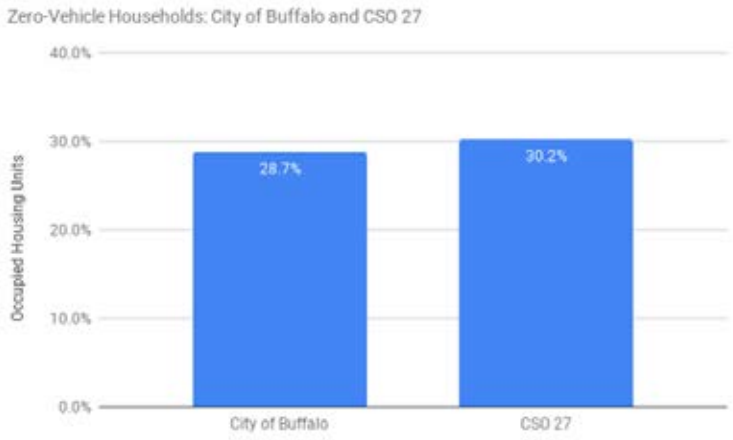
Heart Disease

About 7.6% of adults aged 18 years or older living in CSO 27 neighborhoods reported being told by a health professional that they have coronary heart disease, a leading cause of death in the United States. This proportion is slightly higher compared to adults across the city overall (6.6%).

Connectedness

Car Access

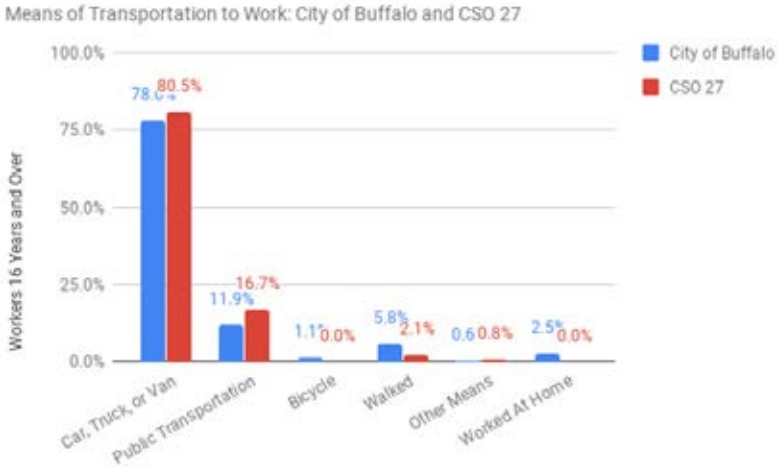
The share of zero-vehicle households in CSO 27 neighborhoods is on par with the share across the city. About 30.2% of households in CSO 27 neighborhoods do not have access to a vehicle, compared to 28.7% of households across the city.



Source: U.S. Census Bureau, American Community Survey 5-Year Estimates (2012-2016)

Means of Transportation to Work

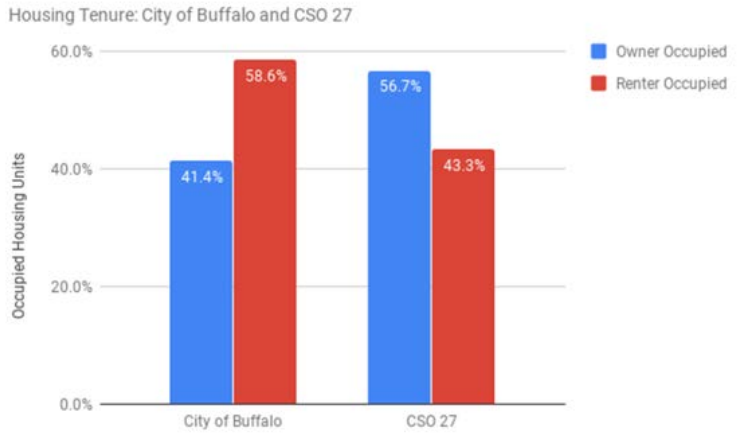
The majority of workers living in CSO 27 neighborhoods commute to work via car, at a rate slightly higher than the city overall. Across the city, 78.0% of workers commute via car, compared to 80.5% for workers in CSO 27 neighborhoods. Additionally, about 16.7% of workers in CSO 27 neighborhoods commute via public transit.



Source: U.S. Census Bureau, American Community Survey 5-Year Estimates (2012-2016)

Housing Tenure

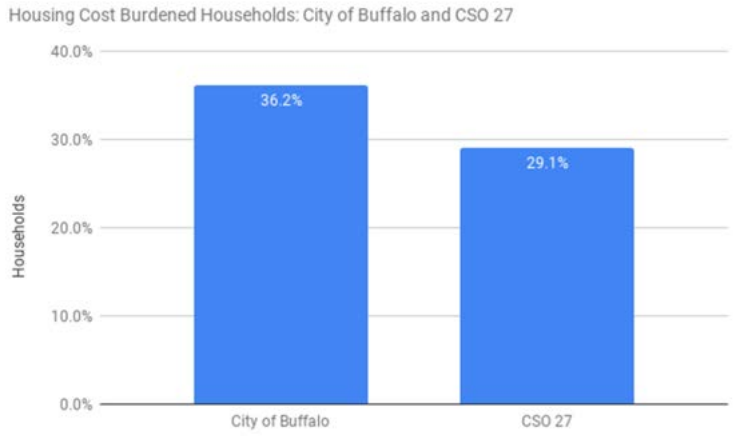
The majority of occupied housing units in CSO 27 neighborhoods are owner occupied, at a share that is higher than for the city of Buffalo overall. Across the city, 41.4% of occupied housing units are owner occupied, compared to 56.7% for housing units in CSO 27 neighborhoods.



Source: U.S. Census Bureau, American Community Survey 5-Year Estimates (2012-2016)

Housing Cost Burden

The share of housing cost burdened households in CSO 27 neighborhoods is lower than the share across the city. The share of housing cost burdened households across the city is 36.2%, compared to 29.1% in CSO 27 neighborhoods.



Source: U.S. Census Bureau, American Community Survey 5-Year Estimates (2012-2016)

Land Use

Vacant Land

Across the city of Buffalo overall, 13.5% of land area is considered vacant. The share of land area that is vacant in CSO 27 neighborhoods is greater than across the city. There are 142.0 acres of vacant land in CSO 27 neighborhoods, representing 15.4% of total land acreage in the area.

Vacancy Rates

The residential vacancy rate in CSO 27 neighborhoods is significantly higher than the rate for the city of Buffalo overall. The residential vacancy rate for the city is 10.0%, compared to 16.0% in CSO 27 neighborhoods. Similarly, the commercial vacancy rate in CSO 27 neighborhoods is significantly higher than the rate for the city of Buffalo overall. The commercial vacancy rate for the city is 16.1%, compared to 24.3% in CSO 27 neighborhoods.

Engagement

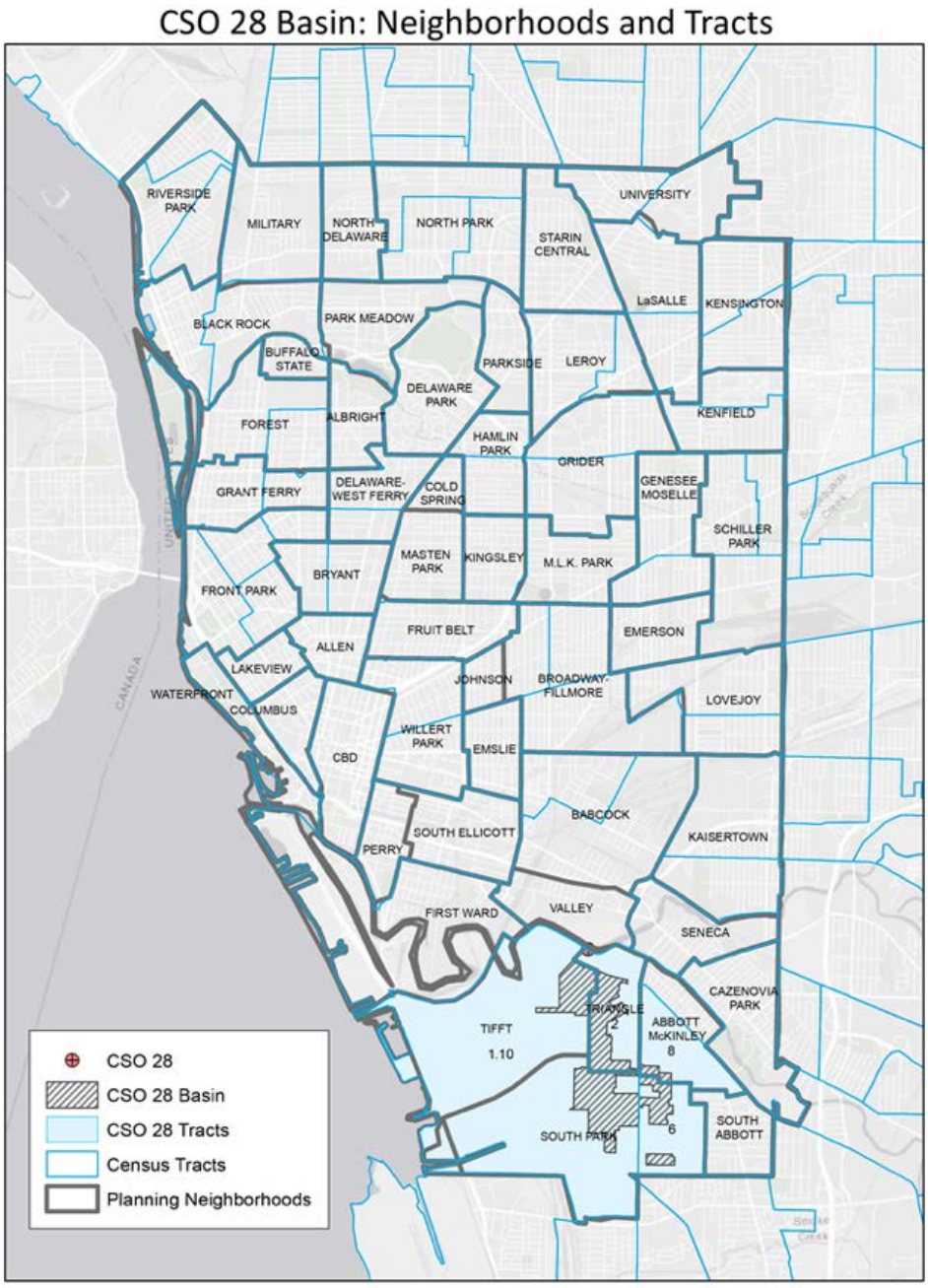
CSO 27 neighborhoods are dominated by large industrial land uses and truck traffic characteristic of wholesale trade. Major employers include Goodwill Industries, U.S. Postal Service, Tripi Foods, Industrial Power and Lighting, and Flexo Transparent. There is a small residential community and some community landmarks and amenities such as Buffalo Central Terminal to the north, Franczyk Park and Hennepin Park. However, natural and built barriers contribute to the geographic isolation of the small residential community in this area, including the predominant industrial land uses and the proximity of railroads, highways, and the Buffalo River at its southern edge.

Community Assets in CSO Basin 27

EQUITY PROFILE: CSO28

Neighborhood Context

CSO 28 basin boundaries intersect with several City of Buffalo planning neighborhoods in South Buffalo, including: Abbott McKinley, South Abbott, South Park, Tifft, and Triangle.



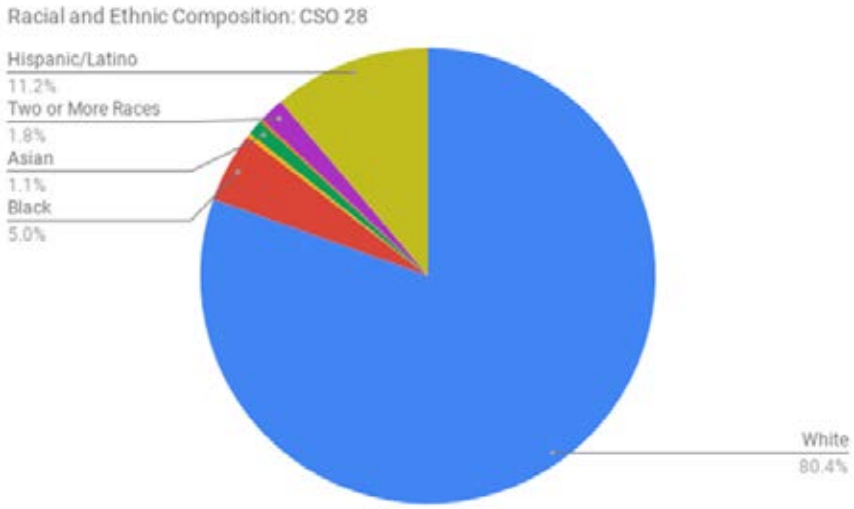
Demographics

Total Population and Age Composition

About 16,369 people live in the CSO 28 neighborhoods, representing about 6.3% of the city's total population. The percentage of residents under age 5 is on par with the city overall, at 6.4% (compared to 6.7% for the city overall). Similarly, the percentage of residents age 65 and over, 13.6%, is on par with the city overall (12.0% across the city).

Racial/Ethnic Composition and Nativity

The overwhelming majority of residents living in CSO 28 neighborhoods are White (80.4%). However, 11.2% of residents are Hispanic or Latino, and 5.0% of residents are Black. Additionally, 3.5% of residents are foreign born.



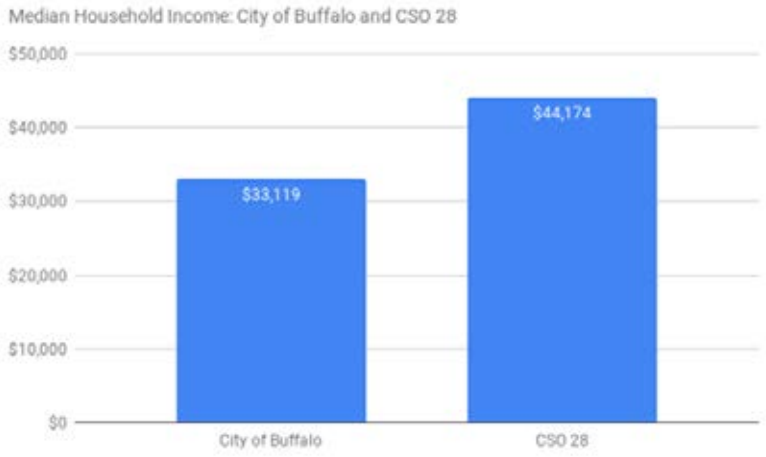
Source: U.S. Census Bureau, American Community Survey 5-Year Estimates (2012-2016)

English-Speaking Ability and Languages Spoken

Only 1.0% of households living in CSO 28 neighborhoods report limited English proficiency. About 5.0% of households in CSO 28 neighborhoods speak Spanish at home, but there are relatively fewer languages outside of English reported by households in the area compared to the city overall.

Median Household Income

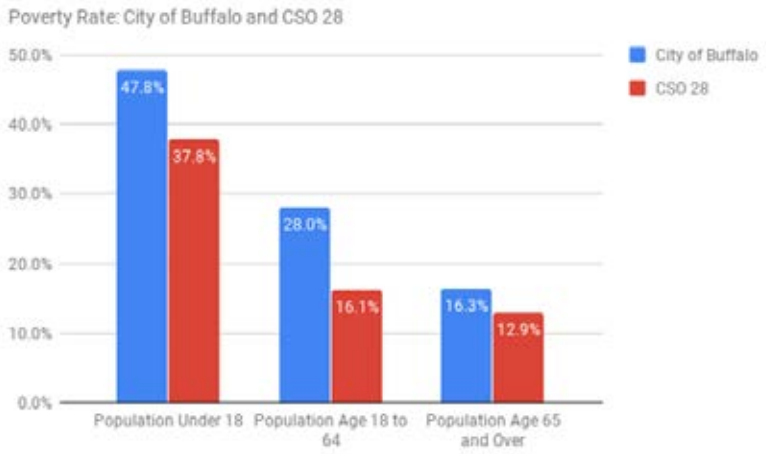
The median household income of residents living in CSO 28 neighborhoods is greater than that of the city of Buffalo overall. The city median household income was $33,119 from 2012-2016, but it was $44,174 for residents in CSO 28 neighborhoods.



Source: U.S. Census Bureau, American Community Survey 5-Year Estimates (2012-2016)

Poverty Status of Households

The poverty status of households living in CSO 28 neighborhoods is lower than for the city of Buffalo overall across multiple age groups. Nearly 38% of children under age 18 living in CSO 28 neighborhoods live in poverty, as well as 16% of adults ages 18 to 64, and 13% of older adults.

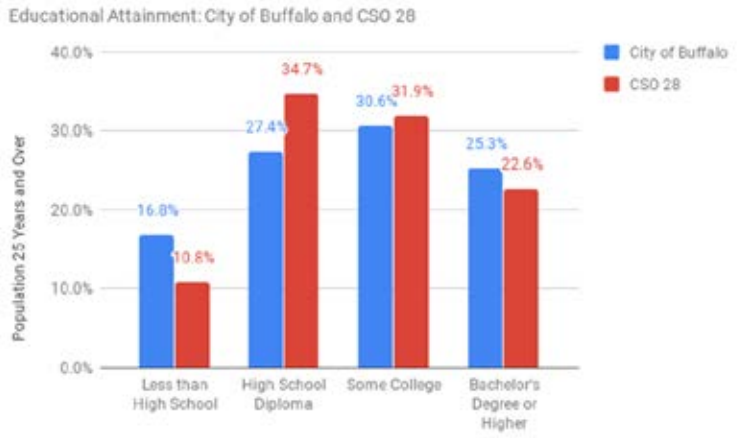


Source: U.S. Census Bureau, American Community Survey 5-Year Estimates (2012-2016)

Workforce

Educational Attainment

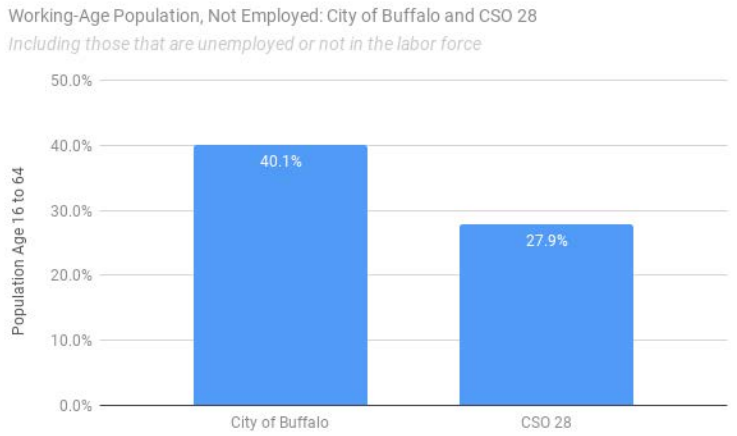
Levels of educational attainment among adults 25 years and over in CSO 28 neighborhoods are comparable to the city of Buffalo overall. Over half of residents in CSO 28 neighborhoods have education beyond a high school diploma, and 22.6% of residents have a bachelor's degree or higher.



Source: U.S. Census Bureau, American Community Survey 5-Year Estimates (2012-2016)

Working-Age Population, Not Employed

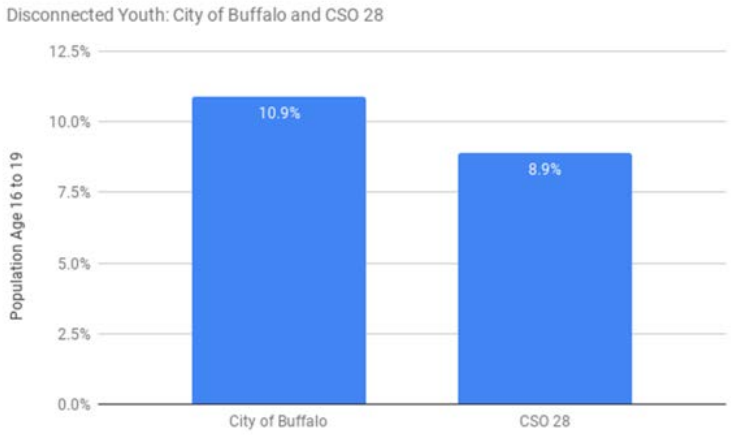
The percentage of the working-age population that is unemployed or not in the labor force is significantly lower in CSO 28 neighborhoods compared to the city overall. The share of the working-age population (age 16 to 64) in CSO 28 neighborhoods that is not employed or not in the labor force is 27.9%, compared to 40.1% of residents across the city.



Source: U.S. Census Bureau, American Community Survey 5-Year Estimates (2012-2016)

Disconnected Youth

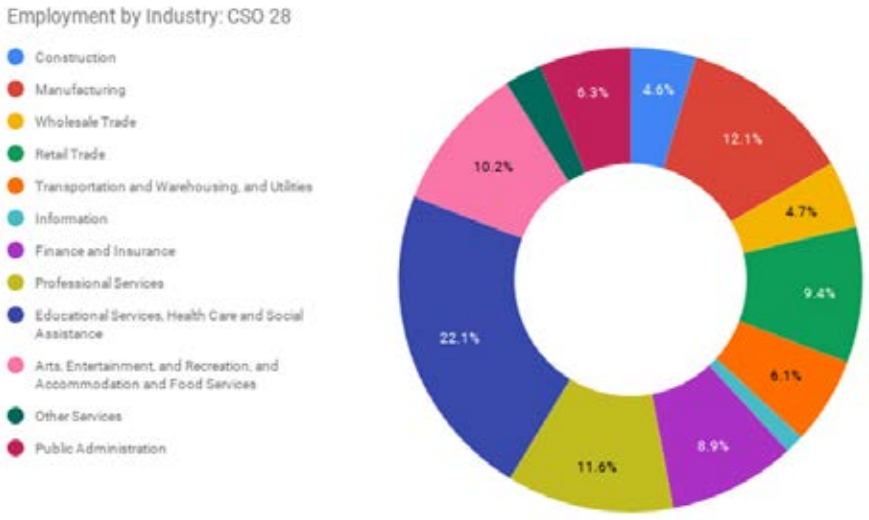
The share of disconnected youth in CSO 28 neighborhoods is slightly less than the share across the city. The share of youth ages 16 to 19 that are not enrolled in school or working is 10.9% across the city, compared to 8.9% in CSO 28 neighborhoods.



Source: U.S. Census Bureau, American Community Survey 5-Year Estimates (2012-2016)

Employment by Industry

Residents living in CSO 28 neighborhoods are employed in a wide range of industry sectors. The largest industry sectors that workers are employed in are educational and health services (22.1%), manufacturing (12.1%), professional services (11.6%), and arts, accommodation and food services (10.2%).



Source: U.S. Census Bureau, American Community Survey 5-Year Estimates (2012-2016)

Public Health

Mental Health

About 14.4% of adults aged 18 years or older living in CSO 28 neighborhoods reported frequent instances of poor mental health. Mental health is an important component of health and quality of life. This proportion is lower compared to adults across the city overall (15.8%).

Current Asthma

About 10.8% of adults aged 18 years or older living in CSO 28 neighborhoods report having asthma, which can increase likelihood of adverse outcomes such as emergency department visits, hospitalizations, and death and result in missed school or work. This proportion is slightly lower compared to adults across the city overall (12.1%).

Physical Inactivity

About 31.4% of adults aged 18 years or older living in CSO 28 neighborhoods reported that they did not regularly participate in any physical activities or exercises. Regular physical activity can improve health and quality of life. This proportion is lower compared to adults across the city overall (35.1%).

Obesity

About 32.8% of adults aged 18 years or older living in CSO 28 neighborhoods reported being overweight or obese, which increases the risk for multiple chronic diseases. This proportion is lower compared to adults across the city overall (37.7%).

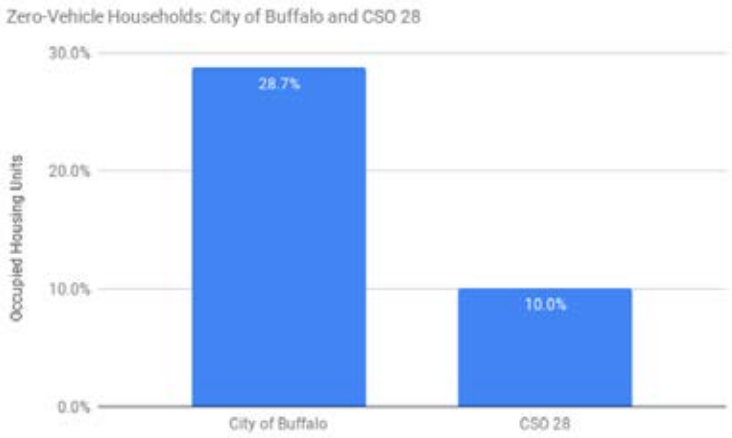
Heart Disease

About 6.0% of adults aged 18 years or older living in CSO 28 neighborhoods reported being told by a health professional that they have coronary heart disease, a leading cause of death in the United States. This proportion is slightly lower compared to adults across the city overall (6.6%).

Connectedness

Car Access

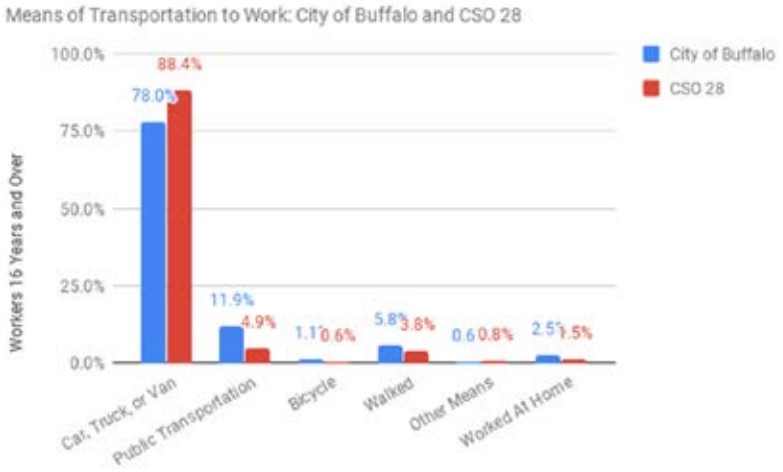
The share of zero-vehicle households is lower in CSO 28 neighborhoods than across the city. Only 10% of households in CSO 28 neighborhoods do not have access to a vehicle, which is considerably lower than the share of zero-vehicle households across the city (28.7%).



Source: U.S. Census Bureau, American Community Survey 5-Year Estimates (2012-2016)

Means of Transportation to Work

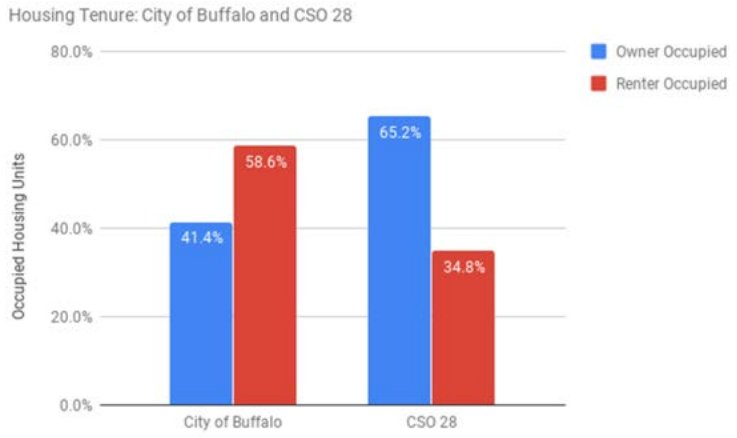
The overwhelming majority of workers living in CSO 28 neighborhoods commute to work via car, at a rate higher than the city overall. Across the city, 78.0% of workers commute via car, compared to 88.4% for workers in CSO 28 neighborhoods. Relatively few workers living in CSO 28 neighborhoods commute via public transit, bicycling or walking.



Source: U.S. Census Bureau, American Community Survey 5-Year Estimates (2012-2016)

Housing Tenure

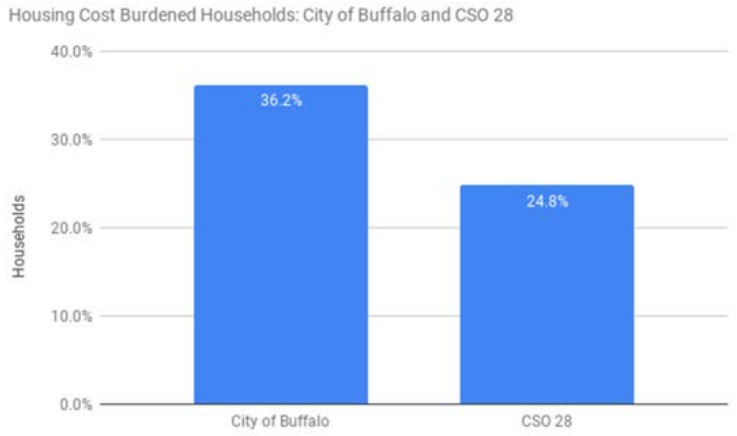
The majority of occupied housing units in CSO 28 neighborhoods are owner occupied, at a share that is considerably higher than for the city of Buffalo overall. Across the city, 41.4% of occupied housing units are owner occupied, compared to 65.2% for housing units in CSO 28 neighborhoods.



Source: U.S. Census Bureau, American Community Survey 5-Year Estimates (2012-2016)

Housing Cost Burden

Nearly one-quarter of the households in CSO 28 neighborhoods are housing cost burdened, spending more than 30% of their monthly income on housing costs. The share of housing cost burdened households across the city is higher at 36.2%.



Source: U.S. Census Bureau, American Community Survey 5-Year Estimates (2012-2016)

Land Use

Vacant Land

Across the city of Buffalo overall, 13.5% of land area is considered vacant. The share of land area that is vacant in CSO 28 neighborhoods is slightly smaller than across the city. There are 49.3 acres of vacant land in CSO 28 neighborhoods, representing 11.1% of total land acreage in the area.

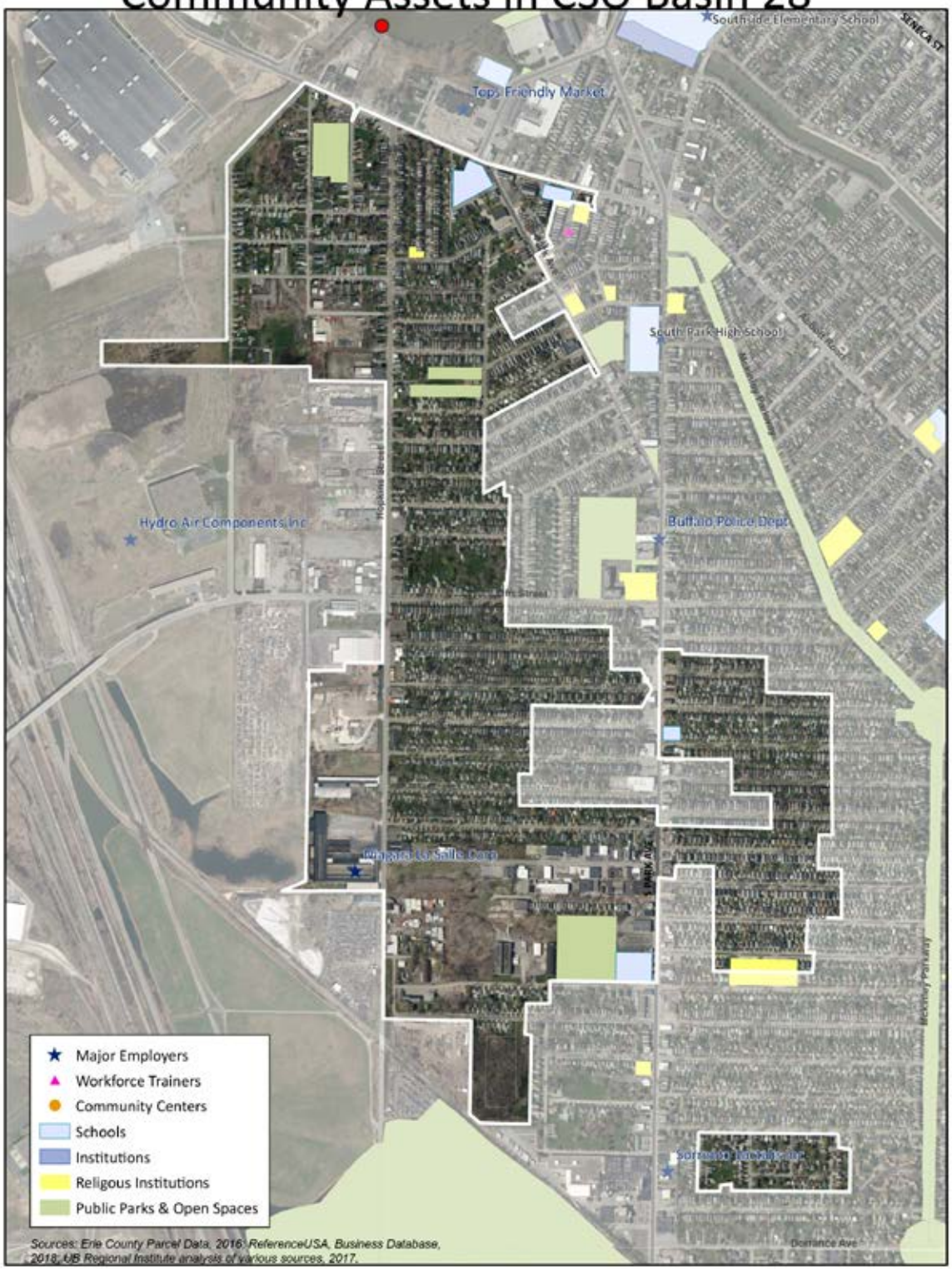
Vacancy Rates

The residential vacancy rate in CSO 28 neighborhoods is nearly half the rate for the city of Buffalo overall. The residential vacancy rate for the city is 10.0%, compared to 5.0% in CSO 28 neighborhoods. Similarly, the commercial vacancy rate in CSO 28 neighborhoods is less than the rate for the city of Buffalo overall. The commercial vacancy rate for the city is 16.1%, compared to 12.4% in CSO 28 neighborhoods.

Engagement

CSO 28 neighborhoods are predominantly residential communities bordered by industrial land uses to the west and the Buffalo River and Cazenovia Creek to the north. The area is also home to a number of schools, religious institutions, and a number of public parks and open spaces including Heacock Park, Mulroy Park, and South Park.

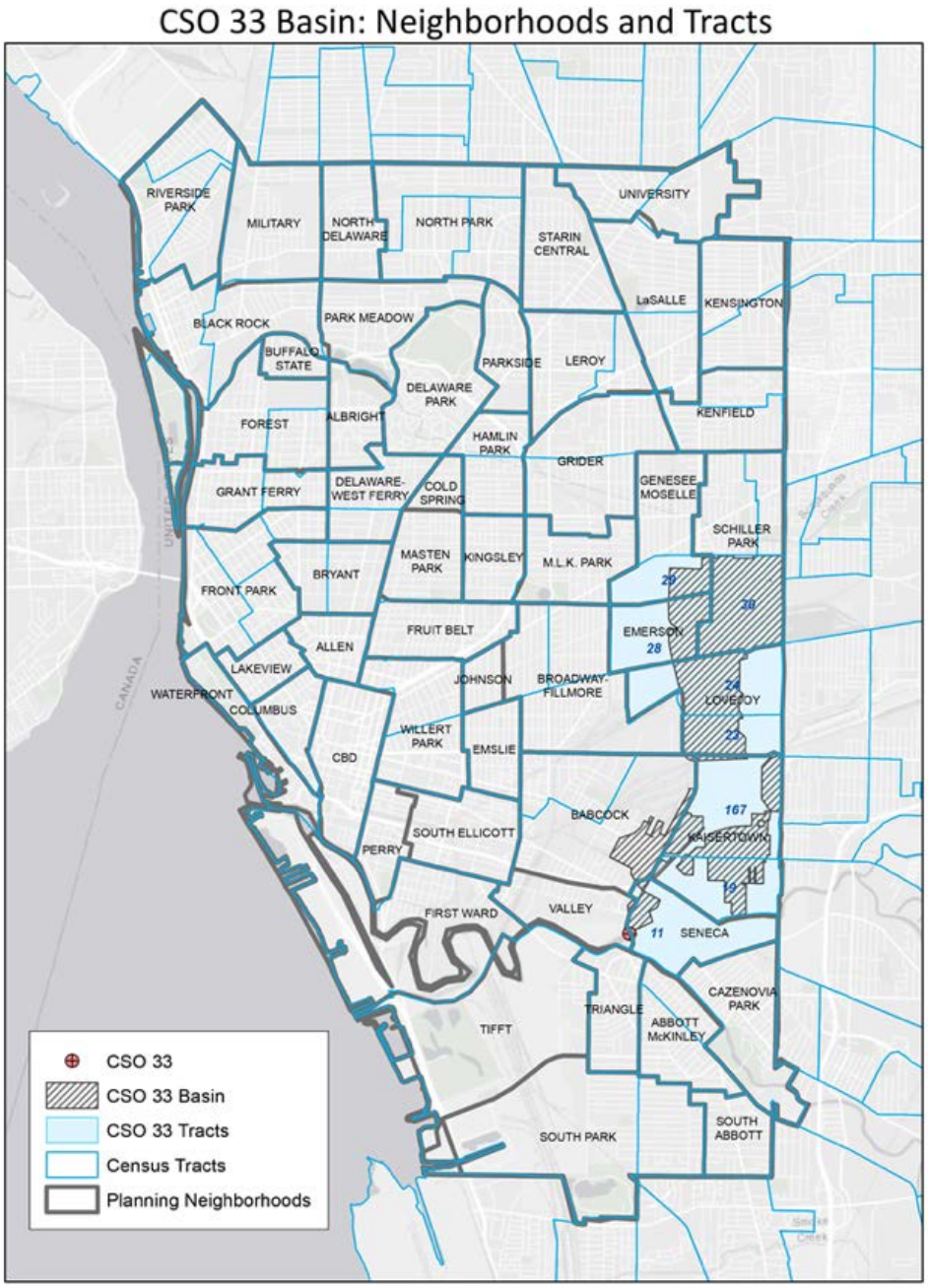
Community Assets in CSO Basin 28



EQUITY PROFILE: CSO33

Neighborhood Context

CSO 33 basin boundaries intersect with several neighborhoods in Southeast Buffalo, including: Babcock, Emerson, Kaisertown, Lovejoy, Schiller Park, and Seneca.



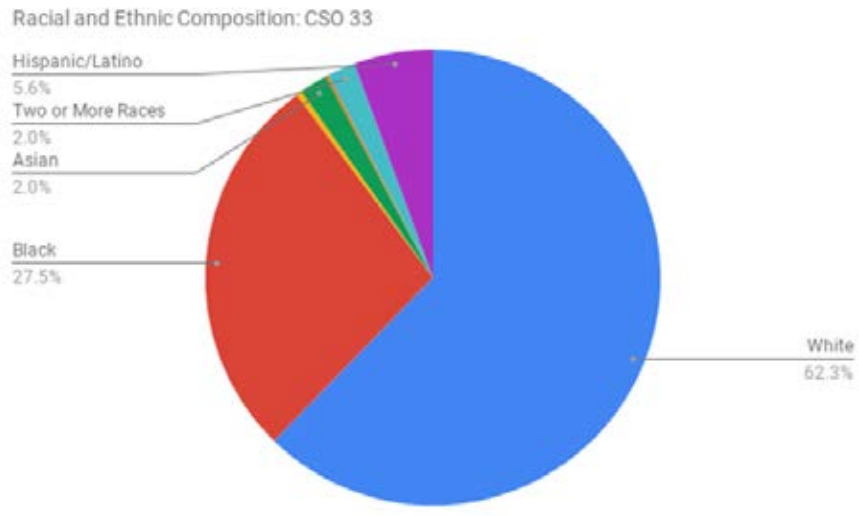
Demographics

Total Population and Age Composition

About 22,569 people live in the CSO 33 neighborhoods, representing about 8.7% of the city's total population. The percentage of residents under age 5 is on par with the city overall, at 7.2% (compared to 6.7% for the city overall). Similarly, the percentage of residents age 65 and over, 12.9%, is on par with the city overall (12.0% across the city).

Racial/Ethnic Composition and Nativity

The majority of residents living in CSO 33 neighborhoods are White (62.3%). However, 27.5% of residents are Black, and 5.6% of residents are Hispanic or Latino. Additionally, 4.5% of residents are foreign born.



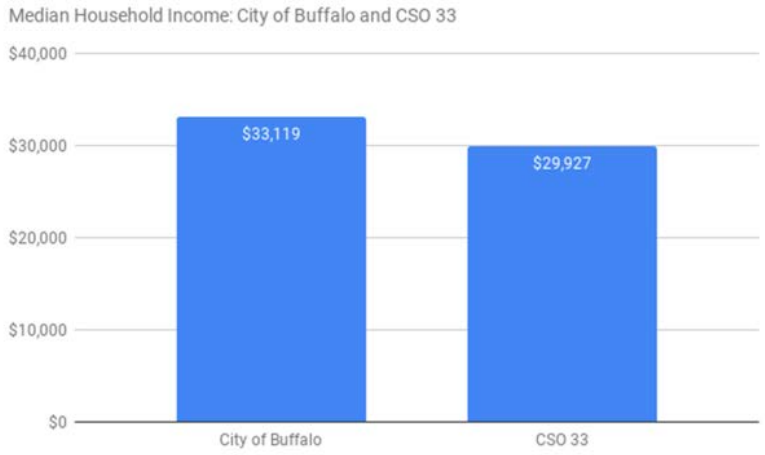
Source: U.S. Census Bureau, American Community Survey 5-Year Estimates (2012-2016)

English-Speaking Ability and Languages Spoken

Only 3.6% of households living in CSO 33 neighborhoods report limited English proficiency. About 10% of households in CSO 33 neighborhoods speak Spanish or other Indo-European languages at home.

Median Household Income

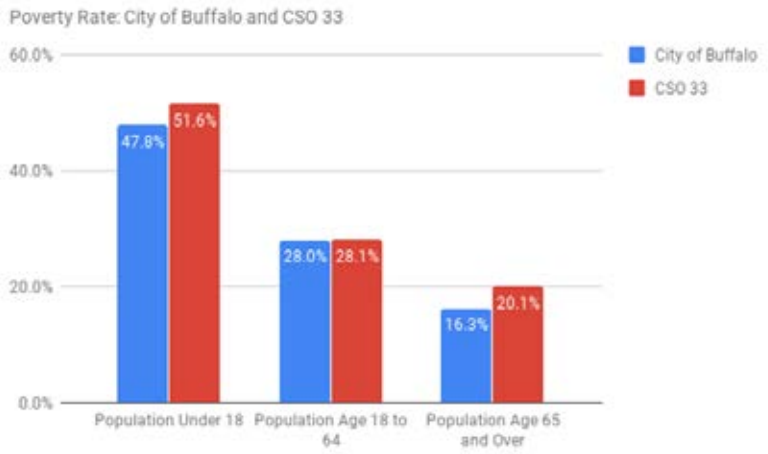
The median household income of residents living in CSO 33 neighborhoods is lower than that of the city of Buffalo overall. The city median household income was $33,119 from 2012-2016, but it was $29,927 for households in CSO 33 neighborhoods.



Source: U.S. Census Bureau, American Community Survey 5-Year Estimates (2012-2016)

Poverty Status of Households

The poverty status of households living in CSO 33 neighborhoods is higher than for the city of Buffalo overall. Over half of children under age 18 in CSO 33 neighborhoods live in poverty, in addition to 28% of adults ages 18 to 64, and 20% of older adults.

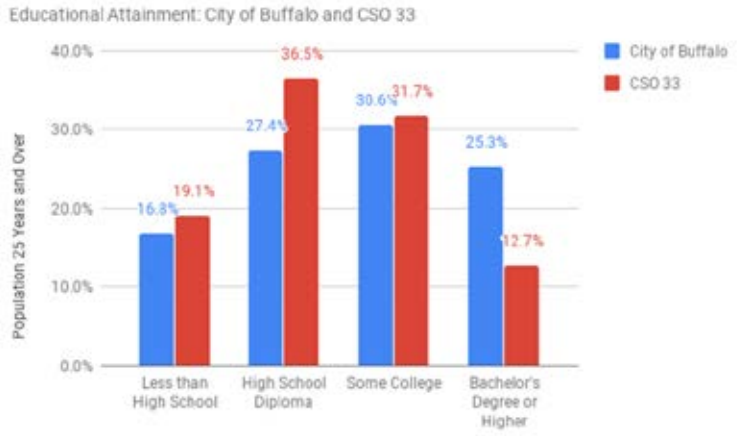


Source: U.S. Census Bureau, American Community Survey 5-Year Estimates (2012-2016)

Workforce

Educational Attainment

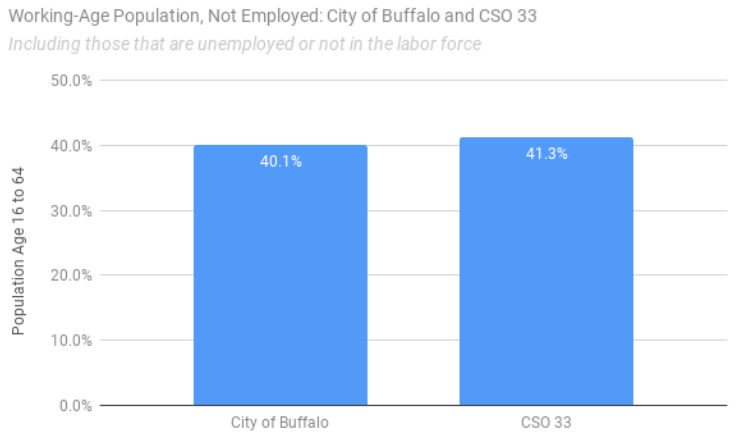
Levels of educational attainment among adults 25 years and over in CSO 33 neighborhoods are comparable to the city of Buffalo overall. About 40% of residents in CSO 33 neighborhoods have education beyond a high school diploma, and 12.7% of residents have a bachelor's degree or higher.



Source: U.S. Census Bureau, American Community Survey 5-Year Estimates (2012-2016)

Working-Age Population, Not Employed

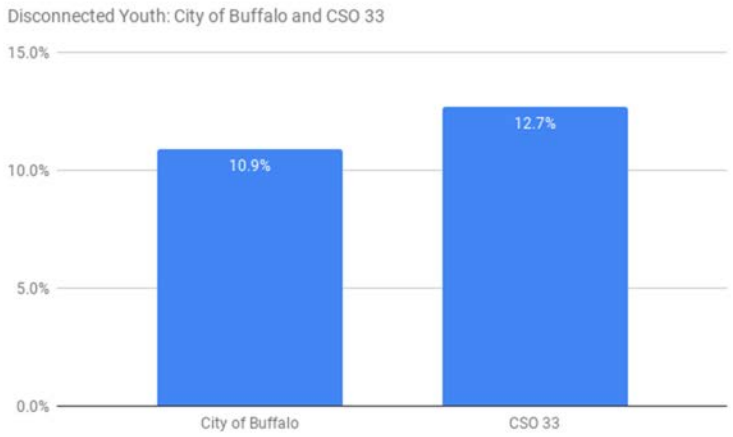
The percentage of the working-age population that is unemployed or not in the labor force in CSO 33 neighborhoods is comparable to the city overall. The share of the working-age population (age 16 to 64) in CSO 33 neighborhoods that is not employed or not in the labor force is 41.3%, compared to 40.1% of residents across the city.



Source: U.S. Census Bureau, American Community Survey 5-Year Estimates (2012-2016)

Disconnected Youth

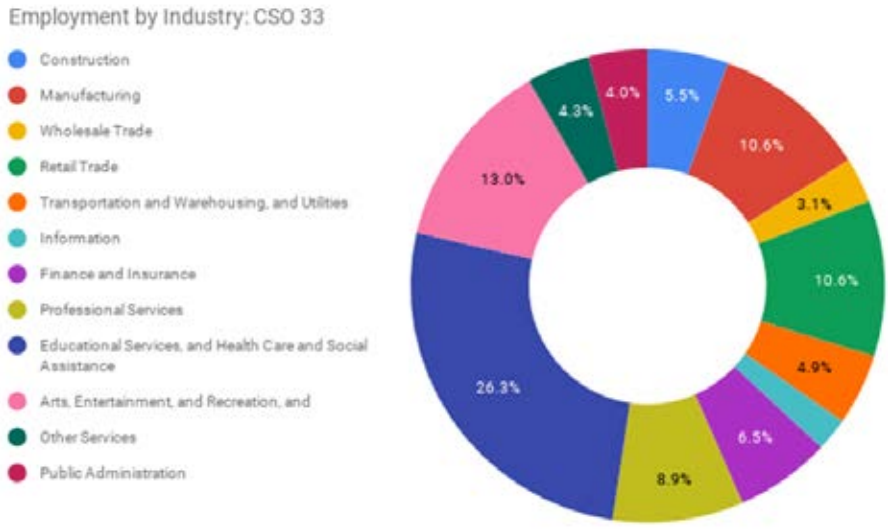
The share of disconnected youth in CSO 33 neighborhoods is slightly higher than the share across the city. The share of youth ages 16 to 19 that are not enrolled in school or working is 10.9% across the city, compared to 12.7% in CSO 33 neighborhoods.



Source: U.S. Census Bureau, American Community Survey 5-Year Estimates (2012-2016)

Employment by Industry

Residents living in CSO 33 neighborhoods are employed in a wide range of industry sectors. Over a quarter of workers are employed in educational and health services (26.3%), followed by arts, accommodation and food services (13.0%), manufacturing (10.6%) and retail trade (10.6%).



Source: U.S. Census Bureau, American Community Survey 5-Year Estimates (2012-2016)

Public Health

Mental Health

About 16.9% of adults aged 18 years or older living in CSO 33 neighborhoods reported frequent instances of poor mental health. Mental health is an important component of health and quality of life. This proportion is slightly higher compared to adults across the city overall (15.8%).

Current Asthma

About 12.3% of adults aged 18 years or older living in CSO 33 neighborhoods report having asthma, which can increase likelihood of adverse outcomes such as emergency department visits, hospitalizations, and death and result in missed school or work. This proportion is slightly higher compared to adults across the city overall (12.1%).

Physical Inactivity

About 37.3% of adults aged 18 years or older living in CSO 33 neighborhoods reported that they did not regularly participate in any physical activities or exercises. Regular physical activity can improve health and quality of life. This proportion is slightly higher compared to adults across the city overall (35.1%).

Obesity

About 38.4% of adults aged 18 years or older living in CSO 33 neighborhoods reported being overweight or obese, which increases the risk for multiple chronic diseases. This proportion is slightly higher compared to adults across the city overall (37.7%).

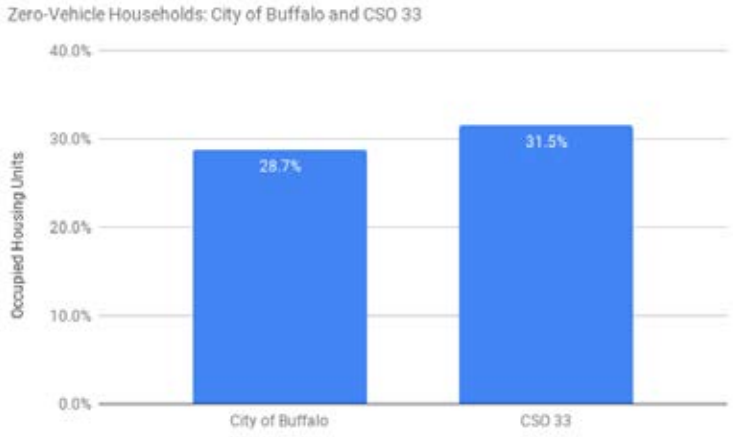
Heart Disease

About 7.6% of adults aged 18 years or older living in CSO 33 neighborhoods reported being told by a health professional that they have coronary heart disease, a leading cause of death in the United States. This proportion is slightly higher compared to adults across the city overall (6.6%).

Connectedness

Car Access

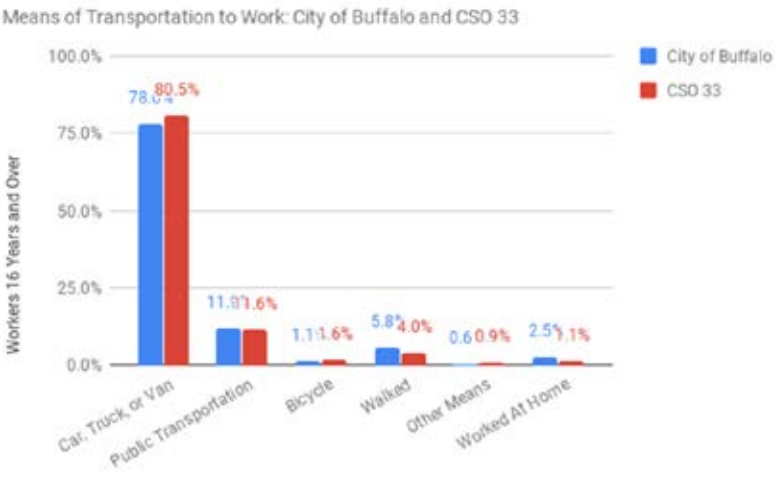
The share of zero-vehicle households is slightly higher in CSO 33 neighborhoods than across the city. About 31.5% of households in CSO 33 neighborhoods do not have access to a vehicle, compared to 28.7% of households across the city.



Source: U.S. Census Bureau, American Community Survey 5-Year Estimates (2012-2016)

Means of Transportation to Work

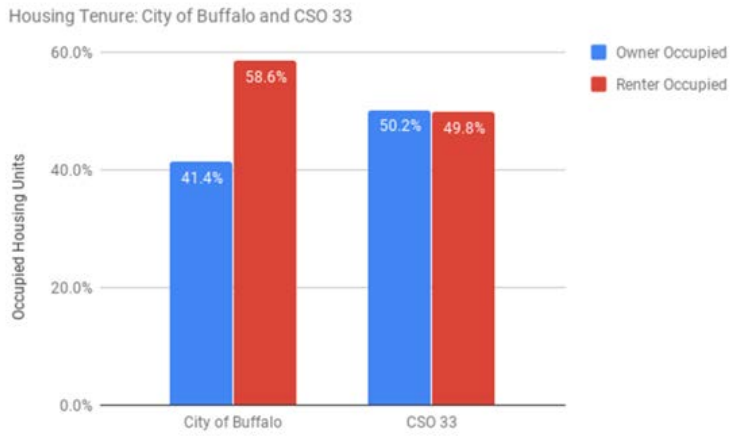
The majority of workers living in CSO 33 neighborhoods commute to work via car, at a rate slightly lower than the city overall. Across the city, 78.0% of workers commute via car, compared to 80.5% for workers in CSO 33 neighborhoods. Additionally, about 11.6% of workers in CSO 33 neighborhoods commute via public transit and 4.0% walk to work.



Source: U.S. Census Bureau, American Community Survey 5-Year Estimates (2012-2016)

Housing Tenure

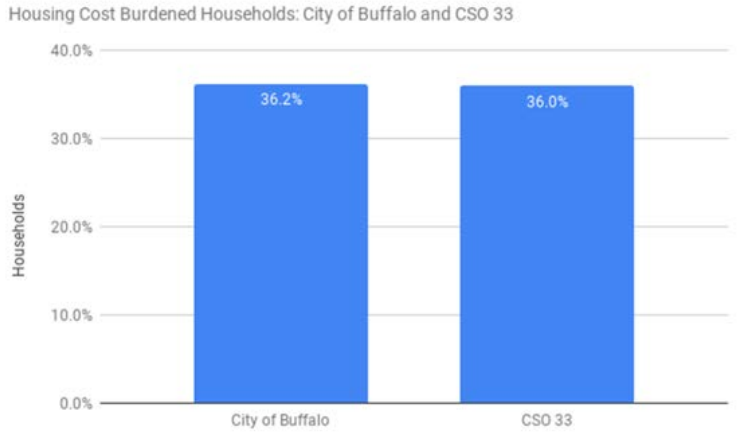
Occupied housing units in CSO 33 neighborhoods are roughly split between owner occupancy and renter occupancy. Across the city, 41.4% of occupied housing units are owner occupied, compared to 50.2% for housing units in CSO 33 neighborhoods.



Source: U.S. Census Bureau, American Community Survey 5-Year Estimates (2012-2016)

Housing Cost Burden

The share of housing cost burdened households in CSO 33 neighborhoods is on par with the share across the city. The share of housing cost burdened households across the city is 36.2%, compared to 36.0% in CSO 33 neighborhoods.



Source: U.S. Census Bureau, American Community Survey 5-Year Estimates (2012-2016)

Land Use

Vacant Land

Across the city of Buffalo overall, 13.5% of land area is considered vacant. The share of land area that is vacant in CSO 33 neighborhoods is lower than across the city. There are 128.6 acres of vacant land in CSO 33 neighborhoods, representing 10.1% of total land acreage in the area.

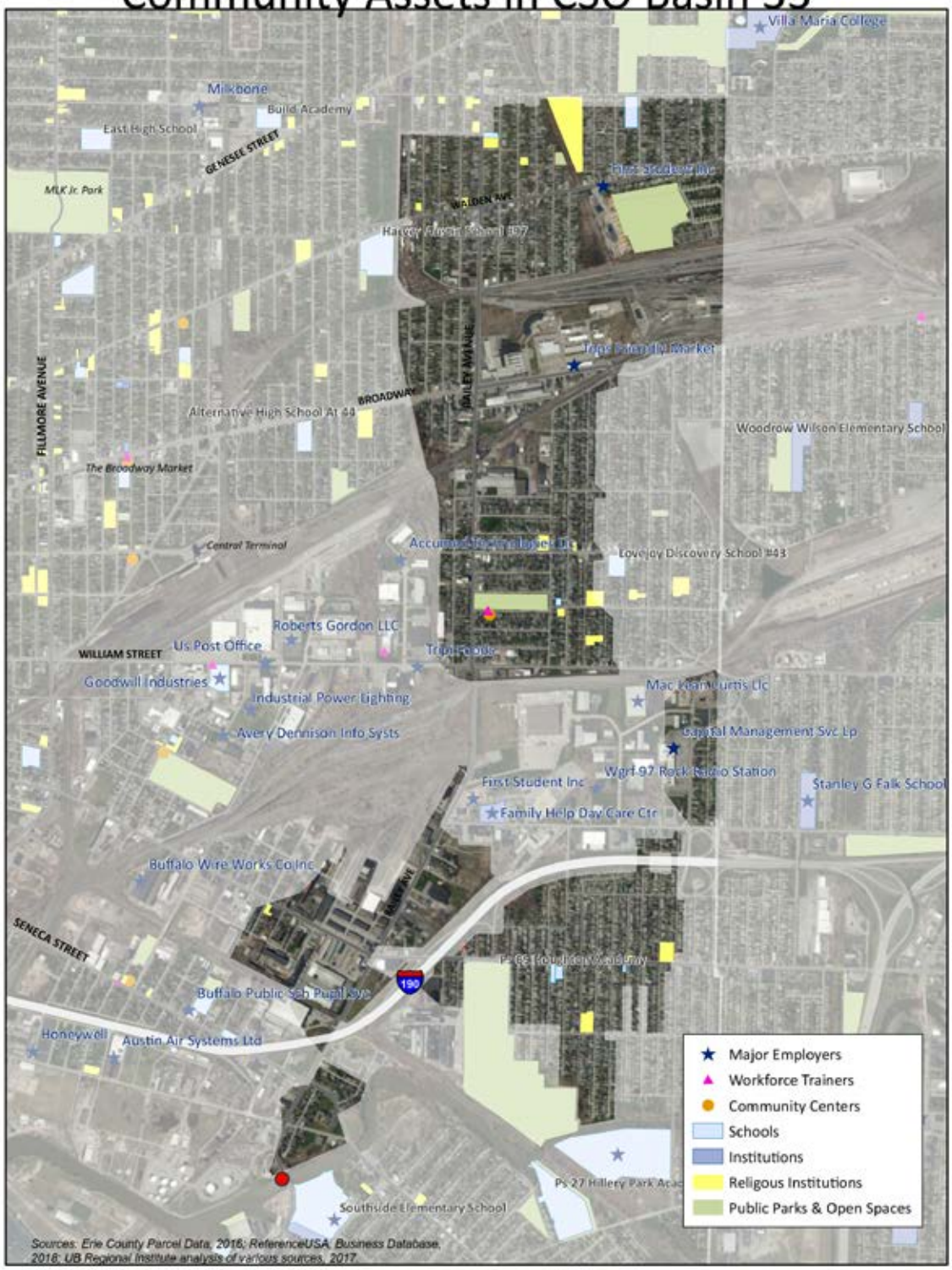
Vacancy Rates

The residential vacancy rate in CSO 33 neighborhoods is slightly higher than the rate for the city of Buffalo overall. The residential vacancy rate for the city is 10.0%, compared to 12.7% in CSO 33 neighborhoods. Similarly, the commercial vacancy rate in CSO 33 neighborhoods is higher than the rate for the city of Buffalo overall. The commercial vacancy rate for the city is 16.1%, compared to 21.2% in CSO 33 neighborhoods.

Engagement

CSO 33 neighborhoods are home to several regional destinations like the Clinton-Bailey Farmers Market and the Niagara Frontier Food Terminal. The area is a mixture of residential, commercial, institutional and industrial uses, including neighborhood corridors like Lovejoy and Clinton and community amenities like Hennepin Park and Walden Park. The presence of wide roads, highways, large commercial strips and other large lots can make the area seem somewhat geographically isolated, limit walkability, and pose safety issues for pedestrians and transit users.

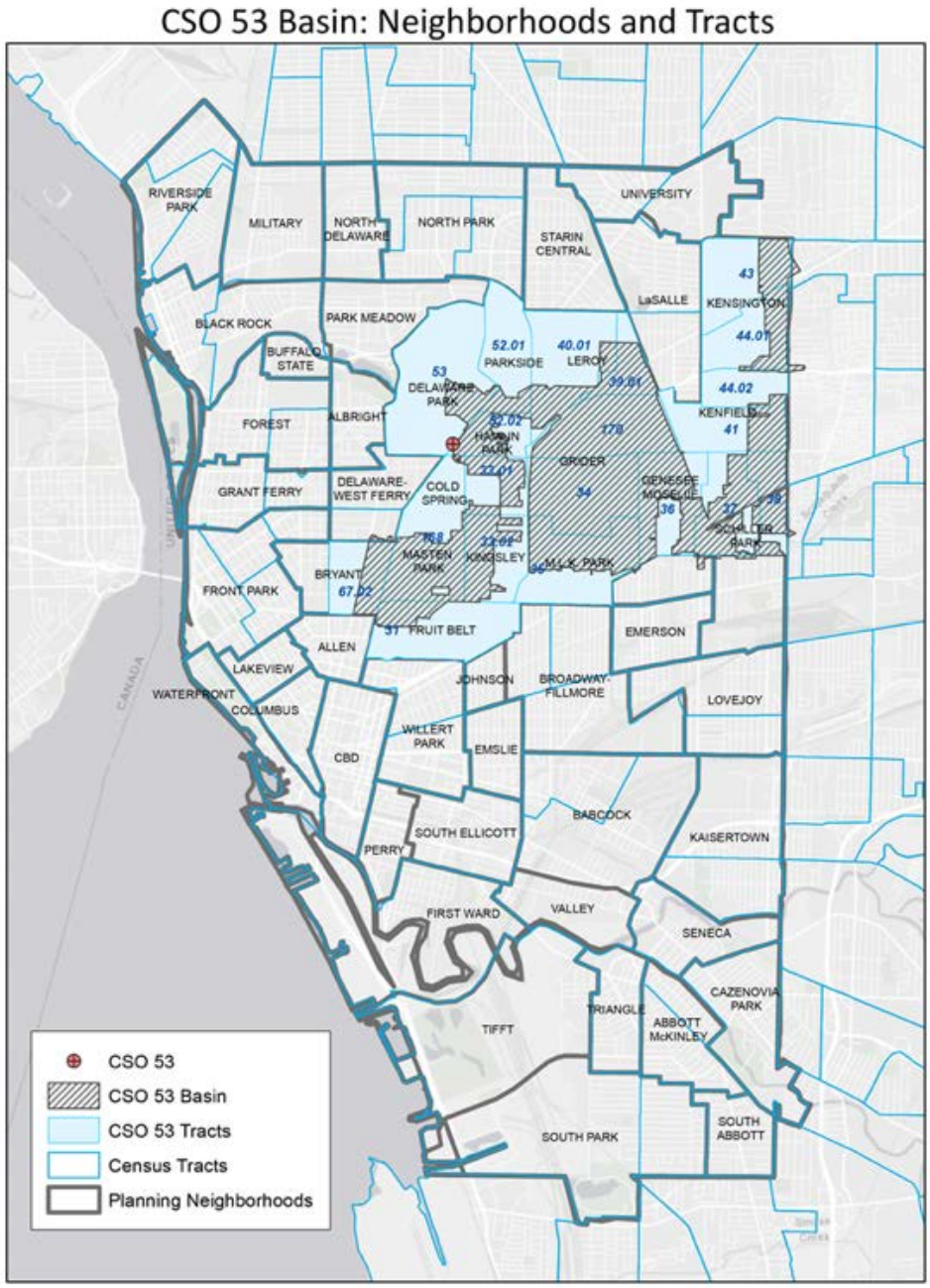
Community Assets in CSO Basin 33



EQUITY PROFILE: CSO53

Neighborhood Context

CSO 53 basin boundaries intersect with several City of Buffalo planning neighborhoods spanning the northeast section of the city and areas along Main Street. Planning neighborhoods in this area include: Parkside, Leroy, Kensington, Kenfield, Schiller Park, Genesee Moselle, Grider, MLK Park, Hamlin Park, Cold Spring, Masten Park, Kingsley, and the Fruit Belt. There are a wide range of land uses represented in this area given its large land area and the broad cross-section of the city that it touches, including major institutions, employers, and recreational areas in the City of Buffalo.



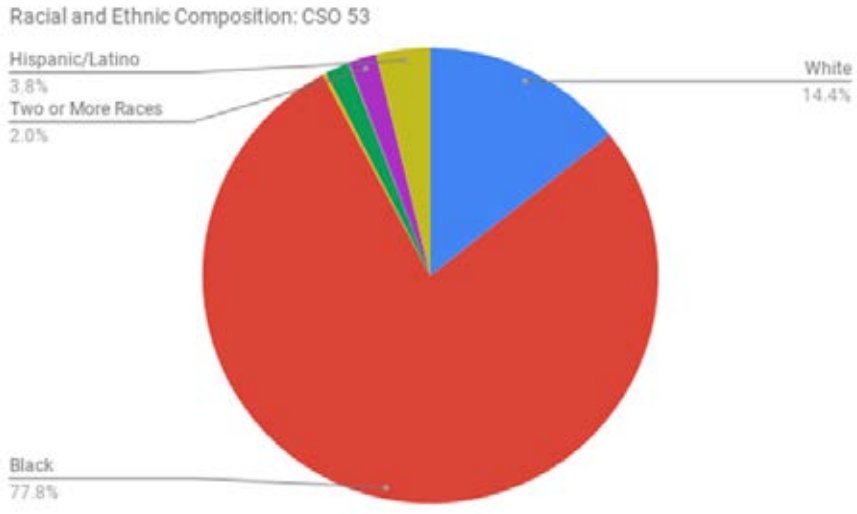
Demographics

Total Population and Age Composition

About 64,289 people live in the CSO 53 neighborhoods, representing about 24.8% of the city's total population. The percentage of residents under age 5 is on par with the city overall, at 6.4% (compared to 6.7% for the city overall). Similarly, the percentage of residents age 65 and over, 14.5%, is on par with the city overall (12.0% across the city).

Racial/Ethnic Composition and Nativity

The majority of residents living in CSO 53 neighborhoods are Black (77.8%). However, 14.4% of residents are White, and 3.8% of residents are Hispanic or Latino. Additionally, 4.7% of residents are foreign born.



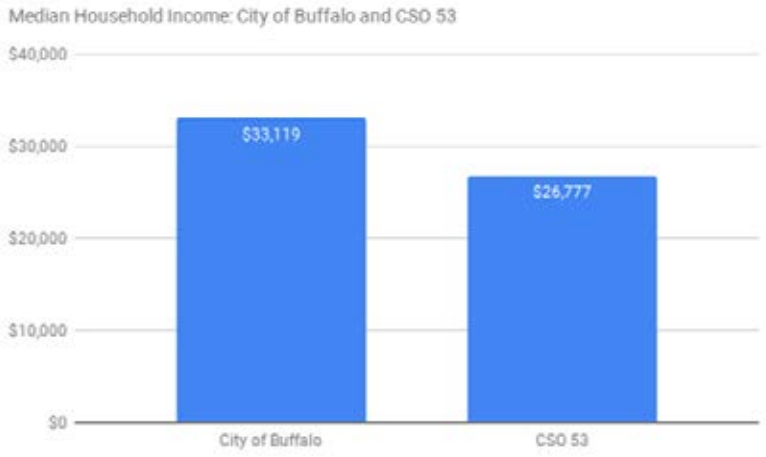
Source: U.S. Census Bureau, American Community Survey 5-Year Estimates (2012-2016)

English-Speaking Ability and Languages Spoken

Only 2.3% of households living in CSO 53 neighborhoods report limited English proficiency. About 3.1% of households in CSO 53 neighborhoods speak Spanish at home, but there are relatively few languages outside of English that households in the area report speaking.

Median Household Income

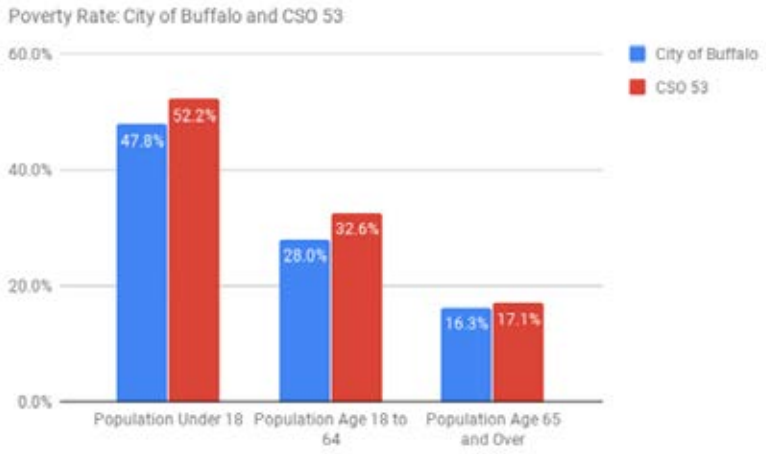
The median household income of residents living in CSO 53 neighborhoods is lower than that of the city of Buffalo overall. The city median household income was $33,119 from 2012-2016, but it was $26,777 for residents in CSO 53 neighborhoods.



Source: U.S. Census Bureau, American Community Survey 5-Year Estimates (2012-2016)

Poverty Status of Households

The poverty status of households living in CSO 53 neighborhoods is higher than for the city of Buffalo overall. Over half of children under age 18 in CSO 53 neighborhoods live in poverty, in addition to 33% of adults ages 18 to 64, and 17% of older adults.

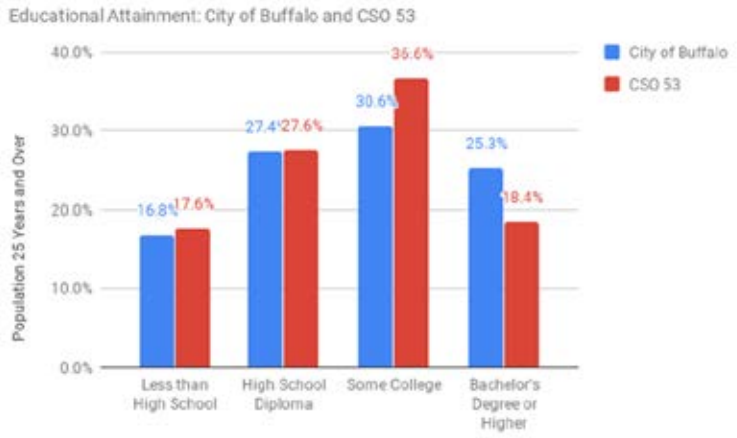


Source: U.S. Census Bureau, American Community Survey 5-Year Estimates (2012-2016)

Workforce

Educational Attainment

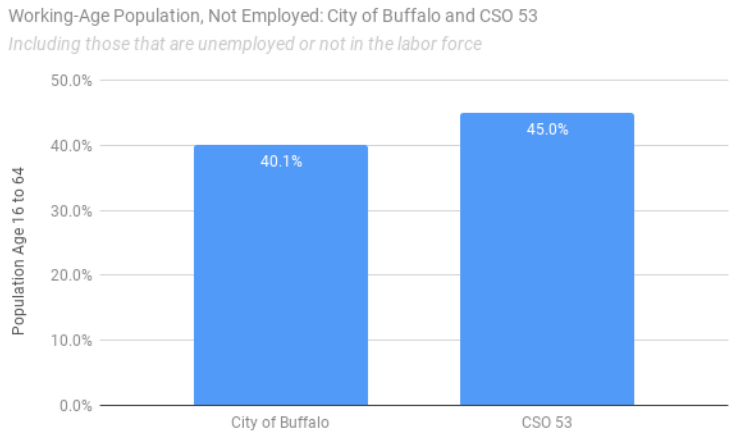
Levels of educational attainment among adults 25 years and over in CSO 53 neighborhoods are comparable to the city of Buffalo overall. About 60% of residents in CSO 53 neighborhoods have education beyond a high school diploma, and 18.4% of residents have a bachelor's degree or higher.



Source: U.S. Census Bureau, American Community Survey 5-Year Estimates (2012-2016)

Working-Age Population, Not Employed

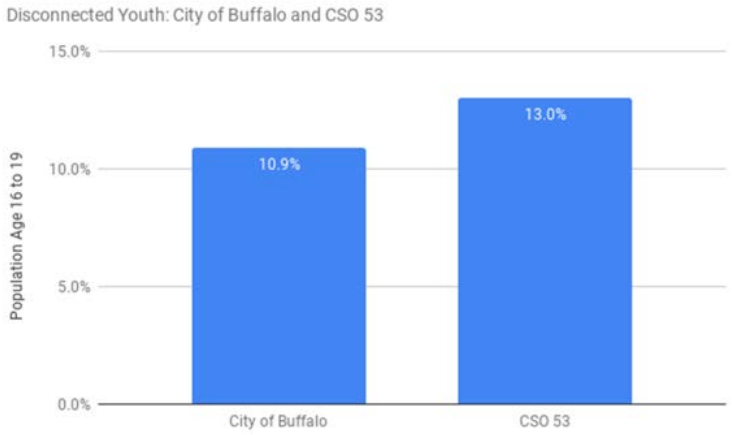
The percentage of the working-age population that is unemployed or not in the labor force is slightly higher in CSO 53 neighborhoods compared to the city overall. The share of the working-age population (age 16 to 64) in CSO 53 neighborhoods that is not employed or not in the labor force is 45.0%, compared to 40.1% of residents across the city.



Source: U.S. Census Bureau, American Community Survey 5-Year Estimates (2012-2016)

Disconnected Youth

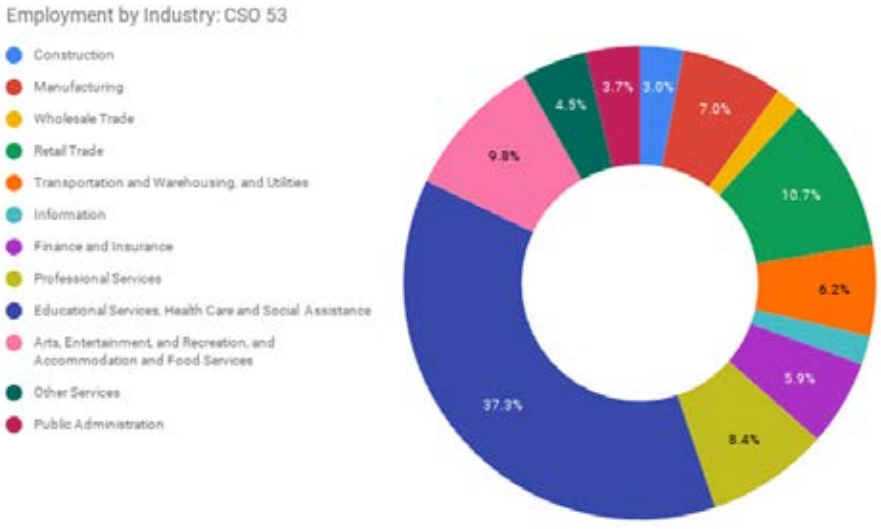
The share of disconnected youth in CSO 53 neighborhoods is higher than the share across the city. The share of youth ages 16 to 19 that are not enrolled in school or working is 10.9% across the city, compared to 13.0% in CSO 53 neighborhoods.



Source: U.S. Census Bureau, American Community Survey 5-Year Estimates (2012-2016)

Employment by Industry

Residents living in CSO 53 neighborhoods are employed in a wide range of industry sectors. More than a third of workers are employed in educational and health services (37.3%), followed by retail trade (10.7%), arts, accommodation and food services (9.8%), and professional services (8.4%).



Source: U.S. Census Bureau, American Community Survey 5-Year Estimates (2012-2016)

Public Health

Mental Health

About 16.9% of adults aged 18 years or older living in CSO 53 neighborhoods reported frequent instances of poor mental health. Mental health is an important component of health and quality of life. This proportion is slightly higher compared to adults across the city overall (15.8%).

Current Asthma

About 13.8% of adults aged 18 years or older living in CSO 53 neighborhoods report having asthma, which can increase likelihood of adverse outcomes such as emergency department visits, hospitalizations, and death and result in missed school or work. This proportion is slightly higher compared to adults across the city overall (12.1%).

Physical Inactivity

About 39.4% of adults aged 18 years or older living in CSO 53 neighborhoods reported that they did not regularly participate in any physical activities or exercises. Regular physical activity can improve health and quality of life. This proportion is higher compared to adults across the city overall (35.1%).

Obesity

About 44.2% of adults aged 18 years or older living in CSO 53 neighborhoods reported being overweight or obese, which increases the risk for multiple chronic diseases. This proportion is higher compared to adults across the city overall (37.7%).

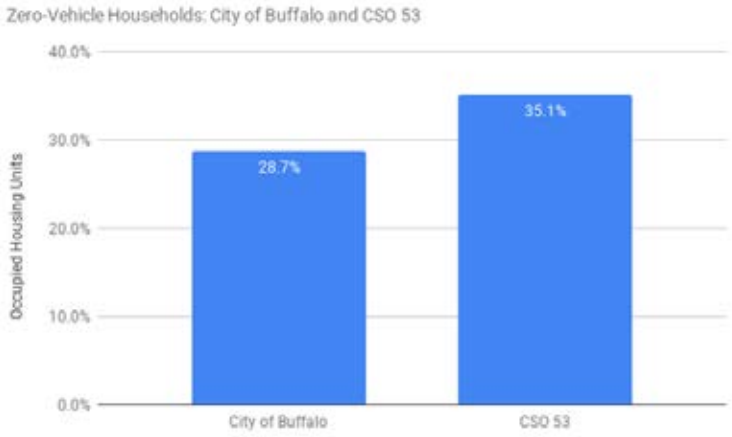
Heart Disease

About 7.6% of adults aged 18 years or older living in CSO 53 neighborhoods reported being told by a health professional that they have coronary heart disease, a leading cause of death in the United States. This proportion is slightly higher compared to adults across the city overall (6.6%).

Connectedness

Car Access

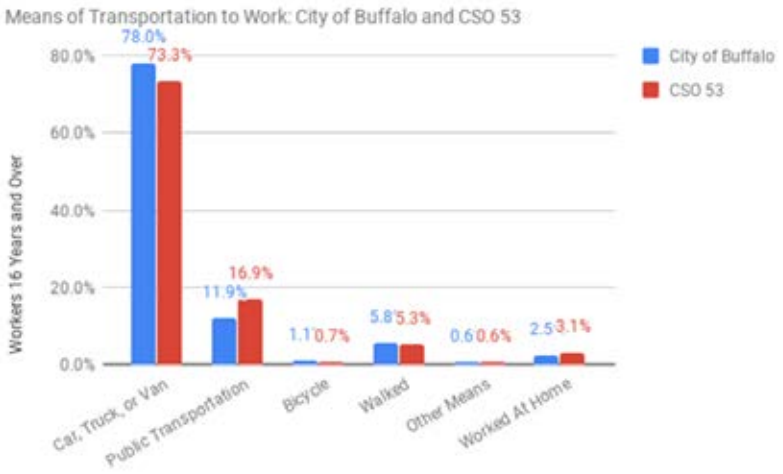
The share of zero-vehicle households is higher in CSO 53 neighborhoods than across the city. About 35.1% of households in CSO 53 neighborhoods do not have access to a vehicle, compared to 28.7% of households across the city.



Source: U.S. Census Bureau, American Community Survey 5-Year Estimates (2012-2016)

Means of Transportation to Work

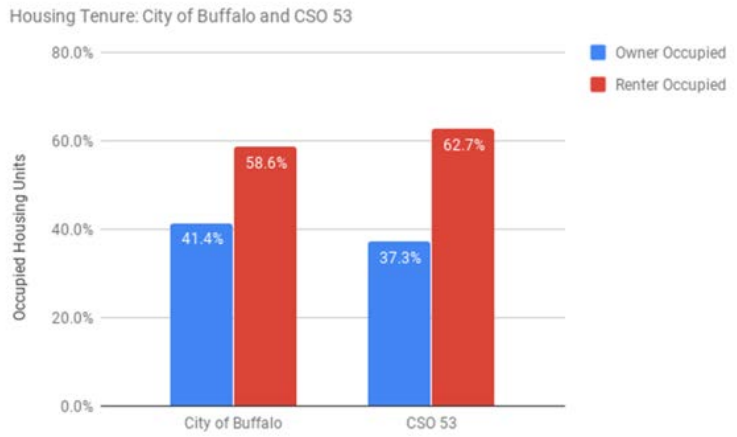
The majority of workers living in CSO 53 neighborhoods commute to work via car, at a rate slightly lower than the city overall. Across the city, 78.0% of workers commute via car, compared to 73.3% for workers in CSO 53 neighborhoods. Additionally, about 16.9% of workers in CSO 53 neighborhoods commute via public transit and 5.3% walk to work.



Source: U.S. Census Bureau, American Community Survey 5-Year Estimates (2012-2016)

Housing Tenure

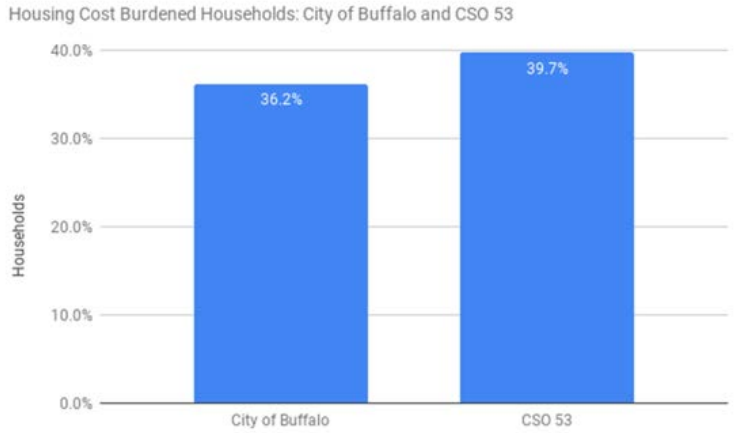
The majority of occupied housing units in CSO 53 neighborhoods are renter occupied, at a share that is slightly higher than for the city of Buffalo overall. Across the city, 58.6% of occupied housing units are renter occupied, compared to 62.7% for housing units in CSO 53 neighborhoods.



Source: U.S. Census Bureau, American Community Survey 5-Year Estimates (2012-2016)

Housing Cost Burden

The share of housing cost burdened households in CSO 53 neighborhoods is slightly higher than the share across the city. The share of housing cost burdened households across the city is 36.2%, compared to 39.7% in CSO 53 neighborhoods.



Source: U.S. Census Bureau, American Community Survey 5-Year Estimates (2012-2016)

Land Use

Vacant Land

Across the city of Buffalo overall, 13.5% of land area is considered vacant. The share of land area that is vacant in CSO 53 neighborhoods is greater than across the city. There are 434.4 acres of vacant land in CSO 53 neighborhoods, representing 15.8% of total land acreage in the area.

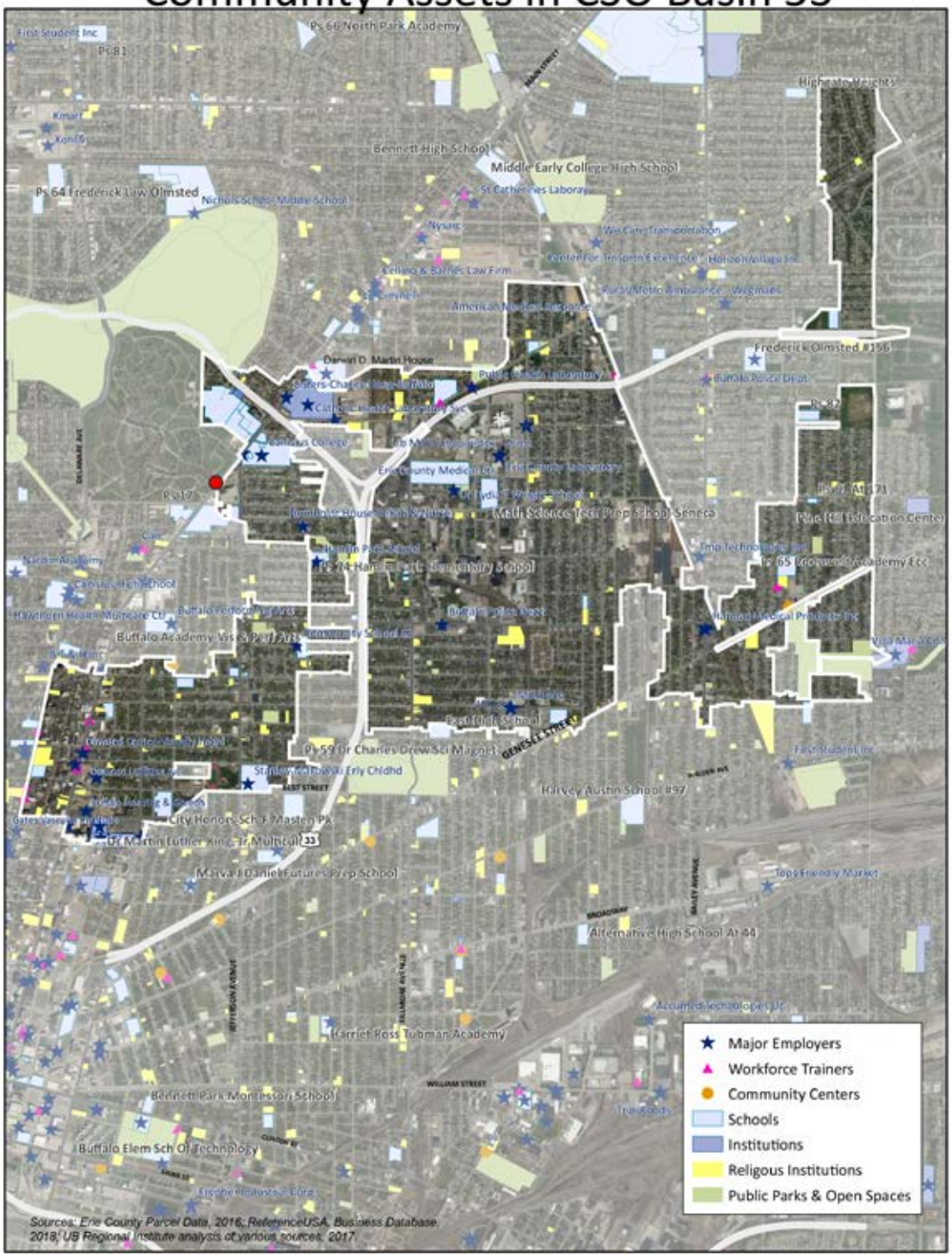
Vacancy Rates

The residential vacancy rate in CSO 53 neighborhoods is slightly higher than the rate for the city of Buffalo overall. The residential vacancy rate for the city is 10.0%, compared to 12.6% in CSO 53 neighborhoods. Similarly, the commercial vacancy rate in CSO 53 neighborhoods is higher than the rate for the city of Buffalo overall. The commercial vacancy rate for the city is 16.1%, compared to 18.3% in CSO 53 neighborhoods.

Engagement

The CSO 53 neighborhoods represent largely residential areas with major institutional uses including hospitals and education institutions. Major institutions and employers located in the area include Buffalo General Hospital, Sister's Hospital, Erie County Medical Center (ECMC) Hospital, Canisius College, and Harmac Medical Products. The area is also home to community amenities, including a large number of public schools, religious institutions, and neighborhood park areas. The area is also adjacent to Forest Lawn Cemetery, where a buried Scajaquada Creek that flows underneath many of these neighborhoods is uncovered and serves as a water feature in the landscape.

Community Assets in CSO Basin 53



APPENDIX C: CITYWIDE TREE CANOPY ANALYSIS

Introduction

The Buffalo Sewer Authority (BSA) began work on Rain Check 2.0, a multi-faceted Green Infrastructure (GI) project that identifies opportunities to implement GI in the City of Buffalo to reduce CSO volume and frequency. Task G of the Rain Check 2.0 effort is a Tree Analysis task, which includes two major elements: 1) a tree planting opportunity analysis; and 2) a stormwater crediting analysis. Both of these tasks were informed by the input and expertise of the Rain Check 2.0 Tree Technical Advisory Committee (the Tree TAC), and completed by the Center for Watershed Protection, Inc. (the Center) and CORE Environmental Consultants (CORE). The methods and results of the analysis were presented to the Tree TAC, as a draft at the September 26, 2018 meeting and a revised version on November 14, 2018. Ross Hassinger, the City of Buffalo Forester , was a key member of the TAC and provided valuable input the work progressed.

This Technical Memorandum provides a description of the methods and results to provide the BSA with preliminary information on the location and extent of potential tree planting opportunities in the City of Buffalo. It is important to emphasize the results represent "potential" tree planting areas or locations as further site assessments are needed to determine the suitability of these areas for the long-term survival of the trees, as well as other planting constraints such as land ownership, use of property for active recreation or other uses, property owner willingness, infrastructure constraints, available space, and other factors. Further, the City of Buffalo Forestry capacity needs must be evaluated to accommodate any tree planting program on streets, in parks, or within other public properties. The tree planting locations of interest were broadly defined to include both street trees and areas within both public and private properties. Vacant lands under public ownership were excluded from the analysis due to maintenance concerns by the city.

The specific details on the approach or plan to plant trees in areas identified as 'opportunities' in this Technical Memorandum is not part of this work effort. It is recommended that the City of Buffalo develop a tree planting program describing an approach to plant trees on private property to include future maintenance and ensure long-term survivorship and health, along with allocation of resources to support such a program.

The objectives of this task included:

- Estimating existing canopy citywide and aggregated by various spatial aggregations
- Estimating potential planting area at the plot scale.
- Providing a planning level estimate of runoff volume reduction that would be achieved by these plantings.

Methods

The methods included an analytical approach to provide the City of Buffalo with potential areas and sites for future tree planting along with preliminary planning level estimates of the number of trees planted and estimated stormwater volume reduction using methods described in the Tree Crediting Technical Memo prepared for BSA. The tree planting opportunity method was based upon the US Forest Service (USFS) Urban Tree Canopy Assessment and the Spatial Analysis Lab Tree Canopy Assessment Team lead by Jarlath O'Neil-Dunne at the University of Vermont[1] , and modified to accommodate the data available in the City of Buffalo (see Table 1 for GIS layers used). The method employs a GIS-based approach, combined with assumptions regarding tree size and distribution, and the benefits associated with trees. The analysis was completed at three different spatial aggregations including: 1) priority CSO basins; 2) neighborhoods; and 3) census block groups. The three spatial aggregations provide an opportunity for the City of Buffalo and BSA to address the value

(1) https://www.nrs.fs.fed.us/urban/utc/

Table 1. GIS Layers Used in the Analysis

Data	Source/Type
Existing canopy cover	GIS layer developed by evolveEA based on 2014 LiDAR data
TreeKeeper Database	Geo database including both the public and internal version, provided by Davey Tree and City of Buffalo Bureau of Forestry. The initial TreeKeeper database was created based on a survey of all the street trees in the City of Buffalo in 2014 and is updated daily by Davey Tree.
• City of Buffalo parcel data • Roads • Railroads • Impervious surfaces	City of Buffalo GIS data provided by Buffalo Sewer Authority

of existing and future tree canopy from different perspectives as urban tree canopy provides multiple benefits at the city, community and city-wide scale.

The analysis included four steps:

1. Calculate the extent of the existing tree Canopy
2. Estimate the potential number of tree plantings.
3. Estimate the total potential canopy area.
4. Estimate the equivalent impervious cover reduction associated with potential future tree planting

Step 1: Existing Tree Canopy

As a part of the Rain Check 2.0 project, Evolve EA developed a layer of tree canopy from 2014 LiDAR data. This layer was used to represent existing tree canopy and was also included as a part of Step 2 of this analysis (identifying existing planting area). Tree canopy areas were intersected with CSO, neighbourhood and census tract boundaries. Canopy cover (percentage) was then calculated, and these percentages were summarized as a GIS layer. Figures 1 – 3 illustrate the percent canopy cover by CSO Basin, neighborhood and census block group.

Table 2. Tree Statistics for City Regions

CSO Basin (entire basin area, not just target SPPs)	**Existing Canopy (Acres)***	**% Existing Canopy**
CSO 014	25.3	16.6
CSO 026	197.1	15.2
CSO 027	66.5	7.2
CSO 028	70.1	17.7
CSO 033	162.4	12.8
CSO 053	481.4	17.5

Neighborhood	**Existing Canopy (Acres)***	**% Existing Canopy**
ABBOTT McKINLEY	79.8	20.4
ALBRIGHT	68.3	26.9
ALLEN	48.8	22.8
BABCOCK	78.7	8
BLACK ROCK	88.8	12.8
BROADWAY FILLMORE	114.0	12.8
BRYANT	90.5	27.1
BUFFALO STATE	10.8	9.2
CAZENOVIA PARK	159.2	29.4
CBD	41.9	9.1
COLD SPRING	12.4	11.6
COLUMBUS	37.0	16.9
DELAWARE PARK	125.2	21.9
DELAWARE W. FERRY	74.8	22.4
EMERSON	41.5	14.4
EMSLIE	33.3	14.1
FIRST WARD	106.1	8.8
FOREST	101.8	14.3
FRONT PARK	115.1	16.6
FRUIT BELT	64.3	17.3
GENESEE MOSELLE	83.0	16.5
GRANT FERRY	59.4	15.1
GRIDER	98.8	13.8
HAMLIN PARK	46.8	14.7
JOHNSON	21.2	19.2
KAISERTOWN	76.2	9.7

Neighborhood	**Existing Canopy (Acres)***	**% Existing Canopy**
KENFIELD	60.1	14.3
KENSINGTON	94.4	17.2
KINGSLEY	45.0	18
LAKEVIEW	21.0	12.4
LaSALLE	98.8	16.1
LEROY	79.4	15.7
LOVEJOY	82.8	13.7
M.L.K. PARK	70.0	18.1
MASTEN PARK	66.5	21
MILITARY	53.5	9.7
NORTH DELAWARE	29.0	9
NORTH PARK	120.5	14.9
PARK MEADOW	94.2	19.9
PARKSIDE	54.7	21.2
PERRY	16.4	7.5
RIVERSIDE PARK	90.7	13.2
SCHILLER PARK	119.6	15.4
SENECA	75.7	20.1
SOUTH ABBOTT	40.9	15.5
SOUTH ELLICOTT	38.7	9.4
SOUTH PARK	164.5	12.8
STARIN CENTRAL	90.9	18.2
TIFFT	125.1	10.9
TRIANGLE	46.8	15.5
UNIVERSITY	81.3	16.3
VALLEY	17.1	5.3
WATERFRONT	29.8	10.5
WILLERT PARK	51.7	9.5

*canopy includes street trees

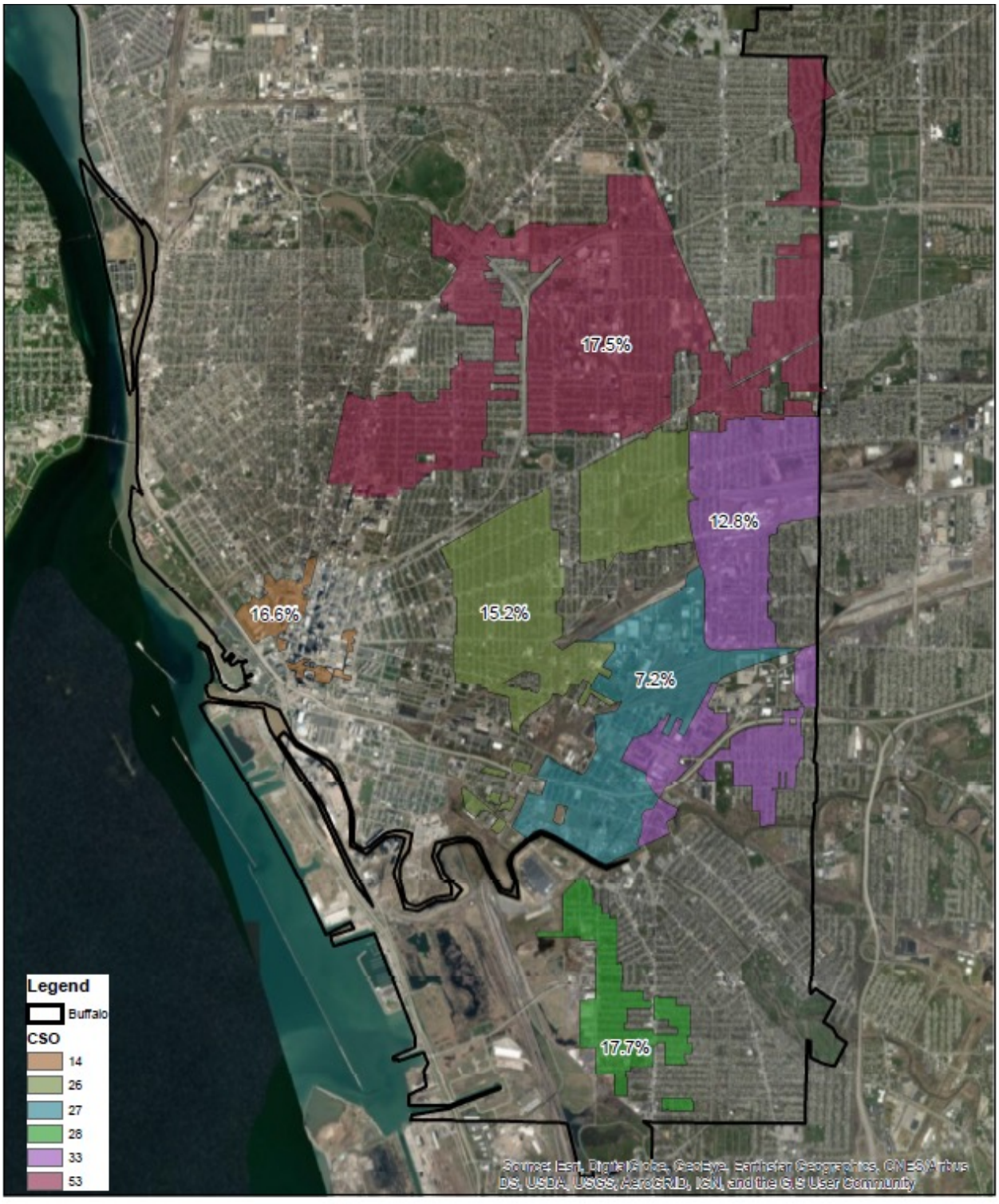


Figure 1. Existing tree canopy cover in six priority CSO Basins in Buffalo, NY.

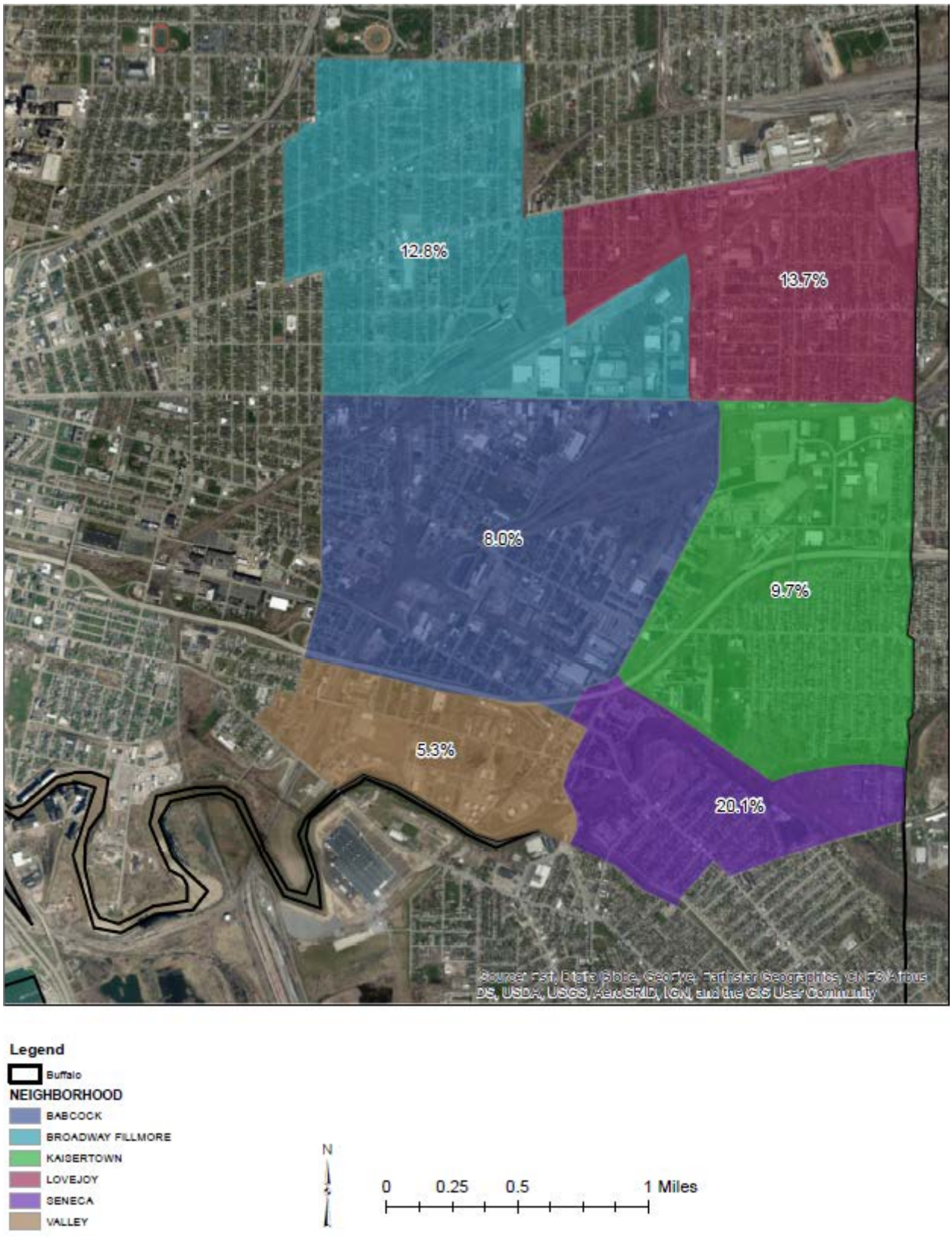


Figure 2. Existing tree canopy cover (%) in selected neighborhoods in Buffalo, NY.

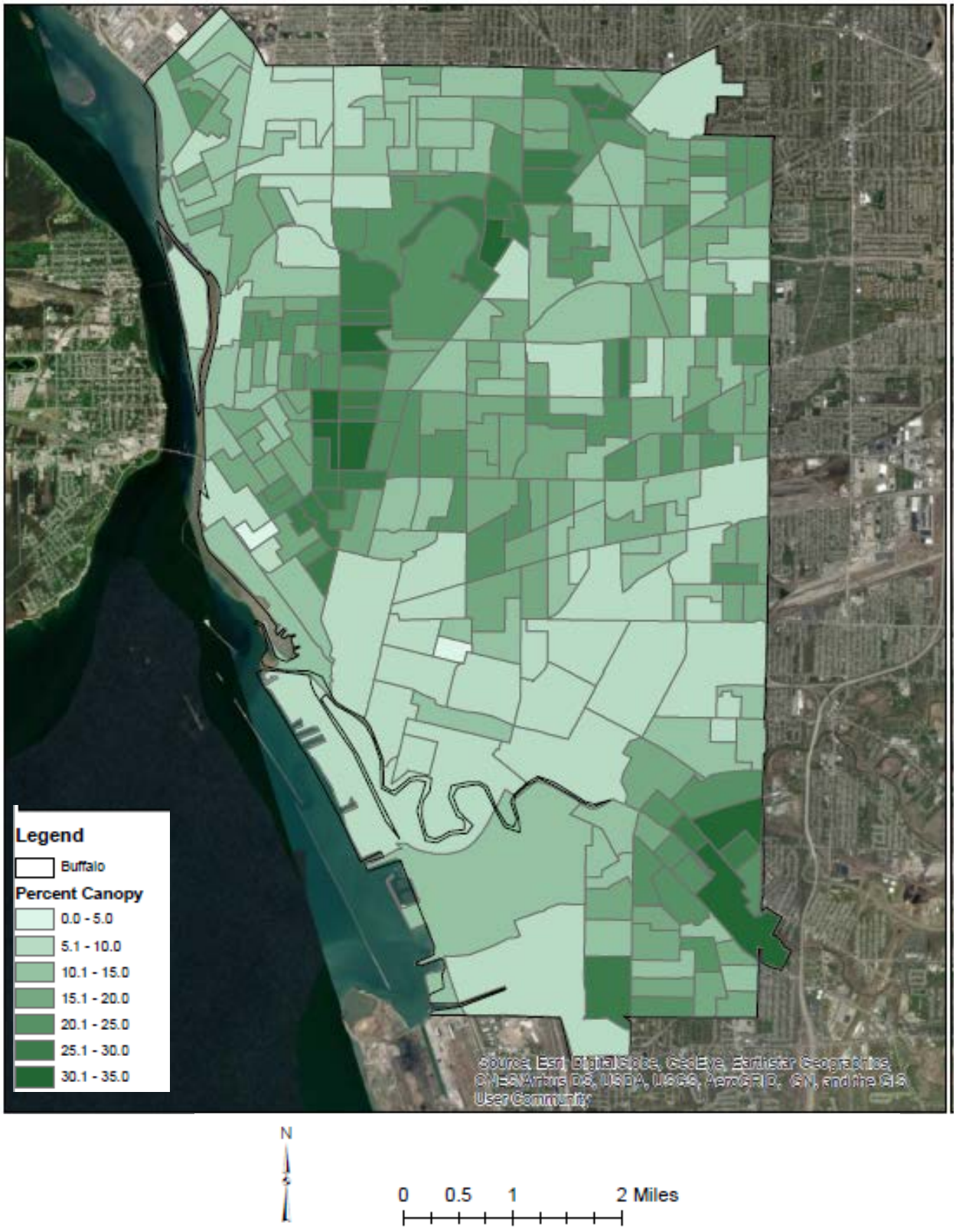


Figure 3. Existing canopy cover (%) by census block group in Buffalo, NY.

Step 2: Estimate the Potential Number of Tree Plantings

Two separate analyses were completed to identify suitable tree planting areas: street trees and non-street trees. In both analyses, the assessment first finds areas that are not suitable for tree planting, and the remaining areas are considered available for potential tree planting.

STREET TREES

The Street Tree analysis uses the TreeKeeper database, combined with other available spatial data to identify potential feasible street tree planting locations. The Treekeeper database includes an inventory of trees on public land, including all street trees. Treekeeper database includes an inventory of locations where trees are planted as well as locations with no trees. Trees that were located within a parcel, or designated as "in lot" by the TreeKeeper database were not considered "street trees" and were removed from the analysis. Locations identified as being in the front of the lot, on the side of the lot, on the rear of the lot, or in a median in the street were included in the analysis. Trees that had a species designation of "vacant" and status of "acceptable" were included as a potential tree planting location.

The designation of vacant acceptable and vacant unacceptable was sourced from the non-public TreeKeeper database. Site locations that are considered unacceptable are identified for a variety of reasons. Examples of why a location may be considered unacceptable include: a lack of soil volume; the presence of utilities at the site such as underground wires, telephone poles, or fire hydrants; or various other factors that impact the ability to plant a tree or the long-term survival of the tree (pers comm., Ross Hassinger). The vacant tree locations were not given a measurable area in the database. They were marked as points along the streets solely as location identifier that have already been assessed on the ground to be suitable for street tree planting. The number of street trees planted was simply a count of the vacant, acceptable locations identified in the TreeKeeper database.

It should be noted there were twenty street trees identified in TreeKeeper that fell just outside of the City of Buffalo boundary. These twenty trees (existing trees) were counted towards the total but were not counted in the spatial aggregate breakdowns.

NON-STREET TREES

This step included a spatial analysis of land use land cover data to broadly delineate areas unacceptable for tree planting. The remaining area within each of the spatial aggregations was considered 'plantable'. Based on the available data, unplantable areas included: existing tree canopy, roads, railroads, within 50 ft of a railroad, impervious surfaces[2] (buildings, driveways, sidewalks etc), and all parcels that are city owned and vacant. City owned vacant parcels were removed due to maintenance concerns by the city. The analysis of the potential planting areas essentially removed all areas that were unsuitable for tree planting leaving a layer of polygons deemed to be potential planting areas. This analysis was run twice, once to include parcels zoned as residential and once to exclude parcels that are zoned as residential.

The pervious area between the end of the tax parcel and road was assumed to be the public right of way and was excluded from this analysis, as it was considered street tree planting area.

The number of non-street tree planting was estimated based on a tree planting density of 35 trees per acre applied to the potential tree planting area derived from Step 2. The 35 trees per acre is based on literature values, then

(2) The impervious surface layer was created from NDVI data, converted from raster format to a shapefile. The NDVI raster data was edited to re-classify a large train yard on the eastern side of the city that had been misclassified.

modified based on best professional judgement and likelihood of planting density achievable in the City of Buffalo and may represent an upper maximum. The estimates are based on very basic assumptions and should only be interpreted as guidance. From the literature, Schroeder and Green (1985) provide an analysis of tree density in municipal parks and supporting imagery (Figure 4), while McNeil et al (2006[3] provide tree densities of existing trees for various land uses. These densities ranged from 67 to 1,371 trees/acre. Both of these estimates were considered high for this application. Consequently, the 35 trees per acre was derived from an average residential lot size in the City of Buffalo assumed two trees were planted per parcel.

Step 3: Estimate the Potential Canopy Area

The total canopy area was estimated by multiplying an assumed canopy area per tree. For street trees, we assumed that the typical canopy area was 400 sf, which was equivalent to the iTree forecast estimate for a broadleaf small tree 25 years after planting. Non-street trees were multiplied by an assumed canopy area of 600 sf, equivalent to a broadleaf medium tree 25 years after planting.

Step 4: Estimate of Impervious Acres Treated

The impervious acres equivalent of the number of trees planting as a result of the analysis is estimate. This required multiplying the street tree canopy area multiplied by the default planning level estimate for trees planted over impervious areas of 17% or 0.17 or 12% (0.12) for non-street trees. These default estimates were derived from a modelling effort supported by input from the Tree TAC. A complete description of this modelling and crediting framework is described in Caraco (2019).[4]

Figure 4. Illustration of a tree planting density of 42 trees/acre (from Schroeder and Green 1985).

(3) McNeil, J., C. Vava and Town of Oakville. 2006. Oakville's Urban Forest: Our solution to our pollution. Town of Oakville Parks and Open Space Department, Forestry Section.

(4) Caraco, D. 2019. "Rain Check 2.0 Tree Crediting Framework". Memo to the Buffalo Sewer Authority. Revised January 24, 2019.

Results

The results provide an upward maximum of the tree planting opportunity area and number of trees planted. There are a number of site specific constraints that may limit opportunities in these general areas identified once a site assessment is completed verifying the applicability of the site to accommodate tree planting and its long-term survivorship. The attached spreadsheet includes results aggregated at the neighborhood, census block and CSO scales. The shaded columns include final summary results, including # of trees, estimated canopy area and estimated impervious cover reduction. Each of these is then aggregated by street trees, non-residential non-street trees, and residential non-street trees. Results aggregated at the CSO Basin scale (in acres) area included in Tables 3-5.

The results in Table 4 suggest that, while trees cannot achieve impervious cover reduction targets by themselves, planting at all of the locations identified would achieve between 13% and 61% of the impervious cover targets, although this is an absolute upper limit on the possible impervious cover reduction. The data also suggest that the opportunities available only through planting vacant street trees would achieve a much smaller target impervious reduction, from about 1% to 9% of the impervious cover reduction targets. These results suggest that street tree planting should be combined with other tree planting efforts on private property.

Table 3. Estimated Number of Potential Plantings

CSO	Street Trees	Non-Residential Non-Street Trees	Residential Non-Street Trees
014	68	889	67
026	3,684	6,637	10,601
027	619	6,420	717
028	1,507	6,879	2,019
033	2,854	8,073	4,861
053	8,232	24,242	13,818

Table 4. Estimated Potential Canopy Area (acres)

CSO	Street Trees	Non-Residential Non-Street Trees	Residential Non-Street Trees
014	1	12	1
026	34	91	146
027	6	88	10
028	14	95	28
033	26	111	67
053	76	334	190

Table 5. Estimated Potential Equivalent Impervious Cover Reduction (acres)[1]

CSO	Street Trees	Non-Residential Non-Street Trees	Residential Non-Street Trees	Total	Goal for Sewershed	% of Goal
014	0.1	1.5	0.1	1.7	13	13%
026	5.8	11.0	17.5	34.2	64	53%
027	1.0	10.6	1.2	12.8	73	18%
028	2.4	11.4	3.3	17.1	28	61%
033	4.5	13.3	8.0	25.8	94	27%
053	12.9	40.1	22.8	75.8	299	25%

(1) The impervious cover reduction estimates included in this table are derived by multiplying the potential canopy area in Table 3 by the estimated canopy area equivalents reported in Caraco (2019). Street tree canopy area is multiplied by 0.17 and the canopy area of other trees is multiplied by 0.12.

Table 6. Tree Statistics for City Block Groups

Block Group	Area (Acres)	Existing Canopy (Acres)*	% Existing Canopy
360290001101	164.3	50.9	31.0
360290001102	737.5	50.2	6.8
360290001103	1168.6	127.4	10.9
360290001104	94.3	11.6	12.3
360290002001	104.4	16.6	15.9
360290002002	48.8	6.0	12.2
360290002003	89.4	17.1	19.1
360290002004	58.2	8.6	14.8
360290005001	1159.3	94.9	8.2
360290005002	72.6	6.2	8.6
360290006001	85.4	12.5	14.6
360290006002	69.9	9.4	13.4
360290006003	63.2	9.6	15.2
360290006004	69.0	16.4	23.7
360290007001	40.0	8.3	20.9
360290007002	49.4	5.6	11.4
360290007003	55.4	9.9	17.9
360290007004	66.2	10.0	15.0
360290007005	53.0	13.3	25.1
360290008001	48.8	10.4	21.3
360290008002	81.7	18.4	22.5
360290008003	95.3	19.7	20.7
360290008004	43.6	4.9	11.2
360290009001	46.1	8.0	17.4
360290009002	44.8	10.1	22.6
360290009003	44.8	9.2	20.5
360290010001	52.6	15.3	29.2
360290010002	46.1	31.0	67.2
360290010003	246.1	75.6	30.7
360290010004	42.9	11.5	26.8
360290010005	123.3	23.3	18.9
360290011001	151.8	36.3	23.9
360290011002	47.1	11.5	24.4
360290011003	177.5	33.2	18.7
360290014021	38.8	1.1	2.9
360290014022	37.2	4.4	11.8
360290014023	93.4	9.3	9.9
360290014024	99.6	7.0	7.0
360290015001	101.7	13.6	13.4
360290015002	134.6	20.1	15.0
360290016001	79.8	12.3	15.4
360290016002	304.8	27.0	8.9
360290016003	31.8	2.9	9.1
360290016004	68.8	7.5	10.9
360290017001	219.0	19.3	8.8
360290017002	68.6	6.4	9.3
360290019001	195.6	26.7	13.7
360290019002	71.8	7.0	9.8
360290019003	33.2	3.2	9.7
360290023001	48.4	8.4	17.4
360290023002	42.6	9.8	23.1
360290023003	45.5	3.7	8.1
360290023004	54.7	6.2	11.3
360290024001	91.0	12.6	13.8
360290024002	32.2	3.7	11.5
360290024003	50.1	10.6	21.2
360290024004	40.5	7.6	18.8
360290024005	115.3	8.8	7.6
360290024006	84.7	12.9	15.2
360290025021	87.3	12.4	14.2
360290025022	184.8	17.1	9.2
360290027021	44.5	5.0	11.3
360290027022	56.3	10.2	18.1
360290027023	78.4	8.8	11.2
360290027024	44.5	5.0	11.3
360290028001	79.4	10.5	13.3
360290028002	84.4	13.3	15.7
360290028003	28.2	3.9	13.8
360290028004	95.4	14.5	15.2
360290029001	36.5	6.7	18.3
360290029002	46.0	10.9	23.7
360290029003	55.9	9.1	16.3
360290029004	53.6	11.5	21.5

*canopy includes street trees

Table 6. Tree Statistics for City Block Groups (continued)

Block Group	Area (Acres)	Existing Canopy (Acres)*	% Existing Canopy
360290030001	42.2	7.5	17.8
360290030002	250.2	22.9	9.2
360290030003	54.6	12.5	22.9
360290031001	117.6	22.8	19.4
360290031002	60.2	12.1	20.1
360290031003	87.9	15.6	17.7
360290031004	103.7	13.7	13.2
360290033011	36.3	6.3	17.4
360290033012	53.9	8.4	15.5
360290033013	45.4	5.0	10.9
360290033014	39.7	6.5	16.5
360290033021	64.9	10.8	16.6
360290033022	81.4	16.1	19.8
360290033023	66.3	10.6	16.1
360290033024	39.3	7.0	17.8
360290034001	37.9	11.0	29.0
360290034002	45.0	9.6	21.3
360290034003	40.7	6.9	16.9
360290034004	52.1	6.9	13.2
360290034005	191.0	17.7	9.3
360290035001	82.4	9.4	11.4
360290035002	62.4	13.2	21.1
360290035003	85.9	19.7	22.9
360290035004	154.0	27.8	18.0
360290036001	105.7	15.4	14.6
360290036002	39.0	6.6	16.9
360290036003	95.9	18.2	19.0
360290036004	70.5	5.5	7.8
360290037001	56.0	6.7	11.9
360290037002	80.8	13.3	16.5
360290037003	34.6	8.5	24.4
360290037004	64.7	10.9	16.8
360290037005	35.1	5.7	16.4
360290038001	56.2	12.9	22.9
360290038002	31.5	6.6	21.1
360290038003	63.4	10.4	16.4
360290039011	129.6	16.9	13.0

Block Group	Area (Acres)	Existing Canopy (Acres)*	% Existing Canopy
360290040011	70.3	7.7	11.0
360290040012	70.6	16.8	23.8
360290040013	78.5	16.1	20.5
360290040014	117.1	16.8	14.3
360290040015	43.8	7.9	18.1
360290041001	78.0	14.4	18.5
360290041002	59.7	11.3	19.0
360290041003	40.3	4.7	11.7
360290041004	90.2	17.1	19.0
360290042001	33.7	7.3	21.6
360290042002	41.7	7.9	18.8
360290042003	46.2	6.9	14.9
360290042004	70.4	7.6	10.8
360290042005	47.3	9.1	19.3
360290043001	41.7	8.1	19.5
360290043002	34.7	5.2	15.1
360290043003	37.3	7.8	20.9
360290043004	61.4	15.3	24.9
360290043005	34.4	6.7	19.4
360290043006	52.7	7.8	14.8
360290043007	26.9	6.1	22.8
360290044011	46.2	7.8	17.0
360290044012	50.4	8.5	16.8
360290044013	88.8	10.8	12.1
360290044014	58.8	10.0	17.0
360290044021	75.7	4.6	6.1
360290044022	69.7	8.0	11.5
360290045001	135.1	64.0	47.4
360290045002	84.9	9.5	11.2
360290045003	77.4	12.5	16.2
360290045004	96.5	26.6	27.6
360290045005	57.5	17.5	30.4
360290045006	48.4	8.5	17.5
360290046011	56.9	11.2	19.7
360290046012	38.9	3.8	9.7
360290046013	68.1	0.6	0.8

*canopy includes street trees

Block Group	Area (Acres)	Existing Canopy (Acres)*	% Existing Canopy
360290046014	38.1	6.9	18.2
360290046021	293.3	20.7	7.1
360290047001	66.2	11.2	16.8
360290047002	53.4	8.9	16.6
360290047003	56.2	8.9	15.9
360290047004	123.7	17.0	13.8
360290047005	66.4	14.9	22.4
360290048001	75.2	10.0	13.3
360290048002	88.9	20.0	22.5
360290048003	80.0	12.7	15.9
360290049001	70.1	8.0	11.4
360290049002	85.1	9.4	11.0
360290049003	33.5	4.6	13.8
360290049004	30.4	3.6	11.8
360290049005	58.0	7.3	12.6
360290050001	129.4	8.5	6.6
360290050002	31.8	4.8	15.1
360290050003	159.0	10.2	6.4
360290051001	136.6	20.5	15.0
360290051002	54.7	8.5	15.5
360290051003	50.2	7.2	14.4
360290051004	45.8	6.5	14.2
360290052011	60.0	14.6	24.3
360290052012	42.1	10.9	25.8
360290052013	100.8	9.8	9.8
360290052014	56.0	16.1	28.7
360290052021	65.1	8.1	12.4
360290052022	77.9	12.6	16.2
360290053001	130.0	37.6	29.0
360290053002	442.9	89.6	20.2
360290054001	189.9	41.5	21.9
360290054002	106.9	14.2	13.3
360290054003	72.2	15.8	21.8
360290054004	108.1	25.5	23.6
360290055001	78.9	7.6	9.6
360290055002	47.0	7.4	15.8
360290055003	174.9	26.0	14.9

Block Group	Area (Acres)	Existing Canopy (Acres)*	% Existing Canopy
360290055004	82.6	10.1	12.2
360290056001	48.3	3.4	6.9
360290056002	261.9	16.8	6.4
360290056003	159.1	19.0	12.0
360290056004	50.0	5.5	11.0
360290056005	23.5	2.2	9.4
360290057001	128.6	14.7	11.4
360290057002	62.2	6.5	10.5
360290057003	45.6	8.6	18.9
360290058011	89.9	12.1	13.4
360290058012	52.5	5.1	9.6
360290058013	26.9	6.1	22.7
360290058021	42.9	8.4	19.6
360290058022	130.5	18.0	13.8
360290058023	29.4	5.7	19.2
360290058024	54.8	5.3	9.6
360290059001	27.1	4.9	17.9
360290059002	39.1	4.9	12.6
360290059003	61.3	7.9	12.9
360290059004	30.6	5.4	17.5
360290059005	149.2	19.7	13.2
360290061001	122.7	14.4	11.7
360290061002	33.1	5.0	15.2
360290061003	41.7	4.6	11.0
360290061004	33.5	6.0	18.0
360290061005	35.5	4.9	13.8
360290062011	118.1	10.9	9.2
360290063011	33.3	7.6	22.8
360290063012	37.1	8.9	24.1
360290063013	36.5	6.6	18.0
360290063014	47.3	9.5	20.1
360290063015	26.6	5.6	21.2
360290063021	154.6	42.5	27.5
360290063022	68.4	19.7	28.7
360290063023	36.7	9.4	25.7
360290065011	35.8	7.6	21.2

*canopy includes street trees

Table 6. Tree Statistics for City Block Groups (continued)

Block Group	Area (Acres)	Existing Canopy (Acres)*	% Existing Canopy
360290065012	29.5	6.9	23.2
360290065013	24.9	5.5	21.9
360290065014	26.6	4.1	15.6
360290066011	24.2	4.4	18.1
360290066012	46.9	13.9	29.5
360290066013	25.7	5.1	20.0
360290066021	38.5	11.0	28.4
360290066022	29.4	6.3	21.6
360290066023	42.2	9.4	22.2
360290067011	56.4	17.6	31.3
360290067012	40.3	7.3	18.0
360290067013	41.3	13.1	31.7
360290067021	63.1	15.9	25.2
360290067022	47.0	10.8	22.9
360290067023	85.4	27.5	32.2
360290068001	30.9	7.2	23.4
360290068002	88.3	16.7	18.9
360290068003	52.0	14.4	27.6
360290068004	42.6	11.4	26.7
360290069011	37.1	5.1	13.7
360290069012	29.3	3.9	13.2
360290069013	50.2	9.0	17.9
360290069014	29.4	4.7	16.2
360290069021	64.8	9.9	15.3
360290069022	35.9	8.9	24.8
360290069023	34.8	5.3	15.2
360290069024	24.3	4.3	17.5
360290070001	70.6	9.2	13.1
360290070002	153.2	15.6	10.2
360290070003	72.4	13.4	18.5
360290071011	26.1	5.7	21.7
360290071012	41.1	2.7	6.5
360290071013	64.3	11.8	18.3
360290071014	38.3	1.8	4.8
360290071021	149.2	20.9	14.0
360290071022	42.2	11.0	26.2
360290071023	24.5	4.7	19.3
360290072021	269.4	29.6	11.0
360290163001	213.8	11.4	5.3
360290163002	387.4	33.2	8.6
360290163003	441.1	25.9	5.9
360290164001	149.5	13.5	9.0
360290164002	117.8	14.4	12.2
360290164003	208.7	18.8	9.0
360290164004	159.2	9.2	5.8
360290165001	469.9	42.9	9.1
360290166001	73.7	14.9	20.2
360290166002	46.7	7.1	15.2
360290166003	58.7	13.2	22.4
360290166004	109.5	21.2	19.3
360290167001	54.1	5.5	10.1
360290167002	33.0	2.8	8.6
360290167003	383.8	23.3	6.1
360290168001	115.0	26.3	22.9
360290168002	103.3	22.4	21.7
360290168003	107.2	12.6	11.8
360290168004	100.8	17.5	17.4
360290169001	38.8	12.6	32.4
360290169002	57.3	13.0	22.7
360290169003	80.4	15.6	19.4
360290169004	46.2	8.3	17.9
360290170001	87.3	16.0	18.3
360290170002	261.1	29.0	11.1
360290171001	213.6	20.6	9.6
360290171002	35.4	5.9	16.7
360290171003	31.8	7.4	23.4
360290171004	31.8	7.5	23.8
360290171005	183.6	21.3	11.6

*canopy includes street trees

APPENDIX D: ECONOMIC IMAPACT ANALYSIS

PURPOSE

Buffalo Sewer Authority (BSA) wishes to estimate the quantifiable economic benefits of its green infrastructure (GI) initiative, Rain Check 2.0, as part of a broader effort to incorporate social equity into BSA's decision-support process. Based on the Buffalo Metropolitan Statistical Area (MSA), more precisely Buffalo-Cheektowaga-Niagara Falls, NY, which covers all of Erie and Niagara Counties, this memorandum:

- Explores the economic impact of a hypothetical GI project using IMPLAN
- Provides an overview of the size, composition, and income of Buffalo's "Green Infrastructure Workforce," as defined by Jobs for the Future, a nonprofit organization, using standard occupation classifications used by the US Government to gather economic statistics

The results should be interpreted as the approximate expected impacts to the Buffalo economy based on a single change in spending in several sectors related to GI (i.e., the construction of a green infrastructure project) in a single year. The reader should also bear in mind that this analysis is of a non-specific, hypothetical project, and the impacts of actual projects or larger programs may vary significantly depending on scale and composition.

METHODOLOGY AND DATA SOURCES

IMPLAN Economic Impact

The economic impact of green infrastructure (GI) projects was modeled using IMPLAN, a software program with proprietary data sets commonly used by planners to model economic impacts of projects and policy changes. The data is for 2016, the most recent year available. The analysis study area is the Buffalo Metropolitan Area (MSA), which is defined as Erie and Niagara Counties, as shown in Figure 1.

For the analysis, a hypothetical $1 million green infrastructure project was modeled as an Industry Change. The $1 million project was separated into industry sectors to accurately model the impacts. Using project experience with BSA input, Arcadis divided the $1 million into six sectors, as shown in Table 1. The table also includes Local Purchase Percentage (LPP), which is the amount (on a scale of 0-1) of the value of impact event (in this case "industry sales") that will be applied to the regional multipliers. It implies that 1-LPP will be the proportion of the impact event activity that will be imported from outside the economy and have no impact on the local economy. These values are provided by IMPLAN.

Multipliers are key to modeling the economic impact of the industry change. Multipliers represent the total production requirements within the Study Area for every unit of production sold to Final Demand. For example, purchasing a restaurant meal in the study area requires the restaurant to make purchases of ingredients, utilities, labor, and rent, for example, and these purchases will in turn induce additional spending in the region.

A Type I Multiplier is calculated by dividing the sum of the Direct Effects (the change in Final Demand that the analyst inputs into IMPLAN) plus the Indirect Effects (the additional economic activity from Industries buying from other local Industries) by the Direct Effects.

A Type SAM Multiplier (where SAM stands for Social Accounting Matrix) is calculated by dividing the sum of the Direct Effects, Indirect Effects, and Induced Effects by the Direct Effects. The Induced Effects represent the spending of Labor Income by the employees working in the Indirectly-impacted Industries, under the assumption that the more income households earn, the more money those households spend. Note that IMPLAN does not assume that 100% of this Labor Income is spent, nor that it is spent locally. IMPLAN removes payroll taxes, personal

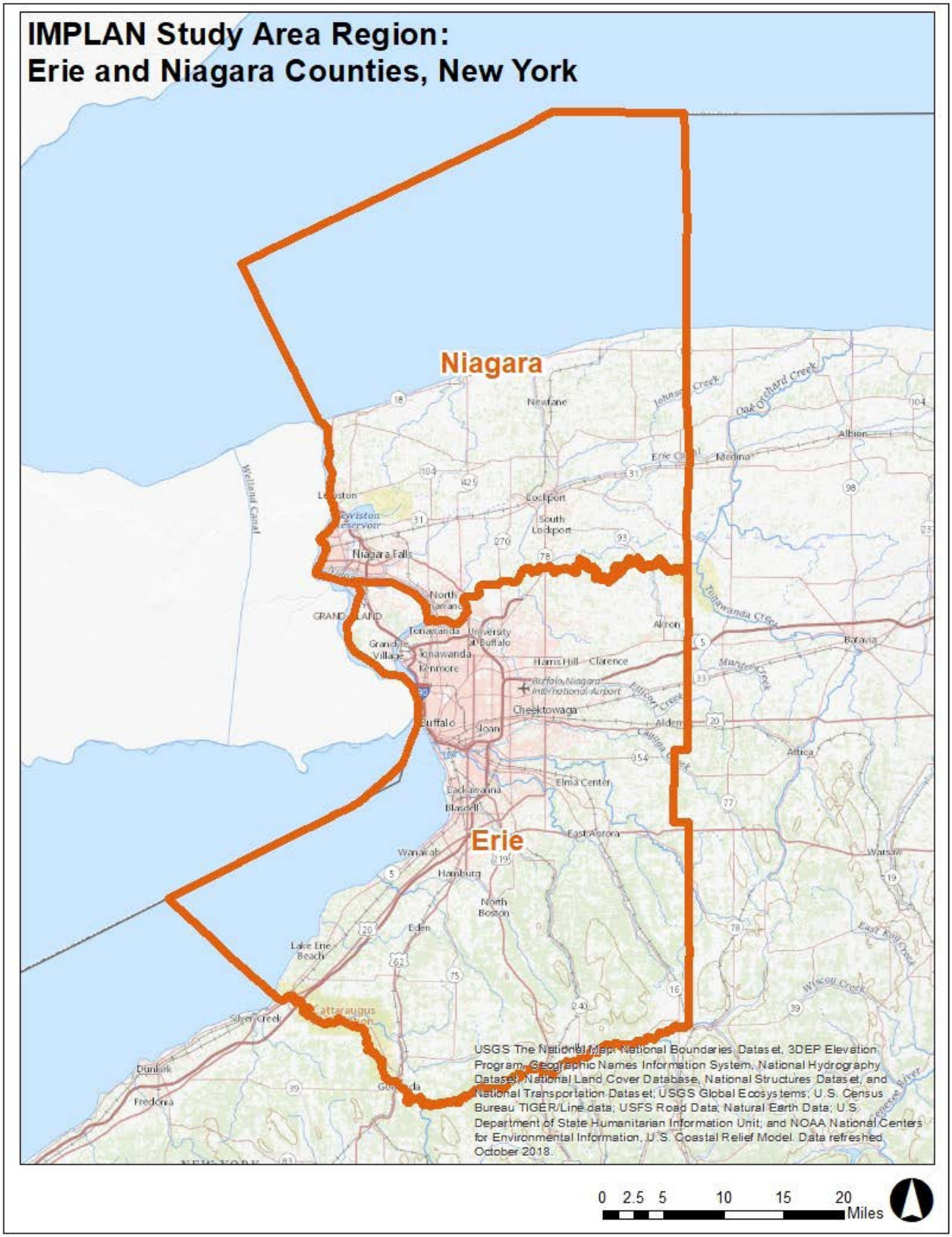

IMPLAN Study Area Region:
Erie and Niagara Counties, New York
Niagara
Erie
Newfane
Lockport
South Lockport
Niagara Falls
North Tonawanda
Tonawanda
University at Buffalo
Grand Island
Grand Island Village
Kenmore
Harris Hill
Clarence
Buffalo Niagara International Airport
Cheektowaga
Buffalo
Sloan
Akron
Batavia
Albion
Medina
Attica
Elma Center
Lackawanna
Blasdell
East Aurora
Wanakah
Hamburg
North Boston
Eden
Lake Erie Beach
Silver Creek
Dunkirk
Fredonia
Warsaw
Wolcott Creek
Johnson Creek
Oak Orchard Creek
Tonawanda Creek
Murder Creek
Eighteen Mile Creek
Cayuga Creek
Welland Canal
USGS The National Map: National Boundaries Dataset, 3DEP Elevation Program, Geographic Names Information System, National Hydrography Dataset, National Land Cover Database, National Structures Dataset, and National Transportation Dataset; USGS Global Ecosystems; U.S. Census Bureau TIGER/Line data; USFS Road Data; Natural Earth Data; U.S. Department of State Humanitarian Information Unit; and NOAA National Centers for Environmental Information, U.S. Coastal Relief Model. Data refreshed October 2018.
0 2.5 5 10 15 20
Miles

Figure 1

Table 1: Breakdown of Green Infrastructure Project by Sector

IMPLAN Code	Description	Green Infrastructure Investment	Local Purchase (%)
6	Greenhouse, nursery, and floriculture production	$50,000	5.35
51	Water, sewage and other systems	$300,000	99.89
58	Construction of other new non-residential structures	$300,000	98.80
449	Architectural, engineering, and related services	$105,000	73.55
455	Environmental and other technical consulting services	$70,000	66.22
469	Landscape and horticultural services	$175,000	60.70
TOTAL		$1,000,000	

Table 2: Green Infrastructure Sector Multipliers for Buffalo MSA, from IMPLAN

IMPLAN Code	Description	Type I Multiplier	Type SAM Multiplier
6	Greenhouse, nursery, and floriculture production	1.214831259	1.474679763
51	Water, sewage and other systems	1.361177175	1.838196391
58	Construction of other new nonresidential structures	1.202653738	1.601569156
449	Architectural, engineering, and related services	1.491248268	2.088430739
455	Environmental and other technical consulting services	1.212623187	1.707998386
469	Landscape and horticultural services	1.073732759	1.298422266

income taxes, savings, in-commuter income, and non-local purchases before spending the rest locally. These leakages and expenditures are based on information in the SAM. IMPLAN's SAM is localized at the county level.

Table 2 lists the Type I and SAM multipliers for the selected industry sectors relevant to Green infrastructure, as previously described.

Green Infrastructure Jobs and Employment

Jobs for the Future (JFF), a national non-profit foundation, in a Natureworks Issue Brief titled, Exploring the Green Infrastructure Workforce identified 30 occupations in the interconnected sectors of construction, landscaping, groundskeeping, urban forestry, tree care, ecological restoration, and water/

wastewater. These occupations, including their Standard Occupational Classification (SOC) numerical codes, are listed in Table 3.

The US Bureau of Labor Statistics (BLS) published employment data at the MSA level by SOC code, including wages. Table 4 lists the occupations that comprise the green infrastructure workforce, and the estimated number of these occupations in the Buffalo MSA, as well as the hourly median wage for each.

Note that not all the green infrastructure workforce occupations identified by JFF were present in the Buffalo MSA according to the BLS data. This may be due to a statistically insignificant number of workers in these fields in Buffalo. Several occupations were omitted from the analysis because they were considered inapplicable, such as Roofers, since green roofs are not part of the initiative, or because they are too general, such as Maintenance and Repair Workers, General. Table 5 lists the occupations missing or omitted from the Buffalo MSA data.

Location quotient is a measure of how significant or "concentrated" that occupation is in Buffalo's economy relative to the United States as a whole; a value of 1.0 means the same concentration of workers as the US as a whole; a value less than 1.0 means that occupation is less concentrated in Buffalo, a value greater than 1.0 means it is more concentrated. High location quotient often indicates an export-oriented occupation, with export meaning good or services sold outside the Buffalo MSA.

SUMMARY OF FINDINGS

IMPLAN Economic Impact

A green infrastructure project costing $1 million (a cost estimate is provided in Table 1) should have a $1.5 million impact on Buffalo's economy in the year the project is built, or $1.52 for each $1 invested.

Table 6 summarizes the economic impacts observed using the IMPLAN model for the $1 Million GI project. The definitions are as follows:

Direct Effect—The set of production changes or expenditures made by producers/consumers because of the project. Applying these initial changes to the multipliers in an IMPLAN model will then display how the region will respond, economically to these initial changes.

Indirect Effect—The impact of local industries buying goods and services from other local industries. The cycle of spending works its way backward through the supply chain until all money leaks from the local economy, either through imports or by payments to value added. The impacts are calculated by applying Direct Effects to the Type I Multipliers.

Induced Effect—The response by an economy to the project (direct effect) that occurs through re-spending of income received by a component of value added. IMPLAN's default multiplier recognizes that labor income (employee compensation and proprietor income components of value added) is recirculated through the household spending patterns causing further local economic activity.

Employment—A job in IMPLAN = the annual average of monthly jobs in that industry. Thus, 1 job lasting 12 months = 2 jobs lasting 6 months each = 3 jobs lasting 4 months each. A job can be either full-time or part-time.

Labor Income—All forms of employment income, including Employee Compensation (wages and benefits) and Proprietor Income resulting from the project.

Value Added—The difference between an industry's or an establishment's total output and the cost of its intermediate inputs. It equals gross output (sales or receipts and other operating income, plus inventory change) minus intermediate inputs (consumption of goods and services purchased from

Table 3: Installation, Maintenance, and Inspection Occupations from Exploring the Green Infrastructure Workforce

SOC Code	Occupation Title
Architecture and Engineering Occupations	
17-3025	Environmental Engineering Technicians
Life, Physical, and Social Science Occupations	
19-4093	Forest and Conservation Technicians
Building and Grounds Cleaning and Maintenance Occupations	
37-1012	First-Line Supervisors of Landscaping, Lawn Service, and Groundskeeping Workers
37-3011	Landscaping and Groundskeeping Workers
37-3012	Pesticide Handlers, Sprayers, and Applicators, Vegetation
37-3013	Tree Trimmers and Pruners
Fishing, Farming, and Forestry Occupations	
45-1011	First-Line Supervisors of Farming, Fishing, and Forestry Workers
45-2092	Farmworkers and Laborers, Crop, Nursery, and Greenhouse
45-4011	Forest and Conservation Workers
Construction and Extraction Occupations	
47-1011	First-Line Supervisors, Construction Trades and Extraction Workers
47-2051	Cement Masons and Concrete Finishers
47-2061	Construction Laborers
47-2071	Paving, Surfacing, and Tamping Equipment Operators
47-2073	Operating Engineers and other Construction Equipment Operators
47-2151	Pipelayers
47-2181	Roofers
47-3015	Helpers—Pipelayers, Plumbers, Pipefitters, and Steamfitters
47-3016	Helpers—Roofers
47-4011	Construction and Building Inspectors
47-4071	Septic Tank Servicers and Sewer Pipe Cleaners
47-4091	Segmental Pavers
47-5021	Earth Drillers, Except Oil and Gas
Installation, Maintenance, and Repair Occupations	
49-9012	Control and Valve Installers and Repairers, Minus Mechanical Door
49-9098	Helpers—Installation, Maintenance, and Repair Workers
Production Occupations	
51-8031	Water and Wastewater Treatment Plant and System Operators
Transportation and Materials Moving Occupations	
53-7032	Excavating and Loading Machine and Dragline Operators
53-7051	Industrial Truck and Tractor Operators
53-7072	Pump Operators, Except Wellhead Pumpers

Table 4: Green Infrastructure Workforce statistics for Buffalo MSA, Courtesy US Bureau of Labor Statistics

Standard Occupational Classification (SOC) Code	Occupation	Total Employment in Buffalo MSA (rounded to nearest 10)	Employment per 1,000 of total jobs in Buffalo MSA	Location Quotient	Hourly median wage
17-3025	Environmental Engineering Technicians	40	0.068	0.55	$21.28
37-1012	First-Line Supervisors of Landscaping, Lawn Service, and Groundskeeping Workers	220	0.406	0.58	$23.05
37-3011	Landscaping and Groundskeeping Workers	3,360	6.14	0.96	$14.16
37-3013	Tree Trimmers and Pruners	60	0.105	0.37	$23.70
47-1011	First-Line Supervisors of Construction Trades and Extraction Workers	1,550	2.834	0.73	$33.80
47-2051	Cement Masons and Concrete Finishers	470	0.854	0.68	$18.60
47-2061	Construction Laborers	3,860	7.039	1.04	$17.16
47-2071	Paving, Surfacing, and Tamping Equipment Operators	160	0.286	0.82	$30.18
47-2073	Operating Engineers and Other Construction Equipment Operators	890	1.633	0.64	$28.85
47-2151	Pipelayers	30	0.06	0.22	$27.08
47-3015	Helpers--Pipelayers, Plumbers, Pipefitters, and Steamfitters	90	0.166	0.43	$13.32
47-3016	Helpers--Roofers	**	**	**	$14.36
47-4011	Construction and Building Inspectors	540	0.985	1.42	$27.96
47-4071	Septic Tank Servicers and Sewer Pipe Cleaners	70	0.119	0.64	$20.82
49-9012	Control and Valve Installers and Repairers, Except Mechanical Door	360	0.661	1.98	$34.31
51-8031	Water and Wastewater Treatment Plant and System Operators	430	0.778	0.94	$24.70
53-7051	Industrial Truck and Tractor Operators	1,710	3.122	0.78	$18.29
TOTAL		13,840	25	**	(Average) $23.04

Table 5: Green Infrastructure Occupations not present in Buffalo MSA data, or omitted

SOC Code	Occupation Title	Not Present/ Omitted
Life, Physical, and Social Science Occupations		
19-4093	Forest and Conservation Technicians	NP
Building and Grounds Cleaning and Maintenance Occupations		
37-3012	Pesticide Handlers, Sprayers, and Applicators, Vegetation	NP
37-3013	Tree Trimmers and Pruners	NP
Fishing, Farming, and Forestry Occupations		
45-1011	First-Line Supervisors of Farming, Fishing, and Forestry Workers	NP
45-2092	Farmworkers and Laborers, Crop, Nursery, and Greenhouse	NP
45-4011	Forest and Conservation Workers	NP
Construction and Extraction Occupations		
47-4091	Segmental Pavers	NP
47-5021	Earth Drillers, Except Oil and Gas	NP
47-2181	Roofers	O
Installation, Maintenance, and Repair Occupations		
49-9071	Maintenance and Repair Workers, General	O
49-9098	Helpers—Installation, Maintenance, and Repair Workers	O
Transportation and Materials Moving Occupations		
53-7032	Excavating and Loading Machine and Dragline Operators	NP
53-7072	Pump Operators, Except Wellhead Pumpers	NP
53-7062	Laborers and Freight, Stock, and Material Movers, Hand	O

Table 6: Summary of Economic Impacts

Impact Type	Employment	Labor Income ($)	Value Added ($)	Output ($)
Direct Effect	8.7	476,980	613,516	828,588
Indirect Effect	1.5	86,317	132,728	235,590
Induced Effect	3.3	148,173	274,474	456,769
Total Effect	13.5	711,470	1,020,719	1,520,947

other industries or imported). Value added consists of compensation of employees, taxes on production and imports less subsidies (formerly indirect business taxes and nontax payments), and gross operating surplus

Output—Output represents the value of industry production. In IMPLAN these are annual production estimates for the year of the data set and are in producer prices. For manufacturers this would be sales plus/minus change in inventory.

The Green Infrastructure Workforce in Buffalo

The $1 million project would be expected to generate approximately 13 jobs during its design and construction, primarily in the construction, water/sewer systems, and landscaping industries.

As of May 2017, the Buffalo Metropolitan Area had approximately 13,840 jobs in industry sectors related to green infrastructure design, construction, and maintenance (the total number of jobs in all occupations in the Buffalo MSA in 2017 was 547,750, according to BLS). These jobs had an average median hourly wage of $23.04, which is 30 percent higher than the median hourly wage for the Metropolitan Area as a whole, $17.77.

1) Bureau of Labor Statistics Occupational Employment Statistics Survey, May 2017 Metropolitan and Nonmetropolitan Area Occupational Employment and Wage Estimates; Buffalo-Cheektowaga-Niagara Falls, NY. Retrieved 10/16/2018. https://www.bls.gov/oes/current/oes_15380.htm

APPENDIX E: DEVELOPMENT TRENDS ANALYSIS

BUFFALO BUILDING PERMITS

An analysis of the City of Buffalo Building Permit dataset for 2007 to 2018 was performed to identify development trends in Buffalo. It should be noted that out of 86,084 total building permit records, 2,732 records had missing or incorrect coordinates and could not be mapped, and so are excluded from this analysis. The following summarizes the analysis.

Overview

Overall, the areas comprising downtown Buffalo and its adjacent areas in the West Side and Elmwood Village, which include **Central**, **Allentown**, **Lower West Side**, **West Side**, **Upper West Side**, **Elmwood Bryant**, and **Elmwood Bidwell**, are seeing a consistently high number of building permits, in relation to their square mileage. Other areas which are seeing notable development trends are **North Park** and **Hamlin Park**.

Of these hotspot neighborhoods:

- The areas seeing heavy residential development (per square mile) are: **West Side**, **Elmwood Bryant**, **Hamlin Park**, and **North Park**, followed by **Elmwood Bidwell**, **South Park**, and **Kensington-Bailey**. Within these neighborhoods, **CSO priority area 028**, which is partially located in South Park, and **CSO priority area 053**, which is partially located in Hamlin Park, are both undergoing notable residential development per square mile.
- The areas seeing heavy commercial development (per square mile) are: **Allentown** and **Elmwood Bryant**, followed by **Lower West Side**, **Central**, **West Side**, **Ellicott**, **Upper West Side**, and **North Park**. Of particular note, the parts of Lower West Side and Central which comprise **CSO priority area 014** are seeing very high commercial development per square mile.
- The areas seeing heavy industrial development (per square mile) are: **Grant-Amherst** and **West Side**, followed by **First Ward**, **Seneca Babcock**, **Upper West Side**, **Ellicott**, and **Black Rock**. **CSO priority area 027**, which is partially located in Seneca Babcock, is the CSO priority area seeing highest industrial development per square mile. It is worth noting that while some of these areas, such as West Side and Upper West Side, are also hotspots of other types of development (e.g., residential and commercial), most of the areas seeing heavy industrial development are seeing little other development.

Of all the CSO priority areas, **CSO area 014**, which is located downtown and has the smallest area of all the CSO priority areas, is seeing the greatest overall development (all permit types) per square mileage. **CSO priority area 027** is seeing the least amount of overall development per square mileage; however, it has the highest concentration of industrial permits in the last two years of any CSO priority area.

Some of these findings are corroborated by the 1-year forecast of the Zillow Home Value Index, which shows the highest projected increases in home values to be located in **Upper West Side**, parts of **Elmwood Bidwell** and **Elmwood Bryant**, as well as **Kaisertown** in **South Buffalo** and **Central Park** in North Buffalo.

In general, many of the neighborhoods seeing the least overall development are amongst the neighborhoods receiving the highest number of industrial permits. These include **Grant-Amherst**, **First Ward**, **Seneca Babcock**, **Ellicott**, **Black Rock**, **Delavan Grider**, and **Fillmore-Leroy**.

Downtown Buffalo

Downtown Buffalo is seeing significant commercial development. **Allentown** has seen more commercial permits per square mile in the last two years than any other neighborhood, with **Central** following close behind. The total value of commercial permits in Central since 2016 far exceeds that of any other neighborhood, coming out to a sum of at least $154M. Indeed, Central has seen

far more permits valued $100K and higher than any other neighborhood. **CSO priority area 014** falls partially within this area.

Allentown has seen moderate-to-high residential development, while Central has received almost no residential permits per square mile. Neither are hotspots for industrial development.

These trends have been relatively consistent since 2010.

West Side

Several areas in the West Side are undergoing heavy development. **West Side**, **Upper West Side**, and **Lower West Side**—which includes parts of **CSO priority area 014**—have all received a significant number of commercial permits per square mile since 2016. West Side and Upper West Side have also seen heavy residential and industrial development, in addition to a high number of vacant land permits and demolitions. The Zillow 1-year home value forecast projects a substantial increase in the Zillow Home Value Index in Upper West Side over the next year.

Further north, **Riverside** is also seeing a moderate-high number of residential developments per square mile, with little other developments and no expected growth. **Black Rock** is one of Buffalo's neighborhoods seeing the least overall development, though with a moderate-high amount of industrial development. **Grant-Amherst** is also a cold spot for commercial and residential developments; however, it has seen the highest number of industrial permits per square mile of any neighborhood in the last two years, although the cumulative value of these permits is relatively low, at $4M.

Elmwood Village

Elmwood Bidwell and **Elmwood Bryant** are hotspots for commercial and residential development. Neither have had any industrial development. These trends are expected to continue, with residential developments—in tandem to increased home values—possibly projected to increase in parts of Elmwood Bidwell. A small section of **CSO priority area 053** overlaps with Elmwood Bryant.

North Buffalo

In North Buffalo, **North Park** is amongst Buffalo's neighborhoods receiving the highest number of residential permits (and overall permits) per square mile. Neighboring **Central Park** is also seeing a moderate-high amount of residential development. Zillow projects that the Home Value Index in Central Park will see substantive increases over the next year. Commercially, North Park has received a moderate-high number of permits per square mile since 2016, though Central Park has seen less. Both trends have been relatively consistent since 2010.

Parkside and **University Heights** have seen a moderate amount of consistent residential development with little commercial and almost no industrial development. However, permit values in Parkside have fluctuated over the last 10 years, especially for other permit types (recreation and entertainment; community services; public services; and/or wild, forested, conservation lands and public parks) and vacant land permits, and University Heights has seen similar such fluctuations since 2014. These may be neighborhoods to watch for future growth. A small section of **CSO priority area 053** overlaps with Parkside.

West Hertel is amongst Buffalo's neighborhoods with the least overall development per square mile, despite several spikes in commercial permit values since 2008.

East Side

Buffalo's East Side is a large area with a lot of variation in development trends between neighborhoods. **Hamlin Park** and **Kensington-Bailey** are two of Buffalo's neighborhoods seeing the highest number of overall permits per square mile since 2016. This is due mostly to heavy residential development per square mile. While Kensington-Bailey is also seeing a moderate amount of

commercial development per square mile, Hamlin Park is seeing very little commercial development. **CSO priority area 053** falls partially within both of these areas.

Fillmore-Leroy, **Delavan Grider**, and **Genesee-Moselle** are amongst Buffalo's heaviest industrial neighborhoods, based on numbers of industrial permits per square mile since 2016. Delavan Grider, while not historically receiving many industrial permits, saw a spike in 2017, with one particular project worth $44M. All three are seeing a moderate to moderate-low number of residential permits per square mile and, while Fillmore-Leroy is seeing a moderate amount of commercial development, Delavan Grider and Genesee-Moselle have seen very little commercial development per square mile. Genesee-Moselle has had a history of vacant land/demolition permits which have decreased as residential permits have increased in the last 10 years.

Masten Park, **Fruit Belt**, **MLK Park**, **Broadway Fillmore**, **Kenfield**, and **Schiller Park** all see a moderate amount of development. Schiller Park and Masten Park have seen a moderate-high amount of residential development per square mile since 2016, while MLK Park, Broadway Fillmore, and Fruit Belt have seen less residential but more commercial development per square mile in the same period. Similar to neighboring Genesee-Moselle, Broadway Fillmore has seen a decrease in vacant land permits possibly correlated with an increase in residential permits in the last 10 years. It has also seen a steady increase in commercial permit values since 2014, which may be worth watching for further growth. Masten Park and MLK Park have seen similar, but milder, negative vacant land-residential permit relationships over the last 10 years. Fruit Belt, neighboring the development-heavy neighborhood of Allentown near downtown, has seen a lot of fluctuation in permit values of all types since 2009 and may merit further analysis for future trends.

Pratt-Willert and **Lovejoy** are two of Buffalo's neighborhoods that have seen the least overall development per square mile since 2016. Despite this, Pratt-Willert has seen a steady increase in total commercial permit values since 2015, which may merit further trend analysis.

The East Side contains most of Buffalo's CSO priority areas. **CSO priority area 053**, which has the largest surface area of any CSO priority area, resides mostly in the East Side, overlapping with residential-heavy areas such as Hamlin Park and Kensington-Bailey, in addition to Fillmore-Leroy, Delavan Grider, Masten Park, Fruit Belt, Genesee-Moselle, Schiller Park, and Kenfield. **CSO priority area 033** is mostly located in East Buffalo, overlapping with Lovejoy, Genesee-Moselle, and Schiller Park, and **CSO priority area 026** fall mostly within Broadway Fillmore, with parts also in Genesee-Moselle and MLK Park.

South Buffalo

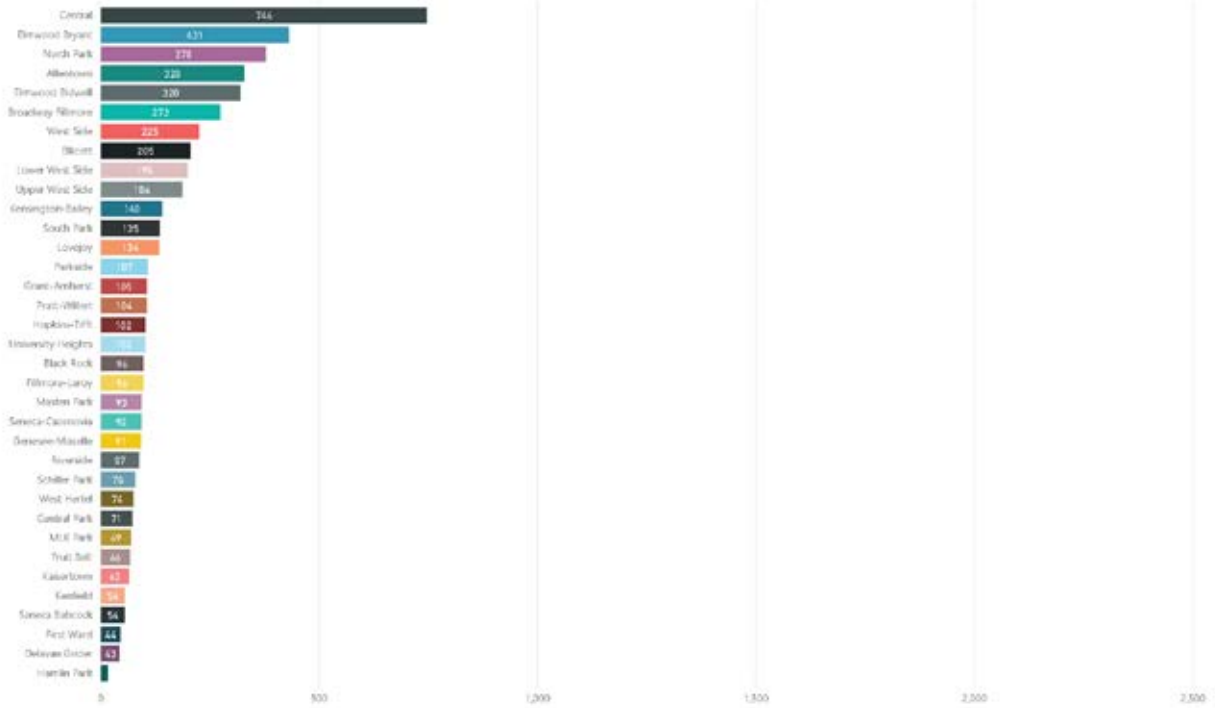
South Buffalo contains some of the neighborhoods in Buffalo with the least overall development. An exception to this is the **South Park** neighborhood, which has seen a consistently high number of residential permits per square mile since 2010 and a steady increase in total permit values for other permit types since 2016. Of interest, while **Kaisertown** has not historically or recently seen a particularly notable number of building permits, Zillow forecasts a substantial increase in the Home Value Index in Kaisertown over the next year. Whether or not this may be an indicator for future growth and increasing development in Kaisertown may be something to consider for further analysis. A substantial portion of Kaisertown's surface area is located in **CSO priority area 033**.

Seneca-Cazenovia is moderate to moderate-low for all permit types, while neighboring **Seneca Babcock** and **Hopkins-Tifft** are seeing very little overall development. Hopkins-Tifft, which has the largest surface area of any neighborhood analyzed, has received

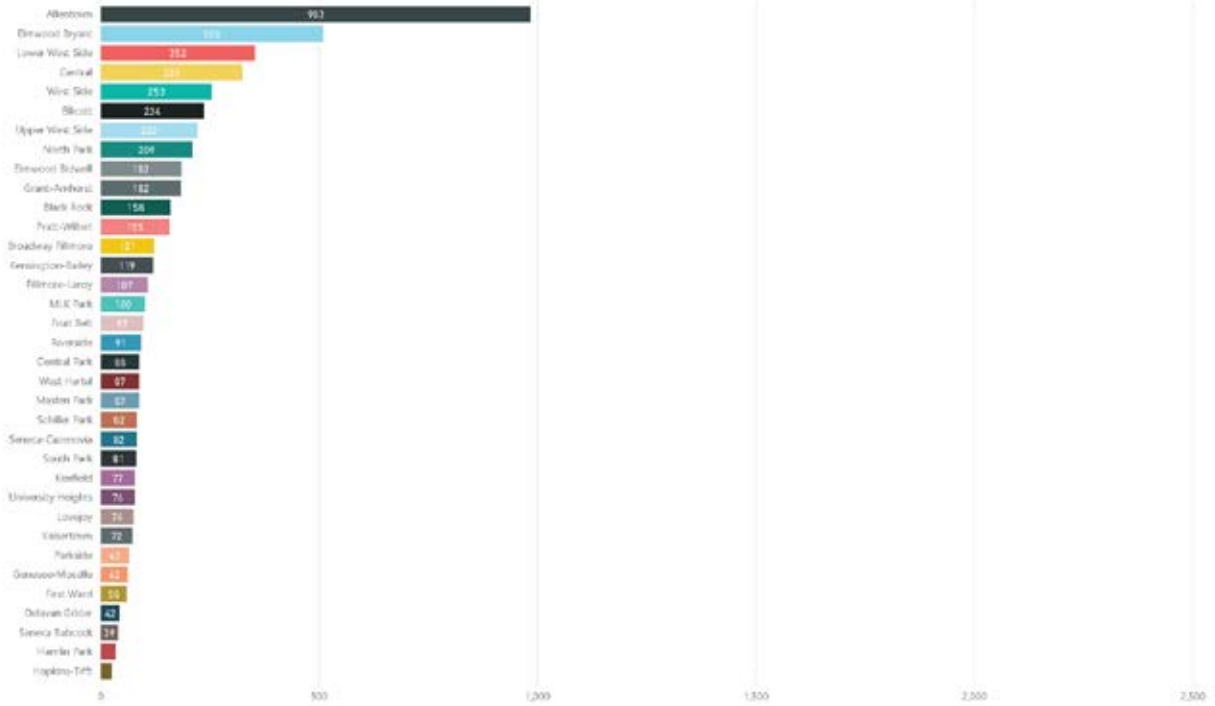
the least permits per square mile since 2016. However, the part of Hopkins-Tifft nearest to South Park overlaps with most of **CSO priority area 028**, which has the highest concentration of residential permits per square mile (since 2016) of any CSO priority area. While Hopkins-Tifft on the whole sees less development per square mile, the section which consists of CSO priority area 028 is a notable hotspot.

Seneca Babcock, **First Ward**, and **Ellicott** have all seen a significant number of industrial permits per square mile since 2016, with very little residential development. Of these three, only Ellicott is a commercial-heavy area, having also seen some spikes in total commercial permit values since 2014. The vast majority of Seneca Babcock's surface area is located in either **CSO priority area 027** or **CSO priority area 033**. A small part of CSO priority area 033 also overlaps with First Ward.

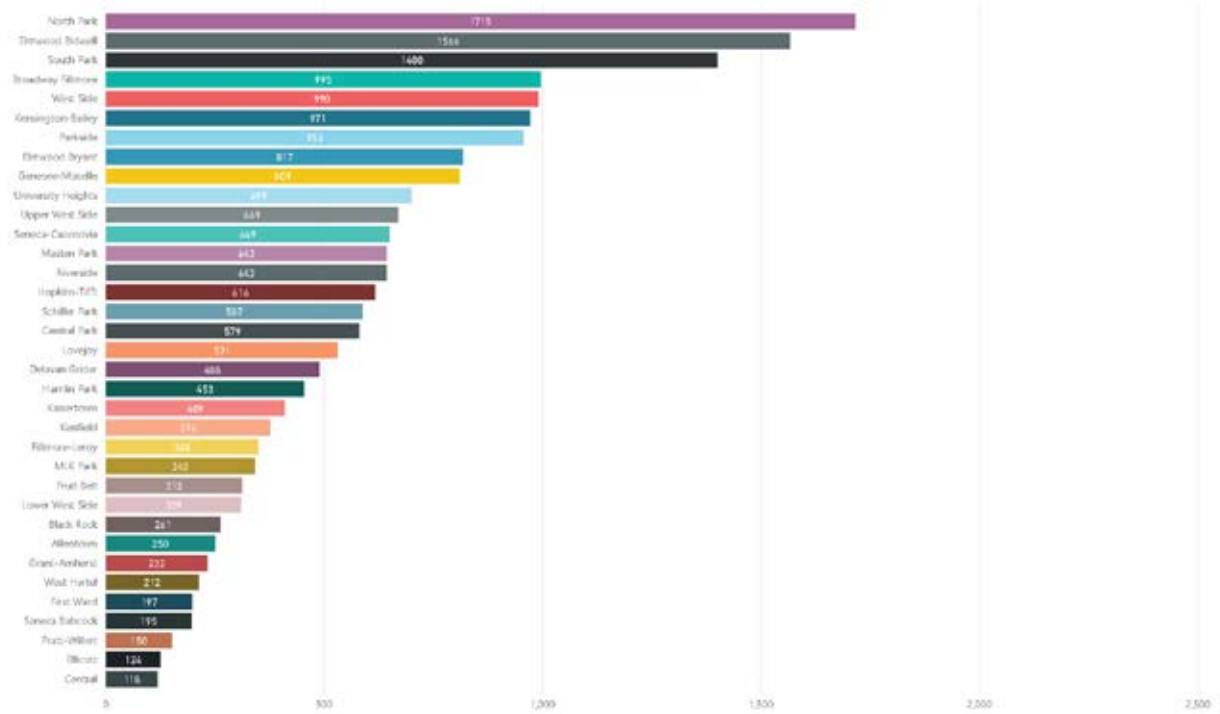
Number of Commercial Permits by Neighborhood, 2016-2018



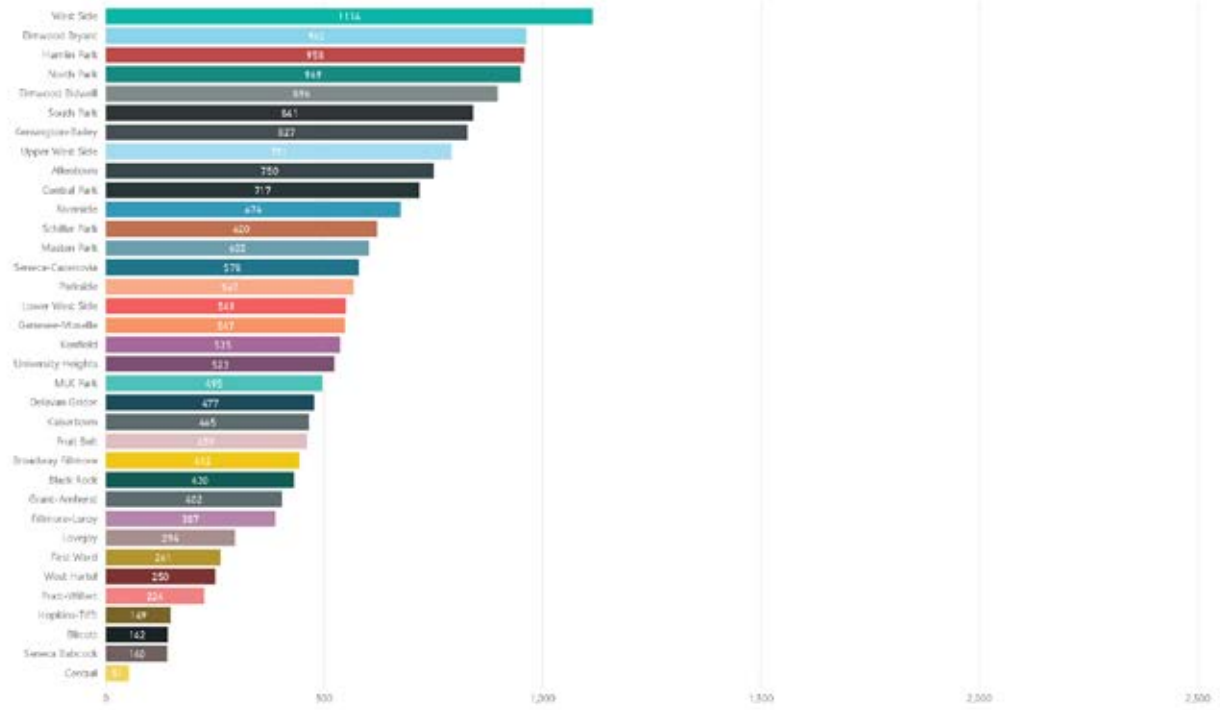
Number of Commercial Permits per Square Mile by Neighborhood, 2016-2018



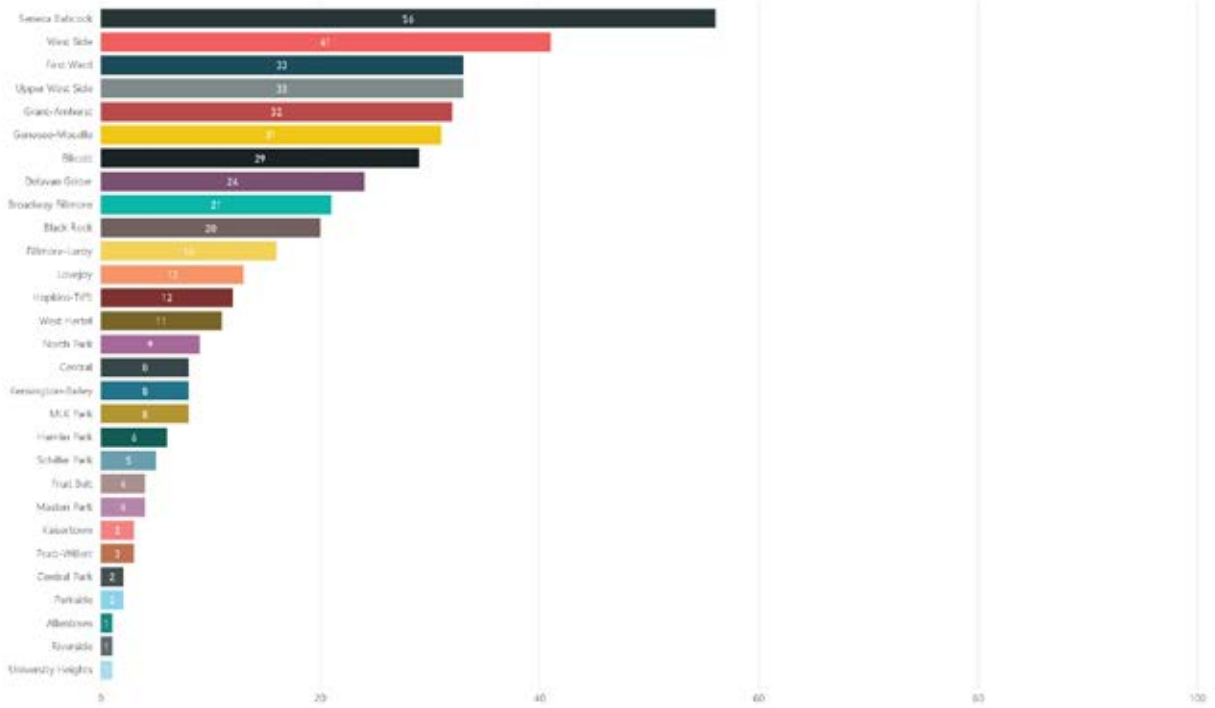
Number of Residential Permits by Neighborhood, 2016-2018



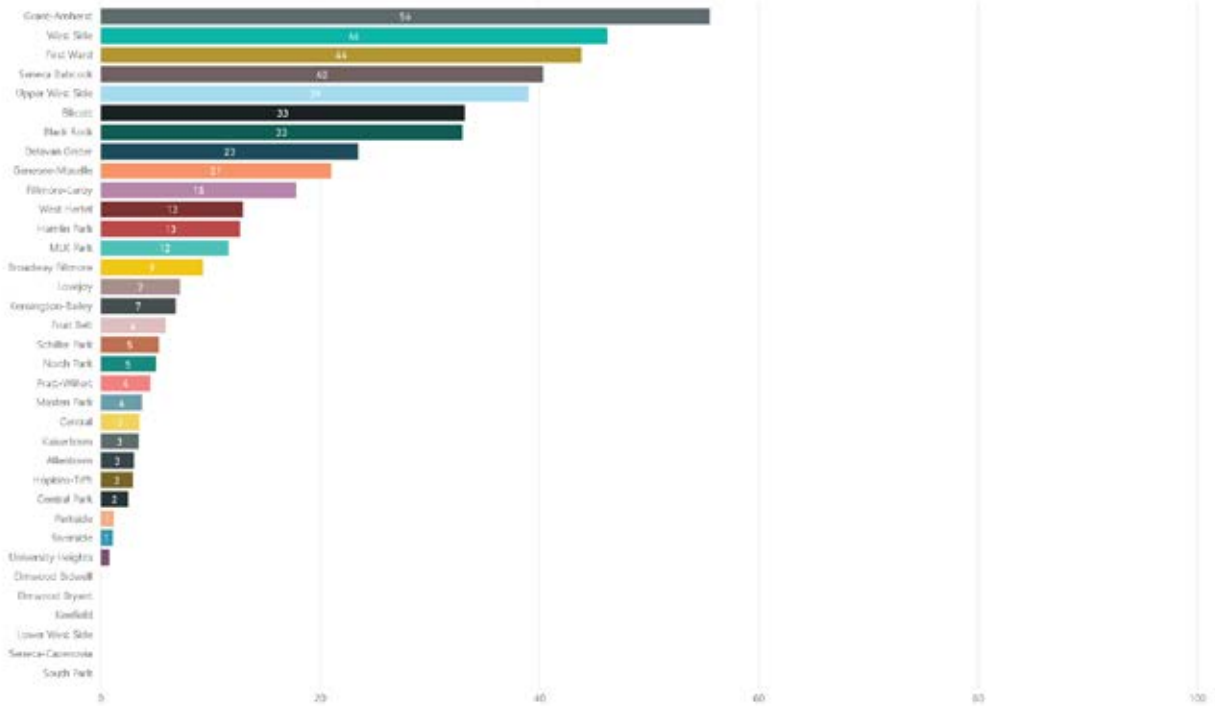
Number of Residential Permits per Square Mile by Neighborhood, 2016-2018

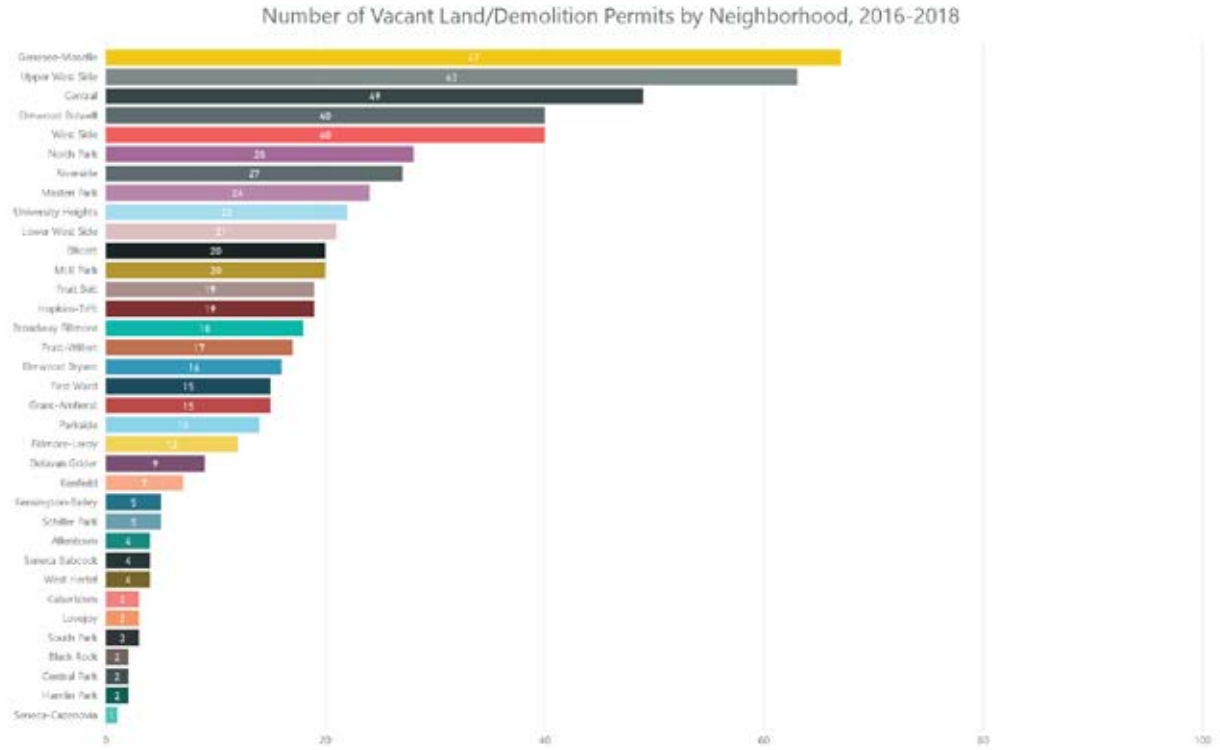


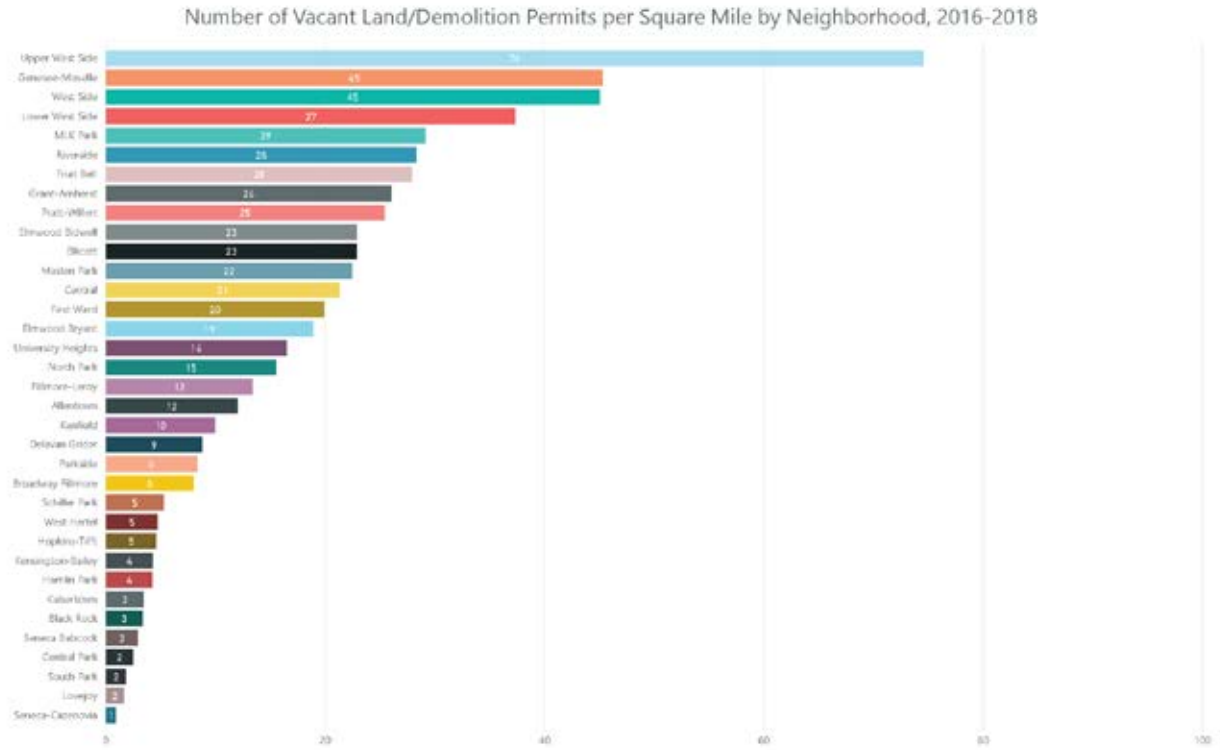
Number of Industrial Permits by Neighborhood, 2016-2018

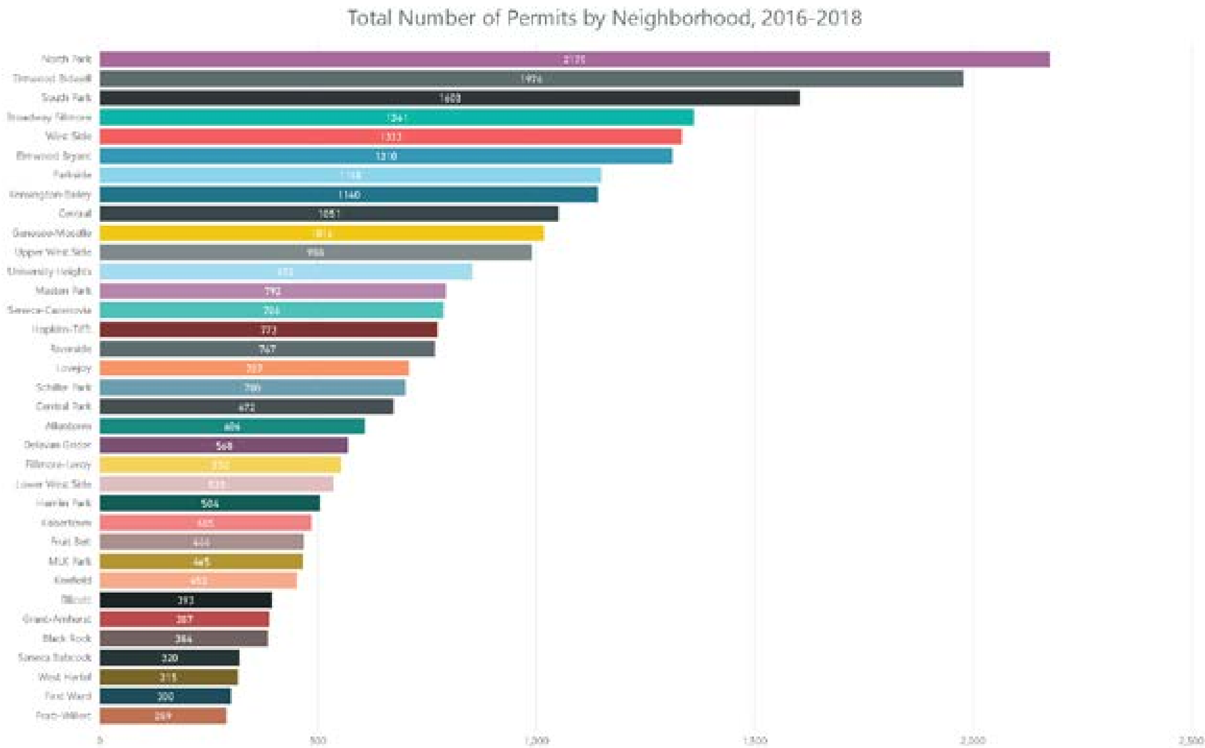


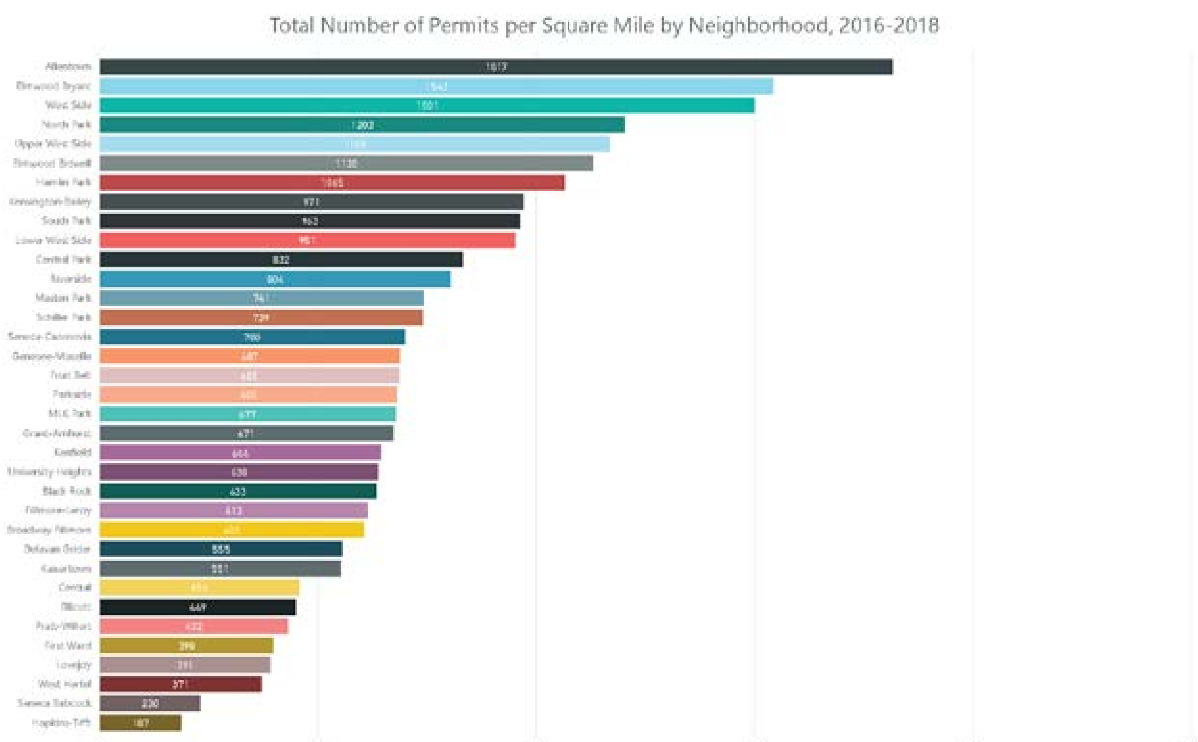
Number of Industrial Permits per Square Mile by Neighborhood, 2016-2018

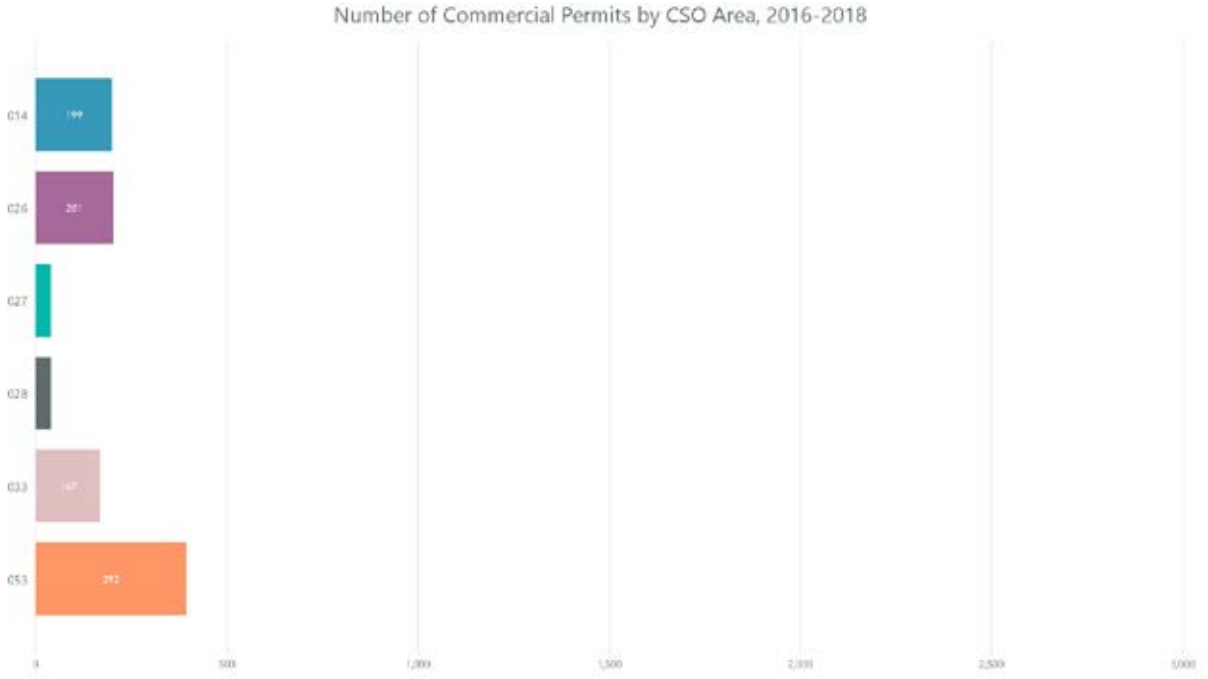


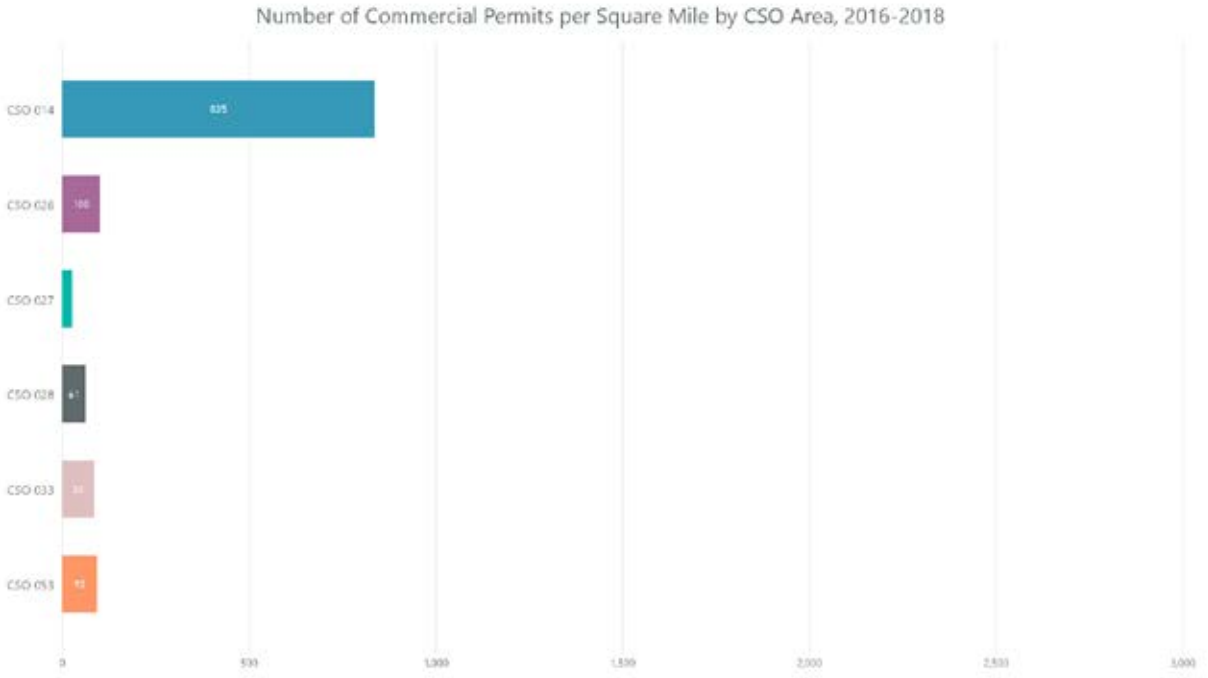

Number of Vacant Land/Demolition Permits by Neighborhood, 2016-2018

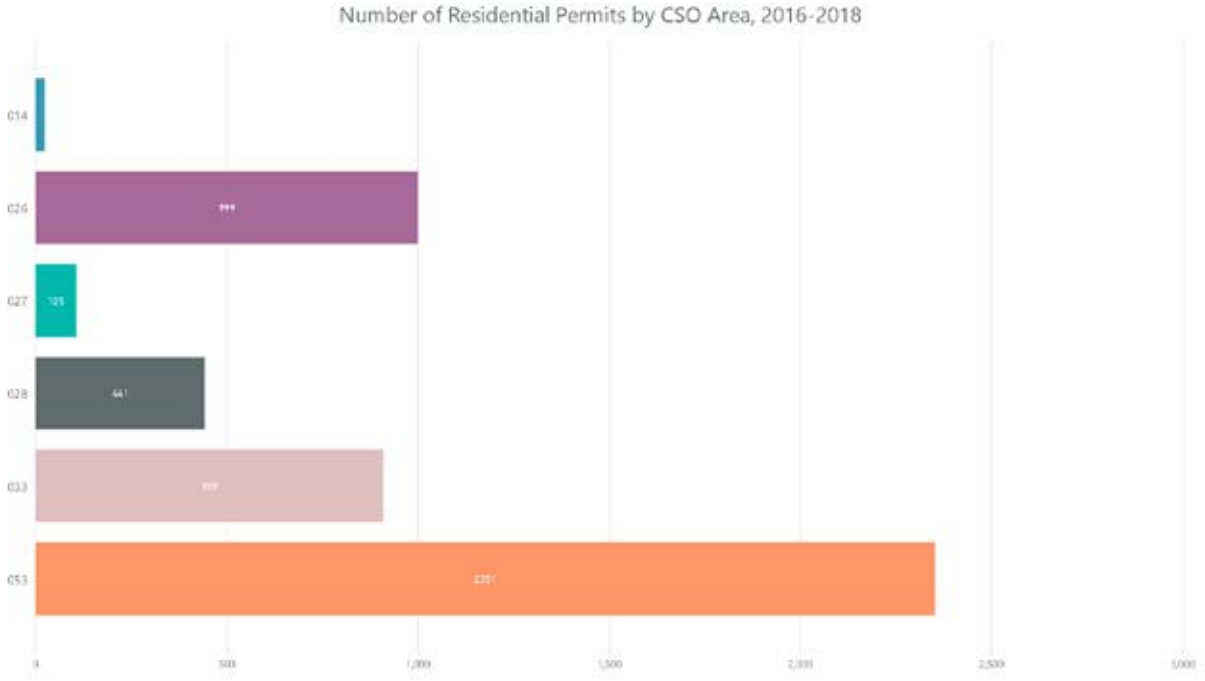

Number of Vacant Land/Demolition Permits per Square Mile by Neighborhood, 2016-2018

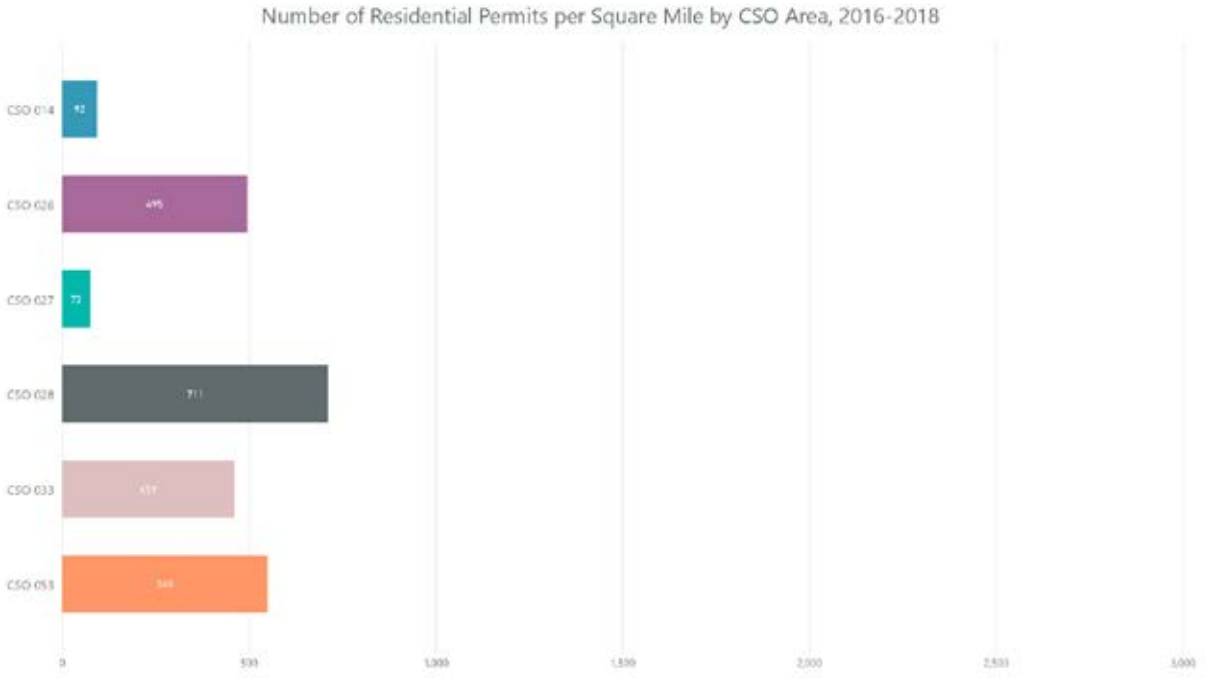

Total Number of Permits by Neighborhood, 2016-2018
North Park
Elmwood Bidwell
1976
South Park
1608
Broadway Fillmore
West Side
Elmwood Bryant
1310
Parkside
Kensington-Bailey
1140
Central
1051
Genesee-Moselle
Upper West Side
University Heights
Masten Park
792
Seneca-Cazenovia
Hopkins-Tifft
772
Riverside
767
Lovejoy
Schiller Park
Central Park
672
Allentown
606
Delavan Grider
568
Fillmore-Leroy
Lower West Side
Hamlin Park
504
Kaisertown
Fruit Belt
MLK Park
465
Kenfield
Ellicott
393
Grant-Amherst
387
Black Rock
384
Seneca Babcock
320
West Hertel
315
First Ward
300
Pratt-Willert
289
0
500
1,000
1,500
2,000
2,500

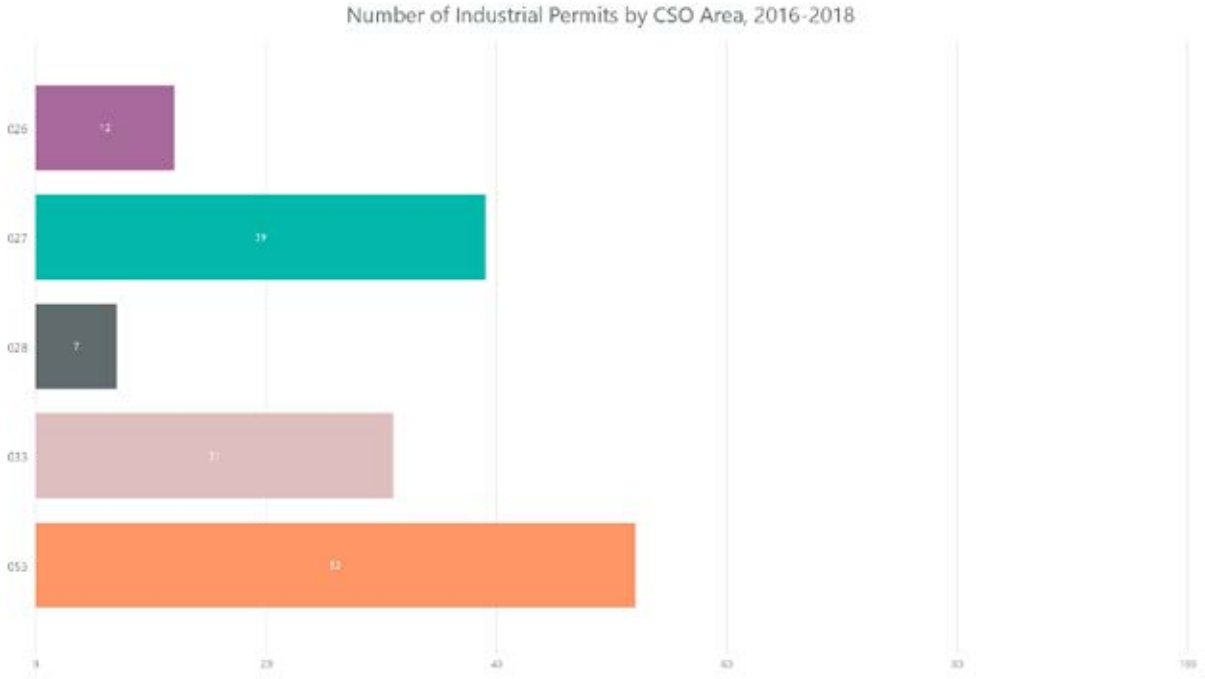

Total Number of Permits per Square Mile by Neighborhood, 2016-2018
Allentown
1817
Elmwood Bryant
West Side
North Park
1203
Upper West Side
Elmwood Bidwell
1130
Hamlin Park
1065
Kensington-Bailey
971
South Park
962
Lower West Side
951
Central Park
832
Riverside
804
Masten Park
741
Schiller Park
739
Seneca-Cazenovia
700
Genesee-Moselle
Fruit Belt
Parkside
MLK Park
677
Grant-Amherst
671
Kenfield
University Heights
Black Rock
633
Fillmore-Leroy
Broadway Fillmore
Delavan Grider
555
Kaisertown
551
Central
Ellicott
449
Pratt-Willert
First Ward
398
Lovejoy
West Hertel
371
Seneca Babcock
230
Hopkins-Tifft
187
0
500
1,000
1,500
2,000
2,500

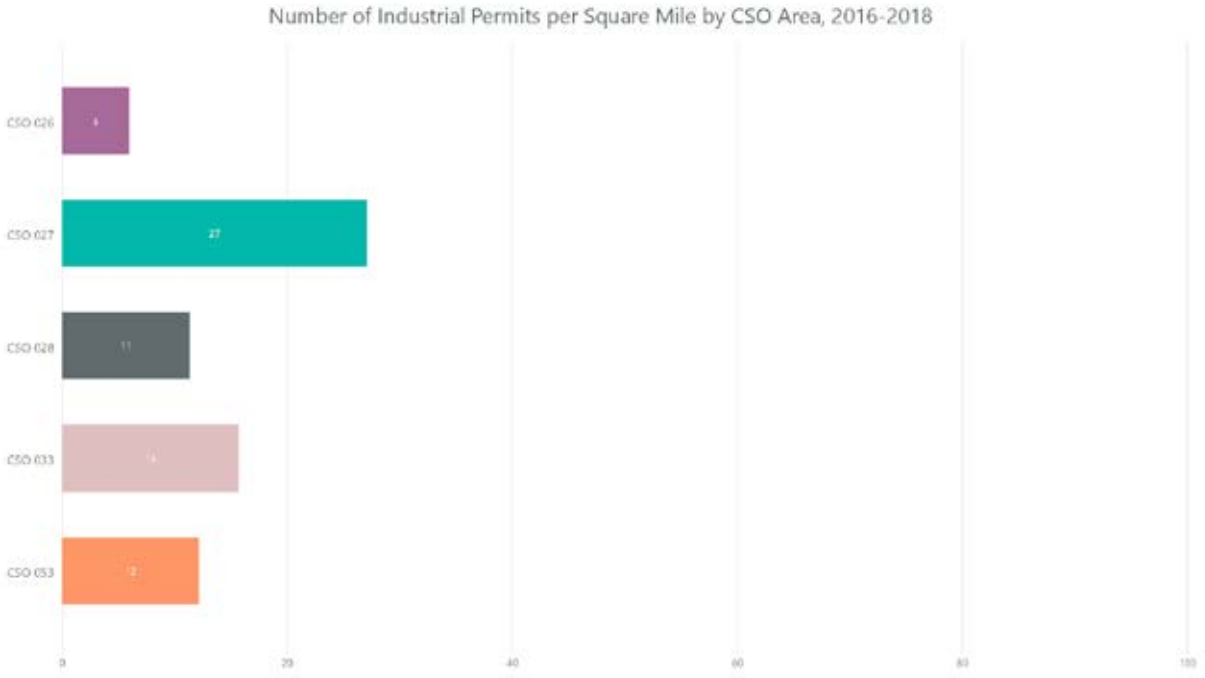

Number of Commercial Permits by CSO Area, 2016-2018
014
026
027
028
033
053

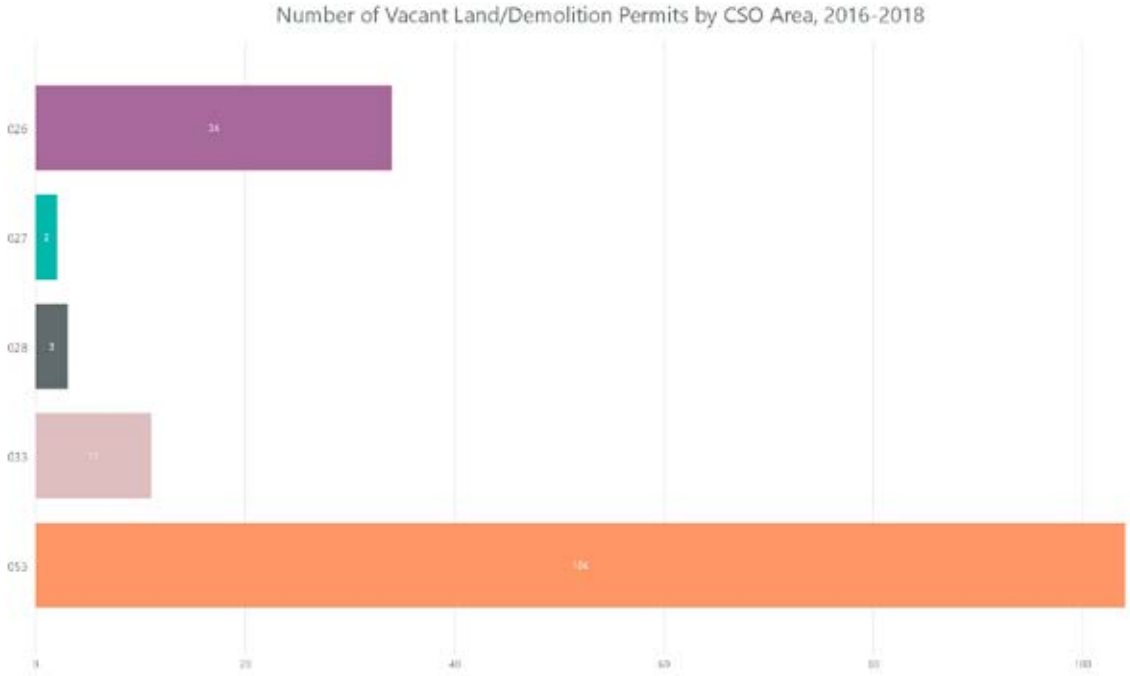

Number of Commercial Permits per Square Mile by CSO Area, 2016-2018
CSO 014
CSO 026
CSO 027
CSO 028
CSO 033
CSO 053

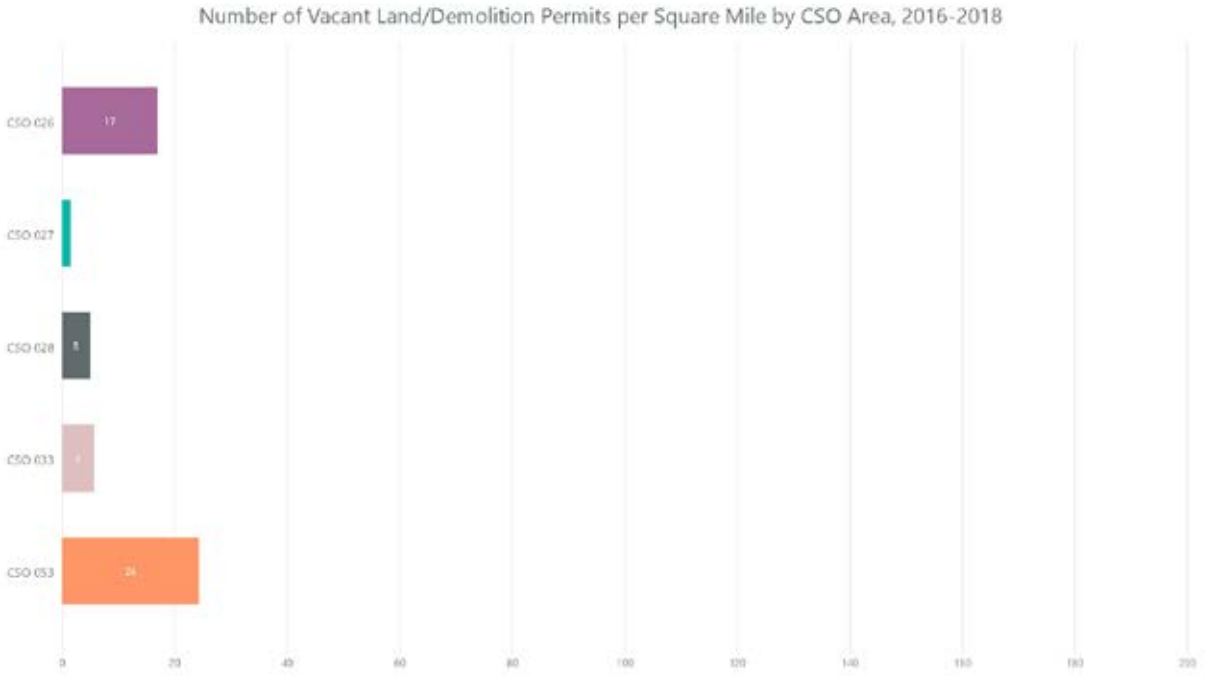

Number of Residential Permits by CSO Area, 2016-2018
014
026
027
028
033
053
999
105
441
2251
0
500
1,000
1,500
2,000
2,500
3,000

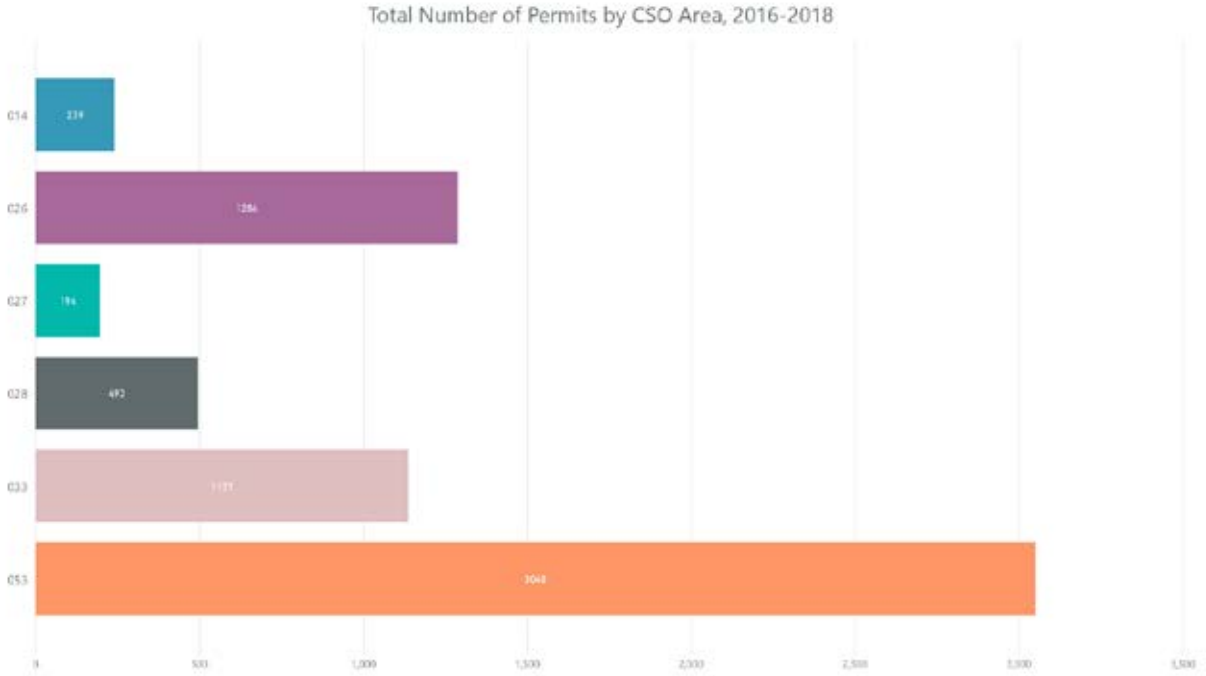

Number of Residential Permits per Square Mile by CSO Area, 2016-2018
CSO 014
CSO 026
CSO 027
CSO 028
CSO 033
CSO 053
92
495
72
711
417
0
500
1,000
1,500
2,000
2,500
3,000

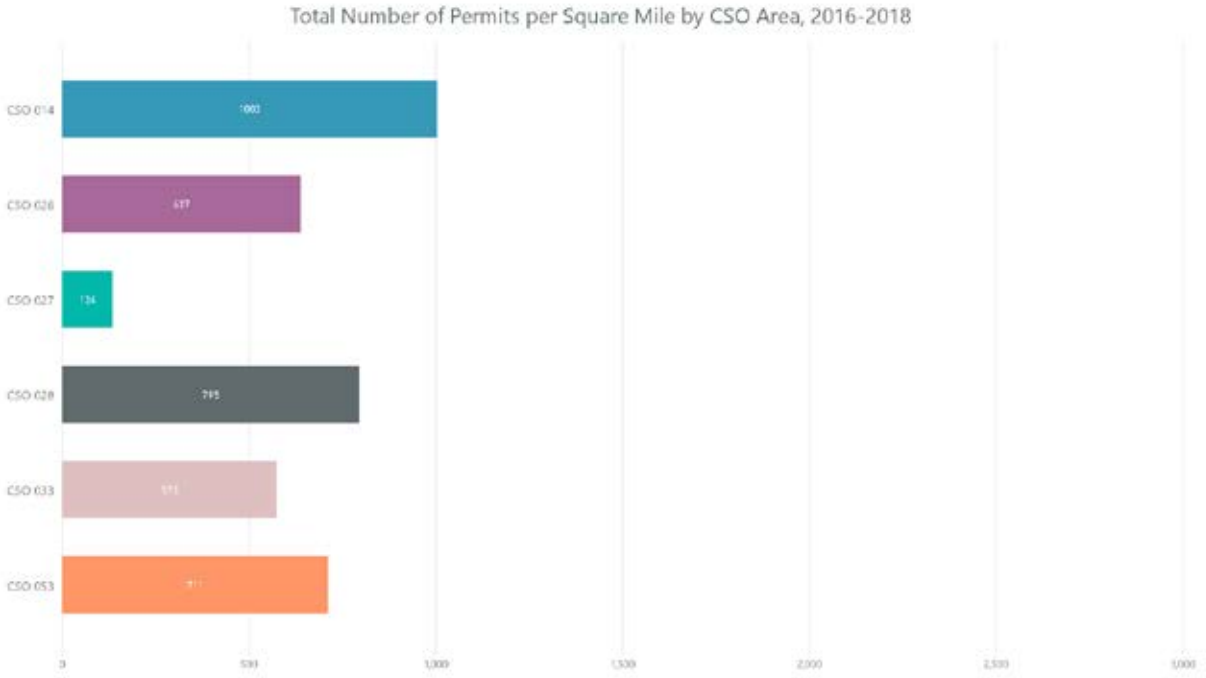

Number of Industrial Permits by CSO Area, 2016-2018
026
027
028
033
053


Number of Industrial Permits per Square Mile by CSO Area, 2016-2018
CSO 026
CSO 027
CSO 028
CSO 033
CSO 053

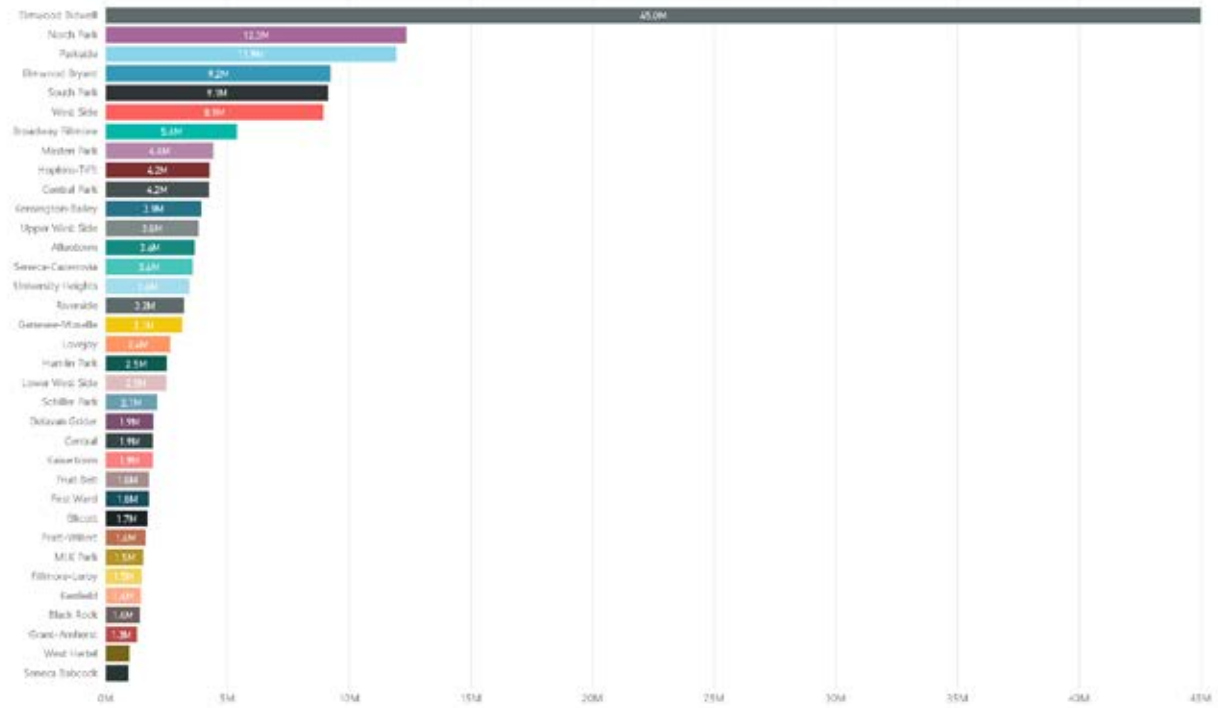

Number of Vacant Land/Demolition Permits by CSO Area, 2016-2018
026
027
028
033
053


Number of Vacant Land/Demolition Permits per Square Mile by CSO Area, 2016-2018
CSO 026
CSO 027
CSO 028
CSO 033
CSO 053

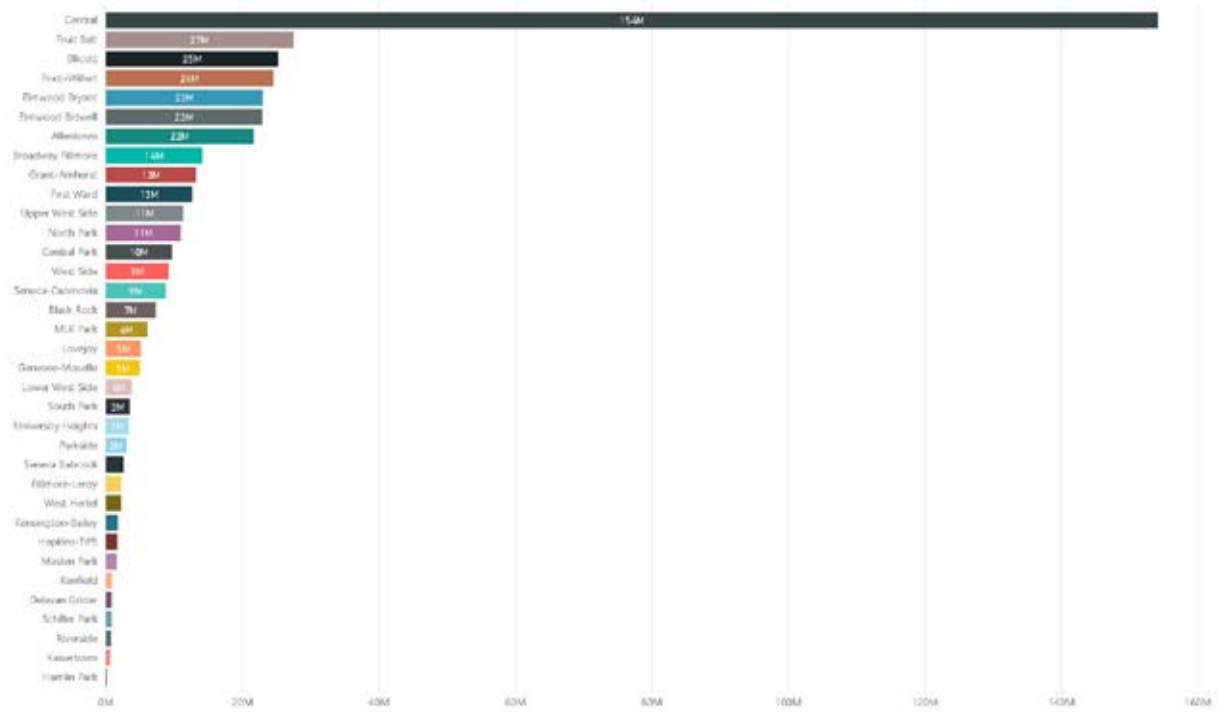

Total Number of Permits by CSO Area, 2016-2018
014
026
027
028
033
053

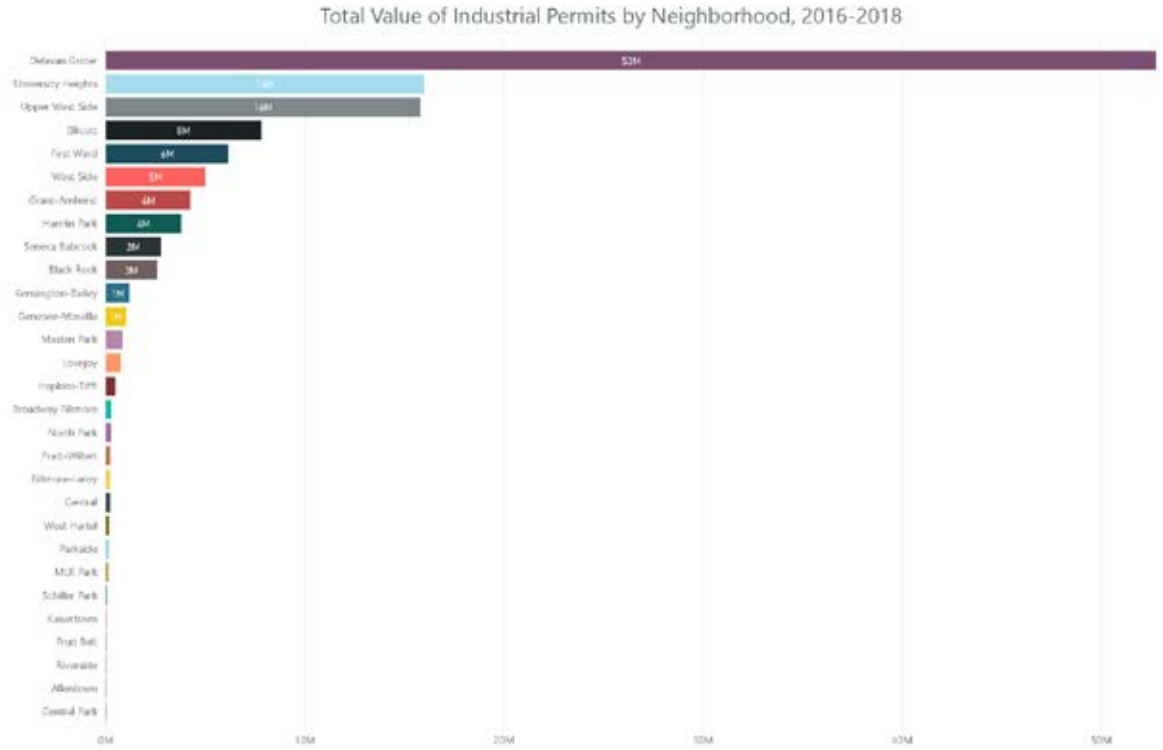

Total Number of Permits per Square Mile by CSO Area, 2016-2018
CSO 014
CSO 026
CSO 027
CSO 028
CSO 033
CSO 053

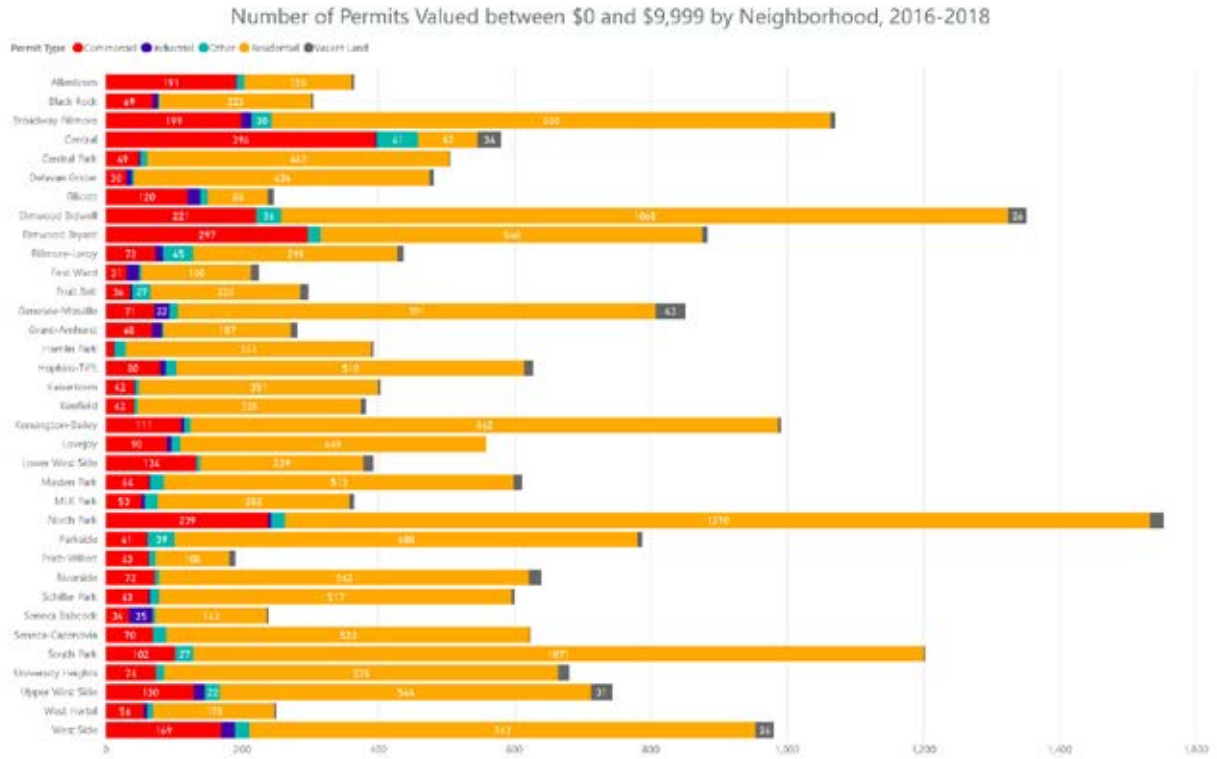
Total Value of Residential Permits by Neighborhood, 2016-2018

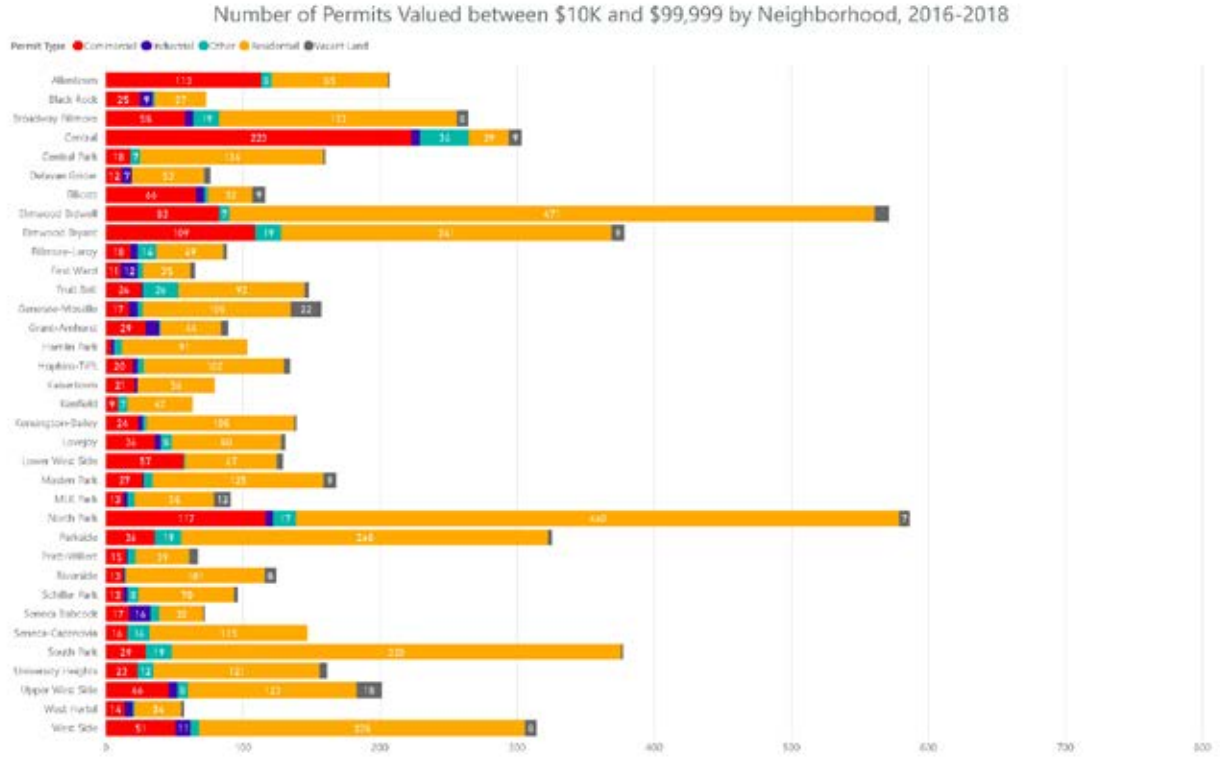


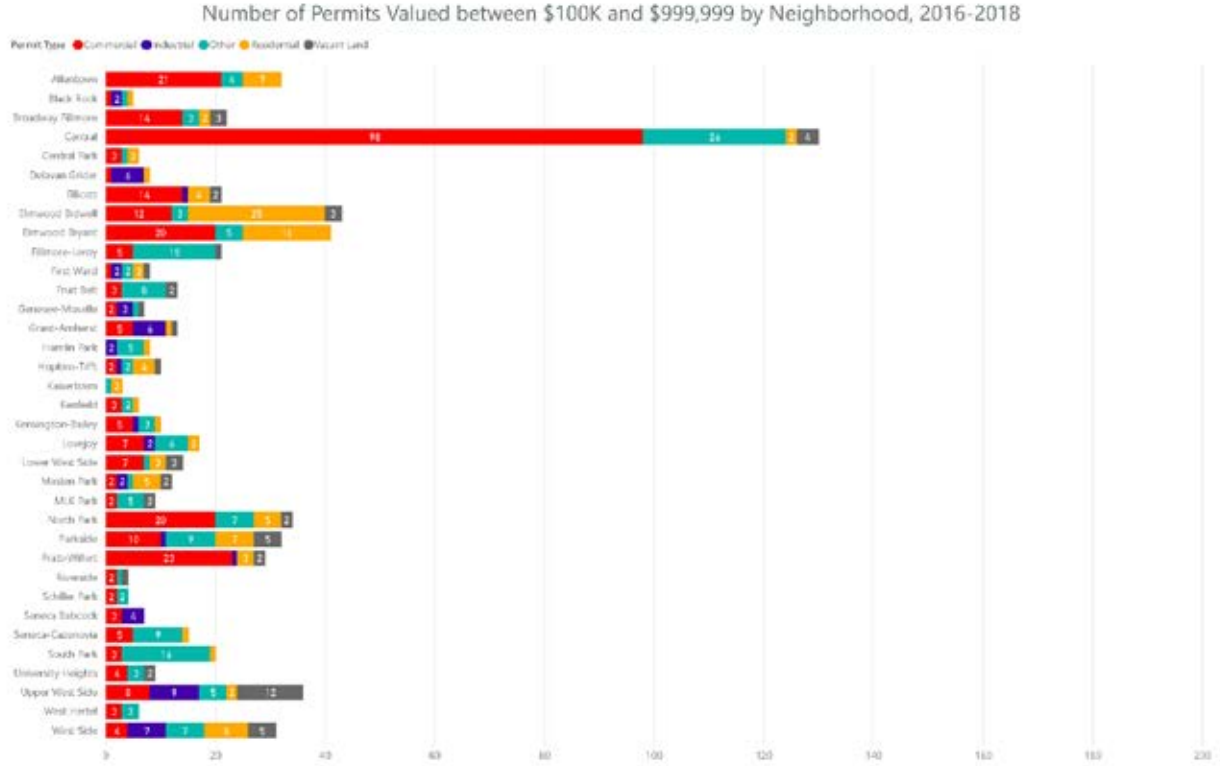
Total Value of Commercial Permits by Neighborhood, 2016-2018

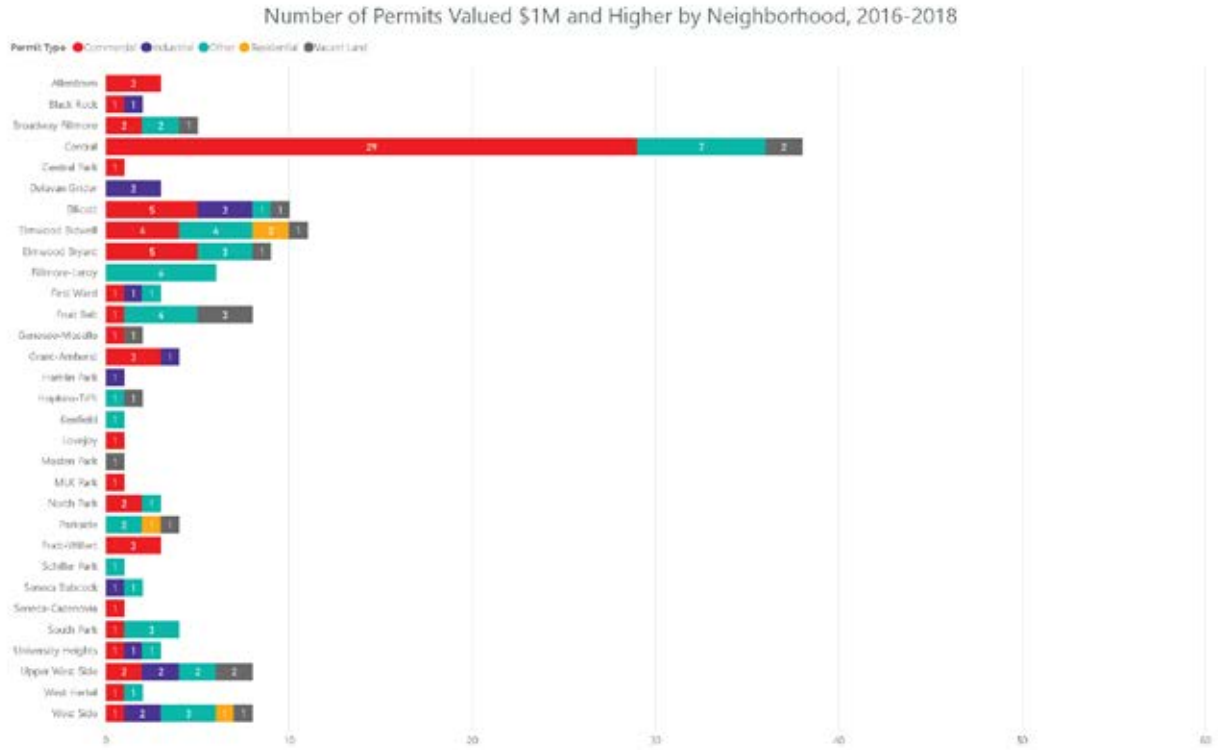


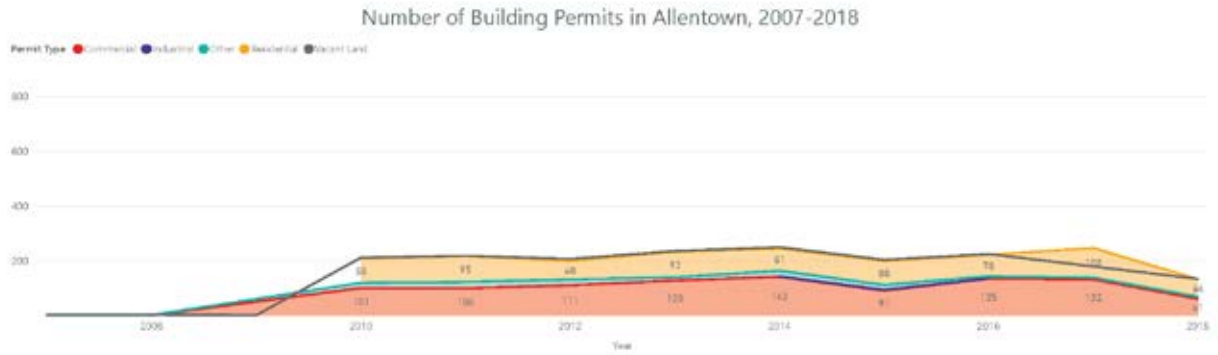

Total Value of Industrial Permits by Neighborhood, 2016-2018

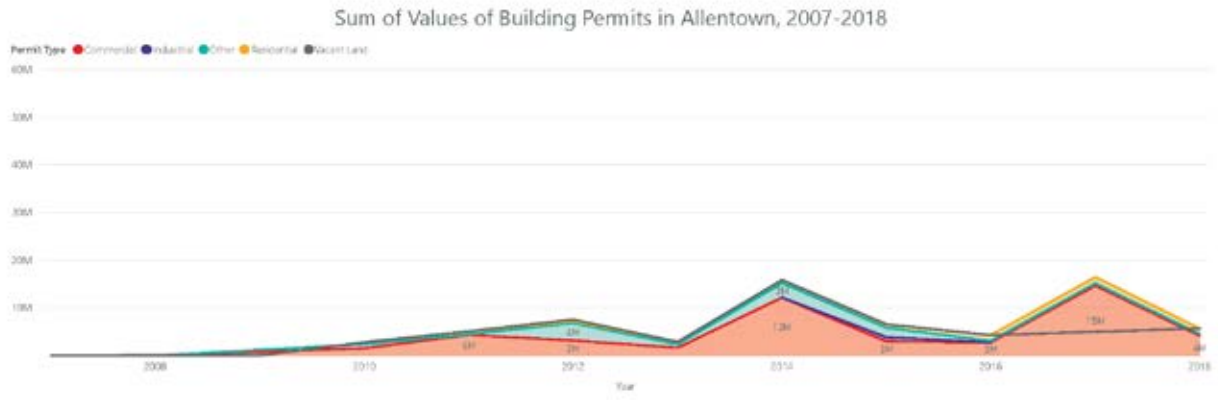

Number of Permits Valued between $0 and $9,999 by Neighborhood, 2016-2018


Number of Permits Valued between $10K and $99,999 by Neighborhood, 2016-2018
Permit Type Commercial Industrial Other Residential Vacant Land
Allentown
Black Rock
Broadway-Fillmore
Central
Central Park
Delavan-Grider
Elliott
Elmwood-Bidwell
Elmwood-Bryant
Fillmore-Leroy
Fruit-Willert
Grant-Amherst
Hamlin Park
Hopkins-Tifft
Kaisertown
Kensington-Bailey
Lovejoy
Lower West Side
Masten Park
MLK Park
North Park
Parkside
Riverside
Schiller Park
Seneca-Babcock
South Park
University Heights
Upper West Side
West Hertel
West Side
0
100
200
300
400
500
600
700
800

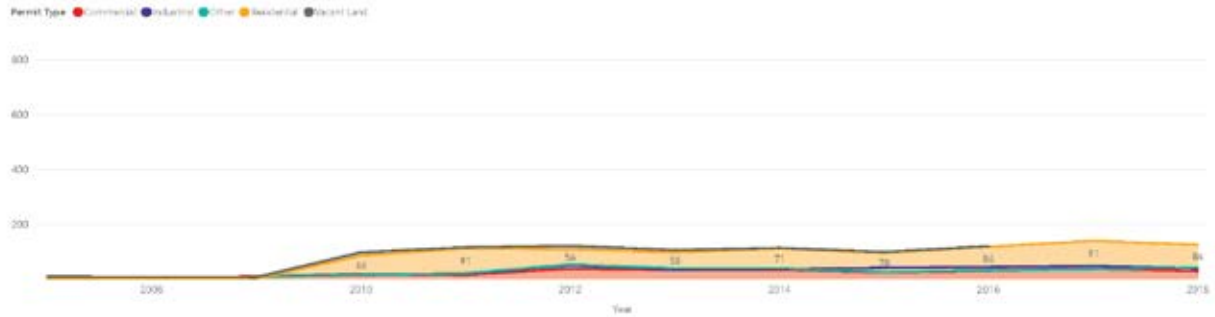

Number of Permits Valued between $100K and $999,999 by Neighborhood, 2016-2018
Permit Type Commercial Industrial Other Residential Vacant Land
Allentown
Black Rock
Broadway-Fillmore
Central
Central Park
Delavan-Grider
Elliott
Elmwood-Bidwell
Elmwood-Bryant
Fillmore-Leroy
Fruit-Willert
Grant-Amherst
Hamlin Park
Hopkins-Tifft
Kaisertown
Kensington-Bailey
Lovejoy
Lower West Side
Masten Park
MLK Park
North Park
Parkside
Riverside
Schiller Park
Seneca-Babcock
South Park
University Heights
Upper West Side
West Hertel
West Side
0
20
40
60
80
100
120
140
160
180
200


Number of Permits Valued $1M and Higher by Neighborhood, 2016-2018
Permit Type

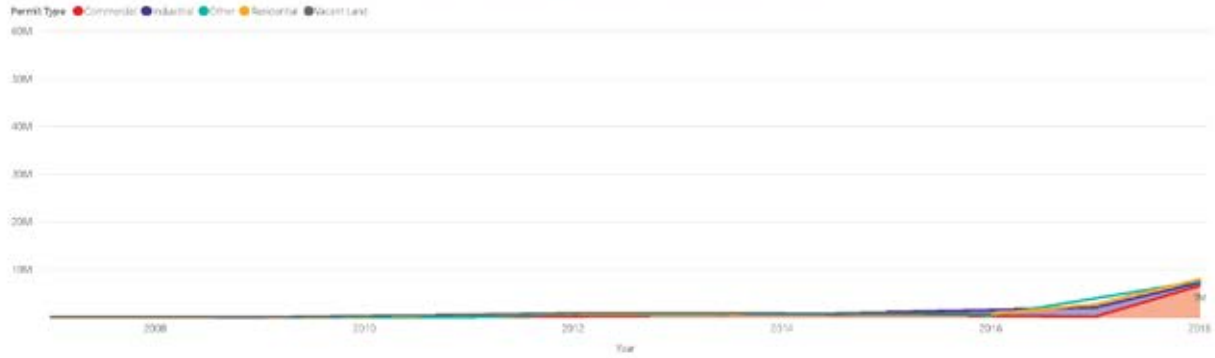

Number of Building Permits in Allentown, 2007-2018
Permit Type


Sum of Values of Building Permits in Allentown, 2007-2018
Permit Type

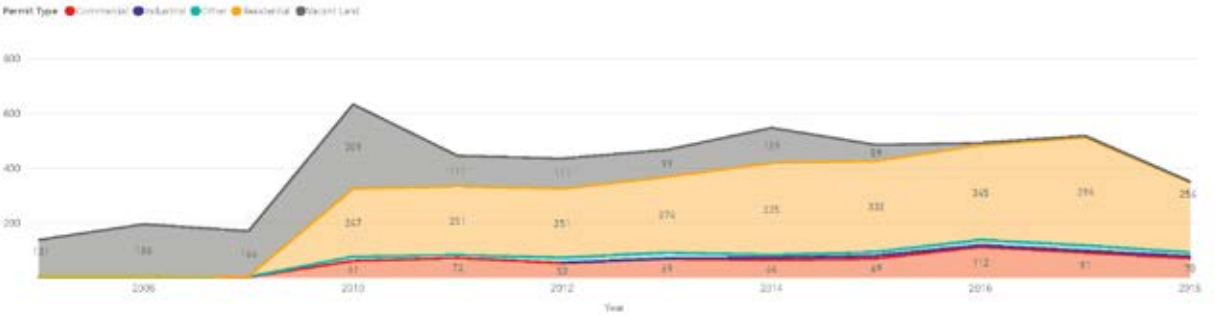
Number of Building Permits in Black Rock, 2007-2018



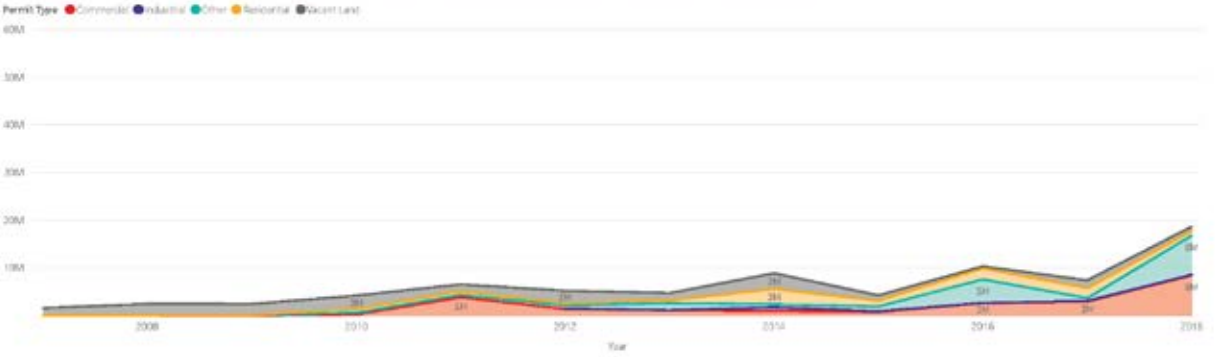
Sum of Values of Building Permits in Black Rock, 2007-2018



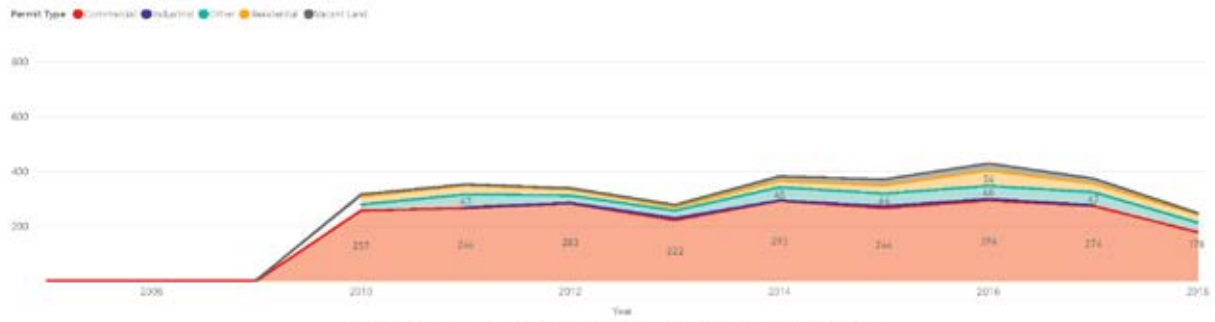
Number of Building Permits in Broadway Fillmore, 2007-2018



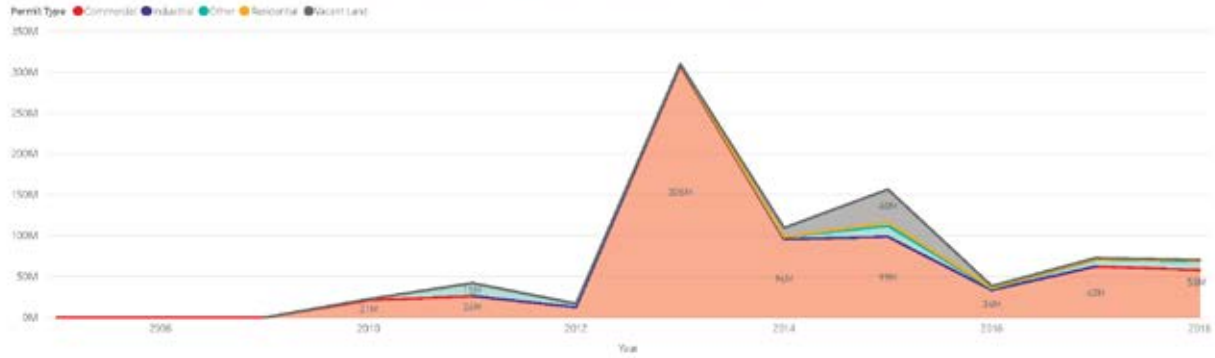
Sum of Values of Building Permits in Broadway Fillmore, 2007-2018



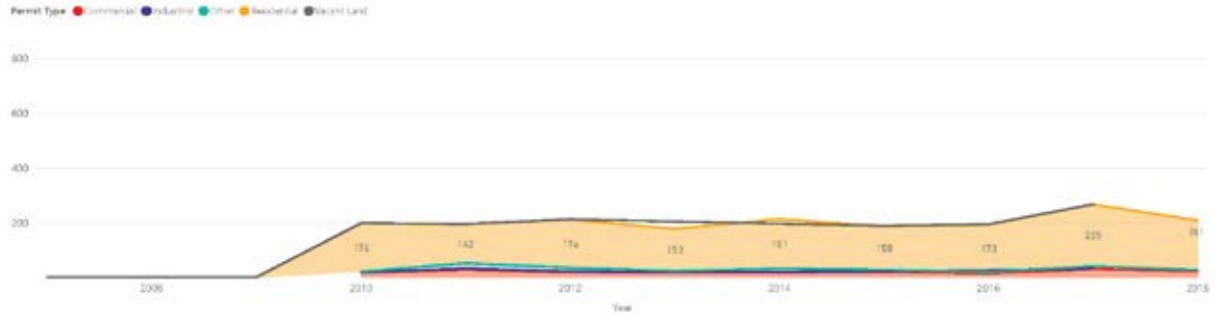
Number of Building Permits in Central, 2007-2018



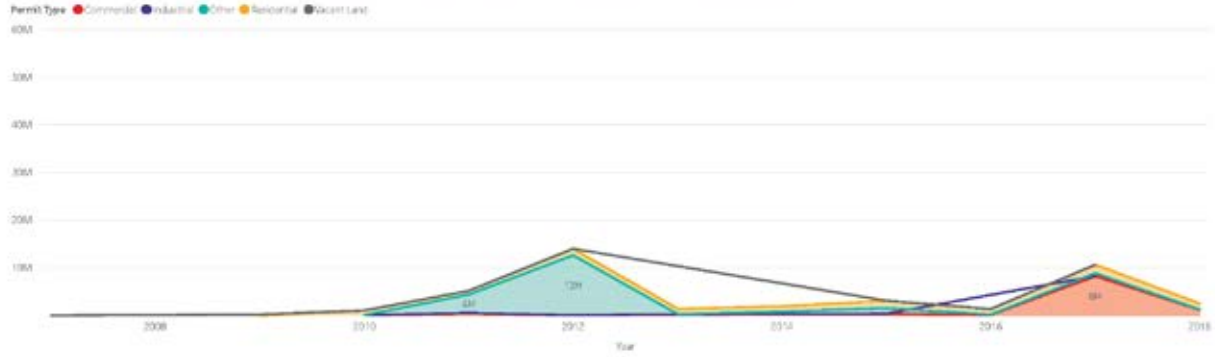
Sum of Values of Building Permits in Central, 2007-2018



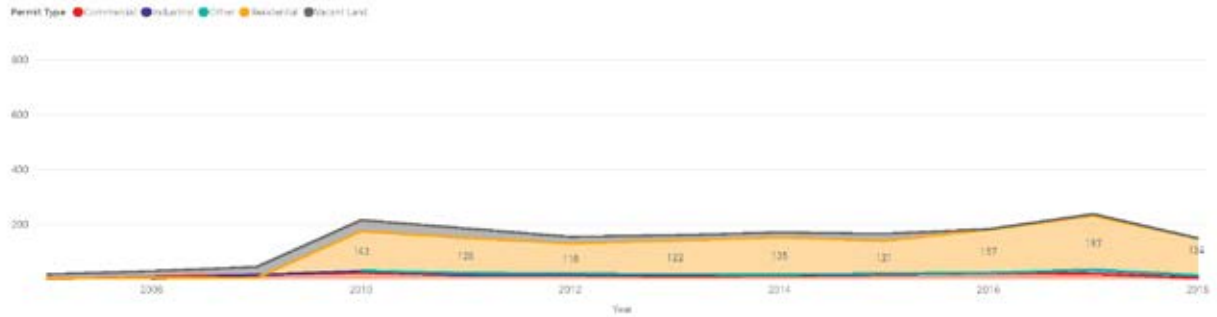
Number of Building Permits in Central Park, 2007-2018



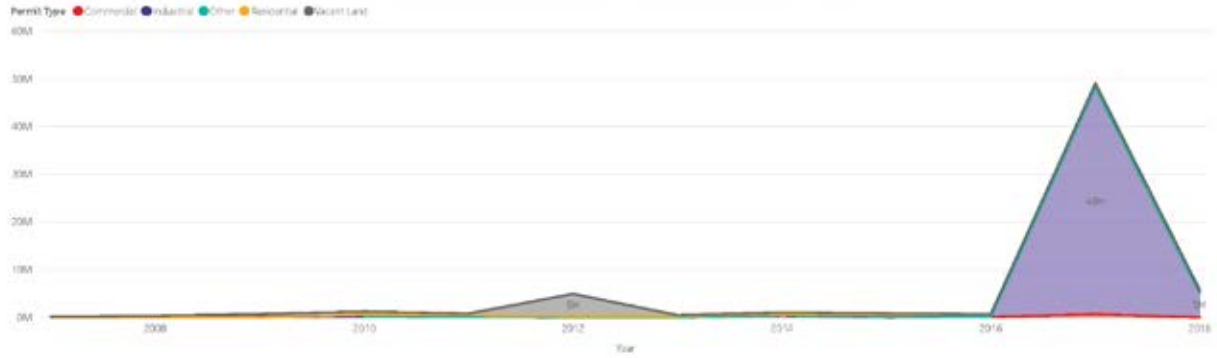
Sum of Values of Building Permits in Central Park, 2007-2018



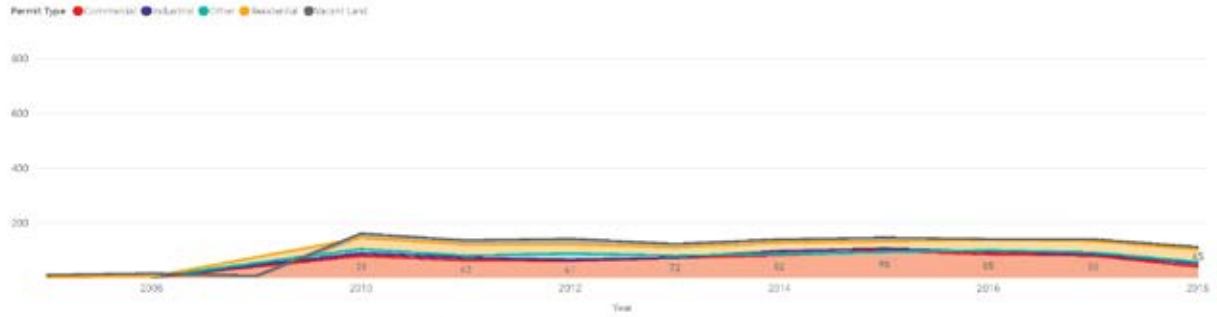
Number of Building Permits in Delavan Grider, 2007-2018



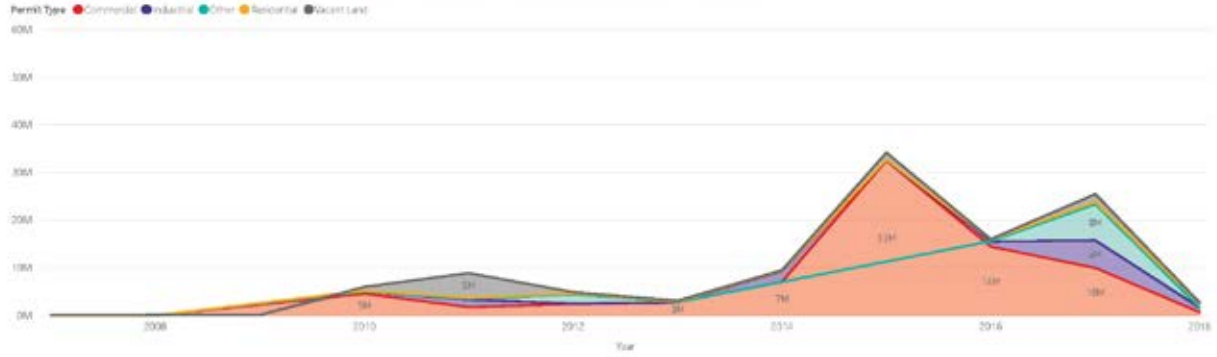
Sum of Values of Building Permits in Delavan Grider, 2007-2018



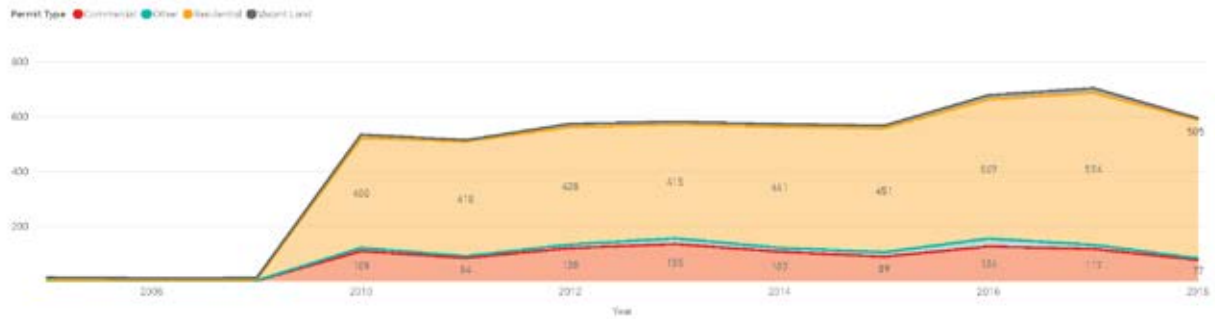
Number of Building Permits in Ellicott, 2007-2018



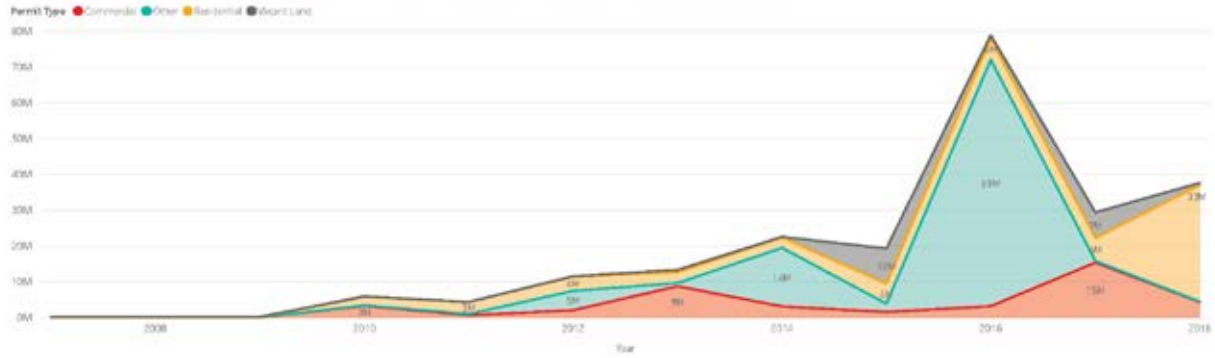
Sum of Values of Building Permits in Ellicott, 2007-2018



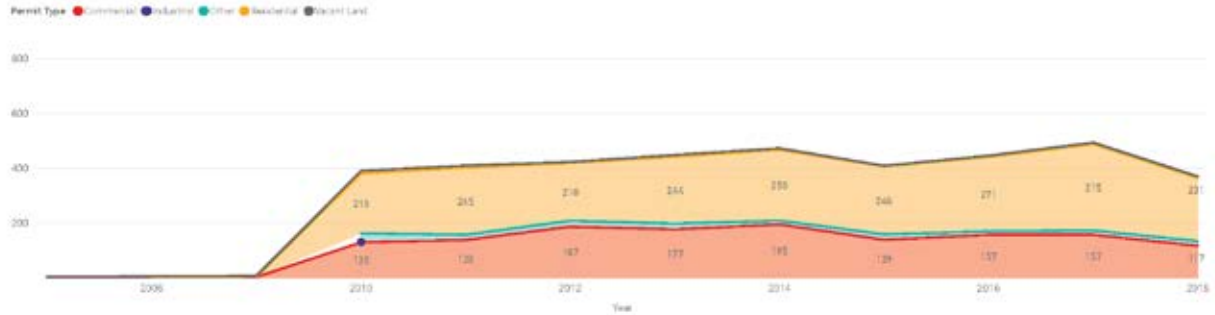
Number of Building Permits in Elmwood Bidwell, 2007-2018



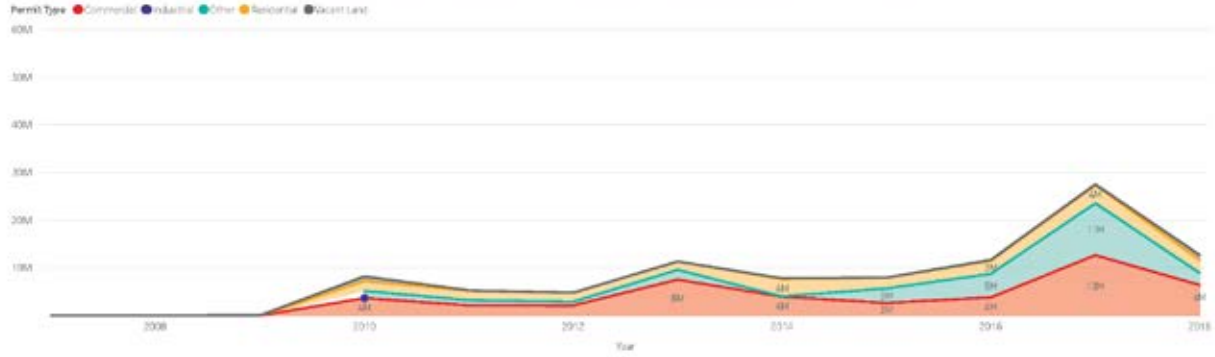
Sum of Values of Building Permits in Elmwood Bidwell, 2007-2018



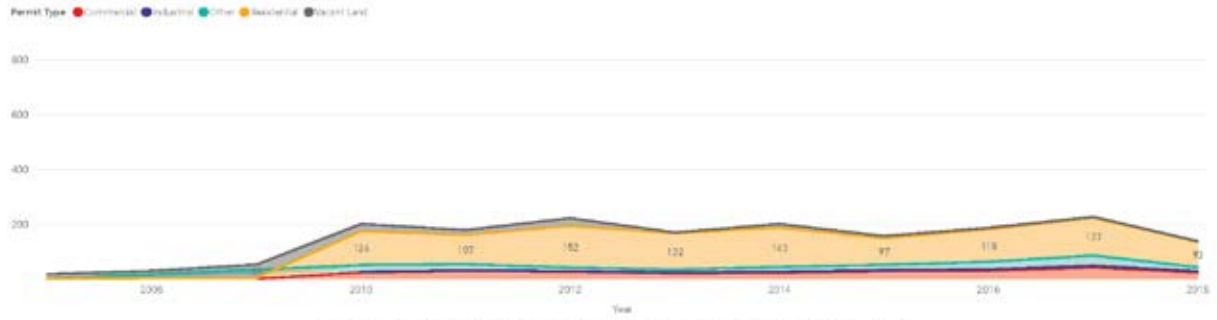
Number of Building Permits in Elmwood Bryant, 2007-2018



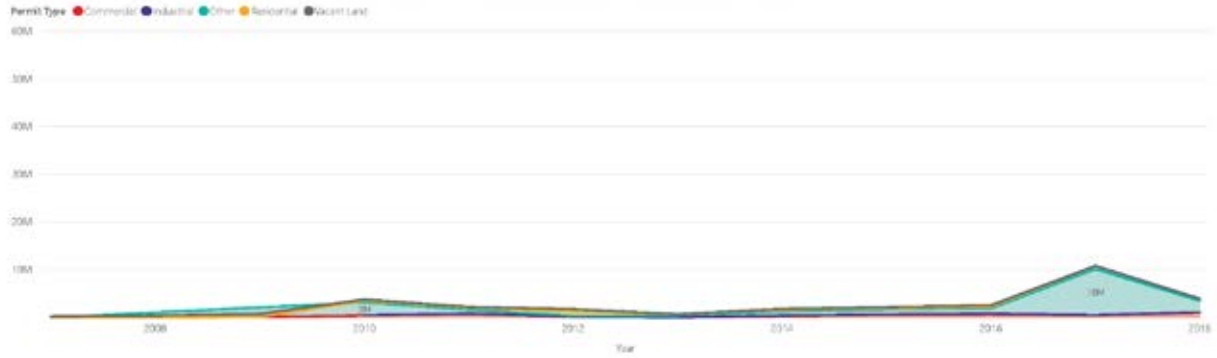
Sum of Values of Building Permits in Elmwood Bryant, 2007-2018



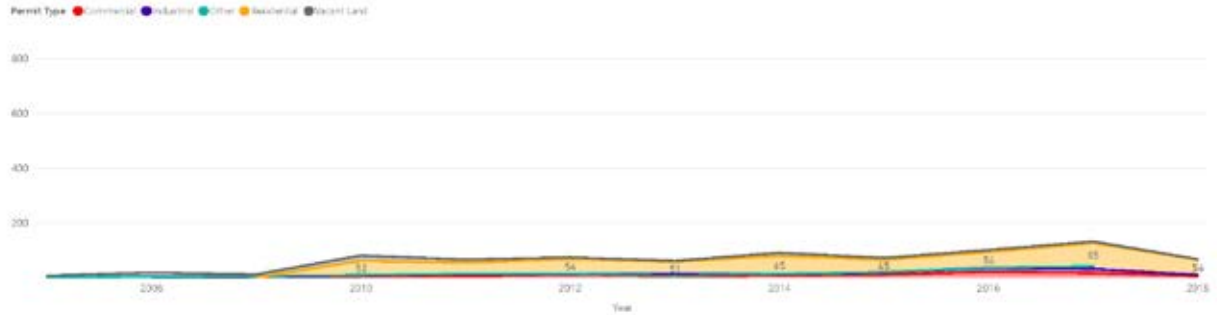
Number of Building Permits in Fillmore-Leroy, 2007-2018



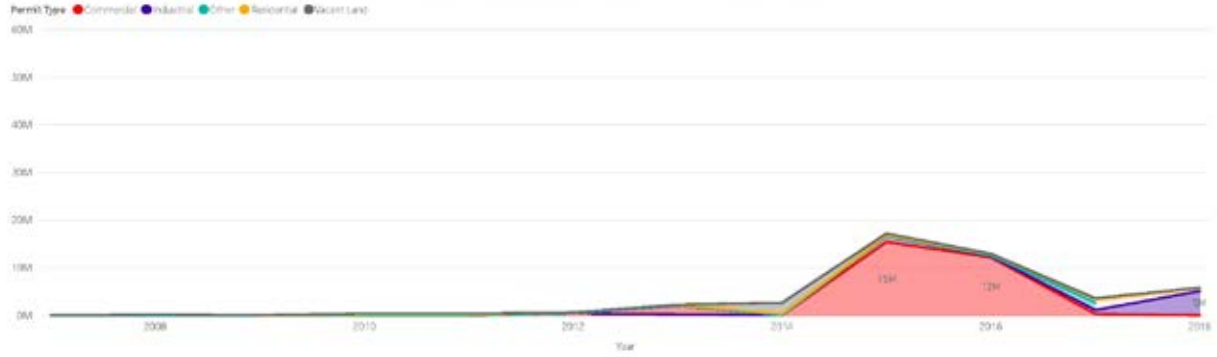
Sum of Values of Building Permits in Fillmore-Leroy, 2007-2018



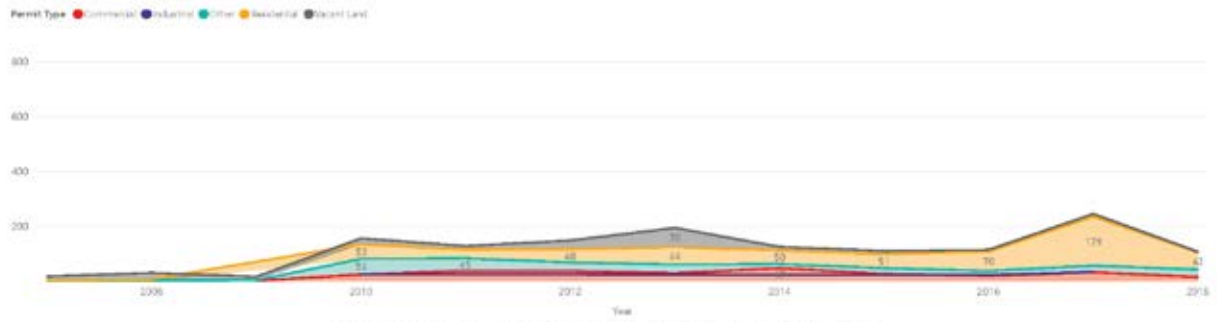
Number of Building Permits in First Ward, 2007-2018



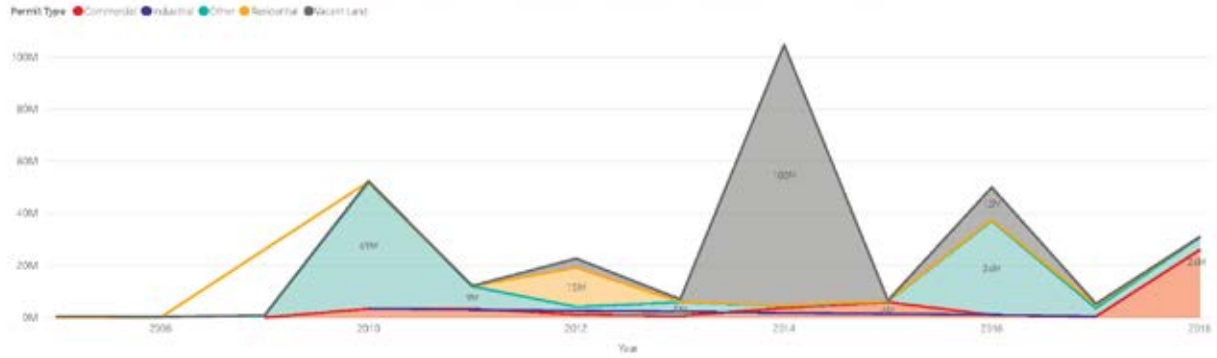
Sum of Values of Building Permits in First Ward, 2007-2018



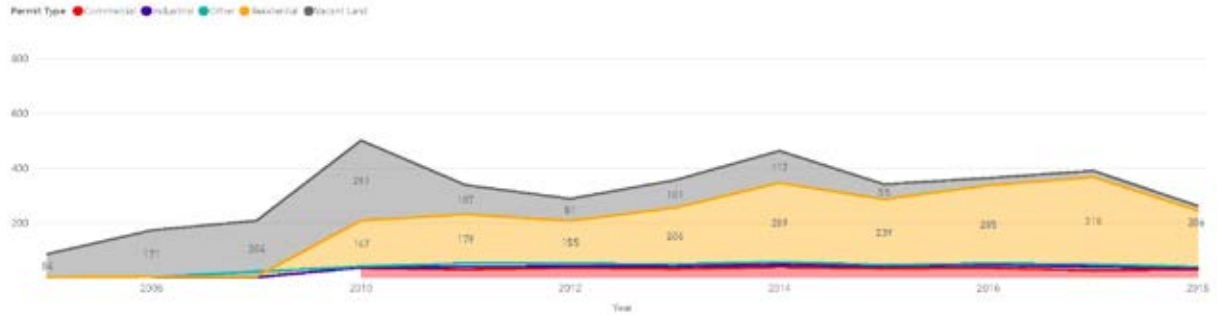
Number of Building Permits in Fruit Belt, 2007-2018



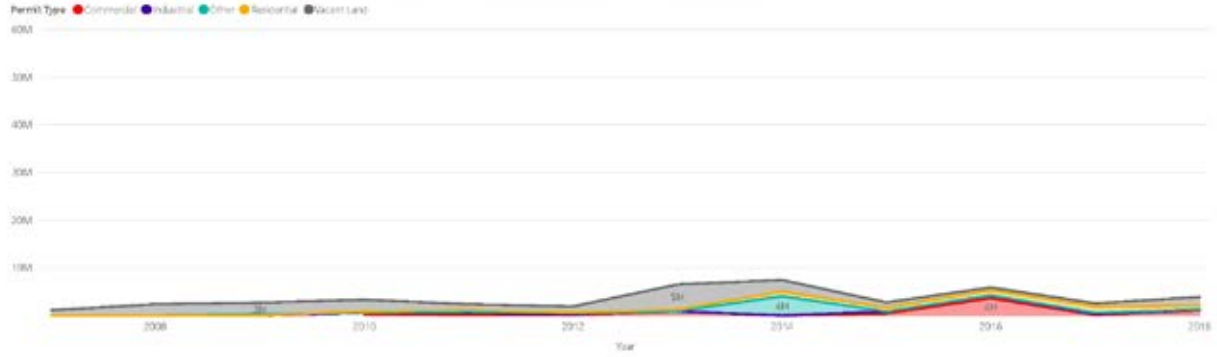
Sum of Values of Building Permits in Fruit Belt, 2007-2018



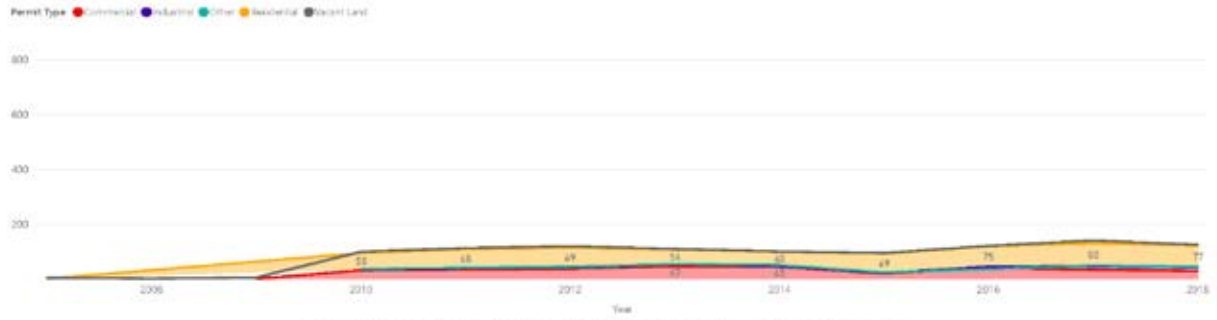
Number of Building Permits in Genesee-Moselle, 2007-2018



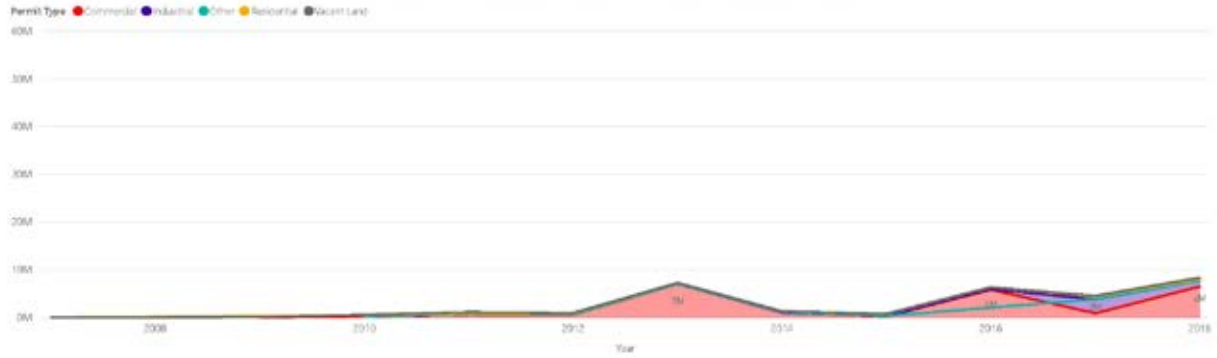
Sum of Values of Building Permits in Genesee-Moselle, 2007-2018



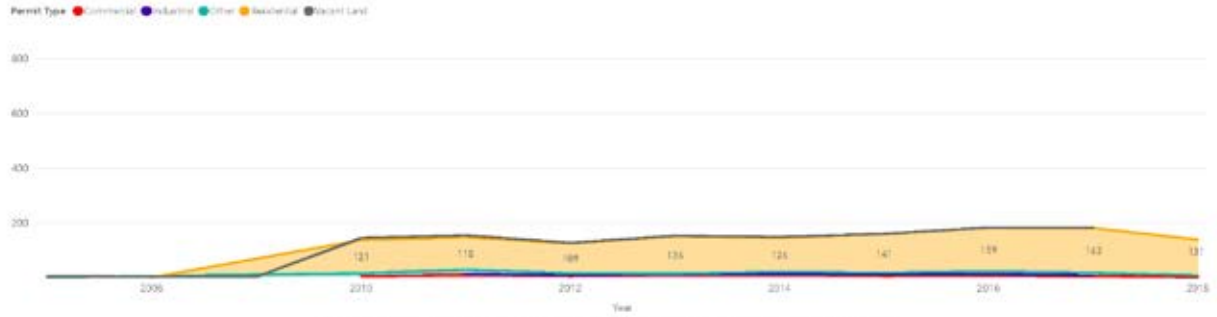
Number of Building Permits in Grant-Amherst, 2007-2018



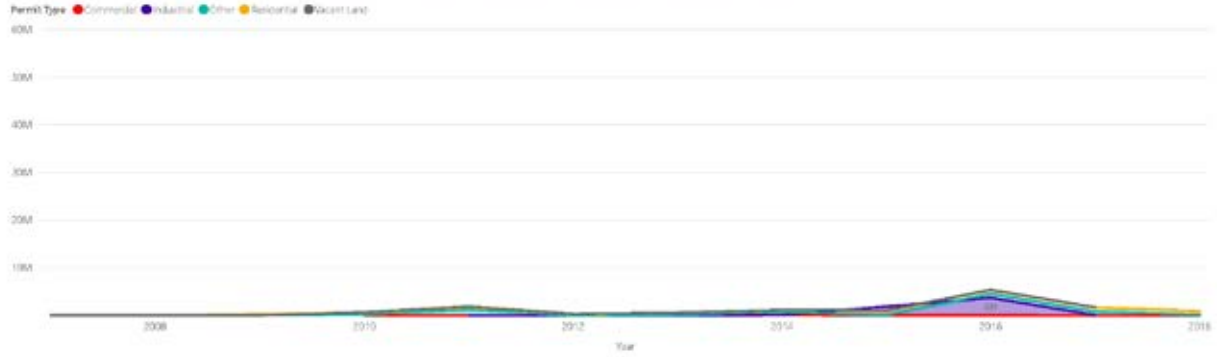
Sum of Values of Building Permits in Grant-Amherst, 2007-2018



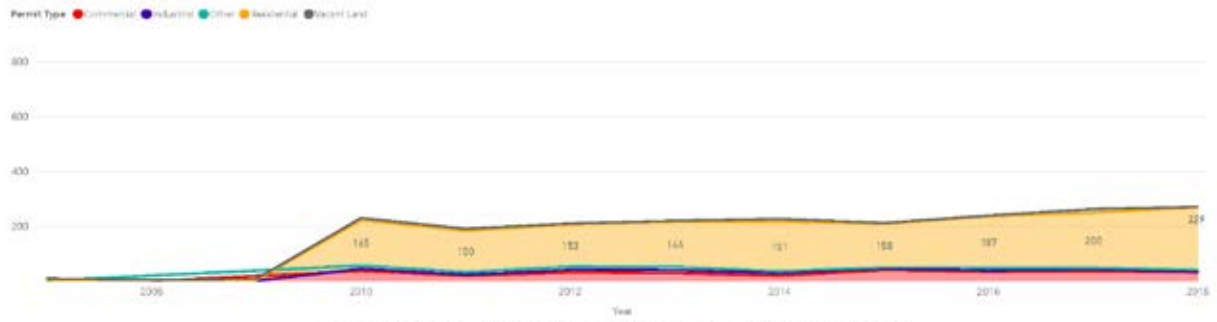
Number of Building Permits in Hamlin Park, 2007-2018



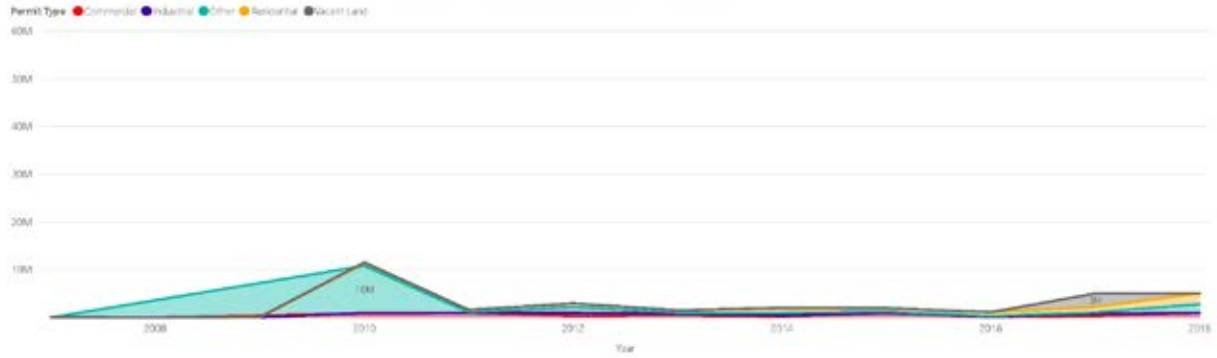
Sum of Values of Building Permits in Hamlin Park, 2007-2018



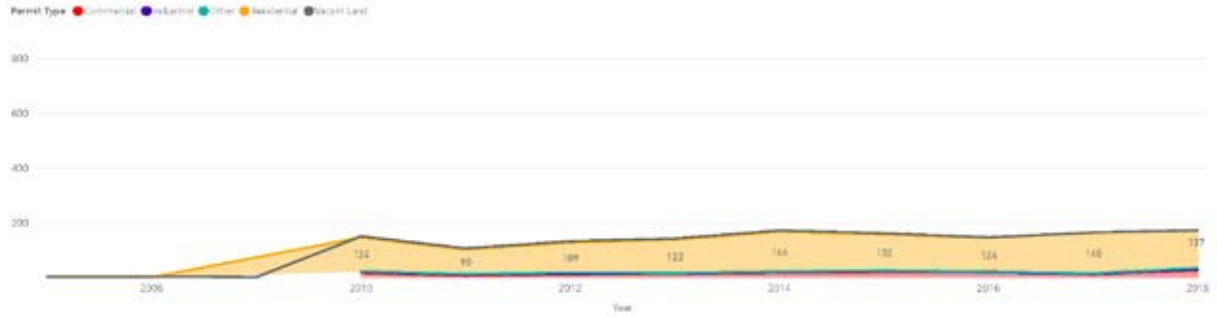
Number of Building Permits in Hopkins-Tifft, 2007-2018



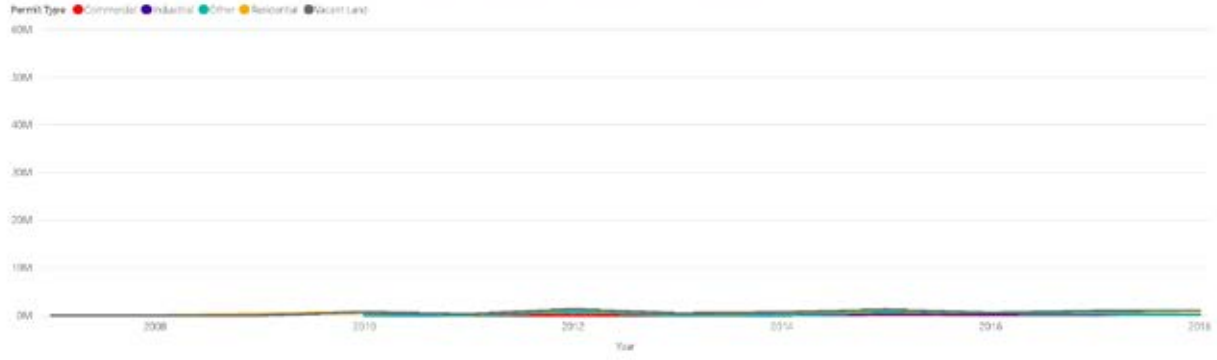
Sum of Values of Building Permits in Hopkins-Tifft, 2007-2018



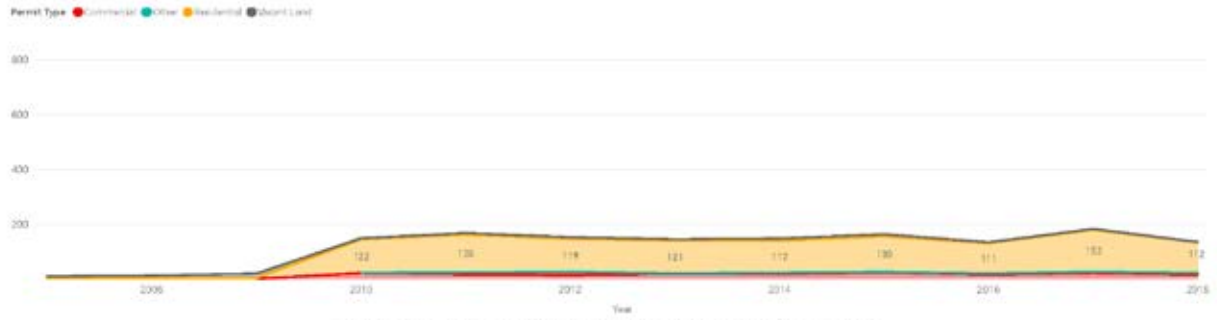
Number of Building Permits in Kaisertown, 2007-2018



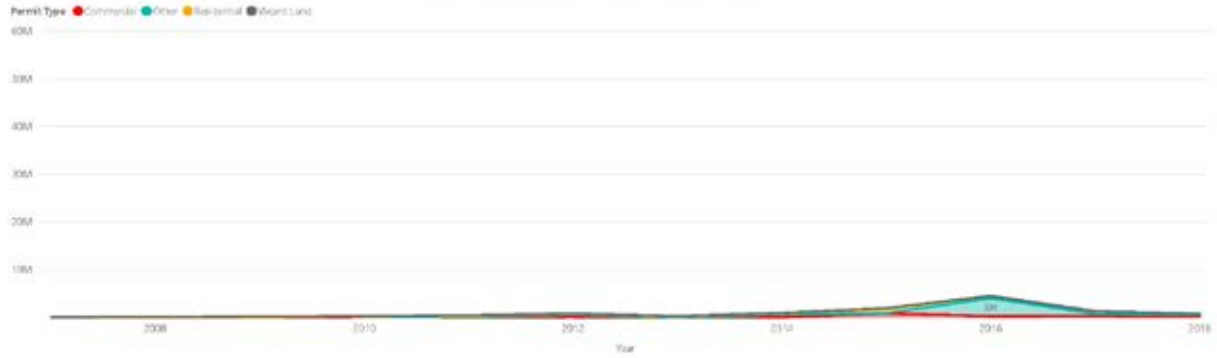
Sum of Values of Building Permits in Kaisertown, 2007-2018



Number of Building Permits in Kenfield, 2007-2018

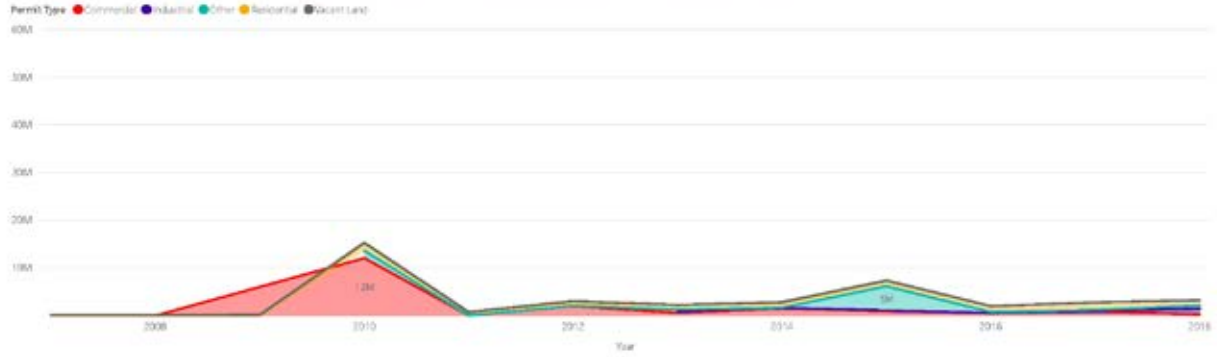


Sum of Values of Building Permits in Kenfield, 2007-2018

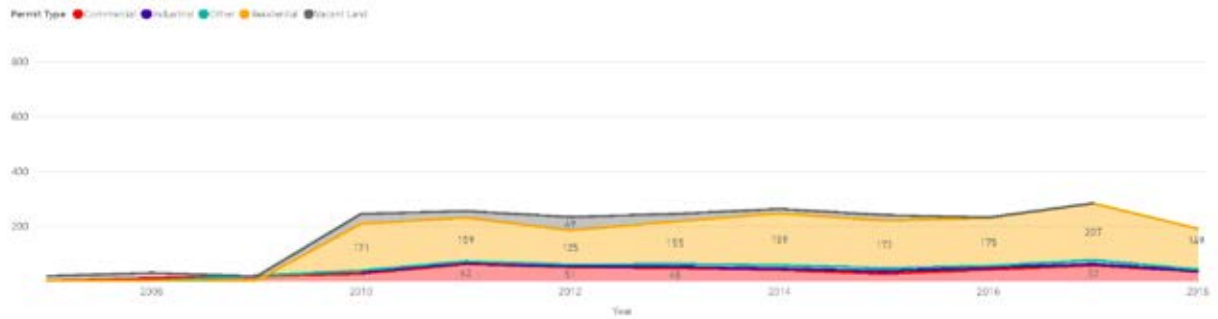


Number of Building Permits in Kensington-Bailey, 2007-2018

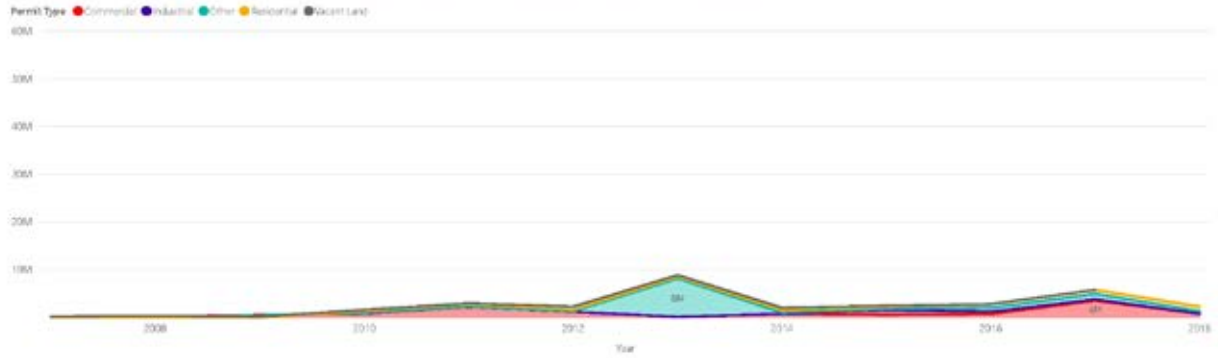
Sum of Values of Building Permits in Kensington-Bailey, 2007-2018



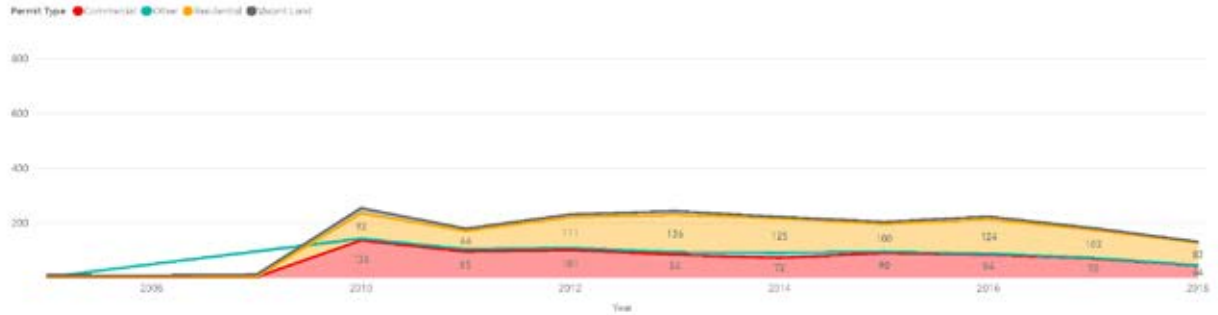
Number of Building Permits in Lovejoy, 2007-2018



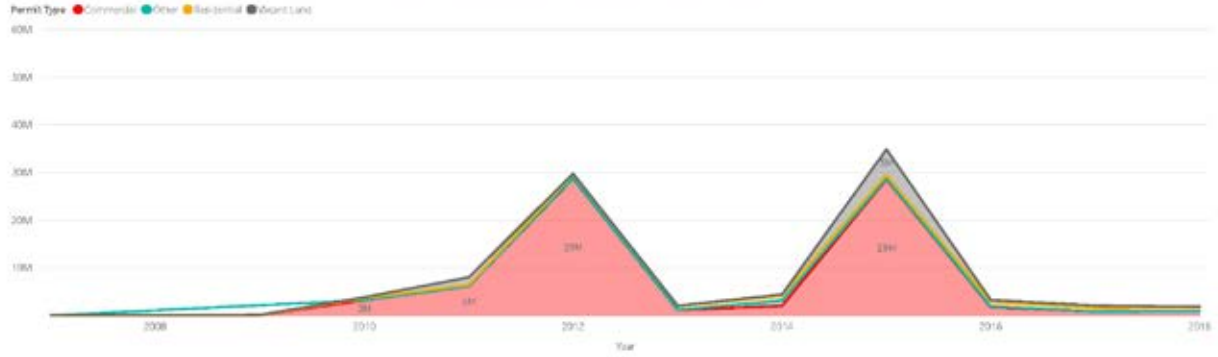
Sum of Values of Building Permits in Lovejoy, 2007-2018



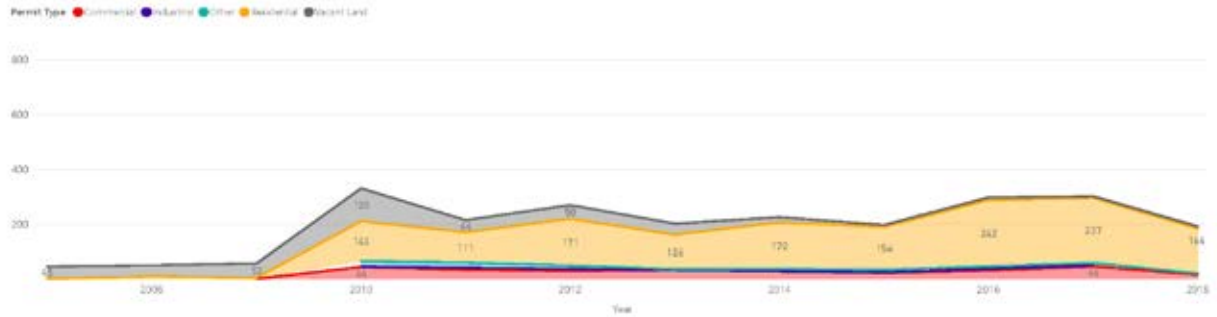
Number of Building Permits in Lower West Side, 2007-2018



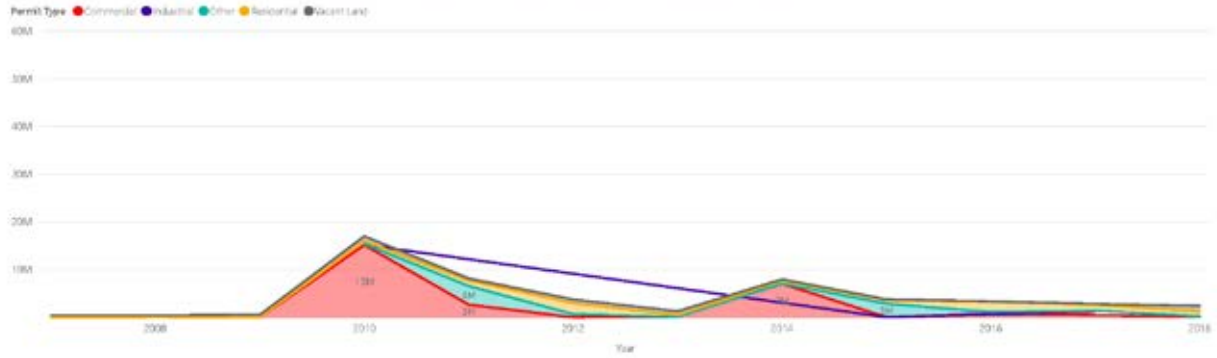
Sum of Values of Building Permits in Lower West Side, 2007-2018



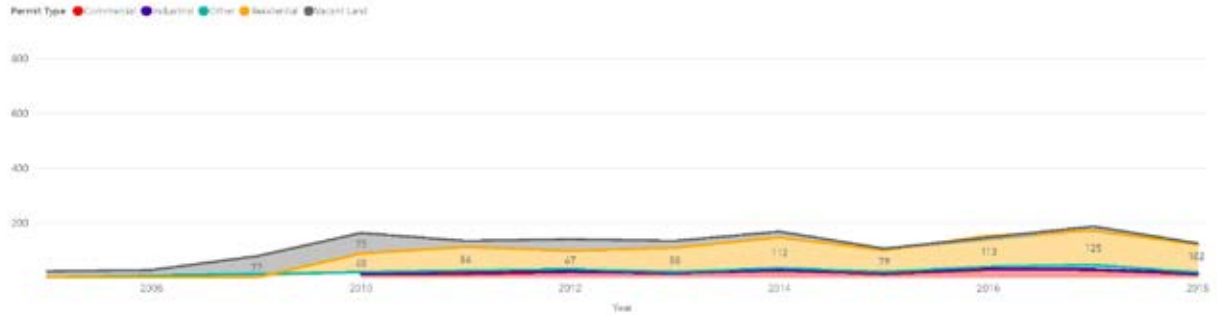
Number of Building Permits in Masten Park, 2007-2018



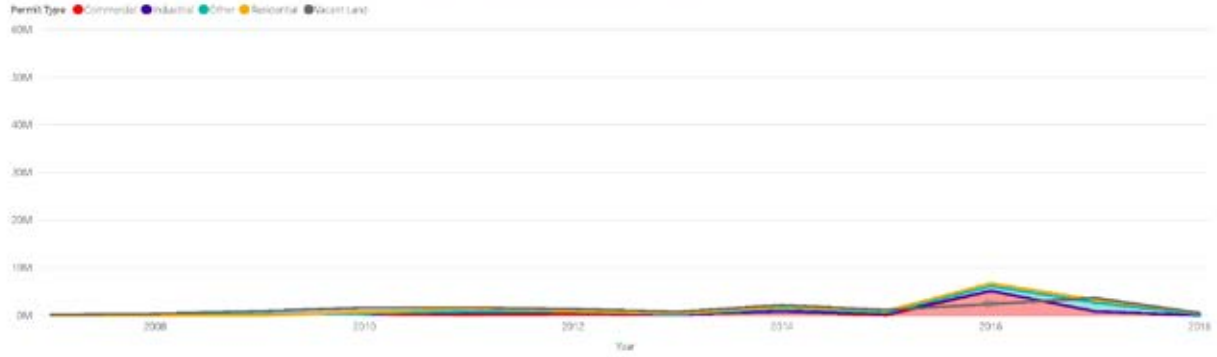
Sum of Values of Building Permits in Masten Park, 2007-2018



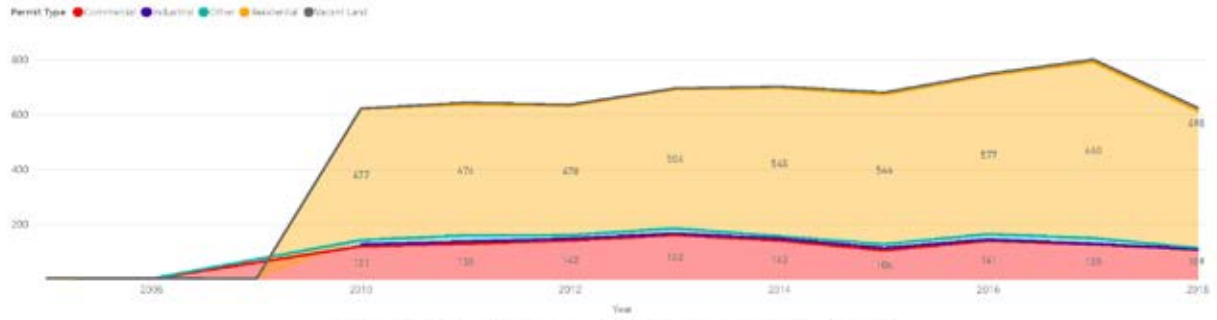
Number of Building Permits in MLK Park, 2007-2018



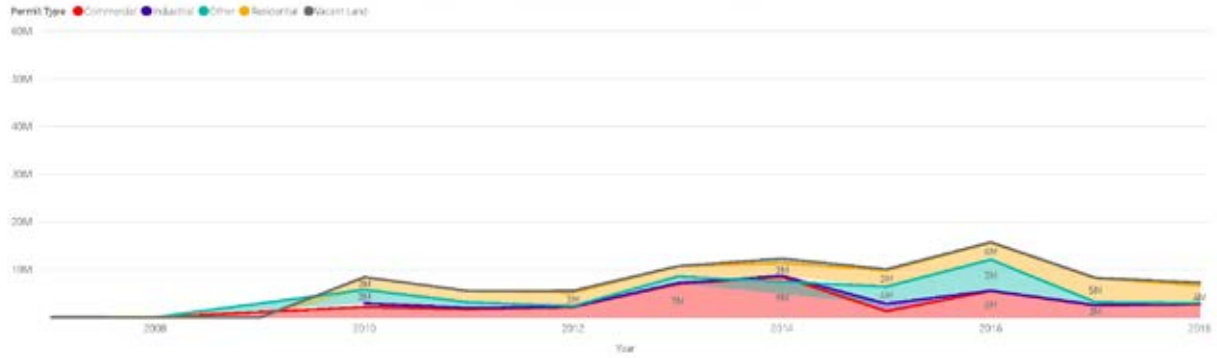
Sum of Values of Building Permits in MLK Park, 2007-2018



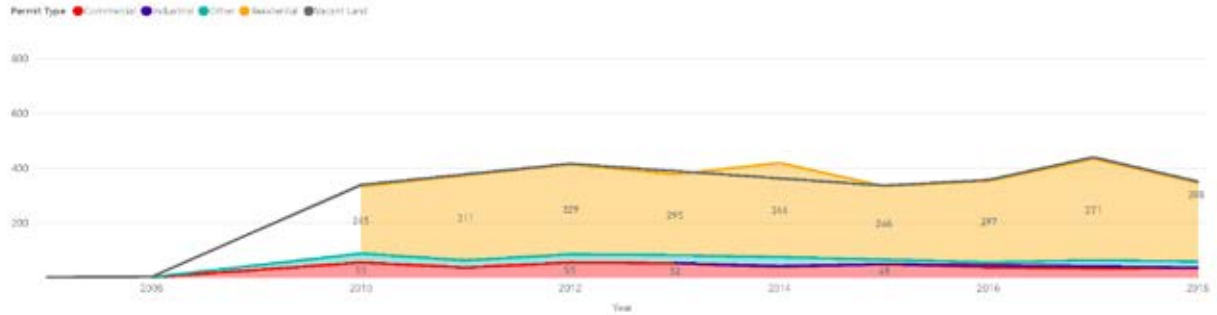
Number of Building Permits in North Park, 2007-2018



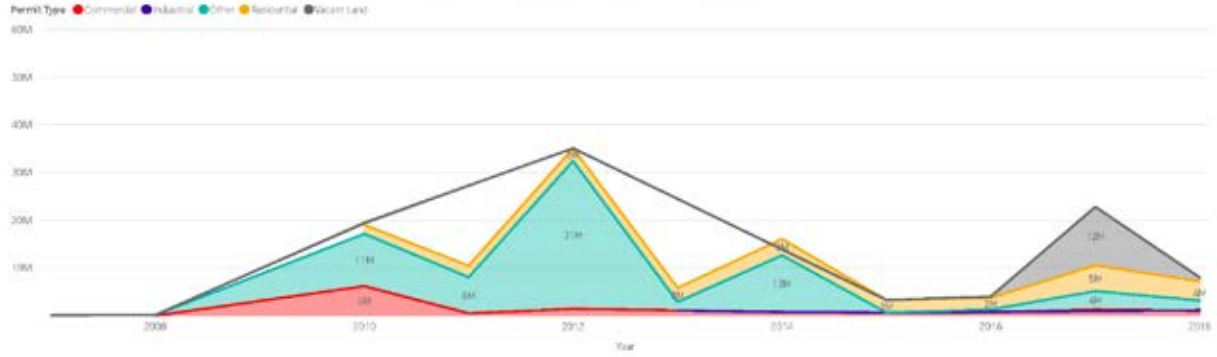
Sum of Values of Building Permits in North Park, 2007-2018



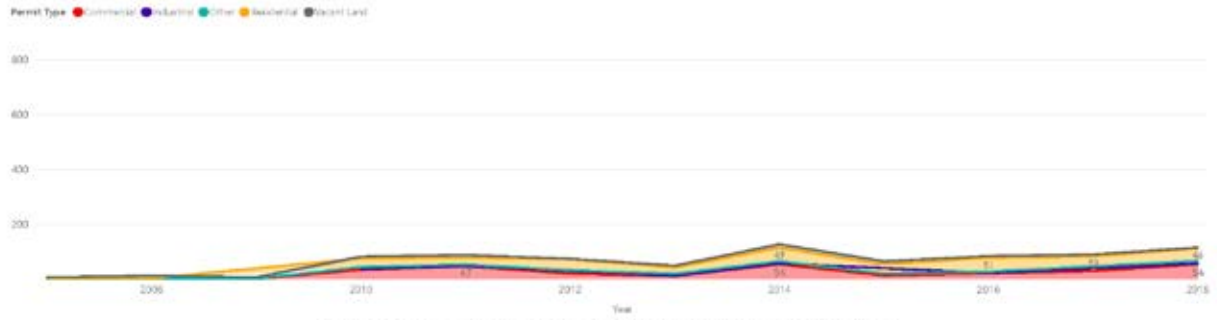
Number of Building Permits in Parkside, 2007-2018



Sum of Values of Building Permits in Parkside, 2007-2018

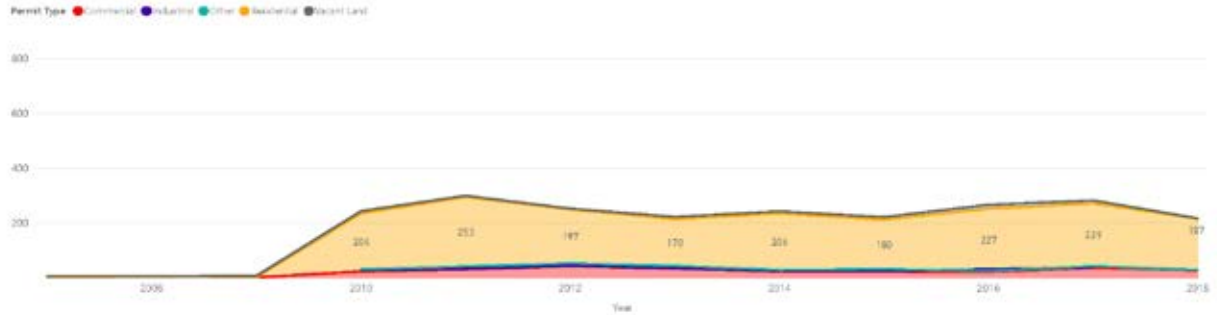


Number of Building Permits in Pratt-Willert, 2007-2018



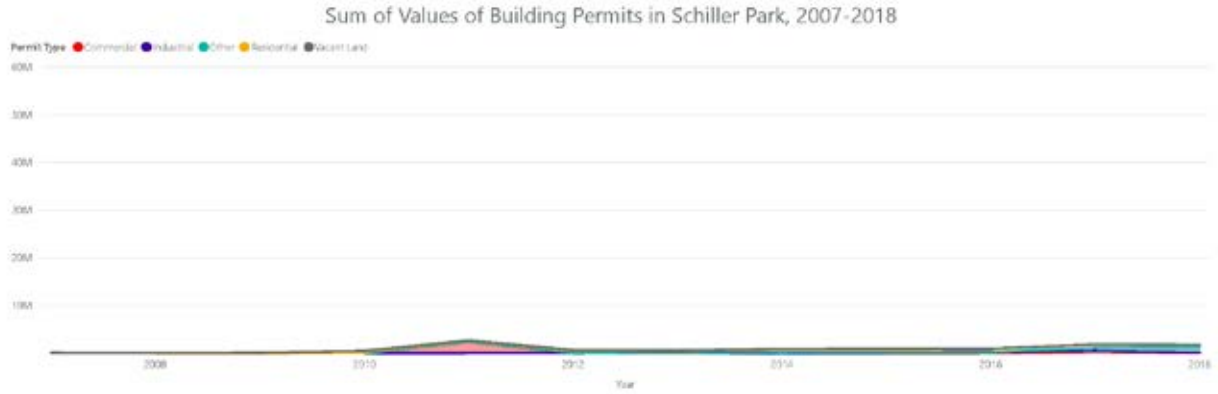
Sum of Values of Building Permits in Pratt-Willert, 2007-2018

Number of Building Permits in Riverside, 2007-2018

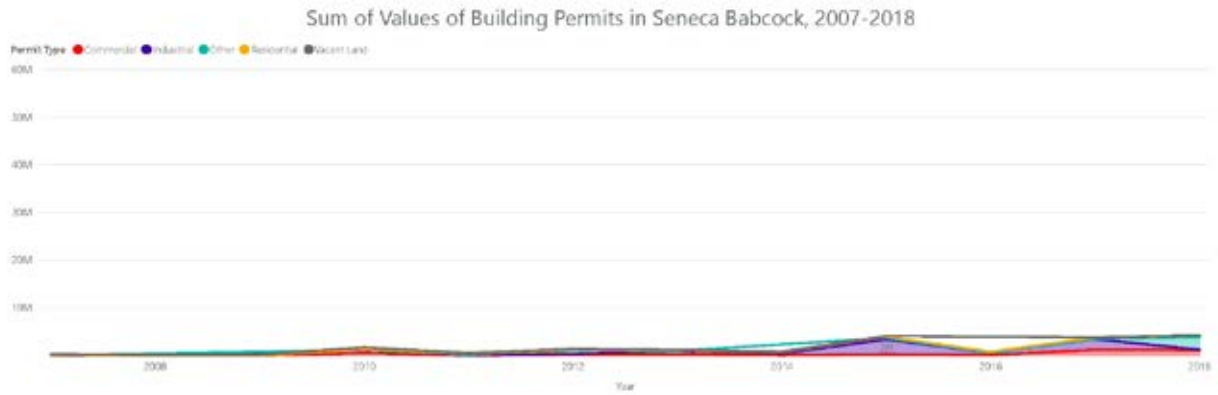


Sum of Values of Building Permits in Riverside, 2007-2018

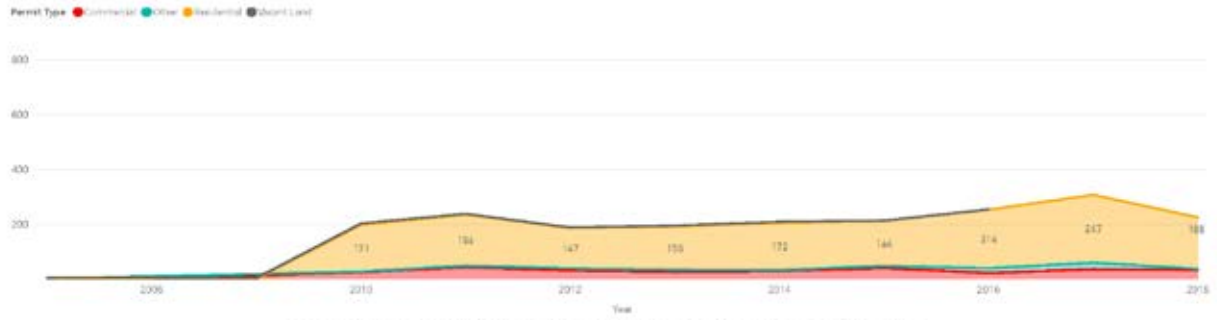

Number of Building Permits in Schiller Park, 2007-2018
Permit Type
800
600
400
200
163
172
143
181
173
158
197
220
170
2008
2010
2012
2014
2016
2018
Year


Sum of Values of Building Permits in Schiller Park, 2007-2018
Permit Type
60M
50M
40M
30M
20M
10M
2008
2010
2012
2014
2016
2018
Year

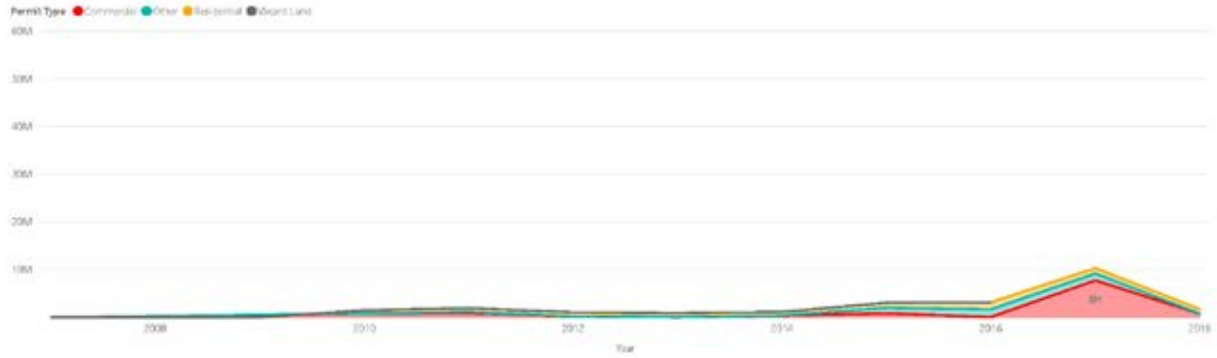

Number of Building Permits in Seneca Babcock, 2007-2018
Permit Type
800
600
400
200
52
44
49
48
57
63
61
66
46
2008
2010
2012
2014
2016
2018
Year


Sum of Values of Building Permits in Seneca Babcock, 2007-2018
Permit Type
60M
50M
40M
30M
20M
10M
2008
2010
2012
2014
2016
2018
Year

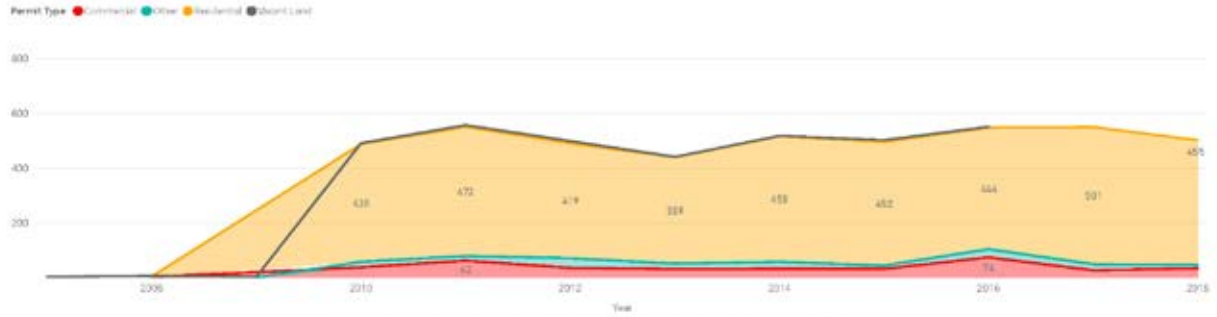
Number of Building Permits in Seneca-Cazenovia, 2007-2018



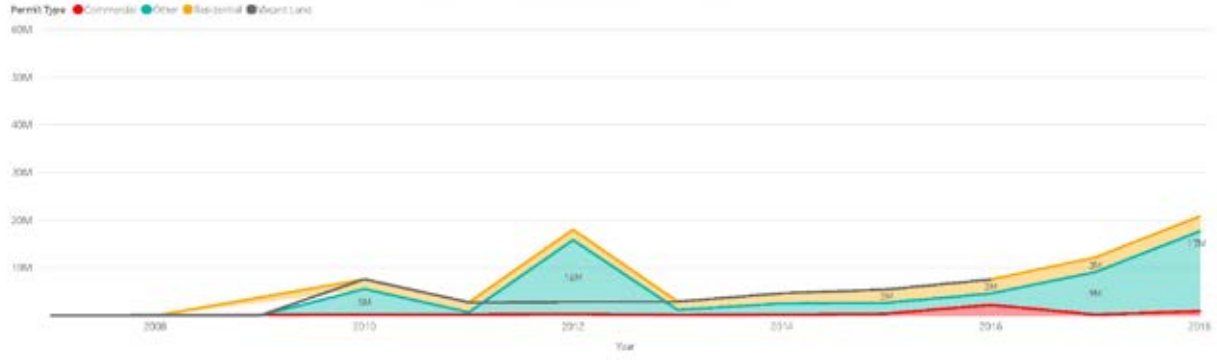
Sum of Values of Building Permits in Seneca-Cazenovia, 2007-2018



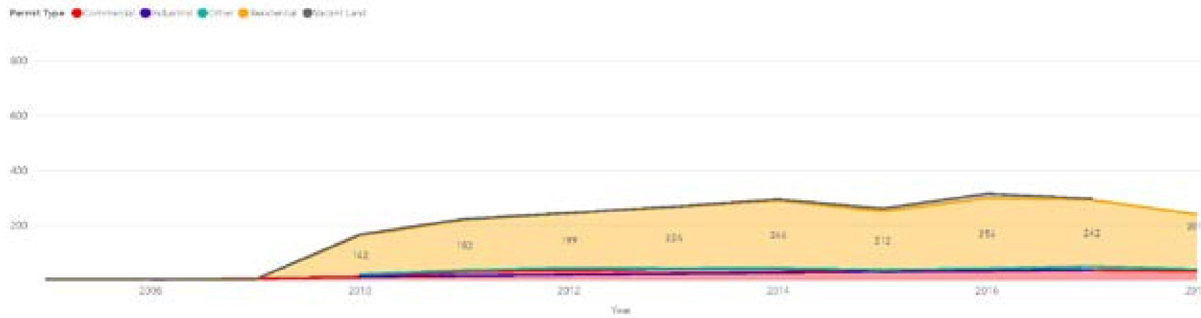
Number of Building Permits in South Park, 2007-2018



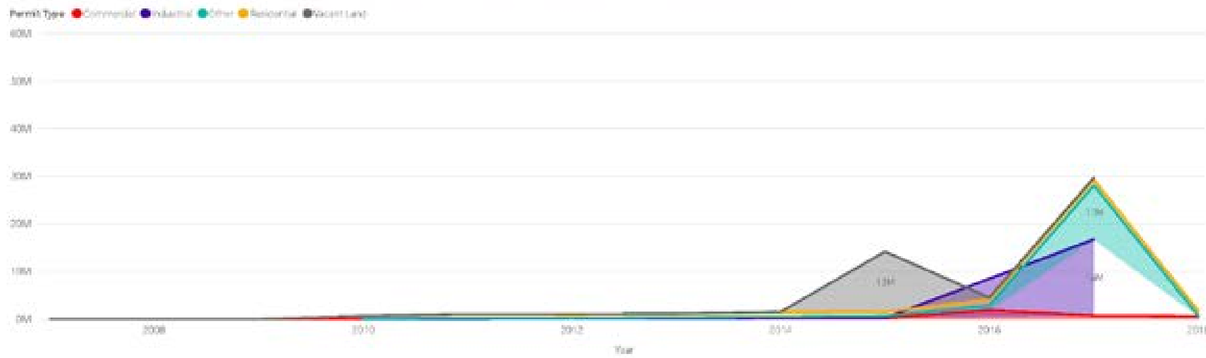
Sum of Values of Building Permits in South Park, 2007-2018



Number of Building Permits in University Heights, 2007-2018

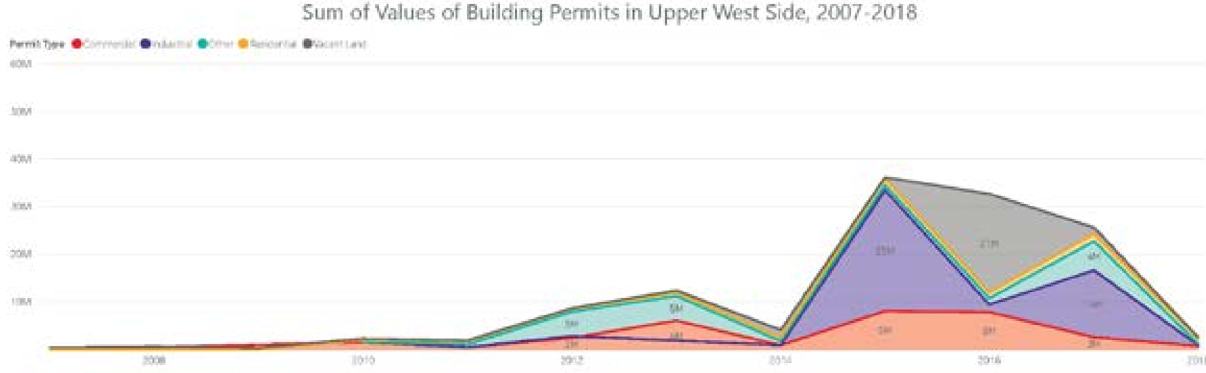


Sum of Values of Building Permits in University Heights, 2007-2018

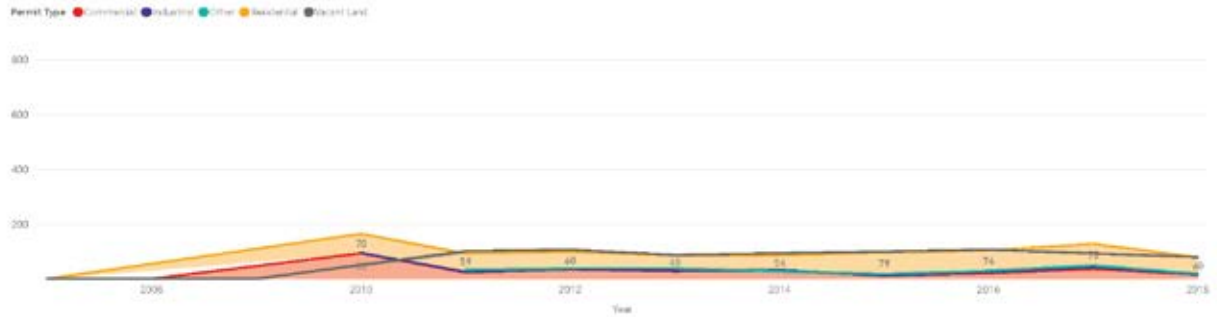


Number of Building Permits in Upper West Side, 2007-2018

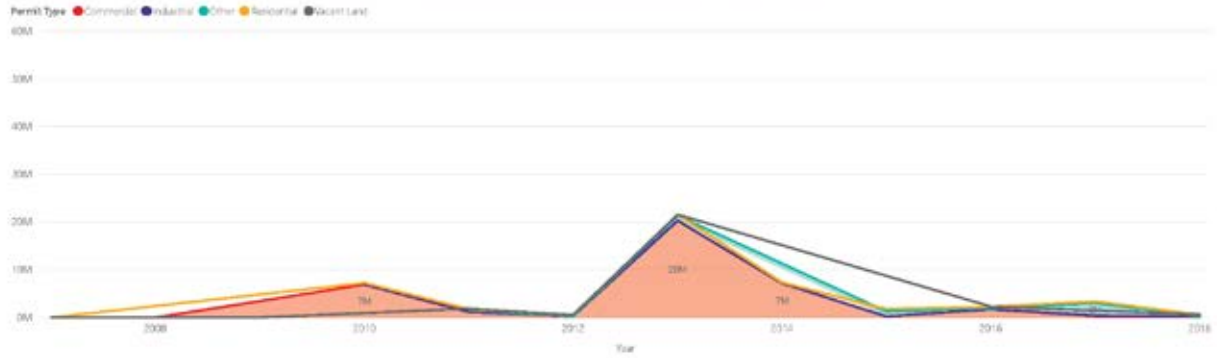
Sum of Values of Building Permits in Upper West Side, 2007-2018



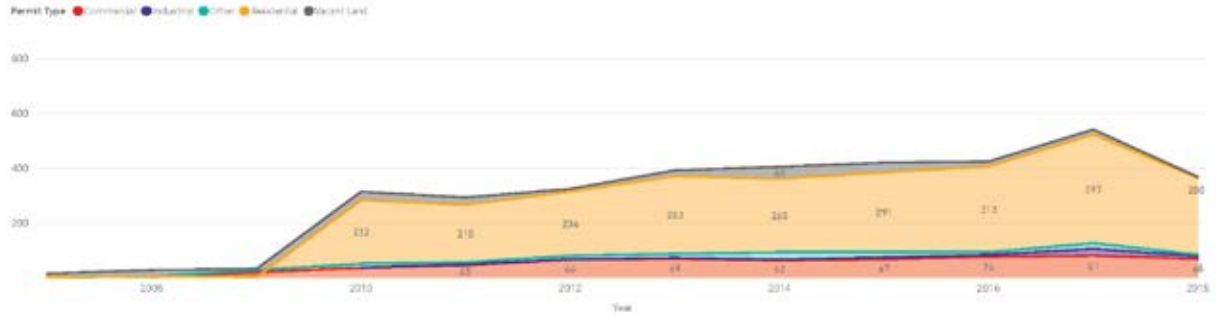
Number of Building Permits in West Hertel, 2007-2018



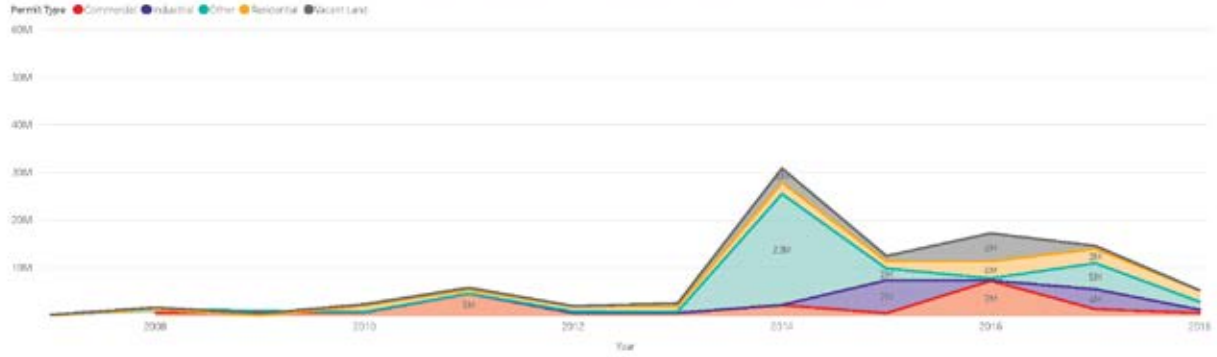
Sum of Values of Building Permits in West Hertel, 2007-2018



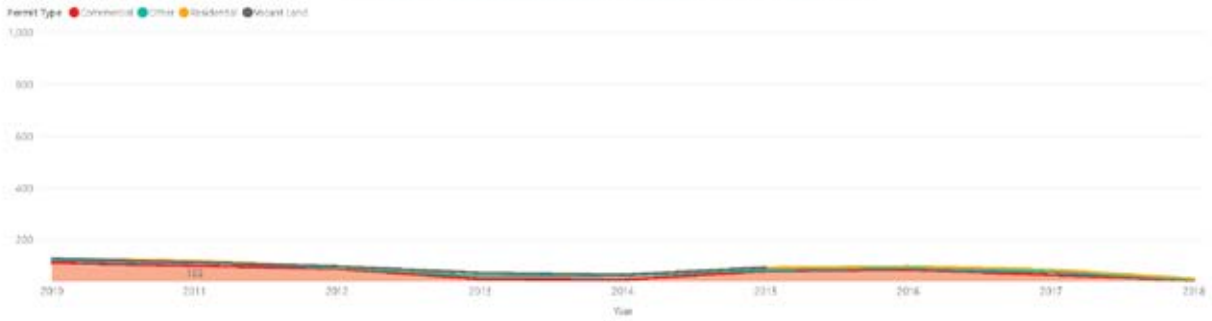
Number of Building Permits in West Side, 2007-2018



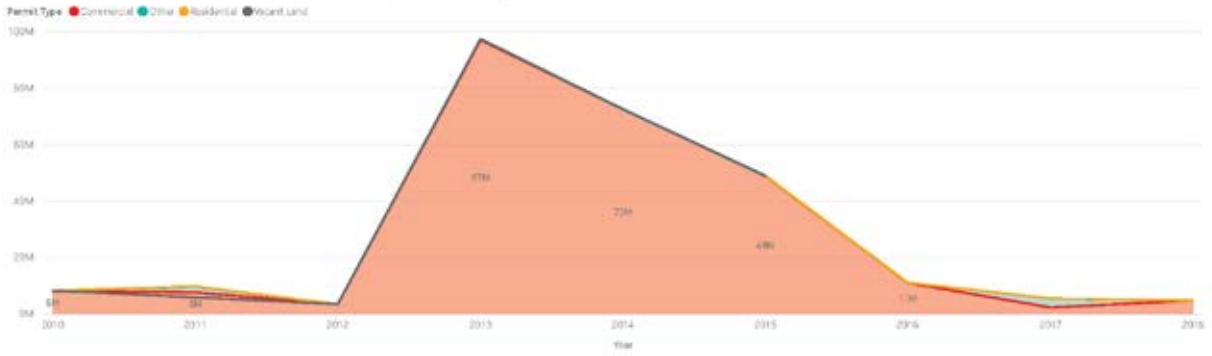
Sum of Values of Building Permits in West Side, 2007-2018



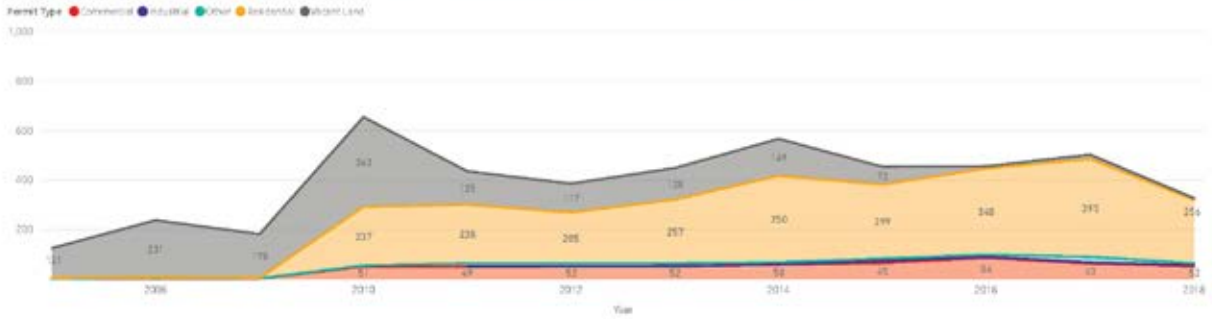
Number of Building Permits in CSO Area 014, 2007-2018



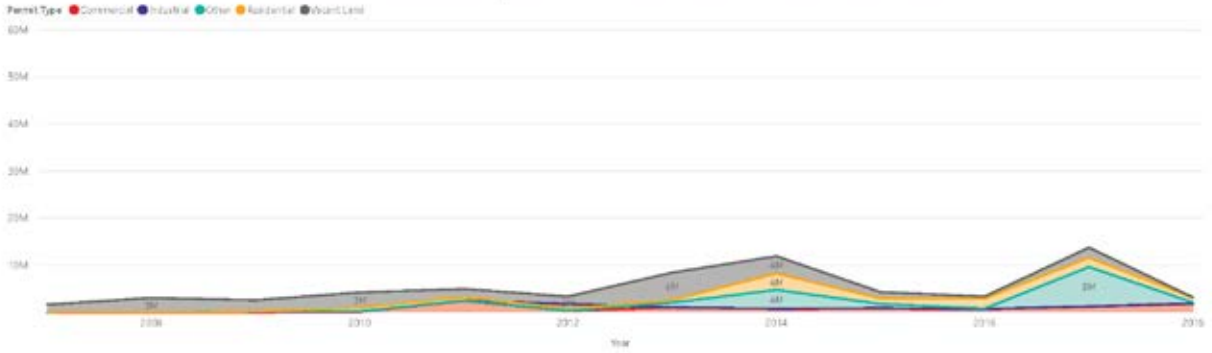
Sum of Values of Building Permits in CSO Area 014 Per Year, 2007-2018



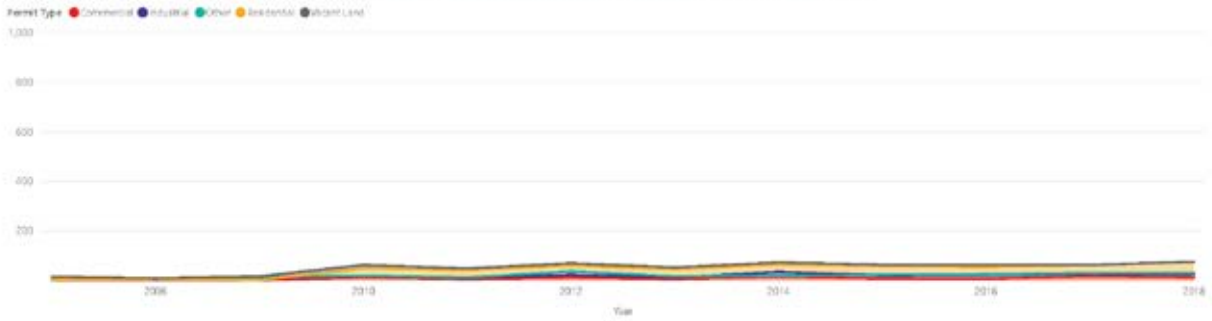
Number of Building Permits in CSO Area 026, 2007-2018



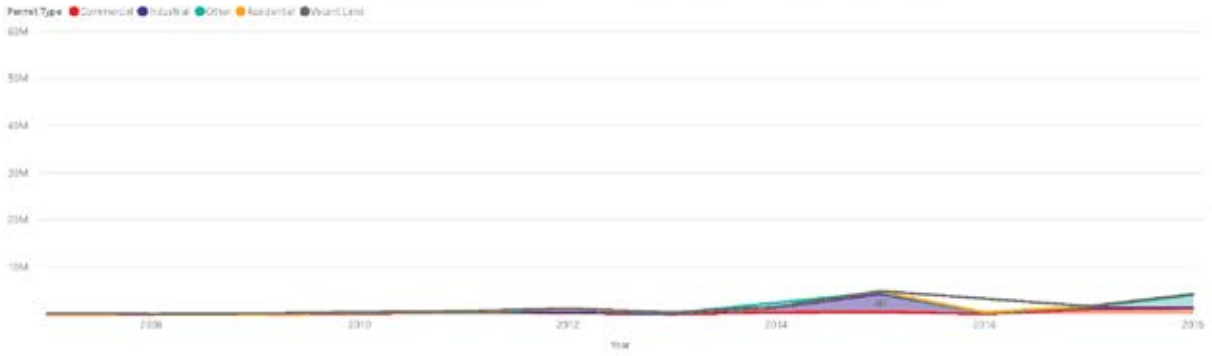
Sum of Values of Building Permits in CSO Area 026 Per Year, 2007-2018



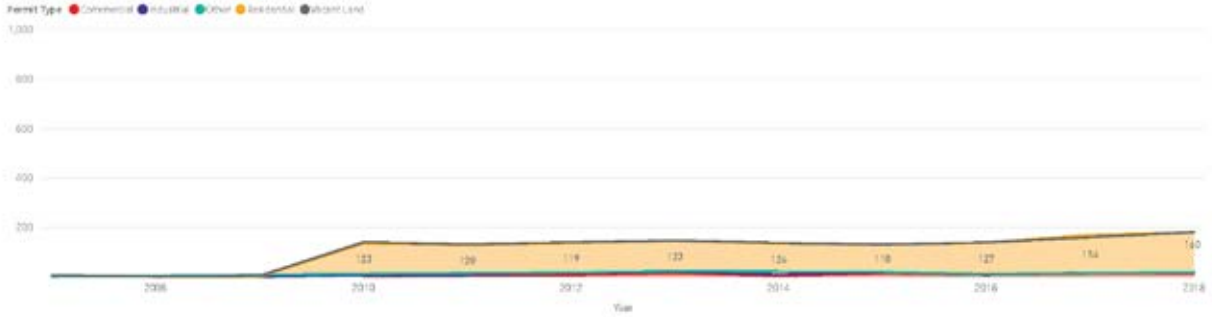
Number of Building Permits in CSO Area 027, 2007-2018



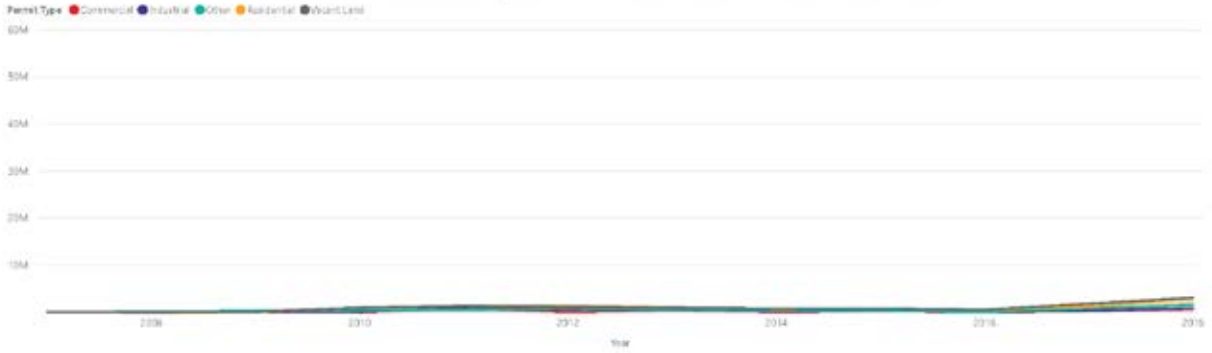
Sum of Values of Building Permits in CSO Area 027 Per Year, 2007-2018



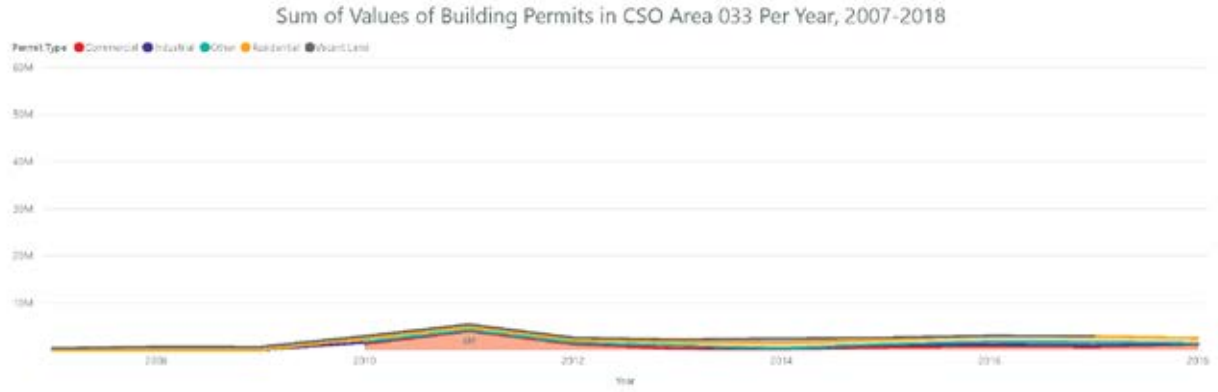
Number of Building Permits in CSO Area 028, 2007-2018

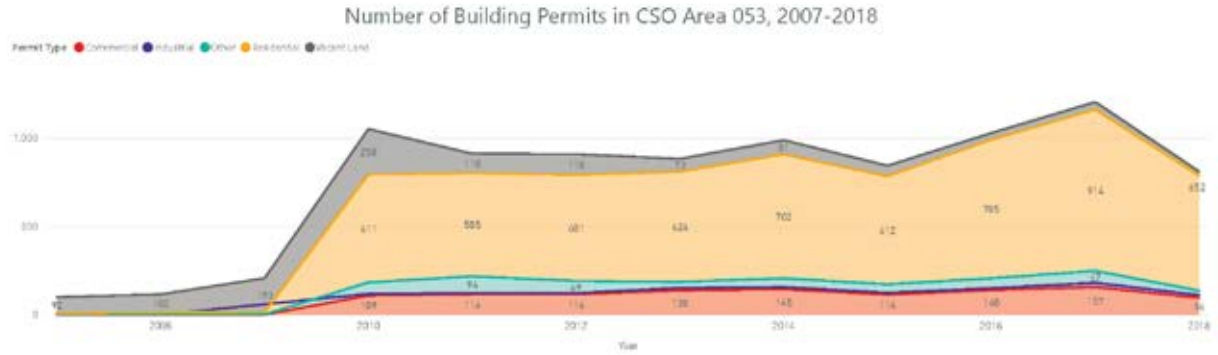


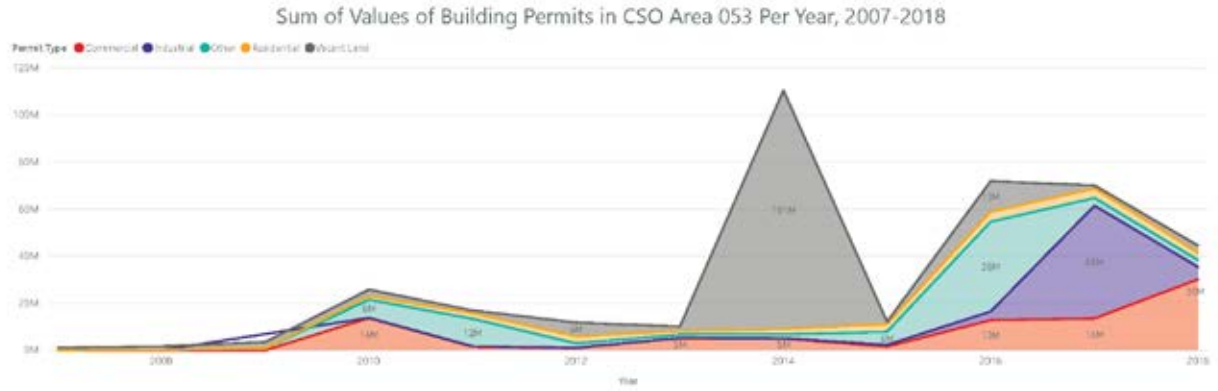
Sum of Values of Building Permits in CSO Area 028 Per Year, 2007-2018




Number of Building Permits in CSO Area 033, 2007-2018
Permit Type
Year


Sum of Values of Building Permits in CSO Area 033 Per Year, 2007-2018
Permit Type
Year


Number of Building Permits in CSO Area 053, 2007-2018
Permit Type
Year


Sum of Values of Building Permits in CSO Area 053 Per Year, 2007-2018
Permit Type
Year