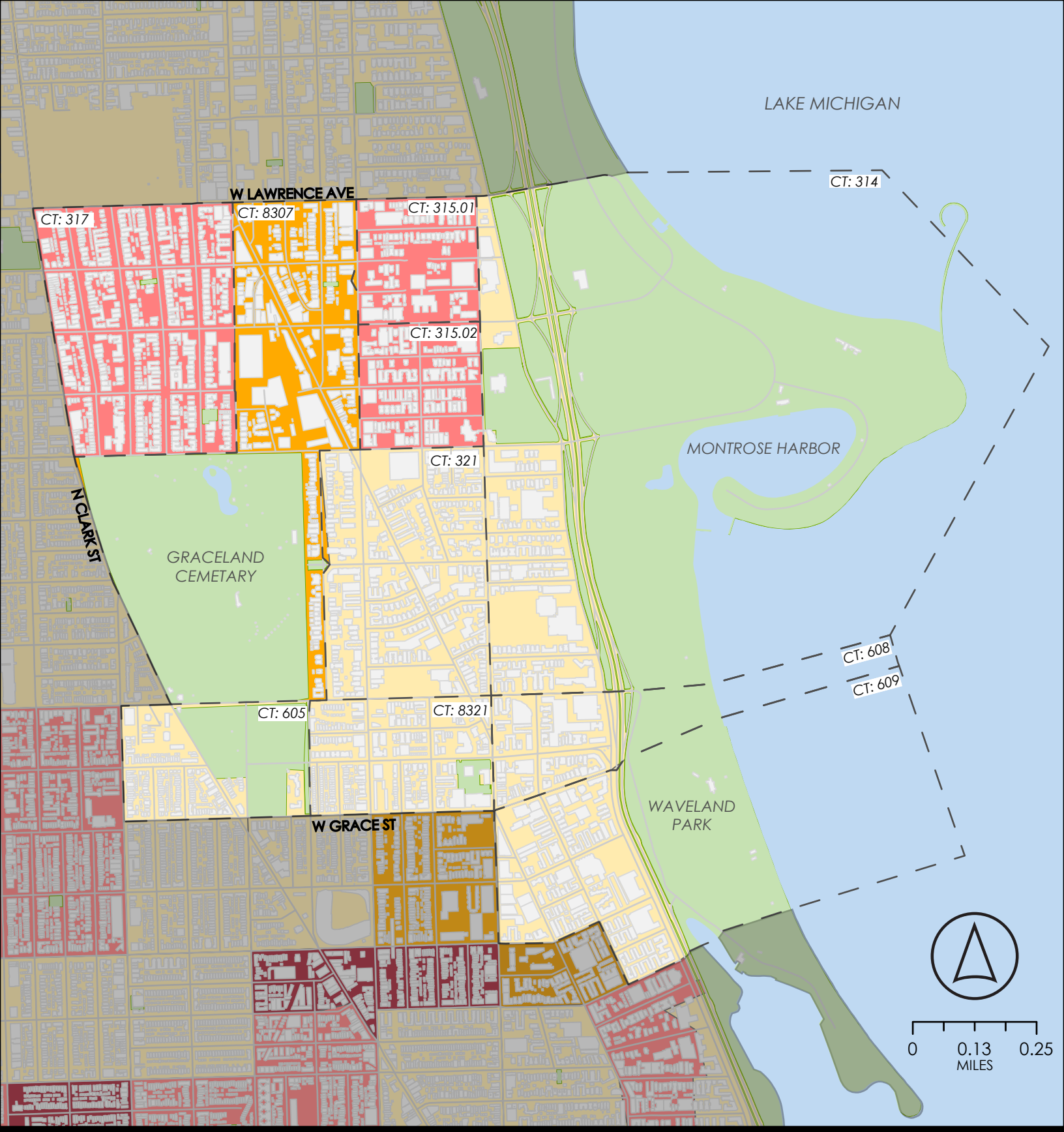


CITY OF CHICAGO
46TH WARD

POPULATION GROWTH 2010 TO 2020

LEGEND

- Building Footprint
- Waterway
- Census Tract Outline
- CT: ## Census Tract Number
- Street Centerline
- Park

POPULATION % CHANGE

- >10% Decrease
- 0% - 9% Decrease
- 0% - 25% Increase
- 25% - 50% Increase
- 50% - 80% Increase

SOURCE: CHICAGO DATA PORTAL, US CENSUS BUREAU

CITY OF CHICAGO
46TH WARD

MEDIAN AGE
2010

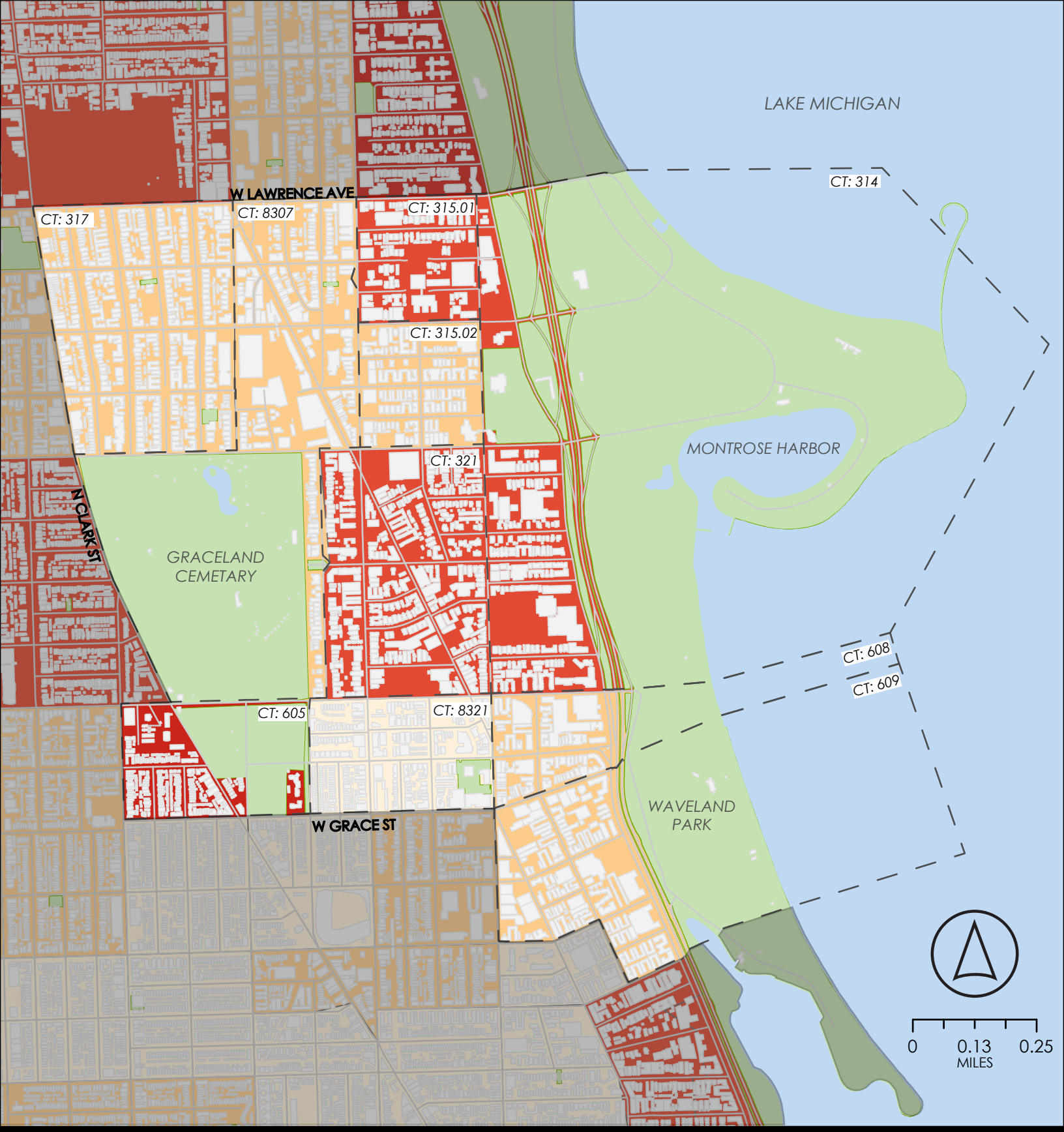
LEGEND

- Building Footprint
- Waterway
- Census Tract Outline
- CT: ## Census Tract Number
- Street Centerline
- Park

MEDIAN AGE

- 20.4 - 30
- 30 - 35
- 35 - 40
- 40 - 50
- 50 - 62

SOURCE: CHICAGO DATA PORTAL, US CENSUS BUREAU



CITY OF CHICAGO
46TH WARD

MEDIAN AGE
2020

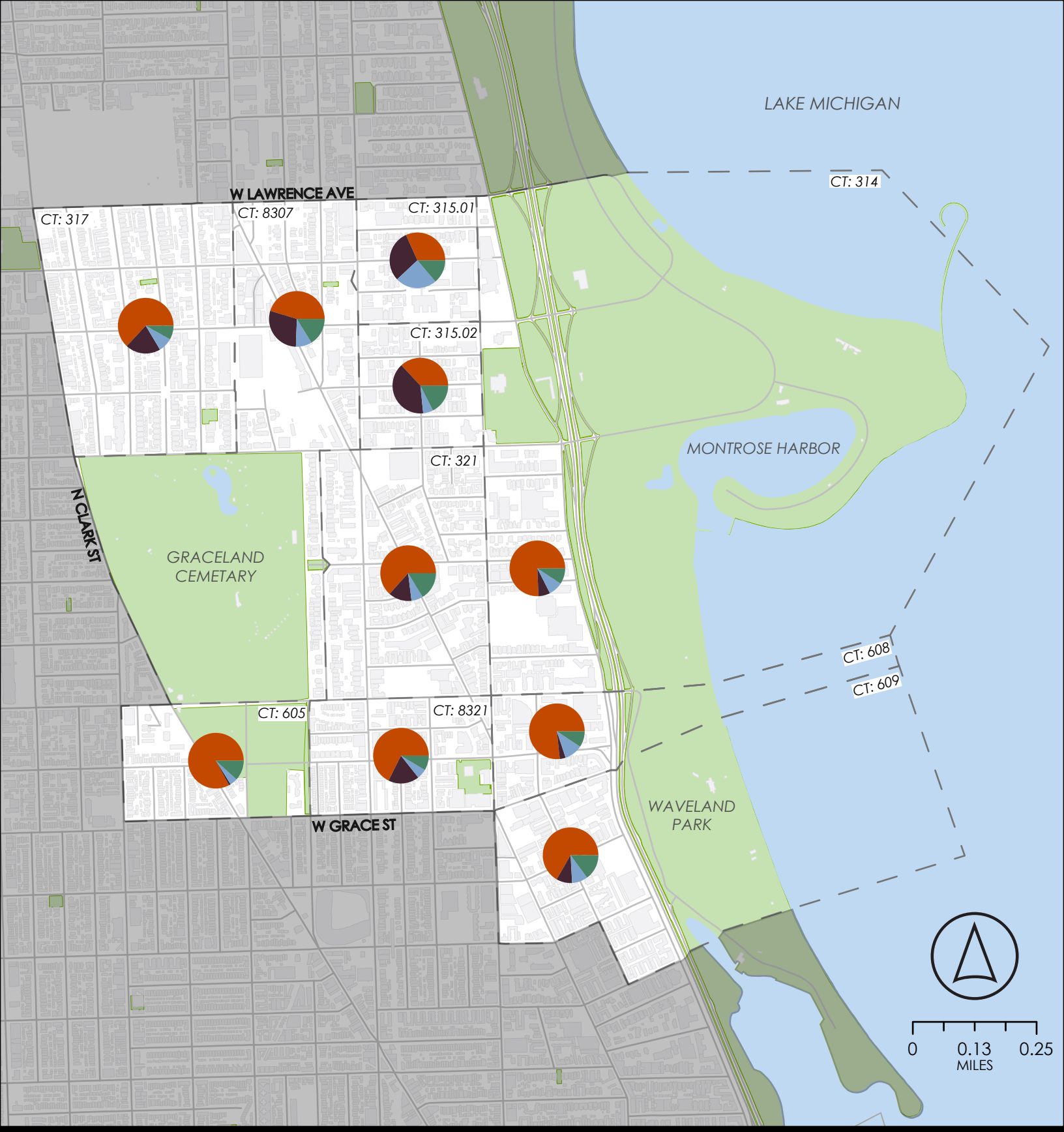
LEGEND

- Building Footprint
- Waterway
- Census Tract Outline
- CT: ## Census Tract Number
- Street Centerline
- Park

MEDIAN AGE

- 20.4 - 30
- 30 - 35
- 35 - 40
- 40 - 50
- 50 - 62

SOURCE: CHICAGO DATA PORTAL, US CENSUS BUREAU



CITY OF CHICAGO
46TH WARD

SHARE OF POPULATION BY RACE
2010

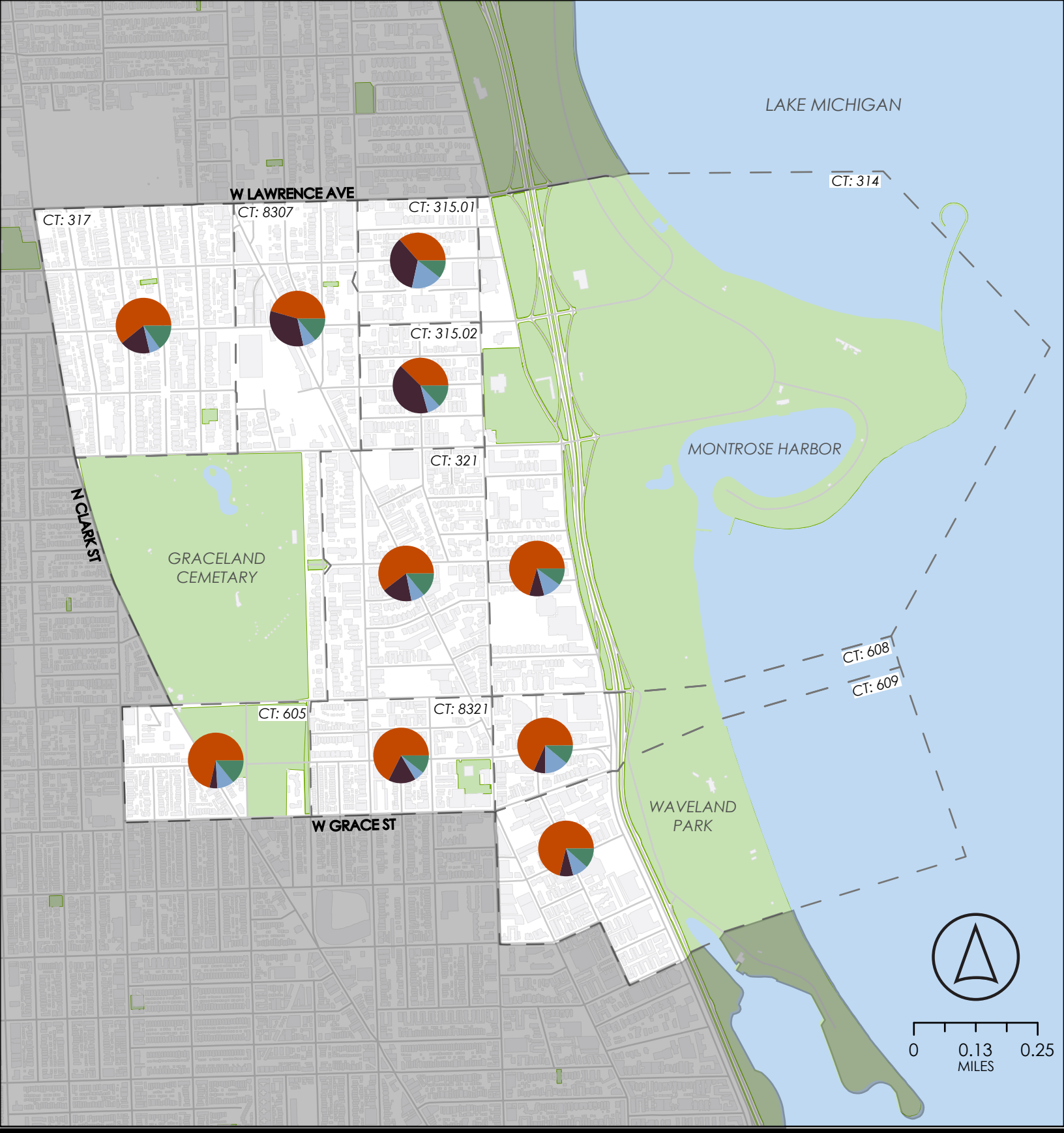
LEGEND

- Building Footprint
- Waterway
- Census Tract Outline
- CT: ## Census Tract Number
- Street Centerline
- Park

SHARE OF POPULATION BY RACE

- White
- Black
- Asian
- Hispanic

SOURCE: CHICAGO DATA PORTAL, US CENSUS BUREAU



CITY OF CHICAGO
46TH WARD

SHARE OF POPULATION BY RACE
2020

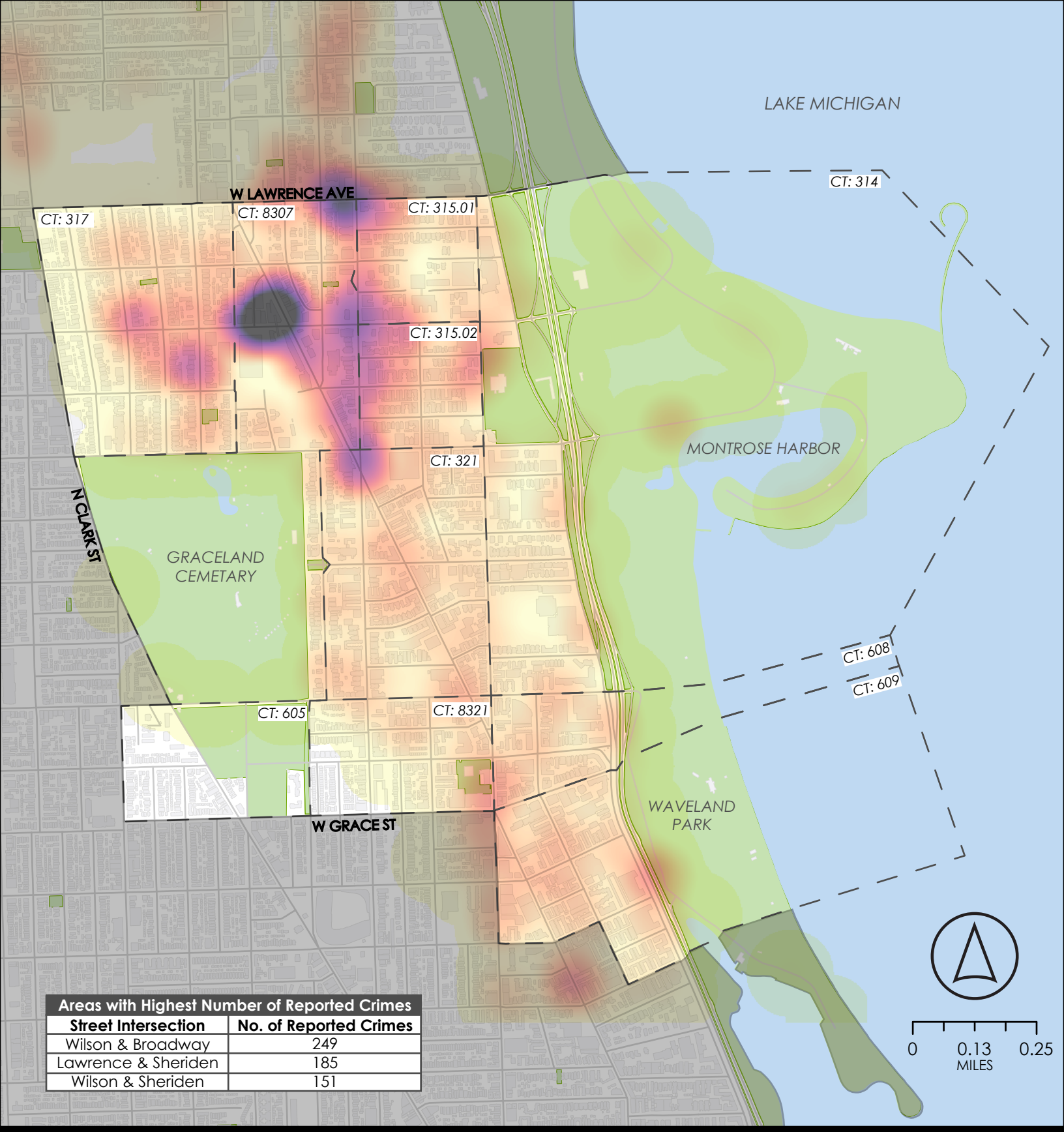
LEGEND

- Building Footprint
- Waterway
- Census Tract Outline
- CT: ## Census Tract Number
- Street Centerline
- Park

SHARE OF POPULATION BY RACE

- White
- Black
- Asian
- Hispanic

SOURCE: CHICAGO DATA PORTAL, US CENSUS BUREAU



Areas with Highest Number of Reported Crimes	
Street Intersection	**No. of Reported Crimes**
Wilson & Broadway	249
Lawrence & Sheriden	185
Wilson & Sheriden	151

CITY OF CHICAGO
46TH WARD

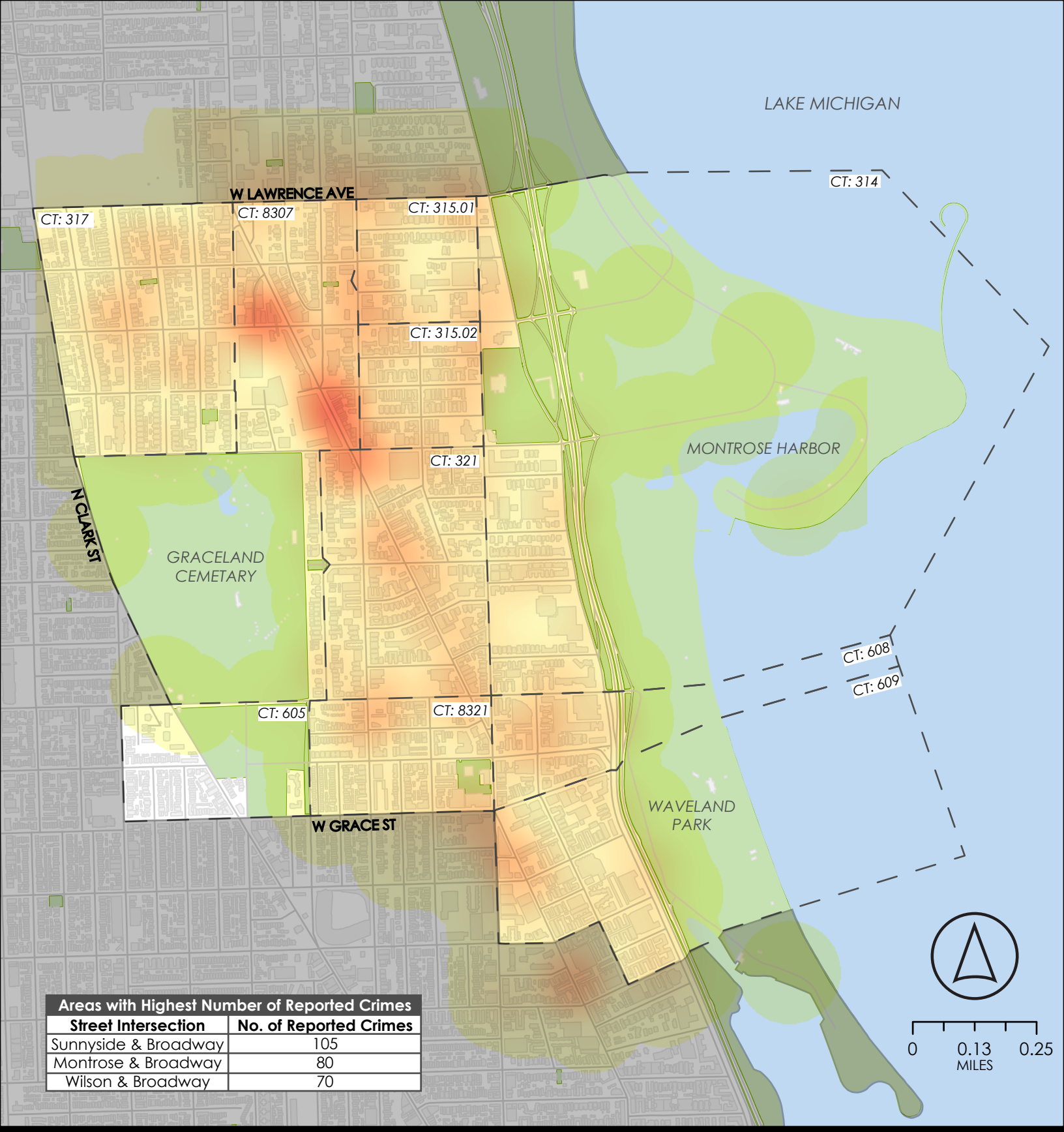
CRIME DENSITY
2010

LEGEND

- Building Footprint
- Waterway
- Census Tract Outline
- CT: ## Census Tract Number
- Street Centerline
- Park

CRIME DENSITY
4,615 Total Reported Crimes
High Crime Area
Low Crime Area

SOURCE: CHICAGO DATA PORTAL, US CENSUS BUREAU



Areas with Highest Number of Reported Crimes	
Street Intersection	**No. of Reported Crimes**
Sunnyside & Broadway	105
Montrose & Broadway	80
Wilson & Broadway	70

CITY OF CHICAGO
46TH WARD

CRIME DENSITY
2020

LEGEND

- Building Footprint
- Waterway
- Census Tract Outline
- CT: ## Census Tract Number
- Street Centerline
- Park

CRIME DENSITY
2,726 Total Reported Crimes
High Crime Area
Low Crime Area

SOURCE: CHICAGO DATA PORTAL, US CENSUS BUREAU

The "Gentrification Factor" for each Census Tract is based on the following variables:

- Percent of population that is White
- Percent of population that is college educated or above
- Median income
- Median property value

CITY OF CHICAGO
46TH WARD

GENTRIFICATION 2010

LEGEND

- Building Footprint
- Waterway
- Census Tract Outline
- CT: ## Census Tract Number
- Street Centerline
- Park

GENTRIFICATION FACTOR

- Low Potential for Gentrification
- High Potential for Gentrification
- Gentrification in Process
- Gentrified

SOURCE: CHICAGO DATA PORTAL, US CENSUS BUREAU

The "Gentrification Factor" for each Census Tract is based on the following variables:

- *Percent of population that is White*
- *Percent of population that is college educated or above*
- *Median income*
- *Median property value*

CITY OF CHICAGO
46TH WARD

GENTRIFICATION
2020

LEGEND

- Building Footprint
- Waterway
- Census Tract Outline
- CT: ## Census Tract Number
- Street Centerline
- Park

GENTRIFICATION FACTOR

- Low Potential for Gentrification
- High Potential for Gentrification
- Gentrification in Process
- Gentrified

SOURCE: CHICAGO DATA PORTAL, US CENSUS BUREAU

The Bike/Transit Accessibility Factor for each Census Tract is based on the following variables:

- *Percent of population that is within 0.25 miles of a CTA station*
- *Percent of population that is within 0.1 miles of a bike lane*
- *Percent of population that is within 0.25 miles of a Divvy Bike Share station*

CITY OF CHICAGO
46TH WARD

BIKE/TRANSIT ACCESSIBILITY
2010

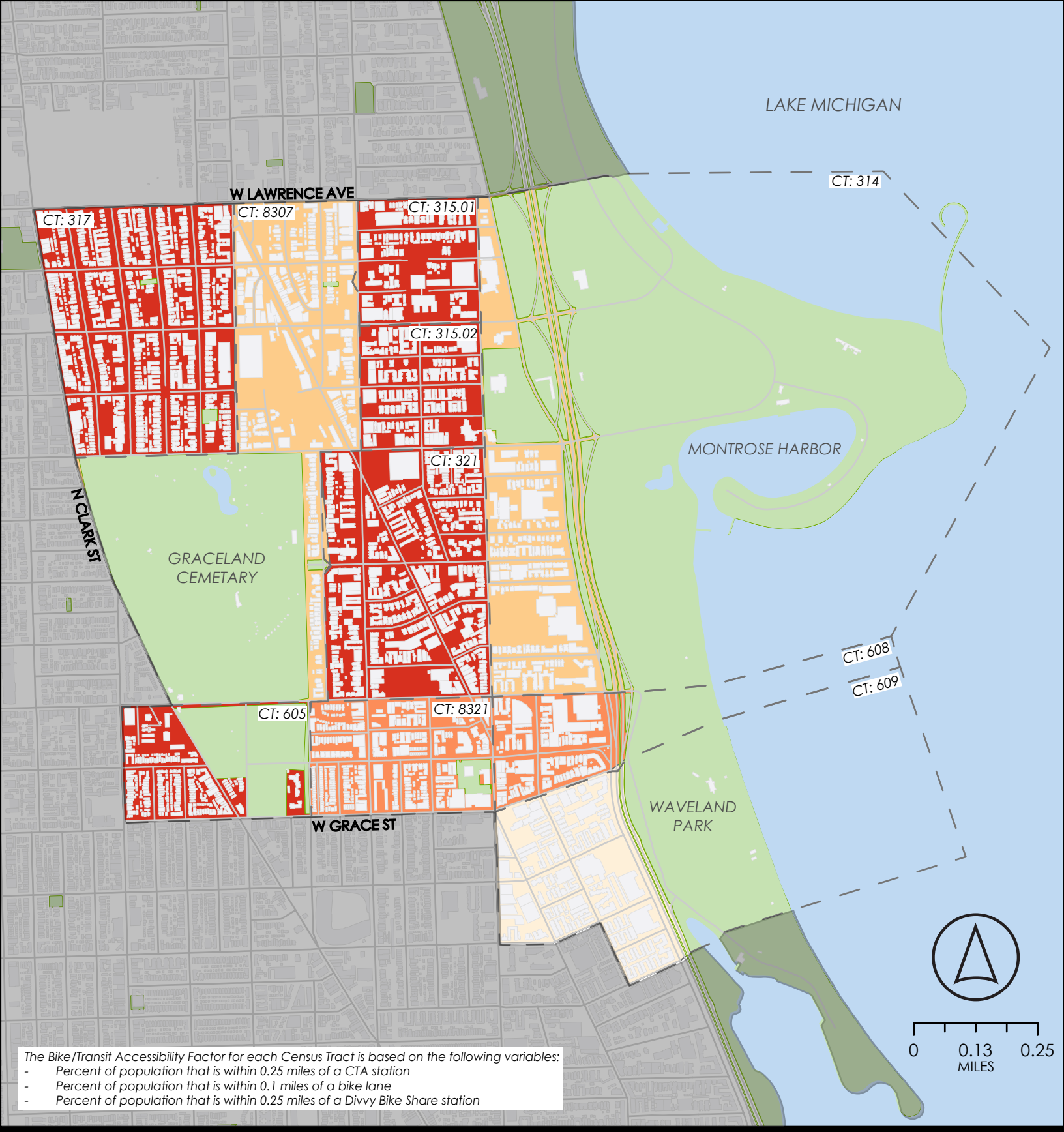
LEGEND

- Building Footprint
- Waterway
- Census Tract Outline
- CT: ## Census Tract Number
- Street Centerline
- Park

BIKE/TRANSIT ACCESSIBILITY

- LOW ACCESSIBILITY
- MODERATE ACCESSIBILITY
- HIGH ACCESSIBILITY
- VERY HIGH ACCESSIBILITY

SOURCE: CHICAGO DATA PORTAL, US CENSUS BUREAU



The Bike/Transit Accessibility Factor for each Census Tract is based on the following variables:

- *Percent of population that is within 0.25 miles of a CTA station*
- *Percent of population that is within 0.1 miles of a bike lane*
- *Percent of population that is within 0.25 miles of a Divvy Bike Share station*

CITY OF CHICAGO
46TH WARD

BIKE/TRANSIT ACCESSIBILITY
2020

LEGEND

- Building Footprint
- Waterway
- Census Tract Outline
- CT: ## Census Tract Number
- Street Centerline
- Park

BIKE/TRANSIT ACCESSIBILITY

- LOW ACCESSIBILITY
- MODERATE ACCESSIBILITY
- HIGH ACCESSIBILITY
- VERY HIGH ACCESSIBILITY

SOURCE: CHICAGO DATA PORTAL, US CENSUS BUREAU

Gentrification Web Map:
https://upenn.maps.arcgis.com/apps/webappviewer/index.html?id=7c2d13f558a54dd09a1a86baf8549066

Bike and Transit Accessibility Map:

https://upenn.maps.arcgis.com/apps/webappviewer/index.html?id=cc514b141c154188947aa47ec572500c&%20Transit%20Accessibility=

Population Change:

https://upenn.maps.arcgis.com/apps/webappviewer/index.html?id=3b48aaed638d4c00bac9ee31cbacf5de

Crime:

https://upenn.maps.arcgis.com/apps/webappviewer/index.html?id=933d27a0d4e6421cbb7db889f0300498

Emmy Park

CPLN 503 – Final Project Process

Base Map & Data

1. Download files for parks, waterways, buildings (2010 and 2020), street centerlines, bike lanes, crime incidents from Chicago Data Portal
2. Download Divvy station locations from Divvy website
3. Download race, income, property value, age, population, education, etc. data from tidycensus

RStudio

File Edit Code View Plots Session Build Debug Profile Tools Help

Go to file/function | Addins

v10 | FinalProject_Census.R | v20

Source on Save | Run | Source

```r
library(tidyverse)
library(tidycensus)
library(dplyr)
library(sf)

setwd("C:/Users/epark/Desktop/CPLN5030/FinalProject/CensusData")

census_api_key("b83c319599849bf7e6987dae48fcce4a9ff26878", install = TRUE, overwrite = TRUE)
readRenviron("~/.Renviron") # doing this reloads the R environment so your api key registers each time

v20 <- load_variables(2020, "pl", cache = TRUE)
view(v20)

v19 <-load_variables(2019, "acs5", cache = T)
view(v19)

v10 <- load_variables(2010, "pl", cache = TRUE)
view(v10)

acs10 <- load_variables(2010, "acs5", cache = TRUE)
view(acs10)

decvariables <- c(white= "P1_003N",black= "P1_004N",asian= "P1_006N",hispanic = "P2_002N",
                  tot_housing = "H1_001N", tot_occHousing = "H1_002N", tot_vacHousing = "H1_003N")
chicago_dec2020 <- get_decennial(geography="tract", variables = decvariables,
                        state = "IL", county = "Cook County", year = 2020, output = "wide", geometry = T)

acsvariables <- c(totpop = "B01001_001", agebysex= "B01002_001",
                  doctorate = "B15003_025", professional = "B15003_024", masters = "B15003_023", bachelors = "B15003_022", education = "B15003_001",
                  income = "B07011_001")
chicago_acs2020 <- get_acs(geography="tract", variables = acsvariables,
                           state = "IL", county = "Cook County",year = 2019, output = "wide", geometry = T)

transpovariables <- c(transport = "B08132_001", transit = "B08132_046", walk = "B08301_019",bike = "B08301_018")
chicago_transport2020 <- get_acs(geography="tract", variables = transpovariables,
                           state = "IL", county = "Cook County",year = 2020, output = "wide", geometry = T)

more2020dec <-get_decennial(geography="tract", variables = c(hispanic = "P2_002N"),
                                state = "IL", county = "Cook County", year = 2020, output = "wide", geometry = T)

more2020acs <- get_acs(geography="tract", variables = c(housingvalue = "B25109_001"),
                        state = "IL", county = "Cook County",year = 2019, output = "wide", geometry = T)

st_write(chicago_dec2020, "ChicagoDecCensusData.gpkg")
st_write(chicago_acs2020, "ChicagoACSCensusData.gpkg")
st_write(more2020dec, "ChicagoMoreDecData.gpkg")
st_write(more2020acs, "ChicagoMoreACSData2020.gpkg")
```

Map 1: Population Change

1. Join 2010 and 2020 population data
2. Calculate field for population change = (2020 population – 2010 population)/(2010 population)
3. Symbology -> Graduated colors

Map 2: Median Age

1. Symbology -> Graduated colors for median age

Map 3: Race Breakdown

1. Symbology -> Charts -> Normalize race populations by total population

Map 4: Crimes

1. Create separate .csv files with crimes from 2010 and 2020
2. Plot XY Coordinates for both .csv files
3. Tools -> Kernel Density -> Heat map for both years
    a. Set scale of symbology to the same values

Map 5: Gentrification

1. Combine white population, median income, median property value, and education levels into one table
2. Create field for total population that is college educated and above
3. Create field for gentrification factor that = White population/total population * College Educated population/total population * Census tract median property value/County median property value * Census tract median income/County median income
4. Symbology -> Graduated colors

Map 6: Transit and Biking Accessibility Map

1. Plot XY Coordinates for CTA bus and train stations
2. Network Analysis -> Service area -> Walking Distance -> 0.25 miles from CTA stations
3. Dissolve service areas into one polygon
4. Plot XY Coordinates for Divvy bike stations
    a. Note: Divvy was introduced in 2013, so the factor was not included for the 2010 transit and biking accessibility map
5. Buffer 0.25 miles around Divvy bike stations
6. Dissolve buffers into one polygon
7. Buffer 0.1 miles around bike lanes (2010 and 2020)
8. Dissolve buffers into one polygon
9. For all dissolved polygons:
    a. Use split tool on each polygon, splitting by census tract
    b. Merge split polygons into one shapefile
    c. Summarize within shapefile by the population in the census tract
    d. Add field for ratio of the census tract population within the polygon to the total census tract population
    e. Join shapefiles into one file by census tract
    f. Create field for TransitBikingAccessibility = Divvy Population Ratio (if applicable) + Bike Lane Population Ratio + CTA Station Population Ratio
10. Symbology -> Graduated Colors for TransitBikingAccessibility