



**RUTGERS**

Edward J. Bloustein School  
of Planning and Public Policy

# **Planning for Healthy, Just, Resilient, and CO2-Neutral Mobility in New Jersey**

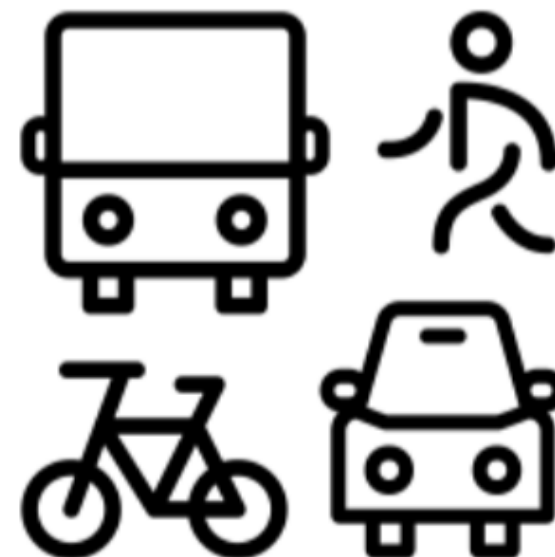
Project Update  
February 2022

### Existing Work Groups

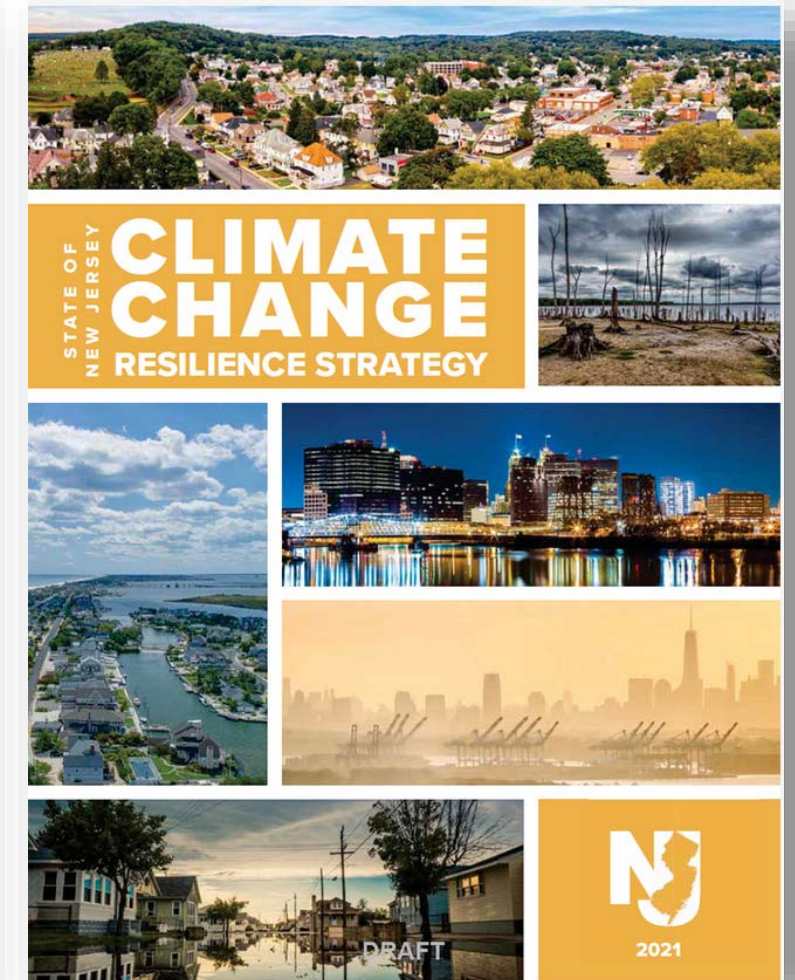
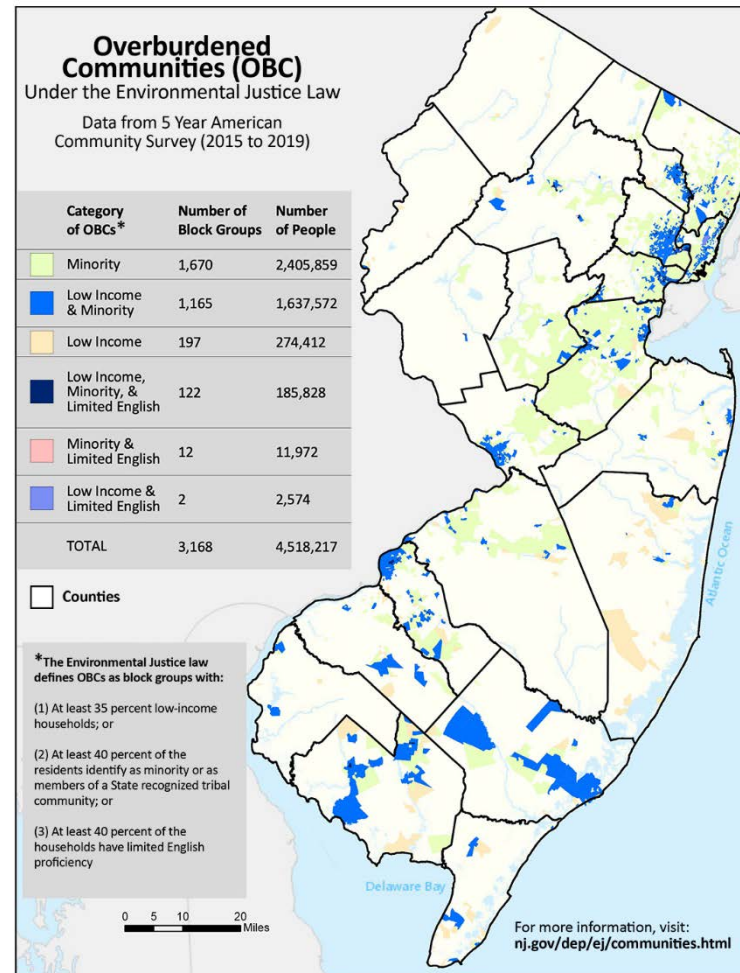
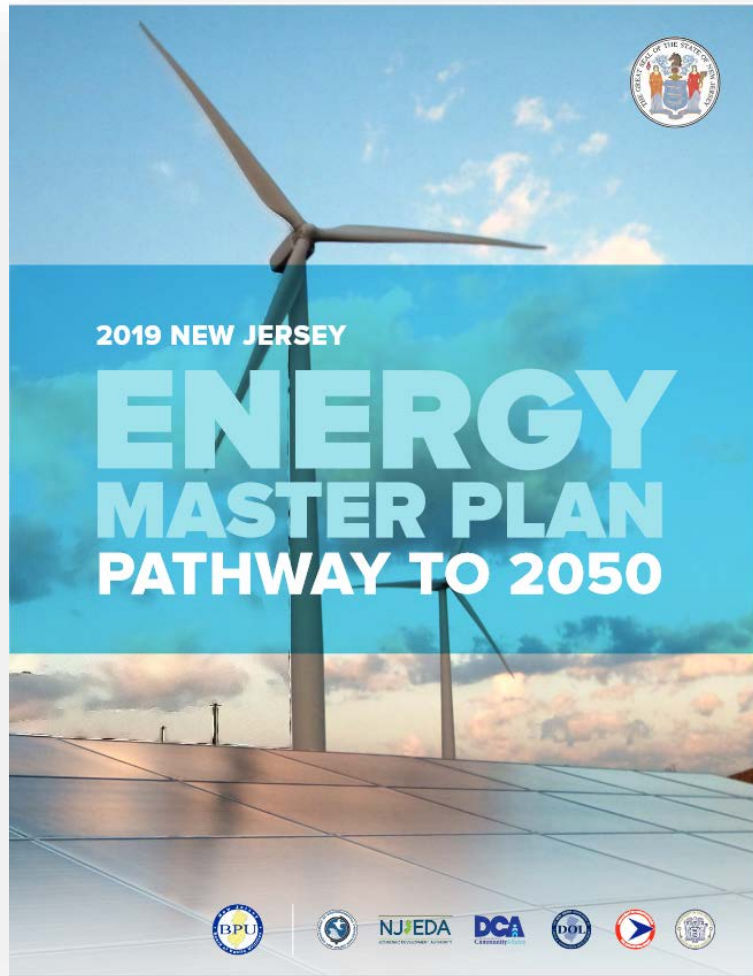
- Long-term Statewide Planning for Climate Change Workgroup
- Natural and Working Lands Workgroup
- Offshore Wind Ecological Monitoring Workgroup
- Public Health Workgroup
- Sustainable Organic Materials Management Workgroup

**(NEW)**

### Transportation Workgroup



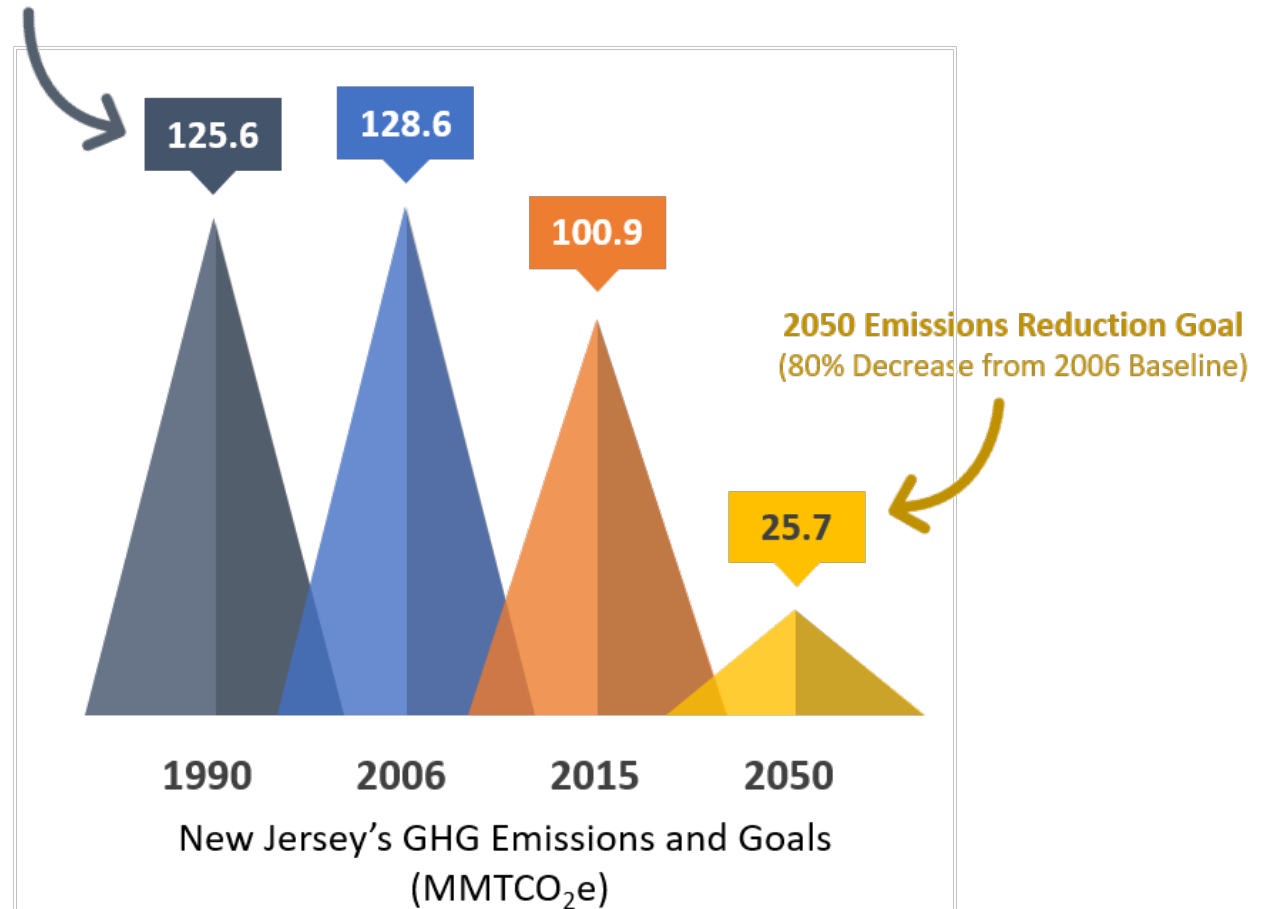
# Changing policy dynamics at the State and national levels



# New Jersey Emissions Targets



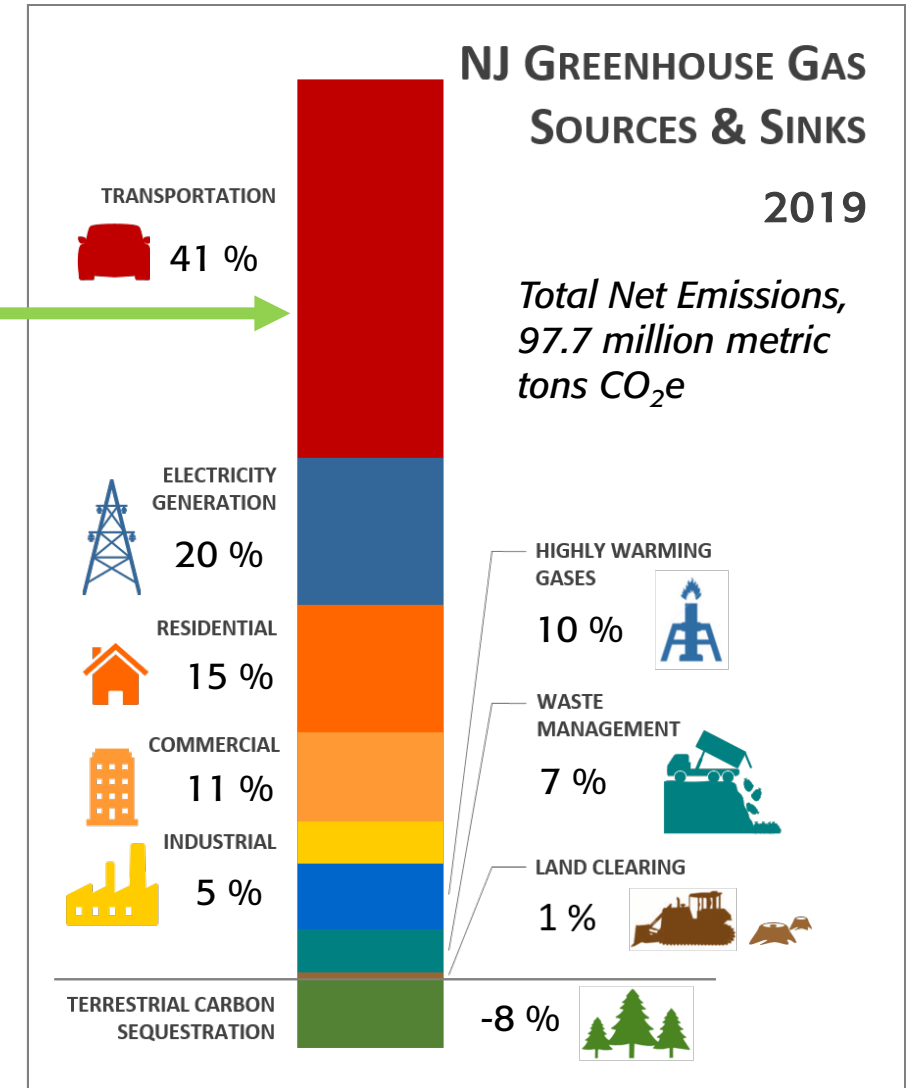
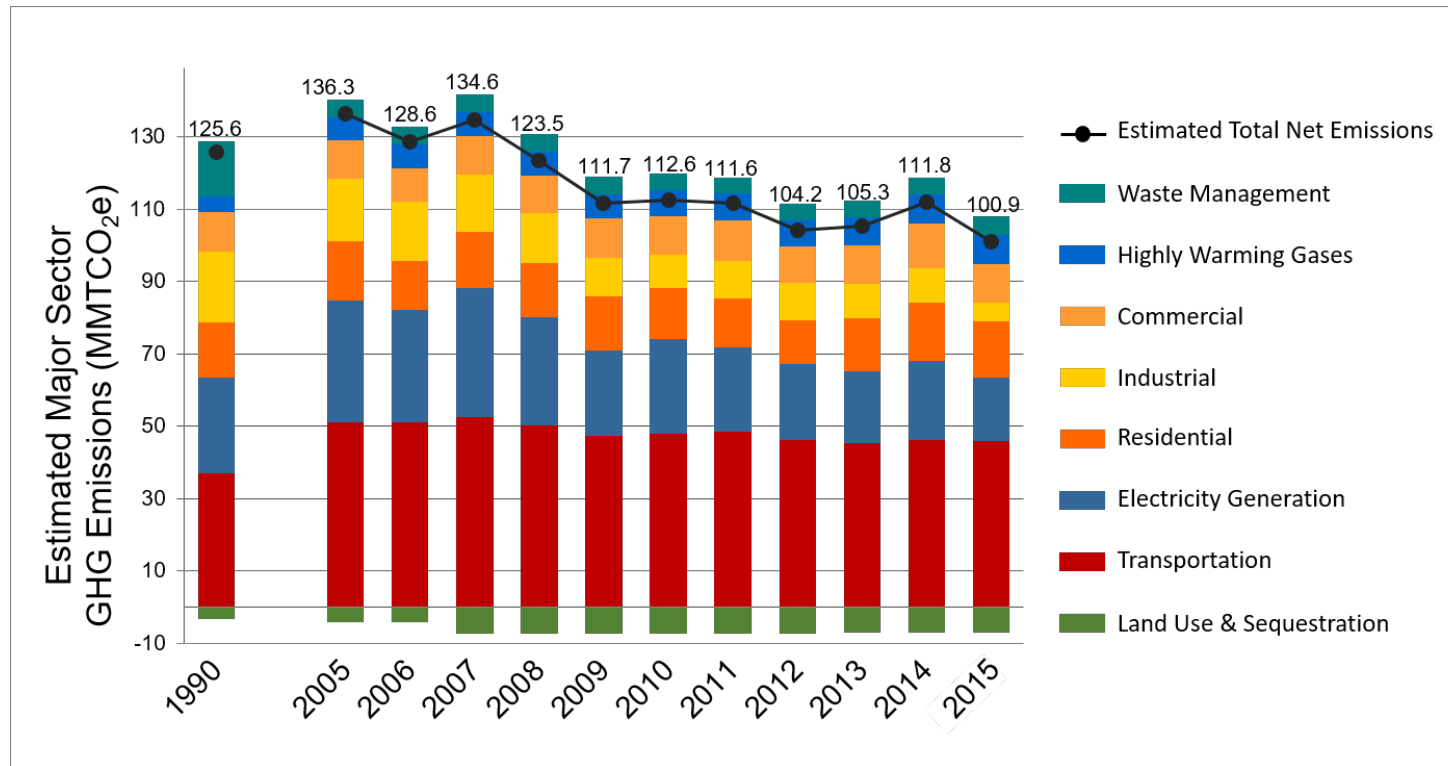
**2020 Emissions Reduction Goal**  
(Equivalent to 1990 GHG Emissions)





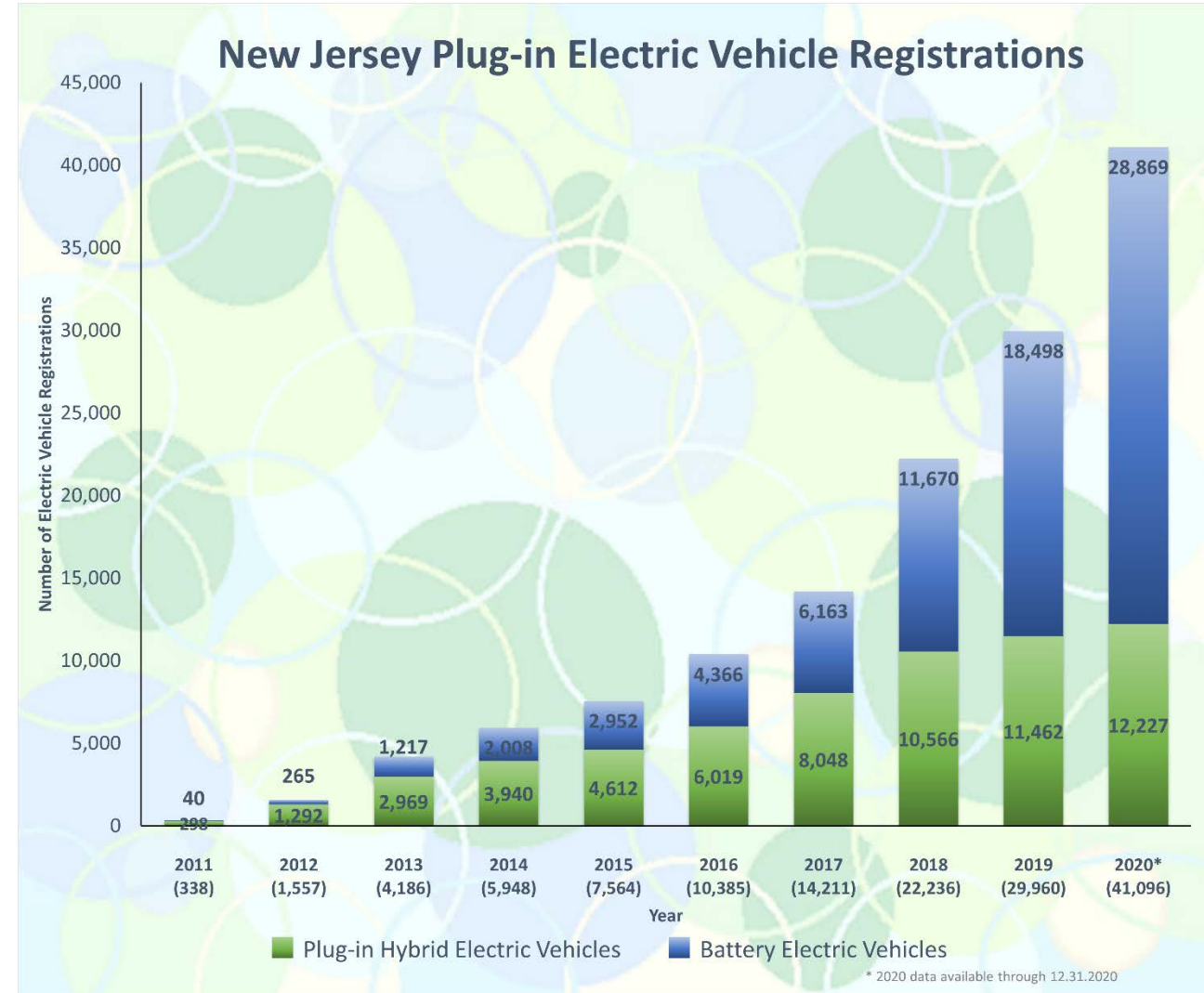
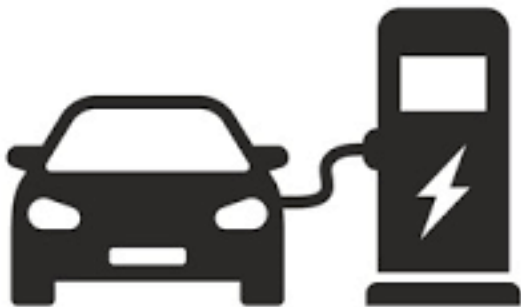
# GHG Emissions in New Jersey

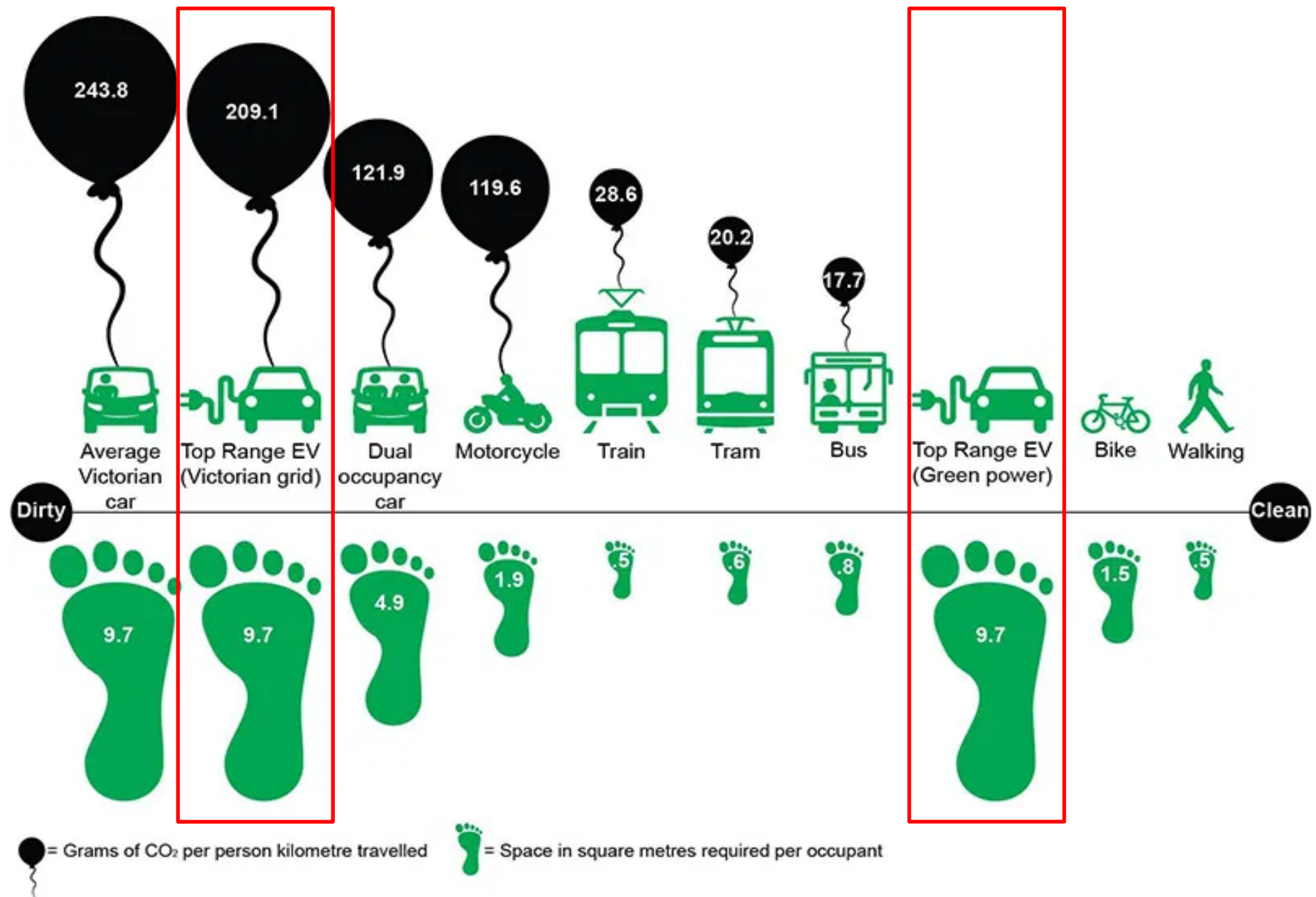
Reductions in the transportation sector will be critical to achieving NJ's emissions target



# Significant attention being paid to vehicle electrification

- Charging infrastructure investments
- Rebates and tax credits to encourage EV purchases
- EVs can use HOV lanes





This infographic compares emissions and space consumption for different transport modes. Source: Institute for Sensible Transport

# What can the working group do?

## Multi-Goal Framework



**Healthy.** Improve health outcomes for people and communities by improving air quality and making it easier and safer to walk and bike.



**Just.** Promote **equity** by making travel by transit more reliable and convenient and by enhancing access to opportunity for marginalized groups.



**Efficient.** Increase transportation system efficiency and effectiveness by integrating advanced and emerging transportation technologies and modes.



**Resilient.** Enhance the resilience of transportation systems by adapting infrastructure to climate hazards.



**Carbon Neutral.** Reduce energy use and emissions of all kinds by facilitating a transition to CO2-neutral transportation.



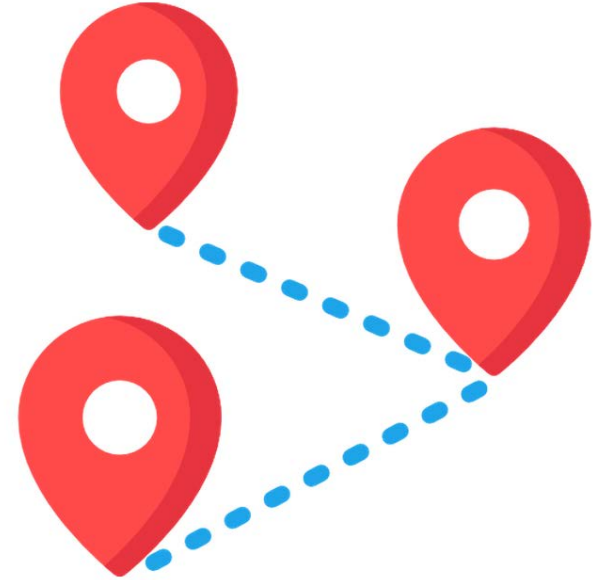
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Toward a healthier, more equitable, and cleaner transport future in New Jersey

# **HEALTHY, JUST, RESILIENT, AND CO2-NEUTRAL MOBILITY FOR ALL**

# What is healthy mobility?

- Access
- Safety
- Physical activity
- Mental health
- Air quality
- Noise



# What is equitable and just mobility?

An equitable and **just transportation system** provides safe and clean transportation options that are affordable, convenient, and easy to use.

**Equitable mobility** provides the same opportunity for everyone to move around reliably and sustainably in ways that meet their needs.



Graphic courtesy of Shared-Use Mobility Center

# What is resilient mobility?

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Robustness

Redundancy

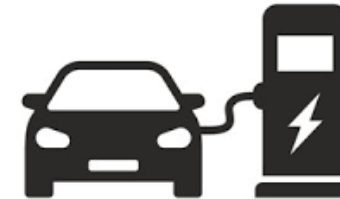
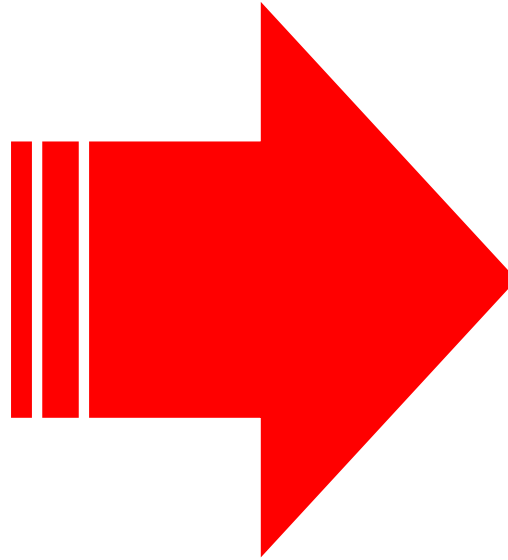
Flexibility

Responsiveness

Coordination



# What is carbon-neutral mobility?



# Guiding concepts

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- **Decarbonize** the transportation sector
- Empower people to **drive less**
- Create a network of **diverse and inclusive neighborhoods that** are well connected to each other
- Think of **mobility as a service** and **reimagine** public transportation
- Embrace **new technologies** but ensure they are affordable and accessible to all
- Make **social justice** a key indicator of transportation performance

# Potential Organizing Framework

## “15-minute” City/Neighborhood

### Leading Practice Examples

- Singapore
- Paris
- Portland
- Melbourne
- Ottawa
- Barcelona



© Shutterstock, Getty | Aerial views of Glasgow, Paris and Melbourne



# What is a “15-minute” city/neighborhood?

## 5 MINUTE WALK

(3 MPH AVG)



RADIUS - 1/4 MILE

ACRES - ~126

DWELLING UNITS - 1,000 @ 8/AC

POPULATION - 2,600 @ 2.6/UNIT

## 15 MINUTE WALK

(3 MPH AVG)



RADIUS - 3/4 MILE

ACRES - ~1,130

DWELLING UNITS - 9,040 @ 8/AC

POPULATION - 23,500 @ 2.6/UNIT

## 5 MINUTE BIKE

(12 MPH AVG)



RADIUS - 1 MILE

ACRES - ~2,010

DWELLING UNITS - 16,100 @ 8/AC

POPULATION - 41,860 @ 2.6/UNIT

## 5 MINUTE ELEC. VEHICLE

(20 MPH AVG)



RADIUS - 1 2/3 MILE

ACRES - ~5,580

DWELLING UNITS - 44,700 @ 8/AC

POPULATION - 116,200 @ 2.6/UNIT

## 15 MINUTE BIKE

(12 MPH AVG)

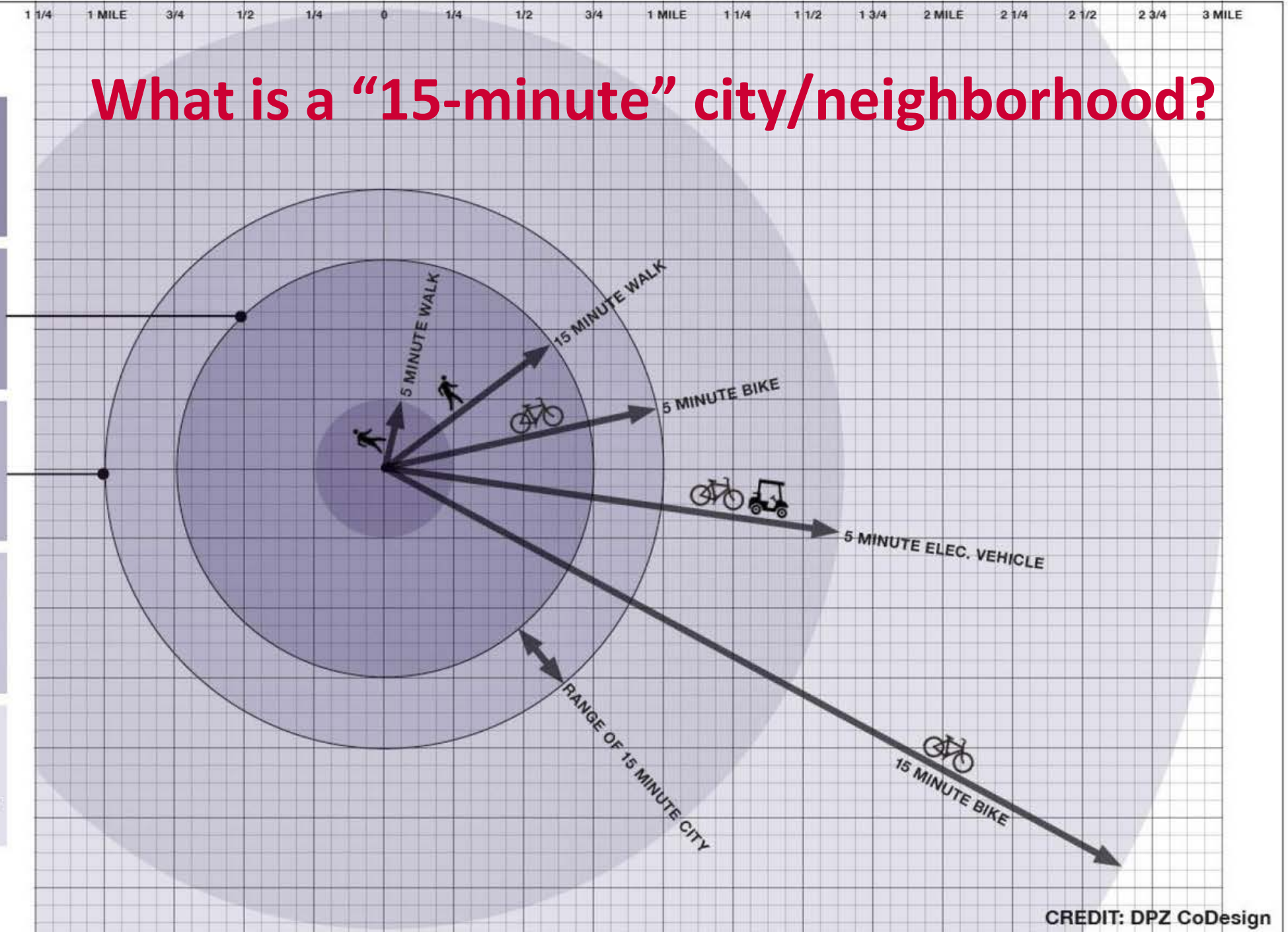


RADIUS - 3 MILE

ACRES - ~18,100

DWELLING UNITS - 144,800 @ 8/AC

POPULATION - 376,480 @ 2.6/UNIT





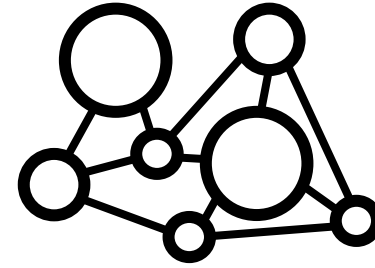
# Key relationships



People



Places



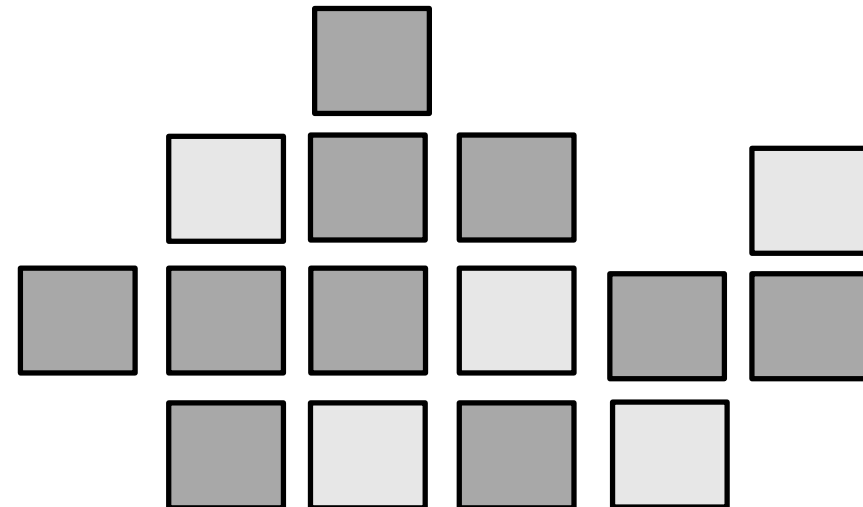
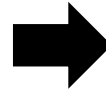
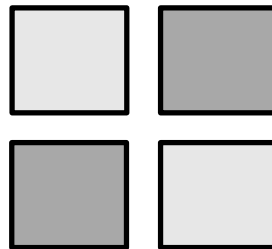
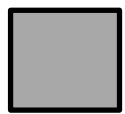
Connections

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Neighborhood

Community

Region

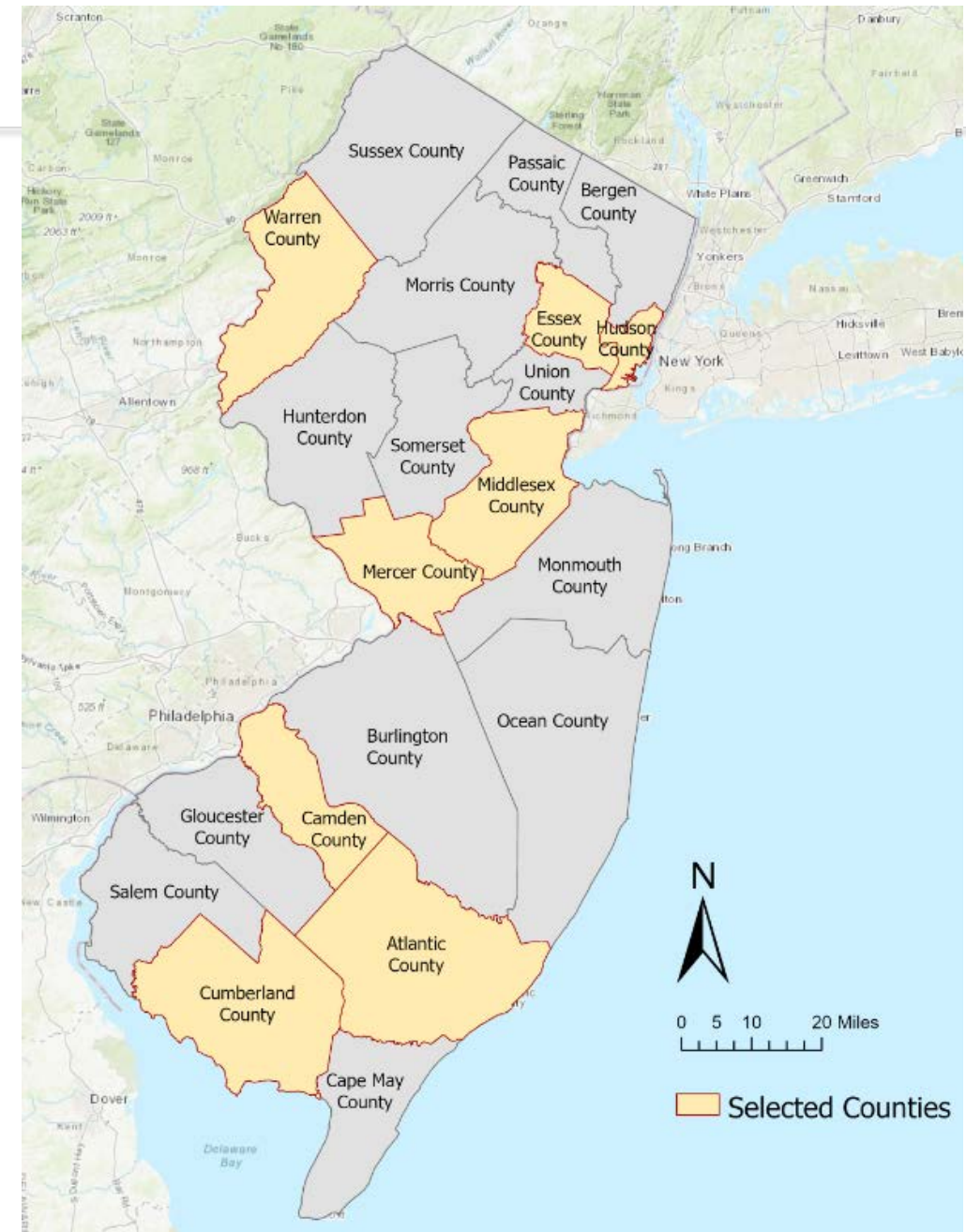


# Work Plan

<b>PHASE 1 – Exploring key concepts, desktop analysis, looking toward the future (Mar 2021 to Feb 2022)</b>	<u>Activities:</u> <ul style="list-style-type: none"><li>• Conduct leading practice research</li><li>• Collect, analyze, and map data</li><li>• Identify of potential community and equity partners</li><li>• Convene “Thought Leaders” webinar and visioning workshops</li><li>• Identify vision components</li><li>• Select locations for neighborhood-scale analysis</li></ul>
<b>PHASE 2 – Field work, community engagement, and developing recommendations (Mar 2022 to Sep 2022)</b>	<u>Activities:</u> <ul style="list-style-type: none"><li>• Conduct field visits and interviews to get to know the neighborhoods</li><li>• Develop and implement community engagement plan</li><li>• Identify local mobility and other community needs and concerns</li><li>• Prepare concept plans for retrofitting existing neighborhoods</li><li>• Identify infrastructure needs</li><li>• Develop planning and policy recommendations</li><li>• Prepare comprehensive final report</li><li>• Convene “Thought Leaders” Forum #2 – How do we get there?</li></ul>

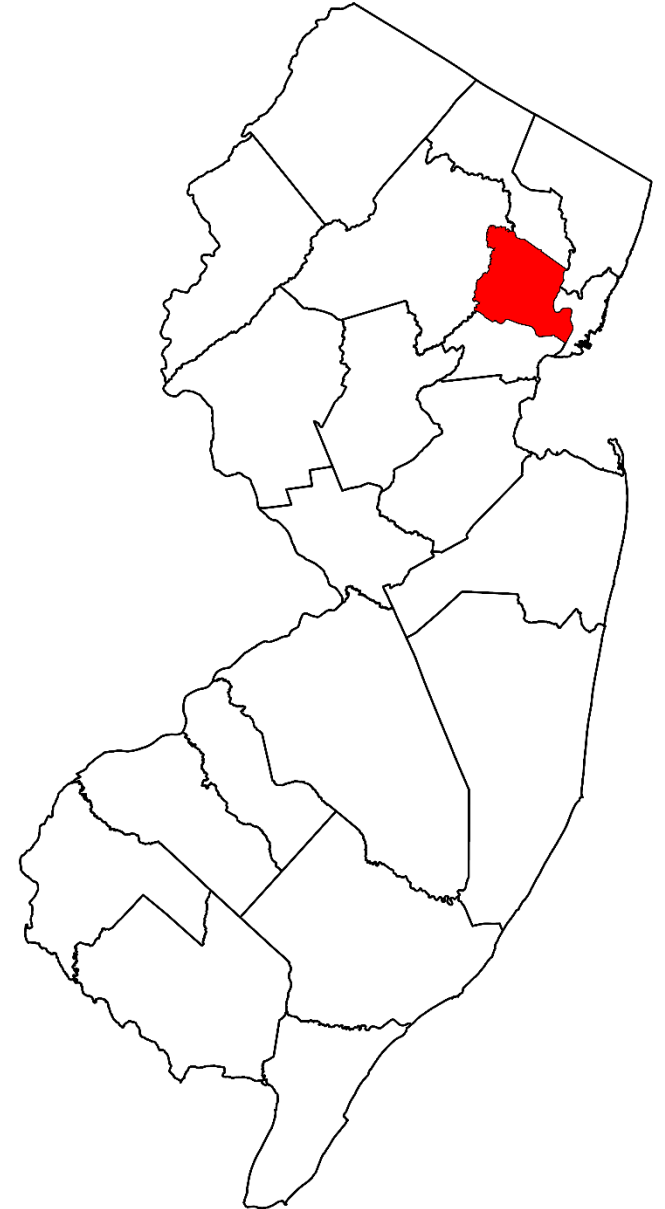
# Phase 1 Case Study Locations

1. Atlantic
2. Camden
3. Cumberland
4. Essex
5. Hudson
6. Mercer
7. Middlesex
8. Warren



Exploring the Geography of People, Place, and Connections

# ESSEX COUNTY





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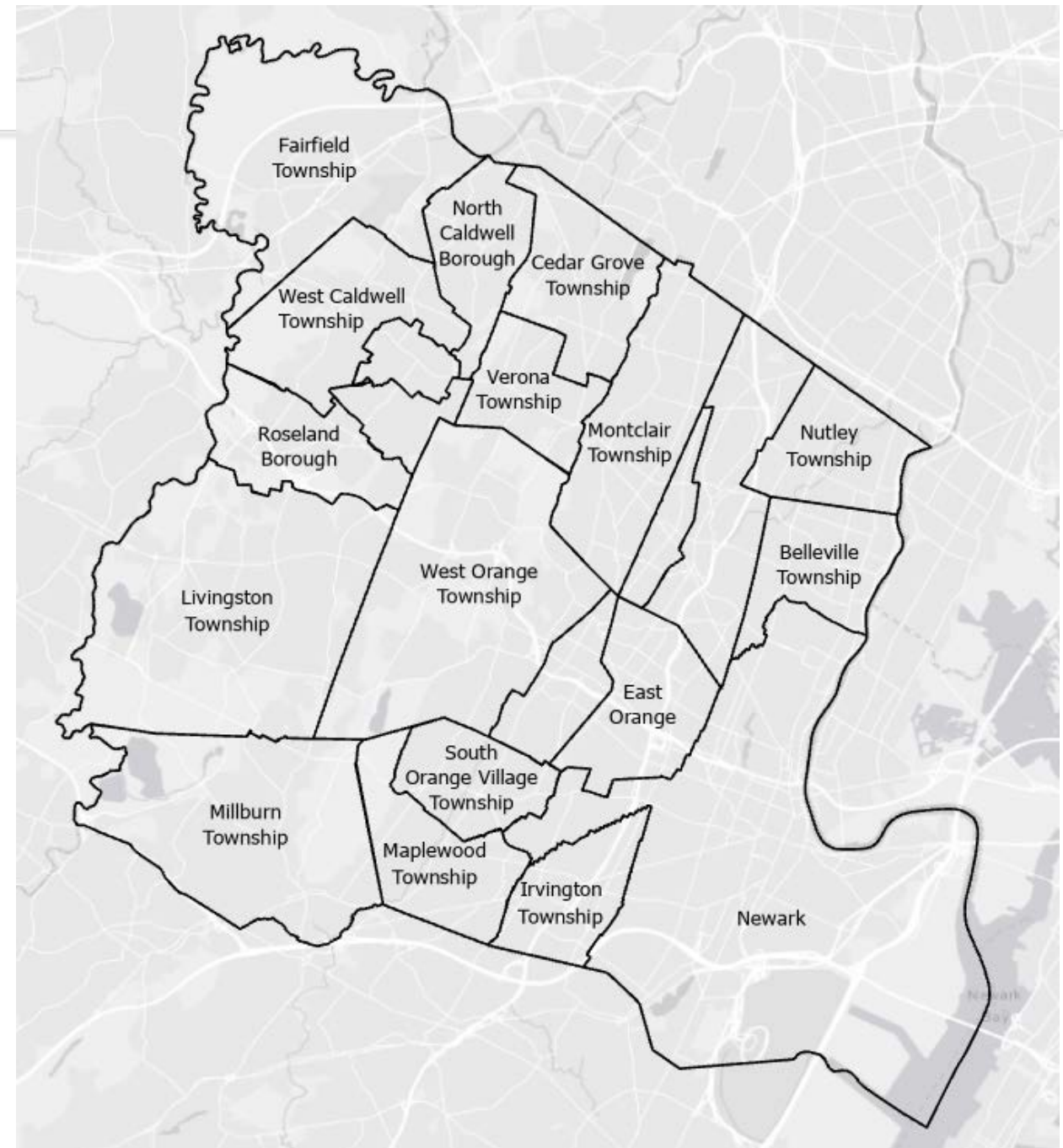
Healthy, Just and CO2-neutral Mobility for All

# GEOGRAPHY OF PEOPLE

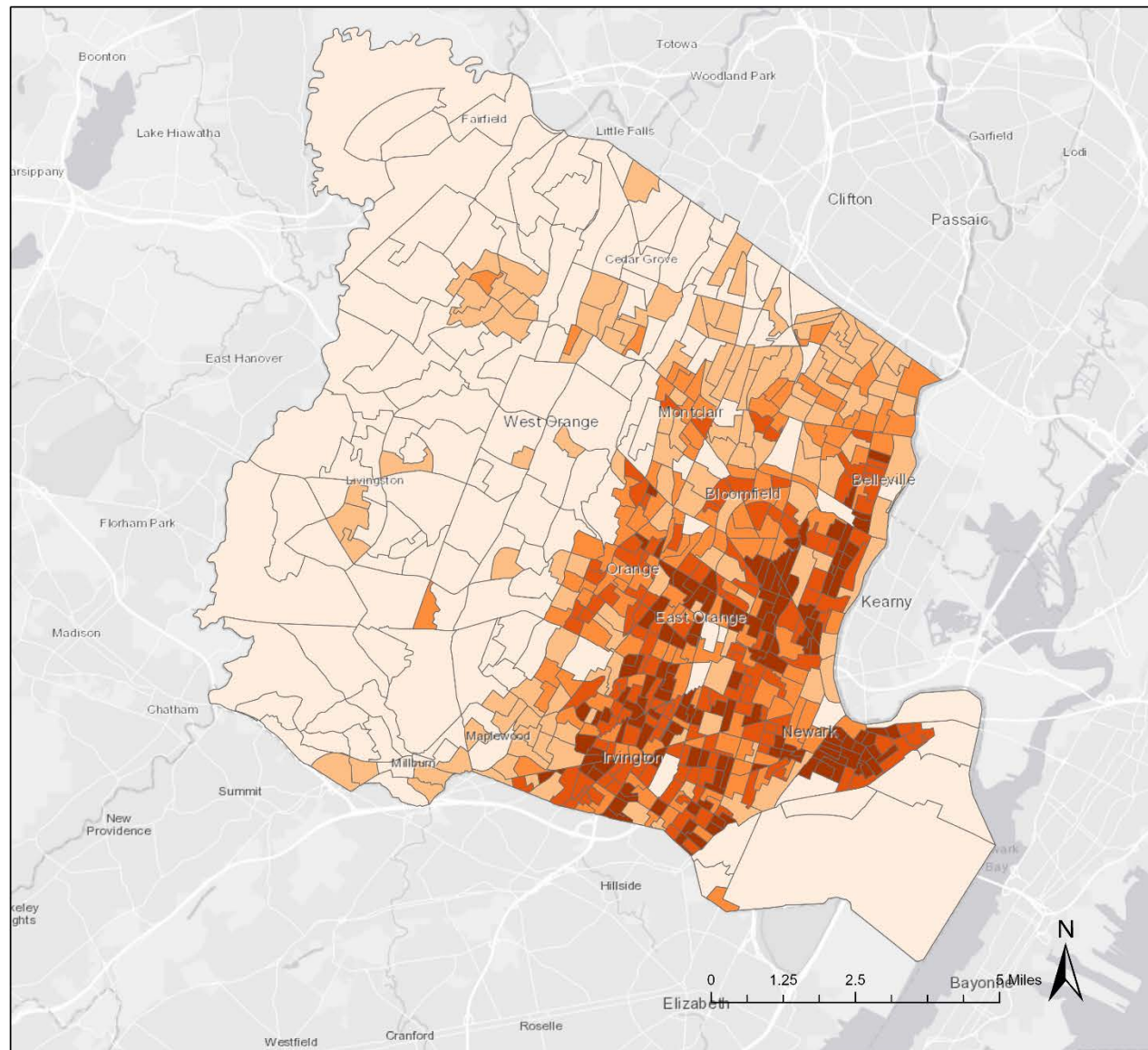
# County at a glance

A mix of small towns, urban centers and rural communities

- 129.6 square miles
- 22 Municipalities
- Almost 800,000 residents
- County Seat: The City of Newark



# Population



## Population Density

Population per sq. mile by Block Group

- 173 - 4,812
- 4,813 - 9,101
- 9,102 - 14,589
- 14,590 - 22,064
- 22,064 - 102,801

Data Source: NJGIN, ACS 2015-2019 5-year estimate, ESRI base map

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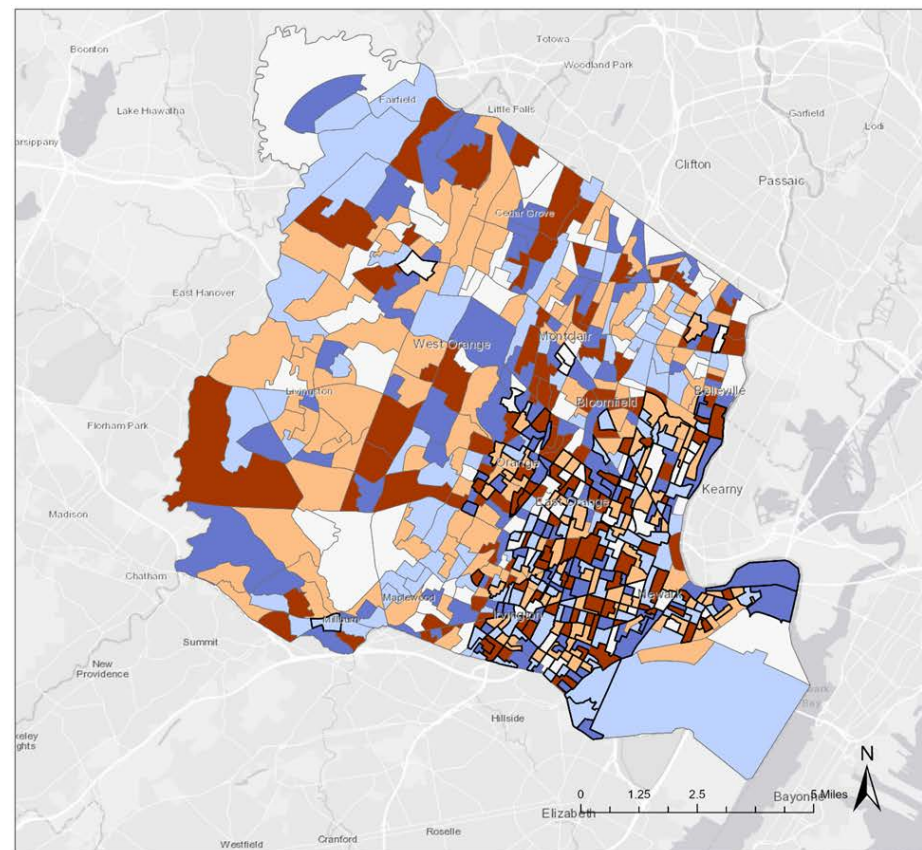
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by Alan M. Voorhees Transportation Center



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# Change in Population : 2014-2019

Population projection, Essex County, NJ  
Linear model



## Population Change

□ Low Income Block Group  
Percent Population Change  
2014-2019

- -2.46% - -0.29%
- -0.28% - -0.01%
- 0.00% - 0.07%
- 0.08% - 0.21%
- 0.22% - 0.91%

Data Source: NJGIN, ACS 2014 and 2019 5-year  
estimate, ESRI base map

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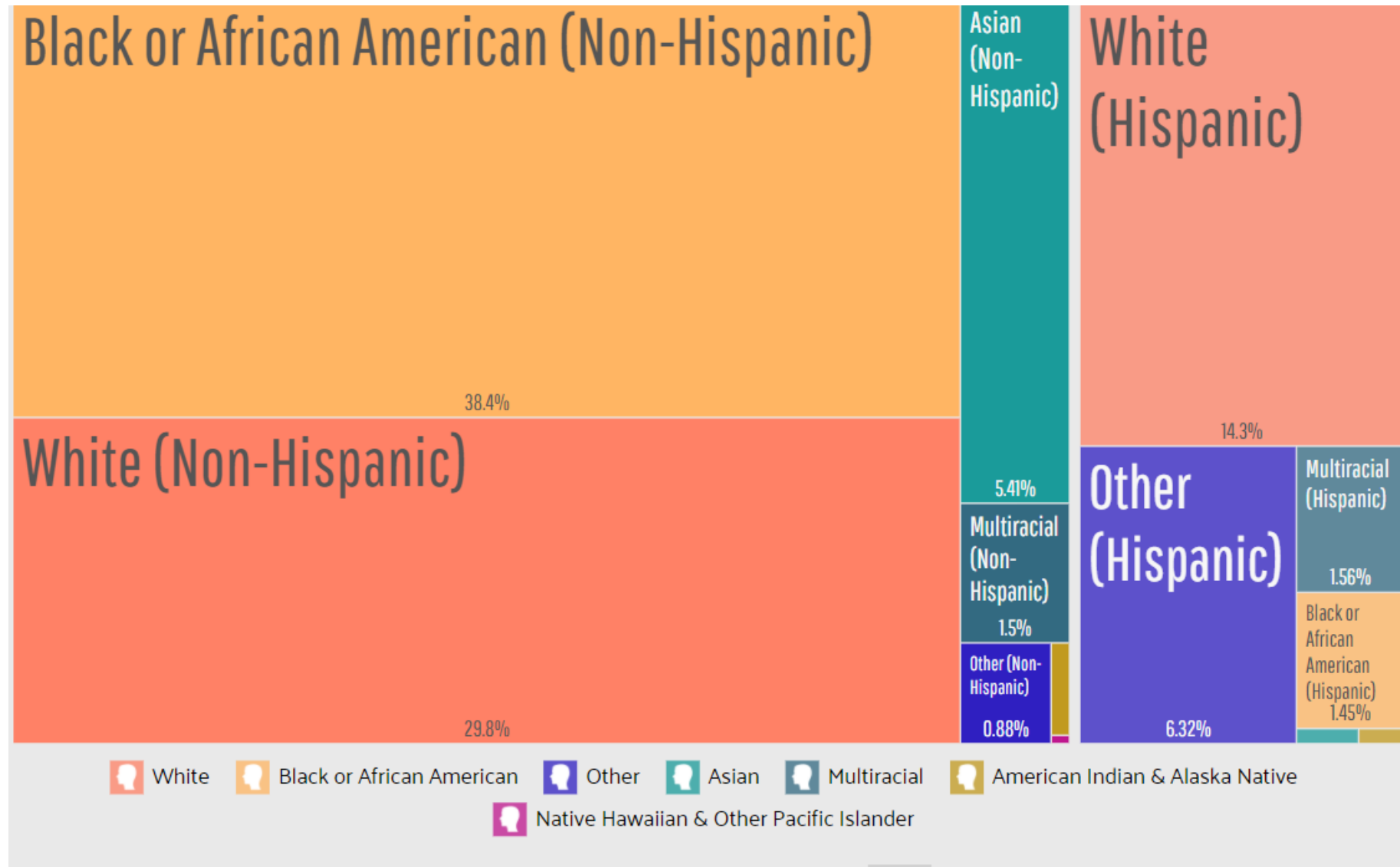
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# Change in Population : 2014-2019

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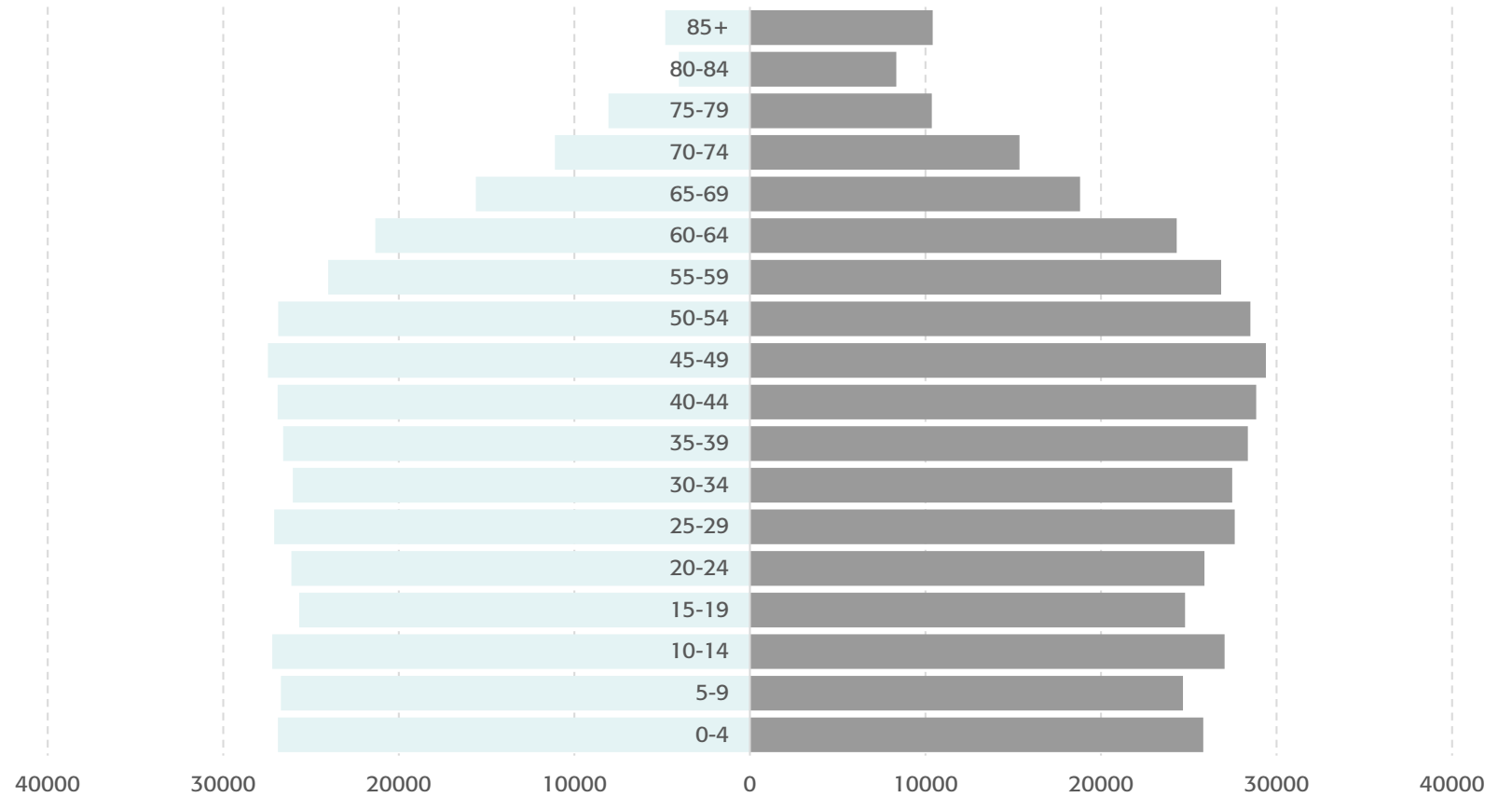
# Race and Ethnicity - 2019





# Age & Gender

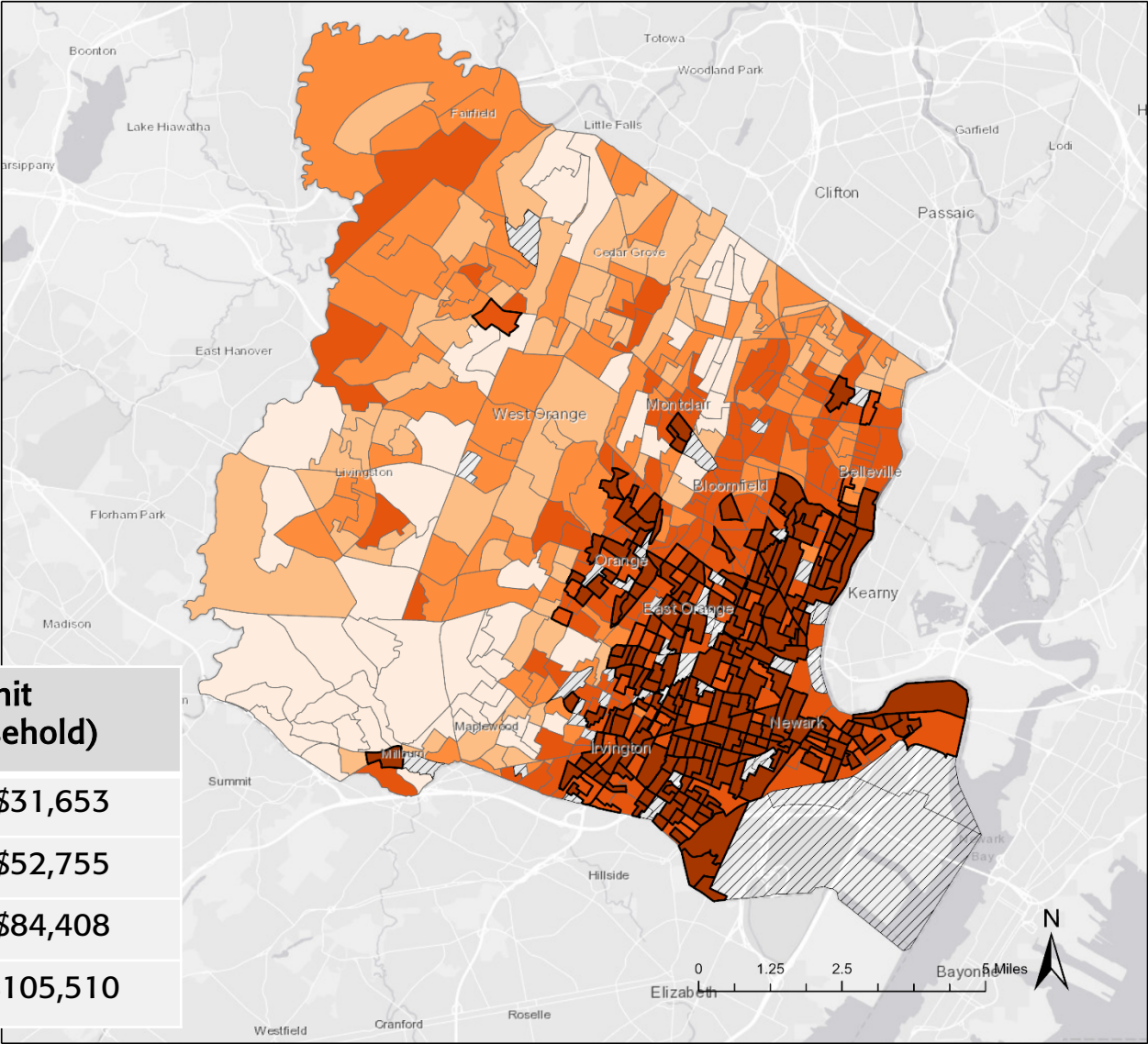
Age Sex Pyramid 2015-2019  
Essex County, NJ



Median Age: 37.6 years old

# Household Income

County Average Median Household Income:  
\$61,510



AHPNJ Region 3: 2020 Affordable Housing Income Limits. Region 2: Essex, Morris, Union, and Warren	
Income Limit (4 person Household)	
Very Low	\$31,653
Low	\$52,755
Moderate	\$84,408
Median	\$105,510

## Median Household Income

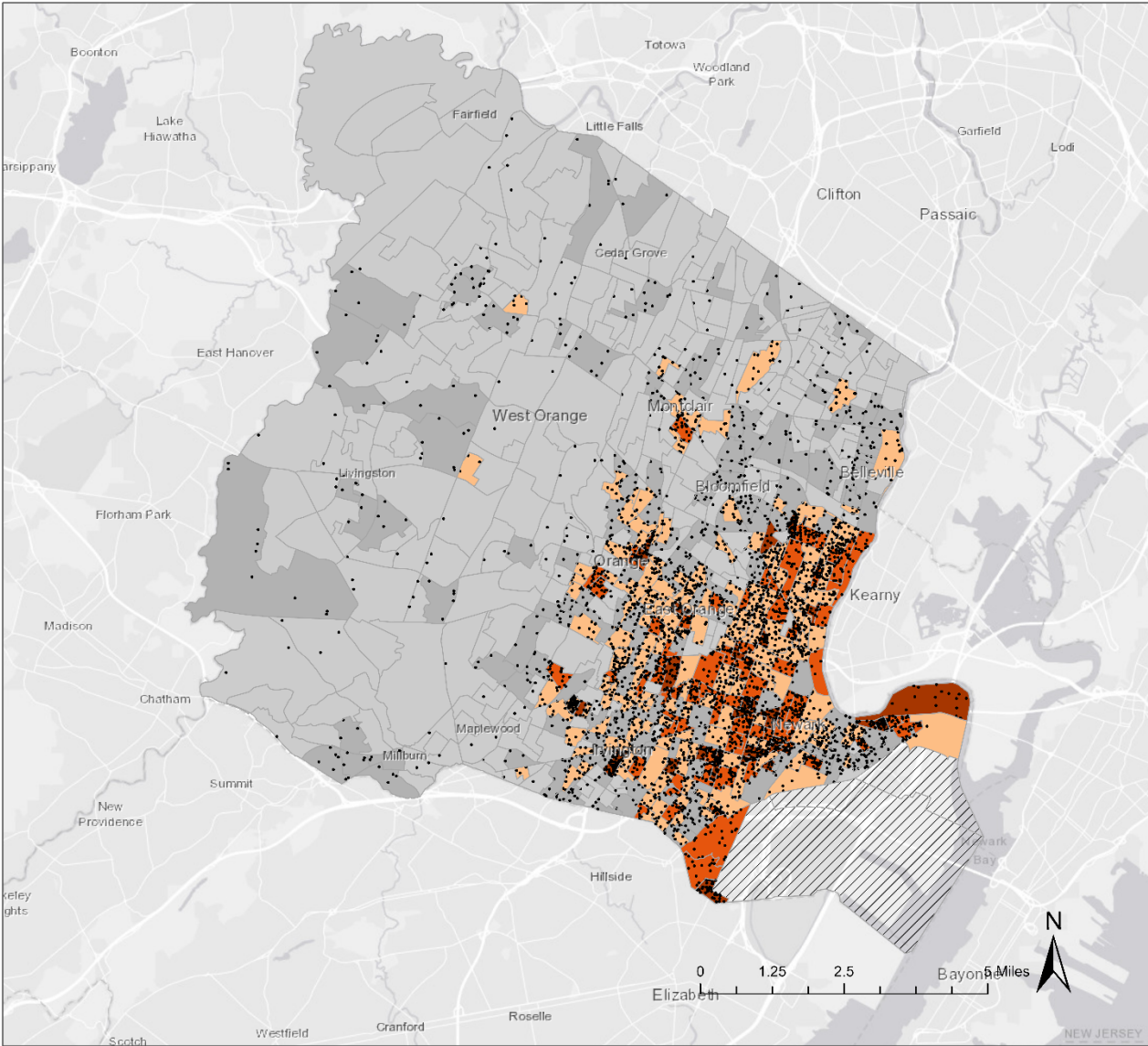
- Low Income Block Group Median Household Income by Block Group
- 9,389 - 48,875
  - 48,876 - 89,659
  - 89,660 - 138,208
  - 138,209 - 194,773
  - 194,774 - 250,001
  - No data

Note: Low Income Block Groups as Median Household Income < \$52,755 (APHNJ)  
Data Source: NJGIN, ACS 2015-2019 5-year estimate, ESRI base map

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# Households living in poverty



## Low Income Households

1 Dot = 10 Households under Poverty

Percent of Households under Poverty by Block Group

- 0% - 6.77%
- 6.78% - 16.58% County average- 16.58%
- 16.59% - 31.58%
- 31.59% - 49.03%
- 49.04% - 81.58%
- No Data

Data Source: NJGIN, ACS 2015-2019 5-year estimate, ESRI base map

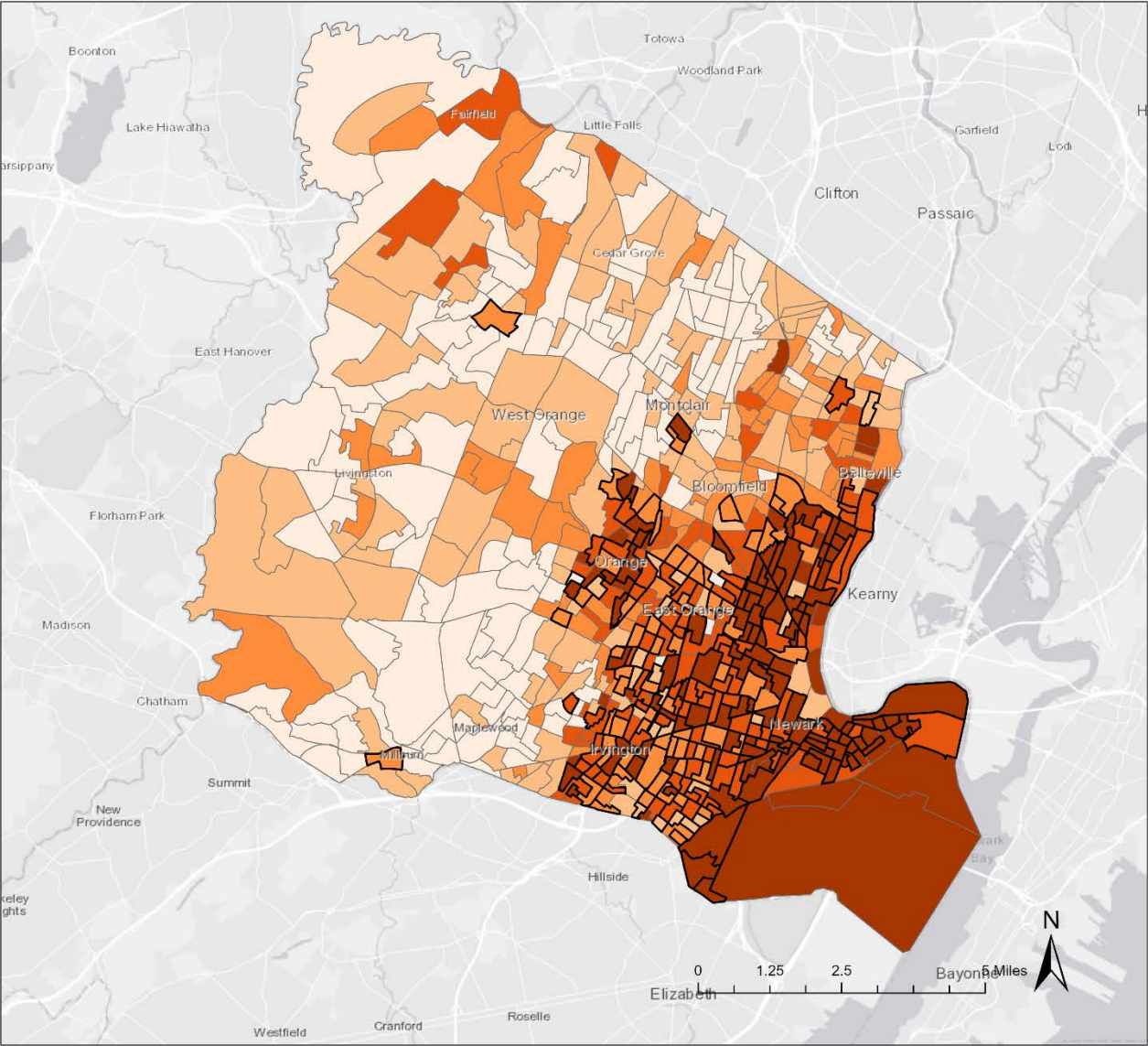
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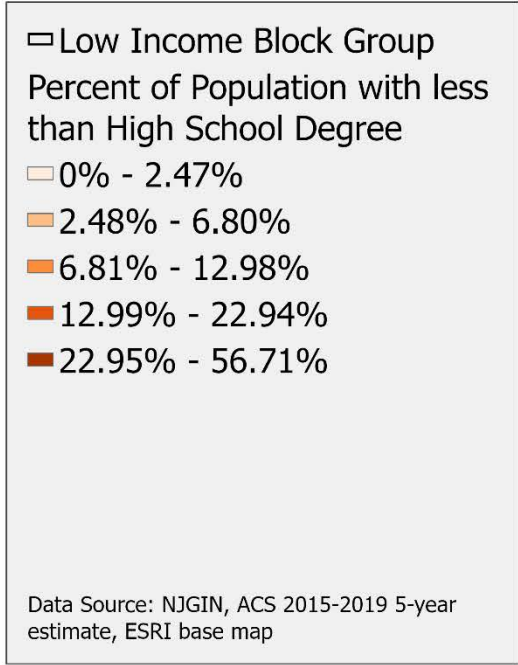




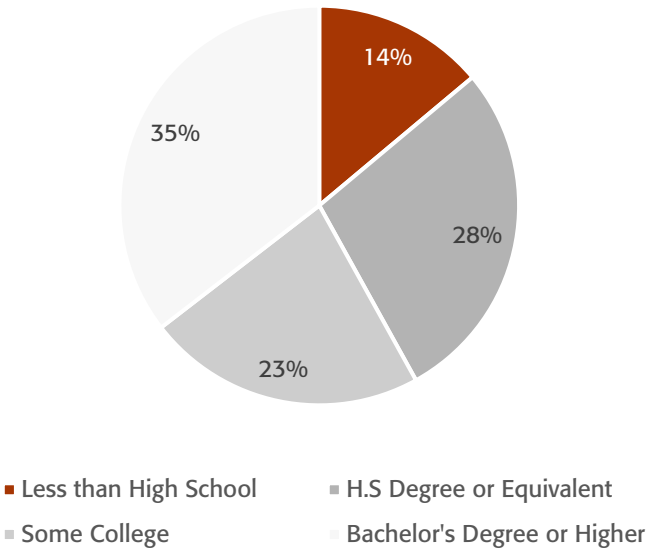
# Educational Attainment



## Educational Attainment (less than High School)




## Educational Attainment Essex County, NJ

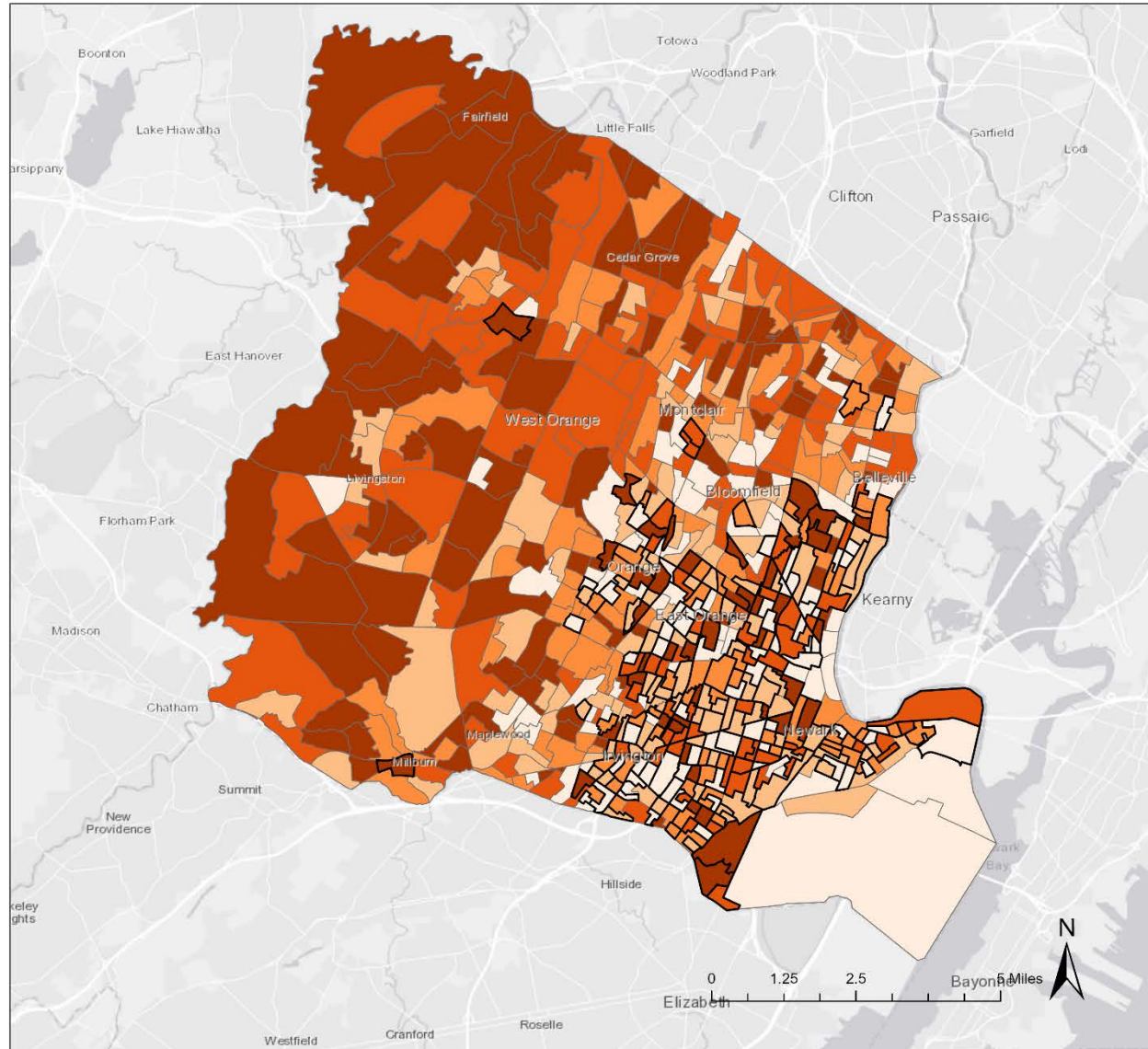


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# Educational Attainment



## Educational Attainment (Bachelor's Degree or higher)

Low Income Block Group  
Percent of Population with  
Bachelor's Degree or Higher

- 0% - 1.61%
- 1.62% - 3.48%
- 3.49% - 5.64%
- 5.65% - 7.93%
- 7.94% - 22.87%

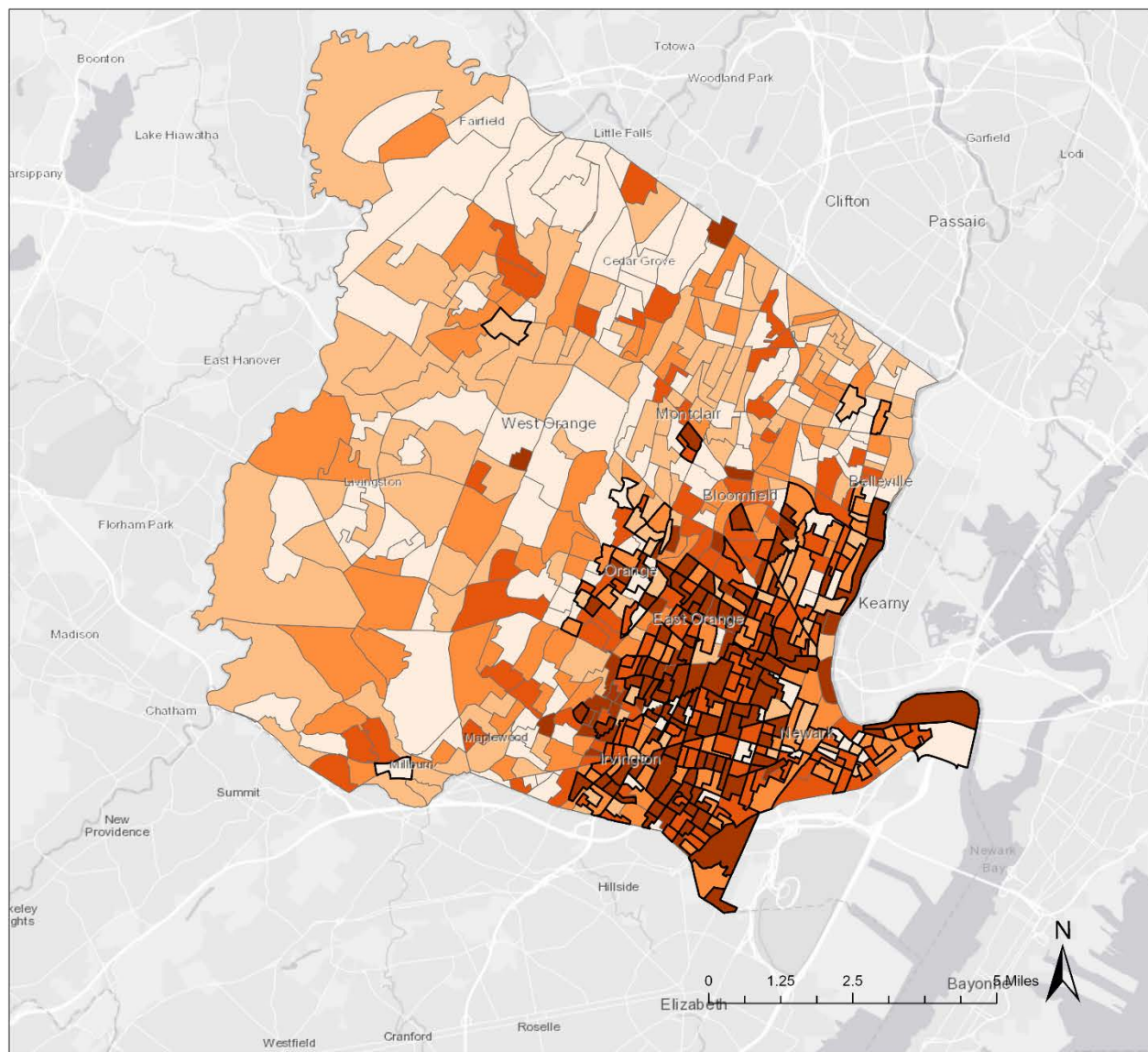
Data Source: NJGIN, ACS 2015-2019 5-year  
estimate, ESRI base map

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# Employment Status



## Employment Status

□ Low Income Block Group  
Percent of Unemployed  
Population by Block Group

- 0% - 1.82%
- 1.83% - 4.89%
- 4.90% - 8.21%
- 8.22% - 13.08%
- 13.09% - 100%

Data Source: NJGIN, ACS 2015-2019 5-year  
estimate, ESRI base map

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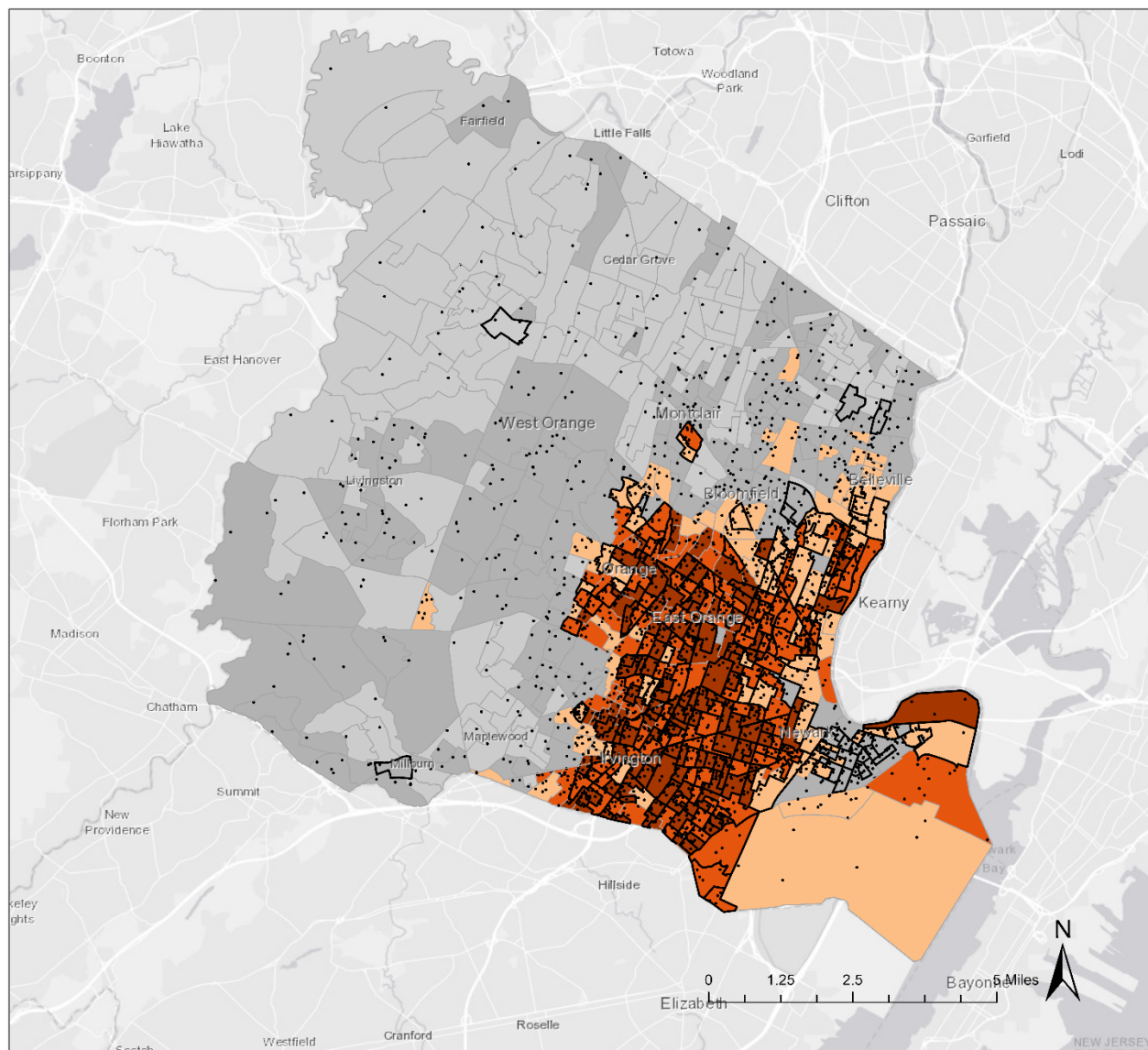
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# Indicators of Potential Disadvantage

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- Racial Minority
- Foreign Born status
- Limited English Proficiency
- Disability status
- Older Adults (75+)
- Single Parent households

# Indicators of Potential Disadvantage



## Racial Minority

□ Low Income Block Group  
1 Dot = 200 Persons of Racial Minority

Percent of Racial Minority Population by Block Group

0% - 30.63%  
30.64% - 69.45% County average- 69.45%  
69.46% - 93.01%  
93.02% - 98.80%  
98.81% - 100%

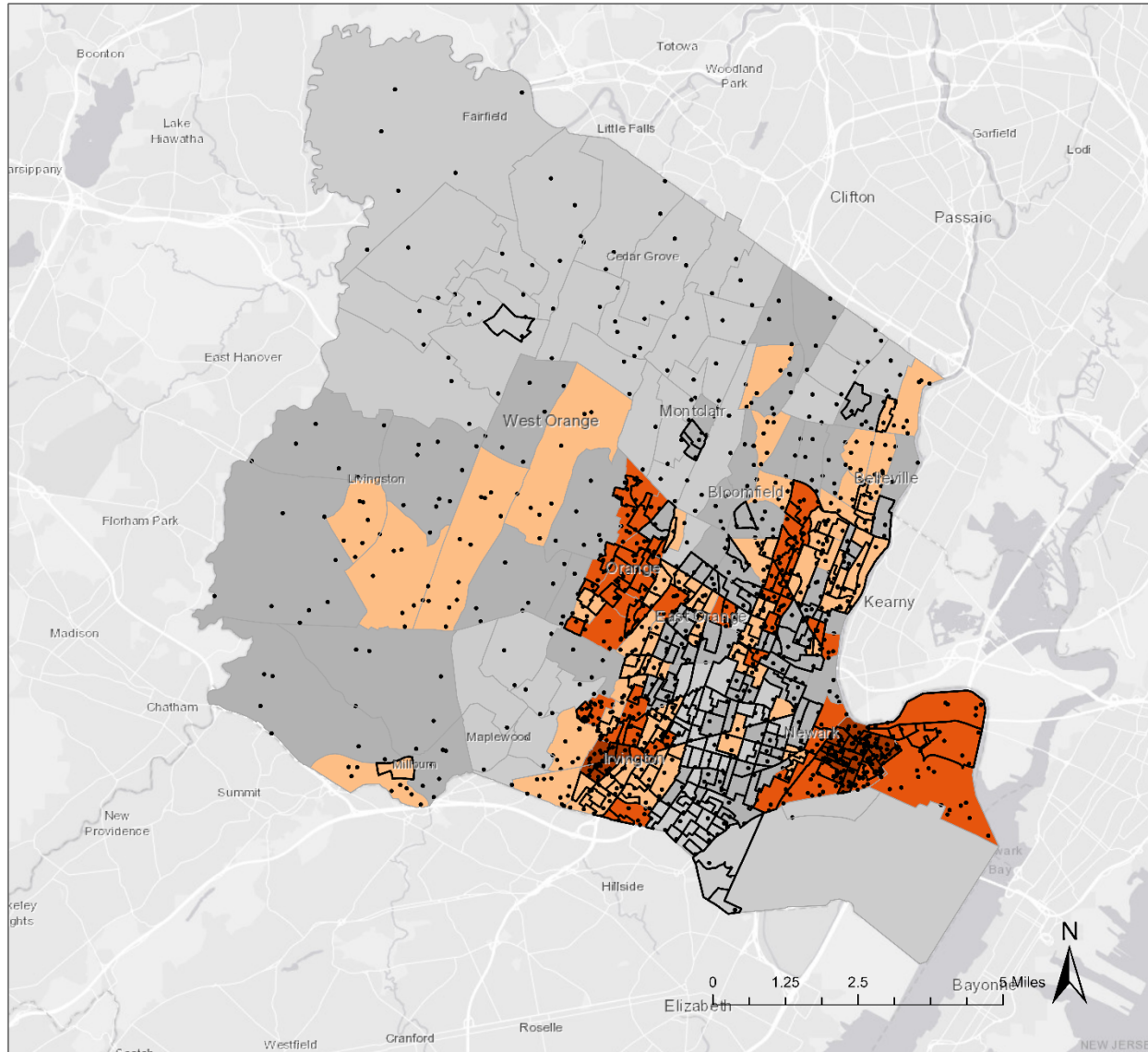
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# Indicators of Potential Disadvantage



## Foreign-born Population

□ Low Income Block Group  
• 1 Dot = 200 Foreign-born Persons

Percent of Foreign-born Population by Census Tract

0% - 17.23%  
17.24% - 27.18% County average- 27.18%  
27.19% - 35.49%  
35.50% - 49.83%  
49.84% - 68.97%

Data Source: NJGIN, ACS 2015-2019 5-year estimate, ESRI base map

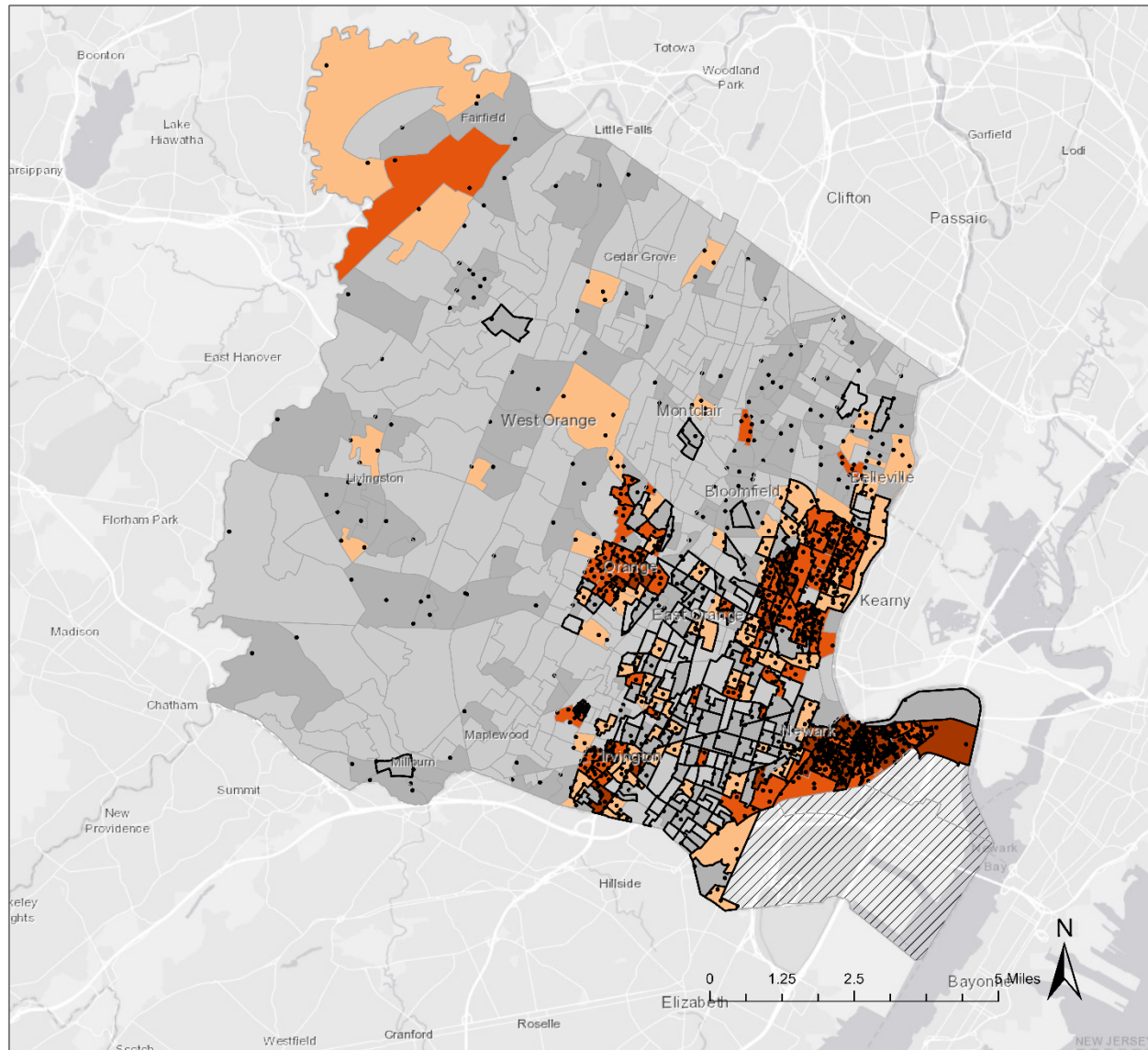
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# Indicators of Potential Disadvantage



## Limited English Proficiency

□ Low Income Block Group

• 1 Dot = 20 Households with Limited English Proficiency

Percent of Limited English Proficiency Households by Block Group

□ 0% - 2.36%

■ 2.37% - 10.14% County average- 10.14%

■ 10.15% - 17.68%

■ 17.69% - 35.37%

■ 35.38% - 81.03%

▨ No Data

Data Source: NJGIN, ACS 2015-2019 5-year estimate, ESRI base map

## Planning for Healthy, Just, Resilient, and CO2-Neutral Mobility in New Jersey

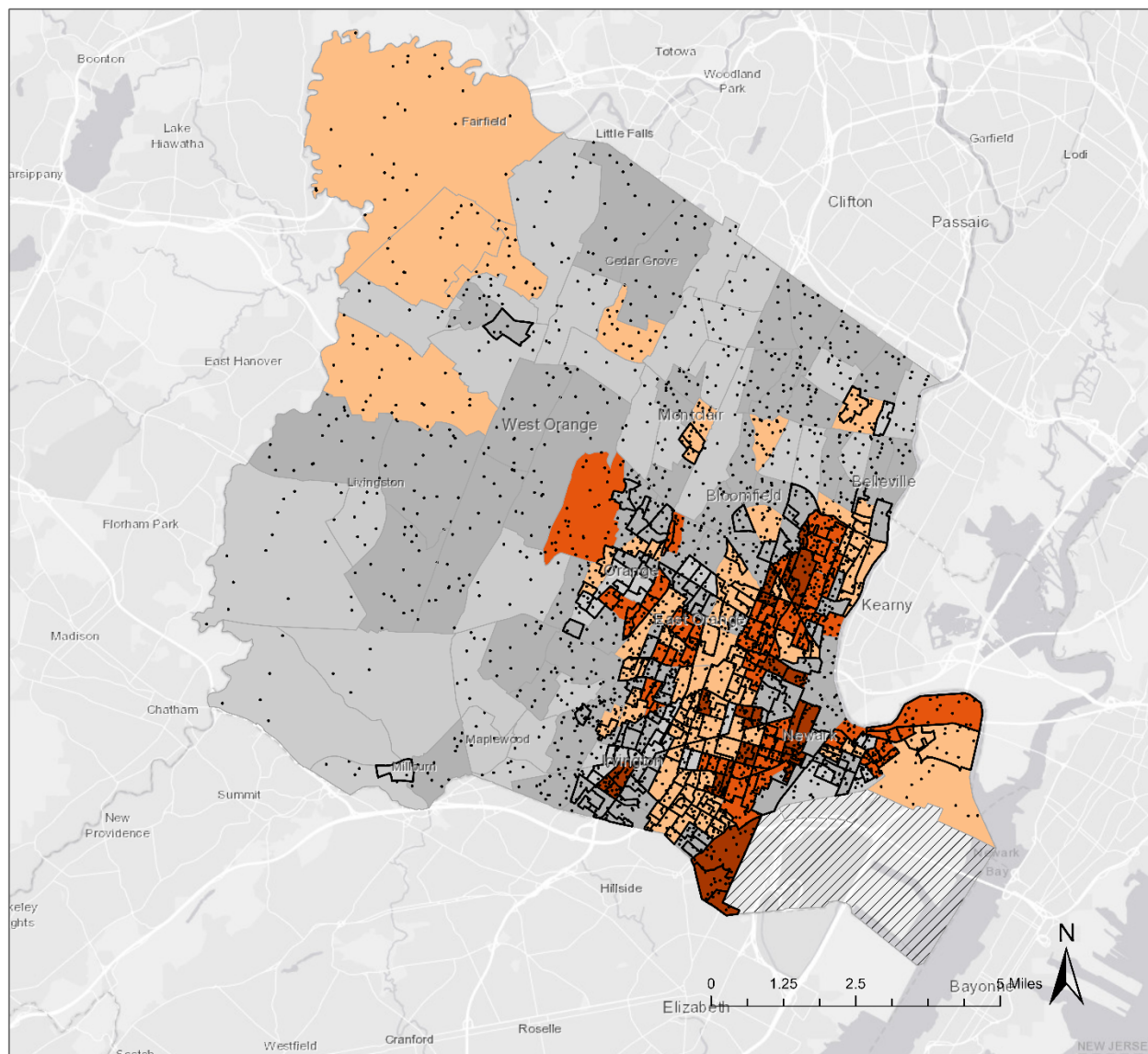
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# Indicators of Potential Disadvantage



## Persons with Disability

□ Low Income Block Group  
1 Dot = 30 Persons with Disability

Percent of Population with Disability by Census Tract

0% - 7.41%

7.42% - 11.08% County average- 11.08%

11.09% - 15.48%

15.49% - 22.13%

22.14% - 44.16%

▨ No Data

Data Source: NJGIN, ACS 2015-2019 5-year estimate, ESRI base map

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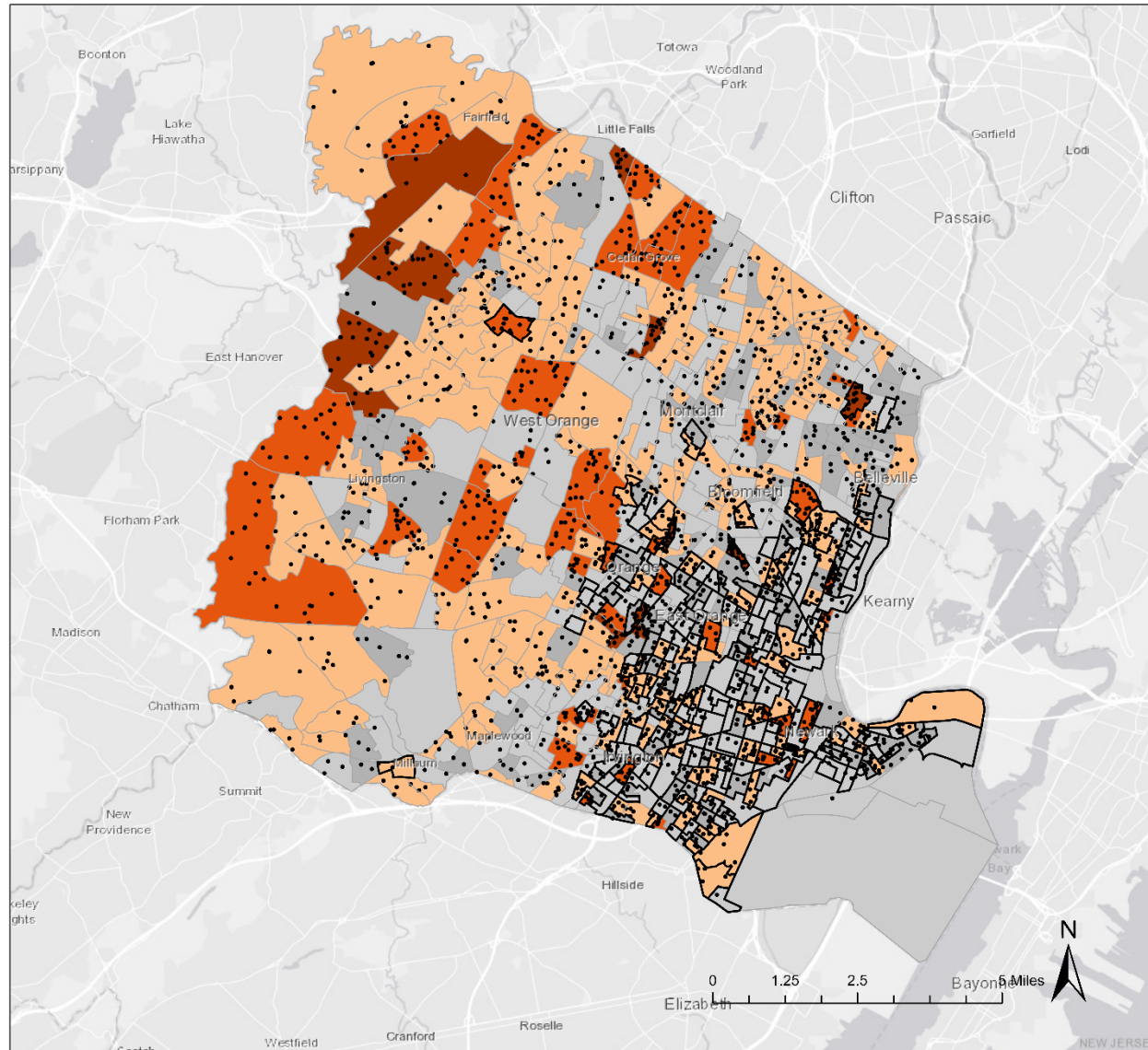
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# Indicators of Potential Disadvantage



## Older Adults (75+)

- Low Income Block Group  
· 1 Dot = 20 Older Adults (75+)
- Percent of Older Adults (75+)  
by Block Group
- 0% - 3.57%
  - 3.58% - 5.79% County average-5.79%
  - 5.80% - 13.40%
  - 13.41% - 24.33%
  - 24.34% - 40.27%

Data Source: NJGIN, ACS 2015-2019 5-year estimate, ESRI base map

## Planning for Healthy, Just, Resilient, and CO<sub>2</sub>-Neutral Mobility in New Jersey

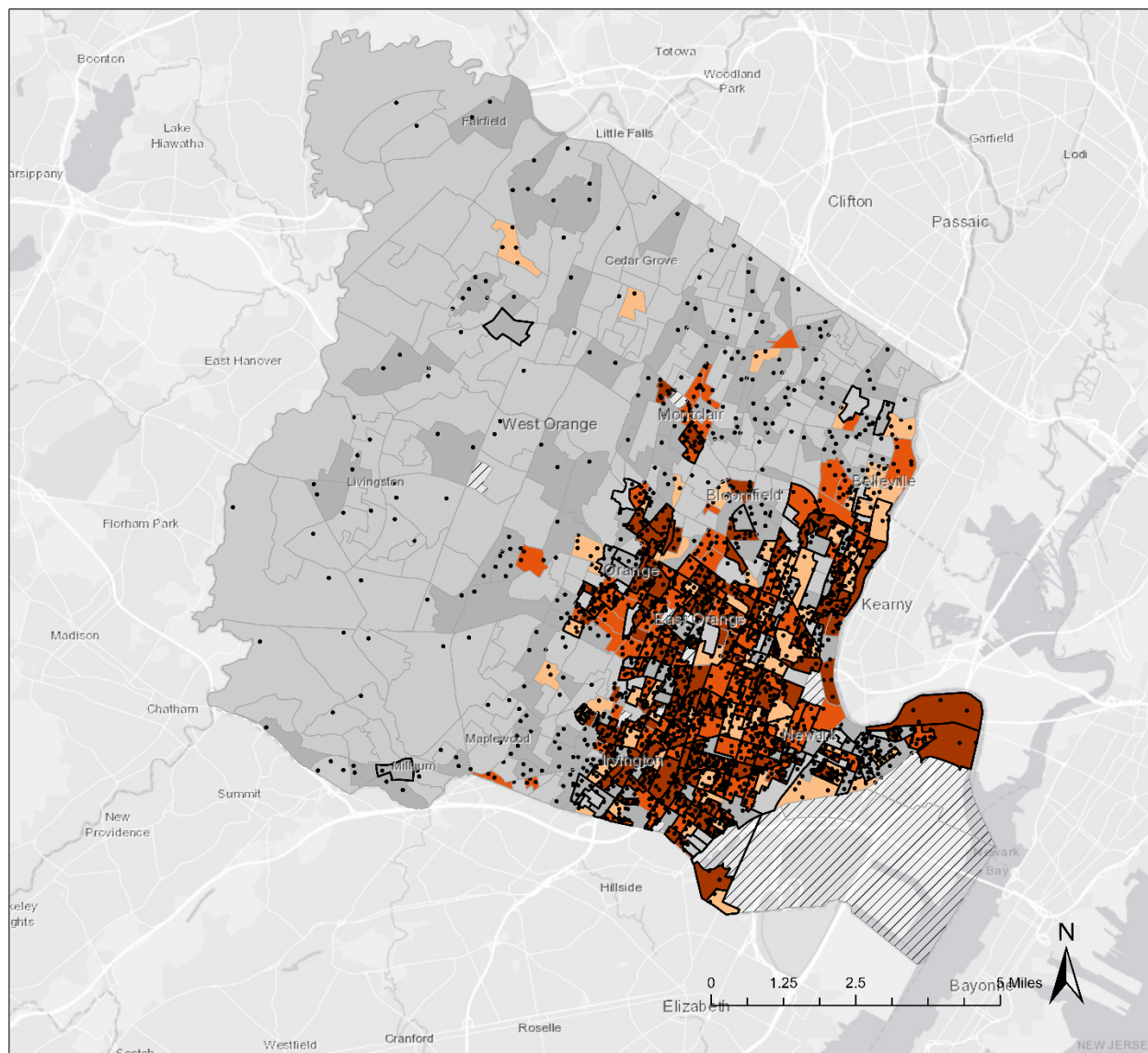
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# Indicators of Potential Disadvantage



## Single parent Family

□ Low Income Block Group  
1 Dot = 30 Single Parent Family

Percent of Single Parent Families by Block Group

- 0% - 13.52%
- 13.53% - 39.97% County average- 39.97%
- 39.98% - 54.72%
- 54.73% - 78.79%
- 78.80% - 100%
- ▨ No Data

Data Source: NJGIN, ACS 2015-2019 5-year estimate, ESRI base map

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# Health Behaviors

Essex is ranked among the least healthy counties in New Jersey (Lowest 0%-25%)



Source: 2020 NJ County Health rankings

Health Behaviors	Essex County	NJ
Adult Smoking	16%	14%
Adult obesity	29%	26%
Food environment index	8.2	9.3
Physical inactivity	29%	26%
Access to exercise opportunities	100%	95%
Excessive drinking	17%	18%
Alcohol-impaired driving deaths	14%	22%

Physical Environment	Essex County	NJ
Air pollution-particulate matter	8.9	9.9
Drinking water problems	Yes	-
Severe housing problems	28%	22%
Driving alone to work	61%	71%
Long commute-driving alone	45%	43%

# Health Behaviors

Quality of Life	Essex County	NJ
Poor or fair health	21%	16%
Poor physical health days	4.3	3.7
Poor mental health days	4.4	3.8
Low birthweight	10%	8%
Life expectancy	79.8	80.5
Diabetes prevalence	11%	10%
Frequent physical distress	13%	11%

Essex is ranked among the least healthy counties in New Jersey (Lowest 25%-50%)



Source: 2020 NJ County Health rankings



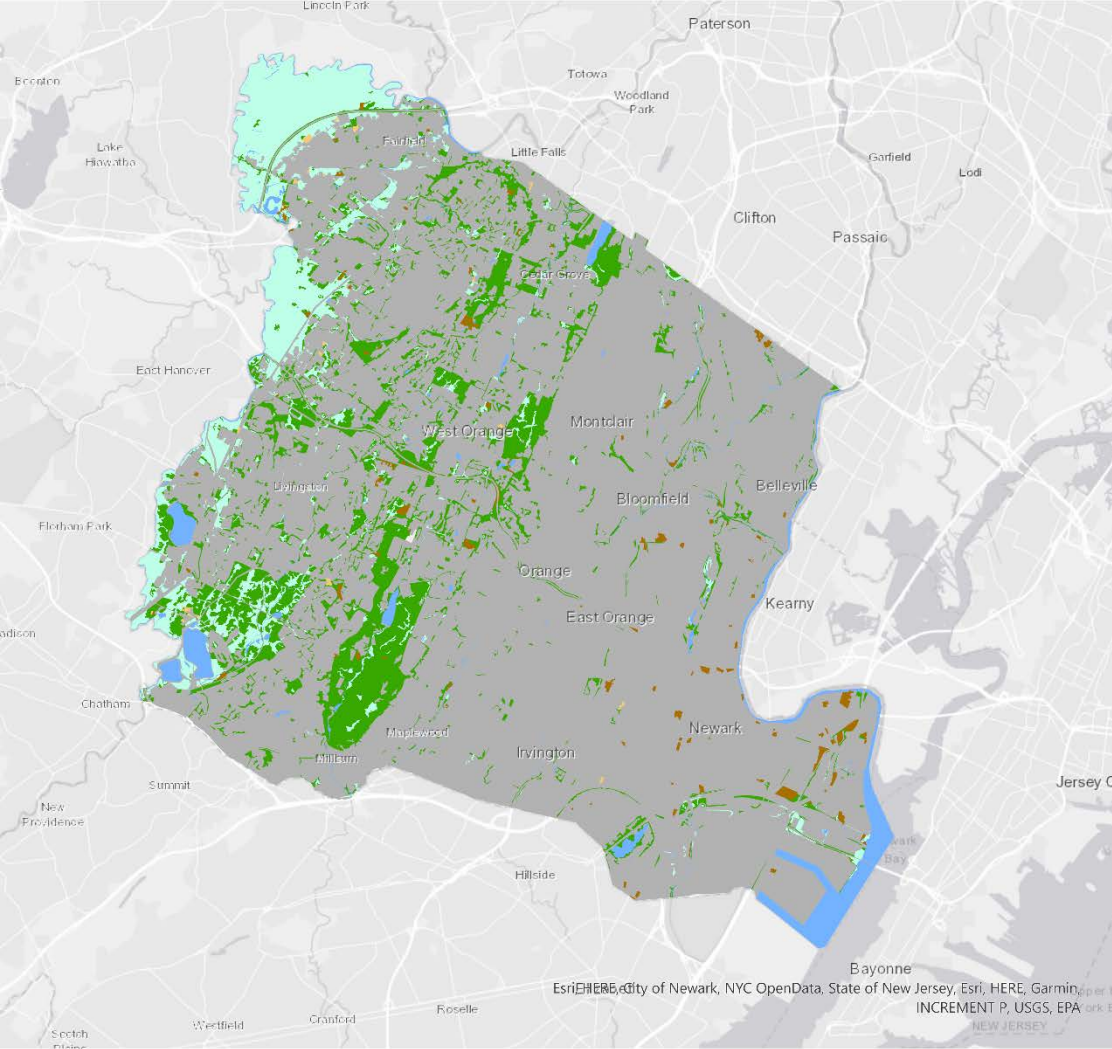
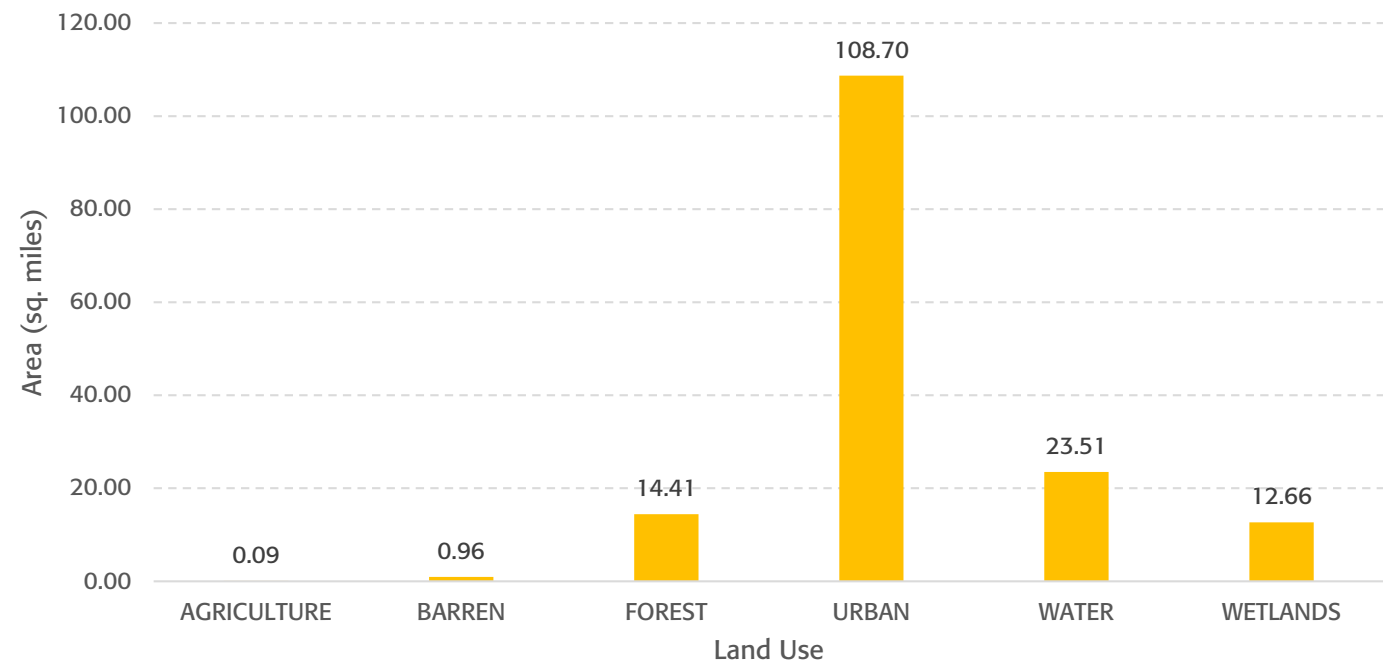
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Healthy, Just and CO2-neutral Mobility for All

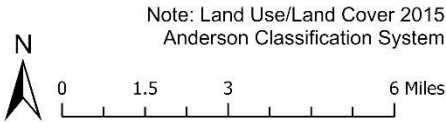
# **GEOGRAPHY OF PLACE**

# Natural Land Use

Land Use Division

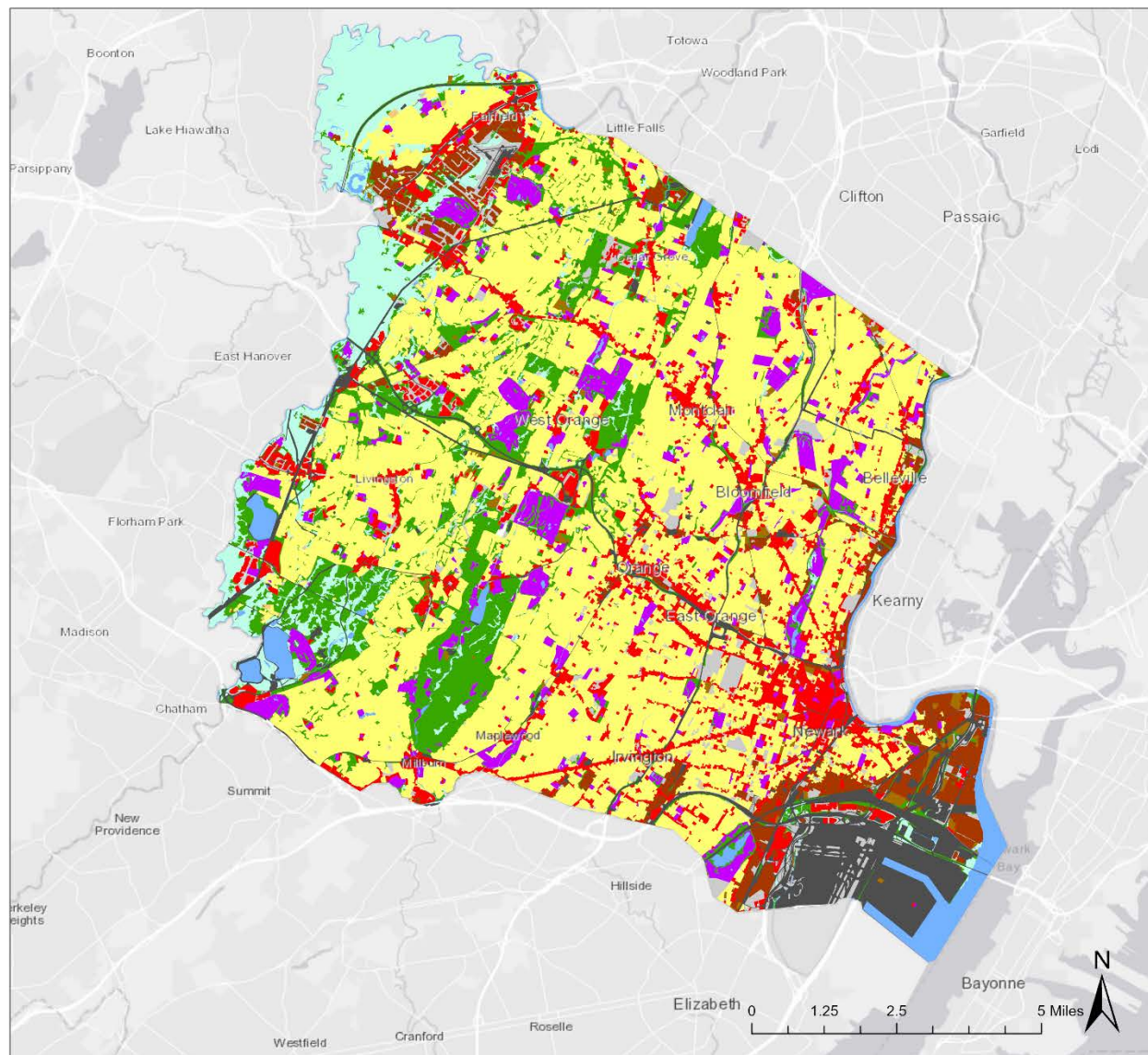


- Land Use
- AGRICULTURE
  - BARREN LAND
  - FOREST
  - URBAN
  - WATER
  - WETLANDS



Data Source: NJGIN, ESRI Base Map

# Urban Land Use



## Land Use

### Urban Land Use

- Residential
- Commercial and Service
- Industrial
- Transportation/  
Communication/Utilities
- Recreational Land
- Other Urban Land

### Other Land Uses

- Agriculture
- Barren Land
- Forest
- Water
- Wetlands

Data Source: NJGIN, NJDEP, ESRI base map

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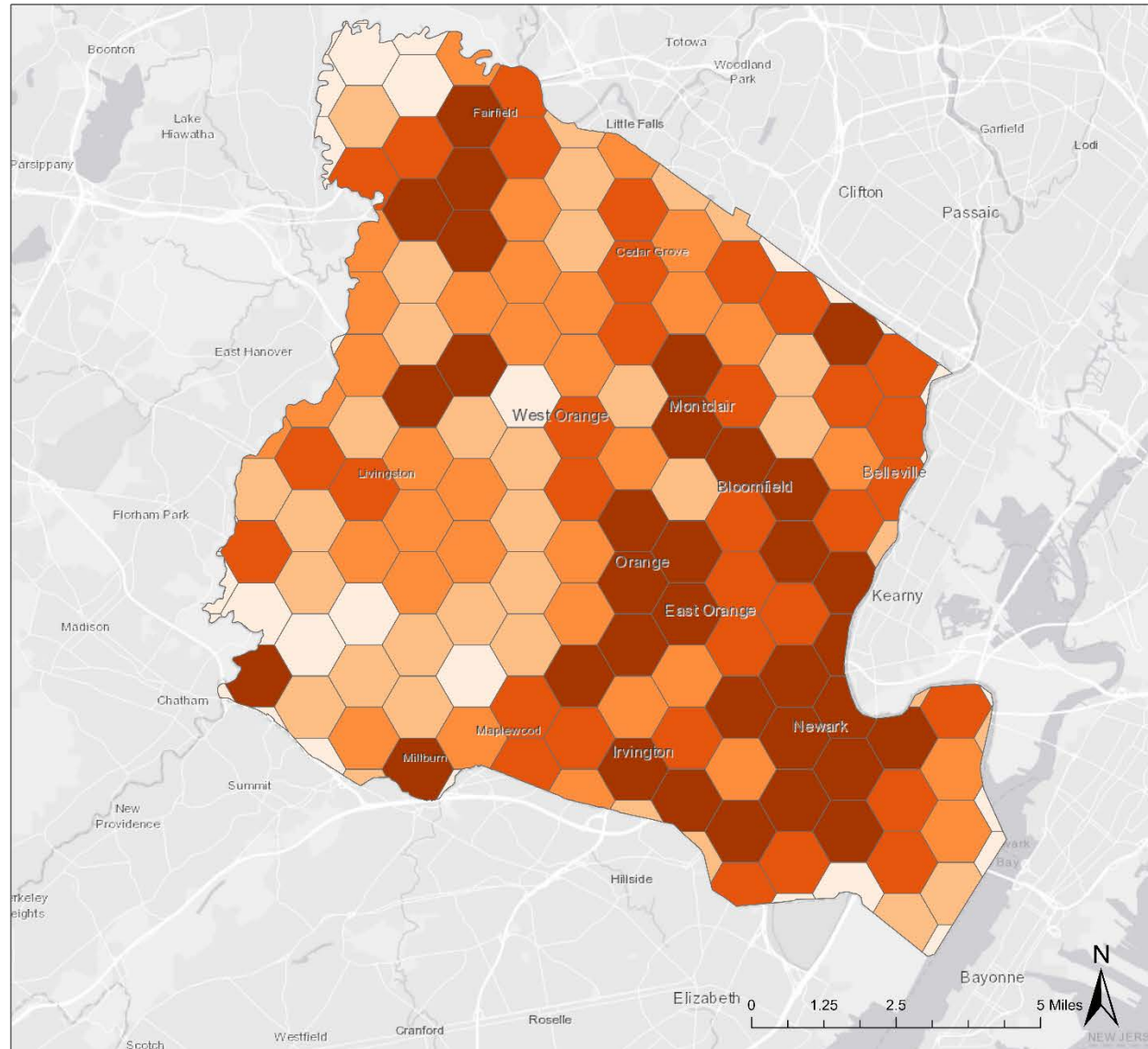
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# Employment Density



## Employment Density

Number of Employees per sq. mile

0 - 111

111 - 754

754 - 1,707

1,707 - 3,065

3,065 - 52,202

Note: The area of a hexagon is 1 sq. mile  
Data Source: NJGIN, ACS 2015-2019 5-year estimate, NOAA, ESRI base map

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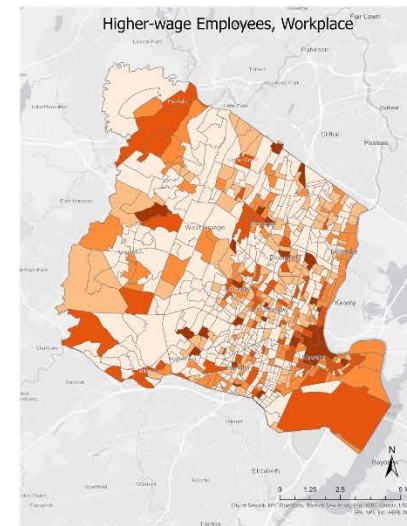
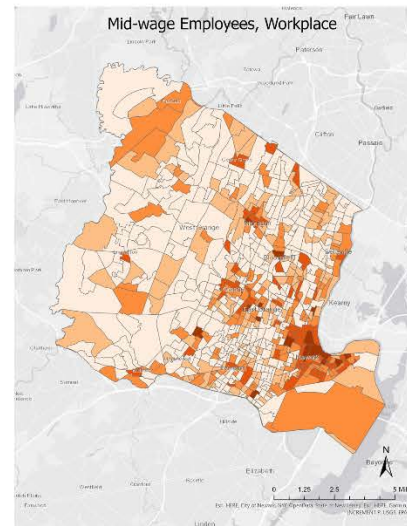
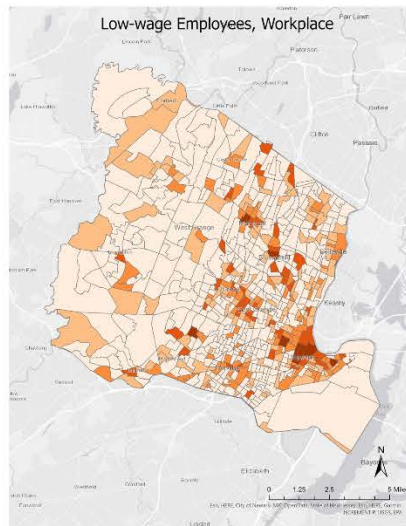
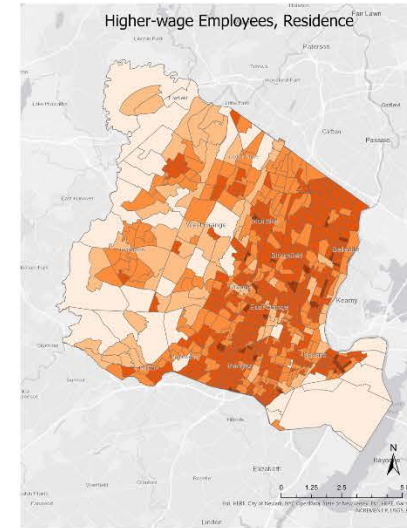
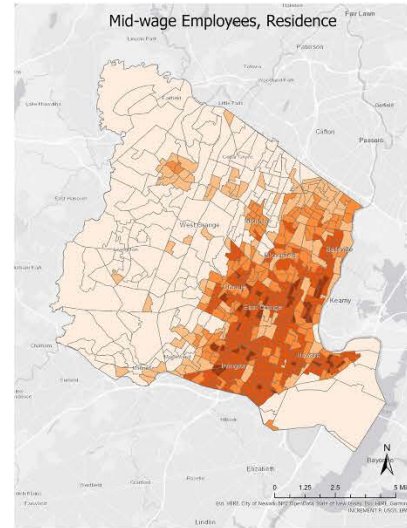
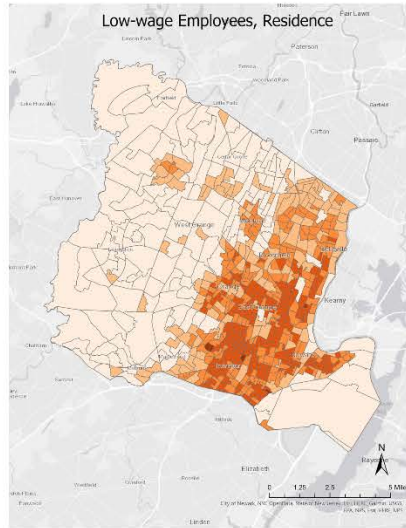
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# Employment Density by Wage



## Employment Density by Wage

Number of low/mid/high wage employees per sq. mile by residence/workplace block group

- < 500
- 501 - 1,000
- 1,001 - 2,000
- 2,001 - 5,000
- > 5,000

Note: low-wage: earnings \$1,250/month or less; mid-wage: earnings \$1,251/month to \$3,333/month; higher-wage: earnings greater than \$3,333/month

Data Source: NJGIN, Longitudinal Employer-Household Dynamics (LEHD) 2014-2018 5-year estimate, ESRI Base map

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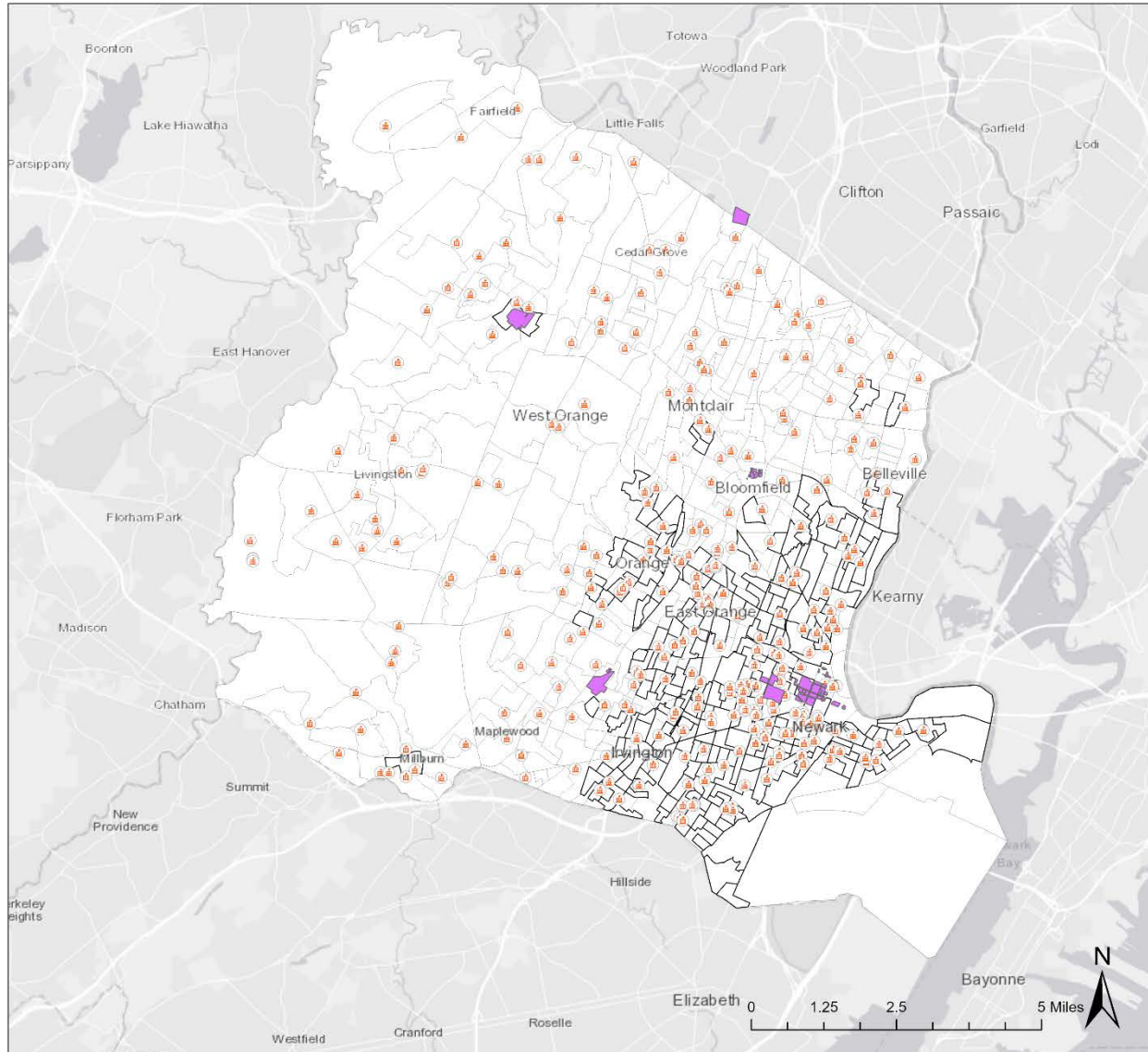


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# Education Services



## Education

- 📍 K-12 Public Schools
- 🏫 Colleges and Universities
- Low Income Block Group

Data Source: NJGIN, ACS 2015-2019 5-year estimate, ESRI base map

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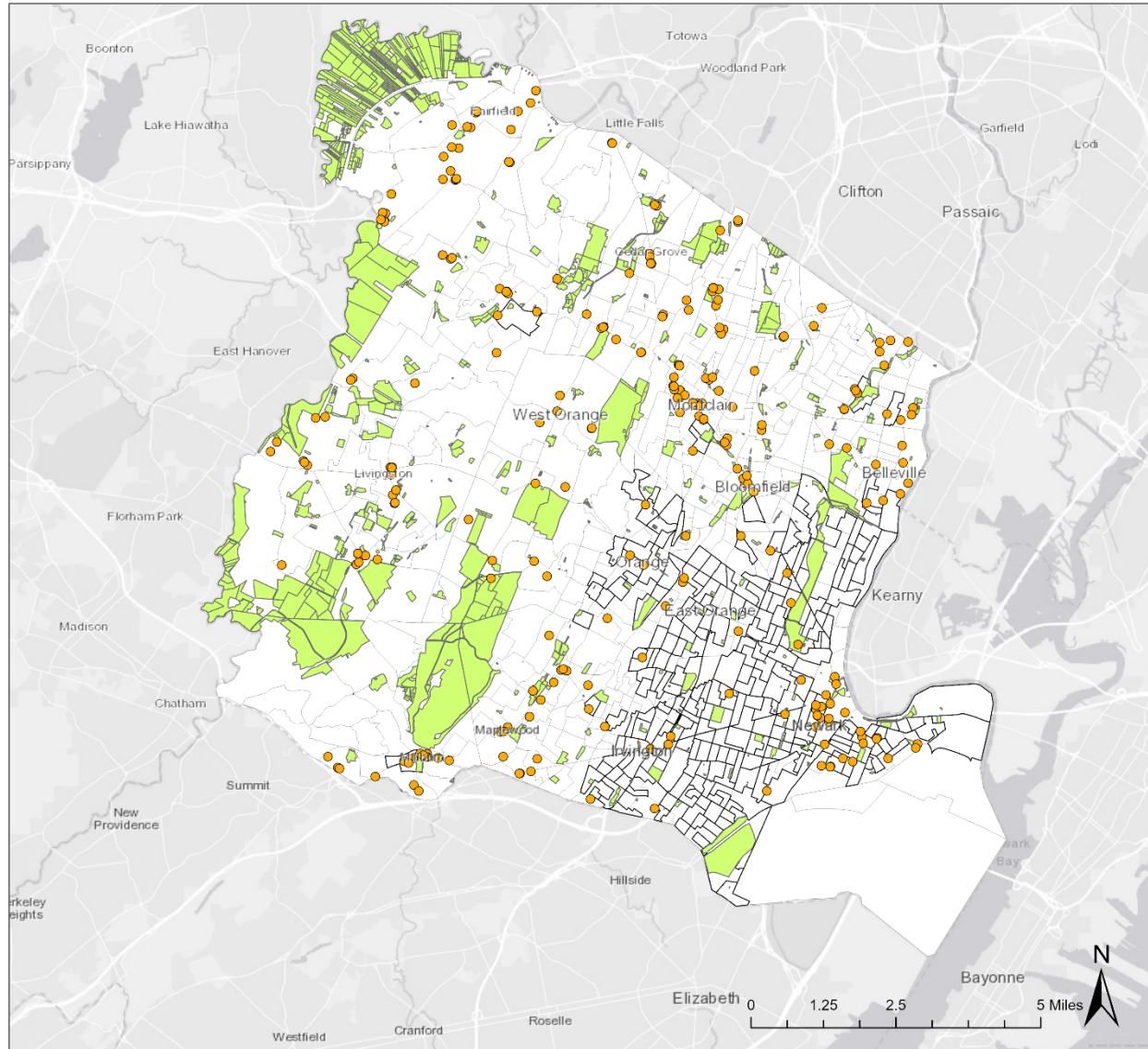
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# Recreation



## Recreation

- Fitness Centers
- State, local, and nonprofit open spaces
- Low Income Block Group

Data Source: NJGIN, ACS 2015-2019 5-year estimate, ESRI Business Search Safegraph, ESRI base map

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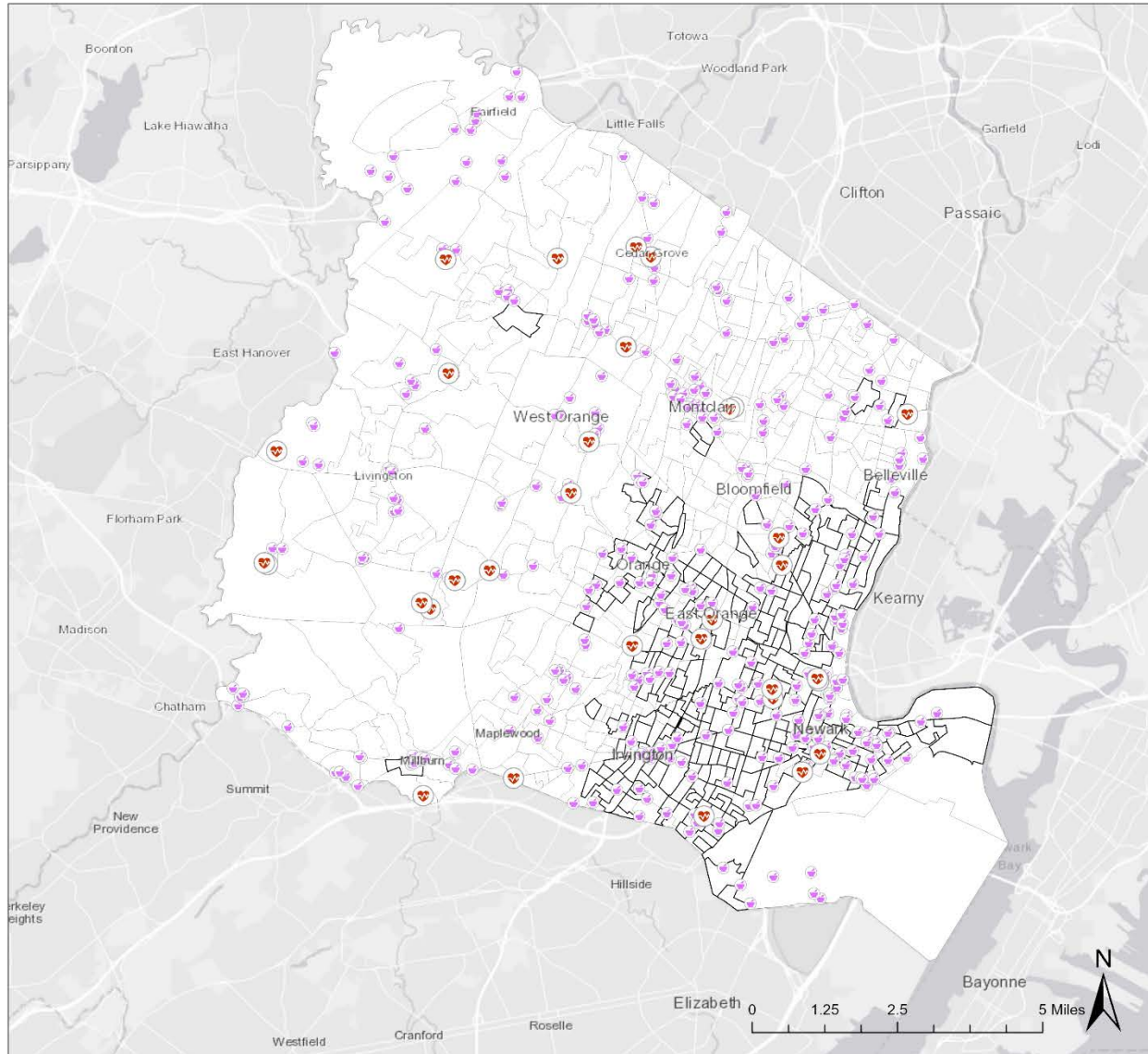
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# Medical Services



## Medical Service

-  Hospitals and Emergency Centers
-  Pharmacies and Drug Stores
-  Low Income Block Group

Data Source: NJGIN, ACS 2015-2019 5-year estimate, ESRI Business Search Safegraph, ESRI base map

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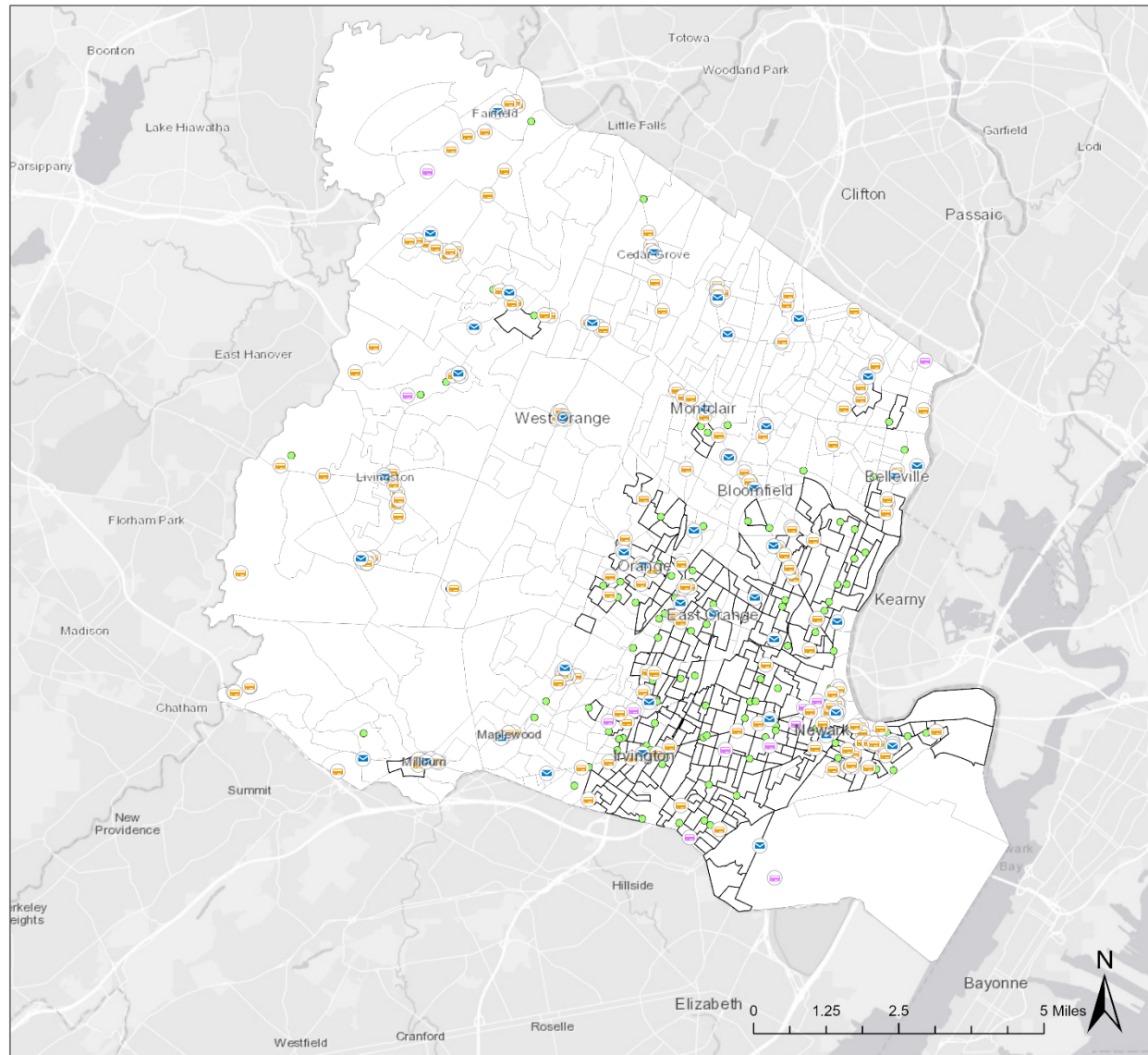


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# Other Essential Services



## Essential Services

- Postal Services
- Commercial Banks
- Credit Unions
- Child Care Centers
- Low Income Block Group

Data Source: NJGIN, ACS 2015-2019 5-year estimate, ESRI Business Search Safegraph, ESRI base map

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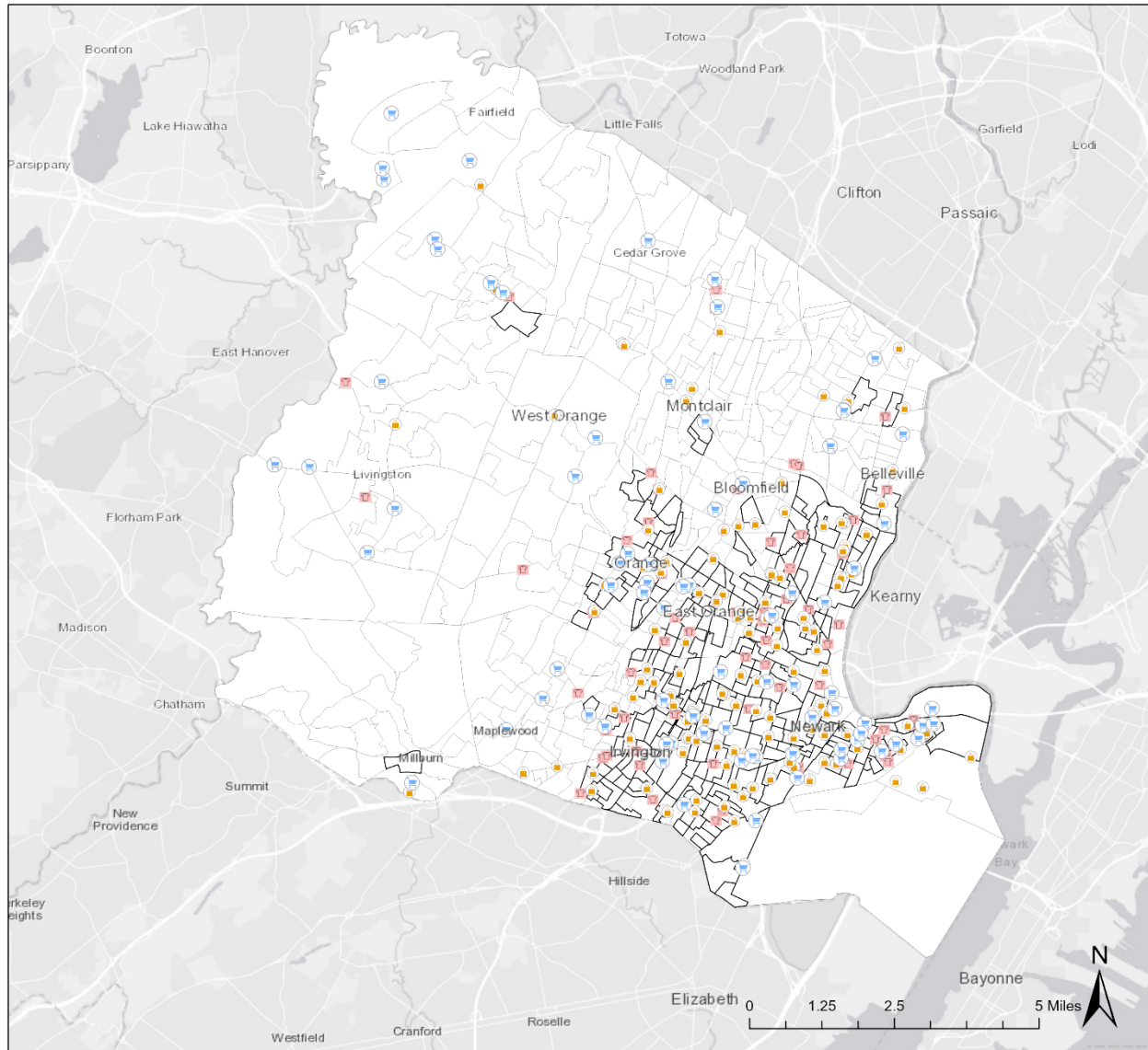


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# Commercial Amenities



## Commercial Amenities

- Full-service Grocery Stores
- Convenience/ Specialty Stores
- Laundromats
- Low Income Block Group

Data Source: NJGIN, ACS 2015-2019 5-year estimate, ESRI Business Search Safegraph, Data Axle, ESRI base map

## Planning for Healthy, Just, Resilient, and CO2-Neutral Mobility in New Jersey

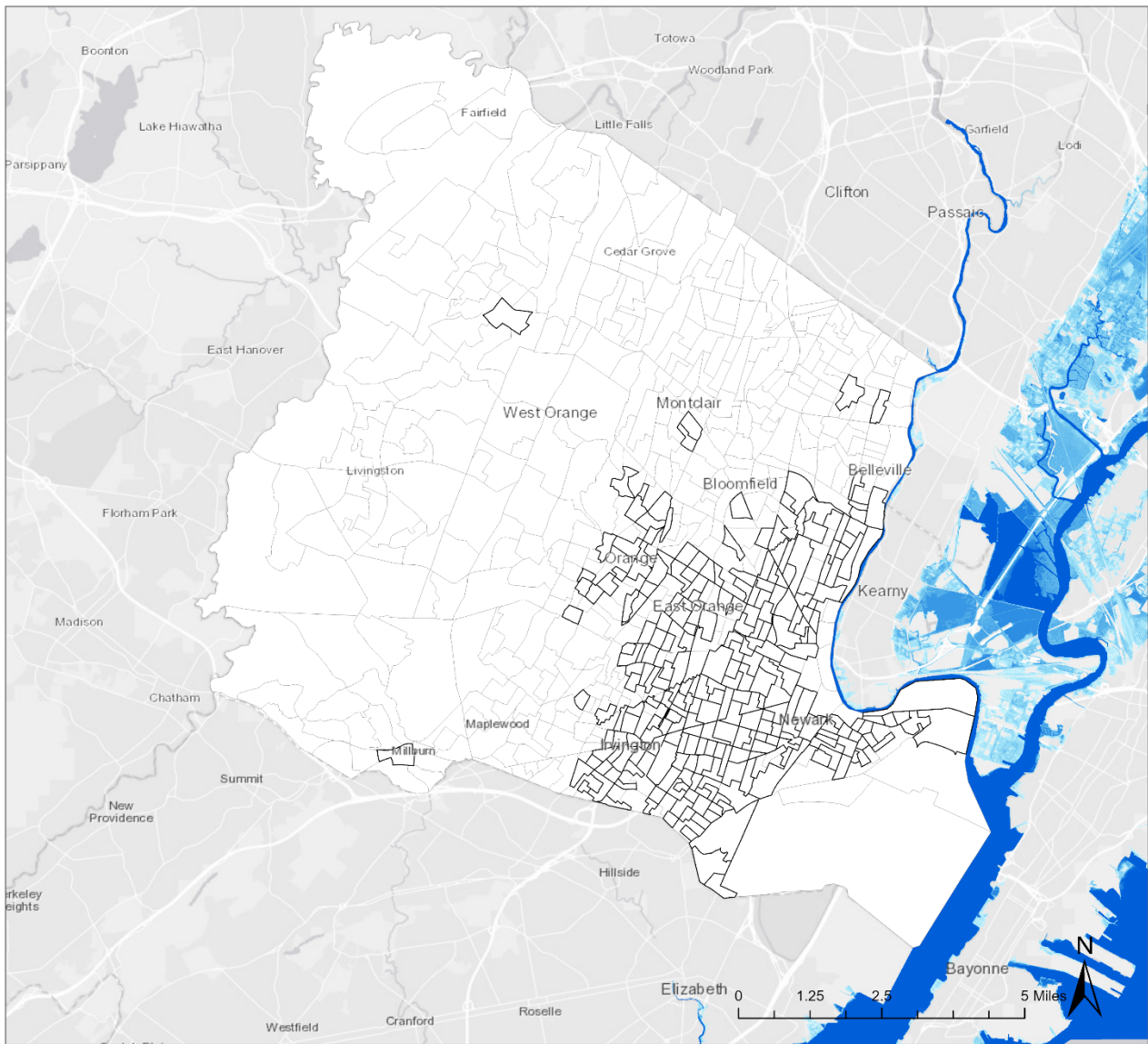
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# Climate Vulnerability



## Sea Level Rise (5ft)

□ Low Income Block Group  
5 ft. sea level rise depth  
■ High  
■ Low

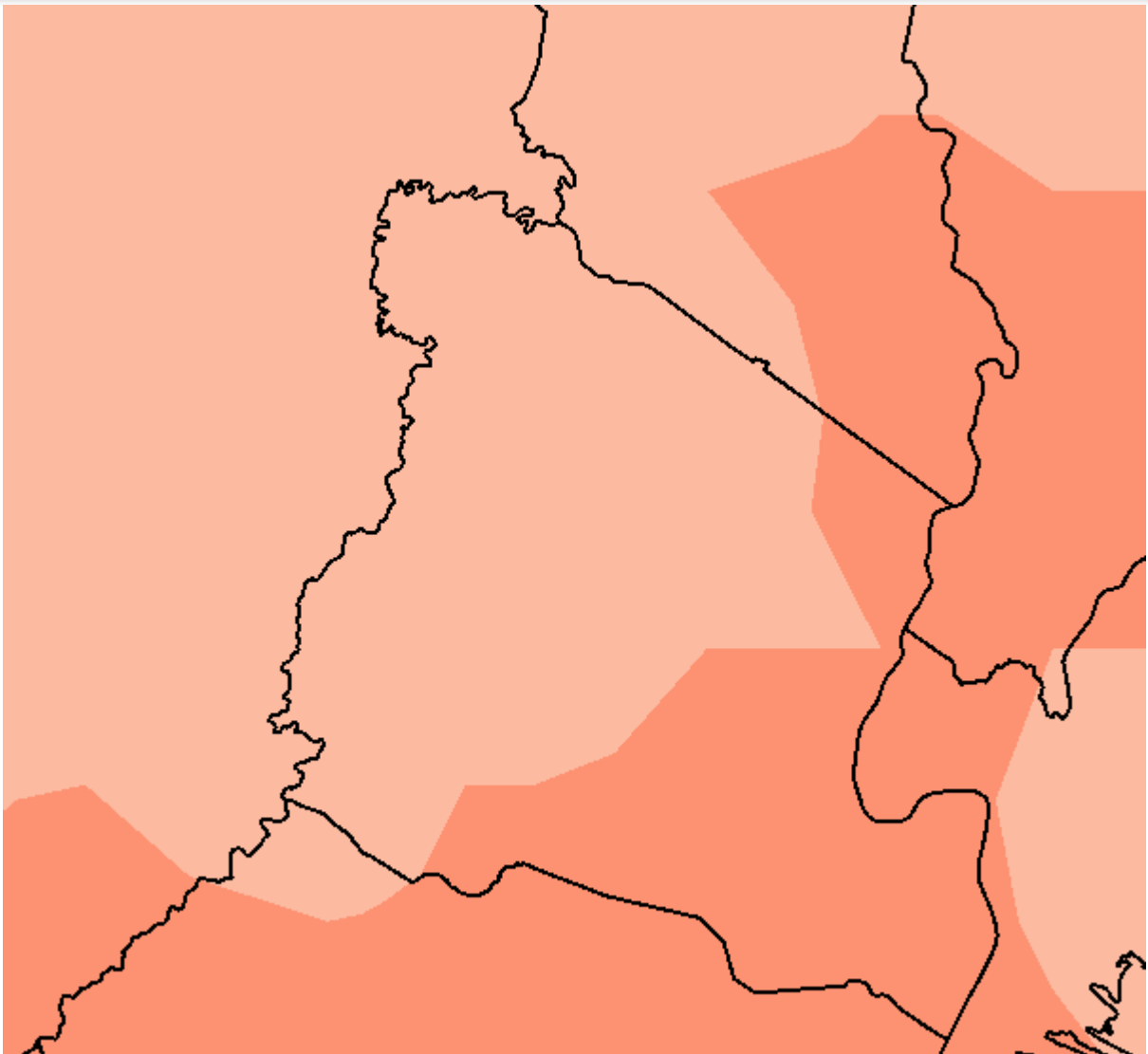
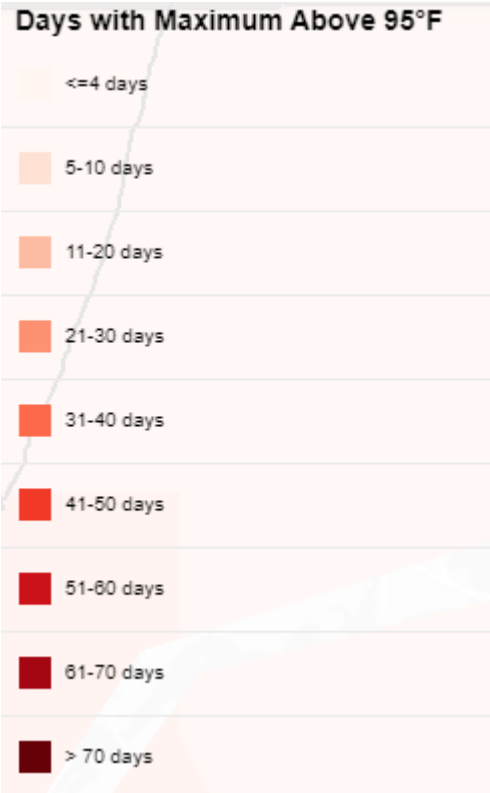
Data Source: NJGIN, ACS 2015-2019 5-year estimate, NOAA, ESRI base map

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# Climate Vulnerability

## Exposure to extreme heat (High-emissions scenario)

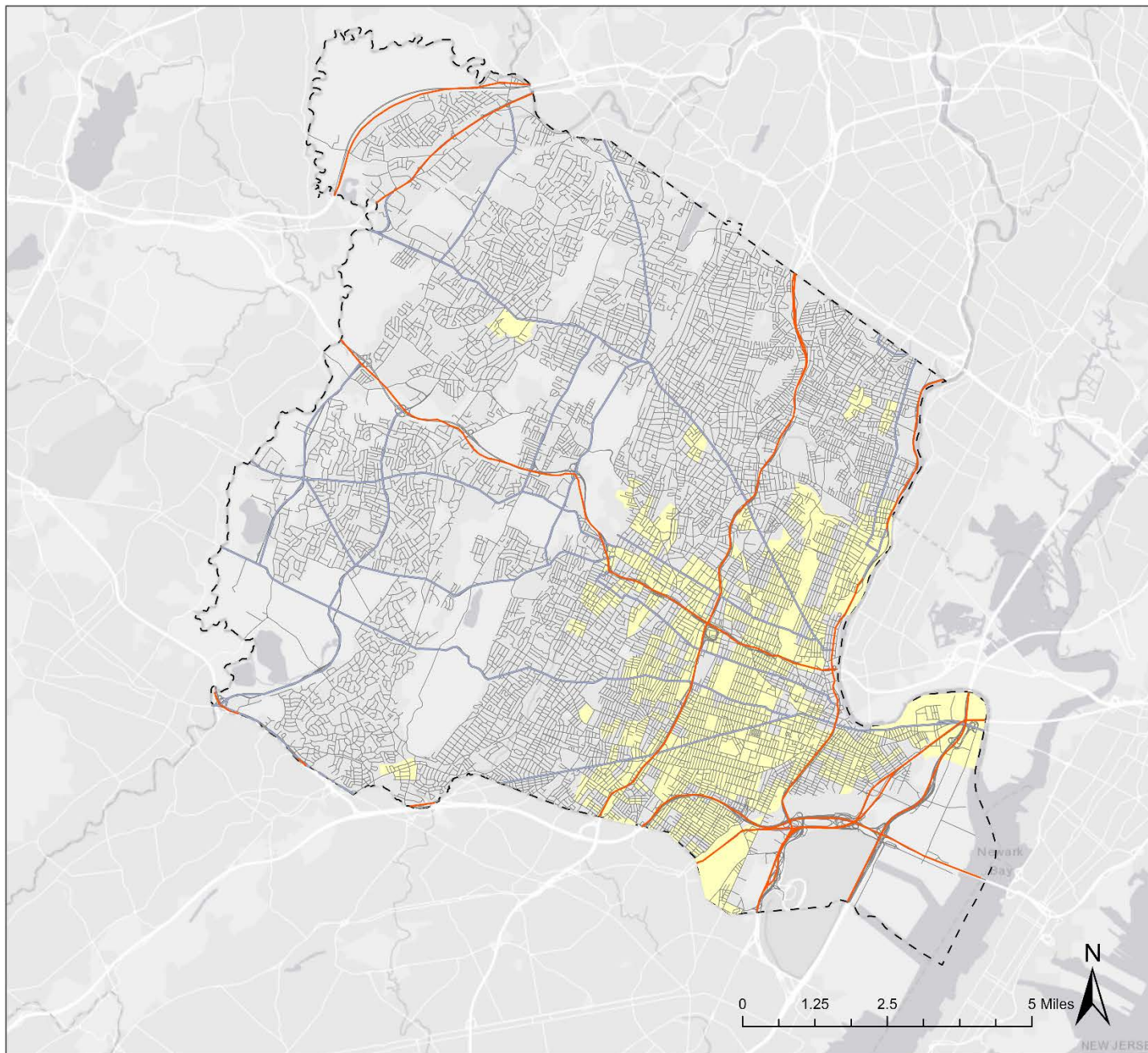


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Healthy, Just and CO2-neutral Mobility for All

# **GEOGRAPHY OF MOBILITY AND CONNECTIONS**





## Road Network

### Type

- Interstate/US/State highway
- County Road
- Local Road
- Low Income Block Group

Data Source: NJGIN, ESRI base map

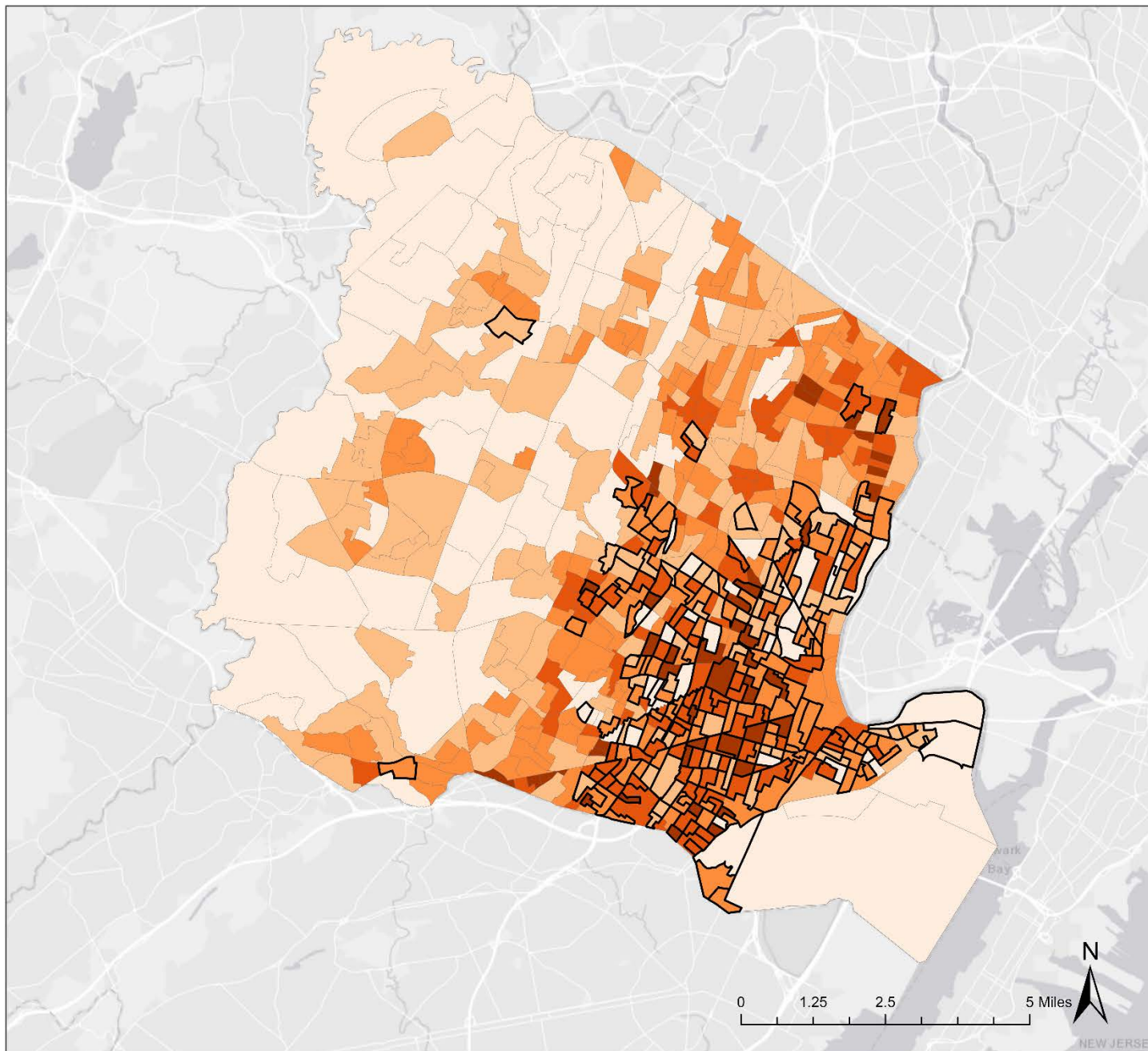
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## Intersection Density

Number of Intersections  
per acre

0 - 47

48 - 82

83 - 116

117 - 166

167 - 319

□ Low Income Block Group

Data Source: NJGIN, EPA, ESRI base map

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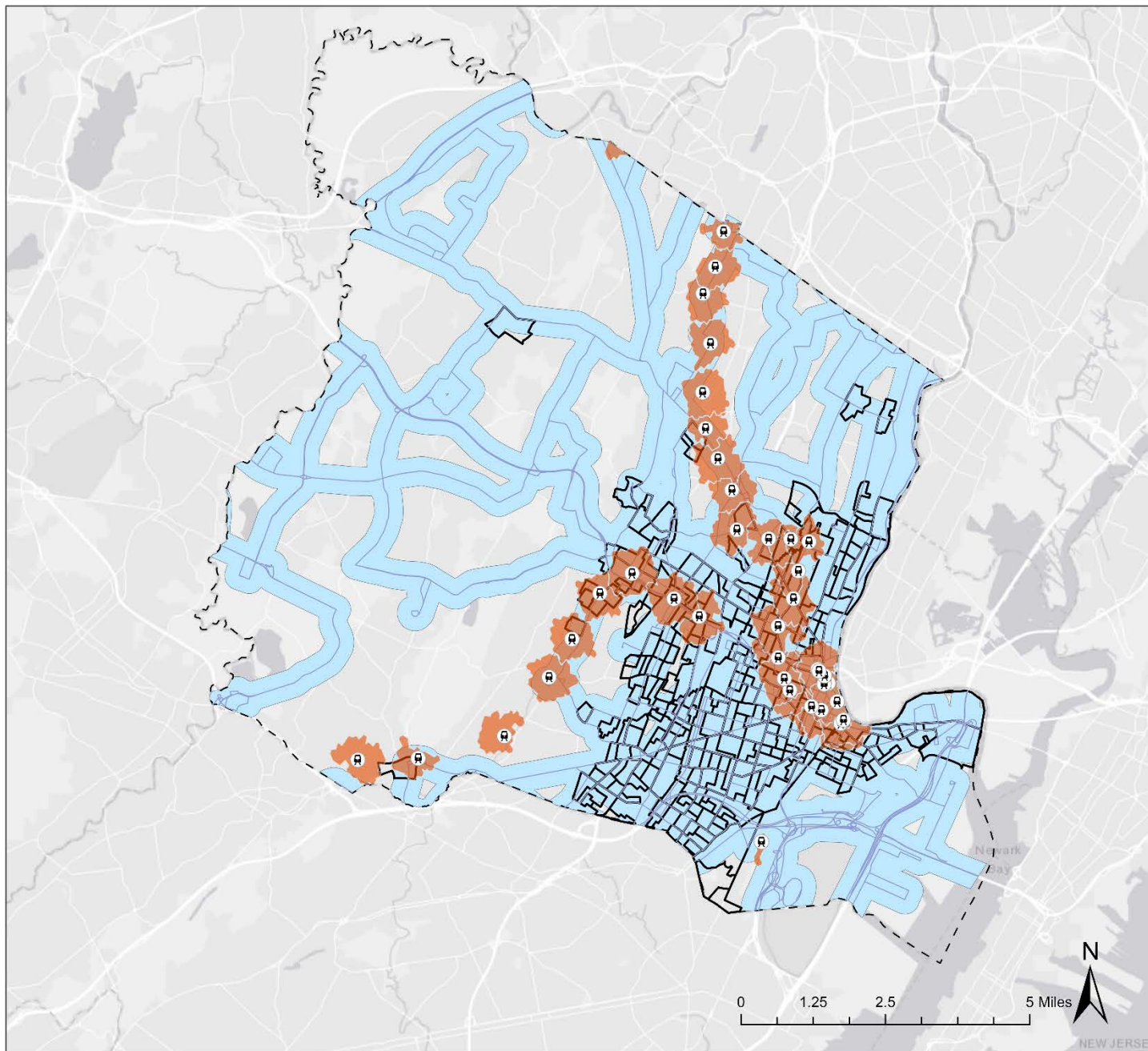
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## Transit Service Area

- Ⓜ Rail Stations
- Rail Station Service Area
- Bus Service Area
- Bus Routes
- Low Income Block Group

Data Source: NJGIN, EPA, ESRI base map, NJT Transit GTFS data

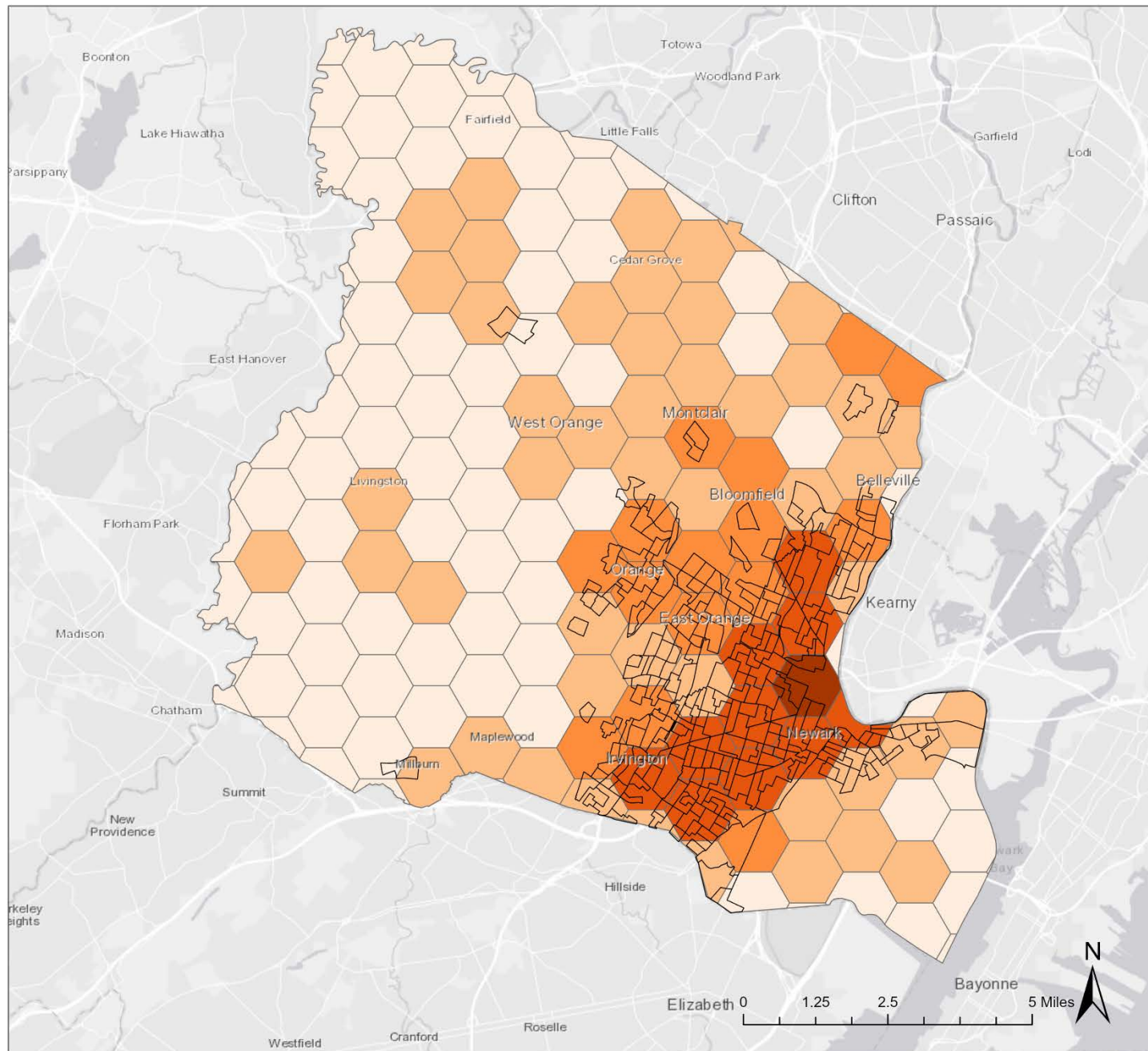
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# Bus Stop Density

- Low Income Block Group
- Number of Bus Stops per sq. mile
- 0 - 11
- 12 - 38
- 39 - 93
- 94 - 222
- 223 - 407

Note: The area of a hexagon is 1 sq. mile  
Data Source: NJGIN, ESRI base map

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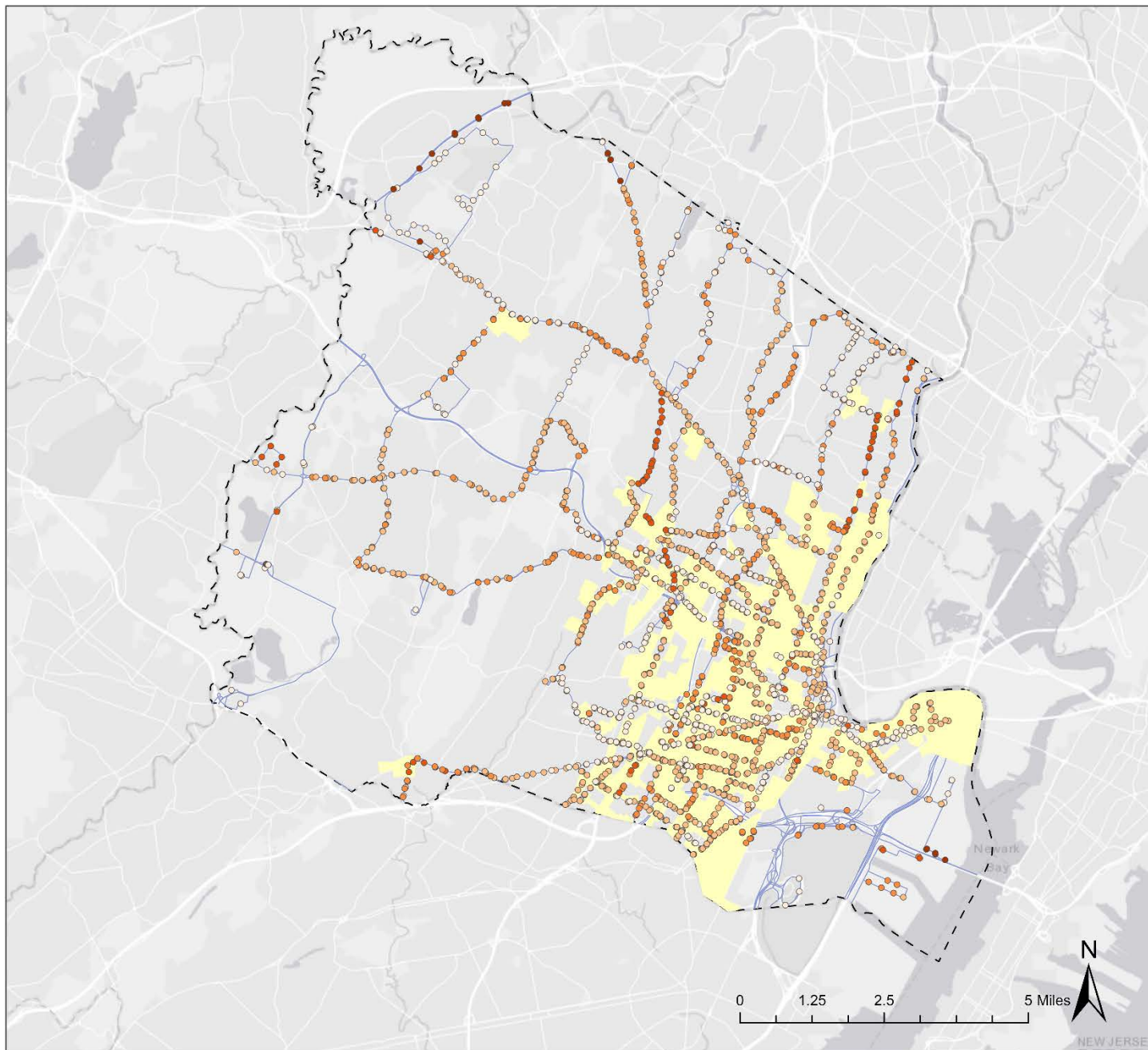
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## Service Frequency- Bus Stops

Maximum Wait Time  
(minutes)

- 0 - 11
- 12 - 28
- 29 - 50
- 51 - 75
- 76 - 148

— Bus Route

■ Low Income Block Group

Note: Weekday Morning Hours- 6:00 - 10:00

Data Source: NJGIN, EPA, ESRI base map, NJT  
Transit GTFS data

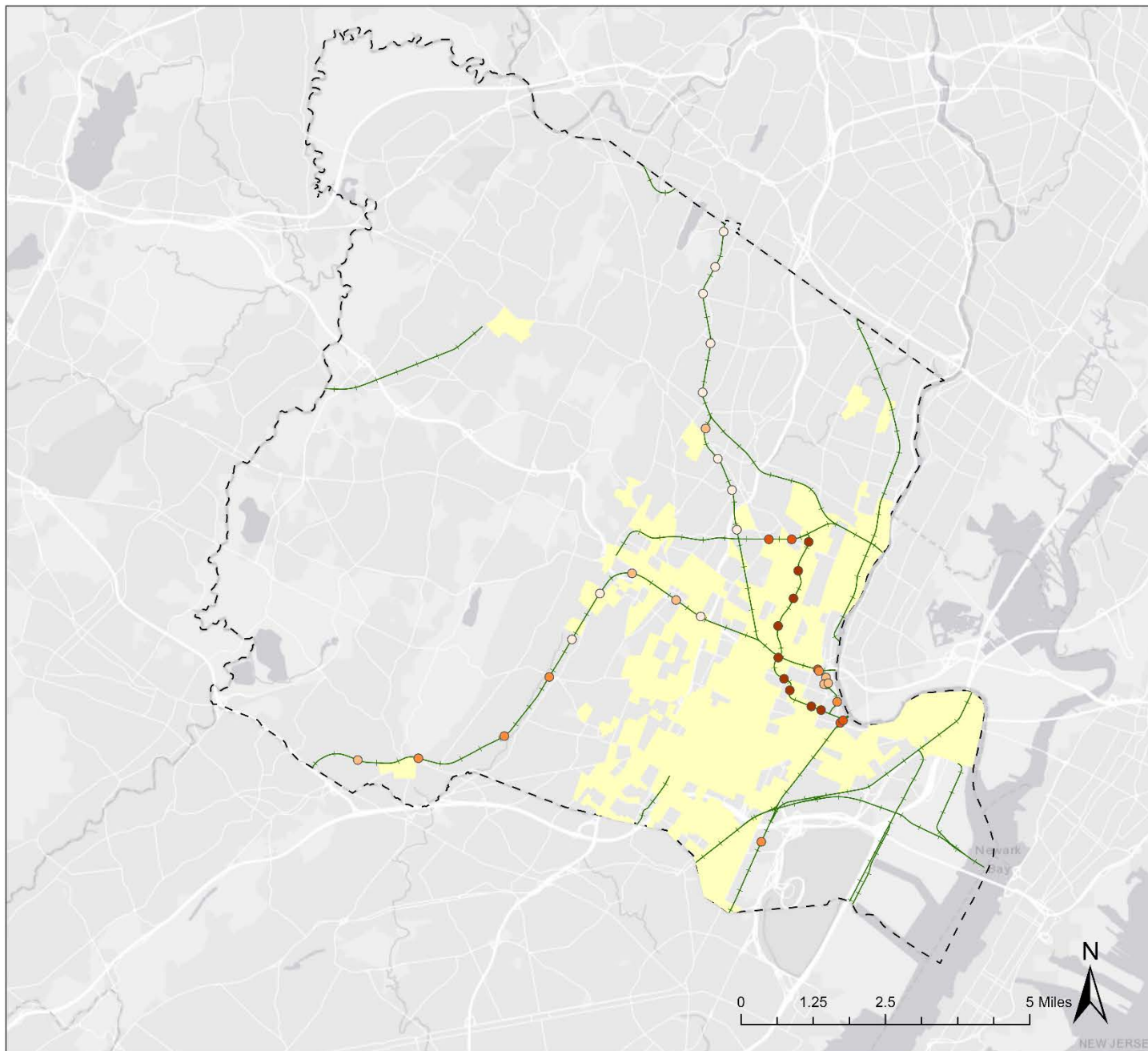
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## Service Frequency- Rail Stations

### Trips Per Hour

- 2.25 - 4.25
- 4.26 - 6.75
- 6.76 - 10.25
- 10.26 - 19.00
- 19.01 - 28.25

— Railroads

■ Low Income Block Group

Note: Weekday Morning Hours- 6:00 - 10:00

Data Source: NJGIN, EPA, ESRI base map, NJT  
Transit GTFS data

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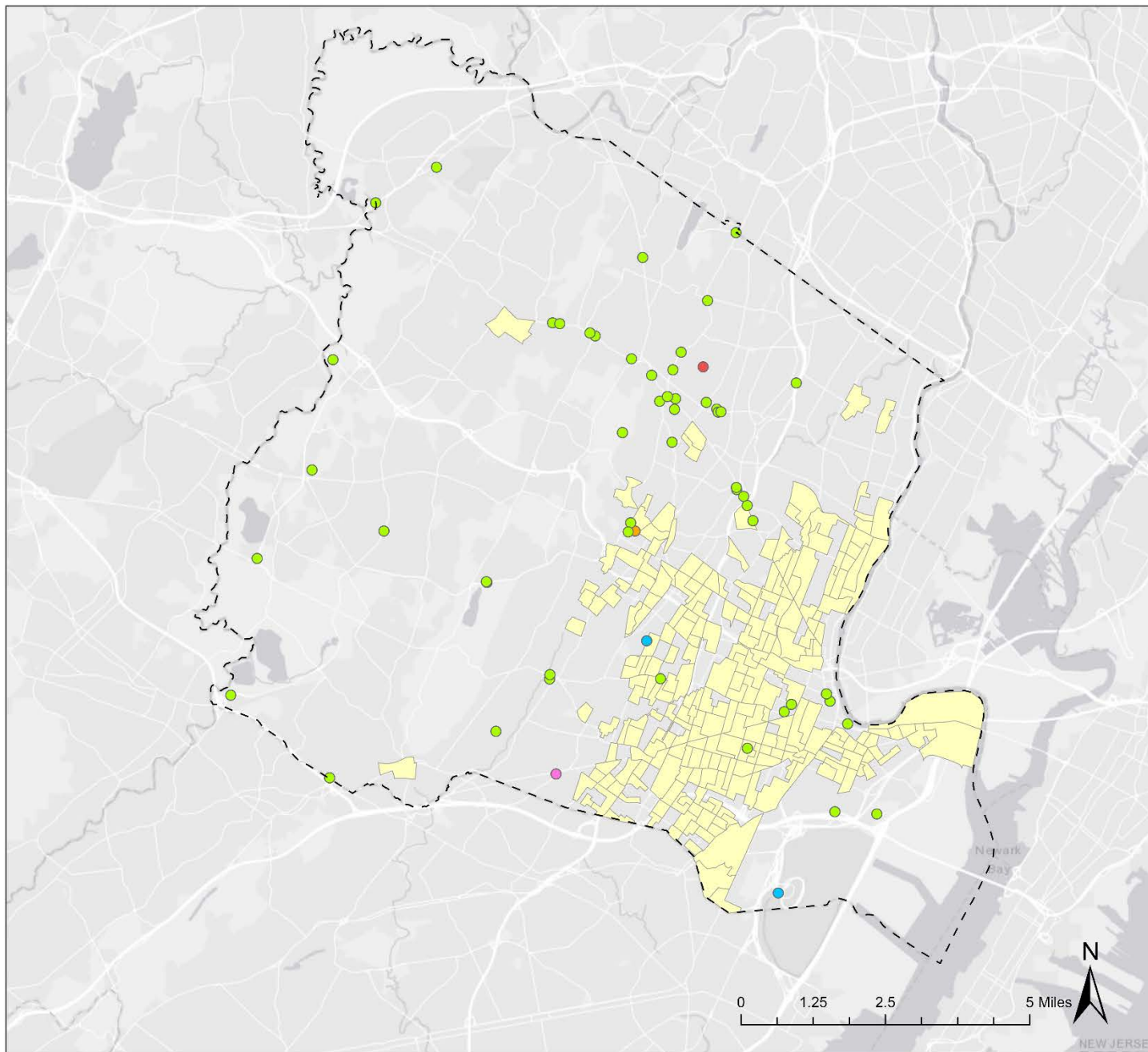
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## Alternative Fuel Stations

### Fuel Type

- Biodiesel
- CNG
- Ethanol
- Electric
- Liquefied Petroleum Gas
- Low Income Block Group

Data Source: NJGIN, Alternative Fuel Data Center, ESRI base map

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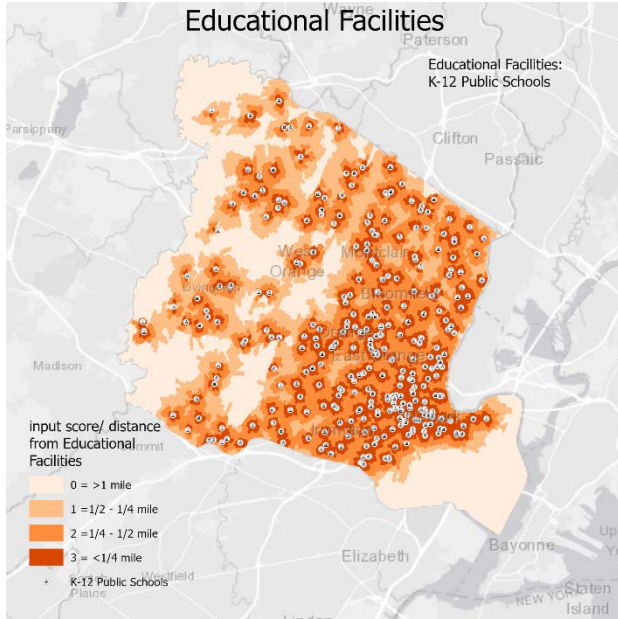
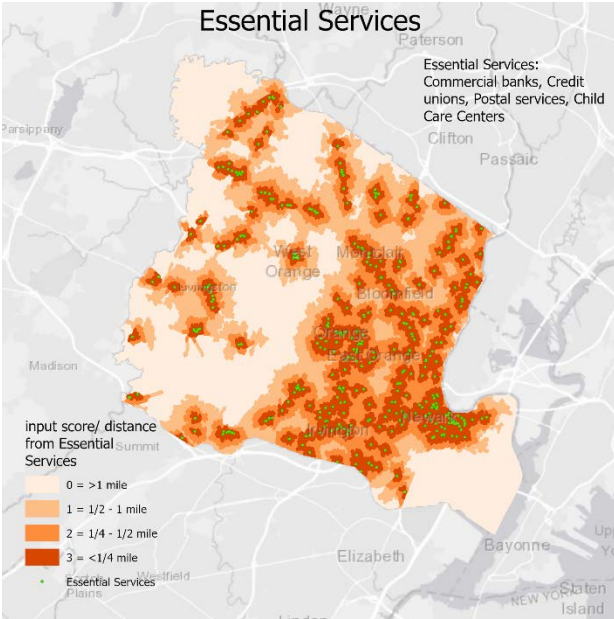
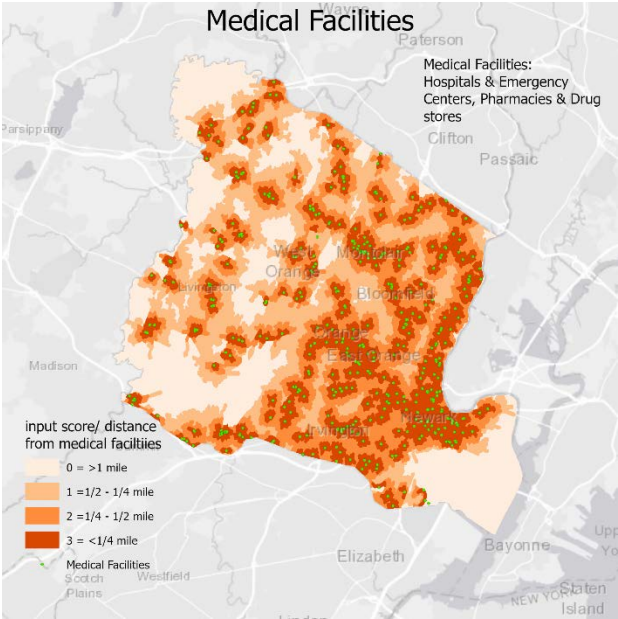
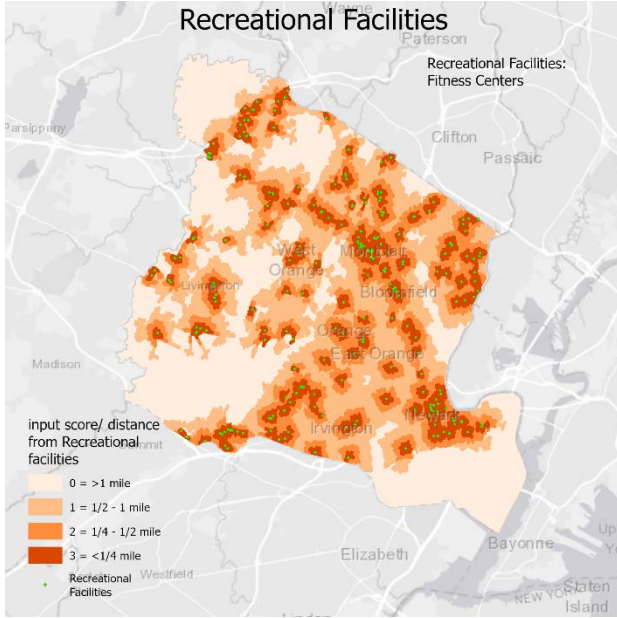
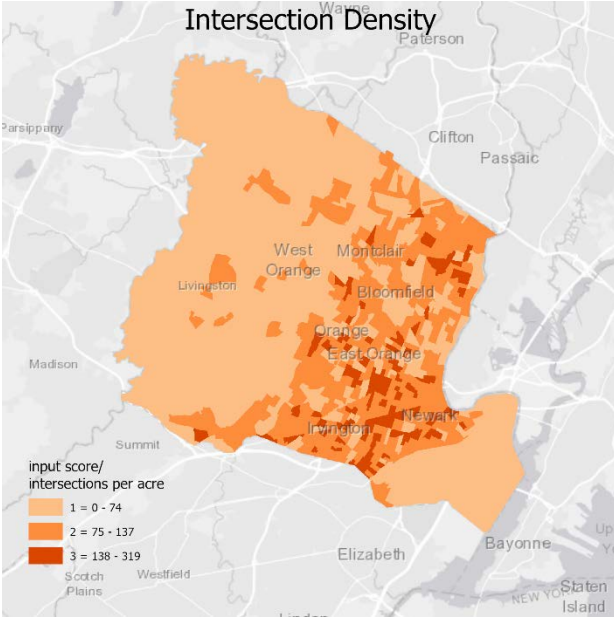
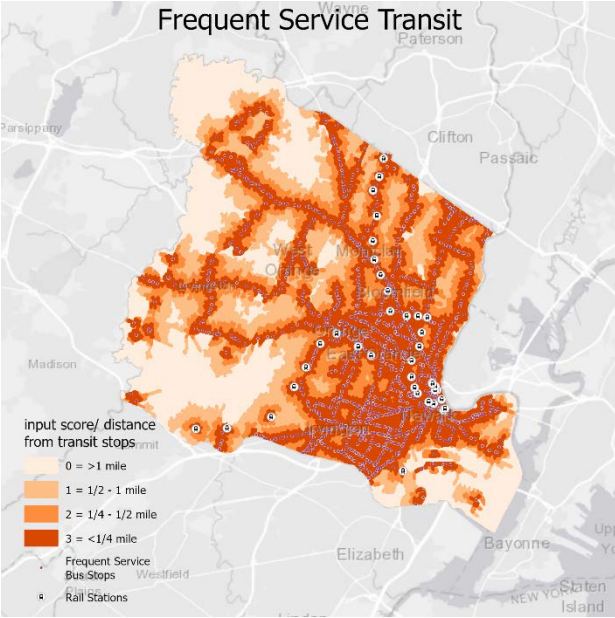
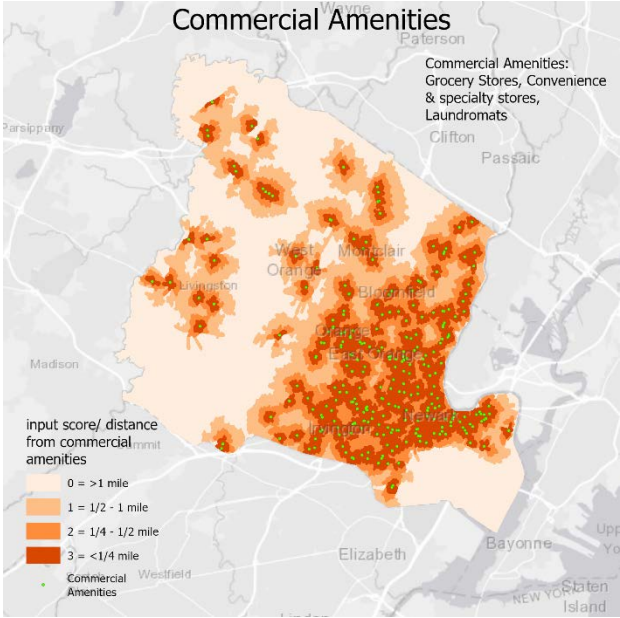
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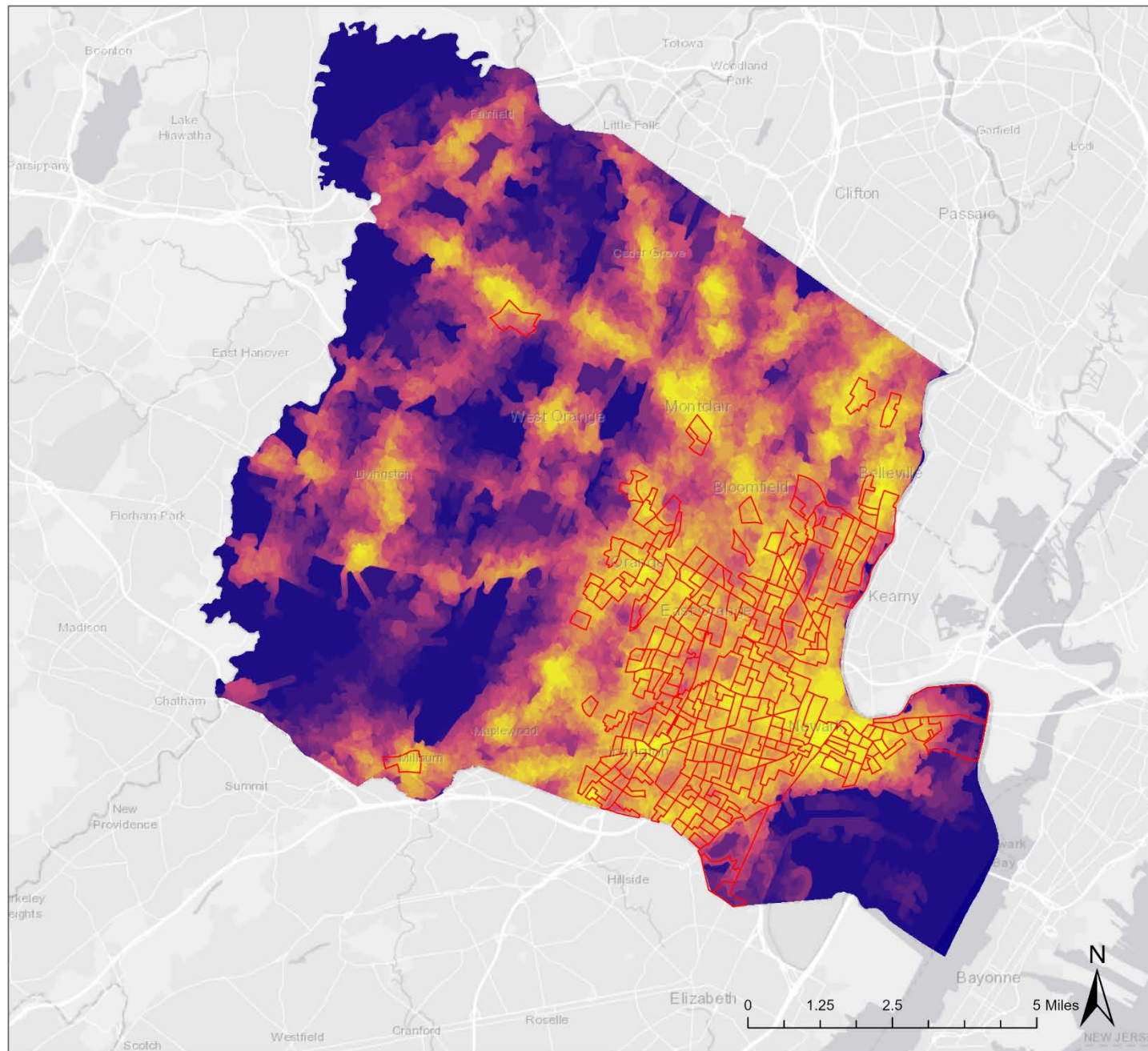
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# Measured Accessibility Analysis







# Accessibility

## Accessibility

Best Access

Moderate Access

Limited Access

Low Income Block Group

Data Source: NJGIN, ESRI Business Analyst, NJ Transit GTFS data, ESRI base map

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# Issues Forum #1

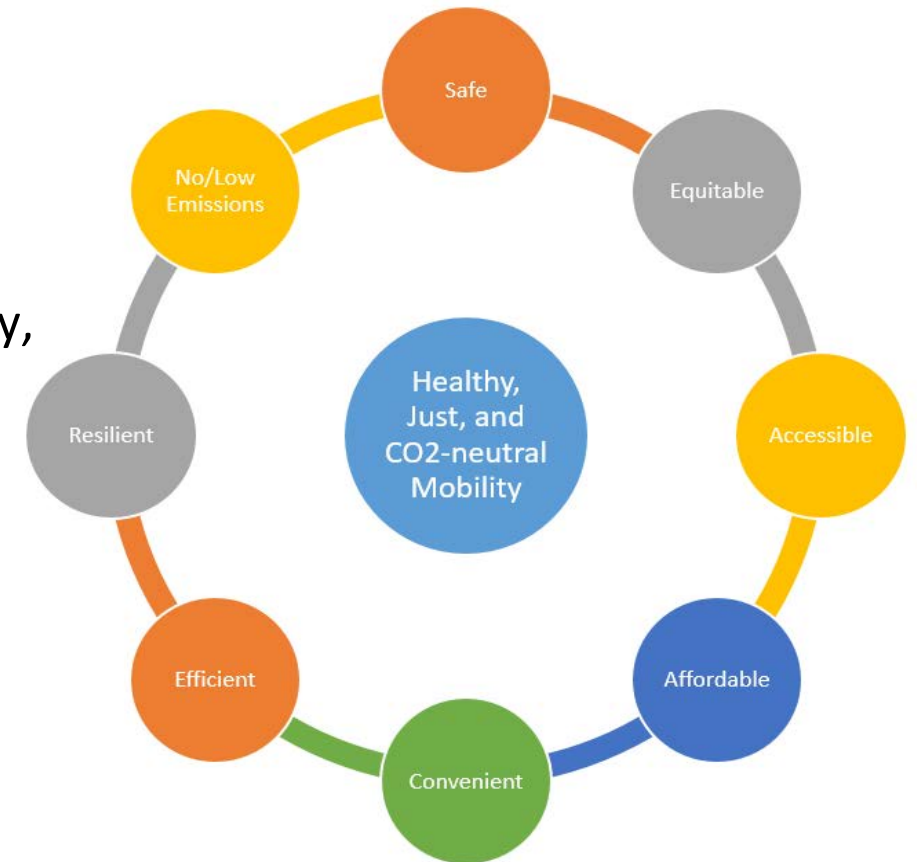
- **Objectives**

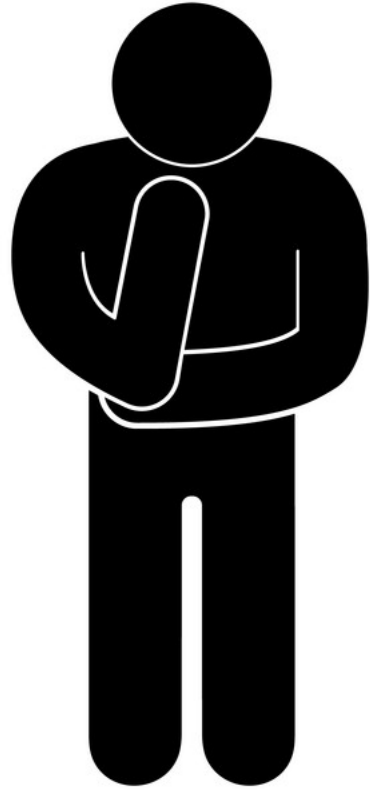
- Explore the components of the multi-goal framework
- Identify
  - Needs, concerns, and desired long-term outcomes
  - Performance measures
  - What needs to change
  - Potential obstacles and impediments to achieving healthy, just, resilient, and carbon-neutral mobility for all

- **Format**

- Plenary + breakouts
- Virtual or in-person depending on conditions

- **Timing** – Dec 2021- March 2022





Thoughts?  
Questions?  
Discussion?